PRELIMINARY HYDROLOGY AND HYDRAULIC STUDY FOR TENTATIVE TRACT MAP 37439

COUNTY OF RIVERSIDE
CALIFORNIA

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This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

06/19/2018

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I. INTRODUCTION

Tentative Tract Map 37439 is a proposed residential development located in the County of Riverside. The purpose of this study is to provide a preliminary drainage solution for the project site that will adequately convey the 100-year flows emanating from the onsite and offsite areas. The project will construct two large channels that will traverse the project, as well as subsurface storm drain and bioretention basins. The bioretention basins will treat for water quality purposes, and discharge directly into one of the two channels. The project site is not required to address the hydrologic conditions of concern or mitigate for increased runoff since the project will construct the Holland Channel from Eucalyptus Avenue to Lindenberger Road (which has an existing culver that discharges into the private lakes and ultimately to Salt Creek). The scope of this report will include the following:

- Determine the peak 100-year and 10-year flow rates for the ultimate condition offsite watershed using the Riverside County Flood Control and Water Conservation District (RCFC & WCD) Rational Method.
- Determine the 100-year and 10-year flow rates for the post-project condition onsite areas using the Riverside County Flood Control and Water Conservation District (RCFC & WCD) Rational Method.
- Develop storm drain alignments and sizes required to flood protect the project site from offsite and onsite flows.
- Preparation of a preliminary hydrology and hydraulic report, which consists of hydrological and analytical results and exhibits.

II. PROJECT SITE AND DRAINAGE OVERVIEW

Tentative Tract Map 37439 is a proposed residential development consisting of approximately 570 residential lots, 9 bioretention basins, two large storm water channels, and subsurface storm drain in the County of Riverside. The project site is approximately 150 acres and is roughly bounded by Craig Avenue to the south, Eucalyptus Avenue to the east, Holland Road to the north, and Leon Road to the west.

The project site will construct the proposed Holland Channel (desigated as Line A through the project site) and Line B. The Holland Channel will be constructed from Eucalyptus Avenue to the existing culvert at Lindenberger Road (see Figure 2 for proposed alignment and see Excerpt A for the preliminary improvement plans). This system will be a combination of box culverts and open channels that will be engineered, hardened, and maintained. This system will discharge into a system that is designated as exempt from addressing hydromodificaitons per the Riverside County Stormwater & Water Conservation Tracking Tool (http://rivco.permitrack.com/). Therefore, since the project is constructing an extension from this location to the project site of a facility that is also engineered, hardened and maintained, the project site will not create a hydrologic condition of concern.

The project site is relatively flat, with the main channel having slopes of 0.1% to 0.3% throughout the project site. Due to the vertical constraints, the bioretention basins were limited to 18" of soil media, and the majority of the storm drain systems have slopes of 0.3%.

III. HYDROLOGY ANALYSIS

The RCFC & WCD Hydrology Manual (Reference 1) was used to develop the hydrological parameters for the rational method and unit hydrograph method. The calculations were performed using the computer program developed by Civil Cadd/Civil Design.

The existing soil classification for the area consists of Hydrologic Soil Type "A", Type "B", Type "C" and Type "D", as shown on Exhibit D. Exhibit D is a hydrologic soils map that was obtained from the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). As recommended by the County of Riverside, an Antecedent Moisture Condition AMC II was utilized for the 10-year and 100-year storm events.

The following rainfall depths were obtained from the RCFC & WCD Hydrology Manual's Isohyetal Maps. The slope of intensity duration of 0.5.

Storm Event	1-hour (in)	3-hour (in)	6-hour (in)	24-hour (in)
2-Year	0.50	0.80	1.00	1.60
100-Year	1.20	1.80	2.50	4.00

The slope value used for the rational method value is 0.55. The rainfall maps have been included as Exhibit E, and the slope of intensity duration curves have been included as Exhibit F.

Offsite Ultimate Condition Hydrology

The offsite hydrology analyses utilized the ultimate condition land use to perform the analyses, since these flow rates would be used for the design of the Line A (Holland Channel) and Line B channel infrastructure systems.

The land uses were obtained from the Harvest Valley/Winchester Area Land Use Plan (see Excerpt B for an excerpt from the Riverside County General Plan, and see Exhibit G for a delineated land use map). The land uses, runoff index numbers, and impervious percentages used in the offsite hydrology analyses are summarized below:

	Runoff Index Numbers				
Land Use Designation	**Soil Type "A"**	**Soil Type "B"**	**Soil Type "C"**	**Soil Type "D"**	**Impervious Fraction**
Commercial/ Retail	32	N/A	69	N/A	0.90
High Density Residential	32	56	69	75	0.80
Med-High Density Residential	32	56	69	75	0.65
Medium Density Residential	32	56	69	75	0.50
Low Density Residential	32	56	N/A	75	0.40
Very Low Density Residential	32	N/A	69	75	0.20
Estate Residential	32	N/A	69	75	0.10
Rural Mountainous	62	76	N/A	88	0.02
Recreation Open Space	N/A	N/A	84	N/A	0
Conservation Open Space	N/A	N/A	N/A	88	0

The soil types with "N/A" listed above indicate that no soil type for that land use is present within the offsite watershed. The offsite areas were ran using the unit hydrograph method for Area A, and the rational method for Areas B through F. This is due to the watershed area for Area A exceeding 500 acres. Since the CivilD program does not allow for user defined initial areas to be entered for the rational method calculations, therefore the land use designation in the CivilD program that most accurately represented the initial area was utilized. The following table summarizes the land uses:

Initial Subarea	**Weighted Runoff Index Number**	**Weighted Impervious Area**	**Land use utilized in CivilD**	**Corresponding Runoff Index Number**	**Corresponding Impervious Area**
B1	88.00	0	Open Brush – Poor Cover	89.00	0
C1	88.00	0.02	Open Brush – Poor Cover	89.00	0
C6	88.00	0.02	Open Brush – Poor Cover	89.00	0
D1	69.00	0.50	Single Family ¼ Acre Residential	69.00	0.50
E1	58.5	0.50	Single Family ¼ Acre Residential	58.60	0.50
E3	59.40	0.50	Single Family ¼ Acre Residential	59.38	0.50
F1	62.60	0.50	Single Family ¼ Acre Residential	62.65	0.50
F4	77.90	0.21	Single Family 1 Acre Residential	65.54	0.20

Onsite Post-Project Hydrology

The post-project condition onsite rational method hydrology analyses was performed the for 9 watershed areas, designated as areas “A” through “I”. Areas “A” through “I” are the in-tract areas that include the half-street improvements within the perimeter streets surrounding the residential development. The area designations correspond to the downstream tributary basin. The rational method analyses utilized condominium land use (65% impervious) for the project based upon the average lot sizes, and the basin areas were analyzed as 100% pervious.

The offsite hydrology analyses have been included in Appendix A and B, and the offsite hydrology map has been included as exhibit A. The post-project condition onsite rational method hydrology analyses have been included in Appendix C, and the post-project condition rational method hydrology map has been included as Exhibit B.

IV. HYDRAULIC ANALYSES

The project site will construct subsurface storm drain that will connect to two main channels traversing the project site. During the preliminary stages, only the main channels (Lines A and B) include Water Surface Profile Gradient Program calculations. The remaining storm drain systems utilized friction slope calculations to size the systems. Systems connecting to Lines A and B utilized downstream water surface elevations obtained from the WSPG calculations. Systems discharging into the onsite basins utilized the 100-year water surface elevations determined by the basin outlet sizing calculations. The laterals utilized the water surface elevations determined by the mainline friction slope calculations.

During the preliminary stages, inlets have been located in locations where the street design criteria would be exceeded. The street design criteria is as follows:

- 10-year flows shall be contained within the top-of-curb elevation
- 100-year flows shall be contained within the right-of-way elevation

Street capacity rating tables (included in Appendix G) were utilized to determine the capacity of the streets at varying longitudinal slopes. The approximate location where the flows would exceed the top-of-curb for the 10-year storm event and where flows would exceed the right-of-way for the 100-year storm event is where catch basins have been located. During final engineering, detailed catch basin analyses and flow by calculations will be performed.

Preliminary water surface profile gradient program calculations were performed for the Line A and Line B channels traversing the project site. The initial flow rates utilized for these analyses are conservative flow rates, and are higher than the flow rate shown on the approved preliminary plans included in Excerpt A. These flow rates will be updated once the final channel plans and analyses have been approved. However, since these flow rates are much larger than the flows shown on the plans, the water surface elevations are conservative for the onsite preliminary design.

The water surface elevations within Lines A and B were utilized for the downstream water surface elevations of all of the laterals and offsite connecting Lines 1, 2 and 3. The storm drains were all sized using friction slope.

Offsite Storm Drain

Three offsite systems are proposed and have been designated as Lines 1, 2 and 3. Line 1 connects to the double box system crossing Leon Road (Line A). It collects flows from Basin I, as well as the offsite area tributary to the south east corner of the Leon Road and Craig Avenue Intersection. The system ranges from 54" – 60", with a peak flow rate of 109 ft^3/s.

The Line 2 system connects to Line A at the upstream end (to the double box culvert crossing Eucalyptus Road). The system collects flows tributary to the south side of Craig Avenue at the east and west intersections of Craig Avenue and Eucalyptus Road. The pipe size ranges from 60" – 66", with a peak flow rate of 153 ft^3/s.

The Line 3 system collects flows tributary to the north east side of Eucalyptus Avenue, and connects to the trapezoidal channel of the Line A system. Line 3 consists of a 6'H x 8'W box culvert and an 84" RCP storm drain, and has a peak flow rate of 180 ft^3/s.

The upstream box culvert of the Line A system was also analyzed, since the preliminary WSPG for the Line A system ended at the transition of the trapezoidal channel to the box culvert. Therefore, a friction slope analyses was performed for the upstream box portion.

Onsite Storm Drain

The onsite storm drain systems were analyzed starting with the basin outlet pipes. The upstream water surface elevation for the basin outlet pipes were used to determine the weir flow line elevation. This weir flow line elevation could not be lower than 0.5 feet above the top of soil media within the basin to ensure that the water quality volume did not bypass the bioretention treatment. The basin outlet structures were then sized for the 100-year flow rate (as determined by the rational method hydrology calculations). The preliminary outlet structures were sized using the weir equation, and a weir coefficient equal to 3. The ponded depth of the 100-year flow rate on the outlet weirs was utilized as the downstream water surface elevation for the storm drains discharging into the basins.

The water surface profile gradient program calculations have been included in Appendix D, the storm drain friction slope sizing calculations have been included in Appendix E, and the basin outlet structure sizing calculations have been included in Appendix F. The drainage facilities map has been included as Exhibit C.

V. CONCLUSIONS

Drainage analyses were prepared for the project site in order to determine the pre-project and post-project conditions. The following conclusions were derived from the hydrology and hydraulic results:

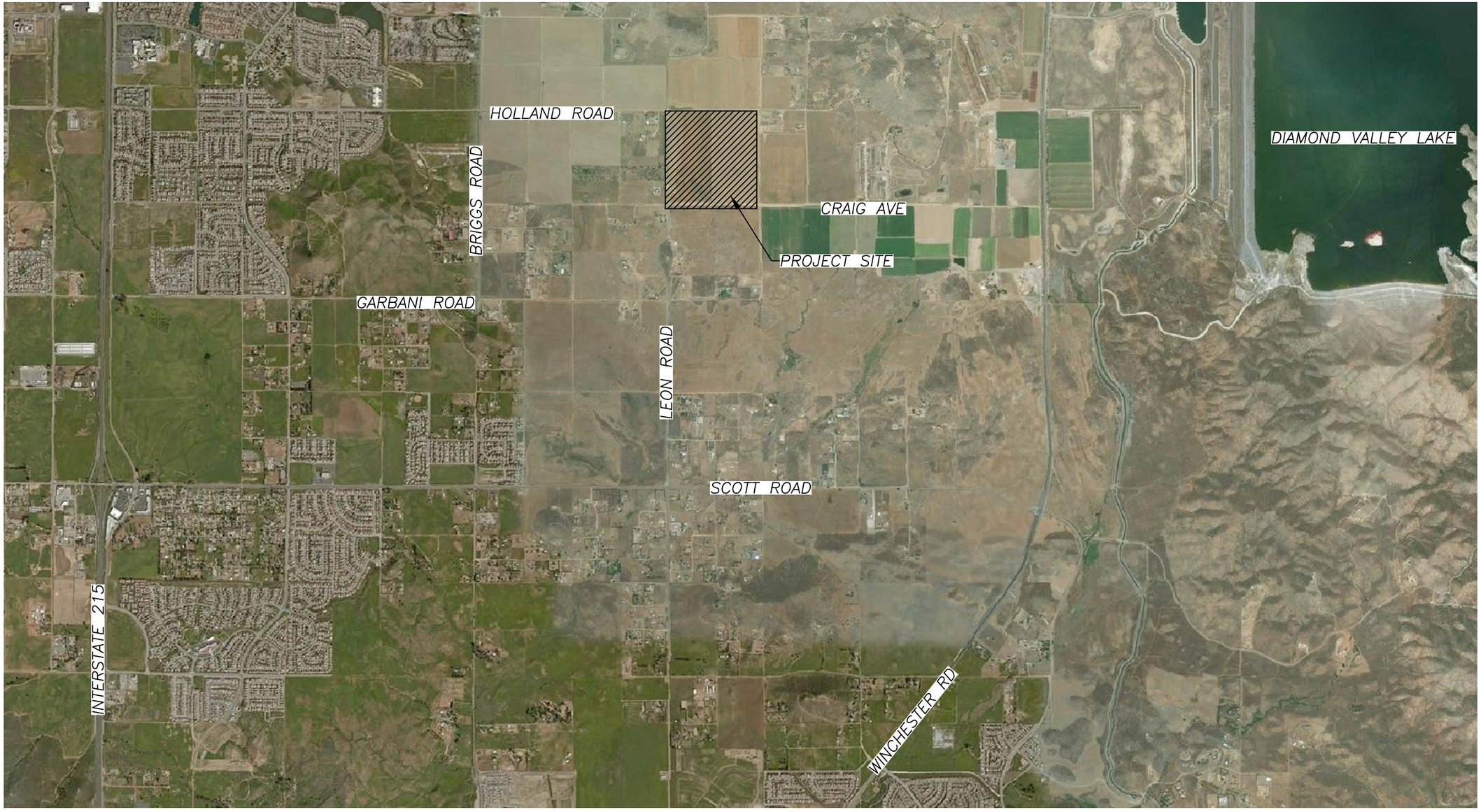
1. The offsite flows will be conveyed through subsurface storm drain without adversely impacting the project site.
2. The proposed storm drain alignments will provide flood protection to the project site for the 100-year storm events.
3. The project site will not adversely impact downstream properties by mitigating increased flows to less than pre-project levels.

VI. REFERENCES

1. Riverside County Flood Control and Water Conservation District Hydrology Manual, April 1978.

FIGURES

FIGURE 1: VICINITY MAP



TENTATIVE TRACT MAP 37439 VICINITY MAP

N

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FIGURE 1

Drawing Name: O:\190.04.15\Engineering\WQMP\Appendix 1 - Maps & Site Plan\Vicinity Map.dwg
Last Opened: Mar 13, 2018 - 8:52am by jcarver

FIGURE 2: MENIFEE VALLEY AREA DRAINAGE PLAN

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

MENIFEE VALLEY AREA DRAINAGE PLAN

LEGEND:

- CULVERT/STORM DRAIN
- CHANNEL

N

GRAPHIC SCALE
400' 0 200' 400' 800'
1" = 400'

FIGURE 2

MENIFEE VALLEY ADP

ULTIMATE FLOOD CONTROL DRAINAGE SYSTEM

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APPENDICES

APPENDIX A: OFFSITE ULTIMATE CONDITION UNIT HYDROGRAPH METHOD ANALYSIS

APPENDIX A.1: RUNOFF INDEX AND IMPERVIOUS FRACTION CALCULATIONS

AREA "A"						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Commercial/Retail	A	5.6	32	0.9	178.9	5.0
High Density Res.	A	11.1	32	0.8	356.5	8.9
Med-High Density Res.	A	24.5	32	0.65	783.3	15.9
Medium Density Res	A	40.1	32	0.5	1281.9	20.0
Low Density Res	A	2.6	32	0.4	82.3	1.0
Very Low Density Res	A	4.5	32	0.2	144.7	0.9
Estate Residential	A	3.7	62	0.1	227.1	0.4
Rural Mountainous	A	4.1	62	0.02	251.9	0.1
High Density Res.	B	0.5	56	0.8	29.1	0.4
Med-High Density Res.	B	5.0	56	0.65	281.7	3.3
Medium Density Res	B	38.3	56	0.5	2145.6	19.2
Low Density Res	B	20.2	56	0.4	1133.8	8.1
Commercial/Retail	C	2.2	69	0.9	150.2	2.0
High Density Res.	C	4.1	69	0.8	282.6	3.3
Med-High Density Res.	C	23.0	69	0.65	1588.1	15.0
Medium Density Res	C	65.1	69	0.5	4492.0	32.6
Very Low Density Res	C	0.5	69	0.2	34.6	0.1
Estate Residential	C	0.4	84	0.1	33.5	0.0
Recreation OS	C	6.6	84	0	555.9	0.0
Med-High Density Res.	D	18.8	75	0.65	1410.8	12.2
Medium Density Res	D	72.7	75	0.5	5449.5	36.3
Low Density Res	D	40.3	75	0.4	3025.9	16.1
Very Low Density Res	D	2.2	75	0.2	163.3	0.4
Rural Mountainous	D	58.3	88	0.02	5133.8	1.2
Conservation OS	D	53.2	88	0	4678.3	0.0
Total Area					507.6	
Sum of A (RI) and (AI)					33895.2	202.4
Total Percentage for (RI) and (AI)					66.8	0.399

CHECK

50.022

APPENDIX A.2: AREA "A" – 100-YEAR, 1-HOUR STORM DURATION

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 06/19/18 File: ARAOFF1100.out

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

Program License Serial Number 6279

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

English Units used in output format

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
UNIT HYDROGRAPH ANALYSIS, 100-YEAR, 1-HOUR STORM DURATION
FILENAME: ARAOFF

Drainage Area = 507.60(Ac.) = 0.793 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 507.60(Ac.) = 0.793 Sq. Mi.
Length along longest watercourse = 9241.00(Ft.)
Length along longest watercourse measured to centroid = 5154.00(Ft.)
Length along longest watercourse = 1.750 Mi.
Length along longest watercourse measured to centroid = 0.976 Mi.
Difference in elevation = 538.00(Ft.)
Slope along watercourse = 307.3953 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.198 Hr.
Lag time = 11.89 Min.
25% of lag time = 2.97 Min.
40% of lag time = 4.76 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]
507.60	0.50	253.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
507.60	1.20	609.12

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.54 %
Adjusted average point rain = 1.194(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
507.600	66.80	0.399

Total Area Entered = 507.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
66.8	66.8	0.397	0.399	0.254	1.000	0.254
					Sum (F) =	0.254

Area averaged mean soil loss (F) (In/Hr) = 0.254
Minimum soil loss rate ((In/Hr)) = 0.127
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.499

Slope of intensity-duration curve for a 1 hour storm =0.5500

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	42.058	4.700	24.042
2	0.167	84.117	19.529	99.901
3	0.250	126.175	27.728	141.845
4	0.333	168.234	16.421	84.004
5	0.417	210.292	7.987	40.858
6	0.500	252.351	5.216	26.684
7	0.583	294.409	3.906	19.981
8	0.667	336.468	2.936	15.020
9	0.750	378.526	2.373	12.140
10	0.833	420.585	1.825	9.336
11	0.917	462.643	1.408	7.202
12	1.000	504.702	1.280	6.549
13	1.083	546.760	1.058	5.412
14	1.167	588.819	0.854	4.367
15	1.250	630.877	0.712	3.643
16	1.333	672.936	0.570	2.915
17	1.417	714.994	0.438	2.241
18	1.500	757.053	0.421	2.152
19	1.583	799.111	0.421	2.152
20	1.667	841.170	0.219	1.121
			Sum = 100.000	Sum= 511.566

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.473	(0.254) 0.236	0.237
2	0.17	4.20	0.602	0.254 (0.300)	0.348
3	0.25	4.40	0.631	0.254 (0.315)	0.377
4	0.33	4.80	0.688	0.254 (0.343)	0.434
5	0.42	5.20	0.745	0.254 (0.372)	0.491
6	0.50	6.20	0.889	0.254 (0.443)	0.635
7	0.58	6.80	0.975	0.254 (0.486)	0.721
8	0.67	8.80	1.261	0.254 (0.629)	1.007
9	0.75	13.90	1.992	0.254 (0.994)	1.738
10	0.83	31.40	4.501	0.254 (2.246)	4.247
11	0.92	7.20	1.032	0.254 (0.515)	0.778
12	1.00	3.80	0.545	0.254 (0.272)	0.291
		(Loss Rate Not Used)			
Sum =		100.0		Sum =	11.3

Flood volume = Effective rainfall 0.94(In)
times area 507.6(Ac.)/[(In)/(Ft.)] = 39.8(Ac.Ft)
Total soil loss = 0.25(In)
Total soil loss = 10.687(Ac.Ft)
Total rainfall = 1.19(In)
Flood volume = 1735413.2 Cubic Feet

```
      Total soil loss =      465521.0 Cubic Feet
      ------------------------------------------------------------------
       Peak flow rate of this hydrograph =    926.834(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      250.0     500.0     750.0    1000.0
 ------------------------------------------------------------------------
   0+ 5       0.0393      5.70  Q         |         |         |         |
   0+10       0.2600     32.05  VQ        |         |         |         |
   0+15       0.7935     77.46  V  Q      |         |         |         |
   0+20       1.6017    117.36  |V  Q     |         |         |         |
   0+25       2.6179    147.54  | V  Q    |         |         |         |
   0+30       3.8446    178.13  |  V   Q  |         |         |         |
   0+35       5.3346    216.35  |    V  Q |         |         |         |
   0+40       7.1658    265.89  |      V  Q         |         |         |
   0+45       9.5444    345.37  |        V|  Q      |         |         |
   0+50      13.2581    539.22  |         |  V      |Q        |         |
   0+55      19.0899    846.78  |         |        V|         |  Q      |
   1+ 0      25.4731    926.83  |         |         |    V    |     Q   |
   1+ 5      29.8432    634.54  |         |         |    Q   V|         |
   1+10      32.4491    378.39  |         |    Q    |         | V       |
   1+15      34.1362    244.97  |        Q|         |         |   V     |
   1+20      35.3509    176.37  |      Q  |         |         |    V    |
   1+25      36.2770    134.47  |    Q    |         |         |     V   |
   1+30      37.0129    106.85  |   Q     |         |         |      V  |
   1+35      37.5944     84.44  |  Q      |         |         |      V  |
   1+40      38.0623     67.93  | Q       |         |         |       V |
   1+45      38.4594     57.67  | Q       |         |         |       V |
   1+50      38.7858     47.39  |Q        |         |         |       V |
   1+55      39.0508     38.47  |Q        |         |         |        V|
   2+ 0      39.2660     31.25  |Q        |         |         |        V|
   2+ 5      39.4369     24.82  Q         |         |         |        V|
   2+10      39.5716     19.57  Q         |         |         |        V|
   2+15      39.6860     16.60  Q         |         |         |        V|
   2+20      39.7784     13.42  Q         |         |         |        V|
   2+25      39.8270      7.06  Q         |         |         |        V|
   2+30      39.8374      1.50  Q         |         |         |        V|
   2+35      39.8396      0.33  Q         |         |         |         V
------------------------------------------------------------------------
```

APPENDIX A.3: AREA "A" – 100-YEAR, 3-HOUR STORM DURATION

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 06/19/18 File: ARAOFF3100.out

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

Program License Serial Number 6279

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

English Units used in output format

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
UNIT HYDROGRAPH ANALYSIS, 100-YEAR, 3-HOUR STORM DURATION
FILENAME: ARAOFF

Drainage Area = 507.60(Ac.) = 0.793 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 507.60(Ac.) = 0.793 Sq. Mi.
Length along longest watercourse = 9241.00(Ft.)
Length along longest watercourse measured to centroid = 5154.00(Ft.)
Length along longest watercourse = 1.750 Mi.
Length along longest watercourse measured to centroid = 0.976 Mi.
Difference in elevation = 538.00(Ft.)
Slope along watercourse = 307.3953 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.198 Hr.
Lag time = 11.89 Min.
25% of lag time = 2.97 Min.
40% of lag time = 4.76 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]
507.60	0.80	406.08

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
507.60	1.80	913.68

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 1.800(In)
Areal adjustment factor = 99.78 %
Adjusted average point rain = 1.796(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
507.600	66.80	0.399

Total Area Entered = 507.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
66.8	66.8	0.397	0.399	0.254	1.000	0.254
					Sum (F) =	0.254

Area averaged mean soil loss (F) (In/Hr) = 0.254
Minimum soil loss rate ((In/Hr)) = 0.127
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.499

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	42.058	4.700	24.042
2	0.167	84.117	19.529	99.901
3	0.250	126.175	27.728	141.845
4	0.333	168.234	16.421	84.004
5	0.417	210.292	7.987	40.858
6	0.500	252.351	5.216	26.684
7	0.583	294.409	3.906	19.981
8	0.667	336.468	2.936	15.020
9	0.750	378.526	2.373	12.140
10	0.833	420.585	1.825	9.336
11	0.917	462.643	1.408	7.202
12	1.000	504.702	1.280	6.549
13	1.083	546.760	1.058	5.412
14	1.167	588.819	0.854	4.367
15	1.250	630.877	0.712	3.643
16	1.333	672.936	0.570	2.915
17	1.417	714.994	0.438	2.241
18	1.500	757.053	0.421	2.152
19	1.583	799.111	0.421	2.152
20	1.667	841.170	0.219	1.121
			Sum = 100.000	Sum= 511.566

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	0.280	(0.254)	0.140	0.140
2	0.17	1.30	0.280	(0.254)	0.140	0.140
3	0.25	1.10	0.237	(0.254)	0.118	0.119
4	0.33	1.50	0.323	(0.254)	0.161	0.162
5	0.42	1.50	0.323	(0.254)	0.161	0.162
6	0.50	1.80	0.388	(0.254)	0.194	0.194
7	0.58	1.50	0.323	(0.254)	0.161	0.162
8	0.67	1.80	0.388	(0.254)	0.194	0.194
9	0.75	1.80	0.388	(0.254)	0.194	0.194
10	0.83	1.50	0.323	(0.254)	0.161	0.162
11	0.92	1.60	0.345	(0.254)	0.172	0.173
12	1.00	1.80	0.388	(0.254)	0.194	0.194
13	1.08	2.20	0.474	(0.254)	0.237	0.238
14	1.17	2.20	0.474	(0.254)	0.237	0.238
15	1.25	2.20	0.474	(0.254)	0.237	0.238
16	1.33	2.00	0.431	(0.254)	0.215	0.216
17	1.42	2.60	0.560	0.254	(0.280)	0.306
18	1.50	2.70	0.582	0.254	(0.290)	0.328
19	1.58	2.40	0.517	0.254	(0.258)	0.263
20	1.67	2.70	0.582	0.254	(0.290)	0.328
21	1.75	3.30	0.711	0.254	(0.355)	0.457
22	1.83	3.10	0.668	0.254	(0.333)	0.414

```
23   1.92     2.90      0.625          0.254    (  0.312)        0.371
24   2.00     3.00      0.647          0.254    (  0.323)        0.392
25   2.08     3.10      0.668          0.254    (  0.333)        0.414
26   2.17     4.20      0.905          0.254    (  0.452)        0.651
27   2.25     5.00      1.078          0.254    (  0.538)        0.823
28   2.33     3.50      0.754          0.254    (  0.376)        0.500
29   2.42     6.80      1.466          0.254    (  0.731)        1.211
30   2.50     7.30      1.573          0.254    (  0.785)        1.319
31   2.58     8.20      1.767          0.254    (  0.882)        1.513
32   2.67     5.90      1.272          0.254    (  0.635)        1.017
33   2.75     2.00      0.431       (  0.254)       0.215        0.216
34   2.83     1.80      0.388       (  0.254)       0.194        0.194
35   2.92     1.80      0.388       (  0.254)       0.194        0.194
36   3.00     0.60      0.129       (  0.254)       0.065        0.065
              (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    13.9
      Flood volume = Effective rainfall      1.16(In)
       times area     507.6(Ac.)/[(In)/(Ft.)] =      49.0(Ac.Ft)
      Total soil loss =      0.64(In)
      Total soil loss =    26.958(Ac.Ft)
      Total rainfall =      1.80(In)
      Flood volume =     2134993.0 Cubic Feet
      Total soil loss =     1174300.0 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    547.398(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      150.0     300.0     450.0     600.0
-------------------------------------------------------------------------
  0+ 5       0.0233      3.38  Q         |         |         |         |
  0+10       0.1431     17.41  VQ        |         |         |         |
  0+15       0.3966     36.81  V Q       |         |         |         |
  0+20       0.7237     47.49  V  Q      |         |         |         |
  0+25       1.0989     54.48  V  Q      |         |         |         |
  0+30       1.5349     63.32  |V  Q     |         |         |         |
  0+35       2.0262     71.33  |V  Q     |         |         |         |
  0+40       2.5549     76.77  | V  Q    |         |         |         |
  0+45       3.1097     80.56  | V  Q    |         |         |         |
  0+50       3.6939     84.83  |  V Q    |         |         |         |
  0+55       4.2828     85.51  |  V Q    |         |         |         |
  1+ 0       4.8672     84.86  |  V Q    |         |         |         |
  1+ 5       5.4773     88.58  |   VQ    |         |         |         |
  1+10       6.1445     96.88  |    VQ   |         |         |         |
  1+15       6.8709    105.48  |    V Q  |         |         |         |
  1+20       7.6284    109.98  |     VQ  |         |         |         |
  1+25       8.4051    112.77  |     VQ  |         |         |         |
  1+30       9.2397    121.19  |      VQ |         |         |         |
  1+35      10.1651    134.36  |       Q |         |         |         |
  1+40      11.1317    140.35  |        Q|         |         |         |
  1+45      12.1402    146.43  |        Q|         |         |         |
  1+50      13.2802    165.54  |         VQ        |         |         |
  1+55      14.5468    183.90  |         |VQ       |         |         |
  2+ 0      15.8395    187.70  |         | Q       |         |         |
  2+ 5      17.1335    187.89  |         | QV      |         |         |
  2+10      18.4999    198.40  |         |  Q V    |         |         |
  2+15      20.0969    231.89  |         |    QV   |         |         |
  2+20      22.0153    278.56  |         |      VQ |         |         |
  2+25      24.1508    310.07  |         |        VQ         |         |
  2+30      26.6557    363.72  |         |         |V  Q     |         |
  2+35      29.8762    467.61  |         |         |   V     |Q        |
  2+40      33.6461    547.40  |         |         |      V  |     Q   |
  2+45      37.3889    543.45  |         |         |         V     Q   |
  2+50      40.3629    431.82  |         |         |       Q | V       |
  2+55      42.4244    299.34  |         |        Q|         |   V     |
  3+ 0      43.9629    223.39  |         |   Q     |         |    V    |
```

```
    3+ 5      45.1697    175.22  |          |Q         |          |     V    |
    3+10      46.0610    129.41  |        Q |          |          |      V   |
    3+15      46.7078     93.92  |      Q   |          |          |       V  |
    3+20      47.2028     71.87  |    Q     |          |          |       V  |
    3+25      47.5946     56.89  |  Q       |          |          |       V  |
    3+30      47.9122     46.11  |  Q       |          |          |        V |
    3+35      48.1724     37.78  | Q        |          |          |        V |
    3+40      48.3834     30.64  | Q        |          |          |        V |
    3+45      48.5525     24.55  |Q         |          |          |        V |
    3+50      48.6863     19.42  |Q         |          |          |        V |
    3+55      48.7929     15.48  |Q         |          |          |        V |
    4+ 0      48.8774     12.27  Q          |          |          |        V |
    4+ 5      48.9392      8.97  Q          |          |          |        V |
    4+10      48.9777      5.59  Q          |          |          |        V |
    4+15      48.9960      2.65  Q          |          |          |        V |
    4+20      49.0044      1.22  Q          |          |          |        V |
    4+25      49.0097      0.78  Q          |          |          |        V |
    4+30      49.0122      0.36  Q          |          |          |        V |
    4+35      49.0127      0.07  Q          |          |          |         V
-------------------------------------------------------------------------
```

APPENDIX A.4: AREA "A" – 100-YEAR, 6-HOUR STORM DURATION

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 06/19/18 File: ARAOFF6100.out

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

Program License Serial Number 6279

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

English Units used in output format

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
UNIT HYDROGRAPH ANALYSIS, 100-YEAR, 6-HOUR STORM DURATION
FILENAME: ARAOFF

Drainage Area = 507.60(Ac.) = 0.793 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 507.60(Ac.) = 0.793 Sq. Mi.
Length along longest watercourse = 9241.00(Ft.)
Length along longest watercourse measured to centroid = 5154.00(Ft.)
Length along longest watercourse = 1.750 Mi.
Length along longest watercourse measured to centroid = 0.976 Mi.
Difference in elevation = 538.00(Ft.)
Slope along watercourse = 307.3953 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.198 Hr.
Lag time = 11.89 Min.
25% of lag time = 2.97 Min.
40% of lag time = 4.76 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]
507.60	1.00	507.60

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
507.60	2.50	1269.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.83 %
Adjusted average point rain = 2.496(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
507.600	66.80	0.399

Total Area Entered = 507.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
66.8	66.8	0.397	0.399	0.254	1.000	0.254
					Sum (F) =	0.254

Area averaged mean soil loss (F) (In/Hr) = 0.254
Minimum soil loss rate ((In/Hr)) = 0.127
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.499

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

Unit Hydrograph Data

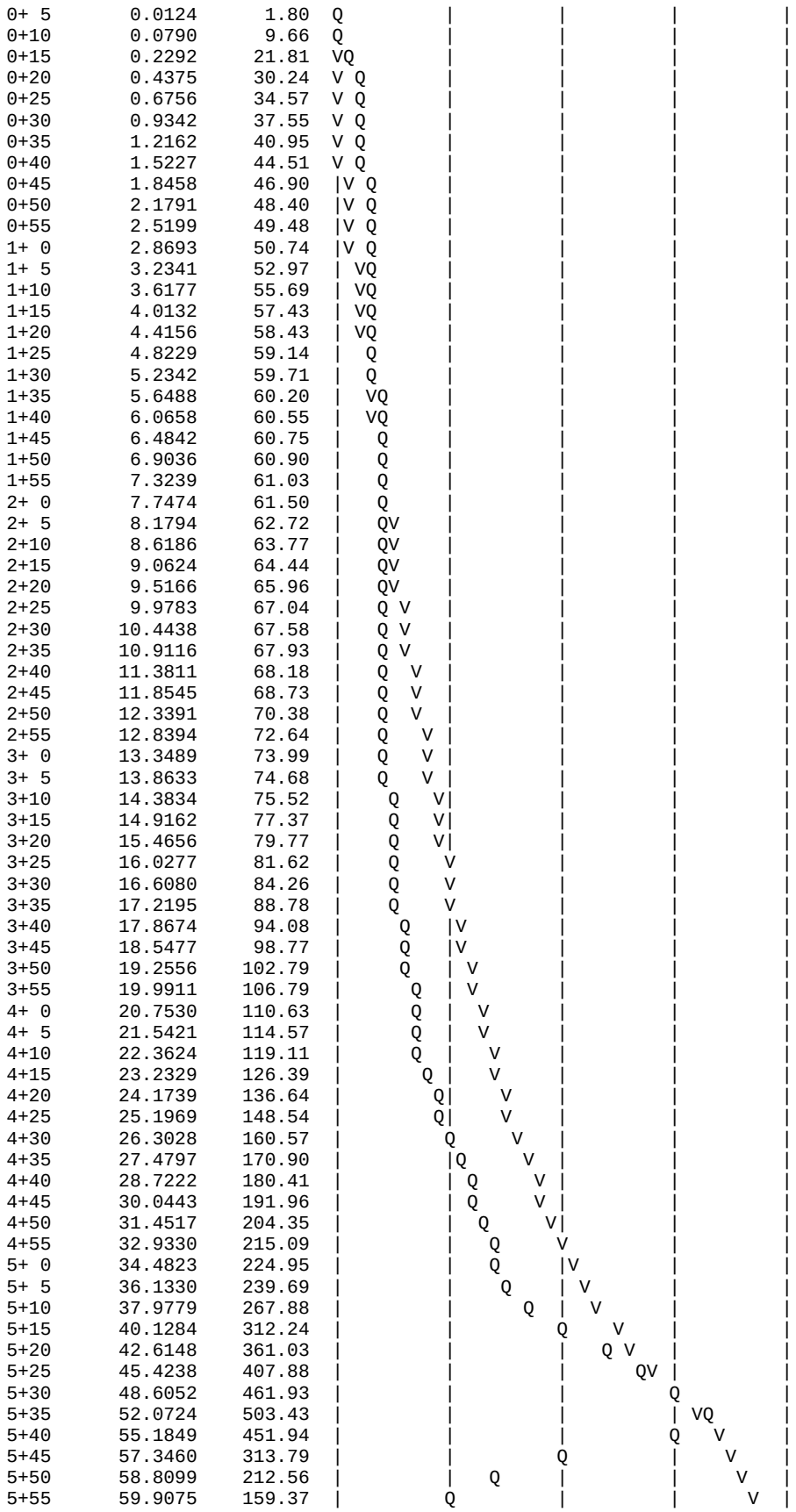
Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	42.058	4.700	24.042
2	0.167	84.117	19.529	99.901
3	0.250	126.175	27.728	141.845
4	0.333	168.234	16.421	84.004
5	0.417	210.292	7.987	40.858
6	0.500	252.351	5.216	26.684
7	0.583	294.409	3.906	19.981
8	0.667	336.468	2.936	15.020
9	0.750	378.526	2.373	12.140
10	0.833	420.585	1.825	9.336
11	0.917	462.643	1.408	7.202
12	1.000	504.702	1.280	6.549
13	1.083	546.760	1.058	5.412
14	1.167	588.819	0.854	4.367
15	1.250	630.877	0.712	3.643
16	1.333	672.936	0.570	2.915
17	1.417	714.994	0.438	2.241
18	1.500	757.053	0.421	2.152
19	1.583	799.111	0.421	2.152
20	1.667	841.170	0.219	1.121
			Sum = 100.000	Sum= 511.566

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	0.150	(0.254)	0.075	0.075
2	0.17	0.60	0.180	(0.254)	0.090	0.090
3	0.25	0.60	0.180	(0.254)	0.090	0.090
4	0.33	0.60	0.180	(0.254)	0.090	0.090
5	0.42	0.60	0.180	(0.254)	0.090	0.090
6	0.50	0.70	0.210	(0.254)	0.105	0.105
7	0.58	0.70	0.210	(0.254)	0.105	0.105
8	0.67	0.70	0.210	(0.254)	0.105	0.105
9	0.75	0.70	0.210	(0.254)	0.105	0.105
10	0.83	0.70	0.210	(0.254)	0.105	0.105
11	0.92	0.70	0.210	(0.254)	0.105	0.105
12	1.00	0.80	0.240	(0.254)	0.120	0.120
13	1.08	0.80	0.240	(0.254)	0.120	0.120
14	1.17	0.80	0.240	(0.254)	0.120	0.120
15	1.25	0.80	0.240	(0.254)	0.120	0.120
16	1.33	0.80	0.240	(0.254)	0.120	0.120
17	1.42	0.80	0.240	(0.254)	0.120	0.120
18	1.50	0.80	0.240	(0.254)	0.120	0.120
19	1.58	0.80	0.240	(0.254)	0.120	0.120
20	1.67	0.80	0.240	(0.254)	0.120	0.120
21	1.75	0.80	0.240	(0.254)	0.120	0.120
22	1.83	0.80	0.240	(0.254)	0.120	0.120

```
23   1.92     0.80      0.240       (  0.254)       0.120        0.120
24   2.00     0.90      0.270       (  0.254)       0.134        0.135
25   2.08     0.80      0.240       (  0.254)       0.120        0.120
26   2.17     0.90      0.270       (  0.254)       0.134        0.135
27   2.25     0.90      0.270       (  0.254)       0.134        0.135
28   2.33     0.90      0.270       (  0.254)       0.134        0.135
29   2.42     0.90      0.270       (  0.254)       0.134        0.135
30   2.50     0.90      0.270       (  0.254)       0.134        0.135
31   2.58     0.90      0.270       (  0.254)       0.134        0.135
32   2.67     0.90      0.270       (  0.254)       0.134        0.135
33   2.75     1.00      0.299       (  0.254)       0.149        0.150
34   2.83     1.00      0.299       (  0.254)       0.149        0.150
35   2.92     1.00      0.299       (  0.254)       0.149        0.150
36   3.00     1.00      0.299       (  0.254)       0.149        0.150
37   3.08     1.00      0.299       (  0.254)       0.149        0.150
38   3.17     1.10      0.329       (  0.254)       0.164        0.165
39   3.25     1.10      0.329       (  0.254)       0.164        0.165
40   3.33     1.10      0.329       (  0.254)       0.164        0.165
41   3.42     1.20      0.359       (  0.254)       0.179        0.180
42   3.50     1.30      0.389       (  0.254)       0.194        0.195
43   3.58     1.40      0.419       (  0.254)       0.209        0.210
44   3.67     1.40      0.419       (  0.254)       0.209        0.210
45   3.75     1.50      0.449       (  0.254)       0.224        0.225
46   3.83     1.50      0.449       (  0.254)       0.224        0.225
47   3.92     1.60      0.479       (  0.254)       0.239        0.240
48   4.00     1.60      0.479       (  0.254)       0.239        0.240
49   4.08     1.70      0.509       (  0.254)       0.254        0.255
50   4.17     1.80      0.539          0.254    (  0.269)        0.285
51   4.25     1.90      0.569          0.254    (  0.284)        0.315
52   4.33     2.00      0.599          0.254    (  0.299)        0.345
53   4.42     2.10      0.629          0.254    (  0.314)        0.375
54   4.50     2.10      0.629          0.254    (  0.314)        0.375
55   4.58     2.20      0.659          0.254    (  0.329)        0.405
56   4.67     2.30      0.689          0.254    (  0.344)        0.435
57   4.75     2.40      0.719          0.254    (  0.359)        0.465
58   4.83     2.40      0.719          0.254    (  0.359)        0.465
59   4.92     2.50      0.749          0.254    (  0.374)        0.495
60   5.00     2.60      0.779          0.254    (  0.389)        0.524
61   5.08     3.10      0.928          0.254    (  0.463)        0.674
62   5.17     3.60      1.078          0.254    (  0.538)        0.824
63   5.25     3.90      1.168          0.254    (  0.583)        0.914
64   5.33     4.20      1.258          0.254    (  0.628)        1.004
65   5.42     4.70      1.408          0.254    (  0.702)        1.153
66   5.50     5.60      1.677          0.254    (  0.837)        1.423
67   5.58     1.90      0.569          0.254    (  0.284)        0.315
68   5.67     0.90      0.270       (  0.254)       0.134        0.135
69   5.75     0.60      0.180       (  0.254)       0.090        0.090
70   5.83     0.50      0.150       (  0.254)       0.075        0.075
71   5.92     0.30      0.090       (  0.254)       0.045        0.045
72   6.00     0.20      0.060       (  0.254)       0.030        0.030
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    18.1
      Flood volume = Effective rainfall      1.51(In)
       times area     507.6(Ac.)/[(In)/(Ft.)] =      63.8(Ac.Ft)
      Total soil loss =      0.99(In)
      Total soil loss =    41.780(Ac.Ft)
      Total rainfall =      2.50(In)
      Flood volume =     2778498.2 Cubic Feet
      Total soil loss =     1819934.1 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    503.433(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      150.0     300.0     450.0     600.0
---------------------------------------------------------------------
```



0+ 5	0.0124	1.80	Q
0+10	0.0790	9.66	Q
0+15	0.2292	21.81	VQ
0+20	0.4375	30.24	V Q
0+25	0.6756	34.57	V Q
0+30	0.9342	37.55	V Q
0+35	1.2162	40.95	V Q
0+40	1.5227	44.51	V Q
0+45	1.8458	46.90	|V Q
0+50	2.1791	48.40	|V Q
0+55	2.5199	49.48	|V Q
1+ 0	2.8693	50.74	|V Q
1+ 5	3.2341	52.97	| VQ
1+10	3.6177	55.69	| VQ
1+15	4.0132	57.43	| VQ
1+20	4.4156	58.43	| VQ
1+25	4.8229	59.14	| Q
1+30	5.2342	59.71	| Q
1+35	5.6488	60.20	| VQ
1+40	6.0658	60.55	| VQ
1+45	6.4842	60.75	| Q
1+50	6.9036	60.90	| Q
1+55	7.3239	61.03	| Q
2+ 0	7.7474	61.50	| Q
2+ 5	8.1794	62.72	| QV
2+10	8.6186	63.77	| QV
2+15	9.0624	64.44	| QV
2+20	9.5166	65.96	| QV
2+25	9.9783	67.04	| Q V
2+30	10.4438	67.58	| Q V
2+35	10.9116	67.93	| Q V
2+40	11.3811	68.18	| Q V
2+45	11.8545	68.73	| Q V
2+50	12.3391	70.38	| Q V
2+55	12.8394	72.64	| Q V |
3+ 0	13.3489	73.99	| Q V |
3+ 5	13.8633	74.68	| Q V |
3+10	14.3834	75.52	| Q V|
3+15	14.9162	77.37	| Q V|
3+20	15.4656	79.77	| Q V|
3+25	16.0277	81.62	| Q V
3+30	16.6080	84.26	| Q V
3+35	17.2195	88.78	| Q V
3+40	17.8674	94.08	| Q |V
3+45	18.5477	98.77	| Q |V
3+50	19.2556	102.79	| Q | V
3+55	19.9911	106.79	| Q | V
4+ 0	20.7530	110.63	| Q | V
4+ 5	21.5421	114.57	| Q | V
4+10	22.3624	119.11	| Q | V
4+15	23.2329	126.39	| Q | V
4+20	24.1739	136.64	| Q| V
4+25	25.1969	148.54	| Q| V
4+30	26.3028	160.57	| Q V
4+35	27.4797	170.90	| Q| V
4+40	28.7222	180.41	| Q| V |
4+45	30.0443	191.96	| Q| V |
4+50	31.4517	204.35	| Q| V|
4+55	32.9330	215.09	| Q| V
5+ 0	34.4823	224.95	| Q| V
5+ 5	36.1330	239.69	| Q| V
5+10	37.9779	267.88	| Q| V
5+15	40.1284	312.24	| Q| V
5+20	42.6148	361.03	| Q| V
5+25	45.4238	407.88	| Q| V
5+30	48.6052	461.93	| Q| V
5+35	52.0724	503.43	| Q| V
5+40	55.1849	451.94	| Q| V
5+45	57.3460	313.79	| Q| V
5+50	58.8099	212.56	| Q| V
5+55	59.9075	159.37	| Q| V

```
    6+ 0      60.7708    125.34  |       Q |         |         |       V |
    6+ 5      61.4484     98.39  |     Q   |         |         |       V |
    6+10      61.9747     76.41  |    Q    |         |         |       V |
    6+15      62.3764     58.33  |  Q      |         |         |        V|
    6+20      62.6920     45.83  |  Q      |         |         |        V|
    6+25      62.9494     37.37  | Q       |         |         |        V|
    6+30      63.1568     30.11  | Q       |         |         |        V|
    6+35      63.3231     24.15  |Q        |         |         |        V|
    6+40      63.4561     19.32  |Q        |         |         |        V|
    6+45      63.5602     15.11  |Q        |         |         |        V|
    6+50      63.6399     11.58  Q         |         |         |        V|
    6+55      63.7010      8.87  Q         |         |         |        V|
    7+ 0      63.7439      6.23  Q         |         |         |        V|
    7+ 5      63.7665      3.28  Q         |         |         |        V|
    7+10      63.7751      1.25  Q         |         |         |        V|
    7+15      63.7799      0.70  Q         |         |         |        V|
    7+20      63.7828      0.43  Q         |         |         |        V|
    7+25      63.7845      0.25  Q         |         |         |        V|
    7+30      63.7853      0.12  Q         |         |         |        V|
    7+35      63.7855      0.03  Q         |         |         |         V
-------------------------------------------------------------------------
```

APPENDIX A.5: AREA "A" – 100-YEAR, 24-HOUR STORM DURATION

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 - 2014, Version 9.0
Study date 06/19/18 File: ARAOFF24100.out

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

Program License Serial Number 6279

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

English Units used in output format

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
UNIT HYDROGRAPH ANALYSIS, 100-YEAR, 24-HOUR STORM DURATION
FILENAME: ARAOFF

Drainage Area = 507.60(Ac.) = 0.793 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 507.60(Ac.) = 0.793 Sq. Mi.
Length along longest watercourse = 9241.00(Ft.)
Length along longest watercourse measured to centroid = 5154.00(Ft.)
Length along longest watercourse = 1.750 Mi.
Length along longest watercourse measured to centroid = 0.976 Mi.
Difference in elevation = 538.00(Ft.)
Slope along watercourse = 307.3953 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.198 Hr.
Lag time = 11.89 Min.
25% of lag time = 2.97 Min.
40% of lag time = 4.76 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]
507.60	1.60	812.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
507.60	4.00	2030.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 4.000(In)
Areal adjustment factor = 99.90 %
Adjusted average point rain = 3.996(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
507.600	66.80	0.399

Total Area Entered = 507.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
66.8	66.8	0.397	0.399	0.254	1.000	0.254
					Sum (F) =	0.254

Area averaged mean soil loss (F) (In/Hr) = 0.254
Minimum soil loss rate ((In/Hr)) = 0.127
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.499

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	42.058	4.700	24.042
2	0.167	84.117	19.529	99.901
3	0.250	126.175	27.728	141.845
4	0.333	168.234	16.421	84.004
5	0.417	210.292	7.987	40.858
6	0.500	252.351	5.216	26.684
7	0.583	294.409	3.906	19.981
8	0.667	336.468	2.936	15.020
9	0.750	378.526	2.373	12.140
10	0.833	420.585	1.825	9.336
11	0.917	462.643	1.408	7.202
12	1.000	504.702	1.280	6.549
13	1.083	546.760	1.058	5.412
14	1.167	588.819	0.854	4.367
15	1.250	630.877	0.712	3.643
16	1.333	672.936	0.570	2.915
17	1.417	714.994	0.438	2.241
18	1.500	757.053	0.421	2.152
19	1.583	799.111	0.421	2.152
20	1.667	841.170	0.219	1.121
			Sum = 100.000	Sum= 511.566

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	0.032	(0.451)	0.016	0.016
2	0.17	0.07	0.032	(0.449)	0.016	0.016
3	0.25	0.07	0.032	(0.447)	0.016	0.016
4	0.33	0.10	0.048	(0.445)	0.024	0.024
5	0.42	0.10	0.048	(0.444)	0.024	0.024
6	0.50	0.10	0.048	(0.442)	0.024	0.024
7	0.58	0.10	0.048	(0.440)	0.024	0.024
8	0.67	0.10	0.048	(0.438)	0.024	0.024
9	0.75	0.10	0.048	(0.437)	0.024	0.024
10	0.83	0.13	0.064	(0.435)	0.032	0.032
11	0.92	0.13	0.064	(0.433)	0.032	0.032
12	1.00	0.13	0.064	(0.432)	0.032	0.032
13	1.08	0.10	0.048	(0.430)	0.024	0.024
14	1.17	0.10	0.048	(0.428)	0.024	0.024
15	1.25	0.10	0.048	(0.426)	0.024	0.024
16	1.33	0.10	0.048	(0.425)	0.024	0.024
17	1.42	0.10	0.048	(0.423)	0.024	0.024
18	1.50	0.10	0.048	(0.421)	0.024	0.024
19	1.58	0.10	0.048	(0.420)	0.024	0.024
20	1.67	0.10	0.048	(0.418)	0.024	0.024
21	1.75	0.10	0.048	(0.416)	0.024	0.024
22	1.83	0.13	0.064	(0.415)	0.032	0.032

23	1.92	0.13	0.064	(0.413)	0.032	0.032
24	2.00	0.13	0.064	(0.411)	0.032	0.032
25	2.08	0.13	0.064	(0.410)	0.032	0.032
26	2.17	0.13	0.064	(0.408)	0.032	0.032
27	2.25	0.13	0.064	(0.406)	0.032	0.032
28	2.33	0.13	0.064	(0.405)	0.032	0.032
29	2.42	0.13	0.064	(0.403)	0.032	0.032
30	2.50	0.13	0.064	(0.401)	0.032	0.032
31	2.58	0.17	0.080	(0.400)	0.040	0.040
32	2.67	0.17	0.080	(0.398)	0.040	0.040
33	2.75	0.17	0.080	(0.396)	0.040	0.040
34	2.83	0.17	0.080	(0.395)	0.040	0.040
35	2.92	0.17	0.080	(0.393)	0.040	0.040
36	3.00	0.17	0.080	(0.392)	0.040	0.040
37	3.08	0.17	0.080	(0.390)	0.040	0.040
38	3.17	0.17	0.080	(0.388)	0.040	0.040
39	3.25	0.17	0.080	(0.387)	0.040	0.040
40	3.33	0.17	0.080	(0.385)	0.040	0.040
41	3.42	0.17	0.080	(0.384)	0.040	0.040
42	3.50	0.17	0.080	(0.382)	0.040	0.040
43	3.58	0.17	0.080	(0.380)	0.040	0.040
44	3.67	0.17	0.080	(0.379)	0.040	0.040
45	3.75	0.17	0.080	(0.377)	0.040	0.040
46	3.83	0.20	0.096	(0.376)	0.048	0.048
47	3.92	0.20	0.096	(0.374)	0.048	0.048
48	4.00	0.20	0.096	(0.372)	0.048	0.048
49	4.08	0.20	0.096	(0.371)	0.048	0.048
50	4.17	0.20	0.096	(0.369)	0.048	0.048
51	4.25	0.20	0.096	(0.368)	0.048	0.048
52	4.33	0.23	0.112	(0.366)	0.056	0.056
53	4.42	0.23	0.112	(0.365)	0.056	0.056
54	4.50	0.23	0.112	(0.363)	0.056	0.056
55	4.58	0.23	0.112	(0.361)	0.056	0.056
56	4.67	0.23	0.112	(0.360)	0.056	0.056
57	4.75	0.23	0.112	(0.358)	0.056	0.056
58	4.83	0.27	0.128	(0.357)	0.064	0.064
59	4.92	0.27	0.128	(0.355)	0.064	0.064
60	5.00	0.27	0.128	(0.354)	0.064	0.064
61	5.08	0.20	0.096	(0.352)	0.048	0.048
62	5.17	0.20	0.096	(0.351)	0.048	0.048
63	5.25	0.20	0.096	(0.349)	0.048	0.048
64	5.33	0.23	0.112	(0.348)	0.056	0.056
65	5.42	0.23	0.112	(0.346)	0.056	0.056
66	5.50	0.23	0.112	(0.345)	0.056	0.056
67	5.58	0.27	0.128	(0.343)	0.064	0.064
68	5.67	0.27	0.128	(0.341)	0.064	0.064
69	5.75	0.27	0.128	(0.340)	0.064	0.064
70	5.83	0.27	0.128	(0.338)	0.064	0.064
71	5.92	0.27	0.128	(0.337)	0.064	0.064
72	6.00	0.27	0.128	(0.335)	0.064	0.064
73	6.08	0.30	0.144	(0.334)	0.072	0.072
74	6.17	0.30	0.144	(0.333)	0.072	0.072
75	6.25	0.30	0.144	(0.331)	0.072	0.072
76	6.33	0.30	0.144	(0.330)	0.072	0.072
77	6.42	0.30	0.144	(0.328)	0.072	0.072
78	6.50	0.30	0.144	(0.327)	0.072	0.072
79	6.58	0.33	0.160	(0.325)	0.080	0.080
80	6.67	0.33	0.160	(0.324)	0.080	0.080
81	6.75	0.33	0.160	(0.322)	0.080	0.080
82	6.83	0.33	0.160	(0.321)	0.080	0.080
83	6.92	0.33	0.160	(0.319)	0.080	0.080
84	7.00	0.33	0.160	(0.318)	0.080	0.080
85	7.08	0.33	0.160	(0.316)	0.080	0.080
86	7.17	0.33	0.160	(0.315)	0.080	0.080
87	7.25	0.33	0.160	(0.314)	0.080	0.080
88	7.33	0.37	0.176	(0.312)	0.088	0.088
89	7.42	0.37	0.176	(0.311)	0.088	0.088
90	7.50	0.37	0.176	(0.309)	0.088	0.088
91	7.58	0.40	0.192	(0.308)	0.096	0.096
92	7.67	0.40	0.192	(0.306)	0.096	0.096
93	7.75	0.40	0.192	(0.305)	0.096	0.096

94	7.83	0.43	0.208	(0.304)	0.104	0.104
95	7.92	0.43	0.208	(0.302)	0.104	0.104
96	8.00	0.43	0.208	(0.301)	0.104	0.104
97	8.08	0.50	0.240	(0.299)	0.120	0.120
98	8.17	0.50	0.240	(0.298)	0.120	0.120
99	8.25	0.50	0.240	(0.297)	0.120	0.120
100	8.33	0.50	0.240	(0.295)	0.120	0.120
101	8.42	0.50	0.240	(0.294)	0.120	0.120
102	8.50	0.50	0.240	(0.292)	0.120	0.120
103	8.58	0.53	0.256	(0.291)	0.128	0.128
104	8.67	0.53	0.256	(0.290)	0.128	0.128
105	8.75	0.53	0.256	(0.288)	0.128	0.128
106	8.83	0.57	0.272	(0.287)	0.136	0.136
107	8.92	0.57	0.272	(0.286)	0.136	0.136
108	9.00	0.57	0.272	(0.284)	0.136	0.136
109	9.08	0.63	0.304	(0.283)	0.152	0.152
110	9.17	0.63	0.304	(0.282)	0.152	0.152
111	9.25	0.63	0.304	(0.280)	0.152	0.152
112	9.33	0.67	0.320	(0.279)	0.160	0.160
113	9.42	0.67	0.320	(0.278)	0.160	0.160
114	9.50	0.67	0.320	(0.276)	0.160	0.160
115	9.58	0.70	0.336	(0.275)	0.167	0.168
116	9.67	0.70	0.336	(0.274)	0.167	0.168
117	9.75	0.70	0.336	(0.272)	0.167	0.168
118	9.83	0.73	0.352	(0.271)	0.175	0.176
119	9.92	0.73	0.352	(0.270)	0.175	0.176
120	10.00	0.73	0.352	(0.268)	0.175	0.176
121	10.08	0.50	0.240	(0.267)	0.120	0.120
122	10.17	0.50	0.240	(0.266)	0.120	0.120
123	10.25	0.50	0.240	(0.265)	0.120	0.120
124	10.33	0.50	0.240	(0.263)	0.120	0.120
125	10.42	0.50	0.240	(0.262)	0.120	0.120
126	10.50	0.50	0.240	(0.261)	0.120	0.120
127	10.58	0.67	0.320	(0.259)	0.160	0.160
128	10.67	0.67	0.320	(0.258)	0.160	0.160
129	10.75	0.67	0.320	(0.257)	0.160	0.160
130	10.83	0.67	0.320	(0.256)	0.160	0.160
131	10.92	0.67	0.320	(0.254)	0.160	0.160
132	11.00	0.67	0.320	(0.253)	0.160	0.160
133	11.08	0.63	0.304	(0.252)	0.152	0.152
134	11.17	0.63	0.304	(0.251)	0.152	0.152
135	11.25	0.63	0.304	(0.249)	0.152	0.152
136	11.33	0.63	0.304	(0.248)	0.152	0.152
137	11.42	0.63	0.304	(0.247)	0.152	0.152
138	11.50	0.63	0.304	(0.246)	0.152	0.152
139	11.58	0.57	0.272	(0.244)	0.136	0.136
140	11.67	0.57	0.272	(0.243)	0.136	0.136
141	11.75	0.57	0.272	(0.242)	0.136	0.136
142	11.83	0.60	0.288	(0.241)	0.144	0.144
143	11.92	0.60	0.288	(0.240)	0.144	0.144
144	12.00	0.60	0.288	(0.238)	0.144	0.144
145	12.08	0.83	0.400	(0.237)	0.199	0.200
146	12.17	0.83	0.400	(0.236)	0.199	0.200
147	12.25	0.83	0.400	(0.235)	0.199	0.200
148	12.33	0.87	0.416	(0.234)	0.207	0.208
149	12.42	0.87	0.416	(0.233)	0.207	0.208
150	12.50	0.87	0.416	(0.231)	0.207	0.208
151	12.58	0.93	0.448	(0.230)	0.223	0.224
152	12.67	0.93	0.448	(0.229)	0.223	0.224
153	12.75	0.93	0.448	(0.228)	0.223	0.224
154	12.83	0.97	0.464	0.227	(0.231)	0.237
155	12.92	0.97	0.464	0.226	(0.231)	0.238
156	13.00	0.97	0.464	0.224	(0.231)	0.239
157	13.08	1.13	0.543	0.223	(0.271)	0.320
158	13.17	1.13	0.543	0.222	(0.271)	0.321
159	13.25	1.13	0.543	0.221	(0.271)	0.322
160	13.33	1.13	0.543	0.220	(0.271)	0.324
161	13.42	1.13	0.543	0.219	(0.271)	0.325
162	13.50	1.13	0.543	0.218	(0.271)	0.326
163	13.58	0.77	0.368	(0.217)	0.183	0.184
164	13.67	0.77	0.368	(0.215)	0.183	0.184

165	13.75	0.77	0.368	(0.214)	0.183	0.184
166	13.83	0.77	0.368	(0.213)	0.183	0.184
167	13.92	0.77	0.368	(0.212)	0.183	0.184
168	14.00	0.77	0.368	(0.211)	0.183	0.184
169	14.08	0.90	0.432	0.210	(0.215)	0.222
170	14.17	0.90	0.432	0.209	(0.215)	0.223
171	14.25	0.90	0.432	0.208	(0.215)	0.224
172	14.33	0.87	0.416	0.207	(0.207)	0.209
173	14.42	0.87	0.416	0.206	(0.207)	0.210
174	14.50	0.87	0.416	0.205	(0.207)	0.211
175	14.58	0.87	0.416	0.204	(0.207)	0.212
176	14.67	0.87	0.416	0.203	(0.207)	0.213
177	14.75	0.87	0.416	0.202	(0.207)	0.214
178	14.83	0.83	0.400	(0.201)	0.199	0.200
179	14.92	0.83	0.400	(0.200)	0.199	0.200
180	15.00	0.83	0.400	0.199	(0.199)	0.201
181	15.08	0.80	0.384	(0.197)	0.191	0.192
182	15.17	0.80	0.384	(0.196)	0.191	0.192
183	15.25	0.80	0.384	(0.195)	0.191	0.192
184	15.33	0.77	0.368	(0.194)	0.183	0.184
185	15.42	0.77	0.368	(0.193)	0.183	0.184
186	15.50	0.77	0.368	(0.192)	0.183	0.184
187	15.58	0.63	0.304	(0.191)	0.152	0.152
188	15.67	0.63	0.304	(0.191)	0.152	0.152
189	15.75	0.63	0.304	(0.190)	0.152	0.152
190	15.83	0.63	0.304	(0.189)	0.152	0.152
191	15.92	0.63	0.304	(0.188)	0.152	0.152
192	16.00	0.63	0.304	(0.187)	0.152	0.152
193	16.08	0.13	0.064	(0.186)	0.032	0.032
194	16.17	0.13	0.064	(0.185)	0.032	0.032
195	16.25	0.13	0.064	(0.184)	0.032	0.032
196	16.33	0.13	0.064	(0.183)	0.032	0.032
197	16.42	0.13	0.064	(0.182)	0.032	0.032
198	16.50	0.13	0.064	(0.181)	0.032	0.032
199	16.58	0.10	0.048	(0.180)	0.024	0.024
200	16.67	0.10	0.048	(0.179)	0.024	0.024
201	16.75	0.10	0.048	(0.178)	0.024	0.024
202	16.83	0.10	0.048	(0.177)	0.024	0.024
203	16.92	0.10	0.048	(0.176)	0.024	0.024
204	17.00	0.10	0.048	(0.176)	0.024	0.024
205	17.08	0.17	0.080	(0.175)	0.040	0.040
206	17.17	0.17	0.080	(0.174)	0.040	0.040
207	17.25	0.17	0.080	(0.173)	0.040	0.040
208	17.33	0.17	0.080	(0.172)	0.040	0.040
209	17.42	0.17	0.080	(0.171)	0.040	0.040
210	17.50	0.17	0.080	(0.170)	0.040	0.040
211	17.58	0.17	0.080	(0.169)	0.040	0.040
212	17.67	0.17	0.080	(0.169)	0.040	0.040
213	17.75	0.17	0.080	(0.168)	0.040	0.040
214	17.83	0.13	0.064	(0.167)	0.032	0.032
215	17.92	0.13	0.064	(0.166)	0.032	0.032
216	18.00	0.13	0.064	(0.165)	0.032	0.032
217	18.08	0.13	0.064	(0.164)	0.032	0.032
218	18.17	0.13	0.064	(0.164)	0.032	0.032
219	18.25	0.13	0.064	(0.163)	0.032	0.032
220	18.33	0.13	0.064	(0.162)	0.032	0.032
221	18.42	0.13	0.064	(0.161)	0.032	0.032
222	18.50	0.13	0.064	(0.161)	0.032	0.032
223	18.58	0.10	0.048	(0.160)	0.024	0.024
224	18.67	0.10	0.048	(0.159)	0.024	0.024
225	18.75	0.10	0.048	(0.158)	0.024	0.024
226	18.83	0.07	0.032	(0.157)	0.016	0.016
227	18.92	0.07	0.032	(0.157)	0.016	0.016
228	19.00	0.07	0.032	(0.156)	0.016	0.016
229	19.08	0.10	0.048	(0.155)	0.024	0.024
230	19.17	0.10	0.048	(0.154)	0.024	0.024
231	19.25	0.10	0.048	(0.154)	0.024	0.024
232	19.33	0.13	0.064	(0.153)	0.032	0.032
233	19.42	0.13	0.064	(0.152)	0.032	0.032
234	19.50	0.13	0.064	(0.152)	0.032	0.032
235	19.58	0.10	0.048	(0.151)	0.024	0.024

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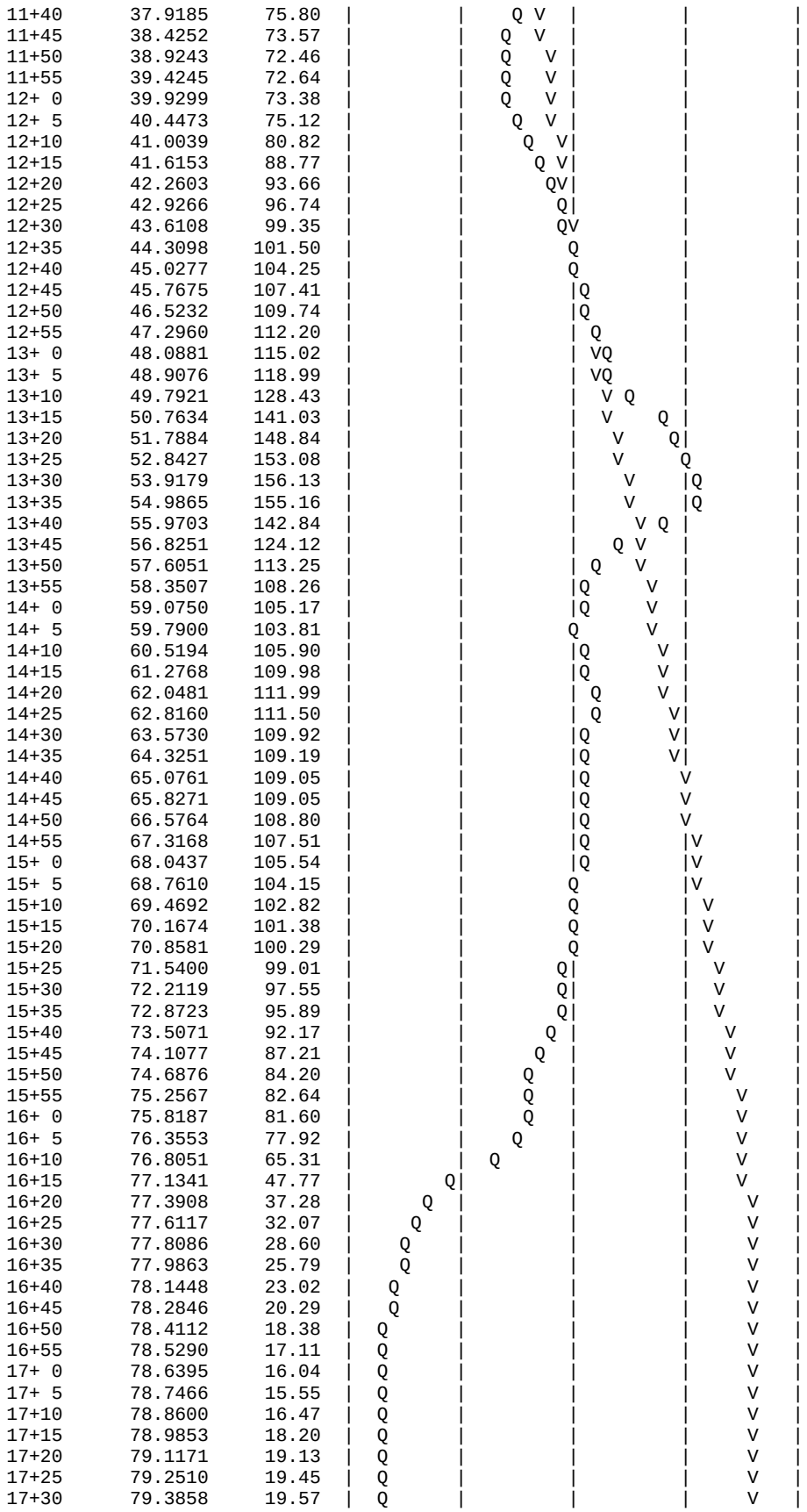
236  19.67     0.10      0.048       (  0.150)       0.024        0.024
237  19.75     0.10      0.048       (  0.150)       0.024        0.024
238  19.83     0.07      0.032       (  0.149)       0.016        0.016
239  19.92     0.07      0.032       (  0.148)       0.016        0.016
240  20.00     0.07      0.032       (  0.148)       0.016        0.016
241  20.08     0.10      0.048       (  0.147)       0.024        0.024
242  20.17     0.10      0.048       (  0.146)       0.024        0.024
243  20.25     0.10      0.048       (  0.146)       0.024        0.024
244  20.33     0.10      0.048       (  0.145)       0.024        0.024
245  20.42     0.10      0.048       (  0.144)       0.024        0.024
246  20.50     0.10      0.048       (  0.144)       0.024        0.024
247  20.58     0.10      0.048       (  0.143)       0.024        0.024
248  20.67     0.10      0.048       (  0.143)       0.024        0.024
249  20.75     0.10      0.048       (  0.142)       0.024        0.024
250  20.83     0.07      0.032       (  0.141)       0.016        0.016
251  20.92     0.07      0.032       (  0.141)       0.016        0.016
252  21.00     0.07      0.032       (  0.140)       0.016        0.016
253  21.08     0.10      0.048       (  0.140)       0.024        0.024
254  21.17     0.10      0.048       (  0.139)       0.024        0.024
255  21.25     0.10      0.048       (  0.139)       0.024        0.024
256  21.33     0.07      0.032       (  0.138)       0.016        0.016
257  21.42     0.07      0.032       (  0.138)       0.016        0.016
258  21.50     0.07      0.032       (  0.137)       0.016        0.016
259  21.58     0.10      0.048       (  0.137)       0.024        0.024
260  21.67     0.10      0.048       (  0.136)       0.024        0.024
261  21.75     0.10      0.048       (  0.136)       0.024        0.024
262  21.83     0.07      0.032       (  0.135)       0.016        0.016
263  21.92     0.07      0.032       (  0.135)       0.016        0.016
264  22.00     0.07      0.032       (  0.134)       0.016        0.016
265  22.08     0.10      0.048       (  0.134)       0.024        0.024
266  22.17     0.10      0.048       (  0.133)       0.024        0.024
267  22.25     0.10      0.048       (  0.133)       0.024        0.024
268  22.33     0.07      0.032       (  0.132)       0.016        0.016
269  22.42     0.07      0.032       (  0.132)       0.016        0.016
270  22.50     0.07      0.032       (  0.132)       0.016        0.016
271  22.58     0.07      0.032       (  0.131)       0.016        0.016
272  22.67     0.07      0.032       (  0.131)       0.016        0.016
273  22.75     0.07      0.032       (  0.131)       0.016        0.016
274  22.83     0.07      0.032       (  0.130)       0.016        0.016
275  22.92     0.07      0.032       (  0.130)       0.016        0.016
276  23.00     0.07      0.032       (  0.130)       0.016        0.016
277  23.08     0.07      0.032       (  0.129)       0.016        0.016
278  23.17     0.07      0.032       (  0.129)       0.016        0.016
279  23.25     0.07      0.032       (  0.129)       0.016        0.016
280  23.33     0.07      0.032       (  0.128)       0.016        0.016
281  23.42     0.07      0.032       (  0.128)       0.016        0.016
282  23.50     0.07      0.032       (  0.128)       0.016        0.016
283  23.58     0.07      0.032       (  0.128)       0.016        0.016
284  23.67     0.07      0.032       (  0.128)       0.016        0.016
285  23.75     0.07      0.032       (  0.127)       0.016        0.016
286  23.83     0.07      0.032       (  0.127)       0.016        0.016
287  23.92     0.07      0.032       (  0.127)       0.016        0.016
288  24.00     0.07      0.032       (  0.127)       0.016        0.016
               (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    24.4
      Flood volume = Effective rainfall      2.03(In)
       times area     507.6(Ac.)/[(In)/(Ft.)] =      86.0(Ac.Ft)
      Total soil loss =      1.96(In)
      Total soil loss =    83.076(Ac.Ft)
      Total rainfall =      4.00(In)
      Flood volume =     3744240.5 Cubic Feet
      Total soil loss =     3618804.5 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    156.127(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	50.0	100.0	150.0	200.0
0+ 5	0.0027	0.39	Q				
0+10	0.0163	1.99	Q				
0+15	0.0457	4.26	Q				
0+20	0.0856	5.80	VQ				
0+25	0.1355	7.25	VQ				
0+30	0.1963	8.82	VQ				
0+35	0.2638	9.81	VQ				
0+40	0.3353	10.38	V Q				
0+45	0.4096	10.79	V Q				
0+50	0.4873	11.29	V Q				
0+55	0.5722	12.33	V Q				
1+ 0	0.6663	13.66	V Q				
1+ 5	0.7649	14.31	V Q				
1+10	0.8610	13.96	V Q				
1+15	0.9516	13.15	V Q				
1+20	1.0392	12.73	V Q				
1+25	1.1259	12.59	V Q				
1+30	1.2123	12.54	V Q				
1+35	1.2984	12.51	V Q				
1+40	1.3844	12.48	V Q				
1+45	1.4702	12.46	V Q				
1+50	1.5572	12.63	V Q				
1+55	1.6496	13.42	V Q				
2+ 0	1.7497	14.53	V Q				
2+ 5	1.8543	15.19	V Q				
2+10	1.9610	15.50	V Q				
2+15	2.0691	15.70	V Q				
2+20	2.1783	15.85	|V Q				
2+25	2.2882	15.96	|V Q				
2+30	2.3987	16.04	|V Q				
2+35	2.5109	16.29	|V Q				
2+40	2.6290	17.14	|V Q				
2+45	2.7553	18.33	|V Q				
2+50	2.8865	19.05	|V Q				
2+55	3.0201	19.41	|V Q				
3+ 0	3.1555	19.65	|V Q				
3+ 5	3.2921	19.84	|V Q				
3+10	3.4297	19.98	|V Q				
3+15	3.5681	20.09	|V Q				
3+20	3.7071	20.18	|V Q				
3+25	3.8465	20.25	|V Q				
3+30	3.9863	20.30	|V Q				
3+35	4.1264	20.34	|V Q				
3+40	4.2668	20.38	|V Q				
3+45	4.4074	20.41	| V Q				
3+50	4.5494	20.63	| V Q				
3+55	4.6971	21.44	| V Q				
4+ 0	4.8527	22.60	| V Q				
4+ 5	5.0131	23.29	| V Q				
4+10	5.1758	23.62	| V Q				
4+15	5.3400	23.84	| V Q				
4+20	5.5066	24.19	| V Q				
4+25	5.6795	25.11	| V Q				
4+30	5.8609	26.34	| V Q				
4+35	6.0475	27.09	| V Q				
4+40	6.2368	27.48	| V Q				
4+45	6.4279	27.74	| V Q				
4+50	6.6217	28.14	| V Q				
4+55	6.8220	29.10	| V Q				
5+ 0	7.0311	30.36	| V Q				
5+ 5	7.2429	30.74	| V Q				
5+10	7.4464	29.55	| V Q				
5+15	7.6361	27.56	| V Q				
5+20	7.8195	26.62	| V Q				
5+25	8.0050	26.93	| V Q				
5+30	8.1963	27.77	| V Q				
5+35	8.3920	28.41	| V Q				
5+40	8.5943	29.38	| V Q				

5+45	8.8050	30.60	V Q			
5+50	9.0209	31.35	V Q			
5+55	9.2394	31.72	V Q			
6+ 0	9.4595	31.96	V Q			
6+ 5	9.6821	32.32	V Q			
6+10	9.9111	33.25	V Q			
6+15	10.1486	34.49	V Q			
6+20	10.3914	35.26	V Q			
6+25	10.6369	35.65	V Q			
6+30	10.8842	35.91	V Q			
6+35	11.1342	36.29	V Q			
6+40	11.3907	37.25	V Q			
6+45	11.6561	38.53	V Q			
6+50	11.9269	39.32	V Q			
6+55	12.2005	39.73	V Q			
7+ 0	12.4761	40.01	V Q			
7+ 5	12.7532	40.23	V Q			
7+10	13.0314	40.40	V Q			
7+15	13.3105	40.53	V Q			
7+20	13.5916	40.82	V Q			
7+25	13.8788	41.69	V Q			
7+30	14.1742	42.90	V Q			
7+35	14.4760	43.82	V Q			
7+40	14.7859	45.00	V Q			
7+45	15.1053	46.38	V Q			
7+50	15.4320	47.43	V Q			
7+55	15.7673	48.69	V Q			
8+ 0	16.1127	50.16	V Q			
8+ 5	16.4672	51.47	V Q			
8+10	16.8362	53.58	V Q			
8+15	17.2234	56.22	V Q			
8+20	17.6217	57.84	V Q			
8+25	18.0261	58.71	V Q			
8+30	18.4346	59.32	V Q			
8+35	18.8476	59.97	V Q			
8+40	19.2686	61.12	V Q			
8+45	19.6994	62.55	V Q			
8+50	20.1378	63.65	V Q			
8+55	20.5851	64.96	V Q			
9+ 0	21.0428	66.46	V Q			
9+ 5	21.5098	67.80	V Q			
9+10	21.9916	69.95	V Q			
9+15	22.4916	72.61	V Q			
9+20	23.0044	74.45	V Q			
9+25	23.5286	76.13	V Q			
9+30	24.0650	77.87	V Q			
9+35	24.6105	79.21	V Q			
9+40	25.1662	80.69	V Q			
9+45	25.7332	82.32	V Q			
9+50	26.3086	83.56	V Q			
9+55	26.8939	84.98	V Q			
10+ 0	27.4901	86.58	V Q			
10+ 5	28.0842	86.26	V Q			
10+10	28.6439	81.26	V Q			
10+15	29.1518	73.75	VQ			
10+20	29.6296	69.38	Q			
10+25	30.0934	67.34	QV			
10+30	30.5483	66.06	QV			
10+35	31.0034	66.08	QV			
10+40	31.4811	69.37	QV			
10+45	31.9940	74.47	Q			
10+50	32.5270	77.39	Q			
10+55	33.0689	78.69	Q			
11+ 0	33.6160	79.44	Q			
11+ 5	34.1655	79.78	Q			
11+10	34.7120	79.36	QV			
11+15	35.2528	78.53	QV			
11+20	35.7906	78.08	QV			
11+25	36.3273	77.93	QV			
11+30	36.8635	77.85	Q V			
11+35	37.3965	77.40	Q V			



11+40	37.9185	75.80			Q V			
11+45	38.4252	73.57			Q V			
11+50	38.9243	72.46			Q V			
11+55	39.4245	72.64			Q V			
12+ 0	39.9299	73.38			Q V			
12+ 5	40.4473	75.12			Q V			
12+10	41.0039	80.82			Q V			
12+15	41.6153	88.77			Q V			
12+20	42.2603	93.66			QV			
12+25	42.9266	96.74			Q			
12+30	43.6108	99.35			QV			
12+35	44.3098	101.50			Q			
12+40	45.0277	104.25			Q			
12+45	45.7675	107.41			Q			
12+50	46.5232	109.74			Q			
12+55	47.2960	112.20			Q			
13+ 0	48.0881	115.02			VQ			
13+ 5	48.9076	118.99			VQ			
13+10	49.7921	128.43			V Q			
13+15	50.7634	141.03			V Q			
13+20	51.7884	148.84			V Q			
13+25	52.8427	153.08			V Q			
13+30	53.9179	156.13			V	Q		
13+35	54.9865	155.16			V	Q		
13+40	55.9703	142.84			V Q			
13+45	56.8251	124.12			Q V			
13+50	57.6051	113.25			Q V			
13+55	58.3507	108.26			Q V			
14+ 0	59.0750	105.17			Q V			
14+ 5	59.7900	103.81			Q V			
14+10	60.5194	105.90			Q V			
14+15	61.2768	109.98			Q V			
14+20	62.0481	111.99			Q V			
14+25	62.8160	111.50			Q V			
14+30	63.5730	109.92			Q V			
14+35	64.3251	109.19			Q V			
14+40	65.0761	109.05			Q V			
14+45	65.8271	109.05			Q V			
14+50	66.5764	108.80			Q V			
14+55	67.3168	107.51			Q V			
15+ 0	68.0437	105.54			Q V			
15+ 5	68.7610	104.15			Q V			
15+10	69.4692	102.82			Q V			
15+15	70.1674	101.38			Q V			
15+20	70.8581	100.29			Q V			
15+25	71.5400	99.01			Q V			
15+30	72.2119	97.55			Q V			
15+35	72.8723	95.89			Q V			
15+40	73.5071	92.17			Q V			
15+45	74.1077	87.21			Q V			
15+50	74.6876	84.20			Q V			
15+55	75.2567	82.64			Q V			
16+ 0	75.8187	81.60			Q V			
16+ 5	76.3553	77.92			Q V			
16+10	76.8051	65.31		Q	V			
16+15	77.1341	47.77		Q	V			
16+20	77.3908	37.28		Q	V			
16+25	77.6117	32.07		Q	V			
16+30	77.8086	28.60		Q	V			
16+35	77.9863	25.79		Q	V			
16+40	78.1448	23.02		Q	V			
16+45	78.2846	20.29		Q	V			
16+50	78.4112	18.38	Q		V			
16+55	78.5290	17.11	Q		V			
17+ 0	78.6395	16.04	Q		V			
17+ 5	78.7466	15.55	Q		V			
17+10	78.8600	16.47	Q		V			
17+15	78.9853	18.20	Q		V			
17+20	79.1171	19.13	Q		V			
17+25	79.2510	19.45	Q		V			
17+30	79.3858	19.57	Q		V			

17+35	79.5207	19.59	Q				V
17+40	79.6561	19.66	Q				V
17+45	79.7926	19.82	Q				V
17+50	79.9287	19.76	Q				V
17+55	80.0599	19.05	Q				V
18+ 0	80.1839	18.01	Q				V
18+ 5	80.3038	17.40	Q				V
18+10	80.4218	17.14	Q				V
18+15	80.5387	16.98	Q				V
18+20	80.6549	16.87	Q				V
18+25	80.7705	16.78	Q				V
18+30	80.8856	16.72	Q				V
18+35	80.9992	16.49	Q				V
18+40	81.1070	15.65	Q				V
18+45	81.2065	14.46	Q				V
18+50	81.2998	13.55	Q				V
18+55	81.3851	12.39	Q				V
19+ 0	81.4609	11.01	Q				V
19+ 5	81.5322	10.34	Q				V
19+10	81.6057	10.68	Q				V
19+15	81.6848	11.49	Q				V
19+20	81.7681	12.10	Q				V
19+25	81.8579	13.04	Q				V
19+30	81.9560	14.24	Q				V
19+35	82.0577	14.76	Q				V
19+40	82.1563	14.32	Q				V
19+45	82.2487	13.41	Q				V
19+50	82.3362	12.71	Q				V
19+55	82.4169	11.71	Q				V
20+ 0	82.4889	10.46	Q				V
20+ 5	82.5571	9.90	Q				V
20+10	82.6282	10.32	Q				V
20+15	82.7054	11.21	Q				V
20+20	82.7859	11.70	Q				V
20+25	82.8678	11.89	Q				V
20+30	82.9504	12.00	Q				V
20+35	83.0336	12.08	Q				V
20+40	83.1172	12.14	Q				V
20+45	83.2011	12.17	Q				V
20+50	83.2837	12.00	Q				V
20+55	83.3610	11.22	Q				V
21+ 0	83.4304	10.09	Q				V
21+ 5	83.4966	9.61	Q				V
21+10	83.5661	10.09	Q				V
21+15	83.6420	11.02	Q				V
21+20	83.7202	11.35	Q				V
21+25	83.7943	10.77	Q				V
21+30	83.8615	9.76	Q				V
21+35	83.9262	9.38	Q				V
21+40	83.9946	9.93	Q				V
21+45	84.0696	10.90	Q				V
21+50	84.1471	11.25	Q				V
21+55	84.2206	10.68	Q				V
22+ 0	84.2873	9.68	Q				V
22+ 5	84.3514	9.31	Q				V
22+10	84.4193	9.86	Q				V
22+15	84.4939	10.84	Q				V
22+20	84.5710	11.20	Q				V
22+25	84.6443	10.63	Q				V
22+30	84.7108	9.66	Q				V
22+35	84.7735	9.10	Q				V
22+40	84.8345	8.87	Q				V
22+45	84.8945	8.71	Q				V
22+50	84.9537	8.59	Q				V
22+55	85.0122	8.50	Q				V
23+ 0	85.0703	8.44	Q				V
23+ 5	85.1282	8.40	Q				V
23+10	85.1859	8.37	Q				V
23+15	85.2432	8.33	Q				V
23+20	85.3004	8.29	Q				V
23+25	85.3573	8.27	Q				V

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   23+30      85.4142      8.26  |Q        |         |         |        V|
   23+35      85.4710      8.25  |Q        |         |         |        V|
   23+40      85.5277      8.24  |Q        |         |         |        V|
   23+45      85.5844      8.22  |Q        |         |         |        V|
   23+50      85.6409      8.21  |Q        |         |         |        V|
   23+55      85.6973      8.20  |Q        |         |         |        V|
   24+ 0      85.7538      8.20  |Q        |         |         |        V|
   24+ 5      85.8076      7.81  |Q        |         |         |        V|
   24+10      85.8504      6.21  |Q        |         |         |        V|
   24+15      85.8775      3.94  Q         |         |         |        V|
   24+20      85.8954      2.59  Q         |         |         |        V|
   24+25      85.9087      1.94  Q         |         |         |        V|
   24+30      85.9191      1.51  Q         |         |         |        V|
   24+35      85.9273      1.19  Q         |         |         |        V|
   24+40      85.9338      0.95  Q         |         |         |        V|
   24+45      85.9390      0.75  Q         |         |         |        V|
   24+50      85.9432      0.60  Q         |         |         |        V|
   24+55      85.9466      0.49  Q         |         |         |        V|
   25+ 0      85.9492      0.38  Q         |         |         |        V|
   25+ 5      85.9513      0.30  Q         |         |         |        V|
   25+10      85.9528      0.23  Q         |         |         |        V|
   25+15      85.9540      0.17  Q         |         |         |        V|
   25+20      85.9548      0.12  Q         |         |         |        V|
   25+25      85.9554      0.09  Q         |         |         |        V|
   25+30      85.9558      0.05  Q         |         |         |        V|
   25+35      85.9559      0.02  Q         |         |         |         V
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APPENDIX B: OFFSITE ULTIMATE CONDITION RATIONAL METHOD ANALYSIS

APPENDIX B.1: RUNOFF INDEX AND IMPERVIOUS FRACTION CALCULATIONS

AREA B1						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Conservation OS	D	8.2	88	0	721.6	0.0
Total Area					8.2	
Sum of A (RI) and (AI)					721.6	0.0
Total Percentage for (RI) and (AI)					88.0	0.000

AREA B2						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Conservation OS	D	20.7	88	0	1821.6	0.0
Total Area					20.7	
Sum of A (RI) and (AI)					1821.6	0.0
Total Percentage for (RI) and (AI)					88.0	0.000

AREA B3						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	0.8	32	0.5	25.7	0.4
Low Density Res	A	0.02	32	0.4	0.5	0.0
Rural Mountainous	A	1.5	62	0.02	91.3	0.0
Medium Density Res	B	0.1	56	0.5	4.0	0.0
Low Density Res	B	0.2	56	0.4	11.0	0.1
Rural Mountainous	B	0.6	76	0.02	47.8	0.0
Medium Density Res	D	0.8	75	0.5	60.1	0.4
Low Density Res	D	3.6	75	0.4	268.1	1.4
Rural Mountainous	D	11.0	88	0.02	969.1	0.2
Conservation OS	D	17.5	88	0	1542.1	0.0
Total Area					36.1	
Sum of A (RI) and (AI)					3019.6	2.6
Total Percentage for (RI) and (AI)					83.6	0.072

AREA B4						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	8.7	32	0.5	277.5	4.3
Low Density Res	A	2.0	32	0.4	65.0	0.8
Rural Mountainous	A	0.1	62	0.02	5.1	0.0
Medium Density Res	B	6.4	56	0.5	356.2	3.2
Low Density Res	B	4.7	56	0.4	265.7	1.9
Rural Mountainous	B	0.6	76	0.02	47.8	0.0
Medium Density Res	D	4.9	75	0.5	367.8	2.5
Low Density Res	D	4.9	75	0.4	367.5	2.0
Rural Mountainous	D	0.5	88	0.02	45.1	0.0
Conservation OS	D	13.5	88	0	1184.8	0.0
Total Area					46.3	
Sum of A (RI) and (AI)					2982.5	14.7
Total Percentage for (RI) and (AI)					64.4	0.317

AREA B5						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Med-High Density Res.	A	1.4	32	0.65	45.2	0.9
Low Density Res	A	10.9	32	0.4	350.2	4.4
High Density Res.	B	0.2	56	0.8	11.9	0.2
Med-High Density Res.	B	0.9	56	0.65	50.4	0.6
Medium Density Res	B	10.4	56	0.5	581.2	5.2
Low Density Res	B	4.3	56	0.4	240.0	1.7
High Density Res.	C	0.1	69	0.8	6.9	0.1
Med-High Density Res.	C	0.6	69	0.65	38.0	0.4
Medium Density Res	C	28.7	69	0.5	1978.6	14.3
High Density Res.	D	0.1	75	0.8	7.5	0.1
Med-High Density Res.	D	0.3	75	0.65	24.4	0.2
Medium Density Res	D	14.9	75	0.5	1117.1	7.4
Low Density Res	D	5.4	75	0.4	407.6	2.2
Conservation OS	D	12.4	88	0	1090.0	0.0
Total Area					90.6	
Sum of A (RI) and (AI)					5948.9	37.6
Total Percentage for (RI) and (AI)					65.7	0.415

AREA C1						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Rural Mountainous	D	8.1	88	0.02	712.8	0.2
Total Area					8.1	
Sum of A (RI) and (AI)					712.8	0.2
Total Percentage for (RI) and (AI)					88.0	0.020

AREA C2						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	D	3.6	75	0.5	270.6	1.8
Rural Mountainous	D	10.8	88	0.02	949.7	0.2
Total Area					14.4	
Sum of A (RI) and (AI)					1220.3	2.0
Total Percentage for (RI) and (AI)					84.7	0.140

AREA C3						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	14.6	32	0.5	466.7	7.3
Medium Density Res	B	6.0	56	0.5	333.6	3.0
Medium Density Res	C	1.1	69	0.5	74.5	0.5
Medium Density Res	D	19.8	75	0.5	1486.4	9.9
Rural Mountainous	D	14.9	88	0.02	1307.8	0.3
Total Area					56.3	
Sum of A (RI) and (AI)					3669.0	21.0
Total Percentage for (RI) and (AI)					65.2	0.373

AREA C4						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	7.3	32	0.5	234.0	3.7
Medium Density Res	B	1.0	56	0.5	55.8	0.5
Medium Density Res	C	10.3	69	0.5	712.1	5.2
Medium Density Res	D	20.3	75	0.5	1522.8	10.2
Rural Mountainous	D	1.1	88	0.02	93.8	0.0
Total Area					40.0	
Sum of A (RI) and (AI)					2618.5	19.5
Total Percentage for (RI) and (AI)					65.5	0.487

AREA C5						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	6.7	56	0.5	376.4	3.4
Medium Density Res	C	23.2	69	0.5	1598.5	11.6
Medium Density Res	D	10.0	75	0.5	747.2	5.0
Total Area					39.9	
Sum of A (RI) and (AI)					2722.0	19.9
Total Percentage for (RI) and (AI)					68.3	0.500

AREA C6						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Rural Mountainous	D	6.4	88	0.02	563.2	0.1
Total Area					6.4	
Sum of A (RI) and (AI)					563.2	0.1
Total Percentage for (RI) and (AI)					88.0	0.020

AREA C7						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	3.2	32	0.5	102.9	1.6
Very Low Density Res	A	3.7	32	0.2	117.3	0.7
Rural Mountainous	A	0.6	62	0.02	35.5	0.0
Medium Density Res	C	0.3	69	0.5	23.6	0.2
Very Low Density Res	C	0.3	69	0.2	23.2	0.1
Medium Density Res	D	0.8	75	0.5	63.7	0.4
Rural Mountainous	D	5.1	88	0.02	450.6	0.1
Total Area					14.1	
Sum of A (RI) and (AI)					816.7	3.1
Total Percentage for (RI) and (AI)					57.9	0.221

AREA C8						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	4.25	56	0.5	238.1	2.1
Medium Density Res	C	7.43	69	0.5	512.7	3.7
Very Low Density Res	C	0.50	69	0.2	34.7	0.1
Medium Density Res	D	14.72	75	0.5	1103.9	7.4
Total Area					26.9	
Sum of A (RI) and (AI)					1889.4	13.3
Total Percentage for (RI) and (AI)					70.2	0.494

AREA C9						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	12.2	32	0.5	389.5	6.1
Medium Density Res	B	17.3	56	0.5	970.3	8.7
Medium Density Res	C	23.0	69	0.5	1586.9	11.5
Medium Density Res	D	49.2	75	0.5	3691.4	24.6
Rural Mountainous	D	8.2	88	0.02	720.3	0.2
Total Area					109.9	
Sum of A (RI) and (AI)					6968.9	44.9
Total Percentage for (RI) and (AI)					63.4	0.409

AREA D1						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	C	6.8	69	0.5	469.2	3.4
Total Area					6.8	
Sum of A (RI) and (AI)					469.2	3.4
Total Percentage for (RI) and (AI)					69.0	0.500

AREA D2						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	C	14.2	69	0.5	979.8	7.1
Total Area					14.2	
Sum of A (RI) and (AI)					979.8	7.1
Total Percentage for (RI) and (AI)					69.0	0.500

AREA D3						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	1.4	56	0.5	75.9	0.7
Medium Density Res	C	20.4	69	0.5	1410.6	10.2
Total Area					21.8	
Sum of A (RI) and (AI)					1486.6	10.9
Total Percentage for (RI) and (AI)					68.2	0.500

AREA E1						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	4.3	56	0.5	243.3	2.2
Medium Density Res	C	1.1	69	0.5	72.9	0.5
Total Area					5.4	
Sum of A (RI) and (AI)					316.1	2.7
Total Percentage for (RI) and (AI)					58.5	0.500

AREA E2						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	6.3	56	0.5	352.1	3.1
Medium Density Res	C	12.3	69	0.5	849.5	6.2
Total Area					18.6	
Sum of A (RI) and (AI)					1201.7	9.3
Total Percentage for (RI) and (AI)					64.6	0.500

AREA E3						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	6.0	56	0.5	333.5	3.0
Medium Density Res	C	2.1	69	0.5	147.9	1.1
Total Area					8.1	
Sum of A (RI) and (AI)					481.5	4.1
Total Percentage for (RI) and (AI)					59.4	0.500

AREA E4						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	3.4	56	0.5	187.8	1.7
Medium Density Res	C	3.3	69	0.5	230.9	1.7
Total Area					6.7	
Sum of A (RI) and (AI)					418.7	3.4
Total Percentage for (RI) and (AI)					62.5	0.500

AREA E5						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	C	1.1	69	0.5	75.9	0.6
Total Area					1.1	
Sum of A (RI) and (AI)					75.9	0.6
Total Percentage for (RI) and (AI)					69.0	0.500

AREA F1

Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	B	6.18	56	0.5	346.0	3.1
Medium Density Res	D	3.32	75	0.5	249.2	1.7
Total Area					9.5	
Sum of A (RI) and (AI)					595.1	4.8
Total Percentage for (RI) and (AI)					62.6	0.500

AREA F2

Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	2.89	32	0.5	92.5	1.4
Medium Density Res	B	5.13	56	0.5	287.3	2.6
Medium Density Res	C	0.63	69	0.5	43.1	0.3
Medium Density Res	D	10.95	75	0.5	821.4	5.5
Total Area					19.6	
Sum of A (RI) and (AI)					1244.4	9.8
Total Percentage for (RI) and (AI)					63.5	0.500

AREA F3

Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	3.91	32	0.5	125.2	2.0
Estate Residential	A	0.6	62	0.1	35.0	0.1
Medium Density Res	C	0.53	69	0.5	36.8	0.3
Medium Density Res	D	3.35	75	0.5	251.3	1.7
Estate Residential	D	0.6	88	0.1	56.4	0.1
Total Area					9.0	
Sum of A (RI) and (AI)					504.6	4.0
Total Percentage for (RI) and (AI)					56.1	0.446

AREA F4						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	0.22	32	0.5	7.0	0.1
Estate Residential	A	0.7	62	0.1	42.0	0.1
Medium Density Res	D	0.87	75	0.5	65.4	0.4
Estate Residential	D	2.3	88	0.1	205.1	0.2
Total Area					4.1	
Sum of A (RI) and (AI)					319.5	0.8
Total Percentage for (RI) and (AI)					77.9	0.207

AREA F5						
Land Use	Soil Type	Area	RI #	AI #	A RI	A AI
Medium Density Res	A	0.05	32	0.5	1.5	0.0
Estate Residential	A	5.2	62	0.1	322.1	0.5
Medium Density Res	D	0.01	75	0.5	0.5	0.0
Estate Residential	D	7.7	88	0.1	673.4	0.8
Total Area					12.9	
Sum of A (RI) and (AI)					997.4	1.3
Total Percentage for (RI) and (AI)					77.3	0.102

APPENDIX B.2: AREA "B" – 100-YEAR STORM EVENT

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARBOFF.out

TRACT 37439 POST-PROJECT OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
RATIONAL METHOD ANALYSIS, 100-YEAR STORM EVENT
FILENAME: ARBOFF

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

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

Program License Serial Number 6279

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

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

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

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

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 783.000(Ft.)
Top (of initial area) elevation = 1974.000(Ft.)
Bottom (of initial area) elevation = 1912.000(Ft.)
Difference in elevation = 62.000(Ft.)
Slope = 0.07918 s(percent)= 7.92
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.649 min.
Rainfall intensity = 2.825(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 19.700(CFS)
Total initial stream area = 8.200(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 202.000 to Point/Station 203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1912.000(Ft.)
End of natural channel elevation = 1760.000(Ft.)
Length of natural channel = 819.000(Ft.)

```
Estimated mean flow rate at midpoint of channel =     44.566(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  16.13(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.1856
Corrected/adjusted channel slope =  0.1856
Travel time =    0.85 min.     TC =   13.50  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.849
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.726(In/Hr) for a   100.0 year storm
Subarea runoff =     47.895(CFS) for     20.700(Ac.)
Total runoff =     67.595(CFS)        Total area =      28.900(Ac.)


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Process from Point/Station      203.000 to Point/Station      204.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1760.000(Ft.)
End of street segment elevation =  1528.000(Ft.)
Length of street segment  =  1161.640(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =    106.127(CFS)
Depth of flow =   0.502(Ft.), Average velocity =  14.545(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    0.10(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  18.766(Ft.)
Flow velocity =  14.54(Ft/s)
Travel time =    1.33 min.     TC =   14.83  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.060
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.920
RI index for soil(AMC 2)  =  83.60
Pervious area fraction =  0.928; Impervious fraction =  0.072
Rainfall intensity =      2.589(In/Hr) for a   100.0 year storm
Subarea runoff =     76.947(CFS) for     36.100(Ac.)
Total runoff =    144.543(CFS)        Total area =      65.000(Ac.)
Street flow at end of street =    144.543(CFS)
Half street flow at end of street =     72.271(CFS)
Depth of flow =   0.558(Ft.), Average velocity =  14.869(Ft/s)
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```
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    2.90(Ft.)
Flow width (from curb towards crown)=  21.564(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1528.000(Ft.)
End of street segment elevation =  1480.000(Ft.)
Length of street segment  =  1532.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =    185.186(CFS)
Depth of flow =   0.774(Ft.), Average velocity =   8.117(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   13.70(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   8.12(Ft/s)
Travel time =    3.15 min.     TC =   17.97  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.752
Decimal fraction soil group A = 0.230
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.520
RI index for soil(AMC 2)  =  64.40
Pervious area fraction =  0.683; Impervious fraction =  0.317
Rainfall intensity =      2.329(In/Hr) for a   100.0 year storm
Subarea runoff =     81.109(CFS) for     46.300(Ac.)
Total runoff =    225.651(CFS)        Total area =     111.300(Ac.)
Street flow at end of street =    225.651(CFS)
Half street flow at end of street =    112.826(CFS)
Depth of flow =   0.818(Ft.), Average velocity =   8.662(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   15.91(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


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Process from Point/Station      205.000 to Point/Station      206.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1480.000(Ft.)
End of street segment elevation =  1444.000(Ft.)
Length of street segment  =  2934.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
```

```
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =    293.162(CFS)
Depth of flow =   1.012(Ft.), Average velocity =   7.260(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   25.59(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   7.26(Ft/s)
Travel time =    6.74 min.     TC =   24.71  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.140
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.320
Decimal fraction soil group D = 0.370
RI index for soil(AMC 2)  =  65.70
Pervious area fraction =  0.585; Impervious fraction =  0.415
Rainfall intensity =      1.955(In/Hr) for a   100.0 year storm
Subarea runoff =    134.914(CFS) for     90.600(Ac.)
Total runoff =    360.565(CFS)        Total area =     201.900(Ac.)
Street flow at end of street =    360.565(CFS)
Half street flow at end of street =    180.283(CFS)
Depth of flow =   1.084(Ft.), Average velocity =   7.887(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   29.20(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)
End of computations, total study area =          201.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.728
Area averaged RI index number =  71.9
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APPENDIX B.3: AREA "C" – 100-YEAR STORM EVENT

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARCOFF.out

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
RATIONAL METHOD ANALYSIS, 100-YEAR STORM EVENT
FILENAME: ARCOFF

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

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

Program License Serial Number 6279

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

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

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

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

++

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

Initial area flow distance = 887.000(Ft.)
Top (of initial area) elevation = 1856.000(Ft.)
Bottom (of initial area) elevation = 1636.000(Ft.)
Difference in elevation = 220.000(Ft.)
Slope = 0.24803 s(percent)= 24.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.581 min.
Rainfall intensity = 3.116(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 21.578(CFS)
Total initial stream area = 8.100(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 302.000 to Point/Station 303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1636.000(Ft.)
End of natural channel elevation = 1492.000(Ft.)
Length of natural channel = 1140.000(Ft.)

```
Estimated mean flow rate at midpoint of channel =     40.759(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.97(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.1263
Corrected/adjusted channel slope =  0.1263
Travel time =    1.46 min.     TC =   12.05  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  84.70
Pervious area fraction =  0.860; Impervious fraction =  0.140
Rainfall intensity =      2.902(In/Hr) for a   100.0 year storm
Subarea runoff =     35.132(CFS) for     14.400(Ac.)
Total runoff =     56.710(CFS)       Total area =      22.500(Ac.)


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Process from Point/Station      303.000 to Point/Station      304.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1492.000(Ft.)
End of street segment elevation =  1460.000(Ft.)
Length of street segment  =  1205.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =    112.962(CFS)
Depth of flow =   0.686(Ft.), Average velocity =   6.676(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    9.31(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   6.68(Ft/s)
Travel time =    3.01 min.     TC =   15.05  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.778
Decimal fraction soil group A = 0.260
Decimal fraction soil group B = 0.110
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.610
RI index for soil(AMC 2)  =  65.20
Pervious area fraction =  0.627; Impervious fraction =  0.373
Rainfall intensity =      2.567(In/Hr) for a   100.0 year storm
Subarea runoff =    112.375(CFS) for     56.300(Ac.)
Total runoff =    169.085(CFS)       Total area =      78.800(Ac.)
Street flow at end of street =    169.085(CFS)
Half street flow at end of street =     84.542(CFS)
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Depth of flow =   0.772(Ft.), Average velocity =   7.457(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   13.61(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1460.000(Ft.)
End of street segment elevation =  1444.000(Ft.)
Length of street segment  =  2051.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =    202.465(CFS)
Depth of flow =   0.967(Ft.), Average velocity =   5.466(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   23.34(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   5.47(Ft/s)
Travel time =    6.25 min.     TC =   21.31  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.180
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.260
Decimal fraction soil group D = 0.540
RI index for soil(AMC 2)  =  65.50
Pervious area fraction =  0.513; Impervious fraction =  0.487
Rainfall intensity =      2.121(In/Hr) for a   100.0 year storm
Subarea runoff =     66.599(CFS) for     40.000(Ac.)
Total runoff =    235.684(CFS)        Total area =     118.800(Ac.)
Street flow at end of street =    235.684(CFS)
Half street flow at end of street =    117.842(CFS)
Depth of flow =   1.015(Ft.), Average velocity =   5.808(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   25.73(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


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Process from Point/Station      305.000 to Point/Station      310.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1444.000(Ft.)
End of street segment elevation =  1439.000(Ft.)
Length of street segment  =  1125.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
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Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =    266.453(CFS)
Depth of flow =   1.165(Ft.), Average velocity =   5.153(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   33.25(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   5.15(Ft/s)
Travel time =    3.64 min.     TC =   24.95  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.791
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.580
Decimal fraction soil group D = 0.250
RI index for soil(AMC 2)  =  68.30
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.944(In/Hr) for a   100.0 year storm
Subarea runoff =     61.398(CFS) for     39.900(Ac.)
Total runoff =    297.081(CFS)        Total area =     158.700(Ac.)
Street flow at end of street =    297.081(CFS)
Half street flow at end of street =    148.541(CFS)
Depth of flow =   1.212(Ft.), Average velocity =   5.382(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   35.61(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


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Process from Point/Station      305.000 to Point/Station      310.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    158.700(Ac.)
Runoff from this stream =    297.081(CFS)
Time of concentration =   24.95 min.
Rainfall intensity =     1.944(In/Hr)


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Process from Point/Station      306.000 to Point/Station      307.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   981.000(Ft.)
Top (of initial area) elevation =  1900.000(Ft.)
Bottom (of initial area) elevation =  1620.000(Ft.)
Difference in elevation =   280.000(Ft.)
Slope =    0.28542  s(percent)=      28.54
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.711 min.
Rainfall intensity =      3.096(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     16.930(CFS)
Total initial stream area =        6.400(Ac.)
Pervious area fraction = 1.000
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Process from Point/Station      307.000 to Point/Station      308.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1620.000(Ft.)
End of street segment elevation =  1464.000(Ft.)
Length of street segment  =  1170.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     31.246(CFS)
Depth of flow =   0.376(Ft.), Average velocity =   9.314(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.452(Ft.)
Flow velocity =   9.31(Ft/s)
Travel time =    2.09 min.     TC =   12.80  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.720
Decimal fraction soil group A = 0.530
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.420
RI index for soil(AMC 2)  =  57.90
Pervious area fraction =  0.779; Impervious fraction =  0.221
Rainfall intensity =      2.806(In/Hr) for a   100.0 year storm
Subarea runoff =     28.487(CFS) for     14.100(Ac.)
Total runoff =     45.416(CFS)        Total area =      20.500(Ac.)
Street flow at end of street =     45.416(CFS)
Half street flow at end of street =     22.708(CFS)
Depth of flow =   0.417(Ft.), Average velocity =  10.184(Ft/s)
Flow width (from curb towards crown)=  14.502(Ft.)


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Process from Point/Station      308.000 to Point/Station      309.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1464.000(Ft.)
End of street segment elevation =  1446.000(Ft.)
Length of street segment  =  1834.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     69.066(CFS)
Depth of flow =   0.687(Ft.), Average velocity =   4.065(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    9.36(Ft.)
Streetflow hydraulics at midpoint of street travel:
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Halfstreet flow width =  22.000(Ft.)
Flow velocity =   4.06(Ft/s)
Travel time =    7.52 min.     TC =   20.32  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.806
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.160
Decimal fraction soil group C = 0.290
Decimal fraction soil group D = 0.550
RI index for soil(AMC 2)  =  70.20
Pervious area fraction =  0.506; Impervious fraction =  0.494
Rainfall intensity =      2.176(In/Hr) for a   100.0 year storm
Subarea runoff =     47.189(CFS) for     26.900(Ac.)
Total runoff =     92.606(CFS)        Total area =      47.400(Ac.)
Street flow at end of street =     92.606(CFS)
Half street flow at end of street =     46.303(CFS)
Depth of flow =   0.748(Ft.), Average velocity =   4.406(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   12.42(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      309.000 to Point/Station      310.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1446.000(Ft.)
End of street segment elevation =  1439.000(Ft.)
Length of street segment  =  1598.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =    169.658(CFS)
Depth of flow =   1.002(Ft.), Average velocity =   4.283(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   25.08(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   4.28(Ft/s)
Travel time =    6.22 min.     TC =   26.54  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.745
Decimal fraction soil group A = 0.110
Decimal fraction soil group B = 0.160
Decimal fraction soil group C = 0.210
Decimal fraction soil group D = 0.520
RI index for soil(AMC 2)  =  63.40
Pervious area fraction =  0.591; Impervious fraction =  0.409
Rainfall intensity =      1.879(In/Hr) for a   100.0 year storm
Subarea runoff =    153.958(CFS) for    109.900(Ac.)
Total runoff =    246.564(CFS)        Total area =     157.300(Ac.)
Street flow at end of street =    246.564(CFS)
Half street flow at end of street =    123.282(CFS)
Depth of flow =   1.136(Ft.), Average velocity =   4.974(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   31.81(Ft.)
```

```
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      309.000 to Point/Station      310.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    157.300(Ac.)
Runoff from this stream =    246.564(CFS)
Time of concentration =   26.54 min.
Rainfall intensity =     1.879(In/Hr)
Summary of stream data:

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


1      297.081     24.95                1.944
2      246.564     26.54                1.879
Largest stream flow has longer or shorter time of concentration
Qp =    297.081 + sum of
          Qa          Tb/Ta
         246.564 *    0.940 =    231.737
Qp =    528.818

Total of 2 streams to confluence:
Flow rates before confluence point:
     297.081     246.564
Area of streams before confluence:
      158.700      157.300
Results of confluence:
Total flow rate =    528.818(CFS)
Time of concentration =    24.947 min.
Effective stream area after confluence =    316.000(Ac.)
End of computations, total study area =          316.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.608
Area averaged RI index number =  67.1
```

APPENDIX B.4: AREA "D" – 100-YEAR STORM EVENT

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARDOFF.out

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
RATIONAL METHOD ANALYSIS, 100-YEAR STORM EVENT
FILENAME: ARDOFF

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

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

Program License Serial Number 6279

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

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

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

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

++

Process from Point/Station 401.000 to Point/Station 402.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 805.000(Ft.)
Top (of initial area) elevation = 1454.000(Ft.)
Bottom (of initial area) elevation = 1444.000(Ft.)
Difference in elevation = 10.000(Ft.)
Slope = 0.01242 s(percent)= 1.24
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.631 min.
Rainfall intensity = 2.711(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 15.091(CFS)
Total initial stream area = 6.800(Ac.)
Pervious area fraction = 0.500

++

Process from Point/Station 402.000 to Point/Station 403.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1444.000(Ft.)
End of street segment elevation = 1443.000(Ft.)
Length of street segment = 604.000(Ft.)

```
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     27.790(CFS)
Depth of flow =   0.683(Ft.), Average velocity =   1.660(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    9.16(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   1.66(Ft/s)
Travel time =    6.06 min.     TC =   19.70  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.214(In/Hr) for a   100.0 year storm
Subarea runoff =     25.287(CFS) for     14.200(Ac.)
Total runoff =     40.379(CFS)        Total area =      21.000(Ac.)
Street flow at end of street =     40.379(CFS)
Half street flow at end of street =     20.189(CFS)
Depth of flow =   0.762(Ft.), Average velocity =   1.839(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   13.09(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


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Process from Point/Station      403.000 to Point/Station      404.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1443.000(Ft.)
End of street segment elevation =  1438.000(Ft.)
Length of street segment  =   677.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     58.081(CFS)
Depth of flow =   0.681(Ft.), Average velocity =   3.496(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    9.06(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   3.50(Ft/s)
```

```
Travel time =    3.23 min.     TC =   22.92  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.795
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.060
Decimal fraction soil group C = 0.940
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  68.22
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.037(In/Hr) for a   100.0 year storm
Subarea runoff =     35.298(CFS) for     21.800(Ac.)
Total runoff =     75.677(CFS)        Total area =      42.800(Ac.)
Street flow at end of street =     75.677(CFS)
Half street flow at end of street =     37.839(CFS)
Depth of flow =   0.735(Ft.), Average velocity =   3.760(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   11.77(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)
End of computations, total study area =           42.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  68.6
```

APPENDIX B.5: AREA "E" – 100-YEAR STORM EVENT

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:AREOFF.out

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
RATIONAL METHOD ANALYSIS, 100-YEAR STORM EVENT
FILENAME: AREOFF

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

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

Program License Serial Number 6279

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

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

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

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

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 860.000(Ft.)
Top (of initial area) elevation = 1470.000(Ft.)
Bottom (of initial area) elevation = 1443.000(Ft.)
Difference in elevation = 27.000(Ft.)
Slope = 0.03140 s(percent)= 3.14
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.628 min.
Rainfall intensity = 2.959(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.791
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 58.60
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 12.644(CFS)
Total initial stream area = 5.400(Ac.)
Pervious area fraction = 0.500

++

Process from Point/Station 502.000 to Point/Station 505.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1443.000(Ft.)
End of street segment elevation = 1437.000(Ft.)
Length of street segment = 1055.000(Ft.)

```
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     29.708(CFS)
Depth of flow =   0.588(Ft.), Average velocity =   2.634(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    4.42(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   2.63(Ft/s)
Travel time =    6.67 min.     TC =   18.30  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.792
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.340
Decimal fraction soil group C = 0.660
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  64.58
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.306(In/Hr) for a   100.0 year storm
Subarea runoff =     33.949(CFS) for     18.600(Ac.)
Total runoff =     46.593(CFS)        Total area =      24.000(Ac.)
Street flow at end of street =     46.593(CFS)
Half street flow at end of street =     23.297(CFS)
Depth of flow =   0.664(Ft.), Average velocity =   2.992(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    8.21(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      505.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     24.000(Ac.)
Runoff from this stream =     46.593(CFS)
Time of concentration =   18.30 min.
Rainfall intensity =     2.306(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1467.000(Ft.)
Bottom (of initial area) elevation =  1444.000(Ft.)
Difference in elevation =    23.000(Ft.)
Slope =    0.03034  s(percent)=       3.03
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.131 min.
Rainfall intensity =      3.031(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.260
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  59.38
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     19.540(CFS)
Total initial stream area =        8.100(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1444.000(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   472.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     27.030(CFS)
Depth of flow =   0.492(Ft.), Average velocity =   3.908(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  18.252(Ft.)
Flow velocity =   3.91(Ft/s)
Travel time =    2.01 min.     TC =   13.14  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.50
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.766(In/Hr) for a   100.0 year storm
Subarea runoff =     14.809(CFS) for      6.700(Ac.)
Total runoff =     34.349(CFS)        Total area =      14.800(Ac.)
Street flow at end of street =     34.349(CFS)
Half street flow at end of street =     17.174(CFS)
Depth of flow =   0.534(Ft.), Average velocity =   3.995(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    1.69(Ft.)
Flow width (from curb towards crown)=  20.355(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     14.800(Ac.)
Runoff from this stream =     34.349(CFS)
Time of concentration =   13.14 min.
Rainfall intensity =     2.766(In/Hr)
Summary of stream data:

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


1       46.593     18.30                2.306
2       34.349     13.14                2.766
```

```
Largest stream flow has longer time of concentration
Qp =     46.593 + sum of
          Qb         Ia/Ib
          34.349 *    0.834 =     28.630
Qp =     75.224

Total of 2 streams to confluence:
Flow rates before confluence point:
      46.593      34.349
Area of streams before confluence:
       24.000       14.800
Results of confluence:
Total flow rate =     75.224(CFS)
Time of concentration =    18.302 min.
Effective stream area after confluence =     38.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      506.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1437.000(Ft.)
End of street segment elevation =  1436.000(Ft.)
Length of street segment  =  1019.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     76.099(CFS)
Depth of flow =   0.985(Ft.), Average velocity =   1.984(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   24.23(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   1.98(Ft/s)
Travel time =    8.56 min.     TC =   26.86  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.791
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.867(In/Hr) for a   100.0 year storm
Subarea runoff =      1.624(CFS) for      1.100(Ac.)
Total runoff =     76.848(CFS)       Total area =      39.900(Ac.)
Street flow at end of street =     76.848(CFS)
Half street flow at end of street =     38.424(CFS)
Depth of flow =   0.988(Ft.), Average velocity =   1.992(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   24.38(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)
End of computations, total study area =           39.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  62.5
```

APPENDIX B.6: AREA "F" – 100-YEAR STORM EVENT

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARFOFF.out

TRACT 37439 POST-PROJECT CONDITION OFFSITE HYDROLOGY
ULTIMATE CONDITION LAND USE
RATIONAL METHOD ANALYSIS, 100-YEAR STORM EVENT
FILENAME: ARFOFF

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

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

Program License Serial Number 6279

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

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

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

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

++

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

Initial area flow distance = 952.000(Ft.)
Top (of initial area) elevation = 1467.000(Ft.)
Bottom (of initial area) elevation = 1446.000(Ft.)
Difference in elevation = 21.000(Ft.)
Slope = 0.02206 s(percent)= 2.21
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.996 min.
Rainfall intensity = 2.783(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.650
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.350
RI index for soil(AMC 2) = 62.65
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 21.155(CFS)
Total initial stream area = 9.500(Ac.)
Pervious area fraction = 0.500

++

Process from Point/Station 602.000 to Point/Station 603.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1446.000(Ft.)
End of street segment elevation = 1438.000(Ft.)
Length of street segment = 1156.000(Ft.)

```
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     38.446(CFS)
Depth of flow =   0.614(Ft.), Average velocity =   3.042(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    5.68(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   3.04(Ft/s)
Travel time =    6.33 min.     TC =   19.33  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.150
Decimal fraction soil group B = 0.260
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.560
RI index for soil(AMC 2)  =  63.43
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.237(In/Hr) for a   100.0 year storm
Subarea runoff =     34.420(CFS) for     19.600(Ac.)
Total runoff =     55.575(CFS)        Total area =      29.100(Ac.)
Street flow at end of street =     55.575(CFS)
Half street flow at end of street =     27.788(CFS)
Depth of flow =   0.679(Ft.), Average velocity =   3.373(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    8.95(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      606.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1438.000(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   545.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     62.246(CFS)
Depth of flow =   0.847(Ft.), Average velocity =   2.209(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   17.35(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   2.21(Ft/s)
```

```
Travel time =    4.11 min.     TC =   23.44  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.730
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.060
Decimal fraction soil group D = 0.440
RI index for soil(AMC 2)  =  56.10
Pervious area fraction =  0.554; Impervious fraction =  0.446
Rainfall intensity =      2.012(In/Hr) for a   100.0 year storm
Subarea runoff =     13.215(CFS) for      9.000(Ac.)
Total runoff =     68.790(CFS)        Total area =      38.100(Ac.)
Street flow at end of street =     68.790(CFS)
Half street flow at end of street =     34.395(CFS)
Depth of flow =   0.871(Ft.), Average velocity =   2.299(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   18.53(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      606.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     38.100(Ac.)
Runoff from this stream =     68.790(CFS)
Time of concentration =   23.44 min.
Rainfall intensity =     2.012(In/Hr)


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Process from Point/Station      604.000 to Point/Station      605.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   919.000(Ft.)
Top (of initial area) elevation =  1494.000(Ft.)
Bottom (of initial area) elevation =  1448.000(Ft.)
Difference in elevation =    46.000(Ft.)
Slope =    0.05005  s(percent)=       5.01
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.387 min.
Rainfall intensity =      2.738(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.753
Decimal fraction soil group A = 0.220
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.780
RI index for soil(AMC 2)  =  65.54
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      8.457(CFS)
Total initial stream area =        4.100(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      606.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1448.000(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   753.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
```

```
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     20.786(CFS)
Depth of flow =   0.457(Ft.), Average velocity =   3.645(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.506(Ft.)
Flow velocity =   3.65(Ft/s)
Travel time =    3.44 min.     TC =   16.83  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.787
Decimal fraction soil group A = 0.410
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.590
RI index for soil(AMC 2)  =  77.30
Pervious area fraction =  0.898; Impervious fraction =  0.102
Rainfall intensity =      2.414(In/Hr) for a   100.0 year storm
Subarea runoff =     24.519(CFS) for     12.900(Ac.)
Total runoff =     32.976(CFS)        Total area =      17.000(Ac.)
Street flow at end of street =     32.976(CFS)
Half street flow at end of street =     16.488(CFS)
Depth of flow =   0.528(Ft.), Average velocity =   3.955(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    1.39(Ft.)
Flow width (from curb towards crown)=  20.057(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      606.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     17.000(Ac.)
Runoff from this stream =     32.976(CFS)
Time of concentration =   16.83 min.
Rainfall intensity =     2.414(In/Hr)
Summary of stream data:

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


1       68.790     23.44                2.012
2       32.976     16.83                2.414
Largest stream flow has longer time of concentration
Qp =     68.790 + sum of
          Qb         Ia/Ib
          32.976 *    0.833 =     27.482
Qp =     96.272

Total of 2 streams to confluence:
Flow rates before confluence point:
      68.790      32.976
Area of streams before confluence:
       38.100       17.000
Results of confluence:
Total flow rate =     96.272(CFS)
Time of concentration =    23.442 min.
Effective stream area after confluence =     55.100(Ac.)
End of computations, total study area =           55.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.624
Area averaged RI index number =  65.5
```

APPENDIX C: ONSITE POST-PROJECT RATIONAL METHOD HYDROLOGY ANALYSIS

APPENDIX C.1: AREA "A"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARA100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "A"
POST-PROJECT CONDITION
FN: ARA100.RRV

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

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

Program License Serial Number 6279

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

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

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

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

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 860.000(Ft.)
Top (of initial area) elevation = 1445.000(Ft.)
Bottom (of initial area) elevation = 1439.900(Ft.)
Difference in elevation = 5.100(Ft.)
Slope = 0.00593 s(percent)= 0.59
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.395 min.
Rainfall intensity = 2.536(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.774
Decimal fraction soil group A = 0.670
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.330
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 44.21
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 5.675(CFS)
Total initial stream area = 2.890(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 102.000 to Point/Station 105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1437.400(Ft.)
Downstream point/station elevation = 1436.500(Ft.)
Pipe length = 71.00(Ft.) Manning's N = 0.013

```
No. of pipes = 1  Required pipe flow  =     5.675(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.675(CFS)
Normal flow depth in pipe =    9.96(In.)
Flow top width inside pipe =   14.17(In.)
Critical Depth =   11.58(In.)
Pipe flow velocity =      6.55(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    15.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.890(Ac.)
Runoff from this stream =      5.675(CFS)
Time of concentration =   15.58 min.
Rainfall intensity =     2.520(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   935.000(Ft.)
Top (of initial area) elevation =  1445.500(Ft.)
Bottom (of initial area) elevation =  1439.900(Ft.)
Difference in elevation =     5.600(Ft.)
Slope =    0.00599  s(percent)=       0.60
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.887 min.
Rainfall intensity =      2.492(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.430
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.570
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.09
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      9.298(CFS)
Total initial stream area =        4.670(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1437.400(Ft.)
Downstream point/station elevation =  1436.500(Ft.)
Pipe length  =    28.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.298(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     9.298(CFS)
Normal flow depth in pipe =   10.17(In.)
Flow top width inside pipe =   14.02(In.)
Critical Depth =   13.98(In.)
Pipe flow velocity =     10.49(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    15.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
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The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.670(Ac.)
Runoff from this stream =      9.298(CFS)
Time of concentration =   15.93 min.
Rainfall intensity =     2.488(In/Hr)
Summary of stream data:

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


1        5.675     15.58               2.520
2        9.298     15.93               2.488
Largest stream flow has longer time of concentration
Qp =      9.298 + sum of
          Qb         Ia/Ib
           5.675 *    0.988 =      5.605
Qp =     14.903

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.675       9.298
Area of streams before confluence:
        2.890        4.670


Results of confluence:
Total flow rate =     14.903(CFS)
Time of concentration =    15.932 min.
Effective stream area after confluence  =      7.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1436.500(Ft.)
Downstream point/station elevation =  1436.000(Ft.)
Pipe length  =   129.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.903(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    14.903(CFS)
Normal flow depth in pipe =   17.81(In.)
Flow top width inside pipe =   25.59(In.)
Critical Depth =   16.14(In.)
Pipe flow velocity =      5.35(Ft/s)
Travel time through pipe =    0.40 min.
Time of concentration (TC) =    16.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.560(Ac.)
Runoff from this stream =     14.903(CFS)
Time of concentration =   16.33 min.
Rainfall intensity =     2.455(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   491.000(Ft.)
Top (of initial area) elevation =  1443.500(Ft.)
Bottom (of initial area) elevation =  1441.000(Ft.)
```

```
Difference in elevation =     2.500(Ft.)
Slope =    0.00509  s(percent)=       0.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.684 min.
Rainfall intensity =      2.821(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.759
Decimal fraction soil group A = 0.870
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  36.81
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.697(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1437.000(Ft.)
Downstream point/station elevation =  1436.000(Ft.)
Pipe length  =    69.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.697(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.697(CFS)
Normal flow depth in pipe =    6.90(In.)
Flow top width inside pipe =   11.86(In.)
Critical Depth =    8.45(In.)
Pipe flow velocity =      5.77(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    12.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.260(Ac.)
Runoff from this stream =      2.697(CFS)
Time of concentration =   12.88 min.
Rainfall intensity =     2.797(In/Hr)
Summary of stream data:

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


1       14.903     16.33               2.455
2        2.697     12.88               2.797
Largest stream flow has longer time of concentration
Qp =     14.903 + sum of
          Qb         Ia/Ib
           2.697 *    0.878 =      2.367
Qp =     17.270

Total of 2 main streams to confluence:
Flow rates before confluence point:
      14.903       2.697
Area of streams before confluence:
        7.560        1.260


Results of confluence:
Total flow rate =     17.270(CFS)
Time of concentration =    16.333 min.
Effective stream area after confluence  =      8.820(Ac.)
```

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Process from Point/Station      108.000 to Point/Station      108.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.488
Decimal fraction soil group A = 0.840
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  39.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.33 min.
Rainfall intensity =      2.455(In/Hr) for a   100.0 year storm
Subarea runoff =      0.528(CFS) for      0.440(Ac.)
Total runoff =     17.797(CFS)        Total area =       9.260(Ac.)
End of computations, total study area =            9.26 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.381
Area averaged RI index number =  47.4
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARA10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "A"
POST-PROJECT CONDITION
FN: ARA10.RRV

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

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

Program License Serial Number 6279

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 860.000(Ft.)
Top (of initial area) elevation = 1445.000(Ft.)
Bottom (of initial area) elevation = 1439.900(Ft.)
Difference in elevation = 5.100(Ft.)
Slope = 0.00593 s(percent)= 0.59
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.395 min.
Rainfall intensity = 1.665(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.742
Decimal fraction soil group A = 0.670
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.330
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 44.21
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 3.569(CFS)
Total initial stream area = 2.890(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 102.000 to Point/Station 105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1437.400(Ft.)
Downstream point/station elevation = 1436.500(Ft.)
Pipe length = 71.00(Ft.) Manning's N = 0.013

```
No. of pipes = 1  Required pipe flow  =     3.569(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.569(CFS)
Normal flow depth in pipe =    8.81(In.)
Flow top width inside pipe =   10.60(In.)
Critical Depth =    9.68(In.)
Pipe flow velocity =      5.77(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    15.60 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.890(Ac.)
Runoff from this stream =      3.569(CFS)
Time of concentration =   15.60 min.
Rainfall intensity =     1.653(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   935.000(Ft.)
Top (of initial area) elevation =  1445.500(Ft.)
Bottom (of initial area) elevation =  1439.900(Ft.)
Difference in elevation =     5.600(Ft.)
Slope =    0.00599  s(percent)=       0.60
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.887 min.
Rainfall intensity =      1.637(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.768
Decimal fraction soil group A = 0.430
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.570
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.09
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.871(CFS)
Total initial stream area =        4.670(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1437.400(Ft.)
Downstream point/station elevation =  1436.500(Ft.)
Pipe length  =    28.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.871(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.871(CFS)
Normal flow depth in pipe =    9.06(In.)
Flow top width inside pipe =   10.32(In.)
Critical depth could not be calculated.
Pipe flow velocity =      9.23(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    15.94 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.670(Ac.)
Runoff from this stream =      5.871(CFS)
Time of concentration =   15.94 min.
Rainfall intensity =     1.634(In/Hr)
Summary of stream data:

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


1        3.569     15.60               1.653
2        5.871     15.94               1.634
Largest stream flow has longer time of concentration
Qp =      5.871 + sum of
          Qb         Ia/Ib
           3.569 *    0.988 =      3.527
Qp =      9.398

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.569       5.871
Area of streams before confluence:
        2.890        4.670


Results of confluence:
Total flow rate =      9.398(CFS)
Time of concentration =    15.938 min.
Effective stream area after confluence  =      7.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1436.500(Ft.)
Downstream point/station elevation =  1436.000(Ft.)
Pipe length  =   129.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.398(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.398(CFS)
Normal flow depth in pipe =   16.38(In.)
Flow top width inside pipe =   17.39(In.)
Critical Depth =   13.68(In.)
Pipe flow velocity =      4.67(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    16.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.560(Ac.)
Runoff from this stream =      9.398(CFS)
Time of concentration =   16.40 min.
Rainfall intensity =     1.608(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   491.000(Ft.)
Top (of initial area) elevation =  1443.500(Ft.)
Bottom (of initial area) elevation =  1441.000(Ft.)
```

```
Difference in elevation =     2.500(Ft.)
Slope =    0.00509  s(percent)=       0.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.684 min.
Rainfall intensity =      1.852(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.726
Decimal fraction soil group A = 0.870
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  36.81
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.694(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1437.000(Ft.)
Downstream point/station elevation =  1436.000(Ft.)
Pipe length  =    69.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.694(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.694(CFS)
Normal flow depth in pipe =    6.38(In.)
Flow top width inside pipe =    8.18(In.)
Critical Depth =    7.17(In.)
Pipe flow velocity =      5.06(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    12.91 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.260(Ac.)
Runoff from this stream =      1.694(CFS)
Time of concentration =   12.91 min.
Rainfall intensity =     1.834(In/Hr)
Summary of stream data:

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


1        9.398     16.40               1.608
2        1.694     12.91               1.834
Largest stream flow has longer time of concentration
Qp =      9.398 + sum of
          Qb         Ia/Ib
           1.694 *    0.877 =      1.485
Qp =     10.883

Total of 2 main streams to confluence:
Flow rates before confluence point:
       9.398       1.694
Area of streams before confluence:
        7.560        1.260


Results of confluence:
Total flow rate =     10.883(CFS)
Time of concentration =    16.398 min.
Effective stream area after confluence  =      8.820(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      108.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.394
Decimal fraction soil group A = 0.840
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  39.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.40 min.
Rainfall intensity =      1.608(In/Hr) for a    10.0 year storm
Subarea runoff =      0.279(CFS) for      0.440(Ac.)
Total runoff =     11.162(CFS)        Total area =       9.260(Ac.)
End of computations, total study area =            9.26 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.381
Area averaged RI index number =  47.4
```

APPENDIX C.2: AREA "B"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARB100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "B"
POST-PROJECT CONDITION
FN: ARB100.RRV

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

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

Program License Serial Number 6279

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

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

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

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

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 853.000(Ft.)
Top (of initial area) elevation = 1444.700(Ft.)
Bottom (of initial area) elevation = 1438.500(Ft.)
Difference in elevation = 6.200(Ft.)
Slope = 0.00727 s(percent)= 0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.733 min.
Rainfall intensity = 2.598(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.260
Decimal fraction soil group C = 0.740
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 65.62
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 3.983(CFS)
Total initial stream area = 1.840(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 202.000 to Point/Station 208.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.500(Ft.)
Downstream point/station elevation = 1434.000(Ft.)
Pipe length = 151.00(Ft.) Manning's N = 0.013

```
No. of pipes = 1  Required pipe flow  =     3.983(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.983(CFS)
Normal flow depth in pipe =    8.53(In.)
Flow top width inside pipe =   14.86(In.)
Critical Depth =    9.69(In.)
Pipe flow velocity =      5.52(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    15.19 min.


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Process from Point/Station      202.000 to Point/Station      208.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.840(Ac.)
Runoff from this stream =      3.983(CFS)
Time of concentration =   15.19 min.
Rainfall intensity =     2.555(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1444.700(Ft.)
Bottom (of initial area) elevation =  1437.400(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.00730  s(percent)=       0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.687 min.
Rainfall intensity =      2.510(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.490
Decimal fraction soil group C = 0.340
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.34
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.470(CFS)
Total initial stream area =        3.190(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      208.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.400(Ft.)
Downstream point/station elevation =  1433.400(Ft.)
Pipe length  =    22.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.470(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.470(CFS)
Normal flow depth in pipe =    8.51(In.)
Flow top width inside pipe =   10.90(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.86(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    15.72 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      208.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
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The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.190(Ac.)
Runoff from this stream =      6.470(CFS)
Time of concentration =   15.72 min.
Rainfall intensity =     2.507(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   338.000(Ft.)
Top (of initial area) elevation =  1445.500(Ft.)
Bottom (of initial area) elevation =  1442.500(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00888  s(percent)=       0.89
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.775 min.
Rainfall intensity =      3.255(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.854(CFS)
Total initial stream area =        1.030(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1442.500(Ft.)
End of street segment elevation =  1437.400(Ft.)
Length of street segment  =   945.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      6.195(CFS)
Depth of flow =   0.374(Ft.), Average velocity =   1.867(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.378(Ft.)
Flow velocity =   1.87(Ft/s)
Travel time =    8.43 min.     TC =   18.21  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.750
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.75
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.312(In/Hr) for a   100.0 year storm
Subarea runoff =      6.484(CFS) for      3.390(Ac.)
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Total runoff =      9.337(CFS)        Total area =       4.420(Ac.)
Street flow at end of street =      9.337(CFS)
Half street flow at end of street =      4.669(CFS)
Depth of flow =   0.419(Ft.), Average velocity =   2.060(Ft/s)
Flow width (from curb towards crown)=  14.629(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.260
Decimal fraction soil group C = 0.610
Decimal fraction soil group D = 0.130
RI index for soil(AMC 2)  =  66.40
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    18.21 min.
Rainfall intensity =      2.312(In/Hr) for a   100.0 year storm
Subarea runoff =      3.564(CFS) for      1.860(Ac.)
Total runoff =     12.902(CFS)        Total area =       6.280(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1434.400(Ft.)
Downstream point/station elevation =  1433.400(Ft.)
Pipe length  =    30.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.902(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    12.902(CFS)
Normal flow depth in pipe =   10.80(In.)
Flow top width inside pipe =   17.63(In.)
Critical Depth =   16.17(In.)
Pipe flow velocity =     11.64(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    18.25 min.


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Process from Point/Station      207.000 to Point/Station      208.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      6.280(Ac.)
Runoff from this stream =     12.902(CFS)
Time of concentration =   18.25 min.
Rainfall intensity =     2.309(In/Hr)
Summary of stream data:

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


1        3.983     15.19               2.555
2        6.470     15.72               2.507
3       12.902     18.25               2.309
Largest stream flow has longer time of concentration
Qp =     12.902 + sum of
          Qb         Ia/Ib
           3.983 *    0.904 =      3.600
          Qb         Ia/Ib
           6.470 *    0.921 =      5.960
Qp =     22.462

Total of 3 main streams to confluence:
```

```
Flow rates before confluence point:
       3.983       6.470      12.902
Area of streams before confluence:
        1.840        3.190        6.280


Results of confluence:
Total flow rate =     22.462(CFS)
Time of concentration =    18.252 min.
Effective stream area after confluence  =     11.310(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      211.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.400(Ft.)
Downstream point/station elevation =  1432.700(Ft.)
Pipe length  =   227.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.462(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    22.462(CFS)
Normal flow depth in pipe =   24.23(In.)
Flow top width inside pipe =   23.64(In.)
Critical Depth =   19.34(In.)
Pipe flow velocity =      5.29(Ft/s)
Travel time through pipe =    0.72 min.
Time of concentration (TC) =    18.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      211.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.310(Ac.)
Runoff from this stream =     22.462(CFS)
Time of concentration =   18.97 min.
Rainfall intensity =     2.261(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   674.000(Ft.)
Top (of initial area) elevation =  1442.500(Ft.)
Bottom (of initial area) elevation =  1436.000(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00964  s(percent)=       0.96
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.671 min.
Rainfall intensity =      2.822(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.690
Decimal fraction soil group C = 0.310
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  60.03
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.306(CFS)
Total initial stream area =        1.850(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
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Downstream point/station elevation =  1432.700(Ft.)
Pipe length  =    30.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.306(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.306(CFS)
Normal flow depth in pipe =    8.95(In.)
Flow top width inside pipe =   14.72(In.)
Critical Depth =   10.09(In.)
Pipe flow velocity =      5.64(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    12.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.814
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    12.76 min.
Rainfall intensity =      2.812(In/Hr) for a   100.0 year storm
Subarea runoff =      0.893(CFS) for      0.390(Ac.)
Total runoff =      5.199(CFS)        Total area =       2.240(Ac.)


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Process from Point/Station      210.000 to Point/Station      211.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.240(Ac.)
Runoff from this stream =      5.199(CFS)
Time of concentration =   12.76 min.
Rainfall intensity =     2.812(In/Hr)
Summary of stream data:

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


1       22.462     18.97                 2.261
2        5.199     12.76                 2.812
Largest stream flow has longer time of concentration
Qp =     22.462 + sum of
          Qb         Ia/Ib
           5.199 *    0.804 =      4.180
Qp =     26.642

Total of 2 streams to confluence:
Flow rates before confluence point:
      22.462       5.199
Area of streams before confluence:
       11.310        2.240
Results of confluence:
Total flow rate =     26.642(CFS)
Time of concentration =    18.967 min.
Effective stream area after confluence =     13.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      222.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1432.700(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
```

```
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.642(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    26.642(CFS)
Normal flow depth in pipe =   23.86(In.)
Flow top width inside pipe =   29.54(In.)
Critical Depth =   20.55(In.)
Pipe flow velocity =      5.79(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    19.14 min.


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Process from Point/Station      211.000 to Point/Station      222.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     13.550(Ac.)
Runoff from this stream =     26.642(CFS)
Time of concentration =   19.14 min.
Rainfall intensity =     2.250(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   765.000(Ft.)
Top (of initial area) elevation =  1442.500(Ft.)
Bottom (of initial area) elevation =  1436.000(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00850  s(percent)=       0.85
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.671 min.
Rainfall intensity =      2.707(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.310
RI index for soil(AMC 2)  =  67.74
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.800(CFS)
Total initial stream area =        2.990(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      213.000 to Point/Station      214.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1432.700(Ft.)
Downstream point/station elevation =  1432.600(Ft.)
Pipe length  =    46.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.800(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     6.800(CFS)
Normal flow depth in pipe =   15.89(In.)
Flow top width inside pipe =   18.02(In.)
Critical Depth =   11.57(In.)
Pipe flow velocity =      3.49(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =    13.89 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      213.000 to Point/Station      214.000
**** SUBAREA FLOW ADDITION ****
```

```
CONDOMINIUM subarea type
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.520
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.440
RI index for soil(AMC 2)  =  64.88
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    13.89 min.
Rainfall intensity =      2.683(In/Hr) for a   100.0 year storm
Subarea runoff =      0.604(CFS) for      0.270(Ac.)
Total runoff =      7.403(CFS)        Total area =       3.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      214.000 to Point/Station      222.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1432.600(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    28.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.403(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.403(CFS)
Normal flow depth in pipe =   13.97(In.)
Flow top width inside pipe =   19.82(In.)
Critical Depth =   12.09(In.)
Pipe flow velocity =      4.35(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    14.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      214.000 to Point/Station      222.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.260(Ac.)
Runoff from this stream =      7.403(CFS)
Time of concentration =   14.00 min.
Rainfall intensity =     2.672(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      216.000 to Point/Station      217.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   789.000(Ft.)
Top (of initial area) elevation =  1438.000(Ft.)
Bottom (of initial area) elevation =  1436.000(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.00253  s(percent)=       0.25
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.630 min.
Rainfall intensity =      2.354(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.280
Decimal fraction soil group C = 0.190
Decimal fraction soil group D = 0.530
RI index for soil(AMC 2)  =  68.54
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.965(CFS)
Total initial stream area =        1.000(Ac.)
Pervious area fraction = 0.350
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      218.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.800(Ft.)
Pipe length  =    44.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.965(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.965(CFS)
Normal flow depth in pipe =    8.25(In.)
Flow top width inside pipe =   11.12(In.)
Critical Depth =    7.17(In.)
Pipe flow velocity =      3.41(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    17.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      218.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
CONDOMINIUM subarea type
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.320
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.650
RI index for soil(AMC 2)  =  68.74
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    17.84 min.
Rainfall intensity =      2.338(In/Hr) for a   100.0 year storm
Subarea runoff =      1.445(CFS) for      0.740(Ac.)
Total runoff =      3.410(CFS)        Total area =       1.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      221.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1432.800(Ft.)
Downstream point/station elevation =  1432.600(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.410(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.410(CFS)
Normal flow depth in pipe =    8.19(In.)
Flow top width inside pipe =   14.94(In.)
Critical Depth =    8.94(In.)
Pipe flow velocity =      4.98(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    17.92 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      221.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 3 in normal stream number 1
Stream flow area =      1.740(Ac.)
Runoff from this stream =      3.410(CFS)
Time of concentration =   17.92 min.
Rainfall intensity =     2.332(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      220.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   658.000(Ft.)
Top (of initial area) elevation =  1442.000(Ft.)
```

```
Bottom (of initial area) elevation =  1435.500(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00988  s(percent)=       0.99
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.490 min.
Rainfall intensity =      2.845(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.670
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  62.09
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     16.432(CFS)
Total initial stream area =        6.960(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      221.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.300(Ft.)
Downstream point/station elevation =  1432.600(Ft.)
Pipe length  =    42.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.432(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.432(CFS)
Normal flow depth in pipe =   14.25(In.)
Flow top width inside pipe =   19.62(In.)
Critical Depth =   17.90(In.)
Pipe flow velocity =      9.46(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    12.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      221.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 3 in normal stream number 2
Stream flow area =      6.960(Ac.)
Runoff from this stream =     16.432(CFS)
Time of concentration =   12.56 min.
Rainfall intensity =     2.836(In/Hr)
Summary of stream data:

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


1        3.410     17.92                2.332
2       16.432     12.56                2.836
Largest stream flow has longer or shorter time of concentration
Qp =     16.432 + sum of
          Qa          Tb/Ta
           3.410 *    0.701 =      2.390
Qp =     18.823

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.410      16.432
Area of streams before confluence:
        1.740        6.960
Results of confluence:
Total flow rate =     18.823(CFS)
Time of concentration =    12.564 min.
Effective stream area after confluence =      8.700(Ac.)
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Process from Point/Station      221.000 to Point/Station      222.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1432.600(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    20.52(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.823(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    18.823(CFS)
Normal flow depth in pipe =   19.50(In.)
Flow top width inside pipe =   24.19(In.)
Critical Depth =   18.20(In.)
Pipe flow velocity =      6.13(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    12.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      221.000 to Point/Station      222.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      8.700(Ac.)
Runoff from this stream =     18.823(CFS)
Time of concentration =   12.62 min.
Rainfall intensity =     2.829(In/Hr)
Summary of stream data:

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


1       26.642     19.14               2.250
2        7.403     14.00               2.672
3       18.823     12.62               2.829
Largest stream flow has longer time of concentration
Qp =     26.642 + sum of
          Qb         Ia/Ib
           7.403 *    0.842 =      6.233
          Qb         Ia/Ib
          18.823 *    0.795 =     14.969
Qp =     47.844

Total of 3 main streams to confluence:
Flow rates before confluence point:
      26.642       7.403      18.823
Area of streams before confluence:
       13.550        3.260        8.700


Results of confluence:
Total flow rate =     47.844(CFS)
Time of concentration =    19.140 min.
Effective stream area after confluence  =     25.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      221.000 to Point/Station      222.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.710
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.520
RI index for soil(AMC 2)  =  68.84
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    19.14 min.
```

```
Rainfall intensity =      2.250(In/Hr) for a   100.0 year storm
Subarea runoff =      1.485(CFS) for      0.930(Ac.)
Total runoff =     49.329(CFS)        Total area =      26.440(Ac.)
End of computations, total study area =           26.44 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.373
Area averaged RI index number =  63.8
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/19/18 File:ARB10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "B"
POST-PROJECT CONDITION
FN: ARB10.RRV

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

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

Program License Serial Number 6279

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 853.000(Ft.)
Top (of initial area) elevation = 1444.700(Ft.)
Bottom (of initial area) elevation = 1438.500(Ft.)
Difference in elevation = 6.200(Ft.)
Slope = 0.00727 s(percent)= 0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.733 min.
Rainfall intensity = 1.706(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.260
Decimal fraction soil group C = 0.740
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 65.62
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 2.538(CFS)
Total initial stream area = 1.840(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 202.000 to Point/Station 208.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.500(Ft.)
Downstream point/station elevation = 1434.000(Ft.)
Pipe length = 151.00(Ft.) Manning's N = 0.013

```
No. of pipes = 1  Required pipe flow  =     2.538(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.538(CFS)
Normal flow depth in pipe =    7.50(In.)
Flow top width inside pipe =   11.62(In.)
Critical Depth =    8.18(In.)
Pipe flow velocity =      4.91(Ft/s)
Travel time through pipe =    0.51 min.
Time of concentration (TC) =    15.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      208.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.840(Ac.)
Runoff from this stream =      2.538(CFS)
Time of concentration =   15.25 min.
Rainfall intensity =     1.674(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1444.700(Ft.)
Bottom (of initial area) elevation =  1437.400(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.00730  s(percent)=       0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.687 min.
Rainfall intensity =      1.648(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.779
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.490
Decimal fraction soil group C = 0.340
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.34
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.093(CFS)
Total initial stream area =        3.190(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      208.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.400(Ft.)
Downstream point/station elevation =  1433.400(Ft.)
Pipe length  =    22.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.093(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.093(CFS)
Normal flow depth in pipe =    6.28(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =   10.27(In.)
Pipe flow velocity =      9.85(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    15.72 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      208.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
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```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.190(Ac.)
Runoff from this stream =      4.093(CFS)
Time of concentration =   15.72 min.
Rainfall intensity =     1.646(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   338.000(Ft.)
Top (of initial area) elevation =  1445.500(Ft.)
Bottom (of initial area) elevation =  1442.500(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00888  s(percent)=       0.89
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.775 min.
Rainfall intensity =      2.138(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.831
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.830(CFS)
Total initial stream area =        1.030(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      206.000 to Point/Station      207.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1442.500(Ft.)
End of street segment elevation =  1437.400(Ft.)
Length of street segment  =   945.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.899(CFS)
Depth of flow =   0.330(Ft.), Average velocity =   1.676(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.179(Ft.)
Flow velocity =   1.68(Ft/s)
Travel time =    9.40 min.     TC =   19.17  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.750
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.75
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.476(In/Hr) for a    10.0 year storm
Subarea runoff =      3.999(CFS) for      3.390(Ac.)
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```
Total runoff =      5.828(CFS)        Total area =       4.420(Ac.)
Street flow at end of street =      5.828(CFS)
Half street flow at end of street =      2.914(CFS)
Depth of flow =   0.368(Ft.), Average velocity =   1.841(Ft/s)
Flow width (from curb towards crown)=  12.068(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.801
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.260
Decimal fraction soil group C = 0.610
Decimal fraction soil group D = 0.130
RI index for soil(AMC 2)  =  66.40
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    19.17 min.
Rainfall intensity =      1.476(In/Hr) for a    10.0 year storm
Subarea runoff =      2.199(CFS) for      1.860(Ac.)
Total runoff =      8.028(CFS)        Total area =       6.280(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.400(Ft.)
Downstream point/station elevation =  1433.400(Ft.)
Pipe length  =    30.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.028(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.028(CFS)
Normal flow depth in pipe =    9.08(In.)
Flow top width inside pipe =   14.66(In.)
Critical Depth =   13.39(In.)
Pipe flow velocity =     10.34(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    19.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      6.280(Ac.)
Runoff from this stream =      8.028(CFS)
Time of concentration =   19.22 min.
Rainfall intensity =     1.474(In/Hr)
Summary of stream data:

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


1        2.538     15.25               1.674
2        4.093     15.72               1.646
3        8.028     19.22               1.474
Largest stream flow has longer time of concentration
Qp =      8.028 + sum of
          Qb         Ia/Ib
           2.538 *    0.880 =      2.234
          Qb         Ia/Ib
           4.093 *    0.895 =      3.665
Qp =     13.927

Total of 3 main streams to confluence:
```

```
Flow rates before confluence point:
       2.538       4.093       8.028
Area of streams before confluence:
        1.840        3.190        6.280


Results of confluence:
Total flow rate =     13.927(CFS)
Time of concentration =    19.219 min.
Effective stream area after confluence  =     11.310(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      211.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.400(Ft.)
Downstream point/station elevation =  1432.700(Ft.)
Pipe length  =   227.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.927(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    13.927(CFS)
Normal flow depth in pipe =   18.42(In.)
Flow top width inside pipe =   25.14(In.)
Critical Depth =   15.57(In.)
Pipe flow velocity =      4.82(Ft/s)
Travel time through pipe =    0.79 min.
Time of concentration (TC) =    20.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      211.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.310(Ac.)
Runoff from this stream =     13.927(CFS)
Time of concentration =   20.00 min.
Rainfall intensity =     1.442(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   674.000(Ft.)
Top (of initial area) elevation =  1442.500(Ft.)
Bottom (of initial area) elevation =  1436.000(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00964  s(percent)=       0.96
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.671 min.
Rainfall intensity =      1.853(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.798
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.690
Decimal fraction soil group C = 0.310
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  60.03
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.736(CFS)
Total initial stream area =        1.850(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
```

```
Downstream point/station elevation =  1432.700(Ft.)
Pipe length  =    30.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.736(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.736(CFS)
Normal flow depth in pipe =    7.89(In.)
Flow top width inside pipe =   11.39(In.)
Critical Depth =    8.50(In.)
Pipe flow velocity =      5.00(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    12.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.786
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    12.77 min.
Rainfall intensity =      1.845(In/Hr) for a    10.0 year storm
Subarea runoff =      0.566(CFS) for      0.390(Ac.)
Total runoff =      3.302(CFS)        Total area =       2.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.240(Ac.)
Runoff from this stream =      3.302(CFS)
Time of concentration =   12.77 min.
Rainfall intensity =     1.845(In/Hr)
Summary of stream data:

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


1       13.927     20.00                1.442
2        3.302     12.77                1.845
Largest stream flow has longer time of concentration
Qp =     13.927 + sum of
          Qb         Ia/Ib
           3.302 *    0.781 =      2.579
Qp =     16.507

Total of 2 streams to confluence:
Flow rates before confluence point:
      13.927       3.302
Area of streams before confluence:
       11.310        2.240
Results of confluence:
Total flow rate =     16.507(CFS)
Time of concentration =    20.004 min.
Effective stream area after confluence =     13.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      222.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1432.700(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
```

```
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.507(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    16.507(CFS)
Normal flow depth in pipe =   20.48(In.)
Flow top width inside pipe =   23.11(In.)
Critical Depth =   17.02(In.)
Pipe flow velocity =      5.10(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    20.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      222.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     13.550(Ac.)
Runoff from this stream =     16.507(CFS)
Time of concentration =   20.20 min.
Rainfall intensity =     1.434(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   765.000(Ft.)
Top (of initial area) elevation =  1442.500(Ft.)
Bottom (of initial area) elevation =  1436.000(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00850  s(percent)=       0.85
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.671 min.
Rainfall intensity =      1.777(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.310
RI index for soil(AMC 2)  =  67.74
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.343(CFS)
Total initial stream area =        2.990(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      213.000 to Point/Station      214.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1432.700(Ft.)
Downstream point/station elevation =  1432.600(Ft.)
Pipe length  =    46.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.343(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.343(CFS)
Normal flow depth in pipe =   13.20(In.)
Flow top width inside pipe =   15.92(In.)
Critical Depth =    9.59(In.)
Pipe flow velocity =      3.13(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    13.92 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      213.000 to Point/Station      214.000
**** SUBAREA FLOW ADDITION ****
```

```
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.520
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.440
RI index for soil(AMC 2)  =  64.88
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    13.92 min.
Rainfall intensity =      1.760(In/Hr) for a    10.0 year storm
Subarea runoff =      0.384(CFS) for      0.270(Ac.)
Total runoff =      4.727(CFS)        Total area =       3.260(Ac.)


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Process from Point/Station      214.000 to Point/Station      222.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1432.600(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    28.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.727(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.727(CFS)
Normal flow depth in pipe =   11.66(In.)
Flow top width inside pipe =   17.20(In.)
Critical Depth =   10.03(In.)
Pipe flow velocity =      3.90(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    14.04 min.


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Process from Point/Station      214.000 to Point/Station      222.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.260(Ac.)
Runoff from this stream =      4.727(CFS)
Time of concentration =   14.04 min.
Rainfall intensity =     1.752(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      216.000 to Point/Station      217.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   789.000(Ft.)
Top (of initial area) elevation =  1438.000(Ft.)
Bottom (of initial area) elevation =  1436.000(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.00253  s(percent)=       0.25
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.630 min.
Rainfall intensity =      1.545(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.811
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.280
Decimal fraction soil group C = 0.190
Decimal fraction soil group D = 0.530
RI index for soil(AMC 2)  =  68.54
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.253(CFS)
Total initial stream area =        1.000(Ac.)
Pervious area fraction = 0.350
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      218.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.800(Ft.)
Pipe length  =    44.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.253(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.253(CFS)
Normal flow depth in pipe =    6.15(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    5.67(In.)
Pipe flow velocity =      3.09(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    17.87 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      218.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
CONDOMINIUM subarea type
Runoff Coefficient = 0.811
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.320
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.650
RI index for soil(AMC 2)  =  68.74
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    17.87 min.
Rainfall intensity =      1.534(In/Hr) for a    10.0 year storm
Subarea runoff =      0.920(CFS) for      0.740(Ac.)
Total runoff =      2.173(CFS)        Total area =       1.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      221.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1432.800(Ft.)
Downstream point/station elevation =  1432.600(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.173(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.173(CFS)
Normal flow depth in pipe =    7.17(In.)
Flow top width inside pipe =   11.77(In.)
Critical Depth =    7.57(In.)
Pipe flow velocity =      4.44(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    17.96 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      221.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 3 in normal stream number 1
Stream flow area =      1.740(Ac.)
Runoff from this stream =      2.173(CFS)
Time of concentration =   17.96 min.
Rainfall intensity =     1.530(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      220.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   658.000(Ft.)
Top (of initial area) elevation =  1442.000(Ft.)
```

```
Bottom (of initial area) elevation =  1435.500(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00988  s(percent)=       0.99
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.490 min.
Rainfall intensity =      1.868(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.670
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  62.09
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     10.459(CFS)
Total initial stream area =        6.960(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      221.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.300(Ft.)
Downstream point/station elevation =  1432.600(Ft.)
Pipe length  =    42.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.459(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.459(CFS)
Normal flow depth in pipe =   11.86(In.)
Flow top width inside pipe =   17.07(In.)
Critical Depth =   14.92(In.)
Pipe flow velocity =      8.47(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    12.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      221.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 3 in normal stream number 2
Stream flow area =      6.960(Ac.)
Runoff from this stream =     10.459(CFS)
Time of concentration =   12.57 min.
Rainfall intensity =     1.861(In/Hr)
Summary of stream data:

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


1        2.173     17.96                1.530
2       10.459     12.57                1.861
Largest stream flow has longer or shorter time of concentration
Qp =     10.459 + sum of
          Qa          Tb/Ta
           2.173 *    0.700 =      1.522
Qp =     11.980

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.173      10.459
Area of streams before confluence:
        1.740        6.960
Results of confluence:
Total flow rate =     11.980(CFS)
Time of concentration =    12.572 min.
Effective stream area after confluence =      8.700(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      221.000 to Point/Station      222.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1432.600(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    20.52(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.980(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    11.980(CFS)
Normal flow depth in pipe =   15.63(In.)
Flow top width inside pipe =   22.87(In.)
Critical Depth =   14.91(In.)
Pipe flow velocity =      5.53(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    12.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      221.000 to Point/Station      222.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      8.700(Ac.)
Runoff from this stream =     11.980(CFS)
Time of concentration =   12.63 min.
Rainfall intensity =     1.856(In/Hr)
Summary of stream data:

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


1       16.507     20.20               1.434
2        4.727     14.04               1.752
3       11.980     12.63               1.856
Largest stream flow has longer time of concentration
Qp =     16.507 + sum of
          Qb         Ia/Ib
           4.727 *    0.819 =      3.869
          Qb         Ia/Ib
          11.980 *    0.773 =      9.255
Qp =     29.631

Total of 3 main streams to confluence:
Flow rates before confluence point:
      16.507       4.727      11.980
Area of streams before confluence:
       13.550        3.260        8.700


Results of confluence:
Total flow rate =     29.631(CFS)
Time of concentration =    20.200 min.
Effective stream area after confluence  =     25.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      221.000 to Point/Station      222.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.633
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.520
RI index for soil(AMC 2)  =  68.84
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    20.20 min.
```

```
Rainfall intensity =      1.434(In/Hr) for a    10.0 year storm
Subarea runoff =      0.845(CFS) for      0.930(Ac.)
Total runoff =     30.476(CFS)        Total area =      26.440(Ac.)
End of computations, total study area =           26.44 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.373
Area averaged RI index number =  63.8
```

APPENDIX C.3: AREA "C"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARC100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "C"
POST-PROJECT CONDITION
FN: ARC100.RRV

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

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

TRI-8 Builders - S/N 615

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

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

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

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

++

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

Initial area flow distance = 958.000(Ft.)
Top (of initial area) elevation = 1445.800(Ft.)
Bottom (of initial area) elevation = 1439.000(Ft.)
Difference in elevation = 6.800(Ft.)
Slope = 0.00710 s(percent)= 0.71
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.507 min.
Rainfall intensity = 2.526(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.930
Decimal fraction soil group D = 0.070
RI index for soil(AMC 2) = 69.42
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 12.144(CFS)
Total initial stream area = 5.720(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 302.000 to Point/Station 308.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.000(Ft.)
Pipe length = 405.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 12.144(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 12.144(CFS)

```
Normal flow depth in pipe =   18.09(In.)
Flow top width inside pipe =   25.39(In.)
Critical Depth =   14.49(In.)
Pipe flow velocity =      4.29(Ft/s)
Travel time through pipe =    1.57 min.
Time of concentration (TC) =    17.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.720(Ac.)
Runoff from this stream =     12.144(CFS)
Time of concentration =   17.08 min.
Rainfall intensity =     2.395(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   999.000(Ft.)
Top (of initial area) elevation =  1445.900(Ft.)
Bottom (of initial area) elevation =  1439.200(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.00671  s(percent)=       0.67
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.949 min.
Rainfall intensity =      2.487(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.843
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.680
Decimal fraction soil group D = 0.320
RI index for soil(AMC 2)  =  70.92
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      7.088(CFS)
Total initial stream area =        3.380(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      304.000 to Point/Station      305.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1439.200(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   453.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      8.650(CFS)
Depth of flow =   0.416(Ft.), Average velocity =   1.943(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.491(Ft.)
Flow velocity =   1.94(Ft/s)
```

```
Travel time =    3.89 min.     TC =   19.84  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.970
Decimal fraction soil group D = 0.030
RI index for soil(AMC 2)  =  69.18
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.206(In/Hr) for a   100.0 year storm
Subarea runoff =      2.738(CFS) for      1.490(Ac.)
Total runoff =      9.826(CFS)        Total area =       4.870(Ac.)
Street flow at end of street =      9.826(CFS)
Half street flow at end of street =      4.913(CFS)
Depth of flow =   0.432(Ft.), Average velocity =   2.003(Ft/s)
Flow width (from curb towards crown)=  15.251(Ft.)


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Process from Point/Station      305.000 to Point/Station      308.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.826(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     9.826(CFS)
Normal flow depth in pipe =   10.73(In.)
Flow top width inside pipe =   13.53(In.)
Critical Depth =   14.16(In.)
Pipe flow velocity =     10.47(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    19.86 min.


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Process from Point/Station      305.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.870(Ac.)
Runoff from this stream =      9.826(CFS)
Time of concentration =   19.86 min.
Rainfall intensity =     2.204(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station      306.000 to Point/Station      307.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   948.000(Ft.)
Top (of initial area) elevation =  1443.400(Ft.)
Bottom (of initial area) elevation =  1437.000(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.00675  s(percent)=       0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.597 min.
Rainfall intensity =      2.518(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     13.272(CFS)
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Total initial stream area =        6.280(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      307.000 to Point/Station      308.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.272(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    13.272(CFS)
Normal flow depth in pipe =   13.71(In.)
Flow top width inside pipe =   15.34(In.)
Critical Depth =   16.33(In.)
Pipe flow velocity =      9.19(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    15.65 min.


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Process from Point/Station      307.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      6.280(Ac.)
Runoff from this stream =     13.272(CFS)
Time of concentration =   15.65 min.
Rainfall intensity =     2.513(In/Hr)
Summary of stream data:

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


1       12.144     17.08               2.395
2        9.826     19.86               2.204
3       13.272     15.65               2.513
Largest stream flow has longer or shorter time of concentration
Qp =     13.272 + sum of
          Qa          Tb/Ta
          12.144 *    0.916 =     11.124
          Qa          Tb/Ta
           9.826 *    0.788 =      7.741
Qp =     32.138

Total of 3 main streams to confluence:
Flow rates before confluence point:
      12.144       9.826      13.272
Area of streams before confluence:
        5.720        4.870        6.280


Results of confluence:
Total flow rate =     32.138(CFS)
Time of concentration =    15.646 min.
Effective stream area after confluence  =     16.870(Ac.)


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Process from Point/Station      308.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =   137.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    32.138(CFS)
Nearest computed pipe diameter  =     30.00(In.)
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Calculated individual pipe flow  =    32.138(CFS)
Normal flow depth in pipe =   22.59(In.)
Flow top width inside pipe =   25.87(In.)
Critical Depth =   23.18(In.)
Pipe flow velocity =      8.10(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    15.93 min.


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Process from Point/Station      308.000 to Point/Station      314.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.870(Ac.)
Runoff from this stream =     32.138(CFS)
Time of concentration =   15.93 min.
Rainfall intensity =     2.489(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      309.000 to Point/Station      310.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1448.500(Ft.)
Bottom (of initial area) elevation =  1440.000(Ft.)
Difference in elevation =     8.500(Ft.)
Slope =    0.00850  s(percent)=       0.85
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.217 min.
Rainfall intensity =      2.552(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.480
RI index for soil(AMC 2)  =  71.88
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.889(CFS)
Total initial stream area =        1.800(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      310.000 to Point/Station      311.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1440.000(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   548.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      4.569(CFS)
Depth of flow =   0.344(Ft.), Average velocity =   1.748(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.863(Ft.)
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Flow velocity =   1.75(Ft/s)
Travel time =    5.22 min.     TC =   20.44  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.670
Decimal fraction soil group D = 0.330
RI index for soil(AMC 2)  =  70.98
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.170(In/Hr) for a   100.0 year storm
Subarea runoff =      1.144(CFS) for      0.630(Ac.)
Total runoff =      5.033(CFS)        Total area =       2.430(Ac.)
Street flow at end of street =      5.033(CFS)
Half street flow at end of street =      2.516(CFS)
Depth of flow =   0.353(Ft.), Average velocity =   1.788(Ft/s)
Flow width (from curb towards crown)=  11.316(Ft.)


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Process from Point/Station      311.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.033(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.033(CFS)
Normal flow depth in pipe =    9.82(In.)
Flow top width inside pipe =    9.25(In.)
Critical Depth =   11.02(In.)
Pipe flow velocity =      7.31(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    20.50 min.


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Process from Point/Station      311.000 to Point/Station      314.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.430(Ac.)
Runoff from this stream =      5.033(CFS)
Time of concentration =   20.50 min.
Rainfall intensity =     2.166(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station      312.000 to Point/Station      313.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   869.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1437.000(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.00690  s(percent)=       0.69
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.996 min.
Rainfall intensity =      2.573(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.910
Decimal fraction soil group D = 0.090
RI index for soil(AMC 2)  =  69.54
Pervious area fraction =  0.350; Impervious fraction =  0.650
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Initial subarea runoff =      4.591(CFS)
Total initial stream area =        2.120(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      313.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    13.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.591(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.591(CFS)
Normal flow depth in pipe =    7.10(In.)
Flow top width inside pipe =   11.80(In.)
Critical Depth =   10.72(In.)
Pipe flow velocity =      9.49(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    15.02 min.


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Process from Point/Station      313.000 to Point/Station      314.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.120(Ac.)
Runoff from this stream =      4.591(CFS)
Time of concentration =   15.02 min.
Rainfall intensity =     2.570(In/Hr)
Summary of stream data:

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


1       32.138     15.93               2.489
2        5.033     20.50               2.166
3        4.591     15.02               2.570
Largest stream flow has longer or shorter time of concentration
Qp =     32.138 + sum of
          Qa          Tb/Ta
           5.033 *    0.777 =      3.911
          Qb          Ia/Ib
           4.591 *    0.968 =      4.445
Qp =     40.493

Total of 3 main streams to confluence:
Flow rates before confluence point:
      32.138       5.033       4.591
Area of streams before confluence:
       16.870        2.430        2.120


Results of confluence:
Total flow rate =     40.493(CFS)
Time of concentration =    15.928 min.
Effective stream area after confluence  =     21.420(Ac.)


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Process from Point/Station      314.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.493(CFS)
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Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    40.493(CFS)
Normal flow depth in pipe =   23.13(In.)
Flow top width inside pipe =   30.22(In.)
Critical Depth =   25.39(In.)
Pipe flow velocity =      9.10(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    16.04 min.


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Process from Point/Station      314.000 to Point/Station      324.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     21.420(Ac.)
Runoff from this stream =     40.493(CFS)
Time of concentration =   16.04 min.
Rainfall intensity =     2.479(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      315.000 to Point/Station      316.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   466.000(Ft.)
Top (of initial area) elevation =  1440.200(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     3.700(Ft.)
Slope =    0.00794  s(percent)=       0.79
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.366 min.
Rainfall intensity =      2.996(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.790
Decimal fraction soil group D = 0.210
RI index for soil(AMC 2)  =  70.26
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.464(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      316.000 to Point/Station      319.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.464(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.464(CFS)
Normal flow depth in pipe =    8.04(In.)
Flow top width inside pipe =   11.29(In.)
Critical Depth =    9.54(In.)
Pipe flow velocity =      6.19(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    11.45 min.


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Process from Point/Station      316.000 to Point/Station      319.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
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Stream flow area =      1.360(Ac.)
Runoff from this stream =      3.464(CFS)
Time of concentration =   11.45 min.
Rainfall intensity =     2.984(In/Hr)


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Process from Point/Station      317.000 to Point/Station      318.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   475.000(Ft.)
Top (of initial area) elevation =  1440.500(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00842  s(percent)=       0.84
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.319 min.
Rainfall intensity =      3.003(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.240
Decimal fraction soil group D = 0.380
RI index for soil(AMC 2)  =  66.34
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.044(CFS)
Total initial stream area =        2.390(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      318.000 to Point/Station      319.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.044(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.044(CFS)
Normal flow depth in pipe =    9.57(In.)
Flow top width inside pipe =   14.41(In.)
Critical Depth =   11.92(In.)
Pipe flow velocity =      7.31(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    11.39 min.


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Process from Point/Station      318.000 to Point/Station      319.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.390(Ac.)
Runoff from this stream =      6.044(CFS)
Time of concentration =   11.39 min.
Rainfall intensity =     2.993(In/Hr)
Summary of stream data:

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


1        3.464     11.45                2.984
2        6.044     11.39                2.993
Largest stream flow has longer or shorter time of concentration
Qp =      6.044 + sum of
          Qa          Tb/Ta
           3.464 *    0.994 =      3.444
Qp =      9.488
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
       3.464       6.044
Area of streams before confluence:
        1.360        2.390
Results of confluence:
Total flow rate =      9.488(CFS)
Time of concentration =    11.390 min.
Effective stream area after confluence =      3.750(Ac.)


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Process from Point/Station      319.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   188.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.488(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.488(CFS)
Normal flow depth in pipe =   14.48(In.)
Flow top width inside pipe =   19.43(In.)
Critical Depth =   13.76(In.)
Pipe flow velocity =      5.36(Ft/s)
Travel time through pipe =    0.58 min.
Time of concentration (TC) =    11.97 min.


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Process from Point/Station      319.000 to Point/Station      324.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.750(Ac.)
Runoff from this stream =      9.488(CFS)
Time of concentration =   11.97 min.
Rainfall intensity =     2.912(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   703.000(Ft.)
Top (of initial area) elevation =  1445.500(Ft.)
Bottom (of initial area) elevation =  1440.000(Ft.)
Difference in elevation =     5.500(Ft.)
Slope =    0.00782  s(percent)=       0.78
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.437 min.
Rainfall intensity =      2.733(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.843
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.028(CFS)
Total initial stream area =        0.880(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      321.000 to Point/Station      322.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
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Top of street segment elevation =  1440.000(Ft.)
End of street segment elevation =  1436.500(Ft.)
Length of street segment  =   701.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.881(CFS)
Depth of flow =   0.308(Ft.), Average velocity =   1.519(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.064(Ft.)
Flow velocity =   1.52(Ft/s)
Travel time =    7.69 min.     TC =   21.13  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.460
Decimal fraction soil group D = 0.540
RI index for soil(AMC 2)  =  72.24
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.131(In/Hr) for a   100.0 year storm
Subarea runoff =      1.323(CFS) for      0.740(Ac.)
Total runoff =      3.351(CFS)        Total area =       1.620(Ac.)
Street flow at end of street =      3.351(CFS)
Half street flow at end of street =      1.675(CFS)
Depth of flow =   0.321(Ft.), Average velocity =   1.572(Ft/s)
Flow width (from curb towards crown)=   9.692(Ft.)


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Process from Point/Station      322.000 to Point/Station      323.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.351(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.351(CFS)
Normal flow depth in pipe =    6.91(In.)
Flow top width inside pipe =   11.86(In.)
Critical Depth =    9.40(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    21.23 min.


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Process from Point/Station      323.000 to Point/Station      323.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
CONDOMINIUM subarea type
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.070
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.930
RI index for soil(AMC 2)  =  73.67
Pervious area fraction =  0.350; Impervious fraction =  0.650
```

```
Time of concentration =    21.23 min.
Rainfall intensity =      2.125(In/Hr) for a   100.0 year storm
Subarea runoff =      0.770(CFS) for      0.430(Ac.)
Total runoff =      4.120(CFS)        Total area =       2.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    26.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.120(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.120(CFS)
Normal flow depth in pipe =    6.63(In.)
Flow top width inside pipe =   11.93(In.)
Critical Depth =   10.28(In.)
Pipe flow velocity =      9.26(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    21.28 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.050(Ac.)
Runoff from this stream =      4.120(CFS)
Time of concentration =   21.28 min.
Rainfall intensity =     2.122(In/Hr)
Summary of stream data:

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


1       40.493     16.04               2.479
2        9.488     11.97               2.912
3        4.120     21.28               2.122
Largest stream flow has longer or shorter time of concentration
Qp =     40.493 + sum of
          Qb         Ia/Ib
           9.488 *    0.852 =      8.080
          Qa          Tb/Ta
           4.120 *    0.754 =      3.105
Qp =     51.678

Total of 3 main streams to confluence:
Flow rates before confluence point:
      40.493       9.488       4.120
Area of streams before confluence:
       21.420        3.750        2.050


Results of confluence:
Total flow rate =     51.678(CFS)
Time of concentration =    16.038 min.
Effective stream area after confluence  =     27.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      324.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.000
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```
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.800
RI index for soil(AMC 2)  =  74.73
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.04 min.
Rainfall intensity =      2.479(In/Hr) for a   100.0 year storm
Subarea runoff =      2.322(CFS) for      1.230(Ac.)
Total runoff =     54.000(CFS)        Total area =      28.450(Ac.)
End of computations, total study area =           28.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.378
Area averaged RI index number =  69.8
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARC10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "C"
POST-PROJECT CONDITION
FN: ARC10.RRV

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

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

TRI-8 Builders - S/N 615

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

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

Initial area flow distance = 958.000(Ft.)
Top (of initial area) elevation = 1445.800(Ft.)
Bottom (of initial area) elevation = 1439.000(Ft.)
Difference in elevation = 6.800(Ft.)
Slope = 0.00710 s(percent)= 0.71
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.507 min.
Rainfall intensity = 1.659(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.930
Decimal fraction soil group D = 0.070
RI index for soil(AMC 2) = 69.42
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 7.756(CFS)
Total initial stream area = 5.720(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 302.000 to Point/Station 308.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.000(Ft.)
Pipe length = 405.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.756(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 7.756(CFS)

```
Normal flow depth in pipe =   16.92(In.)
Flow top width inside pipe =   16.61(In.)
Critical Depth =   12.39(In.)
Pipe flow velocity =      3.73(Ft/s)
Travel time through pipe =    1.81 min.
Time of concentration (TC) =    17.32 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.720(Ac.)
Runoff from this stream =      7.756(CFS)
Time of concentration =   17.32 min.
Rainfall intensity =     1.561(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      303.000 to Point/Station      304.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   999.000(Ft.)
Top (of initial area) elevation =  1445.900(Ft.)
Bottom (of initial area) elevation =  1439.200(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.00671  s(percent)=       0.67
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.949 min.
Rainfall intensity =      1.633(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.680
Decimal fraction soil group D = 0.320
RI index for soil(AMC 2)  =  70.92
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.532(CFS)
Total initial stream area =        3.380(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      304.000 to Point/Station      305.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1439.200(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   453.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.531(CFS)
Depth of flow =   0.368(Ft.), Average velocity =   1.746(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.070(Ft.)
Flow velocity =   1.75(Ft/s)
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Travel time =    4.32 min.     TC =   20.27  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.970
Decimal fraction soil group D = 0.030
RI index for soil(AMC 2)  =  69.18
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.431(In/Hr) for a    10.0 year storm
Subarea runoff =      1.722(CFS) for      1.490(Ac.)
Total runoff =      6.254(CFS)        Total area =       4.870(Ac.)
Street flow at end of street =      6.254(CFS)
Half street flow at end of street =      3.127(CFS)
Depth of flow =   0.381(Ft.), Average velocity =   1.798(Ft/s)
Flow width (from curb towards crown)=  12.699(Ft.)


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Process from Point/Station      305.000 to Point/Station      308.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.254(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.254(CFS)
Normal flow depth in pipe =    9.75(In.)
Flow top width inside pipe =    9.37(In.)
Critical depth could not be calculated.
Pipe flow velocity =      9.14(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    20.30 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.870(Ac.)
Runoff from this stream =      6.254(CFS)
Time of concentration =   20.30 min.
Rainfall intensity =     1.430(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   948.000(Ft.)
Top (of initial area) elevation =  1443.400(Ft.)
Bottom (of initial area) elevation =  1437.000(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.00675  s(percent)=       0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.597 min.
Rainfall intensity =      1.653(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      8.474(CFS)
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```
Total initial stream area =        6.280(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      308.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.474(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.474(CFS)
Normal flow depth in pipe =   11.84(In.)
Flow top width inside pipe =   12.24(In.)
Critical Depth =   13.63(In.)
Pipe flow velocity =      8.16(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    15.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      308.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      6.280(Ac.)
Runoff from this stream =      8.474(CFS)
Time of concentration =   15.65 min.
Rainfall intensity =     1.650(In/Hr)
Summary of stream data:

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


1        7.756     17.32               1.561
2        6.254     20.30               1.430
3        8.474     15.65               1.650
Largest stream flow has longer or shorter time of concentration
Qp =      8.474 + sum of
          Qa          Tb/Ta
           7.756 *    0.904 =      7.011
          Qa          Tb/Ta
           6.254 *    0.771 =      4.822
Qp =     20.307

Total of 3 main streams to confluence:
Flow rates before confluence point:
       7.756       6.254       8.474
Area of streams before confluence:
        5.720        4.870        6.280


Results of confluence:
Total flow rate =     20.307(CFS)
Time of concentration =    15.652 min.
Effective stream area after confluence  =     16.870(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      308.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =   137.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.307(CFS)
Nearest computed pipe diameter  =     24.00(In.)
```

```
Calculated individual pipe flow  =    20.307(CFS)
Normal flow depth in pipe =   21.00(In.)
Flow top width inside pipe =   15.87(In.)
Critical Depth =   19.41(In.)
Pipe flow velocity =      6.97(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =    15.98 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      308.000 to Point/Station      314.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.870(Ac.)
Runoff from this stream =     20.307(CFS)
Time of concentration =   15.98 min.
Rainfall intensity =     1.631(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      309.000 to Point/Station      310.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1448.500(Ft.)
Bottom (of initial area) elevation =  1440.000(Ft.)
Difference in elevation =     8.500(Ft.)
Slope =    0.00850  s(percent)=       0.85
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.217 min.
Rainfall intensity =      1.676(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.480
RI index for soil(AMC 2)  =  71.88
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.489(CFS)
Total initial stream area =        1.800(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      311.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1440.000(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   548.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.925(CFS)
Depth of flow =   0.305(Ft.), Average velocity =   1.580(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.939(Ft.)
```

```
Flow velocity =   1.58(Ft/s)
Travel time =    5.78 min.     TC =   21.00  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.670
Decimal fraction soil group D = 0.330
RI index for soil(AMC 2)  =  70.98
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.404(In/Hr) for a    10.0 year storm
Subarea runoff =      0.718(CFS) for      0.630(Ac.)
Total runoff =      3.207(CFS)        Total area =       2.430(Ac.)
Street flow at end of street =      3.207(CFS)
Half street flow at end of street =      1.604(CFS)
Depth of flow =   0.313(Ft.), Average velocity =   1.613(Ft/s)
Flow width (from curb towards crown)=   9.315(Ft.)


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Process from Point/Station      311.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.207(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.207(CFS)
Normal flow depth in pipe =    6.96(In.)
Flow top width inside pipe =   11.85(In.)
Critical Depth =    9.21(In.)
Pipe flow velocity =      6.80(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    21.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      314.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.430(Ac.)
Runoff from this stream =      3.207(CFS)
Time of concentration =   21.06 min.
Rainfall intensity =     1.402(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      312.000 to Point/Station      313.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   869.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1437.000(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.00690  s(percent)=       0.69
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.996 min.
Rainfall intensity =      1.689(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.910
Decimal fraction soil group D = 0.090
RI index for soil(AMC 2)  =  69.54
Pervious area fraction =  0.350; Impervious fraction =  0.650
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Initial subarea runoff =      2.933(CFS)
Total initial stream area =        2.120(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      313.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    13.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.933(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.933(CFS)
Normal flow depth in pipe =    6.70(In.)
Flow top width inside pipe =    7.85(In.)
Critical depth could not be calculated.
Pipe flow velocity =      8.32(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    15.02 min.


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Process from Point/Station      313.000 to Point/Station      314.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.120(Ac.)
Runoff from this stream =      2.933(CFS)
Time of concentration =   15.02 min.
Rainfall intensity =     1.688(In/Hr)
Summary of stream data:

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


1       20.307     15.98               1.631
2        3.207     21.06               1.402
3        2.933     15.02               1.688
Largest stream flow has longer or shorter time of concentration
Qp =     20.307 + sum of
          Qa          Tb/Ta
           3.207 *    0.759 =      2.434
          Qb         Ia/Ib
           2.933 *    0.967 =      2.835
Qp =     25.576

Total of 3 main streams to confluence:
Flow rates before confluence point:
      20.307       3.207       2.933
Area of streams before confluence:
       16.870        2.430        2.120


Results of confluence:
Total flow rate =     25.576(CFS)
Time of concentration =    15.980 min.
Effective stream area after confluence  =     21.420(Ac.)


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Process from Point/Station      314.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.576(CFS)
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Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    25.576(CFS)
Normal flow depth in pipe =   20.11(In.)
Flow top width inside pipe =   23.54(In.)
Critical Depth =   21.20(In.)
Pipe flow velocity =      8.05(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    16.10 min.


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Process from Point/Station      314.000 to Point/Station      324.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     21.420(Ac.)
Runoff from this stream =     25.576(CFS)
Time of concentration =   16.10 min.
Rainfall intensity =     1.624(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      316.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   466.000(Ft.)
Top (of initial area) elevation =  1440.200(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     3.700(Ft.)
Slope =    0.00794  s(percent)=       0.79
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.366 min.
Rainfall intensity =      1.968(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.790
Decimal fraction soil group D = 0.210
RI index for soil(AMC 2)  =  70.26
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.220(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      316.000 to Point/Station      319.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.220(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.220(CFS)
Normal flow depth in pipe =    6.05(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    7.64(In.)
Pipe flow velocity =      5.60(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    11.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      316.000 to Point/Station      319.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
```

```
Stream flow area =      1.360(Ac.)
Runoff from this stream =      2.220(CFS)
Time of concentration =   11.46 min.
Rainfall intensity =     1.958(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      317.000 to Point/Station      318.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   475.000(Ft.)
Top (of initial area) elevation =  1440.500(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00842  s(percent)=       0.84
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.319 min.
Rainfall intensity =      1.972(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.240
Decimal fraction soil group D = 0.380
RI index for soil(AMC 2)  =  66.34
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.863(CFS)
Total initial stream area =        2.390(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      318.000 to Point/Station      319.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.863(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.863(CFS)
Normal flow depth in pipe =    8.53(In.)
Flow top width inside pipe =   10.88(In.)
Critical Depth =   10.02(In.)
Pipe flow velocity =      6.47(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    11.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      318.000 to Point/Station      319.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.390(Ac.)
Runoff from this stream =      3.863(CFS)
Time of concentration =   11.40 min.
Rainfall intensity =     1.964(In/Hr)
Summary of stream data:

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


1        2.220     11.46                1.958
2        3.863     11.40                1.964
Largest stream flow has longer or shorter time of concentration
Qp =      3.863 + sum of
          Qa          Tb/Ta
           2.220 *    0.994 =      2.208
Qp =      6.070
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
       2.220       3.863
Area of streams before confluence:
        1.360        2.390
Results of confluence:
Total flow rate =      6.070(CFS)
Time of concentration =    11.399 min.
Effective stream area after confluence =      3.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      319.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   188.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.070(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.070(CFS)
Normal flow depth in pipe =   12.09(In.)
Flow top width inside pipe =   16.90(In.)
Critical Depth =   11.42(In.)
Pipe flow velocity =      4.81(Ft/s)
Travel time through pipe =    0.65 min.
Time of concentration (TC) =    12.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      319.000 to Point/Station      324.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.750(Ac.)
Runoff from this stream =      6.070(CFS)
Time of concentration =   12.05 min.
Rainfall intensity =     1.905(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   703.000(Ft.)
Top (of initial area) elevation =  1445.500(Ft.)
Bottom (of initial area) elevation =  1440.000(Ft.)
Difference in elevation =     5.500(Ft.)
Slope =    0.00782  s(percent)=       0.78
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.437 min.
Rainfall intensity =      1.794(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.297(CFS)
Total initial stream area =        0.880(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      321.000 to Point/Station      322.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
```

```
Top of street segment elevation =  1440.000(Ft.)
End of street segment elevation =  1436.500(Ft.)
Length of street segment  =   701.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      1.842(CFS)
Depth of flow =   0.274(Ft.), Average velocity =   1.379(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.357(Ft.)
Flow velocity =   1.38(Ft/s)
Travel time =    8.47 min.     TC =   21.91  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.814
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.460
Decimal fraction soil group D = 0.540
RI index for soil(AMC 2)  =  72.24
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.371(In/Hr) for a    10.0 year storm
Subarea runoff =      0.826(CFS) for      0.740(Ac.)
Total runoff =      2.123(CFS)        Total area =       1.620(Ac.)
Street flow at end of street =      2.123(CFS)
Half street flow at end of street =      1.062(CFS)
Depth of flow =   0.284(Ft.), Average velocity =   1.421(Ft/s)
Flow width (from curb towards crown)=   7.877(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      322.000 to Point/Station      323.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.123(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.123(CFS)
Normal flow depth in pipe =    6.43(In.)
Flow top width inside pipe =    8.13(In.)
Critical Depth =    7.88(In.)
Pipe flow velocity =      6.28(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    22.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      323.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
CONDOMINIUM subarea type
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.070
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.930
RI index for soil(AMC 2)  =  73.67
Pervious area fraction =  0.350; Impervious fraction =  0.650
```

```
Time of concentration =    22.03 min.
Rainfall intensity =      1.367(In/Hr) for a    10.0 year storm
Subarea runoff =      0.481(CFS) for      0.430(Ac.)
Total runoff =      2.604(CFS)        Total area =       2.050(Ac.)


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Process from Point/Station      323.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    26.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.604(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.604(CFS)
Normal flow depth in pipe =    6.11(In.)
Flow top width inside pipe =    8.41(In.)
Critical Depth =    8.40(In.)
Pipe flow velocity =      8.16(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    22.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.050(Ac.)
Runoff from this stream =      2.604(CFS)
Time of concentration =   22.08 min.
Rainfall intensity =     1.365(In/Hr)
Summary of stream data:

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


1       25.576     16.10               1.624
2        6.070     12.05               1.905
3        2.604     22.08               1.365
Largest stream flow has longer or shorter time of concentration
Qp =     25.576 + sum of
          Qb         Ia/Ib
           6.070 *    0.853 =      5.175
          Qa          Tb/Ta
           2.604 *    0.729 =      1.899
Qp =     32.651

Total of 3 main streams to confluence:
Flow rates before confluence point:
      25.576       6.070       2.604
Area of streams before confluence:
       21.420        3.750        2.050


Results of confluence:
Total flow rate =     32.651(CFS)
Time of concentration =    16.104 min.
Effective stream area after confluence  =     27.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      324.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.704
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.800
RI index for soil(AMC 2)  =  74.73
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.10 min.
Rainfall intensity =      1.624(In/Hr) for a    10.0 year storm
Subarea runoff =      1.407(CFS) for      1.230(Ac.)
Total runoff =     34.059(CFS)        Total area =      28.450(Ac.)
End of computations, total study area =           28.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.378
Area averaged RI index number =  69.8
```

APPENDIX C.4: AREA "D"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARD100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "D"
POST-PROJECT CONDITION
FN: ARD100.RRV

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

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

TRI-8 Builders - S/N 615

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

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

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

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

++

Process from Point/Station 401.000 to Point/Station 402.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 993.000(Ft.)
Top (of initial area) elevation = 1445.900(Ft.)
Bottom (of initial area) elevation = 1437.000(Ft.)
Difference in elevation = 8.900(Ft.)
Slope = 0.00896 s(percent)= 0.90
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.014 min.
Rainfall intensity = 2.571(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.560
Decimal fraction soil group D = 0.440
RI index for soil(AMC 2) = 71.64
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 7.659(CFS)
Total initial stream area = 3.520(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 402.000 to Point/Station 405.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.500(Ft.)
Pipe length = 86.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.659(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 7.659(CFS)

```
Normal flow depth in pipe =   14.09(In.)
Flow top width inside pipe =   14.85(In.)
Critical Depth =   12.87(In.)
Pipe flow velocity =      5.16(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    15.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      405.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.520(Ac.)
Runoff from this stream =      7.659(CFS)
Time of concentration =   15.29 min.
Rainfall intensity =     2.545(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   934.000(Ft.)
Top (of initial area) elevation =  1448.500(Ft.)
Bottom (of initial area) elevation =  1443.500(Ft.)
Difference in elevation =     5.000(Ft.)
Slope =    0.00535  s(percent)=       0.54
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.241 min.
Rainfall intensity =      2.462(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.440
Decimal fraction soil group D = 0.560
RI index for soil(AMC 2)  =  72.36
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.145(CFS)
Total initial stream area =        1.510(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      405.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1443.500(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   706.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      9.145(CFS)
Depth of flow =   0.387(Ft.), Average velocity =   2.511(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.016(Ft.)
Flow velocity =   2.51(Ft/s)
```

```
Travel time =    4.69 min.     TC =   20.93  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.460
Decimal fraction soil group D = 0.540
RI index for soil(AMC 2)  =  72.24
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.142(In/Hr) for a   100.0 year storm
Subarea runoff =     10.353(CFS) for      5.760(Ac.)
Total runoff =     13.498(CFS)        Total area =       7.270(Ac.)
Street flow at end of street =     13.498(CFS)
Half street flow at end of street =      6.749(CFS)
Depth of flow =   0.431(Ft.), Average velocity =   2.757(Ft/s)
Flow width (from curb towards crown)=  15.237(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      405.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.270(Ac.)
Runoff from this stream =     13.498(CFS)
Time of concentration =   20.93 min.
Rainfall intensity =     2.142(In/Hr)
Summary of stream data:

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


1        7.659     15.29               2.545
2       13.498     20.93               2.142
Largest stream flow has longer time of concentration
Qp =     13.498 + sum of
          Qb         Ia/Ib
           7.659 *    0.842 =      6.445
Qp =     19.943

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.659      13.498
Area of streams before confluence:
        3.520        7.270


Results of confluence:
Total flow rate =     19.943(CFS)
Time of concentration =    20.927 min.
Effective stream area after confluence  =     10.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      408.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.943(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    19.943(CFS)
Normal flow depth in pipe =   18.23(In.)
Flow top width inside pipe =   20.51(In.)
Critical Depth =   19.26(In.)
Pipe flow velocity =      7.79(Ft/s)
Travel time through pipe =    0.12 min.
```

```
Time of concentration (TC) =    21.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      408.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.790(Ac.)
Runoff from this stream =     19.943(CFS)
Time of concentration =   21.04 min.
Rainfall intensity =     2.135(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      406.000 to Point/Station      407.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   678.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1440.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00442  s(percent)=       0.44
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.843 min.
Rainfall intensity =      2.587(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.393(CFS)
Total initial stream area =        1.560(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      407.000 to Point/Station      408.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    48.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.393(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.393(CFS)
Normal flow depth in pipe =    5.77(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    9.46(In.)
Pipe flow velocity =      9.10(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    14.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      407.000 to Point/Station      408.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.560(Ac.)
Runoff from this stream =      3.393(CFS)
Time of concentration =   14.93 min.
Rainfall intensity =     2.579(In/Hr)
Summary of stream data:
```

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


1       19.943     21.04               2.135
2        3.393     14.93               2.579
Largest stream flow has longer time of concentration
Qp =     19.943 + sum of
          Qb         Ia/Ib
           3.393 *    0.828 =      2.810
Qp =     22.753

Total of 2 main streams to confluence:
Flow rates before confluence point:
      19.943       3.393
Area of streams before confluence:
       10.790        1.560


Results of confluence:
Total flow rate =     22.753(CFS)
Time of concentration =    21.045 min.
Effective stream area after confluence  =     12.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      408.000 to Point/Station      408.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.724
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  72.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    21.04 min.
Rainfall intensity =      2.135(In/Hr) for a   100.0 year storm
Subarea runoff =      1.098(CFS) for      0.710(Ac.)
Total runoff =     23.851(CFS)        Total area =      13.060(Ac.)
End of computations, total study area =           13.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.385
Area averaged RI index number =  71.7
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARD10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "D"
POST-PROJECT CONDITION
FN: ARD10.RRV

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

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

TRI-8 Builders - S/N 615

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 401.000 to Point/Station 402.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 993.000(Ft.)
Top (of initial area) elevation = 1445.900(Ft.)
Bottom (of initial area) elevation = 1437.000(Ft.)
Difference in elevation = 8.900(Ft.)
Slope = 0.00896 s(percent)= 0.90
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.014 min.
Rainfall intensity = 1.688(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.560
Decimal fraction soil group D = 0.440
RI index for soil(AMC 2) = 71.64
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 4.902(CFS)
Total initial stream area = 3.520(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 402.000 to Point/Station 405.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.500(Ft.)
Pipe length = 86.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.902(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 4.902(CFS)

```
Normal flow depth in pipe =   12.23(In.)
Flow top width inside pipe =   11.63(In.)
Critical Depth =   10.77(In.)
Pipe flow velocity =      4.58(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    15.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      405.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.520(Ac.)
Runoff from this stream =      4.902(CFS)
Time of concentration =   15.33 min.
Rainfall intensity =     1.669(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   934.000(Ft.)
Top (of initial area) elevation =  1448.500(Ft.)
Bottom (of initial area) elevation =  1443.500(Ft.)
Difference in elevation =     5.000(Ft.)
Slope =    0.00535  s(percent)=       0.54
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.241 min.
Rainfall intensity =      1.617(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.440
Decimal fraction soil group D = 0.560
RI index for soil(AMC 2)  =  72.36
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.013(CFS)
Total initial stream area =        1.510(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      405.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1443.500(Ft.)
End of street segment elevation =  1437.000(Ft.)
Length of street segment  =   706.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.053
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.852(CFS)
Depth of flow =   0.343(Ft.), Average velocity =   2.261(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.805(Ft.)
Flow velocity =   2.26(Ft/s)
```

```
Travel time =    5.20 min.     TC =   21.45  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.460
Decimal fraction soil group D = 0.540
RI index for soil(AMC 2)  =  72.24
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.388(In/Hr) for a    10.0 year storm
Subarea runoff =      6.514(CFS) for      5.760(Ac.)
Total runoff =      8.527(CFS)        Total area =       7.270(Ac.)
Street flow at end of street =      8.527(CFS)
Half street flow at end of street =      4.264(CFS)
Depth of flow =   0.380(Ft.), Average velocity =   2.470(Ft/s)
Flow width (from curb towards crown)=  12.648(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      405.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.270(Ac.)
Runoff from this stream =      8.527(CFS)
Time of concentration =   21.45 min.
Rainfall intensity =     1.388(In/Hr)
Summary of stream data:

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


1        4.902     15.33               1.669
2        8.527     21.45               1.388
Largest stream flow has longer time of concentration
Qp =      8.527 + sum of
          Qb         Ia/Ib
           4.902 *    0.831 =      4.076
Qp =     12.603

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.902       8.527
Area of streams before confluence:
        3.520        7.270


Results of confluence:
Total flow rate =     12.603(CFS)
Time of concentration =    21.445 min.
Effective stream area after confluence  =     10.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      408.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.603(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    12.603(CFS)
Normal flow depth in pipe =   14.65(In.)
Flow top width inside pipe =   19.29(In.)
Critical Depth =   15.86(In.)
Pipe flow velocity =      7.03(Ft/s)
Travel time through pipe =    0.13 min.
```

```
Time of concentration (TC) =    21.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      408.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.790(Ac.)
Runoff from this stream =     12.603(CFS)
Time of concentration =   21.58 min.
Rainfall intensity =     1.383(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      406.000 to Point/Station      407.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   678.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1440.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00442  s(percent)=       0.44
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.843 min.
Rainfall intensity =      1.699(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.168(CFS)
Total initial stream area =        1.560(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      407.000 to Point/Station      408.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    48.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.168(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.168(CFS)
Normal flow depth in pipe =    5.24(In.)
Flow top width inside pipe =    8.88(In.)
Critical Depth =    7.95(In.)
Pipe flow velocity =      8.11(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    14.94 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      407.000 to Point/Station      408.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.560(Ac.)
Runoff from this stream =      2.168(CFS)
Time of concentration =   14.94 min.
Rainfall intensity =     1.693(In/Hr)
Summary of stream data:
```

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


1       12.603     21.58               1.383
2        2.168     14.94               1.693
Largest stream flow has longer time of concentration
Qp =     12.603 + sum of
          Qb         Ia/Ib
           2.168 *    0.817 =      1.771
Qp =     14.374

Total of 2 main streams to confluence:
Flow rates before confluence point:
      12.603       2.168
Area of streams before confluence:
       10.790        1.560


Results of confluence:
Total flow rate =     14.374(CFS)
Time of concentration =    21.576 min.
Effective stream area after confluence  =     12.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      408.000 to Point/Station      408.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.655
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  72.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    21.58 min.
Rainfall intensity =      1.383(In/Hr) for a    10.0 year storm
Subarea runoff =      0.643(CFS) for      0.710(Ac.)
Total runoff =     15.017(CFS)        Total area =      13.060(Ac.)
End of computations, total study area =           13.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.385
Area averaged RI index number =  71.7
```

APPENDIX C.5: AREA "E"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARE100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "E"
POST-PROJECT CONDITION
FN: ARE100.RRV

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

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

TRI-8 Builders - S/N 615

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

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

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

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

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 689.000(Ft.)
Top (of initial area) elevation = 1443.000(Ft.)
Bottom (of initial area) elevation = 1438.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.00726 s(percent)= 0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.531 min.
Rainfall intensity = 2.722(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.750
Decimal fraction soil group C = 0.250
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 59.25
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 8.601(CFS)
Total initial stream area = 3.850(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 502.000 to Point/Station 505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1436.000(Ft.)
Downstream point/station elevation = 1435.500(Ft.)
Pipe length = 26.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.601(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 8.601(CFS)

```
Normal flow depth in pipe =   11.79(In.)
Flow top width inside pipe =   12.31(In.)
Critical Depth =   13.69(In.)
Pipe flow velocity =      8.31(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    13.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.850(Ac.)
Runoff from this stream =      8.601(CFS)
Time of concentration =   13.58 min.
Rainfall intensity =     2.716(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   675.000(Ft.)
Top (of initial area) elevation =  1442.800(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.800(Ft.)
Slope =    0.00711  s(percent)=       0.71
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.475 min.
Rainfall intensity =      2.728(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.930
Decimal fraction soil group C = 0.070
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.91
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      7.760(CFS)
Total initial stream area =        3.490(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1435.500(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.760(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.760(CFS)
Normal flow depth in pipe =   11.63(In.)
Flow top width inside pipe =   12.53(In.)
Critical Depth =   13.23(In.)
Pipe flow velocity =      7.61(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    13.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.490(Ac.)
```

```
Runoff from this stream =      7.760(CFS)
Time of concentration =   13.54 min.
Rainfall intensity =     2.721(In/Hr)
Summary of stream data:

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


1        8.601     13.58               2.716
2        7.760     13.54               2.721
Largest stream flow has longer time of concentration
Qp =      8.601 + sum of
          Qb         Ia/Ib
           7.760 *    0.998 =      7.747
Qp =     16.348

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.601       7.760
Area of streams before confluence:
        3.850        3.490


Results of confluence:
Total flow rate =     16.348(CFS)
Time of concentration =    13.583 min.
Effective stream area after confluence  =      7.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1435.500(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =   131.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.348(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    16.348(CFS)
Normal flow depth in pipe =   19.20(In.)
Flow top width inside pipe =   24.48(In.)
Critical Depth =   16.94(In.)
Pipe flow velocity =      5.41(Ft/s)
Travel time through pipe =    0.40 min.
Time of concentration (TC) =    13.99 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      510.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.340(Ac.)
Runoff from this stream =     16.348(CFS)
Time of concentration =   13.99 min.
Rainfall intensity =     2.673(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      507.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   646.000(Ft.)
Top (of initial area) elevation =  1442.700(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.700(Ft.)
Slope =    0.00728  s(percent)=       0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   13.180 min.
Rainfall intensity =      2.762(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.120
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.44
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      8.287(CFS)
Total initial stream area =        3.570(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      507.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1435.500(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =    29.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.287(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.287(CFS)
Normal flow depth in pipe =   12.00(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =   13.54(In.)
Pipe flow velocity =      7.88(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    13.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      507.000 to Point/Station      510.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.570(Ac.)
Runoff from this stream =      8.287(CFS)
Time of concentration =   13.24 min.
Rainfall intensity =     2.755(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      508.000 to Point/Station      509.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   792.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1439.000(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00505  s(percent)=       0.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.382 min.
Rainfall intensity =      2.537(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.150
Decimal fraction soil group C = 0.850
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.05
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.535(CFS)
Total initial stream area =        2.140(Ac.)
Pervious area fraction = 0.350
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.535(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.535(CFS)
Normal flow depth in pipe =    7.85(In.)
Flow top width inside pipe =   11.41(In.)
Critical Depth =   10.66(In.)
Pipe flow velocity =      8.33(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    15.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.140(Ac.)
Runoff from this stream =      4.535(CFS)
Time of concentration =   15.45 min.
Rainfall intensity =     2.530(In/Hr)
Summary of stream data:

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


1       16.348     13.99               2.673
2        8.287     13.24               2.755
3        4.535     15.45               2.530
Largest stream flow has longer or shorter time of concentration
Qp =     16.348 + sum of
          Qb         Ia/Ib
           8.287 *    0.970 =      8.041
          Qa          Tb/Ta
           4.535 *    0.905 =      4.104
Qp =     28.493

Total of 3 main streams to confluence:
Flow rates before confluence point:
      16.348       8.287       4.535
Area of streams before confluence:
        7.340        3.570        2.140


Results of confluence:
Total flow rate =     28.493(CFS)
Time of concentration =    13.987 min.
Effective stream area after confluence  =     13.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      510.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.719
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    13.99 min.
```

```
Rainfall intensity =      2.673(In/Hr) for a   100.0 year storm
Subarea runoff =      1.499(CFS) for      0.780(Ac.)
Total runoff =     29.992(CFS)       Total area =      13.830(Ac.)
End of computations, total study area =           13.83 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.387
Area averaged RI index number =  62.4
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARE10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "E"
POST-PROJECT CONDITION
FN: ARE10.RRV

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

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

TRI-8 Builders - S/N 615

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 689.000(Ft.)
Top (of initial area) elevation = 1443.000(Ft.)
Bottom (of initial area) elevation = 1438.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.00726 s(percent)= 0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.531 min.
Rainfall intensity = 1.788(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.793
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.750
Decimal fraction soil group C = 0.250
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 59.25
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 5.459(CFS)
Total initial stream area = 3.850(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 502.000 to Point/Station 505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1436.000(Ft.)
Downstream point/station elevation = 1435.500(Ft.)
Pipe length = 26.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.459(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 5.459(CFS)

```
Normal flow depth in pipe =    8.46(In.)
Flow top width inside pipe =   14.88(In.)
Critical Depth =   11.36(In.)
Pipe flow velocity =      7.66(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    13.59 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.850(Ac.)
Runoff from this stream =      5.459(CFS)
Time of concentration =   13.59 min.
Rainfall intensity =     1.783(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   675.000(Ft.)
Top (of initial area) elevation =  1442.800(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.800(Ft.)
Slope =    0.00711  s(percent)=       0.71
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.475 min.
Rainfall intensity =      1.792(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.786
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.930
Decimal fraction soil group C = 0.070
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.91
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.918(CFS)
Total initial stream area =        3.490(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1435.500(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.918(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.918(CFS)
Normal flow depth in pipe =    8.37(In.)
Flow top width inside pipe =   14.90(In.)
Critical Depth =   10.79(In.)
Pipe flow velocity =      6.99(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    13.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.490(Ac.)
```

```
Runoff from this stream =      4.918(CFS)
Time of concentration =   13.55 min.
Rainfall intensity =     1.786(In/Hr)
Summary of stream data:

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


1        5.459     13.59               1.783
2        4.918     13.55               1.786
Largest stream flow has longer time of concentration
Qp =      5.459 + sum of
          Qb         Ia/Ib
           4.918 *    0.998 =      4.910
Qp =     10.369

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.459       4.918
Area of streams before confluence:
        3.850        3.490


Results of confluence:
Total flow rate =     10.369(CFS)
Time of concentration =    13.588 min.
Effective stream area after confluence  =      7.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.500(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =   131.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.369(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    10.369(CFS)
Normal flow depth in pipe =   15.40(In.)
Flow top width inside pipe =   23.02(In.)
Critical Depth =   13.84(In.)
Pipe flow velocity =      4.87(Ft/s)
Travel time through pipe =    0.45 min.
Time of concentration (TC) =    14.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      510.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.340(Ac.)
Runoff from this stream =     10.369(CFS)
Time of concentration =   14.04 min.
Rainfall intensity =     1.752(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      507.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   646.000(Ft.)
Top (of initial area) elevation =  1442.700(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.700(Ft.)
Slope =    0.00728  s(percent)=       0.73
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   13.180 min.
Rainfall intensity =      1.814(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.120
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.44
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.293(CFS)
Total initial stream area =        3.570(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      507.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.500(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =    29.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.293(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.293(CFS)
Normal flow depth in pipe =    8.58(In.)
Flow top width inside pipe =   14.84(In.)
Critical Depth =   11.19(In.)
Pipe flow velocity =      7.29(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    13.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      507.000 to Point/Station      510.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.570(Ac.)
Runoff from this stream =      5.293(CFS)
Time of concentration =   13.25 min.
Rainfall intensity =     1.809(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      508.000 to Point/Station      509.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   792.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1439.000(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00505  s(percent)=       0.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.382 min.
Rainfall intensity =      1.666(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.811
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.150
Decimal fraction soil group C = 0.850
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.05
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.891(CFS)
Total initial stream area =        2.140(Ac.)
Pervious area fraction = 0.350
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1436.000(Ft.)
Downstream point/station elevation =  1435.000(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.891(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.891(CFS)
Normal flow depth in pipe =    5.91(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    8.75(In.)
Pipe flow velocity =      7.51(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    15.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.140(Ac.)
Runoff from this stream =      2.891(CFS)
Time of concentration =   15.46 min.
Rainfall intensity =     1.661(In/Hr)
Summary of stream data:

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


1       10.369     14.04               1.752
2        5.293     13.25               1.809
3        2.891     15.46               1.661
Largest stream flow has longer or shorter time of concentration
Qp =     10.369 + sum of
          Qb         Ia/Ib
           5.293 *    0.969 =      5.127
          Qa          Tb/Ta
           2.891 *    0.908 =      2.625
Qp =     18.121

Total of 3 main streams to confluence:
Flow rates before confluence point:
      10.369       5.293       2.891
Area of streams before confluence:
        7.340        3.570        2.140


Results of confluence:
Total flow rate =     18.121(CFS)
Time of concentration =    14.036 min.
Effective stream area after confluence  =     13.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      510.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.650
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    14.04 min.
```

```
Rainfall intensity =      1.752(In/Hr) for a    10.0 year storm
Subarea runoff =      0.888(CFS) for      0.780(Ac.)
Total runoff =     19.009(CFS)       Total area =      13.830(Ac.)
End of computations, total study area =           13.83 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.387
Area averaged RI index number =  62.4
```

APPENDIX C.6: AREA "F"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARF100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "F"
POST-PROJECT CONDITION
FN: ARF100.RRV

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

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

TRI-8 Builders - S/N 615

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

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

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

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

++

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

Initial area flow distance = 931.000(Ft.)
Top (of initial area) elevation = 1442.800(Ft.)
Bottom (of initial area) elevation = 1436.500(Ft.)
Difference in elevation = 6.300(Ft.)
Slope = 0.00677 s(percent)= 0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.478 min.
Rainfall intensity = 2.528(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.460
Decimal fraction soil group C = 0.540
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 63.02
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 8.015(CFS)
Total initial stream area = 3.840(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 602.000 to Point/Station 605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1433.500(Ft.)
Downstream point/station elevation = 1433.000(Ft.)
Pipe length = 60.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.015(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 8.015(CFS)

```
Normal flow depth in pipe =   12.59(In.)
Flow top width inside pipe =   16.51(In.)
Critical Depth =   13.16(In.)
Pipe flow velocity =      6.07(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    15.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.840(Ac.)
Runoff from this stream =      8.015(CFS)
Time of concentration =   15.64 min.
Rainfall intensity =     2.514(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   826.000(Ft.)
Top (of initial area) elevation =  1442.000(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     5.500(Ft.)
Slope =    0.00666  s(percent)=       0.67
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.802 min.
Rainfall intensity =      2.591(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.828
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.440
Decimal fraction soil group C = 0.560
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  63.28
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      8.427(CFS)
Total initial stream area =        3.930(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    69.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.427(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.427(CFS)
Normal flow depth in pipe =   13.90(In.)
Flow top width inside pipe =   15.10(In.)
Critical Depth =   13.49(In.)
Pipe flow velocity =      5.75(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    15.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.930(Ac.)
```

```
Runoff from this stream =      8.427(CFS)
Time of concentration =   15.00 min.
Rainfall intensity =     2.572(In/Hr)
Summary of stream data:

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


1        8.015     15.64               2.514
2        8.427     15.00               2.572
Largest stream flow has longer or shorter time of concentration
Qp =      8.427 + sum of
          Qa          Tb/Ta
           8.015 *    0.959 =      7.687
Qp =     16.114

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.015       8.427
Area of streams before confluence:
        3.840        3.930


Results of confluence:
Total flow rate =     16.114(CFS)
Time of concentration =    15.002 min.
Effective stream area after confluence  =      7.770(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   159.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.114(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    16.114(CFS)
Normal flow depth in pipe =   20.55(In.)
Flow top width inside pipe =   23.02(In.)
Critical Depth =   16.81(In.)
Pipe flow velocity =      4.96(Ft/s)
Travel time through pipe =    0.53 min.
Time of concentration (TC) =    15.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.770(Ac.)
Runoff from this stream =     16.114(CFS)
Time of concentration =   15.54 min.
Rainfall intensity =     2.523(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      607.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   967.000(Ft.)
Top (of initial area) elevation =  1443.100(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.00683  s(percent)=       0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   15.687 min.
Rainfall intensity =      2.510(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.780
Decimal fraction soil group C = 0.220
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.86
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      7.708(CFS)
Total initial stream area =        3.770(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      607.000 to Point/Station      609.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.708(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.708(CFS)
Normal flow depth in pipe =   11.06(In.)
Flow top width inside pipe =   17.52(In.)
Critical Depth =   12.90(In.)
Pipe flow velocity =      6.77(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    15.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      607.000 to Point/Station      609.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.770(Ac.)
Runoff from this stream =      7.708(CFS)
Time of concentration =   15.80 min.
Rainfall intensity =     2.500(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      609.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1443.300(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     6.800(Ft.)
Slope =    0.00680  s(percent)=       0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.911 min.
Rainfall intensity =      2.490(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.08
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      9.627(CFS)
Total initial stream area =        4.760(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      609.000
```

```
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      4.760(Ac.)
Runoff from this stream =      9.627(CFS)
Time of concentration =   15.91 min.
Rainfall intensity =     2.490(In/Hr)
Summary of stream data:

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


1        7.708     15.80                2.500
2        9.627     15.91                2.490
Largest stream flow has longer time of concentration
Qp =      9.627 + sum of
          Qb         Ia/Ib
           7.708 *    0.996 =      7.678
Qp =     17.305

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.708       9.627
Area of streams before confluence:
        3.770        4.760
Results of confluence:
Total flow rate =     17.305(CFS)
Time of concentration =    15.911 min.
Effective stream area after confluence =      8.530(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      609.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.305(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    17.305(CFS)
Normal flow depth in pipe =   13.65(In.)
Flow top width inside pipe =   20.03(In.)
Critical Depth =   18.26(In.)
Pipe flow velocity =     10.45(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    15.95 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      609.000 to Point/Station      610.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.530(Ac.)
Runoff from this stream =     17.305(CFS)
Time of concentration =   15.95 min.
Rainfall intensity =     2.487(In/Hr)
Summary of stream data:

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


1       16.114     15.54                2.523
2       17.305     15.95                2.487
Largest stream flow has longer time of concentration
Qp =     17.305 + sum of
          Qb         Ia/Ib
```

```
         16.114 *    0.986 =     15.883
Qp =     33.188

Total of 2 main streams to confluence:
Flow rates before confluence point:
      16.114      17.305
Area of streams before confluence:
        7.770        8.530


Results of confluence:
Total flow rate =     33.188(CFS)
Time of concentration =    15.949 min.
Effective stream area after confluence  =     16.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.95 min.
Rainfall intensity =      2.487(In/Hr) for a   100.0 year storm
Subarea runoff =      1.709(CFS) for      1.060(Ac.)
Total runoff =     34.897(CFS)       Total area =      17.360(Ac.)
End of computations, total study area =           17.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.390
Area averaged RI index number =  60.5
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARF10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "F"
POST-PROJECT CONDITION
FN: ARF10.RRV

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

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

TRI-8 Builders - S/N 615

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

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

Initial area flow distance = 931.000(Ft.)
Top (of initial area) elevation = 1442.800(Ft.)
Bottom (of initial area) elevation = 1436.500(Ft.)
Difference in elevation = 6.300(Ft.)
Slope = 0.00677 s(percent)= 0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.478 min.
Rainfall intensity = 1.660(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.460
Decimal fraction soil group C = 0.540
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 63.02
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 5.094(CFS)
Total initial stream area = 3.840(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 602.000 to Point/Station 605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1433.500(Ft.)
Downstream point/station elevation = 1433.000(Ft.)
Pipe length = 60.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.094(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 5.094(CFS)

```
Normal flow depth in pipe =   10.76(In.)
Flow top width inside pipe =   13.51(In.)
Critical Depth =   10.98(In.)
Pipe flow velocity =      5.41(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    15.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.840(Ac.)
Runoff from this stream =      5.094(CFS)
Time of concentration =   15.66 min.
Rainfall intensity =     1.649(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   826.000(Ft.)
Top (of initial area) elevation =  1442.000(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     5.500(Ft.)
Slope =    0.00666  s(percent)=       0.67
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.802 min.
Rainfall intensity =      1.701(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.802
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.440
Decimal fraction soil group C = 0.560
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  63.28
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.360(CFS)
Total initial stream area =        3.930(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    69.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.360(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.360(CFS)
Normal flow depth in pipe =   11.98(In.)
Flow top width inside pipe =   12.04(In.)
Critical Depth =   11.26(In.)
Pipe flow velocity =      5.11(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    15.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.930(Ac.)
```

```
Runoff from this stream =      5.360(CFS)
Time of concentration =   15.03 min.
Rainfall intensity =     1.687(In/Hr)
Summary of stream data:

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


1        5.094     15.66               1.649
2        5.360     15.03               1.687
Largest stream flow has longer or shorter time of concentration
Qp =      5.360 + sum of
          Qa          Tb/Ta
           5.094 *    0.959 =      4.888
Qp =     10.247

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.094       5.360
Area of streams before confluence:
        3.840        3.930


Results of confluence:
Total flow rate =     10.247(CFS)
Time of concentration =    15.027 min.
Effective stream area after confluence  =      7.770(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   159.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.247(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    10.247(CFS)
Normal flow depth in pipe =   16.36(In.)
Flow top width inside pipe =   22.36(In.)
Critical Depth =   13.74(In.)
Pipe flow velocity =      4.49(Ft/s)
Travel time through pipe =    0.59 min.
Time of concentration (TC) =    15.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.770(Ac.)
Runoff from this stream =     10.247(CFS)
Time of concentration =   15.62 min.
Rainfall intensity =     1.652(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      607.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   967.000(Ft.)
Top (of initial area) elevation =  1443.100(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.00683  s(percent)=       0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   15.687 min.
Rainfall intensity =      1.648(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.786
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.780
Decimal fraction soil group C = 0.220
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.86
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.885(CFS)
Total initial stream area =        3.770(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      607.000 to Point/Station      609.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1433.000(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.885(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.885(CFS)
Normal flow depth in pipe =    9.40(In.)
Flow top width inside pipe =   14.51(In.)
Critical Depth =   10.75(In.)
Pipe flow velocity =      6.03(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    15.81 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      607.000 to Point/Station      609.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.770(Ac.)
Runoff from this stream =      4.885(CFS)
Time of concentration =   15.81 min.
Rainfall intensity =     1.641(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      609.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1443.300(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     6.800(Ft.)
Slope =    0.00680  s(percent)=       0.68
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.911 min.
Rainfall intensity =      1.635(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.783
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.08
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.097(CFS)
Total initial stream area =        4.760(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      609.000
```

```
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      4.760(Ac.)
Runoff from this stream =      6.097(CFS)
Time of concentration =   15.91 min.
Rainfall intensity =     1.635(In/Hr)
Summary of stream data:

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


1        4.885     15.81                1.641
2        6.097     15.91                1.635
Largest stream flow has longer time of concentration
Qp =      6.097 + sum of
          Qb         Ia/Ib
           4.885 *    0.997 =      4.868
Qp =     10.965

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.885       6.097
Area of streams before confluence:
        3.770        4.760
Results of confluence:
Total flow rate =     10.965(CFS)
Time of concentration =    15.911 min.
Effective stream area after confluence =      8.530(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      609.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.965(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.965(CFS)
Normal flow depth in pipe =   11.34(In.)
Flow top width inside pipe =   17.38(In.)
Critical Depth =   15.23(In.)
Pipe flow velocity =      9.35(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    15.95 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      609.000 to Point/Station      610.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.530(Ac.)
Runoff from this stream =     10.965(CFS)
Time of concentration =   15.95 min.
Rainfall intensity =     1.633(In/Hr)
Summary of stream data:

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


1       10.247     15.62                1.652
2       10.965     15.95                1.633
Largest stream flow has longer time of concentration
Qp =     10.965 + sum of
          Qb         Ia/Ib
```

```
         10.247 *    0.988 =     10.128
Qp =     21.092

Total of 2 main streams to confluence:
Flow rates before confluence point:
      10.247      10.965
Area of streams before confluence:
        7.770        8.530


Results of confluence:
Total flow rate =     21.092(CFS)
Time of concentration =    15.954 min.
Effective stream area after confluence  =     16.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.566
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.95 min.
Rainfall intensity =      1.633(In/Hr) for a    10.0 year storm
Subarea runoff =      0.979(CFS) for      1.060(Ac.)
Total runoff =     22.071(CFS)       Total area =      17.360(Ac.)
End of computations, total study area =           17.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.390
Area averaged RI index number =  60.5
```

APPENDIX C.7: AREA "G"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARG100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "G"
POST-PROJECT CONDITION
FN: ARG100.RRV

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

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

TRI-8 Builders - S/N 615

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

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

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

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

++

Process from Point/Station 701.000 to Point/Station 702.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 479.000(Ft.)
Top (of initial area) elevation = 1442.000(Ft.)
Bottom (of initial area) elevation = 1438.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.00835 s(percent)= 0.84
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.376 min.
Rainfall intensity = 2.995(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 5.457(CFS)
Total initial stream area = 2.150(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 702.000 to Point/Station 705.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.000(Ft.)
Pipe length = 48.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.457(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 5.457(CFS)

```
Normal flow depth in pipe =    8.25(In.)
Flow top width inside pipe =   14.92(In.)
Critical Depth =   11.36(In.)
Pipe flow velocity =      7.90(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    11.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      705.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.150(Ac.)
Runoff from this stream =      5.457(CFS)
Time of concentration =   11.48 min.
Rainfall intensity =     2.980(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      703.000 to Point/Station      704.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   543.000(Ft.)
Top (of initial area) elevation =  1442.000(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00737  s(percent)=       0.74
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.265 min.
Rainfall intensity =      2.873(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.820
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.66
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.909(CFS)
Total initial stream area =        2.860(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      704.000 to Point/Station      705.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    28.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.909(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.909(CFS)
Normal flow depth in pipe =    8.07(In.)
Flow top width inside pipe =   14.96(In.)
Critical Depth =   12.64(In.)
Pipe flow velocity =     10.25(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    12.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      704.000 to Point/Station      705.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.860(Ac.)
```

```
Runoff from this stream =      6.909(CFS)
Time of concentration =   12.31 min.
Rainfall intensity =     2.868(In/Hr)
Summary of stream data:

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


1        5.457     11.48               2.980
2        6.909     12.31               2.868
Largest stream flow has longer time of concentration
Qp =      6.909 + sum of
          Qb         Ia/Ib
           5.457 *    0.962 =      5.251
Qp =     12.159

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.457       6.909
Area of streams before confluence:
        2.150        2.860


Results of confluence:
Total flow rate =     12.159(CFS)
Time of concentration =    12.311 min.
Effective stream area after confluence  =      5.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      705.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =   131.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.159(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.159(CFS)
Normal flow depth in pipe =   17.32(In.)
Flow top width inside pipe =   21.51(In.)
Critical Depth =   15.04(In.)
Pipe flow velocity =      5.01(Ft/s)
Travel time through pipe =    0.44 min.
Time of concentration (TC) =    12.75 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      705.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.010(Ac.)
Runoff from this stream =     12.159(CFS)
Time of concentration =   12.75 min.
Rainfall intensity =     2.813(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      707.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   922.000(Ft.)
Top (of initial area) elevation =  1441.000(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00325  s(percent)=       0.33
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   17.849 min.
Rainfall intensity =      2.338(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.370
Decimal fraction soil group D = 0.630
RI index for soil(AMC 2)  =  72.78
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      8.510(CFS)
Total initial stream area =        4.310(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      707.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.510(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.510(CFS)
Normal flow depth in pipe =    8.70(In.)
Flow top width inside pipe =   14.81(In.)
Critical Depth =   13.65(In.)
Pipe flow velocity =     11.55(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    17.90 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      707.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.310(Ac.)
Runoff from this stream =      8.510(CFS)
Time of concentration =   17.90 min.
Rainfall intensity =     2.334(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      708.000 to Point/Station      709.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   561.000(Ft.)
Top (of initial area) elevation =  1441.000(Ft.)
Bottom (of initial area) elevation =  1438.500(Ft.)
Difference in elevation =     2.500(Ft.)
Slope =    0.00446  s(percent)=       0.45
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.740 min.
Rainfall intensity =      2.699(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.843
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.070
Decimal fraction soil group C = 0.750
Decimal fraction soil group D = 0.180
RI index for soil(AMC 2)  =  69.17
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.232(CFS)
Total initial stream area =        1.420(Ac.)
Pervious area fraction = 0.350
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      709.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1435.500(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    46.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.232(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.232(CFS)
Normal flow depth in pipe =    6.91(In.)
Flow top width inside pipe =    7.60(In.)
Critical depth could not be calculated.
Pipe flow velocity =      8.88(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    13.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      709.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.420(Ac.)
Runoff from this stream =      3.232(CFS)
Time of concentration =   13.83 min.
Rainfall intensity =     2.690(In/Hr)
Program is now starting with Main Stream No. 4


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      710.000 to Point/Station      711.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   728.000(Ft.)
Top (of initial area) elevation =  1441.800(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     3.800(Ft.)
Slope =    0.00522  s(percent)=       0.52
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.775 min.
Rainfall intensity =      2.594(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.120
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.44
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      8.232(CFS)
Total initial stream area =        3.790(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      711.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    38.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.232(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.232(CFS)
Normal flow depth in pipe =    8.73(In.)
Flow top width inside pipe =   14.80(In.)
Critical Depth =   13.51(In.)
Pipe flow velocity =     11.10(Ft/s)
Travel time through pipe =    0.06 min.
```

```
Time of concentration (TC) =    14.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      711.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 4
Stream flow area =      3.790(Ac.)
Runoff from this stream =      8.232(CFS)
Time of concentration =   14.83 min.
Rainfall intensity =     2.588(In/Hr)
Summary of stream data:

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


1       12.159     12.75               2.813
2        8.510     17.90               2.334
3        3.232     13.83               2.690
4        8.232     14.83               2.588
Largest stream flow has longer or shorter time of concentration
Qp =     12.159 + sum of
          Qa          Tb/Ta
           8.510 *    0.712 =      6.060
          Qa          Tb/Ta
           3.232 *    0.922 =      2.979
          Qa          Tb/Ta
           8.232 *    0.859 =      7.074
Qp =     28.272

Total of 4 main streams to confluence:
Flow rates before confluence point:
      12.159       8.510       3.232       8.232
Area of streams before confluence:
        5.010        4.310        1.420        3.790


Results of confluence:
Total flow rate =     28.272(CFS)
Time of concentration =    12.746 min.
Effective stream area after confluence  =     14.530(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      712.000 to Point/Station      712.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.960
Decimal fraction soil group D = 0.040
RI index for soil(AMC 2)  =  72.27
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.75 min.
Rainfall intensity =      2.813(In/Hr) for a   100.0 year storm
Subarea runoff =      2.207(CFS) for      1.030(Ac.)
Total runoff =     30.479(CFS)       Total area =      15.560(Ac.)
End of computations, total study area =           15.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.393
Area averaged RI index number =  69.5
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARG10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "G"
POST-PROJECT CONDITION
FN: ARG10.RRV

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

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

TRI-8 Builders - S/N 615

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 701.000 to Point/Station 702.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 479.000(Ft.)
Top (of initial area) elevation = 1442.000(Ft.)
Bottom (of initial area) elevation = 1438.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.00835 s(percent)= 0.84
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.376 min.
Rainfall intensity = 1.967(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 3.494(CFS)
Total initial stream area = 2.150(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 702.000 to Point/Station 705.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.000(Ft.)
Pipe length = 48.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.494(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 3.494(CFS)

```
Normal flow depth in pipe =    7.25(In.)
Flow top width inside pipe =   11.74(In.)
Critical Depth =    9.59(In.)
Pipe flow velocity =      7.04(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    11.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      705.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.150(Ac.)
Runoff from this stream =      3.494(CFS)
Time of concentration =   11.49 min.
Rainfall intensity =     1.956(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      703.000 to Point/Station      704.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   543.000(Ft.)
Top (of initial area) elevation =  1442.000(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00737  s(percent)=       0.74
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.265 min.
Rainfall intensity =      1.887(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.820
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.66
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.413(CFS)
Total initial stream area =        2.860(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      704.000 to Point/Station      705.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    28.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.413(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.413(CFS)
Normal flow depth in pipe =    7.08(In.)
Flow top width inside pipe =   11.80(In.)
Critical Depth =   10.57(In.)
Pipe flow velocity =      9.14(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    12.32 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      704.000 to Point/Station      705.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.860(Ac.)
```

```
Runoff from this stream =      4.413(CFS)
Time of concentration =   12.32 min.
Rainfall intensity =     1.883(In/Hr)
Summary of stream data:

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


1        3.494     11.49               1.956
2        4.413     12.32               1.883
Largest stream flow has longer time of concentration
Qp =      4.413 + sum of
          Qb         Ia/Ib
           3.494 *    0.963 =      3.363
Qp =      7.776

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.494       4.413
Area of streams before confluence:
        2.150        2.860


Results of confluence:
Total flow rate =      7.776(CFS)
Time of concentration =    12.316 min.
Effective stream area after confluence  =      5.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      705.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =   131.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.776(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.776(CFS)
Normal flow depth in pipe =   14.13(In.)
Flow top width inside pipe =   19.70(In.)
Critical Depth =   12.40(In.)
Pipe flow velocity =      4.52(Ft/s)
Travel time through pipe =    0.48 min.
Time of concentration (TC) =    12.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      705.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.010(Ac.)
Runoff from this stream =      7.776(CFS)
Time of concentration =   12.80 min.
Rainfall intensity =     1.843(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      707.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   922.000(Ft.)
Top (of initial area) elevation =  1441.000(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00325  s(percent)=       0.33
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   17.849 min.
Rainfall intensity =      1.535(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.370
Decimal fraction soil group D = 0.630
RI index for soil(AMC 2)  =  72.78
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.443(CFS)
Total initial stream area =        4.310(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      707.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.443(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.443(CFS)
Normal flow depth in pipe =    7.66(In.)
Flow top width inside pipe =   11.53(In.)
Critical Depth =   11.24(In.)
Pipe flow velocity =     10.27(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    17.91 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      707.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.310(Ac.)
Runoff from this stream =      5.443(CFS)
Time of concentration =   17.91 min.
Rainfall intensity =     1.532(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      708.000 to Point/Station      709.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   561.000(Ft.)
Top (of initial area) elevation =  1441.000(Ft.)
Bottom (of initial area) elevation =  1438.500(Ft.)
Difference in elevation =     2.500(Ft.)
Slope =    0.00446  s(percent)=       0.45
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.740 min.
Rainfall intensity =      1.773(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.070
Decimal fraction soil group C = 0.750
Decimal fraction soil group D = 0.180
RI index for soil(AMC 2)  =  69.17
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.066(CFS)
Total initial stream area =        1.420(Ac.)
Pervious area fraction = 0.350
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      709.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1435.500(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    46.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.066(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.066(CFS)
Normal flow depth in pipe =    5.02(In.)
Flow top width inside pipe =    8.94(In.)
Critical Depth =    7.81(In.)
Pipe flow velocity =      8.16(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    13.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      709.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.420(Ac.)
Runoff from this stream =      2.066(CFS)
Time of concentration =   13.83 min.
Rainfall intensity =     1.766(In/Hr)
Program is now starting with Main Stream No. 4


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      710.000 to Point/Station      711.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   728.000(Ft.)
Top (of initial area) elevation =  1441.800(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     3.800(Ft.)
Slope =    0.00522  s(percent)=       0.52
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.775 min.
Rainfall intensity =      1.703(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.814
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.120
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  67.44
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.252(CFS)
Total initial stream area =        3.790(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      711.000 to Point/Station      712.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1433.500(Ft.)
Pipe length  =    38.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.252(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.252(CFS)
Normal flow depth in pipe =    7.70(In.)
Flow top width inside pipe =   11.51(In.)
Critical Depth =   11.15(In.)
Pipe flow velocity =      9.87(Ft/s)
Travel time through pipe =    0.06 min.
```

```
Time of concentration (TC) =    14.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      711.000 to Point/Station      712.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 4
Stream flow area =      3.790(Ac.)
Runoff from this stream =      5.252(CFS)
Time of concentration =   14.84 min.
Rainfall intensity =     1.699(In/Hr)
Summary of stream data:

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


1        7.776     12.80               1.843
2        5.443     17.91               1.532
3        2.066     13.83               1.766
4        5.252     14.84               1.699
Largest stream flow has longer or shorter time of concentration
Qp =      7.776 + sum of
          Qa          Tb/Ta
           5.443 *    0.715 =      3.891
          Qa          Tb/Ta
           2.066 *    0.925 =      1.912
          Qa          Tb/Ta
           5.252 *    0.863 =      4.530
Qp =     18.109

Total of 4 main streams to confluence:
Flow rates before confluence point:
       7.776       5.443       2.066       5.252
Area of streams before confluence:
        5.010        4.310        1.420        3.790


Results of confluence:
Total flow rate =     18.109(CFS)
Time of concentration =    12.800 min.
Effective stream area after confluence  =     14.530(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      712.000 to Point/Station      712.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.704
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.960
Decimal fraction soil group D = 0.040
RI index for soil(AMC 2)  =  72.27
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.80 min.
Rainfall intensity =      1.843(In/Hr) for a    10.0 year storm
Subarea runoff =      1.337(CFS) for      1.030(Ac.)
Total runoff =     19.446(CFS)       Total area =      15.560(Ac.)
End of computations, total study area =           15.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.393
Area averaged RI index number =  69.5
```

APPENDIX C.8: AREA "H"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARH100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "H"
POST-PROJECT CONDITION
FN: ARH100.RRV

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

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

TRI-8 Builders - S/N 615

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

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

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

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

++

Process from Point/Station 801.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 748.000(Ft.)
Top (of initial area) elevation = 1442.000(Ft.)
Bottom (of initial area) elevation = 1436.500(Ft.)
Difference in elevation = 5.500(Ft.)
Slope = 0.00735 s(percent)= 0.74
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.947 min.
Rainfall intensity = 2.677(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2) = 69.60
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 10.685(CFS)
Total initial stream area = 4.730(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 802.000 to Point/Station 804.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1433.500(Ft.)
Downstream point/station elevation = 1433.000(Ft.)
Pipe length = 66.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.685(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 10.685(CFS)

```
Normal flow depth in pipe =   13.88(In.)
Flow top width inside pipe =   19.89(In.)
Critical Depth =   14.62(In.)
Pipe flow velocity =      6.33(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    14.12 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      804.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.730(Ac.)
Runoff from this stream =     10.685(CFS)
Time of concentration =   14.12 min.
Rainfall intensity =     2.659(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      804.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   813.000(Ft.)
Top (of initial area) elevation =  1441.900(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     5.400(Ft.)
Slope =    0.00664  s(percent)=       0.66
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.716 min.
Rainfall intensity =      2.599(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.960
Decimal fraction soil group D = 0.040
RI index for soil(AMC 2)  =  69.24
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     13.672(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      804.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.250(Ac.)
Runoff from this stream =     13.672(CFS)
Time of concentration =   14.72 min.
Rainfall intensity =     2.599(In/Hr)
Summary of stream data:

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


1       10.685     14.12               2.659
2       13.672     14.72               2.599
Largest stream flow has longer time of concentration
Qp =     13.672 + sum of
          Qb         Ia/Ib
          10.685 *    0.978 =     10.445
Qp =     24.117

Total of 2 main streams to confluence:
```

```
Flow rates before confluence point:
      10.685      13.672
Area of streams before confluence:
        4.730        6.250


Results of confluence:
Total flow rate =     24.117(CFS)
Time of concentration =    14.716 min.
Effective stream area after confluence  =     10.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      807.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   156.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.117(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    24.117(CFS)
Normal flow depth in pipe =   25.78(In.)
Flow top width inside pipe =   20.86(In.)
Critical Depth =   20.09(In.)
Pipe flow velocity =      5.37(Ft/s)
Travel time through pipe =    0.48 min.
Time of concentration (TC) =    15.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      807.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.980(Ac.)
Runoff from this stream =     24.117(CFS)
Time of concentration =   15.20 min.
Rainfall intensity =     2.554(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      805.000 to Point/Station      806.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00650  s(percent)=       0.65
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.055 min.
Rainfall intensity =      2.478(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.080
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.680
Decimal fraction soil group D = 0.200
RI index for soil(AMC 2)  =  66.72
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.153(CFS)
Total initial stream area =        2.980(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      806.000 to Point/Station      807.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    48.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.153(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.153(CFS)
Normal flow depth in pipe =    8.89(In.)
Flow top width inside pipe =   14.74(In.)
Critical Depth =   12.02(In.)
Pipe flow velocity =      8.12(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    16.15 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      806.000 to Point/Station      807.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.980(Ac.)
Runoff from this stream =      6.153(CFS)
Time of concentration =   16.15 min.
Rainfall intensity =     2.470(In/Hr)
Summary of stream data:

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


1       24.117     15.20               2.554
2        6.153     16.15               2.470
Largest stream flow has longer or shorter time of concentration
Qp =     24.117 + sum of
          Qa          Tb/Ta
           6.153 *    0.941 =      5.790
Qp =     29.907

Total of 2 main streams to confluence:
Flow rates before confluence point:
      24.117       6.153
Area of streams before confluence:
       10.980        2.980


Results of confluence:
Total flow rate =     29.907(CFS)
Time of concentration =    15.199 min.
Effective stream area after confluence  =     13.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      807.000 to Point/Station      807.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.767
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.570
Decimal fraction soil group D = 0.430
RI index for soil(AMC 2)  =  75.02
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.20 min.
Rainfall intensity =      2.554(In/Hr) for a   100.0 year storm
Subarea runoff =      3.172(CFS) for      1.620(Ac.)
Total runoff =     33.079(CFS)       Total area =      15.580(Ac.)
End of computations, total study area =           15.58 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

```
Area averaged pervious area fraction(Ap) = 0.418
Area averaged RI index number =  69.5
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARH10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "H"
POST-PROJECT CONDITION
FN: ARH10.RRV

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

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

TRI-8 Builders - S/N 615

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 801.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 748.000(Ft.)
Top (of initial area) elevation = 1442.000(Ft.)
Bottom (of initial area) elevation = 1436.500(Ft.)
Difference in elevation = 5.500(Ft.)
Slope = 0.00735 s(percent)= 0.74
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.947 min.
Rainfall intensity = 1.758(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2) = 69.60
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 6.832(CFS)
Total initial stream area = 4.730(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 802.000 to Point/Station 804.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1433.500(Ft.)
Downstream point/station elevation = 1433.000(Ft.)
Pipe length = 66.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.832(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.832(CFS)

```
Normal flow depth in pipe =   11.60(In.)
Flow top width inside pipe =   17.23(In.)
Critical Depth =   12.14(In.)
Pipe flow velocity =      5.67(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    14.14 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      804.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.730(Ac.)
Runoff from this stream =      6.832(CFS)
Time of concentration =   14.14 min.
Rainfall intensity =     1.745(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      804.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   813.000(Ft.)
Top (of initial area) elevation =  1441.900(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     5.400(Ft.)
Slope =    0.00664  s(percent)=       0.66
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.716 min.
Rainfall intensity =      1.707(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.960
Decimal fraction soil group D = 0.040
RI index for soil(AMC 2)  =  69.24
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      8.736(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      804.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.250(Ac.)
Runoff from this stream =      8.736(CFS)
Time of concentration =   14.72 min.
Rainfall intensity =     1.707(In/Hr)
Summary of stream data:

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


1        6.832     14.14               1.745
2        8.736     14.72               1.707
Largest stream flow has longer time of concentration
Qp =      8.736 + sum of
          Qb         Ia/Ib
           6.832 *    0.978 =      6.684
Qp =     15.420

Total of 2 main streams to confluence:
```

```
Flow rates before confluence point:
       6.832       8.736
Area of streams before confluence:
        4.730        6.250


Results of confluence:
Total flow rate =     15.420(CFS)
Time of concentration =    14.716 min.
Effective stream area after confluence  =     10.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      807.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1433.000(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =   156.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.420(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    15.420(CFS)
Normal flow depth in pipe =   19.64(In.)
Flow top width inside pipe =   24.05(In.)
Critical Depth =   16.43(In.)
Pipe flow velocity =      4.97(Ft/s)
Travel time through pipe =    0.52 min.
Time of concentration (TC) =    15.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      807.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.980(Ac.)
Runoff from this stream =     15.420(CFS)
Time of concentration =   15.24 min.
Rainfall intensity =     1.675(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      805.000 to Point/Station      806.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1443.000(Ft.)
Bottom (of initial area) elevation =  1436.500(Ft.)
Difference in elevation =     6.500(Ft.)
Slope =    0.00650  s(percent)=       0.65
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.055 min.
Rainfall intensity =      1.627(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.809
Decimal fraction soil group A = 0.080
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.680
Decimal fraction soil group D = 0.200
RI index for soil(AMC 2)  =  66.72
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.921(CFS)
Total initial stream area =        2.980(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      806.000 to Point/Station      807.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1433.500(Ft.)
Downstream point/station elevation =  1432.500(Ft.)
Pipe length  =    48.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.921(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.921(CFS)
Normal flow depth in pipe =    7.84(In.)
Flow top width inside pipe =   11.42(In.)
Critical Depth =   10.08(In.)
Pipe flow velocity =      7.21(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    16.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      806.000 to Point/Station      807.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.980(Ac.)
Runoff from this stream =      3.921(CFS)
Time of concentration =   16.17 min.
Rainfall intensity =     1.621(In/Hr)
Summary of stream data:

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


1       15.420     15.24               1.675
2        3.921     16.17               1.621
Largest stream flow has longer or shorter time of concentration
Qp =     15.420 + sum of
          Qa          Tb/Ta
           3.921 *    0.943 =      3.696
Qp =     19.116

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.420       3.921
Area of streams before confluence:
       10.980        2.980


Results of confluence:
Total flow rate =     19.116(CFS)
Time of concentration =    15.238 min.
Effective stream area after confluence  =     13.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      807.000 to Point/Station      807.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.711
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.570
Decimal fraction soil group D = 0.430
RI index for soil(AMC 2)  =  75.02
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.24 min.
Rainfall intensity =      1.675(In/Hr) for a    10.0 year storm
Subarea runoff =      1.930(CFS) for      1.620(Ac.)
Total runoff =     21.046(CFS)       Total area =      15.580(Ac.)
End of computations, total study area =           15.58 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

```
Area averaged pervious area fraction(Ap) = 0.418
Area averaged RI index number =  69.5
```

APPENDIX C.9: AREA "I"

100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARI100.out

190.04.15 TTM 37439
100-YEAR RATIONAL TABLING METHOD FOR AREA "I"
POST-PROJECT CONDITION
FN: ARI100.RRV

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

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

TRI-8 Builders - S/N 615

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

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

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

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

++

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

Initial area flow distance = 438.000(Ft.)
Top (of initial area) elevation = 1442.000(Ft.)
Bottom (of initial area) elevation = 1438.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.00913 s(percent)= 0.91
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.781 min.
Rainfall intensity = 3.085(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.840
RI index for soil(AMC 2) = 74.04
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 4.078(CFS)
Total initial stream area = 1.540(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 902.000 to Point/Station 905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.500(Ft.)
Pipe length = 27.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.078(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 4.078(CFS)

```
Normal flow depth in pipe =    8.43(In.)
Flow top width inside pipe =   10.98(In.)
Critical Depth =   10.25(In.)
Pipe flow velocity =      6.92(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    10.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      905.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.540(Ac.)
Runoff from this stream =      4.078(CFS)
Time of concentration =   10.85 min.
Rainfall intensity =     3.074(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      904.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   490.000(Ft.)
Top (of initial area) elevation =  1442.200(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.200(Ft.)
Slope =    0.00857  s(percent)=       0.86
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.420 min.
Rainfall intensity =      2.988(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.050
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.920
RI index for soil(AMC 2)  =  72.67
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.802(CFS)
Total initial stream area =        1.880(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      904.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1434.500(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.802(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.802(CFS)
Normal flow depth in pipe =    9.73(In.)
Flow top width inside pipe =    9.40(In.)
Critical Depth =   10.87(In.)
Pipe flow velocity =      7.04(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      904.000 to Point/Station      905.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.880(Ac.)
```

```
Runoff from this stream =      4.802(CFS)
Time of concentration =   11.48 min.
Rainfall intensity =     2.979(In/Hr)
Summary of stream data:

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


1        4.078     10.85               3.074
2        4.802     11.48               2.979
Largest stream flow has longer time of concentration
Qp =      4.802 + sum of
          Qb         Ia/Ib
           4.078 *    0.969 =      3.952
Qp =      8.754

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.078       4.802
Area of streams before confluence:
        1.540        1.880


Results of confluence:
Total flow rate =      8.754(CFS)
Time of concentration =    11.484 min.
Effective stream area after confluence  =      3.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      905.000 to Point/Station      908.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    95.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.754(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.754(CFS)
Normal flow depth in pipe =   13.71(In.)
Flow top width inside pipe =   19.99(In.)
Critical Depth =   13.19(In.)
Pipe flow velocity =      5.26(Ft/s)
Travel time through pipe =    0.30 min.
Time of concentration (TC) =    11.79 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      905.000 to Point/Station      908.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.420(Ac.)
Runoff from this stream =      8.754(CFS)
Time of concentration =   11.79 min.
Rainfall intensity =     2.937(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      906.000 to Point/Station      907.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   391.000(Ft.)
Top (of initial area) elevation =  1440.000(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.00512  s(percent)=       0.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   11.569 min.
Rainfall intensity =      2.967(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.784
Decimal fraction soil group A = 0.730
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.270
RI index for soil(AMC 2)  =  43.61
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.699(CFS)
Total initial stream area =        1.160(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      907.000 to Point/Station      908.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    51.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.699(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.699(CFS)
Normal flow depth in pipe =    6.29(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    8.45(In.)
Pipe flow velocity =      6.48(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    11.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      907.000 to Point/Station      908.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.160(Ac.)
Runoff from this stream =      2.699(CFS)
Time of concentration =   11.70 min.
Rainfall intensity =     2.949(In/Hr)
Summary of stream data:

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


1        8.754     11.79               2.937
2        2.699     11.70               2.949
Largest stream flow has longer time of concentration
Qp =      8.754 + sum of
          Qb         Ia/Ib
           2.699 *    0.996 =      2.689
Qp =     11.443

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.754       2.699
Area of streams before confluence:
        3.420        1.160


Results of confluence:
Total flow rate =     11.443(CFS)
Time of concentration =    11.785 min.
Effective stream area after confluence  =      4.580(Ac.)


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

```
Process from Point/Station      908.000 to Point/Station      908.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.587
Decimal fraction soil group A = 0.720
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.280
RI index for soil(AMC 2)  =  46.03
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.79 min.
Rainfall intensity =      2.937(In/Hr) for a   100.0 year storm
Subarea runoff =      1.035(CFS) for      0.600(Ac.)
Total runoff =     12.478(CFS)        Total area =       5.180(Ac.)
End of computations, total study area =            5.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.425
Area averaged RI index number =  63.5
```

10-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 02/22/18 File:ARI10.out

190.04.15 TTM 37439
10-YEAR RATIONAL TABLING METHOD FOR AREA "I"
POST-PROJECT CONDITION
FN: ARI10.RRV

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

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

TRI-8 Builders - S/N 615

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

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++

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

Initial area flow distance = 438.000(Ft.)
Top (of initial area) elevation = 1442.000(Ft.)
Bottom (of initial area) elevation = 1438.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.00913 s(percent)= 0.91
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.781 min.
Rainfall intensity = 2.025(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.160
Decimal fraction soil group D = 0.840
RI index for soil(AMC 2) = 74.04
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 2.623(CFS)
Total initial stream area = 1.540(Ac.)
Pervious area fraction = 0.350

++

Process from Point/Station 902.000 to Point/Station 905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1435.000(Ft.)
Downstream point/station elevation = 1434.500(Ft.)
Pipe length = 27.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.623(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.623(CFS)

```
Normal flow depth in pipe =    6.29(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    8.33(In.)
Pipe flow velocity =      6.29(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    10.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      905.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.540(Ac.)
Runoff from this stream =      2.623(CFS)
Time of concentration =   10.85 min.
Rainfall intensity =     2.018(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      904.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   490.000(Ft.)
Top (of initial area) elevation =  1442.200(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     4.200(Ft.)
Slope =    0.00857  s(percent)=       0.86
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.420 min.
Rainfall intensity =      1.962(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.836
Decimal fraction soil group A = 0.050
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.920
RI index for soil(AMC 2)  =  72.67
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.084(CFS)
Total initial stream area =        1.880(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      904.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1434.500(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.084(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.084(CFS)
Normal flow depth in pipe =    6.95(In.)
Flow top width inside pipe =   11.85(In.)
Critical Depth =    9.03(In.)
Pipe flow velocity =      6.54(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    11.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      904.000 to Point/Station      905.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.880(Ac.)
```

```
Runoff from this stream =      3.084(CFS)
Time of concentration =   11.49 min.
Rainfall intensity =     1.956(In/Hr)
Summary of stream data:

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


1        2.623     10.85               2.018
2        3.084     11.49               1.956
Largest stream flow has longer time of concentration
Qp =      3.084 + sum of
          Qb         Ia/Ib
           2.623 *    0.969 =      2.542
Qp =      5.626

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.623       3.084
Area of streams before confluence:
        1.540        1.880


Results of confluence:
Total flow rate =      5.626(CFS)
Time of concentration =    11.489 min.
Effective stream area after confluence  =      3.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      905.000 to Point/Station      908.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1434.500(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    95.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.626(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.626(CFS)
Normal flow depth in pipe =   11.51(In.)
Flow top width inside pipe =   17.29(In.)
Critical Depth =   10.98(In.)
Pipe flow velocity =      4.72(Ft/s)
Travel time through pipe =    0.34 min.
Time of concentration (TC) =    11.82 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      905.000 to Point/Station      908.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.420(Ac.)
Runoff from this stream =      5.626(CFS)
Time of concentration =   11.82 min.
Rainfall intensity =     1.925(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      906.000 to Point/Station      907.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   391.000(Ft.)
Top (of initial area) elevation =  1440.000(Ft.)
Bottom (of initial area) elevation =  1438.000(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.00512  s(percent)=       0.51
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   11.569 min.
Rainfall intensity =      1.948(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.752
Decimal fraction soil group A = 0.730
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.270
RI index for soil(AMC 2)  =  43.61
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.700(CFS)
Total initial stream area =        1.160(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      907.000 to Point/Station      908.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1435.000(Ft.)
Downstream point/station elevation =  1434.000(Ft.)
Pipe length  =    51.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.700(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.700(CFS)
Normal flow depth in pipe =    5.73(In.)
Flow top width inside pipe =    8.66(In.)
Critical Depth =    7.18(In.)
Pipe flow velocity =      5.73(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    11.72 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      907.000 to Point/Station      908.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.160(Ac.)
Runoff from this stream =      1.700(CFS)
Time of concentration =   11.72 min.
Rainfall intensity =     1.935(In/Hr)
Summary of stream data:

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


1        5.626     11.82               1.925
2        1.700     11.72               1.935
Largest stream flow has longer time of concentration
Qp =      5.626 + sum of
          Qb         Ia/Ib
           1.700 *    0.995 =      1.691
Qp =      7.317

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.626       1.700
Area of streams before confluence:
        3.420        1.160


Results of confluence:
Total flow rate =      7.317(CFS)
Time of concentration =    11.824 min.
Effective stream area after confluence  =      4.580(Ac.)


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

```
Process from Point/Station      908.000 to Point/Station      908.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.497
Decimal fraction soil group A = 0.720
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.280
RI index for soil(AMC 2)  =  46.03
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.82 min.
Rainfall intensity =      1.925(In/Hr) for a    10.0 year storm
Subarea runoff =      0.574(CFS) for      0.600(Ac.)
Total runoff =      7.891(CFS)        Total area =       5.180(Ac.)
End of computations, total study area =            5.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.425
Area averaged RI index number =  63.5
```

APPENDIX D: WATER SURFACE PROFILE GRADIENT PROGRAM CALCULATIONS

APPENDIX D.1: LINE "A" CHANNEL

```
T1 LINE A                                                                    0
T2
T3
SO   1000.0001427.390  1                          1433.200
R    1295.2501428.280  1      .014                                .000    .000 0
BE   1295.2501428.280  2       .00
TS   1346.2501428.330  3      .014                                .000
R    2238.8901429.220  3      .035                                .000
TS   2289.2701429.270  4      .014                                .000
BX   2289.2701429.270  5
R    2408.1501429.390  5      .014                                .000    .000 0
BE   2408.1501429.390  6       .00
TS   2458.2301429.441  7      .014                                .000
R    3437.0701430.420  7      .035                                .000
TS   3550.0001430.530  8      .035                              33.525
JX   3600.0001430.580 10  9   .035  305.000         1432.000         45.0       14.843
R    3736.5201430.720 10      .035                              40.529
TS   3786.5201430.771 11      .035                                .000
R    4488.4601431.470 11      .035                                .000
SH   4488.4601431.470 11                          1431.470
CD   1  3   1    .670   7.000   28.670  .000  .000   .00
CD   2  2   0    .000   8.000   28.670  .000  .000   .00
CD   3  2   0    .000   7.000   50.000  .000  .000  -.02
CD   4  2   0    .000   8.000   28.670  .000  .000   .00
CD   5  3   1    .670   7.000   28.670  .000  .000   .00
CD   6  2   0    .000   8.000   28.670  .000  .000   .00
CD   7  1   0    .000   7.000   50.000 4.000 4.000  -.02
CD   8  1   0    .000   7.000   45.000 4.000 4.000  -.02
CD   9  4   1    .000   7.000     .000  .000  .000   .00
CD  10  1   0    .000   7.000   45.000 4.000 4.000  -.02
CD  11  1   0    .000   7.000   40.000 4.000 4.000  -.02
Q           580.000   .0
```

LINE A

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	1427.390	5.810	1433.200	885.00	5.44	.46	1433.66	.00	3.14	28.67	7.000	28.670	.00	1 .7
93.034	.0030					.0006	.05	5.81	.40	3.21	.014	.00	.00	BOX
1093.034	1427.670	5.540	1433.210	885.00	5.71	.51	1433.72	.00	3.14	28.67	7.000	28.670	.00	1 .7
89.018	.0030					.0006	.06	5.54	.43	3.21	.014	.00	.00	BOX
1182.053	1427.939	5.282	1433.220	885.00	5.98	.56	1433.78	.00	3.14	28.67	7.000	28.670	.00	1 .7
85.226	.0030					.0007	.06	5.28	.46	3.21	.014	.00	.00	BOX
1267.279	1428.196	5.036	1433.232	885.00	6.28	.61	1433.84	.00	3.14	28.67	7.000	28.670	.00	1 .7
27.971	.0030					.0008	.02	5.04	.50	3.21	.014	.00	.00	BOX
1295.250	1428.280	4.956	1433.236	885.00	6.38	.63	1433.87	.00	3.14	28.67	7.000	28.670	.00	1 .7
BRIDGE ENTRANCE														
1295.250	1428.280	5.032	1433.312	885.00	6.13	.58	1433.90	.00	3.09	28.67	8.000	28.670	.00	0 .0
TRANS STR	.0010					.0003	.02	5.03	.48		.014	-.02	.00	RECTANG
1346.250	1428.330	5.532	1433.862	885.00	3.20	.16	1434.02	.00	2.14	50.00	7.000	50.000	.00	0 .0
892.640	.0010					.0008	.71	5.53	.24	5.06	.035	-.02	.00	RECTANG
2238.890	1429.220	5.345	1434.565	885.00	3.31	.17	1434.74	.00	2.14	50.00	7.000	50.000	.00	0 .0
TRANS STR	.0010					.0003	.02	5.35	.25		.014	.00	.00	RECTANG
2289.270	1429.270	5.116	1434.386	885.00	6.03	.57	1434.95	.00	3.09	28.67	8.000	28.670	.00	0 .0
BRIDGE EXIT														

LINE A

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2289.270	1429.270	5.079	1434.349	885.00	6.22	.60	1434.95	.00	3.14	28.67	7.000	28.670	.00	1 .7
118.880	.0010					.0008	.10	5.08	.49	4.70	.014	.00	.00	BOX
2408.150	1429.390	5.050	1434.440	885.00	6.26	.61	1435.05	.00	3.14	28.67	7.000	28.670	.00	1 .7
BRIDGE ENTRANCE														
2408.150	1429.390	5.123	1434.513	885.00	6.03	.56	1435.08	.00	3.09	28.67	8.000	28.670	.00	0 .0
TRANS STR	.0010					.0003	.02	5.12	.47		.014	-.02	.00	RECTANG
2458.230	1429.441	5.704	1435.145	885.00	2.13	.07	1435.22	.00	2.02	95.62	7.000	50.000	4.00	0 .0
321.965	.0010					.0004	.13	5.70	.18	4.33	.035	-.02	4.00	TRAP
2780.195	1429.763	5.500	1435.263	885.00	2.24	.08	1435.34	.00	2.02	93.99	7.000	50.000	4.00	0 .0
342.451	.0010					.0004	.15	5.50	.19	4.33	.035	-.02	4.00	TRAP
3122.646	1430.106	5.303	1435.408	885.00	2.34	.09	1435.49	.00	2.02	92.41	7.000	50.000	4.00	0 .0
314.424	.0010					.0005	.16	5.30	.20	4.33	.035	-.02	4.00	TRAP
3437.070	1430.420	5.140	1435.560	885.00	2.44	.09	1435.65	.11	2.02	91.11	7.000	50.000	4.00	0 .0
TRANS STR	.0010					.0006	.07	5.25	.22		.035	-.02	4.00	TRAP
3550.000	1430.530	5.084	1435.614	885.00	2.66	.11	1435.72	.13	2.14	85.66	7.000	45.000	4.00	0 .0
JUNCT STR	.0010					.0005	.02	5.21	.24		.035	-.02	4.00	TRAP
3600.000	1430.580	5.122	1435.702	580.00	1.73	.05	1435.75	.02	1.64	85.97	7.000	45.000	4.00	0 .0
136.520	.0010					.0003	.04	5.15	.15	3.58	.035	-.02	4.00	TRAP

LINE A

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3736.520	1430.720	5.019	1435.739	580.00	1.78	.05	1435.79	.00	1.64	85.14	7.000	45.000	4.00	0 .0
TRANS STR	.0010					.0003	.02	5.02	.16		.035	-.02	4.00	TRAP
3786.520	1430.771	4.978	1435.749	580.00	1.95	.06	1435.81	.00	1.76	79.81	7.000	40.000	4.00	0 .0
282.782	.0010					.0004	.11	4.98	.18	3.81	.035	-.02	4.00	TRAP
4069.302	1431.053	4.803	1435.855	580.00	2.04	.06	1435.92	.00	1.76	78.41	7.000	40.000	4.00	0 .0
302.008	.0010					.0005	.14	4.80	.19	3.81	.035	-.02	4.00	TRAP
4371.311	1431.353	4.632	1435.986	580.00	2.14	.07	1436.06	.00	1.76	77.05	7.000	40.000	4.00	0 .0
117.149	.0010					.0005	.06	4.63	.20	3.81	.035	-.02	4.00	TRAP
4488.460	1431.470	4.572	1436.042	580.00	2.18	.07	1436.12	.00	1.76	76.56	7.000	40.000	4.00	0 .0

APPENDIX D.2: LINE "B" CHANNEL

```
T1 LINE B                                                                       0
T2
T3
SO   1000.0001427.390  1                          1433.200
R    1157.4601427.860  1      .014                                .000    .000 0
R    1313.9201428.330  1      .014                              89.645    .000 0
R    1443.6201428.720  1      .014                                .000    .000 0
BE   1443.6201428.720  2       .00
TS   1493.6901428.870  3      .014                                .000
R    2413.3901431.630  3      .035                                .000
SH   2413.3901431.630  3                          1431.630
CD   1  3   1    .670   7.000   28.670  .000  .000   .00
CD   2  2   0    .000   8.000   28.670  .000  .000   .00
CD   3  1   0    .000   7.000   30.000 4.000 4.000  -.02
Q           780.000   .0
```

Program Package Serial Number: 7028

WATER SURFACE PROFILE LISTING Date: 1-24-2018 Time:12:51:50

LINE B

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	1427.390	5.810	1433.200	780.00	4.79	.36	1433.56	.00	2.89	28.67	7.000	28.670	.00	1 .7
93.241	.0030					.0004	.04	5.81	.35	2.95	.014	.00	.00	BOX
1093.241	1427.668	5.540	1433.208	780.00	5.03	.39	1433.60	.00	2.89	28.67	7.000	28.670	.00	1 .7
64.219	.0030					.0005	.03	5.54	.38	2.95	.014	.00	.00	BOX
1157.460	1427.860	5.354	1433.214	780.00	5.20	.42	1433.63	.12	2.89	28.67	7.000	28.670	.00	1 .7
85.652	.0030					.0005	.05	5.47	.40	2.95	.014	.00	.00	BOX
1243.112	1428.117	5.105	1433.222	780.00	5.46	.46	1433.68	.13	2.89	28.67	7.000	28.670	.00	1 .7
70.808	.0030					.0006	.04	5.23	.43	2.95	.014	.00	.00	BOX
1313.920	1428.330	4.899	1433.229	780.00	5.69	.50	1433.73	.00	2.89	28.67	7.000	28.670	.00	1 .7
78.754	.0030					.0007	.06	4.90	.46	2.94	.014	.00	.00	BOX
1392.674	1428.567	4.671	1433.238	780.00	5.96	.55	1433.79	.00	2.89	28.67	7.000	28.670	.00	1 .7
50.946	.0030					.0008	.04	4.67	.49	2.94	.014	.00	.00	BOX
1443.620	1428.720	4.524	1433.244	780.00	6.16	.59	1433.83	.00	2.89	28.67	7.000	28.670	.00	1 .7
BRIDGE ENTRANCE														
1443.620	1428.720	4.596	1433.316	780.00	5.92	.54	1433.86	.00	2.84	28.67	8.000	28.670	.00	0 .0
TRANS STR	.0030					.0004	.02	4.60	.49		.014	-.02	.00	RECTANG
1493.690	1428.870	4.887	1433.757	780.00	3.22	.16	1433.92	.00	2.46	69.08	7.000	30.000	4.00	0 .0
81.843	.0030					.0012	.10	4.89	.30	3.77	.035	-.02	4.00	TRAP

LINE B

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1575.533	1429.116	4.722	1433.838	780.00	3.38	.18	1434.02	.00	2.46	67.76	7.000	30.000	4.00	0 .0
86.447	.0030					.0014	.12	4.72	.32	3.77	.035	-.02	4.00	TRAP
1661.979	1429.375	4.562	1433.937	780.00	3.55	.20	1434.13	.00	2.46	66.48	7.000	30.000	4.00	0 .0
93.606	.0030					.0015	.14	4.56	.34	3.77	.035	-.02	4.00	TRAP
1755.585	1429.656	4.407	1434.063	780.00	3.72	.21	1434.28	.00	2.46	65.24	7.000	30.000	4.00	0 .0
105.235	.0030					.0018	.19	4.41	.37	3.77	.035	-.02	4.00	TRAP
1860.820	1429.972	4.256	1434.227	780.00	3.90	.24	1434.46	.00	2.46	64.03	7.000	30.000	4.00	0 .0
125.855	.0030					.0020	.25	4.26	.39	3.77	.035	-.02	4.00	TRAP
1986.675	1430.349	4.109	1434.458	780.00	4.09	.26	1434.72	.00	2.46	62.86	7.000	30.000	4.00	0 .0
169.310	.0030					.0023	.39	4.11	.41	3.77	.035	-.02	4.00	TRAP
2155.985	1430.857	3.966	1434.824	780.00	4.29	.29	1435.11	.00	2.46	61.72	7.000	30.000	4.00	0 .0
257.405	.0030					.0026	.68	3.97	.44	3.77	.035	-.02	4.00	TRAP
2413.390	1431.630	3.844	1435.474	780.00	4.47	.31	1435.78	.00	2.46	60.74	7.000	30.000	4.00	0 .0

APPENDIX E: STORM DRAIN FRICTION SLOPE CALCULATIONS

APPENDIX E.1: LINE 1 AND LINE I STORM DRAIN SYSTEMS

LINE 1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1433.22	LINE 1	60	962.98	108.75	2604.42	0.0030	1428.22	1431.11	0.0017	5.5458	0.4767	1.5000	0.7151	1435.61
1435.61	LINE 1	60	308.39	96.27	2604.42	0.0030	1431.11	1432.03	0.0014	4.9094	0.3736	1.5000	0.5604	1436.60
1436.60	LINE 1	54	428.16	68.79	1966.48	0.0030	1432.03	1433.32	0.0012	4.3309	0.2907	1.5000	0.4361	1437.56

LAT 1A

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.61	LAT 1A	36	111.33	12.48	666.97	0.0030	1431.61	1431.94	0.0004	1.7679	0.0484	1.5000	0.0727	1435.73

LAT 1B

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.60	LAT 1B	42	21.71	32.98	1006.08	0.0030	0.50	0.57	0.0011	3.4324	0.1826	1.5000	0.2739	1436.89

LINE I1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.46	LINE I1	24	92.65	8.75	226.22	0.0030	1434.50	1434.78	0.0015	2.7889	0.1206	1.5000	0.1808	1436.78
1436.78	LINE I1	18	26.35	4.08	105.04	0.0030	1434.78	1434.86	0.0015	2.3118	0.0828	1.5000	0.1243	1436.94

LAT I1-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.78	LAT I1-1	18	26.65	4.80	105.04	0.0030	1434.78	1434.86	0.0021	2.7198	0.1147	1.5000	0.1720	1437.01

LINE I2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.88	LINE I2	18	48.45	2.70	105.04	0.0030	1434.50	1434.65	0.0007	1.5299	0.0363	1.5000	0.0544	1435.97

APPENDIX E.2: LINE A UPSTREAM AND LINE 2 STORM DRAIN SYSTEMS

LINE A (UPSTREAM CULVERT)

PIPE SIZING (SOFFIT CONTROL)

DS WSE	SYSTEM	RCB HEIGHT	RCB WIDTH	AREA	NO.RCB	WETTED PERIMETER	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.04	LINE A	6	8	48	2	28	154.43	681.3	15718.46	0.0030	1431.52	1431.98	0.00188	7.0972	0.7821	1.5000	1.1732	1437.51
1437.51	LINE A	6	8	48	2	28	25.61	528.8	15718.46	0.0030	1431.98	1432.06	0.00113	5.5083	0.4711	1.5000	0.7067	1438.24

NOTE: DOWNSTREM WATER SURFACE (DS WSE) FROM UPSTREAM LINE A WSPG CALCS.

LINE 2

PIPE SIZING (SOFFIT CONTROL)

DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.51	LINE 2	72	119.66	152.50	4235.09	0.0030	1431.71	1432.07	0.0013	5.4006	0.4521	1.5000	0.6781	1438.34
1438.34	LINE 2	66	189.10	76.85	3358.09	0.0030	1432.07	1432.64	0.0005	3.2389	0.1626	1.5000	0.2439	1438.68
1438.68	LINE 2	66	316.01	75.22	3358.09	0.0030	1432.64	1433.58	0.0005	3.1702	0.1558	1.5000	0.2337	1439.07

LAT 2A

PIPE SIZING (SOFFIT CONTROL)

DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1438.34	LAT 2A	60	62.86	75.68	2604.42	0.0030	1432.64	1432.82	0.0008	3.8594	0.2309	1.5000	0.3463	1438.74

LAT 2B

PIPE SIZING (SOFFIT CONTROL)

DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1438.68	LAT 2B	18	15.03	1.63	105.04	0.0030	1020.00	1020.05	0.0002	0.9236	0.0132	1.5000	0.0198	1438.71

APPENDIX E.3: LINE 3 STORM DRAIN SYSTEMS

LINE 3 - RCB

PIPE SIZING (SOFFIT CONTROL)																	
DS WSE	SYSTEM	RCB HEIGHT	RCB WIDTH	AREA	NO.RCB	WETTED PERIMETER	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.70	LINE 3	6	8	48	1	28	258.85	180.3	7859.23	0.0030	1432.00	1432.78	0.00053	3.7558	0.2190	1.5000	0.3286	1436.17

NOTE 2: DOWNSTREM WATER SURFACE (DS WSE) FROM UPSTREAM LINE A WSPG CALCS.

LINE 3 - RCP

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.17	LINE 3	84	841.86	180.28	6388.37	0.0030	1432.78	1435.30	0.0008	4.6906	0.3410	1.5000	0.5115	1437.35

APPENDIX E.4: LINE "A" ONSITE STORM DRAIN SYSTEMS

LAT B2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.47	LAT B2	30	79.37	17.80	410.16	0.0030	1433.13	1433.37	0.0019	3.6309	0.2043	1.5000	0.3065	1435.93

LINE A1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.20	LINE A1	30	128.92	14.90	410.16	0.0050	1436.00	1436.64	0.0013	3.0394	0.1432	1.5000	0.2148	1437.58
1437.58	LINE A1	24	27.71	9.30	226.22	0.0100	1436.64	1436.92	0.0017	2.9642	0.1362	1.5000	0.2043	1437.84

LAT A1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.58	LAT A1	18	16.51	5.68	105.04	0.0030	1436.92	1436.97	0.0029	3.2184	0.1606	1.5000	0.2408	1437.87

LINE A2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.20	LINE A2	18	31.68	2.70	105.04	0.0050	1020.00	1020.16	0.0007	1.5299	0.0363	1.5000	0.0544	1437.28

APPENDIX E.5: LINE "B" ONSITE STORM DRAIN SYSTEMS

LAT B1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1433.23	LAT B1	54	282.95	49.33	1966.48	0.0030	1428.73	1429.58	0.0006	3.1057	0.1495	1.5000	0.2243	1433.63

LINE B1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.49	LINE B1	30	20.52	18.82	410.16	0.0030	1432.50	1432.56	0.0021	3.8390	0.2284	1.5000	0.3427	1434.88
1434.88	LINE B1	30	24.23	16.43	410.16	0.0030	1432.56	1432.63	0.0016	3.3515	0.1741	1.5000	0.2612	1435.18

LAT B1-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.88	LAT B1-1	18	43.00	3.41	105.04	0.0050	1432.56	1432.78	0.0011	1.9322	0.0579	1.5000	0.0868	1435.01
1435.01	LINE B1	18	44.00	1.97	105.04	0.0030	1432.78	1432.91	0.0004	1.1163	0.0193	1.5000	0.0290	1435.05

LINE B2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.49	LINE B2	36	59.85	26.64	666.97	0.0030	1432.50	1432.68	0.0016	3.7737	0.2207	1.5000	0.3311	1434.92
1434.92	LINE B2	30	226.93	24.46	410.16	0.0030	1432.68	1433.36	0.0036	4.9895	0.3859	1.5000	0.5788	1436.30
1436.30	LINE B2	18	150.72	3.98	105.04	0.0030	1433.36	1433.81	0.0014	2.2552	0.0788	1.5000	0.1182	1436.64

LAT B2-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.92	LAT B2-1	18	29.40	4.31	105.04	0.0050	1432.68	1432.83	0.0017	2.4422	0.0924	1.5000	0.1387	1435.10

LAT B2-2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.92	LAT B2-2	18	18.00	0.89	105.04	0.0050	1432.68	1432.77	0.0001	0.5043	0.0039	1.5000	0.0059	1434.92

LAT B2-3

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.30	LAT B2-3	24	30.21	12.90	226.22	0.0050	1433.36	1433.51	0.0033	4.1116	0.2620	1.5000	0.3930	1436.79

LAT B2-4

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.30	LAT B2-4	18	22.03	6.47	105.04	0.0050	1433.36	1433.47	0.0038	3.6661	0.2083	1.5000	0.3125	1436.70

LINE B3

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.49	LINE B3	24	27.50	7.40	226.22	0.0030	1432.50	1432.58	0.0011	2.3586	0.0862	1.5000	0.1293	1434.65
1434.65	LINE B3	24	45.50	6.80	226.22	0.0030	1432.58	1432.72	0.0009	2.1673	0.0728	1.5000	0.1092	1434.80

APPENDIX E.6: LINE "C" ONSITE STORM DRAIN SYSTEMS

LAT A2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.44	LAT A2	48	97.30	51.68	1436.42	0.0030	1429.87	1430.16	0.0013	4.1179	0.2628	1.5000	0.3943	1434.96

LINE C1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.72	LINE C1	24	195.65	9.49	226.22	0.0030	1433.00	1433.59	0.0018	3.0247	0.1418	1.5000	0.2127	1436.28
1436.28	LINE C1	24	32.28	4.46	226.22	0.0030	1433.59	1433.68	0.0004	1.4215	0.0313	1.5000	0.0470	1436.34

LAT C1-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.34	LAT C1-1	24	30.41	6.04	226.22	0.0030	1433.68	1433.78	0.0007	1.9251	0.0574	1.5000	0.0862	1436.44

LINE C2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.72	LINE C2	18	33.55	4.12	105.04	0.0030	1433.00	1433.10	0.0015	2.3345	0.0845	1.5000	0.1267	1435.90
1435.90	LINE C2	18	44.96	3.35	105.04	0.0030	1433.10	1433.24	0.0010	1.8982	0.0558	1.5000	0.0838	1436.03

LINE C3

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.72	LINE C3	42	64.46	40.49	1006.08	0.0030	1433.00	1433.19	0.0016	4.2140	0.2752	1.5000	0.4129	1436.24
1436.24	LINE C3	42	136.44	32.14	1006.08	0.0030	1433.19	1433.60	0.0010	3.3449	0.1734	1.5000	0.2601	1436.64
1436.64	LINE C3	30	404.06	12.14	410.16	0.0030	1433.60	1434.81	0.0009	2.4764	0.0951	1.5000	0.1426	1437.13

LAT C3-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.24	LAT C3-1	18	25.01	5.03	105.04	0.0050	1433.19	1433.32	0.0023	2.8501	0.1259	1.5000	0.1889	1436.48

LAT C3-2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.24	LAT C3-2	18	13.00	4.59	105.04	0.0050	1433.19	1433.26	0.0019	2.6008	0.1048	1.5000	0.1573	1436.42

LAT C3-3

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.64	LAT C3-3	24	15.66	9.83	226.22	0.0050	1436.64	1436.71	0.0019	3.1331	0.1522	1.5000	0.2282	1436.89

LAT C3-4

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.64	LAT C3-4	30	26.54	13.27	410.16	0.0050	1436.64	1436.77	0.0010	2.7069	0.1136	1.5000	0.1704	1436.83

APPENDIX E.7: LINE "D" ONSITE STORM DRAIN SYSTEMS

LAT A4

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.58	LAT A4	48	83.79	23.85	1436.42	0.0030	1131.47	1131.72	0.0003	1.9004	0.0560	1.5000	0.0840	1435.69

1432

LINE D1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.44	LINE D1	42	54.73	19.43	1006.08	0.0030	1435.00	1435.16	0.0004	2.0222	0.0634	1.5000	0.0951	1436.56
1436.56	LINE D1	30	85.02	7.66	410.16	0.0030	1435.00	1435.26	0.0003	1.5625	0.0378	1.5000	0.0568	1436.64

LINE D2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.44	LINE D2	18	36.72	1.56	105.04	0.0030	1435.00	1435.11	0.0002	0.8839	0.0121	1.5000	0.0182	1436.47

APPENDIX E.8: LINE "E" ONSITE STORM DRAIN SYSTEMS

LAT A5

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.04	LAT A5	48	68.36	29.99	1436.42	0.0030	1431.97	1432.18	0.0004	2.3897	0.0885	1.5000	0.1328	1436.20

LINE E1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.50	LINE E1	36	124.21	16.35	666.97	0.0030	1435.00	1435.37	0.0006	2.3161	0.0831	1.5000	0.1247	1437.70
1437.70	LINE E1	30	25.47	8.60	410.16	0.0030	1435.37	1435.45	0.0004	1.7543	0.0477	1.5000	0.0716	1437.78

LAT E1-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.70	LAT E1-1	24	30.26	7.76	226.22	0.0030	1435.37	1435.46	0.0012	2.4733	0.0948	1.5000	0.1422	1437.88

LINE E2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.50	LINE E2	24	28.50	8.29	226.22	0.0030	1435.00	1435.09	0.0013	2.6422	0.1082	1.5000	0.1623	1437.70

LINE E3

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1437.50	LINE E3	18	35.03	4.54	105.04	0.0030	1435.00	1435.11	0.0019	2.5725	0.1026	1.5000	0.1539	1437.72

APPENDIX E.9: LINE "F" ONSITE STORM DRAIN SYSTEMS

LAT A3

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.44	LAT A3	48	95.81	34.90	1436.42	0.0030	1429.87	1430.16	0.0006	2.7809	0.1199	1.5000	0.1798	1434.68

LINE F1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.50	LINE F1	30	163.80	16.11	410.16	0.0030	1432.75	1433.24	0.0015	3.2862	0.1674	1.5000	0.2511	1436.00
1436.00	LINE F1	30	68.97	8.43	410.16	0.0030	1433.24	1433.45	0.0004	1.7196	0.0458	1.5000	0.0688	1436.10

LAT F1-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.00	LAT F1-1	30	59.70	8.02	410.16	0.0030	1433.24	1433.42	0.0004	1.6360	0.0415	1.5000	0.0622	1436.09

LINE F2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.50	LINE F2	30	28.50	17.31	410.16	0.0030	1432.75	1432.84	0.0018	3.5310	0.1933	1.5000	0.2899	1435.84
1435.84	LINE F2	24	45.00	7.71	226.22	0.0030	1432.84	1432.97	0.0012	2.4574	0.0936	1.5000	0.1404	1436.03

APPENDIX E.10: LINE "G" ONSITE STORM DRAIN SYSTEMS

LAT A6

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1434.44	LAT A6	48	803.95	34.90	1436.42	0.0030	1429.72	1432.13	0.0006	2.7809	0.1199	1.5000	0.1798	1435.09

LINE G1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.16	LINE G1	24	118.33	12.16	226.22	0.0030	1434.75	1435.10	0.0029	3.8757	0.2328	1.5000	0.3492	1436.85
1436.85	LINE G1	18	47.13	5.46	105.04	0.0030	1435.10	1435.25	0.0027	3.0938	0.1484	1.5000	0.2225	1437.20

LAT G1-1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.85	LAT G1-1	18	27.05	6.91	105.04	0.0030	1435.10	1435.19	0.0043	3.9154	0.2376	1.5000	0.3564	1437.32

LINE G2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.16	LINE G2	18	29.67	8.51	105.04	0.0030	1434.75	1434.84	0.0066	4.8220	0.3604	1.5000	0.5406	1436.90

LINE G3

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.16	LINE G3	18	40.50	3.23	105.04	0.0030	1434.75	1434.87	0.0009	1.8302	0.0519	1.5000	0.0779	1436.28

LINE G4

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1436.16	LINE G4	18	32.18	8.23	105.04	0.0030	1434.75	1434.85	0.0061	4.6633	0.3371	1.5000	0.5056	1436.86

APPENDIX E.11: LINE "H" ONSITE STORM DRAIN SYSTEMS

LAT A1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1433.23	LAT A1	48	94.53	34.90	1436.42	0.0030	1428.70	1428.98	0.0006	2.7809	0.1199	1.5000	0.1798	1433.47

LINE H1

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.00	LINE H1	36	155.16	24.12	666.97	0.0030	1432.50	1432.97	0.0013	3.4167	0.1809	1.5000	0.2714	1435.47
1435.47	LINE H1	24	65.42	10.69	226.22	0.0030	1432.97	1433.16	0.0022	3.4072	0.1799	1.5000	0.2699	1435.89

LINE H2

PIPE SIZING (SOFFIT CONTROL)														
DS WSE	SYSTEM	PIPE DIA.	PIPE LENGTH	Q (cfs)	K	PIPE SLOPE	DS INVERT	US INVERT	FRICTION SLOPE	VELOCITY	VELOCITY HEAD	LOSS COEFFICIENT	LOSSES	US WSE
1435.47	LINE H2	18	35.49	6.15	105.04	0.0030	1432.50	1432.61	0.0034	3.4847	0.1882	1.5000	0.2823	1435.88

APPENDIX F: BASIN OUTLET STRUCTURE SIZING

APPENDIX F.1: BASIN A

BIORETENTION BASIN A

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1436.5

MAXIMUM DEPTH 100-YEAR CAN POND= 1437.25

RESULTING MAXIMUM H = 0.75 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 17.65 ft^3/s

H = 0.75 ft

C = 3

L_{MIN} = 9.06 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \frac{Q}{CL}^{(2/3)}$

Q = 17.65 ft^3/s

L = 10 ft

C = 3

H = 0.70 ft

WEIR INVERT = 1436.5

100-YEAR WSE = **1437.20**

APPENDIX F.2: BASIN B

BIORETENTION BASIN A

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1433.75

MAXIMUM DEPTH 100-YEAR CAN POND= 1434.5

RESULTING MAXIMUM H = 0.75 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 49.33 ft^3/s

H = 0.75 ft

C = 3

L_{MIN} = 25.32 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \frac{Q}{CL}^{(2/3)}$

Q = 49.33 ft^3/s

L = 26 ft

C = 3

H = 0.74 ft

WEIR INVERT = 1433.75

100-YEAR WSE = **1434.49**

APPENDIX F.3: BASIN C

BIORETENTION BASIN A

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1435

MAXIMUM DEPTH 100-YEAR CAN POND= 1435.75

RESULTING MAXIMUM H = 0.75 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 51.68 ft^3/s

H = 0.75 ft

C = 3

L_{MIN} = 26.52 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \frac{Q}{CL}^{(2/3)}$

Q = 51.68 ft^3/s

L = 28 ft

C = 3

H = 0.72 ft

WEIR INVERT = 1435

100-YEAR WSE = **1435.72**

APPENDIX F.4: BASIN D

BIORETENTION BASIN D

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1435.75

MAXIMUM DEPTH 100-YEAR CAN POND= 1436.5

RESULTING MAXIMUM H = 0.75 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 23.85 ft^3/s

H = 0.75 ft

C = 3

L_{MIN} = 12.24 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \frac{Q}{CL}^{(2/3)}$

Q = 23.85 ft^3/s

L = 14 ft

C = 3

H = 0.69 ft

WEIR INVERT = 1435.75

100-YEAR WSE = **1436.44**

APPENDIX F.5: BASIN E

BIORETENTION BASIN E

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1436.5
MAXIMUM DEPTH 100-YEAR CAN POND= 1437.5
RESULTING MAXIMUM H = 1 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 29.99 ft^3/s
H = 1 ft
C = 3

L_{MIN} = 10.00 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \left(\frac{Q}{CL}\right)^{(2/3)}$

Q = 29.99 ft^3/s
L = 10 ft
C = 3

H = 1.00 ft

WEIR INVERT = 1436.5
100-YEAR WSE = **1437.50**

APPENDIX F.6: BASIN F

BIORETENTION BASIN F

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1434.75

MAXIMUM DEPTH 100-YEAR CAN POND= 1435.5

RESULTING MAXIMUM H = 0.75 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 34.9 ft^3/s

H = 0.75 ft

C = 3

L_{MIN} = 17.91 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \frac{Q}{CL}^{(2/3)}$

Q = 34.9 ft^3/s

L = 18 ft

C = 3

H = 0.75 ft

WEIR INVERT = 1434.75

100-YEAR WSE = **1435.50**

APPENDIX F.7: BASIN G

BIORETENTION BASIN G

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1435.15

MAXIMUM DEPTH 100-YEAR CAN POND= 1436.5

RESULTING MAXIMUM H = 1.35 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 30.48 ft^3/s

H = 1.35 ft

C = 3

L_{MIN} = 6.48 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \left(\frac{Q}{CL}\right)^{(2/3)}$

Q = 30.48 ft^3/s

L = 10 ft

C = 3

H = 1.01 ft

WEIR INVERT = 1435.15

100-YEAR WSE = **1436.16**

APPENDIX F.8: BASIN H

BIORETENTION BASIN H

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1433.5

MAXIMUM DEPTH 100-YEAR CAN POND= 1435

RESULTING MAXIMUM H = 1.5 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 33.08 ft^3/s

H = 1.5 ft

C = 3

L_{MIN} = 6.00 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \frac{Q}{CL}^{(2/3)}$

Q = 33.08 ft^3/s

L = 6 ft

C = 3

H = 1.50 ft

WEIR INVERT = 1433.5

100-YEAR WSE = **1435.00**

APPENDIX F.9: BASIN I

BIORETENTION BASIN I

100-YEAR BASIN OUTLET STRUCTURE SIZING

WEIR INVERT ELEVATION= 1434.75

MAXIMUM DEPTH 100-YEAR CAN POND= 1435.75

RESULTING MAXIMUM H = 1 ft

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR L: $L = \frac{Q}{CH^{(3/2)}}$

Q = 12.48 ft^3/s

H = 1 ft

C = 3

L_{MIN} = 4.16 ft

100-YEAR WSE CALCULATION

WEIR EQUATION: $Q = CLH^{(3/2)}$

SOLVING FOR H: $H = \frac{Q}{CL}^{(2/3)}$

Q = 12.48 ft^3/s

L = 5 ft

C = 3

H = 0.88 ft

WEIR INVERT = 1434.75

100-YEAR WSE = **1435.63**

APPENDIX G: STREET CAPACITY CALCULATIONS AND RATING TABLES

APPENDIX G.1: 56' FULL STREET CAPACITY – RIGHT-OF-WAY

Rating Table for 56 FT ROW- ROW-ROW Depth=0.7

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.70	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.70
0+10	0.50
0+10	0.00
0+12	0.13
0+12	0.16
0+28	0.48
0+44	0.16
0+44	0.13
0+46	0.00
0+46	0.50
0+56	0.70

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.70)	(0+56, 0.70)	0.015

Channel Slope (ft/ft)	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	51.55	3.09	16.70	57.08	56.00
0.00700	61.00	3.65	16.70	57.08	56.00
0.00900	69.17	4.14	16.70	57.08	56.00

Rating Table for 56 FT ROW- ROW-ROW Depth=0.7

Input Data

Channel Slope (ft/ft)	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.01100	76.47	4.58	16.70	57.08	56.00
0.01300	83.13	4.98	16.70	57.08	56.00
0.01500	89.29	5.35	16.70	57.08	56.00
0.01700	95.06	5.69	16.70	57.08	56.00
0.01900	100.50	6.02	16.70	57.08	56.00
0.02100	105.66	6.33	16.70	57.08	56.00
0.02300	110.57	6.62	16.70	57.08	56.00
0.02500	115.28	6.90	16.70	57.08	56.00
0.02700	119.80	7.17	16.70	57.08	56.00
0.02900	124.16	7.43	16.70	57.08	56.00
0.03100	128.37	7.69	16.70	57.08	56.00
0.03300	132.45	7.93	16.70	57.08	56.00
0.03500	136.40	8.17	16.70	57.08	56.00
0.03700	140.24	8.40	16.70	57.08	56.00
0.03900	143.98	8.62	16.70	57.08	56.00

APPENDIX G.2: 56' FULL STREET CAPACITY – TOP-OF-CURB

Rating Table for 56 FT- Full Street TC Depth=0.5

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.50	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.70
0+10	0.50
0+10	0.00
0+12	0.13
0+12	0.16
0+28	0.48
0+44	0.16
0+44	0.13
0+46	0.00
0+46	0.50
0+56	0.70

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.70)	(0+56, 0.70)	0.015

Channel Slope (ft/ft)	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	18.10	2.41	7.50	37.07	36.00
0.00700	21.42	2.86	7.50	37.07	36.00
0.00900	24.29	3.24	7.50	37.07	36.00

Rating Table for 56 FT- Full Street TC Depth=0.5

Input Data

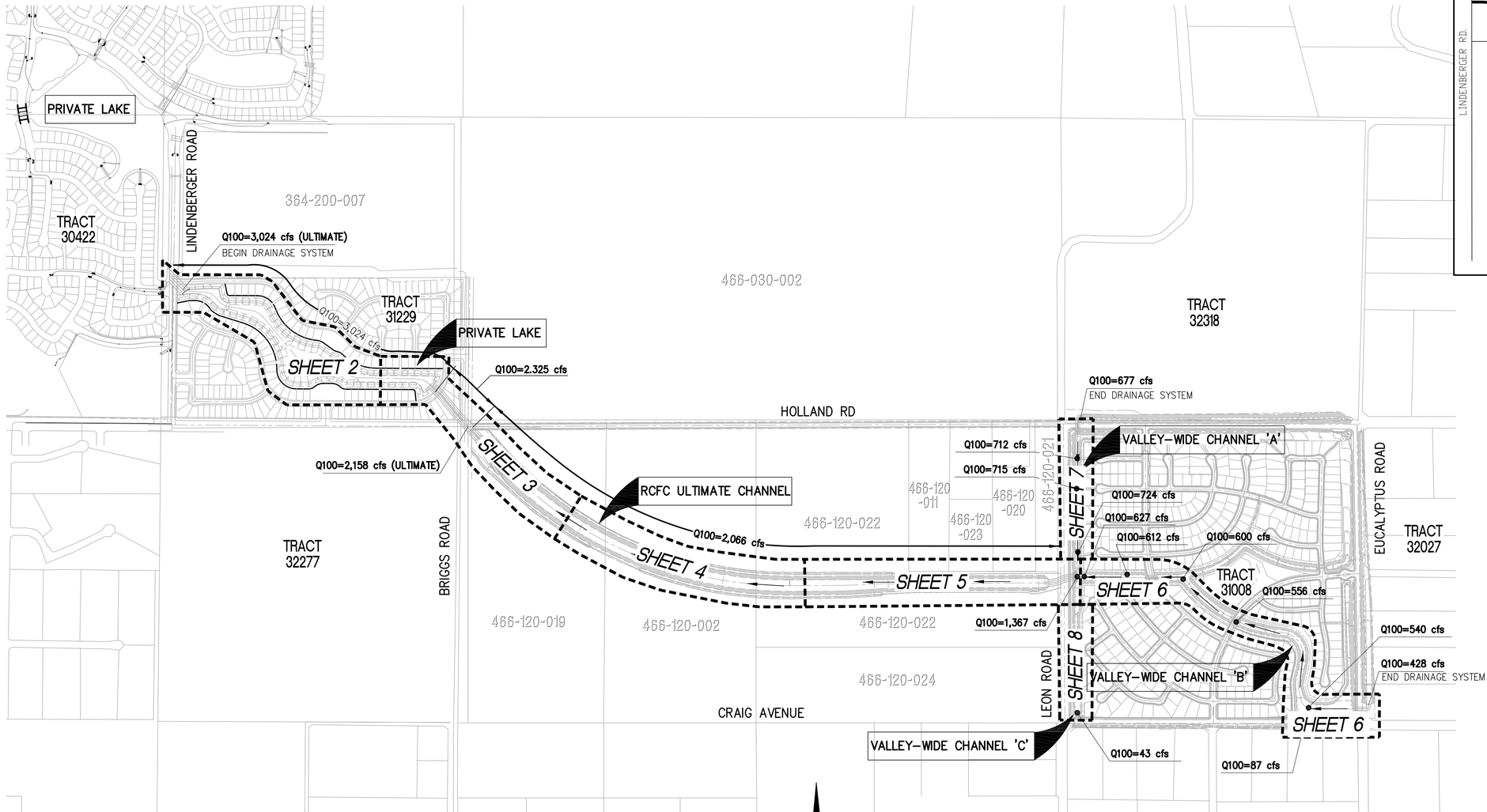
Channel Slope (ft/ft)	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.01100	26.85	3.58	7.50	37.07	36.00
0.01300	29.19	3.89	7.50	37.07	36.00
0.01500	31.36	4.18	7.50	37.07	36.00
0.01700	33.38	4.45	7.50	37.07	36.00
0.01900	35.29	4.71	7.50	37.07	36.00
0.02100	37.10	4.95	7.50	37.07	36.00
0.02300	38.83	5.18	7.50	37.07	36.00
0.02500	40.48	5.40	7.50	37.07	36.00
0.02700	42.07	5.61	7.50	37.07	36.00
0.02900	43.60	5.81	7.50	37.07	36.00
0.03100	45.08	6.01	7.50	37.07	36.00
0.03300	46.51	6.20	7.50	37.07	36.00
0.03500	47.90	6.39	7.50	37.07	36.00
0.03700	49.25	6.57	7.50	37.07	36.00
0.03900	50.56	6.74	7.50	37.07	36.00

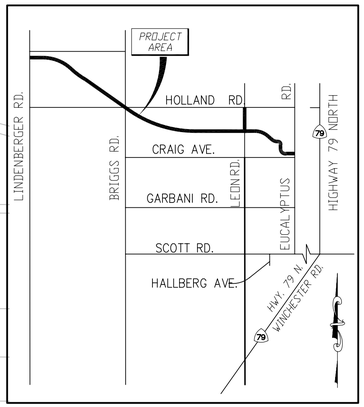
EXCERPTS

EXCERPT 1: PRELIMINARY AREA DRAINAGE PLAN FOR THE MENIFEE VALLEY – PROPOSED LAKE AND CHANNEL PLANS

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

AREA DRAINAGE PLAN FOR THE MENIFEE VALLEY





VICINITY MAP
NO SCALE
THOMAS GUIDE – RIVERSIDE COUNTY (2003)
PAGE 869 C4–C5

INDEX MAP
SCALE: 1" = 500'
N

LEGEND:
- BOUNDARY
- SHEET 2 — SHEET LIMITS
- DRAINAGE DIRECTION

MAINTENANCE RESPONSIBILITY NOTE:

RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT (RCFC&WCD) SHALL MAINTAIN THE ULTIMATE CHANNEL AND STRUCTURAL COMPONENTS OF THE DRAINAGE CHANNEL LOCATED WITHIN TRACT 31008, AS SHOWN ON THESE PLANS, AND THE DESIGN THEREOF SHALL BE CONSISTENT WITH RCFC&WCD DESIGN STANDARDS AND CRITERIA. VALLEY WIDE RECREATION SHALL MAINTAIN THE TRAIL PORTIONS OF THE ULTIMATE CHANNEL AND WITHIN TRACT 31008. VALLEY WIDE SHALL ALSO MAINTAIN THE ENTIRE DRAINAGE CHANNEL WITHIN TRACT 31008 UNDER REGULAR MAINTENANCE ACTIVITIES. ADDITIONALLY, ALL REINFORCED CONCRETE BOXES AS SHOWN ON THESE PLANS WILL BE THE RESPONSIBILITY OF THE RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT FOR MAINTENANCE PURPOSES. THE PRIVATE LAKE WITHIN TRACT 31229, WILL BE MAINTAINED BY AN INTERIM HOME–OWNER'S ASSOCIATION (HOA), UNTIL SUCH TIME THAT TRACT 31229 IS DEVELOPED. UPON CONSTRUCTION OF TRACT 31229, THE HOA OF TRACT 31229 SHALL ASSUME SOLE RESPONSIBILITY FOR THE PRIVATE LAKE.

PRELIMINARY NOTE:

THESE PLANS HAVE BEEN PREPARED FOR THE REVIEW/COMMENT OF RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT. THESE PLANS DO NOT REPRESENT FINAL ENGINEERING CONSTRUCTION DRAWINGS AND ARE SOLEY FOR PRELIMINARY DESIGN PURPOSES.

SHEET INDEX

1. LOCATION MAP AND INDEX MAP
2. PRIVATE LAKE (STA. 7+85.46 TO 29+33)
3. PRIVATE LAKE & RCFC CHANNEL (STA. 29+33.00 TO 52+00.00)
4. RCFC CHANNEL (STA. 52+00.00 TO 75+00.00)
5. RCFC CHANNEL (STA. 75+00.00 TO 97+21.96)
6. VALLEY–WIDE CHANNEL 'B'
7. VALLEY–WIDE CHANNEL 'A'
8. VALLEY–WIDE CHANNEL 'C'

Underground Service Alert
Call: TOLL FREE 1–800 227–2600
TWO WORKING DAYS BEFORE YOU DIG

SEAL–ENGINEER
REGISTERED PROFESSIONAL ENGINEER — FRANK A. ARTIGA — NO. C 61860 EXP. 9/30/07 — CIVIL — STATE OF CALIFORNIA

Designed By	Drawn By	Checked By
F.A.A.	F.A.A.	F.A.A.

Plans Prepared Under Supervision Of
FRANK A. ARTIGA Date:
R.C.E. No. 61860 Expires 09/30/07

ARTIGA CIVIL DESIGN
43430 BUSINESS PARK DRIVE
TEMECULA, CA 92590
T: 951.506.1425
F: 951.506.1426

REVISIONS

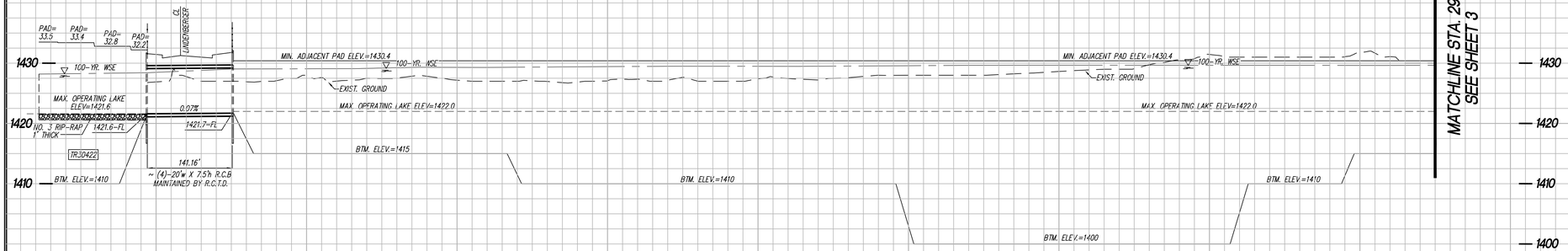
REF.	DESCRIPTION	APPR.	DATE
12/7/06	REVISE PLAN PER GLEN DROGIN'S COMMENTS DATED 9/11/06		
5/22/07	REVISE PLAN PER GLEN DROGIN'S COMMENTS DATED 2/13/07		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL: PRELIMINARY
PLANNING ENGINEER DATE:
APPROVED BY:
CHIEF ENGINEER DATE:

COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT
RECOMMENDED BY:
APPROVED BY: PRELIMINARY Date
KHALED QUIMAN Director of Transportation Date
R.C.E. 19744 Expires 09–30–2007

MENIFEE VALLEY DRAINAGE PLAN
PROPOSED LAKE & CHANNEL PLAN
TITLE SHEET and INDEX MAP

PROJECT NO. --
DRAWING NO.
SHEET NO. 1 OF 8

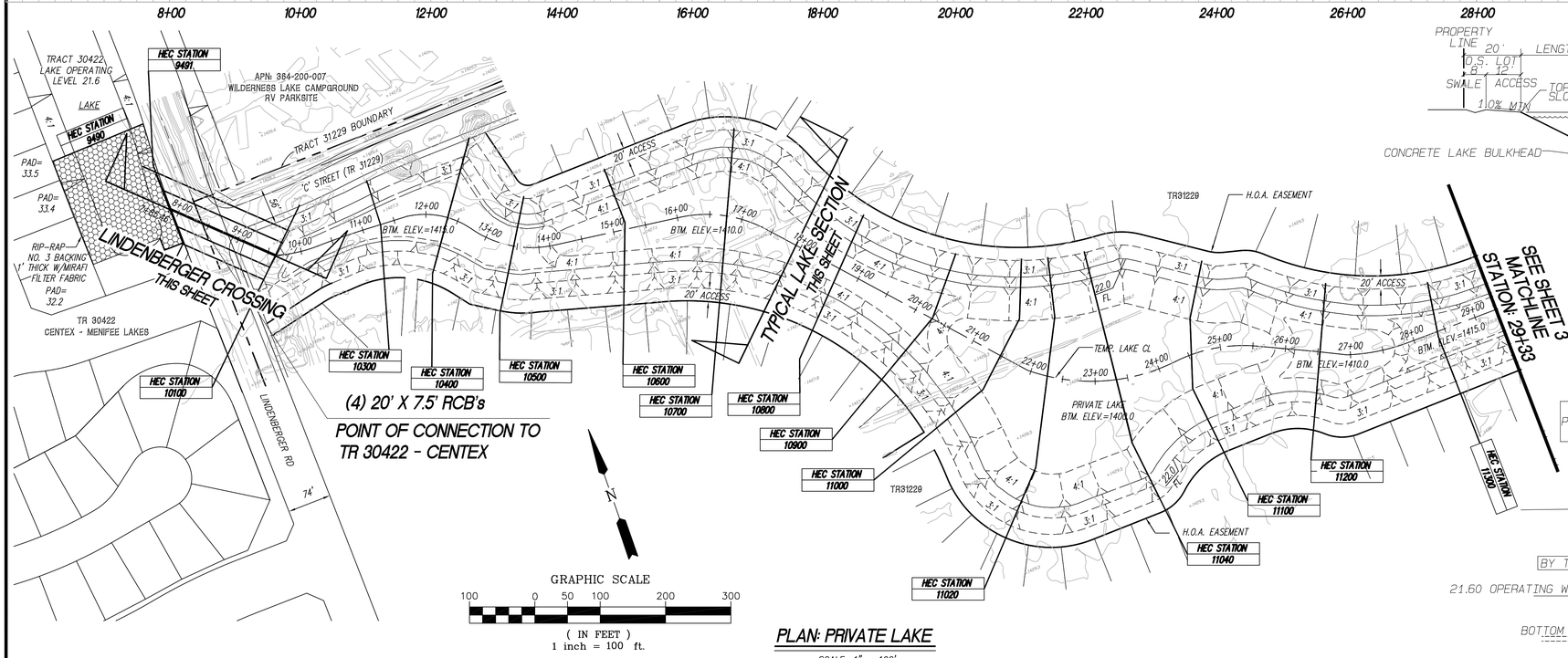


HYDRAULIC DATA

Q_{100} = 3024 CFS
V_{MAX} = 4.4 FPS

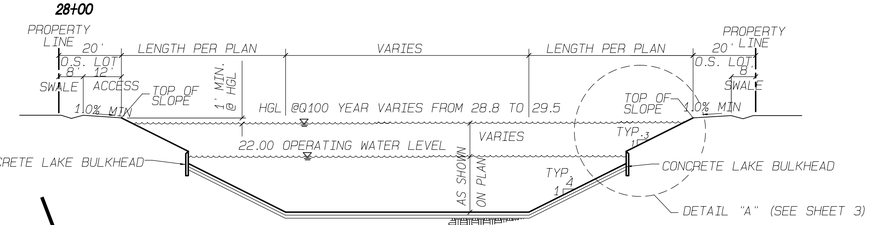
PROFILE: PRIVATE LAKE

SCALE: HORIZ. 1" =100', VERT. 1" = 10'
MAINTAINED BY H.O.A.
R.C.B.'s MAINTAINED BY RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT



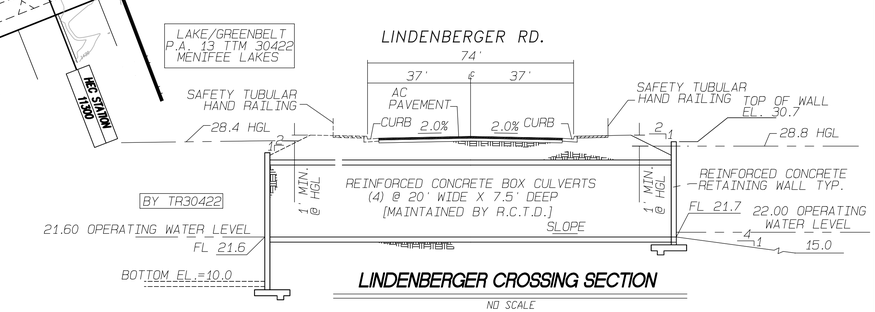
PLAN: PRIVATE LAKE

SCALE: 1" = 100'



TYPICAL LAKE SECTION

NO SCALE
MAINTAINED BY H.O.A.



LINDENBERGER CROSSING SECTION

NO SCALE

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TWO WORKING DAYS BEFORE YOU DIG

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/07 CIVIL STATE OF CALIFORNIA

Designed By	Drawn By	Checked By
F.A.A.	F.A.A.	F.A.A.

Plans Prepared Under Supervision Of
FRANK A. ARTIGA Date:
R.C.E. No. 61860 Expires 09/30/07

ARTIGA CIVIL DESIGN
43430 BUSINESS PARK DRIVE
TEMECULA, CA 92590
T: 951.506.1425
F: 951.506.1426

REVISIONS

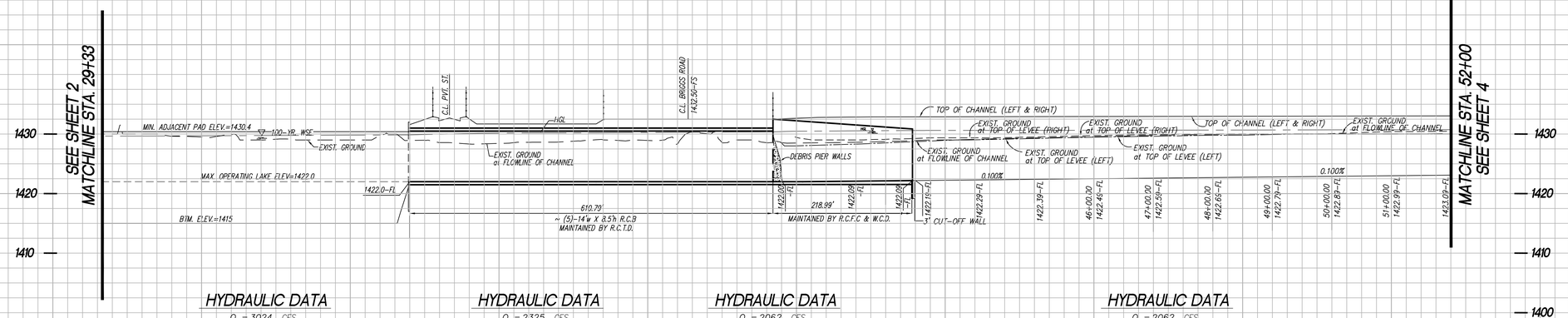
REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
PRELIMINARY
RECOMMENDED FOR APPROVAL:
PLANNING ENGINEER DATE:
APPROVED BY:
CHIEF ENGINEER DATE:

COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT
PRELIMINARY
RECOMMENDED BY:
APPROVED BY: Date
KHALED ORAIMAN Director of Transportation Date
R.C.E. 19744 Expires 09-30-2007

MENIFEE VALLEY DRAINAGE PLAN
PROPOSED LAKE & CHANNEL PLAN
PRIVATE LAKE THRU TRACT 31229
7+85.46 to 29+33.00

PROJECT NO.
DRAWING NO.
SHEET NO. 2 OF 8



HYDRAULIC DATA

$Q_{100} = 3024$ CFS
$V_{MAX} = 3.6$ FPS

HYDRAULIC DATA

$Q_{100} = 2325$ CFS
$V_{MAX} = 3.0$ FPS

HYDRAULIC DATA

$Q_{100} = 2062$ CFS
$V_{MAX} = 2.2$ FPS

HYDRAULIC DATA

$Q_{100} = 2062$ CFS
$V_{MAX} = 3.5$ FPS

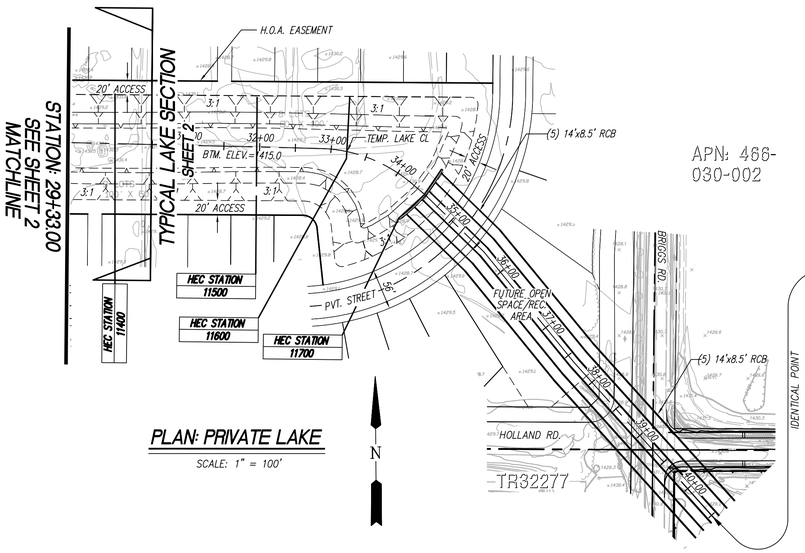
PROFILE: PRIVATE LAKE

SCALE: HORIZ. 1" =100', VERT. 1" = 10'
MAINTAINED BY H.O.A.
R.C.B.'s MAINTAINED BY RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT

PROFILE: RCFC CHANNEL

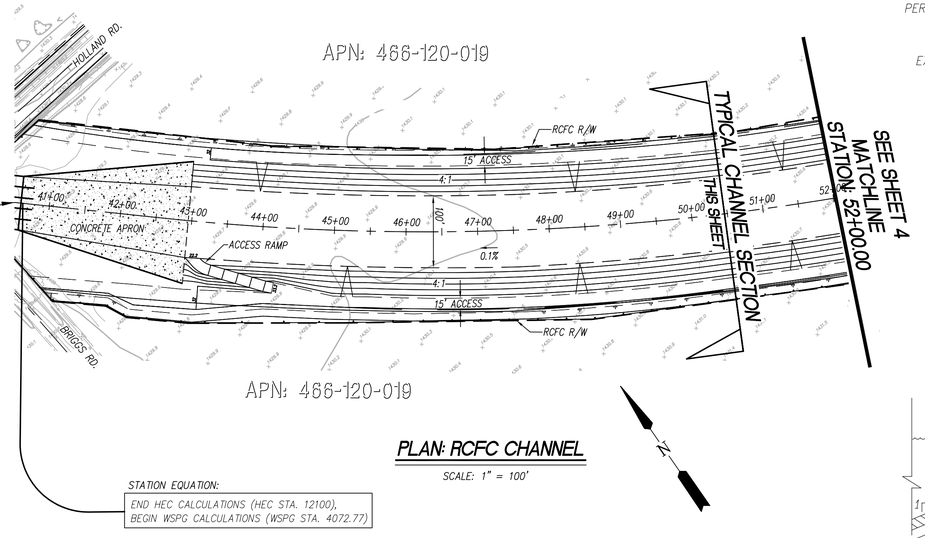
SCALE: HORIZ. 1" =100', VERT. 1" = 10'
MAINTAINED BY RIVERSIDE COUNTY FLOOD CONTROL
R.C.B.'s MAINTAINED BY RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT

30+00 32+00 34+00 36+00 38+00 40+00 42+00 44+00 46+00 48+00 50+00 52+00



PLAN: PRIVATE LAKE

SCALE: 1" = 100'

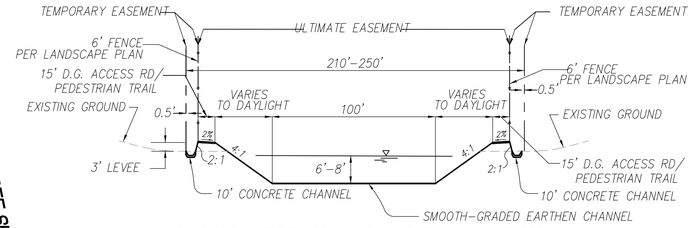


PLAN: RCFC CHANNEL

SCALE: 1" = 100'

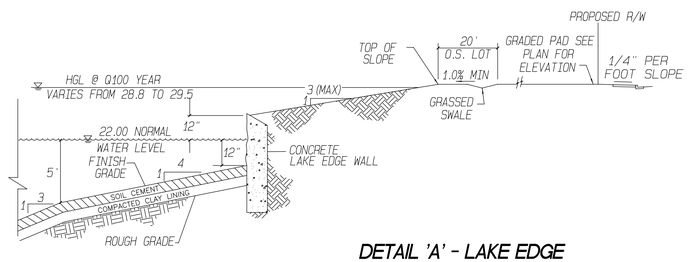
STATION EQUATION:
END HEC CALCULATIONS (HEC STA. 12100),
BEGIN WSPG CALCULATIONS (WSPG STA. 4072.77)

GRAPHIC SCALE
100 0 50 100 200 300
(IN FEET)
1 inch = 100 ft.



CHANNEL SECTION - WITH LEVEE CONDITION

*STA. 41+35.58 TO 76+82.76
NO SCALE
*NOTE: NO LEVEE ON NORTH SIDE OF CHANNEL BETWEEN 41+35.58 TO 60+93.51, AND BETWEEN STATIONS 54+09.56 TO 58+98.10 ON THE SOUTH SIDE



DETAIL 'A' - LAKE EDGE

NO SCALE

Underground Service Alert
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SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/07 CIVIL STATE OF CALIFORNIA

Designed By	Drawn By	Checked By
F.A.A.	F.A.A.	F.A.A.

Plans Prepared Under Supervision Of
FRANK A. ARTIGA Date:
R.C.E. No. 61860 Expires 09/30/07

ARTIGA CIVIL DESIGN
43430 BUSINESS PARK DRIVE
TEMECULA, CA 92590
T: 951.506.1425
F: 951.506.1426

REVISIONS

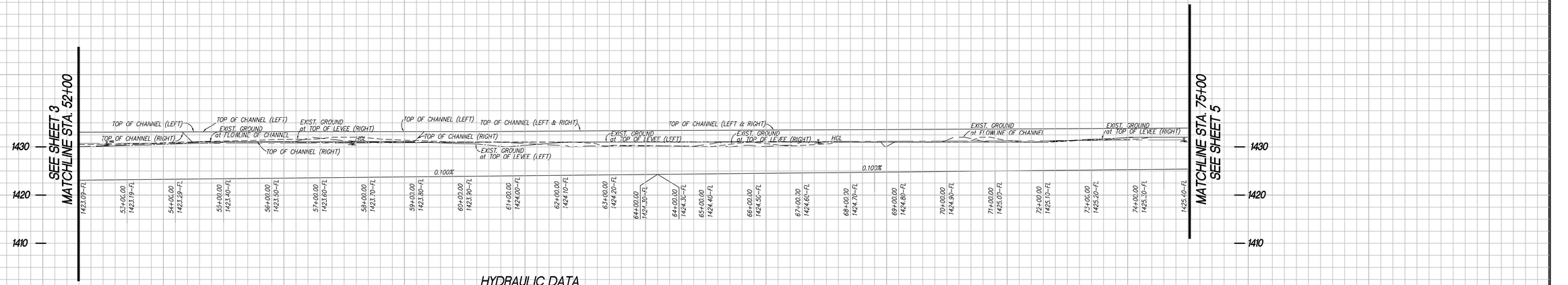
REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL: PRELIMINARY
PLANNING ENGINEER DATE:
APPROVED BY:
CHIEF ENGINEER DATE:

COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT
RECOMMENDED BY: PRELIMINARY Date
APPROVED BY: Date
KHALED ONAMAN Director of Transportation
R.C.E. 19744 Expires 09-30-2007

MENIFEE VALLEY DRAINAGE PLAN
PROPOSED LAKE & CHANNEL PLAN
PRIVATE LAKE THRU TRACT 31229/ RCFC CHANNEL 29+33.00 to 52+00.00

PROJECT NO.
DRAWING NO.
SHEET NO. 3 OF 8

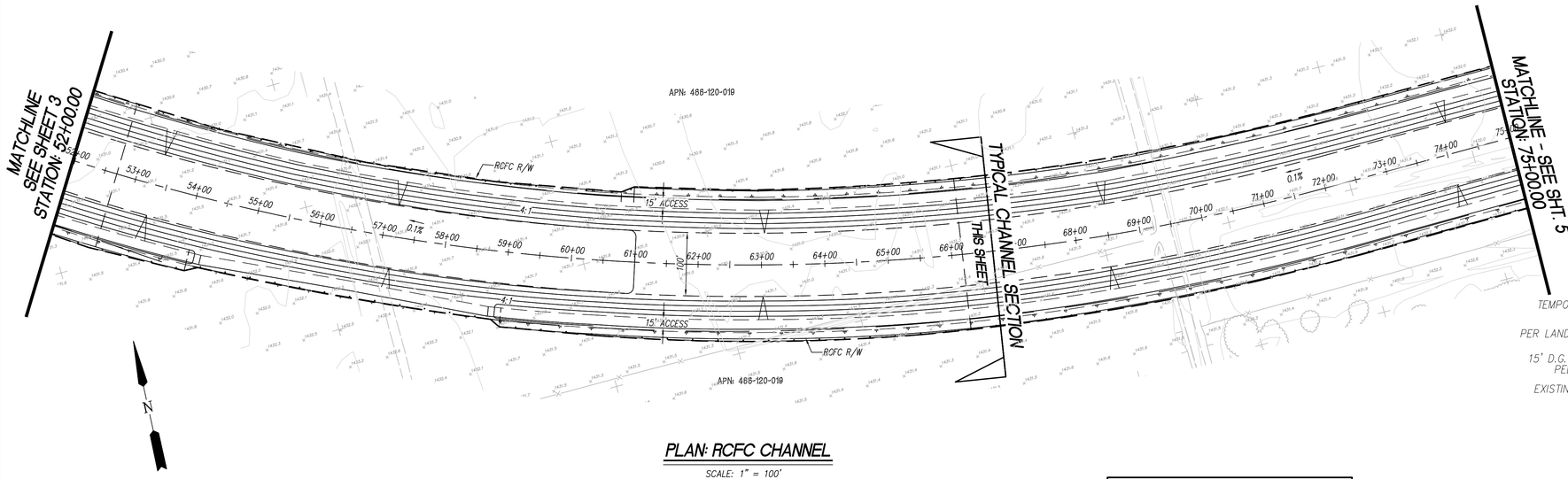


HYDRAULIC DATA

Q_{100} = 2062 CFS
V_{MAX} = 3.0 FPS

PROFILE: RCFC CHANNEL

SCALE: HORIZ. 1" =100', VERT. 1" = 10'
MAINTAINED BY RIVERSIDE COUNTY FLOOD CONTROL
R.C.B.'s MAINTAINED BY RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT

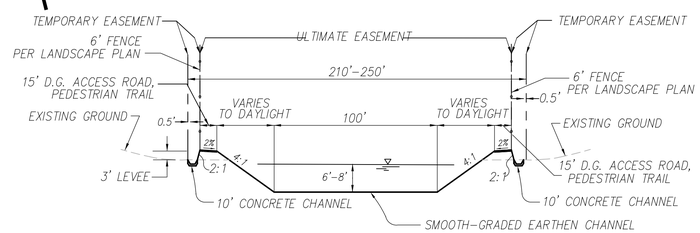


PLAN: RCFC CHANNEL

SCALE: 1" = 100'

GRAPHIC SCALE
100 0 50 100 200 300
(IN FEET)
1 inch = 100 ft.

WSPG STATIONS TAKEN FROM CHANNEL STATIONING



CHANNEL SECTION - WITH LEVEE CONDITION

*STA. 41+35.58 TO 76+82.76

NO SCALE

*NOTE: NO LEVEE ON NORTH SIDE OF CHANNEL BETWEEN 41+35.58 TO 60+93.51, AND BETWEEN STATIONS 54+09.56 TO 58+98.10 ON THE SOUTH SIDE

Underground Service Alert
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SEAL—ENGINEER
REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/07 CIVIL STATE OF CALIFORNIA

Designed By	Drawn By	Checked By
F.A.A.	F.A.A.	F.A.A.

Plans Prepared Under Supervision Of
FRANK A. ARTIGA Date:
R.C.E. No. 61860 Expires 09/30/07

ARTIGA CIVIL DESIGN
43020 BLACKDEER LOOP, #201
TEMECULA, CA 92590
T: 951.587.9841
F: 951.587.9842

REVISIONS

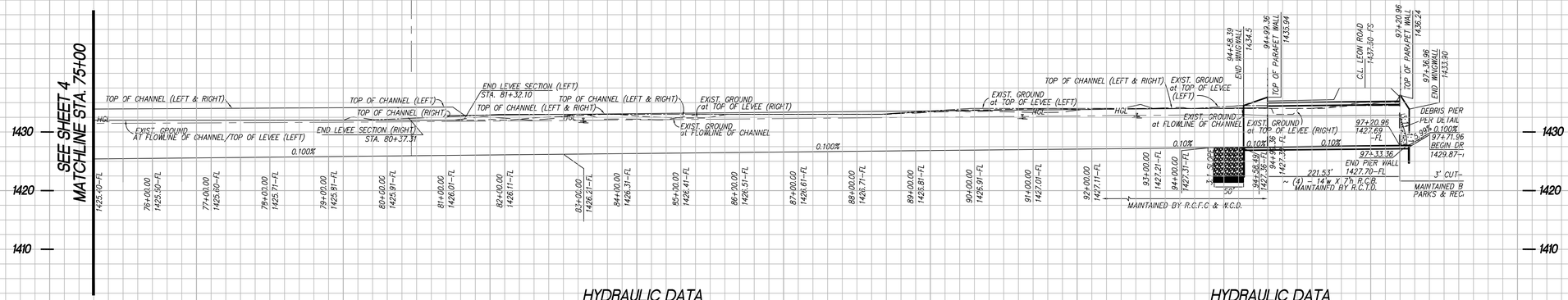
REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
PRELIMINARY
RECOMMENDED FOR APPROVAL: PLANNING ENGINEER DATE:
APPROVED BY: CHIEF ENGINEER DATE:

COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT
PRELIMINARY
RECOMMENDED BY: Date
APPROVED BY: KHALED ELMAN Director of Transportation Date
R.C.E. 19744 Expires 09-30-2007

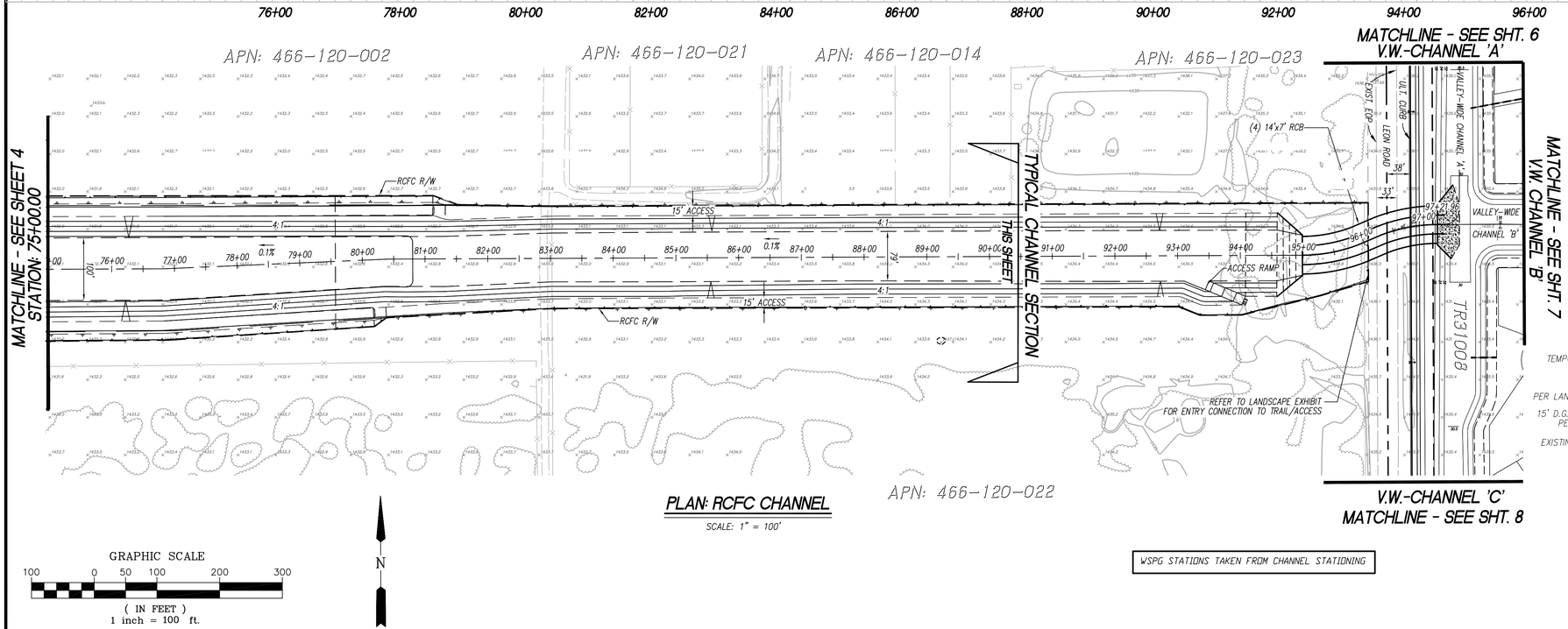
MENIFEE VALLEY DRAINAGE PLAN
PROPOSED LAKE & CHANNEL PLAN
RCFC CHANNEL
52+00.00 to 75+00.00

PROJECT NO.
DRAWING NO.
SHEET NO. 4 OF 8



PROFILE: RCFC CHANNEL

SCALE: HORIZ. 1" =100', VERT. 1" = 10'
MAINTAINED BY RIVERSIDE COUNTY FLOOD CONTROL
R.C.B.'s MAINTAINED BY RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT



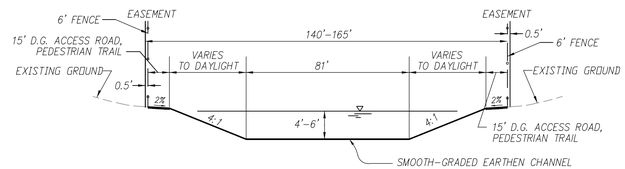
PLAN: RCFC CHANNEL

SCALE: 1" = 100'

GRAPHIC SCALE
100 0 50 100 200 300
(IN FEET)
1 inch = 100 ft.

N

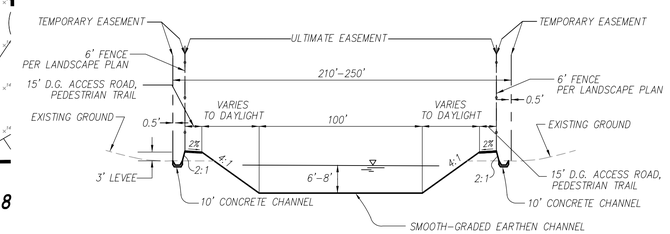
WSPG STATIONS TAKEN FROM CHANNEL STATIONING



CHANNEL SECTION - WITHOUT LEVEE CONDITION

STA. 83+02.14 TO 95+04.98

NO SCALE



CHANNEL SECTION - WITH LEVEE CONDITION

*STA. 41+35.58 TO 76+82.76

NO SCALE

*NOTE: NO LEVEE ON NORTH SIDE OF CHANNEL BETWEEN 41+35.58 TO 60+93.51, AND BETWEEN STATIONS 54+09.56 TO 58+98.10 ON THE SOUTH SIDE

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TWO WORKING DAYS BEFORE YOU DIG

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/07 CIVIL STATE OF CALIFORNIA

Designed By	Drawn By	Checked By
F.A.A.	F.A.A.	F.A.A.

Plans Prepared Under Supervision Of
FRANK A. ARTIGA Date:
R.C.E. No. 61860 Expires 09/30/07

ARTIGA CIVIL DESIGN
43020 BLACKDEER LOOP, #201
TEMECULA, CA 92590
T: 951.587.9841
F: 951.587.9842

REVISIONS

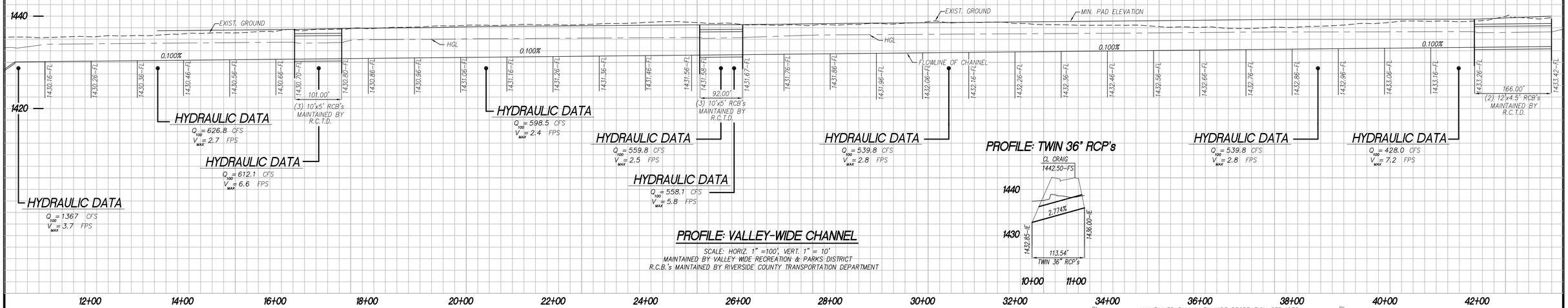
REF.	DESCRIPTION	APPR.	DATE

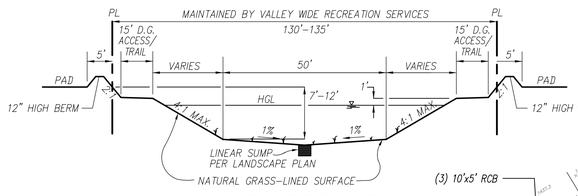
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL: PRELIMINARY
PLANNING ENGINEER DATE:
APPROVED BY:
CHIEF ENGINEER DATE:

COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT
RECOMMENDED BY:
APPROVED BY: PRELIMINARY Date
KHALED ONAMAN Director of Transportation Date
R.C.E. 19744 Expires 09-30-2007

MENIFEE VALLEY DRAINAGE PLAN
PROPOSED LAKE & CHANNEL PLAN
RCFC CHANNEL
75+00.00 to 97+21.96

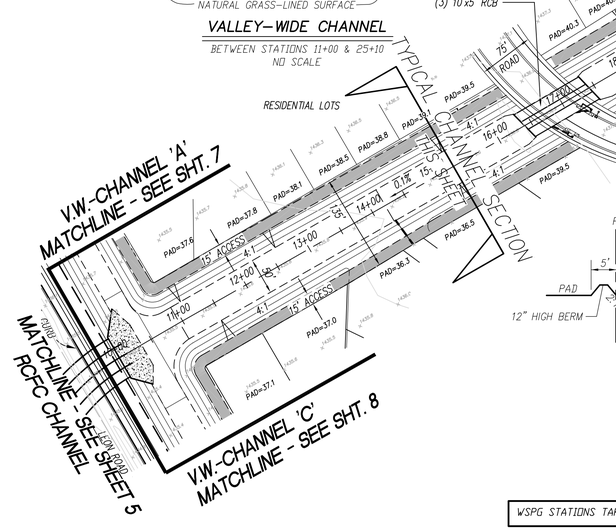
PROJECT NO.
DRAWING NO.
SHEET NO. 5 OF 8

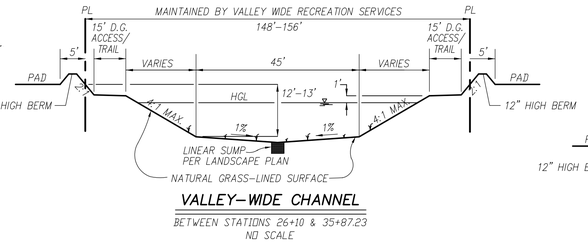




VALLEY-WIDE CHANNEL

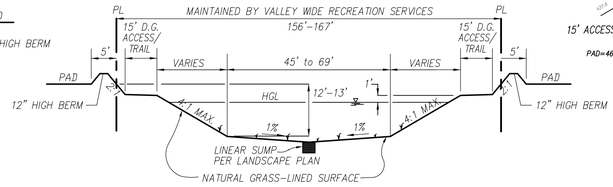
BETWEEN STATIONS 11+00 & 25+10
NO SCALE





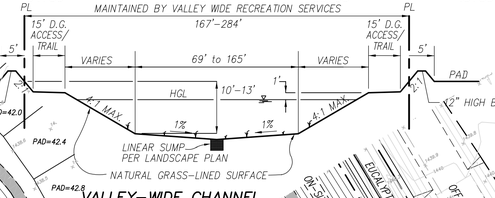
VALLEY-WIDE CHANNEL

BETWEEN STATIONS 26+10 & 35+87.23
NO SCALE



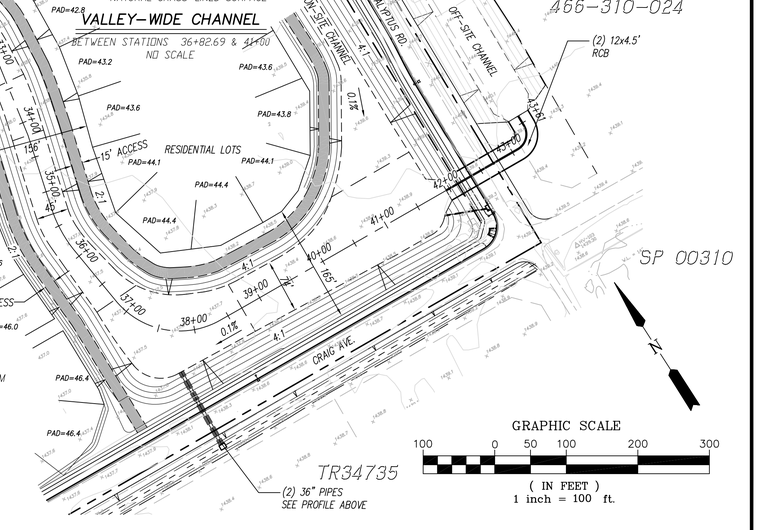
VALLEY-WIDE CHANNEL

BETWEEN STATIONS 35+87.23 & 36+82.69
NO SCALE



VALLEY-WIDE CHANNEL

BETWEEN STATIONS 36+82.69 & 41+00
NO SCALE



GRAPHIC SCALE

100 0 50 100 200 300

(IN FEET)

1 inch = 100 ft.

WSPG STATIONS TAKEN FROM CHANNEL STATIONING

PLAN: VALLEY-WIDE CHANNEL

SCALE: 1" = 100'

Underground Service Alert

Call: TOLL FREE 1-800 227-2600

TWO WORKING DAYS BEFORE YOU DIG

SEAL-ENGINEER

REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/07 CIVIL STATE OF CALIFORNIA

Designed By	Drawn By	Checked By
F.A.A.	F.A.A.	F.A.A.

Plans Prepared Under Supervision Of

FRANK A. ARTIGA Date:

R.C.E. No. 61860 Expires 09/30/07

ARTIGA CIVIL DESIGN

43430 BUSINESS PARK DRIVE
TEMECULA, CA 92590
T: 951.506.1425
F: 951.506.1426

REVISIONS

REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

PRELIMINARY

RECOMMENDED FOR APPROVAL:

PLANNING ENGINEER DATE:

APPROVED BY:

CHIEF ENGINEER DATE:

COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT

PRELIMINARY

RECOMMENDED BY:

APPROVED BY: Date

KHALED OTHMAN Director of Transportation Date

R.C.E. 19744 Expires 09-30-2007

MENIFEE VALLEY DRAINAGE PLAN

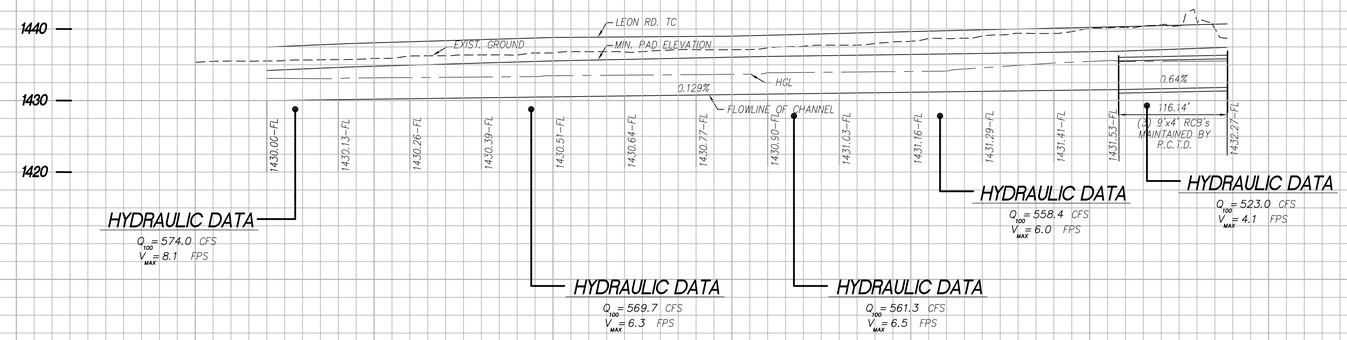
PROPOSED LAKE & CHANNEL PLAN

VALLEY-WIDE CHANNEL 'B'

PROJECT NO.

DRAWING NO.

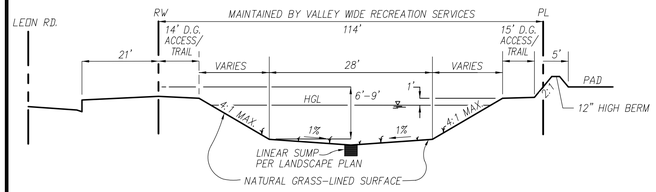
SHEET NO. 6 OF 8



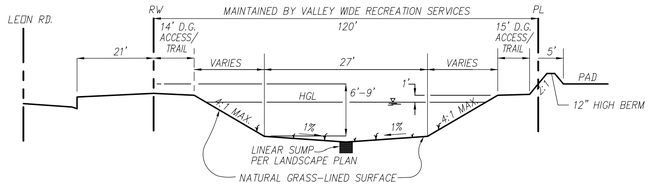
PROFILE: VALLEY-WIDE CHANNEL 'A'

SCALE: HORIZ. 1" =100', VERT. 1" = 10'
MAINTAINED BY VALLEY WIDE RECREATION & PARKS DISTRICT
R.C.B.'s MAINTAINED BY RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT

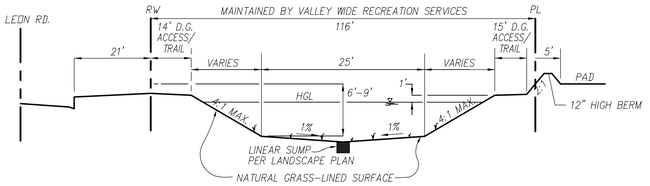
10+00 12+00 14+00 16+00 18+00 20+00 22+00 24+00



VALLEY-WIDE CHANNEL
BETWEEN STATIONS 11+00 & 12+10
NO SCALE

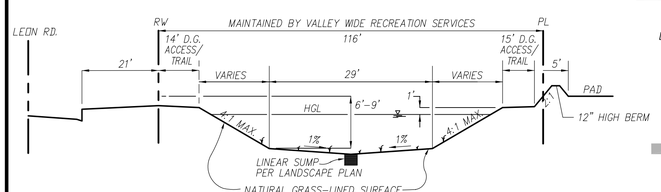


VALLEY-WIDE CHANNEL
BETWEEN STATIONS 14+90 & 20+60
NO SCALE



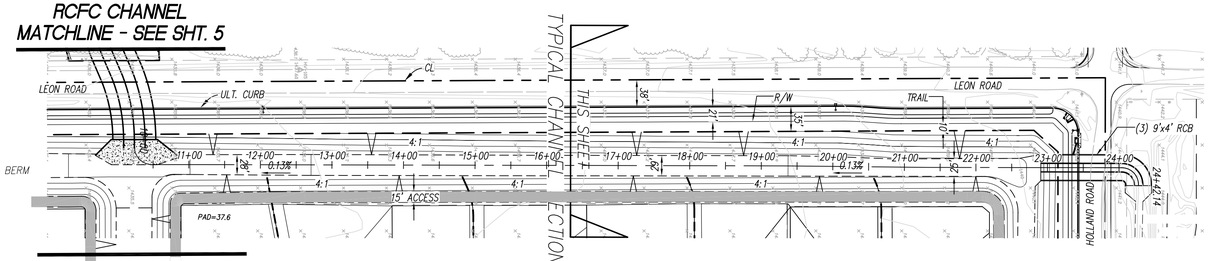
VALLEY-WIDE CHANNEL
BETWEEN STATIONS 20+60 & 22+00
NO SCALE

APN: 466-120-023



VALLEY-WIDE CHANNEL
BETWEEN STATIONS 12+10 & 14+90
NO SCALE

RCFC CHANNEL
MATCHLINE - SEE SHT. 5



MATCHLINE - SEE SHEET 6
V.W.-CHANNEL 'B'

TR31008

TR32318

PLAN: VALLEY-WIDE CHANNEL 'A'

SCALE: 1" = 100'

WSPG STATIONS TAKEN FROM CHANNEL STATIONING

GRAPHIC SCALE
100 0 50 100 200 300
(IN FEET)
1 inch = 100 ft.

Underground Service Alert
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1-800 227-2600
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REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/07 CIVIL STATE OF CALIFORNIA

Designed By	Drawn By	Checked By
F.A.A.	F.A.A.	F.A.A.

Plans Prepared Under Supervision Of
FRANK A. ARTIGA Date:
R.C.E. No. 61860 Expires 09/30/07

ARTIGA CIVIL DESIGN
43020 BLACKDEER LOOP, #201
TEMECULA, CA 92590
T: 951.587.9841
F: 951.587.9842

REVISIONS

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
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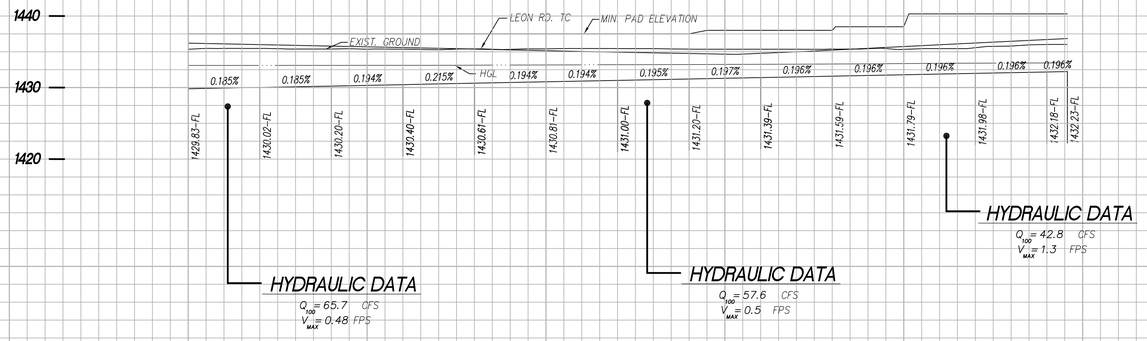
COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT
RECOMMENDED BY: PRELIMINARY Date
APPROVED BY: Date
KHALED ELMAN Director of Transportation
R.C.E. 19744 Expires 09-30-2007

MENIFEE VALLEY DRAINAGE PLAN
PROPOSED LAKE & CHANNEL PLAN
VALLEY-WIDE CHANNEL 'A'

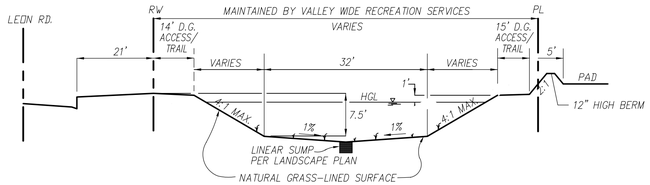
PROJECT NO.
DRAWING NO.
SHEET NO. 7 OF 8



PROFILE: VALLEY-WIDE CHANNEL 'C'

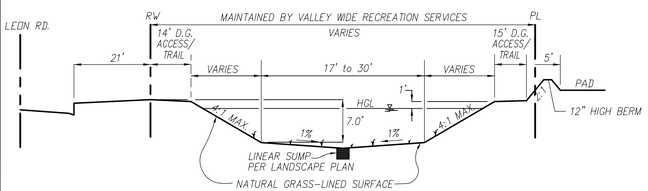
SCALE: HORIZ. 1" =100', VERT. 1" = 10'
MAINTAINED BY VALLEY WIDE RECREATION & PARKS DISTRICT
R.C.B.'s MAINTAINED BY RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT

10+00 12+00 14+00 16+00 18+00 20+00 22+00 24+00



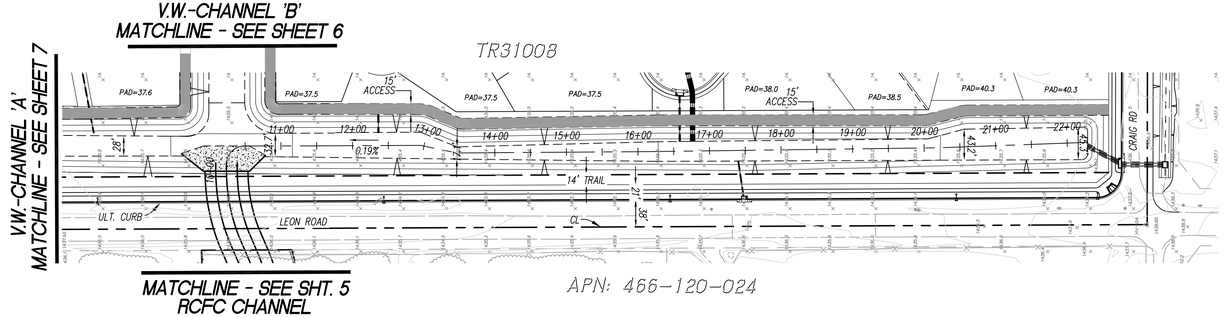
VALLEY-WIDE CHANNEL

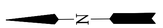
BETWEEN STATIONS 10+00 & 12+73
NO SCALE



VALLEY-WIDE CHANNEL

BETWEEN STATIONS 13+23 & 19+83
NO SCALE





PLAN: VALLEY-WIDE CHANNEL 'C'

SCALE: 1" = 100'

WSPG STATIONS TAKEN FROM CHANNEL STATIONING

GRAPHIC SCALE
100 0 50 100 200 300
(IN FEET)
1 inch = 100 ft.

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APPROVED BY: CHIEF ENGINEER DATE:

COUNTY OF RIVERSIDE, TRANSPORTATION DEPARTMENT
PRELIMINARY
RECOMMENDED BY: Date
APPROVED BY: KHALED ONAMAN Director of Transportation Date
R.C.E. 19744 Expires 09-30-2007

MENIFEE VALLEY DRAINAGE PLAN
PROPOSED LAKE & CHANNEL PLAN
VALLEY-WIDE CHANNEL 'C'

PROJECT NO.
DRAWING NO.
SHEET NO. 8 OF 8

EXHIBITS

EXHIBIT A: ULTIMATE CONDITION OFFSITE HYDROLOGY MAP

TENTATIVE TRACT MAP 37439

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

ULTIMATE CONDITION OFFSITE HYDROLOGY MAP

LEGEND:

X.X / X.X	NODE/CONCENTRATION POINT / FLOWLINE ELEVATION
XXXX.X	APPROXIMATE INVERT ELEVATION
XXX / X.X	SUB AREA / ACRES
L=XXX'	FLOW DISTANCE
	FLOW PATH
	WATERSHED SUB-BOUNDARY
	WATERSHED BOUNDARY

N

GRAPHIC SCALE
400' 0 200' 400' 800'
1" = 400'

EXHIBIT "A"

TTM 37439

ULTIMATE OFFSITE HYDROLOGY MAP

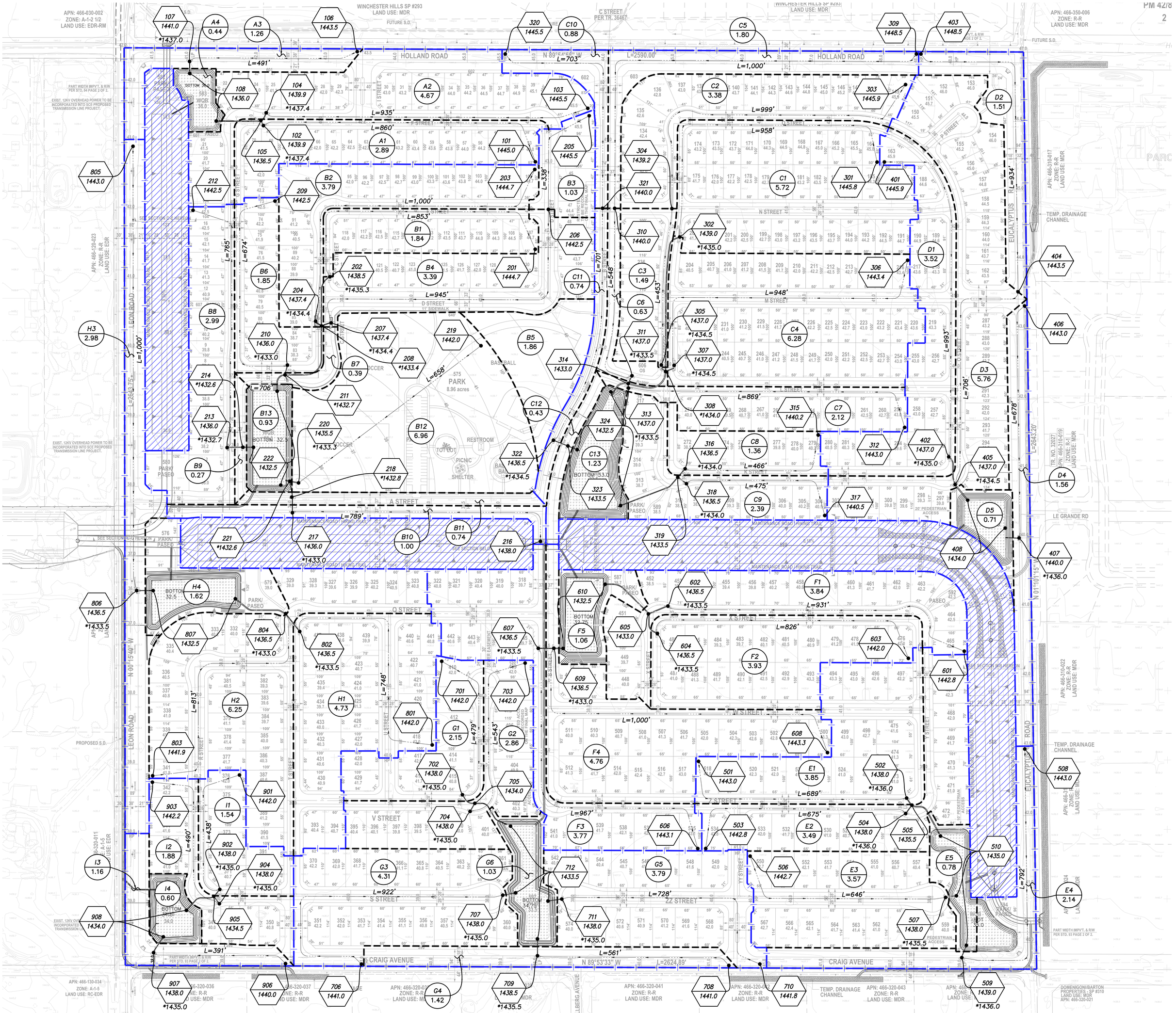
JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

EXHIBIT B: **POST-PROJECT CONDITION ONSITE RATIONAL METHOD HYDROLOGY MAP**

TENTATIVE TRACT MAP 37439

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

POST PROJECT CONDITION - ON-SITE HYDROLOGY MAP



LEGEND:

- XXX.X / XXXX — NODE/CONCENTRATION POINT, FLOWLINE ELEVATION
- XXXX.X — APPROXIMATE INVERT ELEVATION
- XXX / X.X — SUB AREA, ACRES
- L=XXX' — FLOW DISTANCE
- FLOW PATH
- WATERSHED BOUNDARY
- WATERSHED SUB-BOUNDARY

GRAPHIC SCALE 0 50' 100' 200' (1" = 100')

JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

EXHIBIT "B"

TTM 37439

POST PROJECT CONDITION ON-SITE HYDROLOGY MAP

EXHIBIT C: DRAINAGE FACILITIES MAP

SHEET 1 OF 1

TENTATIVE TRACT MAP 37439

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

DRAINAGE FACILITIES MAP

PM 42/8
2

LINE A2
Q100=2.70 CFS
PIPE=18"

LAT B2
Q100=17.80 CFS
PIPE=30"

BIORETENTION BASIN A
WQB
583
36.0

LINE A1–R2
Q100=9.30 CFS
PIPE=24"

LAT A1–1
Q100=5.68 CFS
PIPE=18"

LINE A1–R1
Q100=14.90 CFS
PIPE=30"

LINE B2–R3
Q100=3.98 CFS
PIPE=18"

LAT B2–4
Q100=6.47 CFS
PIPE=18"

LAT B2–1
Q100=4.31 CFS
PIPE=18"

LAT B2–3
Q100=12.90 CFS
PIPE=24"

LINE B2–R1
Q100=26.64 CFS
PIPE=36"

LINE B2–R2
Q100=24.46 CFS
PIPE=30"

LAT B2–2
Q100=0.89 CFS
PIPE=18"

LINE B3–R1
Q100=7.40 CFS
PIPE=24"

LINE B3–R2
Q100=6.80 CFS
PIPE=24"

BIORETENTION BASIN B
584

LINE B1–R
Q100=18.82 CFS
PIPE=30"

LAT B1
Q100=49.33 CFS
PIPE=54"

LINE B1–R2
Q100=16.43 CFS
PIPE=30"

LAT B1–1–R1
Q100=3.41 CFS
PIPE=18"

LAT B1–1–R2
Q100=1.97 CFS
PIPE=18"

LINE A CHANNEL

LAT A1
Q100=33.08 CFS
PIPE=48"

BIORETENTION BASIN H
579

LINE H2
Q100=6.15 CFS
PIPE=18"

LINE H1–R2
Q100=10.69 CFS
PIPE=24"

LINE H1–R1
Q100=24.12 CFS
PIPE=36"

LINE 1–R1
Q100=108.75 CFS
PIPE=60"

LAT 1A
Q100=12.48 CFS
PIPE=36"

LINE I1
Q100=8.75 CFS
PIPE=24"

LINE I1–R2
Q100=4.08 CFS
PIPE=18"

LINE 1–R2
Q100=96.27 CFS
PIPE=60"

BIORETENTION BASIN I
599

LAT I1–1
Q100=4.80 CFS
PIPE=18"

LINE I2
Q100=2.70 CFS
PIPE=18"

LAT 1B
Q100=32.98 CFS
PIPE=42"

LINE 1–R3
Q100=68.79 CFS
PIPE=54"

LINE C3–R3
Q100=12.14 CFS
PIPE=30"

LAT C3–3
Q100=9.83 CFS
PIPE=24"

LAT C3–1
Q100=5.03 CFS
PIPE=18"

LAT C3–4
Q100=13.27 CFS
PIPE=30"

LINE C3–R1
Q100=40.49 CFS
PIPE=42"

LINE C3–R2
Q100=32.14 CFS
PIPE=42"

LAT C3–2
Q100=4.59 CFS
PIPE=18"

LINE C2–R1
Q100=4.12 CFS
PIPE=18"

LINE C2–R2
Q100=3.35 CFS
PIPE=18"

LAT A2
Q100=51.68 CFS
PIPE=48"

BIORETENTION BASIN C
585
BOTTOM 33.0

LINE C1–R1
Q100=9.49 CFS
PIPE=24"

LINE C1–R2
Q100=4.46 CFS
PIPE=24"

LAT C1
Q100=6.04 CFS
PIPE=24"

LAT A3
Q100=34.90 CFS
PIPE=48"

BIORETENTION BASIN F
586
WQB
BOTTOM 32.75

LINE F1–R1
Q100=16.11 CFS
PIPE=30"

LAT F1–1
Q100=8.02 CFS
PIPE=30"

LINE F2–R1
Q100=17.31 CFS
PIPE=30"

LINE F2–R2
Q100=8.43 CFS
PIPE=30"

LAT A6
Q100=30.48 CFS
PIPE=48"

LINE G1–R2
Q100=5.46 CFS
PIPE=18"

LAT G1–1
Q100=6.91 CFS
PIPE=18"

LINE G1–R1
Q100=12.16 CFS
PIPE=24"

LINE G2
Q100=8.51 CFS
PIPE=18"

BIORETENTION BASIN G
597
BOTTOM 34.75

LINE G4
Q100=8.23 CFS
PIPE=18"

LINE G3
Q100=3.23 CFS
PIPE=18"

LINE A CHANNEL

LAT A4
Q100=23.85 CFS
PIPE=48"

BIORETENTION BASIN D
WQB
BOT 35.00

LINE D1–R2
Q100=7.66 CFS
PIPE=30"

LINE D1–R1
Q100=19.43 CFS
PIPE=42"

LINE D2
Q100=1.56 CFS
PIPE=18"

LINE 3
Q100=180.29 CFS
PIPE=84"

LINE 3
Q100=180.29 CFS
PIPE=6'H X 8'W RCB

LINE E1–R2
Q100=8.60 CFS
PIPE=30"

LAT E1–1
Q100=7.76 CFS
PIPE=24"

LINE E1–R1
Q100=16.35 CFS
PIPE=36"

LAT A5
Q100=29.99 CFS
PIPE=48"

LINE A CULVERT
Q100=528.82 CFS – 681.30 CFS
PIPE=DBL 6'W X 8'H RCB

LINE E2
Q100=8.29 CFS
PIPE=24"

LINE E3
Q100=4.54 CFS
PIPE=18"

BIORETENTION BASIN E
WQB
BOT 35.0

LAT 2B
Q100=1.63 CFS
PIPE=18"

LINE 2–R1
Q100=152.50 CFS
PIPE=66"

LINE 2–R3
Q100=75.22 CFS
PIPE=60"

LINE 2–R2
Q100=76.85 CFS
PIPE=60"

LAT 2A
Q100=75.68 CFS
PIPE=60"

HOLLAND ROAD
N 89°54'58" W
L=2590.00'

CRAIG AVENUE
N 89°53'33" W
L=2624.89'

LEON ROAD
L=2643.75'

EUCALYPTUS ROAD
L=2643.20'

LLBERG AVENUE
N 01°01'01" W

N 00°15'40" W

LINE B CHANNEL

PARK
8.96 acres

BASEBALL

SOCCER

PARKING

RESTROOM

TOT LOT

PICNIC SHELTER

BALL

PASEO

C STREET PER TR. 36467

WINCHESTER HILLS SP #293
LAND USE: MDR

APN: 466-030-002
ZONE: A-1-2 1/2
LAND USE: EDR-RM

APN: 466-120-023
ZONE: R-R
LAND USE: EDR

APN: 466-350-006
ZONE: R-R
LAND USE: MDR

APN: 466-310-017
ZONE: R-R
LAND USE: MDR

TR. NO. 32027
APN: 466-310-019
ZONE: R-I
LAND USE: MDR

APN: 466-310-022
ZONE: R-R
LAND USE: MDR

APN: 466-310-023
ZONE: R-R
LAND USE: MDR

APN: 466-320-037
ZONE: R-R
LAND USE: MDR

APN: 466-320-038
ZONE: R-R
LAND USE: MDR

APN: 466-320-039
ZONE: R-R
LAND USE: MDR

APN: 466-320-041
ZONE: R-R
LAND USE: MDR

APN: 466-320-042
ZONE: R-R
LAND USE: MDR

APN: 466-320-043
ZONE: R-R
LAND USE: MDR

APN: 466-320-044
ZONE: R-R
LAND USE: MDR

DOMENIGONI/BARTON PROPERTIES - SP #310

TEMP. DRAINAGE CHANNEL

EXIST. 12KV OVERHEAD POWER TO BE INCORPORATED INTO SCE PROPOSED TRANSMISSION LINE PROJECT.

SEE SECTION C-C HEREON

SEE SECTION D-D HEREON

SEE SECTION E-E HEREON

SEE SECTION F-F HEREON

SEE SECTION A-A HEREON

SEE SECTION B-B HEREON

SEE SECTION BELOW

MAINTENANCE ROAD / HIKING TRAIL

10' PEDESTRIAN ACCESS

RESTRICTED ACCESS TO BE PROVIDED ON THE FINAL MAP

PART WIDTH IMPVT. & R/W PER STD. 94 PAGE 2 OF 2.

PART WIDTH IMPVT. & R/W PER STD. 93 PAGE 2 OF 2.

PROPOSED S.D.

GRAPHIC SCALE
100' 0 50' 100' 200'
1" = 100'

EXHIBIT "C"

TTM 37439

DRAINAGE FACILITIES MAP

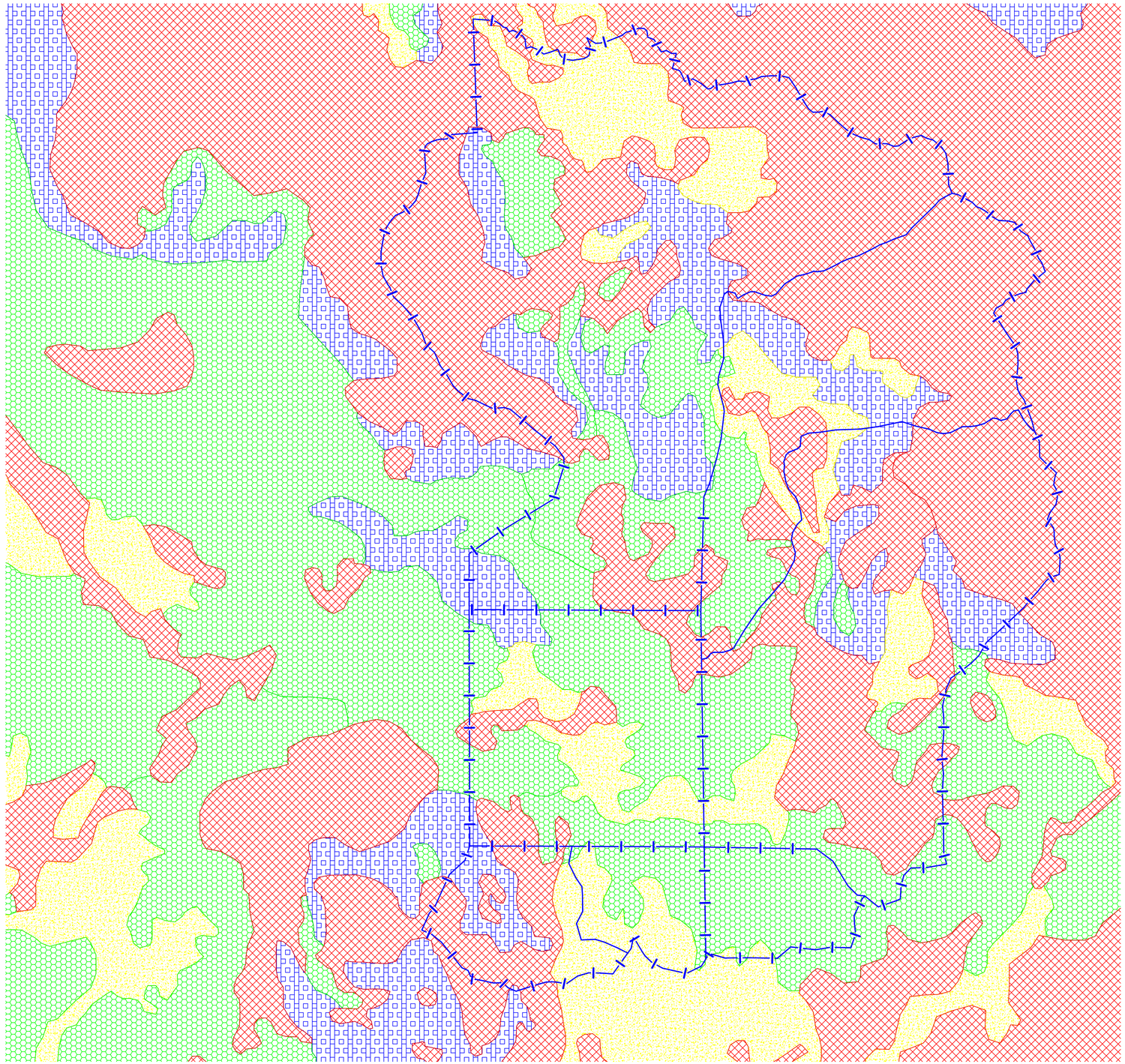
JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

EXHIBIT D: HYDROLOGIC SOILS MAP

TENTATIVE TRACT MAP 37439

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HYDROLOGIC SOILS MAP



LEGEND:

- SOILS A
- SOILS B
- SOILS C
- SOILS D

N

GRAPHIC SCALE

600' 0 300' 600' 1,200'

1" = 600'

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EXHIBIT "D"

TTM 37439

HYDROLOGIC SOILS MAP

Drawing Name: Q:\190.04-15\Engineering\Hydrology_Plan\Exhibits\190.04-15 - Soils_Map-LOCAL HYDROLOGY.dwg
Last Opened: Mar 13, 2018 - 10:30am by jcarver

EXHIBIT E: RAINFALL MAPS

2 YEAR, 1 HOUR

TRACT 37439
RAINFALL = 0.50

JLC Engineering & Consulting, Inc.

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NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR
PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 8823 DATE	DRAWN BY R.L.S. PLATE D-4.3	SHEET NO DR. NO

2 YEAR, 3 HOUR

TRACT 37439
RAINFALL = 0.80

JLC Engineering & Consulting, Inc.

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PH. 951.304.9552 FAX 951.304.3568

Notes:
1. Isohyetals based on NOAA Atlas
Volume XI - California, 1973.

RCFC & WCD

RIVERSIDE COUNTY FLOOD CON
AND
WATER CONSERVATION DISTR

2-YEAR — 3-HOU
PRECIPITATION

DRAWN BY R.A.S.

2 YEAR, 6 HOUR

TRACT 37439
RAINFALL = 1.00

JLC Engineering & Consulting, Inc.

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NOTES:
1. Isohyetals from NOAA Atlas 2
Volume XI - California, 1973

RCFC & WCD

RIVERSIDE COUNTY FLOOD CONT
AND
WATER CONSERVATION DISTRIC

2-YEAR — 6-HOUR
PRECIPITATION

DRAWN BY:

APPROVED:
CHIEF ENGINEER R.C. NO. 8924

2 YEAR, 24 HOUR

TRACT 37439
RAINFALL = 1.60

JLC Engineering & Consulting, Inc.

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PH. 951.304.9552 FAX 951.304.3568

NOTES:
1. Isohyetals from NOAA Atlas 2
Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CON
AND
WATER CONSERVATION DISTR

2-YEAR — 24-HOU
PRECIPITATION

DRAWN BY: R.A.S.
APPROVED

100 YEAR, 1 HOUR

TRACT 37439
RAINFALL = 1.20

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NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

100-YEAR — 1-HOUR
PRECIPITATION

DRAWN BY: | SHEET NO.

100 YEAR, 3 HOUR

TRACT 37439
RAINFALL = 1.80

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PH. 951.304.9552 FAX 951.304.3568

NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 3-HOUR PRECIPITATION

DRAWN BY R.S.

APPROVED

100 YEAR, 6 HOUR

TRACT 37439
RAINFALL = 2.50

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Isohyetals from NOAA Atlas 2
Volume XI - California, 1973

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HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONT
AND
WATER CONSERVATION DISTRIC

100-YEAR — 6-HOUR
PRECIPITATION

DRAWN BY R.C.

100 YEAR, 24 HOUR

TRACT 37439
RAINFALL = 4.00

JLC Engineering & Consulting, Inc.

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NOTES:
Isohyetals from NOAA Atlas 2
Volume XI - California, 1973.

RCFC & WCD

RIVERSIDE COUNTY FLOOD CONT
AND
WATER CONSERVATION DISTRI

100-YEAR — 24-HOU
PRECIPITATION

EXHIBIT F: SLOPE OF INTENSITY DURATION CURVE

SLOPE INTENSITY CURVE

TRACT 31008
SLOPE = 0.55

JLC Engineering & Consulting, Inc.

41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

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

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

SLOPE OF INTENSITY DURATION CURVE

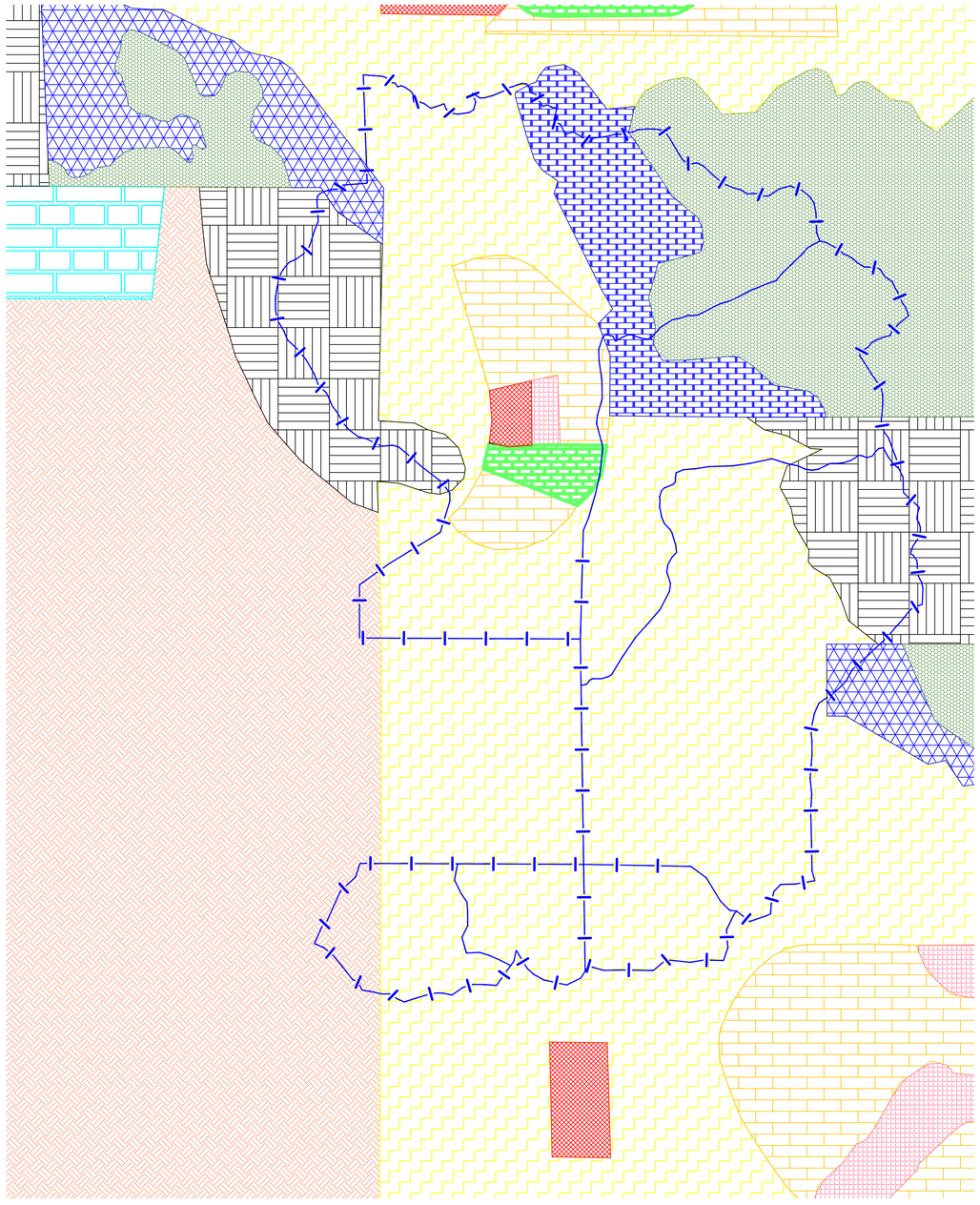
DRAWN BY R.A.S. | SHEET NO | APPROVED

EXHIBIT G: ULTIMATE CONDITION LAND USE MAP

TENTATIVE TRACT MAP 37439

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

ULTIMATE CONDITION LAND USE MAP



LEGEND:

- AGRICULTURE
- COMMERCIAL RETAIL
- CONSERVATION
- ESTATE DENSITY RESIDENTIAL
- VERY LOW DENSITY RESIDENTIAL
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- MEDIUM HIGH DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- RURAL MOUNTAINOUS
- RECREATION OS-R

N

GRAPHIC SCALE

800' 0 400' 800' 1600'

1" = 800'

EXHIBIT "G"

JLC Engineering & Consulting, Inc.
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PH. 951.304.9552 FAX 951.304.3568

TTM 37439

ULTIMATE CONDITION LAND USE MAP

Drawing Name: Q:\190.04-15\Engineering\Hydrology_Plan\Exhibits\190.04-15 - Land_Use_Map-ULTIMATE.dwg
Last Opened: Mar 13, 2018 - 10:07am by jcarver