RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 1 of ___ Sheets

PROJECT ROMOLAND - WEST OF 395

Calculated by [illegible] 4-25-85 DATE

LINE A-11

FREQUENCY 10 yr. ←

Checked by ---------- DATE

DRAINAGE AREA	Soil & Development	A Acres	I In/Hr	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	Σ T	REMARKS
W-1	D-Comm	5.5	1.83	.885	8.9				H=2	600	12.1	12.1	
W-2	D-Comm	8.5	1.50	.88	11.2	8.9	.004	66" St.	2.3	800	5.8	17.9	
W-3	D-Comm	11.9	1.21	.878	12.6	20	.003	66" St.	2.1	1250	9.9	27.8	
						33	003	TR. CHAN	5.3	350	1.1	28.9	(A)
W-4	D-Comm	7.6	1.87	.887	12.6				H=2	550	11.5	11.5	
W-5	"	12.9	1.53	.881	17.4	12.6	.004	66" St.	2.3	800	5.8	17.3	
W-6	"	21.3	1.24	.877	23	30	.003	66" St.	2.3	1250	9.1	26.4	(B)
						53							
			$Q_P = 53 + 33$			(26.4 / 28.9)	=	83		$T_c = 26.4$			
												26.4	
			1.21			83	.003	TR CHAN	6.8	550	1.3	27.7	(A)
W-7	D-Comm	6.2	1.92	.888	10.6				H=2	500	10.9	10.9	
W-8	"	9.2	1.59	.883	12.9	10.6	.005	66" St.	2.5	750	5.0	15.9	
W-9	"	15.8	1.25	.878	17.3	23.5	.003	66" St.	2.1	1250	9.9	25.8	(B)
						41							
			$Q_P = 83 + 41$			(1.21 / 1.25)	=	123		$T_c = 27.7$			

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 3 of ___ Sheets

PROJECT _____ Calculated by [signature] 4-28-83 DATE

FREQUENCY 10 yr. Checked by [signature] DATE

DRAINAGE AREA	Soil & Development	A Acres	I In/Hr	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	Σ T	REMARKS
W-13	D-Comm	4.7	1.73	.885	7.2				H=4	900	13.5	13.5	
W-14	C-Comm	9.7	1.30	.875	11.1	7.2	.003	66" ø	1.95	1200	10.3	23.8	
			1.26			18.3	.003	Tr. Ch.	4.7	500	1.7	25.5	(B)
W-10	D-Comm	4.1	2.06	.888	7.5				H=4	500	9.5	9.5	
W-11	"	8.1	1.50	.881	10.7	7.5	.003	66" ø	1.95	1000	8.5	18.0	
W-12	"	11.6	1.25	.878	12.7	18.2	.003	66" ø	2.1	1000	7.9	25.9	(A)
						31							
		Qp =	31	+	18	(1.25/1.26)	= 49		Tc = 25.9				
			1.21			49	.003	Tr. Ch.	5.5	600	1.8	25.9	
												27.7	
TA = TB		Qp =	123	+		49	= 172		Tc = 27.7				
TRAVEL TO d/s B-2													
			1.10			172	.002	84" ø	4.5	1500	5.6	27.7	
												33.3	

Hydraulics

PROJECT 4-6-954-00 000-0 RUN: LINE A - 12a

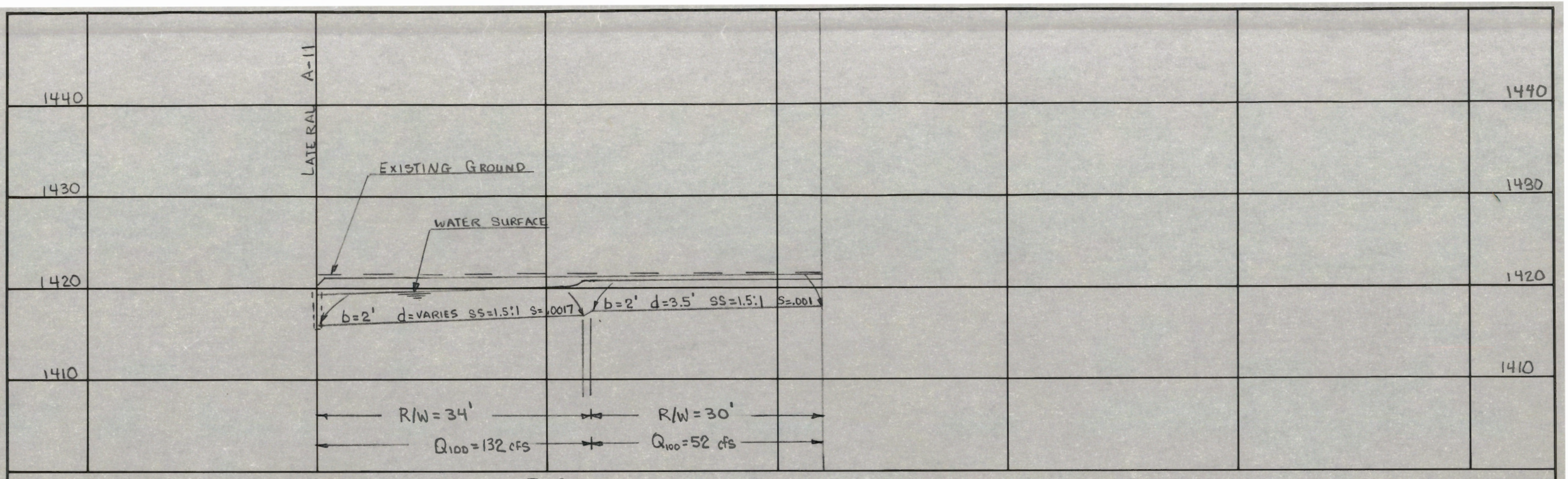
WATER SURFACE PROFILE INPUT DIRECTION = UP (SUBCRITICAL) STARTING DEPTH = 3.39

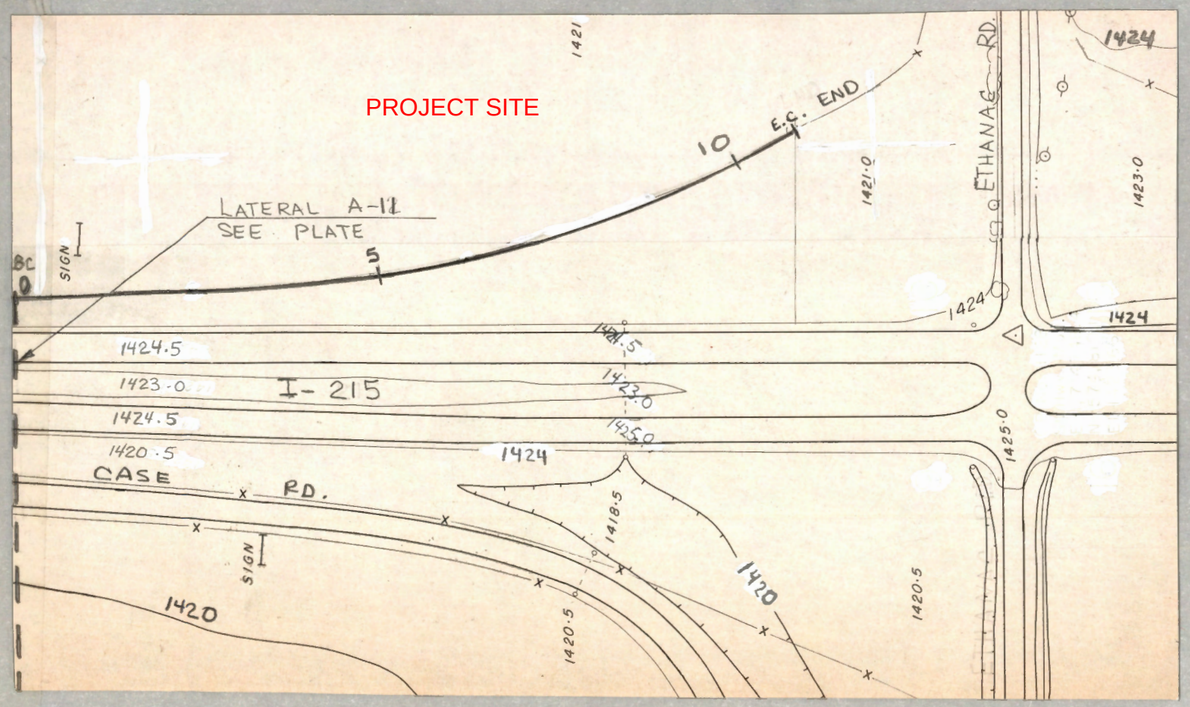
STATION	INVERT ELEV	Q	N	DIST INC	BOTTOM WIDTH	SIDE SLOPE	RADIUS (M+P)
0+00.00	1416.00	132	.015	100	2.00	1.500	-1
5+80.00	1417.00	52	.015	100	2.00	1.500	-1
6+00.00	1417.50	52	.015	100	2.00	1.500	-1
11+00.00	1418.00	52	.015	100	2.00	1.500	-1

PROJECT 4-6-954-00 000-0 RUN: LINE A - 12a

WATER SURFACE PROFILE FOR SUBCRITICAL FLOW

STATION	WATER ELEV	WATER DEPTH	INVERT ELEV	VELO	VH	CD	SUPER M+P	Q	N	BOTTOM WIDTH	SIDE SLOPE
0+00.00	1419.39	3.39	1416.00	5.5	.47	2.8	54	132	.015	2.00	1.500
1+00.00	1419.53	3.36	1416.17	5.6	.48	2.8	53				
2+00.00	1419.68	3.34	1416.34	5.6	.49	2.8	53				
3+00.00	1419.84	3.33	1416.52	5.7	.50	2.8	53				
4+00.00	1420.00	3.31	1416.69	5.7	.51	2.8	53				
5+00.00	1420.17	3.31	1416.86	5.7	.51	2.8	53				
5+80.00	1420.75	3.75	1417.00	1.8	.05	1.8	43	52	.015	2.00	1.500
6+00.00	1420.73	3.23	1417.50	2.4	.09	1.8	31	52	.015	2.00	1.500
7+00.00	1420.75	3.15	1417.60	2.5	.09	1.8	30				
8+00.00	1420.78	3.08	1417.70	2.6	.10	1.8	28				
9+00.00	1420.81	3.01	1417.80	2.7	.11	1.8	27				
10+00.00	1420.84	2.94	1417.90	2.8	.12	1.8	26				
11+00.00	1420.88	2.88	1418.00	2.9	.13	1.8	25	52	.015	2.00	1.500





HORIZ. 1"=200'
VERT. 1"=10'

NOTE: Ground line in profile was taken from orthophoto map dated Aug. 8, 1977. Plan view is from topographic map dated FEB. 25, 1959.

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

M.D.P. - ROMOLAND AREA

LATERAL A-11A

REVISED:	APPROVED: CHIEF ENGINEER	DRAWN BY: D.B.
	DATE:	CHECKED BY:
		DATE DRAWN: 7/12/83

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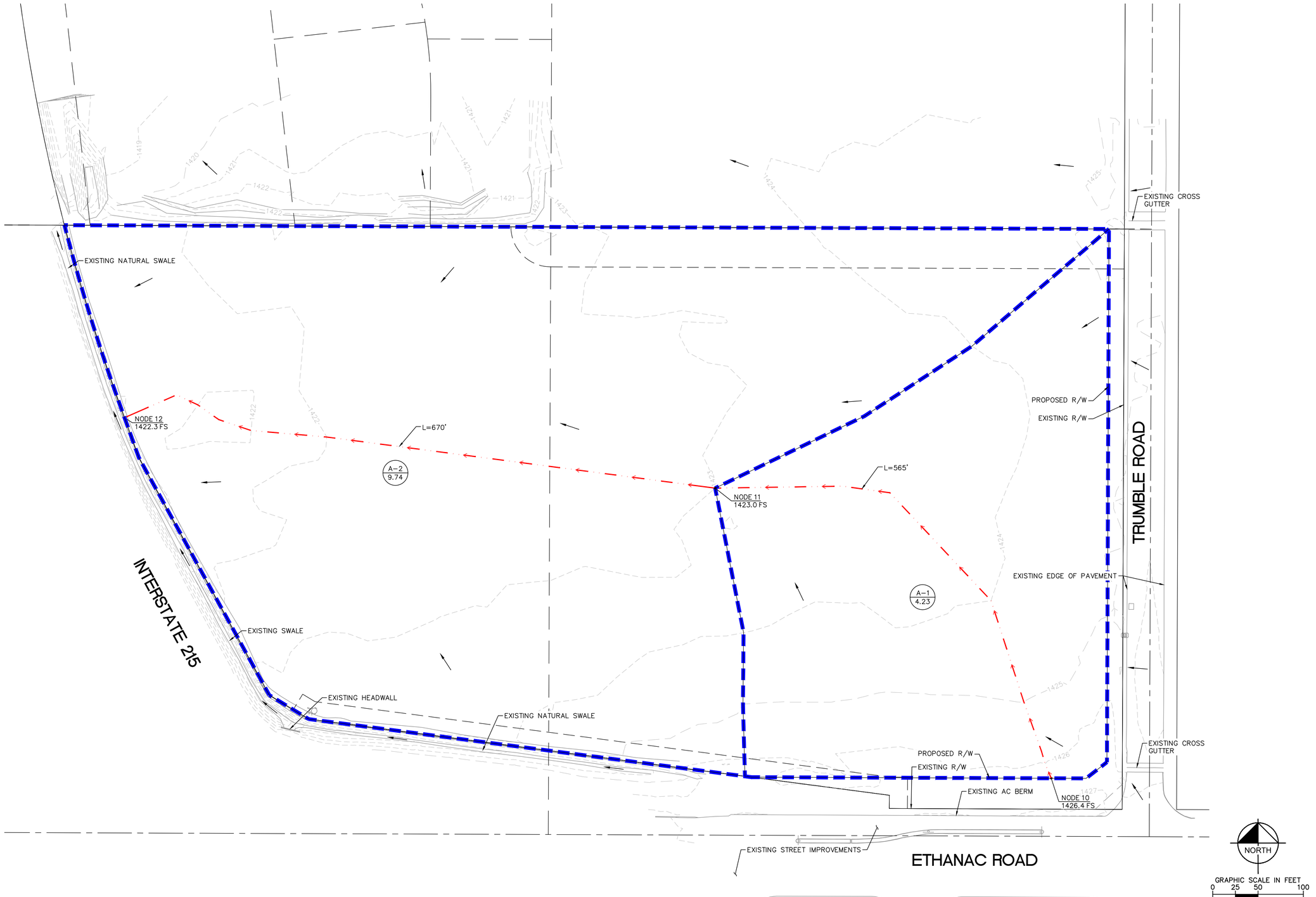
Appendix H

Drainage Maps

LEGEND

- (1695) — EXISTING CONTOUR
- PROPERTY LINE
- DMA BOUNDARY
- FLOW PATH
- FLOW ARROW
- NODE 10 / 50.00 FS — NODE ID AND ELEVATION
- X / XX — DA NAME / DA AREA (IN ACRES)
- RIGHT OF WAY



Kimley»Horn

EXISTING DRAINAGE EXHIBIT

PILOT PERRIS

12/7/2021

LEGEND

1695	PROPOSED CONTOUR
(1695)	EXISTING CONTOUR
	PROPERTY LINE
	DMA BOUNDARY
	PROPOSED STORM DRAIN
	FLOW PATH
	FLOW ARROW
NODE 10 50.00 FS	NODE ID AND ELEVATION
X XX	DA NAME DA AREA (IN ACRES)
	RIGHT OF WAY

PROPOSED OFFSITE CHANNEL
PROPOSED PUMP
EXISTING NATURAL SWALE
PROPOSED OUTLET STRUCTURE
NODE 16 1416.3 FS
NODE 15 1416.4 IE
NODE 52 1419.5 FS 1416.5 IE
L=25'
L=11'
A-9 2.23
PROPOSED BIO-RETENTION BASIN
A-12 0.38
PROPOSED CHANNEL
INTERSTATE 215
EXISTING NATURAL SWALE
NODE 103 1417.9 FS
A-11 0.56
EXISTING HEADWALL
EXISTING NATURAL SWALE
PROPOSED DITCH L=553'
NODE 102 1422.6 FS
PROPOSED CULVERT L=58'
L=963'
A-6 7.14
L=399'
L=112'
NODE 14 1419.3 IE
NODE 13 1419.9 IE
L=57'
NODE 31 1424.4 FS 1421.4 IE
A-4 0.90
L=487'
L=228'
A-2 0.58
A-3 0.16
L=360'
L=180'
A-1 0.30
A-13 0.02
NODE 101 1422.8 FS
PROPOSED DITCH L=293'
EXISTING AC BERM
PROPOSED SIDEWALK, CURB AND GUTTER
EXISTING STREET IMPROVEMENTS
ETHANAC ROAD
A-7 0.07
A-8 0.32
NODE 50 1426.8 FS
PROPOSED BLDG
NODE 20 1426.8 FS
NODE 51 1425.0 FS
A-14 0.06
EXISTING CROSS GUTTER
PROPOSED SIDEWALK, CURB AND GUTTER
PROPOSED R/W
EXISTING R/W
L=237'
A-5 0.87
EXISTING EDGE OF PAVEMENT
NODE 21 1425.6 FS 1422.6 IE
L=40'
NODE 12 1422.3 IE
L=70'
NODE 11 1425.7 FS 1422.7 IE
NODE 10 1427.4 FS
A-10 0.37
EXISTING CROSS GUTTER
PROPOSED R/W
EXISTING R/W
NODE 100 1424.3 FS
PROPOSED SIDEWALK, CURB AND GUTTER
TRUMBLE ROAD

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100
1" = 60'
WHEN PRINTED AT FULL SIZE (24" BY 36")

Kimley»Horn

PROPOSED DRAINAGE EXHIBIT

PILOT PERRIS

3/9/2022

Appendix I

Rational Method Analysis

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 12/07/21 File:PP10E.out

PILOT PERRIS
EXIST 10-YR
XO 12/7/21

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

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

Program License Serial Number 6443

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.780(In/Hr)
Slope of intensity duration curve = 0.4900

++

Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 565.000(Ft.)
Top (of initial area) elevation = 26.400(Ft.)
Bottom (of initial area) elevation = 23.000(Ft.)
Difference in elevation = 3.400(Ft.)
Slope = 0.00602 s(percent)= 0.60
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.587 min.
Rainfall intensity = 1.385(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.804
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 = 4.712(CFS)
Total initial stream area = 4.230(Ac.)
Pervious area fraction = 1.000

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =     23.000(Ft.)
End of natural channel elevation =     22.300(Ft.)
Length of natural channel  =   670.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.138(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 =   0.81(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0010
Corrected/adjusted channel slope =  0.0010
Travel time =   13.78 min.     TC =   32.36  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.778
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 =      1.056(In/Hr) for a    10.0 year storm
Subarea runoff =      8.003(CFS) for      9.740(Ac.)
Total runoff =     12.716(CFS)  Total area =      13.970(Ac.)
End of computations, total study area =           13.97 (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
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/15/22 File:PP10P.out

PILOT PERRIS
PROP 10-YR
XO 3/15/22

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

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

Program License Serial Number 6523

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.780(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

```
Initial area flow distance =   180.000(Ft.)
Top (of initial area) elevation =    27.400(Ft.)
Bottom (of initial area) elevation =    25.700(Ft.)
Difference in elevation =     1.700(Ft.)
Slope =    0.00944  s(percent)=       0.94
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.551 min.
Rainfall intensity =      2.309(In/Hr) for a    10.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.871
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 =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      0.603(CFS)
Total initial stream area =        0.300(Ac.)
Pervious area fraction = 0.200
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    22.700(Ft.)
Downstream point/station elevation =    22.300(Ft.)
Pipe length  =    70.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     0.603(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.603(CFS)
Normal flow depth in pipe =    4.21(In.)
Flow top width inside pipe =    8.98(In.)
Critical Depth =    4.23(In.)
Pipe flow velocity =      2.98(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =     6.94 min.
```

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```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       12.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.300(Ac.)
Runoff from this stream =      0.603(CFS)
Time of concentration =    6.94 min.
Rainfall intensity =     2.244(In/Hr)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   228.000(Ft.)
Top (of initial area) elevation =    26.800(Ft.)
Bottom (of initial area) elevation =    25.600(Ft.)
Difference in elevation =     1.200(Ft.)
Slope =    0.00526  s(percent)=       0.53
TC = k(0.336)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.419 min.
Rainfall intensity =      2.042(In/Hr) for a    10.0 year storm
MOBILE HOME PARK subarea type
Runoff Coefficient = 0.860
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 =  0.250; Impervious fraction =  0.750
Initial subarea runoff =      1.018(CFS)
Total initial stream area =        0.580(Ac.)
Pervious area fraction = 0.250
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    22.600(Ft.)
Downstream point/station elevation =    22.300(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     1.018(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.018(CFS)
Normal flow depth in pipe =    5.32(In.)
Flow top width inside pipe =    8.85(In.)
Critical Depth =    5.56(In.)
Pipe flow velocity =      3.75(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     8.60 min.
```

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```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       12.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.580(Ac.)
Runoff from this stream =      1.018(CFS)
Time of concentration =    8.60 min.
```

```
Rainfall intensity =     2.021(In/Hr)
Summary of stream data:

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


1        0.603      6.94                 2.244
2        1.018      8.60                 2.021
Largest stream flow has longer time of concentration
Qp =      1.018 + sum of
          Qb         Ia/Ib
           0.603 *    0.901 =      0.543
Qp =      1.561

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.603       1.018
Area of streams before confluence:
        0.300        0.580
Results of confluence:
Total flow rate =      1.561(CFS)
Time of concentration =     8.597 min.
Effective stream area after confluence =      0.880(Ac.)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    22.300(Ft.)
Downstream point/station elevation =    19.900(Ft.)
Pipe length  =   487.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     1.561(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.561(CFS)
Normal flow depth in pipe =    6.53(In.)
Flow top width inside pipe =   11.95(In.)
Critical Depth =    6.37(In.)
Pipe flow velocity =      3.57(Ft/s)
Travel time through pipe =    2.27 min.
Time of concentration (TC) =    10.87 min.
```

↟

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       13.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
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 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.87 min.
Rainfall intensity =      1.802(In/Hr) for a    10.0 year storm
Subarea runoff =      0.254(CFS) for      0.160(Ac.)
Total runoff =      1.816(CFS)  Total area =       1.040(Ac.)
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       13.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.040(Ac.)
Runoff from this stream =      1.816(CFS)
Time of concentration =   10.87 min.
Rainfall intensity =     1.802(In/Hr)
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       31.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   360.000(Ft.)
Top (of initial area) elevation =    27.400(Ft.)
Bottom (of initial area) elevation =    24.400(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00833  s(percent)=       0.83
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.863 min.
Rainfall intensity =      1.991(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 = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      1.554(CFS)
Total initial stream area =        0.900(Ac.)
Pervious area fraction = 0.200
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =    21.400(Ft.)
Downstream point/station elevation =    19.900(Ft.)
Pipe length  =    57.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     1.554(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.554(CFS)
Normal flow depth in pipe =    4.68(In.)
Flow top width inside pipe =    8.99(In.)
Critical Depth =    6.88(In.)
Pipe flow velocity =      6.69(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     9.00 min.
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       13.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.900(Ac.)
Runoff from this stream =      1.554(CFS)
Time of concentration =    9.00 min.
Rainfall intensity =     1.976(In/Hr)
Summary of stream data:

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


1        1.816     10.87                 1.802
2        1.554      9.00                 1.976
Largest stream flow has longer time of concentration
Qp =      1.816 + sum of
          Qb         Ia/Ib
           1.554 *    0.912 =      1.417
Qp =      3.233

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.816       1.554
Area of streams before confluence:
        1.040        0.900
Results of confluence:
Total flow rate =      3.233(CFS)
Time of concentration =    10.870 min.
Effective stream area after confluence =      1.940(Ac.)
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    19.900(Ft.)
Downstream point/station elevation =    19.300(Ft.)
Pipe length  =   112.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     3.233(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.233(CFS)
Normal flow depth in pipe =    8.65(In.)
Flow top width inside pipe =   14.82(In.)
Critical Depth =    8.68(In.)
Pipe flow velocity =      4.41(Ft/s)
Travel time through pipe =    0.42 min.
Time of concentration (TC) =    11.29 min.
```

↑

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
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 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.29 min.
Rainfall intensity =      1.768(In/Hr) for a    10.0 year storm
Subarea runoff =      0.109(CFS) for      0.070(Ac.)
Total runoff =      3.342(CFS)  Total area =       2.010(Ac.)
```

↑

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
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 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.29 min.
Rainfall intensity =      1.768(In/Hr) for a    10.0 year storm
Subarea runoff =      0.499(CFS) for      0.320(Ac.)
Total runoff =      3.841(CFS)  Total area =       2.330(Ac.)
```

↑

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =    19.300(Ft.)
Downstream point/station elevation =    16.400(Ft.)
Pipe length  =   399.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     3.841(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.841(CFS)
Normal flow depth in pipe =    8.75(In.)
Flow top width inside pipe =   14.79(In.)
Critical Depth =    9.50(In.)
Pipe flow velocity =      5.16(Ft/s)
Travel time through pipe =    1.29 min.
Time of concentration (TC) =    12.58 min.
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.330(Ac.)
Runoff from this stream =      3.841(CFS)
Time of concentration =   12.58 min.
Rainfall intensity =     1.677(In/Hr)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   237.000(Ft.)
Top (of initial area) elevation =    26.800(Ft.)
Bottom (of initial area) elevation =    25.000(Ft.)
Difference in elevation =     1.800(Ft.)
Slope =    0.00759  s(percent)=       0.76
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.094 min.
Rainfall intensity =      2.220(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 = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Initial subarea runoff =      1.710(CFS)
Total initial stream area =        0.870(Ac.)
Pervious area fraction = 0.100
```

↑

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       52.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =    25.000(Ft.)
Downstream point elevation =    19.500(Ft.)
Channel length thru subarea  =   963.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =      6.284(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      6.284(CFS)
Depth of flow =   0.198(Ft.), Average velocity =   1.602(Ft/s)
Channel flow top width =   39.608(Ft.)
Flow Velocity =    1.60(Ft/s)
Travel time  =   10.02 min.
Time of concentration =   17.11 min.

Sub-Channel No. 1 Critical depth =      0.189(Ft.)
  '     '       '     Critical flow top width =     37.891(Ft.)
  '     '       '     Critical flow velocity=    1.751(Ft/s)
  '     '       '     Critical flow area =      3.589(Sq.Ft)

 Adding area flow to channel
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 = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.442(In/Hr) for a    10.0 year storm
Subarea runoff =      9.051(CFS) for      7.140(Ac.)
Total runoff =     10.760(CFS)  Total area =       8.010(Ac.)
Depth of flow =   0.242(Ft.), Average velocity =   1.833(Ft/s)

Sub-Channel No. 1 Critical depth =      0.234(Ft.)
  '     '       '     Critical flow top width =     46.875(Ft.)
  '     '       '     Critical flow velocity=    1.959(Ft/s)
  '     '       '     Critical flow area =      5.493(Sq.Ft)
```

↑

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    16.500(Ft.)
Downstream point/station elevation =    16.400(Ft.)
Pipe length  =    11.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =    10.760(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.760(CFS)
Normal flow depth in pipe =   14.63(In.)
Flow top width inside pipe =   14.05(In.)
Critical Depth =   15.10(In.)
Pipe flow velocity =      7.00(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    17.14 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      8.010(Ac.)
Runoff from this stream =     10.760(CFS)
Time of concentration =   17.14 min.
Rainfall intensity =     1.441(In/Hr)
Summary of stream data:

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


1        3.841     12.58                 1.677
2       10.760     17.14                 1.441
Largest stream flow has longer time of concentration
Qp =     10.760 + sum of
          Qb         Ia/Ib
           3.841 *    0.859 =      3.301
Qp =     14.061

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.841      10.760
Area of streams before confluence:
        2.330        8.010
Results of confluence:
Total flow rate =     14.061(CFS)
Time of concentration =    17.137 min.
Effective stream area after confluence =     10.340(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    16.400(Ft.)
Downstream point/station elevation =    16.300(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =    14.061(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    14.061(CFS)
Normal flow depth in pipe =   17.91(In.)
Flow top width inside pipe =   20.89(In.)
Critical Depth =   16.22(In.)
Pipe flow velocity =      5.59(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    17.21 min.
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.731
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)  =  80.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    17.21 min.
Rainfall intensity =      1.438(In/Hr) for a    10.0 year storm
Subarea runoff =      2.343(CFS) for      2.230(Ac.)
Total runoff =     16.405(CFS)  Total area =      12.570(Ac.)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     12.570(Ac.)
Runoff from this stream =     16.405(CFS)
Time of concentration =   17.21 min.
Rainfall intensity =     1.438(In/Hr)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
```

```
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   293.000(Ft.)
Top (of initial area) elevation =    24.300(Ft.)
Bottom (of initial area) elevation =    22.800(Ft.)
Difference in elevation =     1.500(Ft.)
Slope =    0.00512  s(percent)=       0.51
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.763 min.
Rainfall intensity =      1.551(In/Hr) for a    10.0 year storm
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 = 0.000
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 =      0.467(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 1.000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    22.800(Ft.)
Downstream point/station elevation =    22.600(Ft.)
Pipe length  =    58.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     0.467(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.467(CFS)
Normal flow depth in pipe =    4.20(In.)
Flow top width inside pipe =    8.98(In.)
Critical Depth =    3.69(In.)
Pipe flow velocity =      2.31(Ft/s)
Travel time through pipe =    0.42 min.
Time of concentration (TC) =    15.18 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =    22.600(Ft.)
Downstream point elevation =    17.900(Ft.)
Channel length thru subarea  =   553.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
```

```
Estimated mean flow rate at midpoint of channel =      0.783(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      0.783(CFS)
Depth of flow =   0.567(Ft.), Average velocity =   1.219(Ft/s)
Channel flow top width =    2.267(Ft.)
Flow Velocity =    1.22(Ft/s)
Travel time  =    7.56 min.
Time of concentration =   22.74 min.

Sub-Channel No. 1 Critical depth =      0.395(Ft.)
  '     '       '     Critical flow top width =      1.578(Ft.)
  '     '       '     Critical flow velocity=    2.516(Ft/s)
  '     '       '     Critical flow area =      0.311(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.796
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 =      1.255(In/Hr) for a    10.0 year storm
Subarea runoff =      0.559(CFS) for      0.560(Ac.)
Total runoff =      1.026(CFS)  Total area =       0.930(Ac.)
Depth of flow =   0.627(Ft.), Average velocity =   1.304(Ft/s)

Sub-Channel No. 1 Critical depth =      0.438(Ft.)
  '     '       '     Critical flow top width =      1.750(Ft.)
  '     '       '     Critical flow velocity=    2.679(Ft/s)
  '     '       '     Critical flow area =      0.383(Sq.Ft)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.026(CFS)
Time of concentration =   22.74 min.
Rainfall intensity =     1.255(In/Hr)
Summary of stream data:

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


1       16.405     17.21                 1.438
```

```
2        1.026     22.74                  1.255
Largest stream flow has longer or shorter time of concentration
Qp =     16.405 + sum of
          Qa          Tb/Ta
           1.026 *    0.757 =      0.776
Qp =     17.181

Total of 2 streams to confluence:
Flow rates before confluence point:
      16.405       1.026
Area of streams before confluence:
       12.570        0.930
Results of confluence:
Total flow rate =     17.181(CFS)
Time of concentration =    17.212 min.
Effective stream area after confluence =     13.500(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.794
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 =  0.500; Impervious fraction =  0.500
Time of concentration =    17.21 min.
Rainfall intensity =      1.438(In/Hr) for a    10.0 year storm
Subarea runoff =      0.434(CFS) for      0.380(Ac.)
Total runoff =     17.615(CFS)  Total area =      13.880(Ac.)
End of computations, total study area =           13.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.331
Area averaged RI index number =  76.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 11/30/21 File:PP100E.out

PILOT PERRIS
EXIST 100-YR
XO 11/30/21

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

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

Program License Serial Number 6443

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 565.000(Ft.)
Top (of initial area) elevation = 26.400(Ft.)
Bottom (of initial area) elevation = 23.000(Ft.)
Difference in elevation = 3.400(Ft.)
Slope = 0.00602 s(percent)= 0.60
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.587 min.
Rainfall intensity = 1.989(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.873
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 = 7.345(CFS)
Total initial stream area = 4.230(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 11.000 to Point/Station 12.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

```
Top of natural channel elevation =     23.000(Ft.)
End of natural channel elevation =     22.300(Ft.)
Length of natural channel  =   670.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.801(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 =   0.91(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0010
Corrected/adjusted channel slope =  0.0010
Travel time =   12.28 min.     TC =   30.87  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.551(In/Hr) for a   100.0 year storm
Subarea runoff =     13.080(CFS) for      9.740(Ac.)
Total runoff =     20.425(CFS)  Total area =      13.970(Ac.)
End of computations, total study area =           13.97 (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
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/15/22
File:PP100P.out

PILOT PERRIS
PROP 100-YR
XO 3/15/22

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

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

Program License Serial Number 6523

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

```
Initial area flow distance =   180.000(Ft.)
Top (of initial area) elevation =    27.400(Ft.)
Bottom (of initial area) elevation =    25.700(Ft.)
Difference in elevation =     1.700(Ft.)
Slope =    0.00944  s(percent)=       0.94
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.551 min.
Rainfall intensity =      3.315(In/Hr) for a   100.0 year storm
APARTMENT 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 = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      0.886(CFS)
Total initial stream area =        0.300(Ac.)
Pervious area fraction = 0.200
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    22.700(Ft.)
Downstream point/station elevation =    22.300(Ft.)
Pipe length  =    70.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     0.886(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.886(CFS)
Normal flow depth in pipe =    5.31(In.)
Flow top width inside pipe =    8.85(In.)
Critical Depth =    5.17(In.)
Pipe flow velocity =      3.27(Ft/s)
Travel time through pipe =    0.36 min.
Time of concentration (TC) =     6.91 min.
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       12.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.300(Ac.)
Runoff from this stream =      0.886(CFS)
Time of concentration =    6.91 min.
Rainfall intensity =     3.230(In/Hr)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   228.000(Ft.)
Top (of initial area) elevation =    26.800(Ft.)
Bottom (of initial area) elevation =    25.600(Ft.)
Difference in elevation =     1.200(Ft.)
Slope =    0.00526  s(percent)=       0.53
TC = k(0.336)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.419 min.
Rainfall intensity =      2.932(In/Hr) for a   100.0 year storm
MOBILE HOME PARK 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 = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.250; Impervious fraction =  0.750
Initial subarea runoff =      1.508(CFS)
Total initial stream area =        0.580(Ac.)
Pervious area fraction = 0.250
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    22.600(Ft.)
Downstream point/station elevation =    22.300(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     1.508(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.508(CFS)
Normal flow depth in pipe =    7.16(In.)
Flow top width inside pipe =    7.26(In.)
Critical Depth =    6.79(In.)
Pipe flow velocity =      4.00(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =     8.59 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       12.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.580(Ac.)
Runoff from this stream =      1.508(CFS)
```

```
Time of concentration =    8.59 min.
Rainfall intensity =     2.904(In/Hr)
Summary of stream data:

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


1        0.886      6.91                 3.230
2        1.508      8.59                 2.904
Largest stream flow has longer time of concentration
Qp =      1.508 + sum of
          Qb         Ia/Ib
           0.886 *    0.899 =      0.796
Qp =      2.304

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.886       1.508
Area of streams before confluence:
        0.300        0.580
Results of confluence:
Total flow rate =      2.304(CFS)
Time of concentration =     8.586 min.
Effective stream area after confluence =      0.880(Ac.)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =    22.300(Ft.)
Downstream point/station elevation =    19.900(Ft.)
Pipe length  =   487.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     2.304(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.304(CFS)
Normal flow depth in pipe =    8.51(In.)
Flow top width inside pipe =   10.90(In.)
Critical Depth =    7.79(In.)
Pipe flow velocity =      3.87(Ft/s)
Travel time through pipe =    2.10 min.
Time of concentration (TC) =    10.68 min.
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       13.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.894
```

```
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 =    10.68 min.
Rainfall intensity =      2.609(In/Hr) for a   100.0 year storm
Subarea runoff =      0.373(CFS) for      0.160(Ac.)
Total runoff =      2.678(CFS)  Total area =       1.040(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       13.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.040(Ac.)
Runoff from this stream =      2.678(CFS)
Time of concentration =   10.68 min.
Rainfall intensity =     2.609(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       31.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   360.000(Ft.)
Top (of initial area) elevation =    27.400(Ft.)
Bottom (of initial area) elevation =    24.400(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00833  s(percent)=       0.83
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.863 min.
Rainfall intensity =      2.859(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.889
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 =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      2.288(CFS)
Total initial stream area =        0.900(Ac.)
Pervious area fraction = 0.200
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       13.000
```

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

Upstream point/station elevation = 21.400(Ft.)
Downstream point/station elevation = 19.900(Ft.)
Pipe length = 57.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 2.288(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 2.288(CFS)
Normal flow depth in pipe = 6.02(In.)
Flow top width inside pipe = 8.47(In.)
Critical Depth = 8.09(In.)
Pipe flow velocity = 7.29(Ft/s)
Travel time through pipe = 0.13 min.
Time of concentration (TC) = 8.99 min.

++
Process from Point/Station 13.000 to Point/Station 13.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 0.900(Ac.)
Runoff from this stream = 2.288(CFS)
Time of concentration = 8.99 min.
Rainfall intensity = 2.839(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	2.678	10.68	2.609
2	2.288	8.99	2.839

Largest stream flow has longer time of concentration
Qp = 2.678 + sum of
Qb Ia/Ib
2.288 * 0.919 = 2.103
Qp = 4.781

Total of 2 streams to confluence:
Flow rates before confluence point:
2.678 2.288
Area of streams before confluence:
1.040 0.900
Results of confluence:
Total flow rate = 4.781(CFS)
Time of concentration = 10.681 min.
Effective stream area after confluence = 1.940(Ac.)

++

```
Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    19.900(Ft.)
Downstream point/station elevation =    19.300(Ft.)
Pipe length  =   112.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     4.781(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.781(CFS)
Normal flow depth in pipe =   11.48(In.)
Flow top width inside pipe =   12.71(In.)
Critical Depth =   10.63(In.)
Pipe flow velocity =      4.74(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    11.07 min.
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.894
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 =    11.07 min.
Rainfall intensity =      2.563(In/Hr) for a   100.0 year storm
Subarea runoff =      0.160(CFS) for      0.070(Ac.)
Total runoff =      4.941(CFS)  Total area =       2.010(Ac.)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.894
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 =    11.07 min.
Rainfall intensity =      2.563(In/Hr) for a   100.0 year storm
Subarea runoff =      0.733(CFS) for      0.320(Ac.)
Total runoff =      5.674(CFS)  Total area =       2.330(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    19.300(Ft.)
Downstream point/station elevation =    16.400(Ft.)
Pipe length  =   399.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     5.674(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.674(CFS)
Normal flow depth in pipe =   11.68(In.)
Flow top width inside pipe =   12.45(In.)
Critical Depth =   11.58(In.)
Pipe flow velocity =      5.53(Ft/s)
Travel time through pipe =    1.20 min.
Time of concentration (TC) =    12.28 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.330(Ac.)
Runoff from this stream =      5.674(CFS)
Time of concentration =   12.28 min.
Rainfall intensity =     2.437(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   237.000(Ft.)
Top (of initial area) elevation =    26.800(Ft.)
Bottom (of initial area) elevation =    25.000(Ft.)
Difference in elevation =     1.800(Ft.)
Slope =    0.00759  s(percent)=       0.76
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.094 min.
Rainfall intensity =      3.188(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
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
Initial subarea runoff =      2.483(CFS)
Total initial stream area =        0.870(Ac.)
Pervious area fraction = 0.100
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       52.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =    25.000(Ft.)
Downstream point elevation =    19.500(Ft.)
Channel length thru subarea  =   963.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =      9.305(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      9.305(CFS)
Depth of flow =   0.229(Ft.), Average velocity =   1.768(Ft/s)
Channel flow top width =   45.888(Ft.)
Flow Velocity =    1.77(Ft/s)
Travel time  =    9.08 min.
Time of concentration =   16.17 min.

Sub-Channel No. 1 Critical depth =      0.223(Ft.)
  '     '       '     Critical flow top width =     44.531(Ft.)
  '     '       '     Critical flow velocity=    1.877(Ft/s)
  '     '       '     Critical flow area =      4.958(Sq.Ft)

 Adding area flow to channel
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 = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.129(In/Hr) for a   100.0 year storm
Subarea runoff =     13.573(CFS) for      7.140(Ac.)
Total runoff =     16.056(CFS)  Total area =       8.010(Ac.)
Depth of flow =   0.282(Ft.), Average velocity =   2.026(Ft/s)

Sub-Channel No. 1 Critical depth =      0.275(Ft.)
  '     '       '     Critical flow top width =     55.078(Ft.)
  '     '       '     Critical flow velocity=    2.117(Ft/s)
  '     '       '     Critical flow area =      7.584(Sq.Ft)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    16.500(Ft.)
Downstream point/station elevation =    16.400(Ft.)
Pipe length  =    11.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =    16.056(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.056(CFS)
Normal flow depth in pipe =   16.88(In.)
Flow top width inside pipe =   16.69(In.)
Critical Depth =   17.74(In.)
Pipe flow velocity =      7.76(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    16.20 min.
```

↑

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      8.010(Ac.)
Runoff from this stream =     16.056(CFS)
Time of concentration =   16.20 min.
Rainfall intensity =     2.128(In/Hr)
Summary of stream data:

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


1        5.674     12.28                2.437
2       16.056     16.20                2.128
Largest stream flow has longer time of concentration
Qp =     16.056 + sum of
          Qb         Ia/Ib
           5.674 *    0.873 =      4.954
Qp =     21.010

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.674      16.056
Area of streams before confluence:
        2.330        8.010
Results of confluence:
Total flow rate =     21.010(CFS)
Time of concentration =    16.198 min.
Effective stream area after confluence =     10.340(Ac.)
```

↑

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =    16.400(Ft.)
Downstream point/station elevation =    16.300(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =    21.010(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    21.010(CFS)
Normal flow depth in pipe =   21.89(In.)
Flow top width inside pipe =   21.15(In.)
Critical Depth =   19.26(In.)
Pipe flow velocity =      6.08(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    16.27 min.
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
UNDEVELOPED (good 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 3)  =  91.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.27 min.
Rainfall intensity =      2.123(In/Hr) for a   100.0 year storm
Subarea runoff =      4.012(CFS) for      2.230(Ac.)
Total runoff =     25.022(CFS)  Total area =      12.570(Ac.)
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     12.570(Ac.)
Runoff from this stream =     25.022(CFS)
Time of concentration =   16.27 min.
Rainfall intensity =     2.123(In/Hr)
```

↟

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

```
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   293.000(Ft.)
Top (of initial area) elevation =    24.300(Ft.)
Bottom (of initial area) elevation =    22.800(Ft.)
Difference in elevation =     1.500(Ft.)
Slope =    0.00512  s(percent)=       0.51
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.763 min.
Rainfall intensity =      2.226(In/Hr) for a   100.0 year storm
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
Initial subarea runoff =      0.722(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 1.000
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =    22.800(Ft.)
Downstream point/station elevation =    22.600(Ft.)
Pipe length  =    58.00(Ft.)   Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     0.722(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.722(CFS)
Normal flow depth in pipe =    5.47(In.)
Flow top width inside pipe =    8.79(In.)
Critical Depth =    4.64(In.)
Pipe flow velocity =      2.57(Ft/s)
Travel time through pipe =    0.38 min.
Time of concentration (TC) =    15.14 min.
```

↟

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------
Upstream point elevation =    22.600(Ft.)
Downstream point elevation =    17.900(Ft.)
Channel length thru subarea  =   553.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
```

```
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      1.219(CFS)
Manning's 'N'    = 0.045
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      1.219(CFS)
Depth of flow =   0.669(Ft.), Average velocity =   1.362(Ft/s)
Channel flow top width =    2.676(Ft.)
Flow Velocity =    1.36(Ft/s)
Travel time  =    6.77 min.
Time of concentration =   21.91 min.

Sub-Channel No. 1 Critical depth =      0.469(Ft.)
  '     '       '     Critical flow top width =      1.875(Ft.)
  '     '       '     Critical flow velocity=    2.773(Ft/s)
  '     '       '     Critical flow area =      0.439(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.871
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 =      1.835(In/Hr) for a   100.0 year storm
Subarea runoff =      0.895(CFS) for      0.560(Ac.)
Total runoff =      1.616(CFS)  Total area =       0.930(Ac.)
Depth of flow =   0.744(Ft.), Average velocity =   1.461(Ft/s)

Sub-Channel No. 1 Critical depth =      0.527(Ft.)
  '     '       '     Critical flow top width =      2.109(Ft.)
  '     '       '     Critical flow velocity=    2.906(Ft/s)
  '     '       '     Critical flow area =      0.556(Sq.Ft)

↑

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.616(CFS)
Time of concentration =   21.91 min.
Rainfall intensity =     1.835(In/Hr)
Summary of stream data:

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

```
1       25.022     16.27                 2.123
2        1.616     21.91                 1.835
Largest stream flow has longer or shorter time of concentration
Qp =     25.022 + sum of
          Qa          Tb/Ta
           1.616 *    0.743 =      1.200
Qp =     26.222

Total of 2 streams to confluence:
Flow rates before confluence point:
      25.022       1.616
Area of streams before confluence:
       12.570        0.930
Results of confluence:
Total flow rate =     26.222(CFS)
Time of concentration =    16.267 min.
Effective stream area after confluence =     13.500(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    16.27 min.
Rainfall intensity =      2.123(In/Hr) for a   100.0 year storm
Subarea runoff =      0.697(CFS) for      0.380(Ac.)
Total runoff =     26.920(CFS)  Total area =      13.880(Ac.)
End of computations, total study area =           13.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.331
Area averaged RI index number =  76.7
```

Appendix J

Synthetic Unit Hydrograph Method Analysis

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 - 2018, Version 9.0
Study date 12/07/21 File: PP1EUH1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PILOT PERRIS
EXIST 100-YR
XO 12/7/21

Drainage Area = 13.97(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.412 Hr.
Lag time = 24.70 Min.
25% of lag time = 6.17 Min.
40% of lag time = 9.88 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]
13.97	0.51	7.07

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	1.59	22.21

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.506(In)
Area Averaged 100-Year Rainfall = 1.590(In)

Point rain (area averaged) = 1.590(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.590(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.970	89.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
89.0	95.6	0.057	0.000	0.057	1.000	0.057
					Sum (F) =	0.057

Area averaged mean soil loss (F) (In/Hr) = 0.057
Minimum soil loss rate ((In/Hr)) = 0.029

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

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	20.246	1.800	0.253
2	0.167	40.492	5.274	0.743
3	0.250	60.739	9.202	1.296
4	0.333	80.985	12.874	1.813
5	0.417	101.231	14.440	2.033
6	0.500	121.477	12.268	1.727
7	0.583	141.723	8.222	1.158
8	0.667	161.970	5.694	0.802
9	0.750	182.216	3.995	0.562
10	0.833	202.462	3.093	0.435
11	0.917	222.708	2.648	0.373
12	1.000	242.954	2.270	0.320
13	1.083	263.201	1.976	0.278
14	1.167	283.447	1.768	0.249
15	1.250	303.693	1.509	0.212
16	1.333	323.939	1.296	0.182
17	1.417	344.185	1.215	0.171
18	1.500	364.431	1.132	0.159
19	1.583	384.678	0.904	0.127
20	1.667	404.924	0.884	0.124
21	1.750	425.170	0.717	0.101
22	1.833	445.416	0.648	0.091
23	1.917	465.662	0.636	0.090
24	2.000	485.909	0.608	0.086
25	2.083	506.155	0.600	0.084
26	2.167	526.401	0.485	0.068
27	2.250	546.647	0.445	0.063
28	2.333	566.893	0.417	0.059
29	2.417	587.140	0.366	0.051
30	2.500	607.386	0.359	0.051
31	2.583	627.632	0.300	0.042
32	2.667	647.878	0.283	0.040
33	2.750	668.124	0.251	0.035
34	2.833	688.371	0.203	0.029
35	2.917	708.617	0.202	0.029
36	3.000	728.863	0.202	0.029
37	3.083	749.109	0.202	0.029
38	3.167	769.355	0.202	0.029
39	3.250	789.602	0.202	0.029
40	3.333	809.848	0.205	0.029
		Sum = 100.000	Sum=	14.079

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	4.20	0.801	0.057 (0.721)	0.744
2	0.17	4.30	0.820	0.057 (0.738)	0.763
3	0.25	5.00	0.954	0.057 (0.858)	0.897
4	0.33	5.00	0.954	0.057 (0.858)	0.897
5	0.42	5.80	1.106	0.057 (0.996)	1.049
6	0.50	6.50	1.240	0.057 (1.116)	1.183
7	0.58	7.40	1.412	0.057 (1.271)	1.355
8	0.67	8.60	1.641	0.057 (1.477)	1.583
9	0.75	12.30	2.347	0.057 (2.112)	2.289
10	0.83	29.10	5.552	0.057 (4.996)	5.494

```
11   0.92     6.80      1.297          0.057    (  1.168)        1.240
12   1.00     5.00      0.954          0.057    (  0.858)        0.897
              (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    18.4
      Flood volume = Effective rainfall      1.53(In)
       times area      14.0(Ac.)/[(In)/(Ft.)] =       1.8(Ac.Ft)
      Total soil loss =      0.06(In)
      Total soil loss =     0.067(Ac.Ft)
      Total rainfall =      1.59(In)
      Flood volume =       77719.8 Cubic Feet
      Total soil loss =        2900.7 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     23.915(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        7.5      15.0      22.5      30.0
-------------------------------------------------------------------------
  0+ 5       0.0013      0.19  Q         |         |         |         |
  0+10       0.0064      0.75  Q         |         |         |         |
  0+15       0.0186      1.76  V Q       |         |         |         |
  0+20       0.0408      3.23  V   Q     |         |         |         |
  0+25       0.0752      4.99  |V    Q   |         |         |         |
  0+30       0.1214      6.71  | V     Q |         |         |         |
  0+35       0.1779      8.21  |  V      Q         |         |         |
  0+40       0.2447      9.70  |    V    | Q       |         |         |
  0+45       0.3233     11.41  |      V  |    Q    |         |         |
  0+50       0.4220     14.33  |        V|        Q|         |         |
  0+55       0.5466     18.08  |         | V       |   Q     |         |
  1+ 0       0.6954     21.61  |         |    V    |       Q |         |
  1+ 5       0.8601     23.92  |         |        V|         |Q        |
  1+10       1.0227     23.61  |         |         | V       |Q        |
  1+15       1.1613     20.12  |         |         |     Q   |         |
  1+20       1.2659     15.20  |         |         Q       V |         |
  1+25       1.3432     11.23  |         |   Q     |         V         |
  1+30       1.4007      8.34  |         |Q        |         |V        |
  1+35       1.4461      6.60  |       Q |         |         | V       |
  1+40       1.4842      5.53  |      Q  |         |         |  V      |
  1+45       1.5170      4.75  |     Q   |         |         |   V     |
  1+50       1.5456      4.15  |    Q    |         |         |   V     |
  1+55       1.5709      3.67  |   Q     |         |         |    V    |
  2+ 0       1.5930      3.22  |   Q     |         |         |    V    |
  2+ 5       1.6126      2.85  |  Q      |         |         |     V   |
  2+10       1.6304      2.58  |  Q      |         |         |     V   |
  2+15       1.6465      2.33  |  Q      |         |         |     V   |
  2+20       1.6606      2.04  | Q       |         |         |      V  |
  2+25       1.6734      1.87  | Q       |         |         |      V  |
  2+30       1.6848      1.65  | Q       |         |         |      V  |
  2+35       1.6952      1.51  | Q       |         |         |       V |
  2+40       1.7049      1.41  |Q        |         |         |       V |
  2+45       1.7139      1.31  |Q        |         |         |       V |
  2+50       1.7224      1.22  |Q        |         |         |       V |
  2+55       1.7298      1.08  |Q        |         |         |       V |
  3+ 0       1.7365      0.98  |Q        |         |         |       V |
  3+ 5       1.7427      0.90  |Q        |         |         |        V|
  3+10       1.7483      0.81  |Q        |         |         |        V|
  3+15       1.7536      0.76  |Q        |         |         |        V|
  3+20       1.7583      0.69  Q         |         |         |        V|
  3+25       1.7625      0.62  Q         |         |         |        V|
  3+30       1.7663      0.55  Q         |         |         |        V|
  3+35       1.7696      0.48  Q         |         |         |        V|
  3+40       1.7726      0.44  Q         |         |         |        V|
  3+45       1.7753      0.40  Q         |         |         |        V|
  3+50       1.7779      0.37  Q         |         |         |        V|
  3+55       1.7801      0.33  Q         |         |         |        V|
  4+ 0       1.7821      0.28  Q         |         |         |        V|
  4+ 5       1.7836      0.22  Q         |         |         |        V|
  4+10       1.7840      0.06  Q         |         |         |        V|
```

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    4+15       1.7842      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 12/07/21 File: PP1EUH3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PILOT PERRIS
EXIST 100-YR
XO 12/7/21

Drainage Area = 13.97(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.412 Hr.
Lag time = 24.70 Min.
25% of lag time = 6.17 Min.
40% of lag time = 9.88 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]
13.97	0.85	11.90

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	2.23	31.15

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.852(In)
Area Averaged 100-Year Rainfall = 2.230(In)

Point rain (area averaged) = 2.230(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.230(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.970	89.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
89.0	95.6	0.057	0.000	0.057	1.000	0.057
					Sum (F) =	0.057

Area averaged mean soil loss (F) (In/Hr) = 0.057
Minimum soil loss rate ((In/Hr)) = 0.029

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

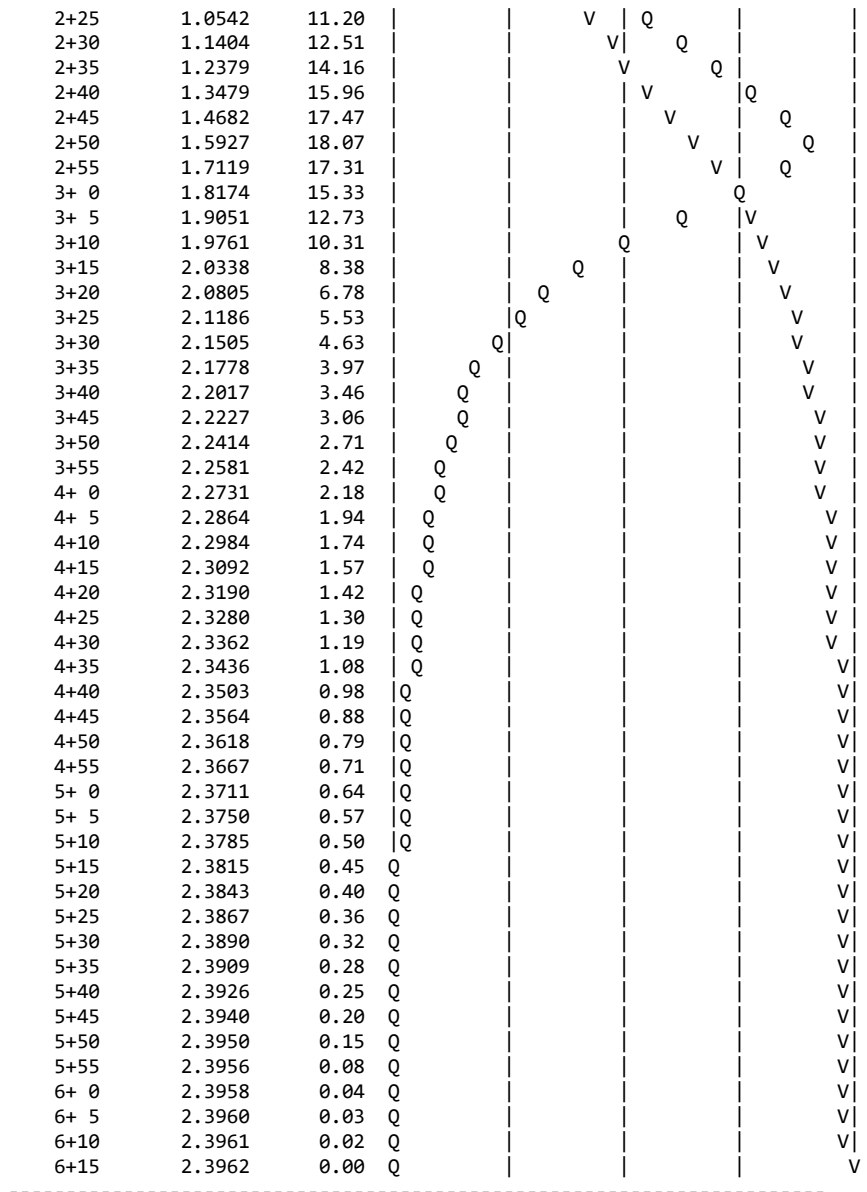
Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	20.246	1.800	0.253
2	0.167	40.492	5.274	0.743
3	0.250	60.739	9.202	1.296
4	0.333	80.985	12.874	1.813
5	0.417	101.231	14.440	2.033
6	0.500	121.477	12.268	1.727
7	0.583	141.723	8.222	1.158
8	0.667	161.970	5.694	0.802
9	0.750	182.216	3.995	0.562
10	0.833	202.462	3.093	0.435
11	0.917	222.708	2.648	0.373
12	1.000	242.954	2.270	0.320
13	1.083	263.201	1.976	0.278
14	1.167	283.447	1.768	0.249
15	1.250	303.693	1.509	0.212
16	1.333	323.939	1.296	0.182
17	1.417	344.185	1.215	0.171
18	1.500	364.431	1.132	0.159
19	1.583	384.678	0.904	0.127
20	1.667	404.924	0.884	0.124
21	1.750	425.170	0.717	0.101
22	1.833	445.416	0.648	0.091
23	1.917	465.662	0.636	0.090
24	2.000	485.909	0.608	0.086
25	2.083	506.155	0.600	0.084
26	2.167	526.401	0.485	0.068
27	2.250	546.647	0.445	0.063
28	2.333	566.893	0.417	0.059
29	2.417	587.140	0.366	0.051
30	2.500	607.386	0.359	0.051
31	2.583	627.632	0.300	0.042
32	2.667	647.878	0.283	0.040
33	2.750	668.124	0.251	0.035
34	2.833	688.371	0.203	0.029
35	2.917	708.617	0.202	0.029
36	3.000	728.863	0.202	0.029
37	3.083	749.109	0.202	0.029
38	3.167	769.355	0.202	0.029
39	3.250	789.602	0.202	0.029
40	3.333	809.848	0.205	0.029
			Sum = 100.000	Sum= 14.079

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	0.348	0.057	(0.313)	0.291
2	0.17	1.30	0.348	0.057	(0.313)	0.291
3	0.25	1.10	0.294	0.057	(0.265)	0.237
4	0.33	1.50	0.401	0.057	(0.361)	0.344
5	0.42	1.50	0.401	0.057	(0.361)	0.344
6	0.50	1.80	0.482	0.057	(0.433)	0.424
7	0.58	1.50	0.401	0.057	(0.361)	0.344
8	0.67	1.80	0.482	0.057	(0.433)	0.424
9	0.75	1.80	0.482	0.057	(0.433)	0.424
10	0.83	1.50	0.401	0.057	(0.361)	0.344
11	0.92	1.60	0.428	0.057	(0.385)	0.371
12	1.00	1.80	0.482	0.057	(0.433)	0.424

```
13   1.08     2.20      0.589          0.057    (  0.530)        0.531
14   1.17     2.20      0.589          0.057    (  0.530)        0.531
15   1.25     2.20      0.589          0.057    (  0.530)        0.531
16   1.33     2.00      0.535          0.057    (  0.482)        0.478
17   1.42     2.60      0.696          0.057    (  0.626)        0.639
18   1.50     2.70      0.722          0.057    (  0.650)        0.665
19   1.58     2.40      0.642          0.057    (  0.578)        0.585
20   1.67     2.70      0.722          0.057    (  0.650)        0.665
21   1.75     3.30      0.883          0.057    (  0.795)        0.826
22   1.83     3.10      0.830          0.057    (  0.747)        0.772
23   1.92     2.90      0.776          0.057    (  0.698)        0.719
24   2.00     3.00      0.803          0.057    (  0.722)        0.746
25   2.08     3.10      0.830          0.057    (  0.747)        0.772
26   2.17     4.20      1.124          0.057    (  1.011)        1.067
27   2.25     5.00      1.338          0.057    (  1.204)        1.281
28   2.33     3.50      0.937          0.057    (  0.843)        0.879
29   2.42     6.80      1.820          0.057    (  1.638)        1.762
30   2.50     7.30      1.953          0.057    (  1.758)        1.896
31   2.58     8.20      2.194          0.057    (  1.975)        2.137
32   2.67     5.90      1.579          0.057    (  1.421)        1.522
33   2.75     2.00      0.535          0.057    (  0.482)        0.478
34   2.83     1.80      0.482          0.057    (  0.433)        0.424
35   2.92     1.80      0.482          0.057    (  0.433)        0.424
36   3.00     0.60      0.161          0.057    (  0.144)        0.103
              (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    24.7
      Flood volume = Effective rainfall      2.06(In)
       times area      14.0(Ac.)/[(In)/(Ft.)] =       2.4(Ac.Ft)
      Total soil loss =      0.17(In)
      Total soil loss =     0.200(Ac.Ft)
      Total rainfall =      2.23(In)
      Flood volume =      104376.8 Cubic Feet
      Total soil loss =        8702.0 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     18.074(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        5.0      10.0      15.0      20.0
-------------------------------------------------------------------------
  0+ 5       0.0005      0.07  Q         |         |         |         |
  0+10       0.0025      0.29  Q         |         |         |         |
  0+15       0.0070      0.65  VQ        |         |         |         |
  0+20       0.0150      1.17  V Q       |         |         |         |
  0+25       0.0272      1.77  V  Q      |         |         |         |
  0+30       0.0433      2.33  V   Q     |         |         |         |
  0+35       0.0625      2.79  |V   Q    |         |         |         |
  0+40       0.0847      3.22  |V    Q   |         |         |         |
  0+45       0.1095      3.61  |V     Q  |         |         |         |
  0+50       0.1365      3.91  | V    Q  |         |         |         |
  0+55       0.1650      4.15  | V     Q |         |         |         |
  1+ 0       0.1948      4.32  |  V    Q |         |         |         |
  1+ 5       0.2258      4.50  |  V    Q |         |         |         |
  1+10       0.2581      4.70  |   V    Q|         |         |         |
  1+15       0.2925      4.99  |   V    Q|         |         |         |
  1+20       0.3293      5.34  |    V    Q         |         |         |
  1+25       0.3686      5.71  |     V   |Q        |         |         |
  1+30       0.4105      6.08  |     V   | Q       |         |         |
  1+35       0.4546      6.41  |      V  | Q       |         |         |
  1+40       0.5011      6.75  |       V | Q       |         |         |
  1+45       0.5503      7.15  |        V|  Q      |         |         |
  1+50       0.6026      7.59  |         V   Q     |         |         |
  1+55       0.6577      8.01  |         V    Q    |         |         |
  2+ 0       0.7158      8.43  |         |V   Q    |         |         |
  2+ 5       0.7766      8.83  |         | V   Q   |         |         |
  2+10       0.8398      9.18  |         |   V   Q |         |         |
  2+15       0.9063      9.66  |         |    V   Q|         |         |
  2+20       0.9771     10.28  |         |     V   Q         |         |
```



2+25	1.0542	11.20	
2+30	1.1404	12.51	
2+35	1.2379	14.16	
2+40	1.3479	15.96	
2+45	1.4682	17.47	
2+50	1.5927	18.07	
2+55	1.7119	17.31	
3+ 0	1.8174	15.33	
3+ 5	1.9051	12.73	
3+10	1.9761	10.31	
3+15	2.0338	8.38	
3+20	2.0805	6.78	
3+25	2.1186	5.53	
3+30	2.1505	4.63	
3+35	2.1778	3.97	
3+40	2.2017	3.46	
3+45	2.2227	3.06	
3+50	2.2414	2.71	
3+55	2.2581	2.42	
4+ 0	2.2731	2.18	
4+ 5	2.2864	1.94	
4+10	2.2984	1.74	
4+15	2.3092	1.57	
4+20	2.3190	1.42	
4+25	2.3280	1.30	
4+30	2.3362	1.19	
4+35	2.3436	1.08	
4+40	2.3503	0.98	
4+45	2.3564	0.88	
4+50	2.3618	0.79	
4+55	2.3667	0.71	
5+ 0	2.3711	0.64	
5+ 5	2.3750	0.57	
5+10	2.3785	0.50	
5+15	2.3815	0.45	
5+20	2.3843	0.40	
5+25	2.3867	0.36	
5+30	2.3890	0.32	
5+35	2.3909	0.28	
5+40	2.3926	0.25	
5+45	2.3940	0.20	
5+50	2.3950	0.15	
5+55	2.3956	0.08	
6+ 0	2.3958	0.04	
6+ 5	2.3960	0.03	
6+10	2.3961	0.02	
6+15	2.3962	0.00	

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 12/07/21 File: PP1EUH6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PILOT PERRIS
EXIST 100-YR
XO 12/7/21

Drainage Area = 13.97(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.412 Hr.
Lag time = 24.70 Min.
25% of lag time = 6.17 Min.
40% of lag time = 9.88 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]
13.97	1.18	16.48

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	2.94	41.07

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.180(In)
Area Averaged 100-Year Rainfall = 2.940(In)

Point rain (area averaged) = 2.940(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.940(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.970	89.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
89.0	95.6	0.057	0.000	0.057	1.000	0.057
					Sum (F) =	0.057

Area averaged mean soil loss (F) (In/Hr) = 0.057
Minimum soil loss rate ((In/Hr)) = 0.029

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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	20.246	1.800	0.253
2	0.167	40.492	5.274	0.743
3	0.250	60.739	9.202	1.296
4	0.333	80.985	12.874	1.813
5	0.417	101.231	14.440	2.033
6	0.500	121.477	12.268	1.727
7	0.583	141.723	8.222	1.158
8	0.667	161.970	5.694	0.802
9	0.750	182.216	3.995	0.562
10	0.833	202.462	3.093	0.435
11	0.917	222.708	2.648	0.373
12	1.000	242.954	2.270	0.320
13	1.083	263.201	1.976	0.278
14	1.167	283.447	1.768	0.249
15	1.250	303.693	1.509	0.212
16	1.333	323.939	1.296	0.182
17	1.417	344.185	1.215	0.171
18	1.500	364.431	1.132	0.159
19	1.583	384.678	0.904	0.127
20	1.667	404.924	0.884	0.124
21	1.750	425.170	0.717	0.101
22	1.833	445.416	0.648	0.091
23	1.917	465.662	0.636	0.090
24	2.000	485.909	0.608	0.086
25	2.083	506.155	0.600	0.084
26	2.167	526.401	0.485	0.068
27	2.250	546.647	0.445	0.063
28	2.333	566.893	0.417	0.059
29	2.417	587.140	0.366	0.051
30	2.500	607.386	0.359	0.051
31	2.583	627.632	0.300	0.042
32	2.667	647.878	0.283	0.040
33	2.750	668.124	0.251	0.035
34	2.833	688.371	0.203	0.029
35	2.917	708.617	0.202	0.029
36	3.000	728.863	0.202	0.029
37	3.083	749.109	0.202	0.029
38	3.167	769.355	0.202	0.029
39	3.250	789.602	0.202	0.029
40	3.333	809.848	0.205	0.029
			Sum = 100.000	Sum= 14.079

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	0.176	0.057	(0.159)	0.119
2	0.17	0.60	0.212	0.057	(0.191)	0.154
3	0.25	0.60	0.212	0.057	(0.191)	0.154
4	0.33	0.60	0.212	0.057	(0.191)	0.154
5	0.42	0.60	0.212	0.057	(0.191)	0.154
6	0.50	0.70	0.247	0.057	(0.222)	0.190
7	0.58	0.70	0.247	0.057	(0.222)	0.190
8	0.67	0.70	0.247	0.057	(0.222)	0.190
9	0.75	0.70	0.247	0.057	(0.222)	0.190
10	0.83	0.70	0.247	0.057	(0.222)	0.190
11	0.92	0.70	0.247	0.057	(0.222)	0.190
12	1.00	0.80	0.282	0.057	(0.254)	0.225

```
13   1.08     0.80      0.282          0.057    (  0.254)        0.225
14   1.17     0.80      0.282          0.057    (  0.254)        0.225
15   1.25     0.80      0.282          0.057    (  0.254)        0.225
16   1.33     0.80      0.282          0.057    (  0.254)        0.225
17   1.42     0.80      0.282          0.057    (  0.254)        0.225
18   1.50     0.80      0.282          0.057    (  0.254)        0.225
19   1.58     0.80      0.282          0.057    (  0.254)        0.225
20   1.67     0.80      0.282          0.057    (  0.254)        0.225
21   1.75     0.80      0.282          0.057    (  0.254)        0.225
22   1.83     0.80      0.282          0.057    (  0.254)        0.225
23   1.92     0.80      0.282          0.057    (  0.254)        0.225
24   2.00     0.90      0.318          0.057    (  0.286)        0.260
25   2.08     0.80      0.282          0.057    (  0.254)        0.225
26   2.17     0.90      0.318          0.057    (  0.286)        0.260
27   2.25     0.90      0.318          0.057    (  0.286)        0.260
28   2.33     0.90      0.318          0.057    (  0.286)        0.260
29   2.42     0.90      0.318          0.057    (  0.286)        0.260
30   2.50     0.90      0.318          0.057    (  0.286)        0.260
31   2.58     0.90      0.318          0.057    (  0.286)        0.260
32   2.67     0.90      0.318          0.057    (  0.286)        0.260
33   2.75     1.00      0.353          0.057    (  0.318)        0.296
34   2.83     1.00      0.353          0.057    (  0.318)        0.296
35   2.92     1.00      0.353          0.057    (  0.318)        0.296
36   3.00     1.00      0.353          0.057    (  0.318)        0.296
37   3.08     1.00      0.353          0.057    (  0.318)        0.296
38   3.17     1.10      0.388          0.057    (  0.349)        0.331
39   3.25     1.10      0.388          0.057    (  0.349)        0.331
40   3.33     1.10      0.388          0.057    (  0.349)        0.331
41   3.42     1.20      0.423          0.057    (  0.381)        0.366
42   3.50     1.30      0.459          0.057    (  0.413)        0.401
43   3.58     1.40      0.494          0.057    (  0.445)        0.437
44   3.67     1.40      0.494          0.057    (  0.445)        0.437
45   3.75     1.50      0.529          0.057    (  0.476)        0.472
46   3.83     1.50      0.529          0.057    (  0.476)        0.472
47   3.92     1.60      0.564          0.057    (  0.508)        0.507
48   4.00     1.60      0.564          0.057    (  0.508)        0.507
49   4.08     1.70      0.600          0.057    (  0.540)        0.543
50   4.17     1.80      0.635          0.057    (  0.572)        0.578
51   4.25     1.90      0.670          0.057    (  0.603)        0.613
52   4.33     2.00      0.706          0.057    (  0.635)        0.648
53   4.42     2.10      0.741          0.057    (  0.667)        0.684
54   4.50     2.10      0.741          0.057    (  0.667)        0.684
55   4.58     2.20      0.776          0.057    (  0.699)        0.719
56   4.67     2.30      0.811          0.057    (  0.730)        0.754
57   4.75     2.40      0.847          0.057    (  0.762)        0.789
58   4.83     2.40      0.847          0.057    (  0.762)        0.789
59   4.92     2.50      0.882          0.057    (  0.794)        0.825
60   5.00     2.60      0.917          0.057    (  0.826)        0.860
61   5.08     3.10      1.094          0.057    (  0.984)        1.036
62   5.17     3.60      1.270          0.057    (  1.143)        1.213
63   5.25     3.90      1.376          0.057    (  1.238)        1.319
64   5.33     4.20      1.482          0.057    (  1.334)        1.424
65   5.42     4.70      1.658          0.057    (  1.492)        1.601
66   5.50     5.60      1.976          0.057    (  1.778)        1.918
67   5.58     1.90      0.670          0.057    (  0.603)        0.613
68   5.67     0.90      0.318          0.057    (  0.286)        0.260
69   5.75     0.60      0.212          0.057    (  0.191)        0.154
70   5.83     0.50      0.176          0.057    (  0.159)        0.119
71   5.92     0.30      0.106          0.057    (  0.095)        0.049
72   6.00     0.20      0.071          0.057    (  0.064)        0.013
             (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    31.2
      Flood volume = Effective rainfall      2.60(In)
       times area      14.0(Ac.)/[(In)/(Ft.)] =       3.0(Ac.Ft)
      Total soil loss =      0.34(In)
      Total soil loss =     0.400(Ac.Ft)
      Total rainfall =      2.94(In)
      Flood volume =      131679.4 Cubic Feet
      Total soil loss =       17404.0 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     16.142(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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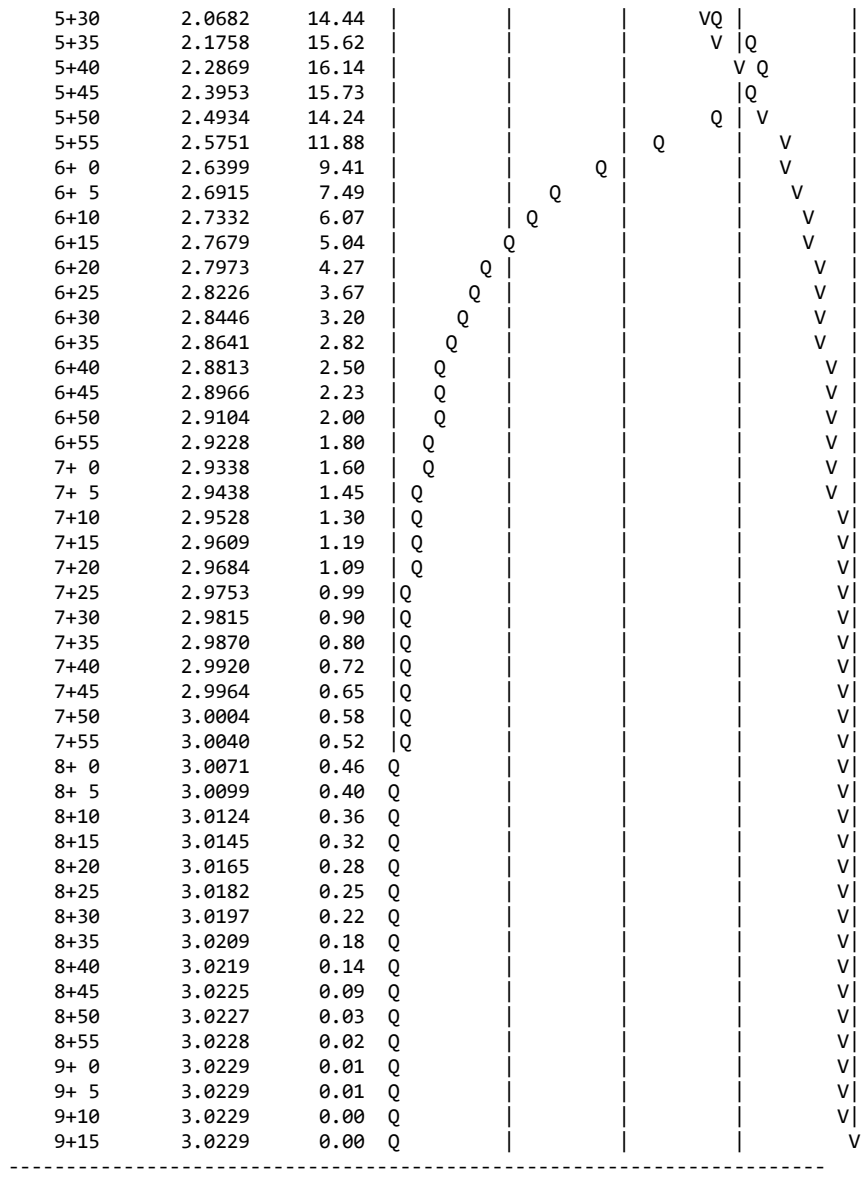
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0002	0.03	Q
0+10	0.0011	0.13	Q
0+15	0.0032	0.31	Q
0+20	0.0071	0.57	VQ
0+25	0.0132	0.88	VQ
0+30	0.0212	1.16	V Q
0+35	0.0308	1.39	V Q
0+40	0.0416	1.57	V Q
0+45	0.0535	1.73	V Q
0+50	0.0664	1.87	V Q
0+55	0.0801	1.99	|V Q
1+ 0	0.0946	2.10	|V Q
1+ 5	0.1097	2.19	|V Q
1+10	0.1255	2.30	|V Q
1+15	0.1421	2.41	|V Q
1+20	0.1595	2.53	| V Q
1+25	0.1776	2.63	| V Q
1+30	0.1962	2.70	| V Q
1+35	0.2152	2.76	| V Q
1+40	0.2346	2.81	| V Q
1+45	0.2542	2.84	| V Q
1+50	0.2740	2.88	| V Q
1+55	0.2940	2.91	| V Q
2+ 0	0.3143	2.95	| VQ
2+ 5	0.3349	2.99	| VQ
2+10	0.3558	3.04	| V Q
2+15	0.3772	3.10	| V Q
2+20	0.3991	3.18	| VQ
2+25	0.4215	3.25	| VQ
2+30	0.4443	3.31	| VQ
2+35	0.4675	3.38	| Q
2+40	0.4911	3.42	| Q
2+45	0.5149	3.46	| Q
2+50	0.5391	3.52	| Q
2+55	0.5638	3.59	| Q
3+ 0	0.5891	3.67	| Q
3+ 5	0.6150	3.76	| QV
3+10	0.6415	3.85	| QV
3+15	0.6685	3.93	| QV
3+20	0.6962	4.02	| QV|
3+25	0.7246	4.12	| QV|
3+30	0.7538	4.25	| QV|
3+35	0.7842	4.41	| Q V
3+40	0.8160	4.61	| QV
3+45	0.8493	4.84	| Q|V
3+50	0.8844	5.10	| QV
3+55	0.9213	5.35	| Q V
4+ 0	0.9598	5.60	|QV
4+ 5	1.0000	5.83	|Q V
4+10	1.0418	6.08	| QV
4+15	1.0854	6.33	| Q V
4+20	1.1310	6.62	| QV
4+25	1.1789	6.95	| Q V
4+30	1.2291	7.30	| Q V
4+35	1.2819	7.66	| QV
4+40	1.3371	8.02	| QV
4+45	1.3948	8.37	| Q V
4+50	1.4548	8.72	| Q V|
4+55	1.5173	9.07	| Q V
5+ 0	1.5822	9.42	| Q V
5+ 5	1.6498	9.82	| Q|V
5+10	1.7208	10.32	| Q V
5+15	1.7966	11.01	| QV
5+20	1.8787	11.92	| QV
5+25	1.9688	13.07	| Q



5+30	2.0682	14.44	
5+35	2.1758	15.62	
5+40	2.2869	16.14	
5+45	2.3953	15.73	
5+50	2.4934	14.24	
5+55	2.5751	11.88	
6+ 0	2.6399	9.41	
6+ 5	2.6915	7.49	
6+10	2.7332	6.07	
6+15	2.7679	5.04	
6+20	2.7973	4.27	
6+25	2.8226	3.67	
6+30	2.8446	3.20	
6+35	2.8641	2.82	
6+40	2.8813	2.50	
6+45	2.8966	2.23	
6+50	2.9104	2.00	
6+55	2.9228	1.80	
7+ 0	2.9338	1.60	
7+ 5	2.9438	1.45	
7+10	2.9528	1.30	
7+15	2.9609	1.19	
7+20	2.9684	1.09	
7+25	2.9753	0.99	
7+30	2.9815	0.90	
7+35	2.9870	0.80	
7+40	2.9920	0.72	
7+45	2.9964	0.65	
7+50	3.0004	0.58	
7+55	3.0040	0.52	
8+ 0	3.0071	0.46	
8+ 5	3.0099	0.40	
8+10	3.0124	0.36	
8+15	3.0145	0.32	
8+20	3.0165	0.28	
8+25	3.0182	0.25	
8+30	3.0197	0.22	
8+35	3.0209	0.18	
8+40	3.0219	0.14	
8+45	3.0225	0.09	
8+50	3.0227	0.03	
8+55	3.0228	0.02	
9+ 0	3.0229	0.01	
9+ 5	3.0229	0.01	
9+10	3.0229	0.00	
9+15	3.0229	0.00	

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 12/07/21 File: PP1EUH24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PILOT PERRIS
EXIST 100-YR
XO 12/7/21

Drainage Area = 13.97(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.412 Hr.
Lag time = 24.70 Min.
25% of lag time = 6.17 Min.
40% of lag time = 9.88 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]
13.97	2.05	28.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	5.33	74.46

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.330(In)

Point rain (area averaged) = 5.330(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.970	89.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
89.0	95.6	0.057	0.000	0.057	1.000	0.057
					Sum (F) =	0.057

Area averaged mean soil loss (F) (In/Hr) = 0.057
Minimum soil loss rate ((In/Hr)) = 0.029

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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	20.246	1.800	0.253
2	0.167	40.492	5.274	0.743
3	0.250	60.739	9.202	1.296
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5	0.417	101.231	14.440	2.033
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7	0.583	141.723	8.222	1.158
8	0.667	161.970	5.694	0.802
9	0.750	182.216	3.995	0.562
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11	0.917	222.708	2.648	0.373
12	1.000	242.954	2.270	0.320
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14	1.167	283.447	1.768	0.249
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17	1.417	344.185	1.215	0.171
18	1.500	364.431	1.132	0.159
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20	1.667	404.924	0.884	0.124
21	1.750	425.170	0.717	0.101
22	1.833	445.416	0.648	0.091
23	1.917	465.662	0.636	0.090
24	2.000	485.909	0.608	0.086
25	2.083	506.155	0.600	0.084
26	2.167	526.401	0.485	0.068
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28	2.333	566.893	0.417	0.059
29	2.417	587.140	0.366	0.051
30	2.500	607.386	0.359	0.051
31	2.583	627.632	0.300	0.042
32	2.667	647.878	0.283	0.040
33	2.750	668.124	0.251	0.035
34	2.833	688.371	0.203	0.029
35	2.917	708.617	0.202	0.029
36	3.000	728.863	0.202	0.029
37	3.083	749.109	0.202	0.029
38	3.167	769.355	0.202	0.029
39	3.250	789.602	0.202	0.029
40	3.333	809.848	0.205	0.029
			Sum = 100.000	Sum= 14.079

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	0.043	(0.101)	0.038	0.004
2	0.17	0.07	0.043	(0.101)	0.038	0.004
3	0.25	0.07	0.043	(0.101)	0.038	0.004
4	0.33	0.10	0.064	(0.100)	0.058	0.006
5	0.42	0.10	0.064	(0.100)	0.058	0.006
6	0.50	0.10	0.064	(0.099)	0.058	0.006
7	0.58	0.10	0.064	(0.099)	0.058	0.006
8	0.67	0.10	0.064	(0.099)	0.058	0.006
9	0.75	0.10	0.064	(0.098)	0.058	0.006
10	0.83	0.13	0.085	(0.098)	0.077	0.009
11	0.92	0.13	0.085	(0.098)	0.077	0.009
12	1.00	0.13	0.085	(0.097)	0.077	0.009

13	1.08	0.10	0.064	(	0.097)		0.058		0.006
14	1.17	0.10	0.064	(	0.096)		0.058		0.006
15	1.25	0.10	0.064	(	0.096)		0.058		0.006
16	1.33	0.10	0.064	(	0.096)		0.058		0.006
17	1.42	0.10	0.064	(	0.095)		0.058		0.006
18	1.50	0.10	0.064	(	0.095)		0.058		0.006
19	1.58	0.10	0.064	(	0.094)		0.058		0.006
20	1.67	0.10	0.064	(	0.094)		0.058		0.006
21	1.75	0.10	0.064	(	0.094)		0.058		0.006
22	1.83	0.13	0.085	(	0.093)		0.077		0.009
23	1.92	0.13	0.085	(	0.093)		0.077		0.009
24	2.00	0.13	0.085	(	0.093)		0.077		0.009
25	2.08	0.13	0.085	(	0.092)		0.077		0.009
26	2.17	0.13	0.085	(	0.092)		0.077		0.009
27	2.25	0.13	0.085	(	0.091)		0.077		0.009
28	2.33	0.13	0.085	(	0.091)		0.077		0.009
29	2.42	0.13	0.085	(	0.091)		0.077		0.009
30	2.50	0.13	0.085	(	0.090)		0.077		0.009
31	2.58	0.17	0.107		0.090	(	0.096)		0.017
32	2.67	0.17	0.107		0.090	(	0.096)		0.017
33	2.75	0.17	0.107		0.089	(	0.096)		0.017
34	2.83	0.17	0.107		0.089	(	0.096)		0.018
35	2.92	0.17	0.107		0.088	(	0.096)		0.018
36	3.00	0.17	0.107		0.088	(	0.096)		0.018
37	3.08	0.17	0.107		0.088	(	0.096)		0.019
38	3.17	0.17	0.107		0.087	(	0.096)		0.019
39	3.25	0.17	0.107		0.087	(	0.096)		0.020
40	3.33	0.17	0.107		0.087	(	0.096)		0.020
41	3.42	0.17	0.107		0.086	(	0.096)		0.020
42	3.50	0.17	0.107		0.086	(	0.096)		0.021
43	3.58	0.17	0.107		0.086	(	0.096)		0.021
44	3.67	0.17	0.107		0.085	(	0.096)		0.021
45	3.75	0.17	0.107		0.085	(	0.096)		0.022
46	3.83	0.20	0.128		0.085	(	0.115)		0.043
47	3.92	0.20	0.128		0.084	(	0.115)		0.044
48	4.00	0.20	0.128		0.084	(	0.115)		0.044
49	4.08	0.20	0.128		0.083	(	0.115)		0.044
50	4.17	0.20	0.128		0.083	(	0.115)		0.045
51	4.25	0.20	0.128		0.083	(	0.115)		0.045
52	4.33	0.23	0.149		0.082	(	0.134)		0.067
53	4.42	0.23	0.149		0.082	(	0.134)		0.067
54	4.50	0.23	0.149		0.082	(	0.134)		0.068
55	4.58	0.23	0.149		0.081	(	0.134)		0.068
56	4.67	0.23	0.149		0.081	(	0.134)		0.068
57	4.75	0.23	0.149		0.081	(	0.134)		0.069
58	4.83	0.27	0.171		0.080	(	0.153)		0.090
59	4.92	0.27	0.171		0.080	(	0.153)		0.091
60	5.00	0.27	0.171		0.080	(	0.153)		0.091
61	5.08	0.20	0.128		0.079	(	0.115)		0.049
62	5.17	0.20	0.128		0.079	(	0.115)		0.049
63	5.25	0.20	0.128		0.079	(	0.115)		0.049
64	5.33	0.23	0.149		0.078	(	0.134)		0.071
65	5.42	0.23	0.149		0.078	(	0.134)		0.071
66	5.50	0.23	0.149		0.078	(	0.134)		0.072
67	5.58	0.27	0.171		0.077	(	0.153)		0.093
68	5.67	0.27	0.171		0.077	(	0.153)		0.094
69	5.75	0.27	0.171		0.077	(	0.153)		0.094
70	5.83	0.27	0.171		0.076	(	0.153)		0.094
71	5.92	0.27	0.171		0.076	(	0.153)		0.095
72	6.00	0.27	0.171		0.076	(	0.153)		0.095
73	6.08	0.30	0.192		0.075	(	0.173)		0.117
74	6.17	0.30	0.192		0.075	(	0.173)		0.117
75	6.25	0.30	0.192		0.074	(	0.173)		0.117
76	6.33	0.30	0.192		0.074	(	0.173)		0.118
77	6.42	0.30	0.192		0.074	(	0.173)		0.118
78	6.50	0.30	0.192		0.074	(	0.173)		0.118
79	6.58	0.33	0.213		0.073	(	0.192)		0.140
80	6.67	0.33	0.213		0.073	(	0.192)		0.140
81	6.75	0.33	0.213		0.073	(	0.192)		0.141
82	6.83	0.33	0.213		0.072	(	0.192)		0.141
83	6.92	0.33	0.213		0.072	(	0.192)		0.141
84	7.00	0.33	0.213		0.072	(	0.192)		0.142
85	7.08	0.33	0.213		0.071	(	0.192)		0.142

86	7.17	0.33	0.213	0.071	(	0.192)	0.142
87	7.25	0.33	0.213	0.071	(	0.192)	0.143
88	7.33	0.37	0.235	0.070	(	0.211)	0.164
89	7.42	0.37	0.235	0.070	(	0.211)	0.165
90	7.50	0.37	0.235	0.070	(	0.211)	0.165
91	7.58	0.40	0.256	0.069	(	0.230)	0.187
92	7.67	0.40	0.256	0.069	(	0.230)	0.187
93	7.75	0.40	0.256	0.069	(	0.230)	0.187
94	7.83	0.43	0.277	0.068	(	0.249)	0.209
95	7.92	0.43	0.277	0.068	(	0.249)	0.209
96	8.00	0.43	0.277	0.068	(	0.249)	0.209
97	8.08	0.50	0.320	0.067	(	0.288)	0.252
98	8.17	0.50	0.320	0.067	(	0.288)	0.253
99	8.25	0.50	0.320	0.067	(	0.288)	0.253
100	8.33	0.50	0.320	0.066	(	0.288)	0.253
101	8.42	0.50	0.320	0.066	(	0.288)	0.254
102	8.50	0.50	0.320	0.066	(	0.288)	0.254
103	8.58	0.53	0.341	0.066	(	0.307)	0.276
104	8.67	0.53	0.341	0.065	(	0.307)	0.276
105	8.75	0.53	0.341	0.065	(	0.307)	0.276
106	8.83	0.57	0.362	0.065	(	0.326)	0.298
107	8.92	0.57	0.362	0.064	(	0.326)	0.298
108	9.00	0.57	0.362	0.064	(	0.326)	0.298
109	9.08	0.63	0.405	0.064	(	0.365)	0.341
110	9.17	0.63	0.405	0.063	(	0.365)	0.342
111	9.25	0.63	0.405	0.063	(	0.365)	0.342
112	9.33	0.67	0.426	0.063	(	0.384)	0.364
113	9.42	0.67	0.426	0.062	(	0.384)	0.364
114	9.50	0.67	0.426	0.062	(	0.384)	0.364
115	9.58	0.70	0.448	0.062	(	0.403)	0.386
116	9.67	0.70	0.448	0.062	(	0.403)	0.386
117	9.75	0.70	0.448	0.061	(	0.403)	0.386
118	9.83	0.73	0.469	0.061	(	0.422)	0.408
119	9.92	0.73	0.469	0.061	(	0.422)	0.408
120	10.00	0.73	0.469	0.060	(	0.422)	0.409
121	10.08	0.50	0.320	0.060	(	0.288)	0.260
122	10.17	0.50	0.320	0.060	(	0.288)	0.260
123	10.25	0.50	0.320	0.060	(	0.288)	0.260
124	10.33	0.50	0.320	0.059	(	0.288)	0.261
125	10.42	0.50	0.320	0.059	(	0.288)	0.261
126	10.50	0.50	0.320	0.059	(	0.288)	0.261
127	10.58	0.67	0.426	0.058	(	0.384)	0.368
128	10.67	0.67	0.426	0.058	(	0.384)	0.368
129	10.75	0.67	0.426	0.058	(	0.384)	0.369
130	10.83	0.67	0.426	0.058	(	0.384)	0.369
131	10.92	0.67	0.426	0.057	(	0.384)	0.369
132	11.00	0.67	0.426	0.057	(	0.384)	0.369
133	11.08	0.63	0.405	0.057	(	0.365)	0.348
134	11.17	0.63	0.405	0.056	(	0.365)	0.349
135	11.25	0.63	0.405	0.056	(	0.365)	0.349
136	11.33	0.63	0.405	0.056	(	0.365)	0.349
137	11.42	0.63	0.405	0.056	(	0.365)	0.349
138	11.50	0.63	0.405	0.055	(	0.365)	0.350
139	11.58	0.57	0.362	0.055	(	0.326)	0.307
140	11.67	0.57	0.362	0.055	(	0.326)	0.308
141	11.75	0.57	0.362	0.054	(	0.326)	0.308
142	11.83	0.60	0.384	0.054	(	0.345)	0.330
143	11.92	0.60	0.384	0.054	(	0.345)	0.330
144	12.00	0.60	0.384	0.054	(	0.345)	0.330
145	12.08	0.83	0.533	0.053	(	0.480)	0.480
146	12.17	0.83	0.533	0.053	(	0.480)	0.480
147	12.25	0.83	0.533	0.053	(	0.480)	0.480
148	12.33	0.87	0.554	0.053	(	0.499)	0.502
149	12.42	0.87	0.554	0.052	(	0.499)	0.502
150	12.50	0.87	0.554	0.052	(	0.499)	0.502
151	12.58	0.93	0.597	0.052	(	0.537)	0.545
152	12.67	0.93	0.597	0.052	(	0.537)	0.545
153	12.75	0.93	0.597	0.051	(	0.537)	0.546
154	12.83	0.97	0.618	0.051	(	0.556)	0.567
155	12.92	0.97	0.618	0.051	(	0.556)	0.567
156	13.00	0.97	0.618	0.051	(	0.556)	0.568
157	13.08	1.13	0.725	0.050	(	0.652)	0.675
158	13.17	1.13	0.725	0.050	(	0.652)	0.675

159	13.25	1.13	0.725	0.050	(	0.652)	0.675
160	13.33	1.13	0.725	0.049	(	0.652)	0.675
161	13.42	1.13	0.725	0.049	(	0.652)	0.676
162	13.50	1.13	0.725	0.049	(	0.652)	0.676
163	13.58	0.77	0.490	0.049	(	0.441)	0.442
164	13.67	0.77	0.490	0.048	(	0.441)	0.442
165	13.75	0.77	0.490	0.048	(	0.441)	0.442
166	13.83	0.77	0.490	0.048	(	0.441)	0.442
167	13.92	0.77	0.490	0.048	(	0.441)	0.443
168	14.00	0.77	0.490	0.048	(	0.441)	0.443
169	14.08	0.90	0.576	0.047	(	0.518)	0.528
170	14.17	0.90	0.576	0.047	(	0.518)	0.529
171	14.25	0.90	0.576	0.047	(	0.518)	0.529
172	14.33	0.87	0.554	0.047	(	0.499)	0.508
173	14.42	0.87	0.554	0.046	(	0.499)	0.508
174	14.50	0.87	0.554	0.046	(	0.499)	0.508
175	14.58	0.87	0.554	0.046	(	0.499)	0.508
176	14.67	0.87	0.554	0.046	(	0.499)	0.509
177	14.75	0.87	0.554	0.045	(	0.499)	0.509
178	14.83	0.83	0.533	0.045	(	0.480)	0.488
179	14.92	0.83	0.533	0.045	(	0.480)	0.488
180	15.00	0.83	0.533	0.045	(	0.480)	0.488
181	15.08	0.80	0.512	0.044	(	0.460)	0.467
182	15.17	0.80	0.512	0.044	(	0.460)	0.467
183	15.25	0.80	0.512	0.044	(	0.460)	0.468
184	15.33	0.77	0.490	0.044	(	0.441)	0.447
185	15.42	0.77	0.490	0.044	(	0.441)	0.447
186	15.50	0.77	0.490	0.043	(	0.441)	0.447
187	15.58	0.63	0.405	0.043	(	0.365)	0.362
188	15.67	0.63	0.405	0.043	(	0.365)	0.362
189	15.75	0.63	0.405	0.043	(	0.365)	0.362
190	15.83	0.63	0.405	0.042	(	0.365)	0.363
191	15.92	0.63	0.405	0.042	(	0.365)	0.363
192	16.00	0.63	0.405	0.042	(	0.365)	0.363
193	16.08	0.13	0.085	0.042	(	0.077)	0.043
194	16.17	0.13	0.085	0.042	(	0.077)	0.044
195	16.25	0.13	0.085	0.041	(	0.077)	0.044
196	16.33	0.13	0.085	0.041	(	0.077)	0.044
197	16.42	0.13	0.085	0.041	(	0.077)	0.044
198	16.50	0.13	0.085	0.041	(	0.077)	0.045
199	16.58	0.10	0.064	0.041	(	0.058)	0.023
200	16.67	0.10	0.064	0.040	(	0.058)	0.024
201	16.75	0.10	0.064	0.040	(	0.058)	0.024
202	16.83	0.10	0.064	0.040	(	0.058)	0.024
203	16.92	0.10	0.064	0.040	(	0.058)	0.024
204	17.00	0.10	0.064	0.040	(	0.058)	0.024
205	17.08	0.17	0.107	0.039	(	0.096)	0.067
206	17.17	0.17	0.107	0.039	(	0.096)	0.067
207	17.25	0.17	0.107	0.039	(	0.096)	0.068
208	17.33	0.17	0.107	0.039	(	0.096)	0.068
209	17.42	0.17	0.107	0.039	(	0.096)	0.068
210	17.50	0.17	0.107	0.038	(	0.096)	0.068
211	17.58	0.17	0.107	0.038	(	0.096)	0.068
212	17.67	0.17	0.107	0.038	(	0.096)	0.069
213	17.75	0.17	0.107	0.038	(	0.096)	0.069
214	17.83	0.13	0.085	0.038	(	0.077)	0.048
215	17.92	0.13	0.085	0.037	(	0.077)	0.048
216	18.00	0.13	0.085	0.037	(	0.077)	0.048
217	18.08	0.13	0.085	0.037	(	0.077)	0.048
218	18.17	0.13	0.085	0.037	(	0.077)	0.048
219	18.25	0.13	0.085	0.037	(	0.077)	0.049
220	18.33	0.13	0.085	0.036	(	0.077)	0.049
221	18.42	0.13	0.085	0.036	(	0.077)	0.049
222	18.50	0.13	0.085	0.036	(	0.077)	0.049
223	18.58	0.10	0.064	0.036	(	0.058)	0.028
224	18.67	0.10	0.064	0.036	(	0.058)	0.028
225	18.75	0.10	0.064	0.036	(	0.058)	0.028
226	18.83	0.07	0.043	0.035	(	0.038)	0.007
227	18.92	0.07	0.043	0.035	(	0.038)	0.007
228	19.00	0.07	0.043	0.035	(	0.038)	0.008
229	19.08	0.10	0.064	0.035	(	0.058)	0.029
230	19.17	0.10	0.064	0.035	(	0.058)	0.029
231	19.25	0.10	0.064	0.035	(	0.058)	0.029

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232  19.33     0.13      0.085          0.034    (  0.077)        0.051
233  19.42     0.13      0.085          0.034    (  0.077)        0.051
234  19.50     0.13      0.085          0.034    (  0.077)        0.051
235  19.58     0.10      0.064          0.034    (  0.058)        0.030
236  19.67     0.10      0.064          0.034    (  0.058)        0.030
237  19.75     0.10      0.064          0.034    (  0.058)        0.030
238  19.83     0.07      0.043          0.034    (  0.038)        0.009
239  19.92     0.07      0.043          0.033    (  0.038)        0.009
240  20.00     0.07      0.043          0.033    (  0.038)        0.009
241  20.08     0.10      0.064          0.033    (  0.058)        0.031
242  20.17     0.10      0.064          0.033    (  0.058)        0.031
243  20.25     0.10      0.064          0.033    (  0.058)        0.031
244  20.33     0.10      0.064          0.033    (  0.058)        0.031
245  20.42     0.10      0.064          0.032    (  0.058)        0.031
246  20.50     0.10      0.064          0.032    (  0.058)        0.032
247  20.58     0.10      0.064          0.032    (  0.058)        0.032
248  20.67     0.10      0.064          0.032    (  0.058)        0.032
249  20.75     0.10      0.064          0.032    (  0.058)        0.032
250  20.83     0.07      0.043          0.032    (  0.038)        0.011
251  20.92     0.07      0.043          0.032    (  0.038)        0.011
252  21.00     0.07      0.043          0.032    (  0.038)        0.011
253  21.08     0.10      0.064          0.031    (  0.058)        0.033
254  21.17     0.10      0.064          0.031    (  0.058)        0.033
255  21.25     0.10      0.064          0.031    (  0.058)        0.033
256  21.33     0.07      0.043          0.031    (  0.038)        0.012
257  21.42     0.07      0.043          0.031    (  0.038)        0.012
258  21.50     0.07      0.043          0.031    (  0.038)        0.012
259  21.58     0.10      0.064          0.031    (  0.058)        0.033
260  21.67     0.10      0.064          0.031    (  0.058)        0.033
261  21.75     0.10      0.064          0.031    (  0.058)        0.033
262  21.83     0.07      0.043          0.030    (  0.038)        0.012
263  21.92     0.07      0.043          0.030    (  0.038)        0.012
264  22.00     0.07      0.043          0.030    (  0.038)        0.012
265  22.08     0.10      0.064          0.030    (  0.058)        0.034
266  22.17     0.10      0.064          0.030    (  0.058)        0.034
267  22.25     0.10      0.064          0.030    (  0.058)        0.034
268  22.33     0.07      0.043          0.030    (  0.038)        0.013
269  22.42     0.07      0.043          0.030    (  0.038)        0.013
270  22.50     0.07      0.043          0.030    (  0.038)        0.013
271  22.58     0.07      0.043          0.030    (  0.038)        0.013
272  22.67     0.07      0.043          0.029    (  0.038)        0.013
273  22.75     0.07      0.043          0.029    (  0.038)        0.013
274  22.83     0.07      0.043          0.029    (  0.038)        0.013
275  22.92     0.07      0.043          0.029    (  0.038)        0.013
276  23.00     0.07      0.043          0.029    (  0.038)        0.013
277  23.08     0.07      0.043          0.029    (  0.038)        0.014
278  23.17     0.07      0.043          0.029    (  0.038)        0.014
279  23.25     0.07      0.043          0.029    (  0.038)        0.014
280  23.33     0.07      0.043          0.029    (  0.038)        0.014
281  23.42     0.07      0.043          0.029    (  0.038)        0.014
282  23.50     0.07      0.043          0.029    (  0.038)        0.014
283  23.58     0.07      0.043          0.029    (  0.038)        0.014
284  23.67     0.07      0.043          0.029    (  0.038)        0.014
285  23.75     0.07      0.043          0.029    (  0.038)        0.014
286  23.83     0.07      0.043          0.029    (  0.038)        0.014
287  23.92     0.07      0.043          0.029    (  0.038)        0.014
288  24.00     0.07      0.043          0.029    (  0.038)        0.014
              (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    48.5
       Flood volume = Effective rainfall      4.04(In)
        times area      14.0(Ac.)/[(In)/(Ft.)] =       4.7(Ac.Ft)
       Total soil loss =      1.29(In)
       Total soil loss =     1.504(Ac.Ft)
       Total rainfall =      5.33(In)
       Flood volume =      204755.2 Cubic Feet
       Total soil loss =       65527.6 Cubic Feet
       ---------------------------------------------------------------------
        Peak flow rate of this hydrograph =      8.523(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
       ---------------------------------------------------------------------
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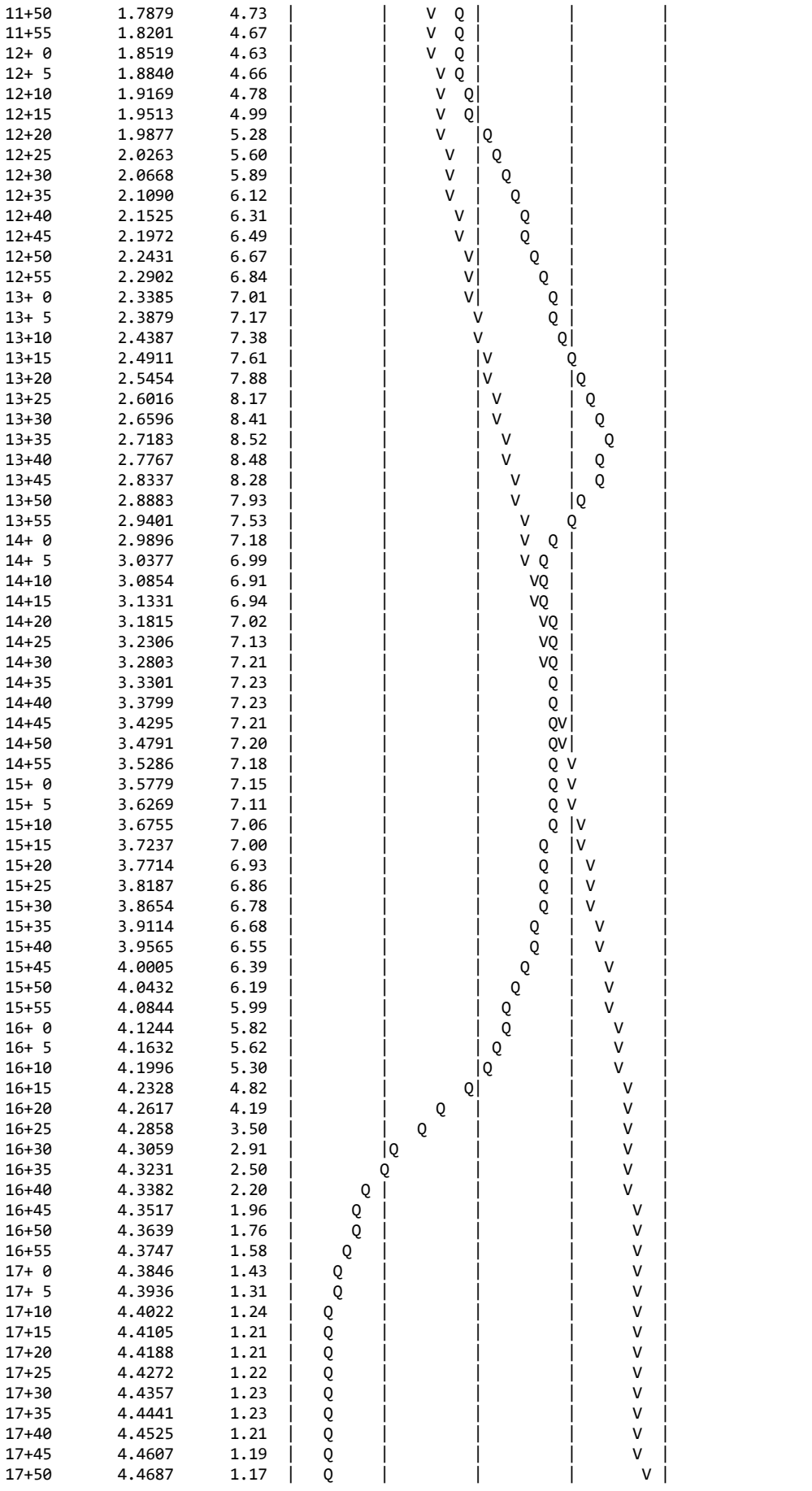
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0000	0.00	Q				
0+15	0.0001	0.01	Q				
0+20	0.0002	0.02	Q				
0+25	0.0004	0.03	Q				
0+30	0.0007	0.04	Q				
0+35	0.0010	0.05	Q				
0+40	0.0014	0.05	Q				
0+45	0.0018	0.06	Q				
0+50	0.0023	0.07	Q				
0+55	0.0028	0.07	Q				
1+ 0	0.0033	0.08	Q				
1+ 5	0.0038	0.08	Q				
1+10	0.0044	0.09	Q				
1+15	0.0050	0.09	Q				
1+20	0.0057	0.09	Q				
1+25	0.0063	0.09	Q				
1+30	0.0069	0.09	Q				
1+35	0.0074	0.09	Q				
1+40	0.0080	0.09	Q				
1+45	0.0086	0.09	Q				
1+50	0.0092	0.09	Q				
1+55	0.0098	0.09	Q				
2+ 0	0.0105	0.09	Q				
2+ 5	0.0111	0.10	Q				
2+10	0.0118	0.10	Q				
2+15	0.0125	0.10	Q				
2+20	0.0133	0.11	Q				
2+25	0.0140	0.11	Q				
2+30	0.0148	0.11	Q				
2+35	0.0156	0.11	Q				
2+40	0.0164	0.12	Q				
2+45	0.0173	0.13	Q				
2+50	0.0183	0.15	Q				
2+55	0.0195	0.17	Q				
3+ 0	0.0208	0.18	Q				
3+ 5	0.0221	0.20	Q				
3+10	0.0235	0.21	Q				
3+15	0.0250	0.22	Q				
3+20	0.0266	0.22	Q				
3+25	0.0282	0.23	Q				
3+30	0.0298	0.24	Q				
3+35	0.0315	0.24	Q				
3+40	0.0332	0.25	VQ				
3+45	0.0350	0.26	VQ				
3+50	0.0369	0.27	VQ				
3+55	0.0389	0.29	VQ				
4+ 0	0.0411	0.32	VQ				
4+ 5	0.0436	0.37	VQ				
4+10	0.0465	0.42	VQ				
4+15	0.0497	0.46	VQ				
4+20	0.0531	0.50	VQ				
4+25	0.0568	0.53	V Q				
4+30	0.0608	0.58	V Q				
4+35	0.0652	0.63	V Q				
4+40	0.0699	0.69	V Q				
4+45	0.0750	0.74	V Q				
4+50	0.0804	0.78	V Q				
4+55	0.0860	0.82	V Q				
5+ 0	0.0921	0.87	V Q				
5+ 5	0.0984	0.92	V Q				
5+10	0.1049	0.95	V Q				
5+15	0.1114	0.94	V Q				
5+20	0.1177	0.91	|V Q				
5+25	0.1237	0.87	|V Q				
5+30	0.1295	0.85	|V Q				
5+35	0.1355	0.86	|V Q				
5+40	0.1417	0.91	|V Q				

5+45	0.1484	0.96	V Q				
5+50	0.1554	1.02	V Q				
5+55	0.1629	1.08	V Q				
6+ 0	0.1707	1.13	V Q				
6+ 5	0.1788	1.17	V Q				
6+10	0.1871	1.21	V Q				
6+15	0.1958	1.26	V Q				
6+20	0.2049	1.32	V Q				
6+25	0.2143	1.38	V Q				
6+30	0.2242	1.43	V Q				
6+35	0.2343	1.47	V Q				
6+40	0.2447	1.51	V Q				
6+45	0.2555	1.57	V Q				
6+50	0.2667	1.63	V Q				
6+55	0.2783	1.69	V Q				
7+ 0	0.2903	1.74	V Q				
7+ 5	0.3026	1.78	V Q				
7+10	0.3150	1.81	V Q				
7+15	0.3276	1.83	V Q				
7+20	0.3404	1.86	V Q				
7+25	0.3535	1.89	V Q				
7+30	0.3668	1.94	V Q				
7+35	0.3806	2.00	V Q				
7+40	0.3949	2.07	V Q				
7+45	0.4097	2.15	V Q				
7+50	0.4250	2.23	V Q				
7+55	0.4410	2.32	V Q				
8+ 0	0.4575	2.40	V Q				
8+ 5	0.4747	2.50	V Q				
8+10	0.4927	2.61	V Q				
8+15	0.5115	2.73	V Q				
8+20	0.5311	2.85	V Q				
8+25	0.5516	2.98	V Q				
8+30	0.5728	3.08	V Q				
8+35	0.5946	3.16	V Q				
8+40	0.6169	3.24	V Q				
8+45	0.6397	3.31	V Q				
8+50	0.6631	3.39	V Q				
8+55	0.6871	3.49	V Q				
9+ 0	0.7118	3.58	V Q				
9+ 5	0.7372	3.68	V Q				
9+10	0.7633	3.80	V Q				
9+15	0.7903	3.93	V Q				
9+20	0.8183	4.06	V Q				
9+25	0.8473	4.21	V Q				
9+30	0.8772	4.34	V Q				
9+35	0.9080	4.47	V Q				
9+40	0.9396	4.59	V Q				
9+45	0.9720	4.70	V Q				
9+50	1.0051	4.81	V Q				
9+55	1.0391	4.93	V Q				
10+ 0	1.0737	5.03	V Q				
10+ 5	1.1089	5.10	V Q				
10+10	1.1439	5.08	V Q				
10+15	1.1781	4.97	V Q				
10+20	1.2109	4.76	V Q				
10+25	1.2419	4.51	V Q				
10+30	1.2714	4.29	V Q				
10+35	1.3002	4.18	V Q				
10+40	1.3290	4.17	V Q				
10+45	1.3583	4.26	V Q				
10+50	1.3887	4.41	V Q				
10+55	1.4203	4.60	V Q				
11+ 0	1.4531	4.75	V Q				
11+ 5	1.4865	4.85	V Q				
11+10	1.5202	4.90	V Q				
11+15	1.5541	4.92	V Q				
11+20	1.5880	4.92	V Q				
11+25	1.6217	4.90	V Q				
11+30	1.6554	4.89	V Q				
11+35	1.6890	4.87	V Q				
11+40	1.7223	4.84	V Q				
11+45	1.7553	4.80	V Q				



17+55	4.4765	1.13	| Q |	|	|	V |
18+ 0	4.4840	1.08	| Q |	|	|	V |
18+ 5	4.4910	1.02	| Q |	|	|	V |
18+10	4.4977	0.96	| Q |	|	|	V |
18+15	4.5040	0.91	| Q |	|	|	V |
18+20	4.5100	0.87	| Q |	|	|	V |
18+25	4.5158	0.85	| Q |	|	|	V |
18+30	4.5215	0.82	| Q |	|	|	V |
18+35	4.5270	0.80	| Q |	|	|	V |
18+40	4.5322	0.76	| Q |	|	|	V |
18+45	4.5372	0.72	| Q |	|	|	V |
18+50	4.5418	0.67	| Q |	|	|	V |
18+55	4.5459	0.60	| Q |	|	|	V |
19+ 0	4.5495	0.52	| Q |	|	|	V |
19+ 5	4.5527	0.46	|Q |	|	|	V |
19+10	4.5555	0.41	|Q |	|	|	V |
19+15	4.5581	0.38	|Q |	|	|	V |
19+20	4.5607	0.38	|Q |	|	|	V |
19+25	4.5635	0.41	|Q |	|	|	V |
19+30	4.5667	0.46	|Q |	|	|	V |
19+35	4.5702	0.51	| Q |	|	|	V |
19+40	4.5739	0.54	| Q |	|	|	V |
19+45	4.5777	0.55	| Q |	|	|	V |
19+50	4.5813	0.53	| Q |	|	|	V |
19+55	4.5847	0.49	|Q |	|	|	V|
20+ 0	4.5877	0.44	|Q |	|	|	V|
20+ 5	4.5904	0.39	|Q |	|	|	V|
20+10	4.5929	0.36	|Q |	|	|	V|
20+15	4.5953	0.34	|Q |	|	|	V|
20+20	4.5977	0.36	|Q |	|	|	V|
20+25	4.6003	0.38	|Q |	|	|	V|
20+30	4.6031	0.40	|Q |	|	|	V|
20+35	4.6060	0.42	|Q |	|	|	V|
20+40	4.6089	0.43	|Q |	|	|	V|
20+45	4.6119	0.43	|Q |	|	|	V|
20+50	4.6148	0.43	|Q |	|	|	V|
20+55	4.6176	0.41	|Q |	|	|	V|
21+ 0	4.6203	0.39	|Q |	|	|	V|
21+ 5	4.6228	0.36	|Q |	|	|	V|
21+10	4.6250	0.33	|Q |	|	|	V|
21+15	4.6273	0.32	|Q |	|	|	V|
21+20	4.6296	0.34	|Q |	|	|	V|
21+25	4.6320	0.35	|Q |	|	|	V|
21+30	4.6344	0.35	|Q |	|	|	V|
21+35	4.6367	0.33	|Q |	|	|	V|
21+40	4.6388	0.31	|Q |	|	|	V|
21+45	4.6410	0.31	|Q |	|	|	V|
21+50	4.6432	0.32	|Q |	|	|	V|
21+55	4.6456	0.34	|Q |	|	|	V|
22+ 0	4.6479	0.34	|Q |	|	|	V|
22+ 5	4.6502	0.33	|Q |	|	|	V|
22+10	4.6523	0.31	|Q |	|	|	V|
22+15	4.6545	0.31	|Q |	|	|	V|
22+20	4.6567	0.33	|Q |	|	|	V|
22+25	4.6591	0.34	|Q |	|	|	V|
22+30	4.6615	0.35	|Q |	|	|	V|
22+35	4.6637	0.33	|Q |	|	|	V|
22+40	4.6658	0.30	|Q |	|	|	V|
22+45	4.6676	0.27	|Q |	|	|	V|
22+50	4.6693	0.25	Q |	|	|	V|
22+55	4.6709	0.24	Q |	|	|	V|
23+ 0	4.6725	0.23	Q |	|	|	V|
23+ 5	4.6741	0.22	Q |	|	|	V|
23+10	4.6756	0.22	Q |	|	|	V|
23+15	4.6771	0.22	Q |	|	|	V|
23+20	4.6786	0.22	Q |	|	|	V|
23+25	4.6801	0.21	Q |	|	|	V|
23+30	4.6815	0.21	Q |	|	|	V|
23+35	4.6830	0.21	Q |	|	|	V|
23+40	4.6844	0.21	Q |	|	|	V|
23+45	4.6858	0.21	Q |	|	|	V|
23+50	4.6872	0.21	Q |	|	|	V|
23+55	4.6887	0.20	Q |	|	|	V|

24+ 0	4.6901	0.20	Q	|	|	|	V|
24+ 5	4.6914	0.20	Q	|	|	|	V|
24+10	4.6927	0.19	Q	|	|	|	V|
24+15	4.6939	0.17	Q	|	|	|	V|
24+20	4.6949	0.15	Q	|	|	|	V|
24+25	4.6957	0.12	Q	|	|	|	V|
24+30	4.6964	0.09	Q	|	|	|	V|
24+35	4.6969	0.07	Q	|	|	|	V|
24+40	4.6973	0.06	Q	|	|	|	V|
24+45	4.6977	0.05	Q	|	|	|	V|
24+50	4.6980	0.05	Q	|	|	|	V|
24+55	4.6983	0.04	Q	|	|	|	V|
25+ 0	4.6986	0.04	Q	|	|	|	V|
25+ 5	4.6988	0.03	Q	|	|	|	V|
25+10	4.6990	0.03	Q	|	|	|	V|
25+15	4.6992	0.03	Q	|	|	|	V|
25+20	4.6993	0.02	Q	|	|	|	V|
25+25	4.6995	0.02	Q	|	|	|	V|
25+30	4.6996	0.02	Q	|	|	|	V|
25+35	4.6997	0.02	Q	|	|	|	V|
25+40	4.6998	0.01	Q	|	|	|	V|
25+45	4.6999	0.01	Q	|	|	|	V|
25+50	4.7000	0.01	Q	|	|	|	V|
25+55	4.7001	0.01	Q	|	|	|	V|
26+ 0	4.7001	0.01	Q	|	|	|	V|
26+ 5	4.7002	0.01	Q	|	|	|	V|
26+10	4.7003	0.01	Q	|	|	|	V|
26+15	4.7003	0.01	Q	|	|	|	V|
26+20	4.7003	0.01	Q	|	|	|	V|
26+25	4.7004	0.01	Q	|	|	|	V|
26+30	4.7004	0.00	Q	|	|	|	V|
26+35	4.7004	0.00	Q	|	|	|	V|
26+40	4.7005	0.00	Q	|	|	|	V|
26+45	4.7005	0.00	Q	|	|	|	V|
26+50	4.7005	0.00	Q	|	|	|	V|
26+55	4.7005	0.00	Q	|	|	|	V|
27+ 0	4.7005	0.00	Q	|	|	|	V|
27+ 5	4.7005	0.00	Q	|	|	|	V|
27+10	4.7005	0.00	Q	|	|	|	V|
27+15	4.7005	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 03/22/22 File: PP1PUH1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PILOT PERRIS
PROP 100-YR
XO 3/22/22

Drainage Area = 13.97(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.217 Hr.
Lag time = 13.02 Min.
25% of lag time = 3.25 Min.
40% of lag time = 5.21 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]
13.97	0.51	7.07

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	1.59	22.21

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.506(In)
Area Averaged 100-Year Rainfall = 1.590(In)

Point rain (area averaged) = 1.590(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.590(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
10.190	75.00	0.900
3.780	87.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	88.0	0.153	0.900	0.029	0.729	0.021
87.0	94.8	0.068	0.000	0.068	0.271	0.018
					Sum (F) =	0.039

Area averaged mean soil loss (F) (In/Hr) = 0.039
Minimum soil loss rate ((In/Hr)) = 0.020
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.364

Slope of intensity-duration curve for a 1 hour storm =0.5000

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	38.402	4.099	0.577
2	0.167	76.805	16.642	2.343
3	0.250	115.207	25.801	3.633
4	0.333	153.610	18.225	2.566
5	0.417	192.012	9.016	1.269
6	0.500	230.415	5.532	0.779
7	0.583	268.817	4.092	0.576
8	0.667	307.220	3.215	0.453
9	0.750	345.622	2.464	0.347
10	0.833	384.025	2.063	0.290
11	0.917	422.427	1.615	0.227
12	1.000	460.829	1.266	0.178
13	1.083	499.232	1.172	0.165
14	1.167	537.634	1.005	0.141

15	1.250	576.037	0.810	0.114
16	1.333	614.439	0.688	0.097
17	1.417	652.842	0.567	0.080
18	1.500	691.244	0.450	0.063
19	1.583	729.647	0.384	0.054
20	1.667	768.049	0.384	0.054
21	1.750	806.452	0.512	0.072
			Sum = 100.000	Sum= 14.079

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	4.20	0.801	0.039	(0.292)	0.762
2	0.17	4.30	0.820	0.039	(0.299)	0.781
3	0.25	5.00	0.954	0.039	(0.347)	0.914
4	0.33	5.00	0.954	0.039	(0.347)	0.914
5	0.42	5.80	1.106	0.039	(0.403)	1.067
6	0.50	6.50	1.240	0.039	(0.451)	1.201
7	0.58	7.40	1.412	0.039	(0.514)	1.372
8	0.67	8.60	1.641	0.039	(0.597)	1.601
9	0.75	12.30	2.347	0.039	(0.854)	2.307
10	0.83	29.10	5.552	0.039	(2.021)	5.512
11	0.92	6.80	1.297	0.039	(0.472)	1.258
12	1.00	5.00	0.954	0.039	(0.347)	0.914
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	18.6

Flood volume = Effective rainfall 1.55(In)
times area 14.0(Ac.)/[(In)/(Ft.)] = 1.8(Ac.Ft)
Total soil loss = 0.04(In)
Total soil loss = 0.046(Ac.Ft)
Total rainfall = 1.59(In)
Flood volume = 78619.0 Cubic Feet
Total soil loss = 2001.5 Cubic Feet

Peak flow rate of this hydrograph = 34.608(CFS)

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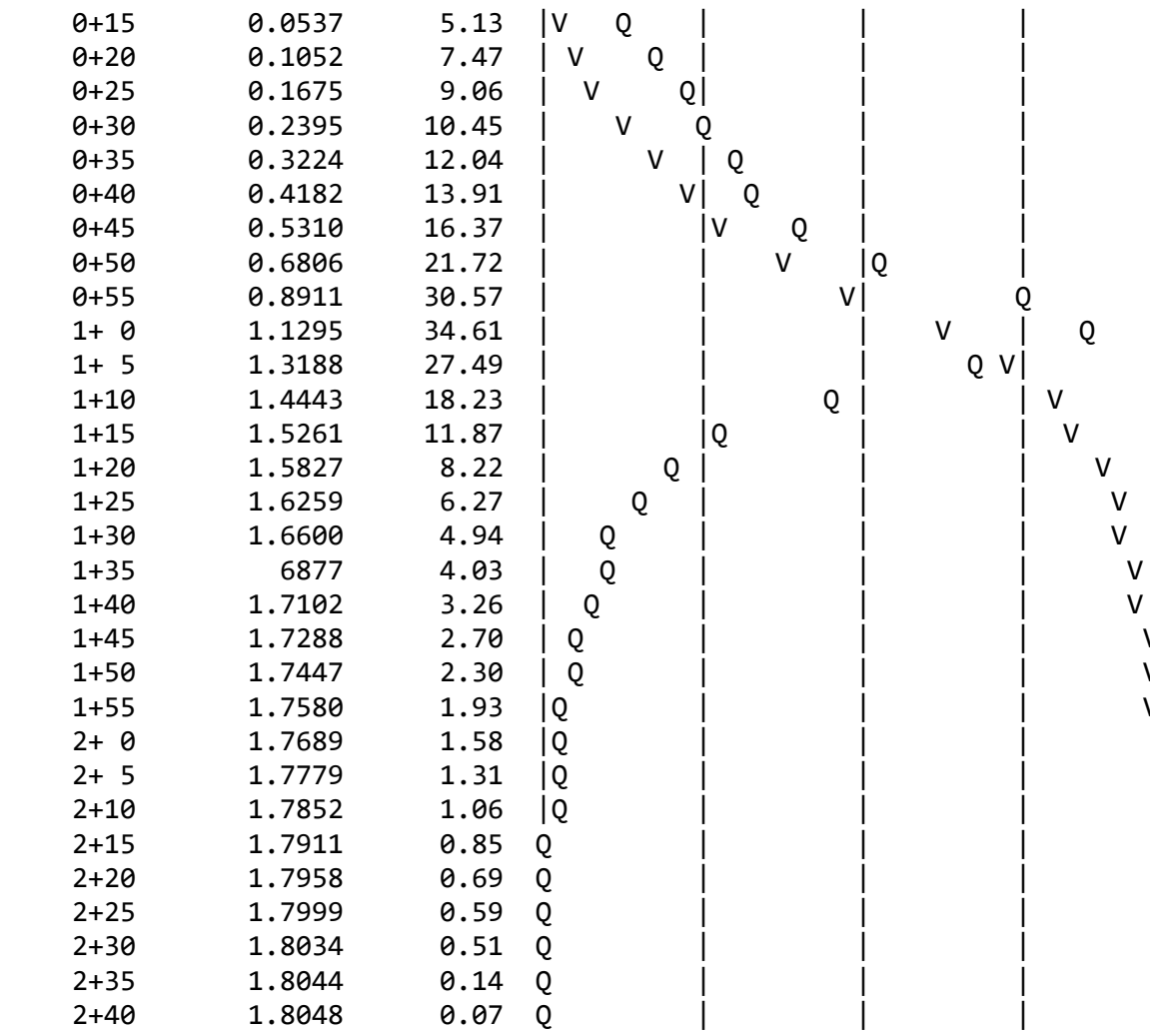
1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0030	0.44	Q	|	|	|	|
0+10	0.0184	2.24	V Q	|	|	|	|


0+15 0.0537 5.13
0+20 0.1052 7.47
0+25 0.1675 9.06
0+30 0.2395 10.45
0+35 0.3224 12.04
0+40 0.4182 13.91
0+45 0.5310 16.37
0+50 0.6806 21.72
0+55 0.8911 30.57
1+ 0 1.1295 34.61
1+ 5 1.3188 27.49
1+10 1.4443 18.23
1+15 1.5261 11.87
1+20 1.5827 8.22
1+25 1.6259 6.27
1+30 1.6600 4.94
1+35 6877 4.03
1+40 1.7102 3.26
1+45 1.7288 2.70
1+50 1.7447 2.30
1+55 1.7580 1.93
2+ 0 1.7689 1.58
2+ 5 1.7779 1.31
2+10 1.7852 1.06
2+15 1.7911 0.85
2+20 1.7958 0.69
2+25 1.7999 0.59
2+30 1.8034 0.51
2+35 1.8044 0.14
2+40 1.8048 0.07

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 03/22/22 File: PP1PUH3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

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English Rainfall Data (Inches) Input Values Used

English Units used in output format

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PROP 100-YR
XO 3/22/22

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Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.217 Hr.
Lag time = 13.02 Min.
25% of lag time = 3.25 Min.
40% of lag time = 5.21 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]
13.97	0.85	11.90

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	2.23	31.15

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.852(In)
Area Averaged 100-Year Rainfall = 2.230(In)

Point rain (area averaged) = 2.230(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.230(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
10.190	75.00	0.900
3.780	87.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	88.0	0.153	0.900	0.029	0.729	0.021
87.0	94.8	0.068	0.000	0.068	0.271	0.018
					Sum (F) =	0.039

Area averaged mean soil loss (F) (In/Hr) = 0.039
Minimum soil loss rate ((In/Hr)) = 0.020
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.364

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	38.402	4.099	0.577
2	0.167	76.805	16.642	2.343
3	0.250	115.207	25.801	3.633
4	0.333	153.610	18.225	2.566
5	0.417	192.012	9.016	1.269
6	0.500	230.415	5.532	0.779
7	0.583	268.817	4.092	0.576
8	0.667	307.220	3.215	0.453
9	0.750	345.622	2.464	0.347
10	0.833	384.025	2.063	0.290
11	0.917	422.427	1.615	0.227
12	1.000	460.829	1.266	0.178
13	1.083	499.232	1.172	0.165
14	1.167	537.634	1.005	0.141
15	1.250	576.037	0.810	0.114
16	1.333	614.439	0.688	0.097

17	1.417	652.842	0.567	0.080
18	1.500	691.244	0.450	0.063
19	1.583	729.647	0.384	0.054
20	1.667	768.049	0.384	0.054
21	1.750	806.452	0.512	0.072
			Sum = 100.000	Sum= 14.079

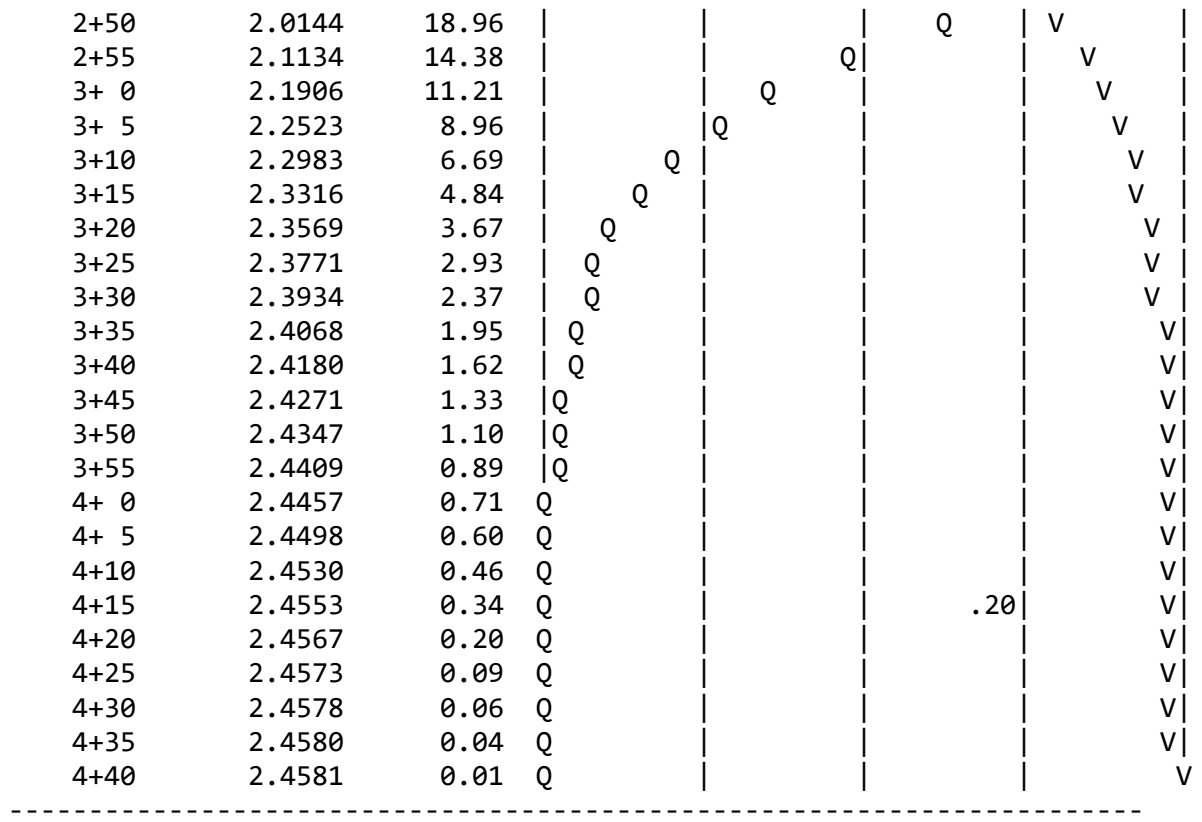
The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.348	0.039	(0.127)	0.308
2	0.17	1.30	0.348	0.039	(0.127)	0.308
3	0.25	1.10	0.294	0.039	(0.107)	0.255
4	0.33	1.50	0.401	0.039	(0.146)	0.362
5	0.42	1.50	0.401	0.039	(0.146)	0.362
6	0.50	1.80	0.482	0.039	(0.175)	0.442
7	0.58	1.50	0.401	0.039	(0.146)	0.362
8	0.67	1.80	0.482	0.039	(0.175)	0.442
9	0.75	1.80	0.482	0.039	(0.175)	0.442
10	0.83	1.50	0.401	0.039	(0.146)	0.362
11	0.92	1.60	0.428	0.039	(0.156)	0.389
12	1.00	1.80	0.482	0.039	(0.175)	0.442
13	1.08	2.20	0.589	0.039	(0.214)	0.549
14	1.17	2.20	0.589	0.039	(0.214)	0.549
15	1.25	2.20	0.589	0.039	(0.214)	0.549
16	1.33	2.00	0.535	0.039	(0.195)	0.496
17	1.42	2.60	0.696	0.039	(0.253)	0.656
18	1.50	2.70	0.722	0.039	(0.263)	0.683
19	1.58	2.40	0.642	0.039	(0.234)	0.603
20	1.67	2.70	0.722	0.039	(0.263)	0.683
21	1.75	3.30	0.883	0.039	(0.321)	0.844
22	1.83	3.10	0.830	0.039	(0.302)	0.790
23	1.92	2.90	0.776	0.039	(0.282)	0.737
24	2.00	3.00	0.803	0.039	(0.292)	0.763
25	2.08	3.10	0.830	0.039	(0.302)	0.790
26	2.17	4.20	1.124	0.039	(0.409)	1.084
27	2.25	5.00	1.338	0.039	(0.487)	1.298
28	2.33	3.50	0.937	0.039	(0.341)	0.897
29	2.42	6.80	1.820	0.039	(0.662)	1.780
30	2.50	7.30	1.953	0.039	(0.711)	1.914
31	2.58	8.20	2.194	0.039	(0.799)	2.155
32	2.67	5.90	1.579	0.039	(0.575)	1.539
33	2.75	2.00	0.535	0.039	(0.195)	0.496
34	2.83	1.80	0.482	0.039	(0.175)	0.442
35	2.92	1.80	0.482	0.039	(0.175)	0.442
36	3.00	0.60	0.161	0.039	(0.058)	0.121

(Loss Rate Not Used)

```
   Sum =     100.0                                    Sum =    25.3
      Flood volume = Effective rainfall      2.11(In)
       times area      14.0(Ac.)/[(In)/(Ft.)] =       2.5(Ac.Ft)
      Total soil loss =      0.12(In)
      Total soil loss =     0.138(Ac.Ft)
      Total rainfall =      2.23(In)
      Flood volume =      107074.5 Cubic Feet
      Total soil loss =        6004.4 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     22.197(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       0.0012      0.18  Q         |         |         |         |
  0+10       0.0074      0.90  VQ        |         |         |         |
  0+15       0.0211      1.99  V Q       |         |         |         |
  0+20       0.0399      2.72  V  Q      |         |         |         |
  0+25       0.0617      3.17  |V  Q     |         |         |         |
  0+30       0.0872      3.71  |V  Q     |         |         |         |
  0+35       0.1163      4.23  |V   Q    |         |         |         |
  0+40       0.1481      4.62  | V   Q   |         |         |         |
  0+45       0.1817      4.88  | V   Q   |         |         |         |
  0+50       0.2172      5.15  |  V  Q   |         |         |         |
  0+55       0.2533      5.24  |   V Q   |         |         |         |
  1+ 0       0.2891      5.20  |   V Q   |         |         |         |
  1+ 5       0.3263      5.41  |    V Q  |         |         |         |
  1+10       0.3670      5.91  |    V Q  |         |         |         |
  1+15       0.4117      6.49  |     V Q |         |         |         |
  1+20       0.4588      6.84  |      V Q|         |         |         |
  1+25       0.5071      7.01  |       VQ|         |         |         |
  1+30       0.5578      7.35  |        Q|         |         |         |
  1+35       0.6124      7.92  |        VQ         |         |         |
  1+40       0.6696      8.31  |         VQ        |         |         |
  1+45       0.7289      8.61  |         |Q        |         |         |
  1+50       0.7924      9.22  |         | Q       |         |         |
  1+55       0.8604      9.87  |         |  QV     |         |         |
  2+ 0       0.9302     10.13  |         |  Q V    |         |         |
  2+ 5       1.0002     10.17  |         |  Q  V   |         |         |
  2+10       1.0725     10.50  |         |  Q   V  |         |         |
  2+15       1.1518     11.52  |         |    Q  V |         |         |
  2+20       1.2414     13.01  |         |      Q  V         |         |
  2+25       1.3392     14.20  |         |       Q |V        |         |
  2+30       1.4486     15.89  |         |         |Q V      |         |
  2+35       1.5800     19.08  |         |         |    Q    |         |
  2+40       1.7309     21.91  |         |         |       VQ|         |
  2+45       1.8838     22.20  |         |         |        QV         |
```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2+55 2.1134 14.38
3+ 0 2.1906 11.21
3+ 5 2.2523 8.96
3+10 2.2983 6.69
3+15 2.3316 4.84
3+20 2.3569 3.67
3+25 2.3771 2.93
3+30 2.3934 2.37
3+35 2.4068 1.95
3+40 2.4180 1.62
3+45 2.4271 1.33
3+50 2.4347 1.10
3+55 2.4409 0.89
4+ 0 2.4457 0.71
4+ 5 2.4498 0.60
4+10 2.4530 0.46
4+15 2.4553 0.34
4+20 2.4567 0.20
4+25 2.4573 0.09
4+30 2.4578 0.06
4+35 2.4580 0.04
4+40 2.4581 0.01
.20

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 03/22/22 File: PP1PUH6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PILOT PERRIS
PROP 100-YR
XO 3/22/22

Drainage Area = 13.97(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.217 Hr.
Lag time = 13.02 Min.
25% of lag time = 3.25 Min.
40% of lag time = 5.21 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]
13.97	1.18	16.48

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	2.94	41.07

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.180(In)
Area Averaged 100-Year Rainfall = 2.940(In)

Point rain (area averaged) = 2.940(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.940(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
10.190	75.00	0.900
3.780	87.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	88.0	0.153	0.900	0.029	0.729	0.021
87.0	94.8	0.068	0.000	0.068	0.271	0.018
					Sum (F) =	0.039

Area averaged mean soil loss (F) (In/Hr) = 0.039
Minimum soil loss rate ((In/Hr)) = 0.020
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.364

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	38.402	4.099	0.577
2	0.167	76.805	16.642	2.343
3	0.250	115.207	25.801	3.633
4	0.333	153.610	18.225	2.566
5	0.417	192.012	9.016	1.269
6	0.500	230.415	5.532	0.779
7	0.583	268.817	4.092	0.576
8	0.667	307.220	3.215	0.453
9	0.750	345.622	2.464	0.347
10	0.833	384.025	2.063	0.290
11	0.917	422.427	1.615	0.227
12	1.000	460.829	1.266	0.178
13	1.083	499.232	1.172	0.165
14	1.167	537.634	1.005	0.141
15	1.250	576.037	0.810	0.114
16	1.333	614.439	0.688	0.097

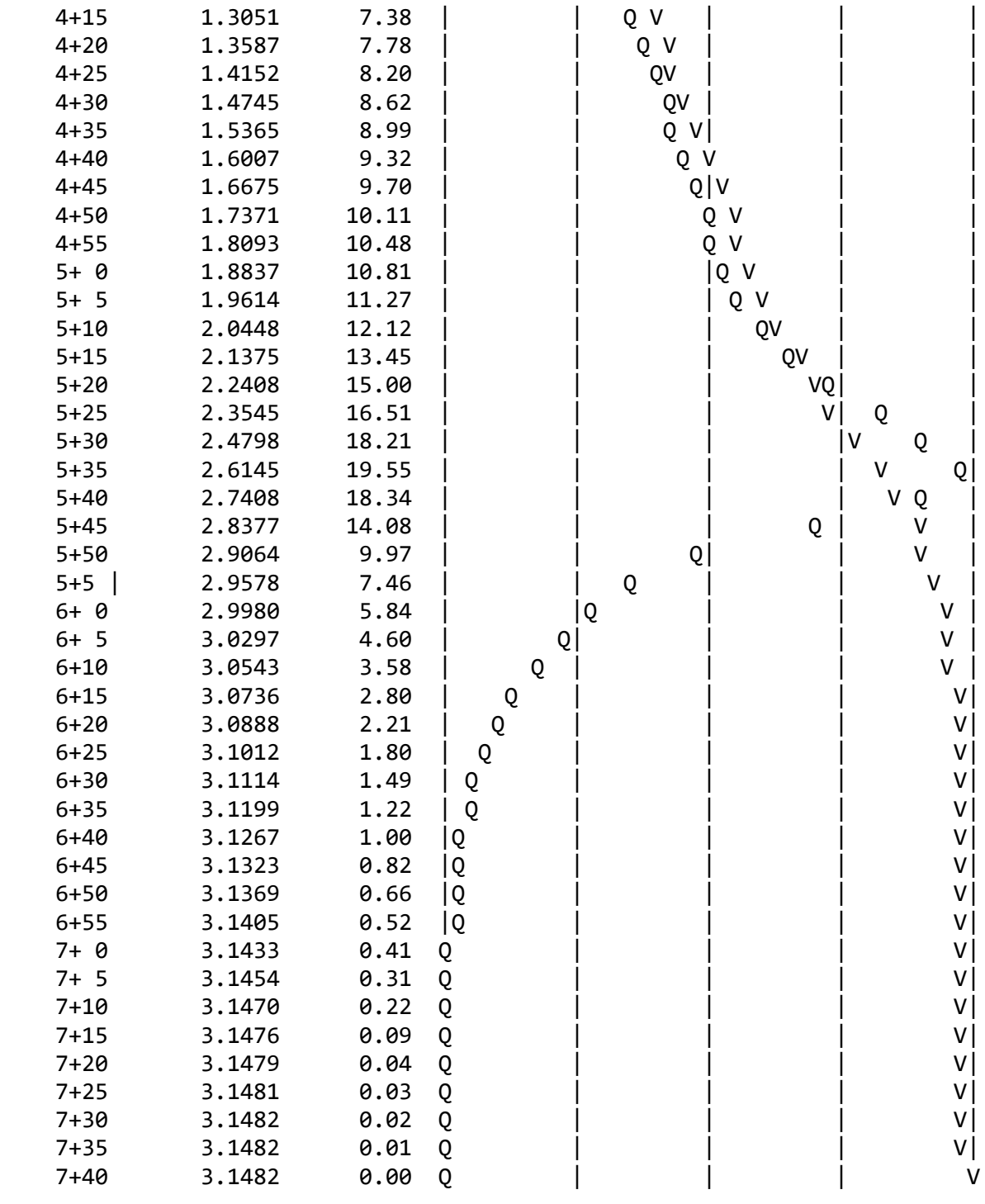
17	1.417	652.842	0.567	0.080
18	1.500	691.244	0.450	0.063
19	1.583	729.647	0.384	0.054
20	1.667	768.049	0.384	0.054
21	1.750	806.452	0.512	0.072
			Sum = 100.000	Sum= 14.079

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	0.176	0.039	(0.064)	0.137
2	0.17	0.60	0.212	0.039	(0.077)	0.172
3	0.25	0.60	0.212	0.039	(0.077)	0.172
4	0.33	0.60	0.212	0.039	(0.077)	0.172
5	0.42	0.60	0.212	0.039	(0.077)	0.172
6	0.50	0.70	0.247	0.039	(0.090)	0.207
7	0.58	0.70	0.247	0.039	(0.090)	0.207
8	0.67	0.70	0.247	0.039	(0.090)	0.207
9	0.75	0.70	0.247	0.039	(0.090)	0.207
10	0.83	0.70	0.247	0.039	(0.090)	0.207
11	0.92	0.70	0.247	0.039	(0.090)	0.207
12	1.00	0.80	0.282	0.039	(0.103)	0.243
13	1.08	0.80	0.282	0.039	(0.103)	0.243
14	1.17	0.80	0.282	0.039	(0.103)	0.243
15	1.25	0.80	0.282	0.039	(0.103)	0.243
16	1.33	0.80	0.282	0.039	(0.103)	0.243
17	1.42	0.80	0.282	0.039	(0.103)	0.243
18	1.50	0.80	0.282	0.039	(0.103)	0.243
19	1.58	0.80	0.282	0.039	(0.103)	0.243
20	1.67	0.80	0.282	0.039	(0.103)	0.243
21	1.75	0.80	0.282	0.039	(0.103)	0.243
22	1.83	0.80	0.282	0.039	(0.103)	0.243
23	1.92	0.80	0.282	0.039	(0.103)	0.243
24	2.00	0.90	0.318	0.039	(0.116)	0.278
25	2.08	0.80	0.282	0.039	(0.103)	0.243
26	2.17	0.90	0.318	0.039	(0.116)	0.278
27	2.25	0.90	0.318	0.039	(0.116)	0.278
28	2.33	0.90	0.318	0.039	(0.116)	0.278
29	2.42	0.90	0.318	0.039	(0.116)	0.278
30	2.50	0.90	0.318	0.039	(0.116)	0.278
31	2.58	0.90	0.318	0.039	(0.116)	0.278
32	2.67	0.90	0.318	0.039	(0.116)	0.278
33	2.75	1.00	0.353	0.039	(0.128)	0.313
34	2.83	1.00	0.353	0.039	(0.128)	0.313
35	2.92	1.00	0.353	0.039	(0.128)	0.313
36	3.00	1.00	0.353	0.039	(0.128)	0.313
37	3.08	1.00	0.353	0.039	(0.128)	0.313

```
38   3.17     1.10      0.388          0.039    (  0.141)        0.349
39   3.25     1.10      0.388          0.039    (  0.141)        0.349
40   3.33     1.10      0.388          0.039    (  0.141)        0.349
41   3.42     1.20      0.423          0.039    (  0.154)        0.384
42   3.50     1.30      0.459          0.039    (  0.167)        0.419
43   3.58     1.40      0.494          0.039    (  0.180)        0.454
44   3.67     1.40      0.494          0.039    (  0.180)        0.454
45   3.75     1.50      0.529          0.039    (  0.193)        0.490
46   3.83     1.50      0.529          0.039    (  0.193)        0.490
47   3.92     1.60      0.564          0.039    (  0.205)        0.525
48   4.00     1.60      0.564          0.039    (  0.205)        0.525
49   4.08     1.70      0.600          0.039    (  0.218)        0.560
50   4.17     1.80      0.635          0.039    (  0.231)        0.596
51   4.25     1.90      0.670          0.039    (  0.244)        0.631
52   4.33     2.00      0.706          0.039    (  0.257)        0.666
53   4.42     2.10      0.741          0.039    (  0.270)        0.701
54   4.50     2.10      0.741          0.039    (  0.270)        0.701
55   4.58     2.20      0.776          0.039    (  0.283)        0.737
56   4.67     2.30      0.811          0.039    (  0.295)        0.772
57   4.75     2.40      0.847          0.039    (  0.308)        0.807
58   4.83     2.40      0.847          0.039    (  0.308)        0.807
59   4.92     2.50      0.882          0.039    (  0.321)        0.842
60   5.00     2.60      0.917          0.039    (  0.334)        0.878
61   5.08     3.10      1.094          0.039    (  0.398)        1.054
62   5.17     3.60      1.270          0.039    (  0.462)        1.231
63   5.25     3.90      1.376          0.039    (  0.501)        1.336
64   5.33     4.20      1.482          0.039    (  0.539)        1.442
65   5.42     4.70      1.658          0.039    (  0.604)        1.619
66   5.50     5.60      1.976          0.039    (  0.719)        1.936
67   5.58     1.90      0.670          0.039    (  0.244)        0.631
68   5.67     0.90      0.318          0.039    (  0.116)        0.278
69   5.75     0.60      0.212          0.039    (  0.077)        0.172
70   5.83     0.50      0.176          0.039    (  0.064)        0.137
71   5.92     0.30      0.106       (  0.039)       0.039        0.067
72   6.00     0.20      0.071       (  0.039)       0.026        0.045
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    32.5
      Flood volume = Effective rainfall      2.70(In)
       times area      14.0(Ac.)/[(In)/(Ft.)] =       3.1(Ac.Ft)
      Total soil loss =      0.24(In)
      Total soil loss =     0.274(Ac.Ft)
      Total rainfall =      2.94(In)
      Flood volume =      137137.0 Cubic Feet
      Total soil loss =       11946.5 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =     19.548(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	0.0005	0.08	Q | | | |
0+10	0.0034	0.42	Q | | | |
0+15	0.0103	1.00	V Q | | | |
0+20	0.0205	1.48	V Q | | | |
0+25	0.0325	1.74	V Q | | | |
0+30	0.0457	1.92	V Q | | | |
0+35	0.0603	2.11	V Q | | | |
0+40	0.0762	2.32	V Q | | | |
0+45	0.0932	2.47	|V Q | | | |
0+50	0.1109	2.57	|V Q | | | |
0+55	0.1291	2.64	|V Q | | | |
1+ 0	0.1477	2.71	|V Q | | | |
1+ 5	0.1673	2.84	| V Q | | | |
1+10	0.1879	3.00	| V Q | | | |
1+15	0.2095	3.12	| V Q | | | |
1+20	0.2315	3.19	| V Q | | | |
1+25	0.2538	3.24	| V Q | | | |
1+30	0.2764	3.28	| V Q | | | |
1+35	0.2992	3.31	| V Q | | | |
1+40	0.3221	3.34	| V Q | | | |
1+45	0.3453	3.36	| V Q | | | |
1+50	0.3685	3.38	| V Q | | | |
1+55	0.3918	3.38	| V Q | | | |
2+ 0	0.4153	3.41	| VQ | | | |
2+ 5	0.4393	3.48	| VQ | | | |
2+10	0.4638	3.55	| V Q | | | |
2+15	0.4886	3.60	| VQ | | | |
2+20	0.5140	3.69	| VQ | | | |
2+25	0.5399	3.76	| VQ | | | |
2+30	0.5661	3.80	| Q | | | |
2+35	0.5924	3.83	| Q | | | |
2+40	0.6189	3.85	| Q | | | |
2+45	0.6457	3.88	| QV | | | |
2+50	0.6730	3.97	| QV | | | |
2+55	0.7013	4.11	| Q | | | |
3+ 0	0.7303	4.21	| QV| | | |
3+ 5	0.7596	4.26	| QV| | | |
3+10	0.7893	4.31	| Q V | | |
3+15	0.8198	4.42	| Q V | | |
3+20	0.8512	4.57	| QV | | |
3+25	0.8835	4.69	| Q|V | | |
3+30	0.9170	4.85	| Q|V | | |
3+35	0.9522	5.12	| Q V | | |
3+40	0.9898	5.45	| Q V | | |
3+45	1.0294	5.76	| |Q V | | |
3+50	1.0709	6.02	| | QV | | |
3+55	1.1142	6.28	| | Q V | | |
4+ 0	1.1591	6.53	| | QV | | |
4+ 5	1.2058	6.78	| | Q V | | |
4+10	1.2543	7.05	| | QV | | |



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 03/22/22 File: PP1PUH24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PILOT PERRIS
PROP 100-YR
XO 3/22/22

Drainage Area = 13.97(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.97(Ac.) = 0.022 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.217 Hr.
Lag time = 13.02 Min.
25% of lag time = 3.25 Min.
40% of lag time = 5.21 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]
13.97	2.05	28.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.97	5.33	74.46

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.330(In)

Point rain (area averaged) = 5.330(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
10.190	75.00	0.900
3.780	87.00	0.000

Total Area Entered = 13.97(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	88.0	0.153	0.900	0.029	0.729	0.021
87.0	94.8	0.068	0.000	0.068	0.271	0.018
					Sum (F) =	0.039

Area averaged mean soil loss (F) (In/Hr) = 0.039
Minimum soil loss rate ((In/Hr)) = 0.020
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.364

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	38.402	4.099	0.577
2	0.167	76.805	16.642	2.343
3	0.250	115.207	25.801	3.633
4	0.333	153.610	18.225	2.566
5	0.417	192.012	9.016	1.269
6	0.500	230.415	5.532	0.779
7	0.583	268.817	4.092	0.576
8	0.667	307.220	3.215	0.453
9	0.750	345.622	2.464	0.347
10	0.833	384.025	2.063	0.290
11	0.917	422.427	1.615	0.227
12	1.000	460.829	1.266	0.178
13	1.083	499.232	1.172	0.165
14	1.167	537.634	1.005	0.141
15	1.250	576.037	0.810	0.114
16	1.333	614.439	0.688	0.097

17	1.417	652.842	0.567	0.080
18	1.500	691.244	0.450	0.063
19	1.583	729.647	0.384	0.054
20	1.667	768.049	0.384	0.054
21	1.750	806.452	0.512	0.072
			Sum = 100.000	Sum= 14.079

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	0.043	(0.070)	0.016	0.027
2	0.17	0.07	0.043	(0.070)	0.016	0.027
3	0.25	0.07	0.043	(0.069)	0.016	0.027
4	0.33	0.10	0.064	(0.069)	0.023	0.041
5	0.42	0.10	0.064	(0.069)	0.023	0.041
6	0.50	0.10	0.064	(0.069)	0.023	0.041
7	0.58	0.10	0.064	(0.068)	0.023	0.041
8	0.67	0.10	0.064	(0.068)	0.023	0.041
9	0.75	0.10	0.064	(0.068)	0.023	0.041
10	0.83	0.13	0.085	(0.068)	0.031	0.054
11	0.92	0.13	0.085	(0.067)	0.031	0.054
12	1.00	0.13	0.085	(0.067)	0.031	0.054
13	1.08	0.10	0.064	(0.067)	0.023	0.041
14	1.17	0.10	0.064	(0.066)	0.023	0.041
15	1.25	0.10	0.064	(0.066)	0.023	0.041
16	1.33	0.10	0.064	(0.066)	0.023	0.041
17	1.42	0.10	0.064	(0.066)	0.023	0.041
18	1.50	0.10	0.064	(0.065)	0.023	0.041
19	1.58	0.10	0.064	(0.065)	0.023	0.041
20	1.67	0.10	0.064	(0.065)	0.023	0.041
21	1.75	0.10	0.064	(0.065)	0.023	0.041
22	1.83	0.13	0.085	(0.064)	0.031	0.054
23	1.92	0.13	0.085	(0.064)	0.031	0.054
24	2.00	0.13	0.085	(0.064)	0.031	0.054
25	2.08	0.13	0.085	(0.064)	0.031	0.054
26	2.17	0.13	0.085	(0.063)	0.031	0.054
27	2.25	0.13	0.085	(0.063)	0.031	0.054
28	2.33	0.13	0.085	(0.063)	0.031	0.054
29	2.42	0.13	0.085	(0.063)	0.031	0.054
30	2.50	0.13	0.085	(0.062)	0.031	0.054
31	2.58	0.17	0.107	(0.062)	0.039	0.068
32	2.67	0.17	0.107	(0.062)	0.039	0.068
33	2.75	0.17	0.107	(0.062)	0.039	0.068
34	2.83	0.17	0.107	(0.061)	0.039	0.068
35	2.92	0.17	0.107	(0.061)	0.039	0.068
36	3.00	0.17	0.107	(0.061)	0.039	0.068
37	3.08	0.17	0.107	(0.061)	0.039	0.068

38	3.17	0.17	0.107	(0.060)	0.039	0.068
39	3.25	0.17	0.107	(0.060)	0.039	0.068
40	3.33	0.17	0.107	(0.060)	0.039	0.068
41	3.42	0.17	0.107	(0.060)	0.039	0.068
42	3.50	0.17	0.107	(0.059)	0.039	0.068
43	3.58	0.17	0.107	(0.059)	0.039	0.068
44	3.67	0.17	0.107	(0.059)	0.039	0.068
45	3.75	0.17	0.107	(0.059)	0.039	0.068
46	3.83	0.20	0.128	(0.058)	0.047	0.081
47	3.92	0.20	0.128	(0.058)	0.047	0.081
48	4.00	0.20	0.128	(0.058)	0.047	0.081
49	4.08	0.20	0.128	(0.058)	0.047	0.081
50	4.17	0.20	0.128	(0.057)	0.047	0.081
51	4.25	0.20	0.128	(0.057)	0.047	0.081
52	4.33	0.23	0.149	(0.057)	0.054	0.095
53	4.42	0.23	0.149	(0.057)	0.054	0.095
54	4.50	0.23	0.149	(0.056)	0.054	0.095
55	4.58	0.23	0.149	(0.056)	0.054	0.095
56	4.67	0.23	0.149	(0.056)	0.054	0.095
57	4.75	0.23	0.149	(0.056)	0.054	0.095
58	4.83	0.27	0.171	0.055	(0.062)	0.115
59	4.92	0.27	0.171	0.055	(0.062)	0.115
60	5.00	0.27	0.171	0.055	(0.062)	0.116
61	5.08	0.20	0.128	(0.055)	0.047	0.081
62	5.17	0.20	0.128	(0.054)	0.047	0.081
63	5.25	0.20	0.128	(0.054)	0.047	0.081
64	5.33	0.23	0.149	0.054	(0.054)	0.095
65	5.42	0.23	0.149	0.054	(0.054)	0.096
66	5.50	0.23	0.149	0.053	(0.054)	0.096
67	5.58	0.27	0.171	0.053	(0.062)	0.117
68	5.67	0.27	0.171	0.053	(0.062)	0.118
69	5.75	0.27	0.171	0.053	(0.062)	0.118
70	5.83	0.27	0.171	0.053	(0.062)	0.118
71	5.92	0.27	0.171	0.052	(0.062)	0.118
72	6.00	0.27	0.171	0.052	(0.062)	0.118
73	6.08	0.30	0.192	0.052	(0.070)	0.140
74	6.17	0.30	0.192	0.052	(0.070)	0.140
75	6.25	0.30	0.192	0.051	(0.070)	0.140
76	6.33	0.30	0.192	0.051	(0.070)	0.141
77	6.42	0.30	0.192	0.051	(0.070)	0.141
78	6.50	0.30	0.192	0.051	(0.070)	0.141
79	6.58	0.33	0.213	0.050	(0.078)	0.163
80	6.67	0.33	0.213	0.050	(0.078)	0.163
81	6.75	0.33	0.213	0.050	(0.078)	0.163
82	6.83	0.33	0.213	0.050	(0.078)	0.163
83	6.92	0.33	0.213	0.050	(0.078)	0.164
84	7.00	0.33	0.213	0.049	(0.078)	0.164
85	7.08	0.33	0.213	0.049	(0.078)	0.164
86	7.17	0.33	0.213	0.049	(0.078)	0.164
87	7.25	0.33	0.213	0.049	(0.078)	0.165
88	7.33	0.37	0.235	0.048	(0.085)	0.186
89	7.42	0.37	0.235	0.048	(0.085)	0.186
90	7.50	0.37	0.235	0.048	(0.085)	0.186

91	7.58	0.40	0.256	0.048	(0.093)	0.208
92	7.67	0.40	0.256	0.048	(0.093)	0.208
93	7.75	0.40	0.256	0.047	(0.093)	0.208
94	7.83	0.43	0.277	0.047	(0.101)	0.230
95	7.92	0.43	0.277	0.047	(0.101)	0.230
96	8.00	0.43	0.277	0.047	(0.101)	0.230
97	8.08	0.50	0.320	0.046	(0.116)	0.273
98	8.17	0.50	0.320	0.046	(0.116)	0.274
99	8.25	0.50	0.320	0.046	(0.116)	0.274
100	8.33	0.50	0.320	0.046	(0.116)	0.274
101	8.42	0.50	0.320	0.046	(0.116)	0.274
102	8.50	0.50	0.320	0.045	(0.116)	0.274
103	8.58	0.53	0.341	0.045	(0.124)	0.296
104	8.67	0.53	0.341	0.045	(0.124)	0.296
105	8.75	0.53	0.341	0.045	(0.124)	0.296
106	8.83	0.57	0.362	0.045	(0.132)	0.318
107	8.92	0.57	0.362	0.044	(0.132)	0.318
108	9.00	0.57	0.362	0.044	(0.132)	0.318
109	9.08	0.63	0.405	0.044	(0.147)	0.361
110	9.17	0.63	0.405	0.044	(0.147)	0.361
111	9.25	0.63	0.405	0.044	(0.147)	0.362
112	9.33	0.67	0.426	0.043	(0.155)	0.383
113	9.42	0.67	0.426	0.043	(0.155)	0.383
114	9.50	0.67	0.426	0.043	(0.155)	0.383
115	9.58	0.70	0.448	0.043	(0.163)	0.405
116	9.67	0.70	0.448	0.042	(0.163)	0.405
117	9.75	0.70	0.448	0.042	(0.163)	0.405
118	9.83	0.73	0.469	0.042	(0.171)	0.427
119	9.92	0.73	0.469	0.042	(0.171)	0.427
120	10.00	0.73	0.469	0.042	(0.171)	0.427
121	10.08	0.50	0.320	0.041	(0.116)	0.278
122	10.17	0.50	0.320	0.041	(0.116)	0.279
123	10.25	0.50	0.320	0.041	(0.116)	0.279
124	10.33	0.50	0.320	0.041	(0.116)	0.279
125	10.42	0.50	0.320	0.041	(0.116)	0.279
126	10.50	0.50	0.320	0.040	(0.116)	0.279
127	10.58	0.67	0.426	0.040	(0.155)	0.386
128	10.67	0.67	0.426	0.040	(0.155)	0.386
129	10.75	0.67	0.426	0.040	(0.155)	0.387
130	10.83	0.67	0.426	0.040	(0.155)	0.387
131	10.92	0.67	0.426	0.039	(0.155)	0.387
132	11.00	0.67	0.426	0.039	(0.155)	0.387
133	11.08	0.63	0.405	0.039	(0.147)	0.366
134	11.17	0.63	0.405	0.039	(0.147)	0.366
135	11.25	0.63	0.405	0.039	(0.147)	0.366
136	11.33	0.63	0.405	0.039	(0.147)	0.367
137	11.42	0.63	0.405	0.038	(0.147)	0.367
138	11.50	0.63	0.405	0.038	(0.147)	0.367
139	11.58	0.57	0.362	0.038	(0.132)	0.324
140	11.67	0.57	0.362	0.038	(0.132)	0.325
141	11.75	0.57	0.362	0.038	(0.132)	0.325
142	11.83	0.60	0.384	0.037	(0.140)	0.346
143	11.92	0.60	0.384	0.037	(0.140)	0.347

144	12.00	0.60	0.384	0.037	(0.140)	0.347
145	12.08	0.83	0.533	0.037	(0.194)	0.496
146	12.17	0.83	0.533	0.037	(0.194)	0.496
147	12.25	0.83	0.533	0.036	(0.194)	0.497
148	12.33	0.87	0.554	0.036	(0.202)	0.518
149	12.42	0.87	0.554	0.036	(0.202)	0.518
150	12.50	0.87	0.554	0.036	(0.202)	0.518
151	12.58	0.93	0.597	0.036	(0.217)	0.561
152	12.67	0.93	0.597	0.036	(0.217)	0.561
153	12.75	0.93	0.597	0.035	(0.217)	0.562
154	12.83	0.97	0.618	0.035	(0.225)	0.583
155	12.92	0.97	0.618	0.035	(0.225)	0.583
156	13.00	0.97	0.618	0.035	(0.225)	0.583
157	13.08	1.13	0.725	0.035	(0.264)	0.690
158	13.17	1.13	0.725	0.035	(0.264)	0.690
159	13.25	1.13	0.725	0.034	(0.264)	0.691
160	13.33	1.13	0.725	0.034	(0.264)	0.691
161	13.42	1.13	0.725	0.034	(0.264)	0.691
162	13.50	1.13	0.725	0.034	(0.264)	0.691
163	13.58	0.77	0.490	0.034	(0.178)	0.457
164	13.67	0.77	0.490	0.033	(0.178)	0.457
165	13.75	0.77	0.490	0.033	(0.178)	0.457
166	13.83	0.77	0.490	0.033	(0.178)	0.457
167	13.92	0.77	0.490	0.033	(0.178)	0.457
168	14.00	0.77	0.490	0.033	(0.178)	0.458
169	14.08	0.90	0.576	0.033	(0.210)	0.543
170	14.17	0.90	0.576	0.032	(0.210)	0.543
171	14.25	0.90	0.576	0.032	(0.210)	0.543
172	14.33	0.87	0.554	0.032	(0.202)	0.522
173	14.42	0.87	0.554	0.032	(0.202)	0.522
174	14.50	0.87	0.554	0.032	(0.202)	0.523
175	14.58	0.87	0.554	0.032	(0.202)	0.523
176	14.67	0.87	0.554	0.031	(0.202)	0.523
177	14.75	0.87	0.554	0.031	(0.202)	0.523
178	14.83	0.83	0.533	0.031	(0.194)	0.502
179	14.92	0.83	0.533	0.031	(0.194)	0.502
180	15.00	0.83	0.533	0.031	(0.194)	0.502
181	15.08	0.80	0.512	0.031	(0.186)	0.481
182	15.17	0.80	0.512	0.031	(0.186)	0.481
183	15.25	0.80	0.512	0.030	(0.186)	0.481
184	15.33	0.77	0.490	0.030	(0.178)	0.460
185	15.42	0.77	0.490	0.030	(0.178)	0.460
186	15.50	0.77	0.490	0.030	(0.178)	0.460
187	15.58	0.63	0.405	0.030	(0.147)	0.375
188	15.67	0.63	0.405	0.030	(0.147)	0.375
189	15.75	0.63	0.405	0.029	(0.147)	0.376
190	15.83	0.63	0.405	0.029	(0.147)	0.376
191	15.92	0.63	0.405	0.029	(0.147)	0.376
192	16.00	0.63	0.405	0.029	(0.147)	0.376
193	16.08	0.13	0.085	0.029	(0.031)	0.056
194	16.17	0.13	0.085	0.029	(0.031)	0.057
195	16.25	0.13	0.085	0.029	(0.031)	0.057
196	16.33	0.13	0.085	0.028	(0.031)	0.057

197	16.42	0.13	0.085	0.028	(0.031)	0.057
198	16.50	0.13	0.085	0.028	(0.031)	0.057
199	16.58	0.10	0.064	(0.028)	0.023	0.041
200	16.67	0.10	0.064	(0.028)	0.023	0.041
201	16.75	0.10	0.064	(0.028)	0.023	0.041
202	16.83	0.10	0.064	(0.028)	0.023	0.041
203	16.92	0.10	0.064	(0.027)	0.023	0.041
204	17.00	0.10	0.064	(0.027)	0.023	0.041
205	17.08	0.17	0.107	0.027	(0.039)	0.079
206	17.17	0.17	0.107	0.027	(0.039)	0.080
207	17.25	0.17	0.107	0.027	(0.039)	0.080
208	17.33	0.17	0.107	0.027	(0.039)	0.080
209	17.42	0.17	0.107	0.027	(0.039)	0.080
210	17.50	0.17	0.107	0.026	(0.039)	0.080
211	17.58	0.17	0.107	0.026	(0.039)	0.080
212	17.67	0.17	0.107	0.026	(0.039)	0.080
213	17.75	0.17	0.107	0.026	(0.039)	0.081
214	17.83	0.13	0.085	0.026	(0.031)	0.059
215	17.92	0.13	0.085	0.026	(0.031)	0.059
216	18.00	0.13	0.085	0.026	(0.031)	0.060
217	18.08	0.13	0.085	0.026	(0.031)	0.060
218	18.17	0.13	0.085	0.025	(0.031)	0.060
219	18.25	0.13	0.085	0.025	(0.031)	0.060
220	18.33	0.13	0.085	0.025	(0.031)	0.060
221	18.42	0.13	0.085	0.025	(0.031)	0.060
222	18.50	0.13	0.085	0.025	(0.031)	0.060
223	18.58	0.10	0.064	(0.025)	0.023	0.041
224	18.67	0.10	0.064	(0.025)	0.023	0.041
225	18.75	0.10	0.064	(0.025)	0.023	0.041
226	18.83	0.07	0.043	(0.024)	0.016	0.027
227	18.92	0.07	0.043	(0.024)	0.016	0.027
228	19.00	0.07	0.043	(0.024)	0.016	0.027
229	19.08	0.10	0.064	(0.024)	0.023	0.041
230	19.17	0.10	0.064	(0.024)	0.023	0.041
231	19.25	0.10	0.064	(0.024)	0.023	0.041
232	19.33	0.13	0.085	0.024	(0.031)	0.062
233	19.42	0.13	0.085	0.024	(0.031)	0.062
234	19.50	0.13	0.085	0.024	(0.031)	0.062
235	19.58	0.10	0.064	(0.023)	0.023	0.041
236	19.67	0.10	0.064	(0.023)	0.023	0.041
237	19.75	0.10	0.064	0.023	(0.023)	0.041
238	19.83	0.07	0.043	(0.023)	0.016	0.027
239	19.92	0.07	0.043	(0.023)	0.016	0.027
240	20.00	0.07	0.043	(0.023)	0.016	0.027
241	20.08	0.10	0.064	0.023	(0.023)	0.041
242	20.17	0.10	0.064	0.023	(0.023)	0.041
243	20.25	0.10	0.064	0.023	(0.023)	0.041
244	20.33	0.10	0.064	0.023	(0.023)	0.041
245	20.42	0.10	0.064	0.022	(0.023)	0.042
246	20.50	0.10	0.064	0.022	(0.023)	0.042
247	20.58	0.10	0.064	0.022	(0.023)	0.042
248	20.67	0.10	0.064	0.022	(0.023)	0.042
249	20.75	0.10	0.064	0.022	(0.023)	0.042

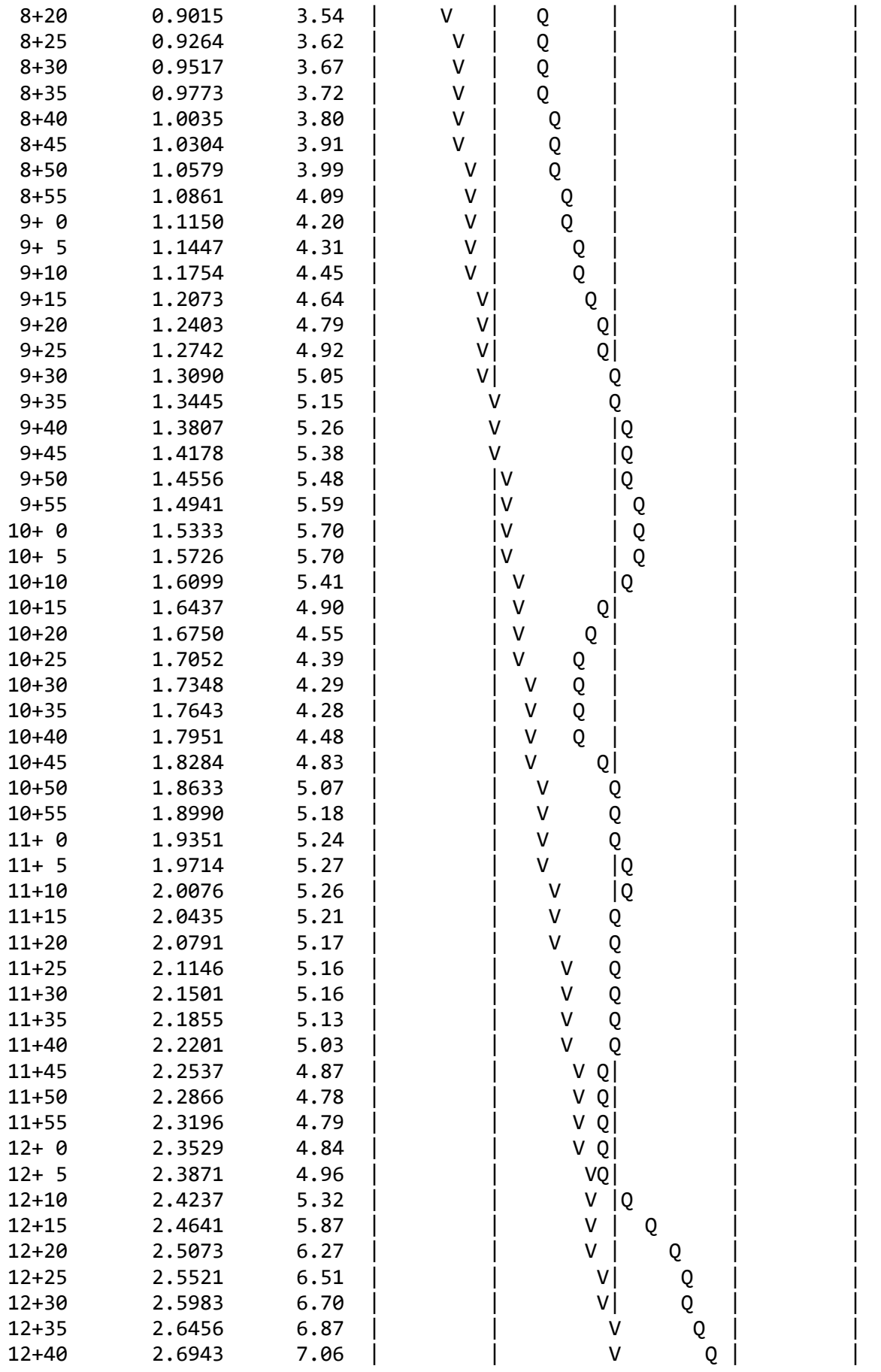
```
250  20.83     0.07      0.043       (  0.022)       0.016        0.027
251  20.92     0.07      0.043       (  0.022)       0.016        0.027
252  21.00     0.07      0.043       (  0.022)       0.016        0.027
253  21.08     0.10      0.064          0.022    (  0.023)        0.042
254  21.17     0.10      0.064          0.022    (  0.023)        0.042
255  21.25     0.10      0.064          0.022    (  0.023)        0.042
256  21.33     0.07      0.043       (  0.021)       0.016        0.027
257  21.42     0.07      0.043       (  0.021)       0.016        0.027
258  21.50     0.07      0.043       (  0.021)       0.016        0.027
259  21.58     0.10      0.064          0.021    (  0.023)        0.043
260  21.67     0.10      0.064          0.021    (  0.023)        0.043
261  21.75     0.10      0.064          0.021    (  0.023)        0.043
262  21.83     0.07      0.043       (  0.021)       0.016        0.027
263  21.92     0.07      0.043       (  0.021)       0.016        0.027
264  22.00     0.07      0.043       (  0.021)       0.016        0.027
265  22.08     0.10      0.064          0.021    (  0.023)        0.043
266  22.17     0.10      0.064          0.021    (  0.023)        0.043
267  22.25     0.10      0.064          0.021    (  0.023)        0.043
268  22.33     0.07      0.043       (  0.021)       0.016        0.027
269  22.42     0.07      0.043       (  0.021)       0.016        0.027
270  22.50     0.07      0.043       (  0.020)       0.016        0.027
271  22.58     0.07      0.043       (  0.020)       0.016        0.027
272  22.67     0.07      0.043       (  0.020)       0.016        0.027
273  22.75     0.07      0.043       (  0.020)       0.016        0.027
274  22.83     0.07      0.043       (  0.020)       0.016        0.027
275  22.92     0.07      0.043       (  0.020)       0.016        0.027
276  23.00     0.07      0.043       (  0.020)       0.016        0.027
277  23.08     0.07      0.043       (  0.020)       0.016        0.027
278  23.17     0.07      0.043       (  0.020)       0.016        0.027
279  23.25     0.07      0.043       (  0.020)       0.016        0.027
280  23.33     0.07      0.043       (  0.020)       0.016        0.027
281  23.42     0.07      0.043       (  0.020)       0.016        0.027
282  23.50     0.07      0.043       (  0.020)       0.016        0.027
283  23.58     0.07      0.043       (  0.020)       0.016        0.027
284  23.67     0.07      0.043       (  0.020)       0.016        0.027
285  23.75     0.07      0.043       (  0.020)       0.016        0.027
286  23.83     0.07      0.043       (  0.020)       0.016        0.027
287  23.92     0.07      0.043       (  0.020)       0.016        0.027
288  24.00     0.07      0.043       (  0.020)       0.016        0.027
                (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    54.5
       Flood volume = Effective rainfall      4.54(In)
        times area      14.0(Ac.)/[(In)/(Ft.)] =       5.3(Ac.Ft)
       Total soil loss =      0.79(In)
       Total soil loss =     0.922(Ac.Ft)
       Total rainfall =      5.33(In)
       Flood volume =      230127.4 Cubic Feet
       Total soil loss =       40155.4 Cubic Feet
       ---------------------------------------------------------------
        Peak flow rate of this hydrograph =      9.310(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	0.02	Q
0+10	0.0007	0.08	Q
0+15	0.0019	0.18	Q
0+20	0.0036	0.26	VQ
0+25	0.0058	0.32	VQ
0+30	0.0085	0.39	VQ
0+35	0.0116	0.44	VQ
0+40	0.0148	0.47	VQ
0+45	0.0182	0.49	VQ
0+50	0.0218	0.52	V Q
0+55	0.0256	0.56	V Q
1+ 0	0.0299	0.62	V Q
1+ 5	0.0344	0.65	V Q
1+10	0.0388	0.65	V Q
1+15	0.0431	0.61	V Q
1+20	0.0471	0.59	V Q
1+25	0.0511	0.58	V Q
1+30	0.0552	0.58	V Q
1+35	0.0591	0.58	V Q
1+40	0.0631	0.58	V Q
1+45	0.0671	0.58	V Q
1+50	0.0712	0.59	V Q
1+55	0.0754	0.62	V Q
2+ 0	0.0800	0.67	V Q
2+ 5	0.0849	0.70	V Q
2+10	0.0898	0.72	V Q
2+15	0.0948	0.73	V Q
2+20	0.0999	0.73	V Q
2+25	0.1050	0.74	V Q
2+30	0.1101	0.75	V Q
2+35	0.1153	0.76	V Q
2+40	0.1208	0.79	V Q
2+45	0.1266	0.84	V Q
2+50	0.1326	0.88	|V Q
2+55	0.1388	0.90	|V Q
3+ 0	0.1451	0.91	|V Q
3+ 5	0.1514	0.92	|V Q
3+10	0.1578	0.93	|V Q
3+15	0.1642	0.93	|V Q
3+20	0.1706	0.94	|V Q
3+25	0.1771	0.94	|V Q
3+30	0.1836	0.94	|V Q
3+35	0.1901	0.95	|V Q
3+40	0.1967	0.95	|V Q
3+45	0.2032	0.95	|V Q
3+50	0.2098	0.96	|V Q

3+55	0.2166	0.99	V Q			
4+ 0	0.2238	1.04	V Q			
4+ 5	0.2312	1.08	V Q			
4+10	0.2387	1.09	V Q			
4+15	0.2464	1.11	V Q			
4+20	0.2541	1.12	V Q			
4+25	0.2621	1.16	V Q			
4+30	0.2704	1.21	V Q			
4+35	0.2791	1.25	V Q			
4+40	0.2878	1.27	V Q			
4+45	0.2967	1.29	V Q			
4+50	0.3057	1.31	V Q			
4+55	0.3151	1.36	V Q			
5+ 0	0.3250	1.44	V Q			
5+ 5	0.3353	1.48	V Q			
5+10	0.3451	1.43	V Q			
5+15	0.3543	1.33	V Q			
5+20	0.3630	1.26	V Q			
5+25	0.3717	1.27	V Q			
5+30	0.3807	1.30	V Q			
5+35	0.3899	1.34	V Q			
5+40	0.3995	1.40	V Q			
5+45	0.4097	1.48	V Q			
5+50	0.4203	1.54	V Q			
5+55	0.4311	1.57	V Q			
6+ 0	0.4421	1.59	V Q			
6+ 5	0.4533	1.62	V Q			
6+10	0.4649	1.68	V Q			
6+15	0.4771	1.77	V Q			
6+20	0.4897	1.84	V Q			
6+25	0.5026	1.87	V Q			
6+30	0.5157	1.90	V Q			
6+35	0.5290	1.93	V Q			
6+40	0.5427	1.99	V Q			
6+45	0.5570	2.08	V Q			
6+50	0.5718	2.15	V Q			
6+55	0.5869	2.19	V Q			
7+ 0	0.6021	2.21	V Q			
7+ 5	0.6175	2.23	V Q			
7+10	0.6329	2.25	V Q			
7+15	0.6485	2.26	V Q			
7+20	0.6643	2.29	V Q			
7+25	0.6804	2.35	V Q			
7+30	0.6972	2.43	V Q			
7+35	0.7145	2.51	V Q			
7+40	0.7323	2.59	V Q			
7+45	0.7509	2.69	V Q			
7+50	0.7700	2.78	V Q			
7+55	0.7897	2.87	V Q			
8+ 0	0.8102	2.97	V Q			
8+ 5	0.8314	3.08	V Q			
8+10	0.8536	3.22	V Q			
8+15	0.8771	3.41	V Q			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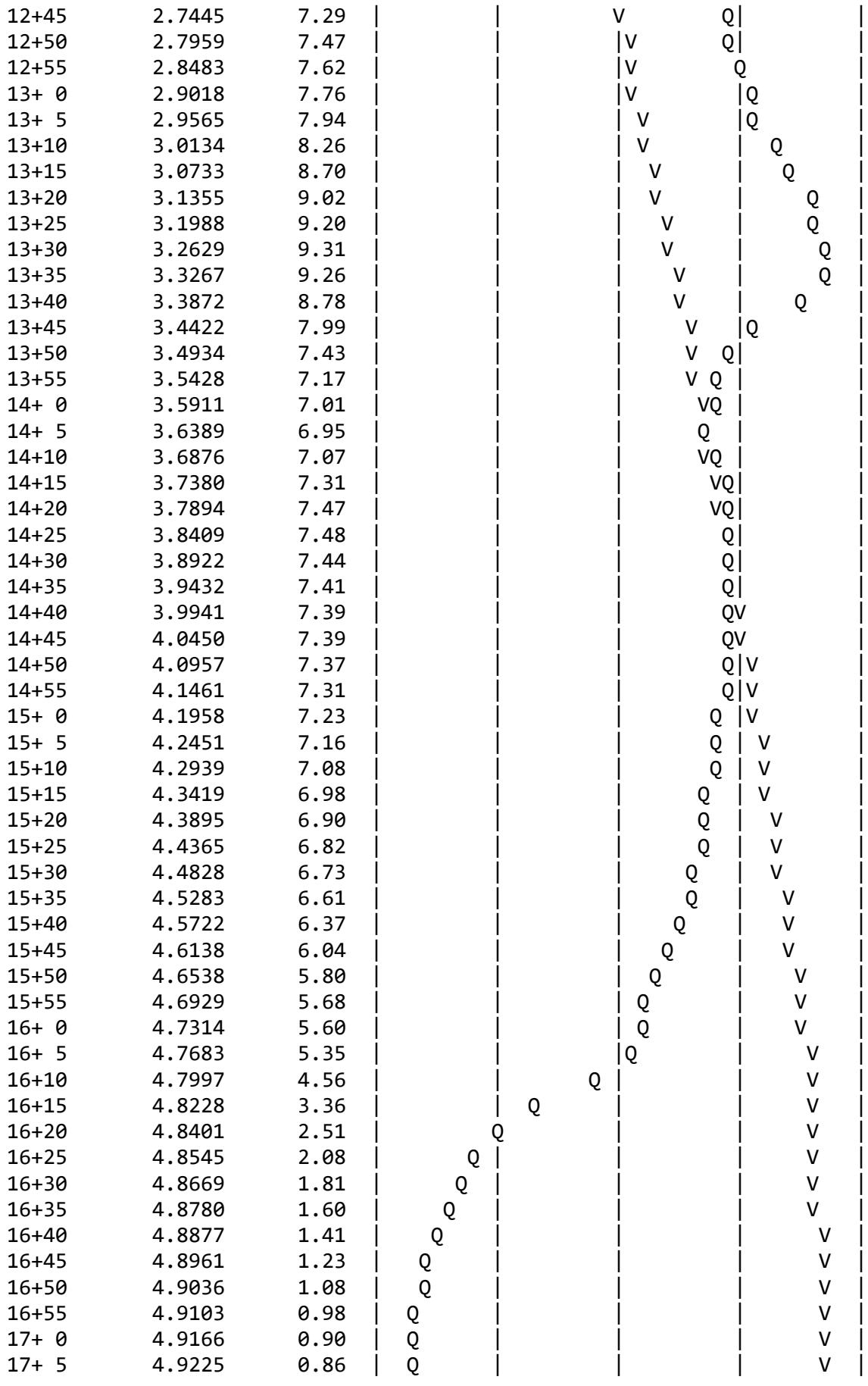
8+25 0.9264 3.62
8+30 0.9517 3.67
8+35 0.9773 3.72
8+40 1.0035 3.80
8+45 1.0304 3.91
8+50 1.0579 3.99
8+55 1.0861 4.09
9+ 0 1.1150 4.20
9+ 5 1.1447 4.31
9+10 1.1754 4.45
9+15 1.2073 4.64
9+20 1.2403 4.79
9+25 1.2742 4.92
9+30 1.3090 5.05
9+35 1.3445 5.15
9+40 1.3807 5.26
9+45 1.4178 5.38
9+50 1.4556 5.48
9+55 1.4941 5.59
10+ 0 1.5333 5.70
10+ 5 1.5726 5.70
10+10 1.6099 5.41
10+15 1.6437 4.90
10+20 1.6750 4.55
10+25 1.7052 4.39
10+30 1.7348 4.29
10+35 1.7643 4.28
10+40 1.7951 4.48
10+45 1.8284 4.83
10+50 1.8633 5.07
10+55 1.8990 5.18
11+ 0 1.9351 5.24
11+ 5 1.9714 5.27
11+10 2.0076 5.26
11+15 2.0435 5.21
11+20 2.0791 5.17
11+25 2.1146 5.16
11+30 2.1501 5.16
11+35 2.1855 5.13
11+40 2.2201 5.03
11+45 2.2537 4.87
11+50 2.2866 4.78
11+55 2.3196 4.79
12+ 0 2.3529 4.84
12+ 5 2.3871 4.96
12+10 2.4237 5.32
12+15 2.4641 5.87
12+20 2.5073 6.27
12+25 2.5521 6.51
12+30 2.5983 6.70
12+35 2.6456 6.87
12+40 2.6943 7.06


12+45 2.7445 7.29
12+50 2.7959 7.47
12+55 2.8483 7.62
13+ 0 2.9018 7.76
13+ 5 2.9565 7.94
13+10 3.0134 8.26
13+15 3.0733 8.70
13+20 3.1355 9.02
13+25 3.1988 9.20
13+30 3.2629 9.31
13+35 3.3267 9.26
13+40 3.3872 8.78
13+45 3.4422 7.99
13+50 3.4934 7.43
13+55 3.5428 7.17
14+ 0 3.5911 7.01
14+ 5 3.6389 6.95
14+10 3.6876 7.07
14+15 3.7380 7.31
14+20 3.7894 7.47
14+25 3.8409 7.48
14+30 3.8922 7.44
14+35 3.9432 7.41
14+40 3.9941 7.39
14+45 4.0450 7.39
14+50 4.0957 7.37
14+55 4.1461 7.31
15+ 0 4.1958 7.23
15+ 5 4.2451 7.16
15+10 4.2939 7.08
15+15 4.3419 6.98
15+20 4.3895 6.90
15+25 4.4365 6.82
15+30 4.4828 6.73
15+35 4.5283 6.61
15+40 4.5722 6.37
15+45 4.6138 6.04
15+50 4.6538 5.80
15+55 4.6929 5.68
16+ 0 4.7314 5.60
16+ 5 4.7683 5.35
16+10 4.7997 4.56
16+15 4.8228 3.36
16+20 4.8401 2.51
16+25 4.8545 2.08
16+30 4.8669 1.81
16+35 4.8780 1.60
16+40 4.8877 1.41
16+45 4.8961 1.23
16+50 4.9036 1.08
16+55 4.9103 0.98
17+ 0 4.9166 0.90
17+ 5 4.9225 0.86

17+10	4.9286	0.89	| Q	|	|	|	V |
17+15	4.9354	0.99	| Q	|	|	|	V |
17+20	4.9427	1.05	| Q	|	|	|	V |
17+25	4.9501	1.07	| Q	|	|	|	V |
17+30	4.9575	1.08	| Q	|	|	|	V |
17+35	4.9650	1.09	| Q	|	|	|	V |
17+40	4.9725	1.09	| Q	|	|	|	V |
17+45	4.9799	1.08	| Q	|	|	|	V |
17+50	4.9873	1.07	| Q	|	|	|	V |
17+55	4.9944	1.03	| Q	|	|	|	V |
18+ 0	5.0010	0.96	| Q	|	|	|	V |
18+ 5	5.0073	0.92	| Q	|	|	|	V |
18+10	5.0135	0.90	| Q	|	|	|	V |
18+15	5.0196	0.88	| Q	|	|	|	V |
18+20	5.0256	0.88	| Q	|	|	|	V |
18+25	5.0316	0.87	| Q	|	|	|	V |
18+30	5.0376	0.87	| Q	|	|	|	V |
18+35	5.0435	0.86	| Q	|	|	|	V |
18+40	5.0491	0.81	| Q	|	|	|	V |
18+45	5.0541	0.74	| Q	|	|	|	V |
18+50	5.0588	0.67	| Q	|	|	|	V |
18+55	5.0630	0.62	| Q	|	|	|	V |
19+ 0	5.0668	0.55	| Q	|	|	|	V |
19+ 5	5.0703	0.51	| Q	|	|	|	V |
19+10	5.0738	0.51	| Q	|	|	|	V |
19+15	5.0776	0.54	| Q	|	|	|	V |
19+20	5.0816	0.58	| Q	|	|	|	V |
19+25	5.0859	0.63	| Q	|	|	|	V |
19+30	5.0908	0.71	| Q	|	|	|	V |
19+35	5.0959	0.75	| Q	|	|	|	V |
19+40	5.1010	0.73	| Q	|	|	|	V |
19+45	5.1056	0.67	| Q	|	|	|	V |
19+50	5.1098	0.62	| Q	|	|	|	V |
19+55	5.1137	0.57	| Q	|	|	|	V |
20+ 0	5.1173	0.51	| Q	|	|	|	V |
20+ 5	5.1206	0.48	|Q	|	|	|	V |
20+10	5.1239	0.49	|Q	|	|	|	V |
20+15	5.1275	0.53	| Q	|	|	|	V |
20+20	5.1313	0.55	| Q	|	|	|	V |
20+25	5.1352	0.56	| Q	|	|	|	V |
20+30	5.1391	0.57	| Q	|	|	|	V |
20+35	5.1431	0.57	| Q	|	|	|	V |
20+40	5.1471	0.58	| Q	|	|	|	V |
20+45	5.1511	0.58	| Q	|	|	|	V|
20+50	5.1550	0.57	| Q	|	|	|	V|
20+55	5.1587	0.54	| Q	|	|	|	V|
21+ 0	5.1621	0.49	|Q	|	|	|	V|
21+ 5	5.1653	0.46	|Q	|	|	|	V|
21+10	5.1686	0.48	|Q	|	|	|	V|
21+15	5.1721	0.52	| Q	|	|	|	V|
21+20	5.1759	0.54	| Q	|	|	|	V|
21+25	5.1795	0.52	| Q	|	|	|	V|
21+30	5.1827	0.47	|Q	|	|	|	V|

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  21+35       5.1858      0.45  |Q        |         |         |         V|
  21+40       5.1890      0.47  |Q        |         |         |         V|
  21+45       5.1926      0.52  | Q       |         |         |         V|
  21+50       5.1963      0.54  | Q       |         |         |         V|
  21+55       5.1999      0.52  | Q       |         |         |         V|
  22+ 0       5.2032      0.47  |Q        |         |         |         V|
  22+ 5       5.2062      0.45  |Q        |         |         |         V|
  22+10       5.2095      0.47  |Q        |         |         |         V|
  22+15       5.2130      0.52  | Q       |         |         |         V|
  22+20       5.2168      0.54  | Q       |         |         |         V|
  22+25       5.2204      0.52  | Q       |         |         |         V|
  22+30       5.2236      0.47  |Q        |         |         |         V|
  22+35       5.2266      0.44  |Q        |         |         |         V|
  22+40       5.2295      0.42  |Q        |         |         |         V|
  22+45       5.2324      0.41  |Q        |         |         |         V|
  22+50       5.2352      0.41  |Q        |         |         |         V|
  22+55       5.2380      0.40  |Q        |         |         |         V|
  23+ 0       5.2407      0.40  |Q        |         |         |         V|
  23+ 5       5.2434      0.39  |Q        |         |         |         V|
  23+10       5.2461      0.39  |Q        |         |         |         V|
  23+15       5.2488      0.39  |Q        |         |         |         V|
  23+20       5.2515      0.39  |Q        |         |         |         V|
  23+25       5.2542      0.39  |Q        |         |         |         V|
  23+30       5.2568      0.39  |Q        |         |         |         V|
  23+35       5.2595      0.39  |Q        |         |         |         V|
  23+40       5.2621      0.38  |Q        |         |         |         V|
  23+45       5.2648      0.38  |Q        |         |         |         V|
  23+50       5.2674      0.38  |Q        |         |         |         V|
  23+55       5.2701      0.38  |Q        |         |         |         V|
  24+ 0       5.2727      0.38  |Q        |         |         |         V|
  24+ 5       5.2752      0.37  |Q        |         |         |         V|
  24+10       5.2773      0.30  |Q        |         |         |         V|
  24+15       5.2787      0.20  Q         |         |         |         V|
  24+20       5.2796      0.13  Q         |         |         |         V|
  24+25       5.2803      0.10  Q         |         |         |         V|
  24+30       5.2809      0.08  Q         |         |         |         V|
  24+35       5.2813      0.06  Q         |         |         |         V|
  24+40       5.2817      0.05  Q         |         |         |         V|
  24+45       5.2819      0.04  Q         |         |         |         V|
  24+50       5.2822      0.03  Q         |         |         |         V|
  24+55       5.2824      0.03  Q         |         |         |         V|
  25+ 0       5.2825      0.02  Q         |         |         |         V|
  25+ 5       5.2826      0.02  Q         |         |         |         V|
  25+10       5.2827      0.01  Q         |         |         |         V|
  25+15       5.2828      0.01  Q         |         |         |         V|
  25+20       5.2829      0.01  Q         |         |         |         V|
  25+25       5.2829      0.01  Q         |         |         |         V|
  25+30       5.2830      0.00  Q         |         |         |         V|
  25+35       5.2830      0.00  Q         |         |         |         V|
  25+40       5.2830      0.00  Q         |         |         |         V|
-------------------------------------------------------------------------
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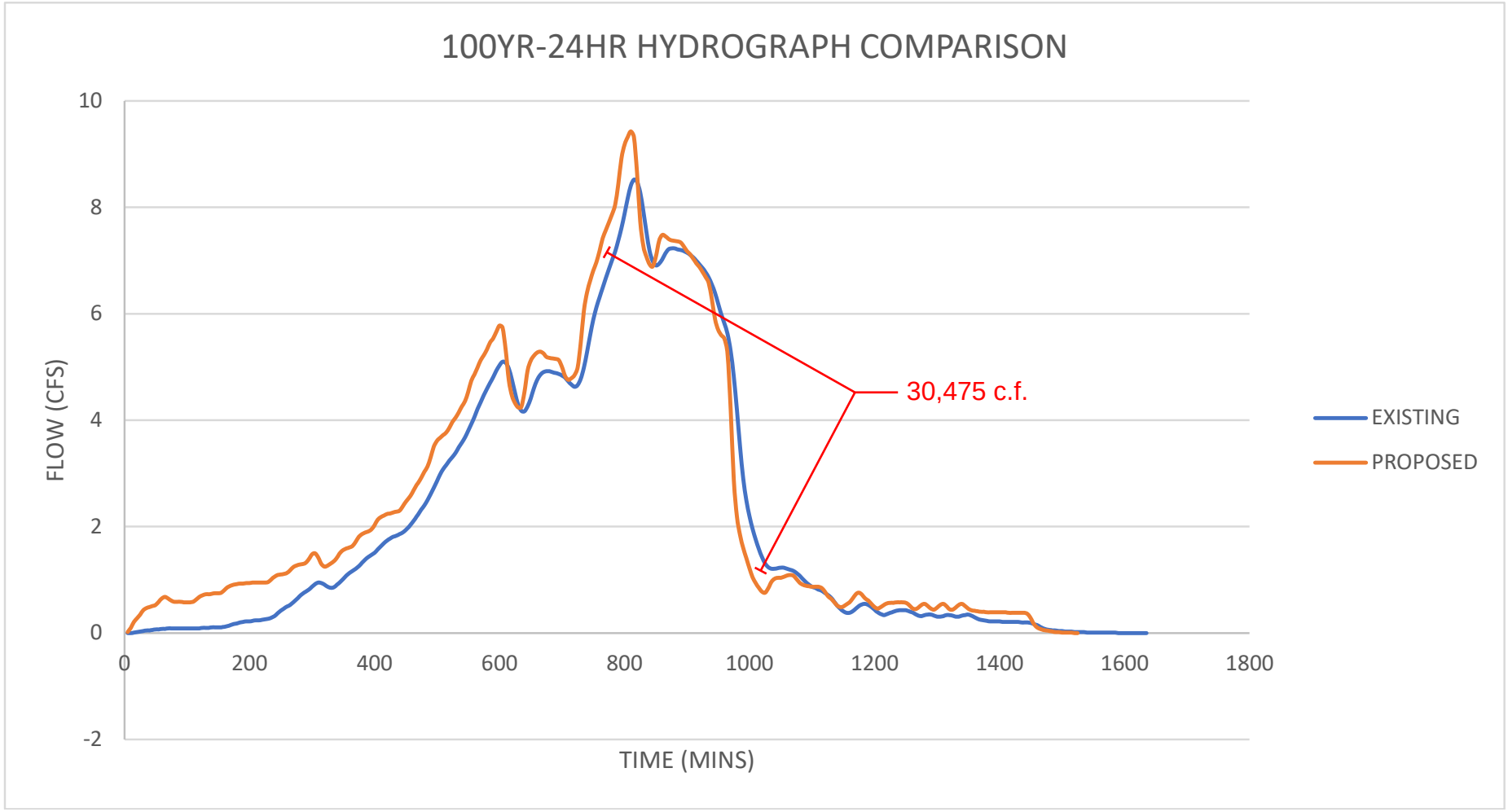
Appendix K

Retention Volume Calculations


100YR-24HR HYDROGRAPH COMPARISON
FLOW (CFS)
10
8
6
4
2
0
-2
0
200
400
600
800
1000
1200
1400
1600
1800
TIME (MINS)
30,475 c.f.
EXISTING
PROPOSED

Prelim Basin Volume

Project: Pilot Perris

Basin Description: BMP-1

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)	Incremental Volume Conic (cu. ft)	Cumulative Volume Conic (cu. ft)
1,416.300	36,306.67	N/A	N/A	0.00	N/A	0.00
1,416.500	37,040.35	0.200	7334.70	7334.70	7334.58	7334.58
1,417.000	40,050.26	0.500	19272.65	26607.35	19267.75	26602.33
1,417.500	44,986.52	0.500	21259.19	47866.55	21247.24	47849.58
1,418.000	50,208.87	0.500	23798.85	71665.39	23786.90	71636.48
1,418.500	55,728.50	0.500	26484.34	98149.73	26472.35	98108.83
1,419.000	61,542.39	0.500	29317.72	127467.45	29305.70	127414.53
1,419.500	67,647.94	0.500	32297.58	159765.04	32285.55	159700.08
1,420.000	74,043.99	0.500	35422.98	195188.02	35410.95	195111.03
1,420.400	79,369.27	0.400	30682.65	225870.67	30676.49	225787.52

Appendix L

Sizing Calculations

Worksheet for Triangular Channel - OFF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.045
Channel Slope	0.005 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	2.000 H:V
Discharge	32.00 cfs

Results	
Normal Depth	27.5 in
Flow Area	13.2 ft²
Wetted Perimeter	12.4 ft
Hydraulic Radius	12.8 in
Top Width	11.47 ft
Critical Depth	19.1 in
Critical Slope	0.035 ft/ft
Velocity	2.43 ft/s
Velocity Head	0.09 ft
Specific Energy	2.39 ft
Froude Number	0.400
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	27.5 in
Critical Depth	19.1 in
Channel Slope	0.005 ft/ft
Critical Slope	0.035 ft/ft

Worksheet for Circular Pipe - 1

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.007 ft/ft
Normal Depth	30.0 in
Diameter	30.0 in

Results	
Discharge	34.32 cfs
Flow Area	4.9 ft²
Wetted Perimeter	7.9 ft
Hydraulic Radius	7.5 in
Top Width	0.00 ft
Critical Depth	23.9 in
Percent Full	100.0 %
Critical Slope	0.007 ft/ft
Velocity	6.99 ft/s
Velocity Head	0.76 ft
Specific Energy	3.26 ft
Froude Number	(N/A)
Maximum Discharge	36.91 cfs
Discharge Full	34.32 cfs
Slope Full	0.007 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	30.0 in
Critical Depth	23.9 in
Channel Slope	0.007 ft/ft
Critical Slope	0.007 ft/ft

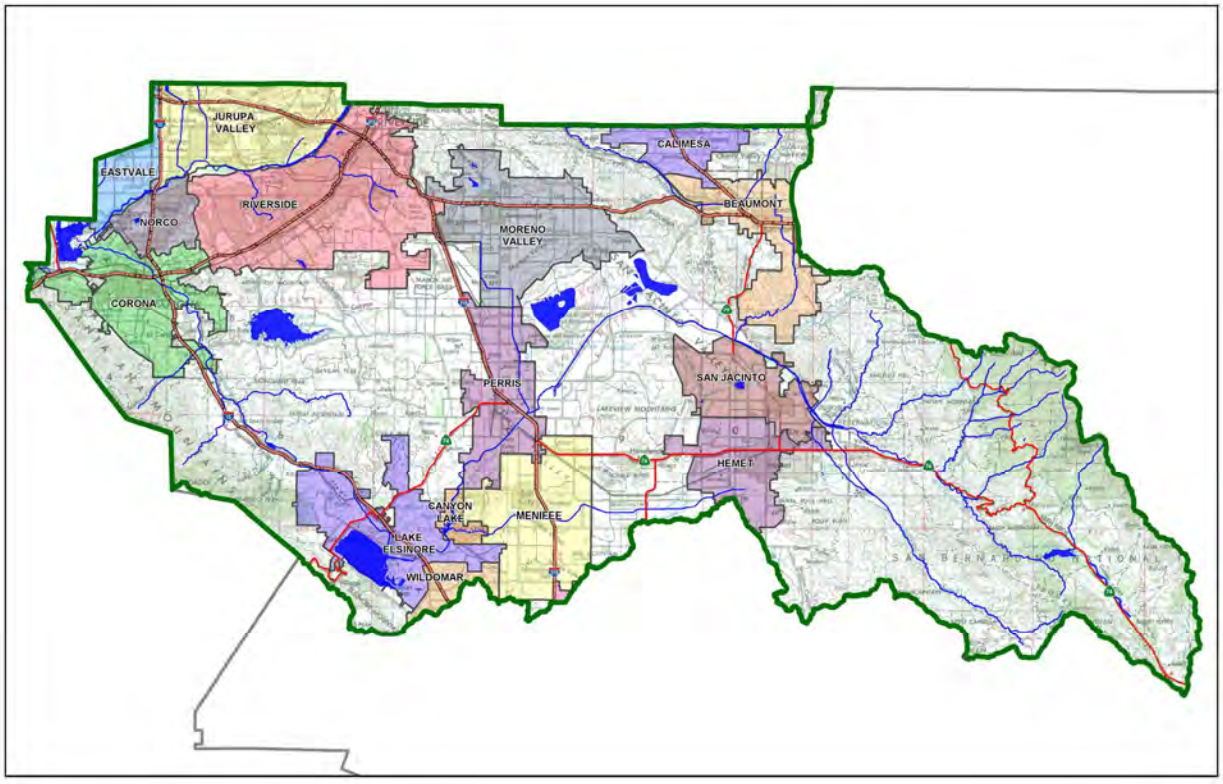
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Pilot Perris

Development No: Ethanac Road and Trumble Road

Design Review/Case No: CUP22-05002 & CUP22-05003



☒ **Preliminary**
☐ **Final**

Original Date Prepared: December 8, 2021

Revision Date(s): June 8, 2022

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

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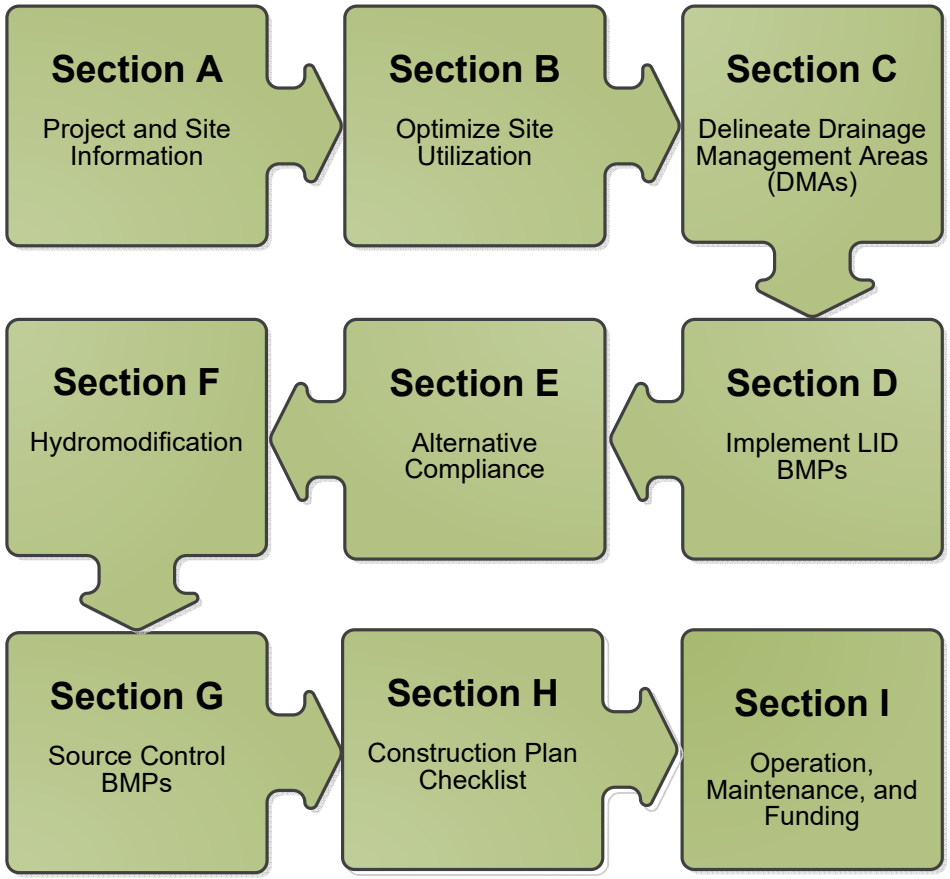
Riverside, CA 92501
(951) 335-8272

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for **Pilot Travel Centers, LLC** by **Kimley-Horn and Associates** for the **Pilot Perris** project.

This WQMP is intended to comply with the requirements of **City of Perris** for **Ordinance 1194** which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Perris Water Quality Ordinance 1194.

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature

6/2/22
Date

Brad Alsup
Owner's Printed Name

Director of Construction Development
Owner's Title/Position

ELIZABETH C. PETERSON
STATE OF TENNESSEE
NOTARY PUBLIC
KNOX COUNTY

My Commission Expires October 7, 2024

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature

06/02/22
Date

Shea-Michael Anti
Preparer's Printed Name

Project Engineer
Preparer's Title/Position

Preparer's Licensure: CA 78274 (Civil)

REGISTERED PROFESSIONAL ENGINEER
SHEA-MICHAEL ANTI
RCE NO. 78274
CIVIL
STATE OF CALIFORNIA

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	**Community Commercial - (Travel center with drive-thru restaurant and car/truck fueling)**
Planning Area:	**Community Commercial**
Community Name:	**Perris**
Development Name:	**Pilot Perris**
PROJECT LOCATION	
Latitude & Longitude (DMS): **Lat: 33.744, Long: -117.1866**	
Project Watershed and Sub-Watershed: **Santa Ana Region Watershed, Santa Ana River Subwatershed**	
Gross Acres: **13.97 acres**	
APN(s): **329-250-011 and 329-250-012**	
Map Book and Page No.:	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	**Restaurant/Fueling Station**
Proposed or Potential SIC Code(s)	**5541, 5812**
Area of Impervious Project Footprint (SF)	**395,859**
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	**395,859**
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	**0 sf**
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	**N/A**
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	**Type D**
What is the Water Quality Design Storm Depth for the project?	**0.60**

A.1 Maps and Site Plans

The proposed Pilot Perris development will include the construction of a truck stop and gas station with associated commercial landscaping, concrete hardscape, and asphalt paving parking. The project site is approximately 14 acres and is located at the northwest corner of Ethanac Road and Trumble Road in the City of Perris. The project will not be phased. The existing site is approximately 0% impervious. Once the site is developed, the site will be approximately 67% impervious and 33% pervious.

Under the existing condition, the project site drains northwest. The existing condition of the project site is vacant and land cover consists mostly of annual grass. Under existing conditions, the project site was subdivided into two drainage areas (A-1 and A-2). Both A-1 and A-2 confluence and sheet flow out along the western boundary into an existing natural swale. The existing natural swale also accepts additional flows from an existing headwall southwest of the project site. The swale flows north and is intercepted by an existing double 6'x5' RCB culvert near Illinois Avenue and Interstate 215. Flows from the existing culvert are conveyed west across Interstate 215 and then continue west through existing drainage facilities until discharging into the San Jacinto River. Under existing conditions, the project site accepts some offsite flows from the adjacent vacant properties on the east. Offsite runoff flows through the site, confluence with the onsite flows, and sheet flow out along the western boundary. Ultimately, existing storm water discharge from offsite and onsite areas are intercepted by the existing double 6'x5' RCB culvert and are tributary to the San Jacinto River.

Similar to existing condition, the post-developed project site will predominantly drain northwest to maintain the existing flow pattern to the maximum extent possible. The proposed development includes the construction of the proposed Pilot Perris Travel Center. The proposed site will encompass one (1) new building with a restaurant, drive thru, and fueling areas. The site will include landscaping, concrete hardscape, asphalt parking, a new concrete channel, a drainage ditch for offsite flows, and a bio-retention basin. Under proposed conditions, the project site will not obstruct conveyance of the existing offsite flows. Under the developed condition, the offsite runoff will be accepted from the existing cross gutter near the intersection of Trumble Road and Ethanac Road. The project is proposing a drainage ditch along the south that flows west and into the proposed channel.

The developed project site includes six (6) drainage management areas (DMA's). DMA A-1 includes most of the proposed development. Runoff from A-1 predominantly drains in a northwest direction and is conveyed by a proposed storm drain system into a proposed bio-retention basin west of the project site. The bio-retention area also contributes to the flows into the basin. Discharge from the basin will be controlled by an outlet structure and, due to the elevations, will be pumped to discharge into the proposed channel. DMA's A-2 and A-3 include the proposed drainage ditch that will convey offsite flows, which is considered self-treating. DMA A-4 includes the proposed channel which is also considered self-treating. DMA's A-5 and A-6 are driveway areas that were unfeasible to capture onsite and will drain toward the adjacent streets which ultimately drain into the proposed channel. DMA A-5 and A-6 are de-minimis areas.

On-site flows will predominately be intercepted by four proposed grated inlets with filter inserts which will screen trash prior to entering the bio-retention basin. The bio-retention basin is proposed

for dual purposes: stormwater quality treatment and mitigation. The volume of storage provided in the basins along with the size of the outflow riser structure is intended to restrict peak flows in the proposed condition to levels equal to or less than the existing flows. The bio-retention basin will be owner owned and maintained.

The project site proposes two trash enclosures, one by the truck stop and one by the shop building. The trash enclosure by the truck stop will include a solid roof over the yard storage area and a chain link over the compactor area for the purposes of debris retention. The trash enclosure by the shop building will include a solid roof over the enclosure.

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
San Jacinto River Reach 3	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A; Not a RARE Water Body
Canyon Lake (San Jacinto River Reach 2)	Nutrients, Pathogens	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A; Not a RARE Water Body
Lake Elsinore (San Jacinto River Reach 1)	Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs, Sediment Toxicity, Unknown Toxicity	REC1, REC2, WARM, WILD	N/A; Not a RARE Water Body

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* **City of Perris Building Permit** **City of Perris Electrical Permit** **City of Perris Mechanical Permit** **City of Perris Site Plan Approval** **City of Perris Landscape Approval** **City of Perris Fire Underground Approval** **Eastern Municipal Water District Water and Sewer Approval** **City of Perris WQMP Approval**	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Yes. The proposed site grading intends to maintain the existing flow pattern by predominantly draining in the northwest direction.

Did you identify and protect existing vegetation? If so, how? If not, why?

No. The existing site is currently vacant and does not have any existing vegetation, other than annual grass. The proposed development will add landscape throughout the site, making the proposed development approximately 33% pervious.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes, based on the Geotechnical Investigation and Percolation Test Results Report prepared by Geotechnical Solutions, Inc the proposed site experiences an average percolation rate of 1.14in/hr. The reported average

infiltration rate based on the Porchet Method was determined to be 0.05 in/hr (without a factor of safety applied). Therefore, bio-retention basins are proposed.

Did you identify and minimize impervious area? If so, how? If not, why?

Yes. The site plan was done with the intent of maximizing the pervious area on the site. This was accomplished by using landscape planters throughout the site and perimeter planter areas.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes. All roof drains and site drainage will be routed to the proposed pervious bioretention basins.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
A-1	**Concrete/Asphalt/Landscape Areas**	**547,937**	**Type "D"**
A-2	**Landscape Areas**	**16,086**	**Type "A"**
A-3	**Landscape Areas**	**24,391**	**Type "A"**
A-4	**Concrete/Landscape**	**16,688**	**Type "A"**
A-5	**Asphalt/Concrete**	**766**	**(De-Minimis)**
A-6	**Asphalt/Concrete**	**2,470**	**(De-Minimis)**

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
A-2	**16,086**	**Proposed Landscape**	**Drip Irrigation**
A-3	**26,819**	**Proposed Landscape**	**Drip Irrigation**
A-4	**16,688**	**Proposed Landscape**	**Drip Irrigation**

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Impervious fraction	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
N/A	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A-1	**Bio-retention Basin (BMP-1)**

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: **All DMA's**		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 4.61

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 9.35

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 0.79

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 7.39

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
7.39	4.61

The project is not feasible for harvesting stormwater runoff for irrigation use.

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 50

Project Type: Commercial

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 9.35

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 132

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 1234

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
1234	50

The project is not feasible for harvesting stormwater runoff for toilet use.

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: N/A

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
A-1	☐	☐	☒	☐	☐
A-2	☐	☐	☐	☐	☒
A-3	☐	☐	☐	☐	☒
A-4	☐	☐	☐	☐	☒
A-5	☐	☐	☐	☐	☒
A-6	☐	☐	☐	☐	☒

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

A-1 is feasible for a structural LID BMP – Bioretention Basin. A-2, A-3 and A-4 are considered self-treating. A-5 and A-6 are considered de-minimis areas. Refer to Appendix 1 for WQMP Exhibit.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP-1*		
	[A]		[B]	[C]	[A] x [C]			
1A	**395,859**	**Concrete or Asphalt**	**1**	**0.89**	**353,106**			
1B	**152,078**	**Ornamental Landscaping**	**0.1**	**0.11**	**16,798**			
						Design Storm Depth (in)	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	A_T = **547,937**				Σ= **369,904**	[E] **0.60**	[F] **18,619**	[G] **48,658**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

N/A

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☒ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☒ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☐	☒	☐	☒	☒	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

[2] Cross Reference Table E.1 above to populate this column.

[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	INSERT VALUE	INSERT VALUE	INSERT VALUE
Volume (Cubic Feet)	INSERT VALUE	INSERT VALUE	INSERT VALUE

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier: INSERT TEXT HERE

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

	2 year – 24 hour		
	Pre-condition	Post-condition	% Difference
Time of Concentration	34.58	18.31	53%
Flow (CFS)	6.51	10.99	69%
Volume (Cubic Feet)	10,454	66,115	532%

The required retention volume was governed by the 2-year, 24-hour storm. To estimate the retention volume required for preliminary purposes, the pre-development volume was compared to the post-development volume to determine the increase in volume discharged from the project site. Since the detention system outlet riser structure will be sized in the Final Report, an additional 20% was added to the calculated difference in volume to account for the efficiency of the outlet structure. The resulting volume (66,804 cf) is the estimated retention volume for preliminary purposes. The proposed bio-retention basin will provide 225,788 cf of storage. Through the mitigation that the bio-retention basin will provide, the proposed development is expected to mitigate for HCOC criteria.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify. **(CASQQ BMP SD-13, "Storm Drain Signage")**	Maintain and periodically repaint or replace inlet markings; Provide storm water pollution prevention information to new site owners, lessees, or operators; See applicable operational BMPs in Fact Sheet SC-74 "Drainage System Maintenance" provided in Appendix 8 of this report.
Landscape/ Outdoor pesticide use	State that final landscape plans will accomplish all of the following. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions. **(CASQA BMP SD-10, "Site Design and Landscape Planning" and SD-12, "Efficient Irrigation")**	Maintain landscaping using minimum or no pesticides. For Bioswales: Remove any dead or diseased vegetation See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/Downloads/LandscapeGardenBrochure.pdf. Provide IPM information to new owners, lessees and operators. Applicable operational BMPS in "What you should know for…. Landscape and Gardening": • Never apply pesticides or fertilizers when rain is predicted within the next 48 hours. • Do not overwater. Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through city's program.

Sidewalks, and parking lots.	None	Sweep sidewalks and parking lot regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.
Refuse areas	State how site refuse will be handled and provide supporting detail to what is shown on plans. State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar. Trash enclosures shall have a solid impermeable roof with a minimum clearance height to allow the bin lid to completely open. Trash enclosures to be constructed of reinforced masonry without wooden gates. Walls shall be at least 6' high. Trash enclosures shall have a concrete slab floor. The concrete slab shall be graded to collect any spill within the enclosure. All trash bins in the trash enclosure shall be leak free and shall have a lid and be continuously closed. The enclosure area shall be protected from receiving direct rainfall or run-on from collateral surfaces. Method to handle site refuse: • Waste will be hauled by either public or commercial carriers. **(CASQA BMP SD-32, "Trash Storage Areas")**	Source control BMP will be implanted based on the following: • Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Storm water Quality Handbooks at www.cabmphandbooks.com • Any standing liquids must be cleaned up and disposed of properly using a mop and a bucket or a wet/dry vacuum machine. All non-hazardous liquids without solid trash may be put in the sanitary sewer.

Miscellaneous Drain or Wash Water or Other Sources: • Boiler drain lines Condensate drain lines • Rooftop equipment • Drainage sumps • Roofing, gutters, and trim. Other sources	• Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. • Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. • Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. • Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. • Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. (**CASQA BMP SD-10, "Site Design and Landscape Planning" and SD-11, "Roof Runoff Controls")**	Additional Operational BMPs suggested on Fact Sheet SC-10: • Train employees to identify non-storm water discharges and report them to the appropriate departments.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BMP-1	**Bioretention Basin Located near the western property line**	TBD*	TBD*

***To be completed in FWQMP**

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: Pilot Travel Centers, LLC

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9**. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

****To be completed in FWQMP**

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map