Preliminary
Drainage Study
for
Keller Crossing - Tract Map No. 38163
@ Winchester Road (HWY-79)
in the
County of Riverside

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REVISED MARCH 2025

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INTRODUCTION

Project Site Description

Tract Map No. 38163, also known as Keller Crossing development project, consists of approximately 191.4 acres and proposes land uses that include single family residential, high density residential, park and open space areas. Winchester Road – Highway 79 improvement is part of Tract 38163 project. Topographic conditions on most of the project site consist of gentle rolling hills with a sloped rise in elevation from existing Keller Road to the northern edge boundary. The site is currently bounded by Pourroy Road to the west, Winchester Highway (HWY-79) to the east, and Keller Road to the south. The northerly boundary of the project adjoins areas that have been designated as Conservation Habitat which will remain undeveloped.

The Keller Crossing development is under the jurisdiction of Riverside County Flood Control & Water Conversation District (RCFC&WCD) and Riverside County Transportation District. The project runoff ultimately discharges into the Santa Margarita River in Temecula and has been determined, under the Regional MS4 Permit to be within the Santa Margarita Watershed Management Area of Riverside County. Therefore, RCFC&WCD is the Principal Permittee of the Santa Margarita MS4 Permit.

Keller Crossing development Drainage Plan addresses proper drainage and water quality mitigation for the proposed development and to be consistent with Riverside County Flood Control and Water Conservation District (RCFC&WCD) and Riverside County Transportation Department specific requirements. The existing pre-developed condition and post-developed condition of the project are analyzed to ensure minimal impact into adjoining communities and existing downstream storm drain infrastructures. Water quality mitigation has also been implemented to integrate with the overall drainage design of the entire project with the application of water quality basins and treatment structures - as the project has been designated to comply with Santa Margarita MS4 Permit and its specific requirements.

The existing pre-developed condition of the project displays the natural water courses of the site in which drainage water courses flow from the northerly higher elevation to south and southeasterly of the project which ultimately flow offsite toward and through several existing Caltrans reinforced concrete pipe (RCP) culvert-under-crossings along Winchester Road (Highway-79). A major drainage course, southwesterly of the project, conveys a significant tributary area runoff from the north and west areas of the site and surface-flows southeasterly across Pourroy Road and Keller Road. This water course continues southeasterly, adjacent to existing residential parcels, and crosses Winchester Road (Highway-79) via several Caltrans RCP culverts. Presently, there is no existing storm drain infrastructure on-site of the project and within Pourroy Road and Keller Road right of ways.
The existing Caltrans culverts capacity were analyzed and compared with the developed peak flows from Keller Project. The detention basins are proposed to mitigate the developed peak flows from Keller Project will be less than existing Caltrans culvert capacity.

This report identifies the existing drainage patterns for the off-site flows per Caltrans Drainage Report for State Route 79, EA-464121 and under full development conditions on-site flows. This is shown on the Hydrology Maps – Existing and Proposed Conditions in Figure 3 and Figure 4.

This report also analyses the drainage from the project in the proposed, post-developed condition. Calculations are provided to verify onsite storm water runoff, off-site runoff onto the property, if any, and the drainage facilities and post-project BMPs required to mitigate post-developed water quality and post-development increases and/or decreases in peak flow and volume runoff.

The water quality features for this project are described in the separate report, 'Project Specific Water Quality Management Report' for Tract Map No. 38163.

The Project Area is shown on the Vicinity Map in **Figure 1** and the Location Map in **Figure 2.**

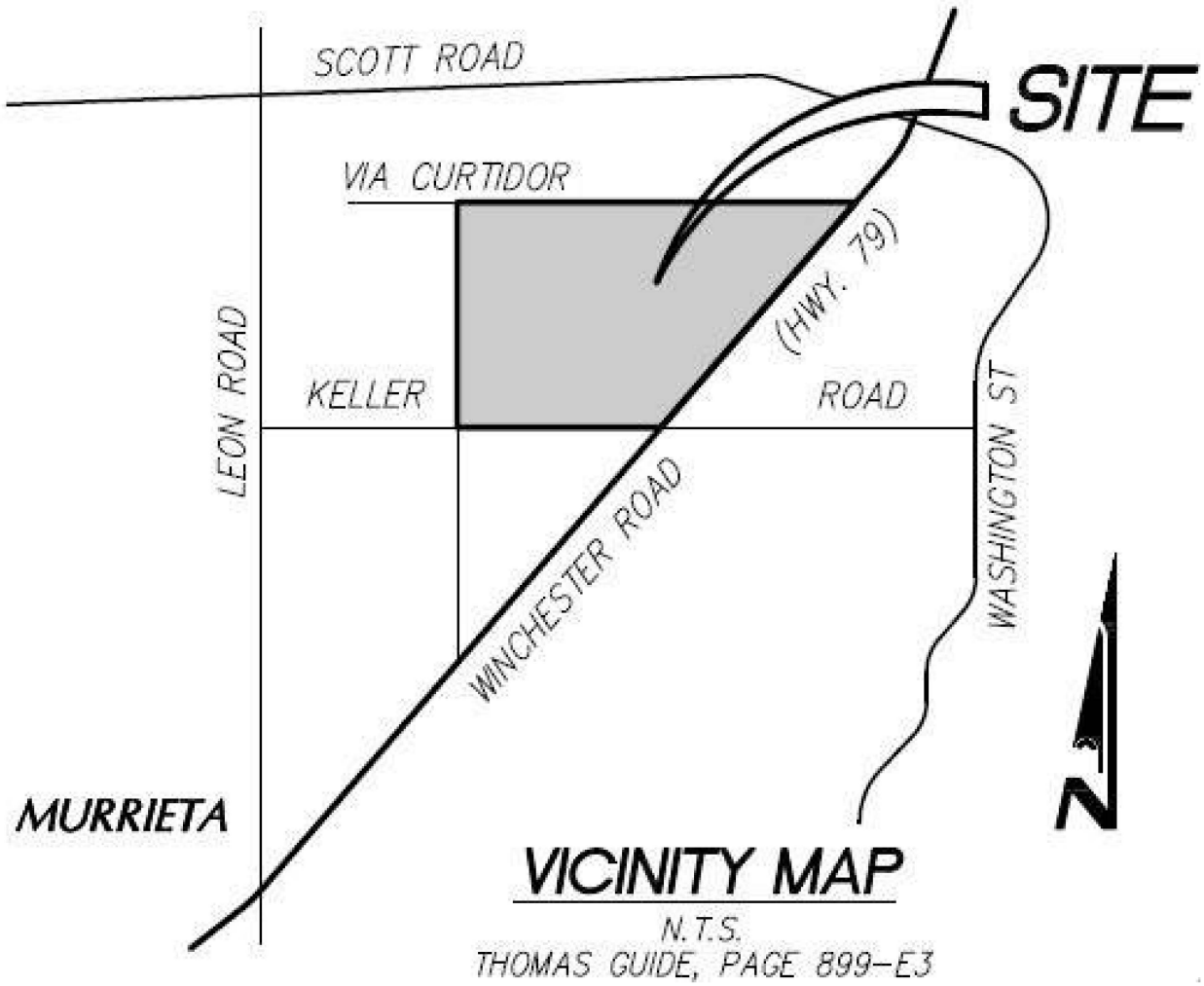


Figure1: Vicinity Map

Figure 2: Location Map (Aerial – Existing Condition)

Proposed Project

The Keller Crossing development project's proposed pipes and pick up points are designed to convey off-site and on-site runoffs into detention basins to attenuate their flows, and ultimately discharge into their existing pre-developed water courses. The proposed on-site pipe sizes vary from 18-inch to 42-inch which will be maintained by RCFC&WCD or Riverside County Transportation Department. There is no plan to increase the sizes of the existing Caltrans RCP culverts under Winchester Road (Highway-79).

A combination of water quality and detention basin is placed south of the proposed re-aligned Keller Road and north of existing Keller Road to mitigate the majority of proposed development water quality volume and to detain on-site runoff volume to ensure that post-development volume does not exceed pre-development volume. Attenuated flow from this basin will be conveyed through a 42-inch pipe southerly to the pre-developed natural course south of the project. All proposed basins and slopes surrounding them will be maintained by Valley-Wide Recreation and Park District. Pipes, inlet and outlet structures within the basins will be maintained by RCFC&WCD or Riverside County Transportation Department.

Post-construction water quality (WQMP) mitigation for the site will be managed by the one (1) WQ basin and two (2) WQ/detention basins which have water quality structural components to handle the required mitigation plus one (1) detention basin. Details of pre-treatment of all land use planning areas for the post-construction water quality mitigation will be addressed in the Final Water Quality Management Plan (FWQMP).

HYDROLOGY

The hydrology calculations for determining the on-site peak flows and time of concentration (Tc) have been determined using the Rational Method by the CivilCADD / CivilDesign Engineering Software Program.

The rational method relates rainfall intensity, the ratio of runoff to rainfall, and the drainage area size to the peak storm runoff and is expressed by the equation: Q = CIA.

Where Q = runoff (in cubic feet per second),

C = runoff coefficient relating the ratio of runoff to rainfall,

I = rainfall intensity (in inches per hour),

A = drainage area (in acres).

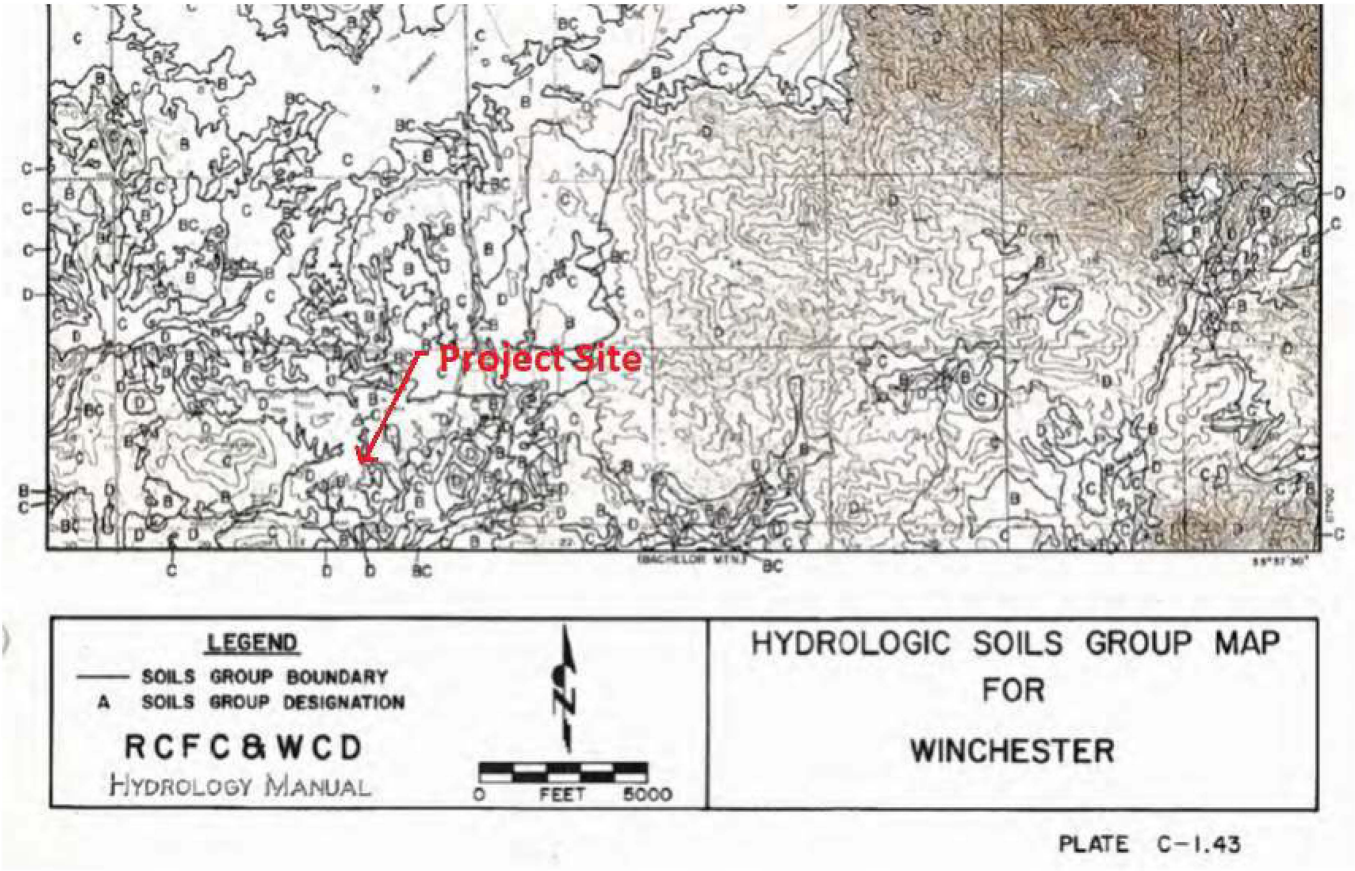
The soil type used in the analysis is mixed Type Soil B, C and D per Hydrologic Soils Group Map for Winchester, Plate C-1.43 RCFC & WCD Hydrology Manual.

Per Caltrans Drainage Report for State Route 79, EA-464121:

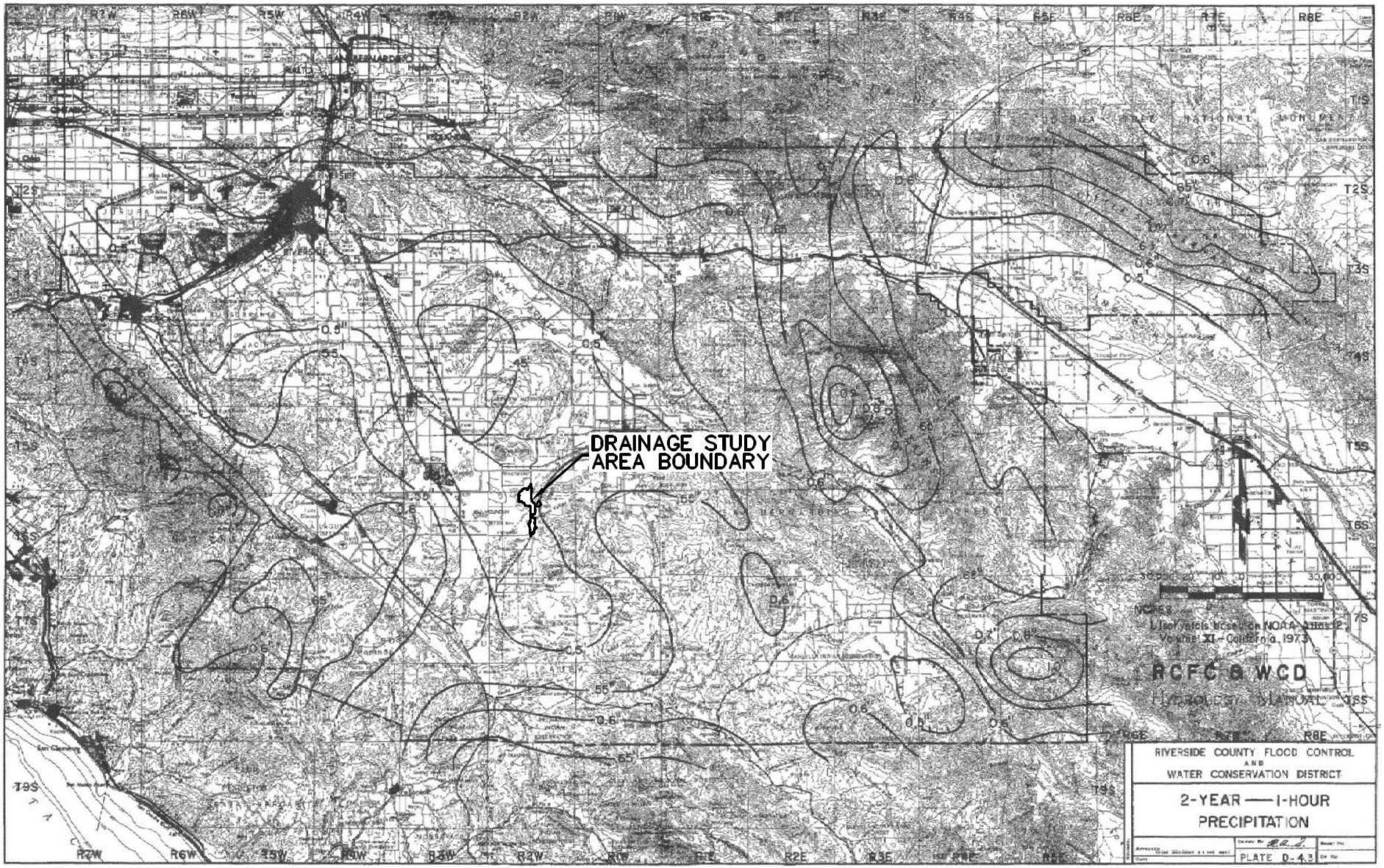
The following rainfall data used to determine the $Q_{(100)}$ Off-Site storm values (Informational Data Only): the 100 year, 1-hour intensity used was 1.20 (In/Hr), the 2 year, 1-hour intensity used was 0.50 (In/Hr) and the Slope of the Intensity Duration Curve of 0.55. The primary land use was assumed to be undeveloped with poor cover while a runoff coefficient of 0.90 was used for the improved road surface areas.

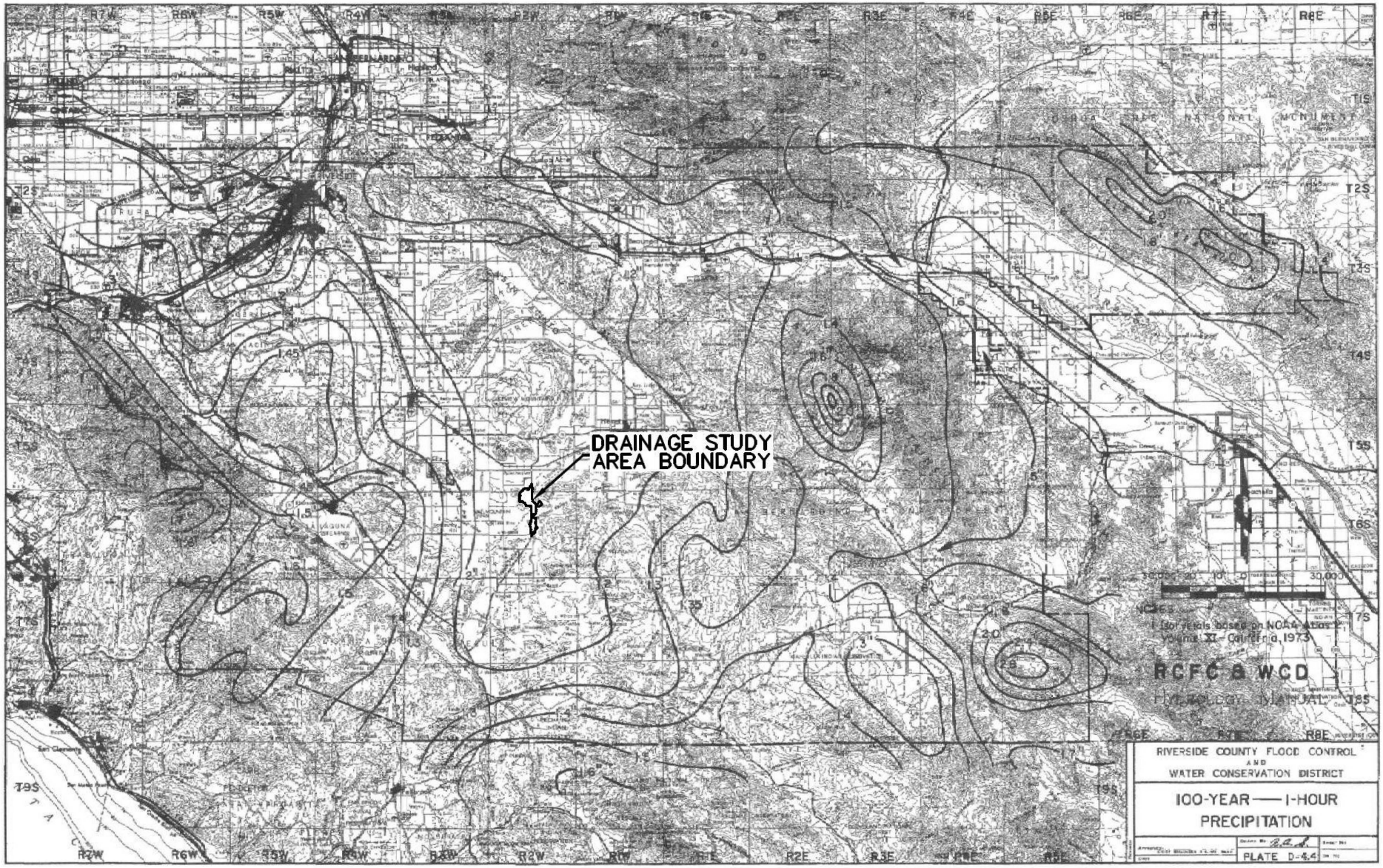
The rational method values were used for determining the pre-project (existing condition – 100-year storm) and post-project (proposed condition) peak discharges for the 100-year storm event.

The Hydrology Maps in **Figure 4** summarizes the results of the rational method hydrologic analysis, including drainage areas, subareas, node numbers, elevations and cumulative Q_{100} values at points of concentration or discharge in existing and proposed conditions.



Hydrologic Soils Group for the project site


DRAINAGE STUDY
AREA BOUNDARY
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.3


DRAINAGE STUDY
AREA BOUNDARY
RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.4

The design discharge in the various sub-drainage areas considered in this study are listed below:

Summary Hydrology – 100-year storm Existing Condition – Rational Method per Caltrans Drainage Report for State Route 79, EA-464121 **(see Attachment A for calculation):**

Existing Downstream Drainage Facility (Caltrans Drainage System – DS#):

Drainage Area	Area in Acre	Q_{100} conf. in cfs	Q_{100} MAX. in cfs	Caltrans Culvert Drainage System
A	9.10	20.41	81.4	DS #1
B	21.70	41.06	41.1 *)	DS #2
C	286.00	548.37	237.9	DS #3
D	29.40	76.93	18.0	DS #4
E	54.80	106.57	14.0	DS #5
F	13.00	31.58	18.7	DS #6
G	6.20	16.32	19.5	DS #7
H	58.60	132.30	350.9	DS #8
I	1.80	5.85	30.9	DS #9
J	7.80	21.11	95.5	DS #10
K	14.50	38.71	56.3 *)	DS #11

*) Used for wildlife crossing

TABLE OF PROPOSED SYSTEM DESIGN VALUES

Drainage System	Existing Pipe Size and Type English (Metric)	Proposed Pipe Size and Type English (Metric)	Station (metric)	D Size (ft)	A (ft2)	S (ft/ft)	n	Wetted Permiter (AP)	R (assume 100% full) A/AP	Q (max) cfs	V(max) ft/s	Q (100)*** cfs	V*** ft/s
1	42 " (1050 mm) CMP	42 " (1050 mm) CSP	165+44.866	3.5	9.62	2.22	0.24	11.00	0.875	81.4	8.46	20.4	9.58
2	84 " (2135 mm) CMP	84 " (2100 mm) RCP	168+92.190	7	38.48	1.16	0.13	21.99	1.75	41.1*	8.84*	41.1	8.84
3	60 " (1500 mm) CMP	60 " (1500 mm) RCP	170+51.318	5	19.63	0.83	0.13	15.71	1.25	237.9	12.12	548.4	12.21
4	24 " (600 mm) CMP	24 " (600 mm) AP	172+76.365	2	3.14	2.14	0.24	6.28	0.5	18.0	5.72	76.9	11.51
5	18 " (450 mm) CMP	24 " (600 mm) RCP	175+17.896	2	3.14	0.38	0.13	6.28	0.5	14.0	4.45	106.6	10.41
6	18 " (450 mm) CMP	24 " (600 mm) RCP	176+86.952	2	3.14	0.68	0.13	6.28	0.5	18.7	5.95	31.6	7.50
7	18 " (450 mm) CMP	24 " (600 mm) AP	178+91.951	2	3.14	2.53	0.24	6.28	0.5	19.5	6.22	16.3	8.67
8	84 " (2134 mm) CMP	84 " (2100 mm) RCP	180+30.829	7	38.48	0.30	0.13	21.99	1.75	350.9	9.12	132.3	11.83
9	18 " (450 mm) CMP	24 " (600 mm) AP	182+44.948	2	3.14	6.34	0.24	6.28	0.5	30.9	9.85	5.8	8.33
10	36 " (900 mm) CMP	36 " (900 mm) AP	183+77.789	3	7.07	6.95	0.24	9.42	0.75	95.5	13.51	21.1	11.72
11	84 " (2135 mm) CMP	84 " (2100 mm) RCP	186+20.636	7	38.48	3.82	0.13	21.99	1.75	56.3*	12.0*	56.3	12.00
12	24 " (600 mm) CMP	24 " (600 mm) AP	187+12.491	2	3.14	1.88	0.24	6.28	0.5	16.8	5.36	11.4	8.79
13	24 " (600 mm) CSP	24 " (600 mm) CSP	190+14.141	2	3.14	4.33	0.24	6.28	0.5	25.6	8.14	18.2	8.79
14	42 " (1050 mm) CSP	42 " (600 mm) CSP	190+89.283	3.5	9.62	2.81	0.24	11.00	0.875	91.6	9.52	69.9	12.54
15	36 " (900 mm) AP	36 " (36 mm) AP	238+49.866	Covered under Project 1 (EA 464611 Drainage Report)						18.9**	8.12**	18.9	8.12
16	6'x3' (1830mmx915mm) RCB	6'x3' (1830mmx915mm) RCB	239+64.212	Covered under Project 1 (EA 464611 Drainage Report)						111.4**	10.56**	111.4	10.56
17	24 " (600 mm) CSP	24 " (600 mm) CSP	136+80.829	2	3.14	1.58	0.24	6.28	0.5	15.4	4.91	N/A - Pipe Extension	
18	24 " (600 mm) CSP	24 " (600 mm) CSP	138+59.920	2	3.14	2.50	0.24	6.28	0.5	19.4	6.18	N/A - Pipe Extension	
19	84 " (2100 mm) CSP	84 " (2100 mm) CSP	151+42.54	7	38.48	1.81	0.24	21.99	1.75	466.9	12.13	N/A - Pipe Extension	
20	84 " (2100 mm) CSP	84 " (2100 mm) CSP	155+16.000	7	38.48	1.66	0.24	21.99	1.75	447.1	11.62	N/A - Pipe Extension	

* Q(100) used. Drainage System is used as a wildlife crossing and is oversized (existing and proposed).

** Covered under Project 1 (EA 464611 Drainage Report)

*** Informational Data Only, See Appendix G and I.

Summary Hydrology – 10-year storm Ultimate Condition – Rational Method, WITHOUT Detention Basins (see Attachment B for calculation):

Drainage Area	Area in Acre	Q_{10} sub-area in cfs	Q_{10} conf. in cfs
A	9.10	12.5 *)	
B	21.70	25.0 *)	
C-1	9.20	13.73	
C-2	30.20	37.08	50.81
C-3	5.00	8.59	
C-4	16.40	22.09	30.68
C-5	6.30	11.10	
C-6	24.40	32.93	44.03
	Node 307	Conf. =	74.47
C-7	3.30	4.27	78.74
	Node 308	Conf. =	125.83
C-8	41.80	47.76	173.59
C-9	7.60	13.93	
C-10	48.80	77.20	91.12
	Node 311	Conf. =	242.57
C-11	11.60	13.05	255.61
C-12 Debris/Detention Basin C	5.10	4.84	260.45
C-13	0.90	1.40	261.44
C-14	4.00	4.08	265.51
	Node 315	**Conf. =**	**265.51**
C-15	4.70	7.04	
C-16	2.80	4.06	11.09
C-17	3.60	5.17	16.27
C-18	2.40	3.32	19.58
C-19	3.90	5.30	24.88
C-20	2.40	3.22	28.10
C-21	2.40	3.18	31.27
C-22	5.30	7.07	38.35
C-23	3.20	4.42	42.77
C-24	3.40	4.80	47.56
C-25	6.10	8.03	55.59
C-26 WQ/Detention Basin C	5.30	5.30	60.89
C-27	3.70	6.10	
C-28	7.50	11.67	17.77
C-29	3.70	6.17	
C-30	2.90	4.74	10.91
	Node 332	Conf. =	28.34
C-31	3.50	5.45	33.79
C-32	3.00	4.75	38.54
C-33	6.50	11.34	
C-34	11.50	16.67	28.01
C-35	2.40	3.55	31.56
	Node 328	Conf. =	121.35

C-36	2.10	2.68	124.03
	Node 315	**Conf. =**	**378.25**
C-37	5.50	5.55	383.80
D	8.0	10.98	
E-1	2.30	5.24	
E-2 WQ Basin E	0.70	1.40	6.64
F-1	8.5	12.35	
F-2	16.9	22.21	34.56
F-3	13.0	14.99	49.55
F-4 Detention Basin F	2.9	2.73	52.27
F-5	7.2	12.06	
F-6	6.6	10.70	22.76
F-7	1.5	2.55	25.32
F-8	0.9	1.52	26.84
	Node 605	Conf. =	71.79
F-9	1.7	2.01	73.80
G-1 WQ/Detention Basin G	5.3	12.46	
G-2	1.7	3.95	16.41
H-1	6.6	10.06	
H-2	14.8	19.28	29.34
H-3	8.8	15.12	
H-4	13.9	22.16	37.28
H-5	11.1	15.45	52.73
		Conf. =	79.13
H-6	2.3	3.07	82.20
I-1	1.8	3.6 *)	

*) No change, the same with existing condition

Summary Hydrology – 100-year storm Ultimate Condition – Rational Method, WITHOUT Detention Basins (see Attachment B for calculation):

Drainage Area	Area in Acre	Q_{100} sub-area in cfs	Q_{100} conf. in cfs
A	9.10	20.41 *)	
B	21.70	41.06 *)	
C-1	9.20	22.52	
C-2	30.20	63.40	85.91
C-3	5.00	13.85	
C-4	16.40	37.25	51.11
C-5	6.30	17.89	

C-6	24.40	55.76	73.65
	Node 307	Conf. =	124.16
C-7	3.30	7.31	131.46
	Node 308	Conf. =	209.82
C-8	41.80	83.55	293.55
C-9	7.60	22.74	
C-10	48.80	128.00	150.74
	Node 311	Conf. =	409.94
C-11	11.60	22.76	432.70
C-12 Debris/Detention Basin C	5.10	9.42	442.13
C-13	0.90	1.74	443.86
C-14	4.00	7.29	451.16
	Node 315	**Conf. =**	**451.16**
C-15	4.70	11.26	
C-16	2.80	6.55	17.81
C-17	3.60	8.38	26.19
C-18	2.40	5.42	31.61
C-19	3.90	8.68	40.29
C-20	2.40	5.29	45.58
C-21	2.40	5.22	50.81
C-22	5.30	11.56	62.37
C-23	3.20	7.04	69.40
C-24	3.40	7.51	76.91
C-25	6.10	13.15	90.06
C-26 WQ/Detention Basin C	5.30	10.07	100.13
C-27	3.70	9.81	
C-28	7.50	19.18	28.99
C-29	3.70	9.90	
C-30	2.90	7.61	17.51
	Node 332	Conf. =	46.00
C-31	3.50	8.82	54.82
C-32	3.00	7.43	62.25
C-33	6.50	17.73	
C-34	11.50	26.98	44.71
C-35	2.40	5.64	50.35
	Node 328	Conf. =	197.75
C-36	2.10	4.27	202.02
	Node 315	**Conf. =**	**638.65**
C-37	5.50	9.84	648.49
D	8.0	19.91	
E-1	2.30	8.08	
E-2 WQ Basin E	0.70	2.37	10.45
F-1	8.5	20.10	
F-2	16.9	36.87	56.97
F-3	13.0	25.37	82.34
F-4	2.9	5.15	87.50

Detention Basin F			
F-5	7.2	19.29	
F-6	6.6	17.21	36.50
F-7	1.5	3.95	40.46
F-8	0.9	2.37	42.82
	Node 605	Conf. =	119.35
F-9	1.7	3.21	122.56
G-1 WQ/Detention Basin G	5.3	19.90	
G-2	1.7	6.08	25.98
H-1	6.6	16.45	
H-2	14.8	32.21	48.66
H-3	8.8	24.39	
H-4	13.9	36.20	60.58
H-5	11.1	25.77	86.35
		Conf. =	129.79
H-6	2.3	5.23	135.01
I-1	1.8	5.85 *)	

*) No change, the same with existing condition

Summary Hydrology, 100-year storm Ultimate Condition – Rational Method, WITH Detention Basins C, E, F and G:
See Rational Method with Detention Basin Outflows (using "User Input" for Detention Basin outflow, for 100-yr 1-hr and 100-yr 6-hr storm frequency) in Attachment J.

Confluence with Basin Outflow for 100-year 1-hour storm:

Drainage Area	Area in Acre	Q_{100} sub-area in cfs	Q_{100} conf. in cfs	Existing Caltrans Culvert ($Q_{100yr\ 1\text{-}hr}$ MAX in cfs)
A	9.10	20.41 *)		81.4
B	21.70	41.06 *)		41.1 **)
*) No change, the same with existing conditions **) Used for wildlife crossing				
Debris/Det. Basin "C" (off-site)	**209.1 Ac**	**Inflow (100yr-1hr) = 417.913 cfs**		
	Basin C (off-site) Outflow =	**62.551 cfs**		
C-13	0.90	0.74	63.29	
C-14	4.00	3.22	66.51	
	Node 315	**Conf. =**	**66.51**	
WQ/Det. Basin "C" (on-site)	**91.8 Ac**	**Inflow (100yr-1hr) = 257.785 cfs**		
	Basin C (on-site) Outflow =	**17.640 cfs**		
C-36	2.1	1.90	19.54	
	Node 315	**Conf. =**	**85.03**	
C-37	5.5	4.38	**89.41**	(DS #3) 237.9
D	8.0	17.78		(DS #4) 18.0
E-1	2.30	8.08		
E-2	**WQ Basin E "Residential" Drainage Area F**	Q max. = 9.7 cfs	**12.16**	(DS #5) 14.0
F-1 thru F-8 59.0 Ac	**Detention Basin F**	**Inflow (100yr-1hr) = 1124.84 cfs**		
	Basin F Max Outflow =	**12.798 cfs**		
F-8	1.7	1.48	**14.28**	(DS #6) 18.7
G-1 5.5 Ac	**WQ/Detention Basin G**	**Inflow (100yr-1hr) = 20.52 cfs**		
	Basin G Max Outflow =	**5.38 cfs**		
G-2	1.7	1.80	**7.18**	(DS #7) 19.5

Confluence with Basin Outflow for 100-year 6-hour storm:

Drainage Area	Area in Acre	Q_{100} sub-area in cfs	Q_{100} conf. in cfs	Existing Caltrans Culvert **($Q_{100yr\ 1\text{-}hr}$ MAX in cfs)**
A	9.10	20.41 *)		81.4
B	21.70	41.06 *)		41.1 **)
*) No change, the same with existing conditions **) Used for wildlife crossing				
Debris/Det. Basin "C" (off-site)	**209.1 Ac**	**Inflow (100yr-6hr) = 417.913 cfs**		
	Basin C (off-site) Outflow =	**66.981 cfs**		
C-13	0.90	0.31	67.29	
C-14	4.00	1.37	68.67	
	Node 315	**Conf. =**	**68.67**	
WQ/Det. Basin "C" (on-site)	**91.8 Ac**	**Inflow (100yr-6hr) = 116.935 cfs**		
	Basin C (on-site) Outflow =	**70.119 cfs**		
C-36	2.1	0.84	70.96	
	Node 315	**Conf. =**	**136.12**	
C-37	5.5	1.94	**138.07**	(DS #3) 237.9
D	8.0	17.78		(DS #4) 18.0
E-1	2.30	8.08		
E-2	**WQ Basin E "Residential" Drainage Area F**	Q max. = 9.7 cfs	**12.16**	(DS #5) 14.0
F-1 thru F-8 59.0 Ac	**Detention Basin F**	**Inflow (100yr-6hr) = 69.30 cfs**		
	Basin F Max Outflow =	**13.715 cfs**		
F-9	1.7	0.66	**14.38**	(DS #6) 18.7
G-1 5.5 Ac	**WQ/Detention Basin G**	**Inflow (100yr-1hr) = 20.52 cfs**		
	Basin G Max Outflow =	**5.38 cfs** (100yr-1hr)		
G-2	1.7	1.80	**7.18**	(DS #7) 19.5

Summary Existing Caltrans Drainage System #2 through #9:

Drainage System No.	Station	Existing Culvert Size	Proposed Culvert	Proposed Improvement
2	168+92.190	84" (2135mm) CMP	84" (2135mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area B). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. This drainage system is used as a wildlife crossing and is oversized. The drainage culvert will be replaced with a 84" (2100 mm) on a slope of -0.0116. $Q_{(100)}$ = 41.1 cfs; Outlet Velocity = 8.84 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 41.1 cfs.
3	170+51.318	60" (1500mm) CMP	60" (1500mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area C). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 60" (1500 mm RCP) on a slope of -0.0083. $Q_{(max)}$ = 237.9 cfs; Outlet Velocity = 12.12 ft/s; 1/2T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 548.4 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to an 8'x4' (2400mmx1200mm) RCB. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with one of the equivalent size pipe.
4	172+76.365	24" (600mm) CMP	24" (600mm) AP	Existing flows are conveyed from west to east (Drainage Sub Area D). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24" (600mm) AP on a slope of -0.0214. $Q_{(max)}$ = 18.0 cfs; Outlet Velocity = 5.72 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 76.9 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to a 48" (1200mm) AP. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with one of the equivalent size pipe.
5	175+17.896	18" (450mm) CMP	24" (600mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area E). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24" (600mm) RCP on a slope of -0.0038. $Q_{(max)}$ = 14.0 cfs; Outlet Velocity = 4.45 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 106.6 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to a 6'x3' (1830mmx915mm) RCB. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with a 24" (600mm) RCP per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet a minimum diameter of pipe of 24" (600mm) will be used.

Drainage System No.	Station	Existing Culvert Size	Proposed Culvert	Proposed Improvement
6	176+86.952	18" (450mm) CMP	24" (600mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area F). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24" (600mm) RCP on a slope of -0.0068. $Q_{(max)}$ = 18.7 cfs; Outlet Velocity = 5.95 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 31.6 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to a 3-24" (3-600mm) RCP. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with a 24" (600mm) RCP per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet a minimum diameter of pipe of 24" (600mm) will be used.
7	178+91.951	18" (450mm) CMP	24" (600mm) AP	Existing flows are conveyed from west to east (Drainage Sub Area G). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24" (600mm) AP on a slope of -0.0253. $Q_{(max)}$ = 19.5 cfs; Outlet Velocity = 6.22 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing will not, but the proposed culvert will convey a $Q_{(100)}$ of 16.3 cfs. Per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet a minimum diameter of pipe of 24" (600mm) will be used.
8	180+30.829	84" (2135mm) CMP	84" (2100mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area H). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. This drainage system is used as a wildlife crossing and is oversized. The drainage culvert will be replaced with a 84" (2100mm) RCP on a slope of -0.0030. $Q_{(max)}$ = 350.9 cfs; Outlet Velocity = 9.12 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 132.3 cfs.
9	182+44.948	18" (450mm") CMP	24" (600mm) AP	Existing flows are conveyed from west to east (Drainage Sub Area I). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24" (600mm) AP on a slope of -0.0634. $Q_{(max)}$ = 30.9 cfs; Outlet Velocity = 9.85 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. Per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet, a minimum diameter of pipe of 24" (600mm) will be used. The existing and proposed culvert will convey a $Q_{(100)}$ of 5.8 cfs.

HYDROGRAPHS

Unit Hydrograph Analysis

The unit hydrograph analysis was conducted using the CivilDesign Corporation Unit Hydrograph software and the Riverside County Hydrology Manual. In this study analysis, the goal was to estimate the quantity of storm water to be detained onsite to mitigate the increase in storm water peak discharge and volume resulting from this development. The 1-hour, 3-hour, 6-hour and 24-hour 100-year storms hydrographs were computed to evaluate the project peak runoff discharge originating from the site for ultimate/proposed conditions.

For sensitive analysis 1-hour, 3-hour, 6-hour and 24-hour 2-, 5-, 10- and 100-year storms hydrographs were computed and compared the basin outflows with the existing conditions.
The ultimate condition-project hydrographs will be used as inflow hydrograph in detention basin routing with restricted outlet structure works.

The following rainfall data used to determine the $Q_{(100)}$ Off-Site storm values (Informational Data Only): the 100 year, 1-hour intensity used was 1.20 (In/Hr), the 2 year, 1-hour intensity used was 0.50 (In/Hr) and the Slope of the Intensity Duration Curve of 0.55. The primary land use was assumed to be undeveloped with poor cover while a runoff coefficient of 0.90 was used for the improved road surface areas.

```
              Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
      Rational Hydrology Study         Date: 06/02/10  File:sr79a.out
--------------------------------------------------------------------------
 **********   Hydrology Study Control Information **********

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

--------------------------------------------------------------------------
Darrin Ginn, Murrieta, California - S/N   874
--------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Homeland-Winchester ] area used.
10 year storm 10 minute intensity =  2.030(In/Hr)
10 year storm 60 minute intensity =  0.800(In/Hr)
100 year storm 10 minute intensity =  3.050(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)
```

Per Caltrans Hydrology (existing conditions) information above, for Rational Method proposed conditions: Rainfall Intensity for 2-year 1-hour storm = 0.50 in/hr and for 100-year 1-hour storm = 1.20 in/hr.

For Inflow Hydrograph, the rainfall intensity per table below:
Summary of Precipitation – Intensity Pattern per Riverside County Hydrology Manual (NOAA Atlas 2), also to match Caltrans Hydrology Existing Condition:

Storm Event	***1-hour***	***3-hour***	***6-hour***	***24-hour***
2-year	0.5	0.77	0.95	1.55
100-year	1.2	1.77	2.45	4.05

ACTUAL IMPERVIOUS COVER

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

Notes:

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

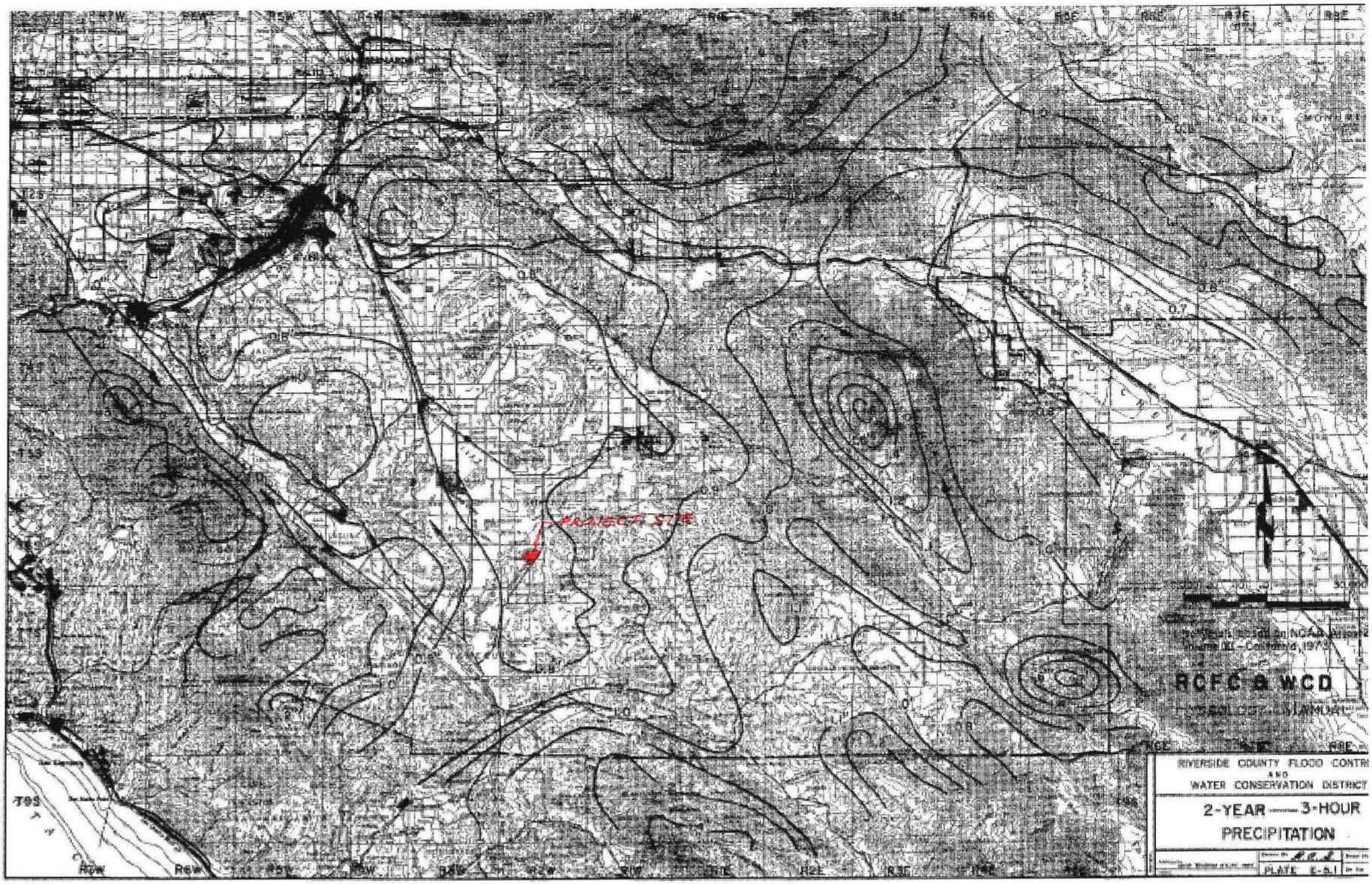
2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some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

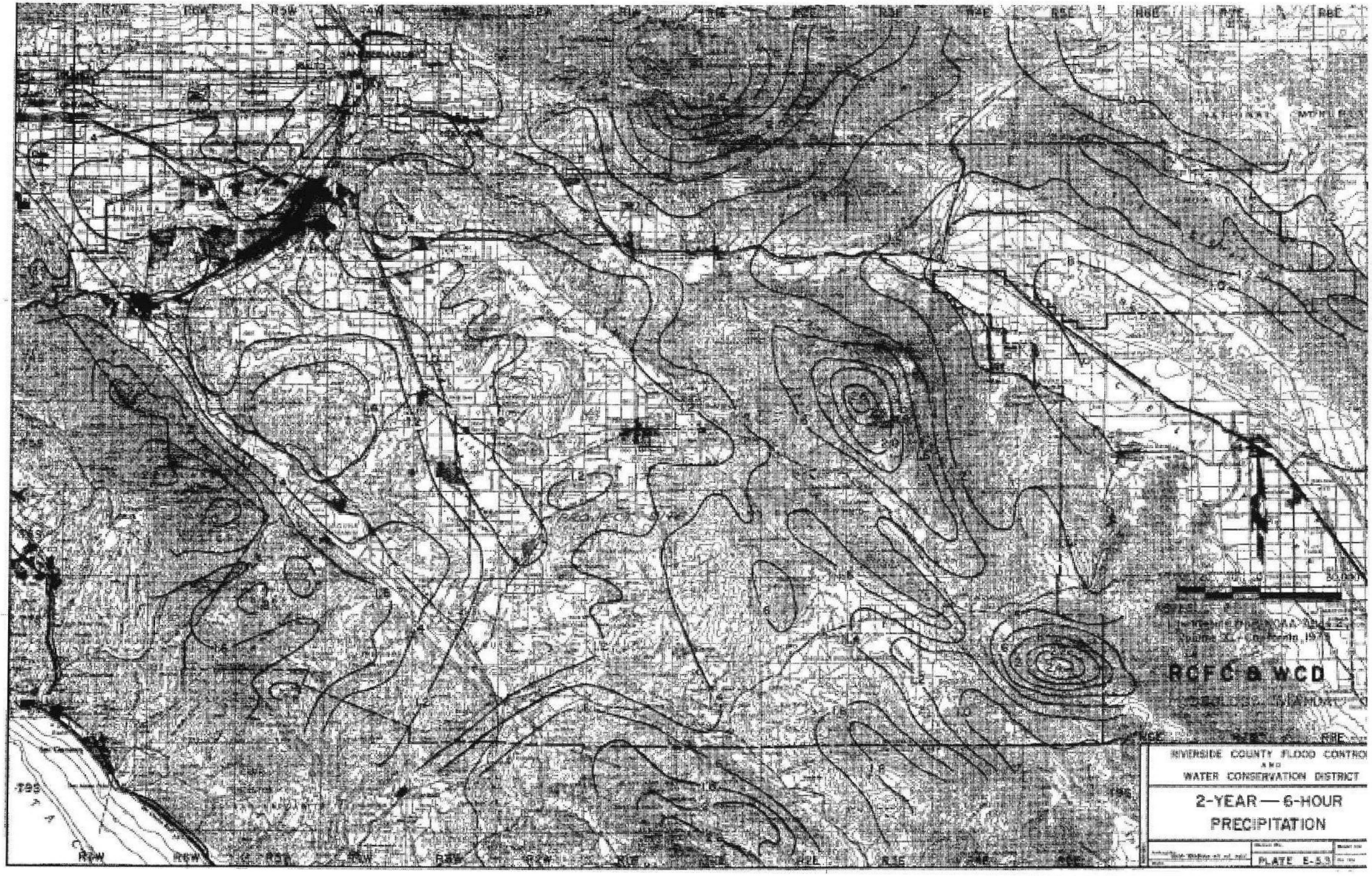
3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

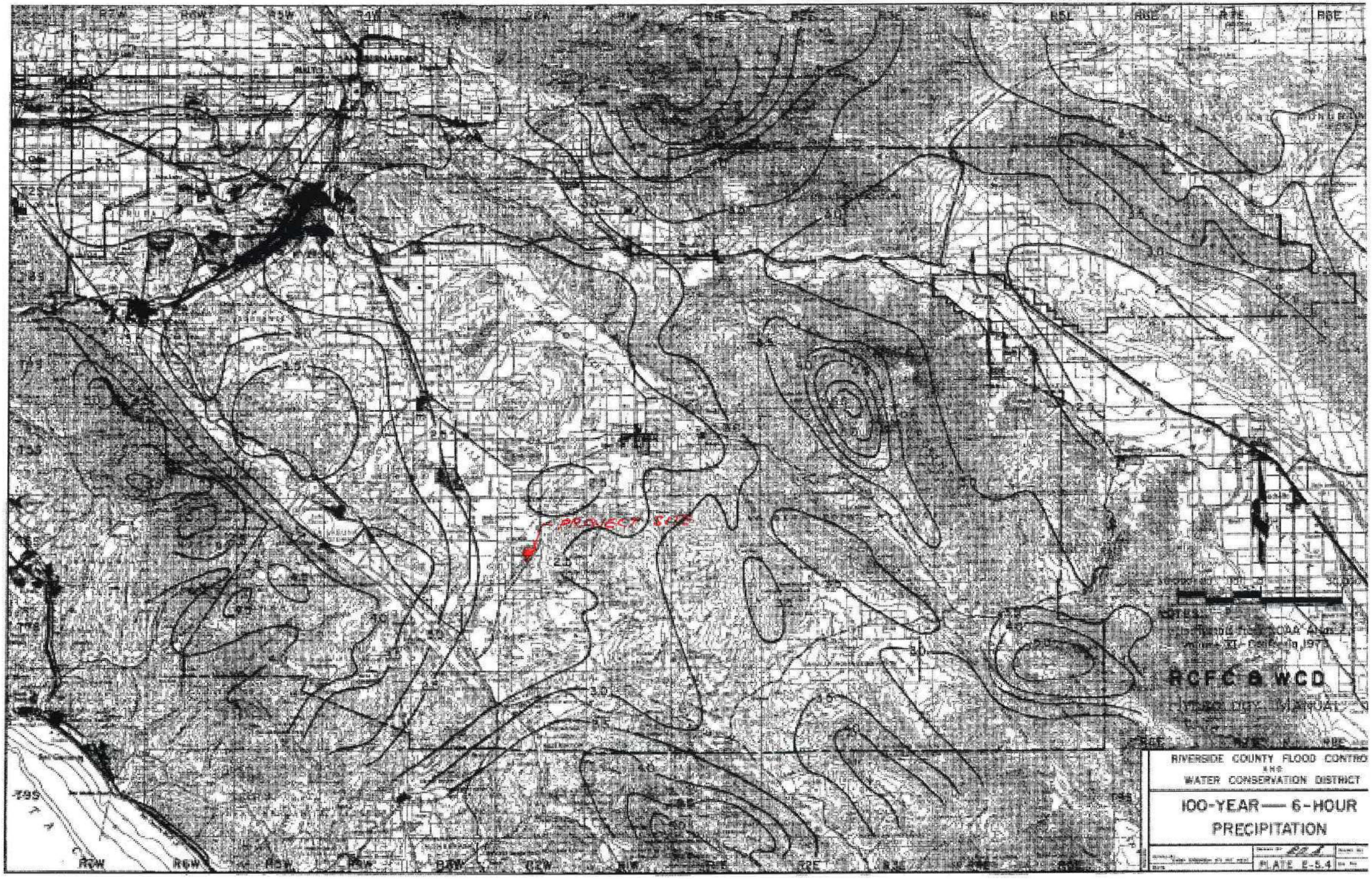
RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE D-5.6


PROJECT SITE
RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTR
AND
WATER CONSERVATION DISTRICT
2-YEAR — 3-HOUR
PRECIPITATION
PLATE E-5.1


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 6-HOUR
PRECIPITATION
PLATE E-5.3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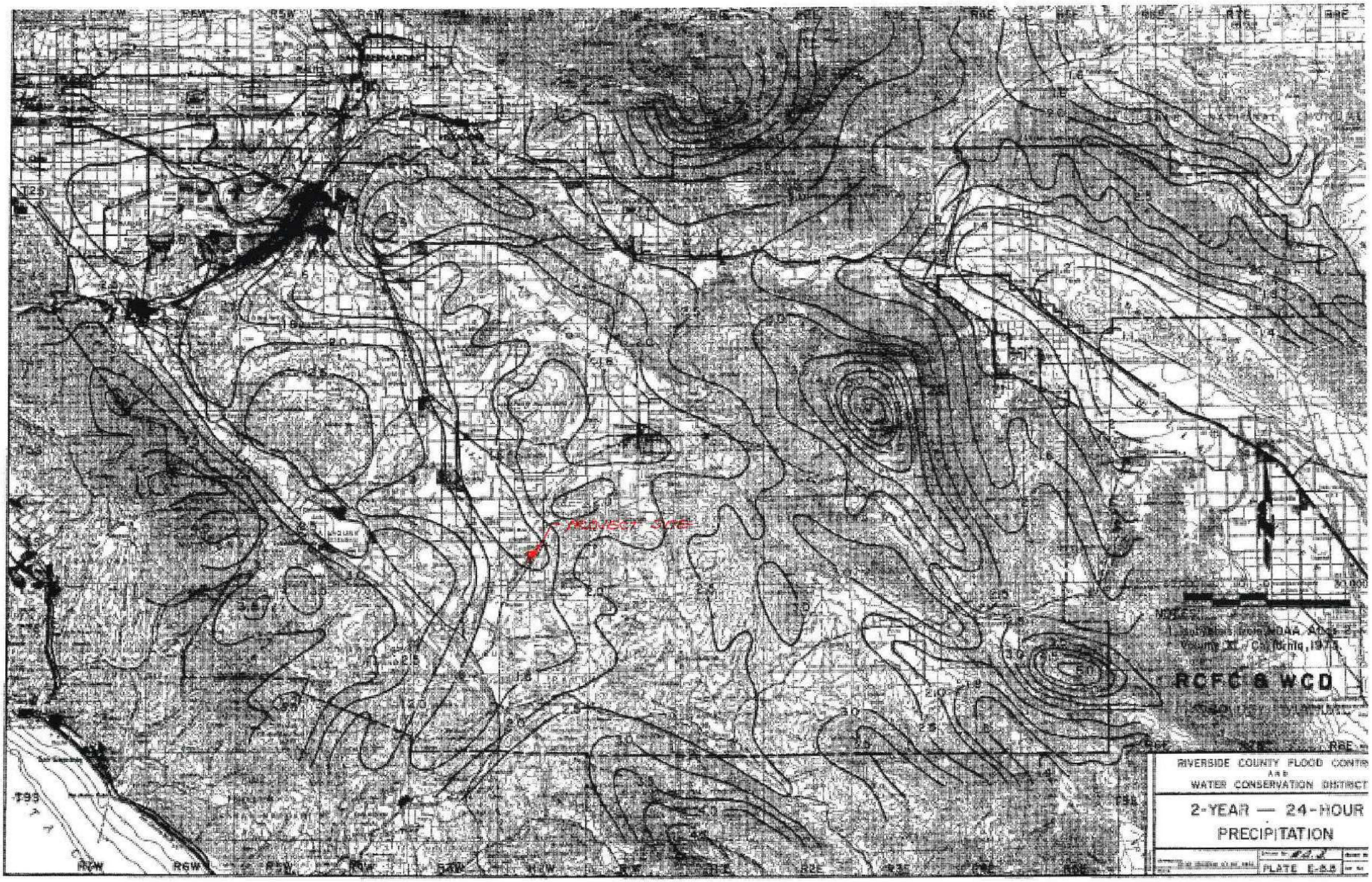
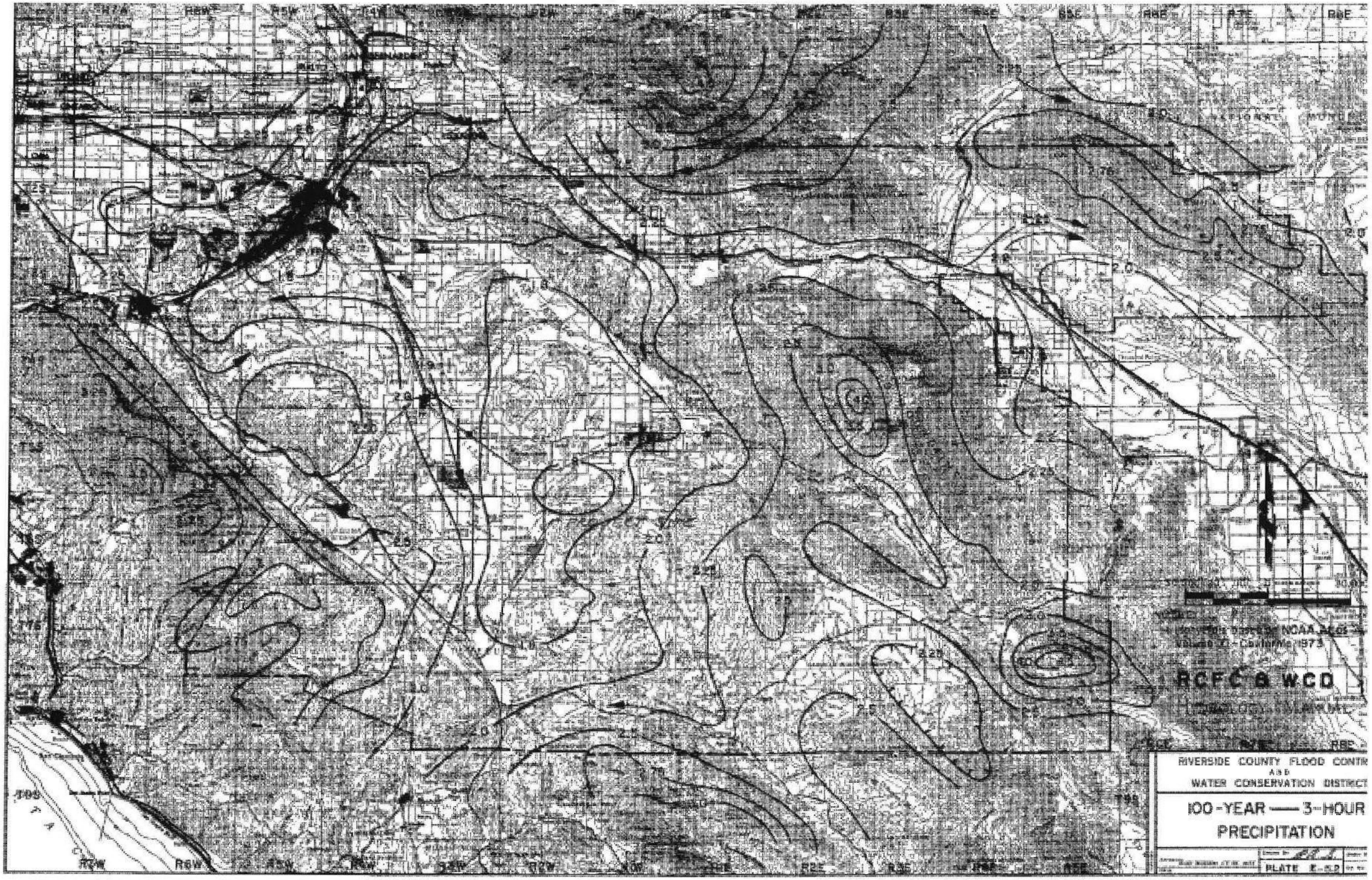
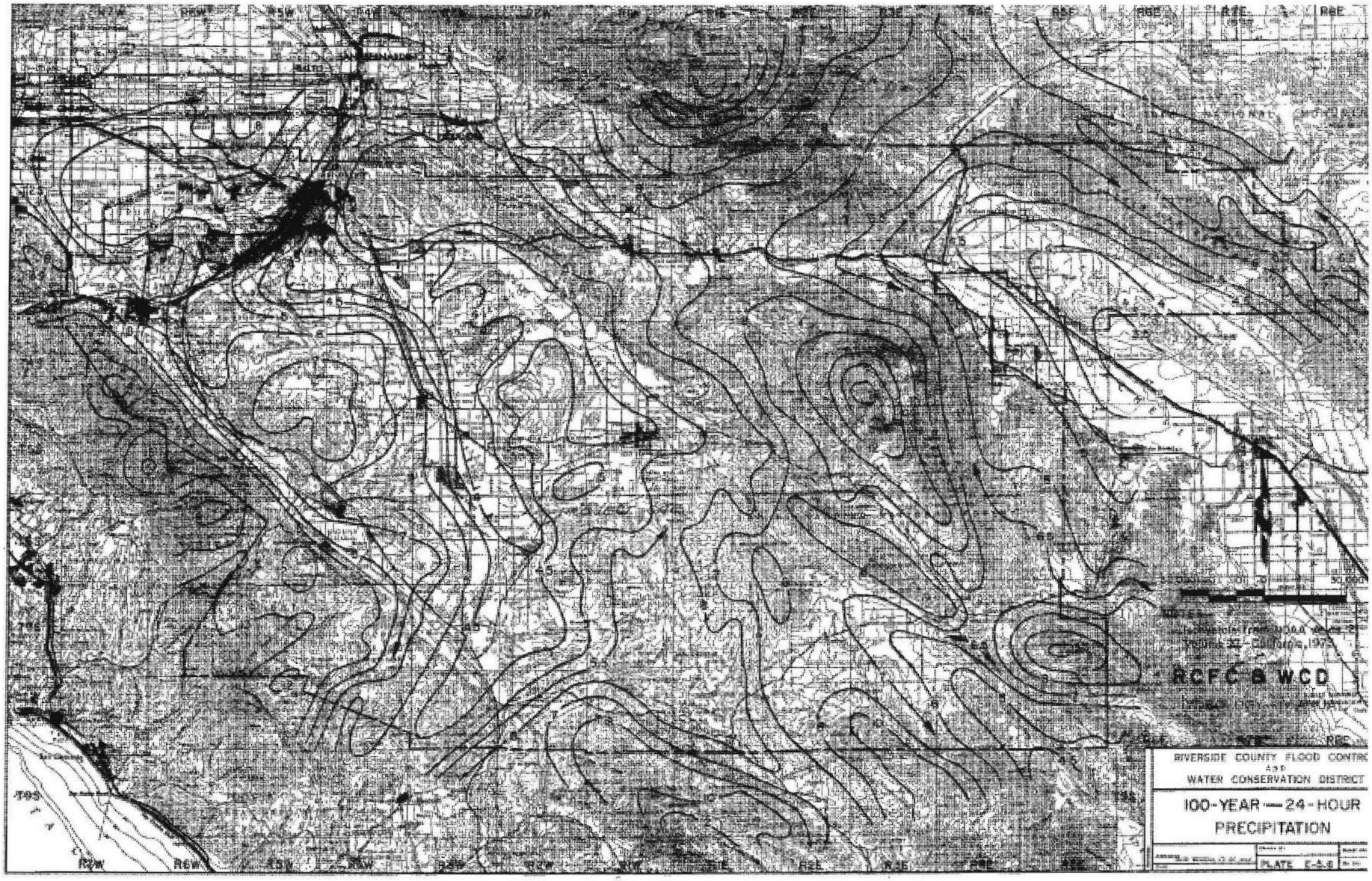
RIVERSIDE COUNTY FLOOD CONTRO
AND
WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR
PRECIPITATION
PLATE E-5.4


PROJECT SITE
RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR
PRECIPITATION
PLATE E-5.8


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTR
AND
WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR
PRECIPITATION
PLATE E-6.2


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTR
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION
PLATE E-5.6

DETENTION BASIN ROUTING

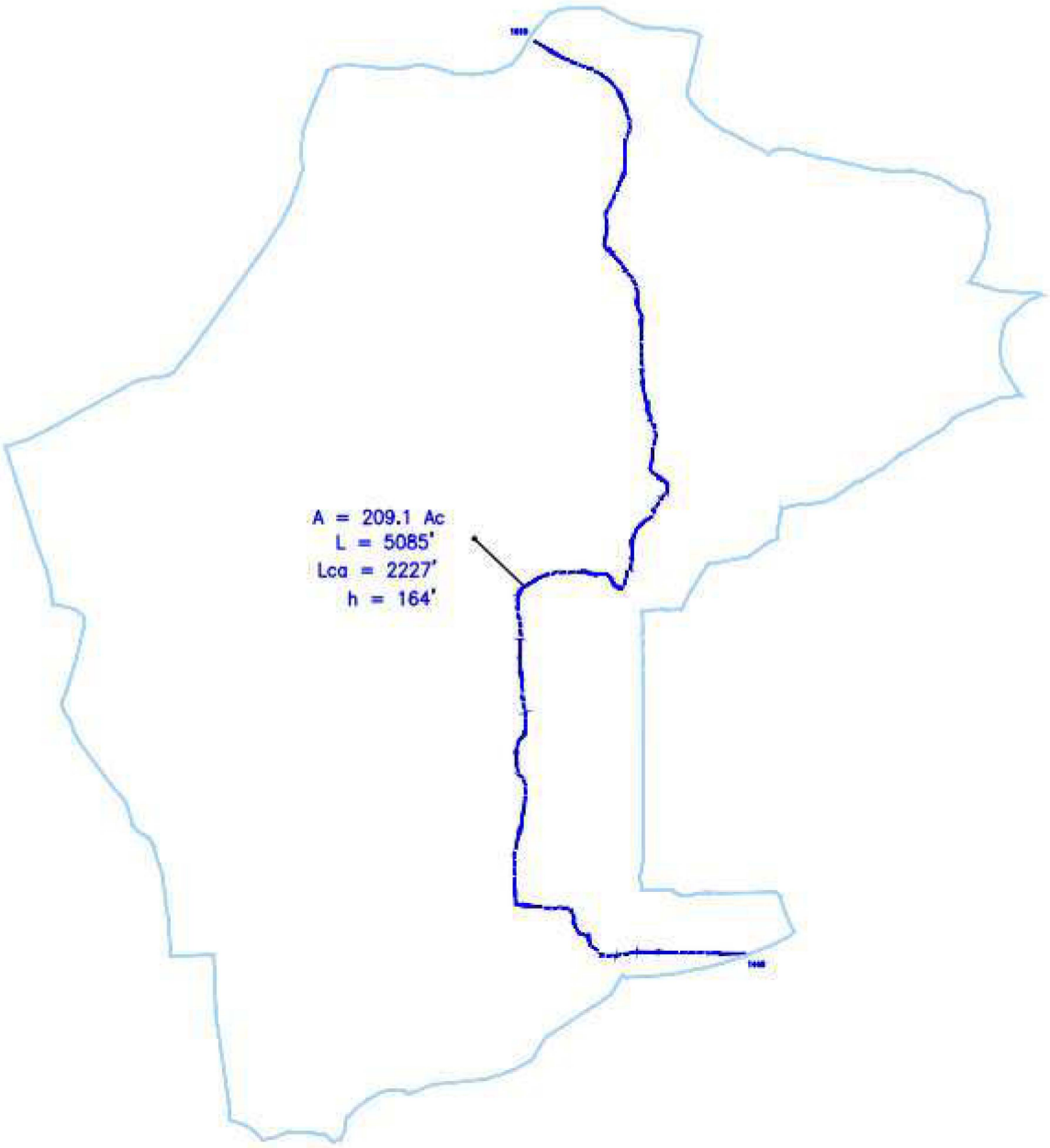
The proposed project Water Quality/Detention Basin is capable of all of the following:

1. Releasing the post-development hydrograph for 2-, 5-, 10- and 100-year 1-, 3-, 6- and 24-hour at flow rates no greater than 110% of pre-development at the same frequency flow rates.
2. By-passing the 100-year storm event without damage to the BMP.
3. Control outlet velocities such that downstream erosion potential is minimized and outlet flow is released in a safe manner.

Detention Basin Routing Calculations

The Detention Basin Routing Calculations were conducted using the CivilCADD/Design software and the Riverside County Hydrology Manual. In this analysis, the goal was to estimate the quantity of storm water to be detained onsite to mitigate the increase in storm water peak discharge and volume resulting from this development for the 2-, 5-, 10-, 100-year 1-, 3-, 6-, 24-hour storms.

INFLOW HYDROGRAPHS
Drainage Area C (Existing offsite)



Keller Crossing					
Manning "n" Value Worksheet					
Drainage Area C - 209.1 Ac (Existing offsite))					
[1]	[2]	[3]	[4]	[5]	[7]
Subarea	**Area in (Ac)**	**Land Use (Plate D-5.6)**	**"n" Value**	**Decimal portion of Area [2] / SUM[2]**	**Average "n" Value [4] * [5]**
	155.1	Natural	0.035	0.74	0.026
	3.9	Basin	0.035	0.02	0.001
	50.1	Res 1/2 Ac	0.015	0.24	0.004
		Res 1/4 Ac	0.015	0.00	0.000
		Res < 1/4 Ac	0.015	0.00	0.000
		Apartment	0.015	0.00	0.000
		Mobil Home	0.015	0.00	0.000
		Park	0.02	0.00	0.000
		Commercial	0.015	0.00	0.000
Sum =	209.1			1.00	**0.030**

Keller Crossing						
Soil Low Loss Rate Worksheet						
Drainage Area C - 209.1 Ac (Existing offsite))						
[1]	[2]	[3]	[4]	[5]	[6]	[7]
Subarea	**Area in (Ac)**	**Land Use (Plate D-5.6)**	**% Impervious (Plate D-5.6)**	**Soil Low Loss Rate 0.9-(0.8)* [4]**	**Decimal portion of Area [2] / SUM[2]**	**Average Low Loss Rate [5] * [6]**
	155.1	Natural	0	0.90	0.74	0.67
	3.9	Basin	5	0.86	0.02	0.02
		Park	10	0.82	0.00	0.00
		Res 1/2 Ac	40	0.58	0.00	0.00
		Res 1/4 Ac	50	0.50	0.00	0.00
	50.1	Res < 1/4 Ac	75	0.30	0.24	0.07
		Mobil Home	80	0.26	0.00	0.00
		Multi Family	85	0.22	0.00	0.00
		Commercial	90	0.18	0.00	0.00
Sum =	209.1				1.00	**0.76**

Keller Crossing							
Runoff Index (RI) Worksheet							
Drainage Area C - 209.1 Ac (Existing offsite)							
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Subarea	**Area in (Ac)**	**Soil Group**	**Cover Type**	**RI Number (Plate E6-1)**	**Land Use**	**Decimal portion of Area [2] / SUM[2]**	**Average RI Value [5] * [7]**
Natural		B	grass (fair)	69	Natural	0.00	0.0
	68.4	C	grass (fair)	79	Natural	0.44	34.8
	86.7	D	grass (fair)	84	Natural	0.56	47.0
Sum =	*155.1*					1.00	**81.8**
Basin		B	Landscape	56	Basin	0.00	0.0
	3.9	C	Landscape	69	Basin	1.00	69.0
		D	Landscape	75	Basin	0.00	0.0
Sum =	*3.9*					1.00	**69.0**
Res >1/2 Ac		B	Landscape	56	Residential	0.00	0.0
	20	C	Landscape	69	Residential	0.40	27.5
	30.1	D	Landscape	75	Residential	0.60	45.1
Sum =	*50.1*					1.00	**72.6**
Total =	209.1						

OFFSITE DEBRIS PRODUCTION

The tributary watershed offsite Drainage Area C to the proposed Debris/Detention Basin is approximately 209 acres. The proposed debris yield was calculated based on the Los Angeles District Method for Prediction of Debris Yield (Method) by the U.S. Army Corps of Engineers Los Angeles District.
The ultimate undeveloped areas is approximately 155.1 acres and the remaining area is low density residential area of 50.1 acres.

USACE Los Angeles District - Debris Method
Expected Debris Yield - Small Watershed (0.1 to 3 sqmi)

Step 1: *Determine the maximum 1-hour precipitation (P) and multiple by 100*

(P), 100-year 1 hour rainfall =	1.59	in/hr
P*100 =	159	

Step 2: *Determine the area of the watershed (A) in sqmi or acre*

A =	155.1	acres

Step 3: *Determine the relief ratio (RR) of the watershed*

U/S Elev =	1608	ft		
D/S Elev =	1445	ft		
Length watercourse =	4778	ft	0.90	mi
RR =	0.034115		180.13	ft/mi

Step 4: *Determine the Fire Factor (FF) for the subject watershed - See Figure 2*

Years since 100% wildfire =	10	yr (estimate)
From Figure 2 - FF =	3	

Step 5: *Determine the Adjustment-Transposition Factor (A-T)*

A-T =	1	(assume)

Step 6: *Calculate the Log (base 10) of the factors P, RR, and A*

From step 1, Log (P) =	2.20
From step 2, Log (A) =	2.19
From step 3, Log (RR) =	2.26

From step 4, FF =	3	
From step 5, A-T =	1	

Step 7: *Drainage Area less than 3.0 sqmi, use Equation 1:*
Log Dy = 0.65 (Log P)+0.18 (Log A)+0.62(Log RR)+0.12(FF)

Log Dy = 3.58

Step 8: *Calculate the antilog of Dy*

Antilog Dy = 3834.20 cuyd/sqmi

Step 9: *Multiple the resulting Dy by the A-T factor*

Adjusted Dy =	3834.20	cuyd/sqmi
	5.99	cuyd/Ac

Step 10: *Multiple the adjusted unit debris yeild by the drainage area*

Debris Volume =	**929**	cuyd
	25088	cuft

USACE Los Angeles District - Debris Method
Expected Debris Yield - Small Watershed (0.1 to 3 sqmi)
Keller Crossing - Tr. 38138 (Use Offsite Drainage Tributary Area)

Step 1: *Determine the maximum 1-hour precipitation (P) and multiple by 100*

(P), 100-year 1 hour rainfall =	1.59	in/hr
P*100 =	159	

Step 2: *Determine the area of the watershed (A) in sqmi or acre*

A =	209.1	acres	0.33	sqmi

Step 3: *Determine the relief ratio (RR) of the watershed*

U/S Elev =	1608	ft		
D/S Elev =	1445	ft		
Length watercourse =	4778	ft	0.90	mi
RR =	0.034114692		180.13	ft/mi

Step 4: *Determine the Fire Factor (FF) for the subject watershed - See Figure 2*

Years since 100% wildfire =	>10	yr (estimate)
From Figure 2 - FF =	3	

Step 5: *Determine the Adjustment-Transposition Factor (A-T)*

A-T =	1	(assume - conservative)

Step 6: *Calculate the Log (base 10) of the factors P, RR, and A*

From step 1, Log (P) =	2.20
From step 2, Log (A) =	2.32
From step 3, Log (RR) =	2.26
From step 4, FF =	3
From step 5, A-T =	1

Step 7: *Drainage Area less than 3.0 sqmi, use Equation 1:*
Log Dy = 0.65 (Log P)+0.18 (Log A)+0.62(Log RR)+0.12(FF)

Log Dy =	3.61	

Step 8: *Calculate the antilog of Dy*

Antilog Dy =	4046.03	cuyd/sqmi

Step 9: *Multiple the resulting Dy by the A-T factor*

Adjusted Dy =	4046.03	cuyd/sqmi
	6.32	cuyd/Ac

Step 10: *Multiple the adjusted unit debris yeild by the drainage area*

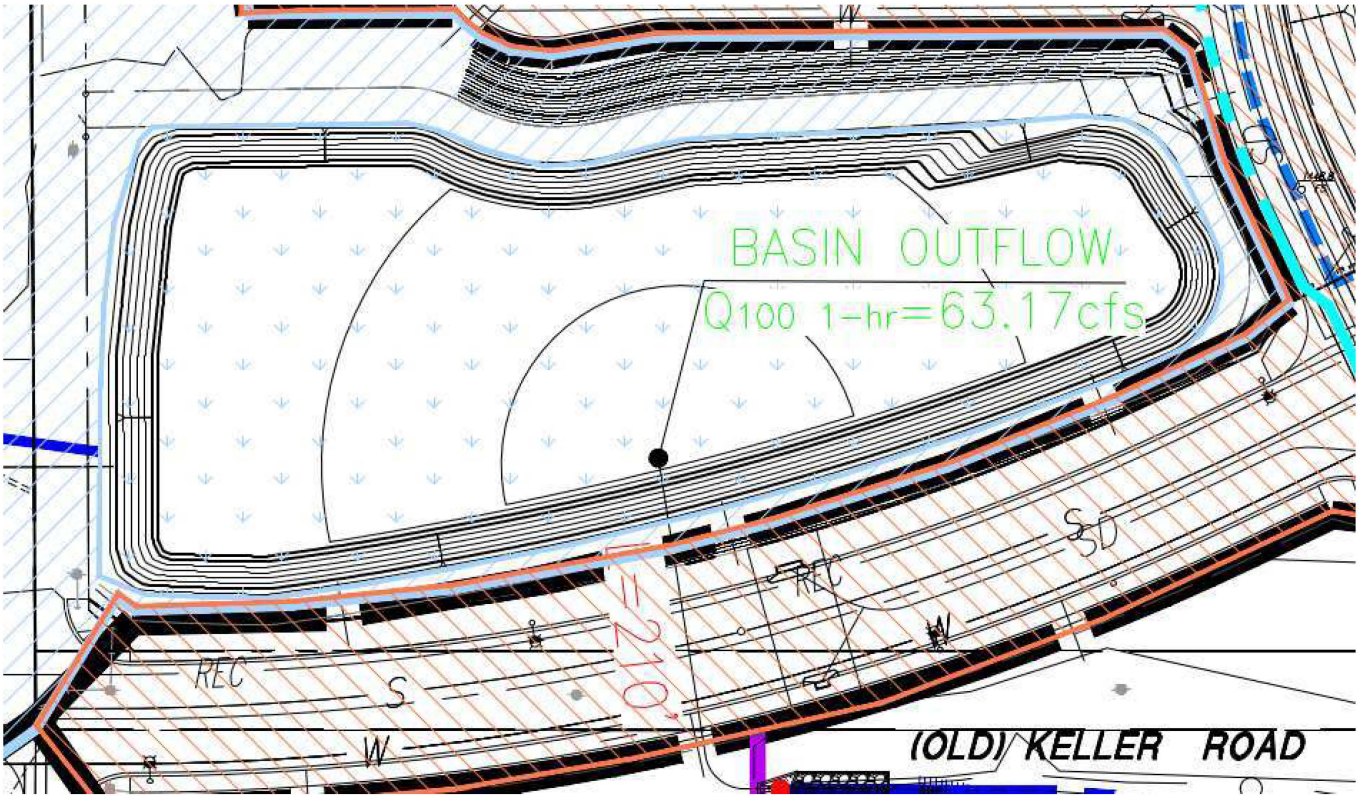
Debris Volume =	**1322**	cuyd
	35692	cuft
	0.82	Acft

DEBRIS / DETENTION BASIN ROUTING

Detention Basin Routing Calculations

The Detention Basin Routing Calculations were conducted using the CivilCADD/Design software and the Riverside County Hydrology Manual. In this analysis, the goal was to estimate the quantity of storm

water to be detained onsite to mitigate the peak discharge off-site existing condition crossing this development for the 100-year 1-hour, 3-hour, 6-hour, 24-hour storms.



DEBRIS / DETENTION BASIN C

Tr. 38163 - Keller Crossing					
Keller Project - Drainage Area C (Existing offsite)					
Debris/Detention Basin C offsite - 2024					
Depth	Elev	Area in sf	Vol inc in cf	Vol tot in cf	Vol tot in Acft
0	1436	0	0	0	0
1	1437	16095	8047.5	8047.5	0.185
2	1438	55024	35559.5	43607	1.001
3	1439	93984	74504	118111	2.711
4	1440	98575	96279.5	214390.5	4.922
5	1441	103305	100940	315330.5	7.239
6	1442	108011	105658	420988.5	9.665
7	1443	112801	110406	531394.5	12.199
8	1444	117662	115231.5	646626	14.844
9	1445	122617	120139.5	766765.5	17.603
10	1446	129371	125994	892759.5	20.495
11	1447	138349	133860	1026619.5	23.568

Keller Project - Drainage Area C (Existing Offsite)					
County of Riverside					
Proposed Debris - Detention Basin Area C					
			Stage 1 Orifice 2' x 2.3' opening	Stage 2 E. Spillway	Total Outflow
Elev	Depth	Vol	A = 4.6 sf	L=130' Opening	**Q total**
(ft)	(ft)	(ac-ft)	1436	1445	(cfs)
1436	0.0	0	0	0	**0.00**
1437	1.0	0.185	6.9	0	**6.90**
1438	2.0	1.001	24.72	0	**24.72**
1439	3.0	2.711	34.96	0	**34.96**
1440	4.0	4.922	42.82	0	**42.82**
1441	5.0	7.239	49.45	0	**49.45**
1442	6.0	9.665	55.28	0	**55.28**
1443	7.0	12.199	60.56	0	**60.56**
1444	8.0	14.844	65.41	0	**65.41**
1445	9.0	17.603	69.93	0	**69.93**
1446	10.0	20.495	74.17	409.99	**484.16**
1447	11.0	23.568	78.18	1160.79	**1238.97**

Rating Table for Rectangular Orifice – Opening 2’ (H) x 2.3’ (W)

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	9.00	ft
Centroid Elevation	1.00	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.67	
Opening Width	2.30	ft
Opening Height	2.00	ft

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.00		
1.00		
2.00	24.72	5.37
3.00	34.96	7.60
4.00	42.82	9.31
5.00	49.45	10.75
6.00	55.28	12.02
7.00	60.56	13.16
8.00	65.41	14.22
9.00	69.93	15.20
10.00	74.17	16.12
11.00	78.18	17.00

Worksheet for Broad Crested Weir - Basin Emergency Spillway Basin C (off-site)

Project Description

Solve For	Headwater Elevation

Input Data

Discharge		417.91	ft^3/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		15.00	ft
Crest Length		130.00	ft

Results

Headwater Elevation	1.04	ft
Headwater Height Above Crest	1.04	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.04	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.04	US
Flow Area	135.01	ft^2
Velocity	3.10	ft/s
Wetted Perimeter	132.08	ft
Top Width	130.00	ft

Detention Basin C off-site, Basin bottom elevation = 1436, E. Spillway @ 1445

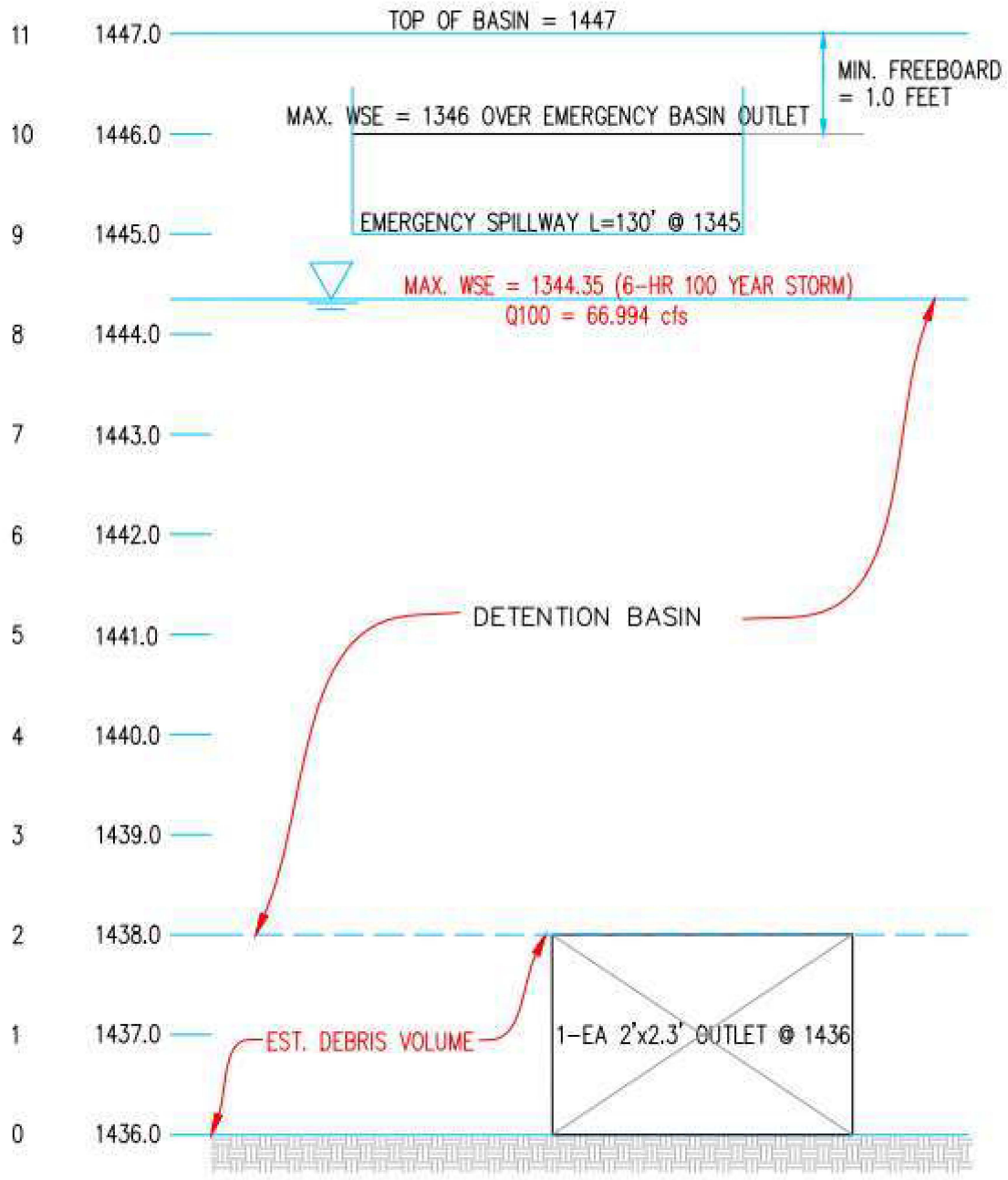
Storm Frequency	Proposed Q_{100} (cfs)	Det. Basin Outlet Q_{100} (cfs)	Det. Basin Depth (ft)	Det. Basin WSE Max. (ft)
100-year 1-hour	417.913	62.551	7.41	1443.41
100-year 3-hour	257.413	65.615	8.05	1444.05
100-year 6-hour	238.016	66.981	8.35	**1444.35**
100-year 24-hour	95.203	56.848	8.30	1444.30

Detention Basin C off-site, Basin bottom elevation = 1436, E. Spillway @ 1445
With debris volume in the basin, depth = 2'

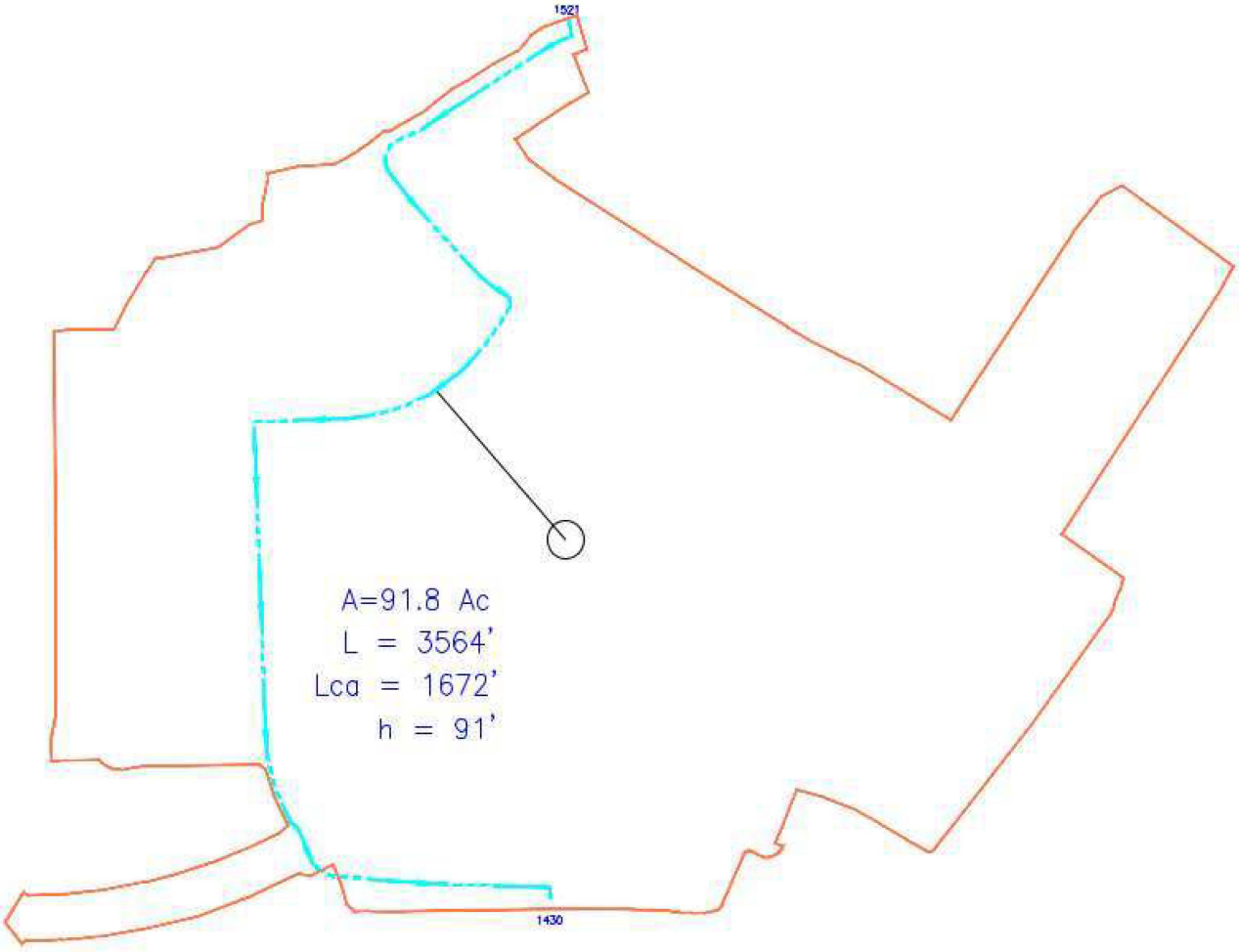
Storm Frequency	Proposed Q_{100} (cfs)	Det. Basin Outlet Q_{100} (cfs)	Det. Basin Depth (ft)	Det. Basin WSE Max. (ft)
100-year 1-hour	417.913	63.166	7.54	1443.54
100-year 3-hour	257.413	65.803	8.09	1444.09
100-year 6-hour	238.016	66.994	8.35	**1444.35**
100-year 24-hour	95.203	56.848	8.30	1444.30

Keller, Tr. 38163 - HYDROLOGIC FLOW CHART

Debris/Detention Basin "C"



INFLOW HYDROGRAPHS
Drainage Area C (Onsite - Residential)



Keller Crossing					
Manning "n" Value Worksheet					
Drainage Area C - 91.8 Ac (Onsite Proposed)					
[1]	[2]	[3]	[4]	[5]	[7]
Subarea	Area in (Ac)	Land Use (Plate D-5.6)	"n" Value	Decimal portion of Area [2] / SUM[2]	Average "n" Value [4] * [5]
		Natural	0.035	0.00	0.000
	5.3	Basin	0.035	0.06	0.002
	7.3	Park	0.025	0.08	0.002
		Res 1/4 Ac	0.015	0.00	0.000
	61.3	Res < 1/4 Ac	0.015	0.67	0.010
	17.9	Townhomes	0.015	0.19	0.003
		Mobil Home	0.015	0.00	0.000
		Hospital	0.02	0.00	0.000
		Commercial	0.015	0.00	0.000
Sum =	91.8			1.00	**0.017**

Keller Crossing						
Soil Low Loss Rate Worksheet						
Drainage Area C - 91.8 Ac (Proposed)						
[1]	[2]	[3]	[4]	[5]	[6]	[7]
Subarea	Area in (Ac)	Land Use (Plate D-5.6)	% Impervious (Plate D-5.6)	Soil Low Loss Rate 0.9-(0.8)* [4]	Decimal portion of Area [2] / SUM[2]	Average Low Loss Rate [5] * [6]
		Natural	0	0.90	0.00	0.00
	5.3	Basin	5	0.86	0.06	0.05
	7.3	Park	7.5	0.84	0.08	0.07
		Res 1/4 Ac	65	0.38	0.00	0.00
	61.3	Res < 1/4 Ac	75	0.30	0.67	0.20
	17.9	Townhome	90	0.18	0.19	0.04
		Mobil Home	80	0.26	0.00	0.00
		Hospital	75	0.30	0.00	0.00
		Commercial	90	0.18	0.00	0.00
Sum =	91.8				1.00	**0.35**

Keller Crossing							
Runoff Index (RI) Worksheet							
Drainage Area C - 91.8 Ac (Proposed)							
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Subarea	**Area in (Ac)**	**Soil Group**	**Cover Type**	**RI Number (Plate E6-1)**	**Land Use**	**Decimal portion of Area [2] / SUM[2]**	**Average RI Value [5] * [7]**
Basin		B	grass (fair)	56	Basin	0.00	0.0
	5.3	C	grass (fair)	69	Basin	1.00	69.0
		D	grass (fair)	75	Basin	0.00	0.0
Sum =	*5.3*					1.00	**69.0**
Park		B	Landscape	56	Park	0.00	0.0
	7.3	C	Landscape	69	Park	1.00	69.0
		D	Landscape	75	Park	0.00	0.0
Sum =	*7.3*					1.00	**69.0**
Res >1/2 Ac		B	Landscape	56	Residential	0.00	0.0
	31	C	Landscape	69	Residential	0.51	34.9
	30.3	D	Landscape	75	Residential	0.49	37.1
Sum =	*61.3*					1.00	**72.0**
Townhomes		B	Landscape	56	Residential	0.00	0.0
	8	C	Landscape	69	Residential	0.45	30.8
	9.9	D	Landscape	75	Residential	0.55	41.5
Sum =	*17.9*					1.00	**72.3**
Total =	91.8						

WATER QUALITY DESIGN VOLUME (Vbmp)

Santa Margarita Watershed BMP Design Volume, V_{BMP} (Rev. 03-2012)	Legend:	Required Entries Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	K&A Engineering, Inc.	Date	4/2/2024
Designed by	JY	County/City Case No	
Company Project Number/Name	Keller Crossing		
Drainage Area Number/Name	Area C (Residential & Park) = 91.8 Ac		

Enter the Area Tributary to this Feature — A_T = 91.8 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location	Township	6S
	Range	2W
	Section	29
Enter the 85th Percentile, 24-hour Rainfall Depth	D_{85} =	0.57

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu)	Mixed Surface Types	
Effective Impervious Fraction	I_f =	0.69

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ — C = 0.48

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ — V_u = 0.28 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 93,306 ft^3

Notes:

Storage and Outflow WQ/Detention Basin C Rating Curve:

Tr. 38163 - Keller Crossing					
Keller Project - Drainage Area C (Residential)					
WQ/Detention Basin C (May 2024)					
Depth	Elev	Area in sf	Vol inc in cf	Vol tot in cf	Vol tot in Acft
0	1423	7162	0	0	0
1	1424	17924	12543	12543	0.288
2	1425	43628	30776	43319	0.994
3	1426	68573	56100.5	99419.5	2.282
4	1427	93936	81254.5	180674	4.148
5	1428	111342	102639	283313	6.504
6	1429	128272	119807	403120	9.254
7	1430	136541	132406.5	535526.5	12.294
8	1431	144922	140731.5	676258	15.525
9	1432	153816	149369	825627	18.954

Keller Project - Drainage Area C (Residential)										
County of Riverside										
Proposed WQ/Detention Basin DMA Area C (Residential)										
			Headwater Stage 1	Detention	Headwater Stage 2	Stage 2 Orifice A=0.09 sf	Stage 3 Orifice A=0.09 sf	Stage 4 Spillway	Stage 5 E. Spillway	Total Outflow
Elev	Depth	Vol	Depth	Vol	Depth	2ea-4" Opening	3ea-4" Opening	L=15' Opening	L=180' Opening	**Q total**
(ft)	(ft)	(ac-ft)	(ft)	(ac-ft)	(ft)	1423	1428	1429	1430.5	(cfs)
1423	0.0	0	WQ Vol		0.0	0	0	0	0	**0.00**
1424	1.0	0.288	WQ Vol		1.0	0.84	0	0	0	**0.00**
1425	2.0	0.994	WQ Vol		2.0	1.24	0	0	0	**0.00**
1425.5	2.5	1.911	WQ Vol		2.5	1.39	0	0	0	**0.00**
1426	3.0	2.828	WQ Vol	0.000	3.0	1.54	0	0	0	**0.00**
1427	4.0	4.148	1.0	1.948	4.0	1.8	0	0	0	**1.80**
1428	5.0	6.504	2.0	4.304	5.0	2.02	0	0	0	**2.02**
1429	6.0	9.254	3.0	7.054	6.0	2.22	1.26	0	0	**3.48**
1430	7.0	12.294	4.0	10.094	7.0	2.4	1.86	45.00	0	**49.26**
1430.5	7.5	13.910	4.5	11.710	7.5	2.49	2.09	82.67	0.00	**87.25**
1431	8.0	15.525	5.0	13.325	8.0	2.58	2.31	127.28	199.14	**331.31**
1432	9.0	18.954	6.0	16.754	9.0	2.74	2.70	233.83	1005.27	**1244.54**
WQ Volume Total = 93,306 cuft = 2.14 Acft										
WQ Volume provided > 2.14 Acft at Basin Elevation 1426 Above 1426 ==> Detention Basin										

Rating Table for Circular Orifice - 4" diameter opening

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	3.10	ft
Centroid Elevation	0.17	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.65	
Diameter	0.33	ft

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.00		
1.00	0.41	4.76
2.00	0.60	7.06
3.00	0.75	8.78
4.00	0.87	10.21
5.00	0.98	11.46
6.00	1.08	12.59
7.00	1.17	13.63
8.00	1.25	14.59
9.00	1.33	15.50
10.00	1.40	16.35
11.00	1.47	17.16
12.00	1.53	17.94
13.00	1.60	18.68
14.00	1.66	19.39
15.00	1.72	20.08

Rating Table for Rectangular Weir – L=15’ Spillway

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	1.00	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Weir Coefficient	3.00	US
Crest Length	15.00	ft
Number Of Contractions	0	

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.50	15.91	2.12
1.00	45.00	3.00
1.50	82.67	3.67
2.00	127.28	4.24
2.50	177.88	4.74
3.00	233.83	5.20
3.50	294.66	5.61
4.00	360.00	6.00
4.50	429.57	6.36
5.00	503.12	6.71

Worksheet for Broad Crested Weir - Basin C Emergency Spillway

Project Description

Solve For	Headwater Elevation

Input Data

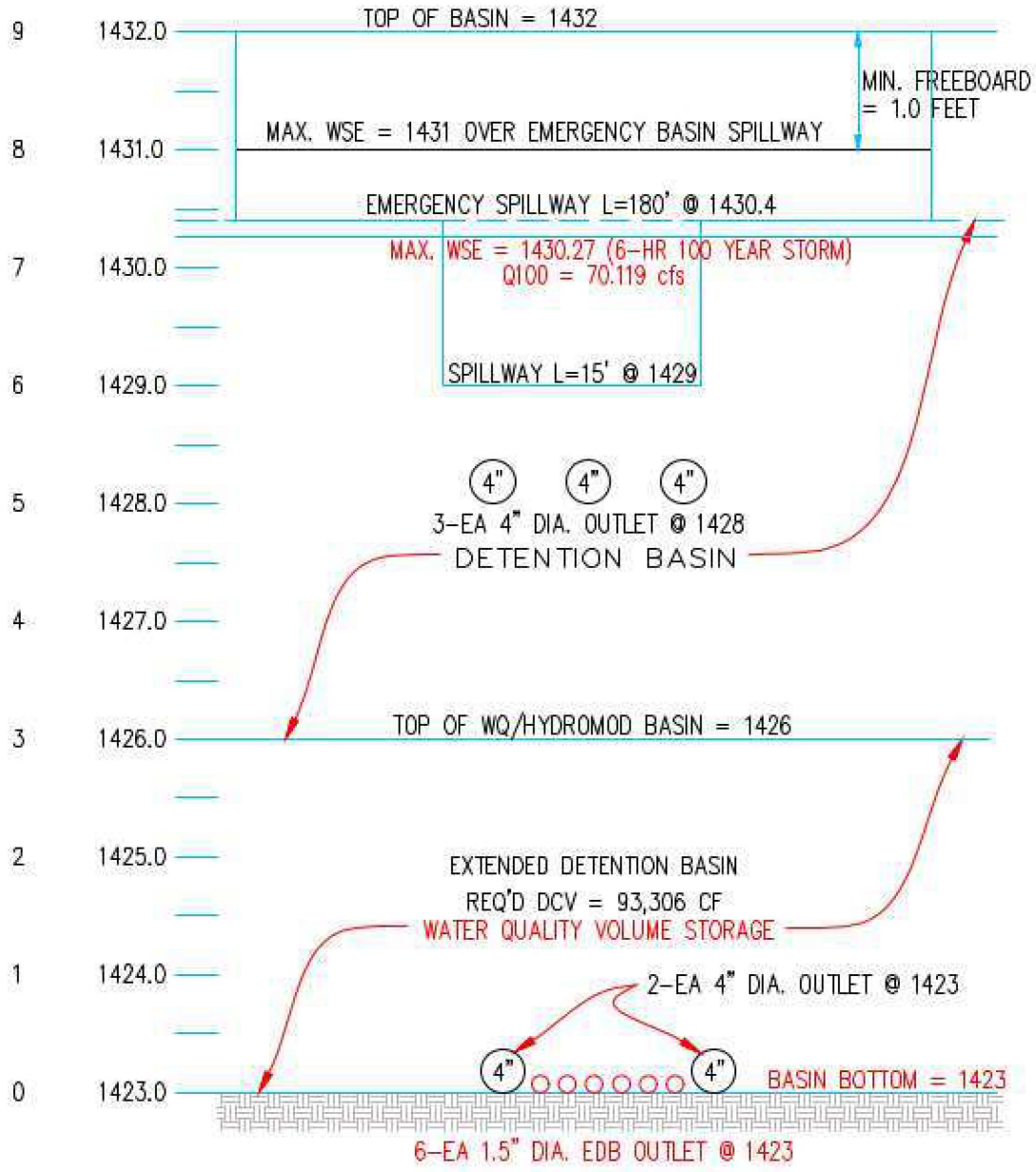
Discharge		257.79	ft³/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		15.00	ft
Crest Length		180.00	ft

Results

Headwater Elevation	0.61	ft
Headwater Height Above Crest	0.61	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.02	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.02	US
Flow Area	109.50	ft²
Velocity	2.35	ft/s
Wetted Perimeter	181.22	ft
Top Width	180.00	ft

Keller, Tr. 38163 - HYDROLOGIC FLOW CHART

WQ / Detention Basin "C"



Worksheet for Broad Crested Weir - Basin C Emergency Spillway

Project Description

Solve For	Headwater Elevation

Input Data

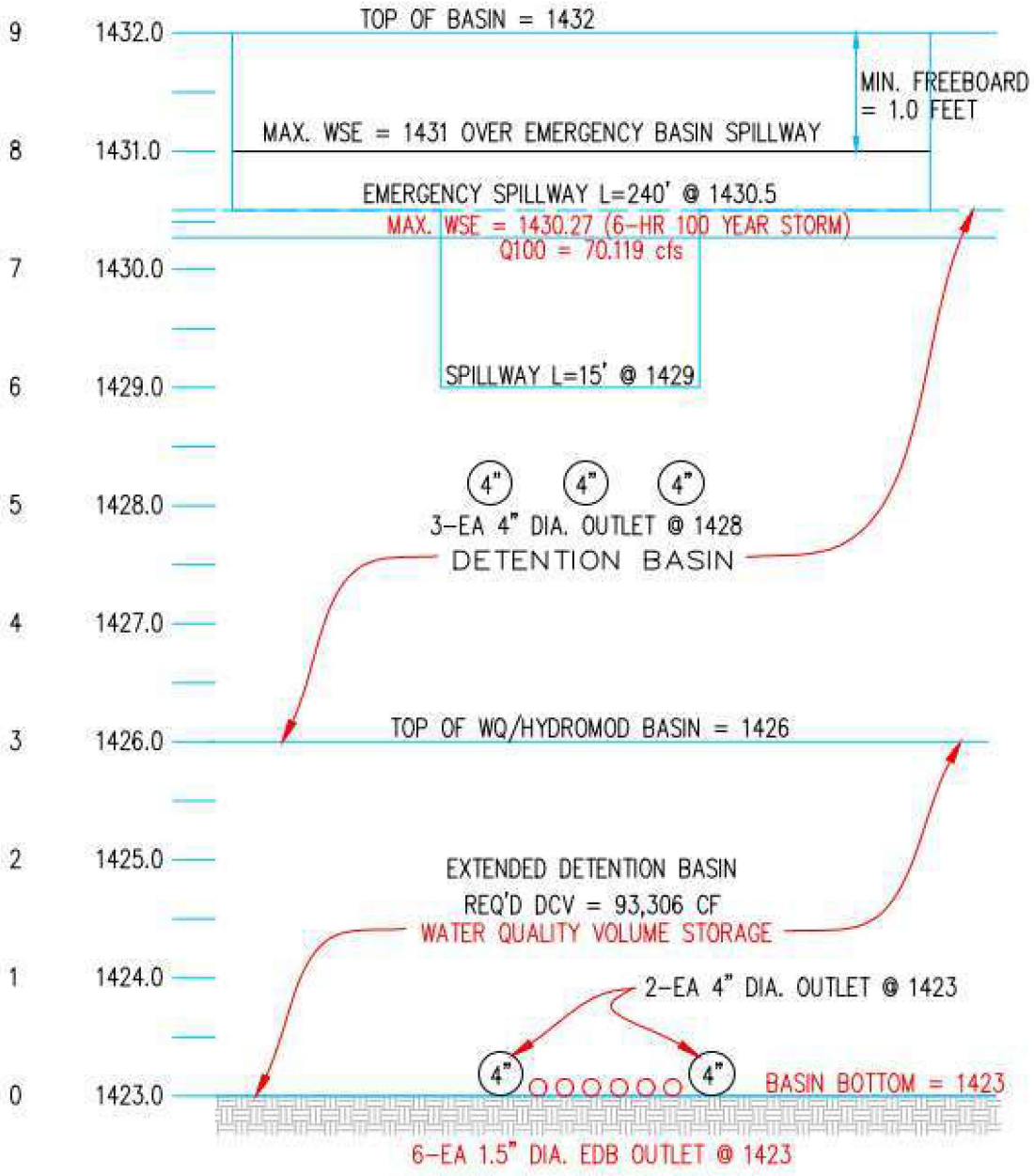
Discharge		257.79	ft³/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		15.00	ft
Crest Length		240.00	ft

Results

Headwater Elevation	0.50	ft
Headwater Height Above Crest	0.50	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.01	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.01	US
Flow Area	120.80	ft²
Velocity	2.13	ft/s
Wetted Perimeter	241.01	ft
Top Width	240.00	ft

Keller, Tr. 38163 - HYDROLOGIC FLOW CHART

WQ / Detention Basin "C"



Extended Detention Basin Design Procedure	BMP Subarea No. Area C	Legend:	Required Entries / Calculated Cells
Company Name: K&A Engineering			Date: 4/2/2024
Designed by: JY			County/City Case No.:

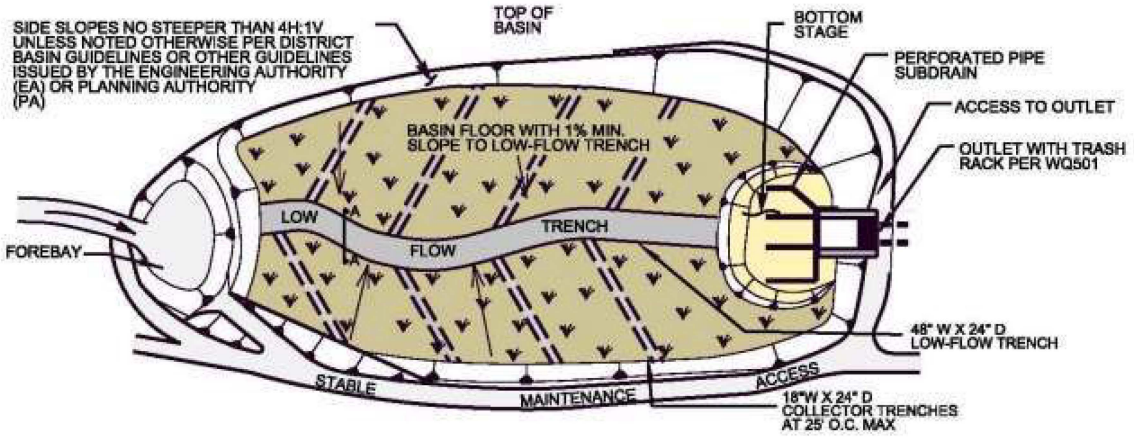
Design Volume

Tributary Area (BMP Subarea)	A_T =	91.8	acres
Enter V_{BMP}, determined from Section 2.1 of this Handbook	V_{BMP}=	93,306	ft^3

Basin Footprint

Overall Geometry

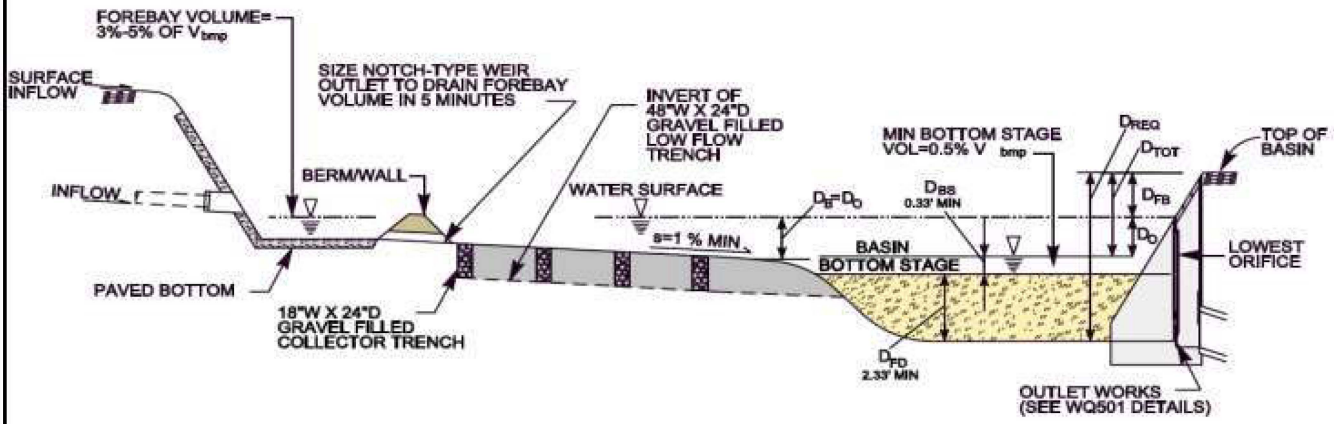
Length at Basin Bottom Surface	Length =	860	ft
Width at Basin Bottom Surface	Width =	135	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	3.00	ft
Depth of freeboard (if used)	D_{FB} =	2.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	7.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	3.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	5.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	51153	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	3750	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	1875	ft^2
Rectangular weir (notch)	W =	2.00	in

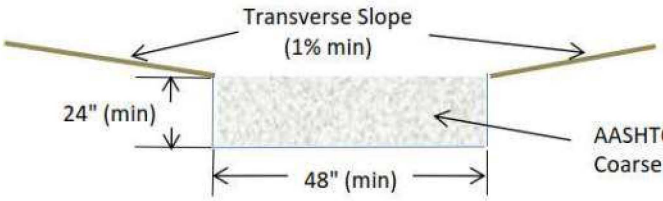
Dry Weather and Low-Flow Management

Low-Flow Trench (see graphic below)

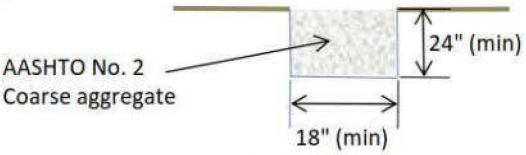
Depth (24 inches minimum, gravel filled)	Depth =	24	inches
Width (48 inches minimum)	Width =	48	inches
Trench Invert Longitudinal Slope	Slope =	1	%

Collector Trenches (see graphic below)

Depth (24 inches minimum)	Depth =	24	inches
Width (18 inches minimum)	Width =	18	inches
Trench Invert Longitudinal Slope	Slope =	1	%
Spacing (25 feet on center maximum)	S =	25	feet



Low-Flow Trench



Collector Trench

Bottom Stage (Sand Filter) Design

Depth of the Bottom Stage (4" minimum ponding)	D_{BS} =	4	in
Surface Area of Bottom Stage	A_{BS} =	2087	ft^2
Dry Weather Ponded Volume (above sand layer)	V_{BS} =	696	ft^3

Is V_{BS} no less than 0.5% V_{BMP}? OK

Depth of ASTM-C33 sand (18 inch minimum)

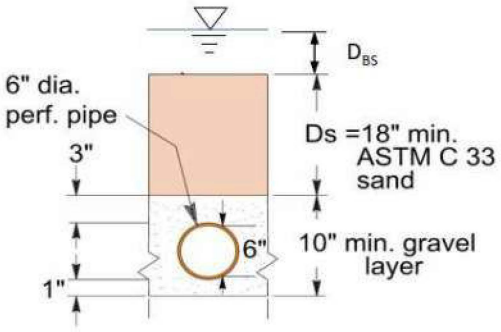
Ds = 18 inches

Diameter of Subdrains

ϕ = 6 in

Subdrain Spacing

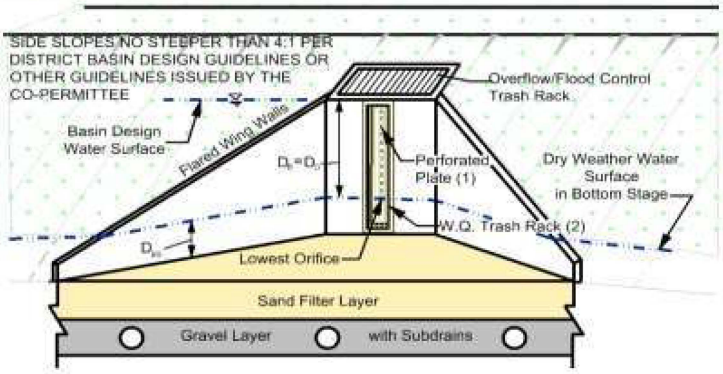
s = 10 ft. on center



Basin Outlet Design

Outlet Design

Assume an orifice area. Based on the information provided above, the spreadsheet provides discharge vs. stage data. Enter the volume vs. stage data for each interval. This information is used to route the volume through the basin. The size of the orifice is acceptable when the data shows that less than 50% of V_{BMP} has drained in 24 hours, and that 100% drawdown occurs within 72 hours.



Flow Rate, Q (cfs)

$$Q=CA[2g(H-H_o)]^{0.5}$$

Discharge Coefficient,

Default, C = 0.66

Other, C =

Orifice Area (ft^2)

Orifice Diameter, d; number of orifices per row, n; and number of orifice rows, N (from the bottom up).

d = 1.5 inches

n = 6 per row

N = 1 rows

Aeff = 0.074 ft^2 per row

or

Aeff = 10.598 in^2 per row

From outflow hydrograph, the time where 50% of V_{BMP} has drained from the basin (24 hour minimum):

Time (50%) = 31.38 hrs

OK

From outflow hydrograph, the time where 100% V_{BMP} has drained from the basin(within 72 hours):

Time (100 %) = 60.77 hrs

OK

Headwater Elev. / Stage (ft)	Discharge (cfs)	Volume (acre-ft)	Δt (hrs.)
0	0.0000	0.0000	
0.33	0.2249	0.027	2.90
0.67	0.3183	0.058	1.38
1.00	0.3898	0.087	0.99
1.33	0.4500	0.288	5.79
1.67	0.5033	0.577	7.34
2.00	0.5512	0.882	7.00
2.33	0.5954	1.304	8.91
2.67	0.6366	1.726	8.29
3.00	0.6751	2.711	18.17
3.33			
3.67			
4.00			
4.33			
4.67			
5.00			
5.33			
5.67			
6.00			
6.33			
6.67			
7.00			
7.33			
7.67			
8.00			
8.33			
8.67			
9.00			
9.33			
9.67			
10.00			
		∑ =	60.77

Notes:

Summary of Hydrographs and Basin Routing:
Drainage Area C onsite – Residential (91.8 Ac)

Storm Frequency	**Existing** Q_2 (cfs) **[1]**	**Proposed** Q_2 (cfs)	**Det. Basin Outlet** Q_2 (cfs) **[2]**	**Different [2] – [1]** (cfs)	**Different [2] – [1]** (%)
2-year 1-hour	52.867	92.574	1.869	-50.998	-96%
2-year 3-hour	20.803	42.196	1.952	-18.851	-90%
2-year 6-hour	11.663	31.285	2.006	-9.657	-82%
2-year 24-hour	2.288	12.607	2.586	0.298	13%

Storm Frequency	**Existing** Q_5 (cfs) **[1]**	**Proposed** Q_5 (cfs)	**Det. Basin Outlet** Q_5 (cfs) **[2]**	**Different [2] – [1]** (cfs)	**Different [2] – [1]** (%)
5-year 1-hour	95.272	127.286	1.964	-93.308	-98%
5-year 3-hour	52.153	59.399	2.311	-49.842	-95%
5-year 6-hour	42.002	47.069	2.847	-39.155	-93%
5-year 24-hour	8.470	17.370	7.898	-0.572	-6.7%

Storm Frequency	**Existing** Q_{10} (cfs) **[1]**	**Proposed** Q_{10} (cfs)	**Det. Basin Outlet** Q_{10} (cfs) **[2]**	**Different [2] – [1]** (cfs)	**Different [2] – [1]** (%)
10-year 1-hour	116.901	161.063	2.305	-114.596	-98%
10-year 3-hour	64.971	80.440	3.030	-61.941	-95%
10-year 6-hour	54.767	66.475	9.336	-45.431	-83%
10-year 24-hour	13.907	21.602	14.141	0.234	1.6%

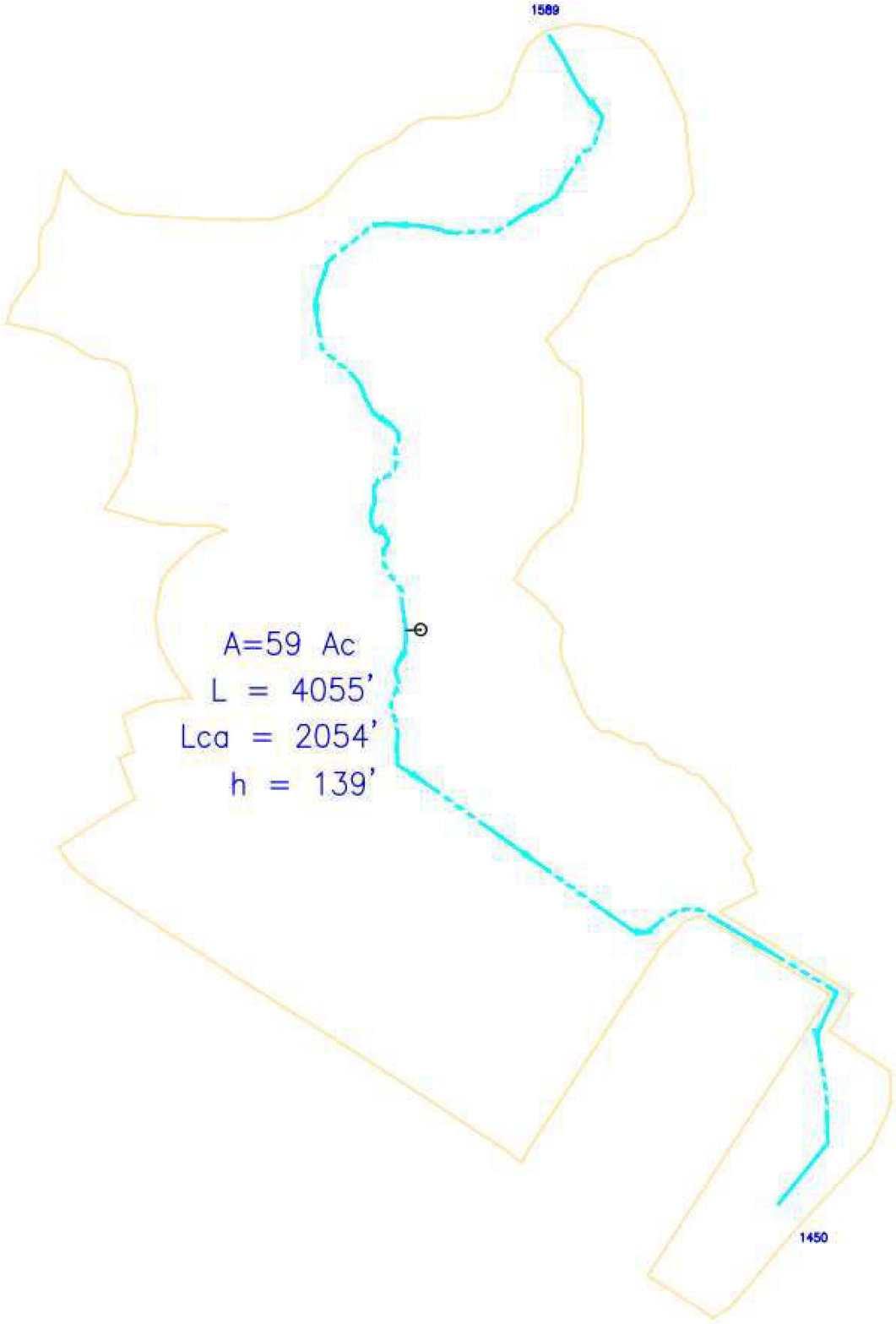
Storm Frequency	**Existing** Q_{100} (cfs) **[1]**	**Proposed** Q_{100} (cfs)	**Det. Basin Outlet** Q_{100} (cfs) **[2]**	**Different [2] – [1]** (cfs)	**Different [2] – [1]** (%)
100-year 1-hour	199.139	257.785	17.640	-181.499	-91%
100-year 3-hour	118.610	132.718	44.934	-73.676	-62%
100-year 6-hour	108.226	116.935	70.119	-38.107	-35%
100-year 24-hour	41.620	45.160	36.434	-5.186	-12%

See **Attachments** for Inflow Hydrographs and Detention Basin Routing Calculations

For more complete detail of Detention Basins, will be provided in the final design.

INFLOW HYDROGRAPHS

Drainage Area F



Summary of Hydrographs and Basin Routing:
Drainage Areas F – 59.0 Ac
Separate WQ Basin E use for Hydromodification

WQ Basin E (BMP for Drainage Area F, Residential)

Storm Frequency	DS #5 Culvert Capacity Q_{max} (cfs	DS #5 Culvert Capacity Q_{100} (cfs)	Proposed Q_{INFLOW} (cfs)	Det. Basin Outlet $Q_{OUTFLOW}$ (cfs)
10-year 1-hour	14.0	106.6	Hydromodification - Q_{max} = 9.7 cfs	
25-year 1-hour	14.0	106.6		
Qbmp Area F = 1.8 cfs				

Detention Basin F

Storm Frequency	DS #6 Culvert Capacity Q_{max} (cfs	DS #6 Culvert Capacity Q_{100} (cfs)	Proposed Q_{INFLOW} (cfs)	Det. Basin Outlet $Q_{OUTFLOW}$ (cfs)
100-year 1-hour	18.7	31.6	124.839	12.798
100-year 3-hour	18.7	31.6	75.768	13.388
100-year 6-hour	18.7	31.6	69.295	**13.715**
100-year 24-hour	18.7	31.6	26.887	12.703

Manning "n" Value Worksheet					
Drainage Area F - 59 Ac (Offsite & Proposed)					
[1]	[2]	[3]	[4]	[5]	[7]
Subarea	**Area in (Ac)**	**Land Use (Plate D-5.6)**	**"n" Value**	**Decimal portion of Area [2] / SUM[2]**	**Average "n" Value [4] * [5]**
	39.1	Natural	0.035	0.66	0.023
	3.5	Basin	0.035	0.06	0.002
		Res 1/2 Ac	0.015	0.00	0.000
		Res 1/4 Ac	0.015	0.00	0.000
	16.4	Res < 1/4 Ac	0.015	0.28	0.004
		Apartment	0.015	0.00	0.000
		Mobil Home	0.015	0.00	0.000
		Hospital	0.02	0.00	0.000
		Commercial	0.015	0.00	0.000
Sum =	59			1.00	**0.029**

Keller Crossing						
Soil Low Loss Rate Worksheet						
Drainage Area F - 59 Ac (Existing & Proposed)						
[1]	[2]	[3]	[4]	[5]	[6]	[7]
Subarea	**Area in (Ac)**	**Land Use (Plate D-5.6)**	**% Impervious (Plate D-5.6)**	**Soil Low Loss Rate 0.9-(0.8)* [4]**	**Decimal portion of Area [2] / SUM[2]**	**Average Low Loss Rate [5] * [6]**
	39.1	Natural	0	0.90	0.43	0.38
	3.5	Basin	5	0.86	0.04	0.03
		Park	7.5	0.84	0.00	0.00
		Res 1/4 Ac	65	0.38	0.00	0.00
	16.4	Res < 1/4 Ac	75	0.30	0.18	0.05
		Townhome	90	0.18	0.00	0.00
		Mobil Home	80	0.26	0.00	0.00
		Hospital	75	0.30	0.00	0.00
		Commercial	90	0.18	0.00	0.00
Sum =	59				0.64	**0.47**

Keller Crossing							
Runoff Index (RI) Worksheet							
Drainage Area F - 59 Ac (Existing & Proposed)							
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Subarea	**Area in (Ac)**	**Soil Group**	**Cover Type**	**RI Number (Plate E6-1)**	**Land Use**	**Decimal portion of Area [2] / SUM[2]**	**Average RI Value [5] * [7]**
Natural		B	grass (fair)	69	Natural	0.00	0.0
	22.2	C	grass (fair)	79	Natural	0.57	44.9
	16.9	D	grass (fair)	84	Natural	0.43	36.3
Sum =	*39.1*					1.00	**81.2**
Basin		B	Landscape	56	Basin	0.00	0.0
	3.5	C	Landscape	69	Basin	1.00	69.0
		D	Landscape	75	Basin	0.00	0.0
Sum =	*3.5*					1.00	**69.0**
Res >1/2 Ac		B	Landscape	56	Residential	0.00	0.0
	10	C	Landscape	69	Residential	0.61	42.1
	6.4	D	Landscape	75	Residential	0.39	29.3
Sum =	*16.4*					1.00	**71.3**
Total =	59						

Tr. 38163 - Keller Crossing					
Drainage Area F = 59 Ac (Off-site and Single Family)					
Storage Rating Curve					
Detention Basin F					
Elev.	Depth	Area (sf)	Vol. inc. (cf)	Vol. Accum. (cf)	Vol. Accum. (Acft)
1433	0	0	0	0	0.00
1434	1	9597	4798.5	4798.5	0.11
1435	2	21145	15371	20169.5	0.46
1436	3	34006	27575.5	47745	1.10
1437	4	44104	39055	86800	1.99
1438	5	47228	45666	132466	3.04
1439	6	50325	48776.5	181242.5	4.16
1440	7	53375	51850	233092.5	5.35
1441	8	56486	54930.5	288023	6.61
1442	9	59647	58066.5	346089.5	7.95
1443	10	62874	61260.5	407350	9.35
1444	11	66142	64508	471858	10.83
1445	12	69475	67808.5	539666.5	12.39
1446	13	72885	71180	610846.5	14.02

Tr. 38163 - Keller Crossing							
County of Riverside							
Proposed Detention Basin Area F							
			Headwater Stage 1	Stage 1 Orifice A=0.79 sf	Stage 2 Orifice A=0.20 sf	Emergency Spillway	Total Outflow
Elev	Depth	Vol	Depth	1ea-12" Opening	1ea-6" Opening	40' Opening	**Q total**
(ft)	(ft)	(ac-ft)	(ft)	1433	1433	1440	(cfs)
1433	0	0	0	0	0	0	**0.00**
1434	1	0.11	1	4.22	0.91	0	**5.13**
1435	2	0.460	2	5.97	1.4	0	**7.37**
1436	3	1.100	3	7.31	1.75	0	**9.06**
1437	4	1.990	4	8.44	2.04	0	**10.48**
1438	5	3.040	5	9.44	2.3	0	**11.74**
1439	6	4.160	6	10.34	2.53	0	**12.87**
1440	7	5.350	7	11.17	2.74	0	**13.91**
1441	8	6.610	8	11.94	2.94	0	**14.88**
1442	9	7.950	9	12.66	3.12	121.48	**137.26**
1443	10	9.350	10	13.35	3.3	343.94	**360.59**
1444	11	10.830	11	14	3.46	637.05	**654.51**

Rating Table for Circular Orifice - 6" opening

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	2.40	ft
Centroid Elevation	0.25	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.67	
Diameter	0.50	ft

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.00		
1.00	0.91	4.65
2.00	1.40	7.11
3.00	1.75	8.91
4.00	2.04	10.41
5.00	2.30	11.71
6.00	2.53	12.89
7.00	2.74	13.96
8.00	2.94	14.96
9.00	3.12	15.90
10.00	3.30	16.78
11.00	3.46	17.62
12.00	3.62	18.42
13.00	3.77	19.19
14.00	3.91	19.93
15.00	4.05	20.64

Rating Table for Circular Orifice - 12" opening

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	0.51	ft
Centroid Elevation	0.50	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.67	
Diameter	1.00	ft

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.00		
1.00	2.98	3.80
2.00	5.17	6.58
3.00	6.67	8.50
4.00	7.90	10.05
5.00	8.95	11.40
6.00	9.90	12.60
7.00	10.76	13.70
8.00	11.56	14.72
9.00	12.31	15.67
10.00	13.01	16.57
11.00	13.68	17.42
12.00	14.31	18.23
13.00	14.92	19.00
14.00	15.51	19.75
15.00	16.07	20.47

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	K&A Engineering, Inc.	Date	4/26/2024
Designed by	JY	County/City Case No	
Company Project Number/Name	Keller Crossing		
Drainage Area Number/Name	Area F (On-site Residential) = 16.4 Ac		

Enter the Area Tributary to this Feature A_T = 16.4 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township 6S

Range 2W

Section 29

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.57

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.75

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.54

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$

V_u = 0.31 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 18,455 ft^3

Notes:

Santa Margarita Watershed

BMP Design Flow Rate, Q_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

Company Name	K&A Engineering, Inc.	Date	4/26/2024
Designed by	JY	County/City Case No	
Company Project Number/Name	Keller Crossing		
Drainage Area Number/Name	Area F (on-site residential) = 16.4 Ac		

Enter the Area Tributary to this Feature A_T = 16.4 acres

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.75

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.54

BMP Design Flow Rate

$Q_{BMP} = C \times I \times A_T$

Q_{BMP} = 1.8 ft^3/s

Notes:

HYDROMODIFICATION

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Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	Keller Project	Rain Gauge	Wildomar/North Murrieta
Latitude (decimal format):	33.629736	BMP Type (per WQMP):	Residential - Area F = 16.4 Ac
Longitude (decimal format):	-117.096404	BMP Number (Sequential):	

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	16.4	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.5
LONGEST WATERCOURSE (FT) - 1,000' max[1]	1752	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.788
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1496	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.55
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1449	CLOSEST IMPERVIOUS PERCENTAGE (%)	0% Undeveloped - Good Cover
EXISTING IMPERVIOUS PERCENTAGE (%)	0		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
32	16.4 Ac.	Pasture, Dryland	Poor Cover	0	20	30	50	72	**86**	94
								0	**0**	0
								0	**0**	0
	16.40 Ac.						**Weighted Average RI Numbers =**	**72.0**	**86.0**	**94.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **9.568** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.704** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	16.4
LONGEST WATERCOURSE (FT)	1752
DIFFERENCE IN ELEV (FT) - along watercourse	47
PROPOSED IMPERVIOUS PERCENTAGE (%)	75

Go to "BMP Design" tab to design your BMP, then check results below.
Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	16.4 Ac.	Urban Landscaping	Good Cover		20	30	50	50	**69**	84
								0	**0**	0
								0	**0**	0
	16.40 Ac.						**Weighted Average RI Numbers =**	**50.0**	**69.0**	**84.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

			First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
			Requirement		Proposed			
Hydromod Ponded depth	**2.20 feet**							
Hydromod Drain Time (unclogged)	**84.68 hours**							
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**		---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**		---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**		---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: _____ Date: _____

Signature: _____ Spreadsheet Developed by: Benjie Cho, P.E.

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BMP Design

Fill in blue shaded areas

BMP Geometry & Detention Calculations

0.1	feet, Stage Intervals

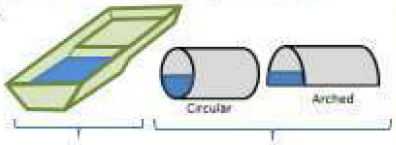
Increase intervals or decrease height

Height is above the limits of this sheet

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 1 for yes; 2 for no

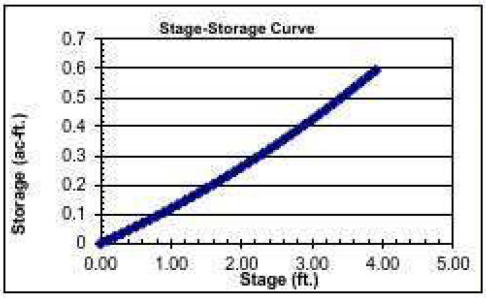


Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 5.0' SS= 3 :1

	Top Area		Bottom Area	
Width	90	Width	60	FT
Length	110	Length	80	FT
area =	9900	area =	4800	

Top Stage H= 0.0'

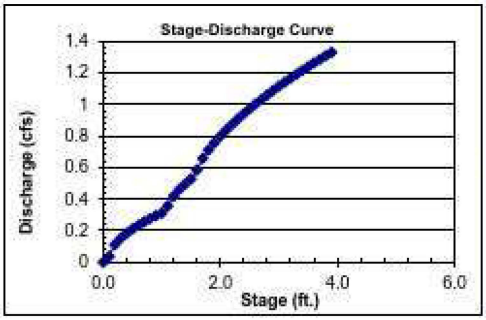


Prop. Top Stg. Vol. =	-	FT3
Prop Bottom Stg Vol =	35,989	FT3
Total Prop. Volume* =	35,989	FT3
Max HydroMod Volume =	12,670	FT3
Total Acreage* =	9,900	FT2
BMP % of Site =	1.39%	
Max HydroMod Depth* =	2.20	FT

*Does not include forebay, or low flow trench

*Does not account for freeboard or access roads

*Does not consider Increased Runoff



MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	2.00	3			
1	2.00	2			
1.5	2.00	2			

Hydromod Depth = 2.20 FT

+ 1' Freeboard = 3.20 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	90	FT
Length	110	FT

Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.011	484	0.04
0.20	0.022	977	0.11
0.30	0.034	1478	0.15
0.40	0.046	1988	0.18
0.50	0.058	2506	0.21
0.60	0.070	3034	0.23
0.70	0.082	3570	0.26
0.80	0.094	4115	0.28
0.90	0.107	4669	0.29
1.00	0.120	5232	0.31
1.10	0.133	5804	0.36
1.20	0.147	6386	0.42
1.30	0.160	6976	0.46
1.40	0.174	7576	0.50
1.50	0.188	8185	0.53
1.60	0.202	8804	0.59
1.70	0.217	9433	0.66
1.80	0.231	10071	0.71
1.90	0.246	10719	0.76
2.00	0.261	11376	0.80
2.10	0.276	12043	0.84
2.20	0.292	12721	0.87
2.30	0.308	13408	0.91
2.40	0.324	14105	0.94
2.50	0.340	14812	0.97
2.60	0.357	15530	1.00
2.70	0.373	16258	1.03
2.80	0.390	16996	1.06
2.90	0.407	17745	1.09
3.00	0.425	18504	1.11
3.10	0.442	19274	1.14
3.20	0.460	20054	1.17
3.30	0.479	20845	1.19
3.40	0.497	21647	1.22
3.50	0.516	22459	1.24
3.60	0.535	23283	1.26
3.70	0.554	24118	1.29
3.80	0.573	24963	1.31
3.90	0.593	25820	1.33
	0.593	25,820	

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudinal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

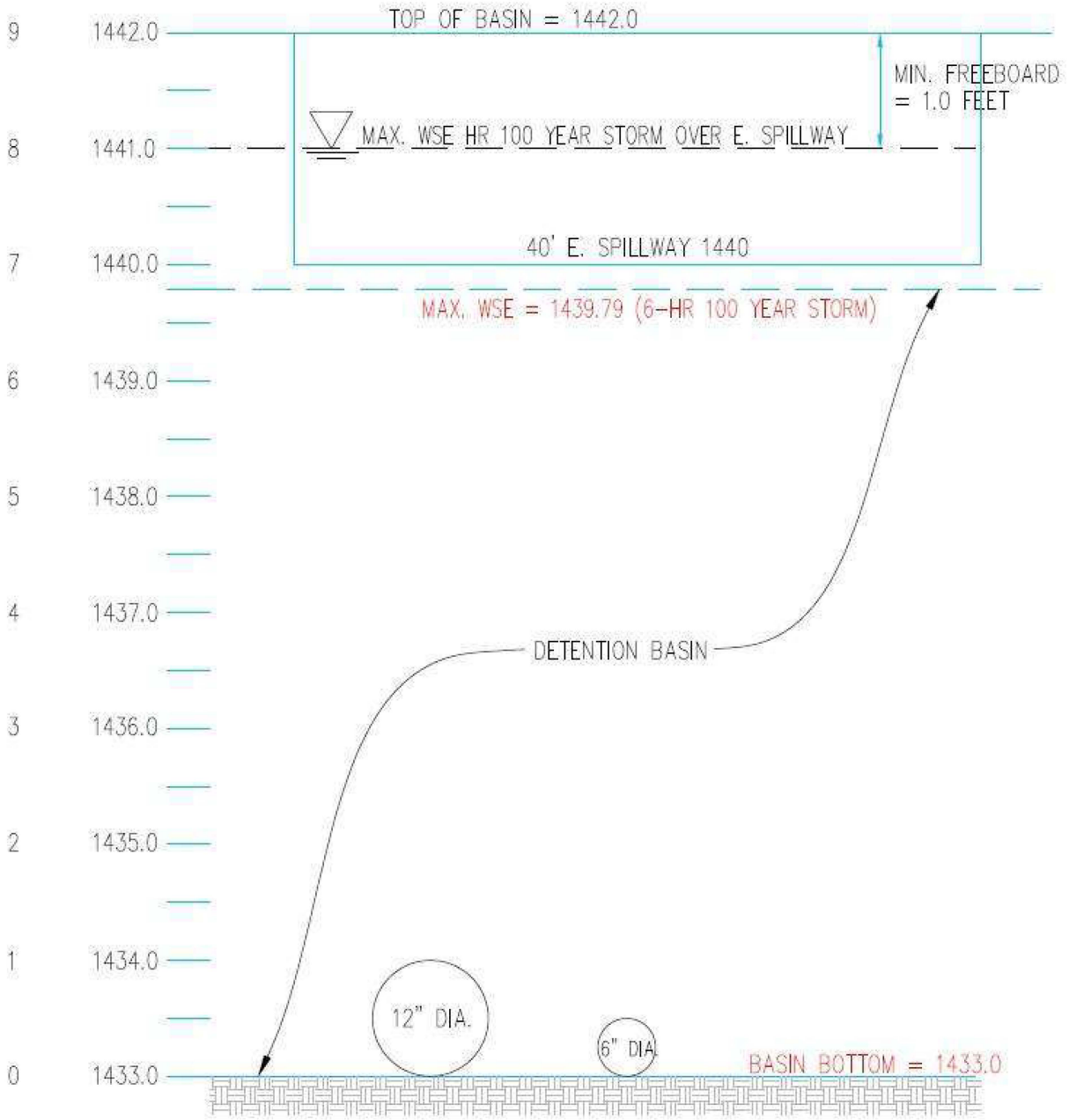
Enter information from actual infiltration tests			
Yes	Consider Infiltration (Yes or No)?		
0.06	Infiltration rate (in/hr) [3]	0.0067	ft3/sec, Infiltration (over entire bottom)
3	Factor of Safety (3 or greater) [3]	0.0022	ft3/sec, Infiltration / Factor of Safety
300	mins, Max. Time represented by tests		

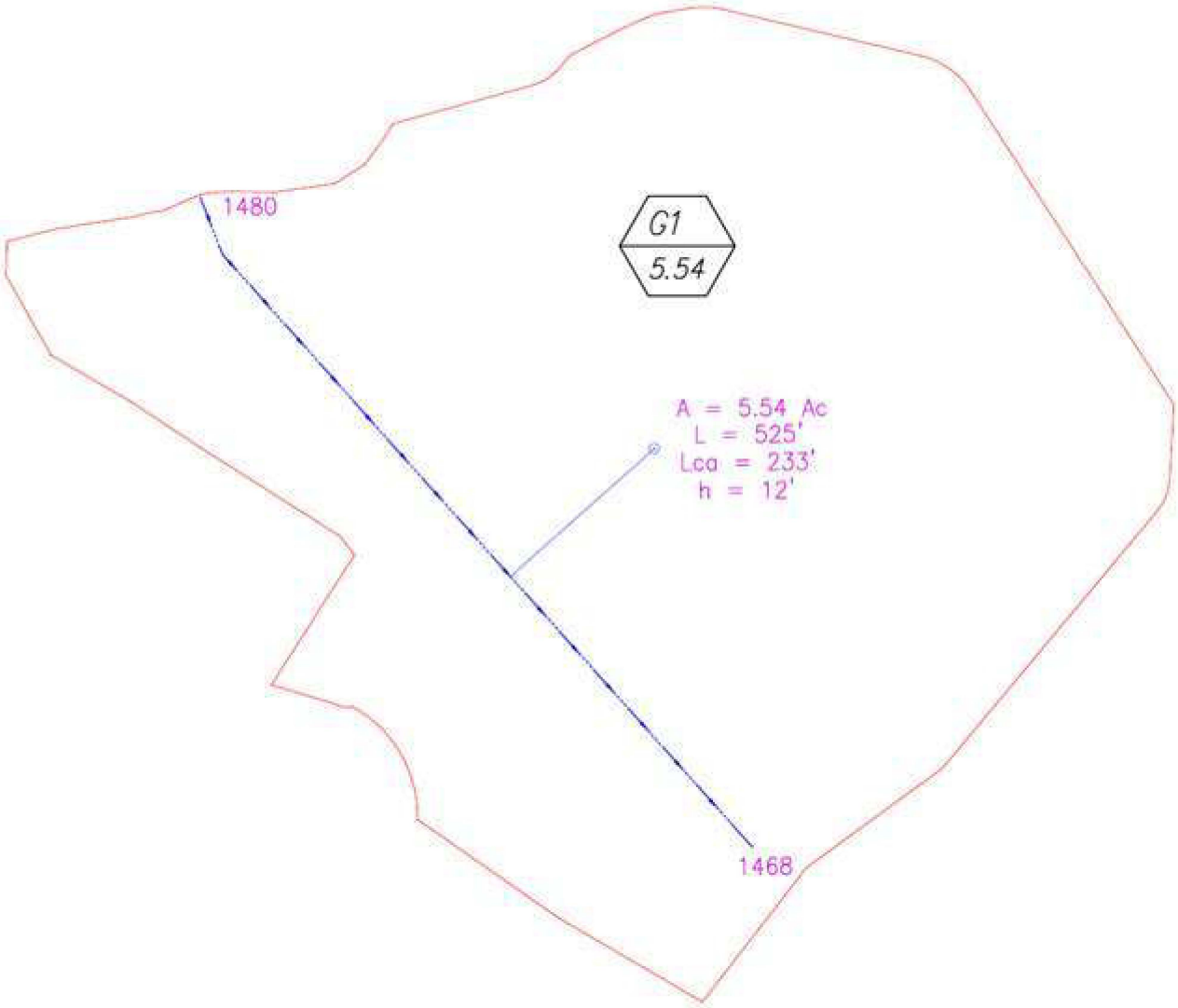
[3]Per the RC LID Manual, Appendix A.

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

Tr. 38163, Keller Crossing - HYDROLOGIC FLOW CHART

DETENTION BASIN "F"





Drainage Area G1 = 5.54 Ac – to WQ/Detention Basin G

Summary of Hydrographs and Basin Routing:
Drainage Area G – 5.5 Ac (Detention above WQ basin volume to mitigate 100-year storm)
WQ / Detention G use for Hydromodification and Peak Flow reduction

For Hydromodification see WQMP for complete report:

Storm Frequency	**DS #7 Culvert Capacity** Q_{max} (cfs	**DS #7 Culvert Capacity** Q_{100} (cfs)	**Proposed** Q_{INFLOW} (cfs)	**Det. Basin Outlet** $Q_{OUTFLOW}$ (cfs)
10-year 1-hour	19.5	16.3	Hydromodification	
25-year 1-hour	19.5	16.3		
100-year 1-hour	19.5	16.3	20.520	**5.381**
100-year 3-hour	19.5	16.3	9.102	4.943
100-year 6-hour	19.5	16.3	8.440	4.885
100-year 24-hour	19.5	16.3	2.828	2.618

Tr. 38163 - Keller Crossing					
Manning "n" Value Worksheet					
Drainage Area G1 - 5.54 Ac (proposed)					
[1]	[2]	[3]	[4]	[5]	[7]
Subarea	**Area in (Ac)**	**Land Use (Plate D-5.6)**	**"n" Value**	**Decimal portion of Area [2] / SUM[2]**	**Average "n" Value [4] * [5]**
		Natural	0.035	0.00	0.000
		Res 1 Ac	0.015	0.00	0.000
		Res 1/2 Ac	0.015	0.00	0.000
		Res 1/4 Ac	0.015	0.00	0.000
		Res < 1/4 Ac	0.015	0.00	0.000
		Apartment	0.015	0.00	0.000
	5.54	Multi Family	0.015	1.00	0.015
		Hospital	0.02	0.00	0.000
		Commercial	0.015	0.00	0.000
Sum =	5.54			1.00	**0.015**

Tr. 38163 - Keller Crossing							
Runoff Index (RI) Worksheet							
Drainage Area G1 - 5.54 Ac (Proposed)							
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Subarea	**Area in (Ac)**	**Soil Group**	**Cover Type**	**RI Number (Plate E6-1)**	**Land Use**	**Decimal portion of Area [2] / SUM[2]**	**Average RI Value [5] * [7]**
Basin		B	Landscape	56	Basin	0.00	0.0
	0.38	C	Landscape	69	Basin	1.00	69.0
		D	Landscape	75	Basin	0.00	0.0
Sum =	*0.38*					1.00	**69.0**
Multi Family		B	Landscape	56	Commercial	0.00	0.0
	3.16	C	Landscape	69	Commercial	0.61	42.3
	2	D	Landscape	75	Commercial	0.39	29.1
Sum =	*5.16*					1.00	**71.3**
Total =	5.54						

Tr. 38163 - Keller Crossing						
Soil Low Loss Rate Worksheet						
Drainage Area G1 - 5.54 Ac (Proposed)						
[1]	[2]	[3]	[4]	[5]	[6]	[7]
Subarea	**Area in (Ac)**	**Land Use (Plate D-5.6)**	**% Impervious (Plate D-5.6)**	**Soil Low Loss Rate 0.9-(0.8)* [4]**	**Decimal portion of Area [2] / SUM[2]**	**Average Low Loss Rate [5] * [6]**
		Natural	0	0.90	0.00	0.00
	0.38	Basin	3	0.88	0.07	0.06
		Res 1/2 Ac	40	0.58	0.00	0.00
		Res 1/4 Ac	50	0.50	0.00	0.00
		Res < 1/4 Ac	65	0.38	0.00	0.00
		Res < 1/4 Ac	70	0.34	0.00	0.00
		Mobil Home	75	0.30	0.00	0.00
	5.16	Multi Family	85	0.22	0.93	0.20
		Commercial	90	0.18	0.00	0.00
Sum =	5.54				1.00	**0.26**

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	K&A Engineering, Inc.	Date	9/1/2022
Designed by	JY	County/City Case No	
Company Project Number/Name	Keller Crossing		
Drainage Area Number/Name	Area G1 (Multi Family) = 5.54 Ac		

Enter the Area Tributary to this Feature A_T = 5.54 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township 6S

Range 2W

Section 29

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.57

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.80

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.60

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$

V_u = 0.34 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 6,837 ft^3

Notes:

HYDROMODIFICATION

It is expressly agreed and understood by the USER of this Excel Spreadsheet file (file) released hereby (whether released in digital or hard copy form) that Riverside County (County) makes no representation as to its accuracy. Further, it is the intent of the parties hereto that the USER shall review and verify calculations, analyze results, and/or independently determine the accuracy thereof prior to placing any reliance whatsoever on the information. Further, the USER shall hold the County, together with the officers, agents and employees of each, free and harmless from any liability whatsoever, including wrongful death, based or asserted upon any act or omission of the District or County, their officers, agents, employees or subcontractors, relating to or in any way connected with the unauthorized use of these files or information, and USER agrees to protect and defend, including all attorney fees and other expenses, each of the foregoing bodies and persons in any legal action based or asserted upon any such acts or omissions. USER also agrees not to sell, reproduce or release these files to others for any purpose whatsoever, except those incidental uses for which the files were acquired, verified and combined with USER'S own work product. Reasonable effort was made to fully comply with the San Diego MS4 Permit requirements using the methods found in the Riverside County Hydrology Manual. If the user finds an error in any way, please contact the County so that the error can be corrected. Any direct tampering of the equations in this spreadsheet would be considered extremely inappropriate, and potentially fraudulent.

Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	Keller Project	Rain Gauge	Wildomar/North Murrieta
Latitude (decimal format):	33.629736	BMP Type (per WQMP):	Multifamily - Area G1 = 5.54 Ac
Longitude (decimal format):	-117.096404	BMP Number (Sequential):	

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	5.54	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.5
LONGEST WATERCOURSE (FT) - 1,000' max[1]	525	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.788
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1501	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.55
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1453	CLOSEST IMPERVIOUS PERCENTAGE (%)	0% Undeveloped - Good Cover
EXISTING IMPERVIOUS PERCENTAGE (%)	0		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
32	5.54 Ac.	Pasture, Dryland	Poor Cover	0	20	30	50	72	86	94
								0	0	0
								0	0	0
	5.54 Ac.						Weighted Average RI Numbers =	72.0	86.0	94.0

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Susceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = 3.433 cfs	Ex. 10% of the 2-year Flowrate[1] = 0.387 cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	5.54	Go to "BMP Design" tab to design your BMP, then check results below. Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.
LONGEST WATERCOURSE (FT)	525	
DIFFERENCE IN ELEV (FT) - along watercourse	12	
PROPOSED IMPERVIOUS PERCENTAGE (%)	80	

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	5.54 Ac.	Urban Landscaping	Good Cover		20	30	50	50	69	84
								0	0	0
								0	0	0
	5.54 Ac.						Weighted Average RI Numbers =	50.0	69.0	84.0

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
		Requirement		Proposed			
Hydromod Ponded depth	1.30 feet						
Hydromod Drain Time (unclogged)	45.38 hours						
Is the HydroMod BMP properly sized?	Yes, this is acceptable	--	--	--	--		
Mitigated Q < 110% of Pre-Dev. Q?	Yes, this is acceptable	--	--	--	--	Issue @ Stage =	--
Mitigated Duration < 110% of Pre-Dev?*	Yes, this is acceptable	--	--	--	--	Issue @ Stage =	--

Responsible-in-charge: _____ Date: _____

Signature: _____ Spreadsheet Developed by: Benjie Cho, P.E.

It is expressly agreed and understood by the USER of this Excel Spreadsheet file (file) released hereby (whether released in digital or hard copy form) that Riverside County (County) makes no representation as to its accuracy. Further, it is the intent of the parties hereto that the USER shall review and verify calculations, analyze results, and/or independently determine the accuracy thereof prior to placing any reliance whatsoever on the information. Further, the USER shall hold the County, together with the officers, agents and employees of each, free and harmless from any liability whatsoever, including wrongful death, based or asserted upon any act or omission of the District or County, their officers, agents, employees or subcontractors, relating to or in any way connected with the unauthorized use of these files or information; and USER agrees to protect and defend, including all attorney fees and other expenses, each of the foregoing bodies and persons in any legal action based or asserted upon any such acts or omissions. USER also agrees not to sell, reproduce or release these files to others for any purpose whatsoever, except those incidental uses for which the files were acquired, verified and combined with USER'S own work product. Reasonable effort was made to fully comply with the San Diego M54 Permit requirements using the methods found in the Riverside County Hydrology Manual. If the user finds an error in any way, please contact the County so that the error can be corrected. Any direct tampering of the equations in this spreadsheet would be considered extremely inappropriate, and potentially fraudulent.

BMP Design

Fill in blue shaded areas

BMP Geometry & Detention Calculations

0.1 feet, Stage Intervals

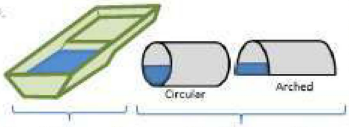
Increase intervals or decrease height

Height is above the limits of this sheet

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 1 for yes; 2 for no.



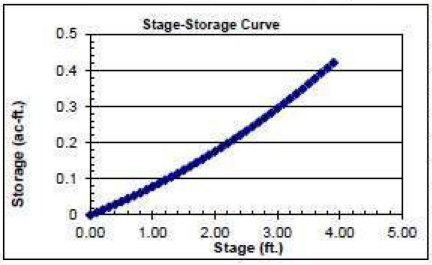
"Basin Shaped" "Tank Shaped"

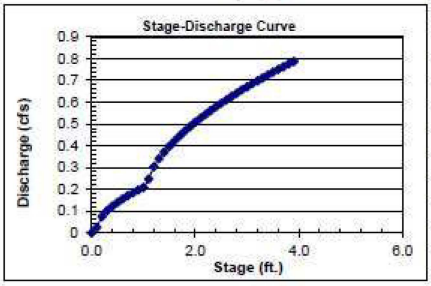
Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 5.0' SS= 3 :1

Top Area		Bottom Area		
Width	60	Width	30	FT
Length	130	Length	100	FT
area =	7800	area =	3000	

Top Stage H= 0.0'





Prop. Top Stg. Vol. =	-	FT3
Prop Bottom Stg Vol =	26,062	FT3
Total Prop. Volume[1] =	26,062	FT3
Max HydroMod Volume =	4,422	FT3
Total Acreage[2] =	7,800	FT2
BMP % of Site =	3.23%	
Max HydroMod Depth[3] =	1.30	FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	2.00	2			
1	2.00	2			

Hydromod Depth = 1.30 FT

+ 1' Freeboard = 2.30 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	60	FT
Length	130	FT

Stage-Storage-Discharge*			
Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.007	304	0.02
0.20	0.014	616	0.07
0.30	0.021	935	0.10
0.40	0.029	1263	0.12
0.50	0.037	1599	0.14
0.60	0.045	1943	0.16
0.70	0.053	2295	0.17
0.80	0.061	2656	0.18
0.90	0.069	3025	0.20
1.00	0.078	3402	0.21
1.10	0.087	3788	0.25
1.20	0.096	4182	0.30
1.30	0.105	4585	0.34
1.40	0.115	4997	0.37
1.50	0.124	5418	0.40
1.60	0.134	5848	0.42
1.70	0.144	6286	0.45
1.80	0.155	6734	0.47
1.90	0.165	7190	0.49
2.00	0.176	7656	0.51
2.10	0.187	8131	0.53
2.20	0.198	8615	0.55
2.30	0.209	9109	0.56
2.40	0.221	9612	0.58
2.50	0.232	10125	0.60
2.60	0.244	10647	0.61
2.70	0.257	11179	0.63
2.80	0.269	11721	0.64
2.90	0.282	12273	0.66
3.00	0.295	12834	0.67
3.10	0.308	13405	0.69
3.20	0.321	13987	0.70
3.30	0.335	14578	0.71
3.40	0.348	15180	0.73
3.50	0.363	15792	0.74
3.60	0.377	16414	0.75
3.70	0.391	17047	0.76
3.80	0.406	17690	0.78
3.90	0.421	18344	0.79
	0.421	18,344	

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests

Yes	Consider Infiltration (Yes or No)?	
0.1	Infiltration rate (in/hr) [3]	0.0069 ft3/sec, Infiltration (over entire bottom)
3	Factor of Safety (3 or greater) [3]	0.0023 ft3/sec, Infiltration / Factor of Safety
300	mins, Max. Time represented by tests	

[3]Per the RC LID Manual, Appendix A.

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

Rating Table for Circular Orifice - 10" opening

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	1.00	ft
Centroid Elevation	0.42	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.67	
Diameter	0.83	ft

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.00		
1.00	2.22	4.11
2.00	3.66	6.77
3.00	4.68	8.64
4.00	5.51	10.18
5.00	6.23	11.51
6.00	6.87	12.70

Rating Table for Broad Crested Weir - 10 LF Emergency Spillway

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	2.00	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Crest Surface Type	Paved	
Crest Breadth	15.00	ft
Crest Length	10.00	ft

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.00		
1.00	30.37	3.04
2.00	85.98	4.30
3.00	159.26	5.31
4.00	246.55	6.16
5.00	345.14	6.90

Worksheet for Broad Crested Weir - Basin Emergency Spillway

Project Description

Solve For	Headwater Elevation

Input Data

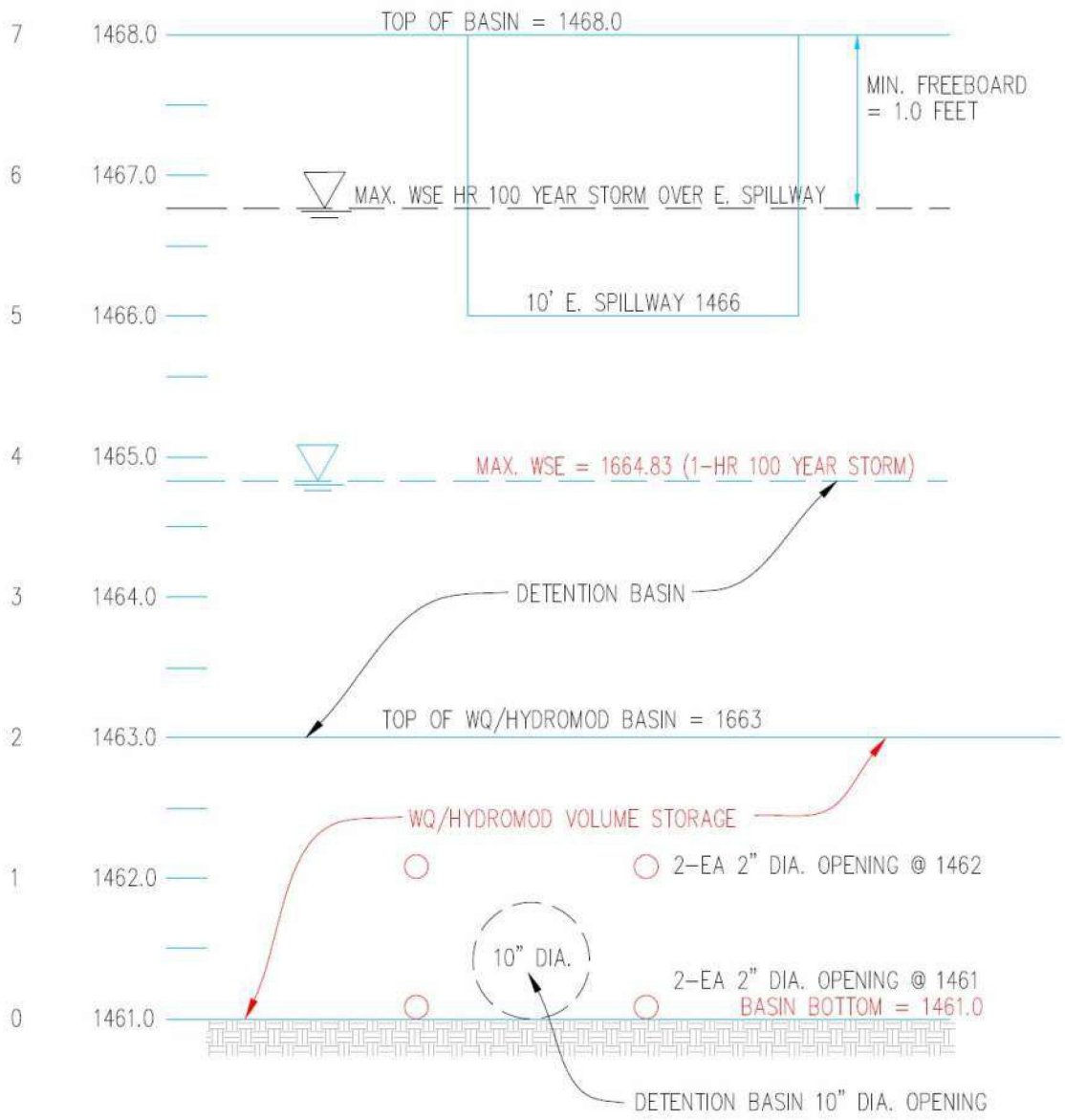
Discharge		20.52	ft³/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		15.00	ft
Crest Length		10.00	ft

Results

Headwater Elevation	0.77	ft
Headwater Height Above Crest	0.77	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.03	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.03	US
Flow Area	7.71	ft²
Velocity	2.66	ft/s
Wetted Perimeter	11.54	ft
Top Width	10.00	ft

Tr. 38163, Keller Crossing - HYDROLOGIC FLOW CHART

WQ-HYDROMOD/DETENTION BASIN "G1"



HYDRAULICS

Storm Drain System Calculations

The 'Open Channel, Pipe and Inlet Program Flow Master' by Bentley V8i, Reference 4, was used to determine the street capacity, ditch capacity and inlet sizing.

Main line system: the following assumptions and criteria were used to design the main line system:

1. n = 0.013 for reinforced concrete pipe,
2. n = 0.014 for reinforced concrete box,
3. n = 0.015 for concrete V-ditch.

The minor losses considered in this study are as follows: friction loss, junction loss, transition loss, and manhole loss. In order to minimize junction structure losses, all junctions are entering the main line at an angle of approximately 45 degrees.

See Catch Basin Sizing calculations in **Final design.**

WSPG hydraulic calculations will be used in the design for the principal off site and onsite storm drains to determine the hydraulic gradient elevation for proposed conduit sizes.

See **Final design** for WSPG calculations.

For the proposed Storm Drain Pipe system in this stage, the size will be estimated by using peak discharges for 100-year storm event and using normal depth pipe flow capacity (Manning Formula, software program Flow Master V8i by Bentley Inc., Reference 4).

See below Rating Tables for RCP:

Rating Table for Circular Pipe - Table Proposed RCP

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	3.00	ft
Diameter	3.00	ft
Discharge	66.69	ft³/s

Channel Slope (ft/ft)	Diameter (ft)	Normal Depth (ft)	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	1.50	1.50	7.43	4.20	1.77	4.71	0.00
0.00500	2.00	2.00	16.00	5.09	3.14	6.28	0.00
0.00500	2.50	2.50	29.00	5.91	4.91	7.85	0.00
0.00500	3.00	3.00	47.16	6.67	7.07	9.42	0.00
0.00500	3.50	3.50	71.14	7.39	9.62	11.00	0.00
0.00500	4.00	4.00	101.57	8.08	12.57	12.57	0.00
0.01000	1.50	1.50	10.50	5.94	1.77	4.71	0.00
0.01000	2.00	2.00	22.62	7.20	3.14	6.28	0.00
0.01000	2.50	2.50	41.01	8.36	4.91	7.85	0.00
0.01000	3.00	3.00	66.69	9.44	7.07	9.42	0.00
0.01000	3.50	3.50	100.60	10.46	9.62	11.00	0.00
0.01000	4.00	4.00	143.64	11.43	12.57	12.57	0.00
0.01500	1.50	1.50	12.86	7.28	1.77	4.71	0.00
0.01500	2.00	2.00	27.71	8.82	3.14	6.28	0.00
0.01500	2.50	2.50	50.23	10.23	4.91	7.85	0.00
0.01500	3.00	3.00	81.68	11.56	7.07	9.42	0.00
0.01500	3.50	3.50	123.21	12.81	9.62	11.00	0.00
0.01500	4.00	4.00	175.92	14.00	12.57	12.57	0.00
0.02000	1.50	1.50	14.85	8.41	1.77	4.71	0.00
0.02000	2.00	2.00	31.99	10.18	3.14	6.28	0.00
0.02000	2.50	2.50	58.00	11.82	4.91	7.85	0.00
0.02000	3.00	3.00	94.32	13.34	7.07	9.42	0.00
0.02000	3.50	3.50	142.28	14.79	9.62	11.00	0.00
0.02000	4.00	4.00	203.13	16.16	12.57	12.57	0.00
0.02500	1.50	1.50	16.61	9.40	1.77	4.71	0.00
0.02500	2.00	2.00	35.77	11.39	3.14	6.28	0.00
0.02500	2.50	2.50	64.85	13.21	4.91	7.85	0.00
0.02500	3.00	3.00	105.45	14.92	7.07	9.42	0.00
0.02500	3.50	3.50	159.07	16.53	9.62	11.00	0.00
0.02500	4.00	4.00	227.11	18.07	12.57	12.57	0.00
0.03000	1.50	1.50	18.19	10.30	1.77	4.71	0.00
0.03000	2.00	2.00	39.18	12.47	3.14	6.28	0.00
0.03000	2.50	2.50	71.04	14.47	4.91	7.85	0.00
0.03000	3.00	3.00	115.52	16.34	7.07	9.42	0.00

0.03000	3.50	3.50	174.25	18.11	9.62	11.00	0.00
0.03000	4.00	4.00	248.78	19.80	12.57	12.57	0.00
0.03500	1.50	1.50	19.65	11.12	1.77	4.71	0.00
0.03500	2.00	2.00	42.32	13.47	3.14	6.28	0.00
0.03500	2.50	2.50	76.73	15.63	4.91	7.85	0.00
0.03500	3.00	3.00	124.77	17.65	7.07	9.42	0.00
0.03500	3.50	3.50	188.21	19.56	9.62	11.00	0.00
0.03500	4.00	4.00	268.72	21.38	12.57	12.57	0.00
0.04000	1.50	1.50	21.01	11.89	1.77	4.71	0.00
0.04000	2.00	2.00	45.24	14.40	3.14	6.28	0.00
0.04000	2.50	2.50	82.03	16.71	4.91	7.85	0.00
0.04000	3.00	3.00	133.39	18.87	7.07	9.42	0.00
0.04000	3.50	3.50	201.21	20.91	9.62	11.00	0.00
0.04000	4.00	4.00	287.27	22.86	12.57	12.57	0.00

The Mainline Storm drain sizing: for proposed Storm Drain Pipe system in this stage, the size will be estimated by using peak discharges for 100-year storm event and using normal depth pipe flow capacity:

See Figure 5 for **Storm Drain Facility Map.**

Drainage Area	Area in Acre	Q_{100} sub-area in cfs	Q_{100} conf. in cfs	Estimate storm drain pipe slope (%)	Mainline Storm Drain Pipe Size in (inches)
C-12 Debris/Detention Basin C	5.10	9.42	442.13		
	Basin C (off-site) Outflow =	$Q_{100\text{-}6}$ (max) = **66.981 cfs**			
C-13	0.90	0.31	67.29	1% min.	36” RCP
C-14	4.00	1.37	68.67	Var.	Ex. Nat. Stream
	Node 315	**Conf. =**	**68.67**		
C-15	4.70	11.26		1%	18” RCP
C-16	2.80	6.55	17.81	1%	24” RCP
C-17	3.60	8.38	26.19	1%	30” RCP
C-18	2.40	5.42	31.61	1%	30” RCP
C-19	3.90	8.68	40.29	1%	30” RCP
C-20	2.40	5.29	45.58	1%	36” RCP
C-21	2.40	5.22	50.81	1%	36” RCP
C-22	5.30	11.56	62.37	1%	36” RCP
C-23	3.20	7.04	69.40	1%	42” RCP
C-24	3.40	7.51	76.91	1%	42” RCP
C-25	6.10	13.15	90.06	1%	42” RCP
C-26 WQ/Detention Basin C	5.30	10.07	100.13	1%	42” RCP
C-27	3.70	9.81		1%	18” RCP
C-28	7.50	19.18	28.99	1%	30” RCP
C-29	3.70	9.90		1%	18” RCP
C-30	2.90	7.61	17.51	1%	24” RCP
	Node 332	Conf. =	46.00	1%	36” RCP
C-31	3.50	8.82	54.82	1%	36” RCP
C-32	3.00	7.43	62.25	1%	36” RCP
C-33	6.50	17.73		1%	18” RCP
C-34	11.50	26.98	44.71	1%	36” RCP
C-35	2.40	5.64	50.35	1%	36” RCP
	Node 328	Conf. =	197.75		
	Basin C (on-site) Outflow =	$Q_{100\text{-}6}$ (max) = **70.119 cfs**			
C-36	2.10	0.84	70.96	1%	42” RCP
	Node 315	**Conf. =**	**136.12**		
C-37	5.50	1.94	**138.07**	Var.	Ex. Nat. Stream

E-1	2.30	8.08			
E-2 WQ Basin E	0.70	2.37	9.7	1%	18” RCP
	WQ Basin E for “Residential” Drainage Area F	Q max. = 9.7 cfs	**12.16**		Existing DS #5 24” RCP
F-4 Detention Basin F	2.9	5.15	87.50		
F-5	7.2	19.29		1%	18” RCP
F-6	6.6	17.21	36.50	1%	30” RCP
F-7	1.5	3.95	40.46	1%	36” RCP
F-8	0.9	2.37	42.82	1%	36” RCP
	Node 605	Conf. =	119.35		
	Basin F Max Outflow =	**13.715 cfs**			
F-9	1.7	0.66	**14.38**		Existing DS #6 24” RCP
G-1 WQ/Detention Basin G	5.3				
	Basin G Max Outflow =	**5.38 cfs**			
G-2	1.7	1.80	**7.18**		Existing DS #7 24” RCP

CONCLUSION

The proposed storm drain system for Keller Crossing Development – Tract 38163 has been designed for the ultimate / proposed condition to convey the 100-year storm event. All necessary drainage easements will be provided as required. This report was prepared to estimate the sizing of proposed storm drain pipes, catch basins, and the included storm drain water surface profile calculations confirm that the system is capable of conveying the 100-year storm event. The proposed site plan, including the grading and drainage design, for Keller Crossing development Project is in conformance with County of Riverside standards and requirements. The proposed storm drain system will drain into the existing downstream drainage facilities Caltrans Culverts Drainage System 2 through Drainage System 8 with smaller peak discharges than an existing conditions or capacity of existing culverts.

The peak flows (2-, 5-, 10-, 100-year 1-, 3-, 6-, and 24-hour storm), post-project water quality will be mitigated with the use of proposed WQ/Detention Basin per Santa Margarita Region Hydromodification Management plan.

Impacts to the existing downstream drainage facilities due to runoff from Keller Crossing development Project will be less than in the existing, pre-developed condition:

- Safely intercept offsite flows and convey them through the site
- Generally maintain drainage patterns as shown on Master Drainage Plan and discharge locations.
- In complying with Santa Ana Region NPDES-MS4 Permit requirements, safely intercept Design Capture Volume and convey onsite developed storm flows to the onsite Water Quality Treatment Control Basin.
- Provide emergency by-pass for 100-year storm event without damage the BMPs.
- Erosion and Sediment Control will be provided during construction for all disturbed areas within the project site
- Comply with Statewide Trash Control Amendments. Trash compliance is for 1-year storm and we are providing mitigation for 2-year storm, above the Trash Capture requirements.
- The proposed Drainage system and Water Quality mitigation is to comply with CEQA requirements

REFERENCES

1. Riverside County Flood Control and Water Conservation District Hydrology Manual.
2. Tentative Tract Map 38163 Plans prepared by K & A Engineering, Inc.
3. CivilCADD / CivilDesign Engineering Software.
4. Hydraulic Calculations with Flow Master V8i, by Bentley, Inc.
5. California Storm Water Best Management Practices Handbook.
6. SMRHM software by Clear Creek Solution, Inc.

FIGURE:

FIGURE 3:

HYDROLOGY MAP - EXISTING CONDITION
(from Caltrans Drainage Report State Route 79, EA-464121)

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
DARRIN P. GINN
No. C63610
Exp. 09/30/10
CIVIL
STATE OF CALIFORNIA

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14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

DATE REVISED BY
DATE REVISED
CALCULATED/ DESIGNED BY
CHECKED BY
DESIGN OVERSIGHT
JON BUMPS
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
PROJECT DEVELOPMENT

OFFSITE DRAINAGE EXHIBIT

SUB AREAS A THRU G
STATE ROUTE 79
SCALE:1" = 200'

D-1

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
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DESIGN OVERSIGHT: JON BUMPS

CALCULATED/ DESIGNED BY

CHECKED BY

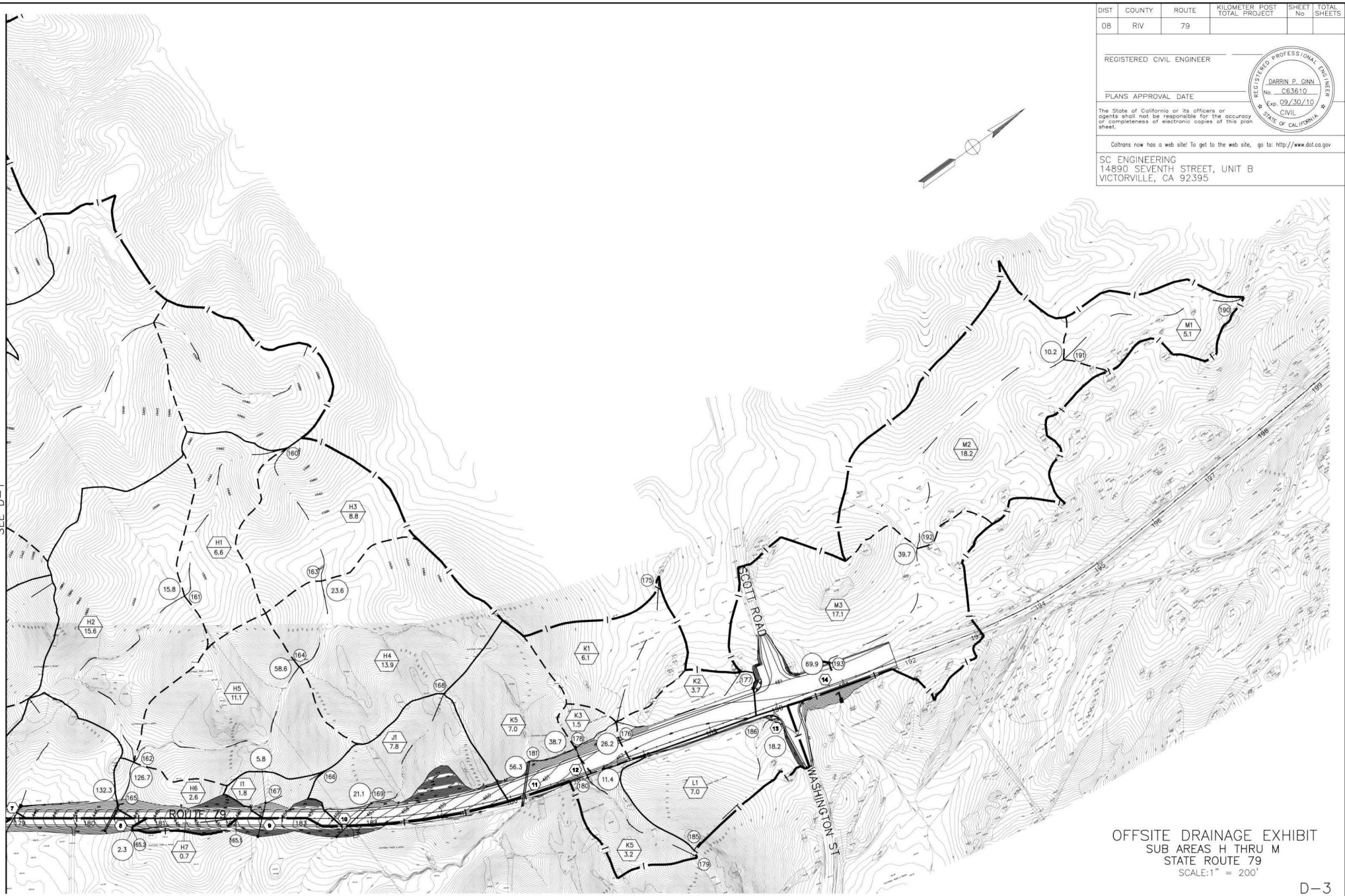
DATE REVISED

BY DATE REVISED

OFFSITE DRAINAGE EXHIBIT
SUB AREA C
STATE ROUTE 79
SCALE:1" = 200'

D-2

SEE D-1



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
DARRIN P. GINN
No. C63610
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DATE REVISED

OFFSITE DRAINAGE EXHIBIT
SUB AREAS H THRU M
STATE ROUTE 79
SCALE:1" = 200'

D-3

FIGURE 4a:

HYDROLOGY MAP - PROPOSED CONDITION

RATIONAL METHOD WITHOUT DETENTION BASINS

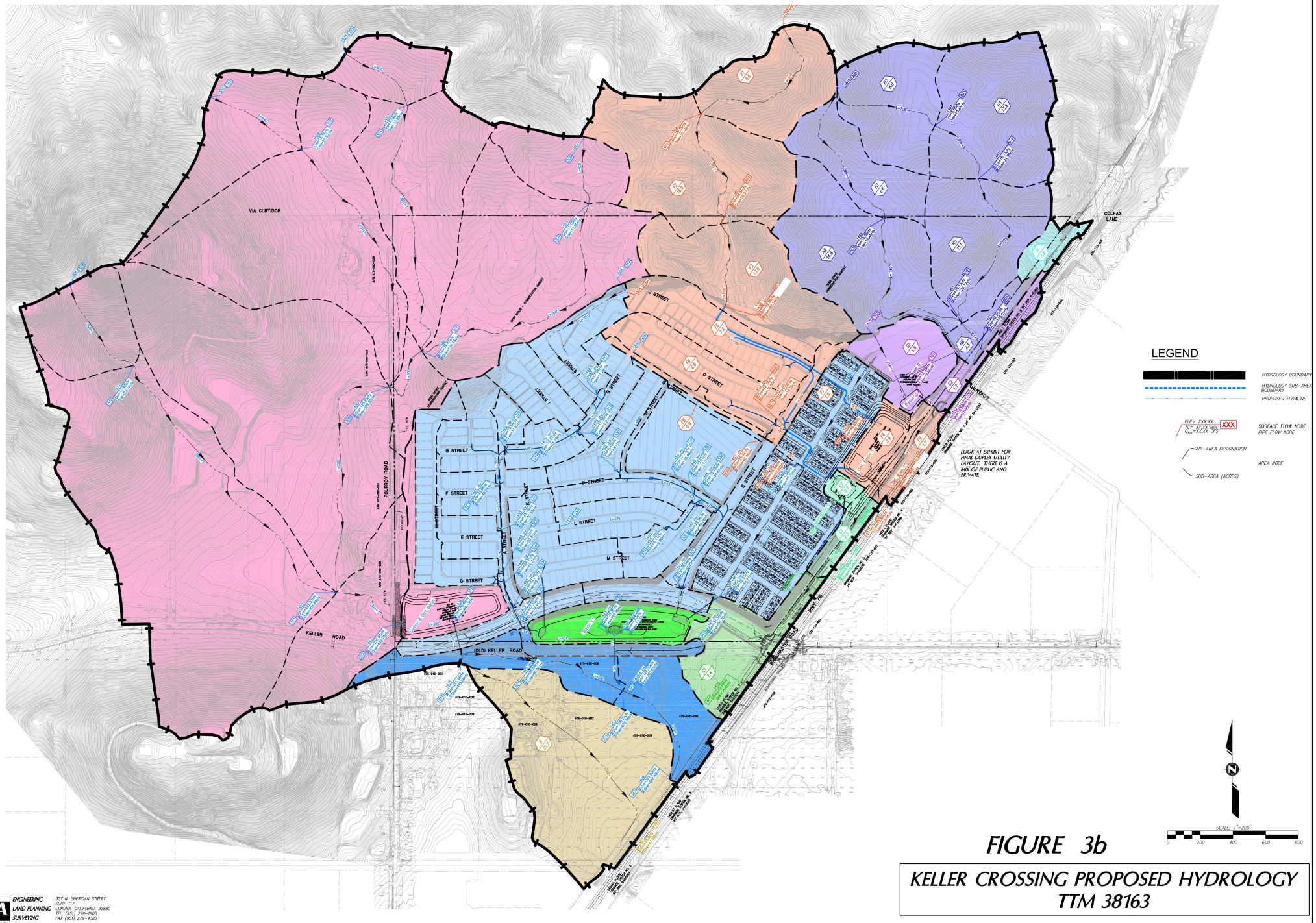


FIGURE 3b

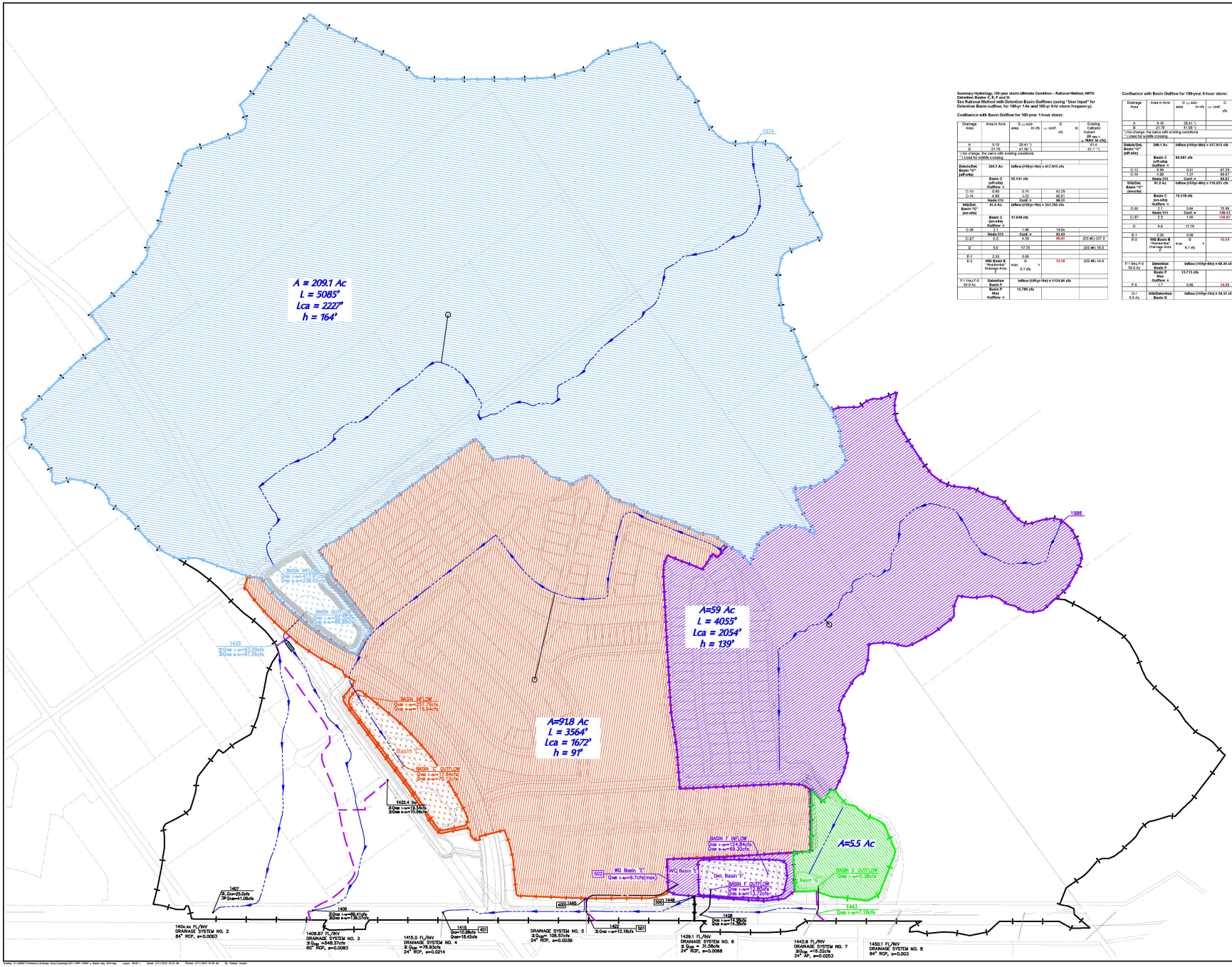
KELLER CROSSING PROPOSED HYDROLOGY
TTM 38163

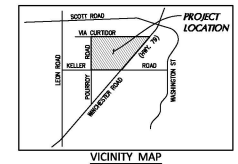
K&A Engineering, Inc.
ENGINEERING
LAND PLANNING
SURVEYING
357 N. SHERIDAN STREET
SUITE 117
CORONA, CALIFORNIA 92880
TEL (951) 279-1600
FAX (951) 279-4380

FIGURE 4b:

HYDROLOGY MAP - PROPOSED CONDITION

CONFLUENCE PEAK FLOWS WITH BASIN OUTFLOWS





VICINITY MAP
NOT TO SCALE

Summary Hydrology, 100-year storm Ultimate Condition – Rational Method, WITH Detention Basins C, E, F and G:
See Rational Method with Detention Basin Outflows (using "User Input" for Detention Basin outflow, for 100-yr 1-hr and 100-yr 6-hr storm frequency).

Confluence with Basin Outflow for 100-year 1-hour storm:

Drainage Area	Area in Acre	Q sub-area in cfs	Q conf. cfs	Existing Culvert (50 year MAX in cfs)
A	9.10	20.41 *)		51.4
B	21.78	41.06 *)		41.1 **)

*) No change, the same with existing conditions
**) Used for wildlife crossing

Debris/Det. Basin "C" (off-site)	**209.1 Ac**	**Inflow (100yr-1hr) = 417.913 cfs**		
	Basin C (off-site) Outflow =	**62.551 cfs**		
C-13	0.90	0.74	63.29	
C-14	4.00	3.22	66.51	
	Node 315	**Conf. =**	**66.51**	
WQ/Det. Basin "C" (on-site)	**91.8 Ac**	**Inflow (100yr-1hr) = 257.785 cfs**		
	Basin C (on-site) Outflow =	**17.649 cfs**		
C-36	7.1	1.90	19.54	
	Node 315	**Conf. =**	**69.03**	
C-37	5.5	4.30	69.41	(DS #6) 237.3
D	8.0	17.70		(DS #6) 16.0
E-1	2.30	0.06		
E-2	**WQ Basin E "Residential" Drainage Area F**	Q max. = 9.7 cfs	**12.16**	(DS #6) 14.0
F-1 thru F-8 59.0 Ac	**Detention Basin F**	**Inflow (100yr-1hr) = 1134.84 cfs**		
	Basin F Max Outflow =	**12.799 cfs**		

Confluence with Basin Outflow for 100-year 6-hour storm:

Drainage Area	Area in Acre	Q sub-area in cfs	Q conf. cfs	Existing Culvert (50 year MAX in cfs)
A	9.10	20.41 *)		51.4
B	21.78	41.06 *)		41.1 **)

*) No change, the same with existing conditions
**) Used for wildlife crossing

Debris/Det. Basin "C" (off-site)	**209.1 Ac**	**Inflow (100yr-6hr) = 417.913 cfs**		
	Basin C (off-site) Outflow =	**66.501 cfs**		
C-13	0.90	0.91	67.29	
C-14	4.00	3.37	69.87	
	Node 315	**Conf. =**	**69.87**	
WQ/Det. Basin "C" (on-site)	**91.8 Ac**	**Inflow (100yr-6hr) = 116.935 cfs**		
	Basin C (on-site) Outflow =	**78.119 cfs**		
C-36	7.1	0.94	79.98	
	Node 315	**Conf. =**	**106.12**	
C-37	5.5	1.04	**106.87**	(DS #6) 237.3
D	8.0	17.70		(DS #6) 16.0
E-1	2.30	0.06		
E-2	**WQ Basin E "Residential" Drainage Area F**	Q max. = 9.7 cfs	**12.16**	(DS #6) 14.0
F-1 thru F-8 59.0 Ac	**Detention Basin F**	**Inflow (100yr-6hr) = 69.39 cfs**		
	Basin F Max Outflow =	**13.715 cfs**		
F-8	1.7	0.66	**14.38**	(DS #6) 19.7
G-1 5.5 Ac	**WQ/Detention Basin G**	**Inflow (100yr-1hr) = 39.52 cfs**		

LEGEND

- HYDROLOGY BOUNDARY
- DRAINAGE BOUNDARY
- FLOWLINE

COLOR CODE

- AREA C OFF-SITE
- AREA C ON-SITE
- AREA F
- AREA G

SCALE: 1"=100'

0 150 300 450 600

FIGURE 4b

rtm engineering consultants
357 N. Sheridan St.
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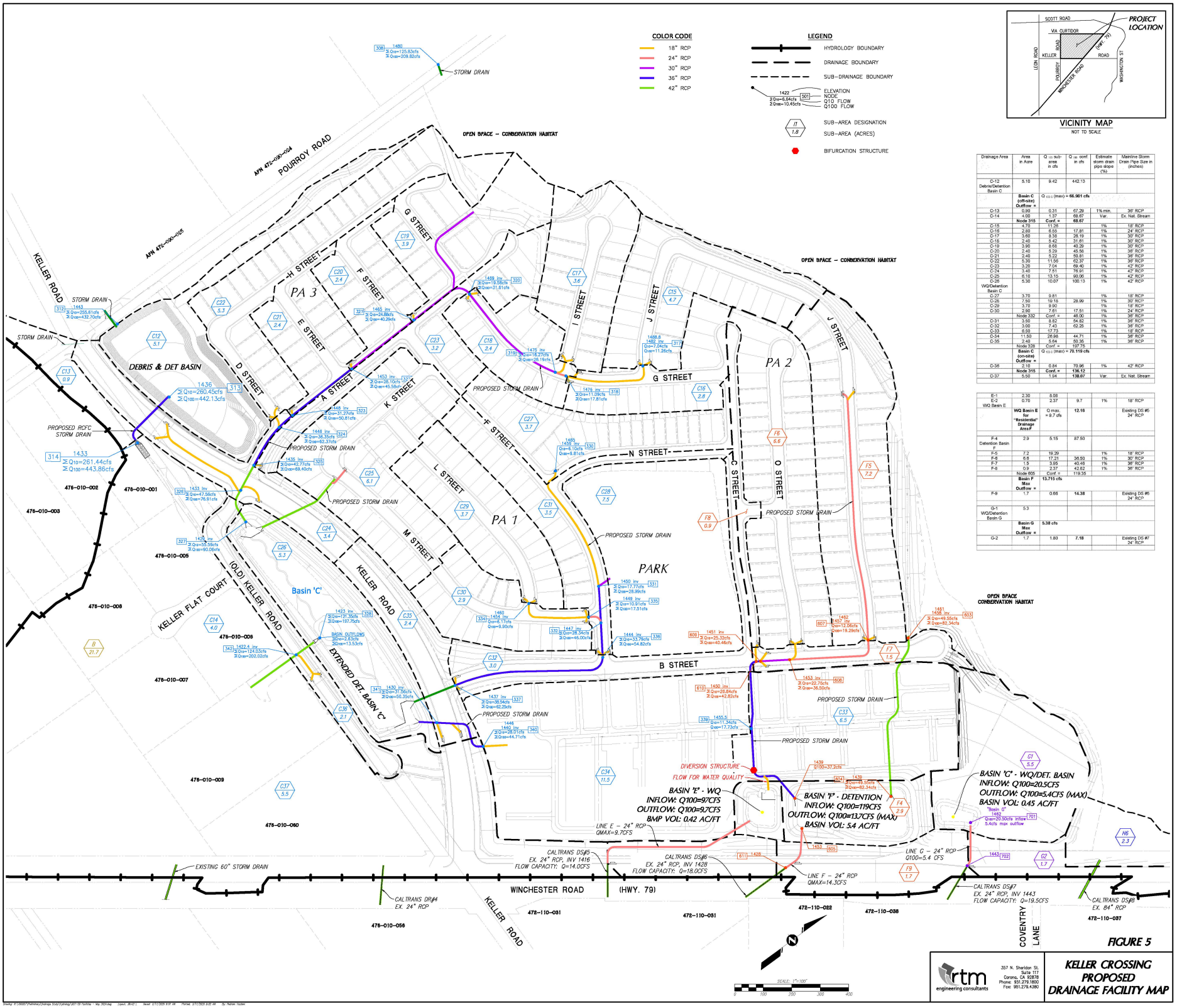
Corona, CA 92878
Phone: 951.279.1800
Fax: 951.279.4380

KELLER CROSSING HYDRO-GRAPHS TTM 38163

FIGURE 5:

STORM DRAIN FACILITY MAP



Drainage Area	Area in Acre	Q 10 sub-area in cfs	Q 100 cont in cfs	Estimate storm drain pipe slope (%)	Mainline Storm Drain Pipe Size in (inches)
C-12 Debris/Detention Basin C	5.10	9.42	442.13		
	Basin C (off-site) Outflow =	**Q_{100} (max) = 66.981 cfs**			
C-13	0.90	0.31	67.29	1% min.	30" RCP
C-14	4.00	1.37	68.67	Var.	Ex. Nat. Stream
	Node 315	**Conf. =**	**68.67**		
C-15	4.70	11.26		1%	18" RCP
C-16	2.80	6.55	17.81	1%	24" RCP
C-17	3.60	8.38	26.19	1%	30" RCP
C-18	2.40	5.42	31.61	1%	30" RCP
C-19	3.90	8.68	40.29	1%	30" RCP
C-20	2.40	5.29	45.58	1%	30" RCP
C-21	2.40	5.22	50.81	1%	36" RCP
C-22	5.30	11.56	62.37	1%	36" RCP
C-23	3.20	7.04	69.40	1%	42" RCP
C-24	3.40	7.51	76.91	1%	42" RCP
C-25	6.10	13.15	90.06	1%	42" RCP
C-26	5.30	10.07	100.13	1%	42" RCP
WQ/Detention Basin C					
C-27	3.70	9.81		1%	18" RCP
C-28	7.50	19.18	28.99	1%	30" RCP
C-29	3.70	9.90		1%	18" RCP
C-30	2.90	7.81	17.51	1%	24" RCP
	Node 332	Conf. =	46.00	1%	36" RCP
C-31	3.50	8.82	54.82	1%	36" RCP
C-32	3.00	7.43	62.25	1%	36" RCP
C-33	6.50	17.73		1%	18" RCP
C-34	11.50	26.98	44.71	1%	36" RCP
C-35	2.40	5.84	50.36	1%	36" RCP
	Node 328	Conf. =	107.75		
	Basin C (on-site) Outflow =	**Q_{100} (max) = 70.119 cfs**			
C-36	2.10	0.84	70.96	1%	42" RCP
	Node 315	**Conf. =**	**136.12**		
C-37	5.50	1.94	138.07	Var.	Ex. Nat. Stream

E-1	2.30	8.08			
E-2	0.70	2.37	9.7	1%	18" RCP
WQ Basin E	**WQ Basin E for "Residential" Drainage Area F**	Q max. = 9.7 cfs	12.16		Existing DS #5 24" RCP
F-4 Detention Basin F	2.9	5.15	87.50		
F-5	7.2	19.29		1%	18" RCP
F-6	6.6	17.31	36.60	1%	30" RCP
F-7	1.5	3.99	40.48	1%	36" RCP
F-8	0.9	2.37	42.82	1%	36" RCP
	Node 605	Conf. =	119.35		
	Basin F Max Outflow =	**13.715 cfs**			
F-9	1.7	0.66	14.38		Existing DS #5 24" RCP
G-1 WQ/Detention Basin G	5.3				
	Basin G Max Outflow =	**5.38 cfs**			
G-2	1.7	1.80	7.18		Existing DS #7 24" RCP

rtm engineering consultants
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Suite 117
Corona, CA 92878
Phone: 951.279.1800
Fax: 951.279.4380

KELLER CROSSING
PROPOSED
DRAINAGE FACILITY MAP

FIGURE 5

ATTACHMENT:

ATTACHMENT A:

EXISTING CONDITION - RATIONAL METHOD HYDROLOGY

FOR 100-YEAR STORM

Rational Methods Hydrology
Existing Condition

from

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

FINAL
DRAINAGE REPORT

FOR

STATE ROUTE 79
08-RIV-79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

IN
RIVERSIDE COUNTY

PREPARED BY

SC Engineering
14890 Seventh Street, Unit B
Victorville, California 92395
(760) 955-7712

January 13, 2012

FINAL
DRAINAGE REPORT

FOR

STATE ROUTE 79
08-RIV-79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

IN
RIVERSIDE COUNTY

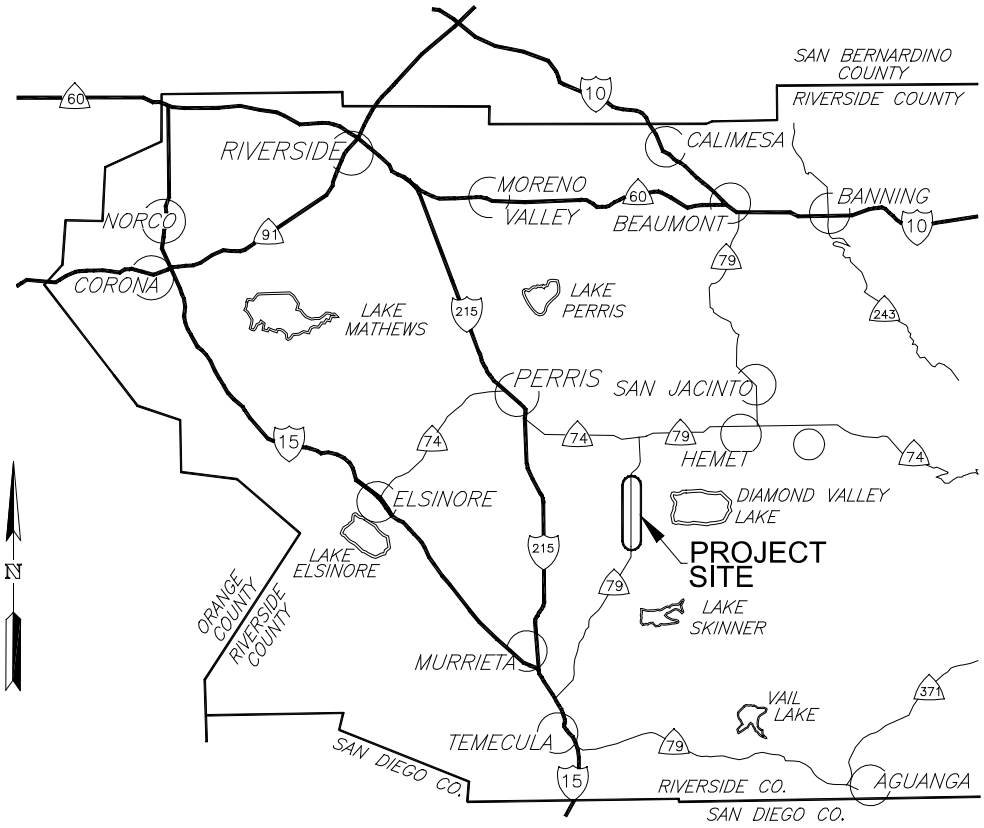
This Drainage Report has been prepared by or under the direction of the following Registered Civil Engineer. The Registered Civil Engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

R. S. Chavez, PE
Registered Civil Engineer

January 13, 2012
Date

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
08-RIV-79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

LOCATION MAP



FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
08-RIV-79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

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I. INTRODUCTION

This report is being prepared to support the design of improvements to State Route 79 (SR 79) located within Riverside County, California. Although the Plans, Specifications and Estimates for this project have been prepared in metric units, this report has been prepared in standard units and the appropriate metric stations and other values have been referenced as applicable.

The Riverside County Transportation Department (RCTD), in cooperation with the California Department of Transportation (Caltrans) District 8, is sponsoring the realignment and widening of State Route 79 (SR-79) from north of Thompson Road to Scott Road and from 0.25 miles south of Newport Road to Newport Road. In addition, existing drainage systems that were constructed under an encroachment permit (EA 464600) will be extended to provide a standard 30' (9.0-m) clear recovery zone (PM R8.4/R10.7 (KP R13.5/R16.4). This section of SR-79 is currently a 2-lane rural conventional highway passing through rolling foothills. The project lies north of the City of Murrieta. The proposed improvements will widen SR-79 to a 4-lane expressway facility with a 14' to 36' (4.2-m to 7.9-m) paved median (either a striped median or a striped median with a concrete barrier), 4-12' (3.6-m) traveled lanes, and 8' (2.4-m) shoulders.

The improvements shall consist primarily of asphalt pavement with specific intersections improved with sidewalk, access ramps and curb and gutter.

Drainage improvements shall consist of:

- Removing existing culverts and constructing new culverts (of equivalent pipe diameter size) at locations that perpetuate existing drainage patterns and in locations as required to maintain the maximum water spread within the proposed road improvements. The original culverts were constructed in approximately 1946. Abelia Street to north of Scott Road (PM R10.7/R11.9 (R16.4/19.2)). The following eleven drainage systems fall into this category:

Drainage System	Existing Culvert Size
2	84" (2100 mm) CMP
3	60" (1500 mm) CMP
4	24" (600 mm) CMP
5	18" (450 mm) CMP
6	18" (450 mm) CMP
7	18" (450 mm) CMP
8	84" (2100 mm) CMP
9	18" (450 mm) CMP
10	36" (900 mm) CMP
11	84" (2100 mm) CMP
12	24" (600 mm) CMP

CMP – Corrugated Metal Pipe

- Extending recently constructed (EA 1A5804 – approximate construction year 2005) culverts to accommodate the proposed widening. (SR-79/Scott Road and SR-79/Abelia Street intersection area). The following three drainage systems fall into this category:

Drainage System	Existing Culvert Size
1	42" (1050 mm) CSP
13	24" (600 mm) CSP
14	42" (1050 mm) CSP

CSP – Corrugated Steel Pipe

- Extend Project 1 (EA 464611) culverts to accommodate the additional widening and to provide a standard 30' (9-m) clear recovery zone. PM 14.9/R15.5 (KP R24.0/R24.4). The following two drainage systems fall into this category:

Drainage System	Existing Culvert Size
15	36" (900 mm) AP
16	6'x3' (1830mmx915mm) RCB

AP – Alternative Pipe (Construction to start in mid-February 2012, material to be determined during construction)
RCB – Reinforced Concrete Box

- Removing recently constructed (EA 464600 - approximate year 2008) temporary culvert end treatment (steel headwalls) and extend the existing culverts with standard headwalls to provide a standard 30' (9.0-m) clear recovery zone. PM R8.4/R10.7 (KP R13.5/R16.4). The following four drainage systems fall into this category:

Drainage System	Existing Culvert Size
17	24" (600 mm) CSP
18	24" (600 mm) CSP
19	84" (2100 mm) CSP
20	84" (2100 mm) CSP

Design Flood Frequency

In determining the off-site year design flood frequency, the following items were considered:

1. The proposed project will realign and widened an existing 2-lane rural conventional highway with non-standard shoulders to a 4-lane divided expressway facility with standard shoulders. A 30' (9.0-m) clear recovery zone has been established for the project. All existing roadway pavement will be completely removed and replaced with new pavement structural section consisting of 0.55' (165 mm) Mix Asphalt (HMA-Type C) over 1.60' (490-mm) Aggregate Base (Class 2). Per the Highway Design Manual (HDM) 103.2, Design Period a 20-year design life after construction has been recommended. Since most drainage crossing between Abelia Street and Scott Road were constructed in 1946; are existing facilities; and there is no evidence of drainage problems/issue, see item 2 below, the existing drainage culverts will be replaced within the same equivalent size.
2. Caltrans Hemet Maintenance staff was contacted on January 4, 2012 to identify any drainage problem areas between Abelia Street to Scott Road. Mr. Chad Slater, Caltrans Maintenance Supervisor stated that that there were no drainage problems/issues between Abelia Street and Scott Road.
3. Per HDM 828.2, Minimum Diameter, the existing culvert crossing 18" (450 mm) culverts will be replaced with 24" (600 mm) (minimum) culverts for maintenance purpose, since the new pipe runs will exceed 100' 30-m) in length.

4. In order to minimize flood related risk to the adjacent properties, no drainage culvert will be upsized, except for maintenance purpose.

Therefore, since all existing culverts will be replaced with equivalent size facilities, a design flood frequency will not be established for off-site flows, but a Q_{100} will be utilized to check some drainage systems.

II. SUMMARY

The project lies within the un-incorporated area in Riverside County, California north of the City of Murrieta, California along SR 79 that currently consists of a two lane, asphalt paved surface.

The drainage tributary to SR 79 consists of several minor watercourses conveying drainage both easterly and/or westerly to existing culvert crossings. The land within the study area is mostly undeveloped with few homes or buildings with agriculture being the primary current land usage. The terrain is generally rolling, consisting of hill country in the upper reaches of the watershed and flat and level land used for agriculture purposes at the downstream limits of the drainage study area. The design and construction of the project will perpetuate these existing drainage patterns and proposes no change to existing tributary areas.

The existing culverts within the project limits consist of corrugated metal pipes. The conditions of the existing culverts vary. While many inlets are in need of maintenance due to sedimentation, most appear to be functioning and are in fair to poor condition. The existing outlets also appear to be in fair to poor condition although there is little evidence of adequate energy dissipators.

Due to the changes in design profile, for both the centerline and edge of traveled ways, being proposed with the widening of SR 79, the existing culverts are either being removed and replaced with new systems or being extended to allow for the proposed widening. This has been necessitated due to either the existing systems being insufficient to convey the design flood frequency drainage flows or by the culverts being at elevations that conflict with the proposed design of SR 79.

This study is being prepared based upon the existing un-developed conditions of the tributary areas along SR 79. It is anticipated that should proposed development eventually occur in the future, the culverts that are being constructed at this time will provide the appropriate governing agency with a method of conditioning the proposed developments location of drainage crossings at SR 79 and limiting the amount of drainage flow that can be conveyed through these systems.

The proposed typical section, for the improvements of SR 79, is being constructed at this time in anticipation for future developments. Except in limited areas of cut, no ac dike is being proposed at the edge of shoulder. This limits the locations where on-site flows are concentrated, allowing drainage to sheet flow off the proposed improvements, thereby limiting areas where the flooded width could have an impact. The proposed shoulder area is also being constructed at a cross-fall of 2% to facilitate any future widening while limiting the amount of required removal of the current proposed improvements. Future developments will be responsible for any widening and construction of curb and gutter or ac dike if required by the appropriate governing agency.

The hydrologic analysis for this project was based upon the Riverside County Flood Control and Water Conversation District Hydrology Manual, from which pertinent soil and rainfall information was obtained and is shown in Appendix A.

Per the Caltrans HDM, a design flood frequency of 25 years for the on-site drainage has been selected.

The following rainfall data used to determine the $Q_{(100)}$ Off-Site storm values (Informational Data Only): the 100 year, 1-hour intensity used was 1.20 (In/Hr), the 2 year, 1-hour intensity used was 0.50 (In/Hr) and the Slope of the Intensity Duration Curve of 0.55. The primary land use was assumed to be undeveloped with poor cover while a runoff coefficient of 0.90 was used for the improved road surface areas.

The rainfall data used to determine the $Q_{(25)}$ On-Site storm values were based upon CALTRANS provided Intensity-Duration-Frequency Curves spreadsheet program. This generated a 5-minute intensity of 3.73 (In/hr). A runoff coefficient of 0.90 was used for the improved road surface areas and 0.80 for non-paved surfaces. A minimum Time of Concentration of 5 minutes was used for the on-site calculations.

The off-site hydrology for the Q_{100} drainage flows, for information use only, were determined by utilizing CIVILCADD/CIVILDESIGN Engineering Software, Version 6.3 and are shown in Appendix B with the Drainage Exhibits delineating the hydrology basins shown in Appendix I. The off-site hydrologic analysis for Systems 15 and 16 was prepared in support of the initial phase of the widening for SR 79 and is included in the Final Drainage Study for EA 464111 (Project 1). Systems 15 and 16 are shown as Systems 19 and 20 respectively in Final Drainage Study for Project 1.

The On-site Hydrology for the $Q_{(25)}$ drainage flows in areas where asphalt dike is being proposed were determined by utilizing the CALTRANS provided On-Drain spreadsheet program and are shown in Appendix C with the Drainage Exhibits delineating the hydrology basins shown in Appendix J.

Hydraulic calculations were prepared for all drainage systems using Manning Equation ($Q_{(max)}$) and WSPG ($Q_{(100)}$) for drainage system 1, 2, 8, 10, 11, 12, 13, 14, 15, and 16 and are summarized in Appendix D and G respectively. The calculations for all culverts were based upon "N" values of 0.013 for reinforced concrete pipe, 0.024 for corrugated metal pipe and alternative pipe and 0.015 for reinforced concrete box. A table of proposed system design values including the proposed system size, stationing, $Q_{(max)}$, and outlet velocity are shown in Appendix D. Hydraulic calculations for Systems 15 and 16 were also prepared in support of the initial phase of the widening for SR 79 and are also included in the Final Drainage Study for EA 464121. Systems 15 and 16 are shown therein as Systems 19 and 20 respectively.

Rip rap energy dissipators are being proposed for all culvert outlets. Utilizing the outlet velocities as shown in the hydraulic calculations, the appropriate rock classifications have been selected for each system based upon the Rip Rap Energy Dissipator detail per the San Diego Regional Standard Drawing D-40. A table of rip rap energy detail design values is shown in Appendix G and the Rip Rap Energy Dissipator detail per the San Diego Regional Standard Drawing D-40 is shown in Appendix H for reference.

Street hydraulic calculations were prepared utilizing the CALTRANS provided On-Drain spreadsheet program for locations where asphalt dike is being proposed. The calculations are based upon an N value of 0.015 for the asphalt road section. The location of overside drains or drainage inlets and spacing was based upon limiting the maximum water spread to the proposed 10 feet wide, 2% cross-fall shoulder area. The street hydraulic calculations are shown in Appendix C and a table of the on-site interception, bypass and flooded width values are shown in Appendix E.

Based upon the design assumptions outlined above, flood protection criteria for on-site $Q_{(25)}$ drainage flows have been met and all drainage culvert facilities have been adequately sized.

A discussion of each drainage system is summarized below:

Drainage System No.	Station	Existing Culvert Size	Proposed Culvert	Proposed Improvement
1	165+44.866	36" (1055mm) CMP	36" (1050mm) CSP (Culvert Extension)	Existing flows are conveyed from the west to the east. This facility was constructed in 2005 as part of SR-79/Abelia Street Traffic Signal Project. The existing drainage culvert will be extended, matching the existing slope of -0.0222, to accommodate the additional widening. $Q_{(max)}$ = 81.4 cfs (capacity flowing full); Outlet Velocity = 8.46 ft/s; 1/2T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 20.4 cfs.
2	168+92.190	84" (2135mm) CMP	84" (2135mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area B). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. This drainage system is used as a wildlife crossing and is oversized. The drainage culvert will be replaced with a 84" (2100 mm) on a slope of -0.0116. $Q_{(100)}$ = 41.1 cfs; Outlet Velocity = 8.84 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 41.1 cfs.
3	170+51.318	60" (1500mm) CMP	60" (1500mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area C). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 60" (1500 mm RCP) on a slope of -0.0083. $Q_{(max)}$ = 237.9 cfs; Outlet Velocity = 12.12 ft/s; 1/2T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 548.4 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to an 8'x4' (2400mmx1200mm) RCB. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with one of the equivalent size pipe.
4	172+76.365	24" (600mm) CMP	24" (600mm) AP	Existing flows are conveyed from west to east (Drainage Sub Area D). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24" (600mm) AP on a slope of -0.0214. $Q_{(max)}$ = 18.0 cfs; Outlet Velocity = 5.72 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 76.9 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to a 48" (1200mm) AP. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with one of the equivalent size pipe.
5	175+17.896	18" (450mm) CMP	24" (600mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area E). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24" (600mm) RCP on a slope of -0.0038. $Q_{(max)}$ = 14.0 cfs; Outlet Velocity = 4.45 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 106.6 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to a 6'x3' (1830mmx915mm) RCB. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with a 24" (600mm) RCP per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet a minimum diameter of pipe of 24" (600mm) will be used.

Drainage System No.	Station	Existing Culvert Size	Proposed Culvert	Proposed Improvement
6	176+86.952	18” (450mm) CMP	24” (600mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area F). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24” (600mm) RCP on a slope of -0.0068. $Q_{(max)}$ = 18.7 cfs; Outlet Velocity = 5.95 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will not convey a $Q_{(100)}$ of 31.6 cfs. In order to convey a $Q_{(100)}$, the drainage system would have to be up-sized to a 3-24” (3-600mm) RCP. Since, there are no reported drainage problems/issues at this location; to minimize flood related risk to the adjacent properties; and because of the economic factors related to substantially up-sizing the culvert, it was determined to replace the drainage culvert with a 24” (600mm) RCP per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet a minimum diameter of pipe of 24” (600mm) will be used.
7	178+91.951	18” (450mm) CMP	24” (600mm) AP	Existing flows are conveyed from west to east (Drainage Sub Area G). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24” (600mm) AP on a slope of -0.0253. $Q_{(max)}$ = 19.5 cfs; Outlet Velocity = 6.22 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing will not, but the proposed culvert will convey a $Q_{(100)}$ of 16.3 cfs. Per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet a minimum diameter of pipe of 24” (600mm) will be used.
8	180+30.829	84” (2135mm) CMP	84” (2100mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area H). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. This drainage system is used as a wildlife crossing and is oversized. The drainage culvert will be replaced with a 84” (2100mm) RCP on a slope of -0.0030. $Q_{(max)}$ = 350.9 cfs; Outlet Velocity = 9.12 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 132.3 cfs.
9	182+44.948	18” (450mm”) CMP	24” (600mm) AP	Existing flows are conveyed from west to east (Drainage Sub Area I). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24” (600mm) AP on a slope of -0.0634. $Q_{(max)}$ = 30.9 cfs; Outlet Velocity = 9.85 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. Per HDM 828.2 Minimum Diameter, because the run exceeds 100 feet, a minimum diameter of pipe of 24” (600mm) will be used. The existing and proposed culvert will convey a $Q_{(100)}$ of 5.8 cfs.
10	183+77.789	36” (900mm) CMP	36” (900mm) AP	Existing flows are conveyed from west to east (Drainage Sub Area J). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 36” (900mm) AP on a slope of -0.0695. $Q_{(max)}$ = 95.49 cfs; Outlet Velocity = 13.51 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 21.1 cfs.
11	186+20.636	84” (2135mm) CMP	84” (2100mm) RCP	Existing flows are conveyed from west to east (Drainage Sub Area K). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. This drainage system is used as a wildlife crossing and is oversized. The drainage culvert will be replaced with a 84” (2100mm) RCP on a slope of -0.0382. $Q_{(100)}$ = 56.3 cfs; Outlet Velocity = 12.00 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 56.3 cfs.

Drainage System No.	Station	Existing Culvert Size	Proposed Culvert	Proposed Improvement
12	187+12.491	24” (600mm) CMP	24” (600mm) AP	Existing flows are conveyed from east to west (part of Drainage Sub Area K). The existing drainage culvert will be removed due to the remaining service life of the existing culvert. The drainage culvert will be replaced with a 24” (600mm) AP on a slope of 0.0188. $Q_{(max)}$ = 16.8 cfs; Outlet Velocity = 5.36 ft/s; 1/4T RSP is proposed to dissipate energy and allow to sheet flow. The existing and proposed culvert will convey a $Q_{(100)}$ of 11.44 cfs.
13	190+14.141	24” (600mm) CSP	24” (600mm) CSP (Culvert Extension)	Existing flows are conveyed from the south to the north. This facility was constructed in 2005 as part of SR-79/Washington Street Traffic Signal Project (EA1A5804). The existing culvert is on a slope of 0.0451 and will be extended 39.4’ (12-m) on the upstream end at a slope of 0.0433 to match the existing ground surface. The existing and proposed culvert will convey a $Q_{(100)}$ of 18.2 cfs.
14	190+14.141	42” (1050mm) CSP	42” (1050mm) CSP (Culvert Extension)	Existing flows are conveyed from the west to the east. This facility was constructed in 2005 as part of SR-79/Washington Street Traffic Signal Project (EA1A5804). The culvert will be extended 49.2’ (15-m) and match the existing slope of -0.0281 on the downstream end and -0.0329 on the upstream end to match the existing ground surface. The existing and proposed culvert will convey a $Q_{(100)}$ of 69.9 cfs.
15	238+49.866	36” (900mm) AP	36” (900mm) AP (Culvert Extension)	Existing flows are conveyed from the west to the east. This facility is being constructed as part of SR-79, Project 1 (EA 464111) as part of the County Project No. B4-05272. This system was constructed with a temporary inlet to maintain the proposed improvements within the existing Right of Way. It was agreed by Caltrans Oversight that the temporary inlet would be removed as part of SR-79, Project 2 and the culvert would be extended to accommodate the proposed widening on Project 2. The culvert will be extended 55.8’ (17-m) and match the existing slope of -0.0044. The existing and proposed culvert will convey a $Q_{(100)}$ of 18.9 cfs.
16	239+64.212	6’x3’ (1830mmx915mm) RCB	6’x3’ (1830mmx915mm) RCB (Culvert Extension)	Existing flows are conveyed from the west to the east. This facility is being constructed as part of SR-79, Project 1 (EA 464111) as part of the County Project No. B4-05272. This system was constructed with a temporary inlet to maintain the proposed improvements within the existing Right of Way. It was agreed by Caltrans Oversight that the temporary inlet would be removed as part of SR-79, Project 2 and the culvert would be extended to accommodate the proposed widening on Project 2. The culvert will be extended 55.8’ (17-m) and match the existing slope of -0.0050. The existing and proposed culvert will convey a $Q_{(100)}$ of 111.4 cfs.
17	136+80.829	24” (600mm) CSP	24” (600mm) CSP (Culvert Extension)	Existing flows are conveyed from the east to the west. This facility was constructed in 2008 as part of the County Project No. B4-0527 (EA 464600). This system was constructed with a temporary steel headwall maintain the proposed improvements within the existing Right of Way It was agreed by Caltrans Oversight that the temporary steel headwall would be removed and a standard headwall would be constructed. In addition, the system would be extended to provide a standard 30’ (9.0-m) clear recovery zone. The culvert will be extended 13.1’ (4-m) and match the existing slope of 0.0158.

Drainage System No.	Station	Existing Culvert Size	Proposed Culvert	Proposed Improvement
18	138+55.920	24” (600mm) CSP	24” (600mm) CSP (Culvert Extension)	Existing flows are conveyed from the east to the west. This facility was constructed in 2008 as part of the County Project No. B4-0527 (EA 464600). This system was constructed with a temporary steel headwall maintain the proposed improvements within the existing Right of Way It was agreed by Caltrans Oversight that the temporary steel headwall would be removed and a standard headwall would be constructed. In addition, the system would be extended to provide a standard 30’ (9.0-m) clear recovery zone. The culvert will be extended 19.7’ (6-m) and match the existing slope of 0.0250.
19	151+42.54	84” (2100mm) CSP	84” (2100mm) CSP (Culvert Extension)	Existing flows are conveyed from the west to the east. This facility was constructed in 2008 as part of the County Project No. B4-0527 (EA 464600). This system was constructed with a temporary steel headwall to avoid environmental impacts. I This system was constructed with non-standard clear recovery zone. It was agreed by Caltrans Oversight to extend this drainage culvert to meet a standard 30’ (9.0-m) clear recovery zone. The culvert will be extended 10’ (3-m) and match the existing slope of -0.0181.
20	155+16.000	84” (2100mm) CSP	84” (2100mm) CSP (Culvert Extension)	Existing flows are conveyed from the west to the east. This facility was constructed in 2008 as part of the County Project No. B4-0527 (EA 464600). This system was constructed with non-standard clear recovery zone. It was agreed by Caltrans Oversight to extend this drainage culvert to meet a standard 30’ (9.0-m) clear recovery zone. The culvert will be extended 19.7 (6-m) and match the existing slope of -0.0166.

CSP – Corrugated Steel Pipe
AP – Alternative Pipe
T – Tonne
RCP – Reinforced Concrete Pipe
cfs – Cubic Feet per Second
RSP – Rock Slope Protection
RCB – Reinforced Concrete Box
fps – Feet per Second

III. APPENDICES

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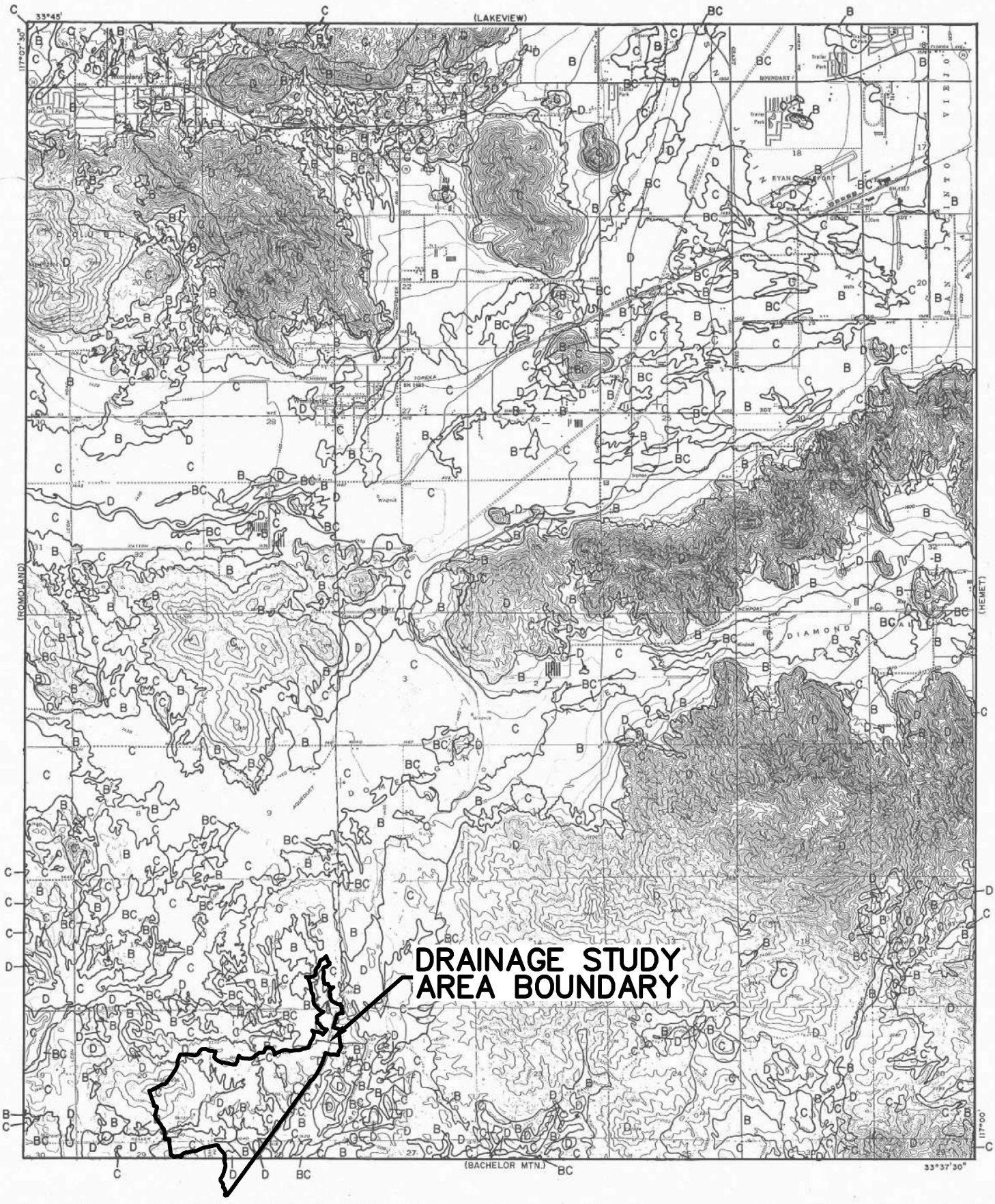
APPENDIX A

RIVERSIDE COUNTY HYDROLOGIC DATA



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

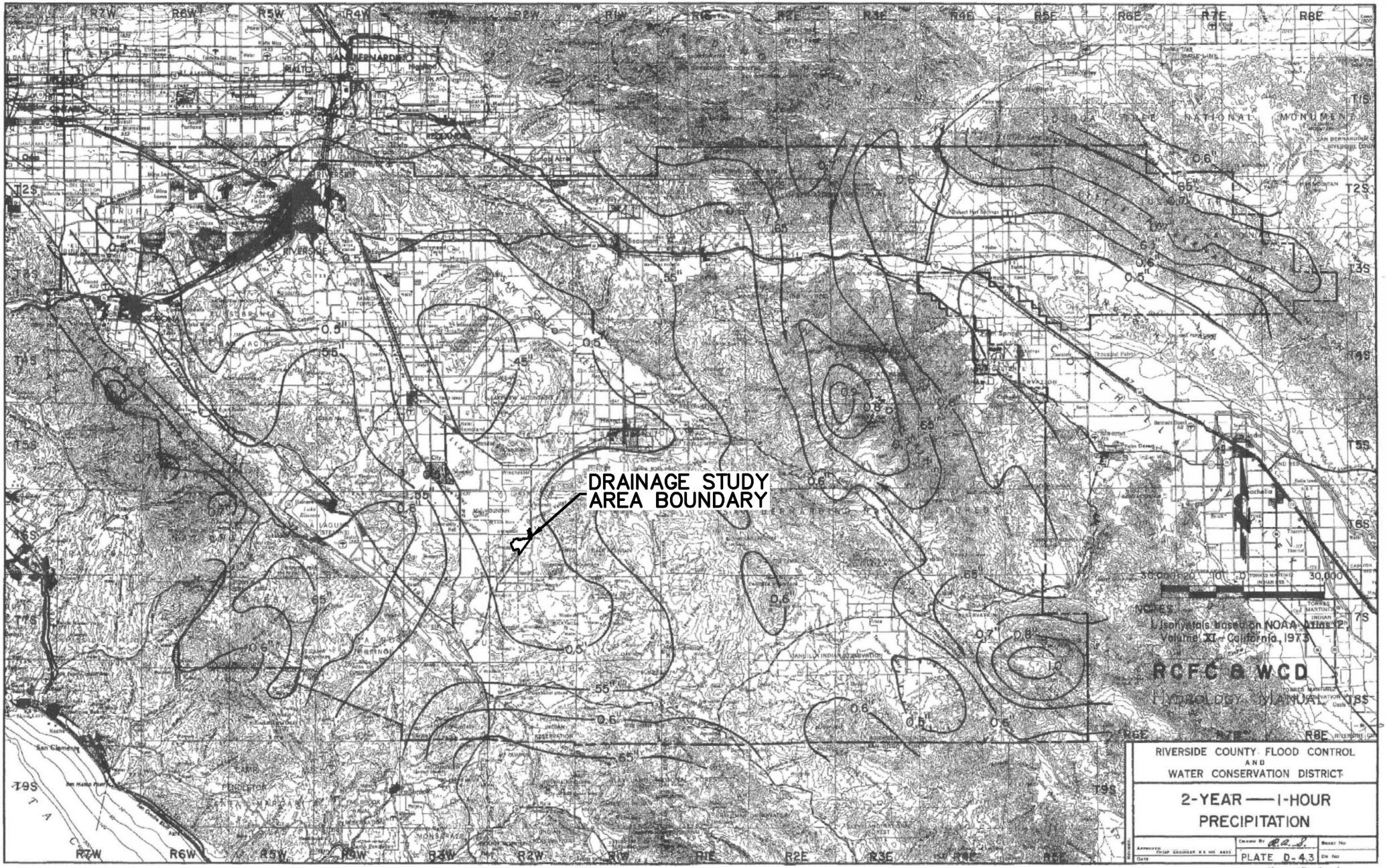
RCFC&WCD

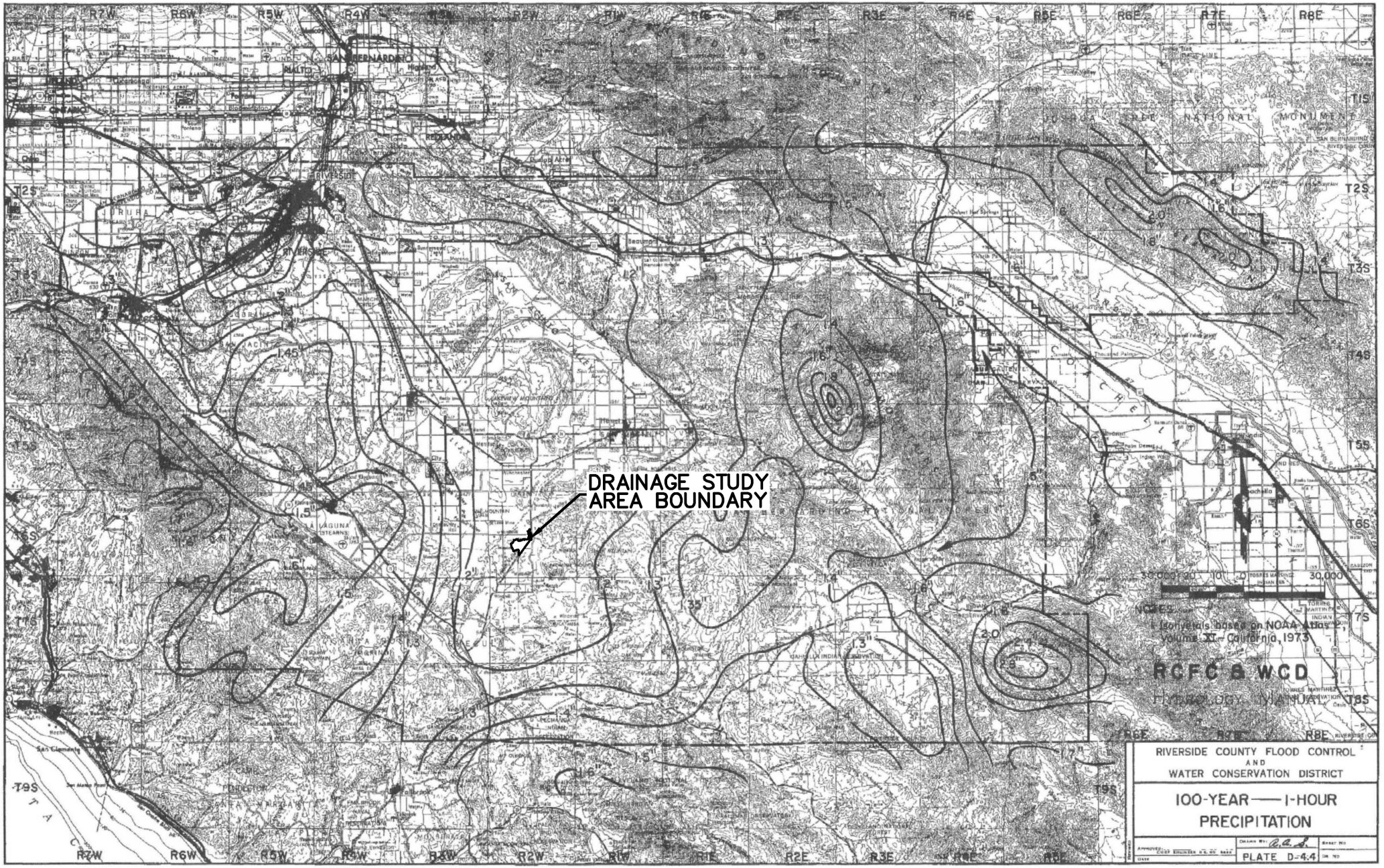
HYDROLOGY MANUAL

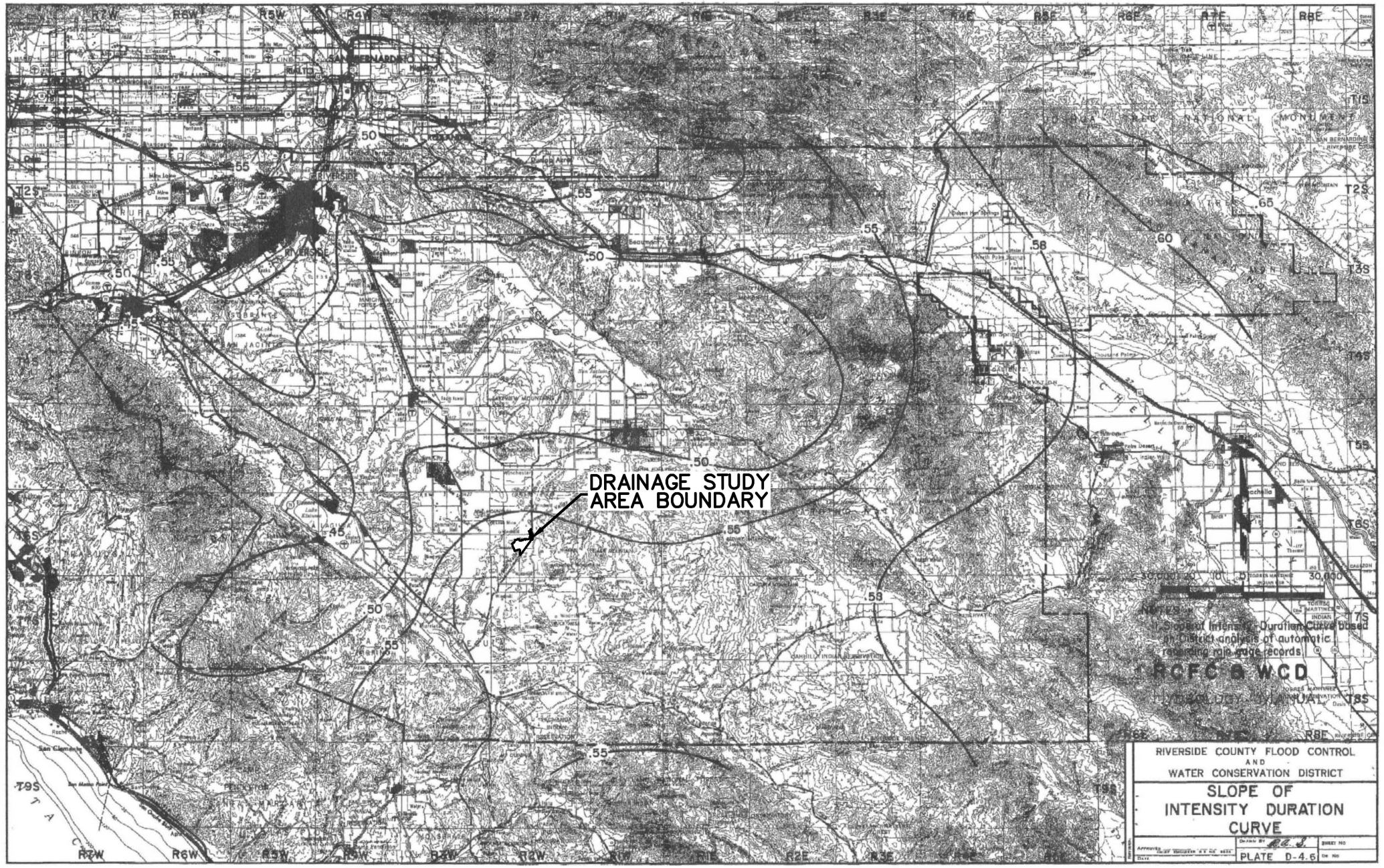
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR WINCHESTER

PLATE C-1.43


DRAINAGE STUDY AREA BOUNDARY
NOTES:
Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.3


DRAINAGE STUDY
AREA BOUNDARY
Isohyetals based on NOAA Atlas 2,
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.4


DRAINAGE STUDY
AREA BOUNDARY
Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records
RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
SLOPE OF
INTENSITY DURATION
CURVE
PLATE D-4.6

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX B

$Q_{(100)}$ OFF-SITE DRAINAGE CALCULATIONS (INFORMATIONAL DATA ONLY)

Sub Area A

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79a.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

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

Initial area flow distance = 690.000(Ft.)
Top (of initial area) elevation = 1465.000(Ft.)
Bottom (of initial area) elevation = 1410.000(Ft.)
Difference in elevation = 55.000(Ft.)
Slope = 0.07971 s(percent)= 7.97
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.009 min.
Rainfall intensity = 2.907(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 5.942(CFS)
Total initial stream area = 2.400(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      101.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1410.000(Ft.)
End of natural channel elevation =   1400.000(Ft.)
Length of natural channel  =   650.000(Ft.)
Estimated mean flow rate at midpoint of channel =     14.236(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.40(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0154
Corrected/adjusted channel slope =  0.0154
Travel time =    3.19 min.     TC =   15.20  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.554(In/Hr) for a   100.0 year storm
Subarea runoff =     14.465(CFS) for      6.700(Ac.)
Total runoff =     20.407(CFS)      Total area =       9.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   575.000(Ft.)
Top (of initial area) elevation =  1413.300(Ft.)
Bottom (of initial area) elevation =  1404.200(Ft.)
Difference in elevation =     9.100(Ft.)
Slope =    0.01583  s(percent)=       1.58
TC = k(0.348)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.143 min.
Rainfall intensity =      3.190(In/Hr) for a   100.0 year storm
Note: User entered runoff coefficient C value =  0.900
       Results in the highest RI Curve number
USER INPUT of soil data for subarea
Runoff Coefficient = 0.900
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  = 100.00
Pervious area fraction =  0.300; Impervious fraction =  0.700
Initial subarea runoff =      2.584(CFS)
```

Total initial stream area = 0.900(Ac.)
Pervious area fraction = 0.300
End of computations, total study area = 10.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.937
Area averaged RI index number = 90.0

Sub Area B

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79b.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 790.000(Ft.)
Top (of initial area) elevation = 1442.000(Ft.)
Bottom (of initial area) elevation = 1421.000(Ft.)
Difference in elevation = 21.000(Ft.)
Slope = 0.02658 s(percent)= 2.66
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.791 min.
Rainfall intensity = 2.501(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2) = 86.30
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 9.959(CFS)
Total initial stream area = 4.800(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      111.000 to Point/Station      112.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------
Top of natural channel elevation =   1421.000(Ft.)
End of natural channel elevation =   1409.000(Ft.)
Length of natural channel  =   850.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.492(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.88(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0141
Corrected/adjusted channel slope =  0.0141
Travel time =    3.65 min.     TC =   19.44  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.800
RI index for soil(AMC 2)  =  86.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.230(In/Hr) for a   100.0 year storm
Subarea runoff =     31.098(CFS) for     16.900(Ac.)
Total runoff =     41.058(CFS)      Total area =      21.700(Ac.)
End of computations, total study area =           21.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  86.7
```

Sub Area C

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79c.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 120.000 to Point/Station 121.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 640.000(Ft.)
Top (of initial area) elevation = 1558.000(Ft.)
Bottom (of initial area) elevation = 1528.000(Ft.)
Difference in elevation = 30.000(Ft.)
Slope = 0.04688 s(percent)= 4.69
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.959 min.
Rainfall intensity = 2.788(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2) = 87.50
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 21.606(CFS)
Total initial stream area = 9.200(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      121.000 to Point/Station      122.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1528.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =  1650.000(Ft.)
Estimated mean flow rate at midpoint of channel =     57.069(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.86(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0291
Corrected/adjusted channel slope =  0.0291
Travel time =    4.01 min.     TC =   16.97  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  86.30
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.404(In/Hr) for a   100.0 year storm
Subarea runoff =     60.044(CFS) for     30.200(Ac.)
Total runoff =     81.650(CFS)      Total area =      39.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      121.000 to Point/Station      122.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     39.400(Ac.)
Runoff from this stream =     81.650(CFS)
Time of concentration =   16.97 min.
Rainfall intensity =     2.404(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      123.000 to Point/Station      124.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   500.000(Ft.)
Top (of initial area) elevation =  1574.000(Ft.)
Bottom (of initial area) elevation =  1532.000(Ft.)
Difference in elevation =    42.000(Ft.)
Slope =    0.08400  s(percent)=       8.40
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   10.447 min.
Rainfall intensity =      3.138(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.418(CFS)
Total initial stream area =        5.000(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      124.000 to Point/Station      125.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1532.000(Ft.)
End of natural channel elevation =   1486.000(Ft.)
Length of natural channel  =  1580.000(Ft.)
Estimated mean flow rate at midpoint of channel =     35.424(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.99(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0291
Corrected/adjusted channel slope =  0.0291
Travel time =    4.40 min.     TC =   14.85  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  87.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.587(In/Hr) for a   100.0 year storm
Subarea runoff =     35.630(CFS) for     16.400(Ac.)
Total runoff =     49.048(CFS)      Total area =      21.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      124.000 to Point/Station      125.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.400(Ac.)
Runoff from this stream =     49.048(CFS)
```

```
Time of concentration =   14.85 min.
Rainfall intensity =     2.587(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      126.000 to Point/Station      127.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   420.000(Ft.)
Top (of initial area) elevation =  1554.000(Ft.)
Bottom (of initial area) elevation =  1523.000(Ft.)
Difference in elevation =    31.000(Ft.)
Slope =    0.07381  s(percent)=       7.38
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.999 min.
Rainfall intensity =      3.215(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     17.341(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      127.000 to Point/Station      125.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =   1523.000(Ft.)
End of natural channel elevation =   1486.000(Ft.)
Length of natural channel  =  1640.000(Ft.)
Estimated mean flow rate at midpoint of channel =     56.426(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.02(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0226
Corrected/adjusted channel slope =  0.0226
Travel time =    4.54 min.     TC =   14.54  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
```

```
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.617(In/Hr) for a   100.0 year storm
Subarea runoff =     62.348(CFS) for     28.400(Ac.)
Total runoff =     79.688(CFS)      Total area =      34.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      127.000 to Point/Station      125.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     34.700(Ac.)
Runoff from this stream =     79.688(CFS)
Time of concentration =   14.54 min.
Rainfall intensity =     2.617(In/Hr)
Summary of stream data:

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


1       49.048     14.85                 2.587
2       79.688     14.54                 2.617
Largest stream flow has longer or shorter time of concentration
Qp =     79.688 + sum of
        Qa          Tb/Ta
        49.048 *    0.979 =     48.032
Qp =    127.720

Total of 2 streams to confluence:
Flow rates before confluence point:
      49.048      79.688
Area of streams before confluence:
       21.400       34.700
Results of confluence:
Total flow rate =    127.720(CFS)
Time of concentration =    14.539 min.
Effective stream area after confluence =     56.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      122.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1486.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =   330.000(Ft.)
Estimated mean flow rate at midpoint of channel =    131.932(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.96(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
      Normal channel slope =  0.0182
Corrected/adjusted channel slope =  0.0182
Travel time =    0.79 min.     TC =   15.33  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.700
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  86.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.542(In/Hr) for a   100.0 year storm
Subarea runoff =      7.844(CFS) for      3.700(Ac.)
Total runoff =    135.564(CFS)      Total area =      59.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      122.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     59.800(Ac.)
Runoff from this stream =    135.564(CFS)
Time of concentration =   15.33 min.
Rainfall intensity =     2.542(In/Hr)
Summary of stream data:

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


1       81.650     16.97               2.404
2      135.564     15.33               2.542
Largest stream flow has longer or shorter time of concentration
Qp =    135.564 + sum of
        Qa          Tb/Ta
        81.650 *    0.903 =     73.764
Qp =    209.329

Total of 2 main streams to confluence:
Flow rates before confluence point:
      81.650     135.564
Area of streams before confluence:
       39.400       59.800


Results of confluence:
Total flow rate =    209.329(CFS)
Time of concentration =    15.329 min.
Effective stream area after confluence  =     99.200(Ac.)


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

```
Process from Point/Station      122.000 to Point/Station      126.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1480.000(Ft.)
End of natural channel elevation =   1452.000(Ft.)
Length of natural channel  =  1520.000(Ft.)
Estimated mean flow rate at midpoint of channel =    253.642(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.57(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0184
Corrected/adjusted channel slope =  0.0184
Travel time =    2.96 min.     TC =   18.28  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  86.30
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.307(In/Hr) for a   100.0 year storm
Subarea runoff =     79.870(CFS) for     42.000(Ac.)
Total runoff =    289.198(CFS)      Total area =     141.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      126.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    141.200(Ac.)
Runoff from this stream =    289.198(CFS)
Time of concentration =   18.28 min.
Rainfall intensity =     2.307(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      127.000 to Point/Station      128.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   650.000(Ft.)
Top (of initial area) elevation =  1806.000(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =   192.000(Ft.)
Slope =    0.29538  s(percent)=      29.54
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    9.023 min.
Rainfall intensity =      3.402(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
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
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     21.873(CFS)
Total initial stream area =        7.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      126.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1614.000(Ft.)
End of natural channel elevation =   1452.000(Ft.)
Length of natural channel  =  1980.000(Ft.)
Estimated mean flow rate at midpoint of channel =     92.097(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  13.25(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0818
Corrected/adjusted channel slope =  0.0818
Travel time =    2.49 min.     TC =   11.51  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.050
RI index for soil(AMC 2)  =  85.75
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.975(In/Hr) for a   100.0 year storm
Subarea runoff =    121.603(CFS) for     48.800(Ac.)
Total runoff =    143.476(CFS)      Total area =      56.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      126.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     56.400(Ac.)
```

```
Runoff from this stream =    143.476(CFS)
Time of concentration =   11.51 min.
Rainfall intensity =     2.975(In/Hr)
Summary of stream data:

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


1      289.198     18.28                2.307
2      143.476     11.51                2.975
Largest stream flow has longer time of concentration
Qp =    289.198 + sum of
         Qb          Ia/Ib
       143.476 *    0.775 =    111.254
Qp =    400.452

Total of 2 main streams to confluence:
Flow rates before confluence point:
     289.198     143.476
Area of streams before confluence:
      141.200       56.400


Results of confluence:
Total flow rate =    400.452(CFS)
Time of concentration =    18.285 min.
Effective stream area after confluence  =    197.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      126.000 to Point/Station      129.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1452.000(Ft.)
End of natural channel elevation =   1414.000(Ft.)
Length of natural channel  =  2635.000(Ft.)
Estimated mean flow rate at midpoint of channel =    490.027(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.34(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0144
Corrected/adjusted channel slope =  0.0144
Travel time =    4.70 min.     TC =   22.99  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.150
```

```
Decimal fraction soil group D = 0.750
RI index for soil(AMC 2)  =  87.45
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.034(In/Hr) for a   100.0 year storm
Subarea runoff =    147.917(CFS) for     88.400(Ac.)
Total runoff =    548.369(CFS)      Total area =     286.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      129.100 to Point/Station      129.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   260.000(Ft.)
Top (of initial area) elevation =  1419.000(Ft.)
Bottom (of initial area) elevation =  1415.700(Ft.)
Difference in elevation =     3.300(Ft.)
Slope =    0.01269  s(percent)=       1.27
TC = k(0.324)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.171 min.
Rainfall intensity =      3.860(In/Hr) for a   100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.900
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  = 100.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      1.042(CFS)
Total initial stream area =        0.300(Ac.)
Pervious area fraction = 0.200
End of computations, total study area =          286.30 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.999
Area averaged RI index number =  86.9
```

Sub Area D

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79d.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.500(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 130.000 to Point/Station 131.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 980.000(Ft.)
Top (of initial area) elevation = 1534.000(Ft.)
Bottom (of initial area) elevation = 1440.000(Ft.)
Difference in elevation = 94.000(Ft.)
Slope = 0.09592 s(percent)= 9.59
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.316 min.
Rainfall intensity = 3.433(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2) = 88.70
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 16.192(CFS)
Total initial stream area = 5.500(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      131.000 to Point/Station      132.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1440.000(Ft.)
End of natural channel elevation =   1418.000(Ft.)
Length of natural channel  =  1050.000(Ft.)
Estimated mean flow rate at midpoint of channel =     37.535(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.16(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0210
Corrected/adjusted channel slope =  0.0210
Travel time =    3.39 min.     TC =   16.71  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  87.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.030(In/Hr) for a   100.0 year storm
Subarea runoff =     37.267(CFS) for     14.500(Ac.)
Total runoff =     53.459(CFS)      Total area =      20.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      133.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1418.000(Ft.)
End of natural channel elevation =   1415.000(Ft.)
Length of natural channel  =   225.000(Ft.)
Estimated mean flow rate at midpoint of channel =     66.022(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.85(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0133
Corrected/adjusted channel slope =  0.0133
Travel time =    0.77 min.     TC =   17.48  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  87.30
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.956(In/Hr) for a   100.0 year storm
Subarea runoff =     23.466(CFS) for      9.400(Ac.)
Total runoff =     76.925(CFS)      Total area =      29.400(Ac.)
End of computations, total study area =          29.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  87.8
```

Sub Area E

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79e.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 140.000 to Point/Station 141.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 1586.000(Ft.)
Bottom (of initial area) elevation = 1504.000(Ft.)
Difference in elevation = 82.000(Ft.)
Slope = 0.08200 s(percent)= 8.20
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.852 min.
Rainfall intensity = 2.687(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 19.371(CFS)
Total initial stream area = 8.500(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      141.000 to Point/Station      142.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------------
Top of natural channel elevation =   1504.000(Ft.)
End of natural channel elevation =   1464.000(Ft.)
Length of natural channel  =  1500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     53.441(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.44(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0267
Corrected/adjusted channel slope =  0.0267
Travel time =    3.88 min.     TC =   17.73  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.850
RI index for soil(AMC 2)  =  88.55
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.346(In/Hr) for a   100.0 year storm
Subarea runoff =     58.812(CFS) for     29.900(Ac.)
Total runoff =     78.182(CFS)      Total area =      38.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      142.000 to Point/Station      143.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------------
Top of natural channel elevation =   1464.000(Ft.)
End of natural channel elevation =   1424.000(Ft.)
Length of natural channel  =  1690.000(Ft.)
Estimated mean flow rate at midpoint of channel =     94.878(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.19(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0237
Corrected/adjusted channel slope =  0.0237
Travel time =    3.92 min.     TC =   21.65  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 2)  =  87.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.102(In/Hr) for a   100.0 year storm
Subarea runoff =     28.385(CFS) for     16.400(Ac.)
Total runoff =    106.567(CFS)      Total area =      54.800(Ac.)
End of computations, total study area =           54.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  88.2
```

Sub Area F

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79f.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 150.000 to Point/Station 151.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 890.000(Ft.)
Top (of initial area) elevation = 1588.000(Ft.)
Bottom (of initial area) elevation = 1441.000(Ft.)
Difference in elevation = 147.000(Ft.)
Slope = 0.16517 s(percent)= 16.52
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.493 min.
Rainfall intensity = 2.978(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.849
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2) = 88.10
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 16.175(CFS)
Total initial stream area = 6.400(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      151.000 to Point/Station      152.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1441.000(Ft.)
End of natural channel elevation =   1430.000(Ft.)
Length of natural channel  =   460.000(Ft.)
Estimated mean flow rate at midpoint of channel =     24.515(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.90(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0239
Corrected/adjusted channel slope =  0.0239
Travel time =    1.57 min.     TC =   13.06  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 2)  =  87.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.776(In/Hr) for a   100.0 year storm
Subarea runoff =     15.403(CFS) for      6.600(Ac.)
Total runoff =     31.578(CFS)      Total area =      13.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      152.100 to Point/Station      152.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   580.000(Ft.)
Top (of initial area) elevation =  1446.200(Ft.)
Bottom (of initial area) elevation =  1430.400(Ft.)
Difference in elevation =    15.800(Ft.)
Slope =    0.02724  s(percent)=       2.72
TC = k(0.324)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.485 min.
Rainfall intensity =      3.519(In/Hr) for a   100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.900
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  = 100.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      2.217(CFS)
Total initial stream area =        0.700(Ac.)
Pervious area fraction = 0.200
```

End of computations, total study area = 13.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.959
Area averaged RI index number = 88.3

Sub Area G

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
      Rational Hydrology Study        Date: 07/05/10  File:2sr79g.out
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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

------------------------------------------------------------------------
Darrin Ginn, Murrieta, California - S/N   874
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.500(In.)
100 year, 1 hour precipitation =  1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      155.000 to Point/Station      156.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   565.000(Ft.)
Top (of initial area) elevation =  1497.000(Ft.)
Bottom (of initial area) elevation =  1445.000(Ft.)
Difference in elevation =    52.000(Ft.)
Slope =    0.09204  s(percent)=       9.20
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.772 min.
Rainfall intensity =      3.086(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)   =  88.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     16.322(CFS)
Total initial stream area =        6.200(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =           6.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  88.7
```

Sub Area H

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79h.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 160.000 to Point/Station 161.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 980.000(Ft.)
Top (of initial area) elevation = 1612.000(Ft.)
Bottom (of initial area) elevation = 1486.000(Ft.)
Difference in elevation = 126.000(Ft.)
Slope = 0.12857 s(percent)= 12.86
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.558 min.
Rainfall intensity = 2.836(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2) = 87.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 15.814(CFS)
Total initial stream area = 6.600(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      161.000 to Point/Station      162.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1486.000(Ft.)
End of natural channel elevation =   1455.000(Ft.)
Length of natural channel  =  1180.000(Ft.)
Estimated mean flow rate at midpoint of channel =     34.504(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    3.48 min.     TC =   16.04  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  88.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.479(In/Hr) for a   100.0 year storm
Subarea runoff =     32.572(CFS) for     15.600(Ac.)
Total runoff =     48.386(CFS)      Total area =      22.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      161.000 to Point/Station      162.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     22.200(Ac.)
Runoff from this stream =     48.386(CFS)
Time of concentration =   16.04 min.
Rainfall intensity =     2.479(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      160.000 to Point/Station      163.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   705.000(Ft.)
Top (of initial area) elevation =  1612.000(Ft.)
Bottom (of initial area) elevation =  1494.000(Ft.)
Difference in elevation =   118.000(Ft.)
Slope =    0.16738  s(percent)=      16.74
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   10.443 min.
Rainfall intensity =      3.139(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     23.622(CFS)
Total initial stream area =        8.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      163.000 to Point/Station      164.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =   1494.000(Ft.)
End of natural channel elevation =   1481.000(Ft.)
Length of natural channel  =   460.000(Ft.)
Estimated mean flow rate at midpoint of channel =     42.279(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0283
Corrected/adjusted channel slope =  0.0283
Travel time =    1.24 min.     TC =   11.68  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.952(In/Hr) for a   100.0 year storm
Subarea runoff =     34.975(CFS) for     13.900(Ac.)
Total runoff =     58.597(CFS)      Total area =      22.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      164.000 to Point/Station      162.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =   1481.000(Ft.)
End of natural channel elevation =   1455.000(Ft.)
Length of natural channel  =  1075.000(Ft.)
```

```
Estimated mean flow rate at midpoint of channel =     72.924(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.72(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0242
Corrected/adjusted channel slope =  0.0242
Travel time =    2.67 min.     TC =   14.35  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.636(In/Hr) for a   100.0 year storm
Subarea runoff =     24.786(CFS) for     11.100(Ac.)
Total runoff =     83.383(CFS)      Total area =      33.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      164.000 to Point/Station      162.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     33.800(Ac.)
Runoff from this stream =     83.383(CFS)
Time of concentration =   14.35 min.
Rainfall intensity =     2.636(In/Hr)
Summary of stream data:

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


1       48.386     16.04                2.479
2       83.383     14.35                2.636
Largest stream flow has longer or shorter time of concentration
Qp =     83.383 + sum of
        Qa          Tb/Ta
        48.386 *    0.894 =     43.267
Qp =    126.650

Total of 2 main streams to confluence:
Flow rates before confluence point:
      48.386      83.383
Area of streams before confluence:
       22.200       33.800
```

```
Results of confluence:
Total flow rate =    126.650(CFS)
Time of concentration =    14.345 min.
Effective stream area after confluence  =     56.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      162.000 to Point/Station      165.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1455.000(Ft.)
End of natural channel elevation =   1448.000(Ft.)
Length of natural channel  =   190.000(Ft.)
Estimated mean flow rate at midpoint of channel =    129.590(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.85(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0368
Corrected/adjusted channel slope =  0.0368
Travel time =    0.32 min.     TC =   14.67  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.200
RI index for soil(AMC 2)  =  86.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.604(In/Hr) for a   100.0 year storm
Subarea runoff =      5.647(CFS) for      2.600(Ac.)
Total runoff =    132.296(CFS)      Total area =      58.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      165.100 to Point/Station      165.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   485.000(Ft.)
Top (of initial area) elevation =  1482.900(Ft.)
Bottom (of initial area) elevation =  1463.300(Ft.)
Difference in elevation =    19.600(Ft.)
Slope =    0.04041  s(percent)=       4.04
TC = k(0.348)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.855 min.
Rainfall intensity =      3.671(In/Hr) for a   100.0 year storm
Note: User entered runoff coefficient C value =  0.900
       Results in the highest RI Curve number
```

```
USER INPUT of soil data for subarea
Runoff Coefficient = 0.900
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
RI index for soil(AMC 2)  = 100.00
Pervious area fraction =  0.300; Impervious fraction =  0.700
Initial subarea runoff =      2.313(CFS)
Total initial stream area =        0.700(Ac.)
Pervious area fraction = 0.300
End of computations, total study area =          59.30 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.992
Area averaged RI index number =  88.8
```

Sub Area I

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/09/10 File:2SR79I.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 166.000 to Point/Station 167.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 320.000(Ft.)
Top (of initial area) elevation = 1534.000(Ft.)
Bottom (of initial area) elevation = 1476.000(Ft.)
Difference in elevation = 58.000(Ft.)
Slope = 0.18125 s(percent)= 18.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.493 min.
Rainfall intensity = 3.768(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 5.848(CFS)
Total initial stream area = 1.800(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 1.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

Sub Area J

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
      Rational Hydrology Study        Date: 07/09/10  File:2SR79J.out
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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

------------------------------------------------------------------------
Darrin Ginn, Murrieta, California - S/N   874
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.500(In.)
100 year, 1 hour precipitation =  1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      168.000 to Point/Station      169.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   675.000(Ft.)
Top (of initial area) elevation =  1603.000(Ft.)
Bottom (of initial area) elevation =  1492.000(Ft.)
Difference in elevation =   111.000(Ft.)
Slope =    0.16444  s(percent)=      16.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.299 min.
Rainfall intensity =      3.163(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     21.106(CFS)
Total initial stream area =        7.800(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            7.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Sub Area K

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79k.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.500(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 175.000 to Point/Station 176.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 720.000(Ft.)
Top (of initial area) elevation = 1522.000(Ft.)
Bottom (of initial area) elevation = 1504.000(Ft.)
Difference in elevation = 18.000(Ft.)
Slope = 0.02500 s(percent)= 2.50
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.404 min.
Rainfall intensity = 3.169(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
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
RI index for soil(AMC 2) = 86.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 16.281(CFS)
Total initial stream area = 6.100(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      175.000 to Point/Station      176.000
**** CONFLUENCE OF MAIN STREAMS ****
--------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.100(Ac.)
Runoff from this stream =     16.281(CFS)
Time of concentration =   15.40 min.
Rainfall intensity =     3.169(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      177.000 to Point/Station      176.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------------
Initial area flow distance =   675.000(Ft.)
Top (of initial area) elevation =  1522.000(Ft.)
Bottom (of initial area) elevation =  1504.000(Ft.)
Difference in elevation =    18.000(Ft.)
Slope =    0.02667  s(percent)=       2.67
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.818 min.
Rainfall intensity =      3.237(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.843
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
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.102(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      177.000 to Point/Station      176.000
**** CONFLUENCE OF MAIN STREAMS ****
--------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.700(Ac.)
Runoff from this stream =     10.102(CFS)
Time of concentration =   14.82 min.
Rainfall intensity =     3.237(In/Hr)
Summary of stream data:

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


1       16.281     15.40                3.169
2       10.102     14.82                3.237
Largest stream flow has longer time of concentration
Qp =     16.281 + sum of
```

```
        Qb          Ia/Ib
        10.102 *    0.979 =      9.889
Qp =     26.170

Total of 2 main streams to confluence:
Flow rates before confluence point:
      16.281      10.102
Area of streams before confluence:
        6.100       3.700


Results of confluence:
Total flow rate =     26.170(CFS)
Time of concentration =    15.404 min.
Effective stream area after confluence  =      9.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      176.000 to Point/Station      178.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1504.000(Ft.)
End of natural channel elevation =   1497.000(Ft.)
Length of natural channel  =   230.000(Ft.)
Estimated mean flow rate at midpoint of channel =     28.173(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.74(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0304
Corrected/adjusted channel slope =  0.0304
Travel time =    0.67 min.     TC =   16.07  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.096(In/Hr) for a   100.0 year storm
Subarea runoff =      3.968(CFS) for      1.500(Ac.)
Total runoff =     30.138(CFS)      Total area =      11.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      176.000 to Point/Station      178.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
```

```
In Main Stream number: 1
Stream flow area =     11.300(Ac.)
Runoff from this stream =     30.138(CFS)
Time of concentration =   16.07 min.
Rainfall intensity =     3.096(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      179.000 to Point/Station      180.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   650.000(Ft.)
Top (of initial area) elevation =  1624.000(Ft.)
Bottom (of initial area) elevation =  1509.000(Ft.)
Difference in elevation =   115.000(Ft.)
Slope =    0.17692  s(percent)=      17.69
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.997 min.
Rainfall intensity =      4.019(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
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
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.982(CFS)
Total initial stream area =        3.200(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      180.000 to Point/Station      178.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1509.000(Ft.)
Downstream point/station elevation =  1497.000(Ft.)
Pipe length  =   147.00(Ft.)   Manning's N = 0.024
No. of pipes = 1  Required pipe flow  =    10.982(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.982(CFS)
Normal flow depth in pipe =   10.84(In.)
Flow top width inside pipe =   17.62(In.)
Critical Depth =   15.23(In.)
Pipe flow velocity =      9.88(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    10.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      180.000 to Point/Station      178.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
```

```
Stream flow area =      3.200(Ac.)
Runoff from this stream =     10.982(CFS)
Time of concentration =   10.25 min.
Rainfall intensity =     3.965(In/Hr)
Summary of stream data:

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


1       30.138     16.07                3.096
2       10.982     10.25                3.965
Largest stream flow has longer time of concentration
Qp =     30.138 + sum of
        Qb         Ia/Ib
        10.982 *    0.781 =      8.573
Qp =     38.711

Total of 2 main streams to confluence:
Flow rates before confluence point:
      30.138      10.982
Area of streams before confluence:
       11.300        3.200


Results of confluence:
Total flow rate =     38.711(CFS)
Time of concentration =    16.071 min.
Effective stream area after confluence  =     14.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      178.000 to Point/Station      181.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1497.000(Ft.)
Downstream point elevation =  1496.000(Ft.)
Channel length thru subarea  =   225.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   4.000
Slope or 'Z' of right channel bank =   4.000
Estimated mean flow rate at midpoint of channel =     48.055(CFS)
Manning's 'N'    = 0.025
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     48.055(CFS)
Depth of flow =   1.816(Ft.), Average velocity =   3.642(Ft/s)
Channel flow top width =   14.530(Ft.)
Flow Velocity =    3.64(Ft/s)
Travel time  =    1.03 min.
Time of concentration =   17.10 min.

Sub-Channel No. 1 Critical depth =      1.547(Ft.)
  '     '       '     Critical flow top width =     12.375(Ft.)
  '     '       '     Critical flow velocity=    5.021(Ft/s)
  '     '       '     Critical flow area =      9.571(Sq.Ft)

 Adding area flow to channel
```

```
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.839
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
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.992(In/Hr) for a   100.0 year storm
Subarea runoff =     17.573(CFS) for      7.000(Ac.)
Total runoff =     56.283(CFS)      Total area =      21.500(Ac.)
End of computations, total study area =           21.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  86.2
```

Sub Area L

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79l.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 185.000 to Point/Station 186.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 755.000(Ft.)
Top (of initial area) elevation = 1620.000(Ft.)
Bottom (of initial area) elevation = 1509.000(Ft.)
Difference in elevation = 111.000(Ft.)
Slope = 0.14702 s(percent)= 14.70
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.015 min.
Rainfall intensity = 3.048(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2) = 88.70
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 18.191(CFS)
Total initial stream area = 7.000(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 7.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 88.7

Sub Area M

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2000 Version 6.3
Rational Hydrology Study Date: 07/05/10 File:2sr79m.out

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

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

Darrin Ginn, Murrieta, California - S/N 874

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 190.000 to Point/Station 191.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 950.000(Ft.)
Top (of initial area) elevation = 1560.000(Ft.)
Bottom (of initial area) elevation = 1531.000(Ft.)
Difference in elevation = 29.000(Ft.)
Slope = 0.03053 s(percent)= 3.05
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.536 min.
Rainfall intensity = 2.438(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 84.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 10.163(CFS)
Total initial stream area = 5.100(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      191.000 to Point/Station      192.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1531.000(Ft.)
End of natural channel elevation =   1512.500(Ft.)
Length of natural channel  =  1295.000(Ft.)
Estimated mean flow rate at midpoint of channel =     28.297(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0143
Corrected/adjusted channel slope =  0.0143
Travel time =    5.48 min.     TC =   22.02  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.779
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  80.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.083(In/Hr) for a   100.0 year storm
Subarea runoff =     29.511(CFS) for     18.200(Ac.)
Total runoff =     39.674(CFS)      Total area =      23.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      192.000 to Point/Station      193.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1512.500(Ft.)
End of natural channel elevation =   1500.000(Ft.)
Length of natural channel  =   765.000(Ft.)
Estimated mean flow rate at midpoint of channel =     54.232(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0163
Corrected/adjusted channel slope =  0.0163
Travel time =    2.52 min.     TC =   24.53  min.


 Adding area flow to channel
Note: User entered runoff coefficient C value =  0.900
```

```
       Results in the highest RI Curve number
USER INPUT of soil data for subarea
Runoff Coefficient = 0.900
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  = 100.00
Pervious area fraction =  0.900; Impervious fraction =  0.100
Rainfall intensity =      1.962(In/Hr) for a   100.0 year storm
Subarea runoff =     30.202(CFS) for     17.100(Ac.)
Total runoff =     69.876(CFS)      Total area =      40.400(Ac.)
End of computations, total study area =          40.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.958
Area averaged RI index number =  89.2
```

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX C

$Q_{(25)}$ ON-SITE DRAINAGE CALCULATIONS

HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (METRIC)

Date: 10/13/11

ONDRAIN 7.3 OS6

	Starting Point							
Location station (m):	**189+60.0**	**190+14.0**						
Longitudinal profile ("on-grade" or "sag"):		on-grade	on-grade	on-grade	on-grade	on-grade		
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (m):		17.70						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (m):								
Grate length (m):								
Precipitation intensity (mm/hr):		95						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (hectares):		0.000						
Watershed paved length (m):		54.0						
Paved area contributing to this inlet (hectares):		0.096						
Subarea discharge Q_{sa} (m^3/s):		0.023						
Additional discharge (m^3/s):		0.000						
Total discharge Q_t, including any upstream by-pass (m^3/s):		**0.023**						
By-pass Q (m3/s): *Description here*	**0.000**	**#VALUE!**						
DEPRESSION CALCULATION:								
Width of depression "w" (m):								
Depression depth "a" (from flowline w/o depression) (mm):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s over shoulder (m^3/s):								
Q=Q_w+Q_s (m^3/s) (after iterations must match Q_t value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (m):		1.73						
Flooded Width T at depression (if any) (m):		1.73						
Flooded Width T for BYPASS Q downstream of inlet (m):		#VALUE!						
Water depth at curb (with or without depression) (mm):		34.56						
Water velocity immediately u/s from inlet (w/o depression) (m/s):		0.75						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (m/s):								
Effective length of grate considering clogging factor (m):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (m^3/s):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (m):		6.67						
Length of inlet provided L (m):								
Efficiency for length L:								
Interception for length L (m^3/s):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (m):								
Max. head at sag w/o exceeding allowable flooded width (m):								
Capacity of grate in a sag (3-sided weir) (m^3/s):								
Length provided of curb-opening inlet at sag (m):								
Capacity of curb-opening inlet in a sag (weir) (m^3/s):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
Underlined values are calculated by the program, the others are input by the user.

HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (IMPERIAL UNITS)

Date: 10/13/11

ONDRAIN 7.3 OS6

	Starting Point							
Location station (ft):	**622+04.7**	**623+81.9**						
Longitudinal profile ("on-grade" or "sag"):		on-grade						
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (ft):		58.07						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (ft):								
Grate length (ft):								
Precipitation intensity (in/hr):		3.74						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (acres):		0.000						
Watershed paved length (ft):		177.2						
Paved area contributing to this inlet (acres):		0.236						
Subarea discharge Q_{sa} (cfs):		0.80						
Additional discharge (cfs):		0.00						
Total discharge Q_t, including any upstream by-pass (cfs):		0.795						
By-pass Q (cfs): *Description here*	0.00	#VALUE!						
DEPRESSION CALCULATION:								
Width of depression "w" (ft):								
Depression depth "a" (from flowline w/o depression) (in):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s in shoulder (excluding Q over depression) (tentative, ITERATE HERE):		1.536	1.538					
Q_s (after iterations must match Q_s above):								
Q=Q_w+Q_s (cfs) (after iterations must match Q_t value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (ft):		5.67						
Flooded Width T at depression (if any) (ft):		5.67						
Flooded Width T for BYPASS Q downstream of inlet (ft):		#VALUE!						
Water depth at curb (with or without depression) (in):		1.36						
Water velocity immediately u/s from inlet (w/o depression) (fps):		2.47						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (fps):								
Effective length of grate considering clogging factor (ft):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (cfs):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (ft):		21.90						
Length of inlet provided L (ft):								
Efficiency for length L:								
Interception for length L (cfs):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (ft):								
Max. head at sag w/o exceeding allowable flooded width (ft):								
Capacity of grate in a sag (3-sided weir), (cfs):								
Length provided of curb-opening inlet at sag (ft):								
Capacity of curb-opening inlet in a sag (weir), (cfs):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
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HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (METRIC)

Date: 10/13/11

ONDRAIN 7.3 OS7

	Starting Point							
Location station (m):	**189+70.0**	**190+14.1**						
Longitudinal profile ("on-grade" or "sag"):		on-grade	on-grade	on-grade	on-grade	on-grade		
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (m):		56.80						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (m):								
Grate length (m):								
Precipitation intensity (mm/hr):		95						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (hectares):		0.000						
Watershed paved length (m):		44.1						
Paved area contributing to this inlet (hectares):		0.250						
Subarea discharge Q_{sa} (m^3/s):		0.059						
Additional discharge (m^3/s):		0.000						
Total discharge Q_t, including any upstream by-pass (m^3/s):		**0.059**						
By-pass Q (m3/s): *Description here*	**0.000**	**#VALUE!**						
DEPRESSION CALCULATION:								
Width of depression "w" (m):								
Depression depth "a" (from flowline w/o depression) (mm):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s over shoulder (m^3/s):								
Q=Q_w+Q_s (m^3/s) (after iterations must match Q_t value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (m):		2.48						
Flooded Width T at depression (if any) (m):		2.48						
Flooded Width T for BYPASS Q downstream of inlet (m):		#VALUE!						
Water depth at curb (with or without depression) (mm):		49.59						
Water velocity immediately u/s from inlet (w/o depression) (m/s):		0.96						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (m/s):								
Effective length of grate considering clogging factor (m):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (m^3/s):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (m):		10.00						
Length of inlet provided L (m):								
Efficiency for length L:								
Interception for length L (m^3/s):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (m):								
Max. head at sag w/o exceeding allowable flooded width (m):								
Capacity of grate in a sag (3-sided weir) (m^3/s):								
Length provided of curb-opening inlet at sag (m):								
Capacity of curb-opening inlet in a sag (weir) (m^3/s):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
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HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (IMPERIAL UNITS)

Date: 10/13/11

ONDRAIN 7.3 OS7

	Starting Point							
Location station (ft):	**622+37.5**	**623+82.1**						
Longitudinal profile ("on-grade" or "sag"):		on-grade						
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (ft):		186.35						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (ft):								
Grate length (ft):								
Precipitation intensity (in/hr):		3.74						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (acres):		0.000						
Watershed paved length (ft):		144.6						
Paved area contributing to this inlet (acres):		0.619						
Subarea discharge Q_{sa} (cfs):		2.08						
Additional discharge (cfs):		0.00						
Total discharge Q_t, including any upstream by-pass (cfs):		2.082						
By-pass Q (cfs): *Description here*	**0.00**	**#VALUE!**						
DEPRESSION CALCULATION:								
Width of depression "w" (ft):								
Depression depth "a" (from flowline w/o depression) (in):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s in shoulder (excluding Q over depression) (tentative, **ITERATE HERE**):		**1.536**	**1.538**					
Q_s (after iterations must match Q_s above):								
Q=Q_w+Q_s (cfs) (after iterations must match Q_t value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (ft):		8.13						
Flooded Width T at depression (if any) (ft):		8.13						
Flooded Width T for BYPASS Q downstream of inlet (ft):		#VALUE!						
Water depth at curb (with or without depression) (in):		1.95						
Water velocity immediately u/s from inlet (w/o depression) (fps):		3.15						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (fps):								
Effective length of grate considering clogging factor (ft):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (cfs):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (ft):		32.81						
Length of inlet provided L (ft):								
Efficiency for length L:								
Interception for length L (cfs):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (ft):								
Max. head at sag w/o exceeding allowable flooded width (ft):								
Capacity of grate in a sag (3-sided weir), (cfs):								
Length provided of curb-opening inlet at sag (ft):								
Capacity of curb-opening inlet in a sag (weir), (cfs):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
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HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (METRIC)

Date: 10/13/11

ONDRAIN 7.3 OS8

	Starting Point							
Location station (m):	**190+14.1**	**190+60.0**						
Longitudinal profile ("on-grade" or "sag"):		on-grade	on-grade	on-grade	on-grade	on-grade		
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (m):		48.20						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (m):								
Grate length (m):								
Precipitation intensity (mm/hr):		95						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (hectares):		0.000						
Watershed paved length (m):		45.9						
Paved area contributing to this inlet (hectares):		0.221						
Subarea discharge Q_{sa} (m^3/s):		0.052						
Additional discharge (m^3/s):		0.000						
Total discharge Q_t, including any upstream by-pass (m^3/s):		**0.052**						
By-pass Q (m3/s): *Description here*	**0.000**	**#VALUE!**						
DEPRESSION CALCULATION:								
Width of depression "w" (m):								
Depression depth "a" (from flowline w/o depression) (mm):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s over shoulder (m^3/s):								
Q=Q_w+Q_s (m^3/s) (after iterations must match Q_t value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (m):		2.37						
Flooded Width T at depression (if any) (m):		2.37						
Flooded Width T for BYPASS Q downstream of inlet (m):		#VALUE!						
Water depth at curb (with or without depression) (mm):		47.35						
Water velocity immediately u/s from inlet (w/o depression) (m/s):		0.93						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (m/s):								
Effective length of grate considering clogging factor (m):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (m^3/s):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (m):		9.50						
Length of inlet provided L (m):								
Efficiency for length L:								
Interception for length L (m^3/s):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (m):								
Max. head at sag w/o exceeding allowable flooded width (m):								
Capacity of grate in a sag (3-sided weir) (m^3/s):								
Length provided of curb-opening inlet at sag (m):								
Capacity of curb-opening inlet in a sag (weir) (m^3/s):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
Underlined values are calculated by the program, the others are input by the user.

HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (IMPERIAL UNITS)

Date: 10/13/11

ONDRAIN 7.3 OS8

	Starting Point							
Location station (ft):	**623+82.1**	**625+32.8**						
Longitudinal profile ("on-grade" or "sag"):		on-grade						
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (ft):		158.14						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (ft):								
Grate length (ft):								
Precipitation intensity (in/hr):		3.74						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (acres):		0.000						
Watershed paved length (ft):		150.7						
Paved area contributing to this inlet (acres):		0.547						
Subarea discharge Q_{sa} (cfs):		1.84						
Additional discharge (cfs):		0.00						
Total discharge Q_t, including any upstream by-pass (cfs):		1.842						
By-pass Q (cfs): *Description here*	**0.00**	**#VALUE!**						
DEPRESSION CALCULATION:								
Width of depression "w" (ft):								
Depression depth "a" (from flowline w/o depression) (in):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s in shoulder (excluding Q over depression) (tentative, **ITERATE HERE**):		**1.536**	**1.538**					
Q_s (after iterations must match Q_s above):								
Q=Q_w+Q_s (cfs) (after iterations must match **Q_t** value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (ft):		7.77						
Flooded Width T at depression (if any) (ft):		7.77						
Flooded Width T for BYPASS Q downstream of inlet (ft):		#VALUE!						
Water depth at curb (with or without depression) (in):		1.86						
Water velocity immediately u/s from inlet (w/o depression) (fps):		3.05						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (fps):								
Effective length of grate considering clogging factor (ft):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (cfs):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (ft):		31.16						
Length of inlet provided L (ft):								
Efficiency for length L:								
Interception for length L (cfs):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (ft):								
Max. head at sag w/o exceeding allowable flooded width (ft):								
Capacity of grate in a sag (3-sided weir), (cfs):								
Length provided of curb-opening inlet at sag (ft):								
Capacity of curb-opening inlet in a sag (weir), (cfs):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
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HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (METRIC)

Date: 10/13/11

ONDRAIN 7.3 OS9

	Starting Point							
Location station (m):	**190+14.1**	**190+50.0**						
Longitudinal profile ("on-grade" or "sag"):		on-grade	on-grade	on-grade	on-grade	on-grade		
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (m):		13.10						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (m):								
Grate length (m):								
Precipitation intensity (mm/hr):		95						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (hectares):		0.000						
Watershed paved length (m):		35.9						
Paved area contributing to this inlet (hectares):		0.047						
Subarea discharge Q_{sa} (m^3/s):		0.011						
Additional discharge (m^3/s):		0.000						
Total discharge Q_t, including any upstream by-pass (m^3/s):		**0.011**						
By-pass Q (m3/s): *Description here*	**0.000**	**#VALUE!**						
DEPRESSION CALCULATION:								
Width of depression "w" (m):								
Depression depth "a" (from flowline w/o depression) (mm):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s over shoulder (m^3/s):								
Q=Q_w+Q_s (m^3/s) (after iterations must match **Q_t** value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (m):		1.32						
Flooded Width T at depression (if any) (m):		1.32						
Flooded Width T for BYPASS Q downstream of inlet (m):		#VALUE!						
Water depth at curb (with or without depression) (mm):		26.50						
Water velocity immediately u/s from inlet (w/o depression) (m/s):		0.63						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (m/s):								
Effective length of grate considering clogging factor (m):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (m^3/s):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (m):		4.96						
Length of inlet provided L (m):								
Efficiency for length L:								
Interception for length L (m^3/s):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (m):								
Max. head at sag w/o exceeding allowable flooded width (m):								
Capacity of grate in a sag (3-sided weir) (m^3/s):								
Length provided of curb-opening inlet at sag (m):								
Capacity of curb-opening inlet in a sag (weir) (m^3/s):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
Underlined values are calculated by the program, the others are input by the user.

HYDRAULIC CALCULATOR FOR ONSITE DRAINAGE (IMPERIAL UNITS)

Date: 10/13/11

ONDRAIN 7.3 OS9

	Starting Point							
Location station (ft):	**623+82.1**	**625+00.0**						
Longitudinal profile ("on-grade" or "sag"):		on-grade						
Calculation Type ("grate", "side opening", or "shoulder hydraulics only"):		side opening	grate	grate	grate	grate		
Longitudinal slope, S:		2.00%						
Shoulder cross-slope, Sx:		2.00%						
Average watershed paved width (ft):		42.98						
Shoulder Manning's n:		0.015						
Inlet description (optional):								
Clogging factor for on-grade grates:								
Grate width (ft):								
Grate length (ft):								
Precipitation intensity (in/hr):		3.74						
Runoff Coefficient for paved areas, "C_p":		0.90						
Runoff Coefficient for unpaved areas, "C_u":		0.80						
Unpaved area contributing to this inlet (acres):		0.000						
Watershed paved length (ft):		117.9						
Paved area contributing to this inlet (acres):		0.116						
Subarea discharge Q_{sa} (cfs):		0.39						
Additional discharge (cfs):		0.00						
Total discharge Q_t, including any upstream by-pass (cfs):		0.392						
By-pass Q (cfs): *Description here*	0.00	#VALUE!						
DEPRESSION CALCULATION:								
Width of depression "w" (ft):								
Depression depth "a" (from flowline w/o depression) (in):								
Depression cross-slope (Sw=Sx+a/w):								
Discharge-weighted equivalent cross-slope (Se):								
Q_s in shoulder (excluding Q over depression) (tentative, ITERATE HERE):		1.536	1.538					
Q_s (after iterations must match Q_s above):								
Q=Q_w+Q_s (cfs) (after iterations must match Q_t value):								
Fraction of flow over the depression (Eo):								
HYDRAULIC RESULTS:								
Flooded Width T for Q_t, upstream of inlet (ft):		4.35						
Flooded Width T at depression (if any) (ft):		4.35						
Flooded Width T for BYPASS Q downstream of inlet (ft):		#VALUE!						
Water depth at curb (with or without depression) (in):		1.04						
Water velocity immediately u/s from inlet (w/o depression) (fps):		2.07						
GRATE INLETS ON-GRADE:								
Splash-over V for effective length of grate (type P-1 3/8) (fps):								
Effective length of grate considering clogging factor (ft):								
Ratio of grate frontal flow to total flow:								
Fraction of frontal flow intercepted (Rf):								
Fraction of side flow interception (Rs):								
Total flow intercepted (cfs):								
Grate Efficiency (E):								
SLOTTED DRAINS & SIDE-OPENING INLETS ON-GRADE:								
Length required for total interception (ft):		16.26						
Length of inlet provided L (ft):								
Efficiency for length L:								
Interception for length L (cfs):		#VALUE!						
INTERCEPTION CAPACITY OF INLETS IN SAG LOCATION:								
Maximum allowable flooded width (including the depression) (ft):								
Max. head at sag w/o exceeding allowable flooded width (ft):								
Capacity of grate in a sag (3-sided weir), (cfs):								
Length provided of curb-opening inlet at sag (ft):								
Capacity of curb-opening inlet in a sag (weir), (cfs):								

ONDRAIN_Metric Version 7.3, developed by Fernando Manzanera, Caltrans District 8, Office of Hydraulics (May 2004).

Notes: This program utilizes the equations presented in the FHA Hydraulic Engineering Circulars 12 and 22 (HEC-12 & HEC-22).
Underlined values are calculated by the program, the others are input by the user.

Intensity-Duration-Frequency Curves based on the Riverside County Flood Control District Hydrology Manual

Calculated by: Darrin Ginn
Date: 7/13/2010

The equation used is: $\mathbf{Int = e^{(E*(ln(Dur)-4.0943)+ln(P(1hr))}}$

where P(1hr) is the 1 hour precipitation for the design return period and E is the slope from the Riverside County Hydrology Manual (the application range is from 5 minutes to 90 minutes, intended to be used with the Rational Method).

EA# and Location: **EA-464621 - State Route 79**

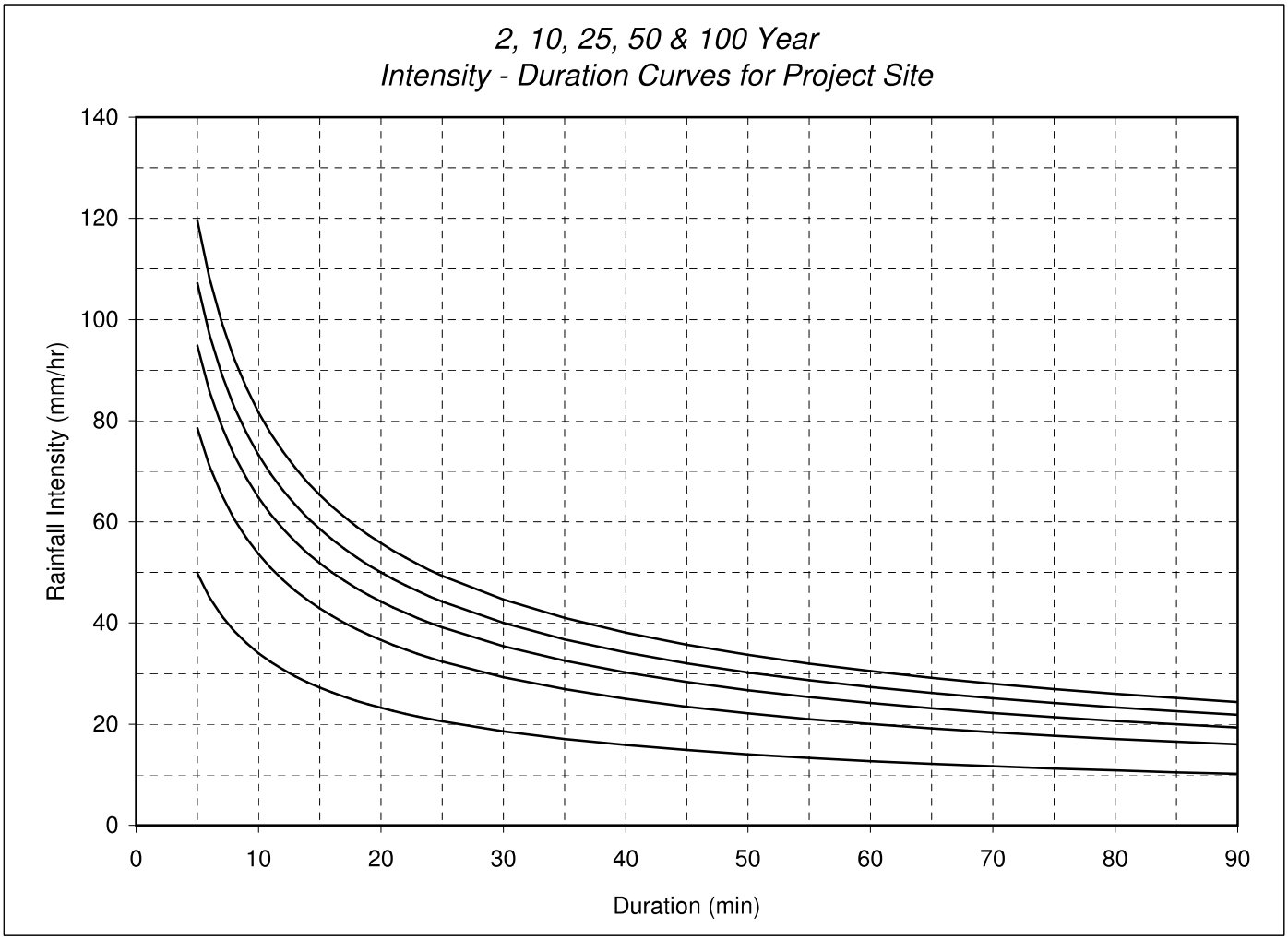
Latitude: 33 deg, 40. min, 5.0 sec, or: 33.668 deg
Longitude: 117 deg, 5. min, 5.0 sec, or: 117.085 deg
Datum: WGS84 Elevation: 1465

Rainfall characteristics of the project site
(from isohyetal maps or recording stations):

2-yr, 1-hr precipitation (from isohyetal map):	0.50 in
Interpolated 10-yr, 1-hr precipitation:	0.79 in
Interpolated 25-yr, 1-hr precipitation:	0.95 in
Interpolated 50-yr, 1-hr precipitation:	1.08 in
100-yr, 1-hr precipitation (from isohyetal map):	1.20 in
Curve slope (from I-D curve slopes map in Hydrology Manual):	-0.550

25 year, 5 minute duration intensity used = 3.73 in/hr for Onsite Hydrology

The resulting 25 year, 10 minute duration intensity at the project site is: **65 mm/ hr,** or: 2.55 in/ hr



Notes:
- Rainfall data and the isohytal maps of the Hydrology Manual are based on USDC, NOAA Atlas 2, Volume XI, California 1973.
- The intensity values provided above are for the design of peak discharge only, not for discharge volume calculations.
- The results in this sheet are intended to be valid only for the project location defined above.
- Spreadsheet developed by Fernando Manzanera (Caltrans District 8 / Hydraulics, 05/13/02).

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EA 464621

APPENDIX D

TABLE OF PROPOSED SYSTEM DESIGN VALUES

TABLE OF PROPOSED SYSTEM DESIGN VALUES

Drainage System	Existing Pipe Size and Type English (Metric)	Proposed Pipe Size and Type English (Metric)	Station (metric)	D Size (ft)	A (ft2)	S (ft/ft)	n	Wetted Permiter (AP)	R (assume 100% full) A/AP	Q (max) cfs	V(max) ft/s	Q (100)*** cfs	V*** ft/s
1	42 " (1050 mm) CMP	42 " (1050 mm) CSP	165+44.866	3.5	9.62	2.22	0.24	11.00	0.875	81.4	8.46	20.4	9.58
2	84 " (2135 mm) CMP	84 " (2100 mm) RCP	168+92.190	7	38.48	1.16	0.13	21.99	1.75	41.1*	8.84*	41.1	8.84
3	60 " (1500 mm) CMP	60 " (1500 mm) RCP	170+51.318	5	19.63	0.83	0.13	15.71	1.25	237.9	12.12	548.4	12.21
4	24 " (600 mm) CMP	24 " (600 mm) AP	172+76.365	2	3.14	2.14	0.24	6.28	0.5	18.0	5.72	76.9	11.51
5	18 " (450 mm) CMP	24 " (600 mm) RCP	175+17.896	2	3.14	0.38	0.13	6.28	0.5	14.0	4.45	106.6	10.41
6	18 " (450 mm) CMP	24 " (600 mm) RCP	176+86.952	2	3.14	0.68	0.13	6.28	0.5	18.7	5.95	31.6	7.50
7	18 " (450 mm) CMP	24 " (600 mm) AP	178+91.951	2	3.14	2.53	0.24	6.28	0.5	19.5	6.22	16.3	8.67
8	84 " (2134 mm) CMP	84 " (2100 mm) RCP	180+30.829	7	38.48	0.30	0.13	21.99	1.75	350.9	9.12	132.3	11.83
9	18 " (450 mm) CMP	24 " (600 mm) AP	182+44.948	2	3.14	6.34	0.24	6.28	0.5	30.9	9.85	5.8	8.33
10	36 " (900 mm) CMP	36 " (900 mm) AP	183+77.789	3	7.07	6.95	0.24	9.42	0.75	95.5	13.51	21.1	11.72
11	84 " (2135 mm) CMP	84 " (2100 mm) RCP	186+20.636	7	38.48	3.82	0.13	21.99	1.75	56.3*	12.0*	56.3	12.00
12	24 " (600 mm) CMP	24 " (600 mm) AP	187+12.491	2	3.14	1.88	0.24	6.28	0.5	16.8	5.36	11.4	8.79
13	24 " (600 mm) CSP	24 " (600 mm) CSP	190+14.141	2	3.14	4.33	0.24	6.28	0.5	25.6	8.14	18.2	8.79
14	42 " (1050 mm) CSP	42 " (600 mm) CSP	190+89.283	3.5	9.62	2.81	0.24	11.00	0.875	91.6	9.52	69.9	12.54
15	36 " (900 mm) AP	36 " (36 mm) AP	238+49.866	Covered under Project 1 (EA 464611 Drainage Report)						18.9**	8.12**	18.9	8.12
16	6'x3' (1830mmx915mm) RCB	6'x3' (1830mmx915mm) RCB	239+64.212	Covered under Project 1 (EA 464611 Drainage Report)						111.4**	10.56**	111.4	10.56
17	24 " (600 mm) CSP	24 " (600 mm) CSP	136+80.829	2	3.14	1.58	0.24	6.28	0.5	15.4	4.91	N/A - Pipe Extension	
18	24 " (600 mm) CSP	24 " (600 mm) CSP	138+59.920	2	3.14	2.50	0.24	6.28	0.5	19.4	6.18	N/A - Pipe Extension	
19	84 " (2100 mm) CSP	84 " (2100 mm) CSP	151+42.54	7	38.48	1.81	0.24	21.99	1.75	466.9	12.13	N/A - Pipe Extension	
20	84 " (2100 mm) CSP	84 " (2100 mm) CSP	155+16.000	7	38.48	1.66	0.24	21.99	1.75	447.1	11.62	N/A - Pipe Extension	

* Q(100) used. Drainage System is used as a wildlife crossing and is oversized (existing and proposed).

** Covered under Project 1 (EA 464611 Drainage Report)

*** Informational Data Only, See Appendix G and I.

$$V = \frac{1.49 \; R^{2/3} \; S^{1/2}}{n}$$

$$Q = \frac{1.49 \; A \; R^{2/3} \; S^{1/2}}{n}$$

V = mean velocity of flow, ft/s
R = the hydraulic radisu, ft - defined as the area of flow divided by the wetted flow surface or wetted permiter (A/AP)
S = the slope of the hydraulic grade line, ft/ft
n = Mannings's roughness coefficient
Q = rate of flow, cfs
A = cross sectional area of flow, ft2

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EA 464621

APPENDIX E

TABLE OF ON-SITE INTERCEPTION, BYPASS AND FLOODED WIDTH VALUES

TABLE OF ON-SITE INTECEPTION, BYPASS AND FLOODED WIDTH VALUES

ON-SITE DRAINAGE BASIN	STATION (M)	Q25 (CFS)	UPSTREAM FLOODES WIDTH (FT)	INLET TYPE	INTERCEPTED VALUE (CFS)	BYPASS VALUE (CFS)	DOWNSTREAM FLOODED WIDTH (FT)
OS 6	190+14.000	0.80	5.67	13' WIDE OVER SIDE DRAIN	0.64	0.16	3.09
OS 7	190+14.000	2.20	8.3	13' WIDE OVER SIDE DRAIN	2.05	0.15	3.03
OS 8	190+14.000	1.84	7.76	13' WIDE OVER SIDE DRAIN	1.14	0.7	5.38
OS 9	190+14.000	0.39	4.35	13' WIDE OVER SIDE DRAIN	0.37	0.02	1.47

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(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX F

TABLE OF RIP RAP ENERGY DISSIPATOR DESIGN VALUES

TABLE OF RIP RAP ENERGY DISSIPATOR DESIGN VALUES

SYSTEM NO.	PROPOSED SIZE	STATION (M)	OUTLET VELOCITY (FPS)	ROCK CLASSIFICATION	WIDTH (a)	WIDTH (b)	LENGTH
1	42" (1050mm)	165+44.866	9.58	1/2 TON	8'	12'	16'
2	84" (2100mm)	168+92.190	8.84	1/4 TON	14'	21'	28'
3	60" (1500mm)	170+51.318	12.21	1/2 TON	12'	16'	32'
4	24" (600mm)	172+76.365	11.51	1/4 TON	4'	10'	16'
5	24" (600mm)	175+17.896	10.41	1/4 TON	4'	14'	24'
6	24" (600mm)	176+86.952	7.50	1/4 TON	4'	8'	8'
7	24" (600mm)	178+91.951	8.67	1/4 TON	5'	10'	10'
8	84" (2100mm)	180+30.829	11.83	1/4 TON	14'	21'	28'
9	24" (600mm)	182+44.948	8.33	1/4 TON	4'	6'	8'
10	36" (900mm)	183+77.789	11.72	1/4 TON	6'	9'	12'
11	84" (2100mm)	186+20.636	12.00	1/4 TON	14'	21'	28'
12	24" (600mm)	187+12.491	8.79	1/4 TON	4'	6'	8'
13	24" (600mm)	190+14.141	8.79	N/A	N/A	N/A	N/A
14	42" (1050mm)	190+89.283	12.54	1/2 TON	7'	10.5'	14'
15	36" (900mm)	238+49.866	8.12	1/4 TON	N/A	N/A	N/A
16	6' (1830mm) x 3' (915mm) RCB	239+64.212	10.56	1/4 TON	N/A	N/A	N/A
17	24" (600mm)	136+80.829	4.91	1/4 TON	4'	6'	8'
18	24" (600mm)	138+59.920	6.18	1/4 TON	4'	6'	8'

DRAINAGE REPORT
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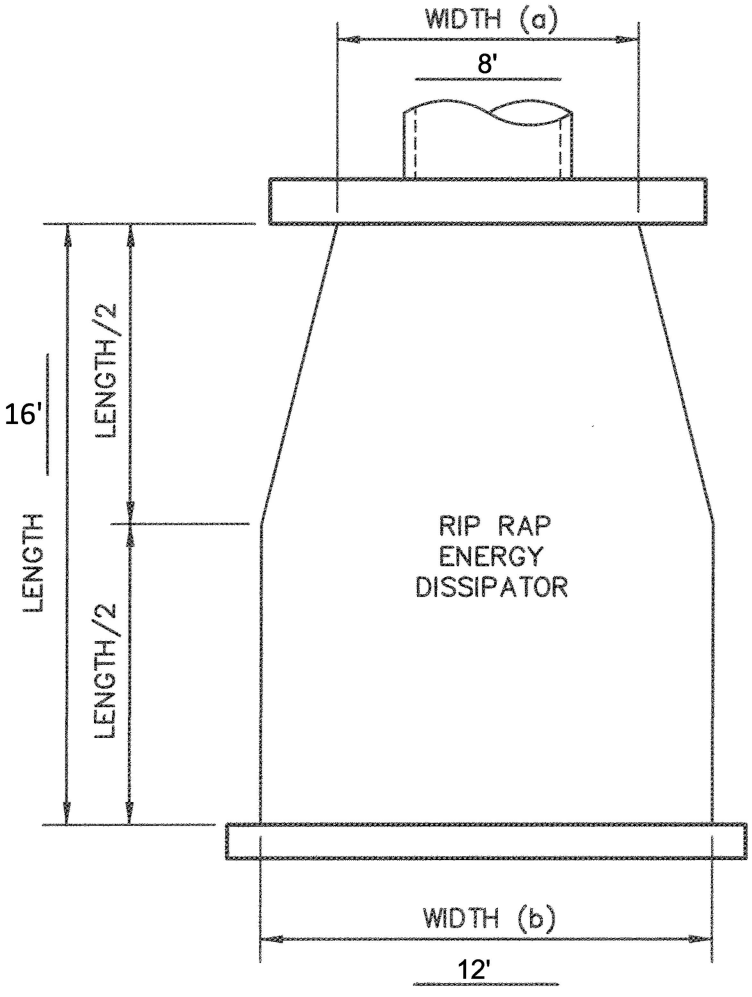

SYSTEM 1

DRAINAGE REPORT
FOR
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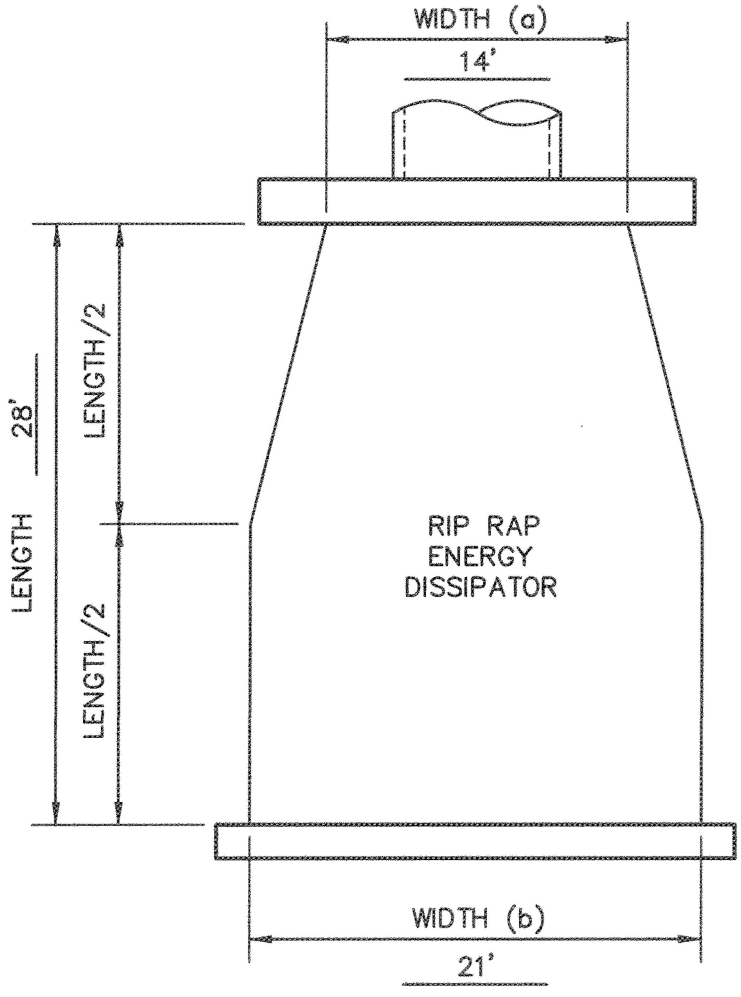
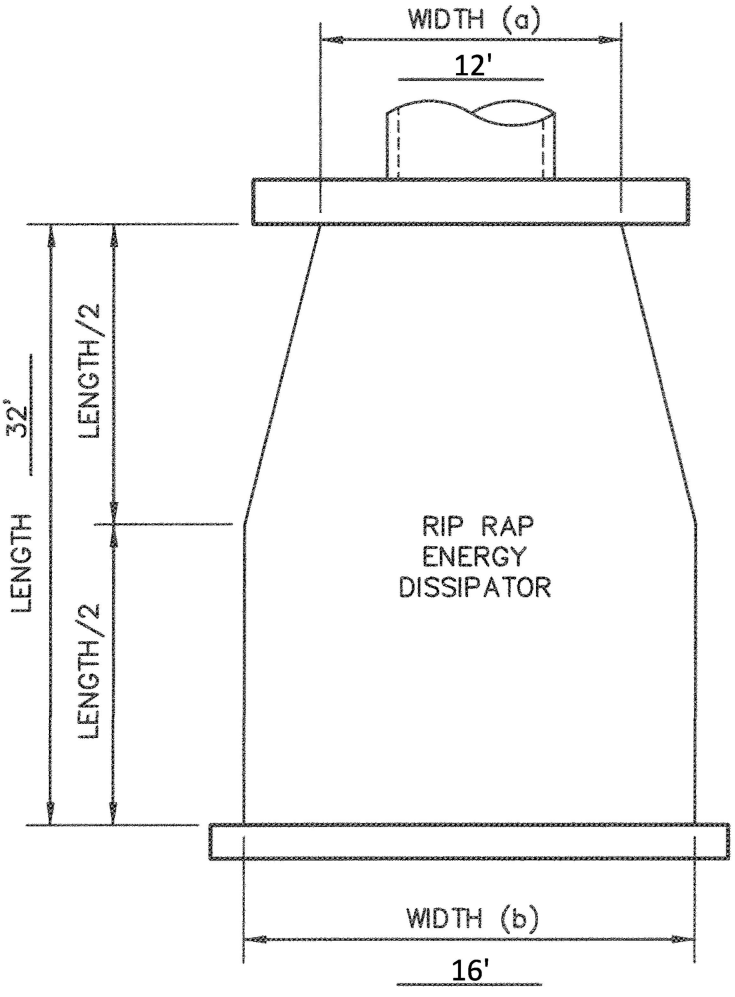


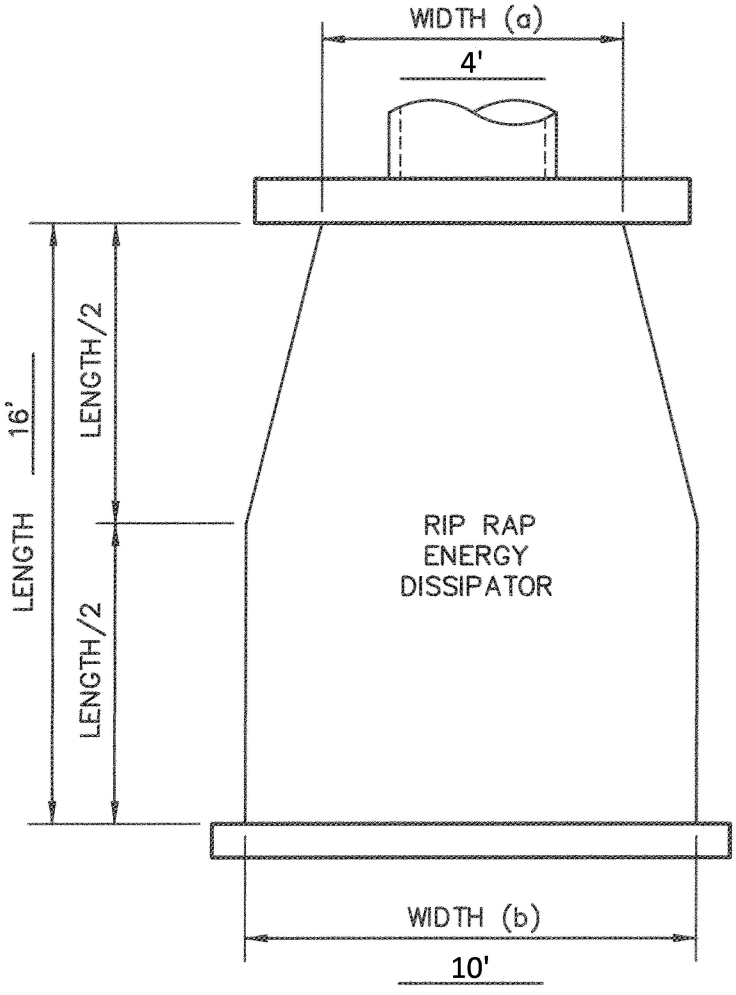
SYSTEM 2

DRAINAGE REPORT
FOR
STATE ROUTE 79



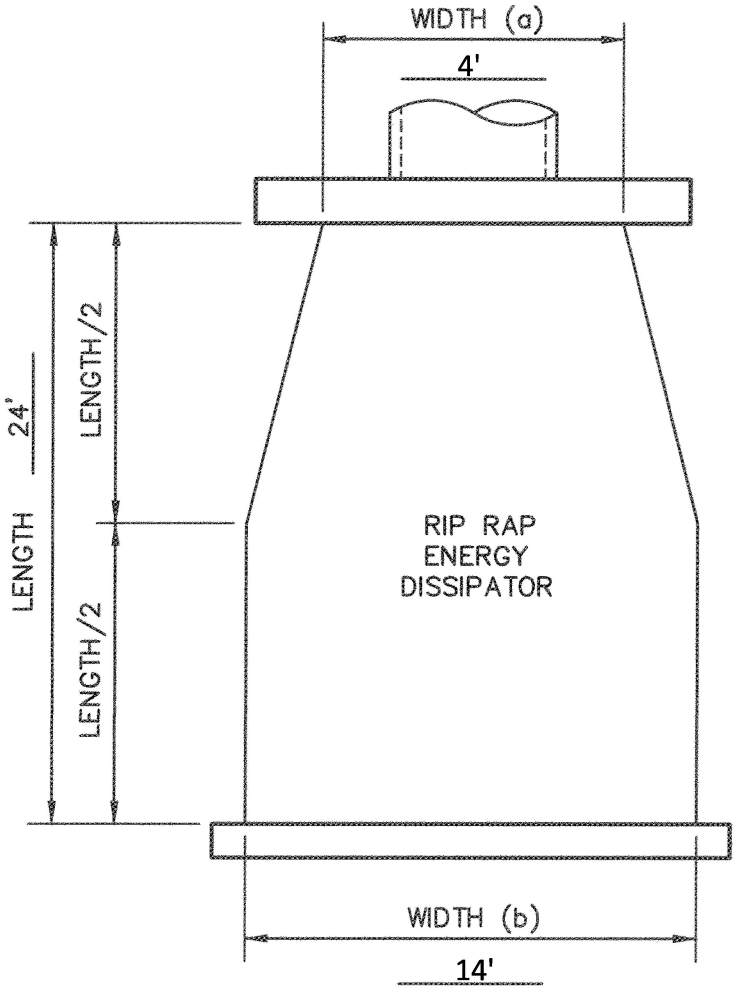
SYSTEM 3

DRAINAGE REPORT
FOR
STATE ROUTE 79



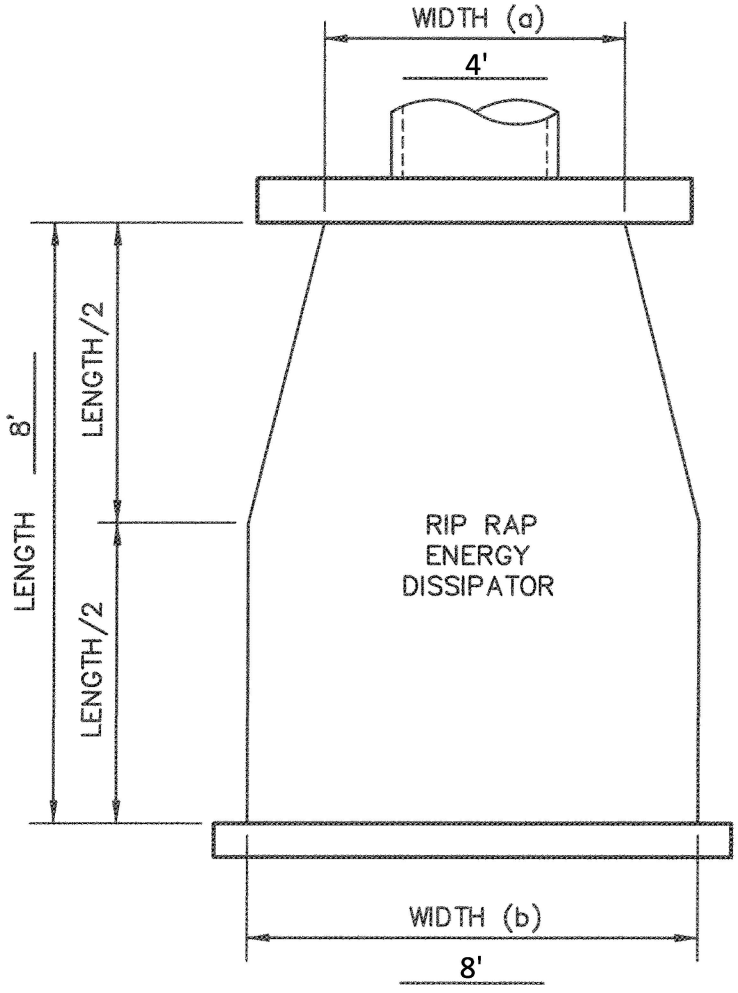
SYSTEM 4

DRAINAGE REPORT
FOR
STATE ROUTE 79



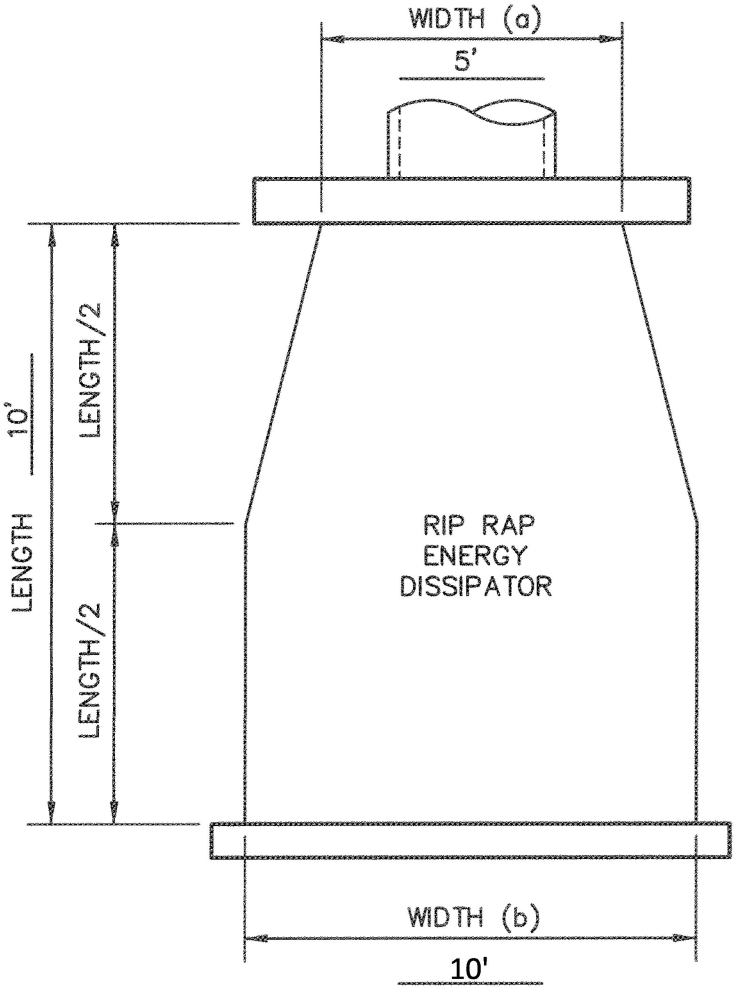
SYSTEM 5

DRAINAGE REPORT
FOR
STATE ROUTE 79



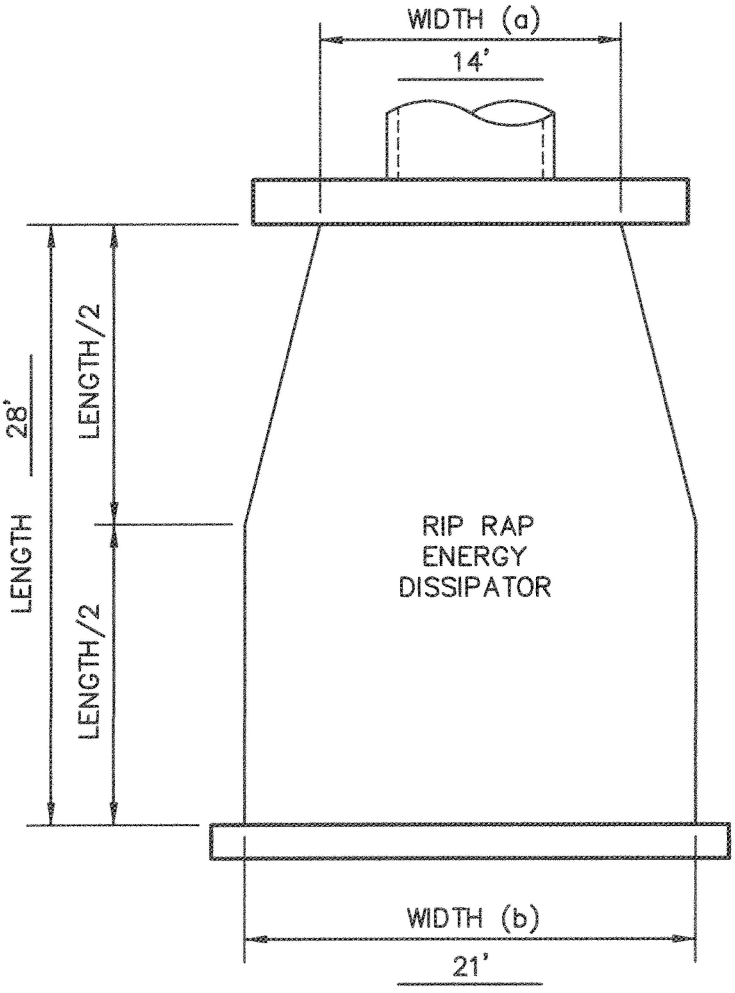
SYSTEM 6

DRAINAGE REPORT
FOR
STATE ROUTE 79



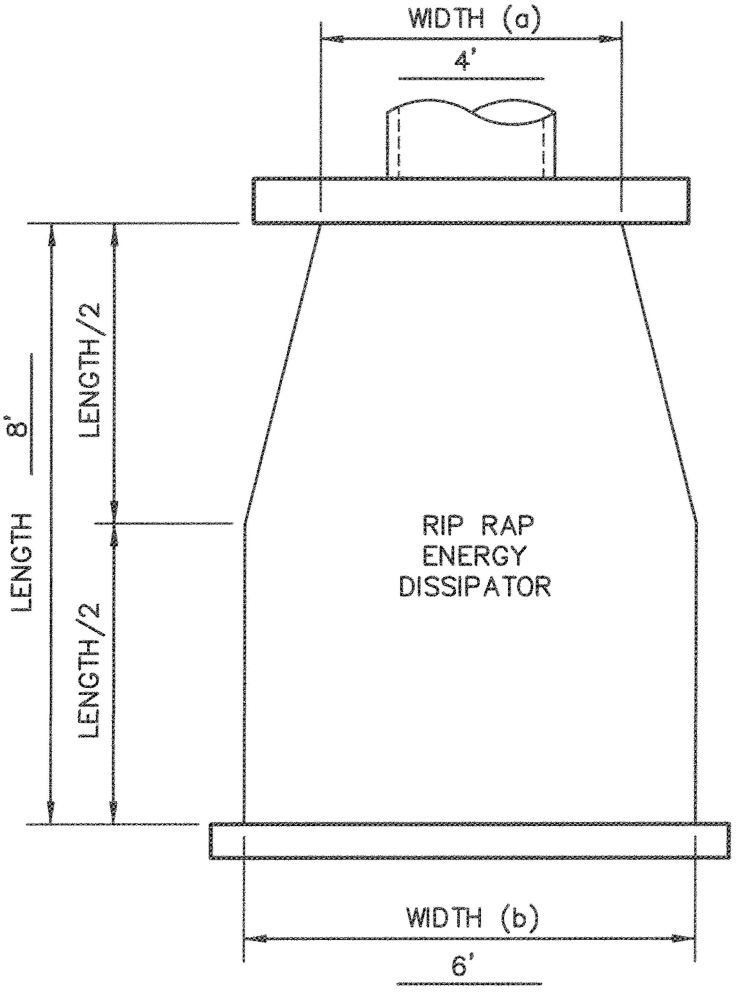
SYSTEM 7

DRAINAGE REPORT
FOR
STATE ROUTE 79



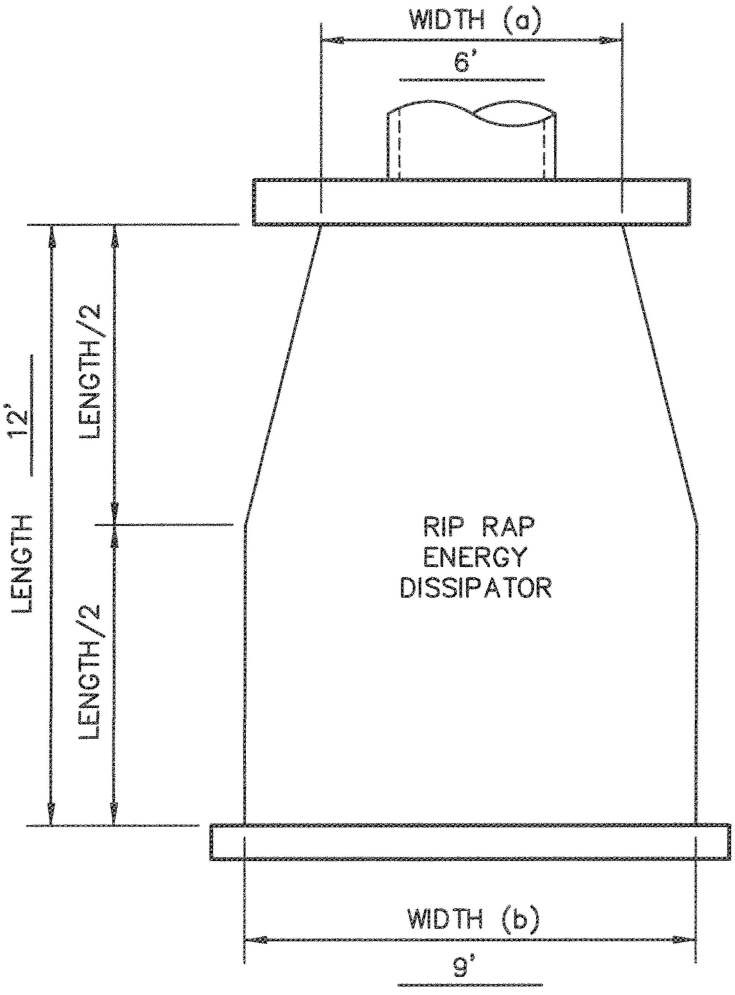
SYSTEM 8

DRAINAGE REPORT
FOR
STATE ROUTE 79



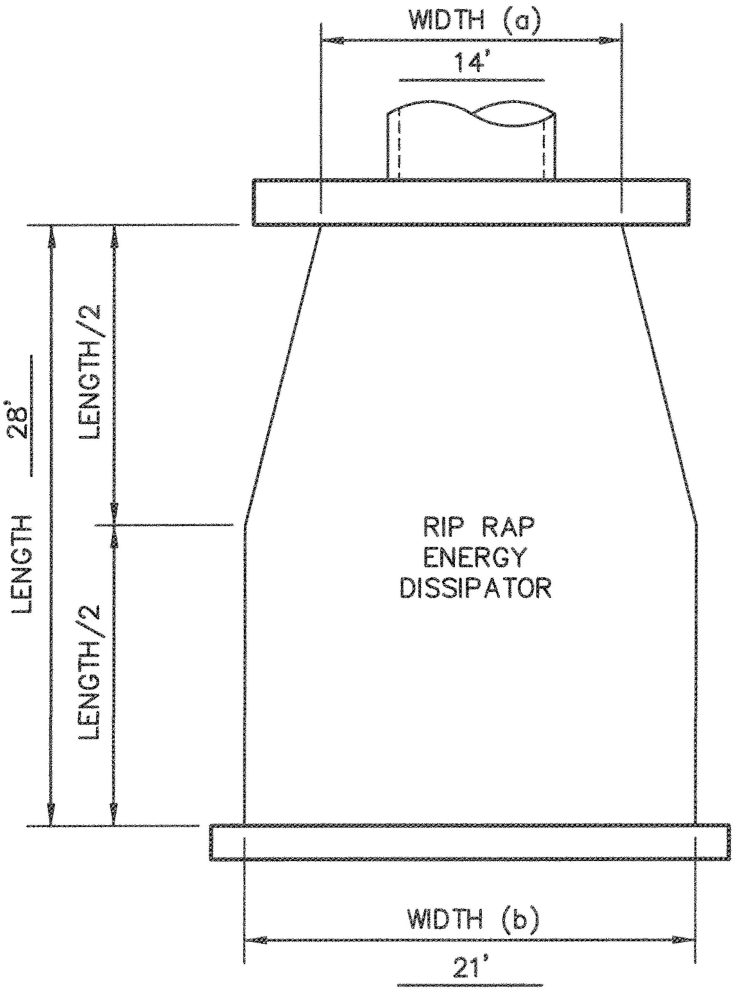
SYSTEM 9

DRAINAGE REPORT
FOR
STATE ROUTE 79



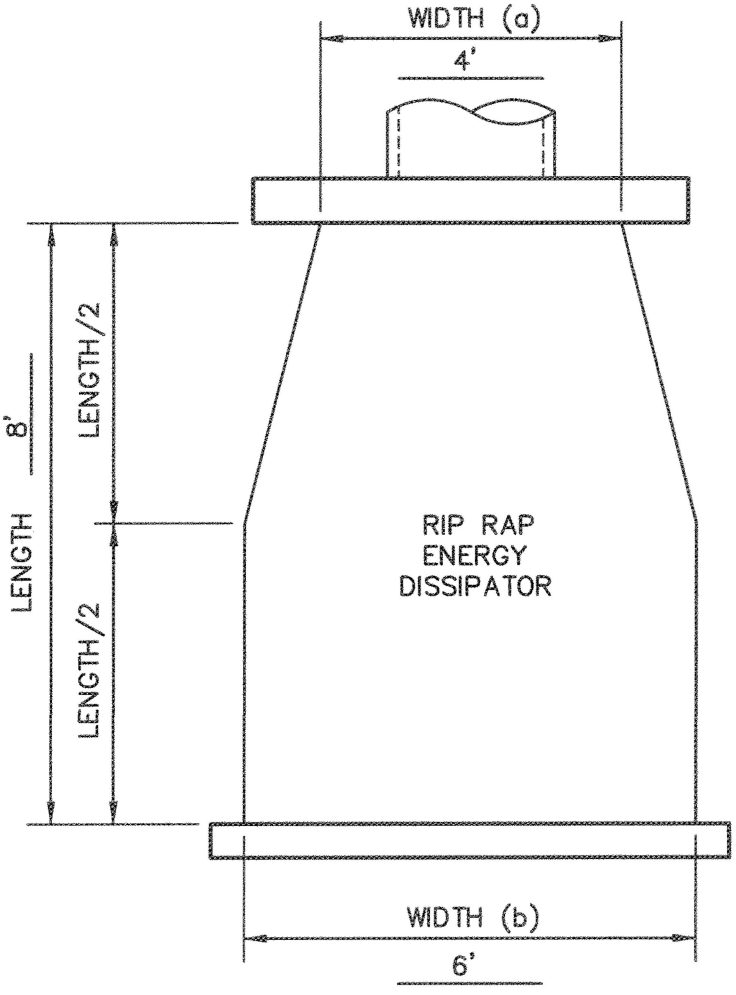
SYSTEM 10

DRAINAGE REPORT
FOR
STATE ROUTE 79



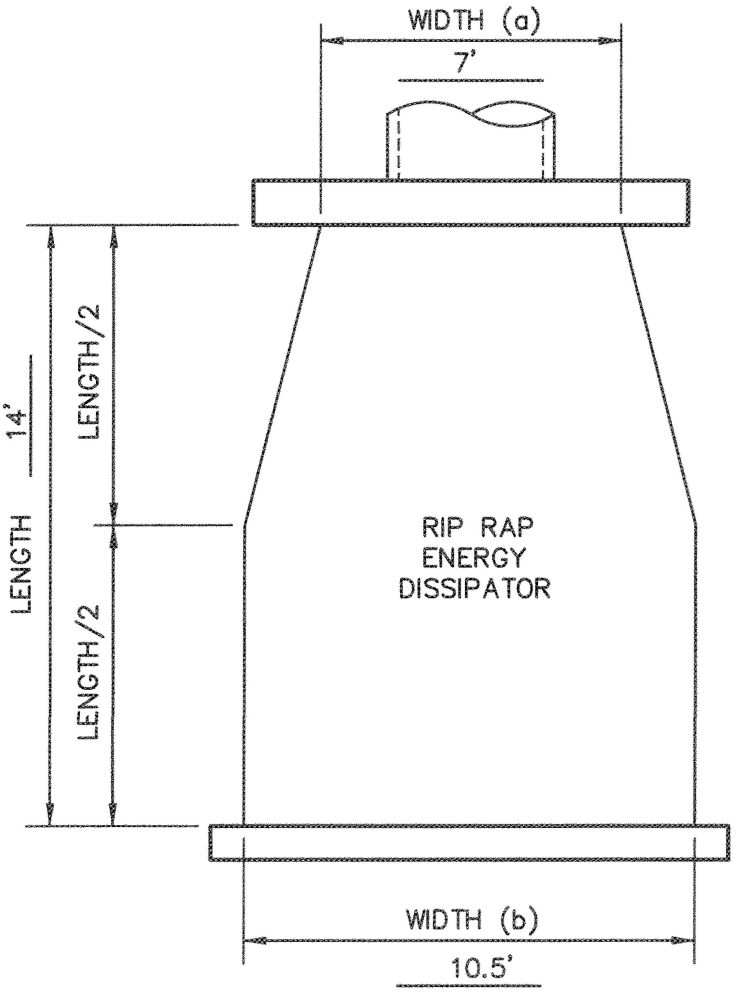
SYSTEM 11

DRAINAGE REPORT
FOR
STATE ROUTE 79



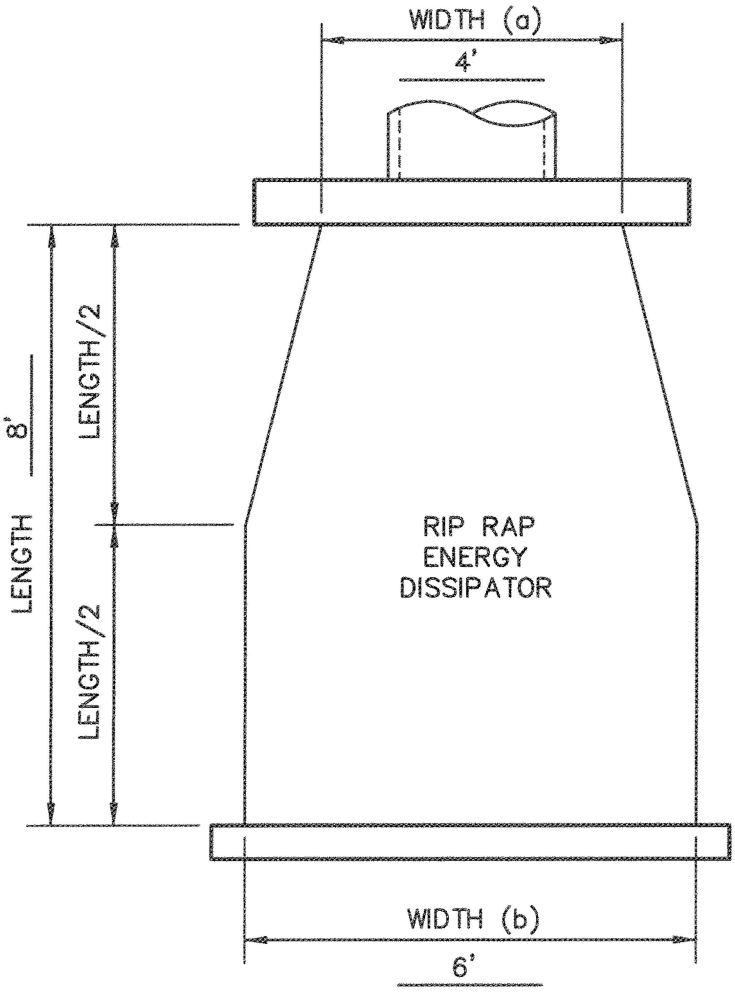
SYSTEM 12

DRAINAGE REPORT
FOR
STATE ROUTE 79



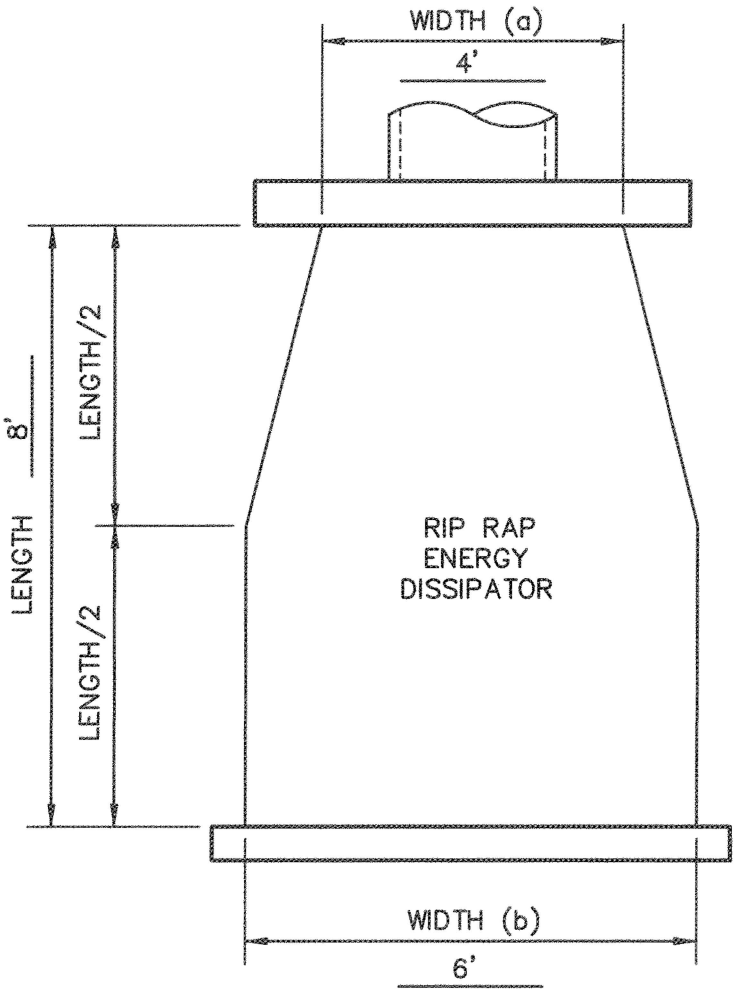
SYSTEM 14

DRAINAGE REPORT
FOR
STATE ROUTE 79



SYSTEM 17

DRAINAGE REPORT
FOR
STATE ROUTE 79



SYSTEM 18

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX G

$Q_{(100)}$ WSPG HYDRAULIC CALCULATIONS (INFORMATIONAL DATA ONLY)

System 1

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	4	1		3.500														
CD	1	5	0	.000															
CD	2	5	0	.000															

WATER SURFACE PROFILE - CROSS SECTION POINT LISTING

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .110	5.250 .000	10.500 .110				
PTS	2	3	.000 .070	3.500 .000	7.000 .070				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

STATE ROUTE 79

HEADING LINE NO 2 IS -

PROJECT 2

HEADING LINE NO 3 IS -

SYSTEM NO. 1 - 42"(1050mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	986.000	1393.420	1	1393.420

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1393.730	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1393.730	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1021.810	1394.210	3	.024	.000	.000	.000	0

ELEMENT NO 5 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1021.810	1394.210	3	1353.250

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 1 - 42"(1050mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
986.000	1393.420	.974	1394.394	81.20	8.41	1.10	1395.49	.00	1.28	10.50		1	0	.0
TRANS STR	.0221					.0964	1.35	.97	1.55		.036			IR-OPEN
1000.000	1393.730	.966	1394.696	81.20	12.46	2.41	1397.11	.00	1.65	7.00		2	0	.0
WALL	EXIT													
1000.000	1393.730	2.813	1396.543	81.20	9.80	1.49	1398.03	.00	2.81	2.78	3.500	.000	.00	1 .0
7.932	.0220					.0225	.18	2.81	1.00	2.88	.024	.00	.00	PIPE
1007.932	1393.905	2.883	1396.787	81.20	9.58	1.42	1398.21	.00	2.81	2.67	3.500	.000	.00	1 .0
13.878	.0220					.0219	.30	2.88	.95	2.88	.024	.00	.00	PIPE
1021.810	1394.210	2.883	1397.093	81.20	9.58	1.42	1398.52	.00	2.81	2.67	3.500	.000	.00	1 .0

System 2

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	4	1		7.000														
CD	1	5	0	.000															
CD	2	5	0	.000															

WATER SURFACE PROFILE - CROSS SECTION POINT LISTING

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .210	10.500 .000	21.000 .210				
PTS	2	3	.000 .140	7.000 .000	14.000 .140				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

STATE ROUTE 79

HEADING LINE NO 2 IS -

PROJECT 2

HEADING LINE NO 3 IS -

SYSTEM NO. 2 - 84"(2100mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	972.000	1404.140	1	1404.140

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1404.460	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1404.460	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1101.540	1405.640	3	.024	.000	.000	.000	0

ELEMENT NO 5 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1101.540	1405.640	3	.200

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1101.540	1405.640	3	1405.640

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 2 - 84"(2100mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
972.000	1404.140	.597	1404.737	41.10	3.98	.25	1404.98	.00	.60	21.00		1	0	.0
TRANS STR	.0114							.597	1.000		.036			IR-OPEN
1000.000	1404.460	.402	1404.862	41.10	8.84	1.21	1406.08	.00	.71	14.00		2	0	.0
WALL	EXIT													
1000.000	1404.460	1.569	1406.029	41.10	6.38	.63	1406.66	.00	1.62	5.84	7.000	.000	.00	1 .0
96.290	.0116					.0116	1.12	1.57	1.07	1.57	.024	.00	.00	PIPE
1096.290	1405.579	1.569	1407.148	41.10	6.38	.63	1407.78	.00	1.62	5.84	7.000	.000	.00	1 .0
5.250	.0116					.0109	.06	1.57	1.07	1.57	.024	.00	.00	PIPE
WALL	ENTRANCE													
1101.540	1405.640	1.624	1407.264	41.10	6.07	.57	1407.84	.00	1.62	5.91	7.000	.000	.00	0 .0

System 8

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	4	1		7.000														
CD	1	5	0	.000															
CD	2	5	0	.000															

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .210	10.500 .000	21.000 .210				
PTS	2	3	.000 .140	7.000 .000	14.000 .140				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -
STATE ROUTE 79
HEADING LINE NO 2 IS -
PROJECT 2
HEADING LINE NO 3 IS -
SYSTEM NO. 8 - 84"(2100mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	972.000	1449.650	1	1449.650

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1449.730	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1449.730	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1137.800	1450.140	3	.024	.000	.000	.000	0

ELEMENT NO 5 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1137.800	1450.140	3	.200

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1137.800	1450.140	3	1450.140

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 8 - 84"(2100mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
972.000	1449.650	1.177	1450.827	132.30	5.88	.54	1451.36	.00	1.18	21.00		1	0	.0
TRANS STR	.0029							1.177	1.000		.036			IR-OPEN
1000.000	1449.730	.869	1450.599	132.30	11.83	2.17	1452.77	.00	1.48	14.00		2	0	.0
WALL	EXIT													
1000.000	1449.730	2.971	1452.700	132.30	8.51	1.12	1453.82	.00	2.97	6.92	7.000	.000	.00	1 .0
.945	.0030					.0098	.01	2.97	1.00	4.32	.024	.00	.00	PIPE
1000.945	1449.733	3.079	1452.812	132.30	8.11	1.02	1453.83	.00	2.97	6.95	7.000	.000	.00	1 .0
3.950	.0030					.0086	.03	3.08	.93	4.32	.024	.00	.00	PIPE
1004.896	1449.745	3.194	1452.939	132.30	7.73	.93	1453.87	.00	2.97	6.97	7.000	.000	.00	1 .0
7.575	.0030					.0075	.06	3.19	.87	4.32	.024	.00	.00	PIPE
1012.471	1449.767	3.313	1453.080	132.30	7.37	.84	1453.92	.00	2.97	6.99	7.000	.000	.00	1 .0
13.469	.0030					.0066	.09	3.31	.81	4.32	.024	.00	.00	PIPE
1025.940	1449.807	3.439	1453.246	132.30	7.03	.77	1454.01	.00	2.97	7.00	7.000	.000	.00	1 .0
21.386	.0030					.0058	.12	3.44	.76	4.32	.024	.00	.00	PIPE
1047.326	1449.871	3.570	1453.441	132.30	6.70	.70	1454.14	.00	2.97	7.00	7.000	.000	.00	1 .0
33.942	.0030					.0051	.17	3.57	.70	4.32	.024	.00	.00	PIPE
1081.269	1449.972	3.707	1453.679	132.30	6.39	.63	1454.31	.00	2.97	6.99	7.000	.000	.00	1 .0
56.022	.0030					.0045	.25	3.71	.65	4.32	.024	.00	.00	PIPE

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 7- 7-2010 Time:10:28:51

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 8 - 84"(2100mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1137.291	1450.138	3.852	1453.990	132.30	6.09	.58	1454.57	.00	2.97	6.96	7.000	.000	.00	1 .0
.510	.0030					.0042	.00	3.85	.61	4.32	.024	.00	.00	PIPE
WALL	ENTRANCE													
1137.800	1450.140	3.854	1453.995	132.30	6.09	.58	1454.57	.00	2.97	6.96	7.000	.000	.00	0 .0

System 10

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	4	1		3.000														
CD	1	5	0	.000															
CD	2	5	0	.000															

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .090	4.500 .000	9.000 .090				
PTS	2	3	.000 .060	3.000 .000	6.000 .060				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

STATE ROUTE 79

HEADING LINE NO 2 IS -

PROJECT 2

HEADING LINE NO 3 IS -

SYSTEM NO. 10 - 36"(900mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	988.000	1476.280	1	1476.280

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1477.120	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1477.120	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1213.180	1491.940	3	.024	.000	.000	.000	0

ELEMENT NO 5 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1213.180	1491.940	3	.200

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1213.180	1491.940	3	1491.940

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 10 - 36"(900mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
988.000	1476.280	.600	1476.880	21.10	4.23	.28	1477.16	.00	.60	9.00		1	0	.0
TRANS STR	.0700							.600	1.000		.036			IR-OPEN
1000.000	1477.120	.330	1477.450	21.10	11.72	2.13	1479.58	.00	.76	6.00		2	0	.0
WALL	EXIT													
1000.000	1477.120	.959	1478.079	21.10	10.83	1.82	1479.90	.00	1.48	2.80	3.000	.000	.00	1 .0
128.722	.0695					.0695	8.95	.96	2.29	.96	.024	.00	.00	PIPE
1128.722	1486.068	.959	1487.028	21.10	10.83	1.82	1488.85	.00	1.48	2.80	3.000	.000	.00	1 .0
31.336	.0695					.0693	2.17	.96	2.29	.96	.024	.00	.00	PIPE
1160.058	1488.247	.960	1489.207	21.10	10.81	1.81	1491.02	.00	1.48	2.80	3.000	.000	.00	1 .0
28.137	.0695					.0649	1.83	.96	2.28	.96	.024	.00	.00	PIPE
1188.195	1490.203	.994	1491.197	21.10	10.31	1.65	1492.85	.00	1.48	2.82	3.000	.000	.00	1 .0
9.058	.0695					.0568	.51	.99	2.13	.96	.024	.00	.00	PIPE
1197.253	1490.833	1.029	1491.862	21.10	9.83	1.50	1493.36	.00	1.48	2.85	3.000	.000	.00	1 .0
5.038	.0695					.0498	.25	1.03	1.99	.96	.024	.00	.00	PIPE
1202.291	1491.183	1.066	1492.249	21.10	9.37	1.36	1493.61	.00	1.48	2.87	3.000	.000	.00	1 .0
3.324	.0695					.0437	.15	1.07	1.86	.96	.024	.00	.00	PIPE
1205.615	1491.414	1.104	1492.518	21.10	8.93	1.24	1493.76	.00	1.48	2.89	3.000	.000	.00	1 .0
2.327	.0695					.0383	.09	1.10	1.74	.96	.024	.00	.00	PIPE

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 10 - 36"(900mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1207.942	1491.576	1.144	1492.720	21.10	8.52	1.13	1493.85	.00	1.48	2.91	3.000	.000	.00	1 .0
1.710	.0695					.0336	.06	1.14	1.63	.96	.024	.00	.00	PIPE
1209.651	1491.695	1.185	1492.880	21.10	8.12	1.02	1493.90	.00	1.48	2.93	3.000	.000	.00	1 .0
1.251	.0695					.0295	.04	1.19	1.52	.96	.024	.00	.00	PIPE
1210.903	1491.782	1.228	1493.010	21.10	7.74	.93	1493.94	.00	1.48	2.95	3.000	.000	.00	1 .0
.908	.0695					.0259	.02	1.23	1.42	.96	.024	.00	.00	PIPE
1211.811	1491.845	1.273	1493.118	21.10	7.38	.85	1493.96	.00	1.48	2.97	3.000	.000	.00	1 .0
.640	.0695					.0227	.01	1.27	1.33	.96	.024	.00	.00	PIPE
1212.452	1491.889	1.320	1493.209	21.10	7.04	.77	1493.98	.00	1.48	2.98	3.000	.000	.00	1 .0
.423	.0695					.0200	.01	1.32	1.24	.96	.024	.00	.00	PIPE
1212.875	1491.919	1.369	1493.288	21.10	6.71	.70	1493.99	.00	1.48	2.99	3.000	.000	.00	1 .0
.243	.0695					.0176	.00	1.37	1.15	.96	.024	.00	.00	PIPE
1213.117	1491.936	1.420	1493.356	21.10	6.40	.64	1493.99	.00	1.48	3.00	3.000	.000	.00	1 .0
.063	.0695					.0154	.00	1.42	1.08	.96	.024	.00	.00	PIPE
WALL	ENTRANCE													
1213.180	1491.940	1.477	1493.417	21.10	6.09	.58	1493.99	.00	1.48	3.00	3.000	.000	.00	0 .0

System 11

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	4	1		7.000														
CD	1	5	0	.000															
CD	2	5	0	.000															

WATER SURFACE PROFILE - CROSS SECTION POINT LISTING

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .210	10.500 .000	21.000 .210				
PTS	2	3	.000 .140	7.000 .000	14.000 .140				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

STATE ROUTE 79

HEADING LINE NO 2 IS -

PROJECT 2

HEADING LINE NO 3 IS -

SYSTEM NO. 11 - 84"(2100mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	972.000	1487.920	1	1487.920

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1488.990	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1488.990	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1177.170	1495.760	3	.024	.000	.000	.000	0

ELEMENT NO 5 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1177.170	1495.760	3	.200

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1177.170	1495.760	3	1495.760

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 11 - 84"(2100mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
972.000	1487.920	.712	1488.632	56.30	4.42	.30	1488.93	.00	.71	21.00		1	0	.0
TRANS STR	.0382							.712	1.000		.036			IR-OPEN
1000.000	1488.990	.405	1489.395	56.30	12.00	2.24	1491.63	.00	.86	14.00		2	0	.0
WALL	EXIT													
1000.000	1488.990	1.365	1490.355	56.30	10.65	1.76	1492.12	.00	1.91	5.55	7.000	.000	.00	1 .0
93.487	.0382					.0382	3.57	1.37	1.92	1.37	.024	.00	.00	PIPE
1093.487	1492.562	1.365	1493.927	56.30	10.65	1.76	1495.69	.00	1.91	5.55	7.000	.000	.00	1 .0
47.440	.0382					.0359	1.70	1.37	1.92	1.37	.024	.00	.00	PIPE
1140.927	1494.375	1.408	1495.783	56.30	10.18	1.61	1497.39	.00	1.91	5.61	7.000	.000	.00	1 .0
14.719	.0382					.0315	.46	1.41	1.81	1.37	.024	.00	.00	PIPE
1155.646	1494.937	1.456	1496.393	56.30	9.71	1.46	1497.86	.00	1.91	5.68	7.000	.000	.00	1 .0
7.798	.0382					.0276	.21	1.46	1.69	1.37	.024	.00	.00	PIPE
1163.444	1495.235	1.506	1496.741	56.30	9.26	1.33	1498.07	.00	1.91	5.75	7.000	.000	.00	1 .0
4.955	.0382					.0241	.12	1.51	1.59	1.37	.024	.00	.00	PIPE
1168.399	1495.425	1.557	1496.982	56.30	8.83	1.21	1498.19	.00	1.91	5.82	7.000	.000	.00	1 .0
3.321	.0382					.0211	.07	1.56	1.49	1.37	.024	.00	.00	PIPE
1171.720	1495.552	1.610	1497.162	56.30	8.42	1.10	1498.26	.00	1.91	5.89	7.000	.000	.00	1 .0
2.271	.0382					.0184	.04	1.61	1.39	1.37	.024	.00	.00	PIPE

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 7-14-2010 Time: 5:30:58

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 11 - 84"(2100mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1173.992	1495.638	1.665	1497.304	56.30	8.02	1.00	1498.30	.00	1.91	5.96	7.000	.000	.00	1 .0
1.533	.0382					.0161	.02	1.67	1.30	1.37	.024	.00	.00	PIPE
1175.524	1495.697	1.722	1497.419	56.30	7.65	.91	1498.33	.00	1.91	6.03	7.000	.000	.00	1 .0
.979	.0382					.0141	.01	1.72	1.22	1.37	.024	.00	.00	PIPE
1176.504	1495.734	1.781	1497.516	56.30	7.30	.83	1498.34	.00	1.91	6.10	7.000	.000	.00	1 .0
.507	.0382					.0123	.01	1.78	1.14	1.37	.024	.00	.00	PIPE
1177.010	1495.754	1.843	1497.597	56.30	6.96	.75	1498.35	.00	1.91	6.17	7.000	.000	.00	1 .0
.160	.0382					.0108	.00	1.84	1.07	1.37	.024	.00	.00	PIPE
WALL ENTRANCE														
1177.170	1495.760	1.909	1497.669	56.30	6.62	.68	1498.35	.00	1.91	6.23	7.000	.000	.00	0 .0
HYDRAULIC JUMP														
1177.170	1495.760	1.908	1497.668	56.30	6.63	.68	1498.35	.00	1.91	6.23	7.000	.000	.00	1 .0

System 12

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	4	1		2.000														
CD	1	5	0	.000															
CD	2	5	0	.000															

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .060	3.000 .000	6.000 .060				
PTS	2	3	.000 .040	2.000 .000	4.000 .040				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

STATE ROUTE 79

HEADING LINE NO 2 IS -

PROJECT 2

HEADING LINE NO 3 IS -

SYSTEM NO. 12 - 24"(600mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	992.000	1504.480	1	1504.480

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1504.790	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1504.790	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1144.390	1510.400	3	.024	.000	.000	.000	0

ELEMENT NO 5 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1144.390	1510.400	3	.200

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1144.390	1510.400	3	1510.400

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 7- 7-2010 Time:11:58:24

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 12 - 24"(600mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
992.000	1504.480	.512	1504.992	11.40	3.94	.24	1505.23	.00	.51	6.00		1	0	.0
TRANS STR	.0388							.512	1.000		.036			IR-OPEN
1000.000	1504.790	.344	1505.134	11.40	8.79	1.20	1506.33	.00	.65	4.00		2	0	.0
WALL	EXIT													
1000.000	1504.790	.967	1505.757	11.40	7.58	.89	1506.65	.00	1.21	2.00	2.000	.000	.00	1 .0
114.021	.0389					.0389	4.43	.97	1.54	.97	.024	.00	.00	PIPE
1114.021	1509.220	.967	1510.187	11.40	7.58	.89	1511.08	.00	1.21	2.00	2.000	.000	.00	1 .0
19.200	.0389					.0368	.71	.97	1.54	.97	.024	.00	.00	PIPE
1133.221	1509.966	.998	1510.964	11.40	7.27	.82	1511.79	.00	1.21	2.00	2.000	.000	.00	1 .0
6.028	.0389					.0328	.20	1.00	1.45	.97	.024	.00	.00	PIPE
1139.249	1510.200	1.036	1511.236	11.40	6.94	.75	1511.98	.00	1.21	2.00	2.000	.000	.00	1 .0
2.796	.0389					.0289	.08	1.04	1.35	.97	.024	.00	.00	PIPE
1142.045	1510.309	1.076	1511.385	11.40	6.61	.68	1512.06	.00	1.21	1.99	2.000	.000	.00	1 .0
1.474	.0389					.0255	.04	1.08	1.25	.97	.024	.00	.00	PIPE
1143.520	1510.366	1.118	1511.484	11.40	6.31	.62	1512.10	.00	1.21	1.99	2.000	.000	.00	1 .0
.680	.0389					.0225	.02	1.12	1.16	.97	.024	.00	.00	PIPE
1144.199	1510.393	1.163	1511.556	11.40	6.01	.56	1512.12	.00	1.21	1.97	2.000	.000	.00	1 .0
.191	.0389					.0199	.00	1.16	1.08	.97	.024	.00	.00	PIPE

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 7- 7-2010 Time:11:58:24

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 12 - 24"(600mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT or I.D.	Base Wt ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
WALL ENTRANCE													
1144.390	1510.400	1.213	1511.613	11.40	5.72	.51	1512.12	.00	1.21	1.95	2.000	.000	.00	0	.0

System 13

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1		2.000														

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -
STATE ROUTE 79
HEADING LINE NO 2 IS -
PROJECT 2
HEADING LINE NO 3 IS -
SYSTEM NO. 13 - 24"(600mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.000	1509.070	1	1509.070

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1032.810	1510.490	1	.024	.000	.000	.000	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1032.810	1510.490	1	.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1032.810	1510.490	1	1491.940

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 13 - 24"(600mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	1509.070	1.253	1510.323	18.20	8.79	1.20	1511.52	.00	1.54	1.93	2.000	.000	.00	1 .0
19.462	.0433					.0412	.80	1.25	1.50	1.25	.024	.00	.00	PIPE
1019.462	1509.912	1.287	1511.199	18.20	8.51	1.12	1512.32	.00	1.54	1.92	2.000	.000	.00	1 .0
8.028	.0433					.0374	.30	1.29	1.42	1.25	.024	.00	.00	PIPE
1027.491	1510.260	1.342	1511.602	18.20	8.12	1.02	1512.62	.00	1.54	1.88	2.000	.000	.00	1 .0
3.394	.0433					.0333	.11	1.34	1.31	1.25	.024	.00	.00	PIPE
1030.885	1510.407	1.401	1511.808	18.20	7.74	.93	1512.74	.00	1.54	1.83	2.000	.000	.00	1 .0
1.510	.0433					.0297	.04	1.40	1.20	1.25	.024	.00	.00	PIPE
1032.395	1510.472	1.465	1511.937	18.20	7.38	.85	1512.78	.00	1.54	1.77	2.000	.000	.00	1 .0
.415	.0433					.0266	.01	1.47	1.10	1.25	.024	.00	.00	PIPE
WALL	ENTRANCE													
1032.810	1510.490	1.537	1512.027	18.20	7.03	.77	1512.79	.00	1.54	1.69	2.000	.000	.00	0 .0

System 14

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	4	1		3.500														
CD	1	5	0	.000															
CD	2	5	0	.000															

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .110	5.250 .000	10.500 .110				
PTS	2	3	.000 .070	3.500 .000	7.000 .070				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

STATE ROUTE 79

HEADING LINE NO 2 IS -

PROJECT 2

HEADING LINE NO 3 IS -

SYSTEM NO. 14 - 42"(1050mm)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	986.000	1498.370	1	1498.370

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1498.770	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1498.770	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1032.810	1499.710	3	.024	.000	.000	.000	0

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1141.080	1502.760	3	.024	.000	.000	.000	0

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1185.990	1504.240	3	.024	.000	.000	.000	0

ELEMENT NO 7 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1185.990	1504.240	3	.200

ELEMENT NO 8 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1185.990	1504.240	3	1504.240

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 7- 9-2010 Time: 9:23:47

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 14 - 42"(1050mm)

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT or "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
986.000	1498.370	.905	1499.275	69.90	7.83	.95	1500.23	.00	1.17	10.50		1		0 .0
TRANS STR	.0286					.1083	1.52	.91	1.50		.036			IR-OPEN
1000.000	1498.770	.831	1499.601	69.90	12.54	2.44	1502.04	.00	1.49	7.00		2		0 .0
WALL	EXIT													
1000.000	1498.770	2.279	1501.049	69.90	10.54	1.72	1502.77	.00	2.62	3.34	3.500	.000	.00	1 .0
32.810	.0286					.0284	.93	2.28	1.32	2.28	.024	.00	.00	PIPE
1032.810	1499.710	2.291	1502.001	69.90	10.47	1.70	1503.70	.00	2.62	3.33	3.500	.000	.00	1 .0
28.171	.0282					.0282	.79	2.29	1.30	2.29	.024	.00	.00	PIPE
1060.981	1500.504	2.291	1502.795	69.90	10.47	1.70	1504.50	.00	2.62	3.33	3.500	.000	.00	1 .0
40.352	.0282					.0283	1.14	2.29	1.30	2.29	.024	.00	.00	PIPE
1101.333	1501.640	2.286	1503.926	69.90	10.50	1.71	1505.64	.00	2.62	3.33	3.500	.000	.00	1 .0
39.747	.0282					.0302	1.20	2.29	1.31	2.29	.024	.00	.00	PIPE
1141.080	1502.760	2.194	1504.954	69.90	11.01	1.88	1506.84	.00	2.62	3.39	3.500	.000	.00	1 .0
7.926	.0330					.0317	.25	2.19	1.42	2.17	.024	.00	.00	PIPE
1149.006	1503.021	2.203	1505.224	69.90	10.96	1.86	1507.09	.00	2.62	3.38	3.500	.000	.00	1 .0
24.036	.0330					.0298	.72	2.20	1.41	2.17	.024	.00	.00	PIPE
1173.043	1503.813	2.296	1506.109	69.90	10.45	1.69	1507.80	.00	2.62	3.33	3.500	.000	.00	1 .0
8.473	.0330					.0265	.22	2.30	1.30	2.17	.024	.00	.00	PIPE

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 7- 9-2010 Time: 9:23:47

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 14 - 42"(1050mm)

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1181.516	1504.093	2.395	1506.488	69.90	9.96	1.54	1508.03	.00	2.62	3.25	3.500	.000	.00	1 .0
3.522	.0330					.0236	.08	2.40	1.20	2.17	.024	.00	.00	PIPE
1185.038	1504.209	2.502	1506.711	69.90	9.50	1.40	1508.11	.00	2.62	3.16	3.500	.000	.00	1 .0
.952	.0330					.0211	.02	2.50	1.10	2.17	.024	.00	.00	PIPE
WALL	ENTRANCE													
1185.990	1504.240	2.621	1506.861	69.90	9.04	1.27	1508.13	.00	2.62	3.04	3.500	.000	.00	0 .0

System 15

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 FILE: ph2_15.WSW                          W S P G W  - EDIT LISTING - Version 14.02              Date: 3- 2-2011  Time:
4:59:51
                                      WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
PAGE    1
  CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR   INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)
Y(9)  Y(10)
  CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH              DROP

  CD      3    4      1             3.000
  CD      1    5      0        .000
  CD      2    5      0        .000
 FILE:                                     W S P G W  - EDIT LISTING - Version 14.02              Date: 3- 2-2011  Time:
4:59:51
                                     WATER SURFACE PROFILE - CROSS SECTION POINT LISTING
PAGE    2
    CARD  SECT  NO OF    X(1) , Y(1)    X(2) , Y(2)    X(3) , Y(3)    X(4) , Y(4)    X(5) , Y(5)    X(6) , Y(6)    X(7) ,
Y(7)
    CODE   NO   POINTS   X(8) , Y(8)    X(9) , Y(9)   X(10) ,Y(10)   X(11) ,Y(11)    X(N) , Y(N)   X(N+1),Y(N+1)  X(35)
,Y(35)

    PTS     1     3        .000    .090    4.500    .000    9.000    .090
    PTS     2     3        .000    .060    3.000    .000    6.000    .060
                                                    W S P G W                                                          PAGE
NO   1
                            WATER SURFACE PROFILE - TITLE CARD LISTING
 HEADING LINE NO 1 IS -
                              STATE ROUTE 79
 HEADING LINE NO 2 IS -
                              PROJECT 2
 HEADING LINE NO 3 IS -
                              SYSTEM NO. 15
                                                    W S P G W                                                          PAGE
NO   2
                            WATER SURFACE PROFILE - ELEMENT CARD LISTING
  ELEMENT NO   1 IS A SYSTEM OUTLET     *         *     *
                      U/S DATA   STATION    INVERT  SECT                                      W S ELEV
                                  988.000 1503.800    1                                        1503.800
  ELEMENT NO   2 IS A TRANSITION        *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                            RADIUS   ANGLE
                                 1000.000 1503.850    2              .036                            .000     .000
  ELEMENT NO   3 IS A  WALL  EXIT                       *
                      U/S DATA   STATION    INVERT  SECT
                                 1000.000 1503.850    3
  ELEMENT NO   4 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                            RADIUS    ANGLE     ANG
PT  MAN H
                                 1161.800 1504.560    3              .024                            .000     .000      .000
0
  ELEMENT NO   5 IS A  WALL  ENTRANCE                   *
```

	U/S DATA	STATION	INVERT	SECT	FP		
		1161.800	1504.560	3	.200		
ELEMENT NO 6 IS A SYSTEM HEADWORKS				*		*	
	U/S DATA	STATION	INVERT	SECT			W S ELEV
		1161.800	1504.560	3			1504.560

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 3- 2-2011 Time: 4:59:52

STATE ROUTE 79
PROJECT 2
SYSTEM NO. 15

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
988.000	1503.800	.560	1504.360	18.90	4.07	.26	1504.62	.00	.56	9.00		1	0	.0
TRANS STR	.0042							.560	1.000		.036			IR-OPEN
1000.000	1503.850	.418	1504.268	18.90	8.12	1.02	1505.29	.00	.71	6.00		2	0	.0
WALL	EXIT													
1000.000	1503.850	1.393	1505.243	18.90	5.88	.54	1505.78	.00	1.39	2.99	3.000	.000	.00	1 .0
.357	.0044					.0133	.00	1.39	1.00	2.01	.024	.00	.00	PIPE
1000.357	1503.852	1.445	1505.297	18.90	5.61	.49	1505.78	.00	1.39	3.00	3.000	.000	.00	1 .0
1.456	.0044					.0117	.02	1.45	.93	2.01	.024	.00	.00	PIPE
1001.813	1503.858	1.500	1505.358	18.90	5.35	.44	1505.80	.00	1.39	3.00	3.000	.000	.00	1 .0
2.825	.0044					.0103	.03	1.50	.87	2.01	.024	.00	.00	PIPE
1004.638	1503.870	1.557	1505.427	18.90	5.10	.40	1505.83	.00	1.39	3.00	3.000	.000	.00	1 .0
5.201	.0044					.0091	.05	1.56	.81	2.01	.024	.00	.00	PIPE
1009.839	1503.893	1.618	1505.511	18.90	4.86	.37	1505.88	.00	1.39	2.99	3.000	.000	.00	1 .0
8.219	.0044					.0080	.07	1.62	.75	2.01	.024	.00	.00	PIPE
1018.058	1503.929	1.681	1505.610	18.90	4.63	.33	1505.94	.00	1.39	2.98	3.000	.000	.00	1 .0
13.729	.0044					.0071	.10	1.68	.70	2.01	.024	.00	.00	PIPE
1031.787	1503.990	1.748	1505.738	18.90	4.42	.30	1506.04	.00	1.39	2.96	3.000	.000	.00	1 .0
23.426	.0044					.0062	.15	1.75	.65	2.01	.024	.00	.00	PIPE

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 3- 2-2011 Time: 4:59:52

STATE ROUTE 79
PHASE 1
SYSTEM NO. 15

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1055.214	1504.092	1.819	1505.911	18.90	4.21	.28	1506.19	.00	1.39	2.93	3.000	.000	.00	1 .0
44.673	.0044					.0055	.25	1.82	.60	2.01	.024	.00	.00	PIPE
1099.887	1504.288	1.895	1506.183	18.90	4.02	.25	1506.43	.00	1.39	2.89	3.000	.000	.00	1 .0
61.913	.0044					.0050	.31	1.90	.56	2.01	.024	.00	.00	PIPE
WALL	ENTRANCE													
1161.800	1504.560	1.949	1506.509	18.90	3.89	.23	1506.74	.00	1.39	2.86	3.000	.000	.00	0 .0

System 16

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	3	3	0	.000	3.000	6.000	.000	.000	.00										
CD	1	5	0	.000															
CD	2	5	0	.000															

WATER SURFACE PROFILE - CROSS SECTION POINT LISTING

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(35) ,Y(35)
PTS	1	3	.000 .180	9.000 .000	18.000 .180				
PTS	2	3	.000 .120	6.000 .000	12.000 .120				

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

STATE ROUTE 79

HEADING LINE NO 2 IS -

PROJECT 2

HEADING LINE NO 3 IS -

SYSTEM NO. 16

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	976.000	1500.890	1	1500.890

ELEMENT NO 2 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE
	1000.000	1501.010	2	.036	.000	.000

ELEMENT NO 3 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1000.000	1501.010	3

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1153.540	1501.780	3	.015	.000	.000	.000	0

ELEMENT NO 5 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1153.540	1501.780	3	.200

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1153.540	1501.780	3	1501.780

Program Package Serial Number: 1346

WATER SURFACE PROFILE LISTING Date: 3- 2-2011 Time: 4:59:41

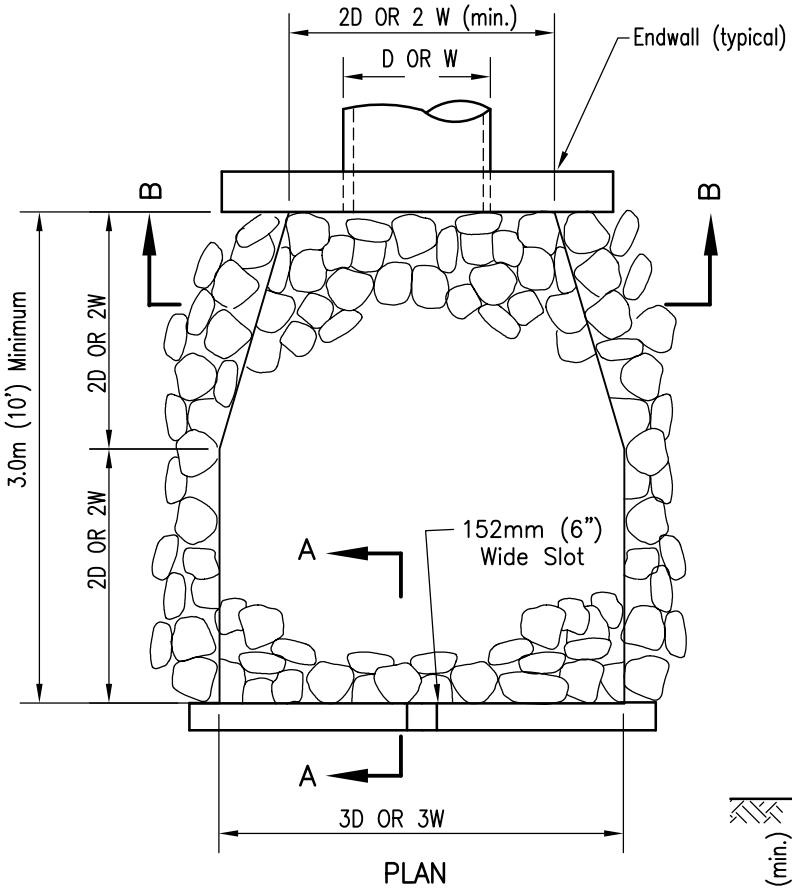
STATE ROUTE 79
PROJECT 2
SYSTEM NO. 16

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
976.000	1500.890	1.150	1502.040	111.40	5.84	.53	1502.57	.00	1.15	18.00		1	0	.0
TRANS STR	.0050							1.150	1.000		.036			IR-OPEN
1000.000	1501.010	.939	1501.949	111.40	10.56	1.73	1503.68	.00	1.45	12.00		2	0	.0
WALL	EXIT													
1000.000	1501.010	2.204	1503.214	111.40	8.42	1.10	1504.32	.00	2.20	6.00	3.000	6.000	.00	0 .0
8.240	.0050					.0050	.04	2.20	1.00	2.24	.015	.00	.00	BOX
1008.240	1501.051	2.241	1503.293	111.40	8.28	1.07	1504.36	.00	2.20	6.00	3.000	6.000	.00	0 .0
145.300	.0050					.0050	.73	2.24	.98	2.24	.015	.00	.00	BOX
WALL	ENTRANCE													
1153.540	1501.780	2.242	1504.022	111.40	8.28	1.06	1505.09	.00	2.20	6.00	3.000	6.000	.00	0 .0

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX H

RIP RAP ENERGY DISSIPATOR DETAIL

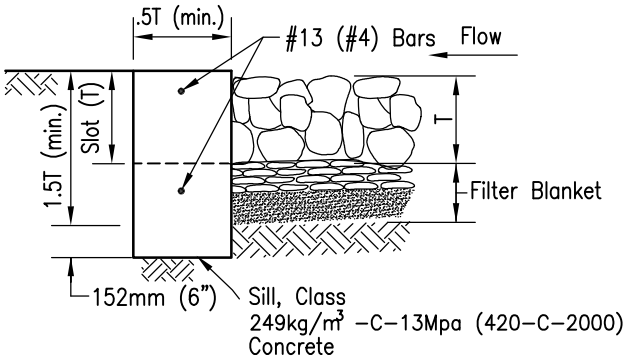


PLAN

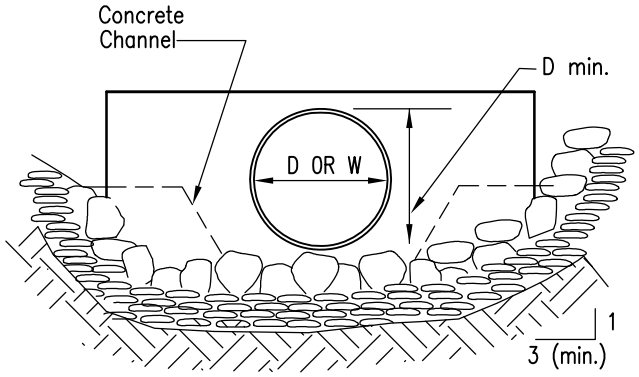
Design Velocity m/sec (ft/sec)*	Rock Classification	T (min)
1.8–3 (6–10)	No. 2 Backing	320mm (1.1ft)
3–3.7 (10–12)	220 kg (1/4 ton)	823mm (2.7ft)
3.7–4.3 (12–14)	450 kg (1/2 ton)	1.1m (3.5ft)
4.3–4.9 (14–16)	900 kg (1 ton)	1.3m (4.4ft)
4.9–5.5 (16–18)	1.8 tonne (2 ton)	1.6m (5.4ft)

*over 5.5 mps (18 fps) requires special design

D = Pipe Diameter
W = Bottom Width of Channel



SECTION A–A



SECTION B–B

NOTES

1. Plans shall specify:
   A) Rock Class and thickness (T).
   B) Filter material, number of layers and thickness.
2. Rip rap shall be either quarry stone or broken concrete (if shown on the plans.) Cobbles are not acceptable.
3. Rip rap shall be placed over filter blanket which may be either granular material or filter fabric (woven filter slit film fabric shall not be used).
4. See Regional Supplement Amendments for selection of filter blanket.
5. Rip rap energy dissipators shall be designated as either Type 1 or Type 2. Type 1 shall be with concrete sill; Type 2 shall be without sill.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Add Rip Rap Table		S. Brady	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

RIP RAP ENERGY DISSIPATER

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–40

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX I

OFF-SITE DRAINAGE EXHIBITS (INFORMATIONAL DATA ONLY)

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
DARRIN P. GINN
No. C63610
Exp. 09/30/10
CIVIL
STATE OF CALIFORNIA

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SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

DATE REVISED BY
DATE REVISED
CALCULATED/ DESIGNED BY
CHECKED BY
DESIGN OVERSIGHT
JON BUMPS
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
PROJECT DEVELOPMENT

OFFSITE DRAINAGE EXHIBIT

SUB AREAS A THRU G
STATE ROUTE 79
SCALE:1" = 200'

D-1

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
DARRIN P. GINN
No. C63610
Exp. 09/30/10
CIVIL
STATE OF CALIFORNIA

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DESIGN OVERSIGHT: JON BUMPS

CALCULATED/ DESIGNED BY

CHECKED BY

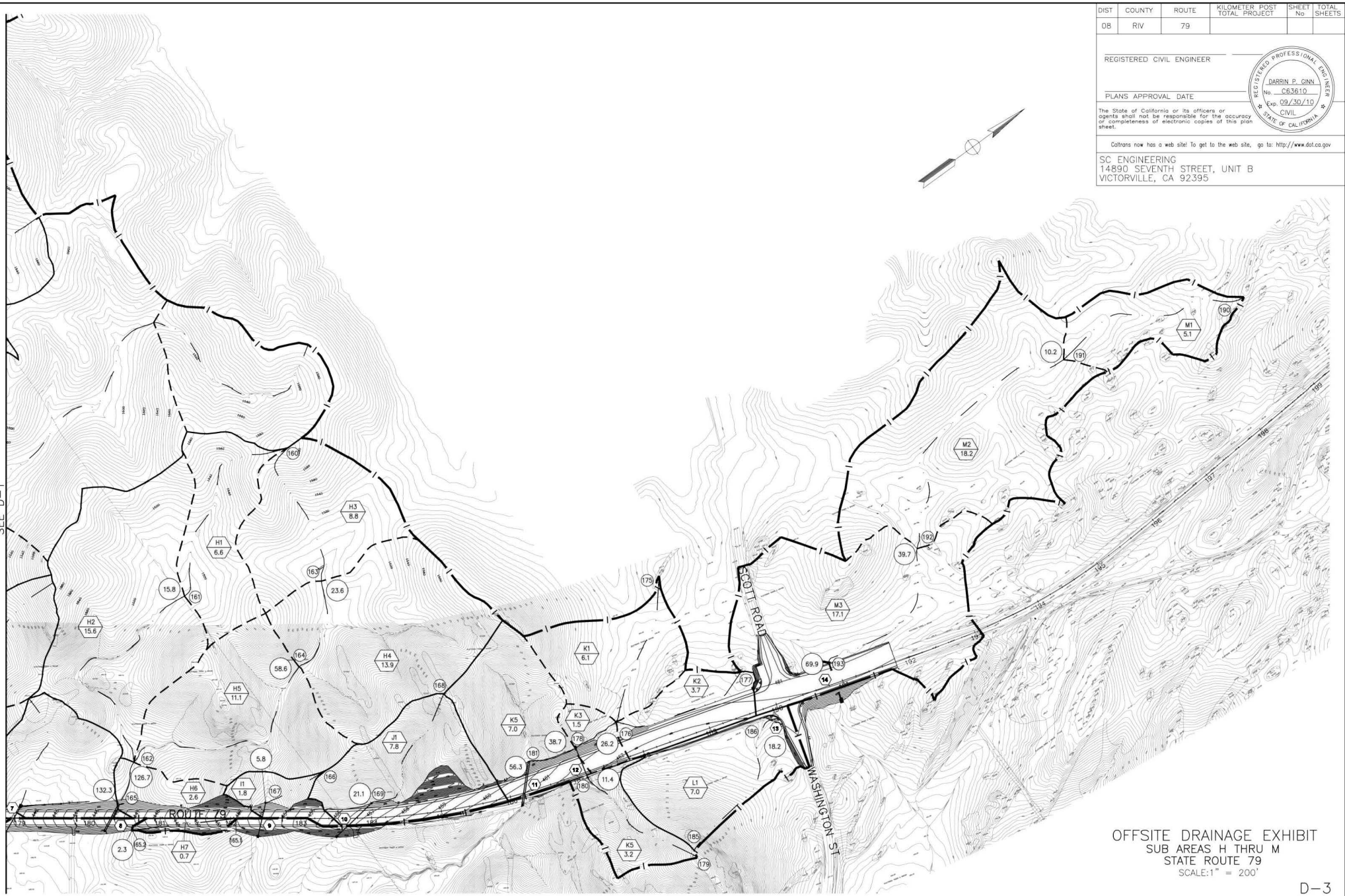
DATE REVISED

BY DATE REVISED

OFFSITE DRAINAGE EXHIBIT
SUB AREA C
STATE ROUTE 79
SCALE:1" = 200'

D-2

SEE D-1



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
DARRIN P. GINN
No. C63610
Exp. 09/30/10
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CHECKED BY

DATE REVISED BY
DATE REVISED

OFFSITE DRAINAGE EXHIBIT
SUB AREAS H THRU M
STATE ROUTE 79
SCALE:1" = 200'

D-3

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX J

ON-SITE DRAINAGE EXHIBITS

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
DARRIN P. GINN
No. C63610
Exp. 09/30/10
CIVIL
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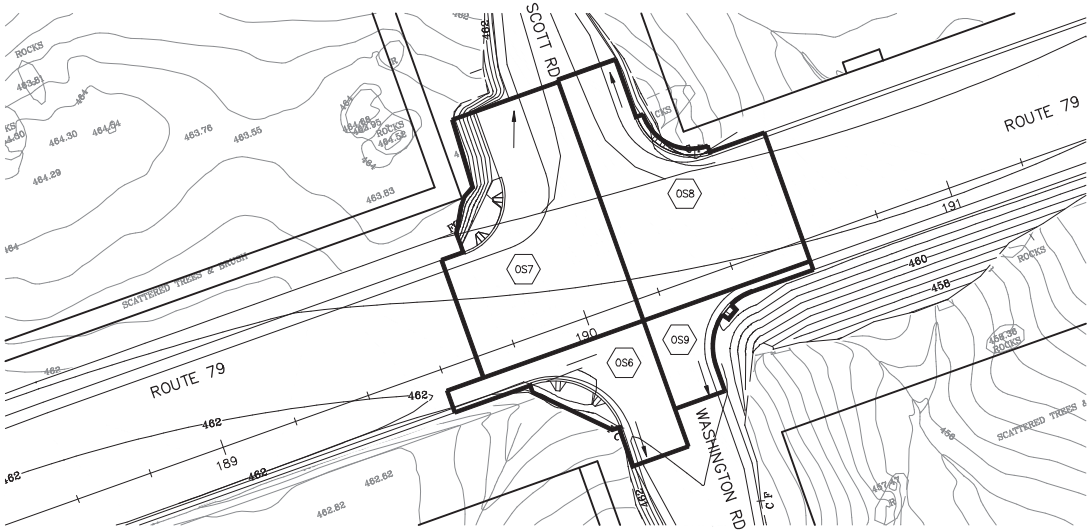
LEGEND

X — ONSITE MAJOR DRAINAGE AREA

MAJOR SUB AREA BOUNDARY

MINOR SUB AREA BOUNDARY



ONSITE DRAINAGE EXHIBIT

AREAS OS1 THRU OS4, OS6 THRU OS9
STATE ROUTE 79
SCALE:1" = 50'

D–4

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION
Caltrans
PROJECT DEVELOPMENT
DESIGN OVERSIGHT
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DATE
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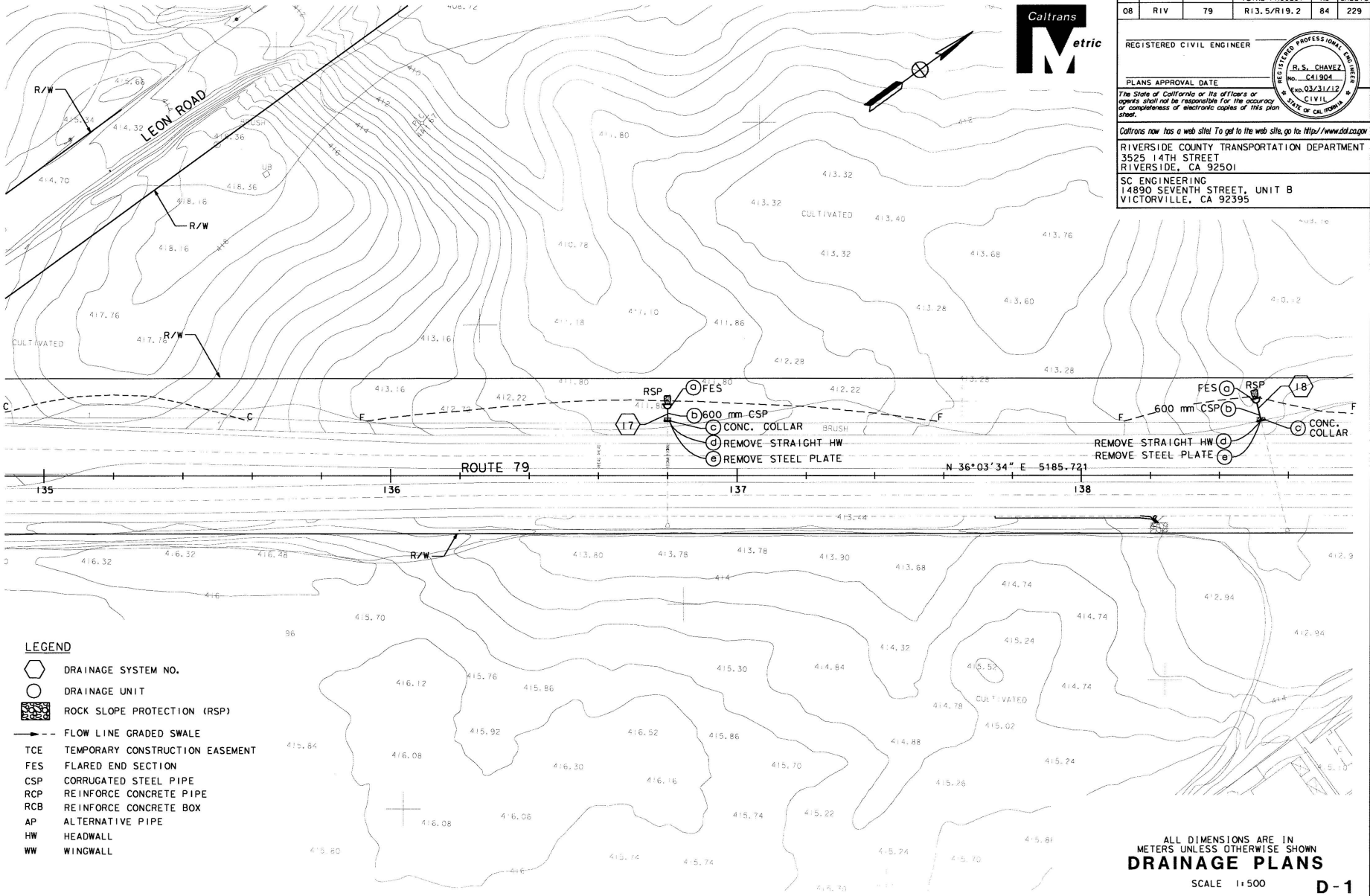
DATE REVISED

FINAL
DRAINAGE REPORT
FOR
STATE ROUTE 79
PM R8.4/R11.9 & R14.9/R15.2
(KP R13.5/R19.2 & R24.0/R24.4)
EA 464621

APPENDIX K

DRAINAGE PLANS, PROFILES, AND DETAILS



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	84	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

R. S. CHAVEZ No. C41904 EXP. 03/31/12 CIVIL STATE OF CALIFORNIA — REGISTERED PROFESSIONAL ENGINEER

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RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT
3525 14TH STREET
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

DESIGN OVERSIGHT: JON BUMPS

CALCULATED/DESIGNED BY: J. DAVIS
CHECKED BY: R.S. CHAVEZ

DATE REVISED BY / DATE REVISED

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-1

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

CU 08220 EA 464621

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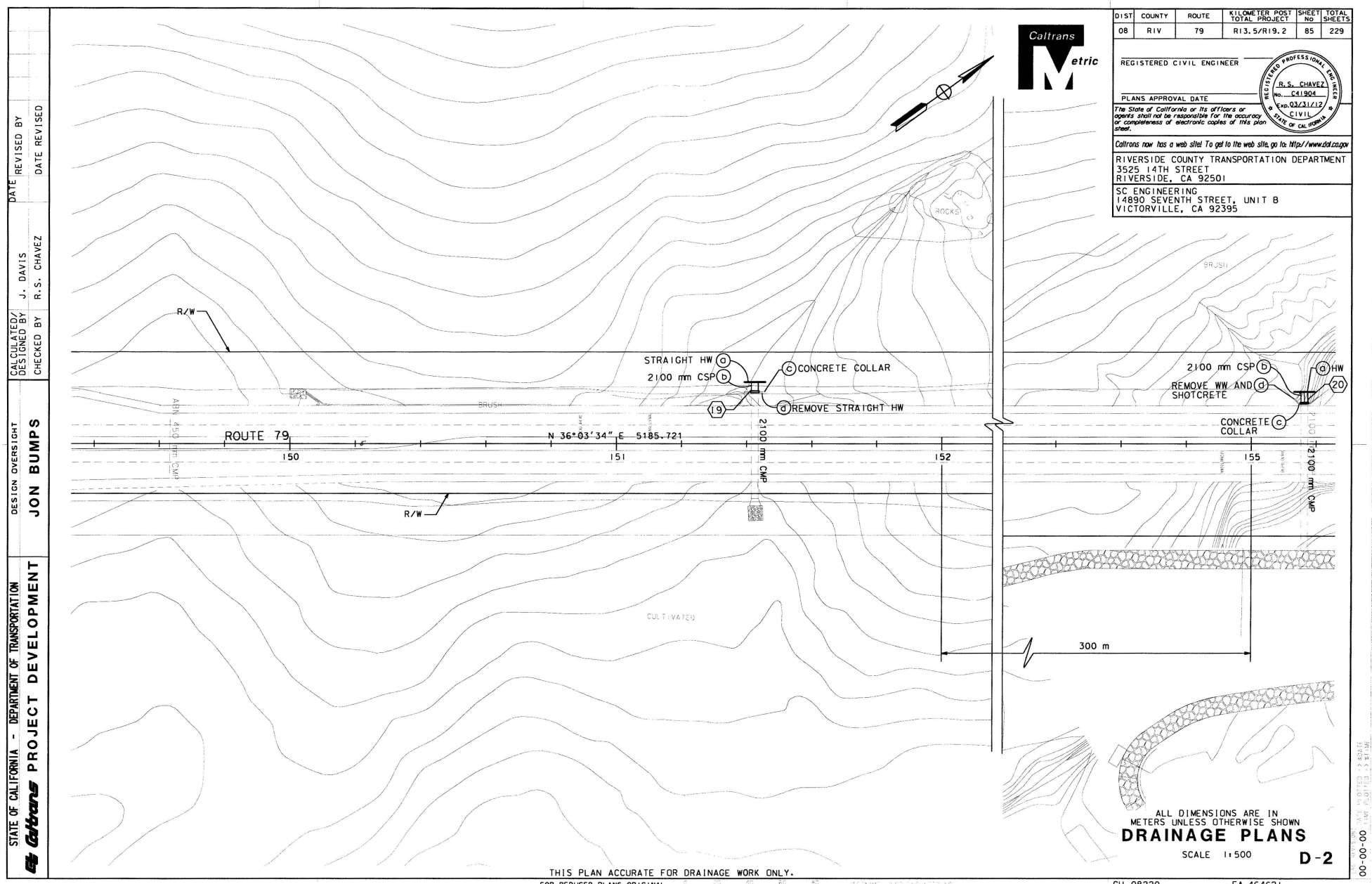

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DESIGN OVERSIGHT: JON BUMPS
CALCULATED/DESIGNED BY: J. DAVIS
CHECKED BY: R.S. CHAVEZ

DATE	REVISED BY	DATE REVISED

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	85	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — R.S. CHAVEZ — No. C41904 — Exp. 03/31/12 — CIVIL — STATE OF CALIFORNIA

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RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

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DRAINAGE PLANS

SCALE 1:500

D-2

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CU 08220 EA 464621

00-00-00

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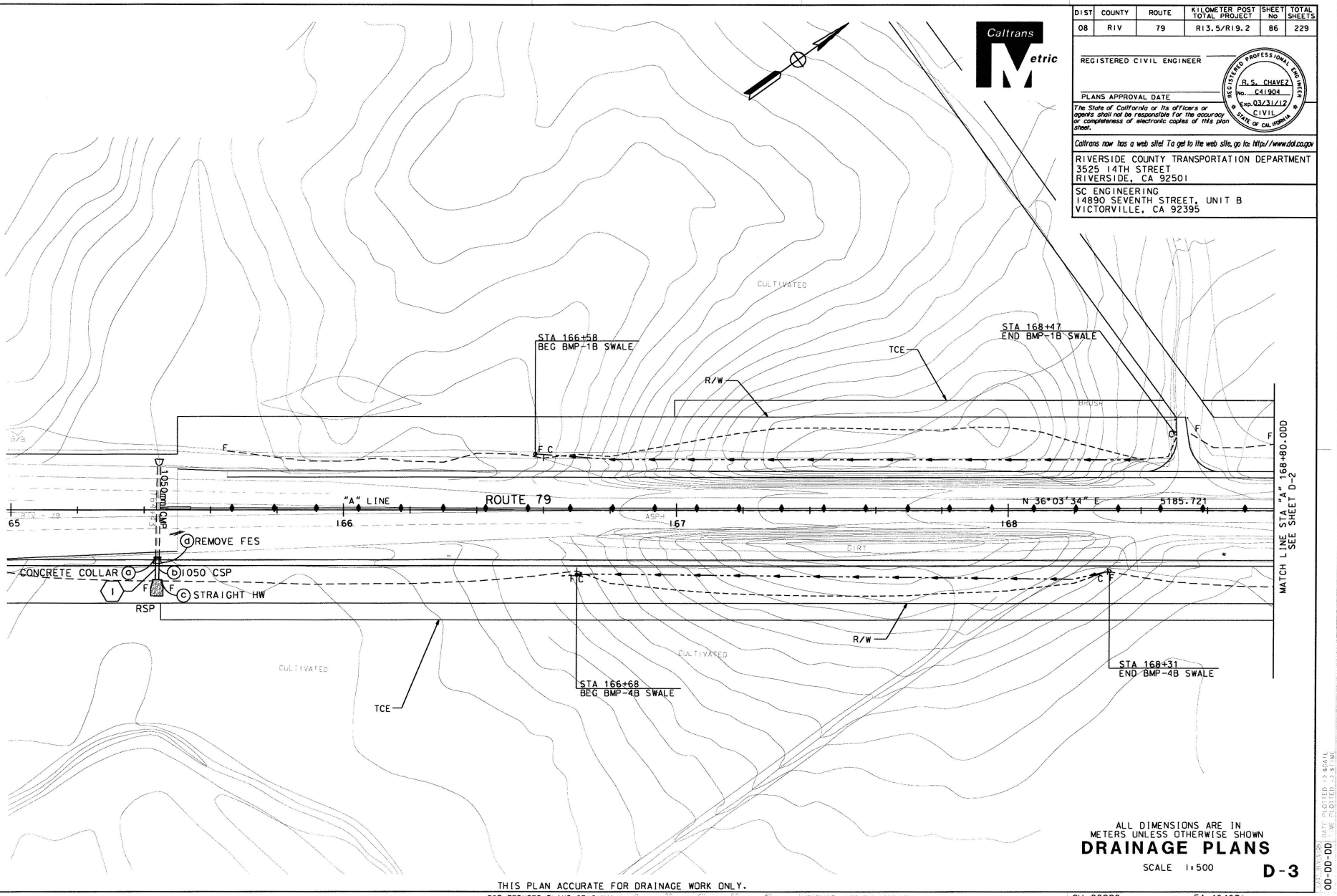

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	86	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

R. S. CHAVEZ No. C41904 EXP. 03/31/12 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

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RIVERSIDE, CA 92501

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VICTORVILLE, CA 92395

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

DESIGN OVERSIGHT: JON BUMPS

CALCULATED/DESIGNED BY: J. DAVIS
CHECKED BY: R.S. CHAVEZ

DATE	REVISED BY	DATE REVISED

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-3

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

CU 08220 EA 464621

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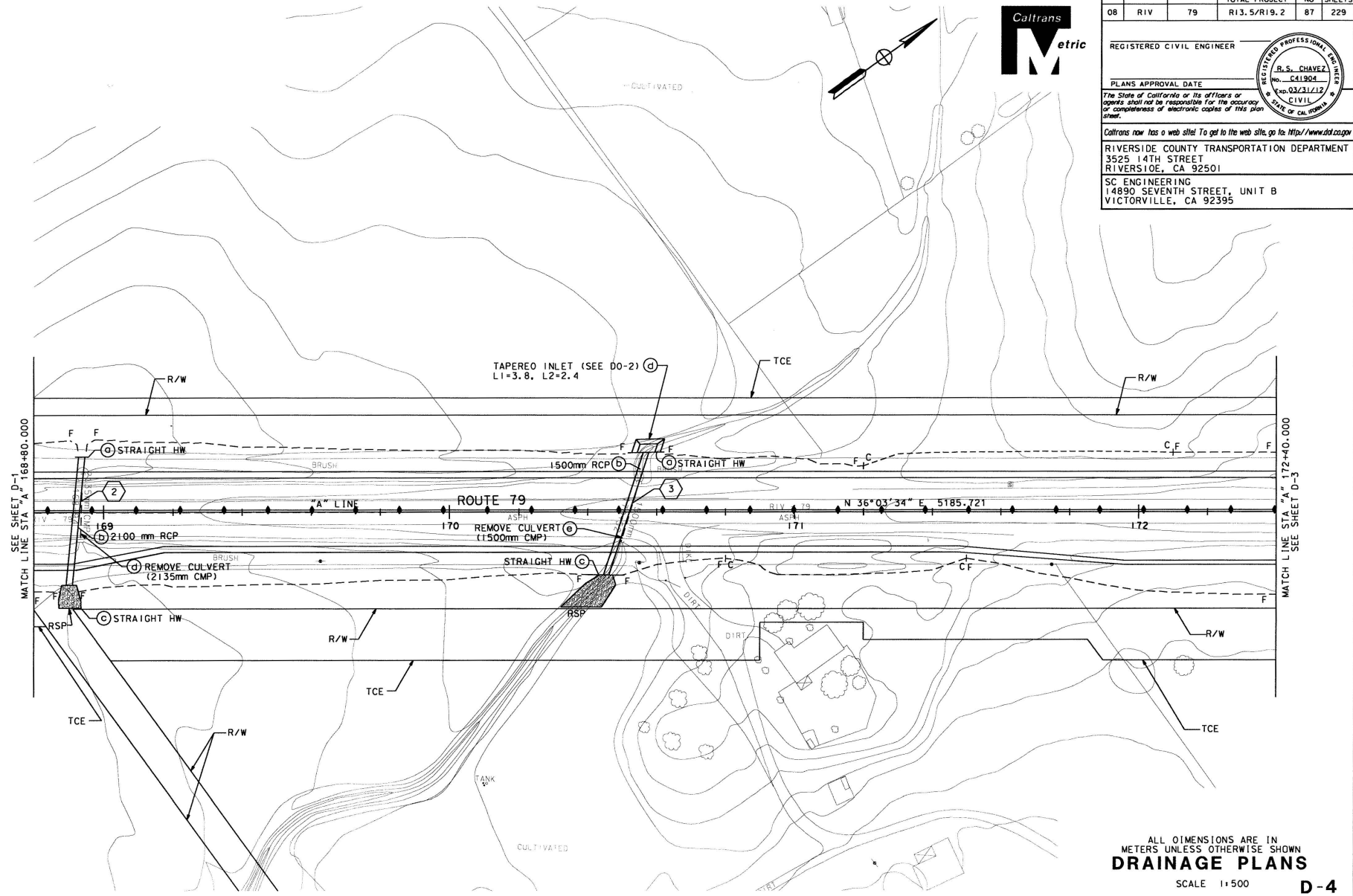

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	87	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

R. S. CHAVEZ
No. C41904
Exp. 03/31/12
CIVIL
STATE OF CALIFORNIA
REGISTERED PROFESSIONAL ENGINEER

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RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT
3525 14TH STREET
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

DESIGN OVERSIGHT JON BUMPS

CALCULATED/DESIGNED BY J. DAVIS
CHECKED BY R.S. CHAVEZ

DATE	REVISED BY	DATE REVISED

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-4

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

CU 08220 EA 464621

...\sr79\plans2\drainage\d-04.dgn Jan. 16, 2012 12:57:14

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	88	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER R.S. CHAVEZ No. C41904 Exp. 03/31/12 CIVIL STATE OF CALIFORNIA

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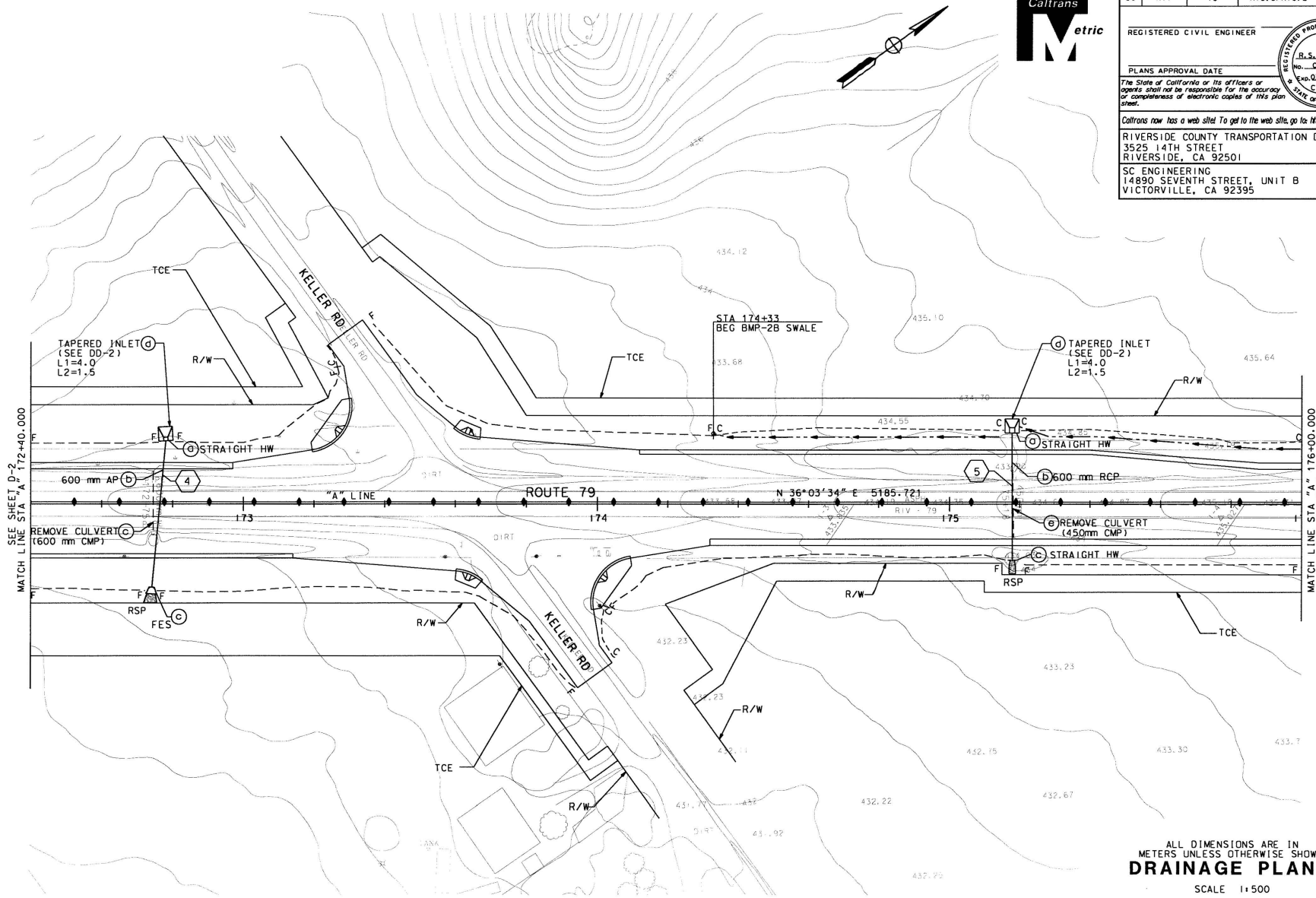
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395



ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-5

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

CU 08220 EA 464621

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

DESIGN OVERSIGHT JON BUMPS

CALCULATED/DESIGNED BY J. DAVIS
CHECKED BY R.S. CHAVEZ

DATE REVISED BY
DATE REVISED

00-00-00

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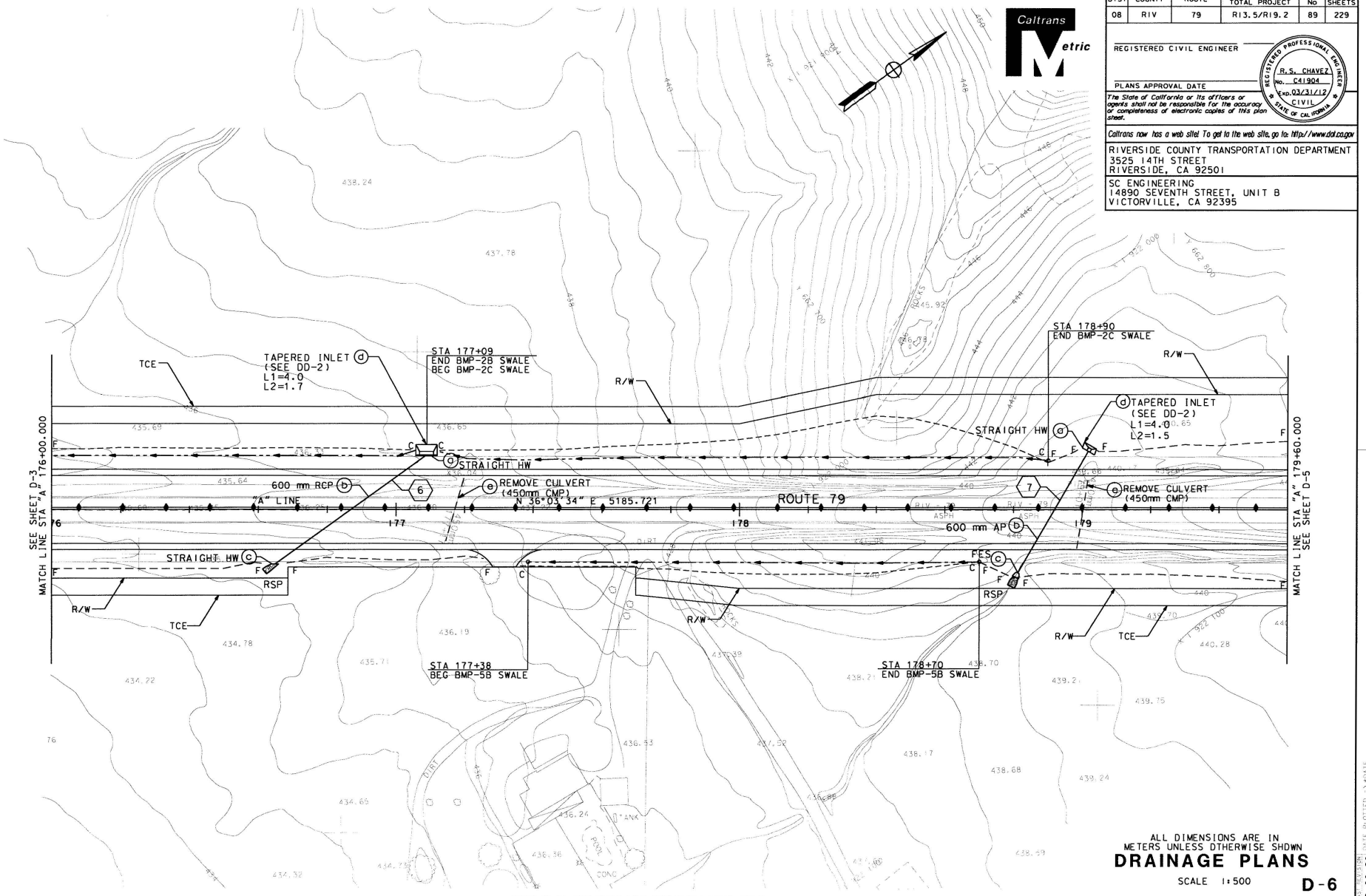

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	89	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

R.S. CHAVEZ No. C41904 EXP.03/31/12 CIVIL STATE OF CALIFORNIA — REGISTERED PROFESSIONAL ENGINEER

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VICTORVILLE, CA 92395

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

DESIGN OVERSIGHT: JON BUMPS

	DATE	REVISED BY	DATE REVISED
CALCULATED/ DESIGNED BY		J. DAVIS	
CHECKED BY		R.S. CHAVEZ	

ALL DIMENSIONS ARE IN METERS UNLESS DTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-6

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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

CU 08220 EA 464621

BAS REVISION DATE PLOTTED => 00-00-00 TIME PLOTTED => 0:00:AM

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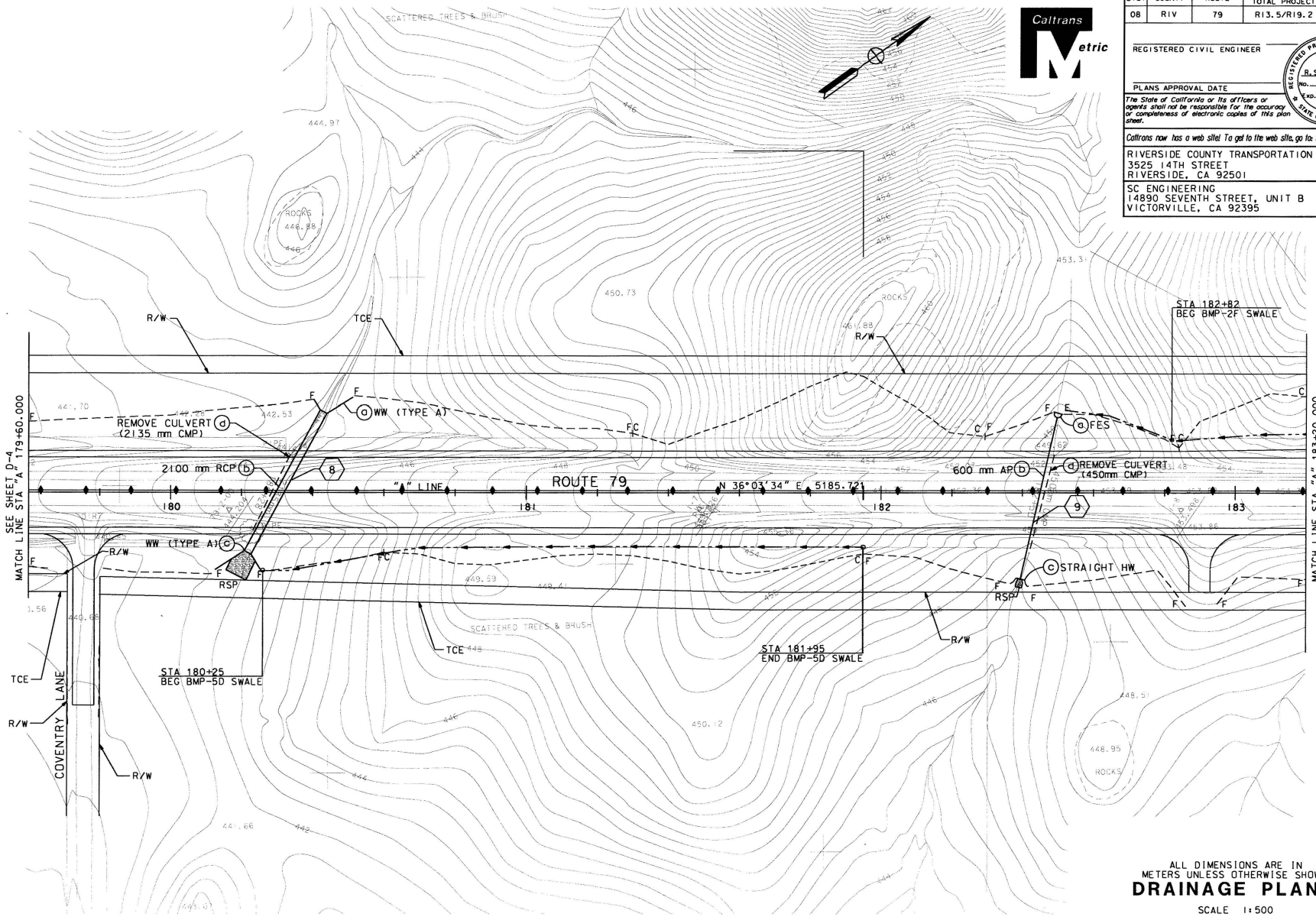

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	90	229

REGISTERED CIVIL ENGINEER

R. S. CHAVEZ No. C41904 EXP. 03/31/12 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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Caltrans PROJECT DEVELOPMENT

DESIGN OVERSIGHT: JON BUMPS

CALCULATED/DESIGNED BY: J. DAVIS
CHECKED BY: R.S. CHAVEZ

DATE	REVISED BY	DATE REVISED

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-7

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

CU 08220 EA 464621

00-00-00 DATE PLOTTED => DATE
TIME PLOTTED => TIME

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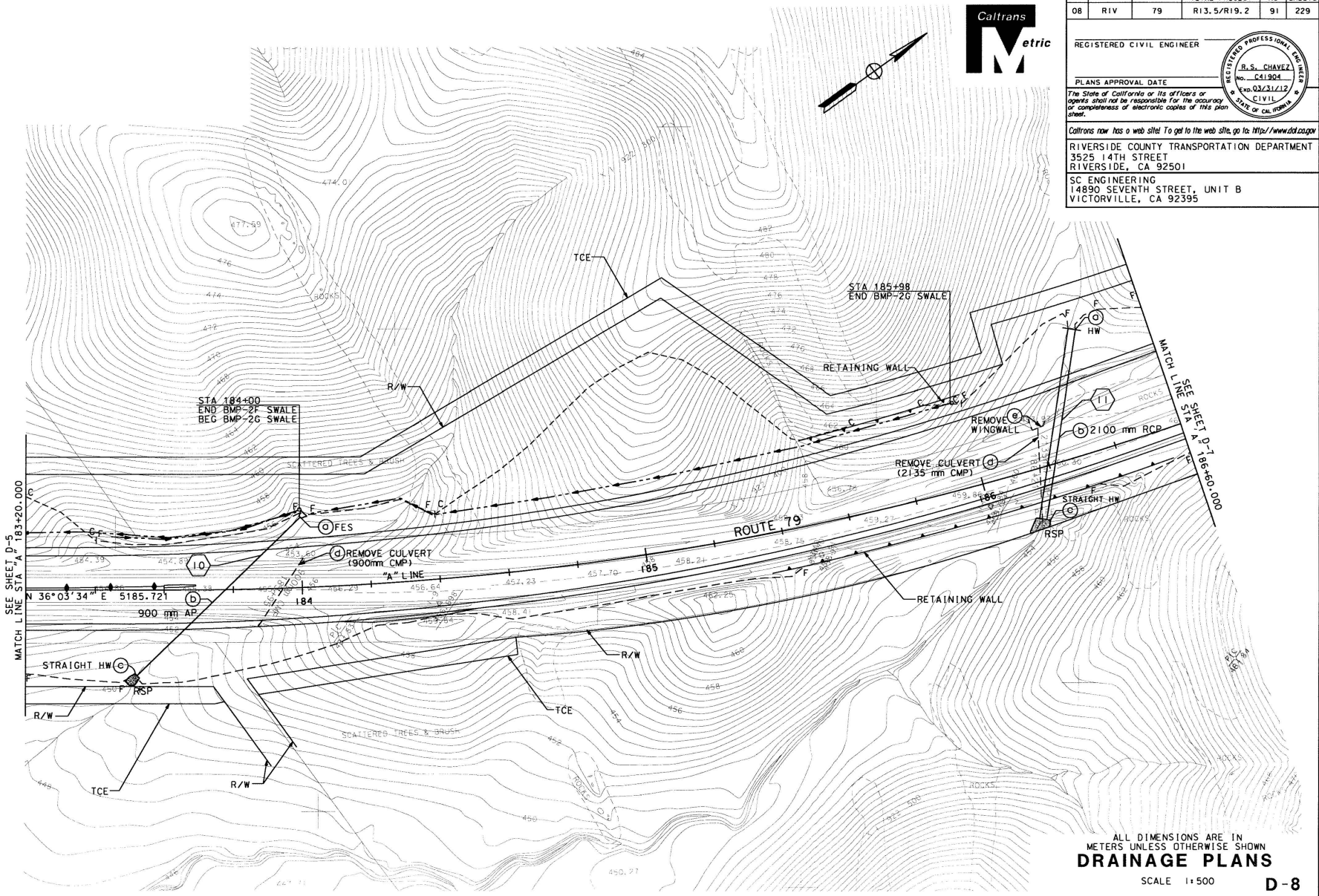

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	91	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — R. S. CHAVEZ — NO. C41904 — EXP. 03/31/12 — CIVIL — STATE OF CALIFORNIA

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VICTORVILLE, CA 92395

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

DESIGN OVERSIGHT: JON BUMPS

CALCULATED/DESIGNED BY: J. DAVIS
CHECKED BY: R.S. CHAVEZ

DATE	REVISED BY	DATE REVISED

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-8

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

CU 08220 EA 464621

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	92	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER R.S. CHAVEZ No. C41904 Exp. 03/31/12 CIVIL STATE OF CALIFORNIA

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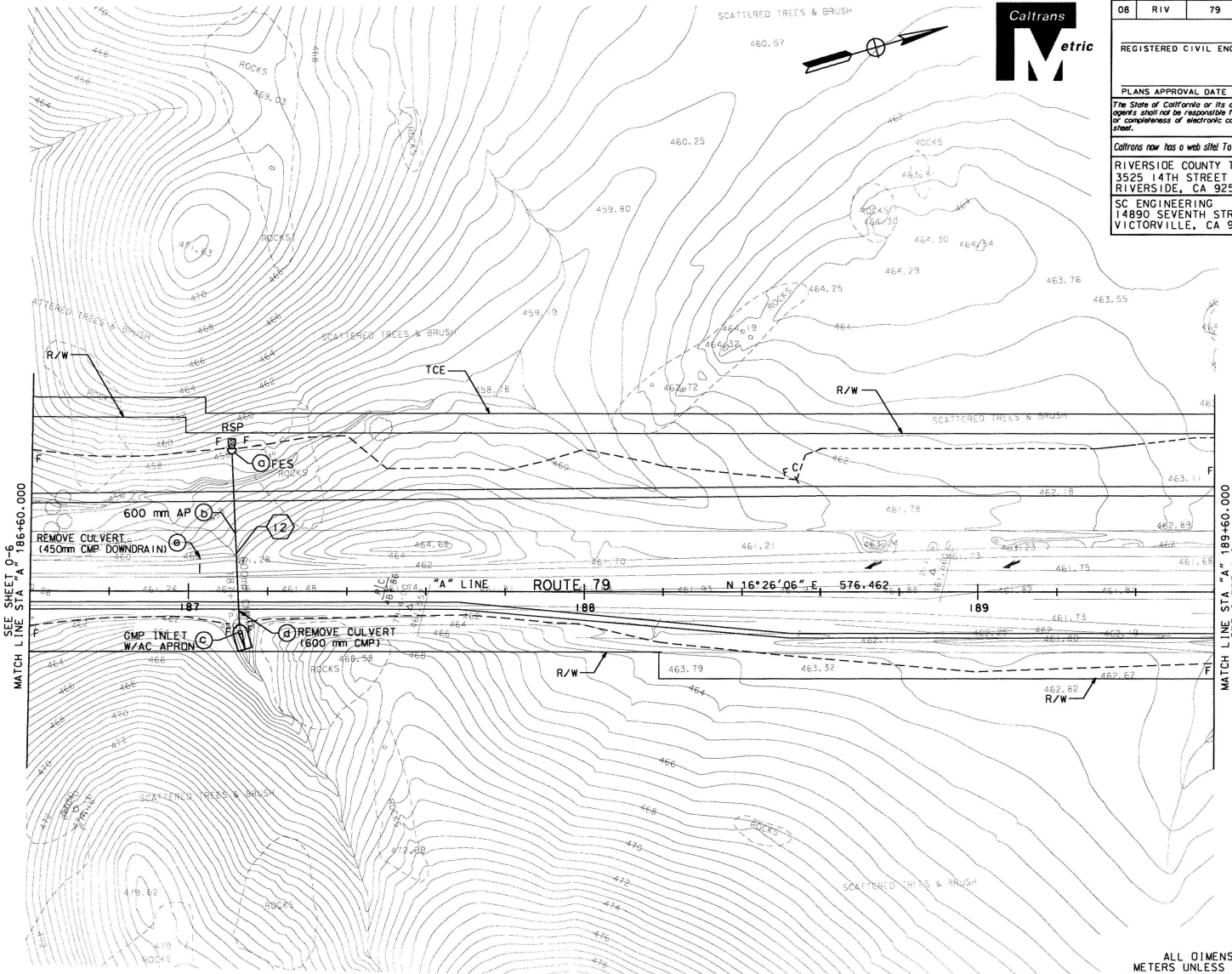
VICTORVILLE, CA 92395



ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-9

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CHECKED BY R.S. CHAVEZ

DATE REVISED BY

DATE REVISED

00-00-00

...\sr79\plans2\drainage\d-09.dgn Jan. 16, 2012 12:57:52

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	93	229

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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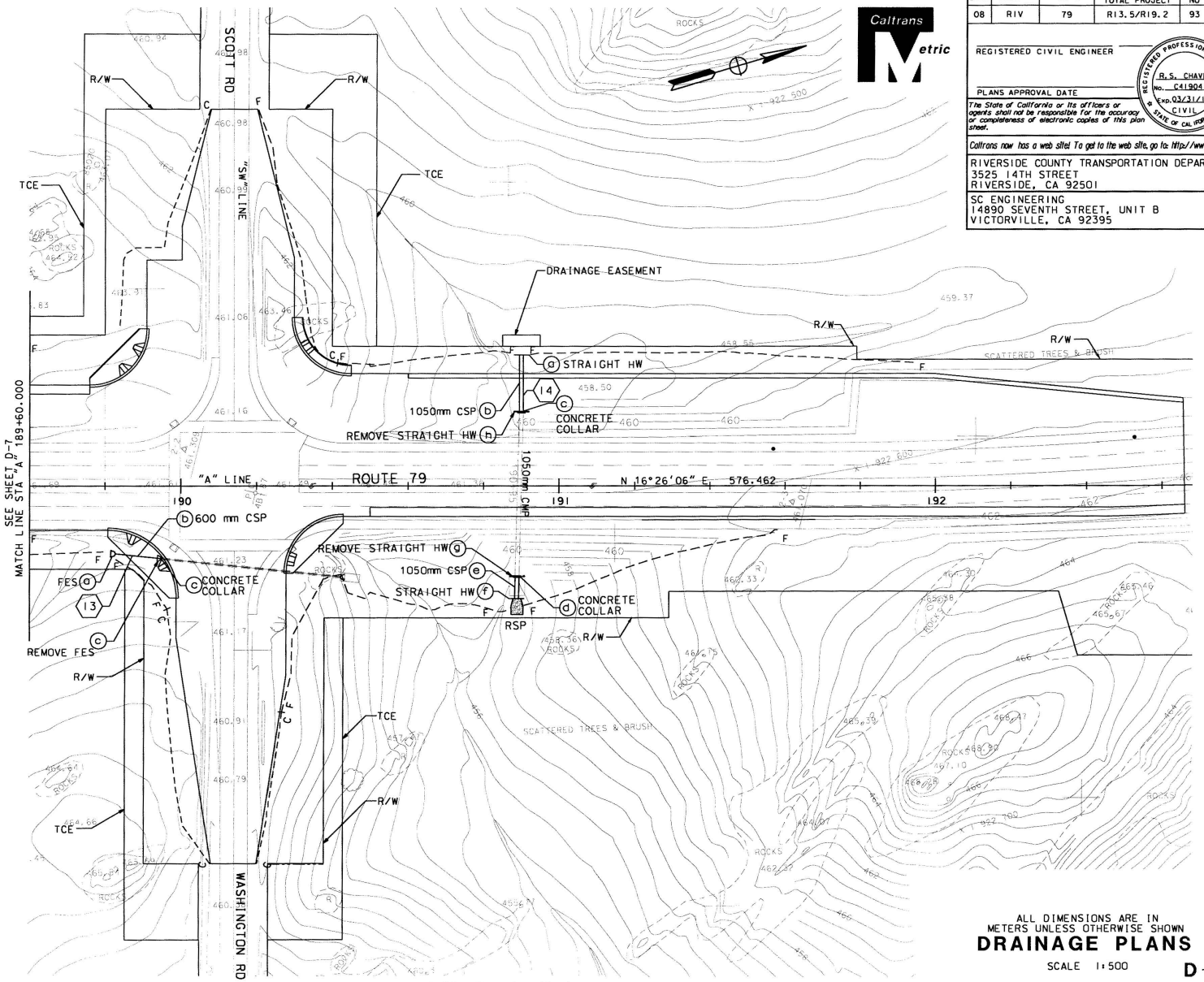
VICTORVILLE, CA 92395

NOTE:

FOR COMPLETE RIGHT OF WAY DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.



ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PLANS

SCALE 1:500

D-10

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Caltrans PROJECT DEVELOPMENT

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CALCULATED/DESIGNED BY J. DAVIS

CHECKED BY R.S. CHAVEZ

DATE REVISED BY

DATE REVISED

00-00-00

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R20.0/R24.4	94	229

REGISTERED CIVIL ENGINEER

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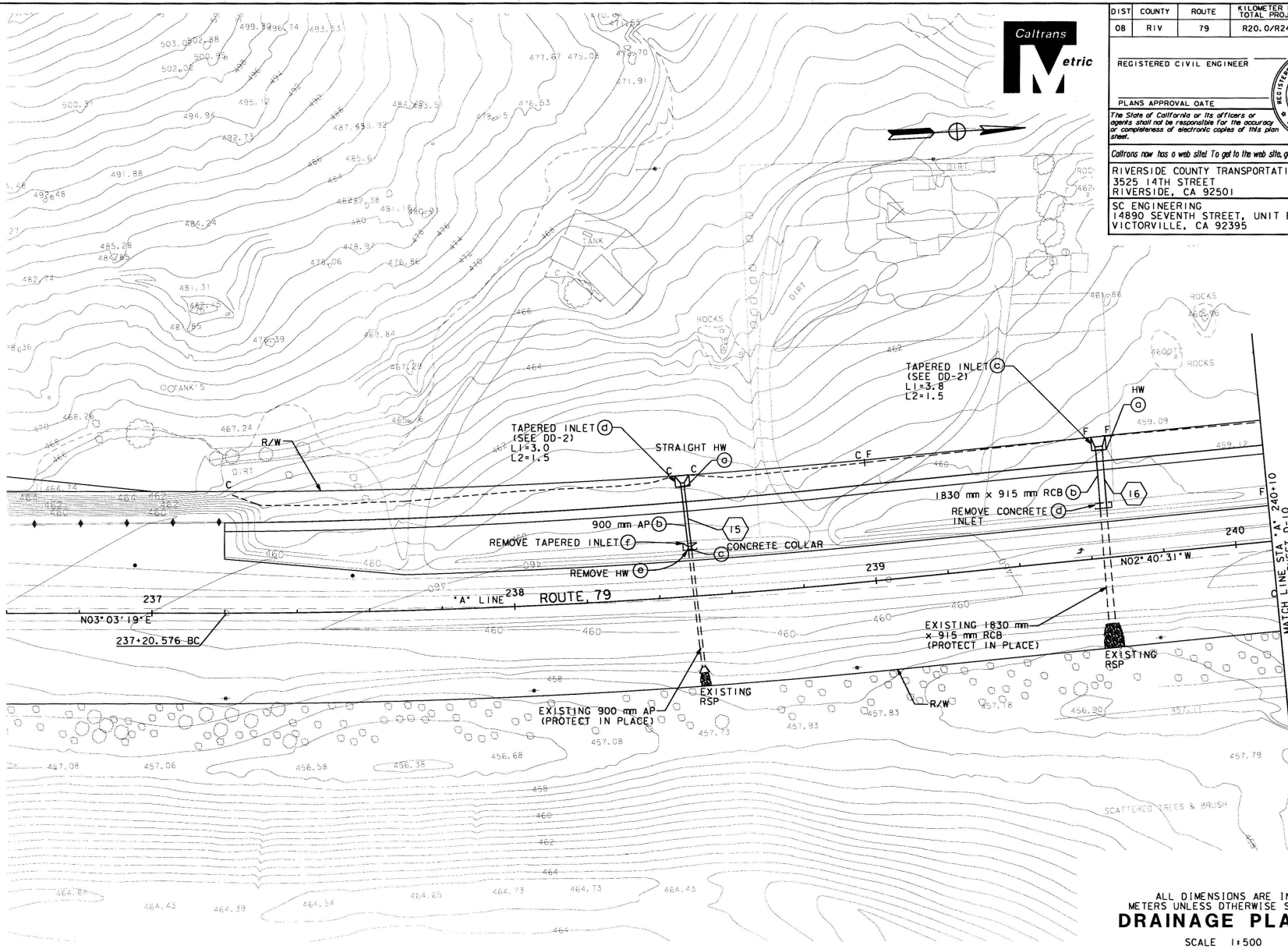

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DRAINAGE PLANS

SCALE 1:500

D-11

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CALCULATED/DESIGNED BY J. DAVIS

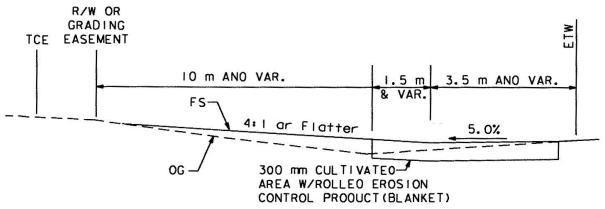
CHECKED BY R.S. CHAVEZ

DATE REVISED BY

DATE REVISED

00-00-00

GRADED CULTIVATED SWALE			
BMP NO.	BEG STA	ENO STA	LENGTH (m)
1B	LT 166+58	168+47	189
2B	LT 174+33	177+09	276
2C	LT 177+09	178+90	181
2F	LT 182+82	184+00	118
2G	LT 184+00	185+98	198
4B	RT 166+68	168+31	163
5B	RT 177+38	178+70	132
5D	RT 180+25	181+95	170

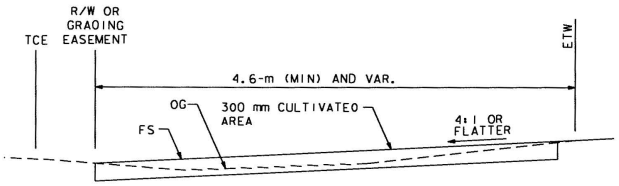


GRADED SWALE
NO SCALE

D(mm)	L(mm)	T(mm)
600	300	150
900	450	200
1050	450	250
2100	600	300

NOTE
1. SEE RIVERSIDE COUNTY FLOOD CONTROL DISTRICT & WATER CONSERVATION DISTRICT STANDARD DRAWING M803 FOR FURTHER INFORMATION.

GRADED CULTIVATED STRIP		
BMP NO.	BEG STA	END STA
1A	LT 165+65	166+58
1C	LT 168+56	173+18
2A	LT 173+67	174+33
2D	LT 178+90	181+30
2E	LT 182+20	182+82
2H	LT 185+98	189+75
3	LT 190+45	192+66
4A	RT 164+48	166+68
4C	RT 168+31	173+59
5A	RT 174+09	177+38
5C	RT 178+70	180+25
6	RT 188+60	189+80
7	RT 190+20	190+39
8	LT 238+50	240+48



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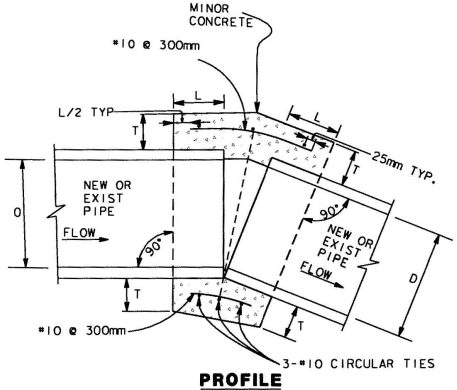

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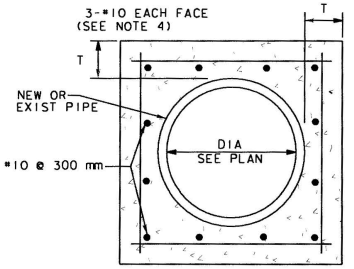
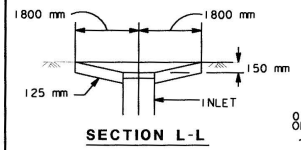
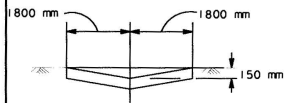


SECTION
NO SCALE

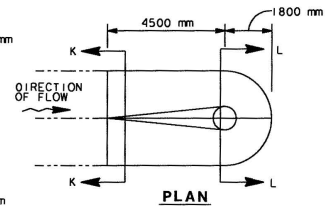
CONCRETE COLLAR DETAIL
(1) (13) (14) (15) (17) (18) (20)



SECTION L-L

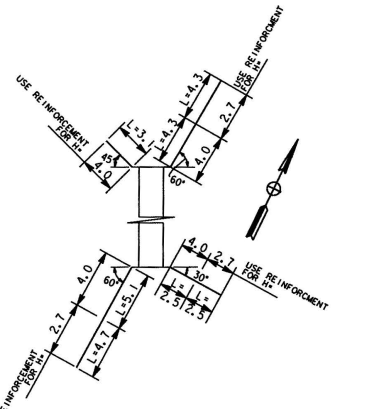


SECTION K-K

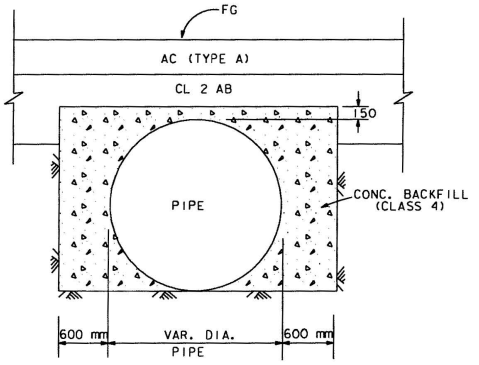


PLAN

AC APRON
NO SCALE



TYPE A WING WALL SYSTEM (8)
NO SCALE



CONCRETE BACKFILL DETAIL
(2) (3) (5) (6) (15)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE DETAILS
SCALE AS SHOWN

DD-1

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	100	229

REGISTERED CIVIL ENGINEER
R. S. CHAVEZ No. C41904 EXP. 03/31/12 CIVIL STATE OF CALIFORNIA
PLANS APPROVAL DATE

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3525 14TH STREET
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

DESIGN OVERSIGHT: JON BUMPS
CALCULATED/DESIGNED BY
CHECKED BY
DATE REVISED
REVISED BY
DATE

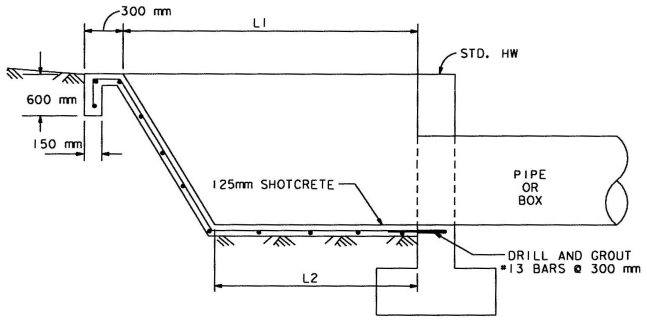
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

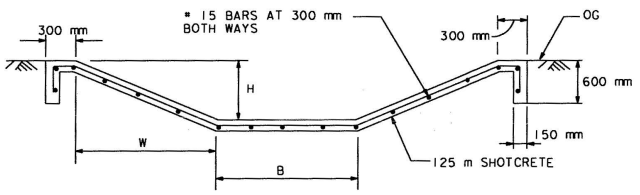
CU 08224 EA 464621

LAST REVISION 00-00-00 TIME PLOTTED -> 12:58:07 16 JAN 12

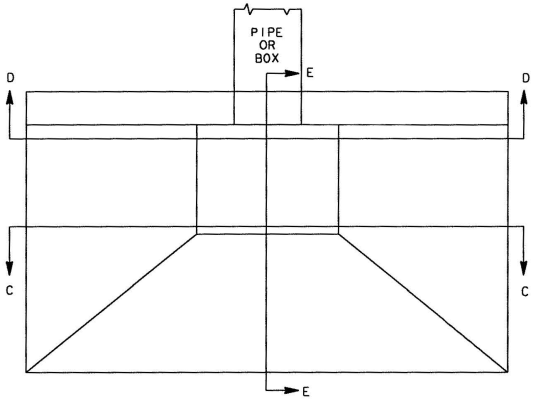
\\sc70\plans2\drainage\dd-1.dgn Jan 16, 2012 12:58:06



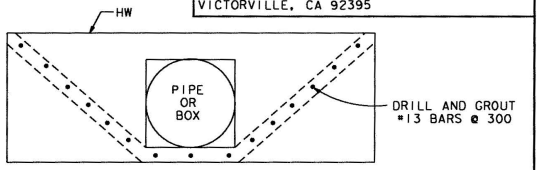
SECTION E-E



SECTION C-C



PLAN

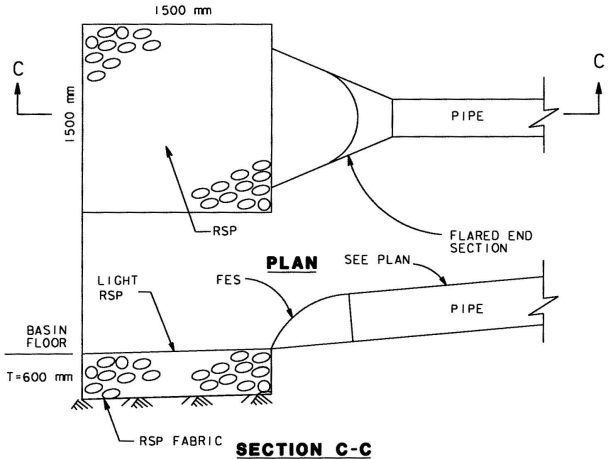


SECTION D-D

DEPRESSED INLET TRANSITION

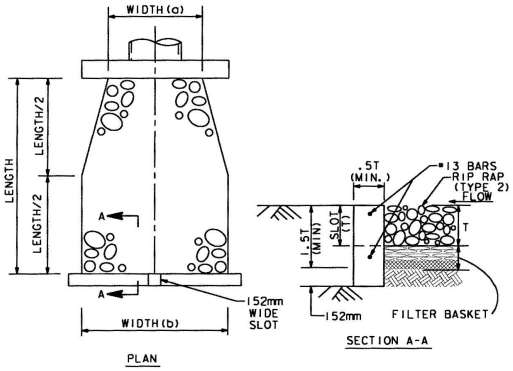
SYSTEM	L1	L2	W	B	H
3	3.8	2.4	1.5	5.1	0.7
4	4.0	1.5	4.0	1.5	0.15
5	4.0	1.5	4.0	1.5	1.2
6	4.0	1.7	2.1	2.1	1.2
7	4.0	1.5	1.25	1.5	0.5
15	3.0	1.5	1.25	1.5	2.2
16	3.8	1.5	1.25	1.5	1.5

TAPERED INLET DETAILS
NO SCALE
3 4 5 6 7 15 16



SECTION C-C

ROCK SLOPE PROTECTION DETAILS



RIP RAP
ENERGY DISSIPATOR
NO SCALE

ROCK SLOPE PROTECTION (RSP)

SYSTEM	STATION	WIDTH(a)	WIDTH(b)	length	T	CLASS
1	165+44.886	2.4	3.7	4.9	1.1	1/2T
2	168+92.190	4.2	6.4	8.5	0.823	1/4T
3	170+51.318	3.7	4.9	9.8	1.1	1/2T
4	172+76.365	1.2	1.8	3.0	0.823	1/4T
5	175+17.896	1.2	1.8	4.2	0.823	1/4T
6	176+86.952	1.2	1.8	2.4	0.823	1/4T
7	178+91.951	1.5	2.3	3.0	0.823	1/4T
8	180+30.829	4.2	6.4	8.5	0.823	1/4T
9	182+44.948	1.2	1.8	2.4	0.823	1/4T
10	183+77.789	1.8	2.7	3.7	0.823	1/4T
11	186+20.636	4.2	6.4	8.5	0.823	1/4T
12	187+12.796	1.2	1.8	2.4	0.823	1/4T
14	190+89.283	2.1	3.2	4.3	1.1	1/2T
17	136+80.829	1.2	1.8	2.4	0.823	1/4T
18	138+55.920	1.2	1.8	2.4	0.823	1/4T

ALL DIMENSIONS ARE IN METERS
UNLESS OTHERWISE SHOWN

DRAINAGE DETAILS

SCALE AS SHOWN

DD-2

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	101	229

REGISTERED CIVIL ENGINEER

R.S. CHAVEZ
No. C41904
Exp. 03/31/12
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT
3525 14TH STREET
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

DESIGN OVERSIGHT: JON BUMPS
CALCULATED/DESIGNED BY
CHECKED BY
DATE REVISED BY
DATE REVISED

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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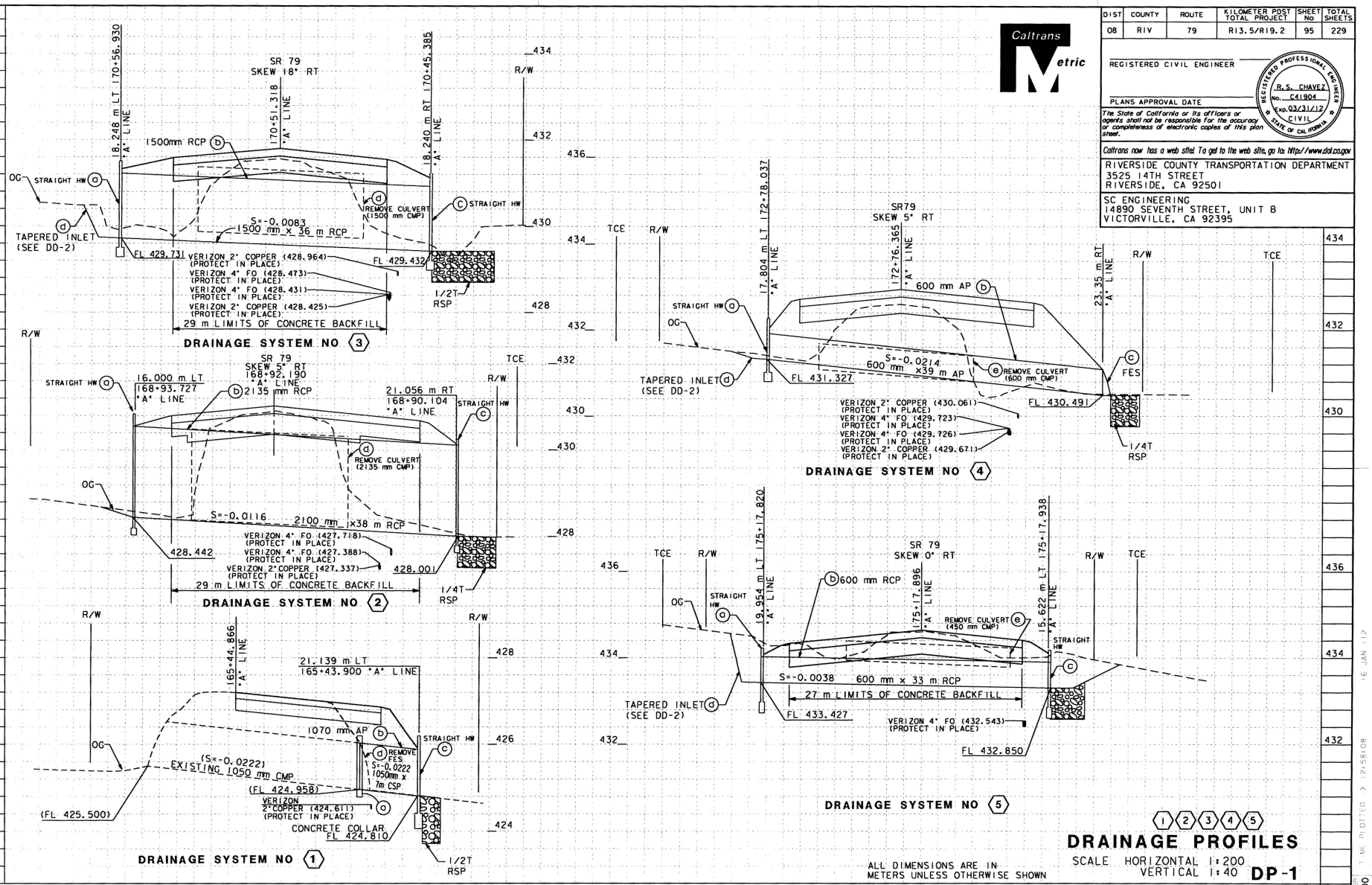
FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME = SC ENGINEERING

CU 08224 EA 464621

REV. REVISION DD-00-00 TIME PLOTTED -> 12:58:07 16 JAN 12

CULVERT PROFILE BY KELLER XING



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	95	229

REGISTERED CIVIL ENGINEER

R.S. CHAVEZ
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CIVIL
STATE OF CALIFORNIA

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3525 14TH STREET
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

DESIGN OVERSIGHT JON BUMPS
CALCULATED/DESIGNED BY J. DAVIS
CHECKED BY R.S. CHAVEZ
DATE REVISED BY
DATE REVISED

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

(1) (2) (3) (4) (5)

DRAINAGE PROFILES

SCALE HORIZONTAL 1:200
VERTICAL 1:40

DP-1

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

Station
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SHEET TOTAL

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

USERNAME = DSC CIVIL

CU 08224 EA 464621

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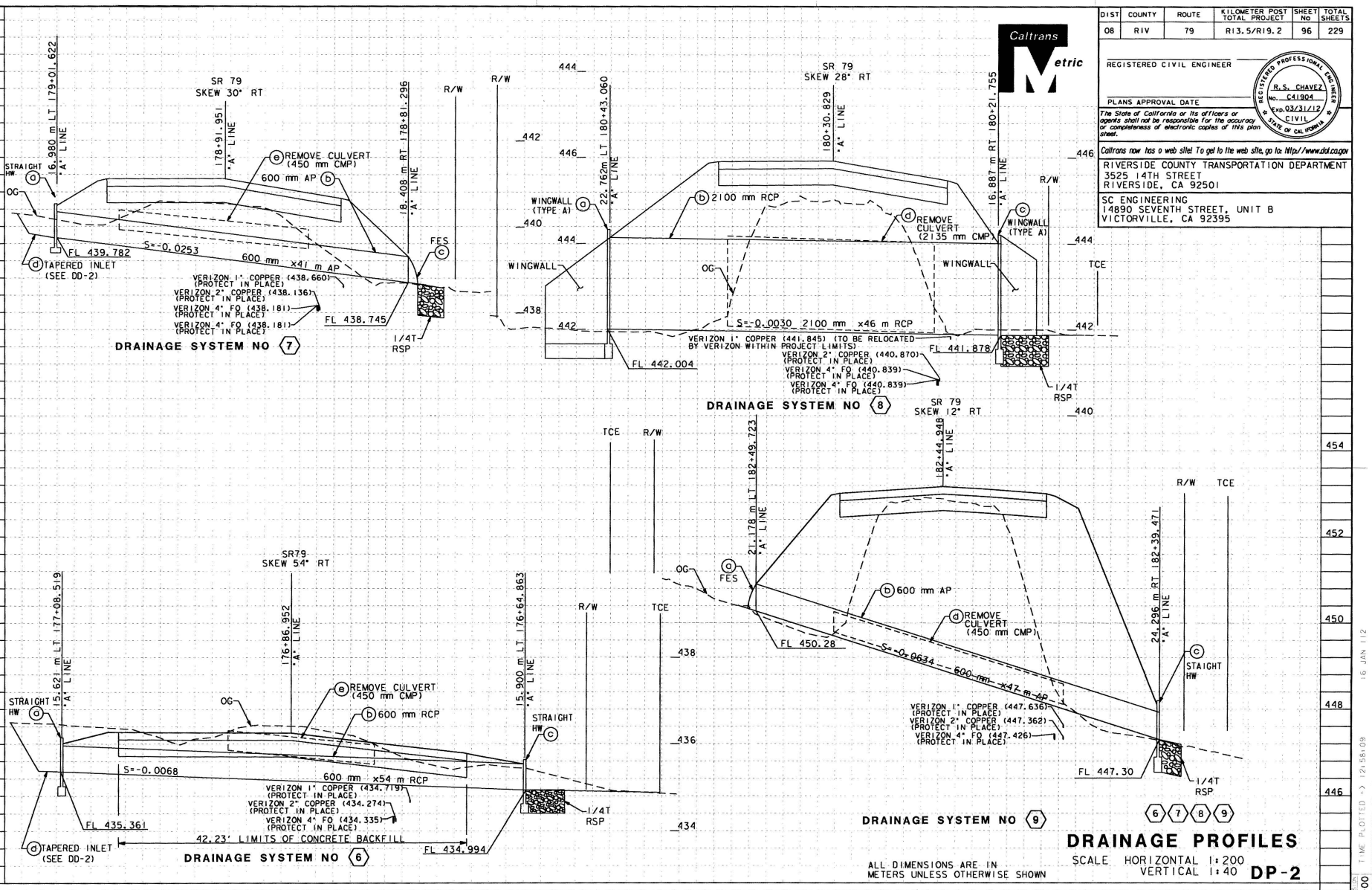
SR 79
SKEW 30° RT
178+91.951
"A" LINE
16.980 m LT 179+01.622
"A" LINE
18.408 m RT 178+81.296
"A" LINE
R/W
STRAIGHT HW (a)
OG
(e) REMOVE CULVERT (450 mm CMP)
600 mm AP (b)
FES (c)
FL 439.782
S=-0.0253
600 mm x41 m AP
(d) TAPERED INLET (SEE DD-2)
VERIZON 1" COPPER (438.660) (PROTECT IN PLACE)
VERIZON 2" COPPER (438.136) (PROTECT IN PLACE)
VERIZON 4" FO (438.181) (PROTECT IN PLACE)
VERIZON 4" FO (438.181) (PROTECT IN PLACE)
FL 438.745
1/4T RSP
DRAINAGE SYSTEM NO (7)
SR 79
SKEW 28° RT
180+30.829
"A" LINE
22.762m LT 180+43.060
"A" LINE
16.887 m RT 180+21.755
"A" LINE
WINGWALL (TYPE A) (a)
(b) 2100 mm RCP
(d) REMOVE CULVERT (2135 mm CMP)
(c) WINGWALL (TYPE A)
WINGWALL
OG
TCE
S=-0.0030 2100 mm x46 m RCP
VERIZON 1" COPPER (441.845) (TO BE RELOCATED BY VERIZON WITHIN PROJECT LIMITS)
VERIZON 2" COPPER (440.870) (PROTECT IN PLACE)
VERIZON 4" FO (440.839) (PROTECT IN PLACE)
VERIZON 4" FO (440.839) (PROTECT IN PLACE)
FL 442.004
FL 441.878
1/4T RSP
DRAINAGE SYSTEM NO (8)
SR 79
SKEW 12° RT
182+44.948
"A" LINE
182+49.723
"A" LINE
21.178 m LT
"A" LINE
24.296 m RT 182+39.471
"A" LINE
TCE
R/W
OG
(a) FES
(b) 600 mm AP
(d) REMOVE CULVERT (450 mm CMP)
FL 450.28
S=-0.0634
600 mm x47 m AP
(c) STAIGHT HW
VERIZON 1" COPPER (447.636) (PROTECT IN PLACE)
VERIZON 2" COPPER (447.362) (PROTECT IN PLACE)
VERIZON 4" FO (447.426) (PROTECT IN PLACE)
FL 447.30
1/4T RSP
DRAINAGE SYSTEM NO (9)
SR79
SKEW 54° RT
177+08.519
"A" LINE
176+86.952
"A" LINE
15.621 m LT
"A" LINE
15.900 m LT 176+64.863
"A" LINE
STRAIGHT HW (a)
OG
(e) REMOVE CULVERT (450 mm CMP)
(b) 600 mm RCP
STRAIGHT HW (c)
S=-0.0068
600 mm x54 m RCP
VERIZON 1" COPPER (434.719) (PROTECT IN PLACE)
VERIZON 2" COPPER (434.274) (PROTECT IN PLACE)
VERIZON 4" FO (434.335) (PROTECT IN PLACE)
FL 435.361
(d) TAPERED INLET (SEE DD-2)
42.23' LIMITS OF CONCRETE BACKFILL
FL 434.994
1/4T RSP
DRAINAGE SYSTEM NO (6)
6 7 8 9
DRAINAGE PROFILES
SCALE HORIZONTAL 1:200
VERTICAL 1:40
DP-2
ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN
Caltrans Metric
DIST 08 | COUNTY RIV | ROUTE 79 | KILOMETER POST TOTAL PROJECT R13.5/R19.2 | SHEET NO 96 | TOTAL SHEETS 229
REGISTERED CIVIL ENGINEER
R.S. CHAVEZ No. C41904 Exp. 03/31/12 CIVIL
REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA
PLANS APPROVAL DATE
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3525 14TH STREET
RIVERSIDE, CA 92501
SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395
DATE REVISED BY
DATE REVISED
J. DAVIS
R.S. CHAVEZ
CALCULATED/DESIGNED BY
CHECKED BY
DESIGN OVERSIGHT
JON BUMPS
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS
CU 08224
EA 464621
00-00-00
16 JAN 12
TIME PLOTTED => 12:58:09
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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	97	229

Caltrans Metric

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER R. S. CHAVEZ No. C41904 Exp. 03/31/12 CIVIL STATE OF CALIFORNIA

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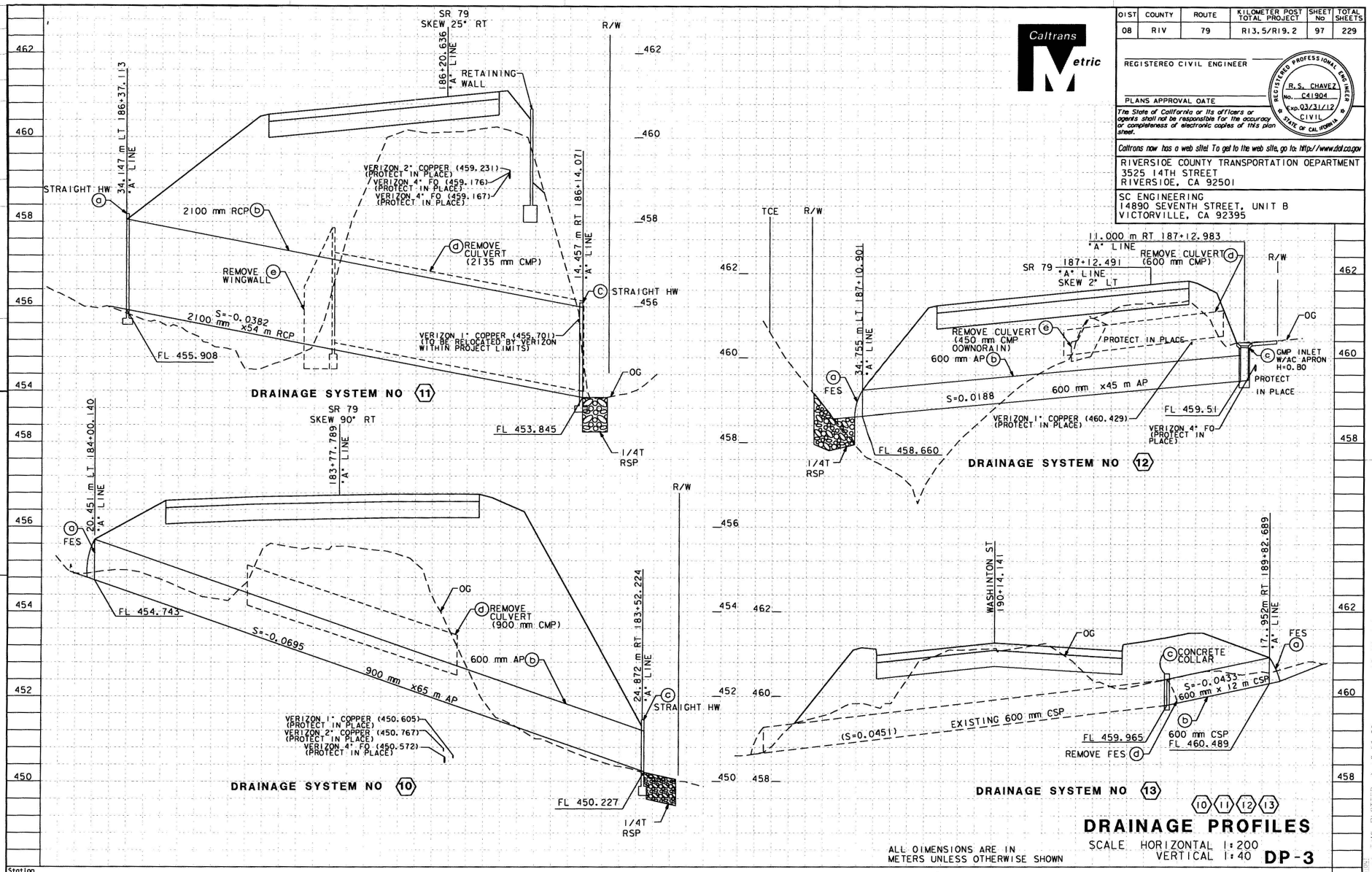
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395



10 11 12 13

DRAINAGE PROFILES

SCALE HORIZONTAL 1:200
VERTICAL 1:40

DP-3

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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DATE REVISED BY
DATE REVISED

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SHEET TOTAL

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

CU 08224 EA 464621

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	98	229

Caltrans Metric

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER R.S. CHAVEZ No. C41904 Exp. 03/31/12 CIVIL STATE OF CALIFORNIA

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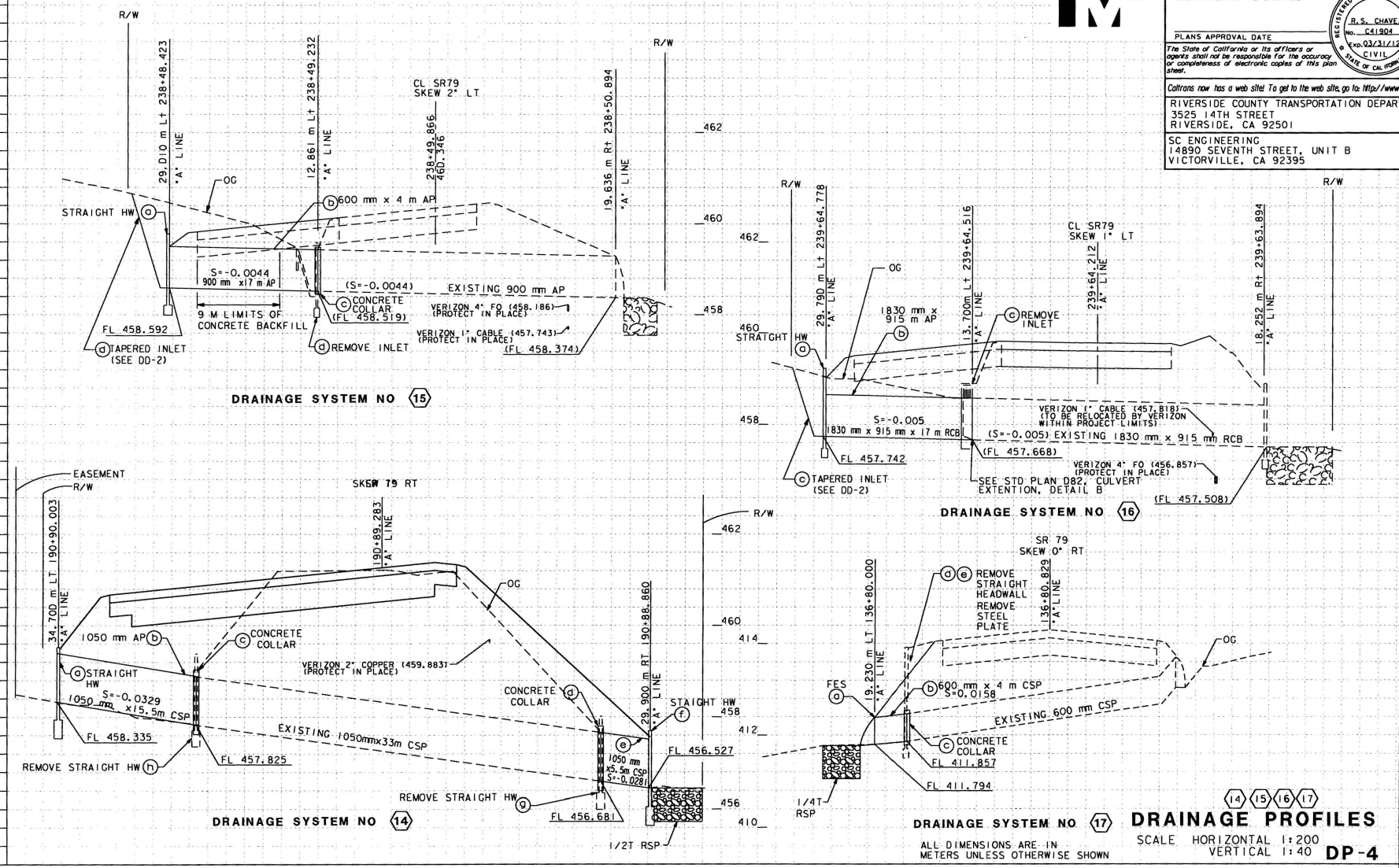
VICTORVILLE, CA 92395



ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DRAINAGE PROFILES

SCALE HORIZONTAL 1:200
VERTICAL 1:40

DP-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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DATE REVISED

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SHEET TOTAL

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

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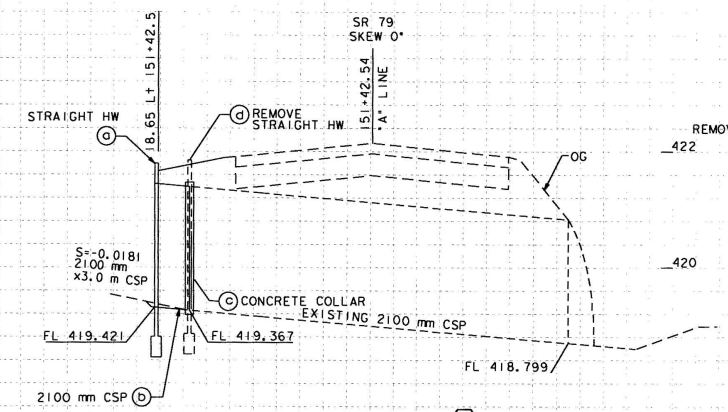
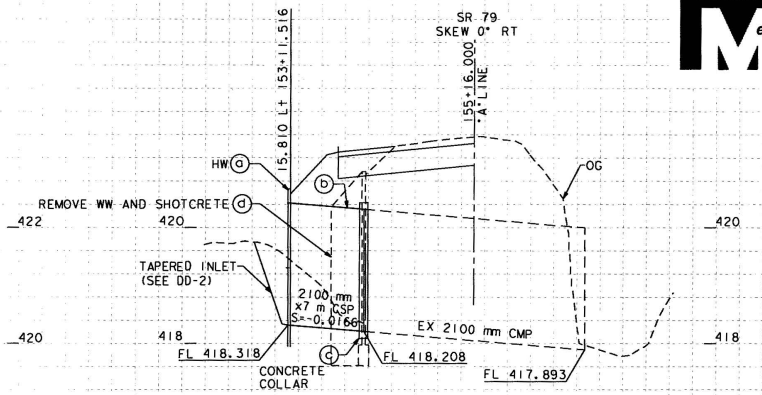
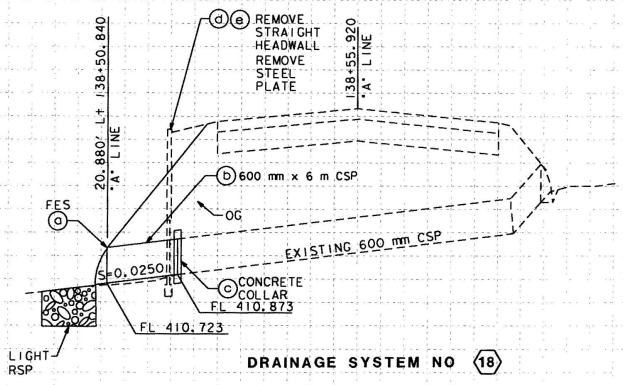


DRAINAGE SYSTEM NO (19)



DRAINAGE SYSTEM NO (20)



DRAINAGE SYSTEM NO (18)

(18) (19) (20)

DRAINAGE PROFILES

SCALE HORIZONTAL 1:200
VERTICAL 1:40

DP-5

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	RIV	79	R13.5/R19.2	99	229

REGISTERED CIVIL ENGINEER

R. S. CHAVEZ No. C41904 Exp. 03/31/12 CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

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RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT
3525 14TH STREET
RIVERSIDE, CA 92501

SC ENGINEERING
14890 SEVENTH STREET, UNIT B
VICTORVILLE, CA 92395

DATE REVISED BY | DATE REVISED
CALCULATED/DESIGNED BY J. DAVIS | R.S. CHAVEZ
CHECKED BY

DESIGN OVERSIGHT JON BUMPS

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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ATTACHMENT B:

DEVELOPED CONDITION - RATIONAL METHOD HYDROLOGY

100-YEAR STORM WITHOUT DETENTION BASIN OUTFLOWS

Rational Methods Hydrology
Proposed Conditions
Without Detention Basins
100-year and 10-year storm

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
       Rational Hydrology Study        Date: 04/25/24  File:907q100.out
------------------------------------------------------------------------

Keller Crossing - Tract 38163
Hydrology Proposed Condition
Main Line Without Detention Basin
100-year storm



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

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

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


Program License Serial Number 4029

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

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

2 year, 1 hour precipitation =  0.500(In.)
100 year, 1 hour precipitation =  1.200(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5500
```

DRAINAGE AREA C

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   640.000(Ft.)
Top (of initial area) elevation =  1558.000(Ft.)
Bottom (of initial area) elevation =  1528.000(Ft.)
Difference in elevation =    30.000(Ft.)
Slope =    0.04688  s(percent)=       4.69
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.959 min.
Rainfall intensity =      2.788(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
```

```
RI index for soil(AMC 3)  =  95.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     22.516(CFS)
Total initial stream area =        9.200(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      308.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1528.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =  1650.000(Ft.)
Estimated mean flow rate at midpoint of channel =     59.471(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0291
Corrected/adjusted channel slope =  0.0291
Travel time =    3.96 min.     TC =   16.92  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  94.52
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.407(In/Hr) for a   100.0 year storm
Subarea runoff =     63.397(CFS) for     30.200(Ac.)
Total runoff =     85.913(CFS)   Total area =      39.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     39.400(Ac.)
Runoff from this stream =     85.913(CFS)
Time of concentration =   16.92 min.
Rainfall intensity =     2.407(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   500.000(Ft.)
Top (of initial area) elevation =  1574.000(Ft.)
Bottom (of initial area) elevation =  1532.000(Ft.)
Difference in elevation =    42.000(Ft.)
```

```
Slope =    0.08400  s(percent)=       8.40
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.447 min.
Rainfall intensity =      3.138(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.852(CFS)
Total initial stream area =        5.000(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1532.000(Ft.)
End of natural channel elevation =   1486.000(Ft.)
Length of natural channel  =  1580.000(Ft.)
Estimated mean flow rate at midpoint of channel =     36.569(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.04(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0291
Corrected/adjusted channel slope =  0.0291
Travel time =    4.36 min.     TC =   14.81  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 3)  =  95.12
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.591(In/Hr) for a   100.0 year storm
Subarea runoff =     37.254(CFS) for     16.400(Ac.)
Total runoff =     51.106(CFS)   Total area =      21.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      307.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.400(Ac.)
Runoff from this stream =     51.106(CFS)
Time of concentration =   14.81 min.
Rainfall intensity =     2.591(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      306.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   420.000(Ft.)
Top (of initial area) elevation =  1554.000(Ft.)
Bottom (of initial area) elevation =  1523.000(Ft.)
Difference in elevation =    31.000(Ft.)
Slope =    0.07381  s(percent)=       7.38
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.999 min.
Rainfall intensity =      3.215(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     17.888(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1523.000(Ft.)
End of natural channel elevation =   1486.000(Ft.)
Length of natural channel  =  1640.000(Ft.)
Estimated mean flow rate at midpoint of channel =     52.528(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.90(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0226
Corrected/adjusted channel slope =  0.0226
Travel time =    4.64 min.     TC =   14.63  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  95.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.607(In/Hr) for a   100.0 year storm
Subarea runoff =     55.759(CFS) for     24.400(Ac.)
Total runoff =     73.647(CFS)   Total area =      30.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
_____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     30.700(Ac.)
Runoff from this stream =     73.647(CFS)
Time of concentration =   14.63 min.
Rainfall intensity =     2.607(In/Hr)
Summary of stream data:

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


1       51.106     14.81                2.591
2       73.647     14.63                2.607
Largest stream flow has longer or shorter time of concentration
Qp =     73.647 + sum of
         Qa          Tb/Ta
         51.106 *    0.988 =     50.509
Qp =    124.155

Total of 2 streams to confluence:
Flow rates before confluence point:
      51.106      73.647
Area of streams before confluence:
       21.400       30.700
Results of confluence:
Total flow rate =    124.155(CFS)
Time of concentration =    14.634 min.
Effective stream area after confluence =     52.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      308.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =   1486.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =   330.000(Ft.)
Estimated mean flow rate at midpoint of channel =    128.087(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.90(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0182
Corrected/adjusted channel slope =  0.0182
Travel time =    0.80 min.     TC =   15.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.700
Decimal fraction soil group D = 0.300
RI index for soil(AMC 3)  =  94.76
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.532(In/Hr) for a   100.0 year storm
Subarea runoff =      7.309(CFS) for      3.300(Ac.)
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Total runoff =    131.464(CFS)    Total area =      55.400(Ac.)


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Process from Point/Station      307.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     55.400(Ac.)
Runoff from this stream =    131.464(CFS)
Time of concentration =   15.43 min.
Rainfall intensity =     2.532(In/Hr)
Summary of stream data:

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


1       85.913     16.92            2.407
2      131.464     15.43            2.532
Largest stream flow has longer or shorter time of concentration
Qp =    131.464 + sum of
         Qa          Tb/Ta
         85.913 *    0.912 =     78.354
Qp =    209.818

Total of 2 main streams to confluence:
Flow rates before confluence point:
      85.913     131.464
Area of streams before confluence:
       39.400       55.400


Results of confluence:
Total flow rate =    209.818(CFS)
Time of concentration =    15.431 min.
Effective stream area after confluence  =     94.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      308.000 to Point/Station      311.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1480.000(Ft.)
End of natural channel elevation =   1452.000(Ft.)
Length of natural channel  =  1520.000(Ft.)
Estimated mean flow rate at midpoint of channel =    256.076(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.60(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0184
Corrected/adjusted channel slope =  0.0184
Travel time =    2.95 min.     TC =   18.38  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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Runoff Coefficient = 0.871
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  94.52
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.300(In/Hr) for a   100.0 year storm
Subarea runoff =     83.726(CFS) for     41.800(Ac.)
Total runoff =    293.545(CFS)   Total area =     136.600(Ac.)


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Process from Point/Station      308.000 to Point/Station      311.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    136.600(Ac.)
Runoff from this stream =    293.545(CFS)
Time of concentration =   18.38 min.
Rainfall intensity =     2.300(In/Hr)


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Process from Point/Station      309.000 to Point/Station      310.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   650.000(Ft.)
Top (of initial area) elevation =  1806.000(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =   192.000(Ft.)
Slope =    0.29538  s(percent)=      29.54
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.023 min.
Rainfall intensity =      3.402(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
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
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     22.740(CFS)
Total initial stream area =        7.600(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      310.000 to Point/Station      311.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1614.000(Ft.)
End of natural channel elevation =   1452.000(Ft.)
Length of natural channel  =  1980.000(Ft.)
Estimated mean flow rate at midpoint of channel =     95.747(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  13.40(Ft/s)

Correction to map slope used on extremely rugged channels with
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drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0818
Corrected/adjusted channel slope =  0.0818
Travel time =    2.46 min.     TC =   11.49  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.090
Decimal fraction soil group D = 0.860
RI index for soil(AMC 3)  =  95.27
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.979(In/Hr) for a   100.0 year storm
Subarea runoff =    127.997(CFS) for     48.800(Ac.)
Total runoff =    150.737(CFS)   Total area =      56.400(Ac.)


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Process from Point/Station      310.000 to Point/Station      311.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     56.400(Ac.)
Runoff from this stream =    150.737(CFS)
Time of concentration =   11.49 min.
Rainfall intensity =     2.979(In/Hr)
Summary of stream data:

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


1      293.545     18.38                2.300
2      150.737     11.49                2.979
Largest stream flow has longer time of concentration
Qp =    293.545 + sum of
         Qb         Ia/Ib
        150.737 *    0.772 =    116.396
Qp =    409.941

Total of 2 streams to confluence:
Flow rates before confluence point:
     293.545     150.737
Area of streams before confluence:
      136.600       56.400
Results of confluence:
Total flow rate =    409.941(CFS)
Time of concentration =    18.378 min.
Effective stream area after confluence =    193.000(Ac.)


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Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1452.000(Ft.)
End of natural channel elevation =   1443.000(Ft.)
Length of natural channel  =   475.000(Ft.)
Estimated mean flow rate at midpoint of channel =    422.260(CFS)
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Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0189
Corrected/adjusted channel slope =  0.0189
Travel time =    0.78 min.     TC =   19.15  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.750
RI index for soil(AMC 3)  =  94.98
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.249(In/Hr) for a   100.0 year storm
Subarea runoff =     22.763(CFS) for     11.600(Ac.)
Total runoff =    432.704(CFS)   Total area =     204.600(Ac.)


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Process from Point/Station      312.000 to Point/Station      313.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Covered channel
Upstream point elevation =  1443.000(Ft.)
Downstream point elevation =  1436.000(Ft.)
Channel length thru subarea  =   305.000(Ft.)
Channel base width  =    8.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =    437.459(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =    437.459(CFS)
Depth of flow =   1.841(Ft.), Average velocity =  17.575(Ft/s)
Channel flow top width =   19.044(Ft.)
Flow Velocity =   17.58(Ft/s)
Travel time  =    0.29 min.
Time of concentration =   19.44 min.

Sub-Channel No. 1 Critical depth =      3.125(Ft.)
  '     '       '     Critical flow top width =     26.750(Ft.)
  '     '       '     Critical flow velocity=    8.057(Ft/s)
  '     '       '     Critical flow area =     54.297(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.829
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
RI index for soil(AMC 3)  =  87.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.230(In/Hr) for a   100.0 year storm
Subarea runoff =      9.424(CFS) for      5.100(Ac.)
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Total runoff =    442.128(CFS)   Total area =     209.700(Ac.)
Depth of flow =   1.851(Ft.), Average velocity =  17.627(Ft/s)

Sub-Channel No. 1 Critical depth =      3.125(Ft.)
  '     '       '     Critical flow top width =     26.750(Ft.)
  '     '       '     Critical flow velocity=    8.143(Ft/s)
  '     '       '     Critical flow area =     54.297(Sq.Ft)



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Process from Point/Station      313.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =   210.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   442.128(CFS)
Nearest computed pipe diameter  =     69.00(In.)
Calculated individual pipe flow  =   442.128(CFS)
Normal flow depth in pipe =   55.22(In.)
Flow top width inside pipe =   55.17(In.)
Critical Depth =   64.96(In.)
Pipe flow velocity =     19.83(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    19.62 min.


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Process from Point/Station      313.000 to Point/Station      314.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.869
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
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    19.62 min.
Rainfall intensity =      2.219(In/Hr) for a   100.0 year storm
Subarea runoff =      1.736(CFS) for      0.900(Ac.)
Total runoff =    443.864(CFS)   Total area =     210.600(Ac.)


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Process from Point/Station      314.000 to Point/Station      315.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1433.000(Ft.)
End of natural channel elevation =   1420.000(Ft.)
Length of natural channel  =  1032.000(Ft.)
Estimated mean flow rate at midpoint of channel =    448.079(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.49(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0126
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Corrected/adjusted channel slope =  0.0126
Travel time =    2.03 min.     TC =   21.65  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.867
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
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.102(In/Hr) for a   100.0 year storm
Subarea runoff =      7.294(CFS) for      4.000(Ac.)
Total runoff =    451.158(CFS)   Total area =     214.600(Ac.)


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Process from Point/Station      316.000 to Point/Station      317.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1504.100(Ft.)
Bottom (of initial area) elevation =  1488.800(Ft.)
Difference in elevation =    15.300(Ft.)
Slope =    0.01530  s(percent)=       1.53
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.529 min.
Rainfall intensity =      2.723(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     11.264(CFS)
Total initial stream area =        4.700(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      317.000 to Point/Station      318.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1482.000(Ft.)
Downstream point/station elevation =  1476.000(Ft.)
Pipe length  =   305.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.264(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    11.264(CFS)
Normal flow depth in pipe =   11.79(In.)
Flow top width inside pipe =   17.11(In.)
Critical Depth =   15.40(In.)
Pipe flow velocity =      9.18(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =    14.08 min.


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Process from Point/Station      317.000 to Point/Station      318.000
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**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  86.86
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.08 min.
Rainfall intensity =      2.663(In/Hr) for a   100.0 year storm
Subarea runoff =      6.546(CFS) for      2.800(Ac.)
Total runoff =     17.810(CFS)   Total area =       7.500(Ac.)


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Process from Point/Station      318.000 to Point/Station      319.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1476.000(Ft.)
Downstream point/station elevation =  1475.000(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.810(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    17.810(CFS)
Normal flow depth in pipe =   13.92(In.)
Flow top width inside pipe =   15.07(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.14(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    14.12 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      318.000 to Point/Station      319.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.800
RI index for soil(AMC 3)  =  85.72
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.12 min.
Rainfall intensity =      2.659(In/Hr) for a   100.0 year storm
Subarea runoff =      8.382(CFS) for      3.600(Ac.)
Total runoff =     26.191(CFS)   Total area =      11.100(Ac.)


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Process from Point/Station      319.000 to Point/Station      320.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1475.000(Ft.)
Downstream point/station elevation =  1469.000(Ft.)
Pipe length  =   415.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.191(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    26.191(CFS)
Normal flow depth in pipe =   18.91(In.)
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Flow top width inside pipe =   19.62(In.)
Critical Depth =   21.49(In.)
Pipe flow velocity =      9.86(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    14.83 min.


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Process from Point/Station      319.000 to Point/Station      320.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.873
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.83 min.
Rainfall intensity =      2.589(In/Hr) for a   100.0 year storm
Subarea runoff =      5.422(CFS) for      2.400(Ac.)
Total runoff =     31.613(CFS)   Total area =      13.500(Ac.)


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Process from Point/Station      320.000 to Point/Station      321.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1469.000(Ft.)
Downstream point/station elevation =  1465.000(Ft.)
Pipe length  =   257.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.613(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    31.613(CFS)
Normal flow depth in pipe =   18.56(In.)
Flow top width inside pipe =   25.03(In.)
Critical Depth =   23.27(In.)
Pipe flow velocity =     10.84(Ft/s)
Travel time through pipe =    0.40 min.
Time of concentration (TC) =    15.22 min.


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Process from Point/Station      320.000 to Point/Station      321.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.872
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.22 min.
Rainfall intensity =      2.552(In/Hr) for a   100.0 year storm
Subarea runoff =      8.680(CFS) for      3.900(Ac.)
Total runoff =     40.293(CFS)   Total area =      17.400(Ac.)


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Process from Point/Station      321.000 to Point/Station      322.000
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =  1465.000(Ft.)
Downstream point/station elevation =  1453.000(Ft.)
Pipe length  =   275.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.293(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    40.293(CFS)
Normal flow depth in pipe =   17.04(In.)
Flow top width inside pipe =   21.78(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.89(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    15.49 min.


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Process from Point/Station      321.000 to Point/Station      322.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.872
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.49 min.
Rainfall intensity =      2.527(In/Hr) for a   100.0 year storm
Subarea runoff =      5.288(CFS) for      2.400(Ac.)
Total runoff =     45.581(CFS)   Total area =      19.800(Ac.)


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Process from Point/Station      322.000 to Point/Station      323.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =  1453.000(Ft.)
Downstream point/station elevation =  1448.000(Ft.)
Pipe length  =   263.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    45.581(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    45.581(CFS)
Normal flow depth in pipe =   20.41(In.)
Flow top width inside pipe =   27.98(In.)
Critical Depth =   26.84(In.)
Pipe flow velocity =     12.82(Ft/s)
Travel time through pipe =    0.34 min.
Time of concentration (TC) =    15.83 min.


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Process from Point/Station      322.000 to Point/Station      323.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.872
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
RI index for soil(AMC 3)  =  84.40
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Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.83 min.
Rainfall intensity =      2.497(In/Hr) for a   100.0 year storm
Subarea runoff =      5.223(CFS) for      2.400(Ac.)
Total runoff =     50.805(CFS)    Total area =      22.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1448.000(Ft.)
Downstream point/station elevation =  1446.000(Ft.)
Pipe length  =    51.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.805(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    50.805(CFS)
Normal flow depth in pipe =   18.75(In.)
Flow top width inside pipe =   24.87(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.24(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    15.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  86.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.88 min.
Rainfall intensity =      2.492(In/Hr) for a   100.0 year storm
Subarea runoff =     11.561(CFS) for      5.300(Ac.)
Total runoff =     62.366(CFS)    Total area =      27.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1446.000(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =   165.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    62.366(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    62.366(CFS)
Normal flow depth in pipe =   17.93(In.)
Flow top width inside pipe =   25.51(In.)
Critical depth could not be calculated.
Pipe flow velocity =     22.24(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    16.01 min.


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Process from Point/Station      324.000 to Point/Station      325.000
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**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
APARTMENT subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 3)  =  86.56
Pervious area fraction =  0.200; Impervious fraction =  0.800
Time of concentration =    16.01 min.
Rainfall intensity =      2.482(In/Hr) for a   100.0 year storm
Subarea runoff =      7.038(CFS) for      3.200(Ac.)
Total runoff =     69.404(CFS)   Total area =      30.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      326.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =   100.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    69.404(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    69.404(CFS)
Normal flow depth in pipe =   25.13(In.)
Flow top width inside pipe =   28.13(In.)
Critical Depth =   31.01(In.)
Pipe flow velocity =     14.30(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    16.12 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      326.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.893
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 3)  =  86.92
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.12 min.
Rainfall intensity =      2.472(In/Hr) for a   100.0 year storm
Subarea runoff =      7.508(CFS) for      3.400(Ac.)
Total runoff =     76.911(CFS)   Total area =      34.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      326.000 to Point/Station      327.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1429.000(Ft.)
Pipe length  =   114.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    76.911(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    76.911(CFS)
Normal flow depth in pipe =   24.61(In.)
```

```
Flow top width inside pipe =   23.04(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.84(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    16.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      326.000 to Point/Station      327.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  86.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    16.23 min.
Rainfall intensity =      2.463(In/Hr) for a   100.0 year storm
Subarea runoff =     13.145(CFS) for      6.100(Ac.)
Total runoff =     90.056(CFS)   Total area =      40.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      327.000 to Point/Station      328.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1429.000(Ft.)
Downstream point elevation =  1423.000(Ft.)
Channel length thru subarea  =   474.000(Ft.)
Channel base width  =  105.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     95.121(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =     95.121(CFS)
Depth of flow =   0.263(Ft.), Average velocity =   3.415(Ft/s)
Channel flow top width =  106.580(Ft.)
Flow Velocity =    3.42(Ft/s)
Travel time  =    2.31 min.
Time of concentration =   18.54 min.

Sub-Channel No. 1 Critical depth =      0.293(Ft.)
  '     '       '     Critical flow top width =    106.758(Ft.)
  '     '       '     Critical flow velocity=    3.067(Ft/s)
  '     '       '     Critical flow area =     31.019(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.830
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
RI index for soil(AMC 3)  =  87.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.289(In/Hr) for a   100.0 year storm
Subarea runoff =     10.073(CFS) for      5.300(Ac.)
Total runoff =    100.129(CFS)   Total area =      45.500(Ac.)
Depth of flow =   0.272(Ft.), Average velocity =   3.485(Ft/s)
```

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Sub-Channel No. 1 Critical depth =      0.305(Ft.)
  '     '       '     Critical flow top width =    106.828(Ft.)
  '     '       '     Critical flow velocity=    3.103(Ft/s)
  '     '       '     Critical flow area =     32.271(Sq.Ft)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     45.500(Ac.)
Runoff from this stream =    100.129(CFS)
Time of concentration =   18.54 min.
Rainfall intensity =     2.289(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      329.000 to Point/Station      330.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   880.000(Ft.)
Top (of initial area) elevation =  1492.000(Ft.)
Bottom (of initial area) elevation =  1465.000(Ft.)
Difference in elevation =    27.000(Ft.)
Slope =    0.03068  s(percent)=       3.07
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.185 min.
Rainfall intensity =      3.023(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.200
RI index for soil(AMC 3)  =  85.12
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      9.814(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      330.000 to Point/Station      331.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1459.000(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =   437.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.814(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.814(CFS)
Normal flow depth in pipe =   10.58(In.)
Flow top width inside pipe =   17.72(In.)
Critical Depth =   14.50(In.)
Pipe flow velocity =      9.08(Ft/s)
Travel time through pipe =    0.80 min.
Time of concentration (TC) =    11.99 min.
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Process from Point/Station      330.000 to Point/Station      331.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  95.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.99 min.
Rainfall intensity =      2.910(In/Hr) for a   100.0 year storm
Subarea runoff =     19.180(CFS) for      7.500(Ac.)
Total runoff =     28.994(CFS)   Total area =      11.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      331.000 to Point/Station      332.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1450.000(Ft.)
Downstream point/station elevation =  1447.000(Ft.)
Pipe length  =   125.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.994(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    28.994(CFS)
Normal flow depth in pipe =   16.64(In.)
Flow top width inside pipe =   22.13(In.)
Critical Depth =   22.14(In.)
Pipe flow velocity =     12.47(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    12.15 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      332.000 to Point/Station      332.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     11.200(Ac.)
Runoff from this stream =     28.994(CFS)
Time of concentration =   12.15 min.
Rainfall intensity =     2.888(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      333.000 to Point/Station      334.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   676.000(Ft.)
Top (of initial area) elevation =  1473.000(Ft.)
Bottom (of initial area) elevation =  1460.000(Ft.)
Difference in elevation =    13.000(Ft.)
Slope =    0.01923  s(percent)=       1.92
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.050 min.
Rainfall intensity =      3.043(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
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```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  86.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      9.901(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      334.000 to Point/Station      335.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1454.000(Ft.)
Downstream point/station elevation =  1449.000(Ft.)
Pipe length  =   236.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.901(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.901(CFS)
Normal flow depth in pipe =   10.55(In.)
Flow top width inside pipe =   17.73(In.)
Critical Depth =   14.55(In.)
Pipe flow velocity =      9.20(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    11.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      334.000 to Point/Station      335.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 3)  =  86.92
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    11.48 min.
Rainfall intensity =      2.980(In/Hr) for a   100.0 year storm
Subarea runoff =      7.607(CFS) for      2.900(Ac.)
Total runoff =     17.507(CFS)   Total area =       6.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      335.000 to Point/Station      332.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1449.000(Ft.)
Downstream point/station elevation =  1447.000(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.507(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    17.507(CFS)
Normal flow depth in pipe =   12.07(In.)
Flow top width inside pipe =   16.92(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.89(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    11.53 min.
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Process from Point/Station      332.000 to Point/Station      332.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      6.600(Ac.)
Runoff from this stream =     17.507(CFS)
Time of concentration =   11.53 min.
Rainfall intensity =     2.972(In/Hr)
Summary of stream data:

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


1       28.994     12.15                2.888
2       17.507     11.53                2.972
Largest stream flow has longer time of concentration
Qp =     28.994 + sum of
         Qb         Ia/Ib
         17.507 *    0.972 =     17.009
Qp =     46.003

Total of 2 streams to confluence:
Flow rates before confluence point:
      28.994      17.507
Area of streams before confluence:
       11.200        6.600
Results of confluence:
Total flow rate =     46.003(CFS)
Time of concentration =    12.153 min.
Effective stream area after confluence =     17.800(Ac.)


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Process from Point/Station      332.000 to Point/Station      336.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1447.000(Ft.)
Downstream point/station elevation =  1444.000(Ft.)
Pipe length  =   124.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    46.003(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    46.003(CFS)
Normal flow depth in pipe =   21.09(In.)
Flow top width inside pipe =   22.32(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.79(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    12.30 min.


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Process from Point/Station      332.000 to Point/Station      336.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
```

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RI index for soil(AMC 3)  =  86.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    12.30 min.
Rainfall intensity =      2.868(In/Hr) for a   100.0 year storm
Subarea runoff =      8.817(CFS) for      3.500(Ac.)
Total runoff =     54.820(CFS)    Total area =      21.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      336.000 to Point/Station      337.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1444.000(Ft.)
Downstream point/station elevation =  1437.000(Ft.)
Pipe length  =   539.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    54.820(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    54.820(CFS)
Normal flow depth in pipe =   24.70(In.)
Flow top width inside pipe =   28.63(In.)
Critical Depth =   28.95(In.)
Pipe flow velocity =     11.50(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    13.08 min.


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Process from Point/Station      336.000 to Point/Station      337.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.893
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.08 min.
Rainfall intensity =      2.773(In/Hr) for a   100.0 year storm
Subarea runoff =      7.426(CFS) for      3.000(Ac.)
Total runoff =     62.246(CFS)    Total area =      24.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      337.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1437.000(Ft.)
Downstream point/station elevation =  1423.000(Ft.)
Pipe length  =   512.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    62.246(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    62.246(CFS)
Normal flow depth in pipe =   22.64(In.)
Flow top width inside pipe =   25.82(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.67(Ft/s)
Travel time through pipe =    0.54 min.
Time of concentration (TC) =    13.63 min.


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Process from Point/Station      337.000 to Point/Station      328.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     24.300(Ac.)
Runoff from this stream =     62.246(CFS)
Time of concentration =   13.63 min.
Rainfall intensity =     2.712(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      338.000 to Point/Station      339.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   705.000(Ft.)
Top (of initial area) elevation =  1463.000(Ft.)
Bottom (of initial area) elevation =  1455.000(Ft.)
Difference in elevation =     8.000(Ft.)
Slope =    0.01135  s(percent)=       1.13
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.902 min.
Rainfall intensity =      3.066(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  87.64
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     17.727(CFS)
Total initial stream area =        6.500(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      339.000 to Point/Station      340.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =  1455.000(Ft.)
Downstream point elevation =  1446.000(Ft.)
Channel length thru subarea  =   916.000(Ft.)
Channel base width  =   20.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   0.020
Estimated mean flow rate at midpoint of channel =     31.257(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     31.257(CFS)
Depth of flow =   0.336(Ft.), Average velocity =   4.646(Ft/s)
Channel flow top width =   20.013(Ft.)
Flow Velocity =    4.65(Ft/s)
Travel time  =    3.29 min.
Time of concentration =   14.19 min.

Sub-Channel No. 1 Critical depth =      0.422(Ft.)
  '     '       '     Critical flow top width =     20.017(Ft.)
  '     '       '     Critical flow velocity=    3.703(Ft/s)
  '     '       '     Critical flow area =      8.441(Sq.Ft)

 Adding area flow to channel
```

```
APARTMENT subarea type
Runoff Coefficient = 0.885
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.200; Impervious fraction =  0.800
Rainfall intensity =      2.652(In/Hr) for a   100.0 year storm
Subarea runoff =     26.984(CFS) for     11.500(Ac.)
Total runoff =     44.711(CFS)   Total area =      18.000(Ac.)
Depth of flow =   0.418(Ft.), Average velocity =   5.344(Ft/s)

Sub-Channel No. 1 Critical depth =      0.539(Ft.)
  '     '       '     Critical flow top width =     20.020(Ft.)
  '     '       '     Critical flow velocity=    4.145(Ft/s)
  '     '       '     Critical flow area =     10.787(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      340.000 to Point/Station      341.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1440.000(Ft.)
Downstream point/station elevation =  1430.000(Ft.)
Pipe length  =   197.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    44.711(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    44.711(CFS)
Normal flow depth in pipe =   17.44(In.)
Flow top width inside pipe =   21.39(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.30(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    14.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      340.000 to Point/Station      341.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.892
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.37 min.
Rainfall intensity =      2.634(In/Hr) for a   100.0 year storm
Subarea runoff =      5.641(CFS) for      2.400(Ac.)
Total runoff =     50.352(CFS)   Total area =      20.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      341.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1430.000(Ft.)
Downstream point/station elevation =  1423.000(Ft.)
Pipe length  =   520.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    50.352(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    50.352(CFS)
Normal flow depth in pipe =   26.63(In.)
Flow top width inside pipe =   18.96(In.)
Critical Depth =   27.63(In.)
Pipe flow velocity =     10.94(Ft/s)
Travel time through pipe =    0.79 min.
Time of concentration (TC) =    15.16 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =     20.400(Ac.)
Runoff from this stream =     50.352(CFS)
Time of concentration =   15.16 min.
Rainfall intensity =     2.557(In/Hr)
Summary of stream data:

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


1      100.129     18.54           2.289
2       62.246     13.63           2.712
3       50.352     15.16           2.557
Largest stream flow has longer time of concentration
Qp =    100.129 + sum of
         Qb         Ia/Ib
         62.246 *    0.844 =     52.547
         Qb         Ia/Ib
         50.352 *    0.895 =     45.069
Qp =    197.745

Total of 3 main streams to confluence:
Flow rates before confluence point:
     100.129      62.246      50.352
Area of streams before confluence:
       45.500       24.300       20.400


Results of confluence:
Total flow rate =    197.745(CFS)
Time of concentration =    18.544 min.
Effective stream area after confluence  =     90.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      342.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1423.000(Ft.)
Downstream point/station elevation =  1422.400(Ft.)
Pipe length  =    73.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   197.745(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   197.745(CFS)
Normal flow depth in pipe =   44.81(In.)
Flow top width inside pipe =   46.74(In.)
```

```
Critical Depth =   48.41(In.)
Pipe flow velocity =     13.23(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    18.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      342.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.891
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.64 min.
Rainfall intensity =      2.283(In/Hr) for a   100.0 year storm
Subarea runoff =      4.272(CFS) for      2.100(Ac.)
Total runoff =    202.017(CFS)   Total area =      92.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      342.000 to Point/Station      315.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1422.400(Ft.)
Downstream point/station elevation =  1420.000(Ft.)
Pipe length  =   230.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   202.017(CFS)
Nearest computed pipe diameter  =     54.00(In.)
Calculated individual pipe flow  =   202.017(CFS)
Normal flow depth in pipe =   44.53(In.)
Flow top width inside pipe =   41.07(In.)
Critical Depth =   48.56(In.)
Pipe flow velocity =     14.40(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    18.90 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      315.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     92.300(Ac.)
Runoff from this stream =    202.017(CFS)
Time of concentration =   18.90 min.
Rainfall intensity =     2.265(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      315.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________________
Rainfall intensity =      2.102(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
User specified values are as follows:
TC =  21.65 min.  Rain intensity =       2.10(In/Hr)
Total area =       214.60(Ac.)  Total runoff =    451.16(CFS)


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Process from Point/Station      315.000 to Point/Station      315.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    214.600(Ac.)
Runoff from this stream =    451.160(CFS)
Time of concentration =   21.65 min.
Rainfall intensity =     2.102(In/Hr)
Summary of stream data:

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


1      202.017     18.90                 2.265
2      451.160     21.65                 2.102
Largest stream flow has longer time of concentration
Qp =    451.160 + sum of
         Qb         Ia/Ib
        202.017 *    0.928 =    187.486
Qp =    638.646

Total of 2 streams to confluence:
Flow rates before confluence point:
     202.017     451.160
Area of streams before confluence:
       92.300      214.600
Results of confluence:
Total flow rate =    638.646(CFS)
Time of concentration =    21.650 min.
Effective stream area after confluence =    306.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      343.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1420.000(Ft.)
End of natural channel elevation =   1409.000(Ft.)
Length of natural channel  =   605.000(Ft.)
Estimated mean flow rate at midpoint of channel =    644.369(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.46(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0182
Corrected/adjusted channel slope =  0.0182
Travel time =    0.88 min.     TC =   22.53  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  95.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.057(In/Hr) for a   100.0 year storm
Subarea runoff =      9.844(CFS) for      5.500(Ac.)
Total runoff =    648.490(CFS)   Total area =     312.400(Ac.)
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DRAINAGE AREA D

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   850.000(Ft.)
Top (of initial area) elevation =  1445.000(Ft.)
Bottom (of initial area) elevation =  1415.000(Ft.)
Difference in elevation =    30.000(Ft.)
Slope =    0.03529  s(percent)=       3.53
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.175 min.
Rainfall intensity =      2.885(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.700
RI index for soil(AMC 3)  =  86.14
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =     18.416(CFS)
Total initial stream area =        7.400(Ac.)
Pervious area fraction = 0.600
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DRAINAGE AREA E

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   560.000(Ft.)
Top (of initial area) elevation =  1448.000(Ft.)
Bottom (of initial area) elevation =  1422.000(Ft.)
Difference in elevation =    26.000(Ft.)
Slope =    0.04643  s(percent)=       4.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.967 min.
Rainfall intensity =      3.922(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
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```
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 3)  =  85.84
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.075(CFS)
Total initial stream area =        2.300(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      500.000 to Point/Station      501.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 3)  =  88.84
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     6.97 min.
Rainfall intensity =      3.922(In/Hr) for a   100.0 year storm
Subarea runoff =      2.370(CFS) for      0.700(Ac.)
Total runoff =     10.445(CFS)   Total area =       3.000(Ac.)
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DRAINAGE AREA F

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1586.000(Ft.)
Bottom (of initial area) elevation =  1504.000(Ft.)
Difference in elevation =    82.000(Ft.)
Slope =    0.08200  s(percent)=       8.20
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.852 min.
Rainfall intensity =      2.687(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     20.100(CFS)
Total initial stream area =        8.500(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1504.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =   795.000(Ft.)
Estimated mean flow rate at midpoint of channel =     40.081(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0302
Corrected/adjusted channel slope =  0.0302
Travel time =    2.10 min.     TC =   15.95  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.850
RI index for soil(AMC 3)  =  95.42
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.487(In/Hr) for a   100.0 year storm
Subarea runoff =     36.874(CFS) for     16.900(Ac.)
Total runoff =     56.974(CFS)   Total area =      25.400(Ac.)


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Process from Point/Station      602.000 to Point/Station      603.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1480.000(Ft.)
End of natural channel elevation =   1461.000(Ft.)
Length of natural channel  =  1162.000(Ft.)
Estimated mean flow rate at midpoint of channel =     71.554(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.49(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0164
Corrected/adjusted channel slope =  0.0164
Travel time =    3.52 min.     TC =   19.48  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.228(In/Hr) for a   100.0 year storm
Subarea runoff =     25.370(CFS) for     13.000(Ac.)
Total runoff =     82.344(CFS)   Total area =      38.400(Ac.)


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Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1458.000(Ft.)
Downstream point/station elevation =  1439.000(Ft.)
Pipe length  =   570.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    82.344(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    82.344(CFS)
Normal flow depth in pipe =   23.44(In.)
Flow top width inside pipe =   29.94(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.26(Ft/s)
Travel time through pipe =    0.52 min.
Time of concentration (TC) =    20.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1439.000(Ft.)
Downstream point elevation =  1434.000(Ft.)
Channel length thru subarea  =   315.000(Ft.)
Channel base width  =   65.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     84.954(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     84.954(CFS)
Depth of flow =   0.306(Ft.), Average velocity =   4.209(Ft/s)
Channel flow top width =   66.837(Ft.)
Flow Velocity =    4.21(Ft/s)
Travel time  =    1.25 min.
Time of concentration =   21.24 min.

Sub-Channel No. 1 Critical depth =      0.375(Ft.)
  '     '       '     Critical flow top width =     67.250(Ft.)
  '     '       '     Critical flow velocity=    3.426(Ft/s)
  '     '       '     Critical flow area =     24.797(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.836
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  89.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.124(In/Hr) for a   100.0 year storm
Subarea runoff =      5.153(CFS) for      2.900(Ac.)
Total runoff =     87.497(CFS)   Total area =      41.300(Ac.)
Depth of flow =   0.312(Ft.), Average velocity =   4.258(Ft/s)

Sub-Channel No. 1 Critical depth =      0.383(Ft.)
  '     '       '     Critical flow top width =     67.297(Ft.)
  '     '       '     Critical flow velocity=    3.455(Ft/s)
  '     '       '     Critical flow area =     25.322(Sq.Ft)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     41.300(Ac.)
Runoff from this stream =     87.497(CFS)
Time of concentration =   21.24 min.
Rainfall intensity =     2.124(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      607.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1504.100(Ft.)
Bottom (of initial area) elevation =  1462.000(Ft.)
Difference in elevation =    42.100(Ft.)
Slope =    0.04210  s(percent)=       4.21
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.050 min.
Rainfall intensity =      3.043(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 3)  =  86.92
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     19.293(CFS)
Total initial stream area =        7.200(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      607.000 to Point/Station      608.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1457.000(Ft.)
Downstream point/station elevation =  1453.000(Ft.)
Pipe length  =   285.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.293(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    19.293(CFS)
Normal flow depth in pipe =   17.77(In.)
Flow top width inside pipe =   15.16(In.)
Critical Depth =   18.98(In.)
Pipe flow velocity =      8.88(Ft/s)
Travel time through pipe =    0.53 min.
Time of concentration (TC) =    11.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      607.000 to Point/Station      608.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
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Decimal fraction soil group D = 0.600
RI index for soil(AMC 3)  =  86.56
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    11.58 min.
Rainfall intensity =      2.965(In/Hr) for a   100.0 year storm
Subarea runoff =     17.210(CFS) for      6.600(Ac.)
Total runoff =     36.503(CFS)   Total area =      13.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      609.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1453.000(Ft.)
Downstream point/station elevation =  1451.000(Ft.)
Pipe length  =   106.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    36.503(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    36.503(CFS)
Normal flow depth in pipe =   19.27(In.)
Flow top width inside pipe =   24.41(In.)
Critical Depth =   24.45(In.)
Pipe flow velocity =     12.03(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    11.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      609.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.73 min.
Rainfall intensity =      2.945(In/Hr) for a   100.0 year storm
Subarea runoff =      3.952(CFS) for      1.500(Ac.)
Total runoff =     40.455(CFS)   Total area =      15.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      609.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1451.000(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =    20.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.455(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    40.455(CFS)
Normal flow depth in pipe =   16.24(In.)
Flow top width inside pipe =   22.45(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.89(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    11.75 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      609.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.893
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
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.75 min.
Rainfall intensity =      2.942(In/Hr) for a   100.0 year storm
Subarea runoff =      2.365(CFS) for      0.900(Ac.)
Total runoff =     42.820(CFS)    Total area =      16.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1450.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =   570.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    42.820(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    42.820(CFS)
Normal flow depth in pipe =   18.70(In.)
Flow top width inside pipe =   24.91(In.)
Critical Depth =   25.49(In.)
Pipe flow velocity =     14.58(Ft/s)
Travel time through pipe =    0.65 min.
Time of concentration (TC) =    12.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     16.200(Ac.)
Runoff from this stream =     42.820(CFS)
Time of concentration =   12.40 min.
Rainfall intensity =     2.856(In/Hr)
Summary of stream data:

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


1       87.497     21.24                2.124
2       42.820     12.40                2.856
Largest stream flow has longer time of concentration
Qp =     87.497 + sum of
         Qb         Ia/Ib
         42.820 *    0.744 =     31.848
Qp =    119.345

Total of 2 streams to confluence:
Flow rates before confluence point:
      87.497      42.820
Area of streams before confluence:
```

```
       41.300       16.200
Results of confluence:
Total flow rate =    119.345(CFS)
Time of concentration =    21.243 min.
Effective stream area after confluence =     57.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      611.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1428.000(Ft.)
Pipe length  =   155.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   119.345(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   119.345(CFS)
Normal flow depth in pipe =   26.95(In.)
Flow top width inside pipe =   31.23(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.04(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    21.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      611.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 3)  =  86.92
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    21.37 min.
Rainfall intensity =      2.117(In/Hr) for a   100.0 year storm
Subarea runoff =      3.212(CFS) for      1.700(Ac.)
Total runoff =    122.556(CFS)   Total area =      59.200(Ac.)
```

DRAINAGE AREA G

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      700.000 to Point/Station      701.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   417.000(Ft.)
Top (of initial area) elevation =  1476.000(Ft.)
Bottom (of initial area) elevation =  1462.000(Ft.)
Difference in elevation =    14.000(Ft.)
Slope =    0.03357  s(percent)=       3.36
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.607 min.
Rainfall intensity =      4.038(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  87.64
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     19.176(CFS)
Total initial stream area =        5.300(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      702.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1456.000(Ft.)
Downstream point/station elevation =  1443.000(Ft.)
Pipe length  =   150.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.176(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    19.176(CFS)
Normal flow depth in pipe =   10.25(In.)
Flow top width inside pipe =   17.82(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.43(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     6.74 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      702.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  87.64
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     6.74 min.
Rainfall intensity =      3.993(In/Hr) for a   100.0 year storm
Subarea runoff =      6.082(CFS) for      1.700(Ac.)
Total runoff =     25.258(CFS)   Total area =       7.000(Ac.)
```

DRAINAGE AREA H

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      800.000 to Point/Station      801.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   980.000(Ft.)
Top (of initial area) elevation =  1612.000(Ft.)
Bottom (of initial area) elevation =  1486.000(Ft.)
Difference in elevation =   126.000(Ft.)
Slope =    0.12857  s(percent)=      12.86
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.558 min.
Rainfall intensity =      2.836(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 3)  =  95.12
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     16.451(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      801.000 to Point/Station      802.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1486.000(Ft.)
End of natural channel elevation =   1455.000(Ft.)
Length of natural channel  =  1180.000(Ft.)
Estimated mean flow rate at midpoint of channel =     34.896(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.66(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    3.47 min.     TC =   16.03  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  95.48
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.480(In/Hr) for a   100.0 year storm
Subarea runoff =     32.212(CFS) for     14.800(Ac.)
Total runoff =     48.662(CFS)   Total area =      21.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      802.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     21.400(Ac.)
Runoff from this stream =     48.662(CFS)
Time of concentration =   16.03 min.
Rainfall intensity =     2.480(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      800.000 to Point/Station      803.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   705.000(Ft.)
Top (of initial area) elevation =  1612.000(Ft.)
```

```
Bottom (of initial area) elevation =  1494.000(Ft.)
Difference in elevation =   118.000(Ft.)
Slope =    0.16738  s(percent)=      16.74
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.443 min.
Rainfall intensity =      3.139(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     24.386(CFS)
Total initial stream area =        8.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      804.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1494.000(Ft.)
End of natural channel elevation =   1481.000(Ft.)
Length of natural channel  =   460.000(Ft.)
Estimated mean flow rate at midpoint of channel =     43.645(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.26(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0283
Corrected/adjusted channel slope =  0.0283
Travel time =    1.23 min.     TC =   11.67  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.953(In/Hr) for a   100.0 year storm
Subarea runoff =     36.195(CFS) for     13.900(Ac.)
Total runoff =     60.580(CFS)   Total area =      22.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      802.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1481.000(Ft.)
End of natural channel elevation =   1455.000(Ft.)
Length of natural channel  =  1075.000(Ft.)
Estimated mean flow rate at midpoint of channel =     75.392(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0242
Corrected/adjusted channel slope =  0.0242
Travel time =    2.64 min.     TC =   14.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.640(In/Hr) for a   100.0 year storm
Subarea runoff =     25.774(CFS) for     11.100(Ac.)
Total runoff =     86.354(CFS)   Total area =      33.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      802.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     33.800(Ac.)
Runoff from this stream =     86.354(CFS)
Time of concentration =   14.31 min.
Rainfall intensity =     2.640(In/Hr)
Summary of stream data:

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


1       48.662     16.03                 2.480
2       86.354     14.31                 2.640
Largest stream flow has longer or shorter time of concentration
Qp =     86.354 + sum of
         Qa          Tb/Ta
         48.662 *    0.892 =     43.430
Qp =    129.785

Total of 2 streams to confluence:
Flow rates before confluence point:
      48.662      86.354
Area of streams before confluence:
       21.400       33.800
Results of confluence:
Total flow rate =    129.785(CFS)
Time of concentration =    14.308 min.
Effective stream area after confluence =     55.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      805.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
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```
Top of natural channel elevation =   1455.000(Ft.)
End of natural channel elevation =   1451.000(Ft.)
Length of natural channel  =   190.000(Ft.)
Estimated mean flow rate at midpoint of channel =    132.489(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.50(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0211
Corrected/adjusted channel slope =  0.0211
Travel time =    0.42 min.     TC =   14.73  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.200
RI index for soil(AMC 3)  =  94.64
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.598(In/Hr) for a   100.0 year storm
Subarea runoff =      5.226(CFS) for      2.300(Ac.)
Total runoff =    135.011(CFS)   Total area =      57.500(Ac.)
End of computations, total study area =          661.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.877
Area averaged RI index number =  84.1
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              Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
       Rational Hydrology Study        Date: 04/25/24  File:907q10.out
------------------------------------------------------------------------

Keller Crossing - Tract 38163
Hydrology Proposed Condition
Without Detention Basin
10-year storm



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

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

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


Program License Serial Number 4029

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

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.500(In.)
100 year, 1 hour precipitation =  1.200(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.788(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   640.000(Ft.)
Top (of initial area) elevation =  1558.000(Ft.)
Bottom (of initial area) elevation =  1528.000(Ft.)
Difference in elevation =    30.000(Ft.)
Slope =    0.04688  s(percent)=       4.69
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.959 min.
Rainfall intensity =      1.831(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
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Initial subarea runoff =     13.729(CFS)
Total initial stream area =        9.200(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      308.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1528.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =  1650.000(Ft.)
Estimated mean flow rate at midpoint of channel =     36.262(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.02(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0291
Corrected/adjusted channel slope =  0.0291
Travel time =    4.57 min.     TC =   17.52  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.792
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  86.30
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.551(In/Hr) for a    10.0 year storm
Subarea runoff =     37.083(CFS) for     30.200(Ac.)
Total runoff =     50.812(CFS)   Total area =      39.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     39.400(Ac.)
Runoff from this stream =     50.812(CFS)
Time of concentration =   17.52 min.
Rainfall intensity =     1.551(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   500.000(Ft.)
Top (of initial area) elevation =  1574.000(Ft.)
Bottom (of initial area) elevation =  1532.000(Ft.)
Difference in elevation =    42.000(Ft.)
Slope =    0.08400  s(percent)=       8.40
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   10.447 min.
Rainfall intensity =      2.061(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.587(CFS)
Total initial stream area =        5.000(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1532.000(Ft.)
End of natural channel elevation =   1486.000(Ft.)
Length of natural channel  =  1580.000(Ft.)
Estimated mean flow rate at midpoint of channel =     22.670(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.29(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0291
Corrected/adjusted channel slope =  0.0291
Travel time =    4.98 min.     TC =   15.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.810
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  87.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.663(In/Hr) for a    10.0 year storm
Subarea runoff =     22.089(CFS) for     16.400(Ac.)
Total runoff =     30.677(CFS)   Total area =      21.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      307.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.400(Ac.)
Runoff from this stream =     30.677(CFS)
Time of concentration =   15.43 min.
Rainfall intensity =     1.663(In/Hr)


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Process from Point/Station      305.000 to Point/Station      306.000
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**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =   420.000(Ft.)
Top (of initial area) elevation =  1554.000(Ft.)
Bottom (of initial area) elevation =  1523.000(Ft.)
Difference in elevation =    31.000(Ft.)
Slope =    0.07381  s(percent)=       7.38
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.999 min.
Rainfall intensity =      2.111(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     11.104(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________
Top of natural channel elevation =   1523.000(Ft.)
End of natural channel elevation =   1486.000(Ft.)
Length of natural channel  =  1640.000(Ft.)
Estimated mean flow rate at midpoint of channel =     32.606(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0226
Corrected/adjusted channel slope =  0.0226
Travel time =    5.31 min.     TC =   15.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.670(In/Hr) for a    10.0 year storm
Subarea runoff =     32.925(CFS) for     24.400(Ac.)
Total runoff =     44.029(CFS)   Total area =      30.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
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```
Stream flow area =     30.700(Ac.)
Runoff from this stream =     44.029(CFS)
Time of concentration =   15.31 min.
Rainfall intensity =     1.670(In/Hr)
Summary of stream data:

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


1       30.677     15.43                1.663
2       44.029     15.31                1.670
Largest stream flow has longer or shorter time of concentration
Qp =     44.029 + sum of
         Qa          Tb/Ta
         30.677 *    0.992 =     30.443
Qp =     74.471

Total of 2 streams to confluence:
Flow rates before confluence point:
      30.677      44.029
Area of streams before confluence:
       21.400       30.700
Results of confluence:
Total flow rate =     74.471(CFS)
Time of concentration =    15.308 min.
Effective stream area after confluence =     52.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      308.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1486.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =   330.000(Ft.)
Estimated mean flow rate at midpoint of channel =     76.830(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.92(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0182
Corrected/adjusted channel slope =  0.0182
Travel time =    0.93 min.     TC =   16.24  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.700
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  86.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.617(In/Hr) for a    10.0 year storm
Subarea runoff =      4.272(CFS) for      3.300(Ac.)
Total runoff =     78.743(CFS)   Total area =      55.400(Ac.)
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Process from Point/Station      307.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     55.400(Ac.)
Runoff from this stream =     78.743(CFS)
Time of concentration =   16.24 min.
Rainfall intensity =     1.617(In/Hr)
Summary of stream data:

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


1       50.812     17.52            1.551
2       78.743     16.24            1.617
Largest stream flow has longer or shorter time of concentration
Qp =     78.743 + sum of
         Qa          Tb/Ta
         50.812 *    0.927 =     47.082
Qp =    125.825

Total of 2 main streams to confluence:
Flow rates before confluence point:
      50.812      78.743
Area of streams before confluence:
       39.400       55.400


Results of confluence:
Total flow rate =    125.825(CFS)
Time of concentration =    16.238 min.
Effective stream area after confluence  =     94.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      308.000 to Point/Station      311.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =   1480.000(Ft.)
End of natural channel elevation =   1452.000(Ft.)
Length of natural channel  =  1520.000(Ft.)
Estimated mean flow rate at midpoint of channel =    153.565(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.34(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0184
Corrected/adjusted channel slope =  0.0184
Travel time =    3.45 min.     TC =   19.69  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.786
Decimal fraction soil group A = 0.000
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Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  86.30
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.454(In/Hr) for a    10.0 year storm
Subarea runoff =     47.761(CFS) for     41.800(Ac.)
Total runoff =    173.585(CFS)   Total area =     136.600(Ac.)


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Process from Point/Station      308.000 to Point/Station      311.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    136.600(Ac.)
Runoff from this stream =    173.585(CFS)
Time of concentration =   19.69 min.
Rainfall intensity =     1.454(In/Hr)


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Process from Point/Station      309.000 to Point/Station      310.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   650.000(Ft.)
Top (of initial area) elevation =  1806.000(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =   192.000(Ft.)
Slope =    0.29538  s(percent)=      29.54
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.023 min.
Rainfall intensity =      2.234(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
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
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.926(CFS)
Total initial stream area =        7.600(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      310.000 to Point/Station      311.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1614.000(Ft.)
End of natural channel elevation =   1452.000(Ft.)
Length of natural channel  =  1980.000(Ft.)
Estimated mean flow rate at midpoint of channel =     58.637(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.59(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0818
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Corrected/adjusted channel slope =  0.0818
Travel time =    2.85 min.     TC =   11.87  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.090
Decimal fraction soil group D = 0.860
RI index for soil(AMC 2)  =  88.18
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.921(In/Hr) for a    10.0 year storm
Subarea runoff =     77.196(CFS) for     48.800(Ac.)
Total runoff =     91.122(CFS)   Total area =      56.400(Ac.)


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Process from Point/Station      310.000 to Point/Station      311.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     56.400(Ac.)
Runoff from this stream =     91.122(CFS)
Time of concentration =   11.87 min.
Rainfall intensity =     1.921(In/Hr)
Summary of stream data:

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


1      173.585     19.69                1.454
2       91.122     11.87                1.921
Largest stream flow has longer time of concentration
Qp =    173.585 + sum of
         Qb         Ia/Ib
         91.122 *    0.757 =     68.980
Qp =    242.565

Total of 2 streams to confluence:
Flow rates before confluence point:
     173.585      91.122
Area of streams before confluence:
      136.600       56.400
Results of confluence:
Total flow rate =    242.565(CFS)
Time of concentration =    19.690 min.
Effective stream area after confluence =    193.000(Ac.)


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Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1452.000(Ft.)
End of natural channel elevation =   1443.000(Ft.)
Length of natural channel  =   475.000(Ft.)
Estimated mean flow rate at midpoint of channel =    249.855(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
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 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.65(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0189
Corrected/adjusted channel slope =  0.0189
Travel time =    0.91 min.     TC =   20.61  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.793
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.750
RI index for soil(AMC 2)  =  87.45
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.418(In/Hr) for a    10.0 year storm
Subarea runoff =     13.048(CFS) for     11.600(Ac.)
Total runoff =    255.614(CFS)   Total area =     204.600(Ac.)


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Process from Point/Station      312.000 to Point/Station      313.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Covered channel
Upstream point elevation =  1443.000(Ft.)
Downstream point elevation =  1436.000(Ft.)
Channel length thru subarea  =   305.000(Ft.)
Channel base width  =    8.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =    258.082(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =    258.082(CFS)
Depth of flow =   1.398(Ft.), Average velocity =  15.133(Ft/s)
Channel flow top width =   16.391(Ft.)
Flow Velocity =   15.13(Ft/s)
Travel time  =    0.34 min.
Time of concentration =   20.94 min.

Sub-Channel No. 1 Critical depth =      2.375(Ft.)
  '     '       '     Critical flow top width =     22.250(Ft.)
  '     '       '     Critical flow velocity=    7.185(Ft/s)
  '     '       '     Critical flow area =     35.922(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.675
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
RI index for soil(AMC 2)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.406(In/Hr) for a    10.0 year storm
Subarea runoff =      4.840(CFS) for      5.100(Ac.)
Total runoff =    260.454(CFS)   Total area =     209.700(Ac.)
Depth of flow =   1.405(Ft.), Average velocity =  15.173(Ft/s)
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Sub-Channel No. 1 Critical depth =      2.375(Ft.)
  '     '       '     Critical flow top width =     22.250(Ft.)
  '     '       '     Critical flow velocity=    7.251(Ft/s)
  '     '       '     Critical flow area =     35.922(Sq.Ft)


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Process from Point/Station      313.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =   210.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   260.454(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   260.454(CFS)
Normal flow depth in pipe =   44.77(In.)
Flow top width inside pipe =   46.81(In.)
Critical Depth =   53.04(In.)
Pipe flow velocity =     17.45(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    21.14 min.


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Process from Point/Station      313.000 to Point/Station      314.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.779
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
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    21.14 min.
Rainfall intensity =      1.399(In/Hr) for a    10.0 year storm
Subarea runoff =      0.981(CFS) for      0.900(Ac.)
Total runoff =    261.435(CFS)   Total area =     210.600(Ac.)


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Process from Point/Station      314.000 to Point/Station      315.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1433.000(Ft.)
End of natural channel elevation =   1420.000(Ft.)
Length of natural channel  =  1032.000(Ft.)
Estimated mean flow rate at midpoint of channel =    263.917(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.18(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0126
Corrected/adjusted channel slope =  0.0126
Travel time =    2.40 min.     TC =   23.54  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.773
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
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.318(In/Hr) for a    10.0 year storm
Subarea runoff =      4.075(CFS) for      4.000(Ac.)
Total runoff =    265.510(CFS)   Total area =     214.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      316.000 to Point/Station      317.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1504.100(Ft.)
Bottom (of initial area) elevation =  1488.800(Ft.)
Difference in elevation =    15.300(Ft.)
Slope =    0.01530  s(percent)=       1.53
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.529 min.
Rainfall intensity =      1.788(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      7.035(CFS)
Total initial stream area =        4.700(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      317.000 to Point/Station      318.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1482.000(Ft.)
Downstream point/station elevation =  1476.000(Ft.)
Pipe length  =   305.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.035(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.035(CFS)
Normal flow depth in pipe =    9.94(In.)
Flow top width inside pipe =   14.19(In.)
Critical Depth =   12.74(In.)
Pipe flow velocity =      8.16(Ft/s)
Travel time through pipe =    0.62 min.
Time of concentration (TC) =    14.15 min.


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Process from Point/Station      317.000 to Point/Station      318.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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CONDOMINIUM subarea type
Runoff Coefficient = 0.831
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  73.10
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.15 min.
Rainfall intensity =      1.744(In/Hr) for a    10.0 year storm
Subarea runoff =      4.057(CFS) for      2.800(Ac.)
Total runoff =     11.092(CFS)   Total area =       7.500(Ac.)


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Process from Point/Station      318.000 to Point/Station      319.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1476.000(Ft.)
Downstream point/station elevation =  1475.000(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.092(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    11.092(CFS)
Normal flow depth in pipe =   11.74(In.)
Flow top width inside pipe =   12.37(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.76(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    14.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      318.000 to Point/Station      319.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.800
RI index for soil(AMC 2)  =  71.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.20 min.
Rainfall intensity =      1.741(In/Hr) for a    10.0 year storm
Subarea runoff =      5.173(CFS) for      3.600(Ac.)
Total runoff =     16.266(CFS)   Total area =      11.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      319.000 to Point/Station      320.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1475.000(Ft.)
Downstream point/station elevation =  1469.000(Ft.)
Pipe length  =   415.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.266(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.266(CFS)
Normal flow depth in pipe =   14.93(In.)
Flow top width inside pipe =   19.04(In.)
Critical Depth =   17.83(In.)
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Pipe flow velocity =      8.90(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    14.98 min.


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Process from Point/Station      319.000 to Point/Station      320.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.818
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.98 min.
Rainfall intensity =      1.690(In/Hr) for a    10.0 year storm
Subarea runoff =      3.317(CFS) for      2.400(Ac.)
Total runoff =     19.583(CFS)    Total area =      13.500(Ac.)


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Process from Point/Station      320.000 to Point/Station      321.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1469.000(Ft.)
Downstream point/station elevation =  1465.000(Ft.)
Pipe length  =   257.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.583(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    19.583(CFS)
Normal flow depth in pipe =   17.04(In.)
Flow top width inside pipe =   16.43(In.)
Critical Depth =   19.05(In.)
Pipe flow velocity =      9.37(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    15.43 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.817
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.43 min.
Rainfall intensity =      1.663(In/Hr) for a    10.0 year storm
Subarea runoff =      5.295(CFS) for      3.900(Ac.)
Total runoff =     24.878(CFS)    Total area =      17.400(Ac.)


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Process from Point/Station      321.000 to Point/Station      322.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
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Upstream point/station elevation =  1465.000(Ft.)
Downstream point/station elevation =  1453.000(Ft.)
Pipe length  =   275.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.878(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    24.878(CFS)
Normal flow depth in pipe =   13.59(In.)
Flow top width inside pipe =   20.07(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.11(Ft/s)
Travel time through pipe =    0.30 min.
Time of concentration (TC) =    15.74 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      321.000 to Point/Station      322.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.816
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.74 min.
Rainfall intensity =      1.645(In/Hr) for a    10.0 year storm
Subarea runoff =      3.221(CFS) for      2.400(Ac.)
Total runoff =     28.099(CFS)   Total area =      19.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      322.000 to Point/Station      323.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1453.000(Ft.)
Downstream point/station elevation =  1448.000(Ft.)
Pipe length  =   263.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.099(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    28.099(CFS)
Normal flow depth in pipe =   17.81(In.)
Flow top width inside pipe =   21.00(In.)
Critical Depth =   21.96(In.)
Pipe flow velocity =     11.24(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    16.13 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      322.000 to Point/Station      323.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.815
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    16.13 min.
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Rainfall intensity =      1.623(In/Hr) for a    10.0 year storm
Subarea runoff =      3.175(CFS) for      2.400(Ac.)
Total runoff =     31.274(CFS)    Total area =      22.200(Ac.)


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Process from Point/Station      323.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1448.000(Ft.)
Downstream point/station elevation =  1446.000(Ft.)
Pipe length  =    51.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.274(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    31.274(CFS)
Normal flow depth in pipe =   17.16(In.)
Flow top width inside pipe =   16.24(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.87(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    16.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  72.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    16.19 min.
Rainfall intensity =      1.620(In/Hr) for a    10.0 year storm
Subarea runoff =      7.071(CFS) for      5.300(Ac.)
Total runoff =     38.345(CFS)    Total area =      27.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1446.000(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =   165.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.345(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    38.345(CFS)
Normal flow depth in pipe =   16.13(In.)
Flow top width inside pipe =   17.73(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.33(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    16.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
```

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APARTMENT subarea type
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  72.60
Pervious area fraction =  0.200; Impervious fraction =  0.800
Time of concentration =    16.33 min.
Rainfall intensity =      1.612(In/Hr) for a    10.0 year storm
Subarea runoff =      4.422(CFS) for      3.200(Ac.)
Total runoff =     42.768(CFS)   Total area =      30.700(Ac.)


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Process from Point/Station      325.000 to Point/Station      326.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =   100.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    42.768(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    42.768(CFS)
Normal flow depth in pipe =   21.56(In.)
Flow top width inside pipe =   21.66(In.)
Critical Depth =   25.49(In.)
Pipe flow velocity =     12.55(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    16.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      326.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  73.20
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.46 min.
Rainfall intensity =      1.605(In/Hr) for a    10.0 year storm
Subarea runoff =      4.797(CFS) for      3.400(Ac.)
Total runoff =     47.564(CFS)   Total area =      34.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      326.000 to Point/Station      327.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1429.000(Ft.)
Pipe length  =   114.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    47.564(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    47.564(CFS)
Normal flow depth in pipe =   18.61(In.)
Flow top width inside pipe =   24.99(In.)
Critical depth could not be calculated.
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Pipe flow velocity =     16.28(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    16.58 min.


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Process from Point/Station      326.000 to Point/Station      327.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  72.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    16.58 min.
Rainfall intensity =      1.599(In/Hr) for a    10.0 year storm
Subarea runoff =      8.025(CFS) for      6.100(Ac.)
Total runoff =     55.589(CFS)   Total area =      40.200(Ac.)


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Process from Point/Station      327.000 to Point/Station      328.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1429.000(Ft.)
Downstream point elevation =  1423.000(Ft.)
Channel length thru subarea  =   474.000(Ft.)
Channel base width  =  105.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     58.272(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =     58.272(CFS)
Depth of flow =   0.196(Ft.), Average velocity =   2.812(Ft/s)
Channel flow top width =  106.178(Ft.)
Flow Velocity =    2.81(Ft/s)
Travel time  =    2.81 min.
Time of concentration =   19.39 min.

Sub-Channel No. 1 Critical depth =      0.211(Ft.)
  '     '       '     Critical flow top width =    106.266(Ft.)
  '     '       '     Critical flow velocity=    2.615(Ft/s)
  '     '       '     Critical flow area =     22.282(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.682
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
RI index for soil(AMC 2)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.467(In/Hr) for a    10.0 year storm
Subarea runoff =      5.303(CFS) for      5.300(Ac.)
Total runoff =     60.892(CFS)   Total area =      45.500(Ac.)
Depth of flow =   0.202(Ft.), Average velocity =   2.861(Ft/s)

Sub-Channel No. 1 Critical depth =      0.219(Ft.)
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  '     '       '     Critical flow top width =    106.313(Ft.)
  '     '       '     Critical flow velocity=    2.635(Ft/s)
  '     '       '     Critical flow area =     23.112(Sq.Ft)


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Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     45.500(Ac.)
Runoff from this stream =     60.892(CFS)
Time of concentration =   19.39 min.
Rainfall intensity =     1.467(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      329.000 to Point/Station      330.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   880.000(Ft.)
Top (of initial area) elevation =  1492.000(Ft.)
Bottom (of initial area) elevation =  1465.000(Ft.)
Difference in elevation =    27.000(Ft.)
Slope =    0.03068  s(percent)=       3.07
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.185 min.
Rainfall intensity =      1.985(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.200
RI index for soil(AMC 2)  =  70.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.097(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      331.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1459.000(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =   437.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.097(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.097(CFS)
Normal flow depth in pipe =    8.87(In.)
Flow top width inside pipe =   14.75(In.)
Critical Depth =   11.96(In.)
Pipe flow velocity =      8.06(Ft/s)
Travel time through pipe =    0.90 min.
Time of concentration (TC) =    12.09 min.


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Process from Point/Station      330.000 to Point/Station      331.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.09 min.
Rainfall intensity =      1.902(In/Hr) for a    10.0 year storm
Subarea runoff =     11.670(CFS) for      7.500(Ac.)
Total runoff =     17.766(CFS)   Total area =      11.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      331.000 to Point/Station      332.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =  1450.000(Ft.)
Downstream point/station elevation =  1447.000(Ft.)
Pipe length  =   125.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.766(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    17.766(CFS)
Normal flow depth in pipe =   13.24(In.)
Flow top width inside pipe =   20.27(In.)
Critical Depth =   18.46(In.)
Pipe flow velocity =     11.12(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    12.28 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      332.000 to Point/Station      332.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     11.200(Ac.)
Runoff from this stream =     17.766(CFS)
Time of concentration =   12.28 min.
Rainfall intensity =     1.886(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      333.000 to Point/Station      334.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =   676.000(Ft.)
Top (of initial area) elevation =  1473.000(Ft.)
Bottom (of initial area) elevation =  1460.000(Ft.)
Difference in elevation =    13.000(Ft.)
Slope =    0.01923  s(percent)=       1.92
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.050 min.
Rainfall intensity =      1.998(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
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Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  72.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.174(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      334.000 to Point/Station      335.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1454.000(Ft.)
Downstream point/station elevation =  1449.000(Ft.)
Pipe length  =   236.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.174(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.174(CFS)
Normal flow depth in pipe =    8.87(In.)
Flow top width inside pipe =   14.75(In.)
Critical Depth =   12.04(In.)
Pipe flow velocity =      8.18(Ft/s)
Travel time through pipe =    0.48 min.
Time of concentration (TC) =    11.53 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      334.000 to Point/Station      335.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  73.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    11.53 min.
Rainfall intensity =      1.952(In/Hr) for a    10.0 year storm
Subarea runoff =      4.738(CFS) for      2.900(Ac.)
Total runoff =     10.912(CFS)   Total area =       6.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      335.000 to Point/Station      332.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1449.000(Ft.)
Downstream point/station elevation =  1447.000(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.912(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    10.912(CFS)
Normal flow depth in pipe =   10.16(In.)
Flow top width inside pipe =   14.02(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.33(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.59 min.


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Process from Point/Station      332.000 to Point/Station      332.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      6.600(Ac.)
Runoff from this stream =     10.912(CFS)
Time of concentration =   11.59 min.
Rainfall intensity =     1.946(In/Hr)
Summary of stream data:

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


1       17.766     12.28                1.886
2       10.912     11.59                1.946
Largest stream flow has longer time of concentration
Qp =     17.766 + sum of
         Qb         Ia/Ib
         10.912 *    0.969 =     10.574
Qp =     28.340

Total of 2 streams to confluence:
Flow rates before confluence point:
      17.766      10.912
Area of streams before confluence:
       11.200        6.600
Results of confluence:
Total flow rate =     28.340(CFS)
Time of concentration =    12.275 min.
Effective stream area after confluence =     17.800(Ac.)


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Process from Point/Station      332.000 to Point/Station      336.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  1447.000(Ft.)
Downstream point/station elevation =  1444.000(Ft.)
Pipe length  =   124.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.340(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    28.340(CFS)
Normal flow depth in pipe =   16.31(In.)
Flow top width inside pipe =   22.40(In.)
Critical Depth =   22.01(In.)
Pipe flow velocity =     12.46(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    12.44 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      332.000 to Point/Station      336.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.832
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  72.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
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Time of concentration =    12.44 min.
Rainfall intensity =      1.872(In/Hr) for a    10.0 year storm
Subarea runoff =      5.449(CFS) for      3.500(Ac.)
Total runoff =     33.790(CFS)    Total area =      21.300(Ac.)


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Process from Point/Station      336.000 to Point/Station      337.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1444.000(Ft.)
Downstream point/station elevation =  1437.000(Ft.)
Pipe length  =   539.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    33.790(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    33.790(CFS)
Normal flow depth in pipe =   21.16(In.)
Flow top width inside pipe =   22.23(In.)
Critical Depth =   23.84(In.)
Pipe flow velocity =     10.11(Ft/s)
Travel time through pipe =    0.89 min.
Time of concentration (TC) =    13.33 min.


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Process from Point/Station      336.000 to Point/Station      337.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.878
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.33 min.
Rainfall intensity =      1.802(In/Hr) for a    10.0 year storm
Subarea runoff =      4.745(CFS) for      3.000(Ac.)
Total runoff =     38.535(CFS)    Total area =      24.300(Ac.)


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Process from Point/Station      337.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1437.000(Ft.)
Downstream point/station elevation =  1423.000(Ft.)
Pipe length  =   512.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.535(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    38.535(CFS)
Normal flow depth in pipe =   20.39(In.)
Flow top width inside pipe =   17.16(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.54(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    13.96 min.


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Process from Point/Station      337.000 to Point/Station      328.000
**** CONFLUENCE OF MAIN STREAMS ****
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_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     24.300(Ac.)
Runoff from this stream =     38.535(CFS)
Time of concentration =   13.96 min.
Rainfall intensity =     1.757(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station      338.000 to Point/Station      339.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   705.000(Ft.)
Top (of initial area) elevation =  1463.000(Ft.)
Bottom (of initial area) elevation =  1455.000(Ft.)
Difference in elevation =     8.000(Ft.)
Slope =    0.01135  s(percent)=       1.13
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.902 min.
Rainfall intensity =      2.013(In/Hr) for a    10.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  74.40
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     11.340(CFS)
Total initial stream area =        6.500(Ac.)
Pervious area fraction = 0.200


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Process from Point/Station      339.000 to Point/Station      340.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____________________________________________________________________________
Upstream point elevation =  1455.000(Ft.)
Downstream point elevation =  1446.000(Ft.)
Channel length thru subarea  =   916.000(Ft.)
Channel base width  =   20.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   0.020
Estimated mean flow rate at midpoint of channel =     19.704(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     19.704(CFS)
Depth of flow =   0.254(Ft.), Average velocity =   3.875(Ft/s)
Channel flow top width =   20.010(Ft.)
Flow Velocity =    3.88(Ft/s)
Travel time  =    3.94 min.
Time of concentration =   14.84 min.

Sub-Channel No. 1 Critical depth =      0.313(Ft.)
  '     '       '     Critical flow top width =     20.013(Ft.)
  '     '       '     Critical flow velocity=    3.152(Ft/s)
  '     '       '     Critical flow area =      6.252(Sq.Ft)

 Adding area flow to channel
APARTMENT subarea type
Runoff Coefficient = 0.853
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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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Rainfall intensity =      1.699(In/Hr) for a    10.0 year storm
Subarea runoff =     16.668(CFS) for     11.500(Ac.)
Total runoff =     28.008(CFS)   Total area =      18.000(Ac.)
Depth of flow =   0.315(Ft.), Average velocity =   4.450(Ft/s)

Sub-Channel No. 1 Critical depth =      0.395(Ft.)
  '     '       '     Critical flow top width =     20.016(Ft.)
  '     '       '     Critical flow velocity=    3.548(Ft/s)
  '     '       '     Critical flow area =      7.894(Sq.Ft)



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Process from Point/Station      340.000 to Point/Station      341.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1440.000(Ft.)
Downstream point/station elevation =  1430.000(Ft.)
Pipe length  =   197.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.008(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    28.008(CFS)
Normal flow depth in pipe =   14.02(In.)
Flow top width inside pipe =   19.79(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.43(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    15.04 min.


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Process from Point/Station      340.000 to Point/Station      341.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.876
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.04 min.
Rainfall intensity =      1.687(In/Hr) for a    10.0 year storm
Subarea runoff =      3.547(CFS) for      2.400(Ac.)
Total runoff =     31.555(CFS)   Total area =      20.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      341.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1430.000(Ft.)
Downstream point/station elevation =  1423.000(Ft.)
Pipe length  =   520.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.555(CFS)
Nearest computed pipe diameter  =     27.00(In.)
```

```
Calculated individual pipe flow  =    31.555(CFS)
Normal flow depth in pipe =   19.62(In.)
Flow top width inside pipe =   24.07(In.)
Critical Depth =   23.22(In.)
Pipe flow velocity =     10.19(Ft/s)
Travel time through pipe =    0.85 min.
Time of concentration (TC) =    15.89 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =     20.400(Ac.)
Runoff from this stream =     31.555(CFS)
Time of concentration =   15.89 min.
Rainfall intensity =     1.636(In/Hr)
Summary of stream data:

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


1       60.892     19.39           1.467
2       38.535     13.96           1.757
3       31.555     15.89           1.636
Largest stream flow has longer time of concentration
Qp =     60.892 + sum of
         Qb          Ia/Ib
         38.535 *    0.835 =     32.167
         Qb          Ia/Ib
         31.555 *    0.896 =     28.287
Qp =    121.346

Total of 3 main streams to confluence:
Flow rates before confluence point:
      60.892      38.535      31.555
Area of streams before confluence:
       45.500       24.300       20.400


Results of confluence:
Total flow rate =    121.346(CFS)
Time of concentration =    19.386 min.
Effective stream area after confluence  =     90.200(Ac.)


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Process from Point/Station      328.000 to Point/Station      342.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1423.000(Ft.)
Downstream point/station elevation =  1422.400(Ft.)
Pipe length  =    73.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   121.346(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   121.346(CFS)
Normal flow depth in pipe =   36.70(In.)
Flow top width inside pipe =   40.72(In.)
Critical Depth =   39.79(In.)
Pipe flow velocity =     11.77(Ft/s)
```

```
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    19.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      342.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.874
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    19.49 min.
Rainfall intensity =      1.463(In/Hr) for a    10.0 year storm
Subarea runoff =      2.684(CFS) for      2.100(Ac.)
Total runoff =    124.030(CFS)   Total area =      92.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      342.000 to Point/Station      315.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1422.400(Ft.)
Downstream point/station elevation =  1420.000(Ft.)
Pipe length  =   230.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   124.030(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   124.030(CFS)
Normal flow depth in pipe =   37.03(In.)
Flow top width inside pipe =   34.36(In.)
Critical Depth =   40.04(In.)
Pipe flow velocity =     12.75(Ft/s)
Travel time through pipe =    0.30 min.
Time of concentration (TC) =    19.79 min.


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Process from Point/Station      315.000 to Point/Station      315.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     92.300(Ac.)
Runoff from this stream =    124.030(CFS)
Time of concentration =   19.79 min.
Rainfall intensity =     1.450(In/Hr)


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Process from Point/Station      315.000 to Point/Station      315.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
________________________________________________________________________
Rainfall intensity =      1.318(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.773
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
RI index for soil(AMC 2)  =  86.00
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```
Pervious area fraction =  1.000; Impervious fraction =  0.000
User specified values are as follows:
TC =  23.54 min.  Rain intensity =       1.32(In/Hr)
Total area =       214.60(Ac.)  Total runoff =    265.51(CFS)


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Process from Point/Station      315.000 to Point/Station      315.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    214.600(Ac.)
Runoff from this stream =    265.510(CFS)
Time of concentration =   23.54 min.
Rainfall intensity =     1.318(In/Hr)
Summary of stream data:

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


1      124.030     19.79                 1.450
2      265.510     23.54                 1.318
Largest stream flow has longer time of concentration
Qp =    265.510 + sum of
         Qb         Ia/Ib
        124.030 *    0.909 =    112.742
Qp =    378.252

Total of 2 streams to confluence:
Flow rates before confluence point:
     124.030     265.510
Area of streams before confluence:
       92.300      214.600
Results of confluence:
Total flow rate =    378.252(CFS)
Time of concentration =    23.540 min.
Effective stream area after confluence =    306.900(Ac.)


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Process from Point/Station      315.000 to Point/Station      343.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1420.000(Ft.)
End of natural channel elevation =   1409.000(Ft.)
Length of natural channel  =   605.000(Ft.)
Estimated mean flow rate at midpoint of channel =    381.641(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.69(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0182
Corrected/adjusted channel slope =  0.0182
Travel time =    1.04 min.     TC =   24.58  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.784
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.287(In/Hr) for a    10.0 year storm
Subarea runoff =      5.551(CFS) for      5.500(Ac.)
Total runoff =    383.802(CFS)   Total area =     312.400(Ac.)


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Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   850.000(Ft.)
Top (of initial area) elevation =  1445.000(Ft.)
Bottom (of initial area) elevation =  1415.000(Ft.)
Difference in elevation =    30.000(Ft.)
Slope =    0.03529  s(percent)=       3.53
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.175 min.
Rainfall intensity =      1.894(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.784
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  71.90
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =     10.984(CFS)
Total initial stream area =        7.400(Ac.)
Pervious area fraction = 0.600


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Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   560.000(Ft.)
Top (of initial area) elevation =  1448.000(Ft.)
Bottom (of initial area) elevation =  1422.000(Ft.)
Difference in elevation =    26.000(Ft.)
Slope =    0.04643  s(percent)=       4.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.967 min.
Rainfall intensity =      2.575(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 2)  =  71.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.239(CFS)
Total initial stream area =        2.300(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      500.000 to Point/Station      501.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.776
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 2)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     6.97 min.
Rainfall intensity =      2.575(In/Hr) for a    10.0 year storm
Subarea runoff =      1.399(CFS) for      0.700(Ac.)
Total runoff =      6.638(CFS)    Total area =       3.000(Ac.)


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Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1586.000(Ft.)
Bottom (of initial area) elevation =  1504.000(Ft.)
Difference in elevation =    82.000(Ft.)
Slope =    0.08200  s(percent)=       8.20
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.852 min.
Rainfall intensity =      1.765(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     12.347(CFS)
Total initial stream area =        8.500(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________
Top of natural channel elevation =   1504.000(Ft.)
End of natural channel elevation =   1480.000(Ft.)
Length of natural channel  =   795.000(Ft.)
Estimated mean flow rate at midpoint of channel =     24.621(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.51(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0302
Corrected/adjusted channel slope =  0.0302
Travel time =    2.41 min.     TC =   16.26  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.850
RI index for soil(AMC 2)  =  88.55
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.616(In/Hr) for a    10.0 year storm
Subarea runoff =     22.209(CFS) for     16.900(Ac.)
Total runoff =     34.556(CFS)   Total area =      25.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1480.000(Ft.)
End of natural channel elevation =   1461.000(Ft.)
Length of natural channel  =  1162.000(Ft.)
Estimated mean flow rate at midpoint of channel =     43.399(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.75(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0164
Corrected/adjusted channel slope =  0.0164
Travel time =    4.08 min.     TC =   20.33  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.807
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.429(In/Hr) for a    10.0 year storm
Subarea runoff =     14.989(CFS) for     13.000(Ac.)
Total runoff =     49.545(CFS)   Total area =      38.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1458.000(Ft.)
Downstream point/station elevation =  1439.000(Ft.)
Pipe length  =   570.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    49.545(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    49.545(CFS)
Normal flow depth in pipe =   19.59(In.)
Flow top width inside pipe =   24.09(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.04(Ft/s)
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Travel time through pipe =    0.59 min.
Time of concentration (TC) =    20.92 min.


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Process from Point/Station      604.000 to Point/Station      605.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1439.000(Ft.)
Downstream point elevation =  1434.000(Ft.)
Channel length thru subarea  =   315.000(Ft.)
Channel base width  =   65.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     50.941(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     50.941(CFS)
Depth of flow =   0.225(Ft.), Average velocity =   3.441(Ft/s)
Channel flow top width =   66.352(Ft.)
Flow Velocity =    3.44(Ft/s)
Travel time  =    1.53 min.
Time of concentration =   22.45 min.

Sub-Channel No. 1 Critical depth =      0.266(Ft.)
  '     '       '     Critical flow top width =     66.594(Ft.)
  '     '       '     Critical flow velocity=    2.915(Ft/s)
  '     '       '     Critical flow area =     17.477(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.695
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.353(In/Hr) for a    10.0 year storm
Subarea runoff =      2.728(CFS) for      2.900(Ac.)
Total runoff =     52.274(CFS)    Total area =      41.300(Ac.)
Depth of flow =   0.229(Ft.), Average velocity =   3.476(Ft/s)

Sub-Channel No. 1 Critical depth =      0.270(Ft.)
  '     '       '     Critical flow top width =     66.617(Ft.)
  '     '       '     Critical flow velocity=    2.947(Ft/s)
  '     '       '     Critical flow area =     17.737(Sq.Ft)



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Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     41.300(Ac.)
Runoff from this stream =     52.274(CFS)
Time of concentration =   22.45 min.
Rainfall intensity =     1.353(In/Hr)


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Process from Point/Station      606.000 to Point/Station      607.000
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**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1504.100(Ft.)
Bottom (of initial area) elevation =  1462.000(Ft.)
Difference in elevation =    42.100(Ft.)
Slope =    0.04210  s(percent)=       4.21
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.050 min.
Rainfall intensity =      1.998(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  73.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     12.059(CFS)
Total initial stream area =        7.200(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      607.000 to Point/Station      608.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =  1457.000(Ft.)
Downstream point/station elevation =  1453.000(Ft.)
Pipe length  =   285.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.059(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    12.059(CFS)
Normal flow depth in pipe =   14.27(In.)
Flow top width inside pipe =   14.59(In.)
Critical Depth =   15.79(In.)
Pipe flow velocity =      8.02(Ft/s)
Travel time through pipe =    0.59 min.
Time of concentration (TC) =    11.64 min.


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Process from Point/Station      607.000 to Point/Station      608.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  72.60
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    11.64 min.
Rainfall intensity =      1.942(In/Hr) for a    10.0 year storm
Subarea runoff =     10.703(CFS) for      6.600(Ac.)
Total runoff =     22.762(CFS)   Total area =      13.800(Ac.)


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Process from Point/Station      608.000 to Point/Station      609.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
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Upstream point/station elevation =  1453.000(Ft.)
Downstream point/station elevation =  1451.000(Ft.)
Pipe length  =   106.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.762(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    22.762(CFS)
Normal flow depth in pipe =   15.26(In.)
Flow top width inside pipe =   23.10(In.)
Critical Depth =   20.38(In.)
Pipe flow velocity =     10.80(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    11.81 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      609.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.81 min.
Rainfall intensity =      1.927(In/Hr) for a    10.0 year storm
Subarea runoff =      2.553(CFS) for      1.500(Ac.)
Total runoff =     25.315(CFS)   Total area =      15.300(Ac.)


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Process from Point/Station      609.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1451.000(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =    20.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.315(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    25.315(CFS)
Normal flow depth in pipe =   13.13(In.)
Flow top width inside pipe =   20.33(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.01(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    11.83 min.


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Process from Point/Station      609.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.879
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
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.83 min.
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Rainfall intensity =      1.925(In/Hr) for a    10.0 year storm
Subarea runoff =      1.522(CFS) for      0.900(Ac.)
Total runoff =     26.837(CFS)    Total area =      16.200(Ac.)


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Process from Point/Station      610.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1450.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =   570.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.837(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    26.837(CFS)
Normal flow depth in pipe =   17.44(In.)
Flow top width inside pipe =   15.76(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.58(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =    12.58 min.


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Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     16.200(Ac.)
Runoff from this stream =     26.837(CFS)
Time of concentration =   12.58 min.
Rainfall intensity =     1.861(In/Hr)
Summary of stream data:

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


1       52.274     22.45                1.353
2       26.837     12.58                1.861
Largest stream flow has longer time of concentration
Qp =     52.274 + sum of
         Qb         Ia/Ib
         26.837 *    0.727 =     19.517
Qp =     71.791

Total of 2 streams to confluence:
Flow rates before confluence point:
      52.274      26.837
Area of streams before confluence:
       41.300       16.200
Results of confluence:
Total flow rate =     71.791(CFS)
Time of concentration =    22.451 min.
Effective stream area after confluence =     57.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      611.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1428.000(Ft.)
```

```
Pipe length  =   155.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    71.791(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    71.791(CFS)
Normal flow depth in pipe =   22.03(In.)
Flow top width inside pipe =   26.50(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.58(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    22.59 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      611.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  73.20
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    22.59 min.
Rainfall intensity =      1.349(In/Hr) for a    10.0 year storm
Subarea runoff =      2.008(CFS) for      1.700(Ac.)
Total runoff =     73.799(CFS)   Total area =      59.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      700.000 to Point/Station      701.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   417.000(Ft.)
Top (of initial area) elevation =  1476.000(Ft.)
Bottom (of initial area) elevation =  1462.000(Ft.)
Difference in elevation =    14.000(Ft.)
Slope =    0.03357  s(percent)=       3.36
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.607 min.
Rainfall intensity =      2.652(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  74.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     12.462(CFS)
Total initial stream area =        5.300(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      702.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1456.000(Ft.)
Downstream point/station elevation =  1443.000(Ft.)
Pipe length  =   150.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.462(CFS)
```

```
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    12.462(CFS)
Normal flow depth in pipe =    8.86(In.)
Flow top width inside pipe =   14.75(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.53(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     6.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      702.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  74.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     6.76 min.
Rainfall intensity =      2.619(In/Hr) for a    10.0 year storm
Subarea runoff =      3.947(CFS) for      1.700(Ac.)
Total runoff =     16.409(CFS)   Total area =       7.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      800.000 to Point/Station      801.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   980.000(Ft.)
Top (of initial area) elevation =  1612.000(Ft.)
Bottom (of initial area) elevation =  1486.000(Ft.)
Difference in elevation =   126.000(Ft.)
Slope =    0.12857  s(percent)=      12.86
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.558 min.
Rainfall intensity =      1.862(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  87.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.062(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      801.000 to Point/Station      802.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1486.000(Ft.)
End of natural channel elevation =   1455.000(Ft.)
Length of natural channel  =  1180.000(Ft.)
Estimated mean flow rate at midpoint of channel =     21.344(CFS)

Natural valley channel type used
```

```
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    3.98 min.     TC =   16.54  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.814
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  88.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.601(In/Hr) for a    10.0 year storm
Subarea runoff =     19.278(CFS) for     14.800(Ac.)
Total runoff =     29.340(CFS)   Total area =      21.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      802.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     21.400(Ac.)
Runoff from this stream =     29.340(CFS)
Time of concentration =   16.54 min.
Rainfall intensity =     1.601(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      800.000 to Point/Station      803.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   705.000(Ft.)
Top (of initial area) elevation =  1612.000(Ft.)
Bottom (of initial area) elevation =  1494.000(Ft.)
Difference in elevation =   118.000(Ft.)
Slope =    0.16738  s(percent)=      16.74
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.443 min.
Rainfall intensity =      2.061(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     15.117(CFS)
Total initial stream area =        8.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      804.000
```

```
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1494.000(Ft.)
End of natural channel elevation =   1481.000(Ft.)
Length of natural channel  =   460.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.057(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.47(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0283
Corrected/adjusted channel slope =  0.0283
Travel time =    1.40 min.     TC =   11.84  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.923(In/Hr) for a    10.0 year storm
Subarea runoff =     22.163(CFS) for     13.900(Ac.)
Total runoff =     37.281(CFS)   Total area =      22.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      802.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1481.000(Ft.)
End of natural channel elevation =   1455.000(Ft.)
Length of natural channel  =  1075.000(Ft.)
Estimated mean flow rate at midpoint of channel =     46.395(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.89(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0242
Corrected/adjusted channel slope =  0.0242
Travel time =    3.04 min.     TC =   14.89  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Rainfall intensity =      1.696(In/Hr) for a    10.0 year storm
Subarea runoff =     15.445(CFS) for     11.100(Ac.)
Total runoff =     52.725(CFS)    Total area =      33.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      802.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     33.800(Ac.)
Runoff from this stream =     52.725(CFS)
Time of concentration =   14.89 min.
Rainfall intensity =     1.696(In/Hr)
Summary of stream data:

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


1       29.340     16.54                 1.601
2       52.725     14.89                 1.696
Largest stream flow has longer or shorter time of concentration
Qp =     52.725 + sum of
         Qa          Tb/Ta
         29.340 *    0.900 =     26.409
Qp =     79.134

Total of 2 streams to confluence:
Flow rates before confluence point:
      29.340      52.725
Area of streams before confluence:
       21.400       33.800
Results of confluence:
Total flow rate =     79.134(CFS)
Time of concentration =    14.885 min.
Effective stream area after confluence =     55.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      805.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1455.000(Ft.)
End of natural channel elevation =   1451.000(Ft.)
Length of natural channel  =   190.000(Ft.)
Estimated mean flow rate at midpoint of channel =     80.783(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.46(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0211
Corrected/adjusted channel slope =  0.0211
Travel time =    0.49 min.     TC =   15.38  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.801
```

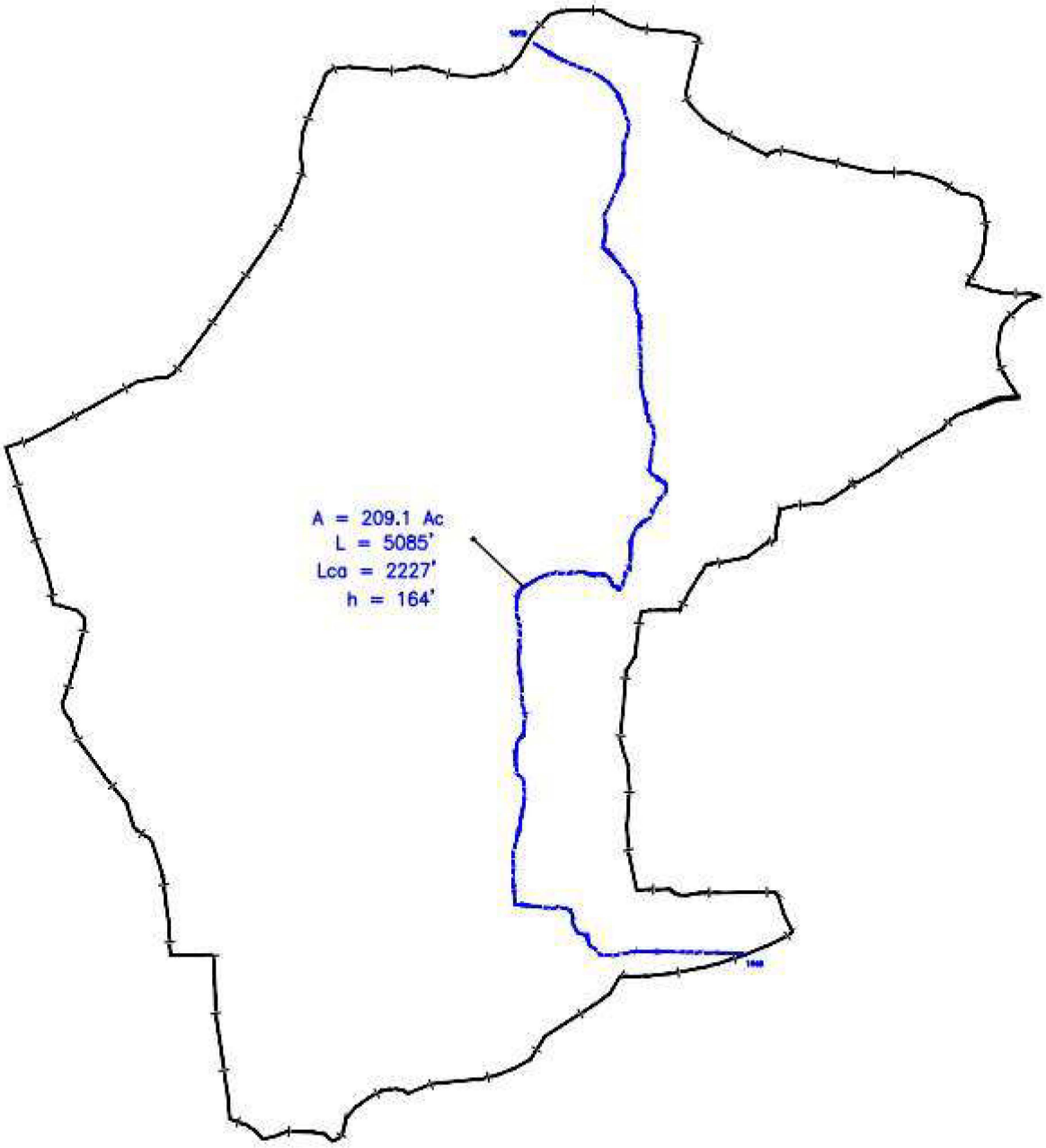
```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.200
RI index for soil(AMC 2)  =  86.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.666(In/Hr) for a    10.0 year storm
Subarea runoff =      3.069(CFS) for      2.300(Ac.)
Total runoff =     82.204(CFS)    Total area =      57.500(Ac.)
End of computations, total study area =          661.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.877
Area averaged RI index number =  84.1
```

ATTACHMENT C:

INFLOW HYDROGRAPHS DRAINAGE AREA C (OFF-SITE)

INFLOW HYDROGRAPHS
EXISTING CONDITION
Drainage Area C (Off-site)
100-year 1-, 3-, 6- and 24-hour storm



Drainage Area C (Existing offsite)

```
                U n i t   H y d r o g r a p h   A n a l y s i s

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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C offsite = 209.1 Ac
100-year 1-hour storm

------------------------------------------------------------------------
Drainage Area =     209.10(Ac.)  =      0.327 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =     209.10(Ac.)  =      0.327 Sq. Mi.
Length along longest watercourse =    5085.00(Ft.)
Length along longest watercourse measured to centroid =    2227.00(Ft.)
Length along longest watercourse =      0.963 Mi.
Length along longest watercourse measured to centroid =      0.422 Mi.
Difference in elevation =     164.00(Ft.)
Slope along watercourse =    170.2891 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.193 Hr.
Lag time =    11.56 Min.
25% of lag time =     2.89 Min.
40% of lag time =     4.62 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          0.50              104.55

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          1.20              250.92

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)
```

```
Point rain (area averaged) =    1.200(In)
Areal adjustment factor =   99.81 %
Adjusted average point rain =    1.198(In)

Sub-Area Data:
Area(Ac.)          Runoff Index    Impervious %
   155.100            81.80          0.000
     3.900            69.00          0.050
    50.100            72.60          0.750
 Total Area Entered =    209.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
81.8  92.1      0.103     0.000        0.103        0.742      0.076
69.0  84.4      0.194     0.050        0.185        0.019      0.003
72.6  86.6      0.169     0.750        0.055        0.240      0.013
                                                  Sum (F) =   0.093
Area averaged mean soil loss (F) (In/Hr) =  0.093
Minimum soil loss rate ((In/Hr)) =  0.047
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.760
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5500
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
-------------------------------------------------------------------
             Unit Hydrograph Data
-------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
-------------------------------------------------------------------------
    1   0.083         43.260          4.906            10.338
    2   0.167         86.521         20.503            43.207
    3   0.250        129.781         28.159            59.341
    4   0.333        173.041         15.836            33.372
    5   0.417        216.301          7.720            16.268
    6   0.500        259.562          5.139            10.829
    7   0.583        302.822          3.838             8.087
    8   0.667        346.082          2.866             6.041
    9   0.750        389.342          2.309             4.867
   10   0.833        432.603          1.759             3.707
   11   0.917        475.863          1.385             2.918
   12   1.000        519.123          1.271             2.678
   13   1.083        562.384          0.999             2.104
   14   1.167        605.644          0.821             1.731
   15   1.250        648.904          0.671             1.414
   16   1.333        692.164          0.523             1.103
   17   1.417        735.425          0.433             0.912
   18   1.500        778.685          0.433             0.912
   19   1.583        821.945          0.429             0.905
                               Sum = 100.000   Sum=     210.734
-------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
```

```
 1   0.08     3.30      0.474          0.093    (  0.360)        0.381
 2   0.17     4.20      0.604          0.093    (  0.459)        0.511
 3   0.25     4.40      0.632          0.093    (  0.481)        0.539
 4   0.33     4.80      0.690          0.093    (  0.524)        0.597
 5   0.42     5.20      0.747          0.093    (  0.568)        0.654
 6   0.50     6.20      0.891          0.093    (  0.677)        0.798
 7   0.58     6.80      0.977          0.093    (  0.743)        0.884
 8   0.67     8.80      1.265          0.093    (  0.961)        1.172
 9   0.75    13.90      1.998          0.093    (  1.518)        1.905
10   0.83    31.40      4.513          0.093    (  3.430)        4.420
11   0.92     7.20      1.035          0.093    (  0.786)        0.942
12   1.00     3.80      0.546          0.093    (  0.415)        0.453
            (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    13.3
    Flood volume = Effective rainfall      1.10(In)
     times area     209.1(Ac.)/[(In)/(Ft.)] =      19.2(Ac.Ft)
    Total soil loss =      0.09(In)
    Total soil loss =     1.621(Ac.Ft)
    Total rainfall =      1.20(In)
    Flood volume =      838523.5 Cubic Feet
    Total soil loss =       70590.1 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =    417.913(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        1 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0      125.0     250.0     375.0     500.0
-------------------------------------------------------------------------
  0+ 5       0.0272      3.94  Q         |         |         |         |
  0+10       0.1771     21.77  VQ        |         |         |         |
  0+15       0.5234     50.29  |V  Q     |         |         |         |
  0+20       1.0230     72.54  | V  Q    |         |         |         |
  0+25       1.6281     87.85  |  V   Q  |         |         |         |
  0+30       2.3336    102.44  |   V   Q |         |         |         |
  0+35       3.1588    119.83  |     V  Q|         |         |         |
  0+40       4.1339    141.58  |       V |Q        |         |         |
  0+45       5.3456    175.94  |         |V  Q     |         |         |
  0+50       7.1309    259.23  |         |   V     Q         |         |
  0+55       9.8211    390.61  |         |         V         |Q        |
  1+ 0      12.6993    417.91  |         |         |     V   |  Q      |
  1+ 5      14.6822    287.92  |         |         |  Q      V         |
  1+10      15.9012    177.00  |         |   Q     |         |  V      |
  1+15      16.6875    114.18  |        Q|         |         |   V     |
  1+20      17.2472     81.26  |     Q   |         |         |    V    |
  1+25      17.6719     61.67  |   Q     |         |         |     V   |
  1+30      18.0080     48.80  |  Q      |         |         |      V  |
  1+35      18.2735     38.55  |  Q      |         |         |      V  |
  1+40      18.4874     31.06  | Q       |         |         |       V |
  1+45      18.6670     26.08  | Q       |         |         |       V |
  1+50      18.8112     20.95  |Q        |         |         |        V|
  1+55      18.9281     16.97  |Q        |         |         |        V|
  2+ 0      19.0213     13.54  |Q        |         |         |        V|
  2+ 5      19.0944     10.60  Q         |         |         |        V|
  2+10      19.1530      8.51  Q         |         |         |        V|
  2+15      19.2020      7.12  Q         |         |         |        V|
  2+20      19.2383      5.27  Q         |         |         |        V|
  2+25      19.2470      1.27  Q         |         |         |        V|
  2+30      19.2499      0.41  Q         |         |         |        V|
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C offsite = 209.1 Ac
100-year 3-hour storm


----------------------------------------------------------------------
Drainage Area =     209.10(Ac.)  =      0.327 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =     209.10(Ac.)  =      0.327 Sq. Mi.
Length along longest watercourse =    5085.00(Ft.)
Length along longest watercourse measured to centroid =    2227.00(Ft.)
Length along longest watercourse =      0.963 Mi.
Length along longest watercourse measured to centroid =      0.422 Mi.
Difference in elevation =     164.00(Ft.)
Slope along watercourse =    170.2891 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.193 Hr.
Lag time =    11.56 Min.
25% of lag time =     2.89 Min.
40% of lag time =     4.62 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          0.77              161.01

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          1.77              370.11

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.770(In)
```

Area Averaged 100-Year Rainfall = 1.770(In)

Point rain (area averaged) = 1.770(In)
Areal adjustment factor = 99.91 %
Adjusted average point rain = 1.768(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
155.100	81.80	0.000
3.900	69.00	0.050
50.100	72.60	0.750

Total Area Entered = 209.10(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
81.8	92.1	0.103	0.000	0.103	0.742	0.076
69.0	84.4	0.194	0.050	0.185	0.019	0.003
72.6	86.6	0.169	0.750	0.055	0.240	0.013
					Sum (F) =	0.093

Area averaged mean soil loss (F) (In/Hr) = 0.093
Minimum soil loss rate ((In/Hr)) = 0.047
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.760

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	43.260	4.906	10.338
2	0.167	86.521	20.503	43.207
3	0.250	129.781	28.159	59.341
4	0.333	173.041	15.836	33.372
5	0.417	216.301	7.720	16.268
6	0.500	259.562	5.139	10.829
7	0.583	302.822	3.838	8.087
8	0.667	346.082	2.866	6.041
9	0.750	389.342	2.309	4.867
10	0.833	432.603	1.759	3.707
11	0.917	475.863	1.385	2.918
12	1.000	519.123	1.271	2.678
13	1.083	562.384	0.999	2.104
14	1.167	605.644	0.821	1.731
15	1.250	648.904	0.671	1.414
16	1.333	692.164	0.523	1.103
17	1.417	735.425	0.433	0.912
18	1.500	778.685	0.433	0.912
19	1.583	821.945	0.429	0.905
		Sum = 100.000	Sum=	210.734

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.276	0.093	(0.210)	0.183

```
 2   0.17     1.30      0.276          0.093    (  0.210)         0.183
 3   0.25     1.10      0.233          0.093    (  0.177)         0.140
 4   0.33     1.50      0.318          0.093    (  0.242)         0.225
 5   0.42     1.50      0.318          0.093    (  0.242)         0.225
 6   0.50     1.80      0.382          0.093    (  0.290)         0.289
 7   0.58     1.50      0.318          0.093    (  0.242)         0.225
 8   0.67     1.80      0.382          0.093    (  0.290)         0.289
 9   0.75     1.80      0.382          0.093    (  0.290)         0.289
10   0.83     1.50      0.318          0.093    (  0.242)         0.225
11   0.92     1.60      0.340          0.093    (  0.258)         0.247
12   1.00     1.80      0.382          0.093    (  0.290)         0.289
13   1.08     2.20      0.467          0.093    (  0.355)         0.374
14   1.17     2.20      0.467          0.093    (  0.355)         0.374
15   1.25     2.20      0.467          0.093    (  0.355)         0.374
16   1.33     2.00      0.424          0.093    (  0.323)         0.331
17   1.42     2.60      0.552          0.093    (  0.419)         0.459
18   1.50     2.70      0.573          0.093    (  0.435)         0.480
19   1.58     2.40      0.509          0.093    (  0.387)         0.416
20   1.67     2.70      0.573          0.093    (  0.435)         0.480
21   1.75     3.30      0.700          0.093    (  0.532)         0.607
22   1.83     3.10      0.658          0.093    (  0.500)         0.565
23   1.92     2.90      0.615          0.093    (  0.468)         0.522
24   2.00     3.00      0.637          0.093    (  0.484)         0.544
25   2.08     3.10      0.658          0.093    (  0.500)         0.565
26   2.17     4.20      0.891          0.093    (  0.677)         0.798
27   2.25     5.00      1.061          0.093    (  0.806)         0.968
28   2.33     3.50      0.743          0.093    (  0.564)         0.650
29   2.42     6.80      1.443          0.093    (  1.097)         1.350
30   2.50     7.30      1.549          0.093    (  1.177)         1.456
31   2.58     8.20      1.740          0.093    (  1.322)         1.647
32   2.67     5.90      1.252          0.093    (  0.952)         1.159
33   2.75     2.00      0.424          0.093    (  0.323)         0.331
34   2.83     1.80      0.382          0.093    (  0.290)         0.289
35   2.92     1.80      0.382          0.093    (  0.290)         0.289
36   3.00     0.60      0.127          0.093    (  0.097)         0.034
            (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    17.9
     Flood volume = Effective rainfall      1.49(In)
      times area     209.1(Ac.)/[(In)/(Ft.)] =      26.0(Ac.Ft)
     Total soil loss =      0.28(In)
     Total soil loss =     4.862(Ac.Ft)
     Total rainfall =      1.77(In)
     Flood volume =     1130489.0 Cubic Feet
     Total soil loss =      211770.3 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =    257.413(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       75.0     150.0     225.0     300.0
-------------------------------------------------------------------------
  0+ 5       0.0130      1.89  Q          |         |         |         |
  0+10       0.0805      9.80  VQ         |         |         |         |
  0+15       0.2197     20.21  V Q        |         |         |         |
  0+20       0.3944     25.36  V  Q       |         |         |         |
  0+25       0.5975     29.49  V  Q       |         |         |         |
  0+30       0.8437     35.75  |V  Q      |         |         |         |
  0+35       1.1293     41.47  |V   Q     |         |         |         |
```

```
    0+40       1.4405     45.18  | V   Q   |          |          |          |
    0+45       1.7693     47.75  | V   Q   |          |          |          |
    0+50       2.1198     50.89  |  V  Q   |          |          |          |
    0+55       2.4709     50.97  |  V  Q   |          |          |          |
    1+ 0       2.8163     50.16  |   V Q   |          |          |          |
    1+ 5       3.1823     53.14  |   V  Q  |          |          |          |
    1+10       3.5948     59.89  |    V Q  |          |          |          |
    1+15       4.0542     66.71  |     V Q |          |          |          |
    1+20       4.5369     70.08  |     V  Q|          |          |          |
    1+25       5.0304     71.67  |      V Q|          |          |          |
    1+30       5.5562     76.34  |       V Q          |          |          |
    1+35       6.1341     83.92  |        V|Q         |          |          |
    1+40       6.7362     87.41  |         VQ         |          |          |
    1+45       7.3602     90.61  |          |VQ       |          |          |
    1+50       8.0436     99.23  |          | VQ      |          |          |
    1+55       8.7804    106.98  |          |  VQ     |          |          |
    2+ 0       9.5276    108.49  |          |   Q     |          |          |
    2+ 5      10.2765    108.74  |          |   QV    |          |          |
    2+10      11.0576    113.42  |          |    Q V  |          |          |
    2+15      11.9368    127.65  |          |      QV |          |          |
    2+20      12.9496    147.06  |          |        Q|          |          |
    2+25      14.0477    159.45  |          |         |Q         |          |
    2+30      15.3021    182.14  |          |         |  VQ      |          |
    2+35      16.8553    225.53  |          |         |    V     Q          |
    2+40      18.6281    257.41  |          |         |       V  |   Q      |
    2+45      20.3754    253.70  |          |         |          |V Q       |
    2+50      21.7808    204.06  |          |         |      Q   |  V       |
    2+55      22.7916    146.77  |          |        Q|          |    V     |
    3+ 0      23.5705    113.09  |          |    Q    |          |     V    |
    3+ 5      24.1709     87.18  |          |Q        |          |      V   |
    3+10      24.5938     61.41  |        Q |         |          |      V   |
    3+15      24.8977     44.13  |    Q     |         |          |       V  |
    3+20      25.1314     33.93  |   Q      |         |          |       V  |
    3+25      25.3158     26.78  |  Q       |         |          |        V|
    3+30      25.4645     21.58  | Q        |         |          |        V|
    3+35      25.5850     17.50  | Q        |         |          |        V|
    3+40      25.6815     14.01  |Q         |         |          |        V|
    3+45      25.7579     11.09  |Q         |         |          |        V|
    3+50      25.8175      8.66  |Q         |         |          |        V|
    3+55      25.8657      7.00  Q          |         |          |        V|
    4+ 0      25.9017      5.23  Q          |         |          |        V|
    4+ 5      25.9268      3.64  Q          |         |          |        V|
    4+10      25.9404      1.98  Q          |         |          |        V|
    4+15      25.9464      0.87  Q          |         |          |        V|
    4+20      25.9502      0.56  Q          |         |          |        V|
    4+25      25.9522      0.29  Q          |         |          |        V|
    4+30      25.9525      0.03  Q          |         |          |         V
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

      Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
            Study date  03/20/24 File: 907hydcoff6100.out


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C offsite = 209.1 Ac
100-year 6-hour storm



------------------------------------------------------------------------
Drainage Area =     209.10(Ac.)  =      0.327 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =     209.10(Ac.)  =      0.327 Sq. Mi.
Length along longest watercourse =    5085.00(Ft.)
Length along longest watercourse measured to centroid =    2227.00(Ft.)
Length along longest watercourse =      0.963 Mi.
Length along longest watercourse measured to centroid =      0.422 Mi.
Difference in elevation =     164.00(Ft.)
Slope along watercourse =    170.2891 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.193 Hr.
Lag time =    11.56 Min.
25% of lag time =     2.89 Min.
40% of lag time =     4.62 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          0.95              198.64

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          2.45              512.30

STORM EVENT (YEAR) =  100.00
```

```
Area Averaged 2-Year Rainfall =    0.950(In)
Area Averaged 100-Year Rainfall =    2.450(In)

Point rain (area averaged) =    2.450(In)
Areal adjustment factor =   99.93 %
Adjusted average point rain =    2.448(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
   155.100            81.80          0.000
     3.900            69.00          0.050
    50.100            72.60          0.750
 Total Area Entered =    209.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
81.8  92.1      0.103     0.000        0.103        0.742      0.076
69.0  84.4      0.194     0.050        0.185        0.019      0.003
72.6  86.6      0.169     0.750        0.055        0.240      0.013
                                                  Sum (F) =   0.093
Area averaged mean soil loss (F) (In/Hr) =  0.093
Minimum soil loss rate ((In/Hr)) =  0.047
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.760
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         43.260          4.906            10.338
    2   0.167         86.521         20.503            43.207
    3   0.250        129.781         28.159            59.341
    4   0.333        173.041         15.836            33.372
    5   0.417        216.301          7.720            16.268
    6   0.500        259.562          5.139            10.829
    7   0.583        302.822          3.838             8.087
    8   0.667        346.082          2.866             6.041
    9   0.750        389.342          2.309             4.867
   10   0.833        432.603          1.759             3.707
   11   0.917        475.863          1.385             2.918
   12   1.000        519.123          1.271             2.678
   13   1.083        562.384          0.999             2.104
   14   1.167        605.644          0.821             1.731
   15   1.250        648.904          0.671             1.414
   16   1.333        692.164          0.523             1.103
   17   1.417        735.425          0.433             0.912
   18   1.500        778.685          0.433             0.912
   19   1.583        821.945          0.429             0.905
                              Sum = 100.000   Sum=     210.734
------------------------------------------------------------------------

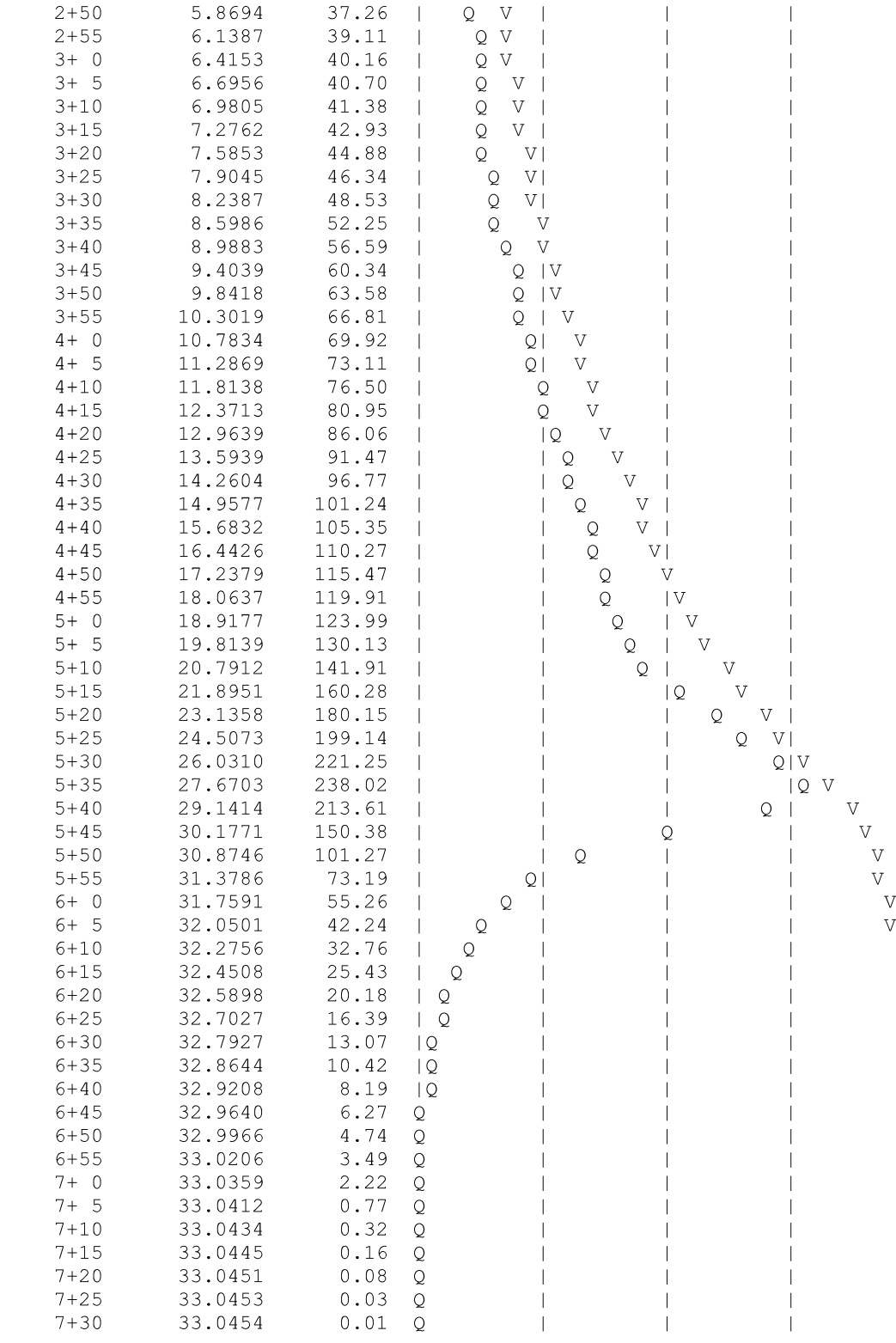
 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
```

1	0.08	0.50	0.147	0.093	(0.112)	0.054
2	0.17	0.60	0.176	0.093	(0.134)	0.083
3	0.25	0.60	0.176	0.093	(0.134)	0.083
4	0.33	0.60	0.176	0.093	(0.134)	0.083
5	0.42	0.60	0.176	0.093	(0.134)	0.083
6	0.50	0.70	0.206	0.093	(0.156)	0.113
7	0.58	0.70	0.206	0.093	(0.156)	0.113
8	0.67	0.70	0.206	0.093	(0.156)	0.113
9	0.75	0.70	0.206	0.093	(0.156)	0.113
10	0.83	0.70	0.206	0.093	(0.156)	0.113
11	0.92	0.70	0.206	0.093	(0.156)	0.113
12	1.00	0.80	0.235	0.093	(0.179)	0.142
13	1.08	0.80	0.235	0.093	(0.179)	0.142
14	1.17	0.80	0.235	0.093	(0.179)	0.142
15	1.25	0.80	0.235	0.093	(0.179)	0.142
16	1.33	0.80	0.235	0.093	(0.179)	0.142
17	1.42	0.80	0.235	0.093	(0.179)	0.142
18	1.50	0.80	0.235	0.093	(0.179)	0.142
19	1.58	0.80	0.235	0.093	(0.179)	0.142
20	1.67	0.80	0.235	0.093	(0.179)	0.142
21	1.75	0.80	0.235	0.093	(0.179)	0.142
22	1.83	0.80	0.235	0.093	(0.179)	0.142
23	1.92	0.80	0.235	0.093	(0.179)	0.142
24	2.00	0.90	0.264	0.093	(0.201)	0.171
25	2.08	0.80	0.235	0.093	(0.179)	0.142
26	2.17	0.90	0.264	0.093	(0.201)	0.171
27	2.25	0.90	0.264	0.093	(0.201)	0.171
28	2.33	0.90	0.264	0.093	(0.201)	0.171
29	2.42	0.90	0.264	0.093	(0.201)	0.171
30	2.50	0.90	0.264	0.093	(0.201)	0.171
31	2.58	0.90	0.264	0.093	(0.201)	0.171
32	2.67	0.90	0.264	0.093	(0.201)	0.171
33	2.75	1.00	0.294	0.093	(0.223)	0.201
34	2.83	1.00	0.294	0.093	(0.223)	0.201
35	2.92	1.00	0.294	0.093	(0.223)	0.201
36	3.00	1.00	0.294	0.093	(0.223)	0.201
37	3.08	1.00	0.294	0.093	(0.223)	0.201
38	3.17	1.10	0.323	0.093	(0.246)	0.230
39	3.25	1.10	0.323	0.093	(0.246)	0.230
40	3.33	1.10	0.323	0.093	(0.246)	0.230
41	3.42	1.20	0.353	0.093	(0.268)	0.260
42	3.50	1.30	0.382	0.093	(0.290)	0.289
43	3.58	1.40	0.411	0.093	(0.313)	0.318
44	3.67	1.40	0.411	0.093	(0.313)	0.318
45	3.75	1.50	0.441	0.093	(0.335)	0.348
46	3.83	1.50	0.441	0.093	(0.335)	0.348
47	3.92	1.60	0.470	0.093	(0.357)	0.377
48	4.00	1.60	0.470	0.093	(0.357)	0.377
49	4.08	1.70	0.499	0.093	(0.380)	0.406
50	4.17	1.80	0.529	0.093	(0.402)	0.436
51	4.25	1.90	0.558	0.093	(0.424)	0.465
52	4.33	2.00	0.588	0.093	(0.447)	0.495
53	4.42	2.10	0.617	0.093	(0.469)	0.524
54	4.50	2.10	0.617	0.093	(0.469)	0.524
55	4.58	2.20	0.646	0.093	(0.491)	0.553
56	4.67	2.30	0.676	0.093	(0.514)	0.583
57	4.75	2.40	0.705	0.093	(0.536)	0.612
58	4.83	2.40	0.705	0.093	(0.536)	0.612
59	4.92	2.50	0.734	0.093	(0.558)	0.641
60	5.00	2.60	0.764	0.093	(0.581)	0.671
61	5.08	3.10	0.911	0.093	(0.692)	0.818
62	5.17	3.60	1.058	0.093	(0.804)	0.965
63	5.25	3.90	1.146	0.093	(0.871)	1.053

```
64   5.33     4.20      1.234          0.093    (  0.938)        1.141
65   5.42     4.70      1.381          0.093    (  1.049)        1.288
66   5.50     5.60      1.645          0.093    (  1.250)        1.552
67   5.58     1.90      0.558          0.093    (  0.424)        0.465
68   5.67     0.90      0.264          0.093    (  0.201)        0.171
69   5.75     0.60      0.176          0.093    (  0.134)        0.083
70   5.83     0.50      0.147          0.093    (  0.112)        0.054
71   5.92     0.30      0.088       (  0.093)       0.067        0.021
72   6.00     0.20      0.059       (  0.093)       0.045        0.014
            (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    22.8
     Flood volume = Effective rainfall      1.90(In)
      times area     209.1(Ac.)/[(In)/(Ft.)] =      33.0(Ac.Ft)
     Total soil loss =      0.55(In)
     Total soil loss =     9.615(Ac.Ft)
     Total rainfall =      2.45(In)
     Flood volume =     1439457.0 Cubic Feet
     Total soil loss =      418837.2 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =    238.016(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         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   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       75.0     150.0     225.0     300.0
-------------------------------------------------------------------------
  0+ 5       0.0038      0.56  Q          |          |          |          |
  0+10       0.0258      3.19  Q          |          |          |          |
  0+15       0.0786      7.66  VQ         |          |          |          |
  0+20       0.1557     11.20  VQ         |          |          |          |
  0+25       0.2457     13.06  VQ         |          |          |          |
  0+30       0.3451     14.43  VQ         |          |          |          |
  0+35       0.4584     16.45  V Q        |          |          |          |
  0+40       0.5876     18.76  V Q        |          |          |          |
  0+45       0.7266     20.18  V Q        |          |          |          |
  0+50       0.8713     21.00  |VQ        |          |          |          |
  0+55       1.0199     21.59  |VQ        |          |          |          |
  1+ 0       1.1739     22.36  |VQ        |          |          |          |
  1+ 5       1.3392     24.00  |V Q       |          |          |          |
  1+10       1.5186     26.04  |V Q       |          |          |          |
  1+15       1.7063     27.26  | VQ       |          |          |          |
  1+20       1.8986     27.92  | VQ       |          |          |          |
  1+25       2.0942     28.40  | VQ       |          |          |          |
  1+30       2.2924     28.78  | VQ       |          |          |          |
  1+35       2.4927     29.08  |  Q       |          |          |          |
  1+40       2.6944     29.29  |  Q       |          |          |          |
  1+45       2.8972     29.43  |  Q       |          |          |          |
  1+50       3.1006     29.55  |  Q       |          |          |          |
  1+55       3.3049     29.65  |  QV      |          |          |          |
  2+ 0       3.5118     30.04  |   Q      |          |          |          |
  2+ 5       3.7257     31.06  |   Q      |          |          |          |
  2+10       3.9453     31.88  |   Q      |          |          |          |
  2+15       4.1686     32.42  |   QV     |          |          |          |
  2+20       4.4006     33.69  |   QV     |          |          |          |
  2+25       4.6384     34.54  |   QV     |          |          |          |
  2+30       4.8792     34.96  |   QV     |          |          |          |
  2+35       5.1218     35.22  |   Q V    |          |          |          |
  2+40       5.3657     35.42  |   Q V    |          |          |          |
  2+45       5.6128     35.87  |   Q V    |          |          |          |
```



2+50	5.8694	37.26					
2+55	6.1387	39.11					
3+ 0	6.4153	40.16					
3+ 5	6.6956	40.70					
3+10	6.9805	41.38					
3+15	7.2762	42.93					
3+20	7.5853	44.88					
3+25	7.9045	46.34					
3+30	8.2387	48.53					
3+35	8.5986	52.25					
3+40	8.9883	56.59					
3+45	9.4039	60.34					
3+50	9.8418	63.58					
3+55	10.3019	66.81					
4+ 0	10.7834	69.92					
4+ 5	11.2869	73.11					
4+10	11.8138	76.50					
4+15	12.3713	80.95					
4+20	12.9639	86.06					
4+25	13.5939	91.47					
4+30	14.2604	96.77					
4+35	14.9577	101.24					
4+40	15.6832	105.35					
4+45	16.4426	110.27					
4+50	17.2379	115.47					
4+55	18.0637	119.91					
5+ 0	18.9177	123.99					
5+ 5	19.8139	130.13					
5+10	20.7912	141.91					
5+15	21.8951	160.28					
5+20	23.1358	180.15					
5+25	24.5073	199.14					
5+30	26.0310	221.25					
5+35	27.6703	238.02					
5+40	29.1414	213.61					
5+45	30.1771	150.38					
5+50	30.8746	101.27					
5+55	31.3786	73.19					
6+ 0	31.7591	55.26					
6+ 5	32.0501	42.24					
6+10	32.2756	32.76					
6+15	32.4508	25.43					
6+20	32.5898	20.18					
6+25	32.7027	16.39					
6+30	32.7927	13.07					
6+35	32.8644	10.42					
6+40	32.9208	8.19					
6+45	32.9640	6.27					
6+50	32.9966	4.74					
6+55	33.0206	3.49					
7+ 0	33.0359	2.22					
7+ 5	33.0412	0.77					
7+10	33.0434	0.32					
7+15	33.0445	0.16					
7+20	33.0451	0.08					
7+25	33.0453	0.03					
7+30	33.0454	0.01					

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydcoff24100.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C offsite = 209.1 Ac
100-year 24-hour storm



----------------------------------------------------------------------
Drainage Area =     209.10(Ac.)  =      0.327 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =     209.10(Ac.)  =      0.327 Sq. Mi.
Length along longest watercourse =    5085.00(Ft.)
Length along longest watercourse measured to centroid =    2227.00(Ft.)
Length along longest watercourse =      0.963 Mi.
Length along longest watercourse measured to centroid =      0.422 Mi.
Difference in elevation =     164.00(Ft.)
Slope along watercourse =    170.2891 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.193 Hr.
Lag time =    11.56 Min.
25% of lag time =     2.89 Min.
40% of lag time =     4.62 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          1.55              324.11

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      209.10          4.05              846.85

STORM EVENT (YEAR) =  100.00
```

```
Area Averaged 2-Year Rainfall =    1.550(In)
Area Averaged 100-Year Rainfall =    4.050(In)

Point rain (area averaged) =    4.050(In)
Areal adjustment factor =   99.96 %
Adjusted average point rain =    4.048(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
   155.100            81.80          0.000
     3.900            69.00          0.050
    50.100            72.60          0.750
 Total Area Entered =    209.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
81.8  92.1      0.103     0.000         0.103        0.742      0.076
69.0  84.4      0.194     0.050         0.185        0.019      0.003
72.6  86.6      0.169     0.750         0.055        0.240      0.013
                                                   Sum (F) =   0.093
Area averaged mean soil loss (F) (In/Hr) =  0.093
Minimum soil loss rate ((In/Hr)) =  0.047
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.760
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         43.260          4.906             10.338
    2   0.167         86.521         20.503             43.207
    3   0.250        129.781         28.159             59.341
    4   0.333        173.041         15.836             33.372
    5   0.417        216.301          7.720             16.268
    6   0.500        259.562          5.139             10.829
    7   0.583        302.822          3.838              8.087
    8   0.667        346.082          2.866              6.041
    9   0.750        389.342          2.309              4.867
   10   0.833        432.603          1.759              3.707
   11   0.917        475.863          1.385              2.918
   12   1.000        519.123          1.271              2.678
   13   1.083        562.384          0.999              2.104
   14   1.167        605.644          0.821              1.731
   15   1.250        648.904          0.671              1.414
   16   1.333        692.164          0.523              1.103
   17   1.417        735.425          0.433              0.912
   18   1.500        778.685          0.433              0.912
   19   1.583        821.945          0.429              0.905
                               Sum = 100.000   Sum=     210.734
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
```

1	0.08	0.07	0.032	(0.165)	0.025	0.008
2	0.17	0.07	0.032	(0.164)	0.025	0.008
3	0.25	0.07	0.032	(0.164)	0.025	0.008
4	0.33	0.10	0.049	(0.163)	0.037	0.012
5	0.42	0.10	0.049	(0.162)	0.037	0.012
6	0.50	0.10	0.049	(0.162)	0.037	0.012
7	0.58	0.10	0.049	(0.161)	0.037	0.012
8	0.67	0.10	0.049	(0.160)	0.037	0.012
9	0.75	0.10	0.049	(0.160)	0.037	0.012
10	0.83	0.13	0.065	(0.159)	0.049	0.016
11	0.92	0.13	0.065	(0.159)	0.049	0.016
12	1.00	0.13	0.065	(0.158)	0.049	0.016
13	1.08	0.10	0.049	(0.157)	0.037	0.012
14	1.17	0.10	0.049	(0.157)	0.037	0.012
15	1.25	0.10	0.049	(0.156)	0.037	0.012
16	1.33	0.10	0.049	(0.155)	0.037	0.012
17	1.42	0.10	0.049	(0.155)	0.037	0.012
18	1.50	0.10	0.049	(0.154)	0.037	0.012
19	1.58	0.10	0.049	(0.154)	0.037	0.012
20	1.67	0.10	0.049	(0.153)	0.037	0.012
21	1.75	0.10	0.049	(0.152)	0.037	0.012
22	1.83	0.13	0.065	(0.152)	0.049	0.016
23	1.92	0.13	0.065	(0.151)	0.049	0.016
24	2.00	0.13	0.065	(0.151)	0.049	0.016
25	2.08	0.13	0.065	(0.150)	0.049	0.016
26	2.17	0.13	0.065	(0.149)	0.049	0.016
27	2.25	0.13	0.065	(0.149)	0.049	0.016
28	2.33	0.13	0.065	(0.148)	0.049	0.016
29	2.42	0.13	0.065	(0.147)	0.049	0.016
30	2.50	0.13	0.065	(0.147)	0.049	0.016
31	2.58	0.17	0.081	(0.146)	0.062	0.019
32	2.67	0.17	0.081	(0.146)	0.062	0.019
33	2.75	0.17	0.081	(0.145)	0.062	0.019
34	2.83	0.17	0.081	(0.144)	0.062	0.019
35	2.92	0.17	0.081	(0.144)	0.062	0.019
36	3.00	0.17	0.081	(0.143)	0.062	0.019
37	3.08	0.17	0.081	(0.143)	0.062	0.019
38	3.17	0.17	0.081	(0.142)	0.062	0.019
39	3.25	0.17	0.081	(0.142)	0.062	0.019
40	3.33	0.17	0.081	(0.141)	0.062	0.019
41	3.42	0.17	0.081	(0.140)	0.062	0.019
42	3.50	0.17	0.081	(0.140)	0.062	0.019
43	3.58	0.17	0.081	(0.139)	0.062	0.019
44	3.67	0.17	0.081	(0.139)	0.062	0.019
45	3.75	0.17	0.081	(0.138)	0.062	0.019
46	3.83	0.20	0.097	(0.137)	0.074	0.023
47	3.92	0.20	0.097	(0.137)	0.074	0.023
48	4.00	0.20	0.097	(0.136)	0.074	0.023
49	4.08	0.20	0.097	(0.136)	0.074	0.023
50	4.17	0.20	0.097	(0.135)	0.074	0.023
51	4.25	0.20	0.097	(0.135)	0.074	0.023
52	4.33	0.23	0.113	(0.134)	0.086	0.027
53	4.42	0.23	0.113	(0.133)	0.086	0.027
54	4.50	0.23	0.113	(0.133)	0.086	0.027
55	4.58	0.23	0.113	(0.132)	0.086	0.027
56	4.67	0.23	0.113	(0.132)	0.086	0.027
57	4.75	0.23	0.113	(0.131)	0.086	0.027
58	4.83	0.27	0.130	(0.131)	0.098	0.031
59	4.92	0.27	0.130	(0.130)	0.098	0.031
60	5.00	0.27	0.130	(0.129)	0.098	0.031
61	5.08	0.20	0.097	(0.129)	0.074	0.023
62	5.17	0.20	0.097	(0.128)	0.074	0.023
63	5.25	0.20	0.097	(0.128)	0.074	0.023

64	5.33	0.23	0.113	(0.127)	0.086	0.027
65	5.42	0.23	0.113	(0.127)	0.086	0.027
66	5.50	0.23	0.113	(0.126)	0.086	0.027
67	5.58	0.27	0.130	(0.126)	0.098	0.031
68	5.67	0.27	0.130	(0.125)	0.098	0.031
69	5.75	0.27	0.130	(0.124)	0.098	0.031
70	5.83	0.27	0.130	(0.124)	0.098	0.031
71	5.92	0.27	0.130	(0.123)	0.098	0.031
72	6.00	0.27	0.130	(0.123)	0.098	0.031
73	6.08	0.30	0.146	(0.122)	0.111	0.035
74	6.17	0.30	0.146	(0.122)	0.111	0.035
75	6.25	0.30	0.146	(0.121)	0.111	0.035
76	6.33	0.30	0.146	(0.121)	0.111	0.035
77	6.42	0.30	0.146	(0.120)	0.111	0.035
78	6.50	0.30	0.146	(0.120)	0.111	0.035
79	6.58	0.33	0.162	0.119	(0.123)	0.043
80	6.67	0.33	0.162	0.118	(0.123)	0.043
81	6.75	0.33	0.162	0.118	(0.123)	0.044
82	6.83	0.33	0.162	0.117	(0.123)	0.045
83	6.92	0.33	0.162	0.117	(0.123)	0.045
84	7.00	0.33	0.162	0.116	(0.123)	0.046
85	7.08	0.33	0.162	0.116	(0.123)	0.046
86	7.17	0.33	0.162	0.115	(0.123)	0.047
87	7.25	0.33	0.162	0.115	(0.123)	0.047
88	7.33	0.37	0.178	0.114	(0.135)	0.064
89	7.42	0.37	0.178	0.114	(0.135)	0.064
90	7.50	0.37	0.178	0.113	(0.135)	0.065
91	7.58	0.40	0.194	0.113	(0.148)	0.082
92	7.67	0.40	0.194	0.112	(0.148)	0.082
93	7.75	0.40	0.194	0.112	(0.148)	0.083
94	7.83	0.43	0.211	0.111	(0.160)	0.099
95	7.92	0.43	0.211	0.111	(0.160)	0.100
96	8.00	0.43	0.211	0.110	(0.160)	0.100
97	8.08	0.50	0.243	0.110	(0.185)	0.133
98	8.17	0.50	0.243	0.109	(0.185)	0.134
99	8.25	0.50	0.243	0.109	(0.185)	0.134
100	8.33	0.50	0.243	0.108	(0.185)	0.135
101	8.42	0.50	0.243	0.108	(0.185)	0.135
102	8.50	0.50	0.243	0.107	(0.185)	0.136
103	8.58	0.53	0.259	0.107	(0.197)	0.153
104	8.67	0.53	0.259	0.106	(0.197)	0.153
105	8.75	0.53	0.259	0.106	(0.197)	0.154
106	8.83	0.57	0.275	0.105	(0.209)	0.170
107	8.92	0.57	0.275	0.105	(0.209)	0.171
108	9.00	0.57	0.275	0.104	(0.209)	0.171
109	9.08	0.63	0.308	0.104	(0.234)	0.204
110	9.17	0.63	0.308	0.103	(0.234)	0.205
111	9.25	0.63	0.308	0.103	(0.234)	0.205
112	9.33	0.67	0.324	0.102	(0.246)	0.222
113	9.42	0.67	0.324	0.102	(0.246)	0.222
114	9.50	0.67	0.324	0.101	(0.246)	0.223
115	9.58	0.70	0.340	0.101	(0.258)	0.239
116	9.67	0.70	0.340	0.100	(0.258)	0.240
117	9.75	0.70	0.340	0.100	(0.258)	0.240
118	9.83	0.73	0.356	0.099	(0.271)	0.257
119	9.92	0.73	0.356	0.099	(0.271)	0.258
120	10.00	0.73	0.356	0.098	(0.271)	0.258
121	10.08	0.50	0.243	0.098	(0.185)	0.145
122	10.17	0.50	0.243	0.097	(0.185)	0.146
123	10.25	0.50	0.243	0.097	(0.185)	0.146
124	10.33	0.50	0.243	0.096	(0.185)	0.147
125	10.42	0.50	0.243	0.096	(0.185)	0.147
126	10.50	0.50	0.243	0.095	(0.185)	0.148

127	10.58	0.67	0.324	0.095	(0.246)	0.229
128	10.67	0.67	0.324	0.094	(0.246)	0.229
129	10.75	0.67	0.324	0.094	(0.246)	0.230
130	10.83	0.67	0.324	0.094	(0.246)	0.230
131	10.92	0.67	0.324	0.093	(0.246)	0.231
132	11.00	0.67	0.324	0.093	(0.246)	0.231
133	11.08	0.63	0.308	0.092	(0.234)	0.216
134	11.17	0.63	0.308	0.092	(0.234)	0.216
135	11.25	0.63	0.308	0.091	(0.234)	0.216
136	11.33	0.63	0.308	0.091	(0.234)	0.217
137	11.42	0.63	0.308	0.090	(0.234)	0.217
138	11.50	0.63	0.308	0.090	(0.234)	0.218
139	11.58	0.57	0.275	0.089	(0.209)	0.186
140	11.67	0.57	0.275	0.089	(0.209)	0.186
141	11.75	0.57	0.275	0.089	(0.209)	0.187
142	11.83	0.60	0.291	0.088	(0.222)	0.203
143	11.92	0.60	0.291	0.088	(0.222)	0.204
144	12.00	0.60	0.291	0.087	(0.222)	0.204
145	12.08	0.83	0.405	0.087	(0.308)	0.318
146	12.17	0.83	0.405	0.086	(0.308)	0.318
147	12.25	0.83	0.405	0.086	(0.308)	0.319
148	12.33	0.87	0.421	0.086	(0.320)	0.336
149	12.42	0.87	0.421	0.085	(0.320)	0.336
150	12.50	0.87	0.421	0.085	(0.320)	0.336
151	12.58	0.93	0.453	0.084	(0.345)	0.369
152	12.67	0.93	0.453	0.084	(0.345)	0.370
153	12.75	0.93	0.453	0.083	(0.345)	0.370
154	12.83	0.97	0.470	0.083	(0.357)	0.387
155	12.92	0.97	0.470	0.083	(0.357)	0.387
156	13.00	0.97	0.470	0.082	(0.357)	0.387
157	13.08	1.13	0.551	0.082	(0.418)	0.469
158	13.17	1.13	0.551	0.081	(0.418)	0.469
159	13.25	1.13	0.551	0.081	(0.418)	0.470
160	13.33	1.13	0.551	0.080	(0.418)	0.470
161	13.42	1.13	0.551	0.080	(0.418)	0.471
162	13.50	1.13	0.551	0.080	(0.418)	0.471
163	13.58	0.77	0.372	0.079	(0.283)	0.293
164	13.67	0.77	0.372	0.079	(0.283)	0.294
165	13.75	0.77	0.372	0.078	(0.283)	0.294
166	13.83	0.77	0.372	0.078	(0.283)	0.294
167	13.92	0.77	0.372	0.078	(0.283)	0.295
168	14.00	0.77	0.372	0.077	(0.283)	0.295
169	14.08	0.90	0.437	0.077	(0.332)	0.360
170	14.17	0.90	0.437	0.076	(0.332)	0.361
171	14.25	0.90	0.437	0.076	(0.332)	0.361
172	14.33	0.87	0.421	0.076	(0.320)	0.345
173	14.42	0.87	0.421	0.075	(0.320)	0.346
174	14.50	0.87	0.421	0.075	(0.320)	0.346
175	14.58	0.87	0.421	0.075	(0.320)	0.347
176	14.67	0.87	0.421	0.074	(0.320)	0.347
177	14.75	0.87	0.421	0.074	(0.320)	0.347
178	14.83	0.83	0.405	0.073	(0.308)	0.331
179	14.92	0.83	0.405	0.073	(0.308)	0.332
180	15.00	0.83	0.405	0.073	(0.308)	0.332
181	15.08	0.80	0.389	0.072	(0.295)	0.316
182	15.17	0.80	0.389	0.072	(0.295)	0.317
183	15.25	0.80	0.389	0.072	(0.295)	0.317
184	15.33	0.77	0.372	0.071	(0.283)	0.301
185	15.42	0.77	0.372	0.071	(0.283)	0.302
186	15.50	0.77	0.372	0.070	(0.283)	0.302
187	15.58	0.63	0.308	0.070	(0.234)	0.238
188	15.67	0.63	0.308	0.070	(0.234)	0.238
189	15.75	0.63	0.308	0.069	(0.234)	0.238

190	15.83	0.63	0.308	0.069	(0.234)	0.239
191	15.92	0.63	0.308	0.069	(0.234)	0.239
192	16.00	0.63	0.308	0.068	(0.234)	0.239
193	16.08	0.13	0.065	(0.068)	0.049	0.016
194	16.17	0.13	0.065	(0.068)	0.049	0.016
195	16.25	0.13	0.065	(0.067)	0.049	0.016
196	16.33	0.13	0.065	(0.067)	0.049	0.016
197	16.42	0.13	0.065	(0.067)	0.049	0.016
198	16.50	0.13	0.065	(0.066)	0.049	0.016
199	16.58	0.10	0.049	(0.066)	0.037	0.012
200	16.67	0.10	0.049	(0.066)	0.037	0.012
201	16.75	0.10	0.049	(0.065)	0.037	0.012
202	16.83	0.10	0.049	(0.065)	0.037	0.012
203	16.92	0.10	0.049	(0.065)	0.037	0.012
204	17.00	0.10	0.049	(0.064)	0.037	0.012
205	17.08	0.17	0.081	(0.064)	0.062	0.019
206	17.17	0.17	0.081	(0.064)	0.062	0.019
207	17.25	0.17	0.081	(0.063)	0.062	0.019
208	17.33	0.17	0.081	(0.063)	0.062	0.019
209	17.42	0.17	0.081	(0.063)	0.062	0.019
210	17.50	0.17	0.081	(0.062)	0.062	0.019
211	17.58	0.17	0.081	(0.062)	0.062	0.019
212	17.67	0.17	0.081	(0.062)	0.062	0.019
213	17.75	0.17	0.081	0.061	(0.062)	0.020
214	17.83	0.13	0.065	(0.061)	0.049	0.016
215	17.92	0.13	0.065	(0.061)	0.049	0.016
216	18.00	0.13	0.065	(0.060)	0.049	0.016
217	18.08	0.13	0.065	(0.060)	0.049	0.016
218	18.17	0.13	0.065	(0.060)	0.049	0.016
219	18.25	0.13	0.065	(0.060)	0.049	0.016
220	18.33	0.13	0.065	(0.059)	0.049	0.016
221	18.42	0.13	0.065	(0.059)	0.049	0.016
222	18.50	0.13	0.065	(0.059)	0.049	0.016
223	18.58	0.10	0.049	(0.058)	0.037	0.012
224	18.67	0.10	0.049	(0.058)	0.037	0.012
225	18.75	0.10	0.049	(0.058)	0.037	0.012
226	18.83	0.07	0.032	(0.058)	0.025	0.008
227	18.92	0.07	0.032	(0.057)	0.025	0.008
228	19.00	0.07	0.032	(0.057)	0.025	0.008
229	19.08	0.10	0.049	(0.057)	0.037	0.012
230	19.17	0.10	0.049	(0.057)	0.037	0.012
231	19.25	0.10	0.049	(0.056)	0.037	0.012
232	19.33	0.13	0.065	(0.056)	0.049	0.016
233	19.42	0.13	0.065	(0.056)	0.049	0.016
234	19.50	0.13	0.065	(0.055)	0.049	0.016
235	19.58	0.10	0.049	(0.055)	0.037	0.012
236	19.67	0.10	0.049	(0.055)	0.037	0.012
237	19.75	0.10	0.049	(0.055)	0.037	0.012
238	19.83	0.07	0.032	(0.054)	0.025	0.008
239	19.92	0.07	0.032	(0.054)	0.025	0.008
240	20.00	0.07	0.032	(0.054)	0.025	0.008
241	20.08	0.10	0.049	(0.054)	0.037	0.012
242	20.17	0.10	0.049	(0.054)	0.037	0.012
243	20.25	0.10	0.049	(0.053)	0.037	0.012
244	20.33	0.10	0.049	(0.053)	0.037	0.012
245	20.42	0.10	0.049	(0.053)	0.037	0.012
246	20.50	0.10	0.049	(0.053)	0.037	0.012
247	20.58	0.10	0.049	(0.052)	0.037	0.012
248	20.67	0.10	0.049	(0.052)	0.037	0.012
249	20.75	0.10	0.049	(0.052)	0.037	0.012
250	20.83	0.07	0.032	(0.052)	0.025	0.008
251	20.92	0.07	0.032	(0.052)	0.025	0.008
252	21.00	0.07	0.032	(0.051)	0.025	0.008

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253  21.08     0.10      0.049       (  0.051)       0.037        0.012
254  21.17     0.10      0.049       (  0.051)       0.037        0.012
255  21.25     0.10      0.049       (  0.051)       0.037        0.012
256  21.33     0.07      0.032       (  0.051)       0.025        0.008
257  21.42     0.07      0.032       (  0.050)       0.025        0.008
258  21.50     0.07      0.032       (  0.050)       0.025        0.008
259  21.58     0.10      0.049       (  0.050)       0.037        0.012
260  21.67     0.10      0.049       (  0.050)       0.037        0.012
261  21.75     0.10      0.049       (  0.050)       0.037        0.012
262  21.83     0.07      0.032       (  0.049)       0.025        0.008
263  21.92     0.07      0.032       (  0.049)       0.025        0.008
264  22.00     0.07      0.032       (  0.049)       0.025        0.008
265  22.08     0.10      0.049       (  0.049)       0.037        0.012
266  22.17     0.10      0.049       (  0.049)       0.037        0.012
267  22.25     0.10      0.049       (  0.049)       0.037        0.012
268  22.33     0.07      0.032       (  0.048)       0.025        0.008
269  22.42     0.07      0.032       (  0.048)       0.025        0.008
270  22.50     0.07      0.032       (  0.048)       0.025        0.008
271  22.58     0.07      0.032       (  0.048)       0.025        0.008
272  22.67     0.07      0.032       (  0.048)       0.025        0.008
273  22.75     0.07      0.032       (  0.048)       0.025        0.008
274  22.83     0.07      0.032       (  0.048)       0.025        0.008
275  22.92     0.07      0.032       (  0.048)       0.025        0.008
276  23.00     0.07      0.032       (  0.047)       0.025        0.008
277  23.08     0.07      0.032       (  0.047)       0.025        0.008
278  23.17     0.07      0.032       (  0.047)       0.025        0.008
279  23.25     0.07      0.032       (  0.047)       0.025        0.008
280  23.33     0.07      0.032       (  0.047)       0.025        0.008
281  23.42     0.07      0.032       (  0.047)       0.025        0.008
282  23.50     0.07      0.032       (  0.047)       0.025        0.008
283  23.58     0.07      0.032       (  0.047)       0.025        0.008
284  23.67     0.07      0.032       (  0.047)       0.025        0.008
285  23.75     0.07      0.032       (  0.047)       0.025        0.008
286  23.83     0.07      0.032       (  0.047)       0.025        0.008
287  23.92     0.07      0.032       (  0.047)       0.025        0.008
288  24.00     0.07      0.032       (  0.047)       0.025        0.008
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    29.4
      Flood volume = Effective rainfall      2.45(In)
       times area     209.1(Ac.)/[(In)/(Ft.)] =      42.7(Ac.Ft)
      Total soil loss =      1.60(In)
      Total soil loss =    27.813(Ac.Ft)
      Total rainfall =      4.05(In)
      Flood volume =     1861307.6 Cubic Feet
      Total soil loss =     1211520.6 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     95.203(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                      R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0       25.0      50.0      75.0     100.0
 ---------------------------------------------------------------------------
   0+ 5       0.0006      0.08  Q         |         |         |         |
   0+10       0.0034      0.42  Q         |         |         |         |
   0+15       0.0095      0.88  Q         |         |         |         |
   0+20       0.0176      1.18  Q         |         |         |         |
   0+25       0.0277      1.47  Q         |         |         |         |
   0+30       0.0400      1.79  Q         |         |         |         |
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0+35	0.0537	1.98	Q	|	|	|	|
0+40	0.0681	2.09	Q	|	|	|	|
0+45	0.0830	2.17	Q	|	|	|	|
0+50	0.0986	2.27	Q	|	|	|	|
0+55	0.1157	2.48	Q	|	|	|	|
1+ 0	0.1347	2.76	VQ	|	|	|	|
1+ 5	0.1545	2.88	VQ	|	|	|	|
1+10	0.1738	2.80	VQ	|	|	|	|
1+15	0.1919	2.63	VQ	|	|	|	|
1+20	0.2094	2.55	VQ	|	|	|	|
1+25	0.2268	2.52	VQ	|	|	|	|
1+30	0.2441	2.51	VQ	|	|	|	|
1+35	0.2613	2.50	VQ	|	|	|	|
1+40	0.2785	2.50	Q	|	|	|	|
1+45	0.2957	2.49	Q	|	|	|	|
1+50	0.3131	2.53	VQ	|	|	|	|
1+55	0.3316	2.69	VQ	|	|	|	|
2+ 0	0.3517	2.92	VQ	|	|	|	|
2+ 5	0.3727	3.04	VQ	|	|	|	|
2+10	0.3940	3.10	VQ	|	|	|	|
2+15	0.4157	3.14	VQ	|	|	|	|
2+20	0.4376	3.17	VQ	|	|	|	|
2+25	0.4596	3.19	VQ	|	|	|	|
2+30	0.4817	3.21	VQ	|	|	|	|
2+35	0.5041	3.26	VQ	|	|	|	|
2+40	0.5278	3.44	VQ	|	|	|	|
2+45	0.5532	3.68	VQ	|	|	|	|
2+50	0.5795	3.82	VQ	|	|	|	|
2+55	0.6063	3.89	VQ	|	|	|	|
3+ 0	0.6334	3.94	VQ	|	|	|	|
3+ 5	0.6607	3.97	VQ	|	|	|	|
3+10	0.6883	4.00	VQ	|	|	|	|
3+15	0.7160	4.02	VQ	|	|	|	|
3+20	0.7438	4.04	VQ	|	|	|	|
3+25	0.7717	4.05	VQ	|	|	|	|
3+30	0.7997	4.06	VQ	|	|	|	|
3+35	0.8277	4.07	VQ	|	|	|	|
3+40	0.8558	4.08	VQ	|	|	|	|
3+45	0.8839	4.08	VQ	|	|	|	|
3+50	0.9123	4.13	VQ	|	|	|	|
3+55	0.9419	4.30	VQ	|	|	|	|
4+ 0	0.9731	4.53	VQ	|	|	|	|
4+ 5	1.0053	4.67	VQ	|	|	|	|
4+10	1.0378	4.73	VQ	|	|	|	|
4+15	1.0707	4.77	|Q	|	|	|	|
4+20	1.1040	4.84	|Q	|	|	|	|
4+25	1.1387	5.03	|VQ	|	|	|	|
4+30	1.1751	5.28	|VQ	|	|	|	|
4+35	1.2125	5.43	|VQ	|	|	|	|
4+40	1.2504	5.50	|VQ	|	|	|	|
4+45	1.2886	5.56	|VQ	|	|	|	|
4+50	1.3275	5.64	|VQ	|	|	|	|
4+55	1.3676	5.83	|VQ	|	|	|	|
5+ 0	1.4096	6.09	|VQ	|	|	|	|
5+ 5	1.4520	6.16	|VQ	|	|	|	|
5+10	1.4926	5.90	|VQ	|	|	|	|
5+15	1.5304	5.49	|VQ	|	|	|	|
5+20	1.5670	5.32	|VQ	|	|	|	|
5+25	1.6042	5.39	|VQ	|	|	|	|
5+30	1.6424	5.56	|VQ	|	|	|	|
5+35	1.6816	5.69	|VQ	|	|	|	|
5+40	1.7221	5.88	|VQ	|	|	|	|
5+45	1.7644	6.13	|VQ	|	|	|	|

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 5+50       1.8076      6.28  |VQ        |          |          |          |
 5+55       1.8513      6.35  |VQ        |          |          |          |
 6+ 0       1.8954      6.39  |VQ        |          |          |          |
 6+ 5       1.9399      6.47  |VQ        |          |          |          |
 6+10       1.9858      6.66  |VQ        |          |          |          |
 6+15       2.0334      6.91  |VQ        |          |          |          |
 6+20       2.0820      7.06  |VQ        |          |          |          |
 6+25       2.1312      7.14  |VQ        |          |          |          |
 6+30       2.1807      7.19  | Q        |          |          |          |
 6+35       2.2310      7.31  | Q        |          |          |          |
 6+40       2.2840      7.69  | VQ       |          |          |          |
 6+45       2.3406      8.22  | VQ       |          |          |          |
 6+50       2.3996      8.57  | VQ       |          |          |          |
 6+55       2.4602      8.79  | VQ       |          |          |          |
 7+ 0       2.5220      8.98  | VQ       |          |          |          |
 7+ 5       2.5850      9.15  | VQ       |          |          |          |
 7+10       2.6491      9.30  | VQ       |          |          |          |
 7+15       2.7141      9.44  | VQ       |          |          |          |
 7+20       2.7812      9.75  | VQ       |          |          |          |
 7+25       2.8541     10.58  | V Q      |          |          |          |
 7+30       2.9344     11.67  | V Q      |          |          |          |
 7+35       3.0205     12.50  | V  Q     |          |          |          |
 7+40       3.1141     13.59  | V  Q     |          |          |          |
 7+45       3.2163     14.84  |  V Q     |          |          |          |
 7+50       3.3251     15.80  |  V  Q    |          |          |          |
 7+55       3.4420     16.97  |  V  Q    |          |          |          |
 8+ 0       3.5681     18.31  |  V   Q   |          |          |          |
 8+ 5       3.7023     19.49  |  V   Q   |          |          |          |
 8+10       3.8497     21.40  |  V    Q  |          |          |          |
 8+15       4.0132     23.73  |  V     Q|          |          |          |
 8+20       4.1863     25.15  |  V      Q          |          |          |
 8+25       4.3651     25.96  |   V     Q          |          |          |
 8+30       4.5480     26.56  |   V     Q          |          |          |
 8+35       4.7354     27.21  |   V     Q          |          |          |
 8+40       4.9303     28.30  |   V     |Q         |          |          |
 8+45       5.1342     29.61  |   V     |Q         |          |          |
 8+50       5.3450     30.61  |    V    | Q        |          |          |
 8+55       5.5641     31.81  |    V    | Q        |          |          |
 9+ 0       5.7926     33.18  |    V    |  Q       |          |          |
 9+ 5       6.0295     34.39  |    V    |  Q       |          |          |
 9+10       6.2797     36.33  |    V    |   Q      |          |          |
 9+15       6.5461     38.67  |     V   |    Q     |          |          |
 9+20       6.8234     40.27  |     V   |     Q    |          |          |
 9+25       7.1111     41.77  |     V   |     Q    |          |          |
 9+30       7.4096     43.34  |     V   |      Q   |          |          |
 9+35       7.7163     44.54  |      V  |      Q   |          |          |
 9+40       8.0322     45.88  |      V  |       Q  |          |          |
 9+45       8.3583     47.34  |      V  |       Q  |          |          |
 9+50       8.6920     48.45  |       V |        Q |          |          |
 9+55       9.0346     49.75  |       V |        Q |          |          |
10+ 0       9.3872     51.19  |       V |         Q|          |          |
10+ 5       9.7381     50.96  |        V|         Q|          |          |
10+10      10.0593     46.64  |        V|       Q  |          |          |
10+15      10.3373     40.37  |        V|     Q    |          |          |
10+20      10.5918     36.96  |        V|   Q      |          |          |
10+25      10.8357     35.41  |         V   Q      |          |          |
10+30      11.0731     34.46  |         V  Q       |          |          |
10+35      11.3115     34.62  |         V  Q       |          |          |
10+40      11.5706     37.63  |         V    Q     |          |          |
10+45      11.8603     42.06  |         |V    Q    |          |          |
10+50      12.1668     44.51  |         |V     Q   |          |          |
10+55      12.4811     45.64  |         |V      Q  |          |          |
11+ 0      12.8003     46.34  |         |V      Q  |          |          |
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11+ 5	13.1221	46.72	|	| V Q |	|	|
11+10	13.4418	46.43	|	| V Q |	|	|
11+15	13.7573	45.81	|	| V Q |	|	|
11+20	14.0711	45.56	|	| V Q |	|	|
11+25	14.3846	45.52	|	| V Q |	|	|
11+30	14.6983	45.56	|	| V Q |	|	|
11+35	15.0100	45.25	|	| V Q |	|	|
11+40	15.3130	43.99	|	| V Q |	|	|
11+45	15.6036	42.20	|	| V Q |	|	|
11+50	15.8888	41.41	|	| V Q |	|	|
11+55	16.1760	41.70	|	| VQ |	|	|
12+ 0	16.4682	42.44	|	| VQ |	|	|
12+ 5	16.7714	44.02	|	| V Q |	|	|
12+10	17.1092	49.05	|	| V Q|	|	|
12+15	17.4940	55.87	|	| V | Q	|	|
12+20	17.9066	59.91	|	| V | Q	|	|
12+25	18.3372	62.53	|	| V | Q	|	|
12+30	18.7834	64.79	|	| V | Q	|	|
12+35	19.2425	66.65	|	| V | Q	|	|
12+40	19.7183	69.08	|	| V | Q	|	|
12+45	20.2129	71.82	|	| V | Q	|	|
12+50	20.7205	73.71	|	| V| Q	|	|
12+55	21.2402	75.45	|	| V| Q |	|
13+ 0	21.7721	77.23	|	| V Q |	|
13+ 5	22.3179	79.25	|	| V |Q |	|
13+10	22.8933	83.55	|	| |V | Q |	|
13+15	23.5062	89.00	|	| V | Q |	|
13+20	24.1413	92.22	|	| V | Q |	|
13+25	24.7884	93.95	|	| V | Q |	|
13+30	25.4440	95.20	|	| V | Q |	|
13+35	26.0938	94.35	|	| V | Q |	|
13+40	26.6954	87.34	|	| V | Q |	|
13+45	27.2281	77.35	|	| V Q |	|
13+50	27.7231	71.88	|	| V Q |	|
13+55	28.2008	69.36	|	| VQ |	|
14+ 0	28.6676	67.78	|	| VQ |	|
14+ 5	29.1311	67.31	|	| QV |	|
14+10	29.6082	69.27	|	| Q |	|
14+15	30.1073	72.46	|	| Q |	|
14+20	30.6169	73.99	|	| VQ|	|
14+25	31.1263	73.98	|	| Q|	|
14+30	31.6318	73.40	|	| Q|	|
14+35	32.1357	73.16	|	| QV	|
14+40	32.6389	73.06	|	| QV	|
14+45	33.1419	73.03	|	| Q|V	|
14+50	33.6436	72.86	|	| Q|V	|
14+55	34.1407	72.17	|	| Q |V	|
15+ 0	34.6312	71.22	|	| Q | V	|
15+ 5	35.1167	70.51	|	| Q | V	|
15+10	35.5967	69.69	|	| Q | V	|
15+15	36.0697	68.68	|	| Q | V	|
15+20	36.5377	67.95	|	| Q | V	|
15+25	36.9991	67.00	|	| Q | V	|
15+30	37.4530	65.90	|	| Q | V	|
15+35	37.8980	64.62	|	| Q | V	|
15+40	38.3213	61.47	|	| Q | V	|
15+45	38.7166	57.39	|	| Q | V	|
15+50	39.0958	55.06	|	| Q | V	|
15+55	39.4671	53.91	|	| |Q | V	|
16+ 0	39.8330	53.14	|	| |Q | V	|
16+ 5	40.1792	50.26	|	| Q | V	|
16+10	40.4557	40.16	|	| Q | | V	|
16+15	40.6383	26.51	|	Q | | V	|

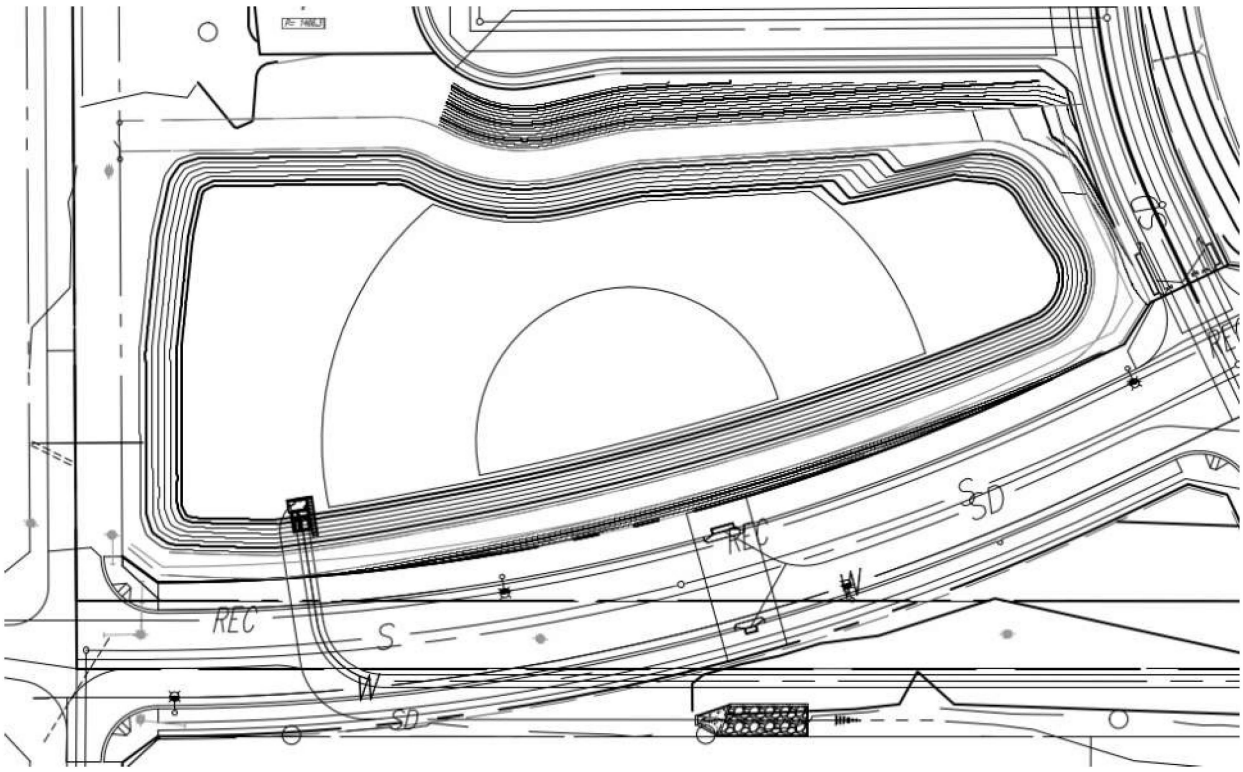
16+20	40.7674	18.75	| Q |	|	|	V |
16+25	40.8700	14.89	| Q |	|	|	V |
16+30	40.9545	12.27	| Q |	|	|	V |
16+35	41.0251	10.26	| Q |	|	|	V |
16+40	41.0845	8.62	| Q |	|	|	V |
16+45	41.1340	7.20	| Q |	|	|	V |
16+50	41.1765	6.16	| Q |	|	|	V |
16+55	41.2135	5.39	| Q |	|	|	V |
17+ 0	41.2458	4.69	|Q |	|	|	V |
17+ 5	41.2748	4.21	|Q |	|	|	V |
17+10	41.3033	4.14	|Q |	|	|	V |
17+15	41.3327	4.26	|Q |	|	|	V |
17+20	41.3620	4.26	|Q |	|	|	V |
17+25	41.3908	4.17	|Q |	|	|	V |
17+30	41.4186	4.04	|Q |	|	|	V |
17+35	41.4455	3.90	|Q |	|	|	V |
17+40	41.4726	3.94	|Q |	|	|	V |
17+45	41.4999	3.97	|Q |	|	|	V |
17+50	41.5272	3.96	|Q |	|	|	V |
17+55	41.5535	3.81	|Q |	|	|	V |
18+ 0	41.5782	3.60	|Q |	|	|	V |
18+ 5	41.6022	3.48	|Q |	|	|	V |
18+10	41.6258	3.43	|Q |	|	|	V |
18+15	41.6491	3.39	|Q |	|	|	V |
18+20	41.6724	3.37	|Q |	|	|	V|
18+25	41.6955	3.35	|Q |	|	|	V|
18+30	41.7185	3.34	|Q |	|	|	V|
18+35	41.7412	3.29	|Q |	|	|	V|
18+40	41.7626	3.12	|Q |	|	|	V|
18+45	41.7824	2.87	|Q |	|	|	V|
18+50	41.8010	2.70	|Q |	|	|	V|
18+55	41.8179	2.46	Q |	|	|	V|
19+ 0	41.8329	2.18	Q |	|	|	V|
19+ 5	41.8471	2.05	Q |	|	|	V|
19+10	41.8618	2.13	Q |	|	|	V|
19+15	41.8776	2.30	Q |	|	|	V|
19+20	41.8942	2.42	Q |	|	|	V|
19+25	41.9123	2.62	|Q |	|	|	V|
19+30	41.9319	2.86	|Q |	|	|	V|
19+35	41.9523	2.96	|Q |	|	|	V|
19+40	41.9720	2.86	|Q |	|	|	V|
19+45	41.9904	2.67	|Q |	|	|	V|
19+50	42.0079	2.54	|Q |	|	|	V|
19+55	42.0239	2.33	Q |	|	|	V|
20+ 0	42.0382	2.08	Q |	|	|	V|
20+ 5	42.0518	1.97	Q |	|	|	V|
20+10	42.0660	2.07	Q |	|	|	V|
20+15	42.0815	2.25	Q |	|	|	V|
20+20	42.0976	2.34	Q |	|	|	V|
20+25	42.1140	2.38	Q |	|	|	V|
20+30	42.1305	2.40	Q |	|	|	V|
20+35	42.1472	2.42	Q |	|	|	V|
20+40	42.1639	2.43	Q |	|	|	V|
20+45	42.1806	2.43	Q |	|	|	V|
20+50	42.1972	2.40	Q |	|	|	V|
20+55	42.2125	2.23	Q |	|	|	V|
21+ 0	42.2263	2.00	Q |	|	|	V|
21+ 5	42.2395	1.91	Q |	|	|	V|
21+10	42.2534	2.02	Q |	|	|	V|
21+15	42.2687	2.21	Q |	|	|	V|
21+20	42.2843	2.27	Q |	|	|	V|
21+25	42.2991	2.15	Q |	|	|	V|
21+30	42.3124	1.94	Q |	|	|	V|

21+35	42.3253	1.87	Q	|	|	|	V|
21+40	42.3391	1.99	Q	|	|	|	V|
21+45	42.3541	2.19	Q	|	|	|	V|
21+50	42.3696	2.25	Q	|	|	|	V|
21+55	42.3843	2.13	Q	|	|	|	V|
22+ 0	42.3975	1.93	Q	|	|	|	V|
22+ 5	42.4103	1.86	Q	|	|	|	V|
22+10	42.4239	1.98	Q	|	|	|	V|
22+15	42.4389	2.18	Q	|	|	|	V|
22+20	42.4543	2.24	Q	|	|	|	V|
22+25	42.4689	2.12	Q	|	|	|	V|
22+30	42.4822	1.92	Q	|	|	|	V|
22+35	42.4947	1.82	Q	|	|	|	V|
22+40	42.5069	1.77	Q	|	|	|	V|
22+45	42.5188	1.74	Q	|	|	|	V|
22+50	42.5306	1.71	Q	|	|	|	V|
22+55	42.5423	1.70	Q	|	|	|	V|
23+ 0	42.5539	1.69	Q	|	|	|	V|
23+ 5	42.5655	1.68	Q	|	|	|	V|
23+10	42.5770	1.67	Q	|	|	|	V|
23+15	42.5884	1.66	Q	|	|	|	V|
23+20	42.5998	1.66	Q	|	|	|	V|
23+25	42.6112	1.65	Q	|	|	|	V|
23+30	42.6226	1.65	Q	|	|	|	V|
23+35	42.6340	1.65	Q	|	|	|	V|
23+40	42.6453	1.65	Q	|	|	|	V|
23+45	42.6566	1.64	Q	|	|	|	V|
23+50	42.6679	1.64	Q	|	|	|	V|
23+55	42.6792	1.64	Q	|	|	|	V|
24+ 0	42.6905	1.64	Q	|	|	|	V|
24+ 5	42.7012	1.56	Q	|	|	|	V|
24+10	42.7096	1.22	Q	|	|	|	V|
24+15	42.7149	0.76	Q	|	|	|	V|
24+20	42.7183	0.50	Q	|	|	|	V|
24+25	42.7209	0.37	Q	|	|	|	V|
24+30	42.7229	0.29	Q	|	|	|	V|
24+35	42.7245	0.23	Q	|	|	|	V|
24+40	42.7257	0.18	Q	|	|	|	V|
24+45	42.7267	0.14	Q	|	|	|	V|
24+50	42.7275	0.11	Q	|	|	|	V|
24+55	42.7281	0.09	Q	|	|	|	V|
25+ 0	42.7286	0.07	Q	|	|	|	V|
25+ 5	42.7290	0.05	Q	|	|	|	V|
25+10	42.7292	0.04	Q	|	|	|	V|
25+15	42.7294	0.03	Q	|	|	|	V|
25+20	42.7296	0.02	Q	|	|	|	V|
25+25	42.7297	0.01	Q	|	|	|	V|
25+30	42.7297	0.01	Q	|	|	|	V|

ATTACHMENT D:

DEBRIS / DETENTION BASIN C (OFF-SITE) ROUTING

DEBRIS – DETENTION BASIN ROUTINGS
Drainage Area C (Offsite)
- Basin Empty
- Basin filled with debris volume



DEBRIS / DETENTION BASIN C

```
                FLOOD HYDROGRAPH ROUTING PROGRAM
          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                      Study date: 03/25/24

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

Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin Empty
100-year 1-hour storm Inflow Hydrograph

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


Program License Serial Number 4029

------------------------------------------------------------------------
******************** HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff1100.rte
*****************************HYDROGRAPH DATA*****************************
             Number of intervals =    30
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =      417.913 (CFS)
             Total volume =      19.250 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
************************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 30
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
   6.000      9.665     55.280      9.475        9.855
   7.000     12.199     60.560     11.990       12.408
```

8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 104.5 208.96 313.44 417.91	Depth (Ft.)
0.083	3.94	0.45	0.012	O	0.07
0.167	21.77	3.27	0.088	OI	0.47
0.250	50.29	9.25	0.293	O I	1.13
0.333	72.54	16.55	0.627	|O I	1.54
0.417	87.85	24.93	1.036	|O I	2.02
0.500	102.44	27.77	1.510	| O I	2.30
0.583	119.83	31.14	2.073	| O |I	2.63
0.667	141.58	35.08	2.745	| O | I	3.02
0.750	175.94	38.07	3.586	| O | I	3.40
0.833	259.23	42.41	4.808	| O | I	3.95
0.917	390.61	48.01	6.734	| O | I	4.78
1.000	417.91	54.08	9.167	| O | I	5.79
1.083	287.92	58.50	11.210	| O | I	6.61
1.167	177.00	60.93	12.399	| O | I	7.08
1.250	114.18	61.99	12.979	| O I	7.29
1.333	81.26	62.44	13.223	| O I	7.39
1.417	61.67	62.55	13.285	| O	7.41
1.500	48.80	62.46	13.235	| IO	7.39
1.583	38.55	62.22	13.106	| I O	7.34
1.667	31.06	61.88	12.919	| I O	7.27
1.750	26.08	61.46	12.691	|I O	7.19
1.833	20.95	60.99	12.431	|I O	7.09
1.917	16.97	60.44	12.143	|I O	6.98
2.000	13.54	59.80	11.834	|I O	6.86
2.083	10.60	59.12	11.508	I O	6.73
2.167	8.51	58.41	11.169	I O	6.59
2.250	7.12	57.69	10.823	I O	6.46
2.333	5.27	56.96	10.471	I O	6.32
2.417	1.27	56.19	10.104	I O	6.17
2.500	0.41	55.41	9.725	I O	6.02
2.583	0.00	54.52	9.348	I O	5.87
2.667	0.00	53.62	8.976	I O	5.72
2.750	0.00	52.74	8.610	I O	5.56
2.833	0.00	51.88	8.249	I O	5.42
2.917	0.00	51.03	7.895	I O	5.27
3.000	0.00	50.19	7.546	I O	5.13
3.083	0.00	49.35	7.204	I O	4.98
3.167	0.00	48.39	6.867	I O	4.84
3.250	0.00	47.44	6.537	I O	4.70
3.333	0.00	46.52	6.214	I O	4.56
3.417	0.00	45.61	5.896	I O	4.42
3.500	0.00	44.72	5.585	I O	4.29
3.583	0.00	43.85	5.280	I O	4.15
3.667	0.00	42.99	4.981	I O	4.03
3.750	0.00	41.99	4.689	I O	3.89
3.833	0.00	40.97	4.403	I O	3.77
3.917	0.00	39.98	4.124	I O	3.64
4.000	0.00	39.02	3.852	I O	3.52
4.083	0.00	38.07	3.587	I O	3.40
4.167	0.00	37.15	3.328	I O	3.28
4.250	0.00	36.25	3.075	I O	3.16
4.333	0.00	35.38	2.828	I O	3.05

4.417	0.00	34.23	2.589	I O	|	|	|	|	2.93
4.500	0.00	32.84	2.358	I O	|	|	|	|	2.79
4.583	0.00	31.52	2.136	I O	|	|	|	|	2.66
4.667	0.00	30.24	1.923	I O	|	|	|	|	2.54
4.750	0.00	29.02	1.719	I O	|	|	|	|	2.42
4.833	0.00	27.85	1.523	I O	|	|	|	|	2.31
4.917	0.00	26.72	1.335	I O	|	|	|	|	2.20
5.000	0.00	25.64	1.155	IO	|	|	|	|	2.09
5.083	0.00	24.33	0.983	IO	|	|	|	|	1.98
5.167	0.00	20.92	0.827	IO	|	|	|	|	1.79
5.250	0.00	18.00	0.693	IO	|	|	|	|	1.62
5.333	0.00	15.48	0.578	IO	|	|	|	|	1.48
5.417	0.00	13.31	0.479	IO	|	|	|	|	1.36
5.500	0.00	11.45	0.393	O	|	|	|	|	1.26
5.583	0.00	9.85	0.320	O	|	|	|	|	1.17
5.667	0.00	8.47	0.257	O	|	|	|	|	1.09
5.750	0.00	7.29	0.203	O	|	|	|	|	1.02
5.833	0.00	5.87	0.157	O	|	|	|	|	0.85
5.917	0.00	4.53	0.122	O	|	|	|	|	0.66
6.000	0.00	3.50	0.094	O	|	|	|	|	0.51
6.083	0.00	2.71	0.073	O	|	|	|	|	0.39
6.167	0.00	2.09	0.056	O	|	|	|	|	0.30
6.250	0.00	1.61	0.043	O	|	|	|	|	0.23
6.333	0.00	1.25	0.033	O	|	|	|	|	0.18
6.417	0.00	0.96	0.026	O	|	|	|	|	0.14
6.500	0.00	0.74	0.020	O	|	|	|	|	0.11
6.583	0.00	0.57	0.015	O	|	|	|	|	0.08
6.667	0.00	0.44	0.012	O	|	|	|	|	0.06
6.750	0.00	0.34	0.009	O	|	|	|	|	0.05
6.833	0.00	0.26	0.007	O	|	|	|	|	0.04
6.917	0.00	0.20	0.005	O	|	|	|	|	0.03
7.000	0.00	0.16	0.004	O	|	|	|	|	0.02
7.083	0.00	0.12	0.003	O	|	|	|	|	0.02
7.167	0.00	0.09	0.003	O	|	|	|	|	0.01
7.250	0.00	0.07	0.002	O	|	|	|	|	0.01
7.333	0.00	0.06	0.002	O	|	|	|	|	0.01
7.417	0.00	0.04	0.001	O	|	|	|	|	0.01
7.500	0.00	0.03	0.001	O	|	|	|	|	0.00
7.583	0.00	0.03	0.001	O	|	|	|	|	0.00
7.667	0.00	0.02	0.001	O	|	|	|	|	0.00
7.750	0.00	0.02	0.000	O	|	|	|	|	0.00
7.833	0.00	0.01	0.000	O	|	|	|	|	0.00
7.917	0.00	0.01	0.000	O	|	|	|	|	0.00
8.000	0.00	0.01	0.000	O	|	|	|	|	0.00
8.083	0.00	0.01	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 97
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 62.551 (CFS)
Total volume = 19.250 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

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                  FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                        Study date: 03/25/24

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

Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin Empty
100-year 3-hour storm Inflow Hydrograph


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


Program License Serial Number 4029

------------------------------------------------------------------------
******************** HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff3100.rte
****************************HYDROGRAPH DATA*****************************
             Number of intervals =    54
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =      257.413 (CFS)
             Total volume =      25.952 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
************************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 54
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
```

6.000	9.665	55.280	9.475	9.855
7.000	12.199	60.560	11.990	12.408
8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 64.4 128.71 193.06 257.41	Depth (Ft.)
0.083	1.89	0.22	0.006	O | | | |	0.03
0.167	9.80	1.50	0.040	OI | | | |	0.22
0.250	20.21	4.57	0.123	O I | | | |	0.66
0.333	25.36	8.02	0.236	O I | | | |	1.06
0.417	29.49	10.73	0.361	|O I | | | |	1.22
0.500	35.75	13.79	0.501	|O I | | | |	1.39
0.583	41.47	17.27	0.660	| O I | | | |	1.58
0.667	45.18	20.91	0.827	| O I | | | |	1.79
0.750	47.75	24.49	0.990	| O I | | | |	1.99
0.833	50.89	25.66	1.157	| O I | | | |	2.09
0.917	50.97	26.68	1.328	| O I | | | |	2.19
1.000	50.16	27.64	1.489	| O I | | | |	2.29
1.083	53.14	28.61	1.651	| O I | | | |	2.38
1.167	59.89	29.74	1.839	| O I| | | |	2.49
1.250	66.71	31.10	2.066	| O I | | |	2.62
1.333	70.08	32.60	2.317	| O I | | |	2.77
1.417	71.67	34.15	2.576	| O I | | |	2.92
1.500	76.34	35.44	2.846	| O |I | | |	3.06
1.583	83.92	36.52	3.150	| O | I | | |	3.20
1.667	87.41	37.71	3.484	| O | I | | |	3.35
1.750	90.61	38.95	3.833	| O | I | | |	3.51
1.833	99.23	40.30	4.214	| O | I | | |	3.68
1.917	106.98	41.82	4.641	| O | I | | |	3.87
2.000	108.49	43.30	5.090	| O | I | | |	4.07
2.083	108.74	44.58	5.536	| O | I | | |	4.26
2.167	113.42	45.87	5.989	| O | I | | |	4.46
2.250	127.65	47.33	6.498	| O | I| | |	4.68
2.333	147.06	49.09	7.112	| O | | I | |	4.95
2.417	159.45	50.86	7.824	| O | | I | |	5.24
2.500	182.14	52.82	8.643	| O | | I | |	5.58
2.583	225.53	55.30	9.674	| O | | | I |	6.00
2.667	257.41	57.95	10.947	| O| | | I|	6.51
2.750	253.70	60.74	12.299	| O| | | I|	7.04
2.833	204.06	62.85	13.449	| O| | |I |	7.47
2.917	146.77	64.27	14.220	| O| | I | |	7.76
3.000	113.09	65.09	14.669	| O I | | |	7.93
3.083	87.18	65.52	14.909	| O I | | | |	8.02
3.167	61.41	65.62	14.969	| IO | | | |	8.05
3.250	44.13	65.47	14.881	| I O | | | |	8.01
3.333	33.93	65.15	14.700	| I O | | | |	7.95
3.417	26.78	64.71	14.462	| I O | | | |	7.86
3.500	21.58	64.20	14.185	| I O| | | |	7.75
3.583	17.50	63.64	13.879	| I O| | | |	7.64
3.667	14.01	63.04	13.551	|I O| | | |	7.51
3.750	11.09	62.41	13.206	|I O| | | |	7.38
3.833	8.66	61.75	12.846	|I O| | | |	7.24
3.917	7.00	61.07	12.477	I O| | | |	7.11
4.000	5.23	60.36	12.101	I O| | | |	6.96
4.083	3.64	59.56	11.719	I O| | | |	6.81
4.167	1.98	58.75	11.331	I O| | | |	6.66

4.250	0.87	57.93	10.939	I O|	|	|	|	6.50
4.333	0.56	57.12	10.548	I O|	|	|	|	6.35
4.417	0.29	56.31	10.160	I O|	|	|	|	6.20
4.500	0.03	55.51	9.776	I O |	|	|	|	6.04
4.583	0.00	54.64	9.397	I O |	|	|	|	5.89
4.667	0.00	53.74	9.024	I O |	|	|	|	5.74
4.750	0.00	52.86	8.657	I O |	|	|	|	5.58
4.833	0.00	51.99	8.295	I O |	|	|	|	5.44
4.917	0.00	51.14	7.940	I O |	|	|	|	5.29
5.000	0.00	50.30	7.591	I O |	|	|	|	5.15
5.083	0.00	49.47	7.248	I O |	|	|	|	5.00
5.167	0.00	48.51	6.910	I O |	|	|	|	4.86
5.250	0.00	47.56	6.579	I O |	|	|	|	4.72
5.333	0.00	46.63	6.255	I O |	|	|	|	4.58
5.417	0.00	45.72	5.937	I O |	|	|	|	4.44
5.500	0.00	44.83	5.625	I O |	|	|	|	4.30
5.583	0.00	43.96	5.319	I O |	|	|	|	4.17
5.667	0.00	43.10	5.020	I O |	|	|	|	4.04
5.750	0.00	42.12	4.726	I O |	|	|	|	3.91
5.833	0.00	41.10	4.439	I O |	|	|	|	3.78
5.917	0.00	40.11	4.160	I O |	|	|	|	3.66
6.000	0.00	39.14	3.887	I O |	|	|	|	3.53
6.083	0.00	38.19	3.621	I O |	|	|	|	3.41
6.167	0.00	37.27	3.361	I O |	|	|	|	3.29
6.250	0.00	36.37	3.107	I O |	|	|	|	3.18
6.333	0.00	35.49	2.860	I O |	|	|	|	3.07
6.417	0.00	34.41	2.619	I O |	|	|	|	2.95
6.500	0.00	33.02	2.387	I O |	|	|	|	2.81
6.583	0.00	31.68	2.164	I O |	|	|	|	2.68
6.667	0.00	30.40	1.950	I O |	|	|	|	2.56
6.750	0.00	29.18	1.745	I O |	|	|	|	2.44
6.833	0.00	28.00	1.548	I O |	|	|	|	2.32
6.917	0.00	26.87	1.359	I O |	|	|	|	2.21
7.000	0.00	25.78	1.178	I O |	|	|	|	2.10
7.083	0.00	24.74	1.004	I O |	|	|	|	2.00
7.167	0.00	21.32	0.845	I O |	|	|	|	1.81
7.250	0.00	18.34	0.709	I O |	|	|	|	1.64
7.333	0.00	15.77	0.591	IO |	|	|	|	1.50
7.417	0.00	13.57	0.490	IO |	|	|	|	1.37
7.500	0.00	11.67	0.403	IO |	|	|	|	1.27
7.583	0.00	10.04	0.329	IO |	|	|	|	1.18
7.667	0.00	8.63	0.264	IO |	|	|	|	1.10
7.750	0.00	7.43	0.209	O |	|	|	|	1.03
7.833	0.00	6.07	0.163	O |	|	|	|	0.88
7.917	0.00	4.68	0.126	O |	|	|	|	0.68
8.000	0.00	3.62	0.097	O |	|	|	|	0.52
8.083	0.00	2.79	0.075	O |	|	|	|	0.41
8.167	0.00	2.16	0.058	O |	|	|	|	0.31
8.250	0.00	1.67	0.045	O |	|	|	|	0.24
8.333	0.00	1.29	0.035	O |	|	|	|	0.19
8.417	0.00	0.99	0.027	O |	|	|	|	0.14
8.500	0.00	0.77	0.021	O |	|	|	|	0.11
8.583	0.00	0.59	0.016	O |	|	|	|	0.09
8.667	0.00	0.46	0.012	O |	|	|	|	0.07
8.750	0.00	0.35	0.009	O |	|	|	|	0.05
8.833	0.00	0.27	0.007	O |	|	|	|	0.04
8.917	0.00	0.21	0.006	O |	|	|	|	0.03
9.000	0.00	0.16	0.004	O |	|	|	|	0.02
9.083	0.00	0.13	0.003	O |	|	|	|	0.02
9.167	0.00	0.10	0.003	O |	|	|	|	0.01
9.250	0.00	0.08	0.002	O |	|	|	|	0.01
9.333	0.00	0.06	0.002	O |	|	|	|	0.01
9.417	0.00	0.04	0.001	O |	|	|	|	0.01

```
 9.500    0.00    0.03      0.001  O       |       |       |       |     0.01
 9.583    0.00    0.03      0.001  O       |       |       |       |     0.00
 9.667    0.00    0.02      0.001  O       |       |       |       |     0.00
 9.750    0.00    0.02      0.000  O       |       |       |       |     0.00
 9.833    0.00    0.01      0.000  O       |       |       |       |     0.00
 9.917    0.00    0.01      0.000  O       |       |       |       |     0.00
10.000    0.00    0.01      0.000  O       |       |       |       |     0.00
10.083    0.00    0.01      0.000  O       |       |       |       |     0.00

      ****************************HYDROGRAPH DATA****************************
                  Number of intervals =   121
                  Time interval =    5.0 (Min.)
                  Maximum/Peak flow rate =       65.615 (CFS)
                  Total volume =      25.952 (Ac.Ft)
            Status of hydrographs being held in storage
                        Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
            Peak (CFS)      0.000     0.000     0.000     0.000     0.000
            Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
      ***********************************************************************

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                FLOOD HYDROGRAPH ROUTING PROGRAM
          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                     Study date: 03/25/24

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Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin Empty
100-year 6-hour storm Inflow Hydrograph

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Program License Serial Number 4029

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******************** HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff6100.rte
****************************HYDROGRAPH DATA*****************************
             Number of intervals =    90
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =      238.016 (CFS)
             Total volume =      33.045 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)     0.000     0.000     0.000     0.000     0.000
************************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 90
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)     (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
   6.000      9.665     55.280      9.475        9.855
```

7.000	12.199	60.560	11.990	12.408
8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 59.5 119.01 178.51 238.02	Depth (Ft.)
0.083	0.56	0.06	0.002	O	0.01
0.167	3.19	0.48	0.013	O	0.07
0.250	7.66	1.60	0.043	OI	0.23
0.333	11.20	3.38	0.091	OI	0.49
0.417	13.06	5.38	0.144	OI	0.78
0.500	14.43	7.13	0.196	OI	1.01
0.583	16.45	8.30	0.249	|OI	1.08
0.667	18.76	9.60	0.309	|OI	1.15
0.750	20.18	10.98	0.372	|OI	1.23
0.833	21.00	12.32	0.433	|OI	1.30
0.917	21.59	13.58	0.491	|OI	1.37
1.000	22.36	14.75	0.545	|O I	1.44
1.083	24.00	15.93	0.599	| OI	1.51
1.167	26.04	17.20	0.657	| OI	1.58
1.250	27.26	18.52	0.717	| OI	1.65
1.333	27.92	19.79	0.775	| OI	1.72
1.417	28.40	20.96	0.829	| OI	1.79
1.500	28.78	22.03	0.878	| OI	1.85
1.583	29.08	23.00	0.922	| O	1.90
1.667	29.29	23.86	0.962	| O	1.95
1.750	29.43	24.63	0.997	| O	2.00
1.833	29.55	24.89	1.030	| O	2.02
1.917	29.65	25.08	1.061	| O	2.04
2.000	30.04	25.27	1.093	| OI	2.05
2.083	31.06	25.49	1.129	| OI	2.07
2.167	31.88	25.73	1.169	| OI	2.10
2.250	32.42	25.99	1.213	| OI	2.12
2.333	33.69	26.27	1.261	| OI	2.15
2.417	34.54	26.59	1.313	| OI	2.18
2.500	34.96	26.92	1.368	| OI	2.21
2.583	35.22	27.25	1.424	| OI	2.25
2.667	35.42	27.58	1.478	| OI	2.28
2.750	35.87	27.90	1.532	| OI	2.31
2.833	37.26	28.25	1.591	| O I	2.34
2.917	39.11	28.65	1.658	| O I	2.38
3.000	40.16	29.10	1.732	| O I	2.43
3.083	40.70	29.56	1.808	| O I	2.47
3.167	41.38	30.02	1.886	| OI	2.52
3.250	42.93	30.51	1.968	| OI	2.57
3.333	44.88	31.05	2.058	| O I	2.62
3.417	46.34	31.64	2.156	| O I	2.68
3.500	48.53	32.28	2.263	| O I	2.74
3.583	52.25	33.01	2.385	| O I	2.81
3.667	56.59	33.88	2.530	| O I	2.89
3.750	60.34	34.87	2.696	| O I	2.99
3.833	63.58	35.56	2.880	| O I	3.08
3.917	66.81	36.28	3.082	| O I	3.17
4.000	69.92	37.05	3.300	| O |I	3.27
4.083	73.11	37.89	3.534	| O |I	3.37
4.167	76.50	38.78	3.786	| O | I	3.49
4.250	80.95	39.75	4.057	| O | I	3.61

4.333	86.06	40.80	4.355	| O |	I |	|	|	3.74
4.417	91.47	41.96	4.681	| O |	I |	|	|	3.89
4.500	96.77	43.15	5.036	| O |	I |	|	|	4.05
4.583	101.24	44.24	5.417	| O |	I |	|	|	4.21
4.667	105.35	45.39	5.820	| O |	I |	|	|	4.39
4.750	110.27	46.61	6.246	| O |	I |	|	|	4.57
4.833	115.47	47.90	6.698	| O |	I|	|	|	4.77
4.917	119.91	49.26	7.174	| O |	I |	|	|	4.97
5.000	123.99	50.49	7.670	| O |	I |	|	|	5.18
5.083	130.13	51.74	8.193	| O |	|I |	|	|	5.39
5.167	141.91	53.13	8.769	| O|	| I |	|	|	5.63
5.250	160.28	54.73	9.438	| O|	| I |	|	|	5.91
5.333	180.15	56.45	10.227	| O|	| I |	|	|	6.22
5.417	199.14	58.35	11.138	| O|	| I |	|	|	6.58
5.500	221.25	60.51	12.176	| O |	| I |	|	|	6.99
5.583	238.02	62.64	13.334	| O |	| I |	|	|	7.43
5.667	213.61	64.69	14.451	| O |	| I |	|	|	7.85
5.750	150.38	66.08	15.254	| O |	| I |	|	|	8.15
5.833	101.27	66.75	15.663	| O I |	|	|	|	8.30
5.917	73.19	66.98	15.803	| |O |	|	|	|	8.35
6.000	55.26	66.95	15.784	| I|O |	|	|	|	8.34
6.083	42.24	66.75	15.660	| I O |	|	|	|	8.30
6.167	32.76	66.42	15.459	| I O |	|	|	|	8.22
6.250	25.43	66.00	15.204	| I O |	|	|	|	8.13
6.333	20.18	65.51	14.908	| I O |	|	|	|	8.02
6.417	16.39	64.93	14.585	| I O |	|	|	|	7.90
6.500	13.07	64.30	14.241	|I O |	|	|	|	7.77
6.583	10.42	63.64	13.881	|I O |	|	|	|	7.64
6.667	8.19	62.96	13.509	|I O |	|	|	|	7.50
6.750	6.27	62.26	13.128	I O |	|	|	|	7.35
6.833	4.74	61.55	12.739	I O |	|	|	|	7.20
6.917	3.49	60.83	12.346	I O |	|	|	|	7.06
7.000	2.22	60.04	11.950	I O |	|	|	|	6.90
7.083	0.77	59.21	11.549	I O|	|	|	|	6.74
7.167	0.32	58.37	11.148	I O|	|	|	|	6.59
7.250	0.16	57.54	10.751	I O|	|	|	|	6.43
7.333	0.08	56.72	10.358	I O|	|	|	|	6.27
7.417	0.03	55.92	9.971	I O|	|	|	|	6.12
7.500	0.01	55.10	9.589	I O|	|	|	|	5.97
7.583	0.00	54.19	9.212	I O|	|	|	|	5.81
7.667	0.00	53.30	8.842	I O|	|	|	|	5.66
7.750	0.00	52.43	8.478	I O|	|	|	|	5.51
7.833	0.00	51.57	8.120	I O |	|	|	|	5.36
7.917	0.00	50.72	7.768	I O |	|	|	|	5.22
8.000	0.00	49.89	7.421	I O |	|	|	|	5.08
8.083	0.00	49.00	7.081	I O |	|	|	|	4.93
8.167	0.00	48.04	6.747	I O |	|	|	|	4.79
8.250	0.00	47.10	6.419	I O |	|	|	|	4.65
8.333	0.00	46.18	6.098	I O |	|	|	|	4.51
8.417	0.00	45.28	5.783	I O |	|	|	|	4.37
8.500	0.00	44.40	5.474	I O |	|	|	|	4.24
8.583	0.00	43.53	5.171	I O |	|	|	|	4.11
8.667	0.00	42.65	4.874	I O |	|	|	|	3.98
8.750	0.00	41.62	4.584	I O |	|	|	|	3.85
8.833	0.00	40.61	4.301	I O |	|	|	|	3.72
8.917	0.00	39.63	4.025	I O |	|	|	|	3.59
9.000	0.00	38.67	3.755	I O |	|	|	|	3.47
9.083	0.00	37.74	3.492	I O |	|	|	|	3.35
9.167	0.00	36.82	3.235	I O |	|	|	|	3.24
9.250	0.00	35.93	2.985	I O |	|	|	|	3.12
9.333	0.00	35.06	2.740	I O |	|	|	|	3.01
9.417	0.00	33.72	2.503	I O |	|	|	|	2.88
9.500	0.00	32.35	2.276	I O |	|	|	|	2.75

9.583	0.00	31.05	2.057	I O	|	|	|	2.62
9.667	0.00	29.79	1.848	I O	|	|	|	2.50
9.750	0.00	28.59	1.647	I O	|	|	|	2.38
9.833	0.00	27.43	1.454	I O	|	|	|	2.26
9.917	0.00	26.32	1.269	I O	|	|	|	2.16
10.000	0.00	25.26	1.091	I O	|	|	|	2.05
10.083	0.00	23.06	0.925	I O	|	|	|	1.91
10.167	0.00	19.83	0.777	I O	|	|	|	1.73
10.250	0.00	17.06	0.650	I O	|	|	|	1.57
10.333	0.00	14.67	0.541	IO	|	|	|	1.44
10.417	0.00	12.62	0.447	IO	|	|	|	1.32
10.500	0.00	10.85	0.366	IO	|	|	|	1.22
10.583	0.00	9.34	0.297	IO	|	|	|	1.14
10.667	0.00	8.03	0.237	IO	|	|	|	1.06
10.750	0.00	6.91	0.185	O	|	|	|	1.00
10.833	0.00	5.34	0.143	O	|	|	|	0.77
10.917	0.00	4.12	0.111	O	|	|	|	0.60
11.000	0.00	3.19	0.085	O	|	|	|	0.46
11.083	0.00	2.46	0.066	O	|	|	|	0.36
11.167	0.00	1.90	0.051	O	|	|	|	0.28
11.250	0.00	1.47	0.039	O	|	|	|	0.21
11.333	0.00	1.13	0.030	O	|	|	|	0.16
11.417	0.00	0.88	0.023	O	|	|	|	0.13
11.500	0.00	0.68	0.018	O	|	|	|	0.10
11.583	0.00	0.52	0.014	O	|	|	|	0.08
11.667	0.00	0.40	0.011	O	|	|	|	0.06
11.750	0.00	0.31	0.008	O	|	|	|	0.05
11.833	0.00	0.24	0.006	O	|	|	|	0.03
11.917	0.00	0.19	0.005	O	|	|	|	0.03
12.000	0.00	0.14	0.004	O	|	|	|	0.02
12.083	0.00	0.11	0.003	O	|	|	|	0.02
12.167	0.00	0.09	0.002	O	|	|	|	0.01
12.250	0.00	0.07	0.002	O	|	|	|	0.01
12.333	0.00	0.05	0.001	O	|	|	|	0.01
12.417	0.00	0.04	0.001	O	|	|	|	0.01
12.500	0.00	0.03	0.001	O	|	|	|	0.00
12.583	0.00	0.02	0.001	O	|	|	|	0.00
12.667	0.00	0.02	0.000	O	|	|	|	0.00
12.750	0.00	0.01	0.000	O	|	|	|	0.00
12.833	0.00	0.01	0.000	O	|	|	|	0.00
12.917	0.00	0.01	0.000	O	|	|	|	0.00
13.000	0.00	0.01	0.000	O	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 156
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 66.981 (CFS)
Total volume = 33.045 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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                FLOOD HYDROGRAPH ROUTING PROGRAM
          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                     Study date: 03/25/24

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Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin Empty
100-year 24-hour storm Inflow Hydrograph

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Program License Serial Number 4029

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********************* HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff24100.rte
****************************HYDROGRAPH DATA*****************************
             Number of intervals =   306
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =       95.203 (CFS)
             Total volume =      42.730 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)     0.000     0.000     0.000     0.000     0.000
************************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 306
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)     (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
   6.000      9.665     55.280      9.475        9.855
```

7.000	12.199	60.560	11.990	12.408
8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	23.8	47.60	71.40	95.20	Depth (Ft.)
0.083	0.08	0.01	0.000	O	|	|	|	|	0.00
0.167	0.42	0.06	0.002	O	|	|	|	|	0.01
0.250	0.88	0.20	0.005	O	|	|	|	|	0.03
0.333	1.18	0.39	0.010	O	|	|	|	|	0.06
0.417	1.47	0.60	0.016	O	|	|	|	|	0.09
0.500	1.79	0.83	0.022	O	|	|	|	|	0.12
0.583	1.98	1.07	0.029	O	|	|	|	|	0.16
0.667	2.09	1.29	0.035	O	|	|	|	|	0.19
0.750	2.17	1.48	0.040	O	|	|	|	|	0.21
0.833	2.27	1.65	0.044	O	|	|	|	|	0.24
0.917	2.48	1.82	0.049	O	|	|	|	|	0.26
1.000	2.76	2.00	0.054	O	|	|	|	|	0.29
1.083	2.88	2.18	0.059	O	|	|	|	|	0.32
1.167	2.80	2.33	0.063	O	|	|	|	|	0.34
1.250	2.63	2.42	0.065	O	|	|	|	|	0.35
1.333	2.55	2.46	0.066	O	|	|	|	|	0.36
1.417	2.52	2.47	0.066	O	|	|	|	|	0.36
1.500	2.51	2.48	0.067	O	|	|	|	|	0.36
1.583	2.50	2.49	0.067	O	|	|	|	|	0.36
1.667	2.50	2.49	0.067	O	|	|	|	|	0.36
1.750	2.49	2.49	0.067	O	|	|	|	|	0.36
1.833	2.53	2.50	0.067	O	|	|	|	|	0.36
1.917	2.69	2.52	0.068	O	|	|	|	|	0.37
2.000	2.92	2.59	0.069	O	|	|	|	|	0.37
2.083	3.04	2.68	0.072	OI	|	|	|	|	0.39
2.167	3.10	2.77	0.074	OI	|	|	|	|	0.40
2.250	3.14	2.85	0.076	OI	|	|	|	|	0.41
2.333	3.17	2.92	0.078	OI	|	|	|	|	0.42
2.417	3.19	2.98	0.080	|O	|	|	|	|	0.43
2.500	3.21	3.03	0.081	|O	|	|	|	|	0.44
2.583	3.26	3.08	0.082	|O	|	|	|	|	0.45
2.667	3.44	3.14	0.084	|O	|	|	|	|	0.45
2.750	3.68	3.23	0.087	|O	|	|	|	|	0.47
2.833	3.82	3.35	0.090	|O	|	|	|	|	0.49
2.917	3.89	3.47	0.093	|O	|	|	|	|	0.50
3.000	3.94	3.57	0.096	|O	|	|	|	|	0.52
3.083	3.97	3.66	0.098	|O	|	|	|	|	0.53
3.167	4.00	3.73	0.100	|O	|	|	|	|	0.54
3.250	4.02	3.79	0.102	|O	|	|	|	|	0.55
3.333	4.04	3.85	0.103	|O	|	|	|	|	0.56
3.417	4.05	3.89	0.104	|O	|	|	|	|	0.56
3.500	4.06	3.93	0.105	|O	|	|	|	|	0.57
3.583	4.07	3.96	0.106	|O	|	|	|	|	0.57
3.667	4.08	3.99	0.107	|O	|	|	|	|	0.58
3.750	4.08	4.01	0.107	|O	|	|	|	|	0.58
3.833	4.13	4.03	0.108	|O	|	|	|	|	0.58
3.917	4.30	4.07	0.109	|O	|	|	|	|	0.59
4.000	4.53	4.15	0.111	|O	|	|	|	|	0.60
4.083	4.67	4.25	0.114	|O	|	|	|	|	0.62
4.167	4.73	4.35	0.117	|O	|	|	|	|	0.63
4.250	4.77	4.44	0.119	|O	|	|	|	|	0.64

4.333	4.84	4.53	0.121	|O	|	|	|	|	0.66
4.417	5.03	4.62	0.124	|O	|	|	|	|	0.67
4.500	5.28	4.74	0.127	|O	|	|	|	|	0.69
4.583	5.43	4.88	0.131	|O	|	|	|	|	0.71
4.667	5.50	5.02	0.134	|O	|	|	|	|	0.73
4.750	5.56	5.13	0.138	|O	|	|	|	|	0.74
4.833	5.64	5.24	0.140	|O	|	|	|	|	0.76
4.917	5.83	5.35	0.143	|O	|	|	|	|	0.78
5.000	6.09	5.49	0.147	|OI	|	|	|	|	0.80
5.083	6.16	5.63	0.151	|OI	|	|	|	|	0.82
5.167	5.90	5.72	0.153	|O	|	|	|	|	0.83
5.250	5.49	5.72	0.153	|O	|	|	|	|	0.83
5.333	5.32	5.65	0.151	|O	|	|	|	|	0.82
5.417	5.39	5.58	0.150	|O	|	|	|	|	0.81
5.500	5.56	5.56	0.149	|O	|	|	|	|	0.81
5.583	5.69	5.57	0.149	|O	|	|	|	|	0.81
5.667	5.88	5.62	0.151	|O	|	|	|	|	0.81
5.750	6.13	5.71	0.153	|OI	|	|	|	|	0.83
5.833	6.28	5.82	0.156	|OI	|	|	|	|	0.84
5.917	6.35	5.93	0.159	|OI	|	|	|	|	0.86
6.000	6.39	6.03	0.162	| O	|	|	|	|	0.87
6.083	6.47	6.12	0.164	| O	|	|	|	|	0.89
6.167	6.66	6.22	0.167	| O	|	|	|	|	0.90
6.250	6.91	6.35	0.170	| O	|	|	|	|	0.92
6.333	7.06	6.50	0.174	| O	|	|	|	|	0.94
6.417	7.14	6.63	0.178	| O	|	|	|	|	0.96
6.500	7.19	6.75	0.181	| O	|	|	|	|	0.98
6.583	7.31	6.87	0.184	| O	|	|	|	|	1.00
6.667	7.69	6.97	0.188	| O	|	|	|	|	1.00
6.750	8.22	7.11	0.194	| O	|	|	|	|	1.01
6.833	8.57	7.29	0.203	| O	|	|	|	|	1.02
6.917	8.79	7.48	0.212	| O	|	|	|	|	1.03
7.000	8.98	7.68	0.221	| OI	|	|	|	|	1.04
7.083	9.15	7.87	0.230	| OI	|	|	|	|	1.05
7.167	9.30	8.06	0.238	| OI	|	|	|	|	1.07
7.250	9.44	8.24	0.247	| OI	|	|	|	|	1.08
7.333	9.75	8.43	0.255	| OI	|	|	|	|	1.09
7.417	10.58	8.68	0.266	| OI	|	|	|	|	1.10
7.500	11.67	9.02	0.282	| O	|	|	|	|	1.12
7.583	12.50	9.45	0.302	| OI	|	|	|	|	1.14
7.667	13.59	9.95	0.325	| OI	|	|	|	|	1.17
7.750	14.84	10.55	0.352	| OI	|	|	|	|	1.20
7.833	15.80	11.21	0.383	| O I	|	|	|	|	1.24
7.917	16.97	11.94	0.416	| OI	|	|	|	|	1.28
8.000	18.31	12.73	0.452	| O I	|	|	|	|	1.33
8.083	19.49	13.60	0.492	| O I	|	|	|	|	1.38
8.167	21.40	14.55	0.536	| O I|	|	|	|	|	1.43
8.250	23.73	15.68	0.587	| O I|	|	|	|	|	1.49
8.333	25.15	16.90	0.643	| O I	|	|	|	|	1.56
8.417	25.96	18.11	0.698	| O I	|	|	|	|	1.63
8.500	26.56	19.25	0.751	| O I	|	|	|	|	1.69
8.583	27.21	20.32	0.799	| O |I	|	|	|	|	1.75
8.667	28.30	21.36	0.847	| O|I	|	|	|	|	1.81
8.750	29.61	22.42	0.896	| O|I	|	|	|	|	1.87
8.833	30.61	23.50	0.945	| O| I	|	|	|	|	1.93
8.917	31.81	24.58	0.994	| O I	|	|	|	|	1.99
9.000	33.18	25.00	1.047	| O I	|	|	|	|	2.03
9.083	34.39	25.35	1.107	| O I	|	|	|	|	2.06
9.167	36.33	25.76	1.174	| O I	|	|	|	|	2.10
9.250	38.67	26.23	1.254	| O I	|	|	|	|	2.15
9.333	40.27	26.77	1.343	| O I	|	|	|	|	2.20
9.417	41.77	27.34	1.439	| |O I	|	|	|	|	2.26
9.500	43.34	27.96	1.542	| |O I	|	|	|	|	2.32

9.583	44.54	28.60	1.650	|	|O I |	|	|	2.38
9.667	45.88	29.27	1.762	|	|O I|	|	|	2.44
9.750	47.34	29.98	1.879	|	| O I|	|	|	2.51
9.833	48.45	30.70	1.999	|	| O I |	|	|	2.58
9.917	49.75	31.44	2.124	|	| O I |	|	|	2.66
10.000	51.19	32.21	2.252	|	| O |I |	|	|	2.73
10.083	50.96	32.97	2.379	|	| O |I |	|	|	2.81
10.167	46.64	33.61	2.486	|	| O I|	|	|	2.87
10.250	40.37	34.01	2.553	|	| O I |	|	|	2.91
10.333	36.96	34.20	2.584	|	| OI |	|	|	2.93
10.417	35.41	34.28	2.598	|	| O |	|	|	2.93
10.500	34.46	34.31	2.602	|	| O |	|	|	2.94
10.583	34.62	34.32	2.604	|	| O |	|	|	2.94
10.667	37.63	34.39	2.616	|	| OI |	|	|	2.94
10.750	42.06	34.61	2.653	|	| O I |	|	|	2.97
10.833	44.51	34.96	2.711	|	| O I |	|	|	3.00
10.917	45.64	35.21	2.780	|	| O I|	|	|	3.03
11.000	46.34	35.47	2.853	|	| O I|	|	|	3.06
11.083	46.72	35.73	2.929	|	| O I|	|	|	3.10
11.167	46.43	36.00	3.002	|	| O I|	|	|	3.13
11.250	45.81	36.24	3.071	|	| O I|	|	|	3.16
11.333	45.56	36.47	3.136	|	| O I|	|	|	3.19
11.417	45.52	36.69	3.197	|	| O I|	|	|	3.22
11.500	45.56	36.90	3.257	|	| O I|	|	|	3.25
11.583	45.25	37.11	3.315	|	| O I|	|	|	3.27
11.667	43.99	37.29	3.366	|	| O I |	|	|	3.30
11.750	42.20	37.43	3.406	|	| O I |	|	|	3.31
11.833	41.41	37.54	3.436	|	| OI |	|	|	3.33
11.917	41.70	37.63	3.463	|	| O I |	|	|	3.34
12.000	42.44	37.74	3.493	|	| O I |	|	|	3.35
12.083	44.02	37.87	3.530	|	| O I |	|	|	3.37
12.167	49.05	38.08	3.589	|	| O I |	|	|	3.40
12.250	55.87	38.43	3.687	|	| O | I |	|	|	3.44
12.333	59.91	38.90	3.820	|	| O | I |	|	|	3.50
12.417	62.53	39.44	3.971	|	| O | I |	|	|	3.57
12.500	64.79	40.03	4.136	|	| O | I |	|	|	3.64
12.583	66.65	40.65	4.311	|	| O | I |	|	|	3.72
12.667	69.08	41.31	4.496	|	| O | I|	|	|	3.81
12.750	71.82	42.01	4.695	|	| O | I |	|	|	3.90
12.833	73.71	42.76	4.904	|	| O | I |	|	|	3.99
12.917	75.45	43.39	5.121	|	| O | I |	|	|	4.09
13.000	77.23	44.03	5.346	|	| O | I |	|	|	4.18
13.083	79.25	44.70	5.579	|	| O| I |	|	|	4.28
13.167	83.55	45.42	5.829	|	| O| I |	|	|	4.39
13.250	89.00	46.21	6.108	|	| O| I |	|	|	4.51
13.333	92.22	47.08	6.411	|	| O| I |	|	|	4.64
13.417	93.95	47.98	6.724	|	| O I |	|	|	4.78
13.500	95.20	48.89	7.042	|	| O I |	|	|	4.92
13.583	94.35	49.73	7.355	|	| O I |	|	|	5.05
13.667	87.34	50.40	7.636	|	| O I |	|	|	5.16
13.750	77.35	50.93	7.854	|	| |O I |	|	|	5.25
13.833	71.88	51.32	8.016	|	| |O I |	|	|	5.32
13.917	69.36	51.63	8.148	|	| |O I|	|	|	5.37
14.000	67.78	51.91	8.264	|	| |O I |	|	|	5.42
14.083	67.31	52.17	8.370	|	| |O I |	|	|	5.47
14.167	69.27	52.43	8.480	|	| |O I|	|	|	5.51
14.250	72.46	52.74	8.606	|	| |O I |	|	|	5.56
14.333	73.99	53.07	8.746	|	| |O I |	|	|	5.62
14.417	73.98	53.42	8.889	|	| |O I |	|	|	5.68
14.500	73.40	53.75	9.028	|	| | O I |	|	|	5.74
14.583	73.16	54.07	9.161	|	| | O I |	|	|	5.79
14.667	73.06	54.38	9.291	|	| | O I |	|	|	5.85
14.750	73.03	54.69	9.419	|	| | O I |	|	|	5.90

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14.833   72.86   54.99      9.543  |        |        | O     I       |      5.95
14.917   72.17   55.28      9.663  |        |        | O     I       |      6.00
15.000   71.22   55.51      9.775  |        |        | O    I|       |      6.04
15.083   70.51   55.73      9.880  |        |        | O    I|       |      6.08
15.167   69.69   55.93      9.979  |        |        | O    I|       |      6.12
15.250   68.68   56.12     10.069  |        |        | O    I|       |      6.16
15.333   67.95   56.30     10.153  |        |        | O   I |       |      6.19
15.417   67.00   56.46     10.229  |        |        | O   I |       |      6.22
15.500   65.90   56.60     10.297  |        |        |  O  I |       |      6.25
15.583   64.62   56.72     10.357  |        |        |  O I  |       |      6.27
15.667   61.47   56.81     10.400  |        |        |  OI   |       |      6.29
15.750   57.39   56.85     10.418  |        |        |  O    |       |      6.30
15.833   55.06   56.84     10.413  |        |        | IO    |       |      6.30
15.917   53.91   56.81     10.397  |        |        | IO    |       |      6.29
16.000   53.14   56.76     10.375  |        |        |I O    |       |      6.28
16.083   50.26   56.69     10.340  |        |        I  O    |       |      6.27
16.167   40.16   56.52     10.262  |        |    I   | O     |       |      6.24
16.250   26.51   56.19     10.103  |        I        | O     |       |      6.17
16.333   18.75   55.71      9.874  |     I  |        | O     |       |      6.08
16.417   14.89   55.14      9.608  |    I   |        | O     |       |      5.98
16.500   12.27   54.46      9.324  |   I    |        | O     |       |      5.86
16.583   10.26   53.75      9.029  |  I     |        | O     |       |      5.74
16.667    8.62   53.02      8.726  | I      |        |O      |       |      5.61
16.750    7.20   52.28      8.418  | I      |        |O      |       |      5.49
16.833    6.16   51.53      8.106  | I      |        |O      |       |      5.36
16.917    5.39   50.78      7.794  |I       |        |O      |       |      5.23
17.000    4.69   50.03      7.481  |I       |        O       |       |      5.10
17.083    4.21   49.25      7.170  |I       |        O       |       |      4.97
17.167    4.14   48.37      6.863  |I       |        O       |       |      4.84
17.250    4.26   47.51      6.561  |I       |       O|       |       |      4.71
17.333    4.26   46.67      6.267  |I       |       O|       |       |      4.58
17.417    4.17   45.84      5.977  |I       |       O|       |       |      4.46
17.500    4.04   45.02      5.692  |I       |       O|       |       |      4.33
17.583    3.90   44.22      5.412  |I       |      O |       |       |      4.21
17.667    3.94   43.44      5.138  |I       |      O |       |       |      4.09
17.750    3.97   42.63      4.868  |I       |      O |       |       |      3.98
17.833    3.96   41.69      4.605  |I       |      O |       |       |      3.86
17.917    3.81   40.78      4.348  |I       |     O  |       |       |      3.74
18.000    3.60   39.88      4.096  |I       |     O  |       |       |      3.63
18.083    3.48   39.00      3.849  |I       |     O  |       |       |      3.51
18.167    3.43   38.14      3.607  |I       |    O   |       |       |      3.41
18.250    3.39   37.30      3.370  |I       |    O   |       |       |      3.30
18.333    3.37   36.48      3.140  |I       |    O   |       |       |      3.19
18.417    3.35   35.68      2.914  |I       |  O     |       |       |      3.09
18.500    3.34   34.86      2.694  |I       |  O     |       |       |      2.99
18.583    3.29   33.59      2.482  |I       |  O     |       |       |      2.87
18.667    3.12   32.36      2.277  |I       | O      |       |       |      2.75
18.750    2.87   31.17      2.078  I        | O      |       |       |      2.63
18.833    2.70   30.02      1.887  I        | O      |       |       |      2.52
18.917    2.46   28.92      1.702  I        |O       |       |       |      2.41
19.000    2.18   27.84      1.522  I        |O       |       |       |      2.30
19.083    2.05   26.80      1.349  I        |O       |       |       |      2.20
19.167    2.13   25.80      1.182  I        O        |       |       |      2.11
19.250    2.30   24.85      1.023  I        O        |       |       |      2.01
19.333    2.42   22.02      0.878  I       O|        |       |       |      1.85
19.417    2.62   19.29      0.753  I      O |        |       |       |      1.70
19.500    2.86   16.98      0.647  I     O  |        |       |       |      1.57
19.583    2.96   15.01      0.556  I     O  |        |       |       |      1.46
19.667    2.86   13.32      0.479  I    O   |        |       |       |      1.36
19.750    2.67   11.84      0.411  I  O     |        |       |       |      1.28
19.833    2.54   10.55      0.352  I  O     |        |       |       |      1.20
19.917    2.33    9.41      0.300  I  O     |        |       |       |      1.14
20.000    2.08    8.41      0.254  I O      |        |       |       |      1.08
```

20.083	1.97	7.51	0.213	I O				1.03
20.167	2.07	6.65	0.178	I O				0.96
20.250	2.25	5.62	0.151	IO				0.82
20.333	2.34	4.87	0.130	IO				0.71
20.417	2.38	4.30	0.115	IO				0.62
20.500	2.40	3.86	0.104	IO				0.56
20.583	2.42	3.53	0.095	IO				0.51
20.667	2.43	3.28	0.088	IO				0.48
20.750	2.43	3.09	0.083	IO				0.45
20.833	2.40	2.93	0.079	O				0.43
20.917	2.23	2.79	0.075	O				0.40
21.000	2.00	2.64	0.071	O				0.38
21.083	1.91	2.48	0.067	O				0.36
21.167	2.02	2.37	0.063	O				0.34
21.250	2.21	2.31	0.062	O				0.33
21.333	2.27	2.29	0.062	O				0.33
21.417	2.15	2.27	0.061	O				0.33
21.500	1.94	2.22	0.060	O				0.32
21.583	1.87	2.15	0.058	O				0.31
21.667	1.99	2.10	0.056	O				0.30
21.750	2.19	2.10	0.056	O				0.30
21.833	2.25	2.13	0.057	O				0.31
21.917	2.13	2.14	0.057	O				0.31
22.000	1.93	2.11	0.057	O				0.31
22.083	1.86	2.06	0.055	O				0.30
22.167	1.98	2.03	0.054	O				0.29
22.250	2.18	2.04	0.055	O				0.30
22.333	2.24	2.08	0.056	O				0.30
22.417	2.12	2.10	0.056	O				0.30
22.500	1.92	2.08	0.056	O				0.30
22.583	1.82	2.03	0.055	O				0.29
22.667	1.77	1.98	0.053	O				0.29
22.750	1.74	1.93	0.052	O				0.28
22.833	1.71	1.88	0.050	O				0.27
22.917	1.70	1.84	0.049	O				0.27
23.000	1.69	1.81	0.048	O				0.26
23.083	1.68	1.78	0.048	O				0.26
23.167	1.67	1.76	0.047	O				0.25
23.250	1.66	1.74	0.047	O				0.25
23.333	1.66	1.72	0.046	O				0.25
23.417	1.65	1.70	0.046	O				0.25
23.500	1.65	1.69	0.045	O				0.25
23.583	1.65	1.68	0.045	O				0.24
23.667	1.65	1.67	0.045	O				0.24
23.750	1.64	1.67	0.045	O				0.24
23.833	1.64	1.66	0.045	O				0.24
23.917	1.64	1.66	0.044	O				0.24
24.000	1.64	1.65	0.044	O				0.24
24.083	1.56	1.64	0.044	O				0.24
24.167	1.22	1.58	0.042	O				0.23
24.250	0.76	1.45	0.039	O				0.21
24.333	0.50	1.26	0.034	O				0.18
24.417	0.37	1.07	0.029	O				0.16
24.500	0.29	0.91	0.024	O				0.13
24.583	0.23	0.76	0.020	O				0.11
24.667	0.18	0.63	0.017	O				0.09
24.750	0.14	0.53	0.014	O				0.08
24.833	0.11	0.44	0.012	O				0.06
24.917	0.09	0.36	0.010	O				0.05
25.000	0.07	0.30	0.008	O				0.04
25.083	0.05	0.24	0.007	O				0.04
25.167	0.04	0.20	0.005	O				0.03
25.250	0.03	0.16	0.004	O				0.02

```
25.333    0.02    0.13      0.003  O       |       |       |       |      0.02
25.417    0.01    0.10      0.003  O       |       |       |       |      0.02
25.500    0.01    0.08      0.002  O       |       |       |       |      0.01
25.583    0.00    0.07      0.002  O       |       |       |       |      0.01
25.667    0.00    0.05      0.001  O       |       |       |       |      0.01
25.750    0.00    0.04      0.001  O       |       |       |       |      0.01
25.833    0.00    0.03      0.001  O       |       |       |       |      0.00
25.917    0.00    0.02      0.001  O       |       |       |       |      0.00
26.000    0.00    0.02      0.000  O       |       |       |       |      0.00
26.083    0.00    0.01      0.000  O       |       |       |       |      0.00
26.167    0.00    0.01      0.000  O       |       |       |       |      0.00
26.250    0.00    0.01      0.000  O       |       |       |       |      0.00
26.333    0.00    0.01      0.000  O       |       |       |       |      0.00

      ****************************HYDROGRAPH DATA****************************
                  Number of intervals =   316
                  Time interval =    5.0 (Min.)
                  Maximum/Peak flow rate =       56.848 (CFS)
                  Total volume =      42.730 (Ac.Ft)
            Status of hydrographs being held in storage
                        Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
            Peak (CFS)      0.000     0.000     0.000     0.000     0.000
            Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
      ***********************************************************************

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                  FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                        Study date: 03/25/24

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Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin full of debris at 1348 (2' depth)
100-year 1-hour storm Inflow Hydrograph


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Program License Serial Number 4029

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******************** HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff1100.rte
****************************HYDROGRAPH DATA*****************************
             Number of intervals =    30
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =      417.913 (CFS)
             Total volume =      19.250 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 30
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   2.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   2.00 (Ft.)
Initial basin storage =      1.00 (Ac.Ft)
Initial basin outflow =  24.72 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
```

6.000	9.665	55.280	9.475	9.855
7.000	12.199	60.560	11.990	12.408
8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 104.5 208.96 313.44 417.91	Depth (Ft.)
0.083	3.94	19.81	0.776	IO | | | | |	1.72
0.167	21.77	18.84	0.732	|O | | | |	1.67
0.250	50.29	21.24	0.842	|O I | | | |	1.80
0.333	72.54	25.34	1.104	|O I | | | |	2.06
0.417	87.85	27.56	1.474	| O I | | | |	2.28
0.500	102.44	30.29	1.931	| O I| | | |	2.54
0.583	119.83	33.55	2.476	| O |I | | |	2.86
0.667	141.58	36.47	3.135	| O | I | | |	3.19
0.750	175.94	39.43	3.967	| O | I | | |	3.57
0.833	259.23	43.56	5.180	| O | | I | | |	4.11
0.917	390.61	49.05	7.099	| O | | | I |	4.94
1.000	417.91	54.94	9.525	| O | | | I	5.94
1.083	287.92	59.23	11.562	| O | | I | |	6.75
1.167	177.00	61.57	12.747	| O | I | | |	7.21
1.250	114.18	62.62	13.322	| O I | | |	7.42
1.333	81.26	63.06	13.562	| O I | | | |	7.52
1.417	61.67	63.17	13.620	| O | | | |	7.54
1.500	48.80	63.07	13.566	| IO | | | |	7.52
1.583	38.55	62.82	13.433	| I O | | | |	7.47
1.667	31.06	62.47	13.241	| I O | | | |	7.39
1.750	26.08	62.05	13.009	|I O | | | |	7.31
1.833	20.95	61.56	12.746	|I O | | | |	7.21
1.917	16.97	61.03	12.454	|I O | | | |	7.10
2.000	13.54	60.44	12.141	|I O | | | |	6.98
2.083	10.60	59.75	11.810	I O | | | |	6.85
2.167	8.51	59.03	11.467	I O | | | |	6.71
2.250	7.12	58.30	11.117	I O | | | |	6.57
2.333	5.27	57.56	10.760	I O | | | |	6.43
2.417	1.27	56.79	10.389	I O | | | |	6.29
2.500	0.41	55.99	10.006	I O | | | |	6.13
2.583	0.00	55.18	9.625	I O | | | |	5.98
2.667	0.00	54.28	9.248	I O | | | |	5.83
2.750	0.00	53.39	8.877	I O | | | |	5.68
2.833	0.00	52.51	8.513	I O | | | |	5.52
2.917	0.00	51.65	8.154	I O | | | |	5.38
3.000	0.00	50.80	7.801	I O | | | |	5.23
3.083	0.00	49.97	7.454	I O | | | |	5.09
3.167	0.00	49.09	7.113	I O | | | |	4.95
3.250	0.00	48.13	6.778	I O | | | |	4.80
3.333	0.00	47.19	6.450	I O | | | |	4.66
3.417	0.00	46.27	6.128	I O | | | |	4.52
3.500	0.00	45.37	5.813	I O | | | |	4.38
3.583	0.00	44.48	5.503	I O | | | |	4.25
3.667	0.00	43.61	5.200	I O | | | |	4.12
3.750	0.00	42.75	4.902	I O | | | |	3.99
3.833	0.00	41.72	4.612	I O | | | |	3.86
3.917	0.00	40.71	4.328	I O | | | |	3.73
4.000	0.00	39.72	4.051	I O | | | |	3.61
4.083	0.00	38.76	3.780	I O | | | |	3.48
4.167	0.00	37.82	3.517	I O | | | |	3.36

4.250	0.00	36.91	3.259	I O	|	|	|	|	3.25
4.333	0.00	36.02	3.008	I O	|	|	|	|	3.13
4.417	0.00	35.15	2.763	I O	|	|	|	|	3.02
4.500	0.00	33.85	2.526	I O	|	|	|	|	2.89
4.583	0.00	32.48	2.297	I O	|	|	|	|	2.76
4.667	0.00	31.17	2.078	I O	|	|	|	|	2.63
4.750	0.00	29.91	1.868	I O	|	|	|	|	2.51
4.833	0.00	28.70	1.666	I O	|	|	|	|	2.39
4.917	0.00	27.54	1.472	I O	|	|	|	|	2.28
5.000	0.00	26.43	1.286	I O	|	|	|	|	2.17
5.083	0.00	25.36	1.108	IO	|	|	|	|	2.06
5.167	0.00	23.39	0.940	IO	|	|	|	|	1.93
5.250	0.00	20.12	0.790	IO	|	|	|	|	1.74
5.333	0.00	17.30	0.661	IO	|	|	|	|	1.58
5.417	0.00	14.88	0.551	IO	|	|	|	|	1.45
5.500	0.00	12.80	0.455	O	|	|	|	|	1.33
5.583	0.00	11.01	0.373	O	|	|	|	|	1.23
5.667	0.00	9.47	0.303	O	|	|	|	|	1.14
5.750	0.00	8.15	0.242	O	|	|	|	|	1.07
5.833	0.00	7.01	0.190	O	|	|	|	|	1.01
5.917	0.00	5.48	0.147	O	|	|	|	|	0.79
6.000	0.00	4.23	0.113	O	|	|	|	|	0.61
6.083	0.00	3.27	0.088	O	|	|	|	|	0.47
6.167	0.00	2.52	0.068	O	|	|	|	|	0.37
6.250	0.00	1.95	0.052	O	|	|	|	|	0.28
6.333	0.00	1.51	0.040	O	|	|	|	|	0.22
6.417	0.00	1.16	0.031	O	|	|	|	|	0.17
6.500	0.00	0.90	0.024	O	|	|	|	|	0.13
6.583	0.00	0.69	0.019	O	|	|	|	|	0.10
6.667	0.00	0.54	0.014	O	|	|	|	|	0.08
6.750	0.00	0.41	0.011	O	|	|	|	|	0.06
6.833	0.00	0.32	0.009	O	|	|	|	|	0.05
6.917	0.00	0.25	0.007	O	|	|	|	|	0.04
7.000	0.00	0.19	0.005	O	|	|	|	|	0.03
7.083	0.00	0.15	0.004	O	|	|	|	|	0.02
7.167	0.00	0.11	0.003	O	|	|	|	|	0.02
7.250	0.00	0.09	0.002	O	|	|	|	|	0.01
7.333	0.00	0.07	0.002	O	|	|	|	|	0.01
7.417	0.00	0.05	0.001	O	|	|	|	|	0.01
7.500	0.00	0.04	0.001	O	|	|	|	|	0.01
7.583	0.00	0.03	0.001	O	|	|	|	|	0.00
7.667	0.00	0.02	0.001	O	|	|	|	|	0.00
7.750	0.00	0.02	0.001	O	|	|	|	|	0.00
7.833	0.00	0.01	0.000	O	|	|	|	|	0.00
7.917	0.00	0.01	0.000	O	|	|	|	|	0.00
8.000	0.00	0.01	0.000	O	|	|	|	|	0.00
8.083	0.00	0.01	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 97
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 63.166 (CFS)
Total volume = 20.080 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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                  FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                        Study date: 03/25/24

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Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin full of debris at 1348 (2' depth)
100-year 3-hour storm Inflow Hydrograph

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Program License Serial Number 4029

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******************** HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff3100.rte
****************************HYDROGRAPH DATA*****************************
             Number of intervals =    54
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =      257.413 (CFS)
             Total volume =      25.952 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
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Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
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User entry of depth-outflow-storage data
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Total number of inflow hydrograph intervals = 54
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   2.00(Ft.)
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Initial basin depth =   2.00 (Ft.)
Initial basin storage =      1.00 (Ac.Ft)
Initial basin outflow =  24.72 (CFS)
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Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
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6.000	9.665	55.280	9.475	9.855
7.000	12.199	60.560	11.990	12.408
8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 64.4 128.71 193.06 257.41	Depth (Ft.)
0.083	1.89	19.67	0.770	I O	1.72
0.167	9.80	17.73	0.681	IO	1.61
0.250	20.21	17.35	0.664	O	1.59
0.333	25.36	18.11	0.698	OI	1.63
0.417	29.49	19.41	0.758	OI	1.70
0.500	35.75	21.26	0.843	O I	1.81
0.583	41.47	23.69	0.954	O I	1.94
0.667	45.18	25.22	1.084	O I	2.05
0.750	47.75	26.07	1.227	O I	2.13
0.833	50.89	27.01	1.384	O I	2.22
0.917	50.97	27.98	1.545	O I	2.32
1.000	50.16	28.89	1.698	O I	2.41
1.083	53.14	29.81	1.851	O I	2.50
1.167	59.89	30.89	2.032	O I	2.60
1.250	66.71	32.20	2.250	O I	2.73
1.333	70.08	33.66	2.494	O I	2.87
1.417	71.67	35.08	2.746	O I	3.02
1.500	76.34	36.03	3.011	O I	3.14
1.583	83.92	37.09	3.311	O I	3.27
1.667	87.41	38.27	3.641	O I	3.42
1.750	90.61	39.49	3.986	O I	3.58
1.833	99.23	40.83	4.364	O I	3.75
1.917	106.98	42.34	4.787	O I	3.94
2.000	108.49	43.71	5.233	O I	4.13
2.083	108.74	44.98	5.676	O I	4.33
2.167	113.42	46.27	6.126	O I	4.52
2.250	127.65	47.72	6.633	O I	4.74
2.333	147.06	49.46	7.244	O I	5.00
2.417	159.45	51.17	7.953	O I	5.29
2.500	182.14	53.13	8.770	O I	5.63
2.583	225.53	55.56	9.800	O I	6.05
2.667	257.41	58.21	11.071	O I	6.55
2.750	253.70	60.97	12.421	O I	7.08
2.833	204.06	63.07	13.570	O I	7.52
2.917	146.77	64.48	14.339	O I	7.81
3.000	113.09	65.30	14.787	O I	7.98
3.083	87.18	65.71	15.025	O I	8.07
3.167	61.41	65.80	15.084	IO	8.09
3.250	44.13	65.66	14.995	I O	8.05
3.333	33.93	65.35	14.812	I O	7.99
3.417	26.78	64.91	14.573	I O	7.90
3.500	21.58	64.40	14.294	I O	7.79
3.583	17.50	63.84	13.987	I O	7.68
3.667	14.01	63.24	13.658	I O	7.55
3.750	11.09	62.60	13.311	I O	7.42
3.833	8.66	61.94	12.950	I O	7.28
3.917	7.00	61.26	12.580	I O	7.14
4.000	5.23	60.57	12.203	I O	7.00
4.083	3.64	59.77	11.819	I O	6.85
4.167	1.98	58.96	11.429	I O	6.70

4.250	0.87	58.14	11.036	I O|	|	|	|	6.54
4.333	0.56	57.32	10.643	I O|	|	|	|	6.39
4.417	0.29	56.51	10.254	I O|	|	|	|	6.23
4.500	0.03	55.70	9.869	I O |	|	|	|	6.08
4.583	0.00	54.86	9.488	I O |	|	|	|	5.93
4.667	0.00	53.95	9.114	I O |	|	|	|	5.77
4.750	0.00	53.07	8.745	I O |	|	|	|	5.62
4.833	0.00	52.20	8.383	I O |	|	|	|	5.47
4.917	0.00	51.34	8.026	I O |	|	|	|	5.32
5.000	0.00	50.50	7.675	I O |	|	|	|	5.18
5.083	0.00	49.67	7.330	I O |	|	|	|	5.04
5.167	0.00	48.74	6.992	I O |	|	|	|	4.89
5.250	0.00	47.79	6.659	I O |	|	|	|	4.75
5.333	0.00	46.86	6.333	I O |	|	|	|	4.61
5.417	0.00	45.94	6.014	I O |	|	|	|	4.47
5.500	0.00	45.05	5.700	I O |	|	|	|	4.34
5.583	0.00	44.17	5.393	I O |	|	|	|	4.20
5.667	0.00	43.31	5.092	I O |	|	|	|	4.07
5.750	0.00	42.37	4.797	I O |	|	|	|	3.94
5.833	0.00	41.35	4.509	I O |	|	|	|	3.81
5.917	0.00	40.35	4.227	I O |	|	|	|	3.69
6.000	0.00	39.37	3.953	I O |	|	|	|	3.56
6.083	0.00	38.42	3.685	I O |	|	|	|	3.44
6.167	0.00	37.49	3.423	I O |	|	|	|	3.32
6.250	0.00	36.59	3.168	I O |	|	|	|	3.21
6.333	0.00	35.70	2.919	I O |	|	|	|	3.09
6.417	0.00	34.75	2.677	I O |	|	|	|	2.98
6.500	0.00	33.35	2.442	I O |	|	|	|	2.84
6.583	0.00	32.00	2.217	I O |	|	|	|	2.71
6.667	0.00	30.71	2.001	I O |	|	|	|	2.58
6.750	0.00	29.47	1.794	I O |	|	|	|	2.46
6.833	0.00	28.28	1.595	I O |	|	|	|	2.35
6.917	0.00	27.14	1.404	I O |	|	|	|	2.24
7.000	0.00	26.04	1.221	I O |	|	|	|	2.13
7.083	0.00	24.99	1.045	I O |	|	|	|	2.03
7.167	0.00	22.15	0.883	I O |	|	|	|	1.86
7.250	0.00	19.05	0.741	I O |	|	|	|	1.68
7.333	0.00	16.38	0.619	I O |	|	|	|	1.53
7.417	0.00	14.09	0.514	IO |	|	|	|	1.40
7.500	0.00	12.12	0.424	IO |	|	|	|	1.29
7.583	0.00	10.43	0.346	IO |	|	|	|	1.20
7.667	0.00	8.97	0.280	IO |	|	|	|	1.12
7.750	0.00	7.71	0.222	O |	|	|	|	1.05
7.833	0.00	6.47	0.173	O |	|	|	|	0.94
7.917	0.00	5.00	0.134	O |	|	|	|	0.72
8.000	0.00	3.86	0.103	O |	|	|	|	0.56
8.083	0.00	2.98	0.080	O |	|	|	|	0.43
8.167	0.00	2.30	0.062	O |	|	|	|	0.33
8.250	0.00	1.78	0.048	O |	|	|	|	0.26
8.333	0.00	1.37	0.037	O |	|	|	|	0.20
8.417	0.00	1.06	0.028	O |	|	|	|	0.15
8.500	0.00	0.82	0.022	O |	|	|	|	0.12
8.583	0.00	0.63	0.017	O |	|	|	|	0.09
8.667	0.00	0.49	0.013	O |	|	|	|	0.07
8.750	0.00	0.38	0.010	O |	|	|	|	0.05
8.833	0.00	0.29	0.008	O |	|	|	|	0.04
8.917	0.00	0.23	0.006	O |	|	|	|	0.03
9.000	0.00	0.17	0.005	O |	|	|	|	0.03
9.083	0.00	0.13	0.004	O |	|	|	|	0.02
9.167	0.00	0.10	0.003	O |	|	|	|	0.02
9.250	0.00	0.08	0.002	O |	|	|	|	0.01
9.333	0.00	0.06	0.002	O |	|	|	|	0.01
9.417	0.00	0.05	0.001	O |	|	|	|	0.01

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 9.500    0.00    0.04      0.001  O       |       |       |       |      0.01
 9.583    0.00    0.03      0.001  O       |       |       |       |      0.00
 9.667    0.00    0.02      0.001  O       |       |       |       |      0.00
 9.750    0.00    0.02      0.000  O       |       |       |       |      0.00
 9.833    0.00    0.01      0.000  O       |       |       |       |      0.00
 9.917    0.00    0.01      0.000  O       |       |       |       |      0.00
10.000    0.00    0.01      0.000  O       |       |       |       |      0.00
10.083    0.00    0.01      0.000  O       |       |       |       |      0.00

      ****************************HYDROGRAPH DATA****************************
                  Number of intervals =   121
                  Time interval =    5.0 (Min.)
                  Maximum/Peak flow rate =       65.803 (CFS)
                  Total volume =      26.783 (Ac.Ft)
            Status of hydrographs being held in storage
                        Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
            Peak (CFS)      0.000     0.000     0.000     0.000     0.000
            Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
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                  FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                        Study date: 03/25/24

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Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin full of debris at 1348 (2' depth)
100-year 6-hour storm Inflow Hydrograph

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Program License Serial Number 4029

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******************** HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff6100.rte
****************************HYDROGRAPH DATA*****************************
             Number of intervals =    90
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =      238.016 (CFS)
             Total volume =      33.045 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)     0.000     0.000     0.000     0.000     0.000
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Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
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User entry of depth-outflow-storage data
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Total number of inflow hydrograph intervals = 90
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   2.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   2.00 (Ft.)
Initial basin storage =      1.00 (Ac.Ft)
Initial basin outflow =  24.72 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)     (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
   6.000      9.665     55.280      9.475        9.855
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7.000	12.199	60.560	11.990	12.408
8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 59.5 119.01 178.51 238.02	Depth (Ft.)
0.083	0.56	19.57	0.765	I O	1.71
0.167	3.19	17.10	0.652	I O	1.57
0.250	7.66	15.46	0.577	IO	1.48
0.333	11.20	14.62	0.539	O	1.43
0.417	13.06	14.27	0.523	O	1.41
0.500	14.43	14.20	0.519	O	1.41
0.583	16.45	14.37	0.527	OI	1.42
0.667	18.76	14.83	0.548	OI	1.44
0.750	20.18	15.48	0.578	O	1.48
0.833	21.00	16.19	0.610	O	1.52
0.917	21.59	16.90	0.643	O	1.56
1.000	22.36	17.61	0.676	OI	1.60
1.083	24.00	18.39	0.711	OI	1.64
1.167	26.04	19.32	0.754	OI	1.70
1.250	27.26	20.35	0.801	OI	1.75
1.333	27.92	21.36	0.847	OI	1.81
1.417	28.40	22.31	0.891	OI	1.86
1.500	28.78	23.19	0.931	O	1.91
1.583	29.08	23.99	0.968	O	1.96
1.667	29.29	24.72	1.001	O	2.00
1.750	29.43	24.91	1.032	O	2.02
1.833	29.55	25.09	1.063	O	2.04
1.917	29.65	25.27	1.094	O	2.05
2.000	30.04	25.46	1.124	OI	2.07
2.083	31.06	25.67	1.159	OI	2.09
2.167	31.88	25.90	1.198	OI	2.12
2.250	32.42	26.15	1.240	OI	2.14
2.333	33.69	26.43	1.287	OI	2.17
2.417	34.54	26.74	1.339	OI	2.20
2.500	34.96	27.07	1.393	OI	2.23
2.583	35.22	27.39	1.447	OI	2.26
2.667	35.42	27.71	1.500	OI	2.29
2.750	35.87	28.03	1.554	OI	2.32
2.833	37.26	28.38	1.611	O I	2.36
2.917	39.11	28.77	1.678	O I	2.40
3.000	40.16	29.21	1.751	O I	2.44
3.083	40.70	29.66	1.827	O I	2.48
3.167	41.38	30.12	1.903	OI	2.53
3.250	42.93	30.61	1.985	OI	2.58
3.333	44.88	31.15	2.074	O I	2.63
3.417	46.34	31.73	2.172	O I	2.68
3.500	48.53	32.37	2.278	O I	2.75
3.583	52.25	33.09	2.400	O I	2.82
3.667	56.59	33.96	2.543	O I	2.90
3.750	60.34	34.95	2.709	O I	3.00
3.833	63.58	35.61	2.893	O I	3.08
3.917	66.81	36.32	3.094	O I	3.17
4.000	69.92	37.10	3.312	O I	3.27
4.083	73.11	37.93	3.546	O I	3.38
4.167	76.50	38.82	3.797	O I	3.49
4.250	80.95	39.79	4.068	O I	3.61

4.333	86.06	40.84	4.366	| O |	I |	|	|	3.75
4.417	91.47	42.00	4.692	| O |	I |	|	|	3.90
4.500	96.77	43.18	5.047	| O |	I |	|	|	4.05
4.583	101.24	44.27	5.428	| O |	I |	|	|	4.22
4.667	105.35	45.42	5.830	| O |	I |	|	|	4.39
4.750	110.27	46.64	6.256	| O |	I |	|	|	4.58
4.833	115.47	47.93	6.707	| O |	I|	|	|	4.77
4.917	119.91	49.29	7.183	| O |	I |	|	|	4.98
5.000	123.99	50.51	7.679	| O |	I |	|	|	5.18
5.083	130.13	51.76	8.202	| O |	|I |	|	|	5.40
5.167	141.91	53.15	8.778	| O|	| I |	|	|	5.63
5.250	160.28	54.76	9.447	| O|	| I |	|	|	5.91
5.333	180.15	56.47	10.236	| O|	| I |	|	|	6.23
5.417	199.14	58.37	11.147	| O|	| I |	|	|	6.58
5.500	221.25	60.53	12.185	| O |	| I |	|	|	6.99
5.583	238.02	62.66	13.342	| O |	| I |	|	|	7.43
5.667	213.61	64.70	14.459	| O |	| I |	|	|	7.85
5.750	150.38	66.09	15.262	| O |	| I |	|	|	8.15
5.833	101.27	66.76	15.671	| O I |	|	|	|	8.30
5.917	73.19	66.99	15.811	| |O |	|	|	|	8.35
6.000	55.26	66.96	15.792	| I|O |	|	|	|	8.34
6.083	42.24	66.76	15.667	| I O |	|	|	|	8.30
6.167	32.76	66.43	15.467	| I O |	|	|	|	8.23
6.250	25.43	66.01	15.211	| I O |	|	|	|	8.13
6.333	20.18	65.53	14.915	| I O |	|	|	|	8.03
6.417	16.39	64.95	14.592	| I O |	|	|	|	7.90
6.500	13.07	64.32	14.248	|I O |	|	|	|	7.77
6.583	10.42	63.66	13.888	|I O |	|	|	|	7.64
6.667	8.19	62.98	13.516	|I O |	|	|	|	7.50
6.750	6.27	62.28	13.135	I O |	|	|	|	7.35
6.833	4.74	61.56	12.746	I O |	|	|	|	7.21
6.917	3.49	60.84	12.353	I O |	|	|	|	7.06
7.000	2.22	60.05	11.957	I O |	|	|	|	6.90
7.083	0.77	59.22	11.556	I O|	|	|	|	6.75
7.167	0.32	58.38	11.155	I O|	|	|	|	6.59
7.250	0.16	57.56	10.757	I O|	|	|	|	6.43
7.333	0.08	56.74	10.365	I O|	|	|	|	6.28
7.417	0.03	55.93	9.977	I O|	|	|	|	6.12
7.500	0.01	55.11	9.595	I O|	|	|	|	5.97
7.583	0.00	54.21	9.218	I O|	|	|	|	5.82
7.667	0.00	53.32	8.848	I O|	|	|	|	5.66
7.750	0.00	52.44	8.484	I O|	|	|	|	5.51
7.833	0.00	51.58	8.126	I O |	|	|	|	5.37
7.917	0.00	50.73	7.773	I O |	|	|	|	5.22
8.000	0.00	49.90	7.427	I O |	|	|	|	5.08
8.083	0.00	49.01	7.086	I O |	|	|	|	4.93
8.167	0.00	48.06	6.752	I O |	|	|	|	4.79
8.250	0.00	47.12	6.424	I O |	|	|	|	4.65
8.333	0.00	46.20	6.103	I O |	|	|	|	4.51
8.417	0.00	45.30	5.788	I O |	|	|	|	4.37
8.500	0.00	44.41	5.479	I O |	|	|	|	4.24
8.583	0.00	43.55	5.176	I O |	|	|	|	4.11
8.667	0.00	42.67	4.879	I O |	|	|	|	3.98
8.750	0.00	41.64	4.589	I O |	|	|	|	3.85
8.833	0.00	40.63	4.306	I O |	|	|	|	3.72
8.917	0.00	39.65	4.029	I O |	|	|	|	3.60
9.000	0.00	38.69	3.759	I O |	|	|	|	3.47
9.083	0.00	37.75	3.496	I O |	|	|	|	3.36
9.167	0.00	36.84	3.239	I O |	|	|	|	3.24
9.250	0.00	35.95	2.989	I O |	|	|	|	3.13
9.333	0.00	35.08	2.744	I O |	|	|	|	3.01
9.417	0.00	33.74	2.507	I O |	|	|	|	2.88
9.500	0.00	32.38	2.279	I O |	|	|	|	2.75

9.583	0.00	31.07	2.061	I O	|	|	|	2.62
9.667	0.00	29.81	1.851	I O	|	|	|	2.50
9.750	0.00	28.61	1.650	I O	|	|	|	2.38
9.833	0.00	27.45	1.457	I O	|	|	|	2.27
9.917	0.00	26.34	1.272	I O	|	|	|	2.16
10.000	0.00	25.28	1.094	I O	|	|	|	2.05
10.083	0.00	23.12	0.928	I O	|	|	|	1.91
10.167	0.00	19.88	0.779	I O	|	|	|	1.73
10.250	0.00	17.10	0.652	I O	|	|	|	1.57
10.333	0.00	14.71	0.543	IO	|	|	|	1.44
10.417	0.00	12.65	0.448	IO	|	|	|	1.32
10.500	0.00	10.88	0.367	IO	|	|	|	1.22
10.583	0.00	9.36	0.298	IO	|	|	|	1.14
10.667	0.00	8.05	0.238	IO	|	|	|	1.06
10.750	0.00	6.92	0.186	O	|	|	|	1.00
10.833	0.00	5.36	0.144	O	|	|	|	0.78
10.917	0.00	4.14	0.111	O	|	|	|	0.60
11.000	0.00	3.20	0.086	O	|	|	|	0.46
11.083	0.00	2.47	0.066	O	|	|	|	0.36
11.167	0.00	1.91	0.051	O	|	|	|	0.28
11.250	0.00	1.47	0.040	O	|	|	|	0.21
11.333	0.00	1.14	0.031	O	|	|	|	0.17
11.417	0.00	0.88	0.024	O	|	|	|	0.13
11.500	0.00	0.68	0.018	O	|	|	|	0.10
11.583	0.00	0.52	0.014	O	|	|	|	0.08
11.667	0.00	0.41	0.011	O	|	|	|	0.06
11.750	0.00	0.31	0.008	O	|	|	|	0.05
11.833	0.00	0.24	0.006	O	|	|	|	0.04
11.917	0.00	0.19	0.005	O	|	|	|	0.03
12.000	0.00	0.14	0.004	O	|	|	|	0.02
12.083	0.00	0.11	0.003	O	|	|	|	0.02
12.167	0.00	0.09	0.002	O	|	|	|	0.01
12.250	0.00	0.07	0.002	O	|	|	|	0.01
12.333	0.00	0.05	0.001	O	|	|	|	0.01
12.417	0.00	0.04	0.001	O	|	|	|	0.01
12.500	0.00	0.03	0.001	O	|	|	|	0.00
12.583	0.00	0.02	0.001	O	|	|	|	0.00
12.667	0.00	0.02	0.000	O	|	|	|	0.00
12.750	0.00	0.01	0.000	O	|	|	|	0.00
12.833	0.00	0.01	0.000	O	|	|	|	0.00
12.917	0.00	0.01	0.000	O	|	|	|	0.00
13.000	0.00	0.01	0.000	O	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 156
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 66.994 (CFS)
Total volume = 33.876 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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                FLOOD HYDROGRAPH ROUTING PROGRAM
          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                     Study date: 03/25/24

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Keller Crossing, Tr. 38163
Debris - Detention Basin Routing Area C offsite
Detention with Basin full of debris at 1348 (2' depth)
100-year 24-hour storm Inflow Hydrograph

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Program License Serial Number 4029

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******************** HYDROGRAPH INFORMATION **********************

             From study/file name: 907hydcoff24100.rte
****************************HYDROGRAPH DATA*****************************
             Number of intervals =   306
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =       95.203 (CFS)
             Total volume =      42.730 (Ac.Ft)
       Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)     0.000     0.000     0.000     0.000     0.000
************************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 306
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   2.00(Ft.)
------------------------------------------------------------------------
------------------------------------------------------------------------
Initial basin depth =   2.00 (Ft.)
Initial basin storage =      1.00 (Ac.Ft)
Initial basin outflow =  24.72 (CFS)
------------------------------------------------------------------------
------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)     (Ac.Ft)
------------------------------------------------------------------------
   0.000      0.000      0.000      0.000        0.000
   1.000      0.185      6.900      0.161        0.209
   2.000      1.001     24.720      0.916        1.086
   3.000      2.711     34.960      2.591        2.831
   4.000      4.922     42.820      4.775        5.069
   5.000      7.239     49.450      7.069        7.409
   6.000      9.665     55.280      9.475        9.855
```

7.000	12.199	60.560	11.990	12.408
8.000	14.844	65.410	14.619	15.069
9.000	17.603	69.930	17.362	17.844
10.000	20.495	484.160	18.828	22.162

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 23.8 47.60 71.40 95.20	Depth (Ft.)
0.083	0.08	19.54	0.764	I O | | | |	1.71
0.167	0.42	16.84	0.640	I O | | | |	1.56
0.250	0.88	14.58	0.536	I O | | | |	1.43
0.333	1.18	12.68	0.450	I O | | | |	1.32
0.417	1.47	11.09	0.377	I O | | | |	1.24
0.500	1.79	9.77	0.316	I O | | | |	1.16
0.583	1.98	8.67	0.266	I O | | | |	1.10
0.667	2.09	7.74	0.223	I O | | | |	1.05
0.750	2.17	6.95	0.187	I O | | | |	1.00
0.833	2.27	5.91	0.158	IO | | | |	0.86
0.917	2.48	5.11	0.137	IO | | | |	0.74
1.000	2.76	4.54	0.122	IO | | | |	0.66
1.083	2.88	4.15	0.111	IO | | | |	0.60
1.167	2.80	3.85	0.103	IO | | | |	0.56
1.250	2.63	3.59	0.096	IO | | | |	0.52
1.333	2.55	3.36	0.090	IO | | | |	0.49
1.417	2.52	3.17	0.085	IO | | | |	0.46
1.500	2.51	3.02	0.081	IO | | | |	0.44
1.583	2.50	2.91	0.078	O | | | |	0.42
1.667	2.50	2.81	0.075	O | | | |	0.41
1.750	2.49	2.74	0.073	O | | | |	0.40
1.833	2.53	2.69	0.072	O | | | |	0.39
1.917	2.69	2.67	0.072	O | | | |	0.39
2.000	2.92	2.70	0.072	O | | | |	0.39
2.083	3.04	2.76	0.074	OI | | | |	0.40
2.167	3.10	2.83	0.076	OI | | | |	0.41
2.250	3.14	2.90	0.078	OI | | | |	0.42
2.333	3.17	2.96	0.079	OI | | | |	0.43
2.417	3.19	3.01	0.081	|O | | | |	0.44
2.500	3.21	3.05	0.082	|O | | | |	0.44
2.583	3.26	3.10	0.083	|O | | | |	0.45
2.667	3.44	3.15	0.085	|O | | | |	0.46
2.750	3.68	3.25	0.087	|O | | | |	0.47
2.833	3.82	3.36	0.090	|O | | | |	0.49
2.917	3.89	3.47	0.093	|O | | | |	0.50
3.000	3.94	3.57	0.096	|O | | | |	0.52
3.083	3.97	3.66	0.098	|O | | | |	0.53
3.167	4.00	3.73	0.100	|O | | | |	0.54
3.250	4.02	3.80	0.102	|O | | | |	0.55
3.333	4.04	3.85	0.103	|O | | | |	0.56
3.417	4.05	3.89	0.104	|O | | | |	0.56
3.500	4.06	3.93	0.105	|O | | | |	0.57
3.583	4.07	3.96	0.106	|O | | | |	0.57
3.667	4.08	3.99	0.107	|O | | | |	0.58
3.750	4.08	4.01	0.107	|O | | | |	0.58
3.833	4.13	4.03	0.108	|O | | | |	0.58
3.917	4.30	4.07	0.109	|O | | | |	0.59
4.000	4.53	4.15	0.111	|O | | | |	0.60
4.083	4.67	4.25	0.114	|O | | | |	0.62
4.167	4.73	4.35	0.117	|O | | | |	0.63
4.250	4.77	4.44	0.119	|O | | | |	0.64

4.333	4.84	4.53	0.121	|O	|	|	|	|	0.66
4.417	5.03	4.62	0.124	|O	|	|	|	|	0.67
4.500	5.28	4.74	0.127	|O	|	|	|	|	0.69
4.583	5.43	4.88	0.131	|O	|	|	|	|	0.71
4.667	5.50	5.02	0.134	|O	|	|	|	|	0.73
4.750	5.56	5.13	0.138	|O	|	|	|	|	0.74
4.833	5.64	5.24	0.140	|O	|	|	|	|	0.76
4.917	5.83	5.35	0.143	|O	|	|	|	|	0.78
5.000	6.09	5.49	0.147	|OI	|	|	|	|	0.80
5.083	6.16	5.63	0.151	|OI	|	|	|	|	0.82
5.167	5.90	5.72	0.153	|O	|	|	|	|	0.83
5.250	5.49	5.72	0.153	|O	|	|	|	|	0.83
5.333	5.32	5.65	0.151	|O	|	|	|	|	0.82
5.417	5.39	5.58	0.150	|O	|	|	|	|	0.81
5.500	5.56	5.56	0.149	|O	|	|	|	|	0.81
5.583	5.69	5.57	0.149	|O	|	|	|	|	0.81
5.667	5.88	5.62	0.151	|O	|	|	|	|	0.81
5.750	6.13	5.71	0.153	|OI	|	|	|	|	0.83
5.833	6.28	5.82	0.156	|OI	|	|	|	|	0.84
5.917	6.35	5.93	0.159	|OI	|	|	|	|	0.86
6.000	6.39	6.03	0.162	| O	|	|	|	|	0.87
6.083	6.47	6.12	0.164	| O	|	|	|	|	0.89
6.167	6.66	6.22	0.167	| O	|	|	|	|	0.90
6.250	6.91	6.35	0.170	| O	|	|	|	|	0.92
6.333	7.06	6.50	0.174	| O	|	|	|	|	0.94
6.417	7.14	6.63	0.178	| O	|	|	|	|	0.96
6.500	7.19	6.75	0.181	| O	|	|	|	|	0.98
6.583	7.31	6.87	0.184	| O	|	|	|	|	1.00
6.667	7.69	6.97	0.188	| O	|	|	|	|	1.00
6.750	8.22	7.11	0.194	| O	|	|	|	|	1.01
6.833	8.57	7.29	0.203	| O	|	|	|	|	1.02
6.917	8.79	7.48	0.212	| O	|	|	|	|	1.03
7.000	8.98	7.68	0.221	| OI	|	|	|	|	1.04
7.083	9.15	7.87	0.230	| OI	|	|	|	|	1.05
7.167	9.30	8.06	0.238	| OI	|	|	|	|	1.07
7.250	9.44	8.24	0.247	| OI	|	|	|	|	1.08
7.333	9.75	8.43	0.255	| OI	|	|	|	|	1.09
7.417	10.58	8.68	0.266	| OI	|	|	|	|	1.10
7.500	11.67	9.02	0.282	| O	|	|	|	|	1.12
7.583	12.50	9.45	0.302	| OI	|	|	|	|	1.14
7.667	13.59	9.95	0.325	| OI	|	|	|	|	1.17
7.750	14.84	10.55	0.352	| OI	|	|	|	|	1.20
7.833	15.80	11.21	0.383	| O I	|	|	|	|	1.24
7.917	16.97	11.94	0.416	| OI	|	|	|	|	1.28
8.000	18.31	12.73	0.452	| O I	|	|	|	|	1.33
8.083	19.49	13.60	0.492	| O I	|	|	|	|	1.38
8.167	21.40	14.55	0.536	| O I|	|	|	|	|	1.43
8.250	23.73	15.68	0.587	| O I|	|	|	|	|	1.49
8.333	25.15	16.90	0.643	| O I	|	|	|	|	1.56
8.417	25.96	18.11	0.698	| O I	|	|	|	|	1.63
8.500	26.56	19.25	0.751	| O I	|	|	|	|	1.69
8.583	27.21	20.32	0.799	| O |I	|	|	|	|	1.75
8.667	28.30	21.36	0.847	| O|I	|	|	|	|	1.81
8.750	29.61	22.42	0.896	| O|I	|	|	|	|	1.87
8.833	30.61	23.50	0.945	| O| I	|	|	|	|	1.93
8.917	31.81	24.58	0.994	| O I	|	|	|	|	1.99
9.000	33.18	25.00	1.047	| O I	|	|	|	|	2.03
9.083	34.39	25.35	1.107	| O I	|	|	|	|	2.06
9.167	36.33	25.76	1.174	| O I	|	|	|	|	2.10
9.250	38.67	26.23	1.254	| O I	|	|	|	|	2.15
9.333	40.27	26.77	1.343	| O I	|	|	|	|	2.20
9.417	41.77	27.34	1.439	| |O I	|	|	|	|	2.26
9.500	43.34	27.96	1.542	| |O I	|	|	|	|	2.32

9.583	44.54	28.60	1.650	|	|O I |	|	|	2.38
9.667	45.88	29.27	1.762	|	|O I|	|	|	2.44
9.750	47.34	29.98	1.879	|	| O I|	|	|	2.51
9.833	48.45	30.70	1.999	|	| O I |	|	|	2.58
9.917	49.75	31.44	2.124	|	| O I |	|	|	2.66
10.000	51.19	32.21	2.252	|	| O |I |	|	|	2.73
10.083	50.96	32.97	2.379	|	| O |I |	|	|	2.81
10.167	46.64	33.61	2.486	|	| O I|	|	|	2.87
10.250	40.37	34.01	2.553	|	| O I |	|	|	2.91
10.333	36.96	34.20	2.584	|	| OI |	|	|	2.93
10.417	35.41	34.28	2.598	|	| O |	|	|	2.93
10.500	34.46	34.31	2.602	|	| O |	|	|	2.94
10.583	34.62	34.32	2.604	|	| O |	|	|	2.94
10.667	37.63	34.39	2.616	|	| OI |	|	|	2.94
10.750	42.06	34.61	2.653	|	| O I |	|	|	2.97
10.833	44.51	34.96	2.711	|	| O I |	|	|	3.00
10.917	45.64	35.21	2.780	|	| O I|	|	|	3.03
11.000	46.34	35.47	2.853	|	| O I|	|	|	3.06
11.083	46.72	35.73	2.929	|	| O I|	|	|	3.10
11.167	46.43	36.00	3.002	|	| O I|	|	|	3.13
11.250	45.81	36.24	3.071	|	| O I|	|	|	3.16
11.333	45.56	36.47	3.136	|	| O I|	|	|	3.19
11.417	45.52	36.69	3.197	|	| O I|	|	|	3.22
11.500	45.56	36.90	3.257	|	| O I|	|	|	3.25
11.583	45.25	37.11	3.315	|	| O I|	|	|	3.27
11.667	43.99	37.29	3.366	|	| O I |	|	|	3.30
11.750	42.20	37.43	3.406	|	| O I |	|	|	3.31
11.833	41.41	37.54	3.436	|	| OI |	|	|	3.33
11.917	41.70	37.63	3.463	|	| O I |	|	|	3.34
12.000	42.44	37.74	3.493	|	| O I |	|	|	3.35
12.083	44.02	37.87	3.530	|	| O I |	|	|	3.37
12.167	49.05	38.08	3.589	|	| O I |	|	|	3.40
12.250	55.87	38.43	3.687	|	| O | I |	|	|	3.44
12.333	59.91	38.90	3.820	|	| O | I |	|	|	3.50
12.417	62.53	39.44	3.971	|	| O | I |	|	|	3.57
12.500	64.79	40.03	4.136	|	| O | I |	|	|	3.64
12.583	66.65	40.65	4.311	|	| O | I |	|	|	3.72
12.667	69.08	41.31	4.496	|	| O | I|	|	|	3.81
12.750	71.82	42.01	4.695	|	| O | I |	|	|	3.90
12.833	73.71	42.76	4.904	|	| O | I |	|	|	3.99
12.917	75.45	43.39	5.121	|	| O | I |	|	|	4.09
13.000	77.23	44.03	5.346	|	| O | I |	|	|	4.18
13.083	79.25	44.70	5.579	|	| O| I |	|	|	4.28
13.167	83.55	45.42	5.829	|	| O| I |	|	|	4.39
13.250	89.00	46.21	6.108	|	| O| I |	|	|	4.51
13.333	92.22	47.08	6.411	|	| O| I |	|	|	4.64
13.417	93.95	47.98	6.724	|	| O I |	|	|	4.78
13.500	95.20	48.89	7.042	|	| O I |	|	|	4.92
13.583	94.35	49.73	7.355	|	| O I |	|	|	5.05
13.667	87.34	50.40	7.636	|	| O I |	|	|	5.16
13.750	77.35	50.93	7.854	|	| |O I |	|	|	5.25
13.833	71.88	51.32	8.016	|	| |O I |	|	|	5.32
13.917	69.36	51.63	8.148	|	| |O I|	|	|	5.37
14.000	67.78	51.91	8.264	|	| |O I |	|	|	5.42
14.083	67.31	52.17	8.370	|	| |O I |	|	|	5.47
14.167	69.27	52.43	8.480	|	| |O I|	|	|	5.51
14.250	72.46	52.74	8.606	|	| |O I |	|	|	5.56
14.333	73.99	53.07	8.746	|	| |O I |	|	|	5.62
14.417	73.98	53.42	8.889	|	| |O I |	|	|	5.68
14.500	73.40	53.75	9.028	|	| | O I |	|	|	5.74
14.583	73.16	54.07	9.161	|	| | O I |	|	|	5.79
14.667	73.06	54.38	9.291	|	| | O I |	|	|	5.85
14.750	73.03	54.69	9.419	|	| | O I |	|	|	5.90

14.833	72.86	54.99	9.543				5.95
14.917	72.17	55.28	9.663				6.00
15.000	71.22	55.51	9.775				6.04
15.083	70.51	55.73	9.880				6.08
15.167	69.69	55.93	9.979				6.12
15.250	68.68	56.12	10.069				6.16
15.333	67.95	56.30	10.153				6.19
15.417	67.00	56.46	10.229				6.22
15.500	65.90	56.60	10.297				6.25
15.583	64.62	56.72	10.357				6.27
15.667	61.47	56.81	10.400				6.29
15.750	57.39	56.85	10.418				6.30
15.833	55.06	56.84	10.413				6.30
15.917	53.91	56.81	10.397				6.29
16.000	53.14	56.76	10.375				6.28
16.083	50.26	56.69	10.340				6.27
16.167	40.16	56.52	10.262				6.24
16.250	26.51	56.19	10.103				6.17
16.333	18.75	55.71	9.874				6.08
16.417	14.89	55.14	9.608				5.98
16.500	12.27	54.46	9.324				5.86
16.583	10.26	53.75	9.029				5.74
16.667	8.62	53.02	8.726				5.61
16.750	7.20	52.28	8.418				5.49
16.833	6.16	51.53	8.106				5.36
16.917	5.39	50.78	7.794				5.23
17.000	4.69	50.03	7.481				5.10
17.083	4.21	49.25	7.170				4.97
17.167	4.14	48.37	6.863				4.84
17.250	4.26	47.51	6.561				4.71
17.333	4.26	46.67	6.267				4.58
17.417	4.17	45.84	5.977				4.46
17.500	4.04	45.02	5.692				4.33
17.583	3.90	44.22	5.412				4.21
17.667	3.94	43.44	5.138				4.09
17.750	3.97	42.63	4.868				3.98
17.833	3.96	41.69	4.605				3.86
17.917	3.81	40.78	4.348				3.74
18.000	3.60	39.88	4.096				3.63
18.083	3.48	39.00	3.849				3.51
18.167	3.43	38.14	3.607				3.41
18.250	3.39	37.30	3.370				3.30
18.333	3.37	36.48	3.140				3.19
18.417	3.35	35.68	2.914				3.09
18.500	3.34	34.86	2.694				2.99
18.583	3.29	33.59	2.482				2.87
18.667	3.12	32.36	2.277				2.75
18.750	2.87	31.17	2.078				2.63
18.833	2.70	30.02	1.887				2.52
18.917	2.46	28.92	1.702				2.41
19.000	2.18	27.84	1.522				2.30
19.083	2.05	26.80	1.349				2.20
19.167	2.13	25.80	1.182				2.11
19.250	2.30	24.85	1.023				2.01
19.333	2.42	22.02	0.878				1.85
19.417	2.62	19.29	0.753				1.70
19.500	2.86	16.98	0.647				1.57
19.583	2.96	15.01	0.556				1.46
19.667	2.86	13.32	0.479				1.36
19.750	2.67	11.84	0.411				1.28
19.833	2.54	10.55	0.352				1.20
19.917	2.33	9.41	0.300				1.14
20.000	2.08	8.41	0.254				1.08

20.083	1.97	7.51	0.213	I O				1.03
20.167	2.07	6.65	0.178	I O				0.96
20.250	2.25	5.62	0.151	IO				0.82
20.333	2.34	4.87	0.130	IO				0.71
20.417	2.38	4.30	0.115	IO				0.62
20.500	2.40	3.86	0.104	IO				0.56
20.583	2.42	3.53	0.095	IO				0.51
20.667	2.43	3.28	0.088	IO				0.48
20.750	2.43	3.09	0.083	IO				0.45
20.833	2.40	2.93	0.079	O				0.43
20.917	2.23	2.79	0.075	O				0.40
21.000	2.00	2.64	0.071	O				0.38
21.083	1.91	2.48	0.067	O				0.36
21.167	2.02	2.37	0.063	O				0.34
21.250	2.21	2.31	0.062	O				0.33
21.333	2.27	2.29	0.062	O				0.33
21.417	2.15	2.27	0.061	O				0.33
21.500	1.94	2.22	0.060	O				0.32
21.583	1.87	2.15	0.058	O				0.31
21.667	1.99	2.10	0.056	O				0.30
21.750	2.19	2.10	0.056	O				0.30
21.833	2.25	2.13	0.057	O				0.31
21.917	2.13	2.14	0.057	O				0.31
22.000	1.93	2.11	0.057	O				0.31
22.083	1.86	2.06	0.055	O				0.30
22.167	1.98	2.03	0.054	O				0.29
22.250	2.18	2.04	0.055	O				0.30
22.333	2.24	2.08	0.056	O				0.30
22.417	2.12	2.10	0.056	O				0.30
22.500	1.92	2.08	0.056	O				0.30
22.583	1.82	2.03	0.055	O				0.29
22.667	1.77	1.98	0.053	O				0.29
22.750	1.74	1.93	0.052	O				0.28
22.833	1.71	1.88	0.050	O				0.27
22.917	1.70	1.84	0.049	O				0.27
23.000	1.69	1.81	0.048	O				0.26
23.083	1.68	1.78	0.048	O				0.26
23.167	1.67	1.76	0.047	O				0.25
23.250	1.66	1.74	0.047	O				0.25
23.333	1.66	1.72	0.046	O				0.25
23.417	1.65	1.70	0.046	O				0.25
23.500	1.65	1.69	0.045	O				0.25
23.583	1.65	1.68	0.045	O				0.24
23.667	1.65	1.67	0.045	O				0.24
23.750	1.64	1.67	0.045	O				0.24
23.833	1.64	1.66	0.045	O				0.24
23.917	1.64	1.66	0.044	O				0.24
24.000	1.64	1.65	0.044	O				0.24
24.083	1.56	1.64	0.044	O				0.24
24.167	1.22	1.58	0.042	O				0.23
24.250	0.76	1.45	0.039	O				0.21
24.333	0.50	1.26	0.034	O				0.18
24.417	0.37	1.07	0.029	O				0.16
24.500	0.29	0.91	0.024	O				0.13
24.583	0.23	0.76	0.020	O				0.11
24.667	0.18	0.63	0.017	O				0.09
24.750	0.14	0.53	0.014	O				0.08
24.833	0.11	0.44	0.012	O				0.06
24.917	0.09	0.36	0.010	O				0.05
25.000	0.07	0.30	0.008	O				0.04
25.083	0.05	0.24	0.007	O				0.04
25.167	0.04	0.20	0.005	O				0.03
25.250	0.03	0.16	0.004	O				0.02

25.333	0.02	0.13	0.003	O	|	|	|	|	0.02
25.417	0.01	0.10	0.003	O	|	|	|	|	0.02
25.500	0.01	0.08	0.002	O	|	|	|	|	0.01
25.583	0.00	0.07	0.002	O	|	|	|	|	0.01
25.667	0.00	0.05	0.001	O	|	|	|	|	0.01
25.750	0.00	0.04	0.001	O	|	|	|	|	0.01
25.833	0.00	0.03	0.001	O	|	|	|	|	0.00
25.917	0.00	0.02	0.001	O	|	|	|	|	0.00
26.000	0.00	0.02	0.000	O	|	|	|	|	0.00
26.083	0.00	0.01	0.000	O	|	|	|	|	0.00
26.167	0.00	0.01	0.000	O	|	|	|	|	0.00
26.250	0.00	0.01	0.000	O	|	|	|	|	0.00
26.333	0.00	0.01	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 316
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 56.848 (CFS)
Total volume = 43.560 (Ac.Ft)

Status of hydrographs being held in storage

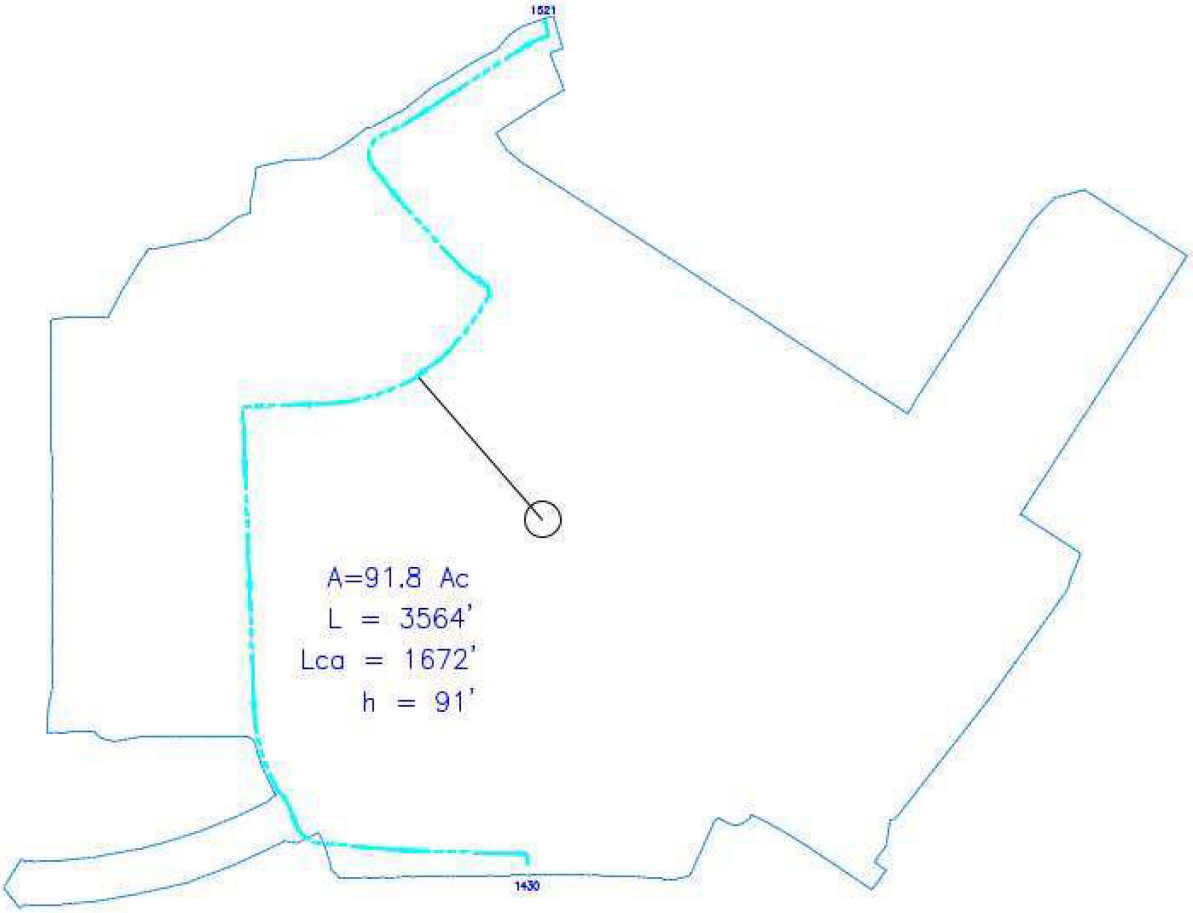
	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

ATTACHMENT E:

INFLOW HYDROGRAPHS
DRAINAGE AREA C (ON-SITE)
PROPOSED CONDITIONS

INFLOW HYDROGRAPHS
PROPOSED CONDITION
Drainage Area C (On-site)
2-, 5-, 10-, 100-yr 1-, 3-, 6-, 24-hr storms



Drainage Area C (Proposed on-site)

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                U n i t   H y d r o g r a p h   A n a l y s i s

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             Study date  03/20/24 File: 907hydc2pr12.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format


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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
2-year 1-hour storm


------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.50                45.90

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.20               110.16

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)
```

Point rain (area averaged) = 0.500(In)
Areal adjustment factor = 99.92 %
Adjusted average point rain = 0.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.300	69.00	0.050
7.300	69.00	0.075
61.300	72.00	0.750
17.900	72.30	0.900

Total Area Entered = 91.80(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.050	0.548	0.058	0.032
69.0	49.8	0.574	0.075	0.535	0.080	0.043
72.0	53.4	0.537	0.750	0.175	0.668	0.117
72.3	53.8	0.534	0.900	0.101	0.195	0.020
					Sum (F) =	0.211

Area averaged mean soil loss (F) (In/Hr) = 0.211
Minimum soil loss rate ((In/Hr)) = 0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	93.206	17.133	15.851
2	0.167	186.412	47.639	44.074
3	0.250	279.618	16.784	15.528
4	0.333	372.824	7.446	6.889
5	0.417	466.031	4.270	3.950
6	0.500	559.237	2.755	2.549
7	0.583	652.443	1.819	1.683
8	0.667	745.649	1.144	1.059
9	0.750	838.855	1.010	0.934
			Sum = 100.000	Sum= 92.517

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.198	(0.211)	0.069	0.129
2	0.17	4.20	0.252	(0.211)	0.088	0.164
3	0.25	4.40	0.264	(0.211)	0.092	0.171
4	0.33	4.80	0.288	(0.211)	0.101	0.187
5	0.42	5.20	0.312	(0.211)	0.109	0.203
6	0.50	6.20	0.372	(0.211)	0.130	0.242
7	0.58	6.80	0.408	(0.211)	0.143	0.265
8	0.67	8.80	0.528	(0.211)	0.185	0.343

```
 9   0.75    13.90      0.833          0.211    (  0.292)        0.623
10   0.83    31.40      1.882          0.211    (  0.659)        1.672
11   0.92     7.20      0.432       (  0.211)       0.151        0.281
12   1.00     3.80      0.228       (  0.211)       0.080        0.148
            (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     4.4
     Flood volume = Effective rainfall      0.37(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       2.8(Ac.Ft)
     Total soil loss =      0.13(In)
     Total soil loss =     1.000(Ac.Ft)
     Total rainfall =      0.50(In)
     Flood volume =      122910.3 Cubic Feet
     Total soil loss =       43568.1 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     92.574(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                    R u n o f f     H y d r o g r a p h
     ---------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       25.0      50.0      75.0     100.0
---------------------------------------------------------------------------
  0+ 5       0.0140      2.04  Q         |         |         |         |
  0+10       0.0710      8.27  |V Q      |         |         |         |
  0+15       0.1532     11.93  | V Q     |         |         |         |
  0+20       0.2493     13.96  |  V Q    |         |         |         |
  0+25       0.3578     15.76  |    VQ   |         |         |         |
  0+30       0.4806     17.83  |     VQ  |         |         |         |
  0+35       0.6225     20.60  |       Q |         |         |         |
  0+40       0.7869     23.86  |        Q|V        |         |         |
  0+45       1.0117     32.64  |         |  QV     |         |         |
  0+50       1.4473     63.25  |         |         V    Q    |         |
  0+55       2.0848     92.57  |         |         |        V|      Q  |
  1+ 0       2.4141     47.81  |         |        Q|         |   V     |
  1+ 5       2.5976     26.64  |         Q         |         |     V   |
  1+10       2.6906     13.51  |    Q    |         |         |       V |
  1+15       2.7461      8.05  |  Q      |         |         |       V |
  1+20       2.7812      5.10  | Q       |         |         |         V|
  1+25       2.8033      3.20  |Q        |         |         |         V|
  1+30       2.8178      2.11  Q         |         |         |         V|
  1+35       2.8207      0.42  Q         |         |         |         V|
  1+40       2.8216      0.14  Q         |         |         |          V
---------------------------------------------------------------------------
```

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      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc2pr32.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
2-year 3-hour storm


------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.77                70.69

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.77               162.49

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    0.770(In)
```

Area Averaged 100-Year Rainfall = 1.770(In)

Point rain (area averaged) = 0.770(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 0.770(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.300	69.00	0.050
7.300	69.00	0.075
61.300	72.00	0.750
17.900	72.30	0.900

Total Area Entered = 91.80(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.050	0.548	0.058	0.032
69.0	49.8	0.574	0.075	0.535	0.080	0.043
72.0	53.4	0.537	0.750	0.175	0.668	0.117
72.3	53.8	0.534	0.900	0.101	0.195	0.020
					Sum (F) =	0.211

Area averaged mean soil loss (F) (In/Hr) = 0.211
Minimum soil loss rate ((In/Hr)) = 0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	93.206	17.133	15.851
2	0.167	186.412	47.639	44.074
3	0.250	279.618	16.784	15.528
4	0.333	372.824	7.446	6.889
5	0.417	466.031	4.270	3.950
6	0.500	559.237	2.755	2.549
7	0.583	652.443	1.819	1.683
8	0.667	745.649	1.144	1.059
9	0.750	838.855	1.010	0.934
			Sum = 100.000	Sum= 92.517

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.120	(0.211)	0.042	0.078
2	0.17	1.30	0.120	(0.211)	0.042	0.078
3	0.25	1.10	0.102	(0.211)	0.036	0.066
4	0.33	1.50	0.139	(0.211)	0.048	0.090
5	0.42	1.50	0.139	(0.211)	0.048	0.090
6	0.50	1.80	0.166	(0.211)	0.058	0.108
7	0.58	1.50	0.139	(0.211)	0.048	0.090
8	0.67	1.80	0.166	(0.211)	0.058	0.108
9	0.75	1.80	0.166	(0.211)	0.058	0.108

```
10   0.83     1.50      0.139       (  0.211)       0.048        0.090
11   0.92     1.60      0.148       (  0.211)       0.052        0.096
12   1.00     1.80      0.166       (  0.211)       0.058        0.108
13   1.08     2.20      0.203       (  0.211)       0.071        0.132
14   1.17     2.20      0.203       (  0.211)       0.071        0.132
15   1.25     2.20      0.203       (  0.211)       0.071        0.132
16   1.33     2.00      0.185       (  0.211)       0.065        0.120
17   1.42     2.60      0.240       (  0.211)       0.084        0.156
18   1.50     2.70      0.249       (  0.211)       0.087        0.162
19   1.58     2.40      0.222       (  0.211)       0.078        0.144
20   1.67     2.70      0.249       (  0.211)       0.087        0.162
21   1.75     3.30      0.305       (  0.211)       0.107        0.198
22   1.83     3.10      0.286       (  0.211)       0.100        0.186
23   1.92     2.90      0.268       (  0.211)       0.094        0.174
24   2.00     3.00      0.277       (  0.211)       0.097        0.180
25   2.08     3.10      0.286       (  0.211)       0.100        0.186
26   2.17     4.20      0.388       (  0.211)       0.136        0.252
27   2.25     5.00      0.462       (  0.211)       0.162        0.300
28   2.33     3.50      0.323       (  0.211)       0.113        0.210
29   2.42     6.80      0.628          0.211    (  0.220)       0.417
30   2.50     7.30      0.674          0.211    (  0.236)       0.464
31   2.58     8.20      0.757          0.211    (  0.265)       0.547
32   2.67     5.90      0.545       (  0.211)       0.191        0.354
33   2.75     2.00      0.185       (  0.211)       0.065        0.120
34   2.83     1.80      0.166       (  0.211)       0.058        0.108
35   2.92     1.80      0.166       (  0.211)       0.058        0.108
36   3.00     0.60      0.055       (  0.211)       0.019        0.036
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     6.1
    Flood volume = Effective rainfall      0.51(In)
     times area      91.8(Ac.)/[(In)/(Ft.)] =       3.9(Ac.Ft)
    Total soil loss =      0.26(In)
    Total soil loss =     2.004(Ac.Ft)
    Total rainfall =      0.77(In)
    Flood volume =      169191.8 Cubic Feet
    Total soil loss =       87295.4 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     42.196(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
-------------------------------------------------------------------------
  0+ 5       0.0085      1.24  Q         |         |         |         |
  0+10       0.0408      4.68  V  Q      |         |         |         |
  0+15       0.0800      5.70  V   Q     |         |         |         |
  0+20       0.1220      6.09  |V  Q     |         |         |         |
  0+25       0.1720      7.27  |V   Q    |         |         |         |
  0+30       0.2275      8.05  | V   Q   |         |         |         |
  0+35       0.2881      8.80  | V    Q  |         |         |         |
  0+40       0.3482      8.72  |  V  Q   |         |         |         |
  0+45       0.4134      9.48  |   V  Q  |         |         |         |
  0+50       0.4785      9.44  |   V  Q  |         |         |         |
  0+55       0.5395      8.86  |    V Q  |         |         |         |
  1+ 0       0.6022      9.11  |     VQ  |         |         |         |
  1+ 5       0.6713     10.03  |     V Q |         |         |         |
  1+10       0.7489     11.27  |      V Q|         |         |         |
  1+15       0.8295     11.71  |       VQ|         |         |         |
```

```
    1+20       0.9103     11.73  |         Q|          |          |          |
    1+25       0.9922     11.89  |         QV          |          |          |
    1+30       1.0849     13.46  |          QV         |          |          |
    1+35       1.1811     13.97  |          |QV        |          |          |
    1+40       1.2761     13.79  |          |Q V       |          |          |
    1+45       1.3798     15.05  |          | Q V      |          |          |
    1+50       1.4948     16.70  |          |  Q V     |          |          |
    1+55       1.6095     16.66  |          |  Q  V    |          |          |
    2+ 0       1.7221     16.35  |          |  Q   V   |          |          |
    2+ 5       1.8367     16.64  |          |  Q    V  |          |          |
    2+10       1.9608     18.02  |          |   Q     V          |          |
    2+15       2.1111     21.82  |          |      Q  |V         |          |
    2+20       2.2736     23.60  |          |       Q |  V       |          |
    2+25       2.4400     24.16  |          |         Q|    V     |          |
    2+30       2.6689     33.23  |          |          |     QV   |          |
    2+35       2.9412     39.55  |          |          |          VQ         |
    2+40       3.2318     42.20  |          |          |          |  Q       |
    2+45       3.4546     32.35  |          |          |    Q     |    V     |
    2+50       3.5929     20.09  |          |     Q    |          |      V   |
    2+55       3.6986     15.34  |          | Q        |          |       V  |
    3+ 0       3.7816     12.06  |         Q|          |          |       V  |
    3+ 5       3.8311      7.19  |    Q     |          |          |         V|
    3+10       3.8562      3.65  | Q        |          |          |         V|
    3+15       3.8703      2.04  |Q         |          |          |         V|
    3+20       3.8776      1.06  Q          |          |          |         V|
    3+25       3.8810      0.50  Q          |          |          |         V|
    3+30       3.8829      0.28  Q          |          |          |         V|
    3+35       3.8839      0.14  Q          |          |          |         V|
    3+40       3.8841      0.03  Q          |          |          |         V|
-------------------------------------------------------------------------
```

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      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc2pr62.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
2-year 6-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.95                87.21

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          2.45               224.91

STORM EVENT (YEAR) =    2.00
```

Area Averaged 2-Year Rainfall = 0.950(In)
Area Averaged 100-Year Rainfall = 2.450(In)

Point rain (area averaged) = 0.950(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 0.950(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.300	69.00	0.050
7.300	69.00	0.075
61.300	72.00	0.750
17.900	72.30	0.900

Total Area Entered = 91.80(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.050	0.548	0.058	0.032
69.0	49.8	0.574	0.075	0.535	0.080	0.043
72.0	53.4	0.537	0.750	0.175	0.668	0.117
72.3	53.8	0.534	0.900	0.101	0.195	0.020
					Sum (F) =	0.211

Area averaged mean soil loss (F) (In/Hr) = 0.211
Minimum soil loss rate ((In/Hr)) = 0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	93.206	17.133	15.851
2	0.167	186.412	47.639	44.074
3	0.250	279.618	16.784	15.528
4	0.333	372.824	7.446	6.889
5	0.417	466.031	4.270	3.950
6	0.500	559.237	2.755	2.549
7	0.583	652.443	1.819	1.683
8	0.667	745.649	1.144	1.059
9	0.750	838.855	1.010	0.934
			Sum = 100.000	Sum= 92.517

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.057	(0.211)	0.020	0.037
2	0.17	0.60	0.068	(0.211)	0.024	0.044
3	0.25	0.60	0.068	(0.211)	0.024	0.044
4	0.33	0.60	0.068	(0.211)	0.024	0.044
5	0.42	0.60	0.068	(0.211)	0.024	0.044
6	0.50	0.70	0.080	(0.211)	0.028	0.052
7	0.58	0.70	0.080	(0.211)	0.028	0.052
8	0.67	0.70	0.080	(0.211)	0.028	0.052

9	0.75	0.70	0.080	(0.211)	0.028	0.052
10	0.83	0.70	0.080	(0.211)	0.028	0.052
11	0.92	0.70	0.080	(0.211)	0.028	0.052
12	1.00	0.80	0.091	(0.211)	0.032	0.059
13	1.08	0.80	0.091	(0.211)	0.032	0.059
14	1.17	0.80	0.091	(0.211)	0.032	0.059
15	1.25	0.80	0.091	(0.211)	0.032	0.059
16	1.33	0.80	0.091	(0.211)	0.032	0.059
17	1.42	0.80	0.091	(0.211)	0.032	0.059
18	1.50	0.80	0.091	(0.211)	0.032	0.059
19	1.58	0.80	0.091	(0.211)	0.032	0.059
20	1.67	0.80	0.091	(0.211)	0.032	0.059
21	1.75	0.80	0.091	(0.211)	0.032	0.059
22	1.83	0.80	0.091	(0.211)	0.032	0.059
23	1.92	0.80	0.091	(0.211)	0.032	0.059
24	2.00	0.90	0.103	(0.211)	0.036	0.067
25	2.08	0.80	0.091	(0.211)	0.032	0.059
26	2.17	0.90	0.103	(0.211)	0.036	0.067
27	2.25	0.90	0.103	(0.211)	0.036	0.067
28	2.33	0.90	0.103	(0.211)	0.036	0.067
29	2.42	0.90	0.103	(0.211)	0.036	0.067
30	2.50	0.90	0.103	(0.211)	0.036	0.067
31	2.58	0.90	0.103	(0.211)	0.036	0.067
32	2.67	0.90	0.103	(0.211)	0.036	0.067
33	2.75	1.00	0.114	(0.211)	0.040	0.074
34	2.83	1.00	0.114	(0.211)	0.040	0.074
35	2.92	1.00	0.114	(0.211)	0.040	0.074
36	3.00	1.00	0.114	(0.211)	0.040	0.074
37	3.08	1.00	0.114	(0.211)	0.040	0.074
38	3.17	1.10	0.125	(0.211)	0.044	0.081
39	3.25	1.10	0.125	(0.211)	0.044	0.081
40	3.33	1.10	0.125	(0.211)	0.044	0.081
41	3.42	1.20	0.137	(0.211)	0.048	0.089
42	3.50	1.30	0.148	(0.211)	0.052	0.096
43	3.58	1.40	0.160	(0.211)	0.056	0.104
44	3.67	1.40	0.160	(0.211)	0.056	0.104
45	3.75	1.50	0.171	(0.211)	0.060	0.111
46	3.83	1.50	0.171	(0.211)	0.060	0.111
47	3.92	1.60	0.182	(0.211)	0.064	0.119
48	4.00	1.60	0.182	(0.211)	0.064	0.119
49	4.08	1.70	0.194	(0.211)	0.068	0.126
50	4.17	1.80	0.205	(0.211)	0.072	0.133
51	4.25	1.90	0.217	(0.211)	0.076	0.141
52	4.33	2.00	0.228	(0.211)	0.080	0.148
53	4.42	2.10	0.239	(0.211)	0.084	0.156
54	4.50	2.10	0.239	(0.211)	0.084	0.156
55	4.58	2.20	0.251	(0.211)	0.088	0.163
56	4.67	2.30	0.262	(0.211)	0.092	0.170
57	4.75	2.40	0.274	(0.211)	0.096	0.178
58	4.83	2.40	0.274	(0.211)	0.096	0.178
59	4.92	2.50	0.285	(0.211)	0.100	0.185
60	5.00	2.60	0.296	(0.211)	0.104	0.193
61	5.08	3.10	0.353	(0.211)	0.124	0.230
62	5.17	3.60	0.410	(0.211)	0.144	0.267
63	5.25	3.90	0.444	(0.211)	0.156	0.289
64	5.33	4.20	0.479	(0.211)	0.168	0.311
65	5.42	4.70	0.536	(0.211)	0.187	0.348
66	5.50	5.60	0.638	0.211	(0.223)	0.428
67	5.58	1.90	0.217	(0.211)	0.076	0.141
68	5.67	0.90	0.103	(0.211)	0.036	0.067
69	5.75	0.60	0.068	(0.211)	0.024	0.044
70	5.83	0.50	0.057	(0.211)	0.020	0.037
71	5.92	0.30	0.034	(0.211)	0.012	0.022

```
72   6.00     0.20      0.023       (  0.211)       0.008        0.015
           (Loss Rate Not Used)
   Sum =     100.0                                   Sum =     7.4
     Flood volume = Effective rainfall      0.62(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       4.7(Ac.Ft)
     Total soil loss =      0.33(In)
     Total soil loss =     2.535(Ac.Ft)
     Total rainfall =      0.95(In)
     Flood volume =      206062.0 Cubic Feet
     Total soil loss =      110410.4 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     31.285(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          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   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0      40.0
-------------------------------------------------------------------------
  0+ 5       0.0040      0.59  Q          |         |         |         |
  0+10       0.0201      2.34  V Q        |         |         |         |
  0+15       0.0425      3.24  V  Q       |         |         |         |
  0+20       0.0673      3.61  V  Q       |         |         |         |
  0+25       0.0936      3.81  V  Q       |         |         |         |
  0+30       0.1214      4.05  |V  Q      |         |         |         |
  0+35       0.1521      4.46  |V  Q      |         |         |         |
  0+40       0.1840      4.62  |V  Q      |         |         |         |
  0+45       0.2165      4.72  |V  Q      |         |         |         |
  0+50       0.2492      4.75  | V Q      |         |         |         |
  0+55       0.2821      4.77  | V Q      |         |         |         |
  1+ 0       0.3158      4.90  | V Q      |         |         |         |
  1+ 5       0.3519      5.24  | V  Q     |         |         |         |
  1+10       0.3888      5.36  |  V Q     |         |         |         |
  1+15       0.4261      5.41  |  V Q     |         |         |         |
  1+20       0.4635      5.44  |  V Q     |         |         |         |
  1+25       0.5011      5.46  |   VQ     |         |         |         |
  1+30       0.5388      5.47  |   VQ     |         |         |         |
  1+35       0.5765      5.48  |   VQ     |         |         |         |
  1+40       0.6143      5.49  |    Q     |         |         |         |
  1+45       0.6521      5.49  |    Q     |         |         |         |
  1+50       0.6899      5.49  |    Q     |         |         |         |
  1+55       0.7277      5.49  |    QV    |         |         |         |
  2+ 0       0.7662      5.60  |    QV    |         |         |         |
  2+ 5       0.8063      5.81  |    QV    |         |         |         |
  2+10       0.8457      5.72  |    Q V   |         |         |         |
  2+15       0.8868      5.98  |    Q V   |         |         |         |
  2+20       0.9287      6.07  |     QV   |         |         |         |
  2+25       0.9708      6.11  |     Q V  |         |         |         |
  2+30       1.0131      6.14  |     Q V  |         |         |         |
  2+35       1.0554      6.15  |     Q V  |         |         |         |
  2+40       1.0979      6.16  |     Q  V|         |         |         |
  2+45       1.1411      6.28  |     Q  V|         |         |         |
  2+50       1.1867      6.62  |     Q   V         |         |         |
  2+55       1.2331      6.73  |     Q   V         |         |         |
  3+ 0       1.2798      6.78  |     Q   V         |         |         |
  3+ 5       1.3267      6.81  |     Q   |V        |         |         |
  3+10       1.3745      6.95  |     Q   |V        |         |         |
  3+15       1.4247      7.29  |      Q  | V       |         |         |
  3+20       1.4757      7.41  |      Q  | V       |         |         |
  3+25       1.5280      7.58  |      Q  | V       |         |         |
```

```
    3+30       1.5835      8.06  |        Q |  V       |          |          |
    3+35       1.6429      8.64  |        Q |  V       |          |          |
    3+40       1.7059      9.14  |         Q|   V      |          |          |
    3+45       1.7711      9.46  |         Q|   V      |          |          |
    3+50       1.8392      9.90  |         Q|    V     |          |          |
    3+55       1.9094     10.19  |          Q     V   |          |          |
    4+ 0       1.9824     10.61  |          Q     V   |          |          |
    4+ 5       2.0574     10.89  |          Q      V  |          |          |
    4+10       2.1361     11.42  |          |Q      V |          |          |
    4+15       2.2190     12.03  |          | Q     V |          |          |
    4+20       2.3062     12.67  |          | Q      V|          |          |
    4+25       2.3980     13.33  |          |  Q      V          |          |
    4+30       2.4936     13.88  |          |  Q      |V         |          |
    4+35       2.5915     14.23  |          |   Q     |V         |          |
    4+40       2.6934     14.79  |          |   Q     | V        |          |
    4+45       2.7996     15.43  |          |    Q    |  V       |          |
    4+50       2.9096     15.96  |          |    Q    |   V      |          |
    4+55       3.0219     16.30  |          |     Q   |    V     |          |
    5+ 0       3.1380     16.86  |          |     Q   |     V    |          |
    5+ 5       3.2617     17.96  |          |      Q  |      V   |          |
    5+10       3.4021     20.39  |          |         Q       V |          |
    5+15       3.5609     23.05  |          |          |  Q      V          |
    5+20       3.7350     25.28  |          |          |    Q    |V         |
    5+25       3.9253     27.63  |          |          |      Q  |  V       |
    5+30       4.1407     31.29  |          |          |         |Q   V     |
    5+35       4.3558     31.23  |          |          |         |Q    V    |
    5+40       4.4877     19.15  |          |         Q|         |      V   |
    5+45       4.5698     11.93  |          |Q         |         |       V  |
    5+50       4.6264      8.21  |        Q |          |         |         V|
    5+55       4.6675      5.97  |    Q     |          |         |         V|
    6+ 0       4.6957      4.10  |   Q      |          |         |         V|
    6+ 5       4.7137      2.61  | Q        |          |         |         V|
    6+10       4.7227      1.30  |Q         |          |         |         V|
    6+15       4.7266      0.56  Q          |          |         |         V|
    6+20       4.7285      0.29  Q          |          |         |         V|
    6+25       4.7296      0.16  Q          |          |         |         V|
    6+30       4.7302      0.08  Q          |          |         |         V|
    6+35       4.7304      0.04  Q          |          |         |         V|
    6+40       4.7305      0.01  Q          |          |         |          V
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      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc2pr242.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

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 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
2-year 24-hour storm


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Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.55              142.29

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          4.05              371.79

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.550(In)
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Area Averaged 100-Year Rainfall = 4.050(In)

Point rain (area averaged) = 1.550(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.550(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.300	69.00	0.050
7.300	69.00	0.075
61.300	72.00	0.750
17.900	72.30	0.900

Total Area Entered = 91.80(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.050	0.548	0.058	0.032
69.0	49.8	0.574	0.075	0.535	0.080	0.043
72.0	53.4	0.537	0.750	0.175	0.668	0.117
72.3	53.8	0.534	0.900	0.101	0.195	0.020
					Sum (F) =	0.211

Area averaged mean soil loss (F) (In/Hr) = 0.211
Minimum soil loss rate ((In/Hr)) = 0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	93.206	17.133	15.851
2	0.167	186.412	47.639	44.074
3	0.250	279.618	16.784	15.528
4	0.333	372.824	7.446	6.889
5	0.417	466.031	4.270	3.950
6	0.500	559.237	2.755	2.549
7	0.583	652.443	1.819	1.683
8	0.667	745.649	1.144	1.059
9	0.750	838.855	1.010	0.934
			Sum = 100.000	Sum= 92.517

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.012	(0.373)	0.004	0.008
2	0.17	0.07	0.012	(0.372)	0.004	0.008
3	0.25	0.07	0.012	(0.370)	0.004	0.008
4	0.33	0.10	0.019	(0.369)	0.007	0.012
5	0.42	0.10	0.019	(0.368)	0.007	0.012
6	0.50	0.10	0.019	(0.366)	0.007	0.012
7	0.58	0.10	0.019	(0.365)	0.007	0.012
8	0.67	0.10	0.019	(0.363)	0.007	0.012
9	0.75	0.10	0.019	(0.362)	0.007	0.012

10	0.83	0.13	0.025	(0.360)	0.009	0.016
11	0.92	0.13	0.025	(0.359)	0.009	0.016
12	1.00	0.13	0.025	(0.358)	0.009	0.016
13	1.08	0.10	0.019	(0.356)	0.007	0.012
14	1.17	0.10	0.019	(0.355)	0.007	0.012
15	1.25	0.10	0.019	(0.353)	0.007	0.012
16	1.33	0.10	0.019	(0.352)	0.007	0.012
17	1.42	0.10	0.019	(0.351)	0.007	0.012
18	1.50	0.10	0.019	(0.349)	0.007	0.012
19	1.58	0.10	0.019	(0.348)	0.007	0.012
20	1.67	0.10	0.019	(0.346)	0.007	0.012
21	1.75	0.10	0.019	(0.345)	0.007	0.012
22	1.83	0.13	0.025	(0.344)	0.009	0.016
23	1.92	0.13	0.025	(0.342)	0.009	0.016
24	2.00	0.13	0.025	(0.341)	0.009	0.016
25	2.08	0.13	0.025	(0.339)	0.009	0.016
26	2.17	0.13	0.025	(0.338)	0.009	0.016
27	2.25	0.13	0.025	(0.337)	0.009	0.016
28	2.33	0.13	0.025	(0.335)	0.009	0.016
29	2.42	0.13	0.025	(0.334)	0.009	0.016
30	2.50	0.13	0.025	(0.333)	0.009	0.016
31	2.58	0.17	0.031	(0.331)	0.011	0.020
32	2.67	0.17	0.031	(0.330)	0.011	0.020
33	2.75	0.17	0.031	(0.329)	0.011	0.020
34	2.83	0.17	0.031	(0.327)	0.011	0.020
35	2.92	0.17	0.031	(0.326)	0.011	0.020
36	3.00	0.17	0.031	(0.324)	0.011	0.020
37	3.08	0.17	0.031	(0.323)	0.011	0.020
38	3.17	0.17	0.031	(0.322)	0.011	0.020
39	3.25	0.17	0.031	(0.320)	0.011	0.020
40	3.33	0.17	0.031	(0.319)	0.011	0.020
41	3.42	0.17	0.031	(0.318)	0.011	0.020
42	3.50	0.17	0.031	(0.316)	0.011	0.020
43	3.58	0.17	0.031	(0.315)	0.011	0.020
44	3.67	0.17	0.031	(0.314)	0.011	0.020
45	3.75	0.17	0.031	(0.312)	0.011	0.020
46	3.83	0.20	0.037	(0.311)	0.013	0.024
47	3.92	0.20	0.037	(0.310)	0.013	0.024
48	4.00	0.20	0.037	(0.309)	0.013	0.024
49	4.08	0.20	0.037	(0.307)	0.013	0.024
50	4.17	0.20	0.037	(0.306)	0.013	0.024
51	4.25	0.20	0.037	(0.305)	0.013	0.024
52	4.33	0.23	0.043	(0.303)	0.015	0.028
53	4.42	0.23	0.043	(0.302)	0.015	0.028
54	4.50	0.23	0.043	(0.301)	0.015	0.028
55	4.58	0.23	0.043	(0.299)	0.015	0.028
56	4.67	0.23	0.043	(0.298)	0.015	0.028
57	4.75	0.23	0.043	(0.297)	0.015	0.028
58	4.83	0.27	0.050	(0.296)	0.017	0.032
59	4.92	0.27	0.050	(0.294)	0.017	0.032
60	5.00	0.27	0.050	(0.293)	0.017	0.032
61	5.08	0.20	0.037	(0.292)	0.013	0.024
62	5.17	0.20	0.037	(0.290)	0.013	0.024
63	5.25	0.20	0.037	(0.289)	0.013	0.024
64	5.33	0.23	0.043	(0.288)	0.015	0.028
65	5.42	0.23	0.043	(0.287)	0.015	0.028
66	5.50	0.23	0.043	(0.285)	0.015	0.028
67	5.58	0.27	0.050	(0.284)	0.017	0.032
68	5.67	0.27	0.050	(0.283)	0.017	0.032
69	5.75	0.27	0.050	(0.282)	0.017	0.032
70	5.83	0.27	0.050	(0.280)	0.017	0.032
71	5.92	0.27	0.050	(0.279)	0.017	0.032
72	6.00	0.27	0.050	(0.278)	0.017	0.032

73	6.08	0.30	0.056	(0.277)	0.020	0.036
74	6.17	0.30	0.056	(0.276)	0.020	0.036
75	6.25	0.30	0.056	(0.274)	0.020	0.036
76	6.33	0.30	0.056	(0.273)	0.020	0.036
77	6.42	0.30	0.056	(0.272)	0.020	0.036
78	6.50	0.30	0.056	(0.271)	0.020	0.036
79	6.58	0.33	0.062	(0.269)	0.022	0.040
80	6.67	0.33	0.062	(0.268)	0.022	0.040
81	6.75	0.33	0.062	(0.267)	0.022	0.040
82	6.83	0.33	0.062	(0.266)	0.022	0.040
83	6.92	0.33	0.062	(0.265)	0.022	0.040
84	7.00	0.33	0.062	(0.263)	0.022	0.040
85	7.08	0.33	0.062	(0.262)	0.022	0.040
86	7.17	0.33	0.062	(0.261)	0.022	0.040
87	7.25	0.33	0.062	(0.260)	0.022	0.040
88	7.33	0.37	0.068	(0.259)	0.024	0.044
89	7.42	0.37	0.068	(0.257)	0.024	0.044
90	7.50	0.37	0.068	(0.256)	0.024	0.044
91	7.58	0.40	0.074	(0.255)	0.026	0.048
92	7.67	0.40	0.074	(0.254)	0.026	0.048
93	7.75	0.40	0.074	(0.253)	0.026	0.048
94	7.83	0.43	0.081	(0.252)	0.028	0.052
95	7.92	0.43	0.081	(0.250)	0.028	0.052
96	8.00	0.43	0.081	(0.249)	0.028	0.052
97	8.08	0.50	0.093	(0.248)	0.033	0.060
98	8.17	0.50	0.093	(0.247)	0.033	0.060
99	8.25	0.50	0.093	(0.246)	0.033	0.060
100	8.33	0.50	0.093	(0.245)	0.033	0.060
101	8.42	0.50	0.093	(0.243)	0.033	0.060
102	8.50	0.50	0.093	(0.242)	0.033	0.060
103	8.58	0.53	0.099	(0.241)	0.035	0.064
104	8.67	0.53	0.099	(0.240)	0.035	0.064
105	8.75	0.53	0.099	(0.239)	0.035	0.064
106	8.83	0.57	0.105	(0.238)	0.037	0.068
107	8.92	0.57	0.105	(0.237)	0.037	0.068
108	9.00	0.57	0.105	(0.236)	0.037	0.068
109	9.08	0.63	0.118	(0.234)	0.041	0.077
110	9.17	0.63	0.118	(0.233)	0.041	0.077
111	9.25	0.63	0.118	(0.232)	0.041	0.077
112	9.33	0.67	0.124	(0.231)	0.043	0.081
113	9.42	0.67	0.124	(0.230)	0.043	0.081
114	9.50	0.67	0.124	(0.229)	0.043	0.081
115	9.58	0.70	0.130	(0.228)	0.046	0.085
116	9.67	0.70	0.130	(0.227)	0.046	0.085
117	9.75	0.70	0.130	(0.226)	0.046	0.085
118	9.83	0.73	0.136	(0.225)	0.048	0.089
119	9.92	0.73	0.136	(0.223)	0.048	0.089
120	10.00	0.73	0.136	(0.222)	0.048	0.089
121	10.08	0.50	0.093	(0.221)	0.033	0.060
122	10.17	0.50	0.093	(0.220)	0.033	0.060
123	10.25	0.50	0.093	(0.219)	0.033	0.060
124	10.33	0.50	0.093	(0.218)	0.033	0.060
125	10.42	0.50	0.093	(0.217)	0.033	0.060
126	10.50	0.50	0.093	(0.216)	0.033	0.060
127	10.58	0.67	0.124	(0.215)	0.043	0.081
128	10.67	0.67	0.124	(0.214)	0.043	0.081
129	10.75	0.67	0.124	(0.213)	0.043	0.081
130	10.83	0.67	0.124	(0.212)	0.043	0.081
131	10.92	0.67	0.124	(0.211)	0.043	0.081
132	11.00	0.67	0.124	(0.210)	0.043	0.081
133	11.08	0.63	0.118	(0.209)	0.041	0.077
134	11.17	0.63	0.118	(0.208)	0.041	0.077
135	11.25	0.63	0.118	(0.207)	0.041	0.077

136	11.33	0.63	0.118	(0.206)	0.041	0.077
137	11.42	0.63	0.118	(0.205)	0.041	0.077
138	11.50	0.63	0.118	(0.204)	0.041	0.077
139	11.58	0.57	0.105	(0.203)	0.037	0.068
140	11.67	0.57	0.105	(0.202)	0.037	0.068
141	11.75	0.57	0.105	(0.201)	0.037	0.068
142	11.83	0.60	0.112	(0.200)	0.039	0.073
143	11.92	0.60	0.112	(0.199)	0.039	0.073
144	12.00	0.60	0.112	(0.198)	0.039	0.073
145	12.08	0.83	0.155	(0.197)	0.054	0.101
146	12.17	0.83	0.155	(0.196)	0.054	0.101
147	12.25	0.83	0.155	(0.195)	0.054	0.101
148	12.33	0.87	0.161	(0.194)	0.056	0.105
149	12.42	0.87	0.161	(0.193)	0.056	0.105
150	12.50	0.87	0.161	(0.192)	0.056	0.105
151	12.58	0.93	0.174	(0.191)	0.061	0.113
152	12.67	0.93	0.174	(0.190)	0.061	0.113
153	12.75	0.93	0.174	(0.189)	0.061	0.113
154	12.83	0.97	0.180	(0.188)	0.063	0.117
155	12.92	0.97	0.180	(0.187)	0.063	0.117
156	13.00	0.97	0.180	(0.186)	0.063	0.117
157	13.08	1.13	0.211	(0.185)	0.074	0.137
158	13.17	1.13	0.211	(0.184)	0.074	0.137
159	13.25	1.13	0.211	(0.183)	0.074	0.137
160	13.33	1.13	0.211	(0.182)	0.074	0.137
161	13.42	1.13	0.211	(0.181)	0.074	0.137
162	13.50	1.13	0.211	(0.180)	0.074	0.137
163	13.58	0.77	0.143	(0.179)	0.050	0.093
164	13.67	0.77	0.143	(0.179)	0.050	0.093
165	13.75	0.77	0.143	(0.178)	0.050	0.093
166	13.83	0.77	0.143	(0.177)	0.050	0.093
167	13.92	0.77	0.143	(0.176)	0.050	0.093
168	14.00	0.77	0.143	(0.175)	0.050	0.093
169	14.08	0.90	0.167	(0.174)	0.059	0.109
170	14.17	0.90	0.167	(0.173)	0.059	0.109
171	14.25	0.90	0.167	(0.172)	0.059	0.109
172	14.33	0.87	0.161	(0.171)	0.056	0.105
173	14.42	0.87	0.161	(0.170)	0.056	0.105
174	14.50	0.87	0.161	(0.170)	0.056	0.105
175	14.58	0.87	0.161	(0.169)	0.056	0.105
176	14.67	0.87	0.161	(0.168)	0.056	0.105
177	14.75	0.87	0.161	(0.167)	0.056	0.105
178	14.83	0.83	0.155	(0.166)	0.054	0.101
179	14.92	0.83	0.155	(0.165)	0.054	0.101
180	15.00	0.83	0.155	(0.164)	0.054	0.101
181	15.08	0.80	0.149	(0.164)	0.052	0.097
182	15.17	0.80	0.149	(0.163)	0.052	0.097
183	15.25	0.80	0.149	(0.162)	0.052	0.097
184	15.33	0.77	0.143	(0.161)	0.050	0.093
185	15.42	0.77	0.143	(0.160)	0.050	0.093
186	15.50	0.77	0.143	(0.159)	0.050	0.093
187	15.58	0.63	0.118	(0.159)	0.041	0.077
188	15.67	0.63	0.118	(0.158)	0.041	0.077
189	15.75	0.63	0.118	(0.157)	0.041	0.077
190	15.83	0.63	0.118	(0.156)	0.041	0.077
191	15.92	0.63	0.118	(0.155)	0.041	0.077
192	16.00	0.63	0.118	(0.155)	0.041	0.077
193	16.08	0.13	0.025	(0.154)	0.009	0.016
194	16.17	0.13	0.025	(0.153)	0.009	0.016
195	16.25	0.13	0.025	(0.152)	0.009	0.016
196	16.33	0.13	0.025	(0.152)	0.009	0.016
197	16.42	0.13	0.025	(0.151)	0.009	0.016
198	16.50	0.13	0.025	(0.150)	0.009	0.016

199	16.58	0.10	0.019	(0.149)	0.007	0.012
200	16.67	0.10	0.019	(0.148)	0.007	0.012
201	16.75	0.10	0.019	(0.148)	0.007	0.012
202	16.83	0.10	0.019	(0.147)	0.007	0.012
203	16.92	0.10	0.019	(0.146)	0.007	0.012
204	17.00	0.10	0.019	(0.145)	0.007	0.012
205	17.08	0.17	0.031	(0.145)	0.011	0.020
206	17.17	0.17	0.031	(0.144)	0.011	0.020
207	17.25	0.17	0.031	(0.143)	0.011	0.020
208	17.33	0.17	0.031	(0.143)	0.011	0.020
209	17.42	0.17	0.031	(0.142)	0.011	0.020
210	17.50	0.17	0.031	(0.141)	0.011	0.020
211	17.58	0.17	0.031	(0.140)	0.011	0.020
212	17.67	0.17	0.031	(0.140)	0.011	0.020
213	17.75	0.17	0.031	(0.139)	0.011	0.020
214	17.83	0.13	0.025	(0.138)	0.009	0.016
215	17.92	0.13	0.025	(0.138)	0.009	0.016
216	18.00	0.13	0.025	(0.137)	0.009	0.016
217	18.08	0.13	0.025	(0.136)	0.009	0.016
218	18.17	0.13	0.025	(0.136)	0.009	0.016
219	18.25	0.13	0.025	(0.135)	0.009	0.016
220	18.33	0.13	0.025	(0.134)	0.009	0.016
221	18.42	0.13	0.025	(0.134)	0.009	0.016
222	18.50	0.13	0.025	(0.133)	0.009	0.016
223	18.58	0.10	0.019	(0.132)	0.007	0.012
224	18.67	0.10	0.019	(0.132)	0.007	0.012
225	18.75	0.10	0.019	(0.131)	0.007	0.012
226	18.83	0.07	0.012	(0.130)	0.004	0.008
227	18.92	0.07	0.012	(0.130)	0.004	0.008
228	19.00	0.07	0.012	(0.129)	0.004	0.008
229	19.08	0.10	0.019	(0.129)	0.007	0.012
230	19.17	0.10	0.019	(0.128)	0.007	0.012
231	19.25	0.10	0.019	(0.127)	0.007	0.012
232	19.33	0.13	0.025	(0.127)	0.009	0.016
233	19.42	0.13	0.025	(0.126)	0.009	0.016
234	19.50	0.13	0.025	(0.126)	0.009	0.016
235	19.58	0.10	0.019	(0.125)	0.007	0.012
236	19.67	0.10	0.019	(0.125)	0.007	0.012
237	19.75	0.10	0.019	(0.124)	0.007	0.012
238	19.83	0.07	0.012	(0.123)	0.004	0.008
239	19.92	0.07	0.012	(0.123)	0.004	0.008
240	20.00	0.07	0.012	(0.122)	0.004	0.008
241	20.08	0.10	0.019	(0.122)	0.007	0.012
242	20.17	0.10	0.019	(0.121)	0.007	0.012
243	20.25	0.10	0.019	(0.121)	0.007	0.012
244	20.33	0.10	0.019	(0.120)	0.007	0.012
245	20.42	0.10	0.019	(0.120)	0.007	0.012
246	20.50	0.10	0.019	(0.119)	0.007	0.012
247	20.58	0.10	0.019	(0.119)	0.007	0.012
248	20.67	0.10	0.019	(0.118)	0.007	0.012
249	20.75	0.10	0.019	(0.118)	0.007	0.012
250	20.83	0.07	0.012	(0.117)	0.004	0.008
251	20.92	0.07	0.012	(0.117)	0.004	0.008
252	21.00	0.07	0.012	(0.116)	0.004	0.008
253	21.08	0.10	0.019	(0.116)	0.007	0.012
254	21.17	0.10	0.019	(0.115)	0.007	0.012
255	21.25	0.10	0.019	(0.115)	0.007	0.012
256	21.33	0.07	0.012	(0.114)	0.004	0.008
257	21.42	0.07	0.012	(0.114)	0.004	0.008
258	21.50	0.07	0.012	(0.114)	0.004	0.008
259	21.58	0.10	0.019	(0.113)	0.007	0.012
260	21.67	0.10	0.019	(0.113)	0.007	0.012
261	21.75	0.10	0.019	(0.112)	0.007	0.012

```
262  21.83     0.07      0.012       (  0.112)       0.004        0.008
263  21.92     0.07      0.012       (  0.112)       0.004        0.008
264  22.00     0.07      0.012       (  0.111)       0.004        0.008
265  22.08     0.10      0.019       (  0.111)       0.007        0.012
266  22.17     0.10      0.019       (  0.110)       0.007        0.012
267  22.25     0.10      0.019       (  0.110)       0.007        0.012
268  22.33     0.07      0.012       (  0.110)       0.004        0.008
269  22.42     0.07      0.012       (  0.109)       0.004        0.008
270  22.50     0.07      0.012       (  0.109)       0.004        0.008
271  22.58     0.07      0.012       (  0.109)       0.004        0.008
272  22.67     0.07      0.012       (  0.108)       0.004        0.008
273  22.75     0.07      0.012       (  0.108)       0.004        0.008
274  22.83     0.07      0.012       (  0.108)       0.004        0.008
275  22.92     0.07      0.012       (  0.108)       0.004        0.008
276  23.00     0.07      0.012       (  0.107)       0.004        0.008
277  23.08     0.07      0.012       (  0.107)       0.004        0.008
278  23.17     0.07      0.012       (  0.107)       0.004        0.008
279  23.25     0.07      0.012       (  0.107)       0.004        0.008
280  23.33     0.07      0.012       (  0.106)       0.004        0.008
281  23.42     0.07      0.012       (  0.106)       0.004        0.008
282  23.50     0.07      0.012       (  0.106)       0.004        0.008
283  23.58     0.07      0.012       (  0.106)       0.004        0.008
284  23.67     0.07      0.012       (  0.106)       0.004        0.008
285  23.75     0.07      0.012       (  0.106)       0.004        0.008
286  23.83     0.07      0.012       (  0.105)       0.004        0.008
287  23.92     0.07      0.012       (  0.105)       0.004        0.008
288  24.00     0.07      0.012       (  0.105)       0.004        0.008
            (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    12.1
      Flood volume = Effective rainfall      1.01(In)
       times area      91.8(Ac.)/[(In)/(Ft.)] =       7.7(Ac.Ft)
      Total soil loss =      0.54(In)
      Total soil loss =     4.149(Ac.Ft)
      Total rainfall =      1.55(In)
      Flood volume =      335673.1 Cubic Feet
      Total soil loss =      180747.0 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     12.607(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                      R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft    Q(CFS)  0        5.0      10.0      15.0      20.0
 ---------------------------------------------------------------------------
   0+ 5       0.0009      0.13  Q          |          |          |          |
   0+10       0.0042      0.48  Q          |          |          |          |
   0+15       0.0084      0.61  VQ         |          |          |          |
   0+20       0.0134      0.73  VQ         |          |          |          |
   0+25       0.0199      0.94  VQ         |          |          |          |
   0+30       0.0269      1.02  V Q        |          |          |          |
   0+35       0.0342      1.06  V Q        |          |          |          |
   0+40       0.0417      1.09  V Q        |          |          |          |
   0+45       0.0493      1.10  V Q        |          |          |          |
   0+50       0.0574      1.17  V Q        |          |          |          |
   0+55       0.0667      1.36  V Q        |          |          |          |
   1+ 0       0.0765      1.42  V Q        |          |          |          |
   1+ 5       0.0861      1.39  V Q        |          |          |          |
   1+10       0.0945      1.23  V Q        |          |          |          |
   1+15       0.1026      1.17  V Q        |          |          |          |
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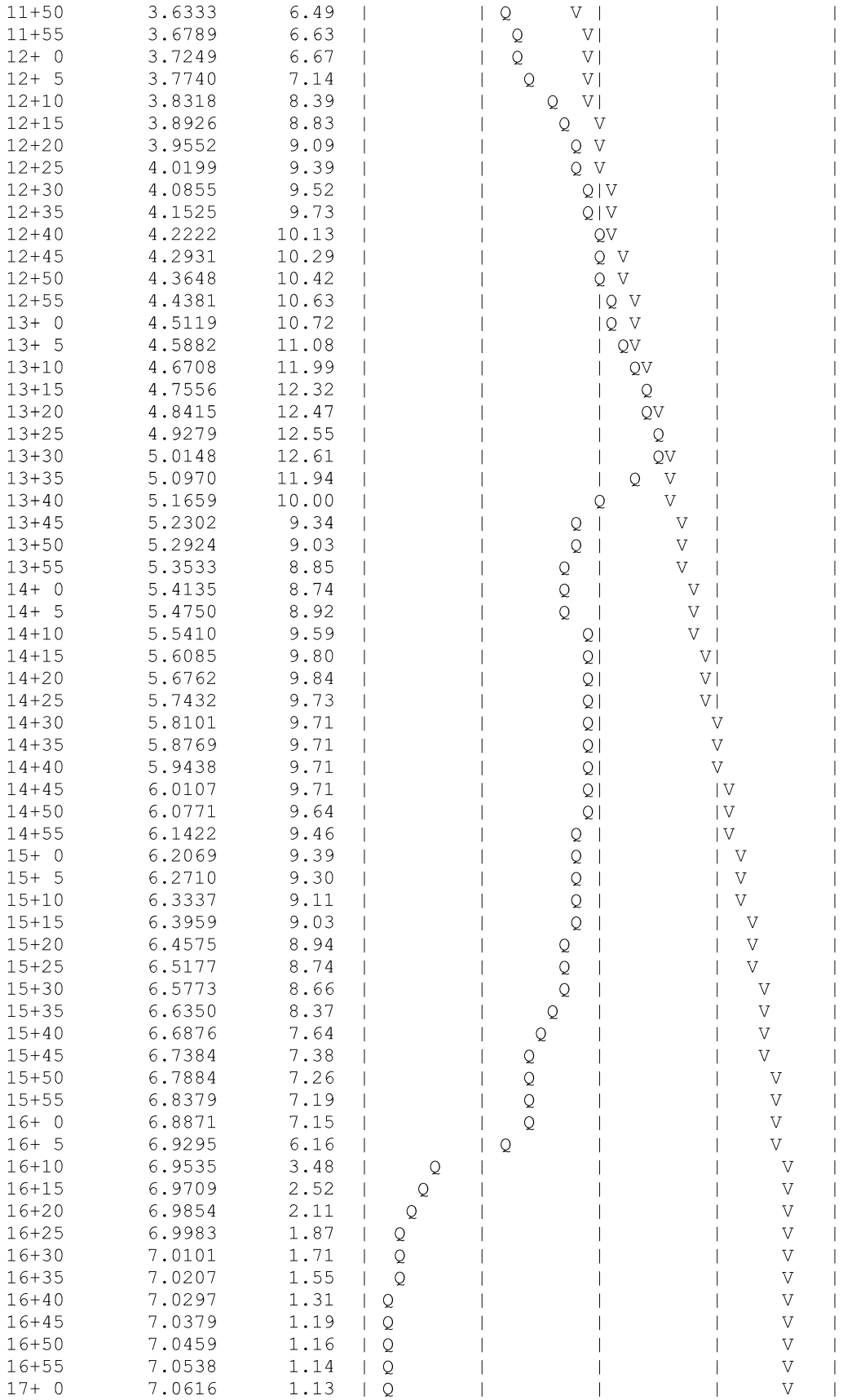
1+20	0.1105	1.15	V Q	|	|	|	|
1+25	0.1184	1.14	V Q	|	|	|	|
1+30	0.1262	1.13	V Q	|	|	|	|
1+35	0.1340	1.13	V Q	|	|	|	|
1+40	0.1417	1.12	V Q	|	|	|	|
1+45	0.1494	1.12	V Q	|	|	|	|
1+50	0.1575	1.18	V Q	|	|	|	|
1+55	0.1669	1.36	V Q	|	|	|	|
2+ 0	0.1767	1.42	V Q	|	|	|	|
2+ 5	0.1867	1.45	V Q	|	|	|	|
2+10	0.1968	1.47	|VQ	|	|	|	|
2+15	0.2070	1.48	|VQ	|	|	|	|
2+20	0.2172	1.48	|VQ	|	|	|	|
2+25	0.2274	1.49	|VQ	|	|	|	|
2+30	0.2377	1.49	|VQ	|	|	|	|
2+35	0.2484	1.56	|V Q	|	|	|	|
2+40	0.2604	1.73	|V Q	|	|	|	|
2+45	0.2727	1.80	|V Q	|	|	|	|
2+50	0.2853	1.82	|V Q	|	|	|	|
2+55	0.2980	1.84	|V Q	|	|	|	|
3+ 0	0.3107	1.85	|V Q	|	|	|	|
3+ 5	0.3235	1.86	|V Q	|	|	|	|
3+10	0.3363	1.86	|V Q	|	|	|	|
3+15	0.3492	1.86	|V Q	|	|	|	|
3+20	0.3620	1.86	|V Q	|	|	|	|
3+25	0.3748	1.86	|V Q	|	|	|	|
3+30	0.3877	1.86	| VQ	|	|	|	|
3+35	0.4005	1.86	| VQ	|	|	|	|
3+40	0.4134	1.86	| VQ	|	|	|	|
3+45	0.4262	1.86	| VQ	|	|	|	|
3+50	0.4395	1.93	| VQ	|	|	|	|
3+55	0.4540	2.11	| V Q	|	|	|	|
4+ 0	0.4689	2.17	| V Q	|	|	|	|
4+ 5	0.4841	2.20	| V Q	|	|	|	|
4+10	0.4993	2.21	| V Q	|	|	|	|
4+15	0.5146	2.22	| V Q	|	|	|	|
4+20	0.5304	2.29	| V Q	|	|	|	|
4+25	0.5475	2.48	| V Q	|	|	|	|
4+30	0.5650	2.54	| V Q	|	|	|	|
4+35	0.5827	2.57	| V Q	|	|	|	|
4+40	0.6005	2.59	| V Q	|	|	|	|
4+45	0.6184	2.60	| V Q	|	|	|	|
4+50	0.6367	2.67	| V Q	|	|	|	|
4+55	0.6563	2.85	| V Q	|	|	|	|
5+ 0	0.6764	2.91	| V Q	|	|	|	|
5+ 5	0.6958	2.81	| V Q	|	|	|	|
5+10	0.7129	2.48	| VQ	|	|	|	|
5+15	0.7291	2.36	| VQ	|	|	|	|
5+20	0.7455	2.38	| VQ	|	|	|	|
5+25	0.7629	2.53	| V Q	|	|	|	|
5+30	0.7806	2.57	| VQ	|	|	|	|
5+35	0.7988	2.65	| VQ	|	|	|	|
5+40	0.8184	2.83	| VQ	|	|	|	|
5+45	0.8383	2.90	| VQ	|	|	|	|
5+50	0.8585	2.93	| VQ	|	|	|	|
5+55	0.8789	2.95	| VQ	|	|	|	|
6+ 0	0.8993	2.97	| VQ	|	|	|	|
6+ 5	0.9203	3.04	| V Q	|	|	|	|
6+10	0.9425	3.22	| V Q	|	|	|	|
6+15	0.9651	3.29	| VQ	|	|	|	|
6+20	0.9879	3.32	| VQ	|	|	|	|
6+25	1.0109	3.33	| VQ	|	|	|	|
6+30	1.0339	3.34	| VQ	|	|	|	|

6+35	1.0574	3.41	VQ			
6+40	1.0822	3.59	V Q			
6+45	1.1074	3.66	V Q			
6+50	1.1328	3.69	V Q			
6+55	1.1583	3.70	VQ			
7+ 0	1.1839	3.71	VQ			
7+ 5	1.2095	3.72	VQ			
7+10	1.2352	3.73	VQ			
7+15	1.2609	3.73	VQ			
7+20	1.2870	3.79	VQ			
7+25	1.3143	3.97	VQ			
7+30	1.3421	4.03	V Q			
7+35	1.3705	4.13	VQ			
7+40	1.4003	4.32	VQ			
7+45	1.4305	4.39	VQ			
7+50	1.4614	4.49	VQ			
7+55	1.4937	4.69	V Q			
8+ 0	1.5266	4.76	V Q			
8+ 5	1.5605	4.93	VQ			
8+10	1.5970	5.30	V Q			
8+15	1.6345	5.44	V Q			
8+20	1.6724	5.50	V Q			
8+25	1.7106	5.54	V Q			
8+30	1.7489	5.56	V Q			
8+35	1.7877	5.64	V Q			
8+40	1.8279	5.83	V Q			
8+45	1.8685	5.90	V Q			
8+50	1.9098	5.99	V Q			
8+55	1.9524	6.18	V Q			
9+ 0	1.9954	6.26	V Q			
9+ 5	2.0397	6.42	V Q			
9+10	2.0865	6.79	V Q			
9+15	2.1342	6.93	V Q			
9+20	2.1828	7.06	V Q			
9+25	2.2329	7.27	V Q			
9+30	2.2836	7.36	V Q			
9+35	2.3350	7.47	V Q			
9+40	2.3879	7.67	V Q			
9+45	2.4412	7.75	V Q			
9+50	2.4953	7.85	V Q			
9+55	2.5507	8.05	V Q			
10+ 0	2.6066	8.12	V Q			
10+ 5	2.6597	7.71	V Q			
10+10	2.7044	6.49	Q V			
10+15	2.7461	6.06	Q V			
10+20	2.7866	5.87	Q V			
10+25	2.8263	5.77	Q V			
10+30	2.8655	5.70	Q V			
10+35	2.9066	5.97	Q V			
10+40	2.9537	6.83	Q V			
10+45	3.0027	7.12	QV			
10+50	3.0526	7.25	QV			
10+55	3.1031	7.33	Q V			
11+ 0	3.1540	7.39	Q V			
11+ 5	3.2047	7.36	Q V			
11+10	3.2542	7.20	Q V			
11+15	3.3035	7.16	Q V			
11+20	3.3526	7.13	Q V			
11+25	3.4016	7.11	Q V			
11+30	3.4505	7.10	Q V			
11+35	3.4985	6.97	Q V			
11+40	3.5440	6.61	Q V			
11+45	3.5886	6.48	Q V			



11+50	3.6333	6.49	|	| Q V |	|	|
11+55	3.6789	6.63	|	| Q V|	|	|
12+ 0	3.7249	6.67	|	| Q V|	|	|
12+ 5	3.7740	7.14	|	| Q V|	|	|
12+10	3.8318	8.39	|	| Q V|	|	|
12+15	3.8926	8.83	|	| Q V	|	|
12+20	3.9552	9.09	|	| Q V	|	|
12+25	4.0199	9.39	|	| Q V	|	|
12+30	4.0855	9.52	|	| Q|V	|	|
12+35	4.1525	9.73	|	| Q|V	|	|
12+40	4.2222	10.13	|	| QV	|	|
12+45	4.2931	10.29	|	| Q V	|	|
12+50	4.3648	10.42	|	| Q V	|	|
12+55	4.4381	10.63	|	| |Q V	|	|
13+ 0	4.5119	10.72	|	| |Q V	|	|
13+ 5	4.5882	11.08	|	| | QV	|	|
13+10	4.6708	11.99	|	| | QV	|	|
13+15	4.7556	12.32	|	| | Q	|	|
13+20	4.8415	12.47	|	| | QV	|	|
13+25	4.9279	12.55	|	| | Q	|	|
13+30	5.0148	12.61	|	| | QV	|	|
13+35	5.0970	11.94	|	| | Q V	|	|
13+40	5.1659	10.00	|	| Q V	|	|
13+45	5.2302	9.34	|	| Q | V	|	|
13+50	5.2924	9.03	|	| Q | V	|	|
13+55	5.3533	8.85	|	| Q | V	|	|
14+ 0	5.4135	8.74	|	| Q | V	|	|
14+ 5	5.4750	8.92	|	| Q | V	|	|
14+10	5.5410	9.59	|	| Q| V	|	|
14+15	5.6085	9.80	|	| Q| V	|	|
14+20	5.6762	9.84	|	| Q| V	|	|
14+25	5.7432	9.73	|	| Q| V	|	|
14+30	5.8101	9.71	|	| Q| V |	|
14+35	5.8769	9.71	|	| Q| V |	|
14+40	5.9438	9.71	|	| Q| V |	|
14+45	6.0107	9.71	|	| Q| |V |	|
14+50	6.0771	9.64	|	| Q| |V |	|
14+55	6.1422	9.46	|	| Q | |V |	|
15+ 0	6.2069	9.39	|	| Q | | V |	|
15+ 5	6.2710	9.30	|	| Q | | V |	|
15+10	6.3337	9.11	|	| Q | | V |	|
15+15	6.3959	9.03	|	| Q | | V |	|
15+20	6.4575	8.94	|	| Q | | V |	|
15+25	6.5177	8.74	|	| Q | | V |	|
15+30	6.5773	8.66	|	| Q | | V |	|
15+35	6.6350	8.37	|	| Q | | V |	|
15+40	6.6876	7.64	|	| Q | | V |	|
15+45	6.7384	7.38	|	| Q | | V |	|
15+50	6.7884	7.26	|	| Q | | V |	|
15+55	6.8379	7.19	|	| Q | | V |	|
16+ 0	6.8871	7.15	|	| Q | | V |	|
16+ 5	6.9295	6.16	|	| Q | | V |	|
16+10	6.9535	3.48	|	Q | | | V |	|
16+15	6.9709	2.52	|	Q | | | V |	|
16+20	6.9854	2.11	|	Q | | | V |	|
16+25	6.9983	1.87	|	Q | | | V |	|
16+30	7.0101	1.71	|	Q | | | V |	|
16+35	7.0207	1.55	|	Q | | | V |	|
16+40	7.0297	1.31	|	Q | | | V |	|
16+45	7.0379	1.19	|	Q | | | V |	|
16+50	7.0459	1.16	|	Q | | | V |	|
16+55	7.0538	1.14	|	Q | | | V |	|
17+ 0	7.0616	1.13	|	Q | | | V |	|

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17+ 5       7.0702      1.25  | Q       |         |         |     V   |
17+10       7.0813      1.61  |  Q      |         |         |     V   |
17+15       7.0932      1.73  |  Q      |         |         |     V   |
17+20       7.1055      1.78  |  Q      |         |         |     V   |
17+25       7.1180      1.81  |  Q      |         |         |     V   |
17+30       7.1306      1.84  |  Q      |         |         |      V  |
17+35       7.1433      1.85  |  Q      |         |         |      V  |
17+40       7.1561      1.86  |  Q      |         |         |      V  |
17+45       7.1690      1.86  |  Q      |         |         |      V  |
17+50       7.1814      1.80  |  Q      |         |         |      V  |
17+55       7.1925      1.62  |  Q      |         |         |      V  |
18+ 0       7.2033      1.56  |  Q      |         |         |      V  |
18+ 5       7.2139      1.53  |  Q      |         |         |      V  |
18+10       7.2243      1.52  |  Q      |         |         |      V  |
18+15       7.2347      1.51  |  Q      |         |         |      V  |
18+20       7.2450      1.50  | Q       |         |         |      V  |
18+25       7.2553      1.50  | Q       |         |         |      V  |
18+30       7.2656      1.49  | Q       |         |         |      V  |
18+35       7.2754      1.43  | Q       |         |         |      V  |
18+40       7.2840      1.25  | Q       |         |         |      V  |
18+45       7.2922      1.19  | Q       |         |         |      V  |
18+50       7.2998      1.10  | Q       |         |         |      V  |
18+55       7.3060      0.90  |Q        |         |         |      V  |
19+ 0       7.3117      0.83  |Q        |         |         |      V  |
19+ 5       7.3176      0.86  |Q        |         |         |      V  |
19+10       7.3246      1.02  | Q       |         |         |       V |
19+15       7.3319      1.06  | Q       |         |         |       V |
19+20       7.3399      1.15  | Q       |         |         |       V |
19+25       7.3491      1.34  | Q       |         |         |       V |
19+30       7.3588      1.41  | Q       |         |         |       V |
19+35       7.3683      1.38  | Q       |         |         |       V |
19+40       7.3767      1.22  | Q       |         |         |       V |
19+45       7.3848      1.17  | Q       |         |         |       V |
19+50       7.3923      1.09  | Q       |         |         |       V |
19+55       7.3984      0.90  |Q        |         |         |       V |
20+ 0       7.4042      0.83  |Q        |         |         |       V |
20+ 5       7.4101      0.86  |Q        |         |         |       V |
20+10       7.4171      1.02  | Q       |         |         |       V |
20+15       7.4244      1.06  | Q       |         |         |       V |
20+20       7.4319      1.09  | Q       |         |         |       V |
20+25       7.4394      1.10  | Q       |         |         |       V |
20+30       7.4470      1.10  | Q       |         |         |       V |
20+35       7.4547      1.11  | Q       |         |         |       V |
20+40       7.4624      1.12  | Q       |         |         |       V |
20+45       7.4701      1.12  | Q       |         |         |       V |
20+50       7.4773      1.06  | Q       |         |         |       V |
20+55       7.4834      0.88  |Q        |         |         |       V |
21+ 0       7.4890      0.81  |Q        |         |         |       V |
21+ 5       7.4949      0.85  |Q        |         |         |       V |
21+10       7.5018      1.01  | Q       |         |         |       V |
21+15       7.5092      1.06  | Q       |         |         |       V |
21+20       7.5162      1.02  | Q       |         |         |        V|
21+25       7.5221      0.86  |Q        |         |         |        V|
21+30       7.5276      0.80  |Q        |         |         |        V|
21+35       7.5334      0.84  |Q        |         |         |        V|
21+40       7.5404      1.01  | Q       |         |         |        V|
21+45       7.5477      1.06  | Q       |         |         |        V|
21+50       7.5547      1.02  | Q       |         |         |        V|
21+55       7.5606      0.86  |Q        |         |         |        V|
22+ 0       7.5661      0.80  |Q        |         |         |        V|
22+ 5       7.5719      0.84  |Q        |         |         |        V|
22+10       7.5789      1.01  | Q       |         |         |        V|
22+15       7.5862      1.06  | Q       |         |         |        V|
```

22+20	7.5933	1.02	| Q	|	|	|	V|
22+25	7.5992	0.86	|Q	|	|	|	V|
22+30	7.6047	0.80	|Q	|	|	|	V|
22+35	7.6100	0.78	|Q	|	|	|	V|
22+40	7.6153	0.77	|Q	|	|	|	V|
22+45	7.6206	0.76	|Q	|	|	|	V|
22+50	7.6258	0.75	|Q	|	|	|	V|
22+55	7.6309	0.75	|Q	|	|	|	V|
23+ 0	7.6361	0.75	|Q	|	|	|	V|
23+ 5	7.6412	0.75	|Q	|	|	|	V|
23+10	7.6463	0.75	|Q	|	|	|	V|
23+15	7.6515	0.75	|Q	|	|	|	V|
23+20	7.6566	0.75	|Q	|	|	|	V|
23+25	7.6617	0.75	|Q	|	|	|	V|
23+30	7.6669	0.75	|Q	|	|	|	V|
23+35	7.6720	0.75	|Q	|	|	|	V|
23+40	7.6772	0.75	|Q	|	|	|	V|
23+45	7.6823	0.75	|Q	|	|	|	V|
23+50	7.6874	0.75	|Q	|	|	|	V|
23+55	7.6926	0.75	|Q	|	|	|	V|
24+ 0	7.6977	0.75	|Q	|	|	|	V|
24+ 5	7.7020	0.62	|Q	|	|	|	V|
24+10	7.7038	0.26	Q	|	|	|	V|
24+15	7.7047	0.14	Q	|	|	|	V|
24+20	7.7053	0.08	Q	|	|	|	V|
24+25	7.7056	0.05	Q	|	|	|	V|
24+30	7.7058	0.03	Q	|	|	|	V|
24+35	7.7059	0.02	Q	|	|	|	V|
24+40	7.7060	0.01	Q	|	|	|	V|

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
5-year 1-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.50                45.90

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.20               110.16

STORM EVENT (YEAR) =    5.00
```

```
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    0.664(In)
Areal adjustment factor =   99.92 %
Adjusted average point rain =    0.663(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  49.8      0.574     0.050         0.548        0.058      0.032
69.0  49.8      0.574     0.075         0.535        0.080      0.043
72.0  53.4      0.537     0.750         0.175        0.668      0.117
72.3  53.8      0.534     0.900         0.101        0.195      0.020
                                                   Sum (F) =   0.211
Area averaged mean soil loss (F) (In/Hr) =  0.211
Minimum soil loss rate ((In/Hr)) =  0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5500
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133            15.851
    2   0.167        186.412         47.639            44.074
    3   0.250        279.618         16.784            15.528
    4   0.333        372.824          7.446             6.889
    5   0.417        466.031          4.270             3.950
    6   0.500        559.237          2.755             2.549
    7   0.583        652.443          1.819             1.683
    8   0.667        745.649          1.144             1.059
    9   0.750        838.855          1.010             0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
    1   0.08     3.30      0.263       (  0.211)       0.092        0.171
    2   0.17     4.20      0.334       (  0.211)       0.117        0.217
    3   0.25     4.40      0.350       (  0.211)       0.123        0.228
    4   0.33     4.80      0.382       (  0.211)       0.134        0.248
    5   0.42     5.20      0.414       (  0.211)       0.145        0.269
    6   0.50     6.20      0.494       (  0.211)       0.173        0.321
```

```
  7   0.58     6.80      0.541       (  0.211)       0.189        0.352
  8   0.67     8.80      0.701          0.211    (  0.245)        0.490
  9   0.75    13.90      1.107          0.211    (  0.387)        0.896
 10   0.83    31.40      2.500          0.211    (  0.875)        2.289
 11   0.92     7.20      0.573       (  0.211)       0.201        0.373
 12   1.00     3.80      0.303       (  0.211)       0.106        0.197
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =     6.1
      Flood volume = Effective rainfall      0.50(In)
       times area      91.8(Ac.)/[(In)/(Ft.)] =       3.9(Ac.Ft)
      Total soil loss =      0.16(In)
      Total soil loss =     1.218(Ac.Ft)
      Total rainfall =      0.66(In)
      Flood volume =      168010.6 Cubic Feet
      Total soil loss =       53058.4 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    127.286(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          1 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
  ------------------------------------------------------------------------
    0+ 5       0.0187      2.71  Q         |         |         |         |
    0+10       0.0942     10.98  V Q       |         |         |         |
    0+15       0.2034     15.85  | VQ      |         |         |         |
    0+20       0.3310     18.53  |  Q      |         |         |         |
    0+25       0.4752     20.93  |   Q     |         |         |         |
    0+30       0.6382     23.68  |   Q V   |         |         |         |
    0+35       0.8267     27.36  |    Q  V |         |         |         |
    0+40       1.0487     32.23  |     Q   V         |         |         |
    0+45       1.3652     45.96  |        Q|   V     |         |         |
    0+50       1.9759     88.67  |         |      Q  V         |         |
    0+55       2.8525    127.29  |         |         |    Q   V|         |
    1+ 0       3.3014     65.18  |         |  Q      |         |   V     |
    1+ 5       3.5508     36.21  |      Q  |         |         |     V   |
    1+10       3.6779     18.45  |  Q      |         |         |       V |
    1+15       3.7538     11.02  | Q       |         |         |       V |
    1+20       3.8019      6.99  |Q        |         |         |        V|
    1+25       3.8322      4.39  Q         |         |         |        V|
    1+30       3.8519      2.86  Q         |         |         |        V|
    1+35       3.8557      0.56  Q         |         |         |        V|
    1+40       3.8570      0.18  Q         |         |         |         V
------------------------------------------------------------------------
```

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      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc5pr35.out

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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
5-year 3-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.77                70.69

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.77               162.49

STORM EVENT (YEAR) =    5.00
```

```
Area Averaged 2-Year Rainfall =    0.770(In)
Area Averaged 100-Year Rainfall =    1.770(In)

Point rain (area averaged) =    1.004(In)
Areal adjustment factor =   99.96 %
Adjusted average point rain =    1.004(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  49.8      0.574     0.050         0.548        0.058      0.032
69.0  49.8      0.574     0.075         0.535        0.080      0.043
72.0  53.4      0.537     0.750         0.175        0.668      0.117
72.3  53.8      0.534     0.900         0.101        0.195      0.020
                                                   Sum (F) =   0.211
Area averaged mean soil loss (F) (In/Hr) =  0.211
Minimum soil loss rate ((In/Hr)) =  0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     1.30      0.157       (  0.211)       0.055        0.102
  2   0.17     1.30      0.157       (  0.211)       0.055        0.102
  3   0.25     1.10      0.133       (  0.211)       0.046        0.086
  4   0.33     1.50      0.181       (  0.211)       0.063        0.117
  5   0.42     1.50      0.181       (  0.211)       0.063        0.117
  6   0.50     1.80      0.217       (  0.211)       0.076        0.141
  7   0.58     1.50      0.181       (  0.211)       0.063        0.117
  8   0.67     1.80      0.217       (  0.211)       0.076        0.141
```

```
 9   0.75     1.80      0.217       (  0.211)       0.076        0.141
10   0.83     1.50      0.181       (  0.211)       0.063        0.117
11   0.92     1.60      0.193       (  0.211)       0.067        0.125
12   1.00     1.80      0.217       (  0.211)       0.076        0.141
13   1.08     2.20      0.265       (  0.211)       0.093        0.172
14   1.17     2.20      0.265       (  0.211)       0.093        0.172
15   1.25     2.20      0.265       (  0.211)       0.093        0.172
16   1.33     2.00      0.241       (  0.211)       0.084        0.157
17   1.42     2.60      0.313       (  0.211)       0.110        0.204
18   1.50     2.70      0.325       (  0.211)       0.114        0.211
19   1.58     2.40      0.289       (  0.211)       0.101        0.188
20   1.67     2.70      0.325       (  0.211)       0.114        0.211
21   1.75     3.30      0.398       (  0.211)       0.139        0.258
22   1.83     3.10      0.373       (  0.211)       0.131        0.243
23   1.92     2.90      0.349       (  0.211)       0.122        0.227
24   2.00     3.00      0.361       (  0.211)       0.126        0.235
25   2.08     3.10      0.373       (  0.211)       0.131        0.243
26   2.17     4.20      0.506       (  0.211)       0.177        0.329
27   2.25     5.00      0.602          0.211    (  0.211)       0.392
28   2.33     3.50      0.422       (  0.211)       0.148        0.274
29   2.42     6.80      0.819          0.211    (  0.287)       0.609
30   2.50     7.30      0.879          0.211    (  0.308)       0.669
31   2.58     8.20      0.988          0.211    (  0.346)       0.777
32   2.67     5.90      0.711          0.211    (  0.249)       0.500
33   2.75     2.00      0.241       (  0.211)       0.084        0.157
34   2.83     1.80      0.217       (  0.211)       0.076        0.141
35   2.92     1.80      0.217       (  0.211)       0.076        0.141
36   3.00     0.60      0.072       (  0.211)       0.025        0.047
          (Loss Rate Not Used)
   Sum =     100.0                                   Sum =     8.2
    Flood volume = Effective rainfall      0.68(In)
     times area      91.8(Ac.)/[(In)/(Ft.)] =       5.2(Ac.Ft)
    Total soil loss =      0.32(In)
    Total soil loss =     2.467(Ac.Ft)
    Total rainfall =      1.00(In)
    Flood volume =      227060.0 Cubic Feet
    Total soil loss =      107447.3 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     59.899(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      3 - H O U R    S T O R M
                   R u n o f f     H y d r o g r a p h
    ---------------------------------------------------------------------
               Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       15.0      30.0      45.0      60.0
-------------------------------------------------------------------------
  0+ 5       0.0111      1.61  VQ        |         |         |         |
  0+10       0.0531      6.10  V   Q     |         |         |         |
  0+15       0.1044      7.44  V   Q     |         |         |         |
  0+20       0.1591      7.94  |V   Q    |         |         |         |
  0+25       0.2244      9.48  |V    Q   |         |         |         |
  0+30       0.2967     10.49  | V   Q   |         |         |         |
  0+35       0.3757     11.48  | V    Q  |         |         |         |
  0+40       0.4541     11.38  |  V   Q  |         |         |         |
  0+45       0.5392     12.36  |   V   Q |         |         |         |
  0+50       0.6240     12.32  |   V   Q |         |         |         |
  0+55       0.7036     11.55  |    V Q  |         |         |         |
  1+ 0       0.7854     11.88  |     VQ  |         |         |         |
  1+ 5       0.8755     13.08  |     V Q |         |         |         |
  1+10       0.9767     14.70  |      V Q|         |         |         |
```

```
    1+15       1.0819     15.27  |       V Q          |          |          |
    1+20       1.1872     15.30  |        VQ          |          |          |
    1+25       1.2940     15.50  |        VQ          |          |          |
    1+30       1.4149     17.55  |         VQ         |          |          |
    1+35       1.5404     18.22  |         |VQ        |          |          |
    1+40       1.6642     17.99  |         |QV        |          |          |
    1+45       1.7995     19.63  |         |  Q       |          |          |
    1+50       1.9495     21.78  |         |   Q      |          |          |
    1+55       2.0991     21.73  |         |   Q V    |          |          |
    2+ 0       2.2460     21.32  |         |   Q  V   |          |          |
    2+ 5       2.3954     21.70  |         |   Q   V  |          |          |
    2+10       2.5573     23.50  |         |    Q   V|          |          |
    2+15       2.7533     28.45  |         |       Q |V         |          |
    2+20       2.9653     30.79  |         |         Q V        |          |
    2+25       3.1893     32.53  |         |          |Q  V     |          |
    2+30       3.5143     47.18  |         |          |     V   |Q         |
    2+35       3.9028     56.42  |         |          |        V|       Q  |
    2+40       4.3153     59.90  |         |          |         |  V     Q|
    2+45       4.6291     45.56  |         |          |         Q    V     |
    2+50       4.8195     27.65  |         |       Q  |          |     V   |
    2+55       4.9627     20.79  |         |  Q       |          |       V  |
    3+ 0       5.0743     16.21  |         Q          |          |       V  |
    3+ 5       5.1412      9.71  |     Q    |         |          |         V|
    3+10       5.1753      4.95  |  Q       |         |          |         V|
    3+15       5.1943      2.76  |Q         |         |          |         V|
    3+20       5.2041      1.42  Q          |         |          |         V|
    3+25       5.2085      0.65  Q          |         |          |         V|
    3+30       5.2110      0.36  Q          |         |          |         V|
    3+35       5.2123      0.18  Q          |         |          |         V|
    3+40       5.2126      0.04  Q          |         |          |          V
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc5pr65.out

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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
5-year 6-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.95                87.21

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          2.45               224.91

STORM EVENT (YEAR) =    5.00
```

```
Area Averaged 2-Year Rainfall =    0.950(In)
Area Averaged 100-Year Rainfall =    2.450(In)

Point rain (area averaged) =    1.301(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    1.301(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  49.8      0.574     0.050         0.548        0.058      0.032
69.0  49.8      0.574     0.075         0.535        0.080      0.043
72.0  53.4      0.537     0.750         0.175        0.668      0.117
72.3  53.8      0.534     0.900         0.101        0.195      0.020
                                                   Sum (F) =   0.211
Area averaged mean soil loss (F) (In/Hr) =  0.211
Minimum soil loss rate ((In/Hr)) =  0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

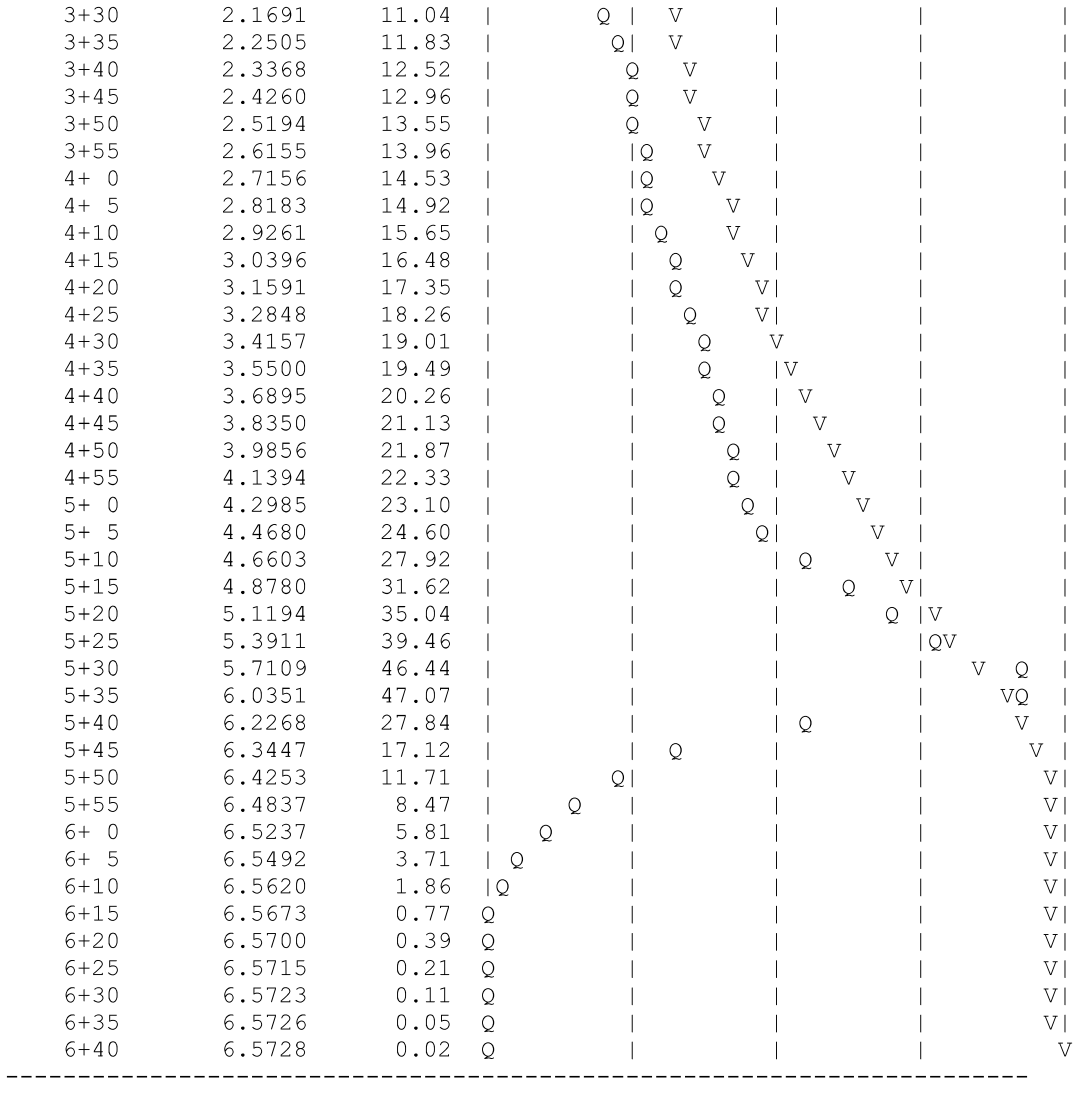
 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.50      0.078       (  0.211)       0.027        0.051
  2   0.17     0.60      0.094       (  0.211)       0.033        0.061
  3   0.25     0.60      0.094       (  0.211)       0.033        0.061
  4   0.33     0.60      0.094       (  0.211)       0.033        0.061
  5   0.42     0.60      0.094       (  0.211)       0.033        0.061
  6   0.50     0.70      0.109       (  0.211)       0.038        0.071
  7   0.58     0.70      0.109       (  0.211)       0.038        0.071
  8   0.67     0.70      0.109       (  0.211)       0.038        0.071
```

9	0.75	0.70	0.109	(0.211)	0.038	0.071
10	0.83	0.70	0.109	(0.211)	0.038	0.071
11	0.92	0.70	0.109	(0.211)	0.038	0.071
12	1.00	0.80	0.125	(0.211)	0.044	0.081
13	1.08	0.80	0.125	(0.211)	0.044	0.081
14	1.17	0.80	0.125	(0.211)	0.044	0.081
15	1.25	0.80	0.125	(0.211)	0.044	0.081
16	1.33	0.80	0.125	(0.211)	0.044	0.081
17	1.42	0.80	0.125	(0.211)	0.044	0.081
18	1.50	0.80	0.125	(0.211)	0.044	0.081
19	1.58	0.80	0.125	(0.211)	0.044	0.081
20	1.67	0.80	0.125	(0.211)	0.044	0.081
21	1.75	0.80	0.125	(0.211)	0.044	0.081
22	1.83	0.80	0.125	(0.211)	0.044	0.081
23	1.92	0.80	0.125	(0.211)	0.044	0.081
24	2.00	0.90	0.140	(0.211)	0.049	0.091
25	2.08	0.80	0.125	(0.211)	0.044	0.081
26	2.17	0.90	0.140	(0.211)	0.049	0.091
27	2.25	0.90	0.140	(0.211)	0.049	0.091
28	2.33	0.90	0.140	(0.211)	0.049	0.091
29	2.42	0.90	0.140	(0.211)	0.049	0.091
30	2.50	0.90	0.140	(0.211)	0.049	0.091
31	2.58	0.90	0.140	(0.211)	0.049	0.091
32	2.67	0.90	0.140	(0.211)	0.049	0.091
33	2.75	1.00	0.156	(0.211)	0.055	0.101
34	2.83	1.00	0.156	(0.211)	0.055	0.101
35	2.92	1.00	0.156	(0.211)	0.055	0.101
36	3.00	1.00	0.156	(0.211)	0.055	0.101
37	3.08	1.00	0.156	(0.211)	0.055	0.101
38	3.17	1.10	0.172	(0.211)	0.060	0.112
39	3.25	1.10	0.172	(0.211)	0.060	0.112
40	3.33	1.10	0.172	(0.211)	0.060	0.112
41	3.42	1.20	0.187	(0.211)	0.066	0.122
42	3.50	1.30	0.203	(0.211)	0.071	0.132
43	3.58	1.40	0.219	(0.211)	0.076	0.142
44	3.67	1.40	0.219	(0.211)	0.076	0.142
45	3.75	1.50	0.234	(0.211)	0.082	0.152
46	3.83	1.50	0.234	(0.211)	0.082	0.152
47	3.92	1.60	0.250	(0.211)	0.087	0.162
48	4.00	1.60	0.250	(0.211)	0.087	0.162
49	4.08	1.70	0.265	(0.211)	0.093	0.173
50	4.17	1.80	0.281	(0.211)	0.098	0.183
51	4.25	1.90	0.297	(0.211)	0.104	0.193
52	4.33	2.00	0.312	(0.211)	0.109	0.203
53	4.42	2.10	0.328	(0.211)	0.115	0.213
54	4.50	2.10	0.328	(0.211)	0.115	0.213
55	4.58	2.20	0.343	(0.211)	0.120	0.223
56	4.67	2.30	0.359	(0.211)	0.126	0.233
57	4.75	2.40	0.375	(0.211)	0.131	0.244
58	4.83	2.40	0.375	(0.211)	0.131	0.244
59	4.92	2.50	0.390	(0.211)	0.137	0.254
60	5.00	2.60	0.406	(0.211)	0.142	0.264
61	5.08	3.10	0.484	(0.211)	0.169	0.315
62	5.17	3.60	0.562	(0.211)	0.197	0.365
63	5.25	3.90	0.609	0.211	(0.213)	0.398
64	5.33	4.20	0.656	0.211	(0.229)	0.445
65	5.42	4.70	0.734	0.211	(0.257)	0.523
66	5.50	5.60	0.874	0.211	(0.306)	0.664
67	5.58	1.90	0.297	(0.211)	0.104	0.193
68	5.67	0.90	0.140	(0.211)	0.049	0.091
69	5.75	0.60	0.094	(0.211)	0.033	0.061
70	5.83	0.50	0.078	(0.211)	0.027	0.051
71	5.92	0.30	0.047	(0.211)	0.016	0.030

```
72   6.00     0.20      0.031       (  0.211)       0.011        0.020
           (Loss Rate Not Used)
   Sum =     100.0                                   Sum =    10.3
     Flood volume = Effective rainfall      0.86(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       6.6(Ac.Ft)
     Total soil loss =      0.44(In)
     Total soil loss =     3.379(Ac.Ft)
     Total rainfall =      1.30(In)
     Flood volume =      286309.9 Cubic Feet
     Total soil loss =      147202.8 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     47.069(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          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   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
-------------------------------------------------------------------------
  0+ 5       0.0055      0.80  Q          |         |         |         |
  0+10       0.0276      3.20  V Q        |         |         |         |
  0+15       0.0582      4.44  V  Q       |         |         |         |
  0+20       0.0922      4.95  V  Q       |         |         |         |
  0+25       0.1282      5.22  V   Q      |         |         |         |
  0+30       0.1664      5.55  |V  Q      |         |         |         |
  0+35       0.2084      6.11  |V  Q      |         |         |         |
  0+40       0.2520      6.33  |V   Q     |         |         |         |
  0+45       0.2965      6.46  |V   Q     |         |         |         |
  0+50       0.3414      6.51  | V  Q     |         |         |         |
  0+55       0.3864      6.54  | V  Q     |         |         |         |
  1+ 0       0.4327      6.72  | V  Q     |         |         |         |
  1+ 5       0.4821      7.17  | V  Q     |         |         |         |
  1+10       0.5326      7.34  |  V Q     |         |         |         |
  1+15       0.5837      7.41  |  V Q     |         |         |         |
  1+20       0.6350      7.45  |  V Q     |         |         |         |
  1+25       0.6865      7.48  |   VQ     |         |         |         |
  1+30       0.7381      7.49  |   VQ     |         |         |         |
  1+35       0.7898      7.50  |   V Q    |         |         |         |
  1+40       0.8415      7.51  |    VQ    |         |         |         |
  1+45       0.8933      7.51  |    VQ    |         |         |         |
  1+50       0.9450      7.51  |    VQ    |         |         |         |
  1+55       0.9968      7.51  |     Q    |         |         |         |
  2+ 0       1.0496      7.68  |     Q    |         |         |         |
  2+ 5       1.1045      7.96  |     Q    |         |         |         |
  2+10       1.1584      7.83  |     QV   |         |         |         |
  2+15       1.2148      8.19  |     QV   |         |         |         |
  2+20       1.2721      8.32  |     QV   |         |         |         |
  2+25       1.3298      8.38  |     Q V  |         |         |         |
  2+30       1.3877      8.41  |     Q V  |         |         |         |
  2+35       1.4458      8.43  |     Q V  |         |         |         |
  2+40       1.5039      8.44  |     Q  V|         |         |         |
  2+45       1.5632      8.60  |     Q  V|         |         |         |
  2+50       1.6256      9.06  |      Q V|         |         |         |
  2+55       1.6891      9.22  |      Q  V         |         |         |
  3+ 0       1.7530      9.29  |      Q  V         |         |         |
  3+ 5       1.8173      9.33  |      Q  |V        |         |         |
  3+10       1.8828      9.52  |      Q  |V        |         |         |
  3+15       1.9516      9.98  |      Q  |V        |         |         |
  3+20       2.0215     10.15  |       Q | V       |         |         |
  3+25       2.0930     10.39  |       Q | V       |         |         |
```



3+30	2.1691	11.04	
3+35	2.2505	11.83	
3+40	2.3368	12.52	
3+45	2.4260	12.96	
3+50	2.5194	13.55	
3+55	2.6155	13.96	
4+ 0	2.7156	14.53	
4+ 5	2.8183	14.92	
4+10	2.9261	15.65	
4+15	3.0396	16.48	
4+20	3.1591	17.35	
4+25	3.2848	18.26	
4+30	3.4157	19.01	
4+35	3.5500	19.49	
4+40	3.6895	20.26	
4+45	3.8350	21.13	
4+50	3.9856	21.87	
4+55	4.1394	22.33	
5+ 0	4.2985	23.10	
5+ 5	4.4680	24.60	
5+10	4.6603	27.92	
5+15	4.8780	31.62	
5+20	5.1194	35.04	
5+25	5.3911	39.46	
5+30	5.7109	46.44	
5+35	6.0351	47.07	
5+40	6.2268	27.84	
5+45	6.3447	17.12	
5+50	6.4253	11.71	
5+55	6.4837	8.47	
6+ 0	6.5237	5.81	
6+ 5	6.5492	3.71	
6+10	6.5620	1.86	
6+15	6.5673	0.77	
6+20	6.5700	0.39	
6+25	6.5715	0.21	
6+30	6.5723	0.11	
6+35	6.5726	0.05	
6+40	6.5728	0.02	

```
      U n i t   H y d r o g r a p h   A n a l y s i s

      Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
            Study date  03/20/24 File: 907hydc5pr245.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
5-year 24-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.55              142.29

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          4.05              371.79

STORM EVENT (YEAR) =    5.00
```

```
Area Averaged 2-Year Rainfall =    1.550(In)
Area Averaged 100-Year Rainfall =    4.050(In)

Point rain (area averaged) =    2.136(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    2.135(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  49.8      0.574     0.050         0.548        0.058      0.032
69.0  49.8      0.574     0.075         0.535        0.080      0.043
72.0  53.4      0.537     0.750         0.175        0.668      0.117
72.3  53.8      0.534     0.900         0.101        0.195      0.020
                                                   Sum (F) =   0.211
Area averaged mean soil loss (F) (In/Hr) =  0.211
Minimum soil loss rate ((In/Hr)) =  0.105
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.07      0.017       (  0.373)       0.006        0.011
  2   0.17     0.07      0.017       (  0.372)       0.006        0.011
  3   0.25     0.07      0.017       (  0.370)       0.006        0.011
  4   0.33     0.10      0.026       (  0.369)       0.009        0.017
  5   0.42     0.10      0.026       (  0.368)       0.009        0.017
  6   0.50     0.10      0.026       (  0.366)       0.009        0.017
  7   0.58     0.10      0.026       (  0.365)       0.009        0.017
  8   0.67     0.10      0.026       (  0.363)       0.009        0.017
```

9	0.75	0.10	0.026	(0.362)	0.009	0.017
10	0.83	0.13	0.034	(0.360)	0.012	0.022
11	0.92	0.13	0.034	(0.359)	0.012	0.022
12	1.00	0.13	0.034	(0.358)	0.012	0.022
13	1.08	0.10	0.026	(0.356)	0.009	0.017
14	1.17	0.10	0.026	(0.355)	0.009	0.017
15	1.25	0.10	0.026	(0.353)	0.009	0.017
16	1.33	0.10	0.026	(0.352)	0.009	0.017
17	1.42	0.10	0.026	(0.351)	0.009	0.017
18	1.50	0.10	0.026	(0.349)	0.009	0.017
19	1.58	0.10	0.026	(0.348)	0.009	0.017
20	1.67	0.10	0.026	(0.346)	0.009	0.017
21	1.75	0.10	0.026	(0.345)	0.009	0.017
22	1.83	0.13	0.034	(0.344)	0.012	0.022
23	1.92	0.13	0.034	(0.342)	0.012	0.022
24	2.00	0.13	0.034	(0.341)	0.012	0.022
25	2.08	0.13	0.034	(0.339)	0.012	0.022
26	2.17	0.13	0.034	(0.338)	0.012	0.022
27	2.25	0.13	0.034	(0.337)	0.012	0.022
28	2.33	0.13	0.034	(0.335)	0.012	0.022
29	2.42	0.13	0.034	(0.334)	0.012	0.022
30	2.50	0.13	0.034	(0.333)	0.012	0.022
31	2.58	0.17	0.043	(0.331)	0.015	0.028
32	2.67	0.17	0.043	(0.330)	0.015	0.028
33	2.75	0.17	0.043	(0.329)	0.015	0.028
34	2.83	0.17	0.043	(0.327)	0.015	0.028
35	2.92	0.17	0.043	(0.326)	0.015	0.028
36	3.00	0.17	0.043	(0.324)	0.015	0.028
37	3.08	0.17	0.043	(0.323)	0.015	0.028
38	3.17	0.17	0.043	(0.322)	0.015	0.028
39	3.25	0.17	0.043	(0.320)	0.015	0.028
40	3.33	0.17	0.043	(0.319)	0.015	0.028
41	3.42	0.17	0.043	(0.318)	0.015	0.028
42	3.50	0.17	0.043	(0.316)	0.015	0.028
43	3.58	0.17	0.043	(0.315)	0.015	0.028
44	3.67	0.17	0.043	(0.314)	0.015	0.028
45	3.75	0.17	0.043	(0.312)	0.015	0.028
46	3.83	0.20	0.051	(0.311)	0.018	0.033
47	3.92	0.20	0.051	(0.310)	0.018	0.033
48	4.00	0.20	0.051	(0.309)	0.018	0.033
49	4.08	0.20	0.051	(0.307)	0.018	0.033
50	4.17	0.20	0.051	(0.306)	0.018	0.033
51	4.25	0.20	0.051	(0.305)	0.018	0.033
52	4.33	0.23	0.060	(0.303)	0.021	0.039
53	4.42	0.23	0.060	(0.302)	0.021	0.039
54	4.50	0.23	0.060	(0.301)	0.021	0.039
55	4.58	0.23	0.060	(0.299)	0.021	0.039
56	4.67	0.23	0.060	(0.298)	0.021	0.039
57	4.75	0.23	0.060	(0.297)	0.021	0.039
58	4.83	0.27	0.068	(0.296)	0.024	0.044
59	4.92	0.27	0.068	(0.294)	0.024	0.044
60	5.00	0.27	0.068	(0.293)	0.024	0.044
61	5.08	0.20	0.051	(0.292)	0.018	0.033
62	5.17	0.20	0.051	(0.290)	0.018	0.033
63	5.25	0.20	0.051	(0.289)	0.018	0.033
64	5.33	0.23	0.060	(0.288)	0.021	0.039
65	5.42	0.23	0.060	(0.287)	0.021	0.039
66	5.50	0.23	0.060	(0.285)	0.021	0.039
67	5.58	0.27	0.068	(0.284)	0.024	0.044
68	5.67	0.27	0.068	(0.283)	0.024	0.044
69	5.75	0.27	0.068	(0.282)	0.024	0.044
70	5.83	0.27	0.068	(0.280)	0.024	0.044
71	5.92	0.27	0.068	(0.279)	0.024	0.044

72	6.00	0.27	0.068	(0.278)	0.024	0.044
73	6.08	0.30	0.077	(0.277)	0.027	0.050
74	6.17	0.30	0.077	(0.276)	0.027	0.050
75	6.25	0.30	0.077	(0.274)	0.027	0.050
76	6.33	0.30	0.077	(0.273)	0.027	0.050
77	6.42	0.30	0.077	(0.272)	0.027	0.050
78	6.50	0.30	0.077	(0.271)	0.027	0.050
79	6.58	0.33	0.085	(0.269)	0.030	0.056
80	6.67	0.33	0.085	(0.268)	0.030	0.056
81	6.75	0.33	0.085	(0.267)	0.030	0.056
82	6.83	0.33	0.085	(0.266)	0.030	0.056
83	6.92	0.33	0.085	(0.265)	0.030	0.056
84	7.00	0.33	0.085	(0.263)	0.030	0.056
85	7.08	0.33	0.085	(0.262)	0.030	0.056
86	7.17	0.33	0.085	(0.261)	0.030	0.056
87	7.25	0.33	0.085	(0.260)	0.030	0.056
88	7.33	0.37	0.094	(0.259)	0.033	0.061
89	7.42	0.37	0.094	(0.257)	0.033	0.061
90	7.50	0.37	0.094	(0.256)	0.033	0.061
91	7.58	0.40	0.102	(0.255)	0.036	0.067
92	7.67	0.40	0.102	(0.254)	0.036	0.067
93	7.75	0.40	0.102	(0.253)	0.036	0.067
94	7.83	0.43	0.111	(0.252)	0.039	0.072
95	7.92	0.43	0.111	(0.250)	0.039	0.072
96	8.00	0.43	0.111	(0.249)	0.039	0.072
97	8.08	0.50	0.128	(0.248)	0.045	0.083
98	8.17	0.50	0.128	(0.247)	0.045	0.083
99	8.25	0.50	0.128	(0.246)	0.045	0.083
100	8.33	0.50	0.128	(0.245)	0.045	0.083
101	8.42	0.50	0.128	(0.243)	0.045	0.083
102	8.50	0.50	0.128	(0.242)	0.045	0.083
103	8.58	0.53	0.137	(0.241)	0.048	0.089
104	8.67	0.53	0.137	(0.240)	0.048	0.089
105	8.75	0.53	0.137	(0.239)	0.048	0.089
106	8.83	0.57	0.145	(0.238)	0.051	0.094
107	8.92	0.57	0.145	(0.237)	0.051	0.094
108	9.00	0.57	0.145	(0.236)	0.051	0.094
109	9.08	0.63	0.162	(0.234)	0.057	0.105
110	9.17	0.63	0.162	(0.233)	0.057	0.105
111	9.25	0.63	0.162	(0.232)	0.057	0.105
112	9.33	0.67	0.171	(0.231)	0.060	0.111
113	9.42	0.67	0.171	(0.230)	0.060	0.111
114	9.50	0.67	0.171	(0.229)	0.060	0.111
115	9.58	0.70	0.179	(0.228)	0.063	0.117
116	9.67	0.70	0.179	(0.227)	0.063	0.117
117	9.75	0.70	0.179	(0.226)	0.063	0.117
118	9.83	0.73	0.188	(0.225)	0.066	0.122
119	9.92	0.73	0.188	(0.223)	0.066	0.122
120	10.00	0.73	0.188	(0.222)	0.066	0.122
121	10.08	0.50	0.128	(0.221)	0.045	0.083
122	10.17	0.50	0.128	(0.220)	0.045	0.083
123	10.25	0.50	0.128	(0.219)	0.045	0.083
124	10.33	0.50	0.128	(0.218)	0.045	0.083
125	10.42	0.50	0.128	(0.217)	0.045	0.083
126	10.50	0.50	0.128	(0.216)	0.045	0.083
127	10.58	0.67	0.171	(0.215)	0.060	0.111
128	10.67	0.67	0.171	(0.214)	0.060	0.111
129	10.75	0.67	0.171	(0.213)	0.060	0.111
130	10.83	0.67	0.171	(0.212)	0.060	0.111
131	10.92	0.67	0.171	(0.211)	0.060	0.111
132	11.00	0.67	0.171	(0.210)	0.060	0.111
133	11.08	0.63	0.162	(0.209)	0.057	0.105
134	11.17	0.63	0.162	(0.208)	0.057	0.105

135	11.25	0.63	0.162	(0.207)	0.057	0.105
136	11.33	0.63	0.162	(0.206)	0.057	0.105
137	11.42	0.63	0.162	(0.205)	0.057	0.105
138	11.50	0.63	0.162	(0.204)	0.057	0.105
139	11.58	0.57	0.145	(0.203)	0.051	0.094
140	11.67	0.57	0.145	(0.202)	0.051	0.094
141	11.75	0.57	0.145	(0.201)	0.051	0.094
142	11.83	0.60	0.154	(0.200)	0.054	0.100
143	11.92	0.60	0.154	(0.199)	0.054	0.100
144	12.00	0.60	0.154	(0.198)	0.054	0.100
145	12.08	0.83	0.214	(0.197)	0.075	0.139
146	12.17	0.83	0.214	(0.196)	0.075	0.139
147	12.25	0.83	0.214	(0.195)	0.075	0.139
148	12.33	0.87	0.222	(0.194)	0.078	0.144
149	12.42	0.87	0.222	(0.193)	0.078	0.144
150	12.50	0.87	0.222	(0.192)	0.078	0.144
151	12.58	0.93	0.239	(0.191)	0.084	0.155
152	12.67	0.93	0.239	(0.190)	0.084	0.155
153	12.75	0.93	0.239	(0.189)	0.084	0.155
154	12.83	0.97	0.248	(0.188)	0.087	0.161
155	12.92	0.97	0.248	(0.187)	0.087	0.161
156	13.00	0.97	0.248	(0.186)	0.087	0.161
157	13.08	1.13	0.290	(0.185)	0.102	0.189
158	13.17	1.13	0.290	(0.184)	0.102	0.189
159	13.25	1.13	0.290	(0.183)	0.102	0.189
160	13.33	1.13	0.290	(0.182)	0.102	0.189
161	13.42	1.13	0.290	(0.181)	0.102	0.189
162	13.50	1.13	0.290	(0.180)	0.102	0.189
163	13.58	0.77	0.196	(0.179)	0.069	0.128
164	13.67	0.77	0.196	(0.179)	0.069	0.128
165	13.75	0.77	0.196	(0.178)	0.069	0.128
166	13.83	0.77	0.196	(0.177)	0.069	0.128
167	13.92	0.77	0.196	(0.176)	0.069	0.128
168	14.00	0.77	0.196	(0.175)	0.069	0.128
169	14.08	0.90	0.231	(0.174)	0.081	0.150
170	14.17	0.90	0.231	(0.173)	0.081	0.150
171	14.25	0.90	0.231	(0.172)	0.081	0.150
172	14.33	0.87	0.222	(0.171)	0.078	0.144
173	14.42	0.87	0.222	(0.170)	0.078	0.144
174	14.50	0.87	0.222	(0.170)	0.078	0.144
175	14.58	0.87	0.222	(0.169)	0.078	0.144
176	14.67	0.87	0.222	(0.168)	0.078	0.144
177	14.75	0.87	0.222	(0.167)	0.078	0.144
178	14.83	0.83	0.214	(0.166)	0.075	0.139
179	14.92	0.83	0.214	(0.165)	0.075	0.139
180	15.00	0.83	0.214	(0.164)	0.075	0.139
181	15.08	0.80	0.205	(0.164)	0.072	0.133
182	15.17	0.80	0.205	(0.163)	0.072	0.133
183	15.25	0.80	0.205	(0.162)	0.072	0.133
184	15.33	0.77	0.196	(0.161)	0.069	0.128
185	15.42	0.77	0.196	(0.160)	0.069	0.128
186	15.50	0.77	0.196	(0.159)	0.069	0.128
187	15.58	0.63	0.162	(0.159)	0.057	0.105
188	15.67	0.63	0.162	(0.158)	0.057	0.105
189	15.75	0.63	0.162	(0.157)	0.057	0.105
190	15.83	0.63	0.162	(0.156)	0.057	0.105
191	15.92	0.63	0.162	(0.155)	0.057	0.105
192	16.00	0.63	0.162	(0.155)	0.057	0.105
193	16.08	0.13	0.034	(0.154)	0.012	0.022
194	16.17	0.13	0.034	(0.153)	0.012	0.022
195	16.25	0.13	0.034	(0.152)	0.012	0.022
196	16.33	0.13	0.034	(0.152)	0.012	0.022
197	16.42	0.13	0.034	(0.151)	0.012	0.022

198	16.50	0.13	0.034	(0.150)	0.012	0.022
199	16.58	0.10	0.026	(0.149)	0.009	0.017
200	16.67	0.10	0.026	(0.148)	0.009	0.017
201	16.75	0.10	0.026	(0.148)	0.009	0.017
202	16.83	0.10	0.026	(0.147)	0.009	0.017
203	16.92	0.10	0.026	(0.146)	0.009	0.017
204	17.00	0.10	0.026	(0.145)	0.009	0.017
205	17.08	0.17	0.043	(0.145)	0.015	0.028
206	17.17	0.17	0.043	(0.144)	0.015	0.028
207	17.25	0.17	0.043	(0.143)	0.015	0.028
208	17.33	0.17	0.043	(0.143)	0.015	0.028
209	17.42	0.17	0.043	(0.142)	0.015	0.028
210	17.50	0.17	0.043	(0.141)	0.015	0.028
211	17.58	0.17	0.043	(0.140)	0.015	0.028
212	17.67	0.17	0.043	(0.140)	0.015	0.028
213	17.75	0.17	0.043	(0.139)	0.015	0.028
214	17.83	0.13	0.034	(0.138)	0.012	0.022
215	17.92	0.13	0.034	(0.138)	0.012	0.022
216	18.00	0.13	0.034	(0.137)	0.012	0.022
217	18.08	0.13	0.034	(0.136)	0.012	0.022
218	18.17	0.13	0.034	(0.136)	0.012	0.022
219	18.25	0.13	0.034	(0.135)	0.012	0.022
220	18.33	0.13	0.034	(0.134)	0.012	0.022
221	18.42	0.13	0.034	(0.134)	0.012	0.022
222	18.50	0.13	0.034	(0.133)	0.012	0.022
223	18.58	0.10	0.026	(0.132)	0.009	0.017
224	18.67	0.10	0.026	(0.132)	0.009	0.017
225	18.75	0.10	0.026	(0.131)	0.009	0.017
226	18.83	0.07	0.017	(0.130)	0.006	0.011
227	18.92	0.07	0.017	(0.130)	0.006	0.011
228	19.00	0.07	0.017	(0.129)	0.006	0.011
229	19.08	0.10	0.026	(0.129)	0.009	0.017
230	19.17	0.10	0.026	(0.128)	0.009	0.017
231	19.25	0.10	0.026	(0.127)	0.009	0.017
232	19.33	0.13	0.034	(0.127)	0.012	0.022
233	19.42	0.13	0.034	(0.126)	0.012	0.022
234	19.50	0.13	0.034	(0.126)	0.012	0.022
235	19.58	0.10	0.026	(0.125)	0.009	0.017
236	19.67	0.10	0.026	(0.125)	0.009	0.017
237	19.75	0.10	0.026	(0.124)	0.009	0.017
238	19.83	0.07	0.017	(0.123)	0.006	0.011
239	19.92	0.07	0.017	(0.123)	0.006	0.011
240	20.00	0.07	0.017	(0.122)	0.006	0.011
241	20.08	0.10	0.026	(0.122)	0.009	0.017
242	20.17	0.10	0.026	(0.121)	0.009	0.017
243	20.25	0.10	0.026	(0.121)	0.009	0.017
244	20.33	0.10	0.026	(0.120)	0.009	0.017
245	20.42	0.10	0.026	(0.120)	0.009	0.017
246	20.50	0.10	0.026	(0.119)	0.009	0.017
247	20.58	0.10	0.026	(0.119)	0.009	0.017
248	20.67	0.10	0.026	(0.118)	0.009	0.017
249	20.75	0.10	0.026	(0.118)	0.009	0.017
250	20.83	0.07	0.017	(0.117)	0.006	0.011
251	20.92	0.07	0.017	(0.117)	0.006	0.011
252	21.00	0.07	0.017	(0.116)	0.006	0.011
253	21.08	0.10	0.026	(0.116)	0.009	0.017
254	21.17	0.10	0.026	(0.115)	0.009	0.017
255	21.25	0.10	0.026	(0.115)	0.009	0.017
256	21.33	0.07	0.017	(0.114)	0.006	0.011
257	21.42	0.07	0.017	(0.114)	0.006	0.011
258	21.50	0.07	0.017	(0.114)	0.006	0.011
259	21.58	0.10	0.026	(0.113)	0.009	0.017
260	21.67	0.10	0.026	(0.113)	0.009	0.017

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261  21.75     0.10      0.026       (  0.112)       0.009        0.017
262  21.83     0.07      0.017       (  0.112)       0.006        0.011
263  21.92     0.07      0.017       (  0.112)       0.006        0.011
264  22.00     0.07      0.017       (  0.111)       0.006        0.011
265  22.08     0.10      0.026       (  0.111)       0.009        0.017
266  22.17     0.10      0.026       (  0.110)       0.009        0.017
267  22.25     0.10      0.026       (  0.110)       0.009        0.017
268  22.33     0.07      0.017       (  0.110)       0.006        0.011
269  22.42     0.07      0.017       (  0.109)       0.006        0.011
270  22.50     0.07      0.017       (  0.109)       0.006        0.011
271  22.58     0.07      0.017       (  0.109)       0.006        0.011
272  22.67     0.07      0.017       (  0.108)       0.006        0.011
273  22.75     0.07      0.017       (  0.108)       0.006        0.011
274  22.83     0.07      0.017       (  0.108)       0.006        0.011
275  22.92     0.07      0.017       (  0.108)       0.006        0.011
276  23.00     0.07      0.017       (  0.107)       0.006        0.011
277  23.08     0.07      0.017       (  0.107)       0.006        0.011
278  23.17     0.07      0.017       (  0.107)       0.006        0.011
279  23.25     0.07      0.017       (  0.107)       0.006        0.011
280  23.33     0.07      0.017       (  0.106)       0.006        0.011
281  23.42     0.07      0.017       (  0.106)       0.006        0.011
282  23.50     0.07      0.017       (  0.106)       0.006        0.011
283  23.58     0.07      0.017       (  0.106)       0.006        0.011
284  23.67     0.07      0.017       (  0.106)       0.006        0.011
285  23.75     0.07      0.017       (  0.106)       0.006        0.011
286  23.83     0.07      0.017       (  0.105)       0.006        0.011
287  23.92     0.07      0.017       (  0.105)       0.006        0.011
288  24.00     0.07      0.017       (  0.105)       0.006        0.011
            (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    16.7
      Flood volume = Effective rainfall      1.39(In)
       times area      91.8(Ac.)/[(In)/(Ft.)] =      10.6(Ac.Ft)
      Total soil loss =      0.75(In)
      Total soil loss =     5.717(Ac.Ft)
      Total rainfall =      2.14(In)
      Flood volume =      462484.0 Cubic Feet
      Total soil loss =      249029.8 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     17.370(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
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   0+ 5       0.0012      0.18  Q          |         |         |         |
   0+10       0.0058      0.67  VQ         |         |         |         |
   0+15       0.0116      0.84  VQ         |         |         |         |
   0+20       0.0185      1.00  V Q        |         |         |         |
   0+25       0.0274      1.29  V Q        |         |         |         |
   0+30       0.0371      1.41  V Q        |         |         |         |
   0+35       0.0471      1.46  V Q        |         |         |         |
   0+40       0.0574      1.50  V Q        |         |         |         |
   0+45       0.0679      1.52  V  Q       |         |         |         |
   0+50       0.0791      1.62  V  Q       |         |         |         |
   0+55       0.0919      1.87  V  Q       |         |         |         |
   1+ 0       0.1054      1.96  V  Q       |         |         |         |
   1+ 5       0.1186      1.91  V  Q       |         |         |         |
   1+10       0.1302      1.69  V  Q       |         |         |         |
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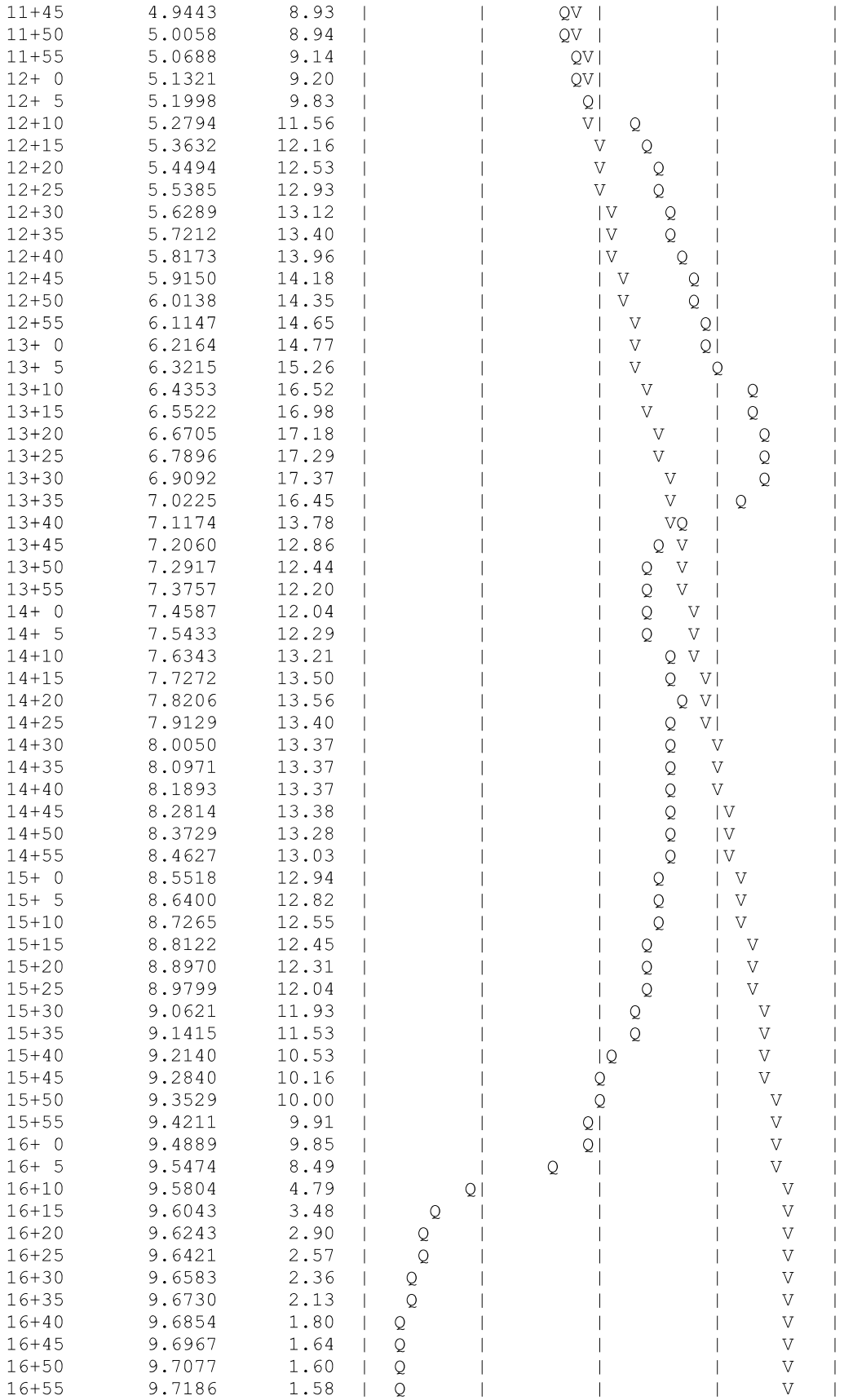
1+15       0.1414      1.62  V  Q       |          |          |          |
1+20       0.1523      1.59  V  Q       |          |          |          |
1+25       0.1631      1.57  V  Q       |          |          |          |
1+30       0.1739      1.56  V  Q       |          |          |          |
1+35       0.1846      1.55  V  Q       |          |          |          |
1+40       0.1952      1.55  V  Q       |          |          |          |
1+45       0.2058      1.54  V  Q       |          |          |          |
1+50       0.2170      1.63  V  Q       |          |          |          |
1+55       0.2300      1.87  V  Q       |          |          |          |
2+ 0       0.2435      1.96  V  Q       |          |          |          |
2+ 5       0.2572      2.00  V  Q       |          |          |          |
2+10       0.2711      2.02  |V  Q       |          |          |          |
2+15       0.2852      2.04  |V  Q       |          |          |          |
2+20       0.2992      2.04  |V  Q       |          |          |          |
2+25       0.3134      2.05  |V  Q       |          |          |          |
2+30       0.3275      2.06  |V  Q       |          |          |          |
2+35       0.3423      2.14  |V  Q       |          |          |          |
2+40       0.3587      2.39  |V  Q       |          |          |          |
2+45       0.3758      2.47  |V  Q       |          |          |          |
2+50       0.3931      2.51  |V   Q      |          |          |          |
2+55       0.4105      2.53  |V   Q      |          |          |          |
3+ 0       0.4281      2.55  |V   Q      |          |          |          |
3+ 5       0.4457      2.56  |V   Q      |          |          |          |
3+10       0.4634      2.56  |V   Q      |          |          |          |
3+15       0.4811      2.57  |V   Q      |          |          |          |
3+20       0.4988      2.57  |V   Q      |          |          |          |
3+25       0.5165      2.57  |V   Q      |          |          |          |
3+30       0.5341      2.57  | V  Q      |          |          |          |
3+35       0.5518      2.57  | V  Q      |          |          |          |
3+40       0.5695      2.57  | V  Q      |          |          |          |
3+45       0.5872      2.57  | V  Q      |          |          |          |
3+50       0.6055      2.66  | V  Q      |          |          |          |
3+55       0.6255      2.90  | V  Q      |          |          |          |
4+ 0       0.6461      2.99  | V  Q      |          |          |          |
4+ 5       0.6670      3.03  | V   Q     |          |          |          |
4+10       0.6879      3.05  | V   Q     |          |          |          |
4+15       0.7090      3.06  | V   Q     |          |          |          |
4+20       0.7308      3.16  | V   Q     |          |          |          |
4+25       0.7543      3.41  | V   Q     |          |          |          |
4+30       0.7784      3.50  | V    Q    |          |          |          |
4+35       0.8028      3.54  |  V   Q    |          |          |          |
4+40       0.8273      3.56  |  V   Q    |          |          |          |
4+45       0.8520      3.58  |  V   Q    |          |          |          |
4+50       0.8773      3.67  |  V   Q    |          |          |          |
4+55       0.9043      3.92  |  V   Q    |          |          |          |
5+ 0       0.9320      4.02  |  V    Q   |          |          |          |
5+ 5       0.9587      3.88  |  V   Q    |          |          |          |
5+10       0.9822      3.41  |  V  Q     |          |          |          |
5+15       1.0046      3.25  |  V  Q     |          |          |          |
5+20       1.0271      3.27  |  V  Q     |          |          |          |
5+25       1.0511      3.48  |  V  Q     |          |          |          |
5+30       1.0755      3.54  |   V  Q    |          |          |          |
5+35       1.1006      3.65  |   V  Q    |          |          |          |
5+40       1.1275      3.91  |   V  Q    |          |          |          |
5+45       1.1550      4.00  |   V  Q    |          |          |          |
5+50       1.1829      4.04  |   V   Q   |          |          |          |
5+55       1.2109      4.07  |   V   Q   |          |          |          |
6+ 0       1.2391      4.09  |   V   Q   |          |          |          |
6+ 5       1.2679      4.19  |   V   Q   |          |          |          |
6+10       1.2985      4.44  |   V   Q   |          |          |          |
6+15       1.3297      4.53  |    V   Q  |          |          |          |
6+20       1.3612      4.57  |    V   Q  |          |          |          |
6+25       1.3928      4.59  |    V   Q  |          |          |          |
```

6+30	1.4245	4.60	| V Q|	|	|	|
6+35	1.4569	4.70	| V Q|	|	|	|
6+40	1.4910	4.95	| V Q|	|	|	|
6+45	1.5257	5.04	| V Q	|	|	|
6+50	1.5607	5.08	| V Q	|	|	|
6+55	1.5959	5.10	| V Q	|	|	|
7+ 0	1.6311	5.12	| V Q	|	|	|
7+ 5	1.6664	5.13	| V Q	|	|	|
7+10	1.7018	5.13	| V Q	|	|	|
7+15	1.7372	5.14	| V Q	|	|	|
7+20	1.7732	5.23	| V Q	|	|	|
7+25	1.8109	5.47	| V Q	|	|	|
7+30	1.8491	5.56	| V |Q	|	|	|
7+35	1.8883	5.68	| V |Q	|	|	|
7+40	1.9293	5.95	| V |Q	|	|	|
7+45	1.9709	6.05	| V | Q	|	|	|
7+50	2.0136	6.19	| V | Q	|	|	|
7+55	2.0580	6.46	| V | Q	|	|	|
8+ 0	2.1033	6.57	| V | Q	|	|	|
8+ 5	2.1500	6.79	| V | Q	|	|	|
8+10	2.2003	7.31	| V | Q	|	|	|
8+15	2.2520	7.50	| V | Q	|	|	|
8+20	2.3042	7.58	| V | Q	|	|	|
8+25	2.3568	7.63	| V | Q	|	|	|
8+30	2.4096	7.67	| V| Q	|	|	|
8+35	2.4631	7.77	| V| Q	|	|	|
8+40	2.5184	8.03	| V| Q	|	|	|
8+45	2.5744	8.13	| V| Q	|	|	|
8+50	2.6312	8.25	| V| Q	|	|	|
8+55	2.6899	8.52	| V Q	|	|	|
9+ 0	2.7493	8.62	| V Q	|	|	|
9+ 5	2.8102	8.84	| V Q	|	|	|
9+10	2.8747	9.36	| V Q	|	|	|
9+15	2.9405	9.55	| |V Q|	|	|	|
9+20	3.0075	9.73	| |V Q|	|	|	|
9+25	3.0765	10.02	| |V Q	|	|	|
9+30	3.1463	10.14	| |V Q	|	|	|
9+35	3.2172	10.29	| | V Q	|	|	|
9+40	3.2899	10.57	| | V |Q	|	|	|
9+45	3.3635	10.68	| | V |Q	|	|	|
9+50	3.4379	10.81	| | V |Q	|	|	|
9+55	3.5143	11.08	| | V | Q	|	|	|
10+ 0	3.5913	11.19	| | V | Q	|	|	|
10+ 5	3.6645	10.62	| | V |Q	|	|	|
10+10	3.7260	8.94	| | V Q	|	|	|
10+15	3.7835	8.35	| | V Q	|	|	|
10+20	3.8393	8.09	| | V Q	|	|	|
10+25	3.8940	7.94	| | VQ	|	|	|
10+30	3.9481	7.85	| | VQ	|	|	|
10+35	4.0047	8.23	| | VQ	|	|	|
10+40	4.0695	9.41	| | V Q	|	|	|
10+45	4.1370	9.80	| | V Q|	|	|	|
10+50	4.2059	9.99	| | V Q|	|	|	|
10+55	4.2755	10.10	| | V Q	|	|	|
11+ 0	4.3455	10.18	| | V Q	|	|	|
11+ 5	4.4153	10.13	| | V Q	|	|	|
11+10	4.4836	9.92	| | V Q|	|	|	|
11+15	4.5515	9.86	| | V Q|	|	|	|
11+20	4.6192	9.82	| | V Q|	|	|	|
11+25	4.6866	9.80	| | V Q|	|	|	|
11+30	4.7540	9.78	| | V Q|	|	|	|
11+35	4.8201	9.60	| | VQ|	|	|	|
11+40	4.8828	9.10	| | Q |	|	|	|



11+45	4.9443	8.93	|	|	QV |	|	|	|	|
11+50	5.0058	8.94	|	|	QV |	|	|	|	|
11+55	5.0688	9.14	|	|	QV|	|	|	|	|
12+ 0	5.1321	9.20	|	|	QV|	|	|	|	|
12+ 5	5.1998	9.83	|	|	Q|	|	|	|	|
12+10	5.2794	11.56	|	|	V| Q	|	|	|	|
12+15	5.3632	12.16	|	|	V Q	|	|	|	|
12+20	5.4494	12.53	|	|	V Q	|	|	|	|
12+25	5.5385	12.93	|	|	V Q	|	|	|	|
12+30	5.6289	13.12	|	|	|V Q	|	|	|	|
12+35	5.7212	13.40	|	|	|V Q	|	|	|	|
12+40	5.8173	13.96	|	|	|V Q	|	|	|	|
12+45	5.9150	14.18	|	|	| V Q	|	|	|	|
12+50	6.0138	14.35	|	|	| V Q	|	|	|	|
12+55	6.1147	14.65	|	|	| V Q|	|	|	|	|
13+ 0	6.2164	14.77	|	|	| V Q|	|	|	|	|
13+ 5	6.3215	15.26	|	|	| V Q	|	|	|	|
13+10	6.4353	16.52	|	|	| V | Q	|	|	|	|
13+15	6.5522	16.98	|	|	| V | Q	|	|	|	|
13+20	6.6705	17.18	|	|	| V | Q	|	|	|	|
13+25	6.7896	17.29	|	|	| V | Q	|	|	|	|
13+30	6.9092	17.37	|	|	| V | Q	|	|	|	|
13+35	7.0225	16.45	|	|	| V | Q	|	|	|	|
13+40	7.1174	13.78	|	|	| VQ |	|	|	|	|
13+45	7.2060	12.86	|	|	| Q V |	|	|	|	|
13+50	7.2917	12.44	|	|	| Q V |	|	|	|	|
13+55	7.3757	12.20	|	|	| Q V |	|	|	|	|
14+ 0	7.4587	12.04	|	|	| Q V |	|	|	|	|
14+ 5	7.5433	12.29	|	|	| Q V |	|	|	|	|
14+10	7.6343	13.21	|	|	| Q V |	|	|	|	|
14+15	7.7272	13.50	|	|	| Q V|	|	|	|	|
14+20	7.8206	13.56	|	|	| Q V|	|	|	|	|
14+25	7.9129	13.40	|	|	| Q V|	|	|	|	|
14+30	8.0050	13.37	|	|	| Q V	|	|	|	|
14+35	8.0971	13.37	|	|	| Q V	|	|	|	|
14+40	8.1893	13.37	|	|	| Q V	|	|	|	|
14+45	8.2814	13.38	|	|	| Q |V	|	|	|	|
14+50	8.3729	13.28	|	|	| Q |V	|	|	|	|
14+55	8.4627	13.03	|	|	| Q |V	|	|	|	|
15+ 0	8.5518	12.94	|	|	| Q | V	|	|	|	|
15+ 5	8.6400	12.82	|	|	| Q | V	|	|	|	|
15+10	8.7265	12.55	|	|	| Q | V	|	|	|	|
15+15	8.8122	12.45	|	|	| Q | V	|	|	|	|
15+20	8.8970	12.31	|	|	| Q | V	|	|	|	|
15+25	8.9799	12.04	|	|	| Q | V	|	|	|	|
15+30	9.0621	11.93	|	|	| Q | V	|	|	|	|
15+35	9.1415	11.53	|	|	| Q | V	|	|	|	|
15+40	9.2140	10.53	|	|	|Q | V	|	|	|	|
15+45	9.2840	10.16	|	|	Q | V	|	|	|	|
15+50	9.3529	10.00	|	|	Q | V	|	|	|	|
15+55	9.4211	9.91	|	|	Q| V	|	|	|	|
16+ 0	9.4889	9.85	|	|	Q| V	|	|	|	|
16+ 5	9.5474	8.49	|	| Q	| V	|	|	|	|
16+10	9.5804	4.79	| Q|	| V	|	|	| V	|
16+15	9.6043	3.48	| Q	| V	|	|	| V	|
16+20	9.6243	2.90	| Q	| V	|	|	| V	|
16+25	9.6421	2.57	| Q	| V	|	|	| V	|
16+30	9.6583	2.36	| Q	| V	|	|	| V	|
16+35	9.6730	2.13	| Q	| V	|	|	| V	|
16+40	9.6854	1.80	| Q	| V	|	|	| V	|
16+45	9.6967	1.64	| Q	| V	|	|	| V	|
16+50	9.7077	1.60	| Q	| V	|	|	| V	|
16+55	9.7186	1.58	| Q	| V	|	|	| V	|

17+ 0	9.7293	1.56	Q				V
17+ 5	9.7412	1.73	Q				V
17+10	9.7565	2.21	Q				V
17+15	9.7728	2.38	Q				V
17+20	9.7898	2.46	Q				V
17+25	9.8070	2.50	Q				V
17+30	9.8244	2.53	Q				V
17+35	9.8419	2.55	Q				V
17+40	9.8596	2.56	Q				V
17+45	9.8773	2.57	Q				V
17+50	9.8943	2.48	Q				V
17+55	9.9098	2.24	Q				V
18+ 0	9.9246	2.15	Q				V
18+ 5	9.9391	2.11	Q				V
18+10	9.9535	2.09	Q				V
18+15	9.9678	2.08	Q				V
18+20	9.9820	2.07	Q				V
18+25	9.9962	2.06	Q				V
18+30	10.0104	2.06	Q				V
18+35	10.0239	1.97	Q				V
18+40	10.0358	1.72	Q				V
18+45	10.0471	1.64	Q				V
18+50	10.0575	1.51	Q				V
18+55	10.0660	1.24	Q				V
19+ 0	10.0739	1.14	Q				V
19+ 5	10.0820	1.18	Q				V
19+10	10.0917	1.40	Q				V
19+15	10.1018	1.47	Q				V
19+20	10.1127	1.58	Q				V
19+25	10.1254	1.85	Q				V
19+30	10.1388	1.94	Q				V
19+35	10.1519	1.90	Q				V
19+40	10.1635	1.68	Q				V
19+45	10.1746	1.62	Q				V
19+50	10.1849	1.50	Q				V
19+55	10.1934	1.24	Q				V
20+ 0	10.2013	1.14	Q				V
20+ 5	10.2095	1.18	Q				V
20+10	10.2191	1.40	Q				V
20+15	10.2292	1.47	Q				V
20+20	10.2395	1.50	Q				V
20+25	10.2499	1.51	Q				V
20+30	10.2604	1.52	Q				V
20+35	10.2709	1.53	Q				V
20+40	10.2815	1.54	Q				V
20+45	10.2921	1.54	Q				V
20+50	10.3021	1.45	Q				V
20+55	10.3105	1.21	Q				V
21+ 0	10.3182	1.12	Q				V
21+ 5	10.3263	1.17	Q				V
21+10	10.3359	1.40	Q				V
21+15	10.3460	1.47	Q				V
21+20	10.3557	1.41	Q				V
21+25	10.3638	1.18	Q				V
21+30	10.3714	1.10	Q				V
21+35	10.3794	1.16	Q				V
21+40	10.3890	1.39	Q				V
21+45	10.3991	1.47	Q				V
21+50	10.4088	1.41	Q				V
21+55	10.4169	1.18	Q				V
22+ 0	10.4245	1.10	Q				V
22+ 5	10.4325	1.16	Q				V
22+10	10.4421	1.39	Q				V

22+15	10.4522	1.47	| Q	|	|	|	V|
22+20	10.4619	1.41	| Q	|	|	|	V|
22+25	10.4700	1.18	| Q	|	|	|	V|
22+30	10.4776	1.10	| Q	|	|	|	V|
22+35	10.4850	1.07	| Q	|	|	|	V|
22+40	10.4922	1.06	| Q	|	|	|	V|
22+45	10.4995	1.05	| Q	|	|	|	V|
22+50	10.5066	1.04	| Q	|	|	|	V|
22+55	10.5137	1.03	| Q	|	|	|	V|
23+ 0	10.5208	1.03	| Q	|	|	|	V|
23+ 5	10.5279	1.03	| Q	|	|	|	V|
23+10	10.5350	1.03	| Q	|	|	|	V|
23+15	10.5420	1.03	| Q	|	|	|	V|
23+20	10.5491	1.03	| Q	|	|	|	V|
23+25	10.5562	1.03	| Q	|	|	|	V|
23+30	10.5633	1.03	| Q	|	|	|	V|
23+35	10.5704	1.03	| Q	|	|	|	V|
23+40	10.5774	1.03	| Q	|	|	|	V|
23+45	10.5845	1.03	| Q	|	|	|	V|
23+50	10.5916	1.03	| Q	|	|	|	V|
23+55	10.5987	1.03	| Q	|	|	|	V|
24+ 0	10.6057	1.03	| Q	|	|	|	V|
24+ 5	10.6116	0.85	|Q	|	|	|	V|
24+10	10.6141	0.36	Q	|	|	|	V|
24+15	10.6154	0.19	Q	|	|	|	V|
24+20	10.6162	0.11	Q	|	|	|	V|
24+25	10.6167	0.07	Q	|	|	|	V|
24+30	10.6169	0.04	Q	|	|	|	V|
24+35	10.6171	0.02	Q	|	|	|	V|
24+40	10.6172	0.01	Q	|	|	|	V

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc10pr110.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
10-year 1-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.50                45.90

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.20               110.16

STORM EVENT (YEAR) =   10.00
```

```
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    0.788(In)
Areal adjustment factor =   99.92 %
Adjusted average point rain =    0.787(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  69.0      0.373     0.050         0.356        0.058      0.021
69.0  69.0      0.373     0.075         0.348        0.080      0.028
72.0  72.0      0.338     0.750         0.110        0.668      0.073
72.3  72.3      0.335     0.900         0.064        0.195      0.012
                                                   Sum (F) =   0.134
Area averaged mean soil loss (F) (In/Hr) =  0.134
Minimum soil loss rate ((In/Hr)) =  0.067
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5500
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133            15.851
    2   0.167        186.412         47.639            44.074
    3   0.250        279.618         16.784            15.528
    4   0.333        372.824          7.446             6.889
    5   0.417        466.031          4.270             3.950
    6   0.500        559.237          2.755             2.549
    7   0.583        652.443          1.819             1.683
    8   0.667        745.649          1.144             1.059
    9   0.750        838.855          1.010             0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
    1   0.08     3.30      0.312       (  0.134)       0.109        0.203
    2   0.17     4.20      0.397          0.134    (  0.139)        0.263
    3   0.25     4.40      0.416          0.134    (  0.145)        0.282
    4   0.33     4.80      0.454          0.134    (  0.159)        0.319
    5   0.42     5.20      0.491          0.134    (  0.172)        0.357
    6   0.50     6.20      0.586          0.134    (  0.205)        0.452
```

```
  7   0.58     6.80      0.642          0.134    (  0.225)        0.508
  8   0.67     8.80      0.831          0.134    (  0.291)        0.697
  9   0.75    13.90      1.313          0.134    (  0.460)        1.179
 10   0.83    31.40      2.967          0.134    (  1.038)        2.833
 11   0.92     7.20      0.680          0.134    (  0.238)        0.546
 12   1.00     3.80      0.359       (  0.134)       0.126        0.233
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =     7.9
      Flood volume = Effective rainfall      0.66(In)
       times area      91.8(Ac.)/[(In)/(Ft.)] =       5.0(Ac.Ft)
      Total soil loss =      0.13(In)
      Total soil loss =     1.004(Ac.Ft)
      Total rainfall =      0.79(In)
      Flood volume =      218621.8 Cubic Feet
      Total soil loss =       43743.3 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    161.063(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          1 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
  ------------------------------------------------------------------------
    0+ 5       0.0221      3.21  Q         |         |         |         |
    0+10       0.1124     13.10  V Q       |         |         |         |
    0+15       0.2446     19.20  |V Q      |         |         |         |
    0+20       0.4028     22.97  |  VQ     |         |         |         |
    0+25       0.5870     26.74  |   VQ    |         |         |         |
    0+30       0.8031     31.38  |     Q   |         |         |         |
    0+35       1.0638     37.86  |      QV |         |         |         |
    0+40       1.3778     45.60  |        QV         |         |         |
    0+45       1.8161     63.63  |         | Q V     |         |         |
    0+50       2.6084    115.04  |         |        V  Q       |         |
    0+55       3.7176    161.06  |         |         |       V| Q       |
    1+ 0       4.3059     85.41  |         |      Q  |         |   V     |
    1+ 5       4.6255     46.41  |        Q|         |         |     V   |
    1+10       4.7889     23.73  |   Q     |         |         |       V |
    1+15       4.8866     14.19  | Q       |         |         |       V |
    1+20       4.9485      8.99  |Q        |         |         |        V|
    1+25       4.9872      5.62  |Q        |         |         |        V|
    1+30       5.0121      3.62  Q         |         |         |        V|
    1+35       5.0174      0.76  Q         |         |         |        V|
    1+40       5.0189      0.22  Q         |         |         |         V
------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc10pr310.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
10-year 3-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.77                70.69

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.77               162.49

STORM EVENT (YEAR) =   10.00
```

```
Area Averaged 2-Year Rainfall =    0.770(In)
Area Averaged 100-Year Rainfall =    1.770(In)

Point rain (area averaged) =    1.181(In)
Areal adjustment factor =   99.96 %
Adjusted average point rain =    1.181(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  69.0      0.373     0.050         0.356        0.058      0.021
69.0  69.0      0.373     0.075         0.348        0.080      0.028
72.0  72.0      0.338     0.750         0.110        0.668      0.073
72.3  72.3      0.335     0.900         0.064        0.195      0.012
                                                   Sum (F) =   0.134
Area averaged mean soil loss (F) (In/Hr) =  0.134
Minimum soil loss rate ((In/Hr)) =  0.067
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     1.30      0.184       (  0.134)       0.064        0.120
  2   0.17     1.30      0.184       (  0.134)       0.064        0.120
  3   0.25     1.10      0.156       (  0.134)       0.055        0.101
  4   0.33     1.50      0.213       (  0.134)       0.074        0.138
  5   0.42     1.50      0.213       (  0.134)       0.074        0.138
  6   0.50     1.80      0.255       (  0.134)       0.089        0.166
  7   0.58     1.50      0.213       (  0.134)       0.074        0.138
  8   0.67     1.80      0.255       (  0.134)       0.089        0.166
```

```
 9   0.75     1.80      0.255       (  0.134)       0.089        0.166
10   0.83     1.50      0.213       (  0.134)       0.074        0.138
11   0.92     1.60      0.227       (  0.134)       0.079        0.147
12   1.00     1.80      0.255       (  0.134)       0.089        0.166
13   1.08     2.20      0.312       (  0.134)       0.109        0.203
14   1.17     2.20      0.312       (  0.134)       0.109        0.203
15   1.25     2.20      0.312       (  0.134)       0.109        0.203
16   1.33     2.00      0.283       (  0.134)       0.099        0.184
17   1.42     2.60      0.368       (  0.134)       0.129        0.239
18   1.50     2.70      0.383       (  0.134)       0.134        0.249
19   1.58     2.40      0.340       (  0.134)       0.119        0.221
20   1.67     2.70      0.383       (  0.134)       0.134        0.249
21   1.75     3.30      0.468          0.134    (  0.164)        0.334
22   1.83     3.10      0.439          0.134    (  0.154)        0.305
23   1.92     2.90      0.411          0.134    (  0.144)        0.277
24   2.00     3.00      0.425          0.134    (  0.149)        0.291
25   2.08     3.10      0.439          0.134    (  0.154)        0.305
26   2.17     4.20      0.595          0.134    (  0.208)        0.461
27   2.25     5.00      0.709          0.134    (  0.248)        0.575
28   2.33     3.50      0.496          0.134    (  0.174)        0.362
29   2.42     6.80      0.964          0.134    (  0.337)        0.830
30   2.50     7.30      1.034          0.134    (  0.362)        0.900
31   2.58     8.20      1.162          0.134    (  0.407)        1.028
32   2.67     5.90      0.836          0.134    (  0.293)        0.702
33   2.75     2.00      0.283       (  0.134)       0.099        0.184
34   2.83     1.80      0.255       (  0.134)       0.089        0.166
35   2.92     1.80      0.255       (  0.134)       0.089        0.166
36   3.00     0.60      0.085       (  0.134)       0.030        0.055
           (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    10.4
     Flood volume = Effective rainfall      0.87(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       6.6(Ac.Ft)
     Total soil loss =      0.31(In)
     Total soil loss =     2.407(Ac.Ft)
     Total rainfall =      1.18(In)
     Flood volume =      288669.0 Cubic Feet
     Total soil loss =      104858.2 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     80.440(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       22.5      45.0      67.5      90.0
-------------------------------------------------------------------------
  0+ 5       0.0131      1.90  Q         |         |         |         |
  0+10       0.0625      7.18  V  Q      |         |         |         |
  0+15       0.1228      8.75  V  Q      |         |         |         |
  0+20       0.1871      9.35  |V  Q     |         |         |         |
  0+25       0.2640     11.16  |V  Q     |         |         |         |
  0+30       0.3490     12.35  | V  Q    |         |         |         |
  0+35       0.4420     13.51  | V   Q   |         |         |         |
  0+40       0.5342     13.38  |  V Q    |         |         |         |
  0+45       0.6343     14.54  |  V  Q   |         |         |         |
  0+50       0.7341     14.49  |   V Q   |         |         |         |
  0+55       0.8277     13.59  |   V Q   |         |         |         |
  1+ 0       0.9240     13.98  |    VQ   |         |         |         |
  1+ 5       1.0300     15.38  |     Q   |         |         |         |
  1+10       1.1490     17.29  |     VQ  |         |         |         |
```

```
    1+15       1.2727     17.96  |      Q  |          |          |          |
    1+20       1.3967     18.00  |      QV |          |          |          |
    1+25       1.5223     18.24  |       QV|          |          |          |
    1+30       1.6645     20.65  |        QV          |          |          |
    1+35       1.8121     21.44  |        QV          |          |          |
    1+40       1.9579     21.16  |        Q|V         |          |          |
    1+45       2.1202     23.57  |         Q V        |          |          |
    1+50       2.3079     27.25  |          | QV      |          |          |
    1+55       2.4941     27.05  |          | Q  V    |          |          |
    2+ 0       2.6750     26.26  |          |Q    V   |          |          |
    2+ 5       2.8602     26.90  |          |Q     V  |          |          |
    2+10       3.0678     30.15  |          |  Q    V |          |          |
    2+15       3.3371     39.10  |          |       Q  V         |          |
    2+20       3.6353     43.30  |          |         Q|V        |          |
    2+25       3.9402     44.27  |          |          Q|  V     |          |
    2+30       4.3818     64.12  |          |           |     V Q |          |
    2+35       4.9047     75.92  |          |           |        V|  Q       |
    2+40       5.4587     80.44  |          |           |         | V  Q     |
    2+45       5.8857     62.00  |          |           |       Q |    V     |
    2+50       6.1341     36.07  |          |     Q     |         |      V   |
    2+55       6.3154     26.32  |          |Q          |         |       V  |
    3+ 0       6.4542     20.16  |        Q |           |         |       V  |
    3+ 5       6.5378     12.13  |    Q     |           |         |         V|
    3+10       6.5808      6.24  | Q        |           |         |         V|
    3+15       6.6047      3.47  |Q         |           |         |         V|
    3+20       6.6169      1.77  Q          |           |         |         V|
    3+25       6.6222      0.77  Q          |           |         |         V|
    3+30       6.6251      0.42  Q          |           |         |         V|
    3+35       6.6266      0.21  Q          |           |         |         V|
    3+40       6.6269      0.05  Q          |           |         |         V|
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydc10pr610.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
10-year 6-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.95                87.21

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          2.45               224.91

STORM EVENT (YEAR) =   10.00
```

```
Area Averaged 2-Year Rainfall =    0.950(In)
Area Averaged 100-Year Rainfall =    2.450(In)

Point rain (area averaged) =    1.567(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    1.567(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  69.0      0.373     0.050         0.356        0.058      0.021
69.0  69.0      0.373     0.075         0.348        0.080      0.028
72.0  72.0      0.338     0.750         0.110        0.668      0.073
72.3  72.3      0.335     0.900         0.064        0.195      0.012
                                                   Sum (F) =   0.134
Area averaged mean soil loss (F) (In/Hr) =  0.134
Minimum soil loss rate ((In/Hr)) =  0.067
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

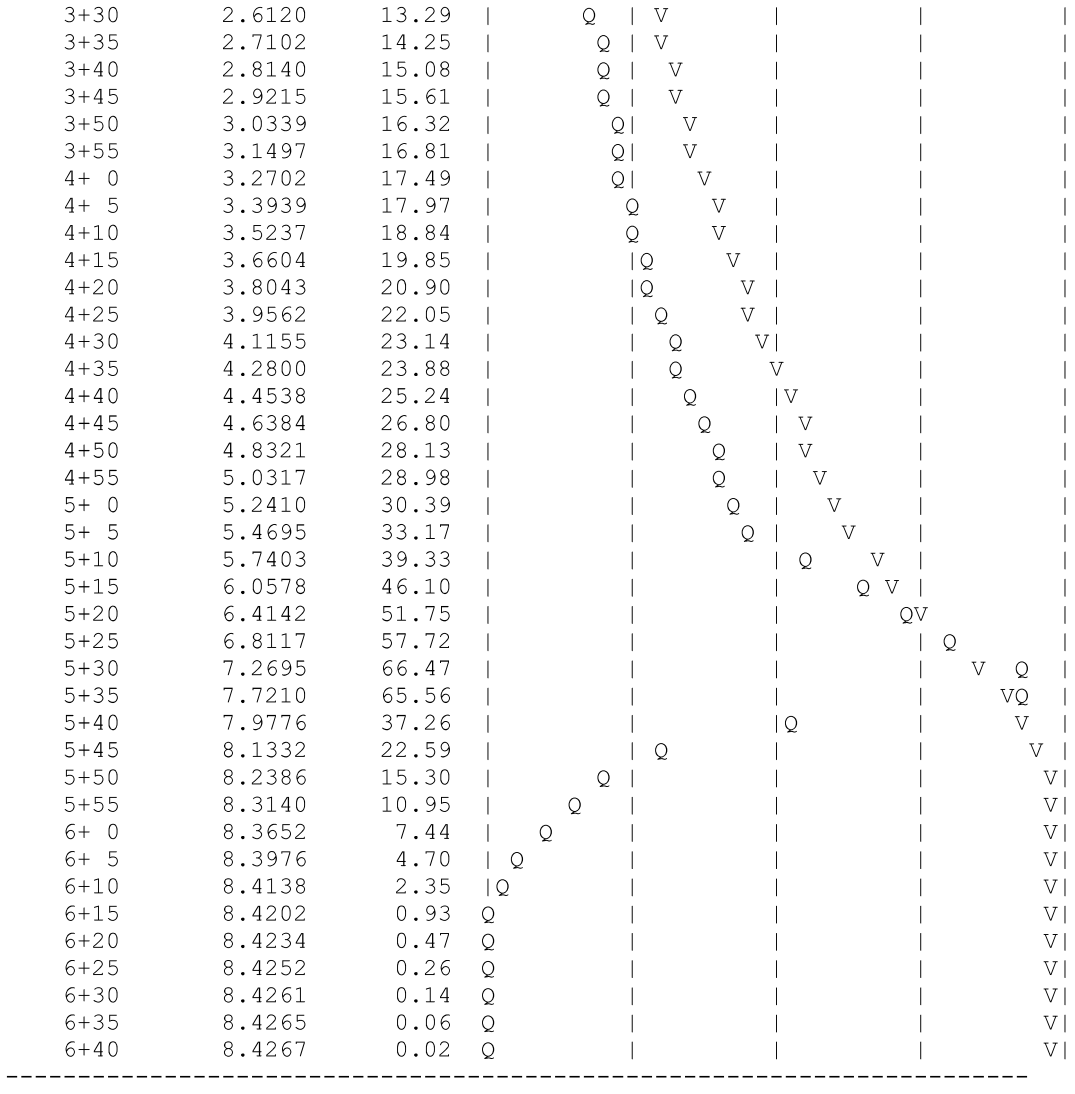
 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.50      0.094       (  0.134)       0.033        0.061
  2   0.17     0.60      0.113       (  0.134)       0.039        0.073
  3   0.25     0.60      0.113       (  0.134)       0.039        0.073
  4   0.33     0.60      0.113       (  0.134)       0.039        0.073
  5   0.42     0.60      0.113       (  0.134)       0.039        0.073
  6   0.50     0.70      0.132       (  0.134)       0.046        0.086
  7   0.58     0.70      0.132       (  0.134)       0.046        0.086
  8   0.67     0.70      0.132       (  0.134)       0.046        0.086
```

9	0.75	0.70	0.132	(0.134)	0.046	0.086
10	0.83	0.70	0.132	(0.134)	0.046	0.086
11	0.92	0.70	0.132	(0.134)	0.046	0.086
12	1.00	0.80	0.150	(0.134)	0.053	0.098
13	1.08	0.80	0.150	(0.134)	0.053	0.098
14	1.17	0.80	0.150	(0.134)	0.053	0.098
15	1.25	0.80	0.150	(0.134)	0.053	0.098
16	1.33	0.80	0.150	(0.134)	0.053	0.098
17	1.42	0.80	0.150	(0.134)	0.053	0.098
18	1.50	0.80	0.150	(0.134)	0.053	0.098
19	1.58	0.80	0.150	(0.134)	0.053	0.098
20	1.67	0.80	0.150	(0.134)	0.053	0.098
21	1.75	0.80	0.150	(0.134)	0.053	0.098
22	1.83	0.80	0.150	(0.134)	0.053	0.098
23	1.92	0.80	0.150	(0.134)	0.053	0.098
24	2.00	0.90	0.169	(0.134)	0.059	0.110
25	2.08	0.80	0.150	(0.134)	0.053	0.098
26	2.17	0.90	0.169	(0.134)	0.059	0.110
27	2.25	0.90	0.169	(0.134)	0.059	0.110
28	2.33	0.90	0.169	(0.134)	0.059	0.110
29	2.42	0.90	0.169	(0.134)	0.059	0.110
30	2.50	0.90	0.169	(0.134)	0.059	0.110
31	2.58	0.90	0.169	(0.134)	0.059	0.110
32	2.67	0.90	0.169	(0.134)	0.059	0.110
33	2.75	1.00	0.188	(0.134)	0.066	0.122
34	2.83	1.00	0.188	(0.134)	0.066	0.122
35	2.92	1.00	0.188	(0.134)	0.066	0.122
36	3.00	1.00	0.188	(0.134)	0.066	0.122
37	3.08	1.00	0.188	(0.134)	0.066	0.122
38	3.17	1.10	0.207	(0.134)	0.072	0.134
39	3.25	1.10	0.207	(0.134)	0.072	0.134
40	3.33	1.10	0.207	(0.134)	0.072	0.134
41	3.42	1.20	0.226	(0.134)	0.079	0.147
42	3.50	1.30	0.244	(0.134)	0.086	0.159
43	3.58	1.40	0.263	(0.134)	0.092	0.171
44	3.67	1.40	0.263	(0.134)	0.092	0.171
45	3.75	1.50	0.282	(0.134)	0.099	0.183
46	3.83	1.50	0.282	(0.134)	0.099	0.183
47	3.92	1.60	0.301	(0.134)	0.105	0.196
48	4.00	1.60	0.301	(0.134)	0.105	0.196
49	4.08	1.70	0.320	(0.134)	0.112	0.208
50	4.17	1.80	0.338	(0.134)	0.118	0.220
51	4.25	1.90	0.357	(0.134)	0.125	0.232
52	4.33	2.00	0.376	(0.134)	0.132	0.244
53	4.42	2.10	0.395	0.134	(0.138)	0.261
54	4.50	2.10	0.395	0.134	(0.138)	0.261
55	4.58	2.20	0.414	0.134	(0.145)	0.280
56	4.67	2.30	0.432	0.134	(0.151)	0.298
57	4.75	2.40	0.451	0.134	(0.158)	0.317
58	4.83	2.40	0.451	0.134	(0.158)	0.317
59	4.92	2.50	0.470	0.134	(0.164)	0.336
60	5.00	2.60	0.489	0.134	(0.171)	0.355
61	5.08	3.10	0.583	0.134	(0.204)	0.449
62	5.17	3.60	0.677	0.134	(0.237)	0.543
63	5.25	3.90	0.733	0.134	(0.257)	0.599
64	5.33	4.20	0.790	0.134	(0.276)	0.656
65	5.42	4.70	0.884	0.134	(0.309)	0.750
66	5.50	5.60	1.053	0.134	(0.368)	0.919
67	5.58	1.90	0.357	(0.134)	0.125	0.232
68	5.67	0.90	0.169	(0.134)	0.059	0.110
69	5.75	0.60	0.113	(0.134)	0.039	0.073
70	5.83	0.50	0.094	(0.134)	0.033	0.061
71	5.92	0.30	0.056	(0.134)	0.020	0.037

```
72   6.00     0.20      0.038       (  0.134)       0.013        0.024
           (Loss Rate Not Used)
   Sum =     100.0                                   Sum =    13.2
     Flood volume = Effective rainfall      1.10(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       8.4(Ac.Ft)
     Total soil loss =      0.47(In)
     Total soil loss =     3.558(Ac.Ft)
     Total rainfall =      1.57(In)
     Flood volume =      367067.3 Cubic Feet
     Total soil loss =      154983.0 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     66.475(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          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   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       17.5      35.0      52.5      70.0
-------------------------------------------------------------------------
  0+ 5       0.0067      0.97  Q          |         |         |         |
  0+10       0.0332      3.86  V Q        |         |         |         |
  0+15       0.0700      5.35  V  Q       |         |         |         |
  0+20       0.1111      5.96  V  Q       |         |         |         |
  0+25       0.1543      6.28  V  Q       |         |         |         |
  0+30       0.2003      6.68  V  Q       |         |         |         |
  0+35       0.2510      7.35  |V  Q      |         |         |         |
  0+40       0.3035      7.63  |V  Q      |         |         |         |
  0+45       0.3571      7.78  |V  Q      |         |         |         |
  0+50       0.4111      7.84  |V  Q      |         |         |         |
  0+55       0.4653      7.87  | V Q      |         |         |         |
  1+ 0       0.5210      8.09  | V Q      |         |         |         |
  1+ 5       0.5805      8.64  | V Q      |         |         |         |
  1+10       0.6414      8.84  |  V Q     |         |         |         |
  1+15       0.7029      8.92  |  V Q     |         |         |         |
  1+20       0.7647      8.97  |  V Q     |         |         |         |
  1+25       0.8267      9.00  |  V Q     |         |         |         |
  1+30       0.8888      9.02  |   VQ     |         |         |         |
  1+35       0.9511      9.04  |   VQ     |         |         |         |
  1+40       1.0134      9.05  |   VQ     |         |         |         |
  1+45       1.0757      9.05  |    Q     |         |         |         |
  1+50       1.1380      9.05  |    Q     |         |         |         |
  1+55       1.2003      9.05  |    Q     |         |         |         |
  2+ 0       1.2640      9.24  |    Q     |         |         |         |
  2+ 5       1.3300      9.59  |    QV    |         |         |         |
  2+10       1.3950      9.43  |    QV    |         |         |         |
  2+15       1.4629      9.87  |    QV    |         |         |         |
  2+20       1.5319     10.02  |    Q V   |         |         |         |
  2+25       1.6014     10.09  |    Q V   |         |         |         |
  2+30       1.6711     10.12  |    Q V   |         |         |         |
  2+35       1.7410     10.15  |    Q  V  |         |         |         |
  2+40       1.8111     10.17  |    Q  V  |         |         |         |
  2+45       1.8824     10.36  |    Q  V  |         |         |         |
  2+50       1.9576     10.91  |     Q  V|         |         |         |
  2+55       2.0340     11.10  |     Q  V|         |         |         |
  3+ 0       2.1111     11.19  |     Q   V         |         |         |
  3+ 5       2.1885     11.23  |     Q   V         |         |         |
  3+10       2.2674     11.46  |     Q   V         |         |         |
  3+15       2.3502     12.02  |     Q   |V        |         |         |
  3+20       2.4343     12.22  |     Q   |V        |         |         |
  3+25       2.5205     12.51  |      Q  |V        |         |         |
```


3+30 2.6120 13.29
3+35 2.7102 14.25
3+40 2.8140 15.08
3+45 2.9215 15.61
3+50 3.0339 16.32
3+55 3.1497 16.81
4+ 0 3.2702 17.49
4+ 5 3.3939 17.97
4+10 3.5237 18.84
4+15 3.6604 19.85
4+20 3.8043 20.90
4+25 3.9562 22.05
4+30 4.1155 23.14
4+35 4.2800 23.88
4+40 4.4538 25.24
4+45 4.6384 26.80
4+50 4.8321 28.13
4+55 5.0317 28.98
5+ 0 5.2410 30.39
5+ 5 5.4695 33.17
5+10 5.7403 39.33
5+15 6.0578 46.10
5+20 6.4142 51.75
5+25 6.8117 57.72
5+30 7.2695 66.47
5+35 7.7210 65.56
5+40 7.9776 37.26
5+45 8.1332 22.59
5+50 8.2386 15.30
5+55 8.3140 10.95
6+ 0 8.3652 7.44
6+ 5 8.3976 4.70
6+10 8.4138 2.35
6+15 8.4202 0.93
6+20 8.4234 0.47
6+25 8.4252 0.26
6+30 8.4261 0.14
6+35 8.4265 0.06
6+40 8.4267 0.02

```
      U n i t   H y d r o g r a p h   A n a l y s i s

      Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
            Study date  03/20/24 File: 907hydc10pr2410.out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------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
10-year 24-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.55              142.29

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          4.05              371.79

STORM EVENT (YEAR) =   10.00
```

```
Area Averaged 2-Year Rainfall =    1.550(In)
Area Averaged 100-Year Rainfall =    4.050(In)

Point rain (area averaged) =    2.579(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    2.578(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  69.0      0.373     0.050         0.356        0.058      0.021
69.0  69.0      0.373     0.075         0.348        0.080      0.028
72.0  72.0      0.338     0.750         0.110        0.668      0.073
72.3  72.3      0.335     0.900         0.064        0.195      0.012
                                                   Sum (F) =   0.134
Area averaged mean soil loss (F) (In/Hr) =  0.134
Minimum soil loss rate ((In/Hr)) =  0.067
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000    Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.07      0.021       (  0.238)       0.007        0.013
  2   0.17     0.07      0.021       (  0.237)       0.007        0.013
  3   0.25     0.07      0.021       (  0.236)       0.007        0.013
  4   0.33     0.10      0.031       (  0.235)       0.011        0.020
  5   0.42     0.10      0.031       (  0.234)       0.011        0.020
  6   0.50     0.10      0.031       (  0.233)       0.011        0.020
  7   0.58     0.10      0.031       (  0.232)       0.011        0.020
  8   0.67     0.10      0.031       (  0.231)       0.011        0.020
```

9	0.75	0.10	0.031	(0.230)	0.011	0.020
10	0.83	0.13	0.041	(0.229)	0.014	0.027
11	0.92	0.13	0.041	(0.229)	0.014	0.027
12	1.00	0.13	0.041	(0.228)	0.014	0.027
13	1.08	0.10	0.031	(0.227)	0.011	0.020
14	1.17	0.10	0.031	(0.226)	0.011	0.020
15	1.25	0.10	0.031	(0.225)	0.011	0.020
16	1.33	0.10	0.031	(0.224)	0.011	0.020
17	1.42	0.10	0.031	(0.223)	0.011	0.020
18	1.50	0.10	0.031	(0.222)	0.011	0.020
19	1.58	0.10	0.031	(0.221)	0.011	0.020
20	1.67	0.10	0.031	(0.220)	0.011	0.020
21	1.75	0.10	0.031	(0.220)	0.011	0.020
22	1.83	0.13	0.041	(0.219)	0.014	0.027
23	1.92	0.13	0.041	(0.218)	0.014	0.027
24	2.00	0.13	0.041	(0.217)	0.014	0.027
25	2.08	0.13	0.041	(0.216)	0.014	0.027
26	2.17	0.13	0.041	(0.215)	0.014	0.027
27	2.25	0.13	0.041	(0.214)	0.014	0.027
28	2.33	0.13	0.041	(0.213)	0.014	0.027
29	2.42	0.13	0.041	(0.213)	0.014	0.027
30	2.50	0.13	0.041	(0.212)	0.014	0.027
31	2.58	0.17	0.052	(0.211)	0.018	0.034
32	2.67	0.17	0.052	(0.210)	0.018	0.034
33	2.75	0.17	0.052	(0.209)	0.018	0.034
34	2.83	0.17	0.052	(0.208)	0.018	0.034
35	2.92	0.17	0.052	(0.207)	0.018	0.034
36	3.00	0.17	0.052	(0.207)	0.018	0.034
37	3.08	0.17	0.052	(0.206)	0.018	0.034
38	3.17	0.17	0.052	(0.205)	0.018	0.034
39	3.25	0.17	0.052	(0.204)	0.018	0.034
40	3.33	0.17	0.052	(0.203)	0.018	0.034
41	3.42	0.17	0.052	(0.202)	0.018	0.034
42	3.50	0.17	0.052	(0.201)	0.018	0.034
43	3.58	0.17	0.052	(0.201)	0.018	0.034
44	3.67	0.17	0.052	(0.200)	0.018	0.034
45	3.75	0.17	0.052	(0.199)	0.018	0.034
46	3.83	0.20	0.062	(0.198)	0.022	0.040
47	3.92	0.20	0.062	(0.197)	0.022	0.040
48	4.00	0.20	0.062	(0.196)	0.022	0.040
49	4.08	0.20	0.062	(0.196)	0.022	0.040
50	4.17	0.20	0.062	(0.195)	0.022	0.040
51	4.25	0.20	0.062	(0.194)	0.022	0.040
52	4.33	0.23	0.072	(0.193)	0.025	0.047
53	4.42	0.23	0.072	(0.192)	0.025	0.047
54	4.50	0.23	0.072	(0.191)	0.025	0.047
55	4.58	0.23	0.072	(0.191)	0.025	0.047
56	4.67	0.23	0.072	(0.190)	0.025	0.047
57	4.75	0.23	0.072	(0.189)	0.025	0.047
58	4.83	0.27	0.082	(0.188)	0.029	0.054
59	4.92	0.27	0.082	(0.187)	0.029	0.054
60	5.00	0.27	0.082	(0.187)	0.029	0.054
61	5.08	0.20	0.062	(0.186)	0.022	0.040
62	5.17	0.20	0.062	(0.185)	0.022	0.040
63	5.25	0.20	0.062	(0.184)	0.022	0.040
64	5.33	0.23	0.072	(0.183)	0.025	0.047
65	5.42	0.23	0.072	(0.182)	0.025	0.047
66	5.50	0.23	0.072	(0.182)	0.025	0.047
67	5.58	0.27	0.082	(0.181)	0.029	0.054
68	5.67	0.27	0.082	(0.180)	0.029	0.054
69	5.75	0.27	0.082	(0.179)	0.029	0.054
70	5.83	0.27	0.082	(0.179)	0.029	0.054
71	5.92	0.27	0.082	(0.178)	0.029	0.054

72	6.00	0.27	0.082	(0.177)	0.029	0.054
73	6.08	0.30	0.093	(0.176)	0.032	0.060
74	6.17	0.30	0.093	(0.175)	0.032	0.060
75	6.25	0.30	0.093	(0.175)	0.032	0.060
76	6.33	0.30	0.093	(0.174)	0.032	0.060
77	6.42	0.30	0.093	(0.173)	0.032	0.060
78	6.50	0.30	0.093	(0.172)	0.032	0.060
79	6.58	0.33	0.103	(0.171)	0.036	0.067
80	6.67	0.33	0.103	(0.171)	0.036	0.067
81	6.75	0.33	0.103	(0.170)	0.036	0.067
82	6.83	0.33	0.103	(0.169)	0.036	0.067
83	6.92	0.33	0.103	(0.168)	0.036	0.067
84	7.00	0.33	0.103	(0.168)	0.036	0.067
85	7.08	0.33	0.103	(0.167)	0.036	0.067
86	7.17	0.33	0.103	(0.166)	0.036	0.067
87	7.25	0.33	0.103	(0.165)	0.036	0.067
88	7.33	0.37	0.113	(0.165)	0.040	0.074
89	7.42	0.37	0.113	(0.164)	0.040	0.074
90	7.50	0.37	0.113	(0.163)	0.040	0.074
91	7.58	0.40	0.124	(0.162)	0.043	0.080
92	7.67	0.40	0.124	(0.162)	0.043	0.080
93	7.75	0.40	0.124	(0.161)	0.043	0.080
94	7.83	0.43	0.134	(0.160)	0.047	0.087
95	7.92	0.43	0.134	(0.159)	0.047	0.087
96	8.00	0.43	0.134	(0.159)	0.047	0.087
97	8.08	0.50	0.155	(0.158)	0.054	0.101
98	8.17	0.50	0.155	(0.157)	0.054	0.101
99	8.25	0.50	0.155	(0.156)	0.054	0.101
100	8.33	0.50	0.155	(0.156)	0.054	0.101
101	8.42	0.50	0.155	(0.155)	0.054	0.101
102	8.50	0.50	0.155	(0.154)	0.054	0.101
103	8.58	0.53	0.165	(0.154)	0.058	0.107
104	8.67	0.53	0.165	(0.153)	0.058	0.107
105	8.75	0.53	0.165	(0.152)	0.058	0.107
106	8.83	0.57	0.175	(0.151)	0.061	0.114
107	8.92	0.57	0.175	(0.151)	0.061	0.114
108	9.00	0.57	0.175	(0.150)	0.061	0.114
109	9.08	0.63	0.196	(0.149)	0.069	0.127
110	9.17	0.63	0.196	(0.149)	0.069	0.127
111	9.25	0.63	0.196	(0.148)	0.069	0.127
112	9.33	0.67	0.206	(0.147)	0.072	0.134
113	9.42	0.67	0.206	(0.146)	0.072	0.134
114	9.50	0.67	0.206	(0.146)	0.072	0.134
115	9.58	0.70	0.217	(0.145)	0.076	0.141
116	9.67	0.70	0.217	(0.144)	0.076	0.141
117	9.75	0.70	0.217	(0.144)	0.076	0.141
118	9.83	0.73	0.227	(0.143)	0.079	0.147
119	9.92	0.73	0.227	(0.142)	0.079	0.147
120	10.00	0.73	0.227	(0.142)	0.079	0.147
121	10.08	0.50	0.155	(0.141)	0.054	0.101
122	10.17	0.50	0.155	(0.140)	0.054	0.101
123	10.25	0.50	0.155	(0.140)	0.054	0.101
124	10.33	0.50	0.155	(0.139)	0.054	0.101
125	10.42	0.50	0.155	(0.138)	0.054	0.101
126	10.50	0.50	0.155	(0.137)	0.054	0.101
127	10.58	0.67	0.206	(0.137)	0.072	0.134
128	10.67	0.67	0.206	(0.136)	0.072	0.134
129	10.75	0.67	0.206	(0.135)	0.072	0.134
130	10.83	0.67	0.206	(0.135)	0.072	0.134
131	10.92	0.67	0.206	(0.134)	0.072	0.134
132	11.00	0.67	0.206	(0.133)	0.072	0.134
133	11.08	0.63	0.196	(0.133)	0.069	0.127
134	11.17	0.63	0.196	(0.132)	0.069	0.127

135	11.25	0.63	0.196	(0.132)	0.069	0.127
136	11.33	0.63	0.196	(0.131)	0.069	0.127
137	11.42	0.63	0.196	(0.130)	0.069	0.127
138	11.50	0.63	0.196	(0.130)	0.069	0.127
139	11.58	0.57	0.175	(0.129)	0.061	0.114
140	11.67	0.57	0.175	(0.128)	0.061	0.114
141	11.75	0.57	0.175	(0.128)	0.061	0.114
142	11.83	0.60	0.186	(0.127)	0.065	0.121
143	11.92	0.60	0.186	(0.126)	0.065	0.121
144	12.00	0.60	0.186	(0.126)	0.065	0.121
145	12.08	0.83	0.258	(0.125)	0.090	0.168
146	12.17	0.83	0.258	(0.125)	0.090	0.168
147	12.25	0.83	0.258	(0.124)	0.090	0.168
148	12.33	0.87	0.268	(0.123)	0.094	0.174
149	12.42	0.87	0.268	(0.123)	0.094	0.174
150	12.50	0.87	0.268	(0.122)	0.094	0.174
151	12.58	0.93	0.289	(0.121)	0.101	0.188
152	12.67	0.93	0.289	(0.121)	0.101	0.188
153	12.75	0.93	0.289	(0.120)	0.101	0.188
154	12.83	0.97	0.299	(0.120)	0.105	0.194
155	12.92	0.97	0.299	(0.119)	0.105	0.194
156	13.00	0.97	0.299	(0.118)	0.105	0.194
157	13.08	1.13	0.351	0.118	(0.123)	0.233
158	13.17	1.13	0.351	0.117	(0.123)	0.233
159	13.25	1.13	0.351	0.117	(0.123)	0.234
160	13.33	1.13	0.351	0.116	(0.123)	0.235
161	13.42	1.13	0.351	0.115	(0.123)	0.235
162	13.50	1.13	0.351	0.115	(0.123)	0.236
163	13.58	0.77	0.237	(0.114)	0.083	0.154
164	13.67	0.77	0.237	(0.114)	0.083	0.154
165	13.75	0.77	0.237	(0.113)	0.083	0.154
166	13.83	0.77	0.237	(0.112)	0.083	0.154
167	13.92	0.77	0.237	(0.112)	0.083	0.154
168	14.00	0.77	0.237	(0.111)	0.083	0.154
169	14.08	0.90	0.278	(0.111)	0.097	0.181
170	14.17	0.90	0.278	(0.110)	0.097	0.181
171	14.25	0.90	0.278	(0.110)	0.097	0.181
172	14.33	0.87	0.268	(0.109)	0.094	0.174
173	14.42	0.87	0.268	(0.109)	0.094	0.174
174	14.50	0.87	0.268	(0.108)	0.094	0.174
175	14.58	0.87	0.268	(0.107)	0.094	0.174
176	14.67	0.87	0.268	(0.107)	0.094	0.174
177	14.75	0.87	0.268	(0.106)	0.094	0.174
178	14.83	0.83	0.258	(0.106)	0.090	0.168
179	14.92	0.83	0.258	(0.105)	0.090	0.168
180	15.00	0.83	0.258	(0.105)	0.090	0.168
181	15.08	0.80	0.247	(0.104)	0.087	0.161
182	15.17	0.80	0.247	(0.104)	0.087	0.161
183	15.25	0.80	0.247	(0.103)	0.087	0.161
184	15.33	0.77	0.237	(0.103)	0.083	0.154
185	15.42	0.77	0.237	(0.102)	0.083	0.154
186	15.50	0.77	0.237	(0.102)	0.083	0.154
187	15.58	0.63	0.196	(0.101)	0.069	0.127
188	15.67	0.63	0.196	(0.100)	0.069	0.127
189	15.75	0.63	0.196	(0.100)	0.069	0.127
190	15.83	0.63	0.196	(0.099)	0.069	0.127
191	15.92	0.63	0.196	(0.099)	0.069	0.127
192	16.00	0.63	0.196	(0.098)	0.069	0.127
193	16.08	0.13	0.041	(0.098)	0.014	0.027
194	16.17	0.13	0.041	(0.097)	0.014	0.027
195	16.25	0.13	0.041	(0.097)	0.014	0.027
196	16.33	0.13	0.041	(0.096)	0.014	0.027
197	16.42	0.13	0.041	(0.096)	0.014	0.027

198	16.50	0.13	0.041	(0.095)	0.014	0.027
199	16.58	0.10	0.031	(0.095)	0.011	0.020
200	16.67	0.10	0.031	(0.094)	0.011	0.020
201	16.75	0.10	0.031	(0.094)	0.011	0.020
202	16.83	0.10	0.031	(0.094)	0.011	0.020
203	16.92	0.10	0.031	(0.093)	0.011	0.020
204	17.00	0.10	0.031	(0.093)	0.011	0.020
205	17.08	0.17	0.052	(0.092)	0.018	0.034
206	17.17	0.17	0.052	(0.092)	0.018	0.034
207	17.25	0.17	0.052	(0.091)	0.018	0.034
208	17.33	0.17	0.052	(0.091)	0.018	0.034
209	17.42	0.17	0.052	(0.090)	0.018	0.034
210	17.50	0.17	0.052	(0.090)	0.018	0.034
211	17.58	0.17	0.052	(0.089)	0.018	0.034
212	17.67	0.17	0.052	(0.089)	0.018	0.034
213	17.75	0.17	0.052	(0.088)	0.018	0.034
214	17.83	0.13	0.041	(0.088)	0.014	0.027
215	17.92	0.13	0.041	(0.088)	0.014	0.027
216	18.00	0.13	0.041	(0.087)	0.014	0.027
217	18.08	0.13	0.041	(0.087)	0.014	0.027
218	18.17	0.13	0.041	(0.086)	0.014	0.027
219	18.25	0.13	0.041	(0.086)	0.014	0.027
220	18.33	0.13	0.041	(0.085)	0.014	0.027
221	18.42	0.13	0.041	(0.085)	0.014	0.027
222	18.50	0.13	0.041	(0.085)	0.014	0.027
223	18.58	0.10	0.031	(0.084)	0.011	0.020
224	18.67	0.10	0.031	(0.084)	0.011	0.020
225	18.75	0.10	0.031	(0.083)	0.011	0.020
226	18.83	0.07	0.021	(0.083)	0.007	0.013
227	18.92	0.07	0.021	(0.083)	0.007	0.013
228	19.00	0.07	0.021	(0.082)	0.007	0.013
229	19.08	0.10	0.031	(0.082)	0.011	0.020
230	19.17	0.10	0.031	(0.081)	0.011	0.020
231	19.25	0.10	0.031	(0.081)	0.011	0.020
232	19.33	0.13	0.041	(0.081)	0.014	0.027
233	19.42	0.13	0.041	(0.080)	0.014	0.027
234	19.50	0.13	0.041	(0.080)	0.014	0.027
235	19.58	0.10	0.031	(0.080)	0.011	0.020
236	19.67	0.10	0.031	(0.079)	0.011	0.020
237	19.75	0.10	0.031	(0.079)	0.011	0.020
238	19.83	0.07	0.021	(0.079)	0.007	0.013
239	19.92	0.07	0.021	(0.078)	0.007	0.013
240	20.00	0.07	0.021	(0.078)	0.007	0.013
241	20.08	0.10	0.031	(0.077)	0.011	0.020
242	20.17	0.10	0.031	(0.077)	0.011	0.020
243	20.25	0.10	0.031	(0.077)	0.011	0.020
244	20.33	0.10	0.031	(0.076)	0.011	0.020
245	20.42	0.10	0.031	(0.076)	0.011	0.020
246	20.50	0.10	0.031	(0.076)	0.011	0.020
247	20.58	0.10	0.031	(0.076)	0.011	0.020
248	20.67	0.10	0.031	(0.075)	0.011	0.020
249	20.75	0.10	0.031	(0.075)	0.011	0.020
250	20.83	0.07	0.021	(0.075)	0.007	0.013
251	20.92	0.07	0.021	(0.074)	0.007	0.013
252	21.00	0.07	0.021	(0.074)	0.007	0.013
253	21.08	0.10	0.031	(0.074)	0.011	0.020
254	21.17	0.10	0.031	(0.073)	0.011	0.020
255	21.25	0.10	0.031	(0.073)	0.011	0.020
256	21.33	0.07	0.021	(0.073)	0.007	0.013
257	21.42	0.07	0.021	(0.073)	0.007	0.013
258	21.50	0.07	0.021	(0.072)	0.007	0.013
259	21.58	0.10	0.031	(0.072)	0.011	0.020
260	21.67	0.10	0.031	(0.072)	0.011	0.020

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261  21.75     0.10      0.031       (  0.072)       0.011        0.020
262  21.83     0.07      0.021       (  0.071)       0.007        0.013
263  21.92     0.07      0.021       (  0.071)       0.007        0.013
264  22.00     0.07      0.021       (  0.071)       0.007        0.013
265  22.08     0.10      0.031       (  0.071)       0.011        0.020
266  22.17     0.10      0.031       (  0.070)       0.011        0.020
267  22.25     0.10      0.031       (  0.070)       0.011        0.020
268  22.33     0.07      0.021       (  0.070)       0.007        0.013
269  22.42     0.07      0.021       (  0.070)       0.007        0.013
270  22.50     0.07      0.021       (  0.069)       0.007        0.013
271  22.58     0.07      0.021       (  0.069)       0.007        0.013
272  22.67     0.07      0.021       (  0.069)       0.007        0.013
273  22.75     0.07      0.021       (  0.069)       0.007        0.013
274  22.83     0.07      0.021       (  0.069)       0.007        0.013
275  22.92     0.07      0.021       (  0.069)       0.007        0.013
276  23.00     0.07      0.021       (  0.068)       0.007        0.013
277  23.08     0.07      0.021       (  0.068)       0.007        0.013
278  23.17     0.07      0.021       (  0.068)       0.007        0.013
279  23.25     0.07      0.021       (  0.068)       0.007        0.013
280  23.33     0.07      0.021       (  0.068)       0.007        0.013
281  23.42     0.07      0.021       (  0.068)       0.007        0.013
282  23.50     0.07      0.021       (  0.068)       0.007        0.013
283  23.58     0.07      0.021       (  0.067)       0.007        0.013
284  23.67     0.07      0.021       (  0.067)       0.007        0.013
285  23.75     0.07      0.021       (  0.067)       0.007        0.013
286  23.83     0.07      0.021       (  0.067)       0.007        0.013
287  23.92     0.07      0.021       (  0.067)       0.007        0.013
288  24.00     0.07      0.021       (  0.067)       0.007        0.013
            (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    20.1
      Flood volume = Effective rainfall      1.68(In)
       times area      91.8(Ac.)/[(In)/(Ft.)] =      12.8(Ac.Ft)
      Total soil loss =      0.90(In)
      Total soil loss =     6.878(Ac.Ft)
      Total rainfall =      2.58(In)
      Flood volume =      559483.7 Cubic Feet
      Total soil loss =      299612.8 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     21.602(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                      R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
 ----------------------------------------------------------------------------
   0+ 5       0.0015      0.21  Q         |         |         |         |
   0+10       0.0070      0.80  VQ        |         |         |         |
   0+15       0.0140      1.01  VQ        |         |         |         |
   0+20       0.0223      1.21  VQ        |         |         |         |
   0+25       0.0330      1.56  V Q       |         |         |         |
   0+30       0.0447      1.70  V Q       |         |         |         |
   0+35       0.0569      1.77  V Q       |         |         |         |
   0+40       0.0693      1.81  V Q       |         |         |         |
   0+45       0.0820      1.84  V Q       |         |         |         |
   0+50       0.0955      1.95  V Q       |         |         |         |
   0+55       0.1110      2.26  V  Q      |         |         |         |
   1+ 0       0.1273      2.37  V  Q      |         |         |         |
   1+ 5       0.1432      2.31  V  Q      |         |         |         |
   1+10       0.1572      2.04  V Q       |         |         |         |
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1+15	0.1707	1.95	V Q	|	|	|	|
1+20	0.1839	1.92	V Q	|	|	|	|
1+25	0.1969	1.90	V Q	|	|	|	|
1+30	0.2099	1.89	V Q	|	|	|	|
1+35	0.2228	1.87	V Q	|	|	|	|
1+40	0.2357	1.87	V Q	|	|	|	|
1+45	0.2485	1.86	V Q	|	|	|	|
1+50	0.2621	1.97	V Q	|	|	|	|
1+55	0.2777	2.26	V Q	|	|	|	|
2+ 0	0.2940	2.37	V Q	|	|	|	|
2+ 5	0.3106	2.41	V Q	|	|	|	|
2+10	0.3274	2.44	|V Q	|	|	|	|
2+15	0.3443	2.46	|V Q	|	|	|	|
2+20	0.3613	2.47	|V Q	|	|	|	|
2+25	0.3784	2.48	|V Q	|	|	|	|
2+30	0.3955	2.48	|V Q	|	|	|	|
2+35	0.4133	2.59	|V Q	|	|	|	|
2+40	0.4331	2.88	|V Q	|	|	|	|
2+45	0.4537	2.99	|V Q	|	|	|	|
2+50	0.4746	3.03	|V Q	|	|	|	|
2+55	0.4957	3.06	|V Q	|	|	|	|
3+ 0	0.5169	3.08	|V Q	|	|	|	|
3+ 5	0.5382	3.09	|V Q	|	|	|	|
3+10	0.5595	3.10	|V Q	|	|	|	|
3+15	0.5808	3.10	|V Q	|	|	|	|
3+20	0.6022	3.10	|V Q	|	|	|	|
3+25	0.6236	3.10	|V Q	|	|	|	|
3+30	0.6449	3.10	| V Q	|	|	|	|
3+35	0.6663	3.10	| V Q	|	|	|	|
3+40	0.6877	3.10	| V Q	|	|	|	|
3+45	0.7090	3.10	| V Q	|	|	|	|
3+50	0.7311	3.21	| V Q	|	|	|	|
3+55	0.7553	3.50	| V Q	|	|	|	|
4+ 0	0.7801	3.61	| V Q	|	|	|	|
4+ 5	0.8053	3.65	| V Q	|	|	|	|
4+10	0.8306	3.68	| V Q	|	|	|	|
4+15	0.8561	3.70	| V Q	|	|	|	|
4+20	0.8824	3.82	| V Q	|	|	|	|
4+25	0.9108	4.12	| V Q	|	|	|	|
4+30	0.9399	4.23	| V Q	|	|	|	|
4+35	0.9693	4.27	| V Q	|	|	|	|
4+40	0.9989	4.30	| V Q	|	|	|	|
4+45	1.0287	4.32	| V Q	|	|	|	|
4+50	1.0592	4.44	| V Q	|	|	|	|
4+55	1.0919	4.74	| V Q	|	|	|	|
5+ 0	1.1253	4.85	| V Q	|	|	|	|
5+ 5	1.1575	4.68	| V Q	|	|	|	|
5+10	1.1859	4.12	| V Q	|	|	|	|
5+15	1.2129	3.93	| V Q	|	|	|	|
5+20	1.2401	3.95	| V Q	|	|	|	|
5+25	1.2691	4.20	| V Q	|	|	|	|
5+30	1.2985	4.28	| VQ	|	|	|	|
5+35	1.3289	4.41	| VQ	|	|	|	|
5+40	1.3614	4.72	| V Q	|	|	|	|
5+45	1.3946	4.82	| V Q	|	|	|	|
5+50	1.4282	4.88	| V Q	|	|	|	|
5+55	1.4621	4.92	| V Q	|	|	|	|
6+ 0	1.4961	4.94	| V Q	|	|	|	|
6+ 5	1.5309	5.06	| V Q	|	|	|	|
6+10	1.5678	5.36	| V Q	|	|	|	|
6+15	1.6055	5.47	| V Q	|	|	|	|
6+20	1.6435	5.52	| V Q	|	|	|	|
6+25	1.6817	5.54	| V Q	|	|	|	|

6+30	1.7200	5.56	| V Q |	|	|	|
6+35	1.7591	5.68	| V Q |	|	|	|
6+40	1.8002	5.98	| V Q |	|	|	|
6+45	1.8422	6.09	| V Q |	|	|	|
6+50	1.8844	6.14	| V Q |	|	|	|
6+55	1.9269	6.16	| V Q |	|	|	|
7+ 0	1.9694	6.18	| V Q |	|	|	|
7+ 5	2.0121	6.19	| V Q |	|	|	|
7+10	2.0548	6.20	| V Q |	|	|	|
7+15	2.0975	6.20	| V Q |	|	|	|
7+20	2.1410	6.31	| V Q |	|	|	|
7+25	2.1865	6.61	| V Q |	|	|	|
7+30	2.2327	6.71	| V Q |	|	|	|
7+35	2.2800	6.86	| V Q|	|	|	|
7+40	2.3294	7.19	| V Q|	|	|	|
7+45	2.3798	7.31	| V Q|	|	|	|
7+50	2.4312	7.47	| V Q|	|	|	|
7+55	2.4849	7.80	| V Q	|	|	|
8+ 0	2.5395	7.93	| V Q	|	|	|
8+ 5	2.5960	8.20	| V Q	|	|	|
8+10	2.6567	8.82	| V |Q	|	|	|
8+15	2.7191	9.05	| V | Q	|	|	|
8+20	2.7821	9.16	| V | Q	|	|	|
8+25	2.8456	9.22	| V | Q	|	|	|
8+30	2.9094	9.26	| V| Q	|	|	|
8+35	2.9740	9.39	| V| Q	|	|	|
8+40	3.0408	9.70	| V| Q	|	|	|
8+45	3.1084	9.81	| V| Q	|	|	|
8+50	3.1770	9.97	| V| Q	|	|	|
8+55	3.2479	10.29	| V Q	|	|	|
9+ 0	3.3195	10.41	| V Q	|	|	|
9+ 5	3.3931	10.68	| V Q	|	|	|
9+10	3.4709	11.30	| V Q	|	|	|
9+15	3.5504	11.54	| |V Q	|	|	|
9+20	3.6313	11.75	| |V Q	|	|	|
9+25	3.7146	12.10	| |V Q	|	|	|
9+30	3.7989	12.25	| |V Q	|	|	|
9+35	3.8845	12.42	| | V Q	|	|	|
9+40	3.9723	12.76	| | V Q	|	|	|
9+45	4.0611	12.89	| | V Q	|	|	|
9+50	4.1510	13.05	| | V Q	|	|	|
9+55	4.2432	13.38	| | V Q	|	|	|
10+ 0	4.3363	13.51	| | V Q	|	|	|
10+ 5	4.4246	12.82	| | V Q	|	|	|
10+10	4.4989	10.79	| | Q	|	|	|
10+15	4.5683	10.08	| | QV	|	|	|
10+20	4.6356	9.77	| | QV	|	|	|
10+25	4.7017	9.59	| | Q V	|	|	|
10+30	4.7670	9.48	| | Q V	|	|	|
10+35	4.8354	9.93	| | Q V	|	|	|
10+40	4.9136	11.36	| | Q	|	|	|
10+45	4.9951	11.84	| | Q	|	|	|
10+50	5.0782	12.07	| | VQ	|	|	|
10+55	5.1623	12.20	| | Q	|	|	|
11+ 0	5.2469	12.29	| | Q	|	|	|
11+ 5	5.3312	12.24	| | Q	|	|	|
11+10	5.4136	11.98	| | QV	|	|	|
11+15	5.4956	11.90	| | Q V	|	|	|
11+20	5.5773	11.86	| | Q V	|	|	|
11+25	5.6587	11.83	| | Q V	|	|	|
11+30	5.7401	11.81	| | Q V	|	|	|
11+35	5.8199	11.59	| | Q V	|	|	|
11+40	5.8956	10.99	| | Q V	|	|	|

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11+45       5.9698     10.78  |          |   Q   V |          |          |
11+50       6.0442     10.79  |          |   Q   V |          |          |
11+55       6.1201     11.03  |          |   Q    V|          |          |
12+ 0       6.1966     11.10  |          |   Q    V|          |          |
12+ 5       6.2784     11.87  |          |    Q   V|          |          |
12+10       6.3745     13.95  |          |       QV|          |          |
12+15       6.4756     14.69  |          |        QV          |          |
12+20       6.5798     15.13  |          |         Q          |          |
12+25       6.6873     15.61  |          |         Q          |          |
12+30       6.7964     15.84  |          |          |Q        |          |
12+35       6.9079     16.18  |          |          |Q        |          |
12+40       7.0239     16.85  |          |          |VQ       |          |
12+45       7.1418     17.12  |          |          | Q       |          |
12+50       7.2612     17.33  |          |          | VQ      |          |
12+55       7.3830     17.68  |          |          | VQ      |          |
13+ 0       7.5058     17.83  |          |          |  Q      |          |
13+ 5       7.6332     18.51  |          |          |  VQ     |          |
13+10       7.7727     20.25  |          |          |   V  Q  |          |
13+15       7.9168     20.92  |          |          |   V  Q  |          |
13+20       8.0631     21.24  |          |          |    V  Q |          |
13+25       8.2108     21.45  |          |          |    V  Q |          |
13+30       8.3595     21.60  |          |          |     V Q |          |
13+35       8.5001     20.41  |          |          |     VQ  |          |
13+40       8.6163     16.87  |          |          | Q   V   |          |
13+45       8.7241     15.65  |          |         Q      V  |          |
13+50       8.8281     15.09  |          |         Q      V  |          |
13+55       8.9298     14.78  |          |        Q|      V  |          |
14+ 0       9.0302     14.57  |          |        Q|       V |          |
14+ 5       9.1325     14.86  |          |        Q|       V |          |
14+10       9.2424     15.95  |          |         |Q      V |          |
14+15       9.3546     16.29  |          |         |Q       V|          |
14+20       9.4674     16.37  |          |         |Q       V|          |
14+25       9.5788     16.18  |          |         |Q       V|          |
14+30       9.6900     16.15  |          |         |Q        V          |
14+35       9.8012     16.15  |          |         |Q        V          |
14+40       9.9125     16.15  |          |         |Q        V          |
14+45      10.0237     16.16  |          |         |Q        |V         |
14+50      10.1342     16.04  |          |         |Q        |V         |
14+55      10.2426     15.74  |          |         Q         |V         |
15+ 0      10.3502     15.63  |          |         Q         | V        |
15+ 5      10.4567     15.47  |          |         Q         | V        |
15+10      10.5611     15.15  |          |         Q         | V        |
15+15      10.6646     15.03  |          |         Q         |  V       |
15+20      10.7670     14.87  |          |        Q|         |  V       |
15+25      10.8671     14.54  |          |        Q|         |  V       |
15+30      10.9664     14.41  |          |        Q|         |   V      |
15+35      11.0623     13.93  |          |       Q |         |   V      |
15+40      11.1498     12.71  |          |     Q   |         |   V      |
15+45      11.2343     12.27  |          |     Q   |         |   V      |
15+50      11.3175     12.08  |          |     Q   |         |    V     |
15+55      11.3999     11.96  |          |    Q    |         |    V     |
16+ 0      11.4817     11.89  |          |    Q    |         |    V     |
16+ 5      11.5523     10.25  |          |  Q      |         |    V     |
16+10      11.5922      5.79  |       Q  |         |         |     V    |
16+15      11.6211      4.20  |     Q    |         |         |     V    |
16+20      11.6452      3.51  |   Q      |         |         |     V    |
16+25      11.6666      3.11  |   Q      |         |         |     V    |
16+30      11.6863      2.85  |  Q       |         |         |     V    |
16+35      11.7040      2.58  |  Q       |         |         |     V    |
16+40      11.7190      2.17  | Q        |         |         |     V    |
16+45      11.7326      1.98  | Q        |         |         |     V    |
16+50      11.7459      1.93  | Q        |         |         |     V    |
16+55      11.7590      1.90  | Q        |         |         |     V    |
```

```
17+ 0      11.7720      1.89  | Q       |         |         |     V   |
17+ 5      11.7863      2.09  | Q       |         |         |     V   |
17+10      11.8047      2.67  |  Q      |         |         |     V   |
17+15      11.8245      2.87  |  Q      |         |         |     V   |
17+20      11.8450      2.97  |  Q      |         |         |     V   |
17+25      11.8657      3.02  |   Q     |         |         |     V   |
17+30      11.8868      3.05  |   Q     |         |         |      V  |
17+35      11.9080      3.08  |   Q     |         |         |      V  |
17+40      11.9292      3.09  |   Q     |         |         |      V  |
17+45      11.9506      3.10  |   Q     |         |         |      V  |
17+50      11.9712      3.00  |  Q      |         |         |      V  |
17+55      11.9898      2.70  |  Q      |         |         |      V  |
18+ 0      12.0077      2.60  |  Q      |         |         |      V  |
18+ 5      12.0253      2.55  |  Q      |         |         |      V  |
18+10      12.0427      2.52  |  Q      |         |         |      V  |
18+15      12.0599      2.51  |  Q      |         |         |      V  |
18+20      12.0771      2.50  |  Q      |         |         |      V  |
18+25      12.0942      2.49  |  Q      |         |         |      V  |
18+30      12.1113      2.48  |  Q      |         |         |      V  |
18+35      12.1277      2.38  |  Q      |         |         |      V  |
18+40      12.1420      2.08  | Q       |         |         |      V  |
18+45      12.1556      1.98  | Q       |         |         |      V  |
18+50      12.1682      1.82  | Q       |         |         |      V  |
18+55      12.1785      1.50  | Q       |         |         |      V  |
19+ 0      12.1880      1.38  |Q        |         |         |      V  |
19+ 5      12.1979      1.43  |Q        |         |         |      V  |
19+10      12.2095      1.69  | Q       |         |         |       V |
19+15      12.2217      1.77  | Q       |         |         |       V |
19+20      12.2349      1.91  | Q       |         |         |       V |
19+25      12.2502      2.23  | Q       |         |         |       V |
19+30      12.2664      2.34  |  Q      |         |         |       V |
19+35      12.2822      2.29  |  Q      |         |         |       V |
19+40      12.2961      2.03  | Q       |         |         |       V |
19+45      12.3096      1.95  | Q       |         |         |       V |
19+50      12.3221      1.81  | Q       |         |         |       V |
19+55      12.3323      1.49  |Q        |         |         |       V |
20+ 0      12.3419      1.38  |Q        |         |         |       V |
20+ 5      12.3517      1.43  |Q        |         |         |       V |
20+10      12.3633      1.69  | Q       |         |         |       V |
20+15      12.3755      1.77  | Q       |         |         |       V |
20+20      12.3880      1.81  | Q       |         |         |       V |
20+25      12.4006      1.83  | Q       |         |         |       V |
20+30      12.4132      1.84  | Q       |         |         |       V |
20+35      12.4259      1.85  | Q       |         |         |       V |
20+40      12.4387      1.86  | Q       |         |         |       V |
20+45      12.4515      1.86  | Q       |         |         |       V |
20+50      12.4636      1.76  | Q       |         |         |       V |
20+55      12.4737      1.46  |Q        |         |         |       V |
21+ 0      12.4830      1.36  |Q        |         |         |       V |
21+ 5      12.4927      1.42  |Q        |         |         |       V |
21+10      12.5043      1.68  | Q       |         |         |       V |
21+15      12.5166      1.77  | Q       |         |         |       V |
21+20      12.5283      1.70  | Q       |         |         |        V|
21+25      12.5381      1.42  |Q        |         |         |        V|
21+30      12.5472      1.33  |Q        |         |         |        V|
21+35      12.5569      1.40  |Q        |         |         |        V|
21+40      12.5684      1.68  | Q       |         |         |        V|
21+45      12.5806      1.77  | Q       |         |         |        V|
21+50      12.5924      1.70  | Q       |         |         |        V|
21+55      12.6022      1.42  |Q        |         |         |        V|
22+ 0      12.6113      1.33  |Q        |         |         |        V|
22+ 5      12.6210      1.40  |Q        |         |         |        V|
22+10      12.6325      1.68  | Q       |         |         |        V|
```

22+15	12.6447	1.77	| Q	|	|	|	V|
22+20	12.6565	1.70	| Q	|	|	|	V|
22+25	12.6663	1.42	|Q	|	|	|	V|
22+30	12.6754	1.33	|Q	|	|	|	V|
22+35	12.6843	1.30	|Q	|	|	|	V|
22+40	12.6931	1.28	|Q	|	|	|	V|
22+45	12.7019	1.27	|Q	|	|	|	V|
22+50	12.7105	1.25	|Q	|	|	|	V|
22+55	12.7191	1.25	|Q	|	|	|	V|
23+ 0	12.7276	1.24	|Q	|	|	|	V|
23+ 5	12.7362	1.24	|Q	|	|	|	V|
23+10	12.7447	1.24	|Q	|	|	|	V|
23+15	12.7533	1.24	|Q	|	|	|	V|
23+20	12.7618	1.24	|Q	|	|	|	V|
23+25	12.7704	1.24	|Q	|	|	|	V|
23+30	12.7789	1.24	|Q	|	|	|	V|
23+35	12.7875	1.24	|Q	|	|	|	V|
23+40	12.7960	1.24	|Q	|	|	|	V|
23+45	12.8045	1.24	|Q	|	|	|	V|
23+50	12.8131	1.24	|Q	|	|	|	V|
23+55	12.8216	1.24	|Q	|	|	|	V|
24+ 0	12.8302	1.24	|Q	|	|	|	V|
24+ 5	12.8373	1.03	|Q	|	|	|	V|
24+10	12.8403	0.44	Q	|	|	|	V|
24+15	12.8419	0.23	Q	|	|	|	V|
24+20	12.8428	0.14	Q	|	|	|	V|
24+25	12.8434	0.08	Q	|	|	|	V|
24+30	12.8437	0.05	Q	|	|	|	V|
24+35	12.8439	0.03	Q	|	|	|	V|
24+40	12.8440	0.01	Q	|	|	|	V

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
100-year 1-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.50                45.90

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.20               110.16

STORM EVENT (YEAR) =  100.00
```

```
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    1.200(In)
Areal adjustment factor =   99.92 %
Adjusted average point rain =    1.199(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  84.4      0.194     0.050         0.185        0.058      0.011
69.0  84.4      0.194     0.075         0.181        0.080      0.014
72.0  86.2      0.173     0.750         0.056        0.668      0.038
72.3  86.4      0.171     0.900         0.033        0.195      0.006
                                                   Sum (F) =   0.069
Area averaged mean soil loss (F) (In/Hr) =  0.069
Minimum soil loss rate ((In/Hr)) =  0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5500
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133            15.851
    2   0.167        186.412         47.639            44.074
    3   0.250        279.618         16.784            15.528
    4   0.333        372.824          7.446             6.889
    5   0.417        466.031          4.270             3.950
    6   0.500        559.237          2.755             2.549
    7   0.583        652.443          1.819             1.683
    8   0.667        745.649          1.144             1.059
    9   0.750        838.855          1.010             0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
    1   0.08     3.30      0.475         0.069    (  0.166)        0.406
    2   0.17     4.20      0.604         0.069    (  0.212)        0.535
    3   0.25     4.40      0.633         0.069    (  0.222)        0.564
    4   0.33     4.80      0.691         0.069    (  0.242)        0.622
    5   0.42     5.20      0.748         0.069    (  0.262)        0.679
    6   0.50     6.20      0.892         0.069    (  0.312)        0.823
```

```
  7   0.58     6.80      0.978          0.069    (  0.342)        0.909
  8   0.67     8.80      1.266          0.069    (  0.443)        1.197
  9   0.75    13.90      2.000          0.069    (  0.700)        1.931
 10   0.83    31.40      4.518          0.069    (  1.581)        4.449
 11   0.92     7.20      1.036          0.069    (  0.363)        0.967
 12   1.00     3.80      0.547          0.069    (  0.191)        0.478
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    13.6
     Flood volume = Effective rainfall      1.13(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       8.6(Ac.Ft)
     Total soil loss =      0.07(In)
     Total soil loss =     0.528(Ac.Ft)
     Total rainfall =      1.20(In)
     Flood volume =      376548.1 Cubic Feet
     Total soil loss =       23000.0 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =    257.785(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                    R u n o f f     H y d r o g r a p h
     ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       75.0     150.0     225.0     300.0
-------------------------------------------------------------------------
  0+ 5       0.0443      6.44  Q         |         |         |         |
  0+10       0.2260     26.38  |V Q      |         |         |         |
  0+15       0.4936     38.85  | V  Q    |         |         |         |
  0+20       0.8093     45.84  |  V  Q   |         |         |         |
  0+25       1.1691     52.24  |    VQ   |         |         |         |
  0+30       1.5802     59.70  |      Q  |         |         |         |
  0+35       2.0612     69.83  |        Q|         |         |         |
  0+40       2.6244     81.78  |         Q V       |         |         |
  0+45       3.3777    109.38  |         |   QV    |         |         |
  0+50       4.6704    187.70  |         |         |V   Q    |         |
  0+55       6.4457    257.79  |         |         |        V|   Q     |
  1+ 0       7.4263    142.38  |         |       Q |         |   V     |
  1+ 5       7.9805     80.47  |         Q         |         |     V   |
  1+10       8.2584     40.34  |    Q    |         |         |       V |
  1+15       8.4225     23.83  |  Q      |         |         |       V |
  1+20       8.5259     15.01  | Q       |         |         |        V|
  1+25       8.5903      9.36  |Q        |         |         |        V|
  1+30       8.6316      5.99  Q         |         |         |        V|
  1+35       8.6413      1.41  Q         |         |         |        V|
  1+40       8.6444      0.45  Q         |         |         |        V|
-------------------------------------------------------------------------
```

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      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydcpr3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
100-year 3-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.77                70.69

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.77               162.49

STORM EVENT (YEAR) =  100.00
```

```
Area Averaged 2-Year Rainfall =    0.770(In)
Area Averaged 100-Year Rainfall =    1.770(In)

Point rain (area averaged) =    1.770(In)
Areal adjustment factor =   99.96 %
Adjusted average point rain =    1.769(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  84.4      0.194     0.050         0.185        0.058      0.011
69.0  84.4      0.194     0.075         0.181        0.080      0.014
72.0  86.2      0.173     0.750         0.056        0.668      0.038
72.3  86.4      0.171     0.900         0.033        0.195      0.006
                                                   Sum (F) =   0.069
Area averaged mean soil loss (F) (In/Hr) =  0.069
Minimum soil loss rate ((In/Hr)) =  0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     1.30      0.276          0.069    (  0.097)        0.207
  2   0.17     1.30      0.276          0.069    (  0.097)        0.207
  3   0.25     1.10      0.234          0.069    (  0.082)        0.165
  4   0.33     1.50      0.318          0.069    (  0.111)        0.249
  5   0.42     1.50      0.318          0.069    (  0.111)        0.249
  6   0.50     1.80      0.382          0.069    (  0.134)        0.313
  7   0.58     1.50      0.318          0.069    (  0.111)        0.249
  8   0.67     1.80      0.382          0.069    (  0.134)        0.313
```

```
 9   0.75     1.80      0.382          0.069    (  0.134)         0.313
10   0.83     1.50      0.318          0.069    (  0.111)         0.249
11   0.92     1.60      0.340          0.069    (  0.119)         0.271
12   1.00     1.80      0.382          0.069    (  0.134)         0.313
13   1.08     2.20      0.467          0.069    (  0.163)         0.398
14   1.17     2.20      0.467          0.069    (  0.163)         0.398
15   1.25     2.20      0.467          0.069    (  0.163)         0.398
16   1.33     2.00      0.425          0.069    (  0.149)         0.356
17   1.42     2.60      0.552          0.069    (  0.193)         0.483
18   1.50     2.70      0.573          0.069    (  0.201)         0.504
19   1.58     2.40      0.510          0.069    (  0.178)         0.441
20   1.67     2.70      0.573          0.069    (  0.201)         0.504
21   1.75     3.30      0.701          0.069    (  0.245)         0.632
22   1.83     3.10      0.658          0.069    (  0.230)         0.589
23   1.92     2.90      0.616          0.069    (  0.215)         0.547
24   2.00     3.00      0.637          0.069    (  0.223)         0.568
25   2.08     3.10      0.658          0.069    (  0.230)         0.589
26   2.17     4.20      0.892          0.069    (  0.312)         0.823
27   2.25     5.00      1.062          0.069    (  0.372)         0.993
28   2.33     3.50      0.743          0.069    (  0.260)         0.674
29   2.42     6.80      1.444          0.069    (  0.505)         1.375
30   2.50     7.30      1.550          0.069    (  0.542)         1.481
31   2.58     8.20      1.741          0.069    (  0.609)         1.672
32   2.67     5.90      1.253          0.069    (  0.438)         1.184
33   2.75     2.00      0.425          0.069    (  0.149)         0.356
34   2.83     1.80      0.382          0.069    (  0.134)         0.313
35   2.92     1.80      0.382          0.069    (  0.134)         0.313
36   3.00     0.60      0.127       (  0.069)       0.045         0.083
           (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    18.8
     Flood volume = Effective rainfall      1.56(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =      12.0(Ac.Ft)
     Total soil loss =      0.21(In)
     Total soil loss =     1.568(Ac.Ft)
     Total rainfall =      1.77(In)
     Flood volume =      521265.8 Cubic Feet
     Total soil loss =       68321.5 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =    132.718(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
-------------------------------------------------------------------------
  0+ 5       0.0226      3.28  Q         |         |         |         |
  0+10       0.1081     12.41  V Q       |         |         |         |
  0+15       0.2111     14.95  V Q       |         |         |         |
  0+20       0.3202     15.85  |V Q       |         |         |         |
  0+25       0.4563     19.76  |V Q       |         |         |         |
  0+30       0.6100     22.32  | V Q      |         |         |         |
  0+35       0.7814     24.89  | V Q      |         |         |         |
  0+40       0.9503     24.52  |  VQ      |         |         |         |
  0+45       1.1371     27.12  |  V Q     |         |         |         |
  0+50       1.3231     27.01  |   VQ     |         |         |         |
  0+55       1.4949     24.94  |   Q      |         |         |         |
  1+ 0       1.6728     25.83  |    Q     |         |         |         |
  1+ 5       1.8730     29.07  |    QV    |         |         |         |
  1+10       2.1035     33.47  |     QV   |         |         |         |
```

```
    1+15       2.3446     35.01  |      Q  |          |          |          |
    1+20       2.5863     35.09  |      QV |          |          |          |
    1+25       2.8318     35.65  |      Q V|          |          |          |
    1+30       3.1156     41.20  |       Q V          |          |          |
    1+35       3.4119     43.02  |       Q |V         |          |          |
    1+40       3.7038     42.39  |       Q | V        |          |          |
    1+45       4.0265     46.85  |        Q|  V       |          |          |
    1+50       4.3893     52.68  |         Q   V      |          |          |
    1+55       4.7511     52.53  |         Q    V     |          |          |
    2+ 0       5.1053     51.43  |         Q      V   |          |          |
    2+ 5       5.4665     52.45  |         Q       V  |          |          |
    2+10       5.8614     57.34  |         |Q       V|          |          |
    2+15       6.3488     70.76  |         |   Q      |V         |          |
    2+20       6.8796     77.07  |         |    Q     | V        |          |
    2+25       7.4204     78.53  |         |    Q     |   V      |          |
    2+30       8.1660    108.26  |         |          |Q     V   |          |
    2+35       9.0334    125.95  |         |          |    Q    V          |
    2+40       9.9474    132.72  |         |          |     Q    |  V       |
    2+45      10.6655    104.26  |         |          Q          |    V     |
    2+50      11.0985     62.87  |         | Q        |          |      V   |
    2+55      11.4208     46.80  |        Q|          |          |       V  |
    3+ 0      11.6685     35.96  |      Q  |          |          |         V|
    3+ 5      11.8115     20.77  |   Q     |          |          |         V|
    3+10      11.8855     10.74  | Q       |          |          |         V|
    3+15      11.9269      6.02  |Q        |          |          |         V|
    3+20      11.9485      3.14  Q         |          |          |         V|
    3+25      11.9582      1.40  Q         |          |          |         V|
    3+30      11.9635      0.76  Q         |          |          |         V|
    3+35      11.9661      0.38  Q         |          |          |         V|
    3+40      11.9666      0.08  Q         |          |          |         V|
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
100-year 6-hour storm



------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.95                87.21

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          2.45               224.91

STORM EVENT (YEAR) =  100.00
```

```
Area Averaged 2-Year Rainfall =    0.950(In)
Area Averaged 100-Year Rainfall =    2.450(In)

Point rain (area averaged) =    2.450(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    2.449(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
69.0  84.4      0.194     0.050        0.185        0.058      0.011
69.0  84.4      0.194     0.075        0.181        0.080      0.014
72.0  86.2      0.173     0.750        0.056        0.668      0.038
72.3  86.4      0.171     0.900        0.033        0.195      0.006
                                                   Sum (F) =   0.069
Area averaged mean soil loss (F) (In/Hr) =  0.069
Minimum soil loss rate ((In/Hr)) =  0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

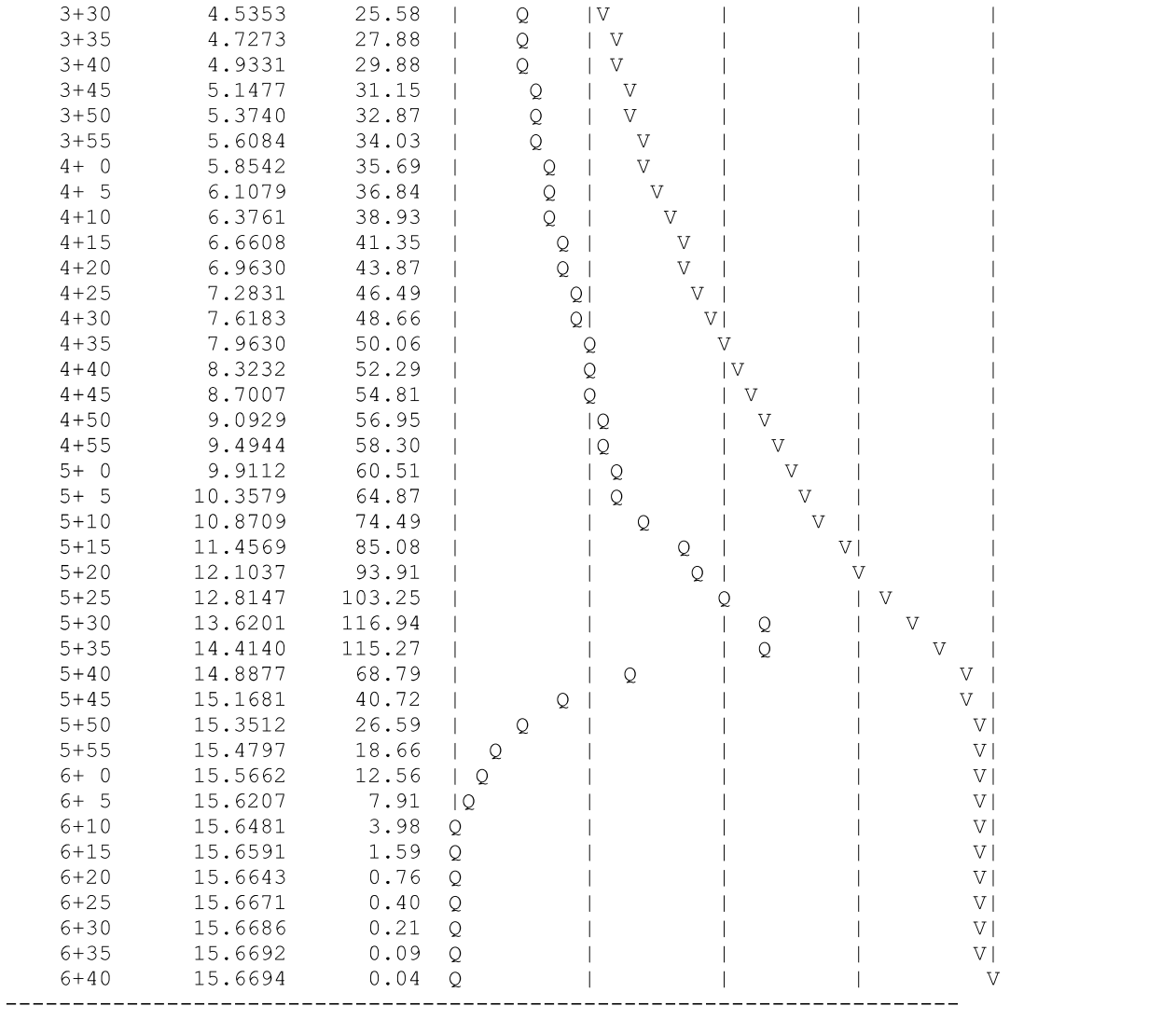
 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.50      0.147       (  0.069)       0.051        0.096
  2   0.17     0.60      0.176       (  0.069)       0.062        0.115
  3   0.25     0.60      0.176       (  0.069)       0.062        0.115
  4   0.33     0.60      0.176       (  0.069)       0.062        0.115
  5   0.42     0.60      0.176       (  0.069)       0.062        0.115
  6   0.50     0.70      0.206          0.069    (  0.072)        0.137
  7   0.58     0.70      0.206          0.069    (  0.072)        0.137
  8   0.67     0.70      0.206          0.069    (  0.072)        0.137
```

9	0.75	0.70	0.206	0.069	(0.072)	0.137
10	0.83	0.70	0.206	0.069	(0.072)	0.137
11	0.92	0.70	0.206	0.069	(0.072)	0.137
12	1.00	0.80	0.235	0.069	(0.082)	0.166
13	1.08	0.80	0.235	0.069	(0.082)	0.166
14	1.17	0.80	0.235	0.069	(0.082)	0.166
15	1.25	0.80	0.235	0.069	(0.082)	0.166
16	1.33	0.80	0.235	0.069	(0.082)	0.166
17	1.42	0.80	0.235	0.069	(0.082)	0.166
18	1.50	0.80	0.235	0.069	(0.082)	0.166
19	1.58	0.80	0.235	0.069	(0.082)	0.166
20	1.67	0.80	0.235	0.069	(0.082)	0.166
21	1.75	0.80	0.235	0.069	(0.082)	0.166
22	1.83	0.80	0.235	0.069	(0.082)	0.166
23	1.92	0.80	0.235	0.069	(0.082)	0.166
24	2.00	0.90	0.265	0.069	(0.093)	0.195
25	2.08	0.80	0.235	0.069	(0.082)	0.166
26	2.17	0.90	0.265	0.069	(0.093)	0.195
27	2.25	0.90	0.265	0.069	(0.093)	0.195
28	2.33	0.90	0.265	0.069	(0.093)	0.195
29	2.42	0.90	0.265	0.069	(0.093)	0.195
30	2.50	0.90	0.265	0.069	(0.093)	0.195
31	2.58	0.90	0.265	0.069	(0.093)	0.195
32	2.67	0.90	0.265	0.069	(0.093)	0.195
33	2.75	1.00	0.294	0.069	(0.103)	0.225
34	2.83	1.00	0.294	0.069	(0.103)	0.225
35	2.92	1.00	0.294	0.069	(0.103)	0.225
36	3.00	1.00	0.294	0.069	(0.103)	0.225
37	3.08	1.00	0.294	0.069	(0.103)	0.225
38	3.17	1.10	0.323	0.069	(0.113)	0.254
39	3.25	1.10	0.323	0.069	(0.113)	0.254
40	3.33	1.10	0.323	0.069	(0.113)	0.254
41	3.42	1.20	0.353	0.069	(0.123)	0.284
42	3.50	1.30	0.382	0.069	(0.134)	0.313
43	3.58	1.40	0.411	0.069	(0.144)	0.342
44	3.67	1.40	0.411	0.069	(0.144)	0.342
45	3.75	1.50	0.441	0.069	(0.154)	0.372
46	3.83	1.50	0.441	0.069	(0.154)	0.372
47	3.92	1.60	0.470	0.069	(0.165)	0.401
48	4.00	1.60	0.470	0.069	(0.165)	0.401
49	4.08	1.70	0.500	0.069	(0.175)	0.431
50	4.17	1.80	0.529	0.069	(0.185)	0.460
51	4.25	1.90	0.558	0.069	(0.195)	0.489
52	4.33	2.00	0.588	0.069	(0.206)	0.519
53	4.42	2.10	0.617	0.069	(0.216)	0.548
54	4.50	2.10	0.617	0.069	(0.216)	0.548
55	4.58	2.20	0.647	0.069	(0.226)	0.578
56	4.67	2.30	0.676	0.069	(0.237)	0.607
57	4.75	2.40	0.705	0.069	(0.247)	0.636
58	4.83	2.40	0.705	0.069	(0.247)	0.636
59	4.92	2.50	0.735	0.069	(0.257)	0.666
60	5.00	2.60	0.764	0.069	(0.267)	0.695
61	5.08	3.10	0.911	0.069	(0.319)	0.842
62	5.17	3.60	1.058	0.069	(0.370)	0.989
63	5.25	3.90	1.146	0.069	(0.401)	1.077
64	5.33	4.20	1.234	0.069	(0.432)	1.165
65	5.42	4.70	1.381	0.069	(0.483)	1.312
66	5.50	5.60	1.646	0.069	(0.576)	1.577
67	5.58	1.90	0.558	0.069	(0.195)	0.489
68	5.67	0.90	0.265	0.069	(0.093)	0.195
69	5.75	0.60	0.176	(0.069)	0.062	0.115
70	5.83	0.50	0.147	(0.069)	0.051	0.096
71	5.92	0.30	0.088	(0.069)	0.031	0.057

```
72   6.00     0.20      0.059       (  0.069)       0.021        0.038
           (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    24.6
     Flood volume = Effective rainfall      2.05(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =      15.7(Ac.Ft)
     Total soil loss =      0.40(In)
     Total soil loss =     3.067(Ac.Ft)
     Total rainfall =      2.45(In)
     Flood volume =      682561.0 Cubic Feet
     Total soil loss =      133604.6 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =    116.935(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          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   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
-------------------------------------------------------------------------
  0+ 5       0.0104      1.51  Q          |          |          |          |
  0+10       0.0520      6.03  VQ         |          |          |          |
  0+15       0.1095      8.36  VQ         |          |          |          |
  0+20       0.1736      9.31  VQ         |          |          |          |
  0+25       0.2413      9.82  VQ         |          |          |          |
  0+30       0.3135     10.49  V Q        |          |          |          |
  0+35       0.3939     11.67  |VQ        |          |          |          |
  0+40       0.4776     12.15  |VQ        |          |          |          |
  0+45       0.5631     12.41  |VQ        |          |          |          |
  0+50       0.6493     12.52  |VQ        |          |          |          |
  0+55       0.7359     12.57  |VQ        |          |          |          |
  1+ 0       0.8260     13.08  | Q        |          |          |          |
  1+ 5       0.9251     14.40  | Q        |          |          |          |
  1+10       1.0275     14.87  | Q        |          |          |          |
  1+15       1.1314     15.08  | VQ       |          |          |          |
  1+20       1.2360     15.19  |  Q       |          |          |          |
  1+25       1.3411     15.27  |  Q       |          |          |          |
  1+30       1.4466     15.32  |  Q       |          |          |          |
  1+35       1.5523     15.35  |  Q       |          |          |          |
  1+40       1.6582     15.38  |  QV      |          |          |          |
  1+45       1.7641     15.38  |  QV      |          |          |          |
  1+50       1.8700     15.38  |  QV      |          |          |          |
  1+55       1.9759     15.38  |  Q V     |          |          |          |
  2+ 0       2.0850     15.84  |  Q V     |          |          |          |
  2+ 5       2.1998     16.67  |  Q V     |          |          |          |
  2+10       2.3121     16.30  |  Q V     |          |          |          |
  2+15       2.4315     17.34  |  Q  V    |          |          |          |
  2+20       2.5535     17.71  |  Q  V    |          |          |          |
  2+25       2.6766     17.87  |  Q  V    |          |          |          |
  2+30       2.8003     17.96  |  Q   V   |          |          |          |
  2+35       2.9244     18.02  |  Q   V   |          |          |          |
  2+40       3.0488     18.06  |  Q   V   |          |          |          |
  2+45       3.1764     18.53  |  Q    V  |          |          |          |
  2+50       3.3132     19.86  |  Q    V  |          |          |          |
  2+55       3.4531     20.31  |   Q   V  |          |          |          |
  3+ 0       3.5944     20.52  |   Q    V|          |          |          |
  3+ 5       3.7365     20.63  |   Q    V|          |          |          |
  3+10       3.8823     21.17  |   Q    V|          |          |          |
  3+15       4.0374     22.52  |   Q     V          |          |          |
  3+20       4.1959     23.01  |   Q     V          |          |          |
  3+25       4.3591     23.70  |   Q     |V         |          |          |
```



3+30	4.5353	25.58	
3+35	4.7273	27.88	
3+40	4.9331	29.88	
3+45	5.1477	31.15	
3+50	5.3740	32.87	
3+55	5.6084	34.03	
4+ 0	5.8542	35.69	
4+ 5	6.1079	36.84	
4+10	6.3761	38.93	
4+15	6.6608	41.35	
4+20	6.9630	43.87	
4+25	7.2831	46.49	
4+30	7.6183	48.66	
4+35	7.9630	50.06	
4+40	8.3232	52.29	
4+45	8.7007	54.81	
4+50	9.0929	56.95	
4+55	9.4944	58.30	
5+ 0	9.9112	60.51	
5+ 5	10.3579	64.87	
5+10	10.8709	74.49	
5+15	11.4569	85.08	
5+20	12.1037	93.91	
5+25	12.8147	103.25	
5+30	13.6201	116.94	
5+35	14.4140	115.27	
5+40	14.8877	68.79	
5+45	15.1681	40.72	
5+50	15.3512	26.59	
5+55	15.4797	18.66	
6+ 0	15.5662	12.56	
6+ 5	15.6207	7.91	
6+10	15.6481	3.98	
6+15	15.6591	1.59	
6+20	15.6643	0.76	
6+25	15.6671	0.40	
6+30	15.6686	0.21	
6+35	15.6692	0.09	
6+40	15.6694	0.04	

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  03/20/24 File: 907hydcpr24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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Keller Crossing, Tr. 38163
Hydrology Proposed Condition Area C onsite = 91.8 Ac
100-year 24-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.017
Lag time =    0.089 Hr.
Lag time =     5.36 Min.
25% of lag time =     1.34 Min.
40% of lag time =     2.15 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.55              142.29

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          4.05              371.79

STORM EVENT (YEAR) =  100.00
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Area Averaged 2-Year Rainfall =    1.550(In)
Area Averaged 100-Year Rainfall =    4.050(In)

Point rain (area averaged) =    4.050(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    4.049(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.300            69.00          0.050
     7.300            69.00          0.075
    61.300            72.00          0.750
    17.900            72.30          0.900
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
69.0  84.4      0.194     0.050         0.185        0.058      0.011
69.0  84.4      0.194     0.075         0.181        0.080      0.014
72.0  86.2      0.173     0.750         0.056        0.668      0.038
72.3  86.4      0.171     0.900         0.033        0.195      0.006
                                                   Sum (F) =   0.069
Area averaged mean soil loss (F) (In/Hr) =  0.069
Minimum soil loss rate ((In/Hr)) =  0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.350
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              U n i t  H y d r o g r a p h
                     VALLEY S-Curve
------------------------------------------------------------------------
              Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         93.206         17.133             15.851
    2   0.167        186.412         47.639             44.074
    3   0.250        279.618         16.784             15.528
    4   0.333        372.824          7.446              6.889
    5   0.417        466.031          4.270              3.950
    6   0.500        559.237          2.755              2.549
    7   0.583        652.443          1.819              1.683
    8   0.667        745.649          1.144              1.059
    9   0.750        838.855          1.010              0.934
                              Sum = 100.000   Sum=      92.517
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 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.07      0.032       (  0.122)       0.011        0.021
  2   0.17     0.07      0.032       (  0.122)       0.011        0.021
  3   0.25     0.07      0.032       (  0.121)       0.011        0.021
  4   0.33     0.10      0.049       (  0.121)       0.017        0.032
  5   0.42     0.10      0.049       (  0.120)       0.017        0.032
  6   0.50     0.10      0.049       (  0.120)       0.017        0.032
  7   0.58     0.10      0.049       (  0.120)       0.017        0.032
  8   0.67     0.10      0.049       (  0.119)       0.017        0.032
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9	0.75	0.10	0.049	(0.119)	0.017	0.032
10	0.83	0.13	0.065	(0.118)	0.023	0.042
11	0.92	0.13	0.065	(0.118)	0.023	0.042
12	1.00	0.13	0.065	(0.117)	0.023	0.042
13	1.08	0.10	0.049	(0.117)	0.017	0.032
14	1.17	0.10	0.049	(0.116)	0.017	0.032
15	1.25	0.10	0.049	(0.116)	0.017	0.032
16	1.33	0.10	0.049	(0.115)	0.017	0.032
17	1.42	0.10	0.049	(0.115)	0.017	0.032
18	1.50	0.10	0.049	(0.114)	0.017	0.032
19	1.58	0.10	0.049	(0.114)	0.017	0.032
20	1.67	0.10	0.049	(0.114)	0.017	0.032
21	1.75	0.10	0.049	(0.113)	0.017	0.032
22	1.83	0.13	0.065	(0.113)	0.023	0.042
23	1.92	0.13	0.065	(0.112)	0.023	0.042
24	2.00	0.13	0.065	(0.112)	0.023	0.042
25	2.08	0.13	0.065	(0.111)	0.023	0.042
26	2.17	0.13	0.065	(0.111)	0.023	0.042
27	2.25	0.13	0.065	(0.110)	0.023	0.042
28	2.33	0.13	0.065	(0.110)	0.023	0.042
29	2.42	0.13	0.065	(0.109)	0.023	0.042
30	2.50	0.13	0.065	(0.109)	0.023	0.042
31	2.58	0.17	0.081	(0.109)	0.028	0.053
32	2.67	0.17	0.081	(0.108)	0.028	0.053
33	2.75	0.17	0.081	(0.108)	0.028	0.053
34	2.83	0.17	0.081	(0.107)	0.028	0.053
35	2.92	0.17	0.081	(0.107)	0.028	0.053
36	3.00	0.17	0.081	(0.106)	0.028	0.053
37	3.08	0.17	0.081	(0.106)	0.028	0.053
38	3.17	0.17	0.081	(0.105)	0.028	0.053
39	3.25	0.17	0.081	(0.105)	0.028	0.053
40	3.33	0.17	0.081	(0.105)	0.028	0.053
41	3.42	0.17	0.081	(0.104)	0.028	0.053
42	3.50	0.17	0.081	(0.104)	0.028	0.053
43	3.58	0.17	0.081	(0.103)	0.028	0.053
44	3.67	0.17	0.081	(0.103)	0.028	0.053
45	3.75	0.17	0.081	(0.102)	0.028	0.053
46	3.83	0.20	0.097	(0.102)	0.034	0.063
47	3.92	0.20	0.097	(0.102)	0.034	0.063
48	4.00	0.20	0.097	(0.101)	0.034	0.063
49	4.08	0.20	0.097	(0.101)	0.034	0.063
50	4.17	0.20	0.097	(0.100)	0.034	0.063
51	4.25	0.20	0.097	(0.100)	0.034	0.063
52	4.33	0.23	0.113	(0.099)	0.040	0.074
53	4.42	0.23	0.113	(0.099)	0.040	0.074
54	4.50	0.23	0.113	(0.099)	0.040	0.074
55	4.58	0.23	0.113	(0.098)	0.040	0.074
56	4.67	0.23	0.113	(0.098)	0.040	0.074
57	4.75	0.23	0.113	(0.097)	0.040	0.074
58	4.83	0.27	0.130	(0.097)	0.045	0.084
59	4.92	0.27	0.130	(0.096)	0.045	0.084
60	5.00	0.27	0.130	(0.096)	0.045	0.084
61	5.08	0.20	0.097	(0.096)	0.034	0.063
62	5.17	0.20	0.097	(0.095)	0.034	0.063
63	5.25	0.20	0.097	(0.095)	0.034	0.063
64	5.33	0.23	0.113	(0.094)	0.040	0.074
65	5.42	0.23	0.113	(0.094)	0.040	0.074
66	5.50	0.23	0.113	(0.094)	0.040	0.074
67	5.58	0.27	0.130	(0.093)	0.045	0.084
68	5.67	0.27	0.130	(0.093)	0.045	0.084
69	5.75	0.27	0.130	(0.092)	0.045	0.084
70	5.83	0.27	0.130	(0.092)	0.045	0.084
71	5.92	0.27	0.130	(0.092)	0.045	0.084

72	6.00	0.27	0.130	(0.091)	0.045	0.084
73	6.08	0.30	0.146	(0.091)	0.051	0.095
74	6.17	0.30	0.146	(0.090)	0.051	0.095
75	6.25	0.30	0.146	(0.090)	0.051	0.095
76	6.33	0.30	0.146	(0.089)	0.051	0.095
77	6.42	0.30	0.146	(0.089)	0.051	0.095
78	6.50	0.30	0.146	(0.089)	0.051	0.095
79	6.58	0.33	0.162	(0.088)	0.057	0.105
80	6.67	0.33	0.162	(0.088)	0.057	0.105
81	6.75	0.33	0.162	(0.088)	0.057	0.105
82	6.83	0.33	0.162	(0.087)	0.057	0.105
83	6.92	0.33	0.162	(0.087)	0.057	0.105
84	7.00	0.33	0.162	(0.086)	0.057	0.105
85	7.08	0.33	0.162	(0.086)	0.057	0.105
86	7.17	0.33	0.162	(0.086)	0.057	0.105
87	7.25	0.33	0.162	(0.085)	0.057	0.105
88	7.33	0.37	0.178	(0.085)	0.062	0.116
89	7.42	0.37	0.178	(0.084)	0.062	0.116
90	7.50	0.37	0.178	(0.084)	0.062	0.116
91	7.58	0.40	0.194	(0.084)	0.068	0.126
92	7.67	0.40	0.194	(0.083)	0.068	0.126
93	7.75	0.40	0.194	(0.083)	0.068	0.126
94	7.83	0.43	0.211	(0.082)	0.074	0.137
95	7.92	0.43	0.211	(0.082)	0.074	0.137
96	8.00	0.43	0.211	(0.082)	0.074	0.137
97	8.08	0.50	0.243	0.081	(0.085)	0.162
98	8.17	0.50	0.243	0.081	(0.085)	0.162
99	8.25	0.50	0.243	0.081	(0.085)	0.162
100	8.33	0.50	0.243	0.080	(0.085)	0.163
101	8.42	0.50	0.243	0.080	(0.085)	0.163
102	8.50	0.50	0.243	0.079	(0.085)	0.164
103	8.58	0.53	0.259	0.079	(0.091)	0.180
104	8.67	0.53	0.259	0.079	(0.091)	0.180
105	8.75	0.53	0.259	0.078	(0.091)	0.181
106	8.83	0.57	0.275	0.078	(0.096)	0.197
107	8.92	0.57	0.275	0.078	(0.096)	0.198
108	9.00	0.57	0.275	0.077	(0.096)	0.198
109	9.08	0.63	0.308	0.077	(0.108)	0.231
110	9.17	0.63	0.308	0.076	(0.108)	0.231
111	9.25	0.63	0.308	0.076	(0.108)	0.232
112	9.33	0.67	0.324	0.076	(0.113)	0.248
113	9.42	0.67	0.324	0.075	(0.113)	0.249
114	9.50	0.67	0.324	0.075	(0.113)	0.249
115	9.58	0.70	0.340	0.075	(0.119)	0.265
116	9.67	0.70	0.340	0.074	(0.119)	0.266
117	9.75	0.70	0.340	0.074	(0.119)	0.266
118	9.83	0.73	0.356	0.074	(0.125)	0.283
119	9.92	0.73	0.356	0.073	(0.125)	0.283
120	10.00	0.73	0.356	0.073	(0.125)	0.283
121	10.08	0.50	0.243	0.073	(0.085)	0.170
122	10.17	0.50	0.243	0.072	(0.085)	0.171
123	10.25	0.50	0.243	0.072	(0.085)	0.171
124	10.33	0.50	0.243	0.071	(0.085)	0.171
125	10.42	0.50	0.243	0.071	(0.085)	0.172
126	10.50	0.50	0.243	0.071	(0.085)	0.172
127	10.58	0.67	0.324	0.070	(0.113)	0.253
128	10.67	0.67	0.324	0.070	(0.113)	0.254
129	10.75	0.67	0.324	0.070	(0.113)	0.254
130	10.83	0.67	0.324	0.069	(0.113)	0.255
131	10.92	0.67	0.324	0.069	(0.113)	0.255
132	11.00	0.67	0.324	0.069	(0.113)	0.255
133	11.08	0.63	0.308	0.068	(0.108)	0.239
134	11.17	0.63	0.308	0.068	(0.108)	0.240

135	11.25	0.63	0.308	0.068	(0.108)	0.240
136	11.33	0.63	0.308	0.067	(0.108)	0.240
137	11.42	0.63	0.308	0.067	(0.108)	0.241
138	11.50	0.63	0.308	0.067	(0.108)	0.241
139	11.58	0.57	0.275	0.066	(0.096)	0.209
140	11.67	0.57	0.275	0.066	(0.096)	0.209
141	11.75	0.57	0.275	0.066	(0.096)	0.210
142	11.83	0.60	0.292	0.065	(0.102)	0.226
143	11.92	0.60	0.292	0.065	(0.102)	0.226
144	12.00	0.60	0.292	0.065	(0.102)	0.227
145	12.08	0.83	0.405	0.064	(0.142)	0.340
146	12.17	0.83	0.405	0.064	(0.142)	0.341
147	12.25	0.83	0.405	0.064	(0.142)	0.341
148	12.33	0.87	0.421	0.063	(0.147)	0.358
149	12.42	0.87	0.421	0.063	(0.147)	0.358
150	12.50	0.87	0.421	0.063	(0.147)	0.358
151	12.58	0.93	0.454	0.063	(0.159)	0.391
152	12.67	0.93	0.454	0.062	(0.159)	0.391
153	12.75	0.93	0.454	0.062	(0.159)	0.392
154	12.83	0.97	0.470	0.062	(0.164)	0.408
155	12.92	0.97	0.470	0.061	(0.164)	0.408
156	13.00	0.97	0.470	0.061	(0.164)	0.409
157	13.08	1.13	0.551	0.061	(0.193)	0.490
158	13.17	1.13	0.551	0.060	(0.193)	0.490
159	13.25	1.13	0.551	0.060	(0.193)	0.491
160	13.33	1.13	0.551	0.060	(0.193)	0.491
161	13.42	1.13	0.551	0.059	(0.193)	0.491
162	13.50	1.13	0.551	0.059	(0.193)	0.492
163	13.58	0.77	0.373	0.059	(0.130)	0.314
164	13.67	0.77	0.373	0.059	(0.130)	0.314
165	13.75	0.77	0.373	0.058	(0.130)	0.314
166	13.83	0.77	0.373	0.058	(0.130)	0.315
167	13.92	0.77	0.373	0.058	(0.130)	0.315
168	14.00	0.77	0.373	0.057	(0.130)	0.315
169	14.08	0.90	0.437	0.057	(0.153)	0.380
170	14.17	0.90	0.437	0.057	(0.153)	0.381
171	14.25	0.90	0.437	0.056	(0.153)	0.381
172	14.33	0.87	0.421	0.056	(0.147)	0.365
173	14.42	0.87	0.421	0.056	(0.147)	0.365
174	14.50	0.87	0.421	0.056	(0.147)	0.366
175	14.58	0.87	0.421	0.055	(0.147)	0.366
176	14.67	0.87	0.421	0.055	(0.147)	0.366
177	14.75	0.87	0.421	0.055	(0.147)	0.366
178	14.83	0.83	0.405	0.054	(0.142)	0.350
179	14.92	0.83	0.405	0.054	(0.142)	0.351
180	15.00	0.83	0.405	0.054	(0.142)	0.351
181	15.08	0.80	0.389	0.054	(0.136)	0.335
182	15.17	0.80	0.389	0.053	(0.136)	0.335
183	15.25	0.80	0.389	0.053	(0.136)	0.336
184	15.33	0.77	0.373	0.053	(0.130)	0.320
185	15.42	0.77	0.373	0.053	(0.130)	0.320
186	15.50	0.77	0.373	0.052	(0.130)	0.320
187	15.58	0.63	0.308	0.052	(0.108)	0.256
188	15.67	0.63	0.308	0.052	(0.108)	0.256
189	15.75	0.63	0.308	0.051	(0.108)	0.256
190	15.83	0.63	0.308	0.051	(0.108)	0.257
191	15.92	0.63	0.308	0.051	(0.108)	0.257
192	16.00	0.63	0.308	0.051	(0.108)	0.257
193	16.08	0.13	0.065	(0.050)	0.023	0.042
194	16.17	0.13	0.065	(0.050)	0.023	0.042
195	16.25	0.13	0.065	(0.050)	0.023	0.042
196	16.33	0.13	0.065	(0.050)	0.023	0.042
197	16.42	0.13	0.065	(0.049)	0.023	0.042

198	16.50	0.13	0.065	(0.049)	0.023	0.042
199	16.58	0.10	0.049	(0.049)	0.017	0.032
200	16.67	0.10	0.049	(0.049)	0.017	0.032
201	16.75	0.10	0.049	(0.048)	0.017	0.032
202	16.83	0.10	0.049	(0.048)	0.017	0.032
203	16.92	0.10	0.049	(0.048)	0.017	0.032
204	17.00	0.10	0.049	(0.048)	0.017	0.032
205	17.08	0.17	0.081	(0.047)	0.028	0.053
206	17.17	0.17	0.081	(0.047)	0.028	0.053
207	17.25	0.17	0.081	(0.047)	0.028	0.053
208	17.33	0.17	0.081	(0.047)	0.028	0.053
209	17.42	0.17	0.081	(0.046)	0.028	0.053
210	17.50	0.17	0.081	(0.046)	0.028	0.053
211	17.58	0.17	0.081	(0.046)	0.028	0.053
212	17.67	0.17	0.081	(0.046)	0.028	0.053
213	17.75	0.17	0.081	(0.046)	0.028	0.053
214	17.83	0.13	0.065	(0.045)	0.023	0.042
215	17.92	0.13	0.065	(0.045)	0.023	0.042
216	18.00	0.13	0.065	(0.045)	0.023	0.042
217	18.08	0.13	0.065	(0.045)	0.023	0.042
218	18.17	0.13	0.065	(0.044)	0.023	0.042
219	18.25	0.13	0.065	(0.044)	0.023	0.042
220	18.33	0.13	0.065	(0.044)	0.023	0.042
221	18.42	0.13	0.065	(0.044)	0.023	0.042
222	18.50	0.13	0.065	(0.044)	0.023	0.042
223	18.58	0.10	0.049	(0.043)	0.017	0.032
224	18.67	0.10	0.049	(0.043)	0.017	0.032
225	18.75	0.10	0.049	(0.043)	0.017	0.032
226	18.83	0.07	0.032	(0.043)	0.011	0.021
227	18.92	0.07	0.032	(0.043)	0.011	0.021
228	19.00	0.07	0.032	(0.042)	0.011	0.021
229	19.08	0.10	0.049	(0.042)	0.017	0.032
230	19.17	0.10	0.049	(0.042)	0.017	0.032
231	19.25	0.10	0.049	(0.042)	0.017	0.032
232	19.33	0.13	0.065	(0.042)	0.023	0.042
233	19.42	0.13	0.065	(0.041)	0.023	0.042
234	19.50	0.13	0.065	(0.041)	0.023	0.042
235	19.58	0.10	0.049	(0.041)	0.017	0.032
236	19.67	0.10	0.049	(0.041)	0.017	0.032
237	19.75	0.10	0.049	(0.041)	0.017	0.032
238	19.83	0.07	0.032	(0.040)	0.011	0.021
239	19.92	0.07	0.032	(0.040)	0.011	0.021
240	20.00	0.07	0.032	(0.040)	0.011	0.021
241	20.08	0.10	0.049	(0.040)	0.017	0.032
242	20.17	0.10	0.049	(0.040)	0.017	0.032
243	20.25	0.10	0.049	(0.040)	0.017	0.032
244	20.33	0.10	0.049	(0.039)	0.017	0.032
245	20.42	0.10	0.049	(0.039)	0.017	0.032
246	20.50	0.10	0.049	(0.039)	0.017	0.032
247	20.58	0.10	0.049	(0.039)	0.017	0.032
248	20.67	0.10	0.049	(0.039)	0.017	0.032
249	20.75	0.10	0.049	(0.039)	0.017	0.032
250	20.83	0.07	0.032	(0.038)	0.011	0.021
251	20.92	0.07	0.032	(0.038)	0.011	0.021
252	21.00	0.07	0.032	(0.038)	0.011	0.021
253	21.08	0.10	0.049	(0.038)	0.017	0.032
254	21.17	0.10	0.049	(0.038)	0.017	0.032
255	21.25	0.10	0.049	(0.038)	0.017	0.032
256	21.33	0.07	0.032	(0.038)	0.011	0.021
257	21.42	0.07	0.032	(0.037)	0.011	0.021
258	21.50	0.07	0.032	(0.037)	0.011	0.021
259	21.58	0.10	0.049	(0.037)	0.017	0.032
260	21.67	0.10	0.049	(0.037)	0.017	0.032

```
261  21.75     0.10      0.049       (  0.037)       0.017        0.032
262  21.83     0.07      0.032       (  0.037)       0.011        0.021
263  21.92     0.07      0.032       (  0.037)       0.011        0.021
264  22.00     0.07      0.032       (  0.036)       0.011        0.021
265  22.08     0.10      0.049       (  0.036)       0.017        0.032
266  22.17     0.10      0.049       (  0.036)       0.017        0.032
267  22.25     0.10      0.049       (  0.036)       0.017        0.032
268  22.33     0.07      0.032       (  0.036)       0.011        0.021
269  22.42     0.07      0.032       (  0.036)       0.011        0.021
270  22.50     0.07      0.032       (  0.036)       0.011        0.021
271  22.58     0.07      0.032       (  0.036)       0.011        0.021
272  22.67     0.07      0.032       (  0.036)       0.011        0.021
273  22.75     0.07      0.032       (  0.035)       0.011        0.021
274  22.83     0.07      0.032       (  0.035)       0.011        0.021
275  22.92     0.07      0.032       (  0.035)       0.011        0.021
276  23.00     0.07      0.032       (  0.035)       0.011        0.021
277  23.08     0.07      0.032       (  0.035)       0.011        0.021
278  23.17     0.07      0.032       (  0.035)       0.011        0.021
279  23.25     0.07      0.032       (  0.035)       0.011        0.021
280  23.33     0.07      0.032       (  0.035)       0.011        0.021
281  23.42     0.07      0.032       (  0.035)       0.011        0.021
282  23.50     0.07      0.032       (  0.035)       0.011        0.021
283  23.58     0.07      0.032       (  0.035)       0.011        0.021
284  23.67     0.07      0.032       (  0.035)       0.011        0.021
285  23.75     0.07      0.032       (  0.035)       0.011        0.021
286  23.83     0.07      0.032       (  0.035)       0.011        0.021
287  23.92     0.07      0.032       (  0.035)       0.011        0.021
288  24.00     0.07      0.032       (  0.035)       0.011        0.021
            (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    37.2
      Flood volume = Effective rainfall      3.10(In)
       times area      91.8(Ac.)/[(In)/(Ft.)] =      23.7(Ac.Ft)
      Total soil loss =      0.95(In)
      Total soil loss =     7.246(Ac.Ft)
      Total rainfall =      4.05(In)
      Flood volume =     1033739.7 Cubic Feet
      Total soil loss =      315616.1 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =     45.160(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                      R u n o f f      H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
 ------------------------------------------------------------------------
   0+ 5       0.0023      0.33  Q         |         |         |         |
   0+10       0.0110      1.26  VQ        |         |         |         |
   0+15       0.0219      1.59  VQ        |         |         |         |
   0+20       0.0350      1.90  VQ        |         |         |         |
   0+25       0.0519      2.45  VQ        |         |         |         |
   0+30       0.0703      2.67  V Q       |         |         |         |
   0+35       0.0894      2.77  V Q       |         |         |         |
   0+40       0.1089      2.84  V Q       |         |         |         |
   0+45       0.1288      2.88  V Q       |         |         |         |
   0+50       0.1499      3.07  V Q       |         |         |         |
   0+55       0.1743      3.54  V Q       |         |         |         |
   1+ 0       0.2000      3.72  V Q       |         |         |         |
   1+ 5       0.2249      3.62  V Q       |         |         |         |
   1+10       0.2470      3.20  V Q       |         |         |         |
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1+15       0.2681      3.06  V Q       |          |          |          |
1+20       0.2888      3.01  V Q       |          |          |          |
1+25       0.3093      2.98  V Q       |          |          |          |
1+30       0.3297      2.96  V Q       |          |          |          |
1+35       0.3500      2.94  V Q       |          |          |          |
1+40       0.3702      2.93  V Q       |          |          |          |
1+45       0.3903      2.92  V Q       |          |          |          |
1+50       0.4116      3.09  V Q       |          |          |          |
1+55       0.4361      3.55  V Q       |          |          |          |
2+ 0       0.4617      3.72  V Q       |          |          |          |
2+ 5       0.4878      3.79  V  Q      |          |          |          |
2+10       0.5142      3.83  V  Q      |          |          |          |
2+15       0.5408      3.86  V  Q      |          |          |          |
2+20       0.5675      3.88  V  Q      |          |          |          |
2+25       0.5943      3.89  |V Q      |          |          |          |
2+30       0.6211      3.90  |V Q      |          |          |          |
2+35       0.6491      4.07  |V Q      |          |          |          |
2+40       0.6803      4.53  |V Q      |          |          |          |
2+45       0.7126      4.69  |V Q      |          |          |          |
2+50       0.7455      4.77  |V Q      |          |          |          |
2+55       0.7786      4.81  |V Q      |          |          |          |
3+ 0       0.8119      4.83  |V Q      |          |          |          |
3+ 5       0.8453      4.85  |V Q      |          |          |          |
3+10       0.8788      4.86  |V Q      |          |          |          |
3+15       0.9123      4.87  |V Q      |          |          |          |
3+20       0.9459      4.87  |V Q      |          |          |          |
3+25       0.9794      4.87  |V Q      |          |          |          |
3+30       1.0130      4.87  |V Q      |          |          |          |
3+35       1.0465      4.87  |V Q      |          |          |          |
3+40       1.0801      4.87  |V Q      |          |          |          |
3+45       1.1137      4.87  |V Q      |          |          |          |
3+50       1.1484      5.04  |V  Q     |          |          |          |
3+55       1.1863      5.50  |V  Q     |          |          |          |
4+ 0       1.2253      5.67  | V Q     |          |          |          |
4+ 5       1.2648      5.74  | V Q     |          |          |          |
4+10       1.3047      5.78  | V Q     |          |          |          |
4+15       1.3447      5.81  | V Q     |          |          |          |
4+20       1.3859      5.99  | V Q     |          |          |          |
4+25       1.4305      6.47  | V  Q    |          |          |          |
4+30       1.4762      6.64  | V  Q    |          |          |          |
4+35       1.5225      6.71  | V  Q    |          |          |          |
4+40       1.5690      6.76  | V  Q    |          |          |          |
4+45       1.6157      6.78  | V  Q    |          |          |          |
4+50       1.6637      6.97  | V  Q    |          |          |          |
4+55       1.7150      7.44  | V  Q    |          |          |          |
5+ 0       1.7674      7.62  | V   Q   |          |          |          |
5+ 5       1.8181      7.36  |  V Q    |          |          |          |
5+10       1.8626      6.47  |  V Q    |          |          |          |
5+15       1.9051      6.17  |  VQ     |          |          |          |
5+20       1.9479      6.21  |  VQ     |          |          |          |
5+25       1.9933      6.60  |  V Q    |          |          |          |
5+30       2.0396      6.72  |  V Q    |          |          |          |
5+35       2.0873      6.92  |  V Q    |          |          |          |
5+40       2.1383      7.41  |  V Q    |          |          |          |
5+45       2.1905      7.58  |  V  Q   |          |          |          |
5+50       2.2433      7.67  |  V  Q   |          |          |          |
5+55       2.2965      7.72  |  V  Q   |          |          |          |
6+ 0       2.3499      7.76  |  V  Q   |          |          |          |
6+ 5       2.4046      7.94  |   V Q   |          |          |          |
6+10       2.4626      8.42  |   V Q   |          |          |          |
6+15       2.5217      8.59  |   V Q   |          |          |          |
6+20       2.5814      8.66  |   V Q   |          |          |          |
6+25       2.6413      8.71  |   V Q   |          |          |          |
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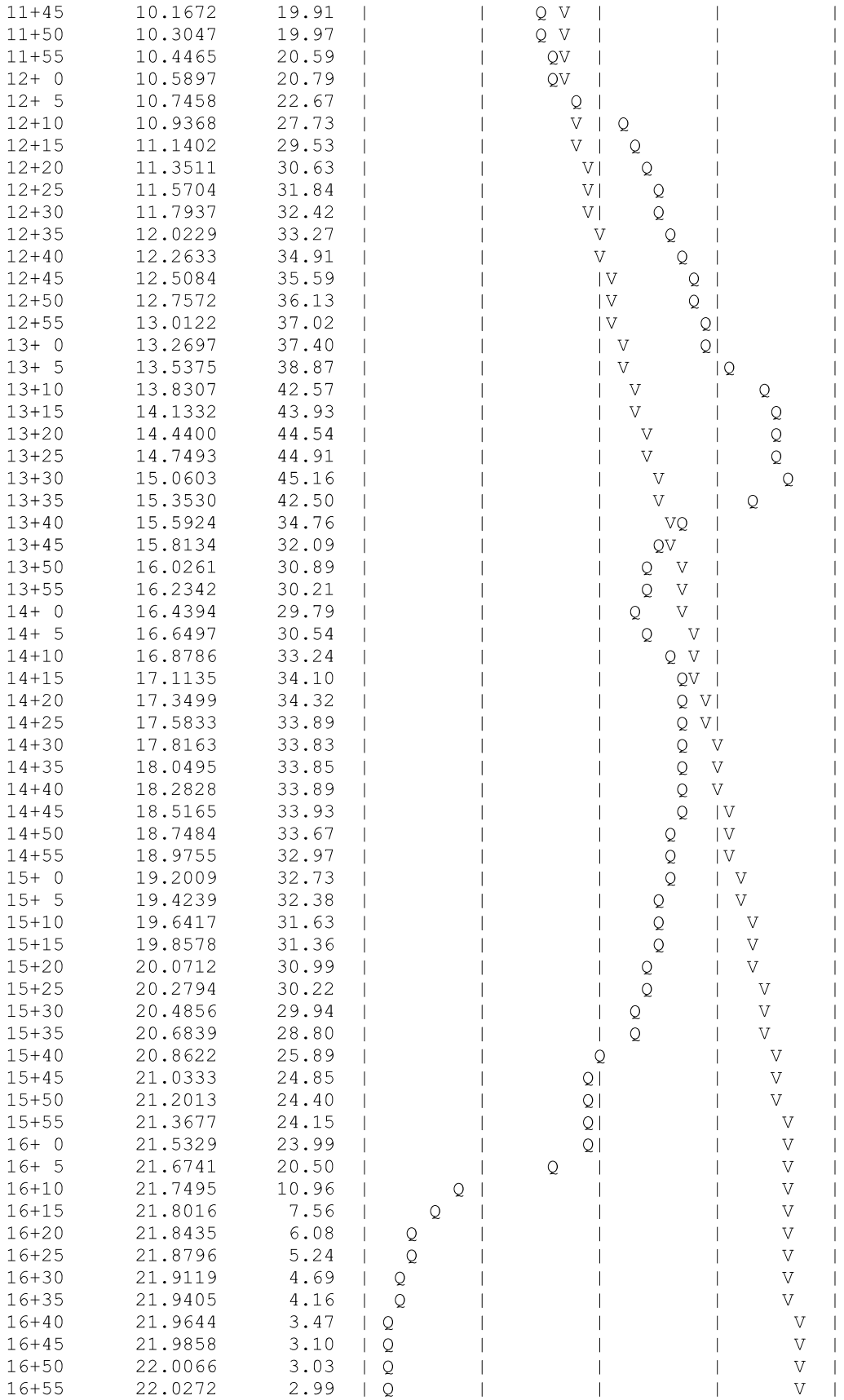
 6+30       2.7015      8.73  |   V Q   |         |         |         |
 6+35       2.7629      8.92  |   V  Q  |         |         |         |
 6+40       2.8276      9.39  |   V  Q  |         |         |         |
 6+45       2.8935      9.57  |   V  Q  |         |         |         |
 6+50       2.9598      9.64  |   V  Q  |         |         |         |
 6+55       3.0265      9.68  |    V Q  |         |         |         |
 7+ 0       3.0934      9.71  |    V Q  |         |         |         |
 7+ 5       3.1603      9.72  |    V Q  |         |         |         |
 7+10       3.2274      9.74  |    V Q  |         |         |         |
 7+15       3.2945      9.75  |    V Q  |         |         |         |
 7+20       3.3628      9.91  |    V Q  |         |         |         |
 7+25       3.4342     10.38  |    V  Q |         |         |         |
 7+30       3.5068     10.54  |    V  Q |         |         |         |
 7+35       3.5811     10.78  |     V Q |         |         |         |
 7+40       3.6588     11.29  |     V  Q|         |         |         |
 7+45       3.7378     11.48  |     V  Q|         |         |         |
 7+50       3.8186     11.73  |     V  Q|         |         |         |
 7+55       3.9030     12.25  |     V  Q|         |         |         |
 8+ 0       3.9887     12.45  |     V  Q|         |         |         |
 8+ 5       4.0778     12.93  |     V   Q         |         |         |
 8+10       4.1748     14.09  |      V  |Q        |         |         |
 8+15       4.2749     14.53  |      V  |Q        |         |         |
 8+20       4.3765     14.75  |      V  |Q        |         |         |
 8+25       4.4790     14.89  |      V  |Q        |         |         |
 8+30       4.5822     14.99  |      V  |Q        |         |         |
 8+35       4.6878     15.32  |      V  | Q       |         |         |
 8+40       4.7987     16.10  |       V | Q       |         |         |
 8+45       4.9117     16.41  |       V |  Q      |         |         |
 8+50       5.0274     16.81  |       V |  Q      |         |         |
 8+55       5.1488     17.62  |       V |   Q     |         |         |
 9+ 0       5.2724     17.95  |       V |   Q     |         |         |
 9+ 5       5.4008     18.64  |        V|   Q     |         |         |
 9+10       5.5398     20.18  |        V|     Q   |         |         |
 9+15       5.6828     20.77  |        V|     Q   |         |         |
 9+20       5.8296     21.32  |        V|      Q  |         |         |
 9+25       5.9826     22.21  |         V      Q  |         |         |
 9+30       6.1382     22.59  |         V       Q |         |         |
 9+35       6.2969     23.05  |         V       Q |         |         |
 9+40       6.4615     23.89  |         V        Q|         |         |
 9+45       6.6285     24.25  |         |V       Q|         |         |
 9+50       6.7984     24.68  |         |V       Q|         |         |
 9+55       6.9741     25.51  |         |V        Q         |         |
10+ 0       7.1521     25.85  |         | V       Q         |         |
10+ 5       7.3190     24.22  |         | V      Q|         |         |
10+10       7.4521     19.34  |         | V  Q     |         |         |
10+15       7.5738     17.66  |         | V Q      |         |         |
10+20       7.6905     16.94  |         | VQ       |         |         |
10+25       7.8044     16.54  |         |  Q       |         |         |
10+30       7.9167     16.30  |         |  Q       |         |         |
10+35       8.0367     17.43  |         |  Q       |         |         |
10+40       8.1807     20.91  |         |  V  Q    |         |         |
10+45       8.3329     22.09  |         |   V  Q   |         |         |
10+50       8.4891     22.68  |         |   V   Q  |         |         |
10+55       8.6477     23.04  |         |   V   Q  |         |         |
11+ 0       8.8080     23.27  |         |   V   Q  |         |         |
11+ 5       8.9677     23.19  |         |    V  Q  |         |         |
11+10       9.1233     22.59  |         |    V  Q  |         |         |
11+15       9.2779     22.44  |         |    V Q   |         |         |
11+20       9.4319     22.36  |         |    V Q   |         |         |
11+25       9.5857     22.33  |         |     VQ   |         |         |
11+30       9.7394     22.32  |         |     VQ   |         |         |
11+35       9.8896     21.81  |         |     VQ   |         |         |
11+40      10.0301     20.39  |         |     Q    |         |         |
```



11+45	10.1672	19.91	Q V
11+50	10.3047	19.97	Q V
11+55	10.4465	20.59	QV
12+ 0	10.5897	20.79	QV
12+ 5	10.7458	22.67	Q
12+10	10.9368	27.73	V Q
12+15	11.1402	29.53	V Q
12+20	11.3511	30.63	V Q
12+25	11.5704	31.84	V Q
12+30	11.7937	32.42	V Q
12+35	12.0229	33.27	V Q
12+40	12.2633	34.91	V Q
12+45	12.5084	35.59	V Q
12+50	12.7572	36.13	V Q
12+55	13.0122	37.02	V Q
13+ 0	13.2697	37.40	V Q
13+ 5	13.5375	38.87	V Q
13+10	13.8307	42.57	V Q
13+15	14.1332	43.93	V Q
13+20	14.4400	44.54	V Q
13+25	14.7493	44.91	V Q
13+30	15.0603	45.16	V Q
13+35	15.3530	42.50	V Q
13+40	15.5924	34.76	VQ
13+45	15.8134	32.09	QV
13+50	16.0261	30.89	Q V
13+55	16.2342	30.21	Q V
14+ 0	16.4394	29.79	Q V
14+ 5	16.6497	30.54	Q V
14+10	16.8786	33.24	Q V
14+15	17.1135	34.10	QV
14+20	17.3499	34.32	Q V
14+25	17.5833	33.89	Q V
14+30	17.8163	33.83	Q V
14+35	18.0495	33.85	Q V
14+40	18.2828	33.89	Q V
14+45	18.5165	33.93	Q V
14+50	18.7484	33.67	Q V
14+55	18.9755	32.97	Q V
15+ 0	19.2009	32.73	Q V
15+ 5	19.4239	32.38	Q V
15+10	19.6417	31.63	Q V
15+15	19.8578	31.36	Q V
15+20	20.0712	30.99	Q V
15+25	20.2794	30.22	Q V
15+30	20.4856	29.94	Q V
15+35	20.6839	28.80	Q V
15+40	20.8622	25.89	Q V
15+45	21.0333	24.85	Q V
15+50	21.2013	24.40	Q V
15+55	21.3677	24.15	Q V
16+ 0	21.5329	23.99	Q V
16+ 5	21.6741	20.50	Q V
16+10	21.7495	10.96	Q V
16+15	21.8016	7.56	Q V
16+20	21.8435	6.08	Q V
16+25	21.8796	5.24	Q V
16+30	21.9119	4.69	Q V
16+35	21.9405	4.16	Q V
16+40	21.9644	3.47	Q V
16+45	21.9858	3.10	Q V
16+50	22.0066	3.03	Q V
16+55	22.0272	2.99	Q V

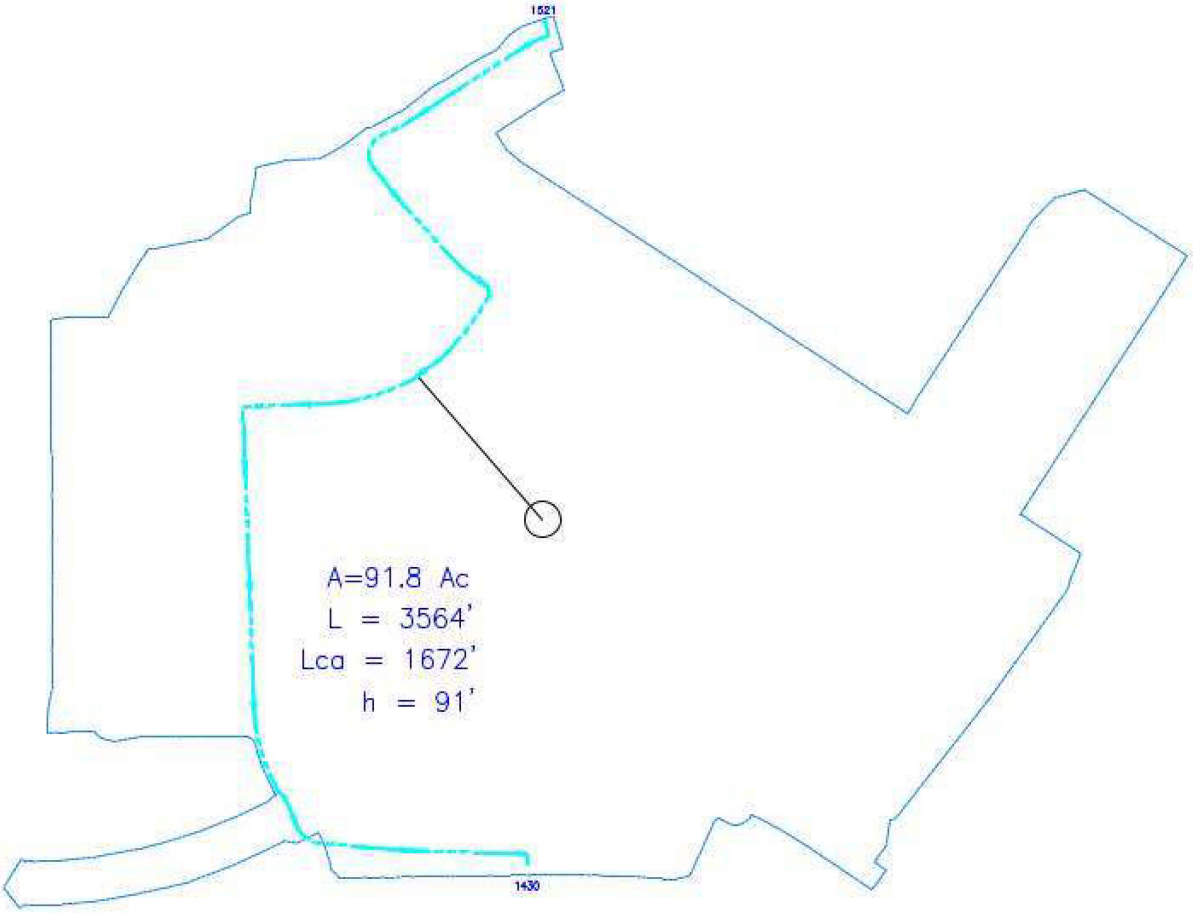
17+ 0	22.0476	2.96	| Q	|	|	|	V |
17+ 5	22.0702	3.28	| Q	|	|	|	V |
17+10	22.0991	4.20	| Q	|	|	|	V |
17+15	22.1302	4.51	| Q	|	|	|	V |
17+20	22.1623	4.66	| Q	|	|	|	V |
17+25	22.1949	4.74	| Q	|	|	|	V |
17+30	22.2279	4.80	| Q	|	|	|	V |
17+35	22.2612	4.83	| Q	|	|	|	V |
17+40	22.2946	4.85	| Q	|	|	|	V |
17+45	22.3282	4.87	| Q	|	|	|	V |
17+50	22.3606	4.71	| Q	|	|	|	V |
17+55	22.3898	4.24	| Q	|	|	|	V |
18+ 0	22.4179	4.08	| Q	|	|	|	V |
18+ 5	22.4455	4.01	| Q	|	|	|	V |
18+10	22.4728	3.96	| Q	|	|	|	V |
18+15	22.4999	3.94	| Q	|	|	|	V |
18+20	22.5269	3.92	| Q	|	|	|	V |
18+25	22.5538	3.91	| Q	|	|	|	V |
18+30	22.5806	3.90	| Q	|	|	|	V |
18+35	22.6063	3.73	| Q	|	|	|	V |
18+40	22.6288	3.27	| Q	|	|	|	V |
18+45	22.6502	3.10	| Q	|	|	|	V |
18+50	22.6699	2.86	| Q	|	|	|	V |
18+55	22.6862	2.36	|Q	|	|	|	V |
19+ 0	22.7011	2.17	|Q	|	|	|	V |
19+ 5	22.7166	2.24	|Q	|	|	|	V |
19+10	22.7348	2.66	| Q	|	|	|	V |
19+15	22.7540	2.78	| Q	|	|	|	V |
19+20	22.7747	3.00	| Q	|	|	|	V |
19+25	22.7988	3.50	| Q	|	|	|	V |
19+30	22.8241	3.68	| Q	|	|	|	V |
19+35	22.8490	3.60	| Q	|	|	|	V |
19+40	22.8709	3.19	| Q	|	|	|	V |
19+45	22.8920	3.06	| Q	|	|	|	V |
19+50	22.9116	2.84	| Q	|	|	|	V |
19+55	22.9278	2.35	|Q	|	|	|	V |
20+ 0	22.9427	2.17	|Q	|	|	|	V |
20+ 5	22.9582	2.24	|Q	|	|	|	V |
20+10	22.9765	2.66	| Q	|	|	|	V |
20+15	22.9956	2.78	| Q	|	|	|	V |
20+20	23.0152	2.84	| Q	|	|	|	V |
20+25	23.0349	2.87	| Q	|	|	|	V |
20+30	23.0548	2.88	| Q	|	|	|	V |
20+35	23.0748	2.90	| Q	|	|	|	V |
20+40	23.0948	2.91	| Q	|	|	|	V |
20+45	23.1150	2.92	| Q	|	|	|	V |
20+50	23.1340	2.76	| Q	|	|	|	V |
20+55	23.1498	2.29	|Q	|	|	|	V|
21+ 0	23.1644	2.13	|Q	|	|	|	V|
21+ 5	23.1797	2.22	|Q	|	|	|	V|
21+10	23.1980	2.65	| Q	|	|	|	V|
21+15	23.2171	2.78	| Q	|	|	|	V|
21+20	23.2355	2.67	| Q	|	|	|	V|
21+25	23.2509	2.24	|Q	|	|	|	V|
21+30	23.2653	2.09	|Q	|	|	|	V|
21+35	23.2805	2.20	|Q	|	|	|	V|
21+40	23.2986	2.64	| Q	|	|	|	V|
21+45	23.3178	2.78	| Q	|	|	|	V|
21+50	23.3362	2.67	| Q	|	|	|	V|
21+55	23.3516	2.24	|Q	|	|	|	V|
22+ 0	23.3660	2.09	|Q	|	|	|	V|
22+ 5	23.3811	2.20	|Q	|	|	|	V|
22+10	23.3993	2.64	| Q	|	|	|	V|

22+15	23.4185	2.78	| Q	|	|	|	V|
22+20	23.4369	2.67	| Q	|	|	|	V|
22+25	23.4523	2.24	|Q	|	|	|	V|
22+30	23.4667	2.09	|Q	|	|	|	V|
22+35	23.4807	2.04	|Q	|	|	|	V|
22+40	23.4945	2.00	|Q	|	|	|	V|
22+45	23.5082	1.99	|Q	|	|	|	V|
22+50	23.5217	1.97	|Q	|	|	|	V|
22+55	23.5352	1.96	|Q	|	|	|	V|
23+ 0	23.5487	1.95	|Q	|	|	|	V|
23+ 5	23.5621	1.95	|Q	|	|	|	V|
23+10	23.5755	1.95	|Q	|	|	|	V|
23+15	23.5889	1.95	|Q	|	|	|	V|
23+20	23.6023	1.95	|Q	|	|	|	V|
23+25	23.6158	1.95	|Q	|	|	|	V|
23+30	23.6292	1.95	|Q	|	|	|	V|
23+35	23.6426	1.95	|Q	|	|	|	V|
23+40	23.6560	1.95	|Q	|	|	|	V|
23+45	23.6695	1.95	|Q	|	|	|	V|
23+50	23.6829	1.95	|Q	|	|	|	V|
23+55	23.6963	1.95	|Q	|	|	|	V|
24+ 0	23.7097	1.95	|Q	|	|	|	V|
24+ 5	23.7209	1.62	|Q	|	|	|	V|
24+10	23.7256	0.69	Q	|	|	|	V|
24+15	23.7281	0.36	Q	|	|	|	V|
24+20	23.7295	0.21	Q	|	|	|	V|
24+25	23.7304	0.13	Q	|	|	|	V|
24+30	23.7310	0.08	Q	|	|	|	V|
24+35	23.7313	0.04	Q	|	|	|	V|
24+40	23.7314	0.02	Q	|	|	|	V

ATTACHMENT F:

INFLOW HYDROGRAPHS
DRAINAGE AREA C (ON-SITE)
EXISTING CONDITION FOR COMPARISON

INFLOW HYDROGRAPHS
EXISTING CONDITION
Drainage Area C (On-site)
For Comparison Sensitive Analysis
2-, 5-, 10-, 100-yr 1-, 3-, 6-, 24-hour storm



Drainage Area C (Existing on-site)

```
                U n i t   H y d r o g r a p h   A n a l y s i s

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             Study date  04/04/24 File: 907hydc2ex12.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format


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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
2-year 1-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.50                45.90

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.20               110.16

STORM EVENT (YEAR) =    2.00
```

```
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    0.500(In)
Areal adjustment factor =   99.92 %
Adjusted average point rain =    0.500(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    91.800           81.80          0.020
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
81.8  65.5      0.410     0.020         0.403       1.000      0.403
                                                  Sum (F) =   0.403
Area averaged mean soil loss (F) (In/Hr) =  0.403
Minimum soil loss rate ((In/Hr)) =  0.201
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.880
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5500
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
-------------------------------------------------------------------
             Unit Hydrograph Data
-------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
-------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
   12   1.000        633.802          0.925             0.856
   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                               Sum = 100.000   Sum=      92.517
-------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
  1   0.08     3.30      0.198       (  0.403)       0.174        0.024
  2   0.17     4.20      0.252       (  0.403)       0.222        0.030
  3   0.25     4.40      0.264       (  0.403)       0.232        0.032
  4   0.33     4.80      0.288       (  0.403)       0.253        0.035
  5   0.42     5.20      0.312       (  0.403)       0.274        0.037
```

```
  6   0.50     6.20      0.372       (  0.403)       0.327        0.045
  7   0.58     6.80      0.408       (  0.403)       0.359        0.049
  8   0.67     8.80      0.528          0.403    (  0.464)        0.125
  9   0.75    13.90      0.833          0.403    (  0.733)        0.430
 10   0.83    31.40      1.882          0.403    (  1.657)        1.479
 11   0.92     7.20      0.432       (  0.403)       0.380        0.052
 12   1.00     3.80      0.228       (  0.403)       0.200        0.027
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =     2.4
      Flood volume = Effective rainfall      0.20(In)
       times area      91.8(Ac.)/[(In)/(Ft.)] =       1.5(Ac.Ft)
      Total soil loss =      0.30(In)
      Total soil loss =     2.314(Ac.Ft)
      Total rainfall =      0.50(In)
      Flood volume =       65661.4 Cubic Feet
      Total soil loss =      100817.0 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     52.867(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          1 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       15.0      30.0      45.0      60.0
  ---------------------------------------------------------------------------
    0+ 5       0.0010      0.15  Q         |         |         |         |
    0+10       0.0066      0.81  Q         |         |         |         |
    0+15       0.0178      1.62  VQ        |         |         |         |
    0+20       0.0323      2.11  VQ        |         |         |         |
    0+25       0.0492      2.46  |Q        |         |         |         |
    0+30       0.0685      2.81  |Q        |         |         |         |
    0+35       0.0908      3.24  | Q       |         |         |         |
    0+40       0.1193      4.14  | QV      |         |         |         |
    0+45       0.1765      8.30  |   VQ    |         |         |         |
    0+50       0.3487     25.00  |         V|     Q   |         |         |
    0+55       0.7128     52.87  |          |       V |         |    Q    |
    1+ 0       1.0340     46.64  |          |         |      V  |Q        |
    1+ 5       1.1864     22.12  |          |   Q     |         |V        |
    1+10       1.2745     12.80  |        Q |         |         |  V      |
    1+15       1.3345      8.70  |    Q     |         |         |    V    |
    1+20       1.3775      6.25  |   Q      |         |         |     V   |
    1+25       1.4095      4.65  |  Q       |         |         |      V  |
    1+30       1.4337      3.50  | Q        |         |         |       V |
    1+35       1.4537      2.91  |Q         |         |         |       V |
    1+40       1.4691      2.23  |Q         |         |         |       V |
    1+45       1.4811      1.74  |Q         |         |         |        V|
    1+50       1.4902      1.33  Q          |         |         |        V|
    1+55       1.4974      1.04  Q          |         |         |        V|
    2+ 0       1.5036      0.90  Q          |         |         |        V|
    2+ 5       1.5071      0.51  Q          |         |         |        V|
    2+10       1.5073      0.03  Q          |         |         |        V|
    2+15       1.5074      0.01  Q          |         |         |         V
  ---------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  04/04/24 File: 907hydc2ex32.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
2-year 3-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.77                70.69

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.77               162.49
```

```
STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    0.770(In)
Area Averaged 100-Year Rainfall =    1.770(In)

Point rain (area averaged) =    0.770(In)
Areal adjustment factor =   99.96 %
Adjusted average point rain =    0.770(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    91.800           81.80         0.020
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
81.8  65.5      0.410     0.020        0.403       1.000      0.403
                                                  Sum (F) =   0.403
Area averaged mean soil loss (F) (In/Hr) =  0.403
Minimum soil loss rate ((In/Hr)) =  0.201
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.880
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
   12   1.000        633.802          0.925             0.856
   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                               Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
    1   0.08     1.30      0.120       (  0.403)       0.106        0.014
    2   0.17     1.30      0.120       (  0.403)       0.106        0.014
    3   0.25     1.10      0.102       (  0.403)       0.089        0.012
    4   0.33     1.50      0.139       (  0.403)       0.122        0.017
    5   0.42     1.50      0.139       (  0.403)       0.122        0.017
    6   0.50     1.80      0.166       (  0.403)       0.146        0.020
```

```
 7   0.58     1.50      0.139       (  0.403)       0.122        0.017
 8   0.67     1.80      0.166       (  0.403)       0.146        0.020
 9   0.75     1.80      0.166       (  0.403)       0.146        0.020
10   0.83     1.50      0.139       (  0.403)       0.122        0.017
11   0.92     1.60      0.148       (  0.403)       0.130        0.018
12   1.00     1.80      0.166       (  0.403)       0.146        0.020
13   1.08     2.20      0.203       (  0.403)       0.179        0.024
14   1.17     2.20      0.203       (  0.403)       0.179        0.024
15   1.25     2.20      0.203       (  0.403)       0.179        0.024
16   1.33     2.00      0.185       (  0.403)       0.163        0.022
17   1.42     2.60      0.240       (  0.403)       0.211        0.029
18   1.50     2.70      0.249       (  0.403)       0.219        0.030
19   1.58     2.40      0.222       (  0.403)       0.195        0.027
20   1.67     2.70      0.249       (  0.403)       0.219        0.030
21   1.75     3.30      0.305       (  0.403)       0.268        0.037
22   1.83     3.10      0.286       (  0.403)       0.252        0.034
23   1.92     2.90      0.268       (  0.403)       0.236        0.032
24   2.00     3.00      0.277       (  0.403)       0.244        0.033
25   2.08     3.10      0.286       (  0.403)       0.252        0.034
26   2.17     4.20      0.388       (  0.403)       0.341        0.047
27   2.25     5.00      0.462          0.403    (  0.406)        0.059
28   2.33     3.50      0.323       (  0.403)       0.284        0.039
29   2.42     6.80      0.628          0.403    (  0.553)        0.225
30   2.50     7.30      0.674          0.403    (  0.593)        0.271
31   2.58     8.20      0.757          0.403    (  0.666)        0.354
32   2.67     5.90      0.545          0.403    (  0.480)        0.142
33   2.75     2.00      0.185       (  0.403)       0.163        0.022
34   2.83     1.80      0.166       (  0.403)       0.146        0.020
35   2.92     1.80      0.166       (  0.403)       0.146        0.020
36   3.00     0.60      0.055       (  0.403)       0.049        0.007
           (Loss Rate Not Used)
   Sum =     100.0                                   Sum =     1.8
    Flood volume = Effective rainfall      0.15(In)
     times area      91.8(Ac.)/[(In)/(Ft.)] =       1.1(Ac.Ft)
    Total soil loss =      0.62(In)
    Total soil loss =     4.746(Ac.Ft)
    Total rainfall =      0.77(In)
    Flood volume =       49758.6 Cubic Feet
    Total soil loss =      206728.5 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     20.803(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      3 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
-------------------------------------------------------------------------
  0+ 5       0.0006      0.09  Q          |          |          |          |
  0+10       0.0038      0.47  Q          |          |          |          |
  0+15       0.0096      0.84  VQ         |          |          |          |
  0+20       0.0162      0.96  VQ         |          |          |          |
  0+25       0.0239      1.11  VQ         |          |          |          |
  0+30       0.0327      1.28  |Q         |          |          |          |
  0+35       0.0426      1.43  |Q         |          |          |          |
  0+40       0.0529      1.50  |VQ        |          |          |          |
  0+45       0.0637      1.57  | Q        |          |          |          |
  0+50       0.0751      1.65  | Q        |          |          |          |
  0+55       0.0863      1.62  | QV       |          |          |          |
  1+ 0       0.0974      1.61  | QV       |          |          |          |
```

```
    1+ 5       0.1092      1.72  | QV       |          |          |          |
    1+10       0.1223      1.90  | Q V      |          |          |          |
    1+15       0.1365      2.05  | Q V      |          |          |          |
    1+20       0.1510      2.11  | Q  V     |          |          |          |
    1+25       0.1656      2.13  | Q  V     |          |          |          |
    1+30       0.1813      2.28  |  Q  V    |          |          |          |
    1+35       0.1982      2.45  |  Q  V    |          |          |          |
    1+40       0.2154      2.49  |  Q   V   |          |          |          |
    1+45       0.2332      2.59  |  Q    V  |          |          |          |
    1+50       0.2527      2.83  |  Q    V  |          |          |          |
    1+55       0.2732      2.98  |  Q     V|          |          |          |
    2+ 0       0.2937      2.97  |  Q      V          |          |          |
    2+ 5       0.3142      2.98  |  Q      |V         |          |          |
    2+10       0.3357      3.12  |   Q     |V         |          |          |
    2+15       0.3602      3.57  |   Q     | V        |          |          |
    2+20       0.3886      4.11  |    Q    |  V       |          |          |
    2+25       0.4245      5.21  |     Q   |   V      |          |          |
    2+30       0.4941     10.11  |         |  Q   V   |          |          |
    2+35       0.6088     16.66  |         |         |VQ        |          |
    2+40       0.7521     20.80  |         |         |     VQ   |          |
    2+45       0.8780     18.28  |         |         |   Q     V          |
    2+50       0.9571     11.49  |         |    Q    |          |  V       |
    2+55       1.0065      7.17  |        Q|         |          |    V     |
    3+ 0       1.0431      5.32  |       Q  |         |          |     V    |
    3+ 5       1.0702      3.94  |     Q    |         |          |      V   |
    3+10       1.0893      2.77  |  Q       |         |          |       V  |
    3+15       1.1031      2.00  | Q        |         |          |       V  |
    3+20       1.1138      1.55  | Q        |         |          |        V |
    3+25       1.1220      1.20  |Q         |         |          |        V |
    3+30       1.1283      0.91  |Q         |         |          |        V |
    3+35       1.1332      0.71  Q          |         |          |        V |
    3+40       1.1370      0.55  Q          |         |          |        V |
    3+45       1.1397      0.39  Q          |         |          |        V |
    3+50       1.1413      0.23  Q          |         |          |        V |
    3+55       1.1419      0.08  Q          |         |          |        V |
    4+ 0       1.1421      0.03  Q          |         |          |        V |
    4+ 5       1.1422      0.02  Q          |         |          |        V |
    4+10       1.1423      0.01  Q          |         |          |        V |
    4+15       1.1423      0.00  Q          |         |          |         V
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  04/04/24 File: 907hydc2ex62.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
2-year 6-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.95                87.21

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          2.45               224.91
```

```
STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    0.950(In)
Area Averaged 100-Year Rainfall =    2.450(In)

Point rain (area averaged) =    0.950(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    0.950(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    91.800           81.80         0.020
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
81.8  65.5      0.410     0.020        0.403       1.000      0.403
                                                  Sum (F) =   0.403
Area averaged mean soil loss (F) (In/Hr) =  0.403
Minimum soil loss rate ((In/Hr)) =  0.201
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.880
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
   12   1.000        633.802          0.925             0.856
   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                              Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
    1   0.08     0.50      0.057       (  0.403)       0.050        0.007
    2   0.17     0.60      0.068       (  0.403)       0.060        0.008
    3   0.25     0.60      0.068       (  0.403)       0.060        0.008
    4   0.33     0.60      0.068       (  0.403)       0.060        0.008
    5   0.42     0.60      0.068       (  0.403)       0.060        0.008
    6   0.50     0.70      0.080       (  0.403)       0.070        0.010
```

7	0.58	0.70	0.080	(0.403)	0.070	0.010
8	0.67	0.70	0.080	(0.403)	0.070	0.010
9	0.75	0.70	0.080	(0.403)	0.070	0.010
10	0.83	0.70	0.080	(0.403)	0.070	0.010
11	0.92	0.70	0.080	(0.403)	0.070	0.010
12	1.00	0.80	0.091	(0.403)	0.080	0.011
13	1.08	0.80	0.091	(0.403)	0.080	0.011
14	1.17	0.80	0.091	(0.403)	0.080	0.011
15	1.25	0.80	0.091	(0.403)	0.080	0.011
16	1.33	0.80	0.091	(0.403)	0.080	0.011
17	1.42	0.80	0.091	(0.403)	0.080	0.011
18	1.50	0.80	0.091	(0.403)	0.080	0.011
19	1.58	0.80	0.091	(0.403)	0.080	0.011
20	1.67	0.80	0.091	(0.403)	0.080	0.011
21	1.75	0.80	0.091	(0.403)	0.080	0.011
22	1.83	0.80	0.091	(0.403)	0.080	0.011
23	1.92	0.80	0.091	(0.403)	0.080	0.011
24	2.00	0.90	0.103	(0.403)	0.090	0.012
25	2.08	0.80	0.091	(0.403)	0.080	0.011
26	2.17	0.90	0.103	(0.403)	0.090	0.012
27	2.25	0.90	0.103	(0.403)	0.090	0.012
28	2.33	0.90	0.103	(0.403)	0.090	0.012
29	2.42	0.90	0.103	(0.403)	0.090	0.012
30	2.50	0.90	0.103	(0.403)	0.090	0.012
31	2.58	0.90	0.103	(0.403)	0.090	0.012
32	2.67	0.90	0.103	(0.403)	0.090	0.012
33	2.75	1.00	0.114	(0.403)	0.100	0.014
34	2.83	1.00	0.114	(0.403)	0.100	0.014
35	2.92	1.00	0.114	(0.403)	0.100	0.014
36	3.00	1.00	0.114	(0.403)	0.100	0.014
37	3.08	1.00	0.114	(0.403)	0.100	0.014
38	3.17	1.10	0.125	(0.403)	0.110	0.015
39	3.25	1.10	0.125	(0.403)	0.110	0.015
40	3.33	1.10	0.125	(0.403)	0.110	0.015
41	3.42	1.20	0.137	(0.403)	0.120	0.016
42	3.50	1.30	0.148	(0.403)	0.130	0.018
43	3.58	1.40	0.160	(0.403)	0.140	0.019
44	3.67	1.40	0.160	(0.403)	0.140	0.019
45	3.75	1.50	0.171	(0.403)	0.150	0.021
46	3.83	1.50	0.171	(0.403)	0.150	0.021
47	3.92	1.60	0.182	(0.403)	0.160	0.022
48	4.00	1.60	0.182	(0.403)	0.160	0.022
49	4.08	1.70	0.194	(0.403)	0.170	0.023
50	4.17	1.80	0.205	(0.403)	0.181	0.025
51	4.25	1.90	0.217	(0.403)	0.191	0.026
52	4.33	2.00	0.228	(0.403)	0.201	0.027
53	4.42	2.10	0.239	(0.403)	0.211	0.029
54	4.50	2.10	0.239	(0.403)	0.211	0.029
55	4.58	2.20	0.251	(0.403)	0.221	0.030
56	4.67	2.30	0.262	(0.403)	0.231	0.031
57	4.75	2.40	0.274	(0.403)	0.241	0.033
58	4.83	2.40	0.274	(0.403)	0.241	0.033
59	4.92	2.50	0.285	(0.403)	0.251	0.034
60	5.00	2.60	0.296	(0.403)	0.261	0.036
61	5.08	3.10	0.353	(0.403)	0.311	0.042
62	5.17	3.60	0.410	(0.403)	0.361	0.049
63	5.25	3.90	0.444	(0.403)	0.391	0.053
64	5.33	4.20	0.479	0.403	(0.421)	0.076
65	5.42	4.70	0.536	0.403	(0.471)	0.133
66	5.50	5.60	0.638	0.403	(0.562)	0.235
67	5.58	1.90	0.217	(0.403)	0.191	0.026
68	5.67	0.90	0.103	(0.403)	0.090	0.012
69	5.75	0.60	0.068	(0.403)	0.060	0.008

```
70   5.83     0.50      0.057       (  0.403)       0.050        0.007
71   5.92     0.30      0.034       (  0.403)       0.030        0.004
72   6.00     0.20      0.023       (  0.403)       0.020        0.003
            (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     1.6
     Flood volume = Effective rainfall      0.13(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       1.0(Ac.Ft)
     Total soil loss =      0.82(In)
     Total soil loss =     6.237(Ac.Ft)
     Total rainfall =      0.95(In)
     Flood volume =       44785.5 Cubic Feet
     Total soil loss =      271686.9 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     11.663(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          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   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-------------------------------------------------------------------------
  0+ 5       0.0003      0.04  Q          |          |          |          |
  0+10       0.0019      0.23  Q          |          |          |          |
  0+15       0.0050      0.45  Q          |          |          |          |
  0+20       0.0088      0.56  VQ         |          |          |          |
  0+25       0.0131      0.62  VQ         |          |          |          |
  0+30       0.0176      0.66  VQ         |          |          |          |
  0+35       0.0226      0.72  VQ         |          |          |          |
  0+40       0.0280      0.78  |Q         |          |          |          |
  0+45       0.0335      0.81  |Q         |          |          |          |
  0+50       0.0393      0.83  |Q         |          |          |          |
  0+55       0.0451      0.84  |Q         |          |          |          |
  1+ 0       0.0510      0.86  |Q         |          |          |          |
  1+ 5       0.0573      0.91  |QV        |          |          |          |
  1+10       0.0639      0.95  |QV        |          |          |          |
  1+15       0.0706      0.97  |QV        |          |          |          |
  1+20       0.0774      0.99  |Q V       |          |          |          |
  1+25       0.0842      0.99  |Q V       |          |          |          |
  1+30       0.0911      1.00  |Q V       |          |          |          |
  1+35       0.0980      1.00  | QV       |          |          |          |
  1+40       0.1049      1.01  | Q V      |          |          |          |
  1+45       0.1118      1.01  | Q V      |          |          |          |
  1+50       0.1188      1.01  | Q V      |          |          |          |
  1+55       0.1257      1.01  | Q V      |          |          |          |
  2+ 0       0.1328      1.02  | Q  V     |          |          |          |
  2+ 5       0.1400      1.05  | Q  V     |          |          |          |
  2+10       0.1472      1.06  | Q  V     |          |          |          |
  2+15       0.1546      1.07  | Q   V    |          |          |          |
  2+20       0.1622      1.10  | Q   V    |          |          |          |
  2+25       0.1699      1.11  | Q   V    |          |          |          |
  2+30       0.1776      1.12  | Q   V    |          |          |          |
  2+35       0.1854      1.13  | Q    V   |          |          |          |
  2+40       0.1931      1.13  | Q    V   |          |          |          |
  2+45       0.2010      1.14  | Q    V   |          |          |          |
  2+50       0.2091      1.18  | Q     V  |          |          |          |
  2+55       0.2175      1.22  | Q     V  |          |          |          |
  3+ 0       0.2260      1.23  | Q     V  |          |          |          |
  3+ 5       0.2345      1.24  | Q      V |          |          |          |
  3+10       0.2432      1.26  | Q      V |          |          |          |
  3+15       0.2521      1.30  | Q      V |          |          |          |
```

```
    3+20       0.2613      1.34  | Q       V          |          |          |
    3+25       0.2707      1.36  | Q       V          |          |          |
    3+30       0.2805      1.42  | Q       V          |          |          |
    3+35       0.2908      1.51  |  Q      |V         |          |          |
    3+40       0.3018      1.60  |  Q      |V         |          |          |
    3+45       0.3133      1.67  |  Q      | V        |          |          |
    3+50       0.3253      1.74  |  Q      | V        |          |          |
    3+55       0.3377      1.80  |  Q      |  V       |          |          |
    4+ 0       0.3506      1.87  |  Q      |  V       |          |          |
    4+ 5       0.3639      1.93  |  Q      |   V      |          |          |
    4+10       0.3777      2.01  |   Q     |   V      |          |          |
    4+15       0.3922      2.11  |   Q     |    V     |          |          |
    4+20       0.4075      2.22  |   Q     |    V     |          |          |
    4+25       0.4236      2.33  |   Q     |     V    |          |          |
    4+30       0.4404      2.44  |   Q     |      V   |          |          |
    4+35       0.4577      2.52  |    Q    |      V   |          |          |
    4+40       0.4757      2.61  |    Q    |       V  |          |          |
    4+45       0.4944      2.72  |    Q    |        V |          |          |
    4+50       0.5139      2.82  |    Q    |        V |          |          |
    4+55       0.5339      2.91  |    Q    |         V          |          |
    5+ 0       0.5545      2.99  |    Q    |          |V         |          |
    5+ 5       0.5761      3.13  |     Q   |          | V        |          |
    5+10       0.5997      3.43  |     Q   |          |  V       |          |
    5+15       0.6262      3.85  |      Q  |          |   V      |          |
    5+20       0.6563      4.38  |       Q |          |    V     |          |
    5+25       0.6946      5.56  |         |Q         |     V    |          |
    5+30       0.7526      8.42  |         |    Q     |      V|  |          |
    5+35       0.8329     11.66  |         |          |  Q       | V        |
    5+40       0.8990      9.59  |         |         Q|          |   V      |
    5+45       0.9356      5.32  |        Q|          |          |    V     |
    5+50       0.9596      3.48  |     Q   |          |          |     V    |
    5+55       0.9773      2.58  |    Q    |          |          |      V   |
    6+ 0       0.9908      1.95  |  Q      |          |          |      V   |
    6+ 5       1.0008      1.47  | Q       |          |          |      V   |
    6+10       1.0083      1.08  | Q       |          |          |       V  |
    6+15       1.0139      0.81  |Q        |          |          |       V  |
    6+20       1.0181      0.61  |Q        |          |          |       V  |
    6+25       1.0213      0.47  Q         |          |          |       V  |
    6+30       1.0237      0.35  Q         |          |          |       V  |
    6+35       1.0255      0.26  Q         |          |          |       V  |
    6+40       1.0269      0.20  Q         |          |          |       V  |
    6+45       1.0277      0.11  Q         |          |          |       V  |
    6+50       1.0279      0.03  Q         |          |          |       V  |
    6+55       1.0280      0.02  Q         |          |          |       V  |
    7+ 0       1.0281      0.01  Q         |          |          |       V  |
    7+ 5       1.0281      0.01  Q         |          |          |       V  |
    7+10       1.0281      0.00  Q         |          |          |       V  |
    7+15       1.0281      0.00  Q         |          |          |        V
---------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  04/04/24 File: 907hydc2ex242.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
2-year 24-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.55              142.29

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          4.05              371.79
```

```
STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.550(In)
Area Averaged 100-Year Rainfall =    4.050(In)

Point rain (area averaged) =    1.550(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    1.550(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    91.800           81.80         0.020
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
81.8  65.5      0.410     0.020        0.403       1.000      0.403
                                                  Sum (F) =   0.403
Area averaged mean soil loss (F) (In/Hr) =  0.403
Minimum soil loss rate ((In/Hr)) =  0.201
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.880
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
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   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                               Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
    1   0.08     0.07      0.012       (  0.714)       0.011        0.001
    2   0.17     0.07      0.012       (  0.712)       0.011        0.001
    3   0.25     0.07      0.012       (  0.709)       0.011        0.001
    4   0.33     0.10      0.019       (  0.706)       0.016        0.002
    5   0.42     0.10      0.019       (  0.703)       0.016        0.002
    6   0.50     0.10      0.019       (  0.701)       0.016        0.002
```

7	0.58	0.10	0.019	(0.698)	0.016	0.002
8	0.67	0.10	0.019	(0.695)	0.016	0.002
9	0.75	0.10	0.019	(0.692)	0.016	0.002
10	0.83	0.13	0.025	(0.690)	0.022	0.003
11	0.92	0.13	0.025	(0.687)	0.022	0.003
12	1.00	0.13	0.025	(0.684)	0.022	0.003
13	1.08	0.10	0.019	(0.682)	0.016	0.002
14	1.17	0.10	0.019	(0.679)	0.016	0.002
15	1.25	0.10	0.019	(0.676)	0.016	0.002
16	1.33	0.10	0.019	(0.674)	0.016	0.002
17	1.42	0.10	0.019	(0.671)	0.016	0.002
18	1.50	0.10	0.019	(0.668)	0.016	0.002
19	1.58	0.10	0.019	(0.665)	0.016	0.002
20	1.67	0.10	0.019	(0.663)	0.016	0.002
21	1.75	0.10	0.019	(0.660)	0.016	0.002
22	1.83	0.13	0.025	(0.658)	0.022	0.003
23	1.92	0.13	0.025	(0.655)	0.022	0.003
24	2.00	0.13	0.025	(0.652)	0.022	0.003
25	2.08	0.13	0.025	(0.650)	0.022	0.003
26	2.17	0.13	0.025	(0.647)	0.022	0.003
27	2.25	0.13	0.025	(0.644)	0.022	0.003
28	2.33	0.13	0.025	(0.642)	0.022	0.003
29	2.42	0.13	0.025	(0.639)	0.022	0.003
30	2.50	0.13	0.025	(0.636)	0.022	0.003
31	2.58	0.17	0.031	(0.634)	0.027	0.004
32	2.67	0.17	0.031	(0.631)	0.027	0.004
33	2.75	0.17	0.031	(0.629)	0.027	0.004
34	2.83	0.17	0.031	(0.626)	0.027	0.004
35	2.92	0.17	0.031	(0.623)	0.027	0.004
36	3.00	0.17	0.031	(0.621)	0.027	0.004
37	3.08	0.17	0.031	(0.618)	0.027	0.004
38	3.17	0.17	0.031	(0.616)	0.027	0.004
39	3.25	0.17	0.031	(0.613)	0.027	0.004
40	3.33	0.17	0.031	(0.611)	0.027	0.004
41	3.42	0.17	0.031	(0.608)	0.027	0.004
42	3.50	0.17	0.031	(0.606)	0.027	0.004
43	3.58	0.17	0.031	(0.603)	0.027	0.004
44	3.67	0.17	0.031	(0.601)	0.027	0.004
45	3.75	0.17	0.031	(0.598)	0.027	0.004
46	3.83	0.20	0.037	(0.595)	0.033	0.004
47	3.92	0.20	0.037	(0.593)	0.033	0.004
48	4.00	0.20	0.037	(0.590)	0.033	0.004
49	4.08	0.20	0.037	(0.588)	0.033	0.004
50	4.17	0.20	0.037	(0.585)	0.033	0.004
51	4.25	0.20	0.037	(0.583)	0.033	0.004
52	4.33	0.23	0.043	(0.580)	0.038	0.005
53	4.42	0.23	0.043	(0.578)	0.038	0.005
54	4.50	0.23	0.043	(0.575)	0.038	0.005
55	4.58	0.23	0.043	(0.573)	0.038	0.005
56	4.67	0.23	0.043	(0.571)	0.038	0.005
57	4.75	0.23	0.043	(0.568)	0.038	0.005
58	4.83	0.27	0.050	(0.566)	0.044	0.006
59	4.92	0.27	0.050	(0.563)	0.044	0.006
60	5.00	0.27	0.050	(0.561)	0.044	0.006
61	5.08	0.20	0.037	(0.558)	0.033	0.004
62	5.17	0.20	0.037	(0.556)	0.033	0.004
63	5.25	0.20	0.037	(0.553)	0.033	0.004
64	5.33	0.23	0.043	(0.551)	0.038	0.005
65	5.42	0.23	0.043	(0.549)	0.038	0.005
66	5.50	0.23	0.043	(0.546)	0.038	0.005
67	5.58	0.27	0.050	(0.544)	0.044	0.006
68	5.67	0.27	0.050	(0.541)	0.044	0.006
69	5.75	0.27	0.050	(0.539)	0.044	0.006

70	5.83	0.27	0.050	(0.537)	0.044	0.006
71	5.92	0.27	0.050	(0.534)	0.044	0.006
72	6.00	0.27	0.050	(0.532)	0.044	0.006
73	6.08	0.30	0.056	(0.530)	0.049	0.007
74	6.17	0.30	0.056	(0.527)	0.049	0.007
75	6.25	0.30	0.056	(0.525)	0.049	0.007
76	6.33	0.30	0.056	(0.523)	0.049	0.007
77	6.42	0.30	0.056	(0.520)	0.049	0.007
78	6.50	0.30	0.056	(0.518)	0.049	0.007
79	6.58	0.33	0.062	(0.516)	0.055	0.007
80	6.67	0.33	0.062	(0.513)	0.055	0.007
81	6.75	0.33	0.062	(0.511)	0.055	0.007
82	6.83	0.33	0.062	(0.509)	0.055	0.007
83	6.92	0.33	0.062	(0.506)	0.055	0.007
84	7.00	0.33	0.062	(0.504)	0.055	0.007
85	7.08	0.33	0.062	(0.502)	0.055	0.007
86	7.17	0.33	0.062	(0.499)	0.055	0.007
87	7.25	0.33	0.062	(0.497)	0.055	0.007
88	7.33	0.37	0.068	(0.495)	0.060	0.008
89	7.42	0.37	0.068	(0.493)	0.060	0.008
90	7.50	0.37	0.068	(0.490)	0.060	0.008
91	7.58	0.40	0.074	(0.488)	0.065	0.009
92	7.67	0.40	0.074	(0.486)	0.065	0.009
93	7.75	0.40	0.074	(0.484)	0.065	0.009
94	7.83	0.43	0.081	(0.481)	0.071	0.010
95	7.92	0.43	0.081	(0.479)	0.071	0.010
96	8.00	0.43	0.081	(0.477)	0.071	0.010
97	8.08	0.50	0.093	(0.475)	0.082	0.011
98	8.17	0.50	0.093	(0.473)	0.082	0.011
99	8.25	0.50	0.093	(0.470)	0.082	0.011
100	8.33	0.50	0.093	(0.468)	0.082	0.011
101	8.42	0.50	0.093	(0.466)	0.082	0.011
102	8.50	0.50	0.093	(0.464)	0.082	0.011
103	8.58	0.53	0.099	(0.462)	0.087	0.012
104	8.67	0.53	0.099	(0.459)	0.087	0.012
105	8.75	0.53	0.099	(0.457)	0.087	0.012
106	8.83	0.57	0.105	(0.455)	0.093	0.013
107	8.92	0.57	0.105	(0.453)	0.093	0.013
108	9.00	0.57	0.105	(0.451)	0.093	0.013
109	9.08	0.63	0.118	(0.449)	0.104	0.014
110	9.17	0.63	0.118	(0.447)	0.104	0.014
111	9.25	0.63	0.118	(0.444)	0.104	0.014
112	9.33	0.67	0.124	(0.442)	0.109	0.015
113	9.42	0.67	0.124	(0.440)	0.109	0.015
114	9.50	0.67	0.124	(0.438)	0.109	0.015
115	9.58	0.70	0.130	(0.436)	0.115	0.016
116	9.67	0.70	0.130	(0.434)	0.115	0.016
117	9.75	0.70	0.130	(0.432)	0.115	0.016
118	9.83	0.73	0.136	(0.430)	0.120	0.016
119	9.92	0.73	0.136	(0.428)	0.120	0.016
120	10.00	0.73	0.136	(0.426)	0.120	0.016
121	10.08	0.50	0.093	(0.424)	0.082	0.011
122	10.17	0.50	0.093	(0.421)	0.082	0.011
123	10.25	0.50	0.093	(0.419)	0.082	0.011
124	10.33	0.50	0.093	(0.417)	0.082	0.011
125	10.42	0.50	0.093	(0.415)	0.082	0.011
126	10.50	0.50	0.093	(0.413)	0.082	0.011
127	10.58	0.67	0.124	(0.411)	0.109	0.015
128	10.67	0.67	0.124	(0.409)	0.109	0.015
129	10.75	0.67	0.124	(0.407)	0.109	0.015
130	10.83	0.67	0.124	(0.405)	0.109	0.015
131	10.92	0.67	0.124	(0.403)	0.109	0.015
132	11.00	0.67	0.124	(0.401)	0.109	0.015

133	11.08	0.63	0.118	(0.399)	0.104	0.014
134	11.17	0.63	0.118	(0.397)	0.104	0.014
135	11.25	0.63	0.118	(0.395)	0.104	0.014
136	11.33	0.63	0.118	(0.393)	0.104	0.014
137	11.42	0.63	0.118	(0.392)	0.104	0.014
138	11.50	0.63	0.118	(0.390)	0.104	0.014
139	11.58	0.57	0.105	(0.388)	0.093	0.013
140	11.67	0.57	0.105	(0.386)	0.093	0.013
141	11.75	0.57	0.105	(0.384)	0.093	0.013
142	11.83	0.60	0.112	(0.382)	0.098	0.013
143	11.92	0.60	0.112	(0.380)	0.098	0.013
144	12.00	0.60	0.112	(0.378)	0.098	0.013
145	12.08	0.83	0.155	(0.376)	0.136	0.019
146	12.17	0.83	0.155	(0.374)	0.136	0.019
147	12.25	0.83	0.155	(0.372)	0.136	0.019
148	12.33	0.87	0.161	(0.371)	0.142	0.019
149	12.42	0.87	0.161	(0.369)	0.142	0.019
150	12.50	0.87	0.161	(0.367)	0.142	0.019
151	12.58	0.93	0.174	(0.365)	0.153	0.021
152	12.67	0.93	0.174	(0.363)	0.153	0.021
153	12.75	0.93	0.174	(0.361)	0.153	0.021
154	12.83	0.97	0.180	(0.360)	0.158	0.022
155	12.92	0.97	0.180	(0.358)	0.158	0.022
156	13.00	0.97	0.180	(0.356)	0.158	0.022
157	13.08	1.13	0.211	(0.354)	0.185	0.025
158	13.17	1.13	0.211	(0.352)	0.185	0.025
159	13.25	1.13	0.211	(0.350)	0.185	0.025
160	13.33	1.13	0.211	(0.349)	0.185	0.025
161	13.42	1.13	0.211	(0.347)	0.185	0.025
162	13.50	1.13	0.211	(0.345)	0.185	0.025
163	13.58	0.77	0.143	(0.343)	0.125	0.017
164	13.67	0.77	0.143	(0.342)	0.125	0.017
165	13.75	0.77	0.143	(0.340)	0.125	0.017
166	13.83	0.77	0.143	(0.338)	0.125	0.017
167	13.92	0.77	0.143	(0.336)	0.125	0.017
168	14.00	0.77	0.143	(0.335)	0.125	0.017
169	14.08	0.90	0.167	(0.333)	0.147	0.020
170	14.17	0.90	0.167	(0.331)	0.147	0.020
171	14.25	0.90	0.167	(0.330)	0.147	0.020
172	14.33	0.87	0.161	(0.328)	0.142	0.019
173	14.42	0.87	0.161	(0.326)	0.142	0.019
174	14.50	0.87	0.161	(0.325)	0.142	0.019
175	14.58	0.87	0.161	(0.323)	0.142	0.019
176	14.67	0.87	0.161	(0.321)	0.142	0.019
177	14.75	0.87	0.161	(0.320)	0.142	0.019
178	14.83	0.83	0.155	(0.318)	0.136	0.019
179	14.92	0.83	0.155	(0.316)	0.136	0.019
180	15.00	0.83	0.155	(0.315)	0.136	0.019
181	15.08	0.80	0.149	(0.313)	0.131	0.018
182	15.17	0.80	0.149	(0.312)	0.131	0.018
183	15.25	0.80	0.149	(0.310)	0.131	0.018
184	15.33	0.77	0.143	(0.308)	0.125	0.017
185	15.42	0.77	0.143	(0.307)	0.125	0.017
186	15.50	0.77	0.143	(0.305)	0.125	0.017
187	15.58	0.63	0.118	(0.304)	0.104	0.014
188	15.67	0.63	0.118	(0.302)	0.104	0.014
189	15.75	0.63	0.118	(0.301)	0.104	0.014
190	15.83	0.63	0.118	(0.299)	0.104	0.014
191	15.92	0.63	0.118	(0.297)	0.104	0.014
192	16.00	0.63	0.118	(0.296)	0.104	0.014
193	16.08	0.13	0.025	(0.294)	0.022	0.003
194	16.17	0.13	0.025	(0.293)	0.022	0.003
195	16.25	0.13	0.025	(0.291)	0.022	0.003

196	16.33	0.13	0.025	(0.290)	0.022	0.003
197	16.42	0.13	0.025	(0.288)	0.022	0.003
198	16.50	0.13	0.025	(0.287)	0.022	0.003
199	16.58	0.10	0.019	(0.286)	0.016	0.002
200	16.67	0.10	0.019	(0.284)	0.016	0.002
201	16.75	0.10	0.019	(0.283)	0.016	0.002
202	16.83	0.10	0.019	(0.281)	0.016	0.002
203	16.92	0.10	0.019	(0.280)	0.016	0.002
204	17.00	0.10	0.019	(0.278)	0.016	0.002
205	17.08	0.17	0.031	(0.277)	0.027	0.004
206	17.17	0.17	0.031	(0.276)	0.027	0.004
207	17.25	0.17	0.031	(0.274)	0.027	0.004
208	17.33	0.17	0.031	(0.273)	0.027	0.004
209	17.42	0.17	0.031	(0.271)	0.027	0.004
210	17.50	0.17	0.031	(0.270)	0.027	0.004
211	17.58	0.17	0.031	(0.269)	0.027	0.004
212	17.67	0.17	0.031	(0.267)	0.027	0.004
213	17.75	0.17	0.031	(0.266)	0.027	0.004
214	17.83	0.13	0.025	(0.265)	0.022	0.003
215	17.92	0.13	0.025	(0.263)	0.022	0.003
216	18.00	0.13	0.025	(0.262)	0.022	0.003
217	18.08	0.13	0.025	(0.261)	0.022	0.003
218	18.17	0.13	0.025	(0.260)	0.022	0.003
219	18.25	0.13	0.025	(0.258)	0.022	0.003
220	18.33	0.13	0.025	(0.257)	0.022	0.003
221	18.42	0.13	0.025	(0.256)	0.022	0.003
222	18.50	0.13	0.025	(0.255)	0.022	0.003
223	18.58	0.10	0.019	(0.253)	0.016	0.002
224	18.67	0.10	0.019	(0.252)	0.016	0.002
225	18.75	0.10	0.019	(0.251)	0.016	0.002
226	18.83	0.07	0.012	(0.250)	0.011	0.001
227	18.92	0.07	0.012	(0.248)	0.011	0.001
228	19.00	0.07	0.012	(0.247)	0.011	0.001
229	19.08	0.10	0.019	(0.246)	0.016	0.002
230	19.17	0.10	0.019	(0.245)	0.016	0.002
231	19.25	0.10	0.019	(0.244)	0.016	0.002
232	19.33	0.13	0.025	(0.243)	0.022	0.003
233	19.42	0.13	0.025	(0.242)	0.022	0.003
234	19.50	0.13	0.025	(0.240)	0.022	0.003
235	19.58	0.10	0.019	(0.239)	0.016	0.002
236	19.67	0.10	0.019	(0.238)	0.016	0.002
237	19.75	0.10	0.019	(0.237)	0.016	0.002
238	19.83	0.07	0.012	(0.236)	0.011	0.001
239	19.92	0.07	0.012	(0.235)	0.011	0.001
240	20.00	0.07	0.012	(0.234)	0.011	0.001
241	20.08	0.10	0.019	(0.233)	0.016	0.002
242	20.17	0.10	0.019	(0.232)	0.016	0.002
243	20.25	0.10	0.019	(0.231)	0.016	0.002
244	20.33	0.10	0.019	(0.230)	0.016	0.002
245	20.42	0.10	0.019	(0.229)	0.016	0.002
246	20.50	0.10	0.019	(0.228)	0.016	0.002
247	20.58	0.10	0.019	(0.227)	0.016	0.002
248	20.67	0.10	0.019	(0.226)	0.016	0.002
249	20.75	0.10	0.019	(0.225)	0.016	0.002
250	20.83	0.07	0.012	(0.224)	0.011	0.001
251	20.92	0.07	0.012	(0.223)	0.011	0.001
252	21.00	0.07	0.012	(0.222)	0.011	0.001
253	21.08	0.10	0.019	(0.222)	0.016	0.002
254	21.17	0.10	0.019	(0.221)	0.016	0.002
255	21.25	0.10	0.019	(0.220)	0.016	0.002
256	21.33	0.07	0.012	(0.219)	0.011	0.001
257	21.42	0.07	0.012	(0.218)	0.011	0.001
258	21.50	0.07	0.012	(0.217)	0.011	0.001

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259  21.58     0.10      0.019       (  0.217)       0.016        0.002
260  21.67     0.10      0.019       (  0.216)       0.016        0.002
261  21.75     0.10      0.019       (  0.215)       0.016        0.002
262  21.83     0.07      0.012       (  0.214)       0.011        0.001
263  21.92     0.07      0.012       (  0.214)       0.011        0.001
264  22.00     0.07      0.012       (  0.213)       0.011        0.001
265  22.08     0.10      0.019       (  0.212)       0.016        0.002
266  22.17     0.10      0.019       (  0.211)       0.016        0.002
267  22.25     0.10      0.019       (  0.211)       0.016        0.002
268  22.33     0.07      0.012       (  0.210)       0.011        0.001
269  22.42     0.07      0.012       (  0.209)       0.011        0.001
270  22.50     0.07      0.012       (  0.209)       0.011        0.001
271  22.58     0.07      0.012       (  0.208)       0.011        0.001
272  22.67     0.07      0.012       (  0.208)       0.011        0.001
273  22.75     0.07      0.012       (  0.207)       0.011        0.001
274  22.83     0.07      0.012       (  0.207)       0.011        0.001
275  22.92     0.07      0.012       (  0.206)       0.011        0.001
276  23.00     0.07      0.012       (  0.205)       0.011        0.001
277  23.08     0.07      0.012       (  0.205)       0.011        0.001
278  23.17     0.07      0.012       (  0.205)       0.011        0.001
279  23.25     0.07      0.012       (  0.204)       0.011        0.001
280  23.33     0.07      0.012       (  0.204)       0.011        0.001
281  23.42     0.07      0.012       (  0.203)       0.011        0.001
282  23.50     0.07      0.012       (  0.203)       0.011        0.001
283  23.58     0.07      0.012       (  0.203)       0.011        0.001
284  23.67     0.07      0.012       (  0.202)       0.011        0.001
285  23.75     0.07      0.012       (  0.202)       0.011        0.001
286  23.83     0.07      0.012       (  0.202)       0.011        0.001
287  23.92     0.07      0.012       (  0.202)       0.011        0.001
288  24.00     0.07      0.012       (  0.202)       0.011        0.001
            (Loss Rate Not Used)
    Sum =     100.0                                  Sum =     2.2
     Flood volume = Effective rainfall      0.19(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       1.4(Ac.Ft)
     Total soil loss =      1.36(In)
     Total soil loss =    10.433(Ac.Ft)
     Total rainfall =      1.55(In)
     Flood volume =       61970.4 Cubic Feet
     Total soil loss =      454449.7 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =      2.288(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ---------------------------------------------------------------------------
   0+ 5       0.0001      0.01  Q          |         |         |         |
   0+10       0.0004      0.05  Q          |         |         |         |
   0+15       0.0010      0.09  Q          |         |         |         |
   0+20       0.0017      0.11  Q          |         |         |         |
   0+25       0.0027      0.14  Q          |         |         |         |
   0+30       0.0038      0.16  Q          |         |         |         |
   0+35       0.0050      0.18  Q          |         |         |         |
   0+40       0.0063      0.18  Q          |         |         |         |
   0+45       0.0076      0.19  Q          |         |         |         |
   0+50       0.0090      0.20  Q          |         |         |         |
   0+55       0.0105      0.22  Q          |         |         |         |
   1+ 0       0.0122      0.24  Q          |         |         |         |
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1+ 5	0.0139	0.25	Q	|	|	|	|
1+10	0.0155	0.24	Q	|	|	|	|
1+15	0.0170	0.22	Q	|	|	|	|
1+20	0.0185	0.22	Q	|	|	|	|
1+25	0.0200	0.21	Q	|	|	|	|
1+30	0.0214	0.21	Q	|	|	|	|
1+35	0.0229	0.21	Q	|	|	|	|
1+40	0.0243	0.21	Q	|	|	|	|
1+45	0.0258	0.21	Q	|	|	|	|
1+50	0.0272	0.21	Q	|	|	|	|
1+55	0.0288	0.23	Q	|	|	|	|
2+ 0	0.0306	0.25	VQ	|	|	|	|
2+ 5	0.0324	0.26	VQ	|	|	|	|
2+10	0.0342	0.26	VQ	|	|	|	|
2+15	0.0360	0.27	|Q	|	|	|	|
2+20	0.0379	0.27	|Q	|	|	|	|
2+25	0.0397	0.27	|Q	|	|	|	|
2+30	0.0416	0.27	|Q	|	|	|	|
2+35	0.0435	0.28	|Q	|	|	|	|
2+40	0.0456	0.30	|Q	|	|	|	|
2+45	0.0477	0.32	|Q	|	|	|	|
2+50	0.0500	0.33	|Q	|	|	|	|
2+55	0.0523	0.33	|Q	|	|	|	|
3+ 0	0.0546	0.33	|Q	|	|	|	|
3+ 5	0.0569	0.34	|Q	|	|	|	|
3+10	0.0592	0.34	|Q	|	|	|	|
3+15	0.0616	0.34	|Q	|	|	|	|
3+20	0.0639	0.34	|Q	|	|	|	|
3+25	0.0663	0.34	|Q	|	|	|	|
3+30	0.0687	0.34	|Q	|	|	|	|
3+35	0.0710	0.34	|Q	|	|	|	|
3+40	0.0734	0.34	|QV	|	|	|	|
3+45	0.0758	0.34	|QV	|	|	|	|
3+50	0.0782	0.35	|QV	|	|	|	|
3+55	0.0807	0.37	|QV	|	|	|	|
4+ 0	0.0834	0.39	|QV	|	|	|	|
4+ 5	0.0861	0.40	|QV	|	|	|	|
4+10	0.0889	0.40	|QV	|	|	|	|
4+15	0.0916	0.40	|QV	|	|	|	|
4+20	0.0945	0.41	|QV	|	|	|	|
4+25	0.0974	0.43	|QV	|	|	|	|
4+30	0.1006	0.45	|QV	|	|	|	|
4+35	0.1038	0.46	|QV	|	|	|	|
4+40	0.1070	0.47	|Q V	|	|	|	|
4+45	0.1102	0.47	|Q V	|	|	|	|
4+50	0.1135	0.48	|Q V	|	|	|	|
4+55	0.1170	0.50	| QV	|	|	|	|
5+ 0	0.1206	0.52	| QV	|	|	|	|
5+ 5	0.1241	0.52	| QV	|	|	|	|
5+10	0.1275	0.49	|Q V	|	|	|	|
5+15	0.1306	0.45	|Q V	|	|	|	|
5+20	0.1337	0.44	|Q V	|	|	|	|
5+25	0.1368	0.46	|Q V	|	|	|	|
5+30	0.1401	0.47	|Q V	|	|	|	|
5+35	0.1434	0.48	|Q V	|	|	|	|
5+40	0.1468	0.50	| Q V	|	|	|	|
5+45	0.1504	0.52	| Q V	|	|	|	|
5+50	0.1541	0.53	| Q V	|	|	|	|
5+55	0.1578	0.54	| Q V	|	|	|	|
6+ 0	0.1615	0.54	| Q V	|	|	|	|
6+ 5	0.1653	0.55	| Q V	|	|	|	|
6+10	0.1692	0.57	| Q V	|	|	|	|
6+15	0.1733	0.59	| Q V	|	|	|	|

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 6+20       0.1774      0.60  | Q V      |          |          |          |
 6+25       0.1816      0.60  | Q  V     |          |          |          |
 6+30       0.1858      0.61  | Q  V     |          |          |          |
 6+35       0.1900      0.62  | Q  V     |          |          |          |
 6+40       0.1944      0.64  | Q  V     |          |          |          |
 6+45       0.1989      0.66  | Q  V     |          |          |          |
 6+50       0.2035      0.67  | Q  V     |          |          |          |
 6+55       0.2082      0.67  | Q  V     |          |          |          |
 7+ 0       0.2129      0.68  | Q  V     |          |          |          |
 7+ 5       0.2175      0.68  | Q   V    |          |          |          |
 7+10       0.2223      0.68  | Q   V    |          |          |          |
 7+15       0.2270      0.68  | Q   V    |          |          |          |
 7+20       0.2317      0.69  | Q   V    |          |          |          |
 7+25       0.2366      0.71  | Q   V    |          |          |          |
 7+30       0.2416      0.73  | Q   V    |          |          |          |
 7+35       0.2468      0.74  | Q   V    |          |          |          |
 7+40       0.2521      0.77  |  Q   V   |          |          |          |
 7+45       0.2575      0.79  |  Q   V   |          |          |          |
 7+50       0.2631      0.81  |  Q   V   |          |          |          |
 7+55       0.2688      0.83  |  Q   V   |          |          |          |
 8+ 0       0.2747      0.86  |  Q   V   |          |          |          |
 8+ 5       0.2808      0.88  |  Q   V   |          |          |          |
 8+10       0.2871      0.92  |  Q    V  |          |          |          |
 8+15       0.2938      0.97  |  Q    V  |          |          |          |
 8+20       0.3006      0.99  |  Q    V  |          |          |          |
 8+25       0.3075      1.00  |   Q   V  |          |          |          |
 8+30       0.3144      1.01  |   Q   V  |          |          |          |
 8+35       0.3215      1.02  |   Q    V |          |          |          |
 8+40       0.3287      1.04  |   Q    V |          |          |          |
 8+45       0.3360      1.07  |   Q    V |          |          |          |
 8+50       0.3435      1.08  |   Q    V |          |          |          |
 8+55       0.3511      1.11  |   Q    V |          |          |          |
 9+ 0       0.3589      1.13  |   Q     V          |          |          |
 9+ 5       0.3669      1.15  |   Q     V          |          |          |
 9+10       0.3751      1.20  |   Q     V          |          |          |
 9+15       0.3837      1.24  |   Q     V          |          |          |
 9+20       0.3924      1.27  |    Q    |V         |          |          |
 9+25       0.4014      1.30  |    Q    |V         |          |          |
 9+30       0.4105      1.33  |    Q    |V         |          |          |
 9+35       0.4198      1.35  |    Q    |V         |          |          |
 9+40       0.4293      1.38  |    Q    | V        |          |          |
 9+45       0.4390      1.40  |    Q    | V        |          |          |
 9+50       0.4487      1.42  |    Q    | V        |          |          |
 9+55       0.4587      1.45  |    Q    | V        |          |          |
10+ 0       0.4689      1.47  |    Q    |  V       |          |          |
10+ 5       0.4789      1.45  |    Q    |  V       |          |          |
10+10       0.4880      1.32  |    Q    |  V       |          |          |
10+15       0.4962      1.19  |   Q     |  V       |          |          |
10+20       0.5041      1.14  |   Q     |   V      |          |          |
10+25       0.5117      1.11  |   Q     |   V      |          |          |
10+30       0.5192      1.09  |   Q     |   V      |          |          |
10+35       0.5268      1.10  |   Q     |   V      |          |          |
10+40       0.5350      1.19  |   Q     |    V     |          |          |
10+45       0.5438      1.28  |    Q    |    V     |          |          |
10+50       0.5528      1.31  |    Q    |    V     |          |          |
10+55       0.5620      1.33  |    Q    |    V     |          |          |
11+ 0       0.5712      1.34  |    Q    |     V    |          |          |
11+ 5       0.5805      1.35  |    Q    |     V    |          |          |
11+10       0.5896      1.33  |    Q    |     V    |          |          |
11+15       0.5987      1.32  |    Q    |     V    |          |          |
11+20       0.6077      1.31  |    Q    |      V   |          |          |
11+25       0.6168      1.31  |    Q    |      V   |          |          |
11+30       0.6258      1.31  |    Q    |      V   |          |          |
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11+35	0.6347	1.30	| Q |	V |	|	|	|
11+40	0.6434	1.26	| Q |	V |	|	|	|
11+45	0.6519	1.22	| Q |	V |	|	|	|
11+50	0.6602	1.21	| Q |	V |	|	|	|
11+55	0.6686	1.22	| Q |	V |	|	|	|
12+ 0	0.6771	1.23	| Q |	V|	|	|	|
12+ 5	0.6859	1.27	| Q |	V|	|	|	|
12+10	0.6955	1.41	| Q |	V|	|	|	|
12+15	0.7062	1.55	| Q |	V|	|	|	|
12+20	0.7173	1.61	| Q |	V |	|	|	|
12+25	0.7287	1.66	| Q |	V |	|	|	|
12+30	0.7404	1.70	| Q |	V |	|	|	|
12+35	0.7523	1.73	| Q |	|V |	|	|	|
12+40	0.7647	1.79	| Q |	|V |	|	|	|
12+45	0.7773	1.84	| Q |	|V |	|	|	|
12+50	0.7902	1.87	| Q |	| V |	|	|	|
12+55	0.8034	1.91	| Q |	| V |	|	|	|
13+ 0	0.8167	1.94	| Q |	| V |	|	|	|
13+ 5	0.8303	1.98	| Q |	| V |	|	|	|
13+10	0.8447	2.09	| Q |	| V |	|	|	|
13+15	0.8599	2.20	| Q |	| V |	|	|	|
13+20	0.8753	2.24	| Q |	| V |	|	|	|
13+25	0.8909	2.27	| Q|	| V |	|	|	|
13+30	0.9067	2.29	| Q|	| V |	|	|	|
13+35	0.9222	2.25	| Q|	| V |	|	|	|
13+40	0.9363	2.05	| Q |	| V |	|	|	|
13+45	0.9489	1.84	| Q |	| V |	|	|	|
13+50	0.9610	1.75	| Q |	| V |	|	|	|
13+55	0.9728	1.71	| Q |	| V |	|	|	|
14+ 0	0.9843	1.68	| Q |	| V |	|	|	|
14+ 5	0.9958	1.67	| Q |	| V |	|	|	|
14+10	1.0078	1.73	| Q |	| V |	|	|	|
14+15	1.0202	1.80	| Q |	| V |	|	|	|
14+20	1.0327	1.82	| Q |	| V|	|	|	|
14+25	1.0452	1.81	| Q |	| V|	|	|	|
14+30	1.0575	1.79	| Q |	| V|	|	|	|
14+35	1.0699	1.79	| Q |	| V |	|	|	|
14+40	1.0822	1.79	| Q |	| V |	|	|	|
14+45	1.0945	1.79	| Q |	| V |	|	|	|
14+50	1.1068	1.78	| Q |	| |V |	|	|	|
14+55	1.1189	1.76	| Q |	| |V |	|	|	|
15+ 0	1.1309	1.74	| Q |	| |V |	|	|	|
15+ 5	1.1428	1.73	| Q |	| | V |	|	|	|
15+10	1.1546	1.71	| Q |	| | V |	|	|	|
15+15	1.1662	1.69	| Q |	| | V |	|	|	|
15+20	1.1778	1.67	| Q |	| | | V |	|	|	|
15+25	1.1891	1.65	| Q |	| | | V |	|	|	|
15+30	1.2003	1.62	| Q |	| | | V |	|	|	|
15+35	1.2112	1.59	| Q |	| | | V |	|	|	|
15+40	1.2216	1.51	| Q |	| | | V |	|	|	|
15+45	1.2314	1.42	| Q |	| | | V |	|	|	|
15+50	1.2409	1.39	| Q |	| | | V |	|	|	|
15+55	1.2503	1.37	| Q |	| | | V |	|	|	|
16+ 0	1.2596	1.35	| Q |	| | | V |	|	|	|
16+ 5	1.2684	1.27	| Q |	| | | V |	|	|	|
16+10	1.2751	0.97	| Q |	| | | V |	|	|	|
16+15	1.2797	0.67	| Q |	| | | V |	|	|	|
16+20	1.2834	0.54	| Q |	| | | V |	|	|	|
16+25	1.2866	0.47	|Q |	| | | V |	|	|	|
16+30	1.2895	0.42	|Q |	| | | V |	|	|	|
16+35	1.2921	0.38	|Q |	| | | V |	|	|	|
16+40	1.2944	0.33	|Q |	| | | V |	|	|	|
16+45	1.2964	0.29	|Q |	| | | V |	|	|	|

16+50	1.2982	0.27	|Q	|	|	|	V |
16+55	1.2999	0.25	|Q	|	|	|	V |
17+ 0	1.3016	0.24	Q	|	|	|	V |
17+ 5	1.3032	0.24	Q	|	|	|	V |
17+10	1.3051	0.27	|Q	|	|	|	V |
17+15	1.3071	0.30	|Q	|	|	|	V |
17+20	1.3093	0.31	|Q	|	|	|	V |
17+25	1.3115	0.32	|Q	|	|	|	V |
17+30	1.3138	0.33	|Q	|	|	|	V |
17+35	1.3161	0.33	|Q	|	|	|	V |
17+40	1.3184	0.33	|Q	|	|	|	V |
17+45	1.3207	0.34	|Q	|	|	|	V |
17+50	1.3230	0.33	|Q	|	|	|	V |
17+55	1.3252	0.32	|Q	|	|	|	V |
18+ 0	1.3272	0.30	|Q	|	|	|	V |
18+ 5	1.3292	0.29	|Q	|	|	|	V |
18+10	1.3312	0.29	|Q	|	|	|	V |
18+15	1.3331	0.28	|Q	|	|	|	V |
18+20	1.3351	0.28	|Q	|	|	|	V |
18+25	1.3370	0.28	|Q	|	|	|	V |
18+30	1.3389	0.28	|Q	|	|	|	V |
18+35	1.3408	0.27	|Q	|	|	|	V |
18+40	1.3426	0.25	|Q	|	|	|	V |
18+45	1.3442	0.23	Q	|	|	|	V |
18+50	1.3457	0.22	Q	|	|	|	V |
18+55	1.3470	0.20	Q	|	|	|	V |
19+ 0	1.3482	0.17	Q	|	|	|	V |
19+ 5	1.3494	0.17	Q	|	|	|	V |
19+10	1.3506	0.18	Q	|	|	|	V |
19+15	1.3519	0.19	Q	|	|	|	V |
19+20	1.3533	0.20	Q	|	|	|	V |
19+25	1.3549	0.23	Q	|	|	|	V |
19+30	1.3566	0.25	Q	|	|	|	V |
19+35	1.3583	0.25	|Q	|	|	|	V |
19+40	1.3599	0.24	Q	|	|	|	V |
19+45	1.3615	0.22	Q	|	|	|	V |
19+50	1.3629	0.21	Q	|	|	|	V |
19+55	1.3642	0.19	Q	|	|	|	V |
20+ 0	1.3654	0.17	Q	|	|	|	V |
20+ 5	1.3665	0.16	Q	|	|	|	V |
20+10	1.3677	0.18	Q	|	|	|	V |
20+15	1.3690	0.19	Q	|	|	|	V |
20+20	1.3704	0.20	Q	|	|	|	V |
20+25	1.3718	0.20	Q	|	|	|	V |
20+30	1.3732	0.20	Q	|	|	|	V |
20+35	1.3746	0.20	Q	|	|	|	V |
20+40	1.3760	0.20	Q	|	|	|	V |
20+45	1.3774	0.20	Q	|	|	|	V |
20+50	1.3788	0.20	Q	|	|	|	V |
20+55	1.3800	0.18	Q	|	|	|	V |
21+ 0	1.3811	0.16	Q	|	|	|	V |
21+ 5	1.3822	0.16	Q	|	|	|	V |
21+10	1.3834	0.17	Q	|	|	|	V |
21+15	1.3847	0.19	Q	|	|	|	V |
21+20	1.3860	0.19	Q	|	|	|	V |
21+25	1.3872	0.18	Q	|	|	|	V|
21+30	1.3883	0.16	Q	|	|	|	V|
21+35	1.3894	0.16	Q	|	|	|	V|
21+40	1.3906	0.17	Q	|	|	|	V|
21+45	1.3919	0.19	Q	|	|	|	V|
21+50	1.3932	0.19	Q	|	|	|	V|
21+55	1.3944	0.17	Q	|	|	|	V|
22+ 0	1.3954	0.16	Q	|	|	|	V|

22+ 5	1.3965	0.15	Q	|	|	|	V|
22+10	1.3977	0.17	Q	|	|	|	V|
22+15	1.3990	0.19	Q	|	|	|	V|
22+20	1.4003	0.19	Q	|	|	|	V|
22+25	1.4015	0.17	Q	|	|	|	V|
22+30	1.4026	0.16	Q	|	|	|	V|
22+35	1.4036	0.15	Q	|	|	|	V|
22+40	1.4046	0.15	Q	|	|	|	V|
22+45	1.4056	0.14	Q	|	|	|	V|
22+50	1.4066	0.14	Q	|	|	|	V|
22+55	1.4075	0.14	Q	|	|	|	V|
23+ 0	1.4085	0.14	Q	|	|	|	V|
23+ 5	1.4095	0.14	Q	|	|	|	V|
23+10	1.4104	0.14	Q	|	|	|	V|
23+15	1.4114	0.14	Q	|	|	|	V|
23+20	1.4123	0.14	Q	|	|	|	V|
23+25	1.4133	0.14	Q	|	|	|	V|
23+30	1.4143	0.14	Q	|	|	|	V|
23+35	1.4152	0.14	Q	|	|	|	V|
23+40	1.4161	0.14	Q	|	|	|	V|
23+45	1.4171	0.14	Q	|	|	|	V|
23+50	1.4180	0.14	Q	|	|	|	V|
23+55	1.4190	0.14	Q	|	|	|	V|
24+ 0	1.4199	0.14	Q	|	|	|	V|
24+ 5	1.4208	0.13	Q	|	|	|	V|
24+10	1.4214	0.09	Q	|	|	|	V|
24+15	1.4218	0.05	Q	|	|	|	V|
24+20	1.4220	0.03	Q	|	|	|	V|
24+25	1.4222	0.02	Q	|	|	|	V|
24+30	1.4223	0.02	Q	|	|	|	V|
24+35	1.4224	0.01	Q	|	|	|	V|
24+40	1.4225	0.01	Q	|	|	|	V|
24+45	1.4225	0.01	Q	|	|	|	V|
24+50	1.4226	0.01	Q	|	|	|	V|
24+55	1.4226	0.00	Q	|	|	|	V|
25+ 0	1.4226	0.00	Q	|	|	|	V|
25+ 5	1.4226	0.00	Q	|	|	|	V|
25+10	1.4226	0.00	Q	|	|	|	V|
25+15	1.4226	0.00	Q	|	|	|	V|

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  04/01/24 File: 907hydc5ex215.out

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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
5-year 1-hour storm



----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.50                45.90

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
       91.80         1.20              110.16

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    0.664(In)
Areal adjustment factor =   99.92 %
Adjusted average point rain =    0.663(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    91.800           81.80          0.010
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
81.8  81.8      0.223     0.010         0.221       1.000      0.221
                                                   Sum (F) =   0.221
Area averaged mean soil loss (F) (In/Hr) =  0.221
Minimum soil loss rate ((In/Hr)) =  0.111
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.890
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5500
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
-------------------------------------------------------------------
             Unit Hydrograph Data
-------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
-------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
   12   1.000        633.802          0.925             0.856
   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                               Sum = 100.000   Sum=      92.517
-------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
    1   0.08     3.30      0.263          0.221    (  0.234)        0.041
    2   0.17     4.20      0.334          0.221    (  0.298)        0.113
```

```
  3   0.25     4.40      0.350          0.221    (  0.312)        0.129
  4   0.33     4.80      0.382          0.221    (  0.340)        0.161
  5   0.42     5.20      0.414          0.221    (  0.368)        0.192
  6   0.50     6.20      0.494          0.221    (  0.439)        0.272
  7   0.58     6.80      0.541          0.221    (  0.482)        0.320
  8   0.67     8.80      0.701          0.221    (  0.623)        0.479
  9   0.75    13.90      1.107          0.221    (  0.985)        0.885
 10   0.83    31.40      2.500          0.221    (  2.225)        2.278
 11   0.92     7.20      0.573          0.221    (  0.510)        0.352
 12   1.00     3.80      0.303          0.221    (  0.269)        0.081
            (Loss Rate Not Used)
    Sum =     100.0                                  Sum =     5.3
     Flood volume = Effective rainfall      0.44(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       3.4(Ac.Ft)
     Total soil loss =      0.22(In)
     Total soil loss =     1.694(Ac.Ft)
     Total rainfall =      0.66(In)
     Flood volume =      147268.1 Cubic Feet
     Total soil loss =       73800.9 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     95.372(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       25.0      50.0      75.0     100.0
-------------------------------------------------------------------------
  0+ 5       0.0018      0.25  Q         |         |         |         |
  0+10       0.0140      1.79  Q         |         |         |         |
  0+15       0.0475      4.86  VQ        |         |         |         |
  0+20       0.1014      7.82  |V Q      |         |         |         |
  0+25       0.1725     10.33  | V Q     |         |         |         |
  0+30       0.2640     13.28  |  V Q    |         |         |         |
  0+35       0.3838     17.40  |   V Q   |         |         |         |
  0+40       0.5399     22.66  |     V  Q|         |         |         |
  0+45       0.7611     32.12  |        V| Q       |         |         |
  0+50       1.1542     57.09  |         |  V      | Q       |         |
  0+55       1.8111     95.37  |         |         |V        |        Q |
  1+ 0       2.4018     85.77  |         |         |       V |   Q     |
  1+ 5       2.7223     46.54  |         |       Q |         | V       |
  1+10       2.9074     26.88  |         Q         |         |   V     |
  1+15       3.0302     17.83  |       Q   |       |         |    V    |
  1+20       3.1184     12.82  |     Q     |       |         |     V   |
  1+25       3.1843      9.56  |  Q        |       |         |      V  |
  1+30       3.2342      7.24  | Q         |       |         |       V |
  1+35       3.2746      5.87  | Q         |       |         |       V |
  1+40       3.3057      4.53  |Q          |       |         |        V|
  1+45       3.3299      3.51  |Q          |       |         |        V|
  1+50       3.3481      2.65  |Q          |       |         |        V|
  1+55       3.3620      2.02  Q           |       |         |        V|
  2+ 0       3.3732      1.62  Q           |       |         |        V|
  2+ 5       3.3796      0.93  Q           |       |         |        V|
  2+10       3.3806      0.15  Q           |       |         |        V|
  2+15       3.3808      0.03  Q           |       |         |         V
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  04/01/24 File: 907hydc5ex235.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
5-year 3-hour storm


----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.77                70.69

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.77               162.49

STORM EVENT (YEAR) =    5.00
```

```
Area Averaged 2-Year Rainfall =    0.770(In)
Area Averaged 100-Year Rainfall =    1.770(In)

Point rain (area averaged) =    1.004(In)
Areal adjustment factor =   99.96 %
Adjusted average point rain =    1.004(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    91.800           81.80          0.010
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
81.8  81.8      0.223     0.010         0.221        1.000      0.221
                                                   Sum (F) =   0.221
Area averaged mean soil loss (F) (In/Hr) =  0.221
Minimum soil loss rate ((In/Hr)) =  0.111
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.890
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
   12   1.000        633.802          0.925             0.856
   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                               Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     1.30      0.157       (  0.221)       0.139        0.017
  2   0.17     1.30      0.157       (  0.221)       0.139        0.017
  3   0.25     1.10      0.133       (  0.221)       0.118        0.015
  4   0.33     1.50      0.181       (  0.221)       0.161        0.020
  5   0.42     1.50      0.181       (  0.221)       0.161        0.020
  6   0.50     1.80      0.217       (  0.221)       0.193        0.024
  7   0.58     1.50      0.181       (  0.221)       0.161        0.020
```

```
 8   0.67     1.80      0.217       (  0.221)       0.193        0.024
 9   0.75     1.80      0.217       (  0.221)       0.193        0.024
10   0.83     1.50      0.181       (  0.221)       0.161        0.020
11   0.92     1.60      0.193       (  0.221)       0.172        0.021
12   1.00     1.80      0.217       (  0.221)       0.193        0.024
13   1.08     2.20      0.265          0.221    (  0.236)       0.044
14   1.17     2.20      0.265          0.221    (  0.236)       0.044
15   1.25     2.20      0.265          0.221    (  0.236)       0.044
16   1.33     2.00      0.241       (  0.221)       0.214        0.027
17   1.42     2.60      0.313          0.221    (  0.279)       0.092
18   1.50     2.70      0.325          0.221    (  0.289)       0.104
19   1.58     2.40      0.289          0.221    (  0.257)       0.068
20   1.67     2.70      0.325          0.221    (  0.289)       0.104
21   1.75     3.30      0.398          0.221    (  0.354)       0.176
22   1.83     3.10      0.373          0.221    (  0.332)       0.152
23   1.92     2.90      0.349          0.221    (  0.311)       0.128
24   2.00     3.00      0.361          0.221    (  0.322)       0.140
25   2.08     3.10      0.373          0.221    (  0.332)       0.152
26   2.17     4.20      0.506          0.221    (  0.450)       0.284
27   2.25     5.00      0.602          0.221    (  0.536)       0.381
28   2.33     3.50      0.422          0.221    (  0.375)       0.200
29   2.42     6.80      0.819          0.221    (  0.729)       0.598
30   2.50     7.30      0.879          0.221    (  0.783)       0.658
31   2.58     8.20      0.988          0.221    (  0.879)       0.766
32   2.67     5.90      0.711          0.221    (  0.633)       0.489
33   2.75     2.00      0.241       (  0.221)       0.214        0.027
34   2.83     1.80      0.217       (  0.221)       0.193        0.024
35   2.92     1.80      0.217       (  0.221)       0.193        0.024
36   3.00     0.60      0.072       (  0.221)       0.064        0.008
          (Loss Rate Not Used)
   Sum =     100.0                                   Sum =     5.0
    Flood volume = Effective rainfall      0.41(In)
     times area      91.8(Ac.)/[(In)/(Ft.)] =       3.2(Ac.Ft)
    Total soil loss =      0.59(In)
    Total soil loss =     4.507(Ac.Ft)
    Total rainfall =      1.00(In)
    Flood volume =      138166.9 Cubic Feet
    Total soil loss =      196340.4 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     52.153(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       15.0      30.0      45.0      60.0
-----------------------------------------------------------------------
  0+ 5       0.0007      0.11  Q         |         |         |         |
  0+10       0.0046      0.56  Q         |         |         |         |
  0+15       0.0115      1.00  Q         |         |         |         |
  0+20       0.0194      1.15  Q         |         |         |         |
  0+25       0.0285      1.33  Q         |         |         |         |
  0+30       0.0391      1.53  VQ        |         |         |         |
  0+35       0.0509      1.71  VQ        |         |         |         |
  0+40       0.0633      1.79  VQ        |         |         |         |
  0+45       0.0762      1.88  VQ        |         |         |         |
  0+50       0.0898      1.98  |Q        |         |         |         |
  0+55       0.1032      1.94  |Q        |         |         |         |
  1+ 0       0.1165      1.93  |Q        |         |         |         |
  1+ 5       0.1312      2.14  |Q        |         |         |         |
```

```
    1+10       0.1501      2.74  |Q         |          |          |          |
    1+15       0.1728      3.30  | Q        |          |          |          |
    1+20       0.1965      3.44  | Q        |          |          |          |
    1+25       0.2207      3.52  | Q        |          |          |          |
    1+30       0.2549      4.96  |  Q       |          |          |          |
    1+35       0.3007      6.65  |  VQ      |          |          |          |
    1+40       0.3483      6.91  |   Q      |          |          |          |
    1+45       0.4024      7.85  |    Q     |          |          |          |
    1+50       0.4746     10.48  |    VQ    |          |          |          |
    1+55       0.5573     12.02  |      VQ  |          |          |          |
    2+ 0       0.6391     11.87  |      QV  |          |          |          |
    2+ 5       0.7215     11.96  |      Q V |          |          |          |
    2+10       0.8141     13.44  |       Q V          |          |          |
    2+15       0.9384     18.06  |          |VQ        |          |          |
    2+20       1.0985     23.24  |          |  V Q     |          |          |
    2+25       1.2715     25.12  |          |     Q    |          |          |
    2+30       1.5004     33.23  |          |        V | Q        |          |
    2+35       1.8117     45.20  |          |          | V        Q          |
    2+40       2.1709     52.15  |          |          |       V  |   Q      |
    2+45       2.5000     47.79  |          |          |          |Q         |
    2+50       2.7166     31.44  |          |          Q          |   V      |
    2+55       2.8419     18.20  |          | Q        |          |    V     |
    3+ 0       2.9297     12.74  |        Q |          |          |     V    |
    3+ 5       2.9940      9.34  |      Q   |          |          |      V   |
    3+10       3.0407      6.79  |   Q      |          |          |       V  |
    3+15       3.0755      5.04  |  Q       |          |          |       V  |
    3+20       3.1024      3.91  | Q        |          |          |        V |
    3+25       3.1235      3.06  | Q        |          |          |        V |
    3+30       3.1392      2.29  |Q         |          |          |        V |
    3+35       3.1511      1.72  |Q         |          |          |        V |
    3+40       3.1601      1.31  Q          |          |          |        V |
    3+45       3.1663      0.90  Q          |          |          |        V |
    3+50       3.1700      0.54  Q          |          |          |        V |
    3+55       3.1714      0.20  Q          |          |          |        V |
    4+ 0       3.1716      0.04  Q          |          |          |        V |
    4+ 5       3.1718      0.02  Q          |          |          |        V |
    4+10       3.1719      0.01  Q          |          |          |        V |
    4+15       3.1719      0.00  Q          |          |          |         V
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

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            Study date  04/01/24 File: 907hydc5ex265.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
5-year 6-hour storm


------------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          0.95                87.21

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          2.45               224.91

STORM EVENT (YEAR) =    5.00
```

```
Area Averaged 2-Year Rainfall =    0.950(In)
Area Averaged 100-Year Rainfall =    2.450(In)

Point rain (area averaged) =    1.301(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    1.301(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    91.800           81.80          0.010
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
81.8  81.8      0.223     0.010         0.221        1.000      0.221
                                                   Sum (F) =   0.221
Area averaged mean soil loss (F) (In/Hr) =  0.221
Minimum soil loss rate ((In/Hr)) =  0.111
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.890
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
   12   1.000        633.802          0.925             0.856
   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                               Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.50      0.078       (  0.221)       0.069        0.009
  2   0.17     0.60      0.094       (  0.221)       0.083        0.010
  3   0.25     0.60      0.094       (  0.221)       0.083        0.010
  4   0.33     0.60      0.094       (  0.221)       0.083        0.010
  5   0.42     0.60      0.094       (  0.221)       0.083        0.010
  6   0.50     0.70      0.109       (  0.221)       0.097        0.012
  7   0.58     0.70      0.109       (  0.221)       0.097        0.012
```

8	0.67	0.70	0.109	(0.221)	0.097	0.012
9	0.75	0.70	0.109	(0.221)	0.097	0.012
10	0.83	0.70	0.109	(0.221)	0.097	0.012
11	0.92	0.70	0.109	(0.221)	0.097	0.012
12	1.00	0.80	0.125	(0.221)	0.111	0.014
13	1.08	0.80	0.125	(0.221)	0.111	0.014
14	1.17	0.80	0.125	(0.221)	0.111	0.014
15	1.25	0.80	0.125	(0.221)	0.111	0.014
16	1.33	0.80	0.125	(0.221)	0.111	0.014
17	1.42	0.80	0.125	(0.221)	0.111	0.014
18	1.50	0.80	0.125	(0.221)	0.111	0.014
19	1.58	0.80	0.125	(0.221)	0.111	0.014
20	1.67	0.80	0.125	(0.221)	0.111	0.014
21	1.75	0.80	0.125	(0.221)	0.111	0.014
22	1.83	0.80	0.125	(0.221)	0.111	0.014
23	1.92	0.80	0.125	(0.221)	0.111	0.014
24	2.00	0.90	0.140	(0.221)	0.125	0.015
25	2.08	0.80	0.125	(0.221)	0.111	0.014
26	2.17	0.90	0.140	(0.221)	0.125	0.015
27	2.25	0.90	0.140	(0.221)	0.125	0.015
28	2.33	0.90	0.140	(0.221)	0.125	0.015
29	2.42	0.90	0.140	(0.221)	0.125	0.015
30	2.50	0.90	0.140	(0.221)	0.125	0.015
31	2.58	0.90	0.140	(0.221)	0.125	0.015
32	2.67	0.90	0.140	(0.221)	0.125	0.015
33	2.75	1.00	0.156	(0.221)	0.139	0.017
34	2.83	1.00	0.156	(0.221)	0.139	0.017
35	2.92	1.00	0.156	(0.221)	0.139	0.017
36	3.00	1.00	0.156	(0.221)	0.139	0.017
37	3.08	1.00	0.156	(0.221)	0.139	0.017
38	3.17	1.10	0.172	(0.221)	0.153	0.019
39	3.25	1.10	0.172	(0.221)	0.153	0.019
40	3.33	1.10	0.172	(0.221)	0.153	0.019
41	3.42	1.20	0.187	(0.221)	0.167	0.021
42	3.50	1.30	0.203	(0.221)	0.181	0.022
43	3.58	1.40	0.219	(0.221)	0.195	0.024
44	3.67	1.40	0.219	(0.221)	0.195	0.024
45	3.75	1.50	0.234	(0.221)	0.208	0.026
46	3.83	1.50	0.234	(0.221)	0.208	0.026
47	3.92	1.60	0.250	0.221	(0.222)	0.028
48	4.00	1.60	0.250	0.221	(0.222)	0.028
49	4.08	1.70	0.265	0.221	(0.236)	0.044
50	4.17	1.80	0.281	0.221	(0.250)	0.060
51	4.25	1.90	0.297	0.221	(0.264)	0.075
52	4.33	2.00	0.312	0.221	(0.278)	0.091
53	4.42	2.10	0.328	0.221	(0.292)	0.106
54	4.50	2.10	0.328	0.221	(0.292)	0.106
55	4.58	2.20	0.343	0.221	(0.306)	0.122
56	4.67	2.30	0.359	0.221	(0.320)	0.138
57	4.75	2.40	0.375	0.221	(0.333)	0.153
58	4.83	2.40	0.375	0.221	(0.333)	0.153
59	4.92	2.50	0.390	0.221	(0.347)	0.169
60	5.00	2.60	0.406	0.221	(0.361)	0.184
61	5.08	3.10	0.484	0.221	(0.431)	0.262
62	5.17	3.60	0.562	0.221	(0.500)	0.341
63	5.25	3.90	0.609	0.221	(0.542)	0.387
64	5.33	4.20	0.656	0.221	(0.584)	0.434
65	5.42	4.70	0.734	0.221	(0.653)	0.512
66	5.50	5.60	0.874	0.221	(0.778)	0.653
67	5.58	1.90	0.297	0.221	(0.264)	0.075
68	5.67	0.90	0.140	(0.221)	0.125	0.015
69	5.75	0.60	0.094	(0.221)	0.083	0.010
70	5.83	0.50	0.078	(0.221)	0.069	0.009

```
71   5.92     0.30      0.047       (  0.221)       0.042        0.005
72   6.00     0.20      0.031       (  0.221)       0.028        0.003
           (Loss Rate Not Used)
   Sum =     100.0                                   Sum =     4.9
     Flood volume = Effective rainfall      0.41(In)
      times area      91.8(Ac.)/[(In)/(Ft.)] =       3.1(Ac.Ft)
     Total soil loss =      0.89(In)
     Total soil loss =     6.844(Ac.Ft)
     Total rainfall =      1.30(In)
     Flood volume =      135369.2 Cubic Feet
     Total soil loss =      298143.5 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     42.002(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          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   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
-------------------------------------------------------------------------
  0+ 5       0.0004      0.05  Q          |         |         |         |
  0+10       0.0024      0.29  Q          |         |         |         |
  0+15       0.0062      0.56  Q          |         |         |         |
  0+20       0.0111      0.70  Q          |         |         |         |
  0+25       0.0164      0.77  Q          |         |         |         |
  0+30       0.0221      0.83  Q          |         |         |         |
  0+35       0.0284      0.91  Q          |         |         |         |
  0+40       0.0351      0.98  Q          |         |         |         |
  0+45       0.0421      1.02  Q          |         |         |         |
  0+50       0.0493      1.04  Q          |         |         |         |
  0+55       0.0566      1.06  Q          |         |         |         |
  1+ 0       0.0641      1.09  Q          |         |         |         |
  1+ 5       0.0720      1.14  Q          |         |         |         |
  1+10       0.0802      1.20  QV         |         |         |         |
  1+15       0.0886      1.22  QV         |         |         |         |
  1+20       0.0971      1.24  QV         |         |         |         |
  1+25       0.1057      1.25  QV         |         |         |         |
  1+30       0.1144      1.25  |Q         |         |         |         |
  1+35       0.1230      1.26  |Q         |         |         |         |
  1+40       0.1317      1.26  |Q         |         |         |         |
  1+45       0.1404      1.26  |Q         |         |         |         |
  1+50       0.1491      1.27  |Q         |         |         |         |
  1+55       0.1579      1.27  |QV        |         |         |         |
  2+ 0       0.1667      1.28  |QV        |         |         |         |
  2+ 5       0.1758      1.32  |QV        |         |         |         |
  2+10       0.1849      1.33  |QV        |         |         |         |
  2+15       0.1942      1.35  |QV        |         |         |         |
  2+20       0.2037      1.38  |QV        |         |         |         |
  2+25       0.2133      1.40  |QV        |         |         |         |
  2+30       0.2230      1.41  |QV        |         |         |         |
  2+35       0.2328      1.41  |QV        |         |         |         |
  2+40       0.2425      1.42  |Q V       |         |         |         |
  2+45       0.2524      1.43  |Q V       |         |         |         |
  2+50       0.2626      1.48  |Q V       |         |         |         |
  2+55       0.2731      1.53  |Q V       |         |         |         |
  3+ 0       0.2837      1.55  |Q V       |         |         |         |
  3+ 5       0.2945      1.56  |Q V       |         |         |         |
  3+10       0.3053      1.58  |Q V       |         |         |         |
  3+15       0.3166      1.63  |Q  V      |         |         |         |
  3+20       0.3281      1.68  |Q  V      |         |         |         |
```

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    3+25       0.3399      1.71  |Q  V     |          |          |          |
    3+30       0.3522      1.78  |Q  V     |          |          |          |
    3+35       0.3652      1.89  |Q  V     |          |          |          |
    3+40       0.3790      2.01  |Q  V     |          |          |          |
    3+45       0.3934      2.10  |Q   V    |          |          |          |
    3+50       0.4085      2.18  |Q   V    |          |          |          |
    3+55       0.4241      2.27  |Q   V    |          |          |          |
    4+ 0       0.4405      2.37  |Q   V    |          |          |          |
    4+ 5       0.4581      2.56  | Q  V    |          |          |          |
    4+10       0.4796      3.12  | Q   V   |          |          |          |
    4+15       0.5076      4.06  |  Q  V   |          |          |          |
    4+20       0.5432      5.18  |   Q V   |          |          |          |
    4+25       0.5872      6.38  |    Q V  |          |          |          |
    4+30       0.6392      7.55  |     Q V |          |          |          |
    4+35       0.6974      8.45  |     Q V |          |          |          |
    4+40       0.7620      9.38  |      Q V|          |          |          |
    4+45       0.8349     10.58  |       Q V          |          |          |
    4+50       0.9159     11.77  |        Q|V         |          |          |
    4+55       1.0034     12.70  |         Q V        |          |          |
    5+ 0       1.0974     13.66  |         Q   V      |          |          |
    5+ 5       1.2025     15.26  |          | Q  V    |          |          |
    5+10       1.3307     18.60  |          |   Q  V  |          |          |
    5+15       1.4921     23.44  |          |       QV|          |          |
    5+20       1.6862     28.18  |          |         |VQ        |          |
    5+25       1.9113     32.68  |          |         |   V Q    |          |
    5+30       2.1752     38.32  |          |         |      V   Q          |
    5+35       2.4644     42.00  |          |         |          |V Q       |
    5+40       2.6844     31.94  |          |         |    Q     |   V      |
    5+45       2.8075     17.87  |          |   Q     |          |     V    |
    5+50       2.8863     11.44  |        Q|          |          |      V   |
    5+55       2.9435      8.31  |     Q    |          |          |      V   |
    6+ 0       2.9864      6.23  |   Q      |          |          |       V  |
    6+ 5       3.0189      4.72  |  Q       |          |          |       V  |
    6+10       3.0434      3.56  | Q        |          |          |        V|
    6+15       3.0625      2.76  | Q        |          |          |        V|
    6+20       3.0769      2.10  |Q         |          |          |        V|
    6+25       3.0877      1.58  |Q         |          |          |        V|
    6+30       3.0956      1.15  Q          |          |          |        V|
    6+35       3.1012      0.81  Q          |          |          |        V|
    6+40       3.1051      0.56  Q          |          |          |        V|
    6+45       3.1070      0.28  Q          |          |          |        V|
    6+50       3.1073      0.05  Q          |          |          |        V|
    6+55       3.1075      0.02  Q          |          |          |        V|
    7+ 0       3.1076      0.01  Q          |          |          |        V|
    7+ 5       3.1076      0.01  Q          |          |          |        V|
    7+10       3.1076      0.00  Q          |          |          |        V|
    7+15       3.1076      0.00  Q          |          |          |        V|
-------------------------------------------------------------------------
```

```
      U n i t   H y d r o g r a p h   A n a l y s i s

      Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
            Study date  04/01/24 File: 907hydc5ex2245.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4029

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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

Keller Crossing, Tr. 38163
Hydrology Existing Condition Area C onsite = 91.8 Ac
For comparison sensitive analysis
5-year 24-hour storm


----------------------------------------------------------------------
Drainage Area =      91.80(Ac.)  =      0.143 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      91.80(Ac.)  =      0.143 Sq. Mi.
Length along longest watercourse =    3564.00(Ft.)
Length along longest watercourse measured to centroid =    1672.00(Ft.)
Length along longest watercourse =      0.675 Mi.
Length along longest watercourse measured to centroid =      0.317 Mi.
Difference in elevation =      91.00(Ft.)
Slope along watercourse =    134.8148 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.158 Hr.
Lag time =     9.47 Min.
25% of lag time =     2.37 Min.
40% of lag time =     3.79 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          1.55              142.29

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       91.80          4.05              371.79

STORM EVENT (YEAR) =    5.00
```

```
Area Averaged 2-Year Rainfall =    1.550(In)
Area Averaged 100-Year Rainfall =    4.050(In)

Point rain (area averaged) =    2.136(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    2.135(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    91.800           81.80          0.010
 Total Area Entered =     91.80(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
81.8  81.8      0.223     0.010         0.221        1.000      0.221
                                                   Sum (F) =    0.221
Area averaged mean soil loss (F) (In/Hr) =  0.221
Minimum soil loss rate ((In/Hr)) =  0.111
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.890
------------------------------------------------------------------------

             U n i t  H y d r o g r a p h
                    VALLEY S-Curve
------------------------------------------------------------------------
             Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083         52.817          6.673             6.173
    2   0.167        105.634         28.498            26.366
    3   0.250        158.450         28.462            26.332
    4   0.333        211.267         12.020            11.121
    5   0.417        264.084          6.556             6.065
    6   0.500        316.901          4.556             4.215
    7   0.583        369.718          3.275             3.030
    8   0.667        422.534          2.432             2.250
    9   0.750        475.351          1.782             1.649
   10   0.833        528.168          1.539             1.424
   11   0.917        580.985          1.172             1.084
   12   1.000        633.802          0.925             0.856
   13   1.083        686.618          0.702             0.650
   14   1.167        739.435          0.538             0.498
   15   1.250        792.252          0.528             0.489
   16   1.333        845.069          0.342             0.316
                               Sum = 100.000   Sum=      92.517
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
  1   0.08     0.07      0.017       (  0.393)       0.015        0.002
  2   0.17     0.07      0.017       (  0.391)       0.015        0.002
  3   0.25     0.07      0.017       (  0.390)       0.015        0.002
  4   0.33     0.10      0.026       (  0.388)       0.023        0.003
  5   0.42     0.10      0.026       (  0.387)       0.023        0.003
  6   0.50     0.10      0.026       (  0.385)       0.023        0.003
  7   0.58     0.10      0.026       (  0.384)       0.023        0.003
```

8	0.67	0.10	0.026	(0.382)	0.023	0.003
9	0.75	0.10	0.026	(0.381)	0.023	0.003
10	0.83	0.13	0.034	(0.379)	0.030	0.004
11	0.92	0.13	0.034	(0.378)	0.030	0.004
12	1.00	0.13	0.034	(0.376)	0.030	0.004
13	1.08	0.10	0.026	(0.375)	0.023	0.003
14	1.17	0.10	0.026	(0.373)	0.023	0.003
15	1.25	0.10	0.026	(0.372)	0.023	0.003
16	1.33	0.10	0.026	(0.370)	0.023	0.003
17	1.42	0.10	0.026	(0.369)	0.023	0.003
18	1.50	0.10	0.026	(0.367)	0.023	0.003
19	1.58	0.10	0.026	(0.366)	0.023	0.003
20	1.67	0.10	0.026	(0.364)	0.023	0.003
21	1.75	0.10	0.026	(0.363)	0.023	0.003
22	1.83	0.13	0.034	(0.361)	0.030	0.004
23	1.92	0.13	0.034	(0.360)	0.030	0.004
24	2.00	0.13	0.034	(0.358)	0.030	0.004
25	2.08	0.13	0.034	(0.357)	0.030	0.004
26	2.17	0.13	0.034	(0.356)	0.030	0.004
27	2.25	0.13	0.034	(0.354)	0.030	0.004
28	2.33	0.13	0.034	(0.353)	0.030	0.004
29	2.42	0.13	0.034	(0.351)	0.030	0.004
30	2.50	0.13	0.034	(0.350)	0.030	0.004
31	2.58	0.17	0.043	(0.348)	0.038	0.005
32	2.67	0.17	0.043	(0.347)	0.038	0.005
33	2.75	0.17	0.043	(0.345)	0.038	0.005
34	2.83	0.17	0.043	(0.344)	0.038	0.005
35	2.92	0.17	0.043	(0.343)	0.038	0.005
36	3.00	0.17	0.043	(0.341)	0.038	0.005
37	3.08	0.17	0.043	(0.340)	0.038	0.005
38	3.17	0.17	0.043	(0.338)	0.038	0.005
39	3.25	0.17	0.043	(0.337)	0.038	0.005
40	3.33	0.17	0.043	(0.336)	0.038	0.005
41	3.42	0.17	0.043	(0.334)	0.038	0.005
42	3.50	0.17	0.043	(0.333)	0.038	0.005
43	3.58	0.17	0.043	(0.331)	0.038	0.005
44	3.67	0.17	0.043	(0.330)	0.038	0.005
45	3.75	0.17	0.043	(0.329)	0.038	0.005
46	3.83	0.20	0.051	(0.327)	0.046	0.006
47	3.92	0.20	0.051	(0.326)	0.046	0.006
48	4.00	0.20	0.051	(0.324)	0.046	0.006
49	4.08	0.20	0.051	(0.323)	0.046	0.006
50	4.17	0.20	0.051	(0.322)	0.046	0.006
51	4.25	0.20	0.051	(0.320)	0.046	0.006
52	4.33	0.23	0.060	(0.319)	0.053	0.007
53	4.42	0.23	0.060	(0.318)	0.053	0.007
54	4.50	0.23	0.060	(0.316)	0.053	0.007
55	4.58	0.23	0.060	(0.315)	0.053	0.007
56	4.67	0.23	0.060	(0.314)	0.053	0.007
57	4.75	0.23	0.060	(0.312)	0.053	0.007
58	4.83	0.27	0.068	(0.311)	0.061	0.008
59	4.92	0.27	0.068	(0.310)	0.061	0.008
60	5.00	0.27	0.068	(0.308)	0.061	0.008
61	5.08	0.20	0.051	(0.307)	0.046	0.006
62	5.17	0.20	0.051	(0.306)	0.046	0.006
63	5.25	0.20	0.051	(0.304)	0.046	0.006
64	5.33	0.23	0.060	(0.303)	0.053	0.007
65	5.42	0.23	0.060	(0.302)	0.053	0.007
66	5.50	0.23	0.060	(0.300)	0.053	0.007
67	5.58	0.27	0.068	(0.299)	0.061	0.008
68	5.67	0.27	0.068	(0.298)	0.061	0.008
69	5.75	0.27	0.068	(0.296)	0.061	0.008
70	5.83	0.27	0.068	(0.295)	0.061	0.008