MASTER DRAINAGE PLAN

FOR THE

ARANTINE HILLS SPECIFIC PLAN

CORONA, CALIFORNIA

Prepared for:

BLUESTONE COMMUNITIES
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Irvine, Ca 92606

Prepared by:

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September 23, 2010

Revised: February 10, 2011

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TABLE OF CONTENTS

PAGE

I. PURPOSE AND SCOPE 1
II. PROJECT SITE AND DRAINAGE AREA OVERVIEW 1-2
III. PREVIOUS STUDIES 2
IV. HYDROLOGY 2-3
V. FLOOD PLAIN STUDY 3
VI. FACILITY DESIGN CRITERIA 3-5
VII. EXISTING FACILITIES 5-6
VIII. RECOMMENDED PLAN 6-8
IX. RECOMMENDATIONS 9
X. REFERENCES 9

FIGURES

FIGURE 1: REGIONAL LOCATION MAP
FIGURE 2: LOCAL VICINITY MAP
FIGURE 3: FEMA FLOODPLAIN MAP
FIGURE 4: DETENTION BASIN/WATER QUALITY BASIN SCHEMATIC
FIGURE 5: LAND USE MAP

APPENDIX

APPENDIX A: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "A" (RATIONAL TABLING METHOD)

APPENDIX A.1: 100-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX A.2: 10-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX A.3: 2-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX B: HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION FOR AREA "A" (RATIONAL TABLING METHOD)

APPENDIX B.1: 100-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX B.2: 10-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX B.3: 2-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX C: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "B" (RATIONAL TABLING METHOD)

APPENDIX C.1: 100-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX C.2: 10-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX C.3: 2-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX D: HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION FOR AREA "B" (RATIONAL TABLING METHOD)

APPENDIX D.1: 100-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX D.2: 10-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX D.3: 2-YEAR RATIONAL TABLING CALCULATIONS

APPENDIX E: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "A" (HYDROGRAPH METHOD)

APPENDIX E.1: 100-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX E.2: 100-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX E.3: 2-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX E.4: 2-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX F: HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION FOR AREA "A" (HYDROGRAPH METHOD)

APPENDIX F.1: 100-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX F.2: 100-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX F.3: 2-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX F.4: 2-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX G: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "B" (HYDROGRAPH METHOD)

APPENDIX G.1: 100-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX G.2: 100-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX G.3: 2-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX G.4: 2-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX H: HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION FOR AREA "B" (HYDROGRAPH METHOD)

APPENDIX H.1: 100-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX H.2: 100-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX H.3: 2-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

APPENDIX H.4: 2-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

APPENDIX I: HYDRAULIC ANALYSIS FOR PROPOSED MDP FACILITIES BASED ON NORMAL-DEPTH METHOD

APPENDIX I.1: PROPOSED MASTER DRAINAGE PLAN

APPENDIX I.2: PROPOSED ALTERNATE MASTER DRAINAGE PLAN

APPENDIX J: BASIN ROUTING CALCULATIONS FOR DETENTION BASIN "A"

APPENDIX J.1: 100-YEAR/1-HOUR BASIN ROUTING CALCULATIONS

APPENDIX J.2: 100-YEAR/24-HOUR BASIN ROUTING CALCULATIONS

APPENDIX J.3: 2-YEAR/1-HOUR BAISN ROUTING CALCULATIONS

APPENDIX J.4: 2-YEAR/24-HOUR BASIN ROUTING CALCULATIONS

APPENDIX J.5: STORAGE VOLUME CALCULATIONS

APPENDIX K: BASIN ROUTING CALCULATIONS FOR DETENTION BASIN "B"

APPENDIX K.1: 100-YEAR/1-HOUR BASIN ROUTING CALCULATIONS

APPENDIX K.2: 100-YEAR/24-HOUR BASIN ROUTING CALCULATIONS

APPENDIX K.3: 2-YEAR/1-HOUR BAISN ROUTING CALCULATIONS

APPENDIX K.4: 2-YEAR/24-HOUR BASIN ROUTING CALCULATIONS

APPENDIX K.4: STORAGE VOLUME CALCULATIONS

EXHIBITS

EXHIBIT "A": PROPOSED MDP FACILITIES MAP (SCALE: 1" = 300')

EXHIBIT "B": PROPOSED ALTERNATE MDP FACILITIES MAP (SCALE: 1" = 300')

EXHIBIT "C": HYDROLOGY MAP BASED ON EXISTING CONDITION–RATIONAL TABLING METHOD (SCALE: 1" = 200')

EXHIBIT "D": HYDROLOGY MAP BASED ON PROPOSED CONDITION –

	RATIONAL TABLING METHOD (SCALE: 1" = 200')
EXHIBIT "E":	HYDROLOGY MAP BASED ON EXISTING CONDITION – HYDROGRAPH METHOD (SCALE: 1" = 200')
EXHIBIT "F":	HYDROLOGY MAP BASED ON PROPOSED CONDITION – HYDROGRAPH METHOD (SCALE: 1" = 200')
EXHIBIT "G":	100-YEAR/1-HOUR RAINFALL MAP
EXHIBIT "H":	2-YEAR/1-HOUR RAINFALL MAP
EXHIBIT "I":	100-YEAR/24-HOUR RAINFALL MAP
EXHIBIT "J":	2-YEAR/24-HOUR RAINFALL MAP
EXHIBIT "K":	SLOPE OF INTENSITY DURATION CURVE
EXHIBIT "L":	HYDROLOGIC SOILS MAP

I. PURPOSE AND SCOPE

The purpose of this report is to investigate and evaluate the drainage conditions of the Arantine Hills Specific Plan area and to develop a drainage plan that will provide this 274-acre project area with improved drainage and flood protection from the 100-year flood. Implementation of this plan in conjunction with the improvement of the major drainage facility, the Bedford Canyon Wash Channel, will achieve this goal. The plan will also act as a planning guide for locating and sizing drainage facilities to be constructed within the project area.

The scope of this master drainage plan includes the following:

A. Review of available drainage reports for the project site.

B. Preparation of a drainage area map and points of flow concentration of storm runoff in the project area.

C. Determination of the quantities of the 100-year and 10-year storm runoff based on existing (pre-project) and proposed (with-project) conditions.

D. Determination of the location and size of the proposed drainage facilities.

E. Investigation of alternative routes and methods as a basis for selecting the most economically and technically sound plan.

F. Preparation of the drainage report, hydrology maps, flood plain maps, and facilities maps.

For purposes of this master drainage plan, ultimate improvements to the Bedford Canyon Wash Channel located along the east side of the property are assumed to be in place. The development of preliminary plans and supporting studies for the Bedford Canyon Wash Channel is included in a separate report entitled, "Sediment Yield and Transport Study for Arantine Hills, Baseline and With-Project Conditions, Bedford Wash".

II. PROJECT SITE AND DRAINAGE AREA OVERVIEW

The Arantine Hills Specific Plan is located in the City of Corona. The project is generally bounded by Eagle Glen Parkway to the west, I-15 to the north, and Bedford Canyon Wash to the east (see Figure 1).

The drainage area covered by this plan consists of approximately 291 acres or 0.45 square miles (excluding the area tributary to the Bedford Canyon Wash Channel). The watershed tributary to the Arantine Hills Specific Plan is characterized by uniform, steep slopes with

elevations ranging from a high of 1,218 feet above sea level to a low of 912 feet near the I-15. The 274-acre Arantine Hills project is currently undeveloped. The upper portion of the project site is covered with annual grass and open brush. The project site generally slopes northerly at a grade of approximately 1 percent.

The project is impacted by Bedford Canyon Wash traversing along the east side of the property (see Figure 2). The flow tributary to this wash is currently conveyed in a natural channel. Bedford Canyon Wash discharges into Temescal Canyon Creek.

III. PREVIOUS STUDIES

AEI-CASC Consulting prepared a master drainage plan (MDP) in support of a previous SP application for this property in July 2002 (Reference 1). That MDP was used in the preparation of this report. A list of other study references is included in Section X.

IV. HYDROLOGY

Drainage basin boundaries and points of storm flow concentration associated with the existing or pre-project condition were determined utilizing the existing project site topography (2002 aerial topographic map). Although the property has been cleared and grubbed after this aerial topographic map was prepared, the drainage boundaries and storm flow concentrations are generally unchanged. For the proposed or with-project condition, the roadway and grading layouts were utilized in the analysis. Field investigations were conducted to verify the relative accuracy of the drainage boundaries. Exhibits "C" and "E" show the rational method and hydrograph method hydrology maps, respectively, for the existing condition while Exhibits "D" and "F" show the rational method and hydrograph method hydrology maps, respectively, for the proposed condition.

The results of the rational method calculations for Drainage Area "A" based upon the existing and proposed conditions are included in Appendix A and Appendix B, respectively. The results of the rational method calculations for Drainage Area "B" based upon the existing and proposed conditions are included in Appendix C and Appendix D, respectively. The hydrograph calculations for Drainage Area "A" based upon the existing and proposed conditions are included in Appendix E and Appendix F, respectively, while the results of the hydrograph calculations for Drainage Area "B" based upon the existing and proposed conditions are included in Appendix G and Appendix H, respectively.

The RCFC & WCD Hydrology Manual was used to develop the hydrological parameters for the 100-year and 10-year storm events (Reference 2). The rational tabling method was utiltized to determine the peak flow rates for the study areas. Computations were performed using the RRV computer program developed by CivilCadd/CivilDesign (CDD). The unit hydrograph method was utilized for basin routing. This method was performed using the UNRBC computer program developed by CDD.

The rainfall values and slope of intensity duration curves used for the study were obtained from the maps contained in the RCFCD hydrology manual (see Exhibits G thru J). The rainfall values for the 2-year/1-hour and 100-year/1-hour storm events are 0.55 inches and 1.40 inches, respectively. Using the interpolation curve for rainfall depth versus return period (Plate E-5.7, Reference 2), the 10-year/1-hour rainfall is approximately 0.9 inches. For the 100-year/24-hour and 2-year/24-hour storm events, the rainfall values are 8.0 inches and 2.5 inches, respectively. The slope of intensity duration curve of 0.45 was used in the study (see Exhibit K)

The entire study area consists of four hydrologic soils groups, A, B, C and D (see Exhibit L). Antecedent Moisture Condition (AMC) 2 was used to determine the peak storm flows and flood volumes.

Land use category descriptions for this master drainage plan were derived from the Arantine Hills Specific Plan (see Figure 5 and Reference 6). For the existing condition hydrology analysis, open brush (fair), and undeveloped (fair) cover types were used.

V. FLOOD PLAIN STUDY

As shown on Figure 3, the Arantine Hills project is currently "unmapped". However, the area immediately downstream of I-15 and south of the project (adjacent to Bedford Canyon Wash) falls within the "Zone A" flood plain as determined by the Federal Emergency Management Agency (FEMA). The "Zone A" flood plain designation is defined by FEMA as "Areas of 100-year flood; base flood elevations and flood hazard factors not determined". The origin of this Zone "A" flood plain is the storm flows emanating from Bedford Canyon Wash.

Due to FEMA's incomplete flood plain information for the Arantine Hills project and in particular, for the Bedford Canyon Wash, AEI-CASC prepared a detailed flood plain and sediment transport study entitled, "Sediment Yield and Transport Study for Arantine Hills, Baseline and With-Project Conditions, Bedford Wash" (Reference 5). The flood plain information derived in that study will provide the existing or "baseline" hydraulic parameters for the areas off-site from the Arantine Hills project necessary for evaluating the adverse impacts, if any, associated with the construction of the proposed channel improvements.

VI. FACILITY DESIGN CRITERIA

Criteria for the conceptual layout and design of drainage improvements were adopted based on the current guidelines of the City of Corona and Riverside County Flood Control and Water Conservation District (RCFC & WCD). The criteria are defined below:

A. UNDERGROUND STORM DRAINS

All underground storm drains proposed in this plan are intended to collect local urban runoff and offsite undeveloped flows. For the most part, these drains are located in existing and proposed street rights-of-way including proposed easements. For local and major streets located within the plan area, runoff from a 10-year storm is allowed to accumulate in the streets until it reaches the top of the curb. The 100-year storm flow, on the other hand, is allowed to accumulate within the street section until it reaches the right-of-way. If either of these two conditions is violated, the plan proposes to construct an underground storm drain to convey the tributary 100-year flows. These conduits are proposed to be either reinforced concrete pipes (RCP) or cast-in-place concrete pipes (CIPCP) or reinforced concrete boxes (RCB). Manning's roughness coefficients (n-values) of 0.013 and 0.014 were used for the proposed RCPs and RCBs, respectively.

B. OPEN CHANNELS

Open channels are proposed when construction and right-of-way costs for a channel improvement prove to be significantly less than the costs of an underground storm drain. Where open channels are provided, they are designed to convey the 100-year storm runoff. These channels are proposed to be lined with concrete with 1.5:1 side slopes. A manning's N-value of 0.015 is used to perform the normal-depth calculations. A minimum channel freeboard of 1.5 feet is used. The channels are sized to convey the 100-year storm flows.

C. DETENTION BASINS

The proposed detention basins are conceptually designed to ensure that the total combined developed 100-year flows exiting the project site are less than or equal to the existing 100-year storm flows (see Figure 4). In this study, the required 100-year storage volumes were increased by 25 percent to account for design contingencies. The proposed detention basin volumes include the volume required for the water quality basins. At the final design phase, the detention basins will be designed to also attenuate the increase in storm runoff for the 2 and 10-year storm flows due to the proposed development in accordance with the City's requirements.

The proposed detention basin will be sized based upon the design criteria established by RCFC & WCD (Reference 3). The proposed detention basin will be located within a drainage easement. A significant section of the basin will be situated below-grade and should drain in less than 24 hours. The proposed detention basin will have an emergency spillway capable of safely conveying the 1,000-year flood. A minimum freeboard of two feet above the 1,000-year water surface elevation will be incorporated in the basin design. The maximum basin side slopes will be 3:1 on the wet side and 2:1 on the dry side.

D. WATER QUALITY BASINS

The master drainage plan proposes to construct water quality basins to remove pollutants from surface discharges by capturing the tributary water quality volume and infiltrating it prior to the next significant storm event. The water quality basin will be located within the footprint of the proposed detention basin (Figure 6). The primary functions of the proposed basins are to remove pollutants from storm water runoff and to recharge or replenish the ground water. Additionally, these basins can significantly reduce the total annual surface runoff volume, which can reduce stream or overland erosion and other adverse impacts to stream habitat from the proposed development project. The water quality basins will be sized based upon ASCE Manual and Report on Engineering Practice No. 87 (Reference 7). The water quality volume quantity will be added to the detention basin volume. The calculations are included in Appendix I.

Proposed Drainage Design and Maintenance Program

1. All drainage facilities and flood control measures will be designed in accordance with the requirements of the City of Corona and RCFC & WCD.

2. The proposed public drainage facilities will be maintained by the City of Corona.

3. Detention basins are proposed in order to mitigate the impact of increased runoff due to the proposed development.

4. This project shall comply with the requirements of the State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ or the latest permit at the time of final development entitlement. All projects proposing construction activities including cleaning, grading or excavation that results in the disturbance of at least one acre of total land area should obtain the appropriate State General Permit for National Pollution Discharge Elimination System (NPDES) and pay the appropriate fees. All developments within the Specific Plan boundaries shall be subject to future requirements adopted by the City for implementation of the NPDES program.

5. Water quality basins are proposed in order to remove pollutants from surface discharges by capturing the tributary water quality volume and infiltrating it prior to the next significant storm event. The water quality basin will be located within the footprint of the proposed detention basin (see Figure 4). The primary functions of the proposed basins are to remove pollutants from storm water runoff and to recharge or replenish the ground water.

6. Storm drainage facilities should ensure the acceptance and disposal of storm run-off without damage to streets or adjacent properties.

VII. EXISTING FACILITIES

With the exception of the Bedford Canyon Wash that runs along the east side of the project and small culverts under I-15 near the northwest and northeast sides of the project, there are no other drainage facilities existing near and within the project area.

VIII. RECOMMENDED PLAN

The master drainage plan for the Arantine Hills project proposes a system of drainage channels and underground storm drains and basins to intercept and convey the storm flows generated by the project site and the off-site flows coming from the south. Proposed improvements for the Bedford Canyon Wash channel is not a part of this MDP and is included in a separate report entitled, "Sediment Yield and Transport Study for Arantine Hills, Baseline and With-Project Conditions, Bedford Wash".

The alignment and location of the facilities proposed in this plan are general; precise facility locations will be dictated by conditions and other factors existing at the time of final design. Similarly, the sizing information shown on the enclosed maps is preliminary. A more detailed analysis performed at the final design stage will determine final sizing.

The majority of the underground drainage facilities are proposed to be placed under the streets. Open channels are proposed along the south, west and north sides of the project site. Detention basins are proposed at two locations in order to mitigate increases in storm runoff due to the development of the various planning areas. These detention basins are preliminarily located on the northeast side of Planning Areas 15 and 16.

The improvements proposed by this plan are shown on Exhibit "A", which is enclosed in the back of this report. These exhibits not only show proposed preliminary alignments, but pertinent preliminary size information, as well as the design flow rates, and detention basin volumes.

The hydraulic calculations in support of the proposed drainage improvements are included in Appendix I. The calculations were done using the normal-depth method. Basin routing calculations for Basins "A" and "B" are included in Appendix J and Appendix K, respectively.

The following is a brief description of the recommended drainage improvements proposed in this MDP:

Line "A"

Line "A" is a concrete-lined open channel and proposed to intercept and convey the on-site peak 100-year storm flows ranging from 116.6 ft^3/sec to 463.2 ft^3/sec and discharge them into Basin "A". It is trapezoidal shaped with a bottom width that ranges from 4 feet to 6

feet, height from 3 feet to 4.5 feet, and side slopes of 1.5 horizontal to 1 vertical. Underground pipe culverts (54-inch and 72-inch RCPs) are proposed at two roadway crossings. Line "B" will require a right of way width of 15 feet.

At the option of the developer, the channel system can be replaced with an underground system as shown on Exhibit "B". As shown, Line "A" will consist of an underground concrete pipe ranging in size from 54-inch to 84-inch RCP. This alternate drainage system will require a drainage easement of 15 feet.

Detention Basin "A"

Detention Basin "A" is proposed to attenuate the increase in storm runoff due to the proposed development of the various planning areas tributary to the basin. This basin is preliminarily sized to attenuate the 2, 5, 10 and 100-year developed storm flows. The proposed basin will require a preliminary 100-year storage volume of approximately 13.6 acre-feet and a water quality volume of 5.7 acre-feet. The maximum basin outflow of 198.0 ft^3/sec will discharge into the Bedford Canyon Wash Channel.

Line "A-1"

Line "A-1" is a 36-inch underground drainage pipe that will collect and convey on-site storm flows generated by planning areas 1 thru 5 and the southerly portion of planning area 6. It is proposed to tie into Line "A". Line "A-1" is sized to convey the maximum 100-year peak flow rate of 46.6 ft^3/sec.

Line "B"

Line "B" is an underground drainage system that will collect and convey on-site storm flows generated by planning areas 6 thru 9. The size varies from 36 to 42 inches and it will tie into Line "A" Line "B" is sized to convey the maximum100-year peak flow rate of 59.3 ft^3/sec.

CP "B-1" and CP "B-2"

Connector Pipes (CPs) "B-1" and "B-2" are underground pipes that will intercept flows from planning area 7 and will tie into Line "B". CP "B-1" is a 24-inch pipe while CP "B-2" is an 18-inch pipe.

Line "C"

Line "C" is an underground drainage system that will collect and convey on-site storm flows generated by planning areas 10 thru 14. The size varies from 42 to 48 inches and it will tie into Line "A" Line "C" is sized to convey the maximum100-year peak flow rate of 119.7 ft^3/sec.

CP "C-1"

Connector Pipe (CP) "C-1" is an underground pipe that will intercept flows from planning areas 11, 12 and 13 and will tie into Line "C". CP "C-1" is a 42-inch pipe.

Line "D" (Transverse Levee) System

The Line "D" (Transverse Levee) system is a concrete-lined open channel and levee system, which is primarily designed to intercept and convey the 100-year breakout or errant flows from Bedford Canyon Channel. The channel portion is trapezoidal shaped with a bottom width of 6 feet, height of 8 feet, and side slopes of 1.5 horizontal to 1 vertical. The levee is concrete lined with side slopes of 1.5 horizontal to 1 vertical and varying height. The height of the levee varies from a maximum height of 10 feet and minimum height of 5 feet measured from the top of the concrete-lined channel to the top of the levee. The channel portion of the system has the capacity to convey approximately the 10-year **clear-water** flow of 2,535 ft^3/sec, which is equivalent to just over the 5-year **bulked** flow condition. The combined channel and levee system is able to convey the entire 100-year **bulked** flow of Bedford Canyon Channel with a minimum of 7.4 feet of freeboard (i.e. 4.4 feet of freeboard for super-elevation plus 3 feet of freeboard for levee condition). The 100-year storm flow emanating from the local off-site area is 39.4 ft3/sec, which can easily be accommodated by the proposed system. The Line "D" system will require a right of way width of 54 feet. As shown on Exhibit "A", the cul-de-sac adjacent to Line "D" will provide access to the levee via a maintenance access ramp. In order to provide access for future development to the south, Street "B" will be extended southerly across Line "D". This drainage system will be modified to include a culvert (pipe or box) under the roadway to allow safe passage of storm flows.

Line "E"

Line "E" is a concrete-lined open channel and proposed to intercept and convey peak 100-year storm flows of 58.0 ft^3/sec emanating from Planning Area 16 and discharge them into Basin "B". It is trapezoidal shaped with a bottom width of 4 feet, height of 3 feet, and side slopes of 1.5 horizontal to 1 vertical. Line "E" will require a right of way width of 30 feet.

Detention Basin "B"

Detention Basin "B" is proposed to attenuate the increase in storm runoff due to the proposed development of Planning Area 16. This basin is preliminarily sized to attenuate the 2, 5, 10 and 100-year developed storm flows. The proposed basin will require a preliminary 100-year storage volume of approximately 1.0 acre-feet and a water quality volume of 5.7 acre-feet. The maximum basin outflow of 30.2 ft^3/sec will discharge into an existing watercourse running along the south side of I-15.

Line "F"

Line "F" will serve as outlet for Basin "A". This 60-inch RCP will convey a maximum basin outflow of 198.0 ft^3/sec and will tie into the Bedford Canyon Wash Channel.

Line "G"

Line "G" will serve as outlet for Basin "B". This 24-inch RCP will convey a maximum basin outflow of 30.2 ft^3/sec and will discharge into an existing watercourse running along the south side of I-15.

IX. RECOMMENDATIONS

This report recommends that:

- The master drainage plan, as set forth herein, be approved and adopted by the City of Corona as part of the overall master plan of drainage for the City.

- The master drainage plan, as set forth herein, be used as a guide for all future developments within the Arantine Hills Specific Plan area and that such developments be required to conform to the plan insofar as possible.

X. REFERENCES

1. AEI CASC Companies, *Arantine Hills Master Drainage Plan*, 2002.

2. Riverside County Flood Control and Water Conservation District; *Hydrology Manual*, April 1978.

3. Riverside County Flood Control and Water Conservation District; *Criteria for Sizing Increased Runoff Detention Basin Facilities*, 1999.

4. Federal Emergency Management Agency, *Flood Insurance Study, Riverside County, CA, Unincorporated Areas, Revised* September 30, 1992.

5. AEI CASC Companies, *"Sediment Yield and Transport Study for Arantine Hills, Baseline and With-Project Conditions, Bedford Wash"*, August 2010.

6. AEI CASC Companies, *Arantine Hills Specific Plan*, August 2001.

7. ASCE Manual and Report on Engineering Practice No. 87, 1998

FIGURE 1: REGIONAL LOCATION MAP

FIGURE 1: REGIONAL LOCATION MAP

FIGURE 2: LOCAL VICINITY MAP

FIGURE 2: LOCAL VICINITY MAP

FIGURE 3: FEMA FLOODPLAIN MAP

FIGURE 3: FEMA FLOODPLAIN MAP

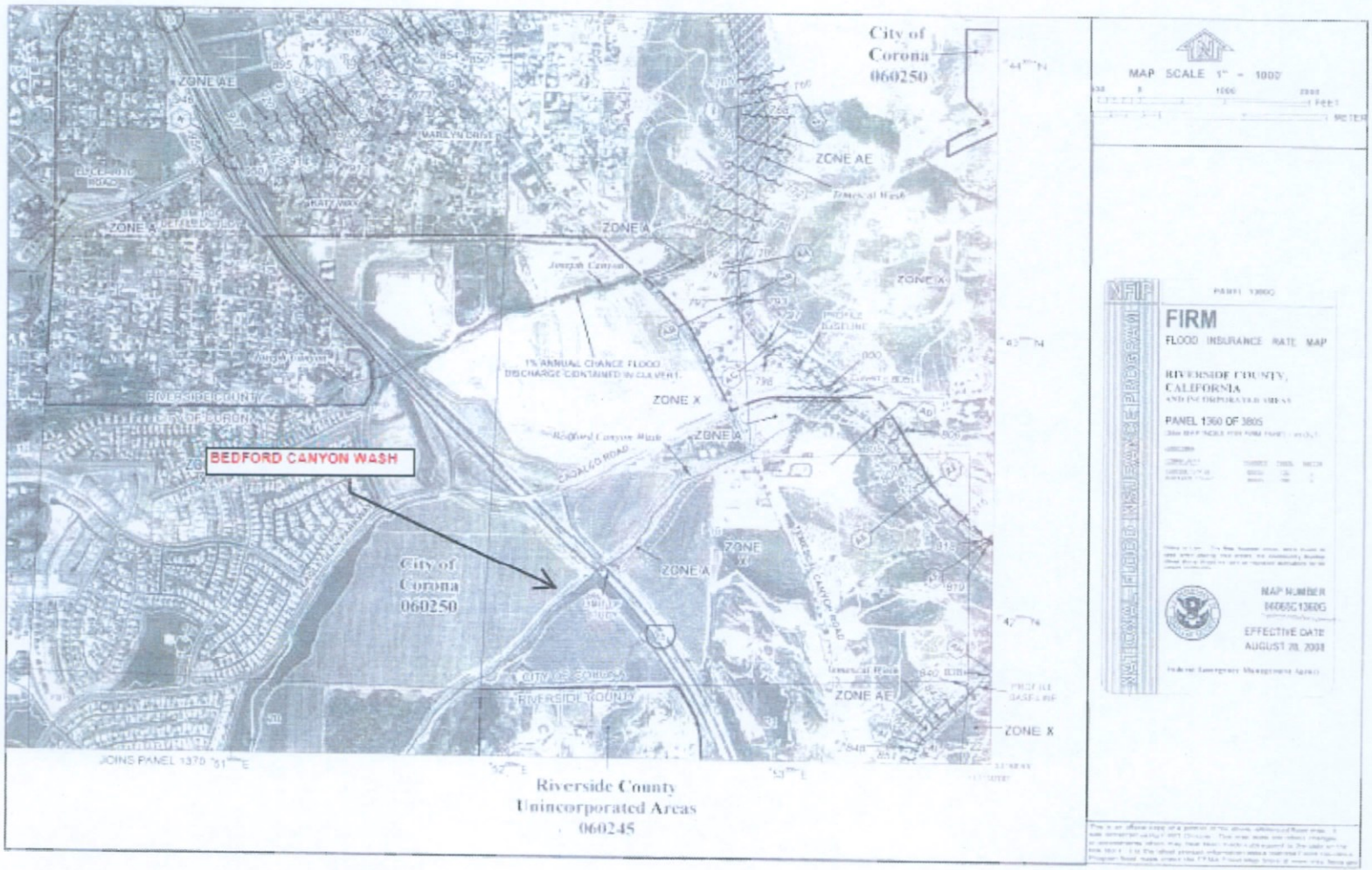


FIGURE 4: DETENTION BASIN/WATER QUALITY BASIN SCHEMATIC

FIGURE 4: DETENTION BASIN/ WATER QUALITY BASIN SCHEMATIC

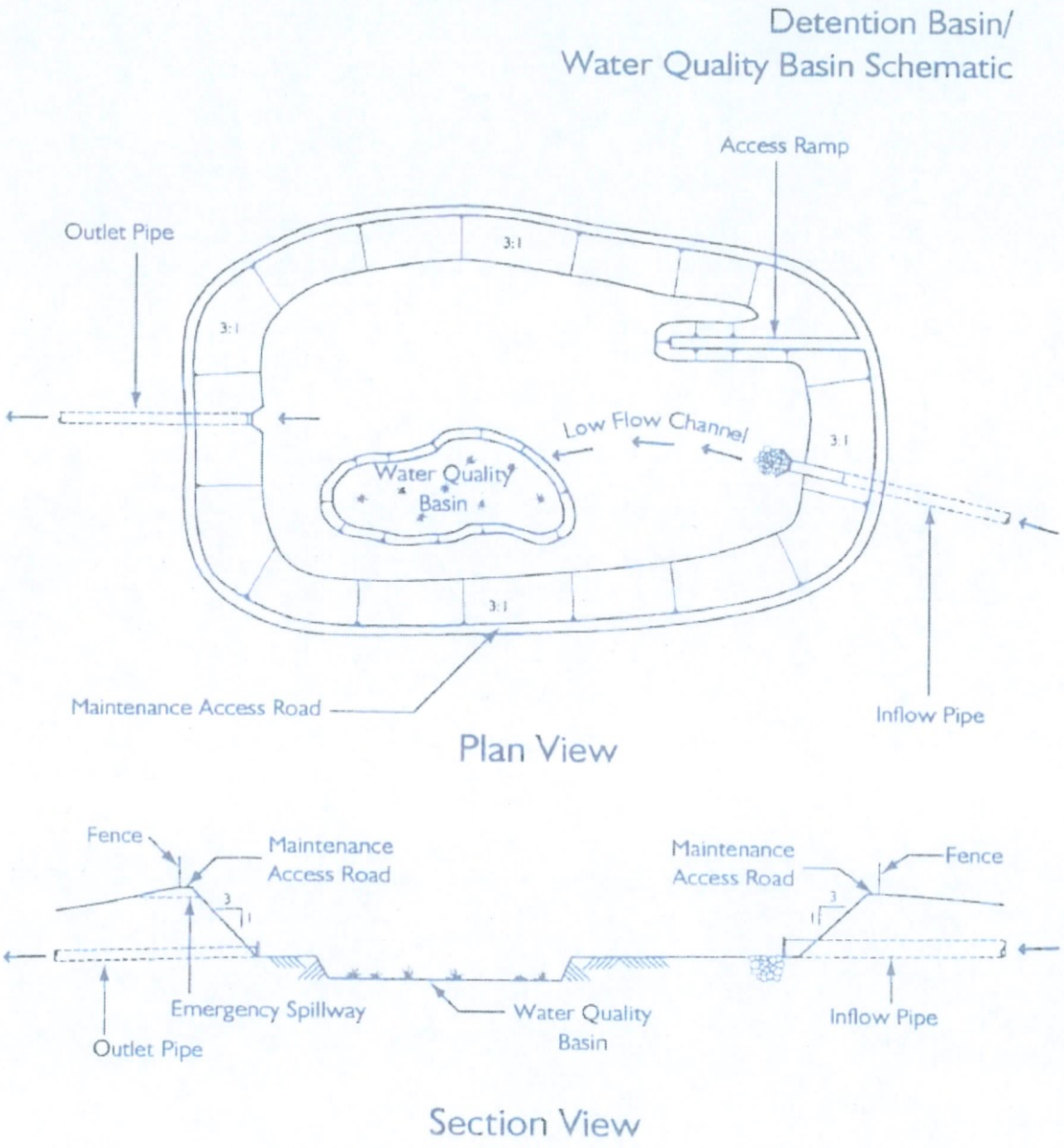
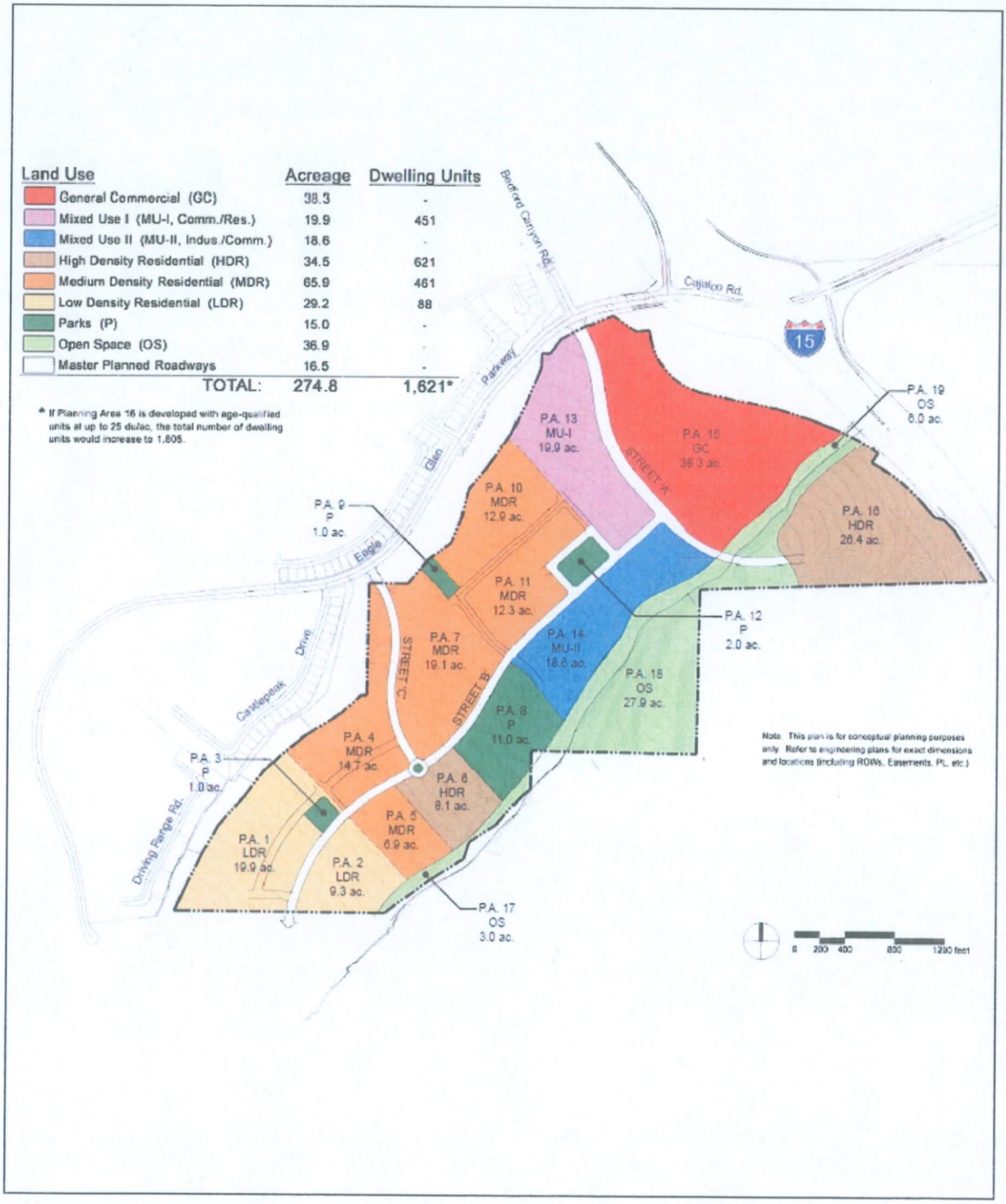


FIGURE 5: LAND USE MAP

FIGURE 5: LAND USE MAP



APPENDIX A: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "A" (RATIONAL TABLING METHOD)

APPENDIX A.1: 100-YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
      Rational Hydrology Study        Date: 06/08/10  File:AE100.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "A" FOR AREAS "A1" TO "A20"
100-YR (EXISTING CONDITION)
FN: AE100
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.400(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1218.000(Ft.)
Bottom (of initial area) elevation =  1104.000(Ft.)
Difference in elevation =   114.000(Ft.)
Slope =    0.11400  s(percent)=      11.40
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.373 min.
Rainfall intensity =      2.445(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.582
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.846(CFS)
Total initial stream area =       2.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1104.000(Ft.)
End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1580.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.047(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.76(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0405
Corrected/adjusted channel slope =  0.0405
Travel time =    5.53 min.     TC =   22.90  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.556
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.160(In/Hr) for a   100.0 year storm
Subarea runoff =      7.090(CFS) for      5.900(Ac.)
Total runoff =     10.935(CFS)        Total area =       8.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.600(Ac.)
Runoff from this stream =      10.935(CFS)
Time of concentration =    22.90 min.
Rainfall intensity =      2.160(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1168.000(Ft.)
Bottom (of initial area) elevation =  1100.000(Ft.)
Difference in elevation =    68.000(Ft.)
Slope =    0.06800  s(percent)=       6.80
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.264 min.
Rainfall intensity =      2.334(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.573
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.081(CFS)
Total initial stream area =       3.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1100.000(Ft.)
End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1430.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.897(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.23(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0420
Corrected/adjusted channel slope =  0.0420
Travel time =    4.55 min.     TC =   23.82  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.553
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
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```
Rainfall intensity =      2.122(In/Hr) for a   100.0 year storm
Subarea runoff =     10.202(CFS) for      8.700(Ac.)
Total runoff =     15.283(CFS)        Total area =      12.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     12.500(Ac.)
Runoff from this stream =     15.283(CFS)
Time of concentration =   23.82 min.
Rainfall intensity =     2.122(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1181.000(Ft.)
Bottom (of initial area) elevation =  1114.000(Ft.)
Difference in elevation =    67.000(Ft.)
Slope =    0.06700  s(percent)=       6.70
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.322 min.
Rainfall intensity =      2.331(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.573
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.275(CFS)
Total initial stream area =        6.200(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      108.000 to Point/Station      109.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1114.000(Ft.)
End of natural channel elevation =   1072.000(Ft.)
Length of natural channel  =   985.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.482(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.78(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0426
Corrected/adjusted channel slope =  0.0426
Travel time =    2.84 min.      TC =   22.16  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.560
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.192(In/Hr) for a   100.0 year storm
Subarea runoff =     13.245(CFS) for     10.800(Ac.)
Total runoff =     21.520(CFS)        Total area =      17.000(Ac.)


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Process from Point/Station      109.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1072.000(Ft.)
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End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1035.000(Ft.)
Estimated mean flow rate at midpoint of channel =     30.761(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0309
Corrected/adjusted channel slope =  0.0309
Travel time =    2.91 min.     TC =   25.07  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.548
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.073(In/Hr) for a   100.0 year storm
Subarea runoff =     16.580(CFS) for     14.600(Ac.)
Total runoff =     38.100(CFS)       Total area =      31.600(Ac.)


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Process from Point/Station      109.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =     31.600(Ac.)
Runoff from this stream =     38.100(CFS)
Time of concentration =   25.07 min.
Rainfall intensity =     2.073(In/Hr)
Summary of stream data:

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


1       10.935     22.90                  2.160
2       15.283     23.82                  2.122
3       38.100     25.07                  2.073
Largest stream flow has longer time of concentration
Qp =     38.100 + sum of
          Qb         Ia/Ib
          10.935 *    0.960 =     10.499
          Qb         Ia/Ib
          15.283 *    0.977 =     14.934
Qp =     63.533

Total of 3 streams to confluence:
Flow rates before confluence point:
      10.935      15.283      38.100
Area of streams before confluence:
       8.600      12.500      31.600
Results of confluence:
Total flow rate =     63.533(CFS)
Time of concentration =    25.072 min.
Effective stream area after confluence =     52.700(Ac.)


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Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1040.000(Ft.)
End of natural channel elevation =    961.000(Ft.)
Length of natural channel  =  2135.000(Ft.)
Estimated mean flow rate at midpoint of channel =     78.603(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.50(Ft/s)
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Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0370
Corrected/adjusted channel slope =  0.0370
Travel time =    4.19 min.     TC =   29.26  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.643
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.250
RI index for soil(AMC 2)  =  63.25
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.934(In/Hr) for a   100.0 year storm
Subarea runoff =     31.072(CFS) for     25.000(Ac.)
Total runoff =     94.605(CFS)       Total area =      77.700(Ac.)


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Process from Point/Station      102.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     77.700(Ac.)
Runoff from this stream =     94.605(CFS)
Time of concentration =   29.26 min.
Rainfall intensity =     1.934(In/Hr)


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Process from Point/Station      114.000 to Point/Station      115.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1073.000(Ft.)
Bottom (of initial area) elevation =  1033.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.04000  s(percent)=       4.00
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   21.421 min.
Rainfall intensity =      2.225(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.563
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.266(CFS)
Total initial stream area =       6.600(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      115.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1033.000(Ft.)
End of natural channel elevation =    961.000(Ft.)
Length of natural channel  =  2180.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.658(CFS)

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

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0330
Corrected/adjusted channel slope =  0.0330
Travel time =    7.01 min.     TC =   28.43  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.536
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Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.959(In/Hr) for a   100.0 year storm
Subarea runoff =     14.061(CFS) for     13.400(Ac.)
Total runoff =     22.327(CFS)       Total area =      20.000(Ac.)


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Process from Point/Station      115.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     20.000(Ac.)
Runoff from this stream =     22.327(CFS)
Time of concentration =   28.43 min.
Rainfall intensity =     1.959(In/Hr)
Summary of stream data:

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


1       94.605      29.26                  1.934
2       22.327      28.43                  1.959
Largest stream flow has longer time of concentration
Qp =     94.605 + sum of
          Qb          Ia/Ib
          22.327 *    0.987 =     22.040
Qp =    116.645

Total of 2 streams to confluence:
Flow rates before confluence point:
      94.605      22.327
Area of streams before confluence:
      77.700      20.000
Results of confluence:
Total flow rate =    116.645(CFS)
Time of concentration =    29.259 min.
Effective stream area after confluence =     97.700(Ac.)


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Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
--------------------------------------------------------------------------------
Top of natural channel elevation =    961.000(Ft.)
End of natural channel elevation =    900.000(Ft.)
Length of natural channel  =  2135.000(Ft.)
Estimated mean flow rate at midpoint of channel =    129.718(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0286
Corrected/adjusted channel slope =  0.0286
Travel time =    4.10 min.     TC =   33.36  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.582
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  57.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.823(In/Hr) for a   100.0 year storm
Subarea runoff =     23.227(CFS) for     21.900(Ac.)
Total runoff =    139.872(CFS)       Total area =     119.600(Ac.)


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Process from Point/Station      104.000 to Point/Station      120.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
---------------------------------------------------------------------------
Top of natural channel elevation =    900.000(Ft.)
End of natural channel elevation =    885.000(Ft.)
Length of natural channel  =  1900.000(Ft.)
Estimated mean flow rate at midpoint of channel =    183.085(CFS)

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

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0079
Corrected/adjusted channel slope =  0.0079
Travel time =    6.25 min.     TC =   39.60  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.585
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  59.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.688(In/Hr) for a   100.0 year storm
Subarea runoff =     73.000(CFS) for     73.900(Ac.)
Total runoff =    212.872(CFS)       Total area =     193.500(Ac.)


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Process from Point/Station      104.000 to Point/Station      120.000
**** CONFLUENCE OF MAIN STREAMS ****
---------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    193.500(Ac.)
Runoff from this stream =    212.872(CFS)
Time of concentration =   39.60 min.
Rainfall intensity =     1.688(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      110.000 to Point/Station      111.000
**** INITIAL AREA EVALUATION ****
---------------------------------------------------------------------------
Initial area flow distance =   960.000(Ft.)
Top (of initial area) elevation =  1202.000(Ft.)
Bottom (of initial area) elevation =  1144.000(Ft.)
Difference in elevation =    58.000(Ft.)
Slope =    0.06042  s(percent)=       6.04
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.406 min.
Rainfall intensity =      2.327(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.572
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.389(CFS)
Total initial stream area =        4.800(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      111.000 to Point/Station      112.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
---------------------------------------------------------------------------
Top of natural channel elevation =   1144.000(Ft.)
End of natural channel elevation =   1114.000(Ft.)
Length of natural channel  =   775.000(Ft.)
Estimated mean flow rate at midpoint of channel =     12.978(CFS)
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Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.26(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0387
Corrected/adjusted channel slope =  0.0387
Travel time =    2.46 min.     TC =   21.86  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.561
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.205(In/Hr) for a   100.0 year storm
Subarea runoff =     12.244(CFS) for      9.900(Ac.)
Total runoff =     18.633(CFS)       Total area =      14.700(Ac.)


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Process from Point/Station      112.000 to Point/Station      113.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =   1114.000(Ft.)
End of natural channel elevation =   1042.000(Ft.)
Length of natural channel  =  1635.000(Ft.)
Estimated mean flow rate at midpoint of channel =     29.535(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0440
Corrected/adjusted channel slope =  0.0440
Travel time =    3.89 min.     TC =   25.76  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.545
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.048(In/Hr) for a   100.0 year storm
Subarea runoff =     19.206(CFS) for     17.200(Ac.)
Total runoff =     37.839(CFS)       Total area =      31.900(Ac.)


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Process from Point/Station      113.000 to Point/Station      119.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =   1042.000(Ft.)
End of natural channel elevation =    967.000(Ft.)
Length of natural channel  =  2260.000(Ft.)
Estimated mean flow rate at midpoint of channel =     52.370(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0332
Corrected/adjusted channel slope =  0.0332
Travel time =    5.27 min.     TC =   31.03  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.560
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.884(In/Hr) for a   100.0 year storm
Subarea runoff =     25.832(CFS) for     24.500(Ac.)
Total runoff =     63.671(CFS)       Total area =      56.400(Ac.)


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Process from Point/Station      113.000 to Point/Station      119.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      56.400(Ac.)
Runoff from this stream =      63.671(CFS)
Time of concentration =   31.03 min.
Rainfall intensity =     1.884(In/Hr)


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Process from Point/Station      116.000 to Point/Station      117.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1104.000(Ft.)
Bottom (of initial area) elevation =  1053.000(Ft.)
Difference in elevation =     51.000(Ft.)
Slope =    0.05100  s(percent)=       5.10
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.405 min.
Rainfall intensity =      2.275(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.567
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.194(CFS)
Total initial stream area =       1.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      117.000 to Point/Station      118.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1053.000(Ft.)
End of natural channel elevation =   1025.000(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =      4.840(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.92(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0350
Corrected/adjusted channel slope =  0.0350
Travel time =    3.40 min.     TC =   23.81  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.553
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Rainfall intensity =      2.122(In/Hr) for a   100.0 year storm
Subarea runoff =      4.809(CFS) for      4.100(Ac.)
Total runoff =      7.003(CFS)       Total area =       5.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1025.000(Ft.)
End of natural channel elevation =    967.000(Ft.)
Length of natural channel  =  1770.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.591(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.70(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0328
Corrected/adjusted channel slope =  0.0328
Travel time =    6.28 min.     TC =   30.09  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.530
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.910(In/Hr) for a   100.0 year storm
Subarea runoff =      7.693(CFS) for      7.600(Ac.)
Total runoff =     14.696(CFS)       Total area =      13.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     13.400(Ac.)
Runoff from this stream =     14.696(CFS)
Time of concentration =   30.09 min.
Rainfall intensity =     1.910(In/Hr)
Summary of stream data:

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


1       63.671     31.03                  1.884
2       14.696     30.09                  1.910
Largest stream flow has longer time of concentration
Qp =     63.671 + sum of
          Qb         Ia/Ib
          14.696 *    0.986 =     14.494
Qp =     78.165

Total of 2 streams to confluence:
Flow rates before confluence point:
      63.671      14.696
Area of streams before confluence:
      56.400       13.400
Results of confluence:
Total flow rate =     78.165(CFS)
Time of concentration =    31.029 min.
Effective stream area after confluence =     69.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      120.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    967.000(Ft.)
End of natural channel elevation =    885.000(Ft.)
Length of natural channel  =  2330.000(Ft.)
```

```
Estimated mean flow rate at midpoint of channel =     93.787(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.74(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0352
Corrected/adjusted channel slope =  0.0352
Travel time =    4.45 min.     TC =   35.47  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.563
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  55.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =     1.774(In/Hr) for a   100.0 year storm
Subarea runoff =     27.869(CFS) for     27.900(Ac.)
Total runoff =    106.035(CFS)       Total area =      97.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      120.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     97.700(Ac.)
Runoff from this stream =    106.035(CFS)
Time of concentration =   35.47 min.
Rainfall intensity =     1.774(In/Hr)
Summary of stream data:

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


1      212.872      39.60                 1.688
2      106.035      35.47                 1.774
Largest stream flow has longer time of concentration
Qp =    212.872 + sum of
          Qb          Ia/Ib
        106.035 *     0.952 =     100.908
Qp =    313.780

Total of 2 main streams to confluence:
Flow rates before confluence point:
     212.872     106.035
Area of streams before confluence:
      193.500       97.700


Results of confluence:
Total flow rate =    313.780(CFS)
Time of concentration =    39.604 min.
Effective stream area after confluence  =    291.200(Ac.)
End of computations, total study area =          291.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  55.0
```

APPENDIX A.2: 10-YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
      Rational Hydrology Study        Date: 06/08/10  File:AE10.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "A" FOR AREAS "A1" TO "A20"
10-YR (EXISTING CONDITION)
FN: AE10
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.900(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1218.000(Ft.)
Bottom (of initial area) elevation =  1104.000(Ft.)
Difference in elevation =   114.000(Ft.)
Slope =    0.11400  s(percent)=      11.40
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.373 min.
Rainfall intensity =      1.572(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.487
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.066(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1104.000(Ft.)
End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1580.000(Ft.)
Estimated mean flow rate at midpoint of channel =      4.323(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.10(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0405
Corrected/adjusted channel slope =  0.0405
Travel time =    6.42 min.     TC =   23.79  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.455
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.364(In/Hr) for a    10.0 year storm
Subarea runoff =      3.664(CFS) for      5.900(Ac.)
Total runoff =      5.730(CFS)       Total area =       8.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.600(Ac.)
Runoff from this stream =      5.730(CFS)
Time of concentration =   23.79 min.
Rainfall intensity =     1.364(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1168.000(Ft.)
Bottom (of initial area) elevation =  1100.000(Ft.)
Difference in elevation =    68.000(Ft.)
Slope =    0.06800  s(percent)=       6.80
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.264 min.
Rainfall intensity =      1.500(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.476
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.716(CFS)
Total initial stream area =       3.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =  1100.000(Ft.)
End of natural channel elevation =  1040.000(Ft.)
Length of natural channel  =  1430.000(Ft.)
Estimated mean flow rate at midpoint of channel =      5.825(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0420
Corrected/adjusted channel slope =  0.0420
Travel time =    5.32 min.     TC =   24.58  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.452
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Rainfall intensity =      1.344(In/Hr) for a    10.0 year storm
Subarea runoff =       5.284(CFS) for      8.700(Ac.)
Total runoff =       8.000(CFS)        Total area =       12.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      12.500(Ac.)
Runoff from this stream =       8.000(CFS)
Time of concentration =    24.58 min.
Rainfall intensity =      1.344(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1181.000(Ft.)
Bottom (of initial area) elevation =  1114.000(Ft.)
Difference in elevation =     67.000(Ft.)
Slope =    0.06700   s(percent)=       6.70
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    19.322 min.
Rainfall intensity =      1.498(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.476
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.423(CFS)
Total initial stream area =       6.200(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1114.000(Ft.)
End of natural channel elevation =   1072.000(Ft.)
Length of natural channel  =   985.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.275(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.92(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0426
Corrected/adjusted channel slope =  0.0426
Travel time =    3.34 min.     TC =   22.66  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.460
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.395(In/Hr) for a    10.0 year storm
Subarea runoff =       6.929(CFS) for     10.800(Ac.)
Total runoff =     11.352(CFS)        Total area =      17.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1072.000(Ft.)
```

```
End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1035.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.227(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0309
Corrected/adjusted channel slope =  0.0309
Travel time =    3.46 min.     TC =   26.12  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.446
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.308(In/Hr) for a    10.0 year storm
Subarea runoff =      8.512(CFS) for     14.600(Ac.)
Total runoff =     19.864(CFS)       Total area =      31.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =     31.600(Ac.)
Runoff from this stream =     19.864(CFS)
Time of concentration =   26.12 min.
Rainfall intensity =     1.308(In/Hr)
Summary of stream data:

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

1         5.730      23.79                   1.364
2         8.000      24.58                   1.344
3        19.864      26.12                   1.308
Largest stream flow has longer time of concentration
Qp =     19.864 + sum of
           Qb          Ia/Ib
            5.730 *     0.959 =      5.494
           Qb          Ia/Ib
            8.000 *     0.973 =      7.785
Qp =     33.143

Total of 3 streams to confluence:
Flow rates before confluence point:
       5.730       8.000      19.864
Area of streams before confluence:
       8.600      12.500      31.600
Results of confluence:
Total flow rate =     33.143(CFS)
Time of concentration =    26.120 min.
Effective stream area after confluence =     52.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1040.000(Ft.)
End of natural channel elevation =    961.000(Ft.)
Length of natural channel  =  2135.000(Ft.)
Estimated mean flow rate at midpoint of channel =     41.004(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.03(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0370
Corrected/adjusted channel slope =  0.0370
Travel time =    5.06 min.     TC =   31.18  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.548
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.250
RI index for soil(AMC 2)  =  63.25
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.208(In/Hr) for a    10.0 year storm
Subarea runoff =     16.558(CFS) for     25.000(Ac.)
Total runoff =     49.700(CFS)       Total area =      77.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     77.700(Ac.)
Runoff from this stream =     49.700(CFS)
Time of concentration =   31.18 min.
Rainfall intensity =     1.208(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      114.000 to Point/Station      115.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1073.000(Ft.)
Bottom (of initial area) elevation =  1033.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.04000  s(percent)=       4.00
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   21.421 min.
Rainfall intensity =      1.430(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.466
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.396(CFS)
Total initial stream area =       6.600(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      115.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1033.000(Ft.)
End of natural channel elevation =    961.000(Ft.)
Length of natural channel  =  2180.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.859(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0330
Corrected/adjusted channel slope =  0.0330
Travel time =    8.25 min.     TC =   29.67  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.433
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```
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =     1.235(In/Hr) for a    10.0 year storm
Subarea runoff =      7.164(CFS) for     13.400(Ac.)
Total runoff =     11.560(CFS)       Total area =      20.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     20.000(Ac.)
Runoff from this stream =     11.560(CFS)
Time of concentration =    29.67 min.
Rainfall intensity =     1.235(In/Hr)
Summary of stream data:

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


1        49.700      31.18                    1.208
2        11.560      29.67                    1.235
Largest stream flow has longer time of concentration
Qp =      49.700 + sum of
            Qb          Ia/Ib
            11.560 *     0.978 =      11.305
Qp =      61.005

Total of 2 streams to confluence:
Flow rates before confluence point:
       49.700       11.560
Area of streams before confluence:
       77.700       20.000
Results of confluence:
Total flow rate =     61.005(CFS)
Time of concentration =    31.179 min.
Effective stream area after confluence =      97.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =     961.000(Ft.)
End of natural channel elevation =     900.000(Ft.)
Length of natural channel  =  2135.000(Ft.)
Estimated mean flow rate at midpoint of channel =      67.842(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0286
Corrected/adjusted channel slope =  0.0286
Travel time =    4.98 min.      TC =   36.16  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.478
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  57.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =     1.130(In/Hr) for a    10.0 year storm
Subarea runoff =     11.829(CFS) for     21.900(Ac.)
Total runoff =     72.834(CFS)       Total area =     119.600(Ac.)


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

```
Process from Point/Station      104.000 to Point/Station      120.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    900.000(Ft.)
End of natural channel elevation =    885.000(Ft.)
Length of natural channel  =  1900.000(Ft.)
Estimated mean flow rate at midpoint of channel =     95.336(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.16(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0079
Corrected/adjusted channel slope =  0.0079
Travel time =    7.62 min.     TC =   43.77  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.480
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  59.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.037(In/Hr) for a    10.0 year storm
Subarea runoff =     36.774(CFS) for     73.900(Ac.)
Total runoff =    109.609(CFS)       Total area =     193.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      120.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    193.500(Ac.)
Runoff from this stream =    109.609(CFS)
Time of concentration =   43.77 min.
Rainfall intensity =     1.037(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   960.000(Ft.)
Top (of initial area) elevation =  1202.000(Ft.)
Bottom (of initial area) elevation =  1144.000(Ft.)
Difference in elevation =    58.000(Ft.)
Slope =    0.06042  s(percent)=       6.04
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.406 min.
Rainfall intensity =      1.495(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.476
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.414(CFS)
Total initial stream area =        4.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      112.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1144.000(Ft.)
End of natural channel elevation =   1114.000(Ft.)
Length of natural channel  =   775.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.935(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.49(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0387
Corrected/adjusted channel slope =  0.0387
Travel time =    2.88 min.     TC =   22.28  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.462
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.405(In/Hr) for a    10.0 year storm
Subarea runoff =      6.423(CFS) for      9.900(Ac.)
Total runoff =      9.837(CFS)       Total area =      14.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1114.000(Ft.)
End of natural channel elevation =   1042.000(Ft.)
Length of natural channel  =  1635.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.593(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.88(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0440
Corrected/adjusted channel slope =  0.0440
Travel time =    4.63 min.     TC =   26.91  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.443
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.291(In/Hr) for a    10.0 year storm
Subarea runoff =      9.826(CFS) for     17.200(Ac.)
Total runoff =     19.663(CFS)       Total area =      31.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      119.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1042.000(Ft.)
End of natural channel elevation =    967.000(Ft.)
Length of natural channel  =  2260.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.214(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0332
Corrected/adjusted channel slope =  0.0332
Travel time =    6.34 min.     TC =   33.26  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.455
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.173(In/Hr) for a    10.0 year storm
Subarea runoff =     13.094(CFS) for     24.500(Ac.)
Total runoff =     32.757(CFS)        Total area =      56.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      119.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     56.400(Ac.)
Runoff from this stream =     32.757(CFS)
Time of concentration =  33.26 min.
Rainfall intensity =     1.173(In/Hr)


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Process from Point/Station      116.000 to Point/Station      117.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1104.000(Ft.)
Bottom (of initial area) elevation =  1053.000(Ft.)
Difference in elevation =    51.000(Ft.)
Slope =    0.05100  s(percent)=       5.10
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.405 min.
Rainfall intensity =      1.462(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.471
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.170(CFS)
Total initial stream area =       1.700(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      117.000 to Point/Station      118.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1053.000(Ft.)
End of natural channel elevation =   1025.000(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =      2.580(CFS)

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

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0350
Corrected/adjusted channel slope =  0.0350
Travel time =    3.92 min.     TC =   24.33  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.453
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Rainfall intensity =      1.351(In/Hr) for a    10.0 year storm
Subarea runoff =       2.508(CFS) for       4.100(Ac.)
Total runoff =       3.677(CFS)        Total area =        5.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------------
Top of natural channel elevation =    1025.000(Ft.)
End of natural channel elevation =     967.000(Ft.)
Length of natural channel  =  1770.000(Ft.)
Estimated mean flow rate at midpoint of channel =       6.087(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =    4.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0328
Corrected/adjusted channel slope =  0.0328
Travel time =    7.37 min.     TC =   31.70  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.426
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.199(In/Hr) for a    10.0 year storm
Subarea runoff =      3.883(CFS) for      7.600(Ac.)
Total runoff =      7.560(CFS)        Total area =      13.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     13.400(Ac.)
Runoff from this stream =      7.560(CFS)
Time of concentration =   31.70 min.
Rainfall intensity =     1.199(In/Hr)
Summary of stream data:

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


1       32.757     33.26                  1.173
2        7.560     31.70                  1.199
Largest stream flow has longer time of concentration
Qp =     32.757 + sum of
          Qb          Ia/Ib
           7.560 *    0.979 =      7.399
Qp =     40.155

Total of 2 streams to confluence:
Flow rates before confluence point:
      32.757       7.560
Area of streams before confluence:
       56.400       13.400
Results of confluence:
Total flow rate =     40.155(CFS)
Time of concentration =    33.258 min.
Effective stream area after confluence =      69.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      120.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------------
Top of natural channel elevation =     967.000(Ft.)
End of natural channel elevation =     885.000(Ft.)
Length of natural channel  =  2330.000(Ft.)
```

```
Estimated mean flow rate at midpoint of channel =     48.181(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.18(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0352
Corrected/adjusted channel slope =  0.0352
Travel time =    5.41 min.     TC =   38.66  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.458
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  55.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.096(In/Hr) for a    10.0 year storm
Subarea runoff =     13.995(CFS) for     27.900(Ac.)
Total runoff =     54.151(CFS)       Total area =      97.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      120.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     97.700(Ac.)
Runoff from this stream =     54.151(CFS)
Time of concentration =   38.66 min.
Rainfall intensity =     1.096(In/Hr)
Summary of stream data:

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

1      109.609     43.77                1.037
2       54.151     38.66                1.096
Largest stream flow has longer time of concentration
Qp =    109.609 + sum of
          Qb         Ia/Ib
          54.151 *    0.946 =     51.210
Qp =    160.818

Total of 2 main streams to confluence:
Flow rates before confluence point:
     109.609      54.151
Area of streams before confluence:
      193.500       97.700


Results of confluence:
Total flow rate =    160.818(CFS)
Time of concentration =    43.772 min.
Effective stream area after confluence  =    291.200(Ac.)
End of computations, total study area =          291.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  55.0
```

APPENDIX A.3: 2-YEAR RATIONAL TABLING CALCULATIONS

```
                    Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
      Rational Hydrology Study        Date: 06/08/10  File:AE2.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "A" FOR AREAS "A1" TO "A20"
2-YR (EXISTING CONDITION)
FN: AE2
------------------------------------------------------------------------
 *********   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) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.550(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1218.000(Ft.)
Bottom (of initial area) elevation =  1104.000(Ft.)
Difference in elevation =   114.000(Ft.)
Slope =    0.11400  s(percent)=      11.40
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.373 min.
Rainfall intensity =      0.961(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.220
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.571(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1104.000(Ft.)
End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1580.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.195(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.12(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0405
Corrected/adjusted channel slope =  0.0405
Travel time =    8.43 min.     TC =   25.81  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.192
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.804(In/Hr) for a     2.0 year storm
Subarea runoff =      0.910(CFS) for      5.900(Ac.)
Total runoff =      1.481(CFS)       Total area =       8.600(Ac.)


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Process from Point/Station      101.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.600(Ac.)
Runoff from this stream =      1.481(CFS)
Time of concentration =   25.81 min.
Rainfall intensity =     0.804(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1168.000(Ft.)
Bottom (of initial area) elevation =  1100.000(Ft.)
Difference in elevation =    68.000(Ft.)
Slope =    0.06800  s(percent)=       6.80
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.264 min.
Rainfall intensity =      0.917(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.212
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.740(CFS)
Total initial stream area =       3.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1100.000(Ft.)
End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1430.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.588(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0420
Corrected/adjusted channel slope =  0.0420
Travel time =    7.09 min.     TC =   26.35  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.190
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Rainfall intensity =      0.796(In/Hr) for a     2.0 year storm
Subarea runoff =      1.319(CFS) for      8.700(Ac.)
Total runoff =      2.060(CFS)       Total area =      12.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     12.500(Ac.)
Runoff from this stream =      2.060(CFS)
Time of concentration =   26.35 min.
Rainfall intensity =     0.796(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1181.000(Ft.)
Bottom (of initial area) elevation =  1114.000(Ft.)
Difference in elevation =    67.000(Ft.)
Slope =    0.06700  s(percent)=       6.70
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.322 min.
Rainfall intensity =      0.916(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.212
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.205(CFS)
Total initial stream area =       6.200(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      108.000 to Point/Station      109.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1114.000(Ft.)
End of natural channel elevation =   1072.000(Ft.)
Length of natural channel  =   985.000(Ft.)
Estimated mean flow rate at midpoint of channel =      2.255(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0426
Corrected/adjusted channel slope =  0.0426
Travel time =    4.50 min.     TC =   23.83  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.197
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.833(In/Hr) for a     2.0 year storm
Subarea runoff =      1.776(CFS) for     10.800(Ac.)
Total runoff =      2.981(CFS)       Total area =      17.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1072.000(Ft.)
```

```
End of natural channel elevation =   1040.000(Ft.)
Length of natural channel  =  1035.000(Ft.)
Estimated mean flow rate at midpoint of channel =      4.261(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.57(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0309
Corrected/adjusted channel slope =  0.0309
Travel time =    4.83 min.     TC =   28.65  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.185
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.767(In/Hr) for a     2.0 year storm
Subarea runoff =      2.070(CFS) for     14.600(Ac.)
Total runoff =      5.051(CFS)       Total area =      31.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      102.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =     31.600(Ac.)
Runoff from this stream =      5.051(CFS)
Time of concentration =   28.65 min.
Rainfall intensity =     0.767(In/Hr)
Summary of stream data:

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


1        1.481     25.81                   0.804
2        2.060     26.35                   0.796
3        5.051     28.65                   0.767
Largest stream flow has longer time of concentration
Qp =      5.051 + sum of
          Qb         Ia/Ib
           1.481 *    0.954 =      1.413
          Qb         Ia/Ib
           2.060 *    0.963 =      1.984
Qp =      8.448

Total of 3 streams to confluence:
Flow rates before confluence point:
       1.481       2.060       5.051
Area of streams before confluence:
       8.600      12.500      31.600
Results of confluence:
Total flow rate =      8.448(CFS)
Time of concentration =    28.652 min.
Effective stream area after confluence =     52.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1040.000(Ft.)
End of natural channel elevation =    961.000(Ft.)
Length of natural channel  =  2135.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.451(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.86(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0370
Corrected/adjusted channel slope =  0.0370
Travel time =    7.32 min.     TC =   35.97  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.255
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.250
RI index for soil(AMC 1)  =  43.25
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.692(In/Hr) for a     2.0 year storm
Subarea runoff =      4.417(CFS) for     25.000(Ac.)
Total runoff =     12.865(CFS)       Total area =      77.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     77.700(Ac.)
Runoff from this stream =     12.865(CFS)
Time of concentration =   35.97 min.
Rainfall intensity =     0.692(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      114.000 to Point/Station      115.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1073.000(Ft.)
Bottom (of initial area) elevation =  1033.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.04000  s(percent)=       4.00
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   21.421 min.
Rainfall intensity =      0.874(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.205
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.182(CFS)
Total initial stream area =       6.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1033.000(Ft.)
End of natural channel elevation =    961.000(Ft.)
Length of natural channel  =  2180.000(Ft.)
Estimated mean flow rate at midpoint of channel =      2.381(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.25(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0330
Corrected/adjusted channel slope =  0.0330
Travel time =   11.20 min.     TC =   32.62  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.176
```

```
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.724(In/Hr) for a     2.0 year storm
Subarea runoff =      1.711(CFS) for     13.400(Ac.)
Total runoff =      2.892(CFS)       Total area =      20.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     20.000(Ac.)
Runoff from this stream =      2.892(CFS)
Time of concentration =   32.62 min.
Rainfall intensity =     0.724(In/Hr)
Summary of stream data:

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


1       12.865     35.97                  0.692
2        2.892     32.62                  0.724
Largest stream flow has longer time of concentration
Qp =     12.865 + sum of
          Qb          Ia/Ib
           2.892 *    0.957 =      2.768
Qp =     15.633

Total of 2 streams to confluence:
Flow rates before confluence point:
      12.865       2.892
Area of streams before confluence:
       77.700       20.000
Results of confluence:
Total flow rate =     15.633(CFS)
Time of concentration =    35.971 min.
Effective stream area after confluence =     97.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    961.000(Ft.)
End of natural channel elevation =    900.000(Ft.)
Length of natural channel  =  2135.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.385(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.88(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0286
Corrected/adjusted channel slope =  0.0286
Travel time =    7.29 min.     TC =   43.27  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.199
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  37.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.637(In/Hr) for a     2.0 year storm
Subarea runoff =      2.771(CFS) for     21.900(Ac.)
Total runoff =     18.403(CFS)       Total area =     119.600(Ac.)


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```
Process from Point/Station      104.000 to Point/Station      120.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    900.000(Ft.)
End of natural channel elevation =    885.000(Ft.)
Length of natural channel  =  1900.000(Ft.)
Estimated mean flow rate at midpoint of channel =     24.089(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0079
Corrected/adjusted channel slope =  0.0079
Travel time =   11.31 min.     TC =   54.57  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.197
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  39.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.574(In/Hr) for a     2.0 year storm
Subarea runoff =      8.375(CFS) for     73.900(Ac.)
Total runoff =     26.779(CFS)       Total area =     193.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      120.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    193.500(Ac.)
Runoff from this stream =     26.779(CFS)
Time of concentration =   54.57 min.
Rainfall intensity =     0.574(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   960.000(Ft.)
Top (of initial area) elevation =  1202.000(Ft.)
Bottom (of initial area) elevation =  1144.000(Ft.)
Difference in elevation =    58.000(Ft.)
Slope =    0.06042  s(percent)=       6.04
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.406 min.
Rainfall intensity =      0.914(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.212
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.930(CFS)
Total initial stream area =        4.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      112.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1144.000(Ft.)
End of natural channel elevation =   1114.000(Ft.)
Length of natural channel  =   775.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.889(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.35(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0387
Corrected/adjusted channel slope =  0.0387
Travel time =    3.86 min.     TC =   23.27  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.199
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.842(In/Hr) for a     2.0 year storm
Subarea runoff =      1.659(CFS) for      9.900(Ac.)
Total runoff =      2.589(CFS)       Total area =      14.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1114.000(Ft.)
End of natural channel elevation =   1042.000(Ft.)
Length of natural channel  =  1635.000(Ft.)
Estimated mean flow rate at midpoint of channel =      4.104(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.23(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0440
Corrected/adjusted channel slope =  0.0440
Travel time =    6.44 min.     TC =   29.71  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.182
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.755(In/Hr) for a     2.0 year storm
Subarea runoff =      2.368(CFS) for     17.200(Ac.)
Total runoff =      4.957(CFS)       Total area =      31.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      119.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1042.000(Ft.)
End of natural channel elevation =    967.000(Ft.)
Length of natural channel  =  2260.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.861(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0332
Corrected/adjusted channel slope =  0.0332
Travel time =    9.09 min.     TC =   38.80  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.185
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  34.04
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.669(In/Hr) for a     2.0 year storm
Subarea runoff =      3.036(CFS) for     24.500(Ac.)
Total runoff =      7.993(CFS)       Total area =      56.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      119.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      56.400(Ac.)
Runoff from this stream =      7.993(CFS)
Time of concentration =   38.80 min.
Rainfall intensity =     0.669(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      116.000 to Point/Station      117.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1104.000(Ft.)
Bottom (of initial area) elevation =  1053.000(Ft.)
Difference in elevation =    51.000(Ft.)
Slope =    0.05100  s(percent)=        5.10
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.405 min.
Rainfall intensity =      0.894(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.208
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.316(CFS)
Total initial stream area =        1.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      117.000 to Point/Station      118.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1053.000(Ft.)
End of natural channel elevation =   1025.000(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =      0.698(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.63(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0350
Corrected/adjusted channel slope =  0.0350
Travel time =    5.07 min.     TC =   25.48  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.193
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Rainfall intensity =      0.809(In/Hr) for a     2.0 year storm
Subarea runoff =      0.639(CFS) for       4.100(AC.)
Total runoff =      0.955(CFS)       Total area =       5.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1025.000(Ft.)
End of natural channel elevation =    967.000(Ft.)
Length of natural channel  =  1770.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.581(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.97(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0328
Corrected/adjusted channel slope =  0.0328
Travel time =    9.94 min.     TC =   35.42  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.171
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.697(In/Hr) for a     2.0 year storm
Subarea runoff =      0.907(CFS) for      7.600(AC.)
Total runoff =      1.863(CFS)       Total area =      13.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     13.400(Ac.)
Runoff from this stream =      1.863(CFS)
Time of concentration =   35.42 min.
Rainfall intensity =     0.697(In/Hr)
Summary of stream data:

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


1        7.993     38.80                  0.669
2        1.863     35.42                  0.697
Largest stream flow has longer time of concentration
Qp =      7.993 + sum of
          Qb          Ia/Ib
          1.863 *     0.960 =      1.788
Qp =      9.781

Total of 2 streams to confluence:
Flow rates before confluence point:
      7.993       1.863
Area of streams before confluence:
     56.400      13.400
Results of confluence:
Total flow rate =      9.781(CFS)
Time of concentration =    38.796 min.
Effective stream area after confluence =     69.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      120.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    967.000(Ft.)
End of natural channel elevation =    885.000(Ft.)
Length of natural channel  =  2330.000(Ft.)
```

```
Estimated mean flow rate at midpoint of channel =     11.736(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.88(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0352
Corrected/adjusted channel slope =  0.0352
Travel time =    7.95 min.     TC =   46.75  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.184
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  35.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.615(In/Hr) for a     2.0 year storm
Subarea runoff =      3.152(CFS) for     27.900(Ac.)
Total runoff =     12.933(CFS)       Total area =      97.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      120.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     97.700(Ac.)
Runoff from this stream =     12.933(CFS)
Time of concentration =   46.75 min.
Rainfall intensity =     0.615(In/Hr)
Summary of stream data:

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


1       26.779     54.57               0.574
2       12.933     46.75               0.615
Largest stream flow has longer time of concentration
Qp =     26.779 + sum of
          Qb         Ia/Ib
          12.933 *    0.933 =     12.063
Qp =     38.841

Total of 2 main streams to confluence:
Flow rates before confluence point:
      26.779      12.933
Area of streams before confluence:
      193.500       97.700


Results of confluence:
Total flow rate =     38.841(CFS)
Time of concentration =    54.574 min.
Effective stream area after confluence  =    291.200(Ac.)
End of computations, total study area =          291.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  55.0
```

APPENDIX B: HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION FOR AREA "A" (RATIONAL TABLING METHOD)

APPENDIX B.1: 100- YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
       Rational Hydrology Study        Date: 06/09/10  File:A1MD100.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "OFFSITE" FOR AREAS "A21" TO "A22"
100-YR (MASTER DRAINAGE STUDY)
FN: A1MD100
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.400(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   815.000(Ft.)
Top (of initial area) elevation =   918.000(Ft.)
Bottom (of initial area) elevation =   897.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.02577  s(percent)=       2.58
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.107 min.
Rainfall intensity =      3.270(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  39.20
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     11.317(CFS)
Total initial stream area =        4.000(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      902.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    897.000(Ft.)
End of natural channel elevation =    886.000(Ft.)
Length of natural channel  =  1670.000(Ft.)
Estimated mean flow rate at midpoint of channel =     39.326(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0066
Corrected/adjusted channel slope =  0.0066
Travel time =    9.49 min.     TC =   18.60  min.
```

```
 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.300
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  48.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.372(In/Hr) for a   100.0 year storm
Subarea runoff =     40.694(CFS) for     19.800(Ac.)
Total runoff =     52.011(CFS)       Total area =      23.800(Ac.)
End of computations, total study area =           23.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  47.2
```

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                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
       Rational Hydrology Study        Date: 07/01/10  File:AMD100.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "A" FOR AREAS "A1" TO "A20"
100-YR (MASTER DRAINAGE STUDY)
FN: AMD100
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.400(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   790.000(Ft.)
Top (of initial area) elevation =  1218.000(Ft.)
Bottom (of initial area) elevation =  1105.000(Ft.)
Difference in elevation =   113.000(Ft.)
Slope =    0.14304  s(percent)=      14.30
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.299 min.
Rainfall intensity =      3.410(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.696
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     23.725(CFS)
Total initial stream area =       10.000(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =  1105.000(Ft.)
Downstream point elevation =  1070.000(Ft.)
Channel length thru subarea  =   780.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     42.705(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     42.705(CFS)
Depth of flow =   0.628(Ft.), Average velocity =  12.947(Ft/s)
Channel flow top width =    6.511(Ft.)
Flow Velocity =   12.95(Ft/s)
Travel time  =    1.00 min.
Time of concentration =    9.30 min.
```

```
Sub-Channel No. 1 Critical depth =      1.234(Ft.)
  '     '       '     Critical flow top width =      8.938(Ft.)
  '     '       '     Critical flow velocity=    5.348(Ft/s)
  '     '       '     Critical flow area =      7.985(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.690
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.239(In/Hr) for a   100.0 year storm
Subarea runoff =     35.760(CFS) for     16.000(Ac.)
Total runoff =     59.485(CFS)       Total area =      26.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1070.000(Ft.)
Downstream point elevation =  1042.000(Ft.)
Channel length thru subarea  =   695.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     88.542(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     88.542(CFS)
Depth of flow =   0.964(Ft.), Average velocity =  15.491(Ft/s)
Channel flow top width =    7.856(Ft.)
Flow Velocity =   15.49(Ft/s)
Travel time  =    0.75 min.
Time of concentration =   10.05 min.

Sub-Channel No. 1 Critical depth =      1.828(Ft.)
  '     '       '     Critical flow top width =     11.313(Ft.)
  '     '       '     Critical flow velocity=    6.326(Ft/s)
  '     '       '     Critical flow area =     13.997(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.719
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  38.70
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.128(In/Hr) for a   100.0 year storm
Subarea runoff =     57.102(CFS) for     25.400(Ac.)
Total runoff =    116.587(CFS)       Total area =      51.400(Ac.)


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Process from Point/Station      103.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1038.000(Ft.)
Downstream point/station elevation =  1037.500(Ft.)
Pipe length  =    70.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   116.587(CFS)
Nearest computed pipe diameter  =     51.00(In.)
Calculated individual pipe flow  =   116.587(CFS)
Normal flow depth in pipe =   39.38(In.)
Flow top width inside pipe =   42.79(In.)
Critical Depth =   38.69(In.)
Pipe flow velocity =      9.91(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    10.17 min.


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Process from Point/Station      103.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
```

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Stream flow area =     51.400(Ac.)
Runoff from this stream =    116.587(CFS)
Time of concentration =   10.17 min.
Rainfall intensity =     3.112(In/Hr)


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Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   780.000(Ft.)
Top (of initial area) elevation =  1115.000(Ft.)
Bottom (of initial area) elevation =  1075.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.05128  s(percent)=       5.13
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.137 min.
Rainfall intensity =      3.116(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.686
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     20.086(CFS)
Total initial stream area =        9.400(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      201.000 to Point/Station      202.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1075.000(Ft.)
Downstream point elevation =  1047.000(Ft.)
Channel length thru subarea  =   690.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     32.800(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     32.800(CFS)
Depth of flow =   0.557(Ft.), Average velocity =  11.521(Ft/s)
Channel flow top width =    6.227(Ft.)
Flow Velocity =   11.52(Ft/s)
Travel time  =    1.00 min.
Time of concentration =   11.14 min.

Sub-Channel No. 1 Critical depth =      1.063(Ft.)
  '     '       '     Critical flow top width =      8.250(Ft.)
  '     '       '     Critical flow velocity=    5.040(Ft/s)
  '     '       '     Critical flow area =      6.508(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.747
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.987(In/Hr) for a   100.0 year storm
Subarea runoff =     26.543(CFS) for     11.900(Ac.)
Total runoff =     46.630(CFS)       Total area =      21.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1042.000(Ft.)
Downstream point/station elevation =  1037.500(Ft.)
Pipe length  =   420.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    46.630(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    46.630(CFS)
Normal flow depth in pipe =   26.53(In.)
```

```
Flow top width inside pipe =   26.20(In.)
Critical Depth =   27.10(In.)
Pipe flow velocity =      9.11(Ft/s)
Travel time through pipe =    0.77 min.
Time of concentration (TC) =    11.90 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     21.300(Ac.)
Runoff from this stream =     46.630(CFS)
Time of concentration =   11.90 min.
Rainfall intensity =     2.899(In/Hr)
Summary of stream data:

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


1       116.587     10.17                  3.112
2        46.630     11.90                  2.899
Largest stream flow has longer or shorter time of concentration
Qp =    116.587 + sum of
          Qa          Tb/Ta
          46.630 *    0.854 =     39.832
Qp =    156.419

Total of 2 streams to confluence:
Flow rates before confluence point:
     116.587      46.630
Area of streams before confluence:
       51.400       21.300
Results of confluence:
Total flow rate =    156.419(CFS)
Time of concentration =    10.169 min.
Effective stream area after confluence =     72.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1037.500(Ft.)
Downstream point/station elevation =  1037.000(Ft.)
Pipe length =    40.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow =   156.419(CFS)
Nearest computed pipe diameter =     51.00(In.)
Calculated individual pipe flow =   156.419(CFS)
Normal flow depth in pipe =   39.94(In.)
Flow top width inside pipe =   42.04(In.)
Critical Depth =   44.07(In.)
Pipe flow velocity =     13.13(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    10.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =  1037.000(Ft.)
Downstream point elevation =   990.000(Ft.)
Channel length thru subarea =  1480.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    168.898(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =    168.898(CFS)
Depth of flow =   1.518(Ft.), Average velocity =  17.723(Ft/s)
Channel flow top width =    8.554(Ft.)
Flow Velocity =   17.72(Ft/s)
Travel time  =    1.39 min.
Time of concentration =   11.61 min.

Sub-Channel No. 1 Critical depth =      2.719(Ft.)
  '      '        '     Critical flow top width =     12.156(Ft.)
```

```
'     '       '     Critical flow velocity=    7.690(Ft/s)
'     '       '     Critical flow area =     21.962(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.722
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  41.10
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =     2.932(In/Hr) for a   100.0 year storm
Subarea runoff =     24.567(CFS) for     11.600(Ac.)
Total runoff =    180.986(CFS)       Total area =      84.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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: 1
Stream flow area =     84.300(Ac.)
Runoff from this stream =    180.986(CFS)
Time of concentration =   11.61 min.
Rainfall intensity =     2.932(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   660.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =  1025.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.05303  s(percent)=       5.30
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.935 min.
Rainfall intensity =      3.298(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.754
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     19.658(CFS)
Total initial stream area =        7.900(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      401.000 to Point/Station      402.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1025.000(Ft.)
Downstream point elevation =  1001.000(Ft.)
Channel length thru subarea  =   770.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     30.732(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     30.732(CFS)
Depth of flow =   0.578(Ft.), Average velocity =  10.310(Ft/s)
Channel flow top width =    6.312(Ft.)
Flow Velocity =   10.31(Ft/s)
Travel time  =    1.24 min.
Time of concentration =   10.18 min.

Sub-Channel No. 1 Critical depth =      1.023(Ft.)
'     '       '     Critical flow top width =      8.094(Ft.)
'     '       '     Critical flow velocity=    4.966(Ft/s)
'     '       '     Critical flow area =      6.189(Sq.Ft)

 Adding area flow to channel
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```
USER INPUT of soil data for subarea
Runoff Coefficient = 0.589
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  44.00
Pervious area fraction =  0.980; Impervious fraction =  0.020
Rainfall intensity =      3.110(In/Hr) for a   100.0 year storm
Subarea runoff =     16.295(CFS) for      8.900(Ac.)
Total runoff =     35.954(CFS)       Total area =      16.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   996.000(Ft.)
Downstream point/station elevation =   994.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    35.954(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    35.954(CFS)
Normal flow depth in pipe =   27.05(In.)
Flow top width inside pipe =   25.38(In.)
Critical Depth =   23.95(In.)
Pipe flow velocity =      6.90(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    10.97 min.


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Process from Point/Station      402.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.800(Ac.)
Runoff from this stream =     35.954(CFS)
Time of concentration =   10.97 min.
Rainfall intensity =     3.008(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.000(Ft.)
Bottom (of initial area) elevation =  1005.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.04000  s(percent)=       4.00
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.767 min.
Rainfall intensity =      2.914(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.678
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     10.079(CFS)
Total initial stream area =        5.100(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      601.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1000.000(Ft.)
Downstream point/station elevation =   994.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    10.079(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    10.079(CFS)
Normal flow depth in pipe =    8.11(In.)
Flow top width inside pipe =   14.95(In.)
Critical Depth =   14.23(In.)
Pipe flow velocity =     14.89(Ft/s)
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Travel time through pipe =    0.07 min.
Time of concentration (TC) =    11.83 min.


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Process from Point/Station      601.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      5.100(Ac.)
Runoff from this stream =     10.079(CFS)
Time of concentration =   11.83 min.
Rainfall intensity =     2.907(In/Hr)
Summary of stream data:

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


1        35.954      10.97                  3.008
2        10.079      11.83                  2.907
Largest stream flow has longer or shorter time of concentration
Qp =     35.954 + sum of
          Qa          Tb/Ta
          10.079 *    0.927 =      9.339
Qp =     45.292

Total of 2 streams to confluence:
Flow rates before confluence point:
      35.954      10.079
Area of streams before confluence:
      16.800       5.100
Results of confluence:
Total flow rate =     45.292(CFS)
Time of concentration =    10.965 min.
Effective stream area after confluence =     21.900(Ac.)


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Process from Point/Station      403.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
--------------------------------------------------------------------------------
Upstream point/station elevation =    994.000(Ft.)
Downstream point/station elevation =    992.000(Ft.)
Pipe length  =    305.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     45.292(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =     45.292(CFS)
Normal flow depth in pipe =    28.50(In.)
Flow top width inside pipe =    29.24(In.)
Critical Depth =    26.30(In.)
Pipe flow velocity =       7.54(Ft/s)
Travel time through pipe =     0.67 min.
Time of concentration (TC) =     11.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.900(Ac.)
Runoff from this stream =     45.292(CFS)
Time of concentration =   11.64 min.
Rainfall intensity =     2.928(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1044.000(Ft.)
Bottom (of initial area) elevation =   997.000(Ft.)
Difference in elevation =    47.000(Ft.)
Slope =    0.04700  s(percent)=       4.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.393 min.
Rainfall intensity =      2.957(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.680
```

```
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     14.070(CFS)
Total initial stream area =        7.000(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   993.000(Ft.)
Downstream point/station elevation =   992.000(Ft.)
Pipe length  =    50.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    14.070(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    14.070(CFS)
Normal flow depth in pipe =   13.24(In.)
Flow top width inside pipe =   20.27(In.)
Critical Depth =   16.72(In.)
Pipe flow velocity =      8.80(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    11.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      404.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.000(Ac.)
Runoff from this stream =     14.070(CFS)
Time of concentration =   11.49 min.
Rainfall intensity =     2.946(In/Hr)
Summary of stream data:

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


1       45.292     11.64                  2.928
2       14.070     11.49                  2.946
Largest stream flow has longer time of concentration
Qp =     45.292 + sum of
          Qb         Ia/Ib
          14.070 *    0.994 =     13.987
Qp =     59.280

Total of 2 streams to confluence:
Flow rates before confluence point:
      45.292      14.070
Area of streams before confluence:
       21.900        7.000
Results of confluence:
Total flow rate =     59.280(CFS)
Time of concentration =    11.639 min.
Effective stream area after confluence =     28.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   992.000(Ft.)
Downstream point/station elevation =   990.000(Ft.)
Pipe length  =   465.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    59.280(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    59.280(CFS)
Normal flow depth in pipe =   36.00(In.)
Flow top width inside pipe =   29.39(In.)
Critical Depth =   28.94(In.)
Pipe flow velocity =      6.75(Ft/s)
Travel time through pipe =    1.15 min.
Time of concentration (TC) =    12.79 min.
```

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Process from Point/Station      404.000 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 =     28.900(Ac.)
Runoff from this stream =     59.280(CFS)
Time of concentration =   12.79 min.
Rainfall intensity =     2.807(In/Hr)
Summary of stream data:

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


1       180.986      11.61                2.932
2        59.280      12.79                2.807
Largest stream flow has longer or shorter time of concentration
Qp =    180.986 + sum of
          Qa           Tb/Ta
          59.280 *     0.908 =      53.831
Qp =    234.817

Total of 2 main streams to confluence:
Flow rates before confluence point:
     180.986      59.280
Area of streams before confluence:
       84.300       28.900


Results of confluence:
Total flow rate =     234.817(CFS)
Time of concentration =    11.611 min.
Effective stream area after confluence  =     113.200(Ac.)


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Process from Point/Station      105.000 to Point/Station      106.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   990.000(Ft.)
Downstream point elevation =   950.000(Ft.)
Channel length thru subarea  =  1160.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =     248.715(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.500(Ft.)
Flow(q) thru subarea =    248.715(CFS)
Depth of flow =   1.820(Ft.), Average velocity =  20.306(Ft/s)
Channel flow top width =    9.460(Ft.)
Flow Velocity =   20.31(Ft/s)
Travel time  =    0.95 min.
Time of concentration =   12.56 min.

Sub-Channel No. 1 Critical depth =      3.344(Ft.)
  '      '        '     Critical flow top width =     14.031(Ft.)
  '      '        '     Critical flow velocity=    8.250(Ft/s)
  '      '        '     Critical flow area =     30.146(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.708
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  38.70
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.829(In/Hr) for a   100.0 year storm
Subarea runoff =     26.831(CFS) for     13.400(Ac.)
Total runoff =    261.648(CFS)       Total area =     126.600(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   950.000(Ft.)
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Downstream point elevation =   925.000(Ft.)
Channel length thru subarea  =  1085.000(Ft.)
Channel base width     =    6.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    269.605(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.500(Ft.)
Flow(q) thru subarea =    269.605(CFS)
Depth of flow =   1.785(Ft.), Average velocity =  17.407(Ft/s)
Channel flow top width =   11.355(Ft.)
Flow Velocity =   17.41(Ft/s)
Travel time  =    1.04 min.
Time of concentration =   13.60 min.

Sub-Channel No. 1 Critical depth =      3.063(Ft.)
  '       '       '     Critical flow top width =     15.188(Ft.)
  '       '       '     Critical flow velocity=    8.310(Ft/s)
  '       '       '     Critical flow area =     32.443(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.740
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.730(In/Hr) for a   100.0 year storm
Subarea runoff =     15.547(CFS) for      7.700(Ac.)
Total runoff =    277.195(CFS)       Total area =     134.300(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    134.300(Ac.)
Runoff from this stream =    277.195(CFS)
Time of concentration =   13.60 min.
Rainfall intensity =     2.730(In/Hr)


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Process from Point/Station      800.000 to Point/Station      801.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   945.000(Ft.)
Top (of initial area) elevation =   995.000(Ft.)
Bottom (of initial area) elevation =   960.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.03704  s(percent)=       3.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.682 min.
Rainfall intensity =      2.924(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.773
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     10.391(CFS)
Total initial stream area =        4.600(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      801.000 to Point/Station      107.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   960.000(Ft.)
Downstream point elevation =   925.000(Ft.)
Channel length thru subarea  =  1330.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     23.379(CFS)
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Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     23.379(CFS)
Depth of flow =   0.819(Ft.), Average velocity =   7.853(Ft/s)
Channel flow top width =    5.274(Ft.)
Flow Velocity =    7.85(Ft/s)
Travel time  =    2.82 min.
Time of concentration =   14.50 min.

Sub-Channel No. 1 Critical depth =      1.125(Ft.)
  '      '       '     Critical flow top width =      6.500(Ft.)
  '      '       '     Critical flow velocity=    4.890(Ft/s)
  '      '       '     Critical flow area =      4.781(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.791
Decimal fraction soil group A = 0.300
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  48.80
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.652(In/Hr) for a   100.0 year storm
Subarea runoff =     24.133(CFS) for     11.500(Ac.)
Total runoff =     34.524(CFS)       Total area =      16.100(Ac.)


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Process from Point/Station      801.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     16.100(Ac.)
Runoff from this stream =      34.524(CFS)
Time of concentration =   14.50 min.
Rainfall intensity =     2.652(In/Hr)
Summary of stream data:

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


1      277.195     13.60                  2.730
2       34.524     14.50                  2.652
Largest stream flow has longer or shorter time of concentration
Qp =    277.195 + sum of
          Qa          Tb/Ta
          34.524 *    0.938 =     32.376
Qp =    309.571

Total of 2 streams to confluence:
Flow rates before confluence point:
     277.195      34.524
Area of streams before confluence:
      134.300       16.100
Results of confluence:
Total flow rate =    309.571(CFS)
Time of concentration =    13.602 min.
Effective stream area after confluence =    150.400(Ac.)


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Process from Point/Station      107.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   920.000(Ft.)
Downstream point/station elevation =   919.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   309.571(CFS)
Nearest computed pipe diameter  =     69.00(In.)
Calculated individual pipe flow  =   309.571(CFS)
Normal flow depth in pipe =   54.66(In.)
Flow top width inside pipe =   56.00(In.)
Critical Depth =   57.90(In.)
Pipe flow velocity =     14.03(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    13.73 min.


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Process from Point/Station      107.000 to Point/Station      504.000
**** CONFLUENCE OF MAIN STREAMS ****
--------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    150.400(Ac.)
Runoff from this stream =    309.571(CFS)
Time of concentration =   13.73 min.
Rainfall intensity =    2.719(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------------
Initial area flow distance =   790.000(Ft.)
Top (of initial area) elevation =  1016.000(Ft.)
Bottom (of initial area) elevation =   978.000(Ft.)
Difference in elevation =    38.000(Ft.)
Slope =    0.04810  s(percent)=       4.81
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.939 min.
Rainfall intensity =      3.479(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  34.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     28.187(CFS)
Total initial stream area =        9.400(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      501.000 to Point/Station      502.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------------
Upstream point elevation =   978.000(Ft.)
Downstream point elevation =   942.000(Ft.)
Channel length thru subarea  =   990.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     46.928(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     46.928(CFS)
Depth of flow =   1.067(Ft.), Average velocity =  10.645(Ft/s)
Channel flow top width =    6.267(Ft.)
Flow Velocity =   10.64(Ft/s)
Travel time  =    1.55 min.
Time of concentration =    9.49 min.

Sub-Channel No. 1 Critical depth =      1.594(Ft.)
  '     '       '     Critical flow top width =      8.375(Ft.)
  '     '       '     Critical flow velocity=    5.676(Ft/s)
  '     '       '     Critical flow area =      8.268(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.858
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      3.210(In/Hr) for a   100.0 year storm
Subarea runoff =     34.423(CFS) for     12.500(Ac.)
Total runoff =     62.610(CFS)       Total area =      21.900(Ac.)


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Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
--------------------------------------------------------------------------------
Upstream point/station elevation =   937.000(Ft.)
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Downstream point/station elevation =   932.000(Ft.)
Pipe length  =   745.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    62.610(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    62.610(CFS)
Normal flow depth in pipe =   30.47(In.)
Flow top width inside pipe =   37.49(In.)
Critical Depth =   29.76(In.)
Pipe flow velocity =      8.37(Ft/s)
Travel time through pipe =    1.48 min.
Time of concentration (TC) =    10.97 min.


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Process from Point/Station      502.000 to Point/Station      503.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.900(Ac.)
Runoff from this stream =     62.610(CFS)
Time of concentration =   10.97 min.
Rainfall intensity =     3.007(In/Hr)


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Process from Point/Station      700.000 to Point/Station      701.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   695.000(Ft.)
Top (of initial area) elevation =  1000.000(Ft.)
Bottom (of initial area) elevation =   965.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.05036  s(percent)=       5.04
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.715 min.
Rainfall intensity =      3.176(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.780
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     23.044(CFS)
Total initial stream area =        9.300(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      701.000 to Point/Station      702.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   965.000(Ft.)
Downstream point elevation =   938.000(Ft.)
Channel length thru subarea  =  1095.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     43.610(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     43.610(CFS)
Depth of flow =   1.131(Ft.), Average velocity =   9.048(Ft/s)
Channel flow top width =    6.524(Ft.)
Flow Velocity =    9.05(Ft/s)
Travel time  =    2.02 min.
Time of concentration =   11.73 min.

Sub-Channel No. 1 Critical depth =      1.547(Ft.)
  '     '       '     Critical flow top width =      8.188(Ft.)
  '     '       '     Critical flow velocity=    5.535(Ft/s)
  '     '       '     Critical flow area =      7.879(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.200
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 2)  =  51.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =     2.918(In/Hr) for a   100.0 year storm
Subarea runoff =     38.965(CFS) for     16.600(Ac.)
Total runoff =     62.009(CFS)        Total area =      25.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   933.000(Ft.)
Downstream point/station elevation =   932.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    62.009(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    62.009(CFS)
Normal flow depth in pipe =   28.59(In.)
Flow top width inside pipe =   34.50(In.)
Critical Depth =   30.13(In.)
Pipe flow velocity =      9.51(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    11.92 min.


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Process from Point/Station      702.000 to Point/Station      503.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     25.900(Ac.)
Runoff from this stream =     62.009(CFS)
Time of concentration =   11.92 min.
Rainfall intensity =     2.898(In/Hr)
Summary of stream data:

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


1       62.610     10.97                  3.007
2       62.009     11.92                  2.898
Largest stream flow has longer or shorter time of concentration
Qp =     62.610 + sum of
          Qa          Tb/Ta
          62.009 *    0.921 =     57.095
Qp =    119.705

Total of 2 streams to confluence:
Flow rates before confluence point:
      62.610      62.009
Area of streams before confluence:
       21.900       25.900
Results of confluence:
Total flow rate =    119.705(CFS)
Time of concentration =    10.972 min.
Effective stream area after confluence =     47.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   932.000(Ft.)
Downstream point/station elevation =   919.000(Ft.)
Pipe length  =   975.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   119.705(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   119.705(CFS)
Normal flow depth in pipe =   36.47(In.)
Flow top width inside pipe =   35.28(In.)
Critical Depth =   39.55(In.)
Pipe flow velocity =     12.49(Ft/s)
Travel time through pipe =    1.30 min.
Time of concentration (TC) =    12.27 min.


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Process from Point/Station      503.000 to Point/Station      504.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
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The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     47.800(Ac.)
Runoff from this stream =    119.705(CFS)
Time of concentration =   12.27 min.
Rainfall intensity =     2.859(In/Hr)
Summary of stream data:

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


1       309.571      13.73                2.719
2       119.705      12.27                2.859
Largest stream flow has longer time of concentration
Qp =    309.571 + sum of
          Qb          Ia/Ib
         119.705 *     0.951 =     113.823
Qp =    423.394

Total of 2 main streams to confluence:
Flow rates before confluence point:
     309.571      119.705
Area of streams before confluence:
      150.400       47.800


Results of confluence:
Total flow rate =     423.394(CFS)
Time of concentration =     13.727 min.
Effective stream area after confluence  =     198.200(Ac.)


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Process from Point/Station      504.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =    919.000(Ft.)
Downstream point/station elevation =    918.000(Ft.)
Pipe length  =     55.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    423.394(CFS)
Nearest computed pipe diameter  =     69.00(In.)
Calculated individual pipe flow  =    423.394(CFS)
Normal flow depth in pipe =    54.09(In.)
Flow top width inside pipe =    56.79(In.)
Critical Depth =    64.36(In.)
Pipe flow velocity =     19.37(Ft/s)
Travel time through pipe =     0.05 min.
Time of concentration (TC) =     13.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------
Upstream point elevation =    918.000(Ft.)
Downstream point elevation =    904.000(Ft.)
Channel length thru subarea  =   1445.000(Ft.)
Channel base width     =     6.000(Ft.)
Slope or 'Z' of left channel bank =    1.500
Slope or 'Z' of right channel bank =    1.500
Estimated mean flow rate at midpoint of channel =     442.406(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =     4.500(Ft.)
Flow(q) thru subarea =     442.406(CFS)
Depth of flow =    2.919(Ft.), Average velocity =  14.606(Ft/s)
Channel flow top width =    14.756(Ft.)
Flow Velocity =    14.61(Ft/s)
Travel time  =     1.65 min.
Time of concentration =    15.42 min.

Sub-Channel No. 1 Critical depth =      4.000(Ft.)
  '     '       '     Critical flow top width =     18.000(Ft.)
  '     '       '     Critical flow velocity=     9.217(Ft/s)
  '     '       '     Critical flow area =     48.000(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.600
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  46.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.580(In/Hr) for a   100.0 year storm
Subarea runoff =     39.787(CFS) for     17.800(Ac.)
Total runoff =    463.181(CFS)       Total area =     216.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   904.000(Ft.)
Downstream point elevation =   895.000(Ft.)
Channel length thru subarea  =   945.000(Ft.)
Channel base width     =    6.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    486.876(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.500(Ft.)
Flow(q) thru subarea =    486.876(CFS)
Depth of flow =   3.079(Ft.), Average velocity =  14.892(Ft/s)
Channel flow top width =   15.237(Ft.)
Flow Velocity =   14.89(Ft/s)
Travel time  =    1.06 min.
Time of concentration =   16.48 min.

Sub-Channel No. 1 Critical depth =      4.188(Ft.)
  '      '        '     Critical flow top width =     18.563(Ft.)
  '      '        '     Critical flow velocity=    9.467(Ft/s)
  '      '        '     Critical flow area =     51.428(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  34.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.504(In/Hr) for a   100.0 year storm
Subarea runoff =     47.298(CFS) for     22.100(Ac.)
Total runoff =    510.479(CFS)       Total area =     238.100(Ac.)
End of computations, total study area =          238.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.379
Area averaged RI index number =  38.8
```

APPENDIX B.2: 10- YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
       Rational Hydrology Study        Date: 06/09/10  File:A1MD10.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "OFFSITE" FOR AREAS "A21" TO "A22"
10-YR (MASTER DRAINAGE STUDY)
FN: A1MD10
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.900(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   815.000(Ft.)
Top (of initial area) elevation =   918.000(Ft.)
Bottom (of initial area) elevation =   897.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.02577  s(percent)=       2.58
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.107 min.
Rainfall intensity =      2.102(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  39.20
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.190(CFS)
Total initial stream area =        4.000(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      902.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    897.000(Ft.)
End of natural channel elevation =    886.000(Ft.)
Length of natural channel  =  1670.000(Ft.)
Estimated mean flow rate at midpoint of channel =     24.987(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.58(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0066
Corrected/adjusted channel slope =  0.0066
Travel time =   10.77 min.     TC =   19.88  min.
```

```
 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.300
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  48.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.479(In/Hr) for a    10.0 year storm
Subarea runoff =     25.076(CFS) for     19.800(Ac.)
Total runoff =     32.266(CFS)       Total area =      23.800(Ac.)
End of computations, total study area =          23.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  47.2
```

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
       Rational Hydrology Study        Date: 07/01/10  File:AMD10.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "A" FOR AREAS "A1" TO "A20"
10-YR (MASTER DRAINAGE STUDY)
FN: AMD10
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.900(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   790.000(Ft.)
Top (of initial area) elevation =  1218.000(Ft.)
Bottom (of initial area) elevation =  1105.000(Ft.)
Difference in elevation =   113.000(Ft.)
Slope =    0.14304  s(percent)=      14.30
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.299 min.
Rainfall intensity =      2.191(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.646
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     14.161(CFS)
Total initial stream area =       10.000(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1105.000(Ft.)
Downstream point elevation =  1070.000(Ft.)
Channel length thru subarea  =   780.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     25.490(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     25.490(CFS)
Depth of flow =   0.469(Ft.), Average velocity =  11.006(Ft/s)
Channel flow top width =    5.876(Ft.)
Flow Velocity =   11.01(Ft/s)
Travel time  =    1.18 min.
Time of concentration =    9.48 min.
```

```
Sub-Channel No. 1 Critical depth =      0.922(Ft.)
  '     '       '     Critical flow top width =      7.688(Ft.)
  '     '       '     Critical flow velocity=    4.732(Ft/s)
  '     '       '     Critical flow area =      5.387(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.640
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.064(In/Hr) for a    10.0 year storm
Subarea runoff =     21.123(CFS) for     16.000(Ac.)
Total runoff =     35.285(CFS)       Total area =      26.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1070.000(Ft.)
Downstream point elevation =  1042.000(Ft.)
Channel length thru subarea  =   695.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     52.520(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     52.520(CFS)
Depth of flow =   0.725(Ft.), Average velocity =  13.281(Ft/s)
Channel flow top width =    6.902(Ft.)
Flow Velocity =   13.28(Ft/s)
Travel time  =    0.87 min.
Time of concentration =   10.35 min.

Sub-Channel No. 1 Critical depth =      1.375(Ft.)
  '     '       '     Critical flow top width =      9.500(Ft.)
  '     '       '     Critical flow velocity=    5.659(Ft/s)
  '     '       '     Critical flow area =      9.281(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.668
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  38.70
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.984(In/Hr) for a    10.0 year storm
Subarea runoff =     33.657(CFS) for     25.400(Ac.)
Total runoff =     68.942(CFS)       Total area =      51.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1038.000(Ft.)
Downstream point/station elevation =  1037.500(Ft.)
Pipe length  =    70.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    68.942(CFS)
Nearest computed pipe diameter  =    42.00(In.)
Calculated individual pipe flow  =    68.942(CFS)
Normal flow depth in pipe =   32.20(In.)
Flow top width inside pipe =   35.52(In.)
Critical Depth =   31.20(In.)
Pipe flow velocity =      8.70(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    10.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
```

```
Stream flow area =     51.400(Ac.)
Runoff from this stream =     68.942(CFS)
Time of concentration =   10.49 min.
Rainfall intensity =     1.972(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   780.000(Ft.)
Top (of initial area) elevation =  1115.000(Ft.)
Bottom (of initial area) elevation =  1075.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.05128  s(percent)=       5.13
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.137 min.
Rainfall intensity =      2.003(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.636
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     11.979(CFS)
Total initial stream area =        9.400(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1075.000(Ft.)
Downstream point elevation =  1047.000(Ft.)
Channel length thru subarea  =   690.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     19.562(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     19.562(CFS)
Depth of flow =   0.415(Ft.), Average velocity =   9.763(Ft/s)
Channel flow top width =    5.659(Ft.)
Flow Velocity =    9.76(Ft/s)
Travel time  =    1.18 min.
Time of concentration =   11.31 min.

Sub-Channel No. 1 Critical depth =      0.789(Ft.)
  '     '       '     Critical flow top width =      7.156(Ft.)
  '     '       '     Critical flow velocity=    4.444(Ft/s)
  '     '       '     Critical flow area =      4.401(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.712
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.906(In/Hr) for a    10.0 year storm
Subarea runoff =     16.142(CFS) for     11.900(Ac.)
Total runoff =     28.121(CFS)       Total area =      21.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1042.000(Ft.)
Downstream point/station elevation =  1037.500(Ft.)
Pipe length  =   420.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    28.121(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    28.121(CFS)
Normal flow depth in pipe =   22.45(In.)
```

```
Flow top width inside pipe =   20.21(In.)
Critical Depth =   22.13(In.)
Pipe flow velocity =      7.96(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    12.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     21.300(Ac.)
Runoff from this stream =     28.121(CFS)
Time of concentration =   12.19 min.
Rainfall intensity =     1.843(In/Hr)
Summary of stream data:

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


1       68.942     10.49                  1.972
2       28.121     12.19                  1.843
Largest stream flow has longer or shorter time of concentration
Qp =     68.942 + sum of
          Qa          Tb/Ta
          28.121 *    0.860 =     24.183
Qp =     93.125

Total of 2 streams to confluence:
Flow rates before confluence point:
      68.942      28.121
Area of streams before confluence:
       51.400       21.300
Results of confluence:
Total flow rate =     93.125(CFS)
Time of concentration =    10.486 min.
Effective stream area after confluence =     72.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1037.500(Ft.)
Downstream point/station elevation =  1037.000(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    93.125(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    93.125(CFS)
Normal flow depth in pipe =   32.86(In.)
Flow top width inside pipe =   34.66(In.)
Critical Depth =   35.80(In.)
Pipe flow velocity =     11.54(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    10.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =  1037.000(Ft.)
Downstream point elevation =   990.000(Ft.)
Channel length thru subarea  =  1480.000(Ft.)
Channel base width    =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    100.554(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =    100.554(CFS)
Depth of flow =   1.148(Ft.), Average velocity =  15.305(Ft/s)
Channel flow top width =    7.445(Ft.)
Flow Velocity =   15.30(Ft/s)
Travel time  =    1.61 min.
Time of concentration =   12.16 min.

Sub-Channel No. 1 Critical depth =      2.078(Ft.)
                  Critical flow top width =     10.234(Ft.)
```

```
'     '       '     Critical flow velocity=    6.799(Ft/s)
'     '       '     Critical flow area =     14.790(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.671
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  41.10
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =     1.845(In/Hr) for a    10.0 year storm
Subarea runoff =     14.366(CFS) for     11.600(Ac.)
Total runoff =    107.491(CFS)       Total area =      84.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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: 1
Stream flow area =     84.300(Ac.)
Runoff from this stream =    107.491(CFS)
Time of concentration =   12.16 min.
Rainfall intensity =     1.845(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   660.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =  1025.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.05303  s(percent)=       5.30
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.935 min.
Rainfall intensity =      2.120(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.720
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     12.053(CFS)
Total initial stream area =        7.900(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1025.000(Ft.)
Downstream point elevation =  1001.000(Ft.)
Channel length thru subarea  =   770.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     18.843(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     18.843(CFS)
Depth of flow =   0.438(Ft.), Average velocity =   8.824(Ft/s)
Channel flow top width =    5.752(Ft.)
Flow Velocity =    8.82(Ft/s)
Travel time  =    1.45 min.
Time of concentration =   10.39 min.

Sub-Channel No. 1 Critical depth =      0.773(Ft.)
'     '       '     Critical flow top width =      7.094(Ft.)
'     '       '     Critical flow velocity=    4.392(Ft/s)
'     '       '     Critical flow area =     4.290(Sq.Ft)

 Adding area flow to channel
```

```
USER INPUT of soil data for subarea
Runoff Coefficient = 0.493
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  44.00
Pervious area fraction =  0.980; Impervious fraction =  0.020
Rainfall intensity =      1.981(In/Hr) for a    10.0 year storm
Subarea runoff =      8.690(CFS) for      8.900(Ac.)
Total runoff =     20.744(CFS)       Total area =      16.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   996.000(Ft.)
Downstream point/station elevation =   994.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    20.744(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    20.744(CFS)
Normal flow depth in pipe =   21.80(In.)
Flow top width inside pipe =   21.30(In.)
Critical Depth =   19.13(In.)
Pipe flow velocity =      6.04(Ft/s)
Travel time through pipe =    0.90 min.
Time of concentration (TC) =    11.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.800(Ac.)
Runoff from this stream =     20.744(CFS)
Time of concentration =   11.29 min.
Rainfall intensity =     1.908(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.000(Ft.)
Bottom (of initial area) elevation =  1005.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.04000  s(percent)=       4.00
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.767 min.
Rainfall intensity =      1.873(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.629
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      6.008(CFS)
Total initial stream area =        5.100(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1000.000(Ft.)
Downstream point/station elevation =   994.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     6.008(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.008(CFS)
Normal flow depth in pipe =    6.81(In.)
Flow top width inside pipe =   11.89(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.07(Ft/s)
```

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Travel time through pipe =    0.08 min.
Time of concentration (TC) =    11.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      5.100(Ac.)
Runoff from this stream =      6.008(CFS)
Time of concentration =   11.84 min.
Rainfall intensity =    1.867(In/Hr)
Summary of stream data:

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


1        20.744      11.29                  1.908
2         6.008      11.84                  1.867
Largest stream flow has longer or shorter time of concentration
Qp =     20.744 + sum of
          Qa           Tb/Ta
           6.008 *     0.953 =       5.726
Qp =     26.470

Total of 2 streams to confluence:
Flow rates before confluence point:
      20.744       6.008
Area of streams before confluence:
       16.800       5.100
Results of confluence:
Total flow rate =      26.470(CFS)
Time of concentration =    11.287 min.
Effective stream area after confluence =      21.900(Ac.)


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Process from Point/Station      403.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =    994.000(Ft.)
Downstream point/station elevation =    992.000(Ft.)
Pipe length  =    305.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     26.470(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =     26.470(CFS)
Normal flow depth in pipe =    22.66(In.)
Flow top width inside pipe =    25.79(In.)
Critical Depth =    21.05(In.)
Pipe flow velocity =       6.65(Ft/s)
Travel time through pipe =     0.76 min.
Time of concentration (TC) =     12.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      21.900(Ac.)
Runoff from this stream =      26.470(CFS)
Time of concentration =   12.05 min.
Rainfall intensity =     1.853(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1044.000(Ft.)
Bottom (of initial area) elevation =   997.000(Ft.)
Difference in elevation =    47.000(Ft.)
Slope =    0.04700  s(percent)=       4.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.393 min.
Rainfall intensity =      1.900(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.631
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```
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      8.388(CFS)
Total initial stream area =        7.000(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   993.000(Ft.)
Downstream point/station elevation =   992.000(Ft.)
Pipe length  =    50.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     8.388(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.388(CFS)
Normal flow depth in pipe =   10.58(In.)
Flow top width inside pipe =   17.72(In.)
Critical Depth =   13.46(In.)
Pipe flow velocity =      7.76(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    11.50 min.


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Process from Point/Station      301.000 to Point/Station      404.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.000(Ac.)
Runoff from this stream =      8.388(CFS)
Time of concentration =   11.50 min.
Rainfall intensity =     1.892(In/Hr)
Summary of stream data:

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


1        26.470     12.05                  1.853
2         8.388     11.50                  1.892
Largest stream flow has longer time of concentration
Qp =     26.470 + sum of
          Qb          Ia/Ib
           8.388 *    0.979 =      8.213
Qp =     34.683

Total of 2 streams to confluence:
Flow rates before confluence point:
      26.470       8.388
Area of streams before confluence:
       21.900       7.000
Results of confluence:
Total flow rate =     34.683(CFS)
Time of concentration =    12.051 min.
Effective stream area after confluence =     28.900(Ac.)


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Process from Point/Station      404.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   992.000(Ft.)
Downstream point/station elevation =   990.000(Ft.)
Pipe length  =   465.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    34.683(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    34.683(CFS)
Normal flow depth in pipe =   27.09(In.)
Flow top width inside pipe =   31.07(In.)
Critical Depth =   22.98(In.)
Pipe flow velocity =      6.08(Ft/s)
Travel time through pipe =    1.27 min.
Time of concentration (TC) =    13.33 min.
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Process from Point/Station      404.000 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 =      28.900(Ac.)
Runoff from this stream =      34.683(CFS)
Time of concentration =    13.33 min.
Rainfall intensity =      1.771(In/Hr)
Summary of stream data:

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


1       107.491      12.16                1.845
2        34.683      13.33                1.771
Largest stream flow has longer or shorter time of concentration
Qp =     107.491 + sum of
           Qa           Tb/Ta
           34.683 *     0.912 =      31.639
Qp =     139.130

Total of 2 main streams to confluence:
Flow rates before confluence point:
      107.491       34.683
Area of streams before confluence:
       84.300        28.900


Results of confluence:
Total flow rate =     139.130(CFS)
Time of concentration =     12.156 min.
Effective stream area after confluence  =     113.200(Ac.)


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Process from Point/Station      105.000 to Point/Station      106.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =    990.000(Ft.)
Downstream point elevation =    950.000(Ft.)
Channel length thru subarea  =   1160.000(Ft.)
Channel base width     =     4.000(Ft.)
Slope or 'Z' of left channel bank =    1.500
Slope or 'Z' of right channel bank =    1.500
Estimated mean flow rate at midpoint of channel =     147.365(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =     3.500(Ft.)
Flow(q) thru subarea =     147.365(CFS)
Depth of flow =    1.381(Ft.), Average velocity =   17.575(Ft/s)
Channel flow top width =     8.143(Ft.)
Flow Velocity =    17.58(Ft/s)
Travel time  =     1.10 min.
Time of concentration =    13.26 min.

Sub-Channel No. 1 Critical depth =       2.531(Ft.)
  '     '       '     Critical flow top width =      11.594(Ft.)
  '     '       '     Critical flow velocity=     7.467(Ft/s)
  '     '       '     Critical flow area =      19.736(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.655
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  38.70
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.775(In/Hr) for a    10.0 year storm
Subarea runoff =      15.590(CFS) for      13.400(Ac.)
Total runoff =     154.720(CFS)        Total area =      126.600(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =    950.000(Ft.)
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Downstream point elevation =   925.000(Ft.)
Channel length thru subarea  =  1085.000(Ft.)
Channel base width     =    6.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    159.426(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.500(Ft.)
Flow(q) thru subarea =    159.426(CFS)
Depth of flow =   1.335(Ft.), Average velocity =  14.919(Ft/s)
Channel flow top width =   10.006(Ft.)
Flow Velocity =   14.92(Ft/s)
Travel time  =    1.21 min.
Time of concentration =   14.47 min.

Sub-Channel No. 1 Critical depth =      2.297(Ft.)
  '     '       '     Critical flow top width =     12.891(Ft.)
  '     '       '     Critical flow velocity=    7.349(Ft/s)
  '     '       '     Critical flow area =     21.695(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.703
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.706(In/Hr) for a    10.0 year storm
Subarea runoff =      9.242(CFS) for      7.700(Ac.)
Total runoff =    163.963(CFS)       Total area =     134.300(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    134.300(Ac.)
Runoff from this stream =    163.963(CFS)
Time of concentration =   14.47 min.
Rainfall intensity =     1.706(In/Hr)


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Process from Point/Station      800.000 to Point/Station      801.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   945.000(Ft.)
Top (of initial area) elevation =   995.000(Ft.)
Bottom (of initial area) elevation =   960.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.03704  s(percent)=       3.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.682 min.
Rainfall intensity =      1.879(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.729
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      6.298(CFS)
Total initial stream area =        4.600(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      801.000 to Point/Station      107.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   960.000(Ft.)
Downstream point elevation =   925.000(Ft.)
Channel length thru subarea  =  1330.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     14.171(CFS)
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Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     14.171(CFS)
Depth of flow =   0.633(Ft.), Average velocity =   6.848(Ft/s)
Channel flow top width =    4.534(Ft.)
Flow Velocity =    6.85(Ft/s)
Travel time  =    3.24 min.
Time of concentration =   14.92 min.

Sub-Channel No. 1 Critical depth =      0.867(Ft.)
  '      '       '     Critical flow top width =      5.469(Ft.)
  '      '       '     Critical flow velocity=    4.376(Ft/s)
  '      '       '     Critical flow area =      3.238(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.757
Decimal fraction soil group A = 0.300
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  48.80
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.683(In/Hr) for a    10.0 year storm
Subarea runoff =     14.652(CFS) for     11.500(Ac.)
Total runoff =     20.950(CFS)       Total area =      16.100(Ac.)


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Process from Point/Station      801.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     16.100(Ac.)
Runoff from this stream =     20.950(CFS)
Time of concentration =   14.92 min.
Rainfall intensity =     1.683(In/Hr)
Summary of stream data:

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


1      163.963     14.47                  1.706
2       20.950     14.92                  1.683
Largest stream flow has longer or shorter time of concentration
Qp =    163.963 + sum of
          Qa          Tb/Ta
          20.950 *    0.970 =     20.317
Qp =    184.279

Total of 2 streams to confluence:
Flow rates before confluence point:
     163.963       20.950
Area of streams before confluence:
      134.300       16.100
Results of confluence:
Total flow rate =    184.279(CFS)
Time of concentration =    14.468 min.
Effective stream area after confluence =    150.400(Ac.)


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Process from Point/Station      107.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   920.000(Ft.)
Downstream point/station elevation =   919.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   184.279(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   184.279(CFS)
Normal flow depth in pipe =   44.72(In.)
Flow top width inside pipe =   46.87(In.)
Critical Depth =   46.98(In.)
Pipe flow velocity =     12.34(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    14.61 min.


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Process from Point/Station      107.000 to Point/Station      504.000
**** CONFLUENCE OF MAIN STREAMS ****
--------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    150.400(Ac.)
Runoff from this stream =    184.279(CFS)
Time of concentration =   14.61 min.
Rainfall intensity =    1.699(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------------
Initial area flow distance =   790.000(Ft.)
Top (of initial area) elevation =  1016.000(Ft.)
Bottom (of initial area) elevation =   978.000(Ft.)
Difference in elevation =    38.000(Ft.)
Slope =    0.04810  s(percent)=       4.81
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.939 min.
Rainfall intensity =      2.236(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  34.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     17.906(CFS)
Total initial stream area =        9.400(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      501.000 to Point/Station      502.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------------
Upstream point elevation =   978.000(Ft.)
Downstream point elevation =   942.000(Ft.)
Channel length thru subarea  =   990.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     29.812(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     29.812(CFS)
Depth of flow =   0.853(Ft.), Average velocity =   9.436(Ft/s)
Channel flow top width =    5.411(Ft.)
Flow Velocity =    9.44(Ft/s)
Travel time  =    1.75 min.
Time of concentration =    9.69 min.

Sub-Channel No. 1 Critical depth =      1.281(Ft.)
  '     '       '     Critical flow top width =      7.125(Ft.)
  '     '       '     Critical flow velocity=    5.100(Ft/s)
  '     '       '     Critical flow area =      5.846(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.848
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.044(In/Hr) for a    10.0 year storm
Subarea runoff =     21.659(CFS) for     12.500(Ac.)
Total runoff =     39.565(CFS)       Total area =      21.900(Ac.)


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Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
--------------------------------------------------------------------------------
Upstream point/station elevation =   937.000(Ft.)
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Downstream point/station elevation =   932.000(Ft.)
Pipe length  =   745.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    39.565(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    39.565(CFS)
Normal flow depth in pipe =   29.06(In.)
Flow top width inside pipe =   21.39(In.)
Critical Depth =   25.11(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    1.74 min.
Time of concentration (TC) =    11.42 min.


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Process from Point/Station      502.000 to Point/Station      503.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.900(Ac.)
Runoff from this stream =     39.565(CFS)
Time of concentration =   11.42 min.
Rainfall intensity =     1.898(In/Hr)


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Process from Point/Station      700.000 to Point/Station      701.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   695.000(Ft.)
Top (of initial area) elevation =  1000.000(Ft.)
Bottom (of initial area) elevation =   965.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.05036  s(percent)=       5.04
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.715 min.
Rainfall intensity =      2.041(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.737
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     14.000(CFS)
Total initial stream area =         9.300(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      701.000 to Point/Station      702.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   965.000(Ft.)
Downstream point elevation =   938.000(Ft.)
Channel length thru subarea  =  1095.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     26.495(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     26.495(CFS)
Depth of flow =   0.886(Ft.), Average velocity =   7.931(Ft/s)
Channel flow top width =    5.543(Ft.)
Flow Velocity =    7.93(Ft/s)
Travel time  =    2.30 min.
Time of concentration =   12.02 min.

Sub-Channel No. 1 Critical depth =      1.203(Ft.)
  '     '       '     Critical flow top width =      6.813(Ft.)
  '     '       '     Critical flow velocity=    4.998(Ft/s)
  '     '       '     Critical flow area =      5.301(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.772
Decimal fraction soil group A = 0.200
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 2)  =  51.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.855(In/Hr) for a    10.0 year storm
Subarea runoff =     23.772(CFS) for     16.600(Ac.)
Total runoff =     37.772(CFS)        Total area =      25.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   933.000(Ft.)
Downstream point/station elevation =   932.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    37.772(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    37.772(CFS)
Normal flow depth in pipe =   23.25(In.)
Flow top width inside pipe =   30.11(In.)
Critical Depth =   24.54(In.)
Pipe flow velocity =      8.44(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    12.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      503.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     25.900(Ac.)
Runoff from this stream =     37.772(CFS)
Time of concentration =   12.22 min.
Rainfall intensity =     1.841(In/Hr)
Summary of stream data:

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


1       39.565     11.42                 1.898
2       37.772     12.22                 1.841
Largest stream flow has longer or shorter time of concentration
Qp =     39.565 + sum of
          Qa          Tb/Ta
          37.772 *    0.935 =     35.301
Qp =     74.867

Total of 2 streams to confluence:
Flow rates before confluence point:
      39.565      37.772
Area of streams before confluence:
       21.900       25.900
Results of confluence:
Total flow rate =     74.867(CFS)
Time of concentration =    11.424 min.
Effective stream area after confluence =     47.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   932.000(Ft.)
Downstream point/station elevation =   919.000(Ft.)
Pipe length  =   975.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    74.867(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    74.867(CFS)
Normal flow depth in pipe =   29.11(In.)
Flow top width inside pipe =   33.94(In.)
Critical Depth =   32.81(In.)
Pipe flow velocity =     11.28(Ft/s)
Travel time through pipe =    1.44 min.
Time of concentration (TC) =    12.86 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      47.800(Ac.)
Runoff from this stream =      74.867(CFS)
Time of concentration =   12.86 min.
Rainfall intensity =     1.799(In/Hr)
Summary of stream data:

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


1       184.279      14.61                1.699
2        74.867      12.86                1.799
Largest stream flow has longer time of concentration
Qp =    184.279 + sum of
          Qb          Ia/Ib
          74.867 *     0.944 =      70.700
Qp =    254.979

Total of 2 main streams to confluence:
Flow rates before confluence point:
     184.279       74.867
Area of streams before confluence:
      150.400        47.800


Results of confluence:
Total flow rate =     254.979(CFS)
Time of concentration =     14.610 min.
Effective stream area after confluence  =     198.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       504.000 to Point/Station       108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =    919.000(Ft.)
Downstream point/station elevation =    918.000(Ft.)
Pipe length  =     55.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    254.979(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =    254.979(CFS)
Normal flow depth in pipe =    44.81(In.)
Flow top width inside pipe =    46.74(In.)
Critical Depth =    52.77(In.)
Pipe flow velocity =     17.06(Ft/s)
Travel time through pipe =     0.05 min.
Time of concentration (TC) =     14.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       108.000 to Point/Station       109.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =    918.000(Ft.)
Downstream point elevation =    904.000(Ft.)
Channel length thru subarea  =  1445.000(Ft.)
Channel base width     =     6.000(Ft.)
Slope or 'Z' of left channel bank =    1.500
Slope or 'Z' of right channel bank =    1.500
Estimated mean flow rate at midpoint of channel =     266.429(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =     4.500(Ft.)
Flow(q) thru subarea =     266.429(CFS)
Depth of flow =    2.239(Ft.), Average velocity =  12.715(Ft/s)
Channel flow top width =    12.717(Ft.)
Flow Velocity =    12.71(Ft/s)
Travel time  =     1.89 min.
Time of concentration =    16.56 min.

Sub-Channel No. 1 Critical depth =       3.063(Ft.)
  '      '       '      Critical flow top width =      15.188(Ft.)
  '      '       '      Critical flow velocity=     8.212(Ft/s)
  '      '       '      Critical flow area =      32.443(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.600
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  46.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.606(In/Hr) for a     10.0 year storm
Subarea runoff =      24.467(CFS) for      17.800(Ac.)
Total runoff =    279.446(CFS)        Total area =      216.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   904.000(Ft.)
Downstream point elevation =   895.000(Ft.)
Channel length thru subarea  =   945.000(Ft.)
Channel base width     =    6.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    293.742(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.500(Ft.)
Flow(q) thru subarea =    293.742(CFS)
Depth of flow =   2.369(Ft.), Average velocity =  12.983(Ft/s)
Channel flow top width =   13.106(Ft.)
Flow Velocity =   12.98(Ft/s)
Travel time  =    1.21 min.
Time of concentration =   17.77 min.

Sub-Channel No. 1 Critical depth =      3.219(Ft.)
  '     '       '     Critical flow top width =     15.656(Ft.)
  '     '       '     Critical flow velocity=    8.428(Ft/s)
  '     '       '     Critical flow area =     34.853(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  34.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.556(In/Hr) for a     10.0 year storm
Subarea runoff =     29.021(CFS) for     22.100(Ac.)
Total runoff =    308.467(CFS)        Total area =      238.100(Ac.)
End of computations, total study area =          238.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.379
Area averaged RI index number =  38.8
```

APPENDIX B.3: 2-YEAR RATIONAL TABLING CALCULATIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 06/09/10 File:A1MD2.out

TENTATIVE TRACT MAP 36294
AREA "OFFSITE" FOR AREAS "A21" TO "A22"
2-YR (MASTER DRAINAGE STUDY)
FN: A1MD2

********* 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) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.400(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

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

Initial area flow distance = 815.000(Ft.)
Top (of initial area) elevation = 918.000(Ft.)
Bottom (of initial area) elevation = 897.000(Ft.)
Difference in elevation = 21.000(Ft.)
Slope = 0.02577 s(percent)= 2.58
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.107 min.
Rainfall intensity = 1.285(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 21.36
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 4.258(CFS)
Total initial stream area = 4.000(Ac.)
Pervious area fraction = 0.100

++
Process from Point/Station 901.000 to Point/Station 902.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 897.000(Ft.)
End of natural channel elevation = 886.000(Ft.)
Length of natural channel = 1670.000(Ft.)
Estimated mean flow rate at midpoint of channel = 14.798(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 2.24(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0066
Corrected/adjusted channel slope = 0.0066
Travel time = 12.40 min. TC = 21.51 min.

```
 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.300
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  29.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      0.873(In/Hr) for a     2.0 year storm
Subarea runoff =     14.334(CFS) for     19.800(Ac.)
Total runoff =     18.593(CFS)       Total area =      23.800(Ac.)
End of computations, total study area =           23.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  47.2
```

```
                    Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study         Date: 07/01/10  File:AMD2.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "A" FOR AREAS "A1" TO "A20"
2-YR (MASTER DRAINAGE STUDY)
FN: AMD2
------------------------------------------------------------------------
 *********   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) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.550(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   790.000(Ft.)
Top (of initial area) elevation =  1218.000(Ft.)
Bottom (of initial area) elevation =  1105.000(Ft.)
Difference in elevation =   113.000(Ft.)
Slope =    0.14304  s(percent)=      14.30
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.299 min.
Rainfall intensity =      1.340(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.523
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      7.009(CFS)
Total initial stream area =       10.000(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1105.000(Ft.)
Downstream point elevation =  1070.000(Ft.)
Channel length thru subarea  =   780.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     12.615(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     12.615(CFS)
Depth of flow =   0.313(Ft.), Average velocity =   8.722(Ft/s)
Channel flow top width =    5.251(Ft.)
Flow Velocity =    8.72(Ft/s)
Travel time  =    1.49 min.
Time of concentration =    9.79 min.
```

```
Sub-Channel No. 1 Critical depth =      0.609(Ft.)
  '     '       '     Critical flow top width =      6.438(Ft.)
  '     '       '     Critical flow velocity=    3.967(Ft/s)
  '     '       '     Critical flow area =      3.180(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.519
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.244(In/Hr) for a     2.0 year storm
Subarea runoff =     10.322(CFS) for     16.000(Ac.)
Total runoff =     17.330(CFS)       Total area =      26.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1070.000(Ft.)
Downstream point elevation =  1042.000(Ft.)
Channel length thru subarea  =   695.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     25.796(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     25.796(CFS)
Depth of flow =   0.487(Ft.), Average velocity =  10.651(Ft/s)
Channel flow top width =    5.948(Ft.)
Flow Velocity =   10.65(Ft/s)
Travel time  =    1.09 min.
Time of concentration =   10.88 min.

Sub-Channel No. 1 Critical depth =      0.922(Ft.)
  '     '       '     Critical flow top width =      7.688(Ft.)
  '     '       '     Critical flow velocity=    4.788(Ft/s)
  '     '       '     Critical flow area =      5.387(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.536
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  20.96
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.186(In/Hr) for a     2.0 year storm
Subarea runoff =     16.144(CFS) for     25.400(Ac.)
Total runoff =     33.474(CFS)       Total area =      51.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1038.000(Ft.)
Downstream point/station elevation =  1037.500(Ft.)
Pipe length  =    70.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    33.474(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    33.474(CFS)
Normal flow depth in pipe =   23.67(In.)
Flow top width inside pipe =   29.72(In.)
Critical Depth =   23.13(In.)
Pipe flow velocity =      7.34(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    11.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
```

```
Stream flow area =     51.400(Ac.)
Runoff from this stream =     33.474(CFS)
Time of concentration =   11.04 min.
Rainfall intensity =     1.178(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   780.000(Ft.)
Top (of initial area) elevation =  1115.000(Ft.)
Bottom (of initial area) elevation =  1075.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.05128  s(percent)=       5.13
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.137 min.
Rainfall intensity =      1.224(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.518
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      5.959(CFS)
Total initial stream area =        9.400(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1075.000(Ft.)
Downstream point elevation =  1047.000(Ft.)
Channel length thru subarea  =   690.000(Ft.)
Channel base width    =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      9.731(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      9.731(CFS)
Depth of flow =   0.277(Ft.), Average velocity =   7.721(Ft/s)
Channel flow top width =    5.107(Ft.)
Flow Velocity =    7.72(Ft/s)
Travel time  =    1.49 min.
Time of concentration =   11.63 min.

Sub-Channel No. 1 Critical depth =      0.520(Ft.)
  '     '       '     Critical flow top width =      6.078(Ft.)
  '     '       '     Critical flow velocity=    3.717(Ft/s)
  '     '       '     Critical flow area =      2.618(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.630
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.151(In/Hr) for a     2.0 year storm
Subarea runoff =      8.630(CFS) for     11.900(Ac.)
Total runoff =     14.589(CFS)       Total area =      21.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1042.000(Ft.)
Downstream point/station elevation =  1037.500(Ft.)
Pipe length  =   420.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    14.589(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    14.589(CFS)
Normal flow depth in pipe =   17.77(In.)
```

```
Flow top width inside pipe =    15.16(In.)
Critical Depth =    17.01(In.)
Pipe flow velocity =       6.73(Ft/s)
Travel time through pipe =     1.04 min.
Time of concentration (TC) =     12.67 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       202.000 to Point/Station       203.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      21.300(Ac.)
Runoff from this stream =      14.589(CFS)
Time of concentration =    12.67 min.
Rainfall intensity =      1.107(In/Hr)
Summary of stream data:

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


1        33.474      11.04                  1.178
2        14.589      12.67                  1.107
Largest stream flow has longer or shorter time of concentration
Qp =      33.474 + sum of
           Qa          Tb/Ta
           14.589 *    0.871 =      12.710
Qp =      46.185

Total of 2 streams to confluence:
Flow rates before confluence point:
      33.474       14.589
Area of streams before confluence:
       51.400       21.300
Results of confluence:
Total flow rate =      46.185(CFS)
Time of concentration =     11.036 min.
Effective stream area after confluence =      72.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       203.000 to Point/Station       104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   1037.500(Ft.)
Downstream point/station elevation =   1037.000(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     46.185(CFS)
Nearest computed pipe diameter  =      33.00(In.)
Calculated individual pipe flow  =     46.185(CFS)
Normal flow depth in pipe =    24.52(In.)
Flow top width inside pipe =    28.84(In.)
Critical Depth =    26.99(In.)
Pipe flow velocity =       9.77(Ft/s)
Travel time through pipe =     0.07 min.
Time of concentration (TC) =     11.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       104.000 to Point/Station       105.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   1037.000(Ft.)
Downstream point elevation =    990.000(Ft.)
Channel length thru subarea  =   1480.000(Ft.)
Channel base width     =     4.000(Ft.)
Slope or 'Z' of left channel bank =    1.500
Slope or 'Z' of right channel bank =    1.500
Estimated mean flow rate at midpoint of channel =      49.869(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =     3.000(Ft.)
Flow(q) thru subarea =      49.869(CFS)
Depth of flow =    0.777(Ft.), Average velocity =   12.422(Ft/s)
Channel flow top width =     6.332(Ft.)
Flow Velocity =    12.42(Ft/s)
Travel time  =     1.99 min.
Time of concentration =    13.09 min.

Sub-Channel No. 1 Critical depth =      1.406(Ft.)
   '      '      '      Critical flow top width =      8.219(Ft.)
```

```
'     '       '     Critical flow velocity=    5.805(Ft/s)
'     '       '     Critical flow area =      8.591(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.538
Decimal fraction soil group A = 0.700
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  22.88
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.091(In/Hr) for a     2.0 year storm
Subarea runoff =      6.809(CFS) for     11.600(Ac.)
Total runoff =     52.993(CFS)       Total area =      84.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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: 1
Stream flow area =     84.300(Ac.)
Runoff from this stream =      52.993(CFS)
Time of concentration =   13.09 min.
Rainfall intensity =     1.091(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   660.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =  1025.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.05303  s(percent)=       5.30
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.935 min.
Rainfall intensity =      1.296(In/Hr) for a     2.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.635
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.498(CFS)
Total initial stream area =       7.900(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      401.000 to Point/Station      402.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =  1025.000(Ft.)
Downstream point elevation =  1001.000(Ft.)
Channel length thru subarea  =   770.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     10.159(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     10.159(CFS)
Depth of flow =   0.307(Ft.), Average velocity =   7.184(Ft/s)
Channel flow top width =    5.226(Ft.)
Flow Velocity =    7.18(Ft/s)
Travel time  =    1.79 min.
Time of concentration =   10.72 min.

Sub-Channel No. 1 Critical depth =      0.531(Ft.)
'     '       '     Critical flow top width =      6.125(Ft.)
'     '       '     Critical flow velocity=    3.777(Ft/s)
'     '       '     Critical flow area =      2.689(Sq.Ft)

 Adding area flow to channel
```

```
USER INPUT of soil data for subarea
Runoff Coefficient = 0.222
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  25.20
Pervious area fraction =  0.980; Impervious fraction =  0.020
Rainfall intensity =      1.194(In/Hr) for a     2.0 year storm
Subarea runoff =      2.363(CFS) for      8.900(Ac.)
Total runoff =      8.861(CFS)       Total area =      16.800(Ac.)


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Process from Point/Station      402.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   996.000(Ft.)
Downstream point/station elevation =   994.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     8.861(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.861(CFS)
Normal flow depth in pipe =   14.51(In.)
Flow top width inside pipe =   19.41(In.)
Critical Depth =   13.27(In.)
Pipe flow velocity =      5.00(Ft/s)
Travel time through pipe =    1.08 min.
Time of concentration (TC) =    11.80 min.


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Process from Point/Station      402.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.800(Ac.)
Runoff from this stream =      8.861(CFS)
Time of concentration =   11.80 min.
Rainfall intensity =     1.143(In/Hr)


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Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.000(Ft.)
Bottom (of initial area) elevation =  1005.000(Ft.)
Difference in elevation =    40.000(Ft.)
Slope =    0.04000  s(percent)=       4.00
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.767 min.
Rainfall intensity =      1.145(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.514
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.001(CFS)
Total initial stream area =        5.100(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      601.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1000.000(Ft.)
Downstream point/station elevation =   994.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.001(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.001(CFS)
Normal flow depth in pipe =    5.35(In.)
Flow top width inside pipe =    8.84(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.97(Ft/s)
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Travel time through pipe =    0.09 min.
Time of concentration (TC) =    11.86 min.


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Process from Point/Station      601.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      5.100(Ac.)
Runoff from this stream =      3.001(CFS)
Time of concentration =   11.86 min.
Rainfall intensity =     1.141(In/Hr)
Summary of stream data:

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


1         8.861     11.80                  1.143
2         3.001     11.86                  1.141
Largest stream flow has longer or shorter time of concentration
Qp =      8.861 + sum of
          Qa          Tb/Ta
           3.001 *    0.996 =      2.988
Qp =     11.849

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.861       3.001
Area of streams before confluence:
      16.800       5.100
Results of confluence:
Total flow rate =     11.849(CFS)
Time of concentration =    11.805 min.
Effective stream area after confluence =     21.900(Ac.)


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Process from Point/Station      403.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   994.000(Ft.)
Downstream point/station elevation =   992.000(Ft.)
Pipe length  =   305.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    11.849(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.849(CFS)
Normal flow depth in pipe =   18.90(In.)
Flow top width inside pipe =   12.60(In.)
Critical Depth =   15.41(In.)
Pipe flow velocity =      5.20(Ft/s)
Travel time through pipe =    0.98 min.
Time of concentration (TC) =    12.78 min.


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Process from Point/Station      403.000 to Point/Station      404.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.900(Ac.)
Runoff from this stream =     11.849(CFS)
Time of concentration =   12.78 min.
Rainfall intensity =     1.103(In/Hr)


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Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1044.000(Ft.)
Bottom (of initial area) elevation =   997.000(Ft.)
Difference in elevation =    47.000(Ft.)
Slope =    0.04700  s(percent)=       4.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.393 min.
Rainfall intensity =      1.162(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.515
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Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      4.186(CFS)
Total initial stream area =        7.000(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      301.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   993.000(Ft.)
Downstream point/station elevation =   992.000(Ft.)
Pipe length  =    50.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     4.186(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.186(CFS)
Normal flow depth in pipe =    9.42(In.)
Flow top width inside pipe =    9.86(In.)
Critical Depth =   10.36(In.)
Pipe flow velocity =      6.33(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    11.52 min.


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Process from Point/Station      301.000 to Point/Station      404.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.000(Ac.)
Runoff from this stream =      4.186(CFS)
Time of concentration =   11.52 min.
Rainfall intensity =     1.156(In/Hr)
Summary of stream data:

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


1       11.849     12.78                  1.103
2        4.186     11.52                  1.156
Largest stream flow has longer time of concentration
Qp =     11.849 + sum of
          Qb          Ia/Ib
           4.186 *    0.954 =      3.996
Qp =     15.845

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.849       4.186
Area of streams before confluence:
       21.900        7.000
Results of confluence:
Total flow rate =     15.845(CFS)
Time of concentration =    12.783 min.
Effective stream area after confluence =     28.900(Ac.)


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Process from Point/Station      404.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   992.000(Ft.)
Downstream point/station elevation =   990.000(Ft.)
Pipe length  =   465.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    15.845(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    15.845(CFS)
Normal flow depth in pipe =   20.02(In.)
Flow top width inside pipe =   23.65(In.)
Critical Depth =   16.64(In.)
Pipe flow velocity =      5.01(Ft/s)
Travel time through pipe =    1.55 min.
Time of concentration (TC) =    14.33 min.
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Process from Point/Station      404.000 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 =     28.900(Ac.)
Runoff from this stream =     15.845(CFS)
Time of concentration =   14.33 min.
Rainfall intensity =     1.048(In/Hr)
Summary of stream data:

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


1        52.993     13.09                1.091
2        15.845     14.33                1.048
Largest stream flow has longer or shorter time of concentration
Qp =     52.993 + sum of
          Qa          Tb/Ta
          15.845 *    0.913 =     14.474
Qp =     67.467

Total of 2 main streams to confluence:
Flow rates before confluence point:
       52.993      15.845
Area of streams before confluence:
       84.300      28.900


Results of confluence:
Total flow rate =     67.467(CFS)
Time of concentration =    13.090 min.
Effective stream area after confluence  =    113.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   990.000(Ft.)
Downstream point elevation =   950.000(Ft.)
Channel length thru subarea  =  1160.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =     71.461(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.500(Ft.)
Flow(q) thru subarea =     71.461(CFS)
Depth of flow =   0.929(Ft.), Average velocity =  14.254(Ft/s)
Channel flow top width =    6.788(Ft.)
Flow Velocity =   14.25(Ft/s)
Travel time  =    1.36 min.
Time of concentration =   14.45 min.

Sub-Channel No. 1 Critical depth =      1.719(Ft.)
  '     '       '     Critical flow top width =      9.156(Ft.)
  '     '       '     Critical flow velocity=    6.321(Ft/s)
  '     '       '     Critical flow area =     11.306(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.527
Decimal fraction soil group A = 0.800
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  20.96
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =     1.044(In/Hr) for a     2.0 year storm
Subarea runoff =      7.377(CFS) for     13.400(Ac.)
Total runoff =     74.844(CFS)       Total area =     126.600(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   950.000(Ft.)
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Downstream point elevation =   925.000(Ft.)
Channel length thru subarea  =  1085.000(Ft.)
Channel base width     =    6.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =     77.120(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.500(Ft.)
Flow(q) thru subarea =     77.120(CFS)
Depth of flow =   0.884(Ft.), Average velocity =  11.910(Ft/s)
Channel flow top width =    8.652(Ft.)
Flow Velocity =   11.91(Ft/s)
Travel time  =    1.52 min.
Time of concentration =   15.96 min.

Sub-Channel No. 1 Critical depth =      1.516(Ft.)
  '     '       '     Critical flow top width =     10.547(Ft.)
  '     '       '     Critical flow velocity=    6.150(Ft/s)
  '     '       '     Critical flow area =     12.539(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.625
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      0.998(In/Hr) for a     2.0 year storm
Subarea runoff =      4.801(CFS) for      7.700(Ac.)
Total runoff =     79.645(CFS)       Total area =     134.300(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    134.300(Ac.)
Runoff from this stream =      79.645(CFS)
Time of concentration =   15.96 min.
Rainfall intensity =     0.998(In/Hr)


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Process from Point/Station      800.000 to Point/Station      801.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   945.000(Ft.)
Top (of initial area) elevation =   995.000(Ft.)
Bottom (of initial area) elevation =   960.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.03704  s(percent)=       3.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.682 min.
Rainfall intensity =      1.149(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.588
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  33.88
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.106(CFS)
Total initial stream area =        4.600(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      801.000 to Point/Station      107.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   960.000(Ft.)
Downstream point elevation =   925.000(Ft.)
Channel length thru subarea  =  1330.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      6.988(CFS)
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Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      6.988(CFS)
Depth of flow =   0.435(Ft.), Average velocity =   5.597(Ft/s)
Channel flow top width =    3.740(Ft.)
Flow Velocity =    5.60(Ft/s)
Travel time  =    3.96 min.
Time of concentration =   15.64 min.

Sub-Channel No. 1 Critical depth =      0.590(Ft.)
  '     '       '     Critical flow top width =      4.359(Ft.)
  '     '       '     Critical flow velocity=    3.726(Ft/s)
  '     '       '     Critical flow area =      1.876(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.661
Decimal fraction soil group A = 0.300
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  29.80
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.007(In/Hr) for a     2.0 year storm
Subarea runoff =      7.661(CFS) for     11.500(Ac.)
Total runoff =     10.767(CFS)       Total area =      16.100(Ac.)


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Process from Point/Station      801.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     16.100(Ac.)
Runoff from this stream =     10.767(CFS)
Time of concentration =   15.64 min.
Rainfall intensity =     1.007(In/Hr)
Summary of stream data:

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


1       79.645     15.96                  0.998
2       10.767     15.64                  1.007
Largest stream flow has longer time of concentration
Qp =     79.645 + sum of
          Qb         Ia/Ib
          10.767 *    0.991 =     10.669
Qp =     90.314

Total of 2 streams to confluence:
Flow rates before confluence point:
      79.645      10.767
Area of streams before confluence:
     134.300       16.100
Results of confluence:
Total flow rate =     90.314(CFS)
Time of concentration =    15.965 min.
Effective stream area after confluence =    150.400(Ac.)


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Process from Point/Station      107.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   920.000(Ft.)
Downstream point/station elevation =   919.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    90.314(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    90.314(CFS)
Normal flow depth in pipe =   37.50(In.)
Flow top width inside pipe =   25.98(In.)
Critical Depth =   35.37(In.)
Pipe flow velocity =      9.97(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    16.14 min.


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Process from Point/Station      107.000 to Point/Station      504.000
**** CONFLUENCE OF MAIN STREAMS ****
--------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     150.400(Ac.)
Runoff from this stream =      90.314(CFS)
Time of concentration =   16.14 min.
Rainfall intensity =     0.993(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------------
Initial area flow distance =   790.000(Ft.)
Top (of initial area) elevation =  1016.000(Ft.)
Bottom (of initial area) elevation =   978.000(Ft.)
Difference in elevation =    38.000(Ft.)
Slope =    0.04810  s(percent)=       4.81
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.939 min.
Rainfall intensity =      1.367(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  17.64
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     10.614(CFS)
Total initial stream area =        9.400(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      501.000 to Point/Station      502.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------------
Upstream point elevation =   978.000(Ft.)
Downstream point elevation =   942.000(Ft.)
Channel length thru subarea  =   990.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     17.670(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     17.670(CFS)
Depth of flow =   0.653(Ft.), Average velocity =   8.182(Ft/s)
Channel flow top width =    4.613(Ft.)
Flow Velocity =    8.18(Ft/s)
Travel time  =    2.02 min.
Time of concentration =    9.96 min.

Sub-Channel No. 1 Critical depth =      0.977(Ft.)
  '      '        '     Critical flow top width =      5.906(Ft.)
  '      '        '     Critical flow velocity=    4.577(Ft/s)
  '      '        '     Critical flow area =      3.860(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.824
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  16.20
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.234(In/Hr) for a     2.0 year storm
Subarea runoff =     12.708(CFS) for     12.500(Ac.)
Total runoff =     23.321(CFS)        Total area =      21.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
--------------------------------------------------------------------------------
Upstream point/station elevation =   937.000(Ft.)
```

```
Downstream point/station elevation =   932.000(Ft.)
Pipe length  =   745.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    23.321(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    23.321(CFS)
Normal flow depth in pipe =   24.00(In.)
Flow top width inside pipe =   16.97(In.)
Critical Depth =   20.27(In.)
Pipe flow velocity =      6.24(Ft/s)
Travel time through pipe =    1.99 min.
Time of concentration (TC) =    11.94 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.900(Ac.)
Runoff from this stream =     23.321(CFS)
Time of concentration =   11.94 min.
Rainfall intensity =     1.137(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      700.000 to Point/Station      701.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   695.000(Ft.)
Top (of initial area) elevation =  1000.000(Ft.)
Bottom (of initial area) elevation =   965.000(Ft.)
Difference in elevation =    35.000(Ft.)
Slope =    0.05036  s(percent)=       5.04
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.715 min.
Rainfall intensity =      1.248(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.596
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  33.88
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      6.915(CFS)
Total initial stream area =        9.300(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      702.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   965.000(Ft.)
Downstream point elevation =   938.000(Ft.)
Channel length thru subarea  =  1095.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     13.087(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     13.087(CFS)
Depth of flow =   0.618(Ft.), Average velocity =   6.542(Ft/s)
Channel flow top width =    4.473(Ft.)
Flow Velocity =    6.54(Ft/s)
Travel time  =    2.79 min.
Time of concentration =   12.50 min.

Sub-Channel No. 1 Critical depth =      0.828(Ft.)
  '     '       '     Critical flow top width =      5.313(Ft.)
  '     '       '     Critical flow velocity=    4.322(Ft/s)
  '     '       '     Critical flow area =      3.028(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.674
Decimal fraction soil group A = 0.200
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 1)  =  31.96
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.114(In/Hr) for a     2.0 year storm
Subarea runoff =     12.459(CFS) for     16.600(Ac.)
Total runoff =     19.374(CFS)       Total area =      25.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------------
Upstream point/station elevation =   933.000(Ft.)
Downstream point/station elevation =   932.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    19.374(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    19.374(CFS)
Normal flow depth in pipe =   19.97(In.)
Flow top width inside pipe =   17.94(In.)
Critical Depth =   18.99(In.)
Pipe flow velocity =      6.94(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    12.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      503.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     25.900(Ac.)
Runoff from this stream =     19.374(CFS)
Time of concentration =   12.76 min.
Rainfall intensity =     1.104(In/Hr)
Summary of stream data:

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


1       23.321     11.94                  1.137
2       19.374     12.76                  1.104
Largest stream flow has longer or shorter time of concentration
Qp =     23.321 + sum of
          Qa          Tb/Ta
          19.374 *    0.936 =     18.141
Qp =     41.462

Total of 2 streams to confluence:
Flow rates before confluence point:
      23.321      19.374
Area of streams before confluence:
       21.900       25.900
Results of confluence:
Total flow rate =     41.462(CFS)
Time of concentration =    11.945 min.
Effective stream area after confluence =     47.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------------
Upstream point/station elevation =   932.000(Ft.)
Downstream point/station elevation =   919.000(Ft.)
Pipe length  =   975.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    41.462(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    41.462(CFS)
Normal flow depth in pipe =   24.89(In.)
Flow top width inside pipe =   22.55(In.)
Critical Depth =   25.90(In.)
Pipe flow velocity =      9.53(Ft/s)
Travel time through pipe =    1.71 min.
Time of concentration (TC) =    13.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------------
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     47.800(Ac.)
Runoff from this stream =     41.462(CFS)
Time of concentration =   13.65 min.
Rainfall intensity =     1.071(In/Hr)
Summary of stream data:

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


1       90.314     16.14               0.993
2       41.462     13.65               1.071
Largest stream flow has longer time of concentration
Qp =     90.314 + sum of
          Qb         Ia/Ib
          41.462 *    0.927 =     38.451
Qp =    128.765

Total of 2 main streams to confluence:
Flow rates before confluence point:
      90.314      41.462
Area of streams before confluence:
      150.400       47.800


Results of confluence:
Total flow rate =    128.765(CFS)
Time of concentration =    16.140 min.
Effective stream area after confluence  =    198.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   919.000(Ft.)
Downstream point/station elevation =   918.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   128.765(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   128.765(CFS)
Normal flow depth in pipe =   33.75(In.)
Flow top width inside pipe =   38.97(In.)
Critical Depth =   40.54(In.)
Pipe flow velocity =     14.50(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    16.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------------
Upstream point elevation =   918.000(Ft.)
Downstream point elevation =   904.000(Ft.)
Channel length thru subarea  =  1445.000(Ft.)
Channel base width     =    6.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    134.547(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.500(Ft.)
Flow(q) thru subarea =    134.547(CFS)
Depth of flow =   1.546(Ft.), Average velocity =  10.461(Ft/s)
Channel flow top width =   10.638(Ft.)
Flow Velocity =   10.46(Ft/s)
Travel time  =    2.30 min.
Time of concentration =   18.51 min.

Sub-Channel No. 1 Critical depth =      2.094(Ft.)
  '     '       '     Critical flow top width =     12.281(Ft.)
  '     '       '     Critical flow velocity=    7.030(Ft/s)
  '     '       '     Critical flow area =     19.138(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.600
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  27.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      0.934(In/Hr) for a     2.0 year storm
Subarea runoff =     13.776(CFS) for     17.800(Ac.)
Total runoff =    142.541(CFS)        Total area =     216.000(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   904.000(Ft.)
Downstream point elevation =   895.000(Ft.)
Channel length thru subarea  =   945.000(Ft.)
Channel base width     =    6.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =    149.833(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.500(Ft.)
Flow(q) thru subarea =    149.833(CFS)
Depth of flow =   1.648(Ft.), Average velocity =  10.730(Ft/s)
Channel flow top width =   10.945(Ft.)
Flow Velocity =   10.73(Ft/s)
Travel time  =    1.47 min.
Time of concentration =   19.97 min.

Sub-Channel No. 1 Critical depth =      2.219(Ft.)
  '      '       '     Critical flow top width =     12.656(Ft.)
  '      '       '     Critical flow velocity=     7.239(Ft/s)
  '      '       '     Critical flow area =     20.697(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  17.64
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      0.902(In/Hr) for a     2.0 year storm
Subarea runoff =     16.378(CFS) for     22.100(Ac.)
Total runoff =    158.919(CFS)        Total area =     238.100(Ac.)
End of computations, total study area =          238.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.379
Area averaged RI index number =  38.8
```

APPENDIX C: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "B" (RATIONAL TABLING METHOD)

APPENDIXC.1: 100- YEAR RATIONAL TABLING CALCULATIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 06/18/10 File:BE100.out

TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B1" TO "B8"
100-YR (EXISTING CONDITION)
FN: BE100

********* 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 = 0.550(In.)
100 year, 1 hour precipitation = 1.400(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.400(In/Hr)
Slope of intensity duration curve = 0.4500

++

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

Initial area flow distance = 970.000(Ft.)
Top (of initial area) elevation = 1033.000(Ft.)
Bottom (of initial area) elevation = 979.000(Ft.)
Difference in elevation = 54.000(Ft.)
Slope = 0.05567 s(percent)= 5.57
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 19.808 min.
Rainfall intensity = 2.305(In/Hr) for a 100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.728
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) = 71.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 3.021(CFS)
Total initial stream area = 1.800(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 201.000 to Point/Station 202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 979.000(Ft.)
End of natural channel elevation = 952.000(Ft.)
Length of natural channel = 645.000(Ft.)
Estimated mean flow rate at midpoint of channel = 5.454(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 4.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0419
Corrected/adjusted channel slope = 0.0419
Travel time = 2.44 min. TC = 22.25 min.

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.707
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)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.188(In/Hr) for a   100.0 year storm
Subarea runoff =      4.483(CFS) for      2.900(Ac.)
Total runoff =      7.504(CFS)       Total area =       4.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      207.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    952.000(Ft.)
End of natural channel elevation =    926.000(Ft.)
Length of natural channel  =   937.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.163(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0277
Corrected/adjusted channel slope =  0.0277
Travel time =    3.26 min.     TC =   25.51  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.704
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  70.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.057(In/Hr) for a   100.0 year storm
Subarea runoff =     17.534(CFS) for     12.100(Ac.)
Total runoff =     25.037(CFS)       Total area =      16.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      207.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.800(Ac.)
Runoff from this stream =     25.037(CFS)
Time of concentration =   25.51 min.
Rainfall intensity =     2.057(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 =   540.000(Ft.)
Top (of initial area) elevation =  1094.000(Ft.)
Bottom (of initial area) elevation =  1015.000(Ft.)
Difference in elevation =    79.000(Ft.)
Slope =    0.14630  s(percent)=      14.63
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.917 min.
Rainfall intensity =      2.794(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
```

```
RI index for soil(AMC 2)  =  83.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.102(CFS)
Total initial stream area =        3.100(Ac.)
Pervious area fraction = 1.000

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      206.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1015.000(Ft.)
End of natural channel elevation =    958.000(Ft.)
Length of natural channel  =  1050.000(Ft.)
Estimated mean flow rate at midpoint of channel =     14.318(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.39(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0543
Corrected/adjusted channel slope =  0.0543
Travel time =    2.74 min.     TC =   15.66  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =     2.563(In/Hr) for a   100.0 year storm
Subarea runoff =     12.670(CFS) for      6.300(Ac.)
Total runoff =     19.772(CFS)       Total area =       9.400(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      9.400(Ac.)
Runoff from this stream =     19.772(CFS)
Time of concentration =   15.66 min.
Rainfall intensity =     2.563(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1093.000(Ft.)
Bottom (of initial area) elevation =   958.000(Ft.)
Difference in elevation =   135.000(Ft.)
Slope =    0.13500  s(percent)=      13.50
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.795 min.
Rainfall intensity =      2.483(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.700
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  80.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.039(CFS)
Total initial stream area =        7.100(Ac.)
Pervious area fraction = 1.000

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.100(Ac.)
Runoff from this stream =     14.039(CFS)
Time of concentration =   16.80 min.
Rainfall intensity =     2.483(In/Hr)
Summary of stream data:

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


1        19.772      15.66                  2.563
2        14.039      16.80                  2.483
Largest stream flow has longer or shorter time of concentration
Qp =      19.772 + sum of
           Qa          Tb/Ta
           14.039 *    0.932 =      13.088
Qp =      32.860

Total of 2 streams to confluence:
Flow rates before confluence point:
       19.772      14.039
Area of streams before confluence:
        9.400       7.100
Results of confluence:
Total flow rate =      32.860(CFS)
Time of concentration =    15.657 min.
Effective stream area after confluence =      16.500(Ac.)


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Process from Point/Station      206.000 to Point/Station      207.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =     958.000(Ft.)
End of natural channel elevation =     926.000(Ft.)
Length of natural channel  =    900.000(Ft.)
Estimated mean flow rate at midpoint of channel =      41.822(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0356
Corrected/adjusted channel slope =  0.0356
Travel time =    2.16 min.      TC =   17.82  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.754
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)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.418(In/Hr) for a   100.0 year storm
Subarea runoff =     16.404(CFS) for      9.000(Ac.)
Total runoff =     49.264(CFS)       Total area =      25.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     25.500(Ac.)
Runoff from this stream =     49.264(CFS)
Time of concentration =   17.82 min.
Rainfall intensity =     2.418(In/Hr)
Summary of stream data:

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

```
1       25.037      25.51                2.057
2       49.264      17.82                2.418
Largest stream flow has longer or shorter time of concentration
Qp =     49.264 + sum of
          Qa          Tb/Ta
          25.037 *    0.699 =     17.492
Qp =     66.756

Total of 2 main streams to confluence:
Flow rates before confluence point:
      25.037      49.264
Area of streams before confluence:
       16.800       25.500


Results of confluence:
Total flow rate =     66.756(CFS)
Time of concentration =    17.820 min.
Effective stream area after confluence  =     42.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    926.000(Ft.)
End of natural channel elevation =    912.000(Ft.)
Length of natural channel  =   585.000(Ft.)
Estimated mean flow rate at midpoint of channel =     77.724(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.81(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0239
Corrected/adjusted channel slope =  0.0239
Travel time =    1.43 min.     TC =   19.25  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.781
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)  =  79.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.335(In/Hr) for a   100.0 year storm
Subarea runoff =     25.361(CFS) for     13.900(Ac.)
Total runoff =     92.117(CFS)       Total area =      56.200(Ac.)
End of computations, total study area =           56.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

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

APPENDIXC.2: 10-YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
       Rational Hydrology Study        Date: 06/18/10  File:BE10.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B1" TO "B8"
10-YR (EXISTING CONDITION)
FN: BE10
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.900(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   970.000(Ft.)
Top (of initial area) elevation =  1033.000(Ft.)
Bottom (of initial area) elevation =   979.000(Ft.)
Difference in elevation =    54.000(Ft.)
Slope =    0.05567  s(percent)=       5.57
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.808 min.
Rainfall intensity =      1.481(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.658
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)  =  71.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.755(CFS)
Total initial stream area =        1.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    979.000(Ft.)
End of natural channel elevation =    952.000(Ft.)
Length of natural channel  =   645.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.168(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.89(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0419
Corrected/adjusted channel slope =  0.0419
Travel time =    2.76 min.     TC =   22.57  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.630
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)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.397(In/Hr) for a    10.0 year storm
Subarea runoff =      2.552(CFS) for      2.900(Ac.)
Total runoff =      4.306(CFS)       Total area =       4.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      207.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    952.000(Ft.)
End of natural channel elevation =    926.000(Ft.)
Length of natural channel  =   937.000(Ft.)
Estimated mean flow rate at midpoint of channel =      9.850(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0277
Corrected/adjusted channel slope =  0.0277
Travel time =    3.77 min.     TC =   26.34  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.626
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  70.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.303(In/Hr) for a    10.0 year storm
Subarea runoff =      9.866(CFS) for     12.100(Ac.)
Total runoff =     14.172(CFS)       Total area =      16.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      207.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.800(Ac.)
Runoff from this stream =     14.172(CFS)
Time of concentration =   26.34 min.
Rainfall intensity =     1.303(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 =   540.000(Ft.)
Top (of initial area) elevation =  1094.000(Ft.)
Bottom (of initial area) elevation =  1015.000(Ft.)
Difference in elevation =    79.000(Ft.)
Slope =    0.14630  s(percent)=      14.63
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.917 min.
Rainfall intensity =      1.796(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.781
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
```

```
RI index for soil(AMC 2)  =  83.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.349(CFS)
Total initial stream area =        3.100(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      206.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1015.000(Ft.)
End of natural channel elevation =    958.000(Ft.)
Length of natural channel  =  1050.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.768(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.63(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0543
Corrected/adjusted channel slope =  0.0543
Travel time =    3.11 min.     TC =   16.02  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.731
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.630(In/Hr) for a    10.0 year storm
Subarea runoff =      7.508(CFS) for      6.300(Ac.)
Total runoff =     11.857(CFS)       Total area =       9.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      9.400(Ac.)
Runoff from this stream =     11.857(CFS)
Time of concentration =   16.02 min.
Rainfall intensity =     1.630(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1093.000(Ft.)
Bottom (of initial area) elevation =   958.000(Ft.)
Difference in elevation =   135.000(Ft.)
Slope =    0.13500  s(percent)=      13.50
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.795 min.
Rainfall intensity =      1.596(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.748
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.700
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  80.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.480(CFS)
Total initial stream area =        7.100(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.100(Ac.)
Runoff from this stream =      8.480(CFS)
Time of concentration =   16.80 min.
Rainfall intensity =     1.596(In/Hr)
Summary of stream data:

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


1        11.857     16.02                  1.630
2         8.480     16.80                  1.596
Largest stream flow has longer or shorter time of concentration
Qp =     11.857 + sum of
          Qa          Tb/Ta
           8.480 *    0.954 =      8.090
Qp =     19.947

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.857       8.480
Area of streams before confluence:
       9.400       7.100
Results of confluence:
Total flow rate =     19.947(CFS)
Time of concentration =    16.024 min.
Effective stream area after confluence =     16.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =    958.000(Ft.)
End of natural channel elevation =    926.000(Ft.)
Length of natural channel  =   900.000(Ft.)
Estimated mean flow rate at midpoint of channel =     25.387(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.03(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0356
Corrected/adjusted channel slope =  0.0356
Travel time =    2.49 min.     TC =   18.51  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.689
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)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.527(In/Hr) for a    10.0 year storm
Subarea runoff =      9.467(CFS) for      9.000(Ac.)
Total runoff =     29.414(CFS)       Total area =      25.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     25.500(Ac.)
Runoff from this stream =     29.414(CFS)
Time of concentration =   18.51 min.
Rainfall intensity =     1.527(In/Hr)
Summary of stream data:

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

```
1       14.172     26.34              1.303
2       29.414     18.51              1.527
Largest stream flow has longer or shorter time of concentration
Qp =     29.414 + sum of
          Qa          Tb/Ta
          14.172 *    0.703 =      9.961
Qp =     39.374

Total of 2 main streams to confluence:
Flow rates before confluence point:
      14.172      29.414
Area of streams before confluence:
       16.800       25.500


Results of confluence:
Total flow rate =     39.374(CFS)
Time of concentration =    18.512 min.
Effective stream area after confluence  =     42.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    926.000(Ft.)
End of natural channel elevation =    912.000(Ft.)
Length of natural channel  =   585.000(Ft.)
Estimated mean flow rate at midpoint of channel =     45.844(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.84(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0239
Corrected/adjusted channel slope =  0.0239
Travel time =    1.67 min.     TC =   20.18  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.725
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)  =  79.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.469(In/Hr) for a    10.0 year storm
Subarea runoff =     14.806(CFS) for     13.900(Ac.)
Total runoff =     54.180(CFS)      Total area =      56.200(Ac.)
End of computations, total study area =           56.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

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

APPENDIXC.3: 2-YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study        Date: 06/18/10  File:BE2.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B1" TO "B8"
2-YR (EXISTING CONDITION)
FN: BE2
------------------------------------------------------------------------
 *********   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) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.550(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Initial area flow distance =   970.000(Ft.)
Top (of initial area) elevation =  1033.000(Ft.)
Bottom (of initial area) elevation =   979.000(Ft.)
Difference in elevation =    54.000(Ft.)
Slope =    0.05567  s(percent)=       5.57
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.808 min.
Rainfall intensity =      0.906(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.383
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 1)  =  52.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.625(CFS)
Total initial stream area =        1.800(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
--------------------------------------------------------------------------
Top of natural channel elevation =    979.000(Ft.)
End of natural channel elevation =    952.000(Ft.)
Length of natural channel  =   645.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.128(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0419
Corrected/adjusted channel slope =  0.0419
Travel time =    3.42 min.     TC =   23.23  min.
```

```
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.347
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 1)  =  49.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.843(In/Hr) for a     2.0 year storm
Subarea runoff =      0.848(CFS) for      2.900(Ac.)
Total runoff =      1.473(CFS)       Total area =       4.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      207.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    952.000(Ft.)
End of natural channel elevation =    926.000(Ft.)
Length of natural channel  =   937.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.369(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0277
Corrected/adjusted channel slope =  0.0277
Travel time =    4.87 min.     TC =   28.10  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.339
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  51.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.774(In/Hr) for a     2.0 year storm
Subarea runoff =      3.173(CFS) for     12.100(Ac.)
Total runoff =      4.646(CFS)       Total area =      16.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      207.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.800(Ac.)
Runoff from this stream =      4.646(CFS)
Time of concentration =   28.10 min.
Rainfall intensity =     0.774(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 =   540.000(Ft.)
Top (of initial area) elevation =  1094.000(Ft.)
Bottom (of initial area) elevation =  1015.000(Ft.)
Difference in elevation =    79.000(Ft.)
Slope =    0.14630  s(percent)=      14.63
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.917 min.
Rainfall intensity =      1.098(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.565
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
```

```
RI index for soil(AMC 1)  =  67.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.923(CFS)
Total initial stream area =        3.100(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      206.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1015.000(Ft.)
End of natural channel elevation =    958.000(Ft.)
Length of natural channel  =  1050.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.877(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.63(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0543
Corrected/adjusted channel slope =  0.0543
Travel time =    3.78 min.     TC =   16.69  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.477
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.978(In/Hr) for a     2.0 year storm
Subarea runoff =      2.940(CFS) for      6.300(Ac.)
Total runoff =      4.863(CFS)       Total area =       9.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      9.400(Ac.)
Runoff from this stream =      4.863(CFS)
Time of concentration =   16.69 min.
Rainfall intensity =     0.978(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1093.000(Ft.)
Bottom (of initial area) elevation =   958.000(Ft.)
Difference in elevation =   135.000(Ft.)
Slope =    0.13500  s(percent)=      13.50
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.795 min.
Rainfall intensity =      0.975(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.506
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.700
Decimal fraction soil group D = 0.300
RI index for soil(AMC 1)  =  63.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.504(CFS)
Total initial stream area =        7.100(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.100(Ac.)
Runoff from this stream =      3.504(CFS)
Time of concentration =   16.80 min.
Rainfall intensity =     0.975(In/Hr)
Summary of stream data:

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


1        4.863     16.69                 0.978
2        3.504     16.80                 0.975
Largest stream flow has longer or shorter time of concentration
Qp =      4.863 + sum of
          Qa          Tb/Ta
           3.504 *    0.994 =      3.482
Qp =      8.345

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.863       3.504
Area of streams before confluence:
        9.400       7.100
Results of confluence:
Total flow rate =      8.345(CFS)
Time of concentration =    16.694 min.
Effective stream area after confluence =     16.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =    958.000(Ft.)
End of natural channel elevation =    926.000(Ft.)
Length of natural channel  =   900.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.621(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0356
Corrected/adjusted channel slope =  0.0356
Travel time =    3.13 min.     TC =   19.83  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.415
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 1)  =  55.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.905(In/Hr) for a     2.0 year storm
Subarea runoff =      3.384(CFS) for      9.000(Ac.)
Total runoff =     11.729(CFS)       Total area =      25.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     25.500(Ac.)
Runoff from this stream =     11.729(CFS)
Time of concentration =   19.83 min.
Rainfall intensity =     0.905(In/Hr)
Summary of stream data:

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

```
1        4.646      28.10                0.774
2       11.729      19.83                0.905
Largest stream flow has longer or shorter time of concentration
Qp =     11.729 + sum of
          Qa           Tb/Ta
           4.646 *     0.706 =      3.279
Qp =     15.008

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.646      11.729
Area of streams before confluence:
       16.800       25.500


Results of confluence:
Total flow rate =     15.008(CFS)
Time of concentration =    19.828 min.
Effective stream area after confluence  =     42.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =    926.000(Ft.)
End of natural channel elevation =    912.000(Ft.)
Length of natural channel  =   585.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.474(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.47(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0239
Corrected/adjusted channel slope =  0.0239
Travel time =    2.18 min.     TC =   22.01  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.461
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 I)  =  61.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.864(In/Hr) for a      2.0 year storm
Subarea runoff =      5.529(CFS) for     13.900(Ac.)
Total runoff =     20.537(CFS)       Total area =      56.200(Ac.)
End of computations, total study area =          56.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

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

APPENDIX D: HYDROLOGY CALCULATIONS ASED ON PROPOSED CONDITION FOR AREA "B" (RATIONAL TABLING METHOD)

APPENDIX D.1: 100- YEAR RATIONAL TABLING CALCULATIONS

```
                    Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study        Date: 07/01/10  File:B1MD100.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B1" & "B2"
100-YR (MASTER DRAINAGE STUDY)
FN: B1MD100
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.400(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1000.000 to Point/Station     1001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   710.000(Ft.)
Top (of initial area) elevation =  1013.000(Ft.)
Bottom (of initial area) elevation =   980.000(Ft.)
Difference in elevation =    33.000(Ft.)
Slope =    0.04648  s(percent)=       4.65
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.446 min.
Rainfall intensity =      3.217(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 = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.30
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     21.248(CFS)
Total initial stream area =        8.000(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   980.000(Ft.)
Downstream point elevation =   930.000(Ft.)
Channel length thru subarea  =  1315.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =     41.036(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     41.036(CFS)
Depth of flow =   0.661(Ft.), Average velocity =  12.440(Ft/s)
Channel flow top width =    5.983(Ft.)
Flow Velocity =   12.44(Ft/s)
Travel time  =    1.76 min.
Time of concentration =   11.21 min.
```

```
Sub-Channel No. 1 Critical depth =      1.258(Ft.)
   '      '       '     Critical flow top width =      7.773(Ft.)
   '      '       '     Critical flow velocity=    5.542(Ft/s)
   '      '       '     Critical flow area =      7.404(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  59.90
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.979(In/Hr) for a   100.0 year storm
Subarea runoff =     36.719(CFS) for     14.900(Ac.)
Total runoff =     57.968(CFS)       Total area =      22.900(Ac.)
End of computations, total study area =           22.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  59.0
```

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study        Date: 06/08/10  File:B2MD100.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B3" TO "B7"
100-YR (MASTER DRAINAGE STUDY)
FN: B2MD100
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.400(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1004.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   950.000(Ft.)
Top (of initial area) elevation =  1094.000(Ft.)
Bottom (of initial area) elevation =   980.000(Ft.)
Difference in elevation =   114.000(Ft.)
Slope =    0.12000  s(percent)=      12.00
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.847 min.
Rainfall intensity =      2.480(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.802
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  81.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     12.132(CFS)
Total initial stream area =        6.100(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1005.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   980.000(Ft.)
Downstream point elevation =   955.000(Ft.)
Channel length thru subarea  =   470.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     17.800(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     17.800(CFS)
Depth of flow =   0.255(Ft.), Average velocity =   6.633(Ft/s)
Channel flow top width =   11.021(Ft.)
Flow Velocity =    6.63(Ft/s)
Travel time  =    1.18 min.
Time of concentration =   18.03 min.
```

```
Sub-Channel No. 1 Critical depth =      0.445(Ft.)
   '      '       '     Critical flow top width =     11.781(Ft.)
   '      '       '     Critical flow velocity=    3.670(Ft/s)
   '      '       '     Critical flow area =      4.850(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.787
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)  =  79.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.405(In/Hr) for a   100.0 year storm
Subarea runoff =     10.795(CFS) for      5.700(Ac.)
Total runoff =     22.926(CFS)       Total area =      11.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1008.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   955.000(Ft.)
Downstream point elevation =   912.000(Ft.)
Channel length thru subarea  =  1035.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     37.207(CFS)
Manning's 'N'     = 0.020
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     37.207(CFS)
Depth of flow =   0.426(Ft.), Average velocity =   8.056(Ft/s)
Channel flow top width =   11.702(Ft.)
Flow Velocity =    8.06(Ft/s)
Travel time   =    2.14 min.
Time of concentration =   20.17 min.

Sub-Channel No. 1 Critical depth =      0.719(Ft.)
   '      '       '     Critical flow top width =     12.875(Ft.)
   '      '       '     Critical flow velocity=    4.526(Ft/s)
   '      '       '     Critical flow area =      8.221(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.569
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.287(In/Hr) for a   100.0 year storm
Subarea runoff =     19.109(CFS) for     14.700(Ac.)
Total runoff =     42.036(CFS)       Total area =      26.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     26.500(Ac.)
Runoff from this stream =     42.036(CFS)
Time of concentration =   20.17 min.
Rainfall intensity =     2.287(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1007.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   665.000(Ft.)
Top (of initial area) elevation =   959.000(Ft.)
Bottom (of initial area) elevation =   943.000(Ft.)
Difference in elevation =    16.000(Ft.)
Slope =    0.02406  s(percent)=       2.41
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.143 min.
Rainfall intensity =      2.288(In/Hr) for a   100.0 year storm
```

```
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.713
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)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.611(CFS)
Total initial stream area =       1.600(Ac.)
Pervious area fraction = 1.000

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1007.000 to Point/Station     1008.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   943.000(Ft.)
Downstream point elevation =   912.000(Ft.)
Channel length thru subarea  =  1065.000(Ft.)
Channel base width     =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      4.243(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =      4.243(CFS)
Depth of flow =   0.562(Ft.), Average velocity =   6.728(Ft/s)
Channel flow top width =    2.246(Ft.)
Flow Velocity =    6.73(Ft/s)
Travel time  =    2.64 min.
Time of concentration =   22.78 min.

Sub-Channel No. 1 Critical depth =      0.773(Ft.)
  '      '       '     Critical flow top width =      3.094(Ft.)
  '      '       '     Critical flow velocity=    3.546(Ft/s)
  '      '       '     Critical flow area =      1.196(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.740
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)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.165(In/Hr) for a   100.0 year storm
Subarea runoff =      3.203(CFS) for      2.000(Ac.)
Total runoff =      5.814(CFS)       Total area =       3.600(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1007.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.600(Ac.)
Runoff from this stream =      5.814(CFS)
Time of concentration =   22.78 min.
Rainfall intensity =     2.165(In/Hr)
Summary of stream data:

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


1       42.036      20.17                 2.287
2        5.814      22.78                 2.165
Largest stream flow has longer or shorter time of concentration
Qp =      42.036 + sum of
          Qa          Tb/Ta
           5.814 *    0.885 =      5.147
Qp =      47.183

Total of 2 streams to confluence:
Flow rates before confluence point:
      42.036       5.814
Area of streams before confluence:
       26.500       3.600
Results of confluence:
```

```
Total flow rate =     47.183(CFS)
Time of concentration =    20.169 min.
Effective stream area after confluence =     30.100(Ac.)
End of computations, total study area =           30.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  64.6
```

APPENDIX D.2: 10- YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
      Rational Hydrology Study        Date: 07/01/10  File:B1MD10.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B1" & "B2"
10-YR (MASTER DRAINAGE STUDY)
FN: B1MD10
------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.900(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1000.000 to Point/Station     1001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   710.000(Ft.)
Top (of initial area) elevation =  1013.000(Ft.)
Bottom (of initial area) elevation =   980.000(Ft.)
Difference in elevation =    33.000(Ft.)
Slope =    0.04648  s(percent)=       4.65
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.446 min.
Rainfall intensity =      2.067(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 = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.30
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     13.193(CFS)
Total initial stream area =        8.000(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   980.000(Ft.)
Downstream point elevation =   930.000(Ft.)
Channel length thru subarea  =  1315.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =     25.480(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     25.480(CFS)
Depth of flow =   0.502(Ft.), Average velocity =  10.675(Ft/s)
Channel flow top width =    5.506(Ft.)
Flow Velocity =   10.67(Ft/s)
Travel time  =    2.05 min.
Time of concentration =   11.50 min.
```

```
Sub-Channel No. 1 Critical depth =      0.953(Ft.)
  '      '       '     Critical flow top width =      6.859(Ft.)
  '      '       '     Critical flow velocity=    4.923(Ft/s)
  '      '       '     Critical flow area =      5.175(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  59.90
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.892(In/Hr) for a    10.0 year storm
Subarea runoff =     22.528(CFS) for     14.900(Ac.)
Total runoff =     35.721(CFS)       Total area =      22.900(Ac.)
End of computations, total study area =           22.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  59.0
```

```
                    Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
      Rational Hydrology Study        Date: 06/08/10  File:B2MD10.out
------------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B3" TO "B7"
10-YR (MASTER DRAINAGE STUDY)
FN: B2MD10
------------------------------------------------------------------------------
 *********   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 =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.900(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1004.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   950.000(Ft.)
Top (of initial area) elevation =  1094.000(Ft.)
Bottom (of initial area) elevation =   980.000(Ft.)
Difference in elevation =   114.000(Ft.)
Slope =    0.12000  s(percent)=      12.00
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.847 min.
Rainfall intensity =      1.593(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.756
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  81.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.352(CFS)
Total initial stream area =        6.100(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1005.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   980.000(Ft.)
Downstream point elevation =   955.000(Ft.)
Channel length thru subarea  =   470.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     10.786(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     10.786(CFS)
Depth of flow =   0.189(Ft.), Average velocity =   5.487(Ft/s)
Channel flow top width =   10.758(Ft.)
Flow Velocity =    5.49(Ft/s)
Travel time  =    1.43 min.
Time of concentration =   18.27 min.
```

```
Sub-Channel No. 1 Critical depth =      0.324(Ft.)
  '      '       '     Critical flow top width =     11.297(Ft.)
  '      '       '     Critical flow velocity=    3.124(Ft/s)
  '      '       '     Critical flow area =      3.452(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.735
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)  =  79.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.536(In/Hr) for a    10.0 year storm
Subarea runoff =      6.439(CFS) for      5.700(Ac.)
Total runoff =     13.791(CFS)       Total area =      11.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1008.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   955.000(Ft.)
Downstream point elevation =   912.000(Ft.)
Channel length thru subarea  =  1035.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     22.381(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     22.381(CFS)
Depth of flow =   0.315(Ft.), Average velocity =   6.687(Ft/s)
Channel flow top width =   11.260(Ft.)
Flow Velocity =    6.69(Ft/s)
Travel time  =    2.58 min.
Time of concentration =   20.85 min.

Sub-Channel No. 1 Critical depth =      0.516(Ft.)
  '      '       '     Critical flow top width =     12.063(Ft.)
  '      '       '     Critical flow velocity=    3.935(Ft/s)
  '      '       '     Critical flow area =      5.688(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.468
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  50.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.448(In/Hr) for a    10.0 year storm
Subarea runoff =      9.969(CFS) for     14.700(Ac.)
Total runoff =     23.760(CFS)       Total area =      26.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     26.500(Ac.)
Runoff from this stream =     23.760(CFS)
Time of concentration =   20.85 min.
Rainfall intensity =     1.448(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1007.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   665.000(Ft.)
Top (of initial area) elevation =   959.000(Ft.)
Bottom (of initial area) elevation =   943.000(Ft.)
Difference in elevation =    16.000(Ft.)
Slope =    0.02406  s(percent)=       2.41
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.143 min.
Rainfall intensity =      1.470(In/Hr) for a    10.0 year storm
```

```
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.639
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)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.504(CFS)
Total initial stream area =        1.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1007.000 to Point/Station     1008.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   943.000(Ft.)
Downstream point elevation =   912.000(Ft.)
Channel length thru subarea  =  1065.000(Ft.)
Channel base width     =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      2.445(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =      2.445(CFS)
Depth of flow =   0.457(Ft.), Average velocity =   5.861(Ft/s)
Channel flow top width =    1.827(Ft.)
Flow Velocity =    5.86(Ft/s)
Travel time  =    3.03 min.
Time of concentration =   23.17 min.

Sub-Channel No. 1 Critical depth =      0.621(Ft.)
  '      '       '     Critical flow top width =      2.484(Ft.)
  '      '       '     Critical flow velocity=    3.169(Ft/s)
  '      '       '     Critical flow area =      0.772(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.672
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)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.380(In/Hr) for a    10.0 year storm
Subarea runoff =      1.855(CFS) for      2.000(Ac.)
Total runoff =      3.360(CFS)       Total area =       3.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1007.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.600(Ac.)
Runoff from this stream =      3.360(CFS)
Time of concentration =   23.17 min.
Rainfall intensity =     1.380(In/Hr)
Summary of stream data:

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


1       23.760     20.85                  1.448
2        3.360     23.17                  1.380
Largest stream flow has longer or shorter time of concentration
Qp =     23.760 + sum of
          Qa          Tb/Ta
           3.360 *    0.900 =      3.024
Qp =     26.783

Total of 2 streams to confluence:
Flow rates before confluence point:
      23.760       3.360
Area of streams before confluence:
       26.500       3.600
Results of confluence:
```

Total flow rate = 26.783(CFS)
Time of concentration = 20.854 min.
Effective stream area after confluence = 30.100(Ac.)
End of computations, total study area = 30.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 64.6

APPENDIX D.3: 2- YEAR RATIONAL TABLING CALCULATIONS

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
       Rational Hydrology Study        Date: 07/01/10  File:B1MD2.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B1" & "B2"
2-YR (MASTER DRAINAGE STUDY)
FN: B1MD2
------------------------------------------------------------------------
 *********   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) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.550(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1000.000 to Point/Station     1001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   710.000(Ft.)
Top (of initial area) elevation =  1013.000(Ft.)
Bottom (of initial area) elevation =   980.000(Ft.)
Difference in elevation =    33.000(Ft.)
Slope =    0.04648  s(percent)=       4.65
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.446 min.
Rainfall intensity =      1.264(In/Hr) for a     2.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.699
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  37.30
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      7.063(CFS)
Total initial stream area =        8.000(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   980.000(Ft.)
Downstream point elevation =   930.000(Ft.)
Channel length thru subarea  =  1315.000(Ft.)
Channel base width     =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.500
Slope or 'Z' of right channel bank =   1.500
Estimated mean flow rate at midpoint of channel =     13.640(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     13.640(CFS)
Depth of flow =   0.348(Ft.), Average velocity =   8.654(Ft/s)
Channel flow top width =    5.045(Ft.)
Flow Velocity =    8.65(Ft/s)
Travel time  =    2.53 min.
Time of concentration =   11.98 min.
```

```
Sub-Channel No. 1 Critical depth =      0.656(Ft.)
  '      '        '     Critical flow top width =      5.969(Ft.)
  '      '        '     Critical flow velocity=    4.170(Ft/s)
  '      '        '     Critical flow area =      3.271(Sq.Ft)

 Adding area flow to channel
CONDOMINIUM subarea type
Runoff Coefficient = 0.699
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.300
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  39.90
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.136(In/Hr) for a     2.0 year storm
Subarea runoff =     11.824(CFS) for     14.900(Ac.)
Total runoff =     18.887(CFS)       Total area =      22.900(Ac.)
End of computations, total study area =           22.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  59.0
```

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study        Date: 06/08/10  File:B2MD2.out
------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294
AREA "B" FOR AREAS "B3" TO "B7"
2-YR (MASTER DRAINAGE STUDY)
FN: B2MD2
------------------------------------------------------------------------
 *********   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) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.400(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.550(In/Hr)
Slope of intensity duration curve = 0.4500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1004.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   950.000(Ft.)
Top (of initial area) elevation =  1094.000(Ft.)
Bottom (of initial area) elevation =   980.000(Ft.)
Difference in elevation =   114.000(Ft.)
Slope =    0.12000  s(percent)=      12.00
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.847 min.
Rainfall intensity =      0.974(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.519
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  65.10
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.084(CFS)
Total initial stream area =        6.100(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1005.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   980.000(Ft.)
Downstream point elevation =   955.000(Ft.)
Channel length thru subarea  =   470.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      4.525(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.525(CFS)
Depth of flow =   0.113(Ft.), Average velocity =   3.927(Ft/s)
Channel flow top width =   10.451(Ft.)
Flow Velocity =    3.93(Ft/s)
Travel time  =    1.99 min.
Time of concentration =   18.84 min.
```

```
Sub-Channel No. 1 Critical depth =      0.184(Ft.)
  '      '       '     Critical flow top width =     10.734(Ft.)
  '      '       '     Critical flow velocity=    2.378(Ft/s)
  '      '       '     Critical flow area =      1.903(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.482
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 1)  =  62.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.926(In/Hr) for a     2.0 year storm
Subarea runoff =      2.545(CFS) for      5.700(Ac.)
Total runoff =      5.629(CFS)       Total area =      11.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1008.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   955.000(Ft.)
Downstream point elevation =   912.000(Ft.)
Channel length thru subarea  =  1035.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      9.135(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      9.135(CFS)
Depth of flow =   0.185(Ft.), Average velocity =   4.771(Ft/s)
Channel flow top width =   10.739(Ft.)
Flow Velocity =    4.77(Ft/s)
Travel time  =    3.62 min.
Time of concentration =   22.46 min.

Sub-Channel No. 1 Critical depth =      0.289(Ft.)
  '      '       '     Critical flow top width =     11.156(Ft.)
  '      '       '     Critical flow velocity=    2.988(Ft/s)
  '      '       '     Critical flow area =      3.058(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.201
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  31.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.856(In/Hr) for a     2.0 year storm
Subarea runoff =      2.535(CFS) for     14.700(Ac.)
Total runoff =      8.164(CFS)       Total area =      26.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     26.500(Ac.)
Runoff from this stream =      8.164(CFS)
Time of concentration =   22.46 min.
Rainfall intensity =     0.856(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1007.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   665.000(Ft.)
Top (of initial area) elevation =   959.000(Ft.)
Bottom (of initial area) elevation =   943.000(Ft.)
Difference in elevation =    16.000(Ft.)
Slope =    0.02406  s(percent)=       2.41
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.143 min.
Rainfall intensity =      0.899(In/Hr) for a     2.0 year storm
```

```
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.361
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 1)  =  49.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.519(CFS)
Total initial stream area =        1.600(Ac.)
Pervious area fraction = 1.000

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1007.000 to Point/Station     1008.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   943.000(Ft.)
Downstream point elevation =   912.000(Ft.)
Channel length thru subarea  =  1065.000(Ft.)
Channel base width     =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      0.843(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =      0.843(CFS)
Depth of flow =   0.306(Ft.), Average velocity =   4.491(Ft/s)
Channel flow top width =    1.225(Ft.)
Flow Velocity =    4.49(Ft/s)
Travel time  =    3.95 min.
Time of concentration =   24.10 min.

Sub-Channel No. 1 Critical depth =      0.406(Ft.)
  '     '       '     Critical flow top width =      1.625(Ft.)
  '     '       '     Critical flow velocity=    2.554(Ft/s)
  '     '       '     Critical flow area =      0.330(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.396
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 1)  =  55.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.829(In/Hr) for a     2.0 year storm
Subarea runoff =      0.656(CFS) for      2.000(Ac.)
Total runoff =      1.175(CFS)       Total area =       3.600(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1007.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.600(Ac.)
Runoff from this stream =      1.175(CFS)
Time of concentration =   24.10 min.
Rainfall intensity =     0.829(In/Hr)
Summary of stream data:

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


1         8.164      22.46                  0.856
2         1.175      24.10                  0.829
Largest stream flow has longer or shorter time of concentration
Qp =      8.164 + sum of
          Qa          Tb/Ta
           1.175 *    0.932 =       1.095
Qp =      9.259

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.164       1.175
Area of streams before confluence:
      26.500       3.600
Results of confluence:
```

Total flow rate = 9.259(CFS)
Time of concentration = 22.456 min.
Effective stream area after confluence = 30.100(Ac.)
End of computations, total study area = 30.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 64.6

APPENDIX E: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "A" (HYDROGRAPH METHOD)

APPENDIX E.1: 100-YEAR/1- HOUR HYDROGRAPH CALCULATIONS

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 - 2002, Version 6.1
Study date 06/18/10 File: AEUH1100.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "A" FOR AREAS "A1" TO "A20"
100 YEAR - 1, 3, 6, 24 HOUR
FN: AEUH

Drainage Area = 291.20(Ac.) = 0.455 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 291.20(Ac.) = 0.455 Sq. Mi.
Length along longest watercourse = 8640.00(Ft.)
Length along longest watercourse measured to centroid = 4525.00(Ft.)
Length along longest watercourse = 1.636 Mi.
Length along longest watercourse measured to centroid = 0.857 Mi.
Difference in elevation = 317.00(Ft.)
Slope along watercourse = 193.7222 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.251 Hr.
Lag time = 15.05 Min.
25% of lag time = 3.76 Min.
40% of lag time = 6.02 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]
291.20	0.55	160.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
291.20	1.40	407.68

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.400(In)

Point rain (area averaged) = 1.400(In)
Areal adjustment factor = 99.74 %
Adjusted average point rain = 1.396(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
118.000	50.00	0.000
25.000	63.25	0.000
21.900	57.20	0.000
73.900	59.50	0.000
24.500	53.80	0.000
27.900	55.70	0.000

Total Area Entered = 291.20(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
50.0	50.0	0.572	0.000	0.572	0.405	0.232
63.3	63.3	0.435	0.000	0.435	0.086	0.037

57.2	57.2	0.499	0.000	0.499	0.075	0.037
59.5	59.5	0.475	0.000	0.475	0.254	0.121
53.8	53.8	0.533	0.000	0.533	0.084	0.045
55.7	55.7	0.514	0.000	0.514	0.096	0.049
					Sum (F) =	0.521

Area averaged mean soil loss (F) (In/Hr) = 0.521
Minimum soil loss rate ((In/Hr)) = 0.261
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.4800

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	33.222	3.334	9.786
2	0.167	66.444	12.801	37.567
3	0.250	99.665	21.686	63.643
4	0.333	132.887	20.105	59.002
5	0.417	166.109	11.153	32.730
6	0.500	199.331	6.338	18.600
7	0.583	232.553	4.479	13.146
8	0.667	265.774	3.476	10.201
9	0.750	298.996	2.840	8.334
10	0.833	332.218	2.225	6.530
11	0.917	365.440	1.936	5.682
12	1.000	398.662	1.538	4.513
13	1.083	431.883	1.278	3.751
14	1.167	465.105	1.057	3.101
15	1.250	498.327	1.007	2.954
16	1.333	531.549	0.877	2.573
17	1.417	564.771	0.718	2.107
18	1.500	597.992	0.618	1.815
19	1.583	631.214	0.539	1.583
20	1.667	664.436	0.453	1.329
21	1.750	697.658	0.353	1.037
22	1.833	730.879	0.332	0.975
23	1.917	764.101	0.332	0.975
24	2.000	797.323	0.332	0.975
25	2.083	830.545	0.193	0.566
			Sum = 100.000	Sum= 293.475

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.737	0.521	---	0.22
2	0.17	4.50	0.754	0.521	---	0.23
3	0.25	5.40	0.905	0.521	---	0.38
4	0.33	5.40	0.905	0.521	---	0.38
5	0.42	5.70	0.955	0.521	---	0.43
6	0.50	6.40	1.072	0.521	---	0.55
7	0.58	7.90	1.324	0.521	---	0.80
8	0.67	9.10	1.525	0.521	---	1.00
9	0.75	12.80	2.145	0.521	---	1.62
10	0.83	25.60	4.289	0.521	---	3.77
11	0.92	7.90	1.324	0.521	---	0.80
12	1.00	4.90	0.821	0.521	---	0.30
	Sum =	100.0			Sum =	10.5

Flood volume = Effective rainfall 0.88(In)
times area 291.2(Ac.)/[(In)/(Ft.)] = 21.2(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 12.650(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 924946.5 Cubic Feet
Total soil loss = 551026.5 Cubic Feet

Peak flow rate of this hydrograph = 436.342(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	125.0	250.0	375.0	500.0
0+ 5	0.0146	2.11	Q				
0+10	0.0862	10.40	Q				
0+15	0.2670	26.25	V Q				
0+20	0.5820	45.74	V Q				
0+25	1.0220	63.89	V Q				
0+30	1.5757	80.40	V Q				
0+35	2.2545	98.56	V Q				
0+40	3.1199	125.64	V Q				
0+45	4.2755	167.80	V Q				
0+50	5.9808	247.61	V Q				
0+55	8.4891	364.20	V Q				
1+ 0	11.4942	436.34	V Q				
1+ 5	14.1318	382.98	Q V				
1+10	15.8834	254.34	Q V				
1+15	17.0059	162.98	Q V				
1+20	17.7872	113.45	Q V				
1+25	18.3846	86.74	Q V				
1+30	18.8660	69.90	Q V				
1+35	19.2565	56.69	Q V				
1+40	19.5847	47.66	Q V				
1+45	19.8552	39.28	Q V				
1+50	20.0829	33.06	Q V				
1+55	20.2768	28.16	Q V				
2+ 0	20.4501	25.16	Q V				
2+ 5	20.6003	21.80	Q V				
2+10	20.7268	18.38	Q V				
2+15	20.8342	15.60	Q V				
2+20	20.9253	13.22	Q V				
2+25	21.0014	11.05	Q V				
2+30	21.0641	9.11	Q V				
2+35	21.1187	7.92	Q V				
2+40	21.1664	6.92	Q V				
2+45	21.2054	5.67	Q V				
2+50	21.2275	3.21	Q V				
2+55	21.2327	0.75	Q V				
3+ 0	21.2339	0.17	Q V				

APPENDIX E.2: 100-YEAR/24- HOUR HYDROGRAPH CALCULATIONS

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 06/18/10 File: AEUH24100.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "A" FOR AREAS "A1" TO "A20"
100 YEAR - 1, 3, 6, 24 HOUR
FN: AEUH

Drainage Area = 291.20(Ac.) = 0.455 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 291.20(Ac.) = 0.455 Sq. Mi.
Length along longest watercourse = 8640.00(Ft.)
Length along longest watercourse measured to centroid = 4525.00(Ft.)
Length along longest watercourse = 1.636 Mi.
Length along longest watercourse measured to centroid = 0.857 Mi.
Difference in elevation = 317.00(Ft.)
Slope along watercourse = 193.7222 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.251 Hr.
Lag time = 15.05 Min.
25% of lag time = 3.76 Min.
40% of lag time = 6.02 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]
291.20	2.50	728.00

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
291.20	8.00	2329.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 8.000(In)

Point rain (area averaged) = 8.000(In)
Areal adjustment factor = 99.94 %
Adjusted average point rain = 7.995(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
118.000	50.00	0.000
25.000	63.25	0.000
21.900	57.20	0.000
73.900	59.50	0.000
24.500	53.80	0.000
27.900	55.70	0.000

Total Area Entered = 291.20(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
50.0	50.0	0.572	0.000	0.572	0.405	0.232
63.3	63.3	0.435	0.000	0.435	0.086	0.037

57.2	57.2	0.499	0.000	0.499	0.075	0.037
59.5	59.5	0.475	0.000	0.475	0.254	0.121
53.8	53.8	0.533	0.000	0.533	0.084	0.045
55.7	55.7	0.514	0.000	0.514	0.096	0.049
					Sum (F) =	0.521

Area averaged mean soil loss (F) (In/Hr) = 0.521
Minimum soil loss rate ((In/Hr)) = 0.261
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	33.222	3.334	9.786
2	0.167	66.444	12.801	37.567
3	0.250	99.665	21.686	63.643
4	0.333	132.887	20.105	59.002
5	0.417	166.109	11.153	32.730
6	0.500	199.331	6.338	18.600
7	0.583	232.553	4.479	13.146
8	0.667	265.774	3.476	10.201
9	0.750	298.996	2.840	8.334
10	0.833	332.218	2.225	6.530
11	0.917	365.440	1.936	5.682
12	1.000	398.662	1.538	4.513
13	1.083	431.883	1.278	3.751
14	1.167	465.105	1.057	3.101
15	1.250	498.327	1.007	2.954
16	1.333	531.549	0.877	2.573
17	1.417	564.771	0.718	2.107
18	1.500	597.992	0.618	1.815
19	1.583	631.214	0.539	1.583
20	1.667	664.436	0.453	1.329
21	1.750	697.658	0.353	1.037
22	1.833	730.879	0.332	0.975
23	1.917	764.101	0.332	0.975
24	2.000	797.323	0.332	0.975
25	2.083	830.545	0.193	0.566
			Sum = 100.000	Sum= 293.475

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.064	0.924	0.058	0.01
2	0.17	0.07	0.064	0.921	0.058	0.01
3	0.25	0.07	0.064	0.917	0.058	0.01
4	0.33	0.10	0.096	0.913	0.086	0.01
5	0.42	0.10	0.096	0.910	0.086	0.01
6	0.50	0.10	0.096	0.906	0.086	0.01
7	0.58	0.10	0.096	0.903	0.086	0.01
8	0.67	0.10	0.096	0.899	0.086	0.01
9	0.75	0.10	0.096	0.896	0.086	0.01
10	0.83	0.13	0.128	0.892	0.115	0.01
11	0.92	0.13	0.128	0.889	0.115	0.01
12	1.00	0.13	0.128	0.885	0.115	0.01
13	1.08	0.10	0.096	0.882	0.086	0.01
14	1.17	0.10	0.096	0.878	0.086	0.01
15	1.25	0.10	0.096	0.875	0.086	0.01
16	1.33	0.10	0.096	0.871	0.086	0.01
17	1.42	0.10	0.096	0.868	0.086	0.01
18	1.50	0.10	0.096	0.864	0.086	0.01
19	1.58	0.10	0.096	0.861	0.086	0.01
20	1.67	0.10	0.096	0.857	0.086	0.01
21	1.75	0.10	0.096	0.854	0.086	0.01
22	1.83	0.13	0.128	0.851	0.115	0.01
23	1.92	0.13	0.128	0.847	0.115	0.01
24	2.00	0.13	0.128	0.844	0.115	0.01
25	2.08	0.13	0.128	0.840	0.115	0.01
26	2.17	0.13	0.128	0.837	0.115	0.01
27	2.25	0.13	0.128	0.833	0.115	0.01
28	2.33	0.13	0.128	0.830	0.115	0.01
29	2.42	0.13	0.128	0.827	0.115	0.01
30	2.50	0.13	0.128	0.823	0.115	0.01
31	2.58	0.17	0.160	0.820	0.144	0.02

32	2.67	0.17	0.160	0.817	0.144	0.02
33	2.75	0.17	0.160	0.813	0.144	0.02
34	2.83	0.17	0.160	0.810	0.144	0.02
35	2.92	0.17	0.160	0.807	0.144	0.02
36	3.00	0.17	0.160	0.803	0.144	0.02
37	3.08	0.17	0.160	0.800	0.144	0.02
38	3.17	0.17	0.160	0.797	0.144	0.02
39	3.25	0.17	0.160	0.793	0.144	0.02
40	3.33	0.17	0.160	0.790	0.144	0.02
41	3.42	0.17	0.160	0.787	0.144	0.02
42	3.50	0.17	0.160	0.783	0.144	0.02
43	3.58	0.17	0.160	0.780	0.144	0.02
44	3.67	0.17	0.160	0.777	0.144	0.02
45	3.75	0.17	0.160	0.773	0.144	0.02
46	3.83	0.20	0.192	0.770	0.173	0.02
47	3.92	0.20	0.192	0.767	0.173	0.02
48	4.00	0.20	0.192	0.764	0.173	0.02
49	4.08	0.20	0.192	0.760	0.173	0.02
50	4.17	0.20	0.192	0.757	0.173	0.02
51	4.25	0.20	0.192	0.754	0.173	0.02
52	4.33	0.23	0.224	0.751	0.201	0.02
53	4.42	0.23	0.224	0.748	0.201	0.02
54	4.50	0.23	0.224	0.744	0.201	0.02
55	4.58	0.23	0.224	0.741	0.201	0.02
56	4.67	0.23	0.224	0.738	0.201	0.02
57	4.75	0.23	0.224	0.735	0.201	0.02
58	4.83	0.27	0.256	0.732	0.230	0.03
59	4.92	0.27	0.256	0.729	0.230	0.03
60	5.00	0.27	0.256	0.725	0.230	0.03
61	5.08	0.20	0.192	0.722	0.173	0.02
62	5.17	0.20	0.192	0.719	0.173	0.02
63	5.25	0.20	0.192	0.716	0.173	0.02
64	5.33	0.23	0.224	0.713	0.201	0.02
65	5.42	0.23	0.224	0.710	0.201	0.02
66	5.50	0.23	0.224	0.707	0.201	0.02
67	5.58	0.27	0.256	0.703	0.230	0.03
68	5.67	0.27	0.256	0.700	0.230	0.03
69	5.75	0.27	0.256	0.697	0.230	0.03
70	5.83	0.27	0.256	0.694	0.230	0.03
71	5.92	0.27	0.256	0.691	0.230	0.03
72	6.00	0.27	0.256	0.688	0.230	0.03
73	6.08	0.30	0.288	0.685	0.259	0.03
74	6.17	0.30	0.288	0.682	0.259	0.03
75	6.25	0.30	0.288	0.679	0.259	0.03
76	6.33	0.30	0.288	0.676	0.259	0.03
77	6.42	0.30	0.288	0.673	0.259	0.03
78	6.50	0.30	0.288	0.670	0.259	0.03
79	6.58	0.33	0.320	0.667	0.288	0.03
80	6.67	0.33	0.320	0.664	0.288	0.03
81	6.75	0.33	0.320	0.661	0.288	0.03
82	6.83	0.33	0.320	0.658	0.288	0.03
83	6.92	0.33	0.320	0.655	0.288	0.03
84	7.00	0.33	0.320	0.652	0.288	0.03
85	7.08	0.33	0.320	0.649	0.288	0.03
86	7.17	0.33	0.320	0.646	0.288	0.03
87	7.25	0.33	0.320	0.643	0.288	0.03
88	7.33	0.37	0.352	0.640	0.317	0.04
89	7.42	0.37	0.352	0.637	0.317	0.04
90	7.50	0.37	0.352	0.634	0.317	0.04
91	7.58	0.40	0.384	0.631	0.345	0.04
92	7.67	0.40	0.384	0.628	0.345	0.04
93	7.75	0.40	0.384	0.626	0.345	0.04
94	7.83	0.43	0.416	0.623	0.374	0.04
95	7.92	0.43	0.416	0.620	0.374	0.04
96	8.00	0.43	0.416	0.617	0.374	0.04
97	8.08	0.50	0.480	0.614	0.432	0.05
98	8.17	0.50	0.480	0.611	0.432	0.05
99	8.25	0.50	0.480	0.608	0.432	0.05
100	8.33	0.50	0.480	0.606	0.432	0.05
101	8.42	0.50	0.480	0.603	0.432	0.05
102	8.50	0.50	0.480	0.600	0.432	0.05
103	8.58	0.53	0.512	0.597	0.461	0.05
104	8.67	0.53	0.512	0.594	0.461	0.05
105	8.75	0.53	0.512	0.591	0.461	0.05
106	8.83	0.57	0.544	0.589	0.489	0.05
107	8.92	0.57	0.544	0.586	0.489	0.05
108	9.00	0.57	0.544	0.583	0.489	0.05
109	9.08	0.63	0.608	0.580	---	0.03
110	9.17	0.63	0.608	0.578	---	0.03
111	9.25	0.63	0.608	0.575	---	0.03
112	9.33	0.67	0.640	0.572	---	0.07

113	9.42	0.67	0.640	0.569	---	0.07
114	9.50	0.67	0.640	0.567	---	0.07
115	9.58	0.70	0.672	0.564	---	0.11
116	9.67	0.70	0.672	0.561	---	0.11
117	9.75	0.70	0.672	0.559	---	0.11
118	9.83	0.73	0.704	0.556	---	0.15
119	9.92	0.73	0.704	0.553	---	0.15
120	10.00	0.73	0.704	0.550	---	0.15
121	10.08	0.50	0.480	0.548	0.432	0.05
122	10.17	0.50	0.480	0.545	0.432	0.05
123	10.25	0.50	0.480	0.543	0.432	0.05
124	10.33	0.50	0.480	0.540	0.432	0.05
125	10.42	0.50	0.480	0.537	0.432	0.05
126	10.50	0.50	0.480	0.535	0.432	0.05
127	10.58	0.67	0.640	0.532	---	0.11
128	10.67	0.67	0.640	0.529	---	0.11
129	10.75	0.67	0.640	0.527	---	0.11
130	10.83	0.67	0.640	0.524	---	0.12
131	10.92	0.67	0.640	0.522	---	0.12
132	11.00	0.67	0.640	0.519	---	0.12
133	11.08	0.63	0.608	0.517	---	0.09
134	11.17	0.63	0.608	0.514	---	0.09
135	11.25	0.63	0.608	0.511	---	0.10
136	11.33	0.63	0.608	0.509	---	0.10
137	11.42	0.63	0.608	0.506	---	0.10
138	11.50	0.63	0.608	0.504	---	0.10
139	11.58	0.57	0.544	0.501	---	0.04
140	11.67	0.57	0.544	0.499	---	0.04
141	11.75	0.57	0.544	0.496	---	0.05
142	11.83	0.60	0.576	0.494	---	0.08
143	11.92	0.60	0.576	0.492	---	0.08
144	12.00	0.60	0.576	0.489	---	0.09
145	12.08	0.83	0.800	0.487	---	0.31
146	12.17	0.83	0.800	0.484	---	0.32
147	12.25	0.83	0.800	0.482	---	0.32
148	12.33	0.87	0.832	0.479	---	0.35
149	12.42	0.87	0.832	0.477	---	0.35
150	12.50	0.87	0.832	0.475	---	0.36
151	12.58	0.93	0.895	0.472	---	0.42
152	12.67	0.93	0.895	0.470	---	0.43
153	12.75	0.93	0.895	0.467	---	0.43
154	12.83	0.97	0.927	0.465	---	0.46
155	12.92	0.97	0.927	0.463	---	0.46
156	13.00	0.97	0.927	0.460	---	0.47
157	13.08	1.13	1.087	0.458	---	0.63
158	13.17	1.13	1.087	0.456	---	0.63
159	13.25	1.13	1.087	0.453	---	0.63
160	13.33	1.13	1.087	0.451	---	0.64
161	13.42	1.13	1.087	0.449	---	0.64
162	13.50	1.13	1.087	0.446	---	0.64
163	13.58	0.77	0.736	0.444	---	0.29
164	13.67	0.77	0.736	0.442	---	0.29
165	13.75	0.77	0.736	0.440	---	0.30
166	13.83	0.77	0.736	0.437	---	0.30
167	13.92	0.77	0.736	0.435	---	0.30
168	14.00	0.77	0.736	0.433	---	0.30
169	14.08	0.90	0.864	0.431	---	0.43
170	14.17	0.90	0.864	0.429	---	0.43
171	14.25	0.90	0.864	0.426	---	0.44
172	14.33	0.87	0.832	0.424	---	0.41
173	14.42	0.87	0.832	0.422	---	0.41
174	14.50	0.87	0.832	0.420	---	0.41
175	14.58	0.87	0.832	0.418	---	0.41
176	14.67	0.87	0.832	0.416	---	0.42
177	14.75	0.87	0.832	0.413	---	0.42
178	14.83	0.83	0.800	0.411	---	0.39
179	14.92	0.83	0.800	0.409	---	0.39
180	15.00	0.83	0.800	0.407	---	0.39
181	15.08	0.80	0.768	0.405	---	0.36
182	15.17	0.80	0.768	0.403	---	0.36
183	15.25	0.80	0.768	0.401	---	0.37
184	15.33	0.77	0.736	0.399	---	0.34
185	15.42	0.77	0.736	0.397	---	0.34
186	15.50	0.77	0.736	0.395	---	0.34
187	15.58	0.63	0.608	0.393	---	0.21
188	15.67	0.63	0.608	0.391	---	0.22
189	15.75	0.63	0.608	0.389	---	0.22
190	15.83	0.63	0.608	0.387	---	0.22
191	15.92	0.63	0.608	0.385	---	0.22
192	16.00	0.63	0.608	0.383	---	0.22
193	16.08	0.13	0.128	0.381	0.115	0.01

194	16.17	0.13	0.128	0.379	0.115	0.01
195	16.25	0.13	0.128	0.377	0.115	0.01
196	16.33	0.13	0.128	0.375	0.115	0.01
197	16.42	0.13	0.128	0.373	0.115	0.01
198	16.50	0.13	0.128	0.371	0.115	0.01
199	16.58	0.10	0.096	0.369	0.086	0.01
200	16.67	0.10	0.096	0.367	0.086	0.01
201	16.75	0.10	0.096	0.366	0.086	0.01
202	16.83	0.10	0.096	0.364	0.086	0.01
203	16.92	0.10	0.096	0.362	0.086	0.01
204	17.00	0.10	0.096	0.360	0.086	0.01
205	17.08	0.17	0.160	0.358	0.144	0.02
206	17.17	0.17	0.160	0.356	0.144	0.02
207	17.25	0.17	0.160	0.355	0.144	0.02
208	17.33	0.17	0.160	0.353	0.144	0.02
209	17.42	0.17	0.160	0.351	0.144	0.02
210	17.50	0.17	0.160	0.349	0.144	0.02
211	17.58	0.17	0.160	0.348	0.144	0.02
212	17.67	0.17	0.160	0.346	0.144	0.02
213	17.75	0.17	0.160	0.344	0.144	0.02
214	17.83	0.13	0.128	0.342	0.115	0.01
215	17.92	0.13	0.128	0.341	0.115	0.01
216	18.00	0.13	0.128	0.339	0.115	0.01
217	18.08	0.13	0.128	0.337	0.115	0.01
218	18.17	0.13	0.128	0.336	0.115	0.01
219	18.25	0.13	0.128	0.334	0.115	0.01
220	18.33	0.13	0.128	0.332	0.115	0.01
221	18.42	0.13	0.128	0.331	0.115	0.01
222	18.50	0.13	0.128	0.329	0.115	0.01
223	18.58	0.10	0.096	0.328	0.086	0.01
224	18.67	0.10	0.096	0.326	0.086	0.01
225	18.75	0.10	0.096	0.325	0.086	0.01
226	18.83	0.07	0.064	0.323	0.058	0.01
227	18.92	0.07	0.064	0.321	0.058	0.01
228	19.00	0.07	0.064	0.320	0.058	0.01
229	19.08	0.10	0.096	0.318	0.086	0.01
230	19.17	0.10	0.096	0.317	0.086	0.01
231	19.25	0.10	0.096	0.315	0.086	0.01
232	19.33	0.13	0.128	0.314	0.115	0.01
233	19.42	0.13	0.128	0.312	0.115	0.01
234	19.50	0.13	0.128	0.311	0.115	0.01
235	19.58	0.10	0.096	0.310	0.086	0.01
236	19.67	0.10	0.096	0.308	0.086	0.01
237	19.75	0.10	0.096	0.307	0.086	0.01
238	19.83	0.07	0.064	0.305	0.058	0.01
239	19.92	0.07	0.064	0.304	0.058	0.01
240	20.00	0.07	0.064	0.303	0.058	0.01
241	20.08	0.10	0.096	0.301	0.086	0.01
242	20.17	0.10	0.096	0.300	0.086	0.01
243	20.25	0.10	0.096	0.299	0.086	0.01
244	20.33	0.10	0.096	0.297	0.086	0.01
245	20.42	0.10	0.096	0.296	0.086	0.01
246	20.50	0.10	0.096	0.295	0.086	0.01
247	20.58	0.10	0.096	0.294	0.086	0.01
248	20.67	0.10	0.096	0.292	0.086	0.01
249	20.75	0.10	0.096	0.291	0.086	0.01
250	20.83	0.07	0.064	0.290	0.058	0.01
251	20.92	0.07	0.064	0.289	0.058	0.01
252	21.00	0.07	0.064	0.288	0.058	0.01
253	21.08	0.10	0.096	0.287	0.086	0.01
254	21.17	0.10	0.096	0.285	0.086	0.01
255	21.25	0.10	0.096	0.284	0.086	0.01
256	21.33	0.07	0.064	0.283	0.058	0.01
257	21.42	0.07	0.064	0.282	0.058	0.01
258	21.50	0.07	0.064	0.281	0.058	0.01
259	21.58	0.10	0.096	0.280	0.086	0.01
260	21.67	0.10	0.096	0.279	0.086	0.01
261	21.75	0.10	0.096	0.278	0.086	0.01
262	21.83	0.07	0.064	0.277	0.058	0.01
263	21.92	0.07	0.064	0.276	0.058	0.01
264	22.00	0.07	0.064	0.275	0.058	0.01
265	22.08	0.10	0.096	0.274	0.086	0.01
266	22.17	0.10	0.096	0.273	0.086	0.01
267	22.25	0.10	0.096	0.273	0.086	0.01
268	22.33	0.07	0.064	0.272	0.058	0.01
269	22.42	0.07	0.064	0.271	0.058	0.01
270	22.50	0.07	0.064	0.270	0.058	0.01
271	22.58	0.07	0.064	0.269	0.058	0.01
272	22.67	0.07	0.064	0.269	0.058	0.01
273	22.75	0.07	0.064	0.268	0.058	0.01
274	22.83	0.07	0.064	0.267	0.058	0.01

275	22.92	0.07	0.064	0.266	0.058	0.01
276	23.00	0.07	0.064	0.266	0.058	0.01
277	23.08	0.07	0.064	0.265	0.058	0.01
278	23.17	0.07	0.064	0.265	0.058	0.01
279	23.25	0.07	0.064	0.264	0.058	0.01
280	23.33	0.07	0.064	0.263	0.058	0.01
281	23.42	0.07	0.064	0.263	0.058	0.01
282	23.50	0.07	0.064	0.263	0.058	0.01
283	23.58	0.07	0.064	0.262	0.058	0.01
284	23.67	0.07	0.064	0.262	0.058	0.01
285	23.75	0.07	0.064	0.261	0.058	0.01
286	23.83	0.07	0.064	0.261	0.058	0.01
287	23.92	0.07	0.064	0.261	0.058	0.01
288	24.00	0.07	0.064	0.261	0.058	0.01
	Sum =	100.0			Sum =	25.2

Flood volume = Effective rainfall 2.10(In)
times area 291.2(Ac.)/[(In)/(Ft.)] = 50.9(Ac.Ft)
Total soil loss = 5.90(In)
Total soil loss = 143.113(Ac.Ft)
Total rainfall = 8.00(In)
Flood volume = 2217644.2 Cubic Feet
Total soil loss = 6233994.2 Cubic Feet

Peak flow rate of this hydrograph = 168.771(CFS)

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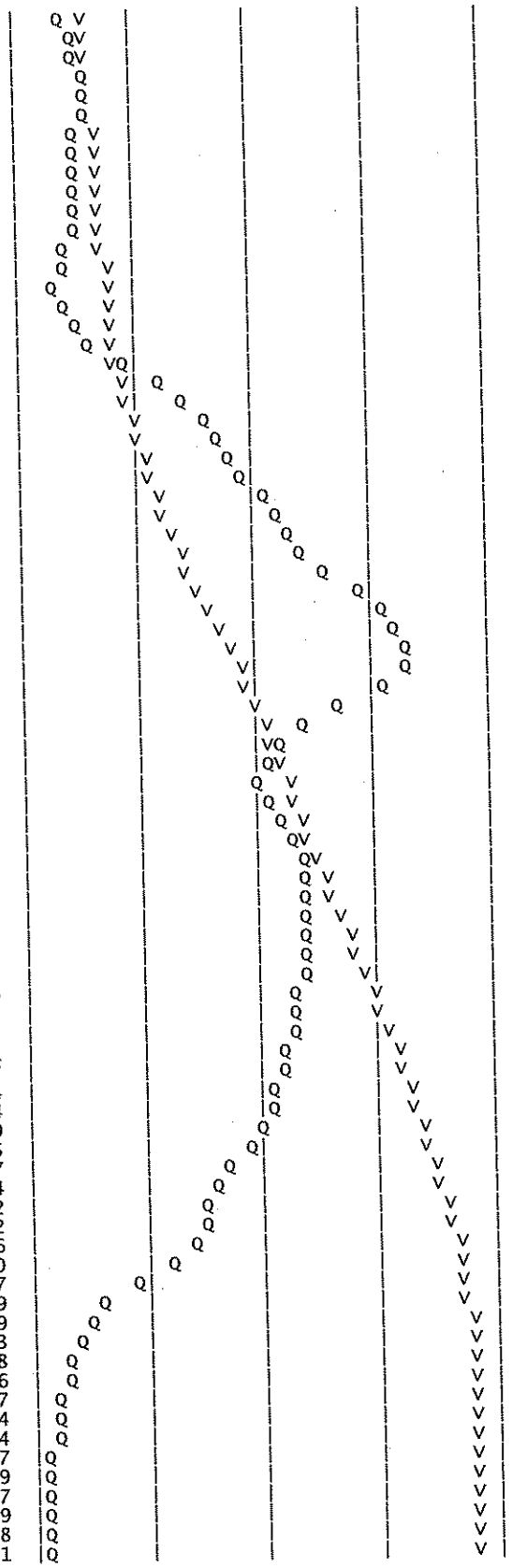
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0004	0.06	Q				
0+10	0.0025	0.30	Q				
0+15	0.0074	0.71	Q				
0+20	0.0151	1.12	Q				
0+25	0.0251	1.45	Q				
0+30	0.0373	1.77	Q				
0+35	0.0514	2.04	Q				
0+40	0.0666	2.21	Q				
0+45	0.0827	2.33	Q				
0+50	0.0995	2.44	Q				
0+55	0.1176	2.63	Q				
1+ 0	0.1375	2.89	Q				
1+ 5	0.1588	3.09	Q				
1+10	0.1803	3.12	Q				
1+15	0.2010	3.01	Q				
1+20	0.2209	2.89	Q				
1+25	0.2404	2.84	Q				
1+30	0.2599	2.83	Q				
1+35	0.2793	2.82	Q				
1+40	0.2988	2.82	Q				
1+45	0.3182	2.82	Q				
1+50	0.3379	2.86	Q				
1+55	0.3584	2.98	Q				
2+ 0	0.3804	3.19	Q				
2+ 5	0.4037	3.38	Q				
2+10	0.4277	3.49	Q				
2+15	0.4521	3.54	Q				
2+20	0.4768	3.59	Q				
2+25	0.5017	3.62	Q				
2+30	0.5267	3.64	Q				
2+35	0.5522	3.69	Q				
2+40	0.5785	3.83	Q				
2+45	0.6064	4.04	Q				
2+50	0.6356	4.24	Q				
2+55	0.6656	4.36	Q				
3+ 0	0.6961	4.42	Q				
3+ 5	0.7268	4.47	Q				
3+10	0.7579	4.51	Q				
3+15	0.7892	4.54	Q				
3+20	0.8206	4.57	Q				
3+25	0.8523	4.59	Q				
3+30	0.8840	4.61	Q				
3+35	0.9158	4.62	Q				
3+40	0.9478	4.64	Q				
3+45	0.9798	4.65	Q				
3+50	1.0121	4.69	Q				
3+55	1.0453	4.82	Q				

4+ 0	1.0799	5.03	VQ				
4+ 5	1.1158	5.22	VQ				
4+10	1.1525	5.33	VQ				
4+15	1.1897	5.39	VQ				
4+20	1.2273	5.47	VQ				
4+25	1.2661	5.62	VQ				
4+30	1.3064	5.86	|Q				
4+35	1.3482	6.07	|Q				
4+40	1.3909	6.19	|Q				
4+45	1.4340	6.27	|Q				
4+50	1.4778	6.35	|Q				
4+55	1.5227	6.51	|Q				
5+ 0	1.5692	6.75	|Q				
5+ 5	1.6168	6.91	|Q				
5+10	1.6636	6.80	|Q				
5+15	1.7082	6.47	|Q				
5+20	1.7508	6.18	|Q				
5+25	1.7931	6.14	|Q				
5+30	1.8362	6.27	|Q				
5+35	1.8805	6.43	|Q				
5+40	1.9261	6.62	|Q				
5+45	1.9733	6.86	|Q				
5+50	2.0220	7.06	|Q				
5+55	2.0714	7.18	|Q				
6+ 0	2.1213	7.25	|Q				
6+ 5	2.1718	7.33	|Q				
6+10	2.2234	7.49	|Q				
6+15	2.2766	7.73	|Q				
6+20	2.3313	7.94	|Q				
6+25	2.3868	8.06	|Q				
6+30	2.4428	8.14	|Q				
6+35	2.4995	8.22	|Q				
6+40	2.5572	8.39	|QV				
6+45	2.6167	8.63	|QV				
6+50	2.6776	8.85	|QV				
6+55	2.7394	8.98	|QV				
7+ 0	2.8018	9.05	|QV				
7+ 5	2.8645	9.11	|QV				
7+10	2.9276	9.16	|QV				
7+15	2.9910	9.20	|QV				
7+20	3.0548	9.27	|QV				
7+25	3.1197	9.42	|QV				
7+30	3.1861	9.64	|QV				
7+35	3.2542	9.88	|QV				
7+40	3.3239	10.12	| Q				
7+45	3.3955	10.40	| Q				
7+50	3.4690	10.67	| Q				
7+55	3.5444	10.94	| Q				
8+ 0	3.6217	11.24	| Q				
8+ 5	3.7014	11.56	| Q				
8+10	3.7837	11.96	| Q				
8+15	3.8696	12.47	| QV				
8+20	3.9586	12.93	| QV				
8+25	4.0495	13.20	| QV				
8+30	4.1416	13.37	| QV				
8+35	4.2348	13.53	| QV				
8+40	4.3295	13.75	| QV				
8+45	4.4262	14.04	| QV				
8+50	4.5249	14.33	| QV				
8+55	4.6255	14.61	| QV				
9+ 0	4.7282	14.92	| QV				
9+ 5	4.8310	14.92	| QV				
9+10	4.9281	14.11	| QV				
9+15	5.0152	12.63	| QV				
9+20	5.0960	11.74	| Q V				
9+25	5.1828	12.60	| Q V				
9+30	5.2844	14.75	| Q V				
9+35	5.4032	17.25	| QV				
9+40	5.5402	19.90	| QV				
9+45	5.6987	23.01	| Q				
9+50	5.8789	26.17	| VQ				
9+55	6.0808	29.32	| VQ				
10+ 0	6.3069	32.83	| V Q				
10+ 5	6.5475	34.93	| VQ				
10+10	6.7753	33.07	| VQ				
10+15	6.9664	27.76	| Q				
10+20	7.1216	22.53	| QV				
10+25	7.2584	19.86	| Q V				
10+30	7.3861	18.54	| Q V				
10+35	7.5118	18.25	| Q V				
10+40	7.6487	19.88	| Q V				

10+45	7.8091	23.29	
10+50	7.9932	26.72	
10+55	8.1913	28.77	
11+ 0	8.3990	30.15	
11+ 5	8.6124	31.00	
11+10	8.8250	30.87	
11+15	9.0303	29.81	
11+20	9.2288	28.82	
11+25	9.4261	28.65	
11+30	9.6250	28.89	
11+35	9.8223	28.65	
11+40	10.0062	26.70	
11+45	10.1657	23.16	
11+50	10.3052	20.27	
11+55	10.4425	19.92	
12+ 0	10.5895	21.34	
12+ 5	10.7631	25.21	
12+10	11.0021	34.71	
12+15	11.3444	49.71	
12+20	11.7847	63.93	
12+25	12.2883	73.13	
12+30	12.8394	80.02	
12+35	13.4326	86.14	
12+40	14.0699	92.53	
12+45	14.7565	99.70	
12+50	15.4886	106.30	
12+55	16.2588	111.83	
13+ 0	17.0644	116.98	
13+ 5	17.9114	122.99	
13+10	18.8222	132.25	
13+15	19.8212	145.05	
13+20	20.9004	156.70	
13+25	22.0289	163.86	
13+30	23.1898	168.55	
13+35	24.3521	168.77	
13+40	25.4446	158.63	
13+45	26.4012	138.90	
13+50	27.2305	120.42	
13+55	27.9948	110.97	
14+ 0	28.7267	106.27	
14+ 5	29.4464	104.50	
14+10	30.1837	107.06	
14+15	30.9658	113.56	
14+20	31.7901	119.69	
14+25	32.6288	121.77	
14+30	33.4660	121.56	
14+35	34.2993	121.00	
14+40	35.1331	121.06	
14+45	35.9686	121.32	
14+50	36.8042	121.33	
14+55	37.6347	120.58	
15+ 0	38.4542	119.00	
15+ 5	39.2616	117.23	
15+10	40.0560	115.35	
15+15	40.8357	113.21	
15+20	41.6006	111.07	
15+25	42.3509	108.94	
15+30	43.0840	106.44	
15+35	43.7947	103.20	
15+40	44.4665	97.55	
15+45	45.0800	89.07	
15+50	45.6409	81.44	
15+55	46.1734	77.32	
16+ 0	46.6908	75.12	
16+ 5	47.1836	71.56	
16+10	47.6134	62.40	
16+15	47.9431	47.87	
16+20	48.1806	34.49	
16+25	48.3652	26.79	
16+30	48.5183	22.23	
16+35	48.6483	18.88	
16+40	48.7596	16.16	
16+45	48.8545	13.77	
16+50	48.9360	11.84	
16+55	49.0065	10.24	
17+ 0	49.0683	8.97	
17+ 5	49.1233	7.99	
17+10	49.1740	7.37	
17+15	49.2221	6.99	
17+20	49.2681	6.68	
17+25	49.3116	6.31	

17+30	49.3524	5.92	Q				V
17+35	49.3909	5.60	Q				V
17+40	49.4280	5.38	Q				V
17+45	49.4639	5.21	Q				V
17+50	49.4984	5.01	Q				V
17+55	49.5309	4.72	Q				V
18+ 0	49.5608	4.33	Q				V
18+ 5	49.5886	4.04	Q				V
18+10	49.6158	3.95	Q				V
18+15	49.6428	3.91	Q				V
18+20	49.6695	3.88	Q				V
18+25	49.6960	3.86	Q				V
18+30	49.7225	3.84	Q				V
18+35	49.7486	3.80	Q				V
18+40	49.7739	3.67	Q				V
18+45	49.7977	3.45	Q				V
18+50	49.8199	3.23	Q				V
18+55	49.8406	3.00	Q				V
19+ 0	49.8594	2.73	Q				V
19+ 5	49.8768	2.53	Q				V
19+10	49.8941	2.51	Q				V
19+15	49.9121	2.62	Q				V
19+20	49.9312	2.77	Q				V
19+25	49.9514	2.94	Q				V
19+30	49.9732	3.16	Q				V
19+35	49.9961	3.32	Q				V
19+40	50.0188	3.31	Q				V
19+45	50.0406	3.16	Q				V
19+50	50.0612	2.98	Q				V
19+55	50.0804	2.79	Q				V
20+ 0	50.0980	2.56	Q				V
20+ 5	50.1144	2.38	Q				V
20+10	50.1307	2.38	Q				V
20+15	50.1480	2.51	Q				V
20+20	50.1662	2.65	Q				V
20+25	50.1849	2.71	Q				V
20+30	50.2037	2.74	Q				V
20+35	50.2227	2.75	Q				V
20+40	50.2418	2.77	Q				V
20+45	50.2609	2.78	Q				V
20+50	50.2798	2.75	Q				V
20+55	50.2980	2.64	Q				V
21+ 0	50.3148	2.44	Q				V
21+ 5	50.3306	2.29	Q				V
21+10	50.3464	2.31	Q				V
21+15	50.3633	2.45	Q				V
21+20	50.3810	2.57	Q				V
21+25	50.3984	2.52	Q				V
21+30	50.4146	2.35	Q				V
21+35	50.4298	2.21	Q				V
21+40	50.4453	2.24	Q				V
21+45	50.4618	2.40	Q				V
21+50	50.4792	2.53	Q				V
21+55	50.4964	2.49	Q				V
22+ 0	50.5124	2.33	Q				V
22+ 5	50.5275	2.20	Q				V
22+10	50.5429	2.23	Q				V
22+15	50.5594	2.39	Q				V
22+20	50.5767	2.52	Q				V
22+25	50.5938	2.48	Q				V
22+30	50.6097	2.32	Q				V
22+35	50.6246	2.15	Q				V
22+40	50.6388	2.07	Q				V
22+45	50.6528	2.03	Q				V
22+50	50.6665	2.00	Q				V
22+55	50.6801	1.98	Q				V
23+ 0	50.6936	1.96	Q				V
23+ 5	50.7071	1.95	Q				V
23+10	50.7204	1.93	Q				V
23+15	50.7336	1.92	Q				V
23+20	50.7468	1.92	Q				V
23+25	50.7600	1.91	Q				V
23+30	50.7731	1.91	Q				V
23+35	50.7863	1.90	Q				V
23+40	50.7993	1.90	Q				V
23+45	50.8124	1.89	Q				V
23+50	50.8254	1.89	Q				V
23+55	50.8384	1.89	Q				V
24+ 0	50.8514	1.89	Q				V
24+ 5	50.8639	1.82	Q				V
24+10	50.8748	1.58	Q				V

24+15	50.8829	1.17	Q	|	|	|	V|
24+20	50.8883	0.79	Q	|	|	|	V|
24+25	50.8923	0.58	Q	|	|	|	V|
24+30	50.8955	0.46	Q	|	|	|	V|
24+35	50.8981	0.38	Q	|	|	|	V|
24+40	50.9002	0.31	Q	|	|	|	V|
24+45	50.9020	0.26	Q	|	|	|	V|
24+50	50.9035	0.22	Q	|	|	|	V|
24+55	50.9048	0.18	Q	|	|	|	V|
25+ 0	50.9058	0.15	Q	|	|	|	V|
25+ 5	50.9067	0.13	Q	|	|	|	V|
25+10	50.9074	0.11	Q	|	|	|	V|
25+15	50.9081	0.09	Q	|	|	|	V|
25+20	50.9086	0.07	Q	|	|	|	V|
25+25	50.9090	0.06	Q	|	|	|	V|
25+30	50.9093	0.05	Q	|	|	|	V|
25+35	50.9095	0.04	Q	|	|	|	V|
25+40	50.9097	0.03	Q	|	|	|	V|
25+45	50.9099	0.02	Q	|	|	|	V|
25+50	50.9100	0.02	Q	|	|	|	V|
25+55	50.9101	0.01	Q	|	|	|	V|
26+ 0	50.9101	0.00	Q	|	|	|	V

APPENDIX E.3: 2-YEAR/1- HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: AE1UH12.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "A" FOR AREAS "A1" TO "A20"
2 YEAR - 1, 3, 6, 24 HOUR
FN: AE1UH

Drainage Area = 291.20(Ac.) = 0.455 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 291.20(Ac.) = 0.455 Sq. Mi.
Length along longest watercourse = 8640.00(Ft.)
Length along longest watercourse measured to centroid = 4525.00(Ft.)
Length along longest watercourse = 1.636 Mi.
Length along longest watercourse measured to centroid = 0.857 Mi.
Difference in elevation = 317.00(Ft.)
Slope along watercourse = 193.7222 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.251 Hr.
Lag time = 15.05 Min.
25% of lag time = 3.76 Min.
40% of lag time = 6.02 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]
291.20	0.55	160.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
291.20	1.40	407.68

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.400(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.74 %
Adjusted average point rain = 0.549(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
118.000	50.00	0.000
25.000	63.25	0.000
21.900	57.20	0.000
73.900	59.50	0.000
24.500	53.80	0.000
27.900	55.70	0.000

Total Area Entered = 291.20(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
50.0	31.0	0.751	0.000	0.751	0.405	0.304
63.3	43.3	0.638	0.000	0.638	0.086	0.055

57.2	37.2	0.695	0.000	0.695	0.075	0.052
59.5	39.5	0.675	0.000	0.675	0.254	0.171
53.8	34.0	0.724	0.000	0.724	0.084	0.061
55.7	35.7	0.709	0.000	0.709	0.096	0.068
					Sum (F) =	0.711

Area averaged mean soil loss (F) (In/Hr) = 0.711
Minimum soil loss rate ((In/Hr)) = 0.356
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.4800

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	33.222	3.334	9.786
2	0.167	66.444	12.801	37.567
3	0.250	99.665	21.686	63.643
4	0.333	132.887	20.105	59.002
5	0.417	166.109	11.153	32.730
6	0.500	199.331	6.338	18.600
7	0.583	232.553	4.479	13.146
8	0.667	265.774	3.476	10.201
9	0.750	298.996	2.840	8.334
10	0.833	332.218	2.225	6.530
11	0.917	365.440	1.936	5.682
12	1.000	398.662	1.538	4.513
13	1.083	431.883	1.278	3.751
14	1.167	465.105	1.057	3.101
15	1.250	498.327	1.007	2.954
16	1.333	531.549	0.877	2.573
17	1.417	564.771	0.718	2.107
18	1.500	597.992	0.618	1.815
19	1.583	631.214	0.539	1.583
20	1.667	664.436	0.453	1.329
21	1.750	697.658	0.353	1.037
22	1.833	730.879	0.332	0.975
23	1.917	764.101	0.332	0.975
24	2.000	797.323	0.332	0.975
25	2.083	830.545	0.193	0.566
			Sum = 100.000	Sum= 293.475

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.290	0.711	0.261	0.03
2	0.17	4.50	0.296	0.711	0.267	0.03
3	0.25	5.40	0.355	0.711	0.320	0.04
4	0.33	5.40	0.355	0.711	0.320	0.04
5	0.42	5.70	0.375	0.711	0.338	0.04
6	0.50	6.40	0.421	0.711	0.379	0.04
7	0.58	7.90	0.520	0.711	0.468	0.05
8	0.67	9.10	0.599	0.711	0.539	0.06
9	0.75	12.80	0.843	0.711	---	0.13
10	0.83	25.60	1.685	0.711	---	0.97
11	0.92	7.90	0.520	0.711	0.468	0.05
12	1.00	4.90	0.323	0.711	0.290	0.03
Sum =		100.0			Sum =	1.5

Flood volume = Effective rainfall 0.13(In)
times area 291.2(Ac.)/[(In)/(Ft.)] = 3.1(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 10.257(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 133057.4 Cubic Feet
Total soil loss = 446789.1 Cubic Feet

Peak flow rate of this hydrograph = 76.718(CFS)

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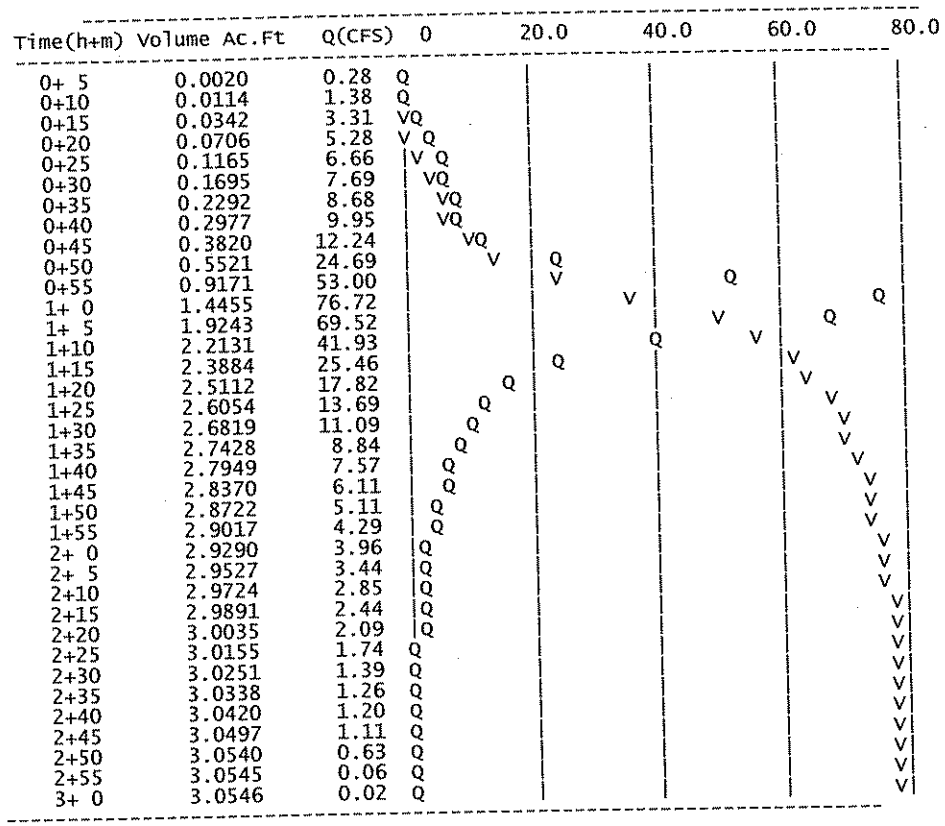
1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))


Time(h+m) Volume Ac.Ft Q(CFS) 0 20.0 40.0 60.0 80.0
0+ 5 0.0020 0.28
0+10 0.0114 1.38
0+15 0.0342 3.31
0+20 0.0706 5.28
0+25 0.1165 6.66
0+30 0.1695 7.69
0+35 0.2292 8.68
0+40 0.2977 9.95
0+45 0.3820 12.24
0+50 0.5521 24.69
0+55 0.9171 53.00
1+ 0 1.4455 76.72
1+ 5 1.9243 69.52
1+10 2.2131 41.93
1+15 2.3884 25.46
1+20 2.5112 17.82
1+25 2.6054 13.69
1+30 2.6819 11.09
1+35 2.7428 8.84
1+40 2.7949 7.57
1+45 2.8370 6.11
1+50 2.8722 5.11
1+55 2.9017 4.29
2+ 0 2.9290 3.96
2+ 5 2.9527 3.44
2+10 2.9724 2.85
2+15 2.9891 2.44
2+20 3.0035 2.09
2+25 3.0155 1.74
2+30 3.0251 1.39
2+35 3.0338 1.26
2+40 3.0420 1.20
2+45 3.0497 1.11
2+50 3.0540 0.63
2+55 3.0545 0.06
3+ 0 3.0546 0.02

APPENDIX E.4: 2-YEAR/24- HOUR HYDROGRAPH CALCULATIONS

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                    U n i t   H y d r o g r a p h   A n a l y s i s

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                  Study date  07/01/10 File: AE1UH242.out

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

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

TRI-8 Builders - S/N   615

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

 English Units used in output format


------------------------------------------------------------------------------
TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "A" FOR AREAS "A1" TO "A20"
2 YEAR - 1, 3, 6, 24 HOUR
FN: AE1UH
------------------------------------------------------------------------------
Drainage Area =     291.20(Ac.)  =      0.455 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =     291.20(Ac.)  =   0.455 Sq. Mi.
Length along longest watercourse =    8640.00(Ft.)
Length along longest watercourse measured to centroid =    4525.00(Ft.)
Length along longest watercourse =      1.636 Mi.
Length along longest watercourse measured to centroid =      0.857 Mi.
Difference in elevation =     317.00(Ft.)
Slope along watercourse =    193.7222 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time =    0.251 Hr.
Lag time =    15.05 Min.
25% of lag time =     3.76 Min.
40% of lag time =     6.02 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]
     291.20             2.50                 728.00

100 YEAR Area rainfall data:

Area(Ac.)[1]       Rainfall(In)[2]       Weighting[1*2]
     291.20             8.00                2329.60

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.500(In)
Area Averaged 100-Year Rainfall =    8.000(In)

Point rain (area averaged) =    2.500(In)
Areal adjustment factor =   99.94 %
Adjusted average point rain =    2.499(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
   118.000           50.00          0.000
    25.000           63.25          0.000
    21.900           57.20          0.000
    73.900           59.50          0.000
    24.500           53.80          0.000
    27.900           55.70          0.000
 Total Area Entered =    291.20(Ac.)


RI     RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)      (In/Hr)        (Dec.)   (In/Hr)
50.0  31.0      0.751      0.000        0.751          0.405    0.304
63.3  43.3      0.638      0.000        0.638          0.086    0.055
```

57.2	37.2	0.695	0.000	0.695	0.075	0.052
59.5	39.5	0.675	0.000	0.675	0.254	0.171
53.8	34.0	0.724	0.000	0.724	0.084	0.061
55.7	35.7	0.709	0.000	0.709	0.096	0.068
					Sum (F) =	0.711

Area averaged mean soil loss (F) (In/Hr) = 0.711
Minimum soil loss rate ((In/Hr)) = 0.356
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	33.222	3.334		9.786
2	0.167	66.444	12.801		37.567
3	0.250	99.665	21.686		63.643
4	0.333	132.887	20.105		59.002
5	0.417	166.109	11.153		32.730
6	0.500	199.331	6.338		18.600
7	0.583	232.553	4.479		13.146
8	0.667	265.774	3.476		10.201
9	0.750	298.996	2.840		8.334
10	0.833	332.218	2.225		6.530
11	0.917	365.440	1.936		5.682
12	1.000	398.662	1.538		4.513
13	1.083	431.883	1.278		3.751
14	1.167	465.105	1.057		3.101
15	1.250	498.327	1.007		2.954
16	1.333	531.549	0.877		2.573
17	1.417	564.771	0.718		2.107
18	1.500	597.992	0.618		1.815
19	1.583	631.214	0.539		1.583
20	1.667	664.436	0.453		1.329
21	1.750	697.658	0.353		1.037
22	1.833	730.879	0.332		0.975
23	1.917	764.101	0.332		0.975
24	2.000	797.323	0.332		0.975
25	2.083	830.545	0.193		0.566
			Sum = 100.000	Sum=	293.475

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.020	1.261	0.018	0.00
2	0.17	0.07	0.020	1.256	0.018	0.00
3	0.25	0.07	0.020	1.251	0.018	0.00
4	0.33	0.10	0.030	1.246	0.027	0.00
5	0.42	0.10	0.030	1.242	0.027	0.00
6	0.50	0.10	0.030	1.237	0.027	0.00
7	0.58	0.10	0.030	1.232	0.027	0.00
8	0.67	0.10	0.030	1.227	0.027	0.00
9	0.75	0.10	0.030	1.222	0.027	0.00
10	0.83	0.13	0.040	1.217	0.036	0.00
11	0.92	0.13	0.040	1.213	0.036	0.00
12	1.00	0.13	0.040	1.208	0.036	0.00
13	1.08	0.10	0.030	1.203	0.027	0.00
14	1.17	0.10	0.030	1.198	0.027	0.00
15	1.25	0.10	0.030	1.194	0.027	0.00
16	1.33	0.10	0.030	1.189	0.027	0.00
17	1.42	0.10	0.030	1.184	0.027	0.00
18	1.50	0.10	0.030	1.179	0.027	0.00
19	1.58	0.10	0.030	1.175	0.027	0.00
20	1.67	0.10	0.030	1.170	0.027	0.00
21	1.75	0.10	0.030	1.165	0.027	0.00
22	1.83	0.13	0.040	1.161	0.036	0.00
23	1.92	0.13	0.040	1.156	0.036	0.00
24	2.00	0.13	0.040	1.151	0.036	0.00
25	2.08	0.13	0.040	1.147	0.036	0.00
26	2.17	0.13	0.040	1.142	0.036	0.00
27	2.25	0.13	0.040	1.137	0.036	0.00
28	2.33	0.13	0.040	1.133	0.036	0.00
29	2.42	0.13	0.040	1.128	0.036	0.00
30	2.50	0.13	0.040	1.123	0.036	0.00
31	2.58	0.17	0.050	1.119	0.045	0.00

32	2.67	0.17	0.050	1.114	0.045	0.00
33	2.75	0.17	0.050	1.110	0.045	0.00
34	2.83	0.17	0.050	1.105	0.045	0.00
35	2.92	0.17	0.050	1.101	0.045	0.00
36	3.00	0.17	0.050	1.096	0.045	0.00
37	3.08	0.17	0.050	1.091	0.045	0.00
38	3.17	0.17	0.050	1.087	0.045	0.00
39	3.25	0.17	0.050	1.082	0.045	0.00
40	3.33	0.17	0.050	1.078	0.045	0.00
41	3.42	0.17	0.050	1.073	0.045	0.00
42	3.50	0.17	0.050	1.069	0.045	0.00
43	3.58	0.17	0.050	1.064	0.045	0.00
44	3.67	0.17	0.050	1.060	0.045	0.00
45	3.75	0.17	0.050	1.056	0.045	0.00
46	3.83	0.20	0.060	1.051	0.054	0.01
47	3.92	0.20	0.060	1.047	0.054	0.01
48	4.00	0.20	0.060	1.042	0.054	0.01
49	4.08	0.20	0.060	1.038	0.054	0.01
50	4.17	0.20	0.060	1.033	0.054	0.01
51	4.25	0.20	0.060	1.029	0.054	0.01
52	4.33	0.23	0.070	1.025	0.063	0.01
53	4.42	0.23	0.070	1.020	0.063	0.01
54	4.50	0.23	0.070	1.016	0.063	0.01
55	4.58	0.23	0.070	1.011	0.063	0.01
56	4.67	0.23	0.070	1.007	0.063	0.01
57	4.75	0.23	0.070	1.003	0.063	0.01
58	4.83	0.27	0.080	0.998	0.072	0.01
59	4.92	0.27	0.080	0.994	0.072	0.01
60	5.00	0.27	0.080	0.990	0.072	0.01
61	5.08	0.20	0.060	0.986	0.054	0.01
62	5.17	0.20	0.060	0.981	0.054	0.01
63	5.25	0.20	0.060	0.977	0.054	0.01
64	5.33	0.23	0.070	0.973	0.063	0.01
65	5.42	0.23	0.070	0.968	0.063	0.01
66	5.50	0.23	0.070	0.964	0.063	0.01
67	5.58	0.27	0.080	0.960	0.072	0.01
68	5.67	0.27	0.080	0.956	0.072	0.01
69	5.75	0.27	0.080	0.952	0.072	0.01
70	5.83	0.27	0.080	0.947	0.072	0.01
71	5.92	0.27	0.080	0.943	0.072	0.01
72	6.00	0.27	0.080	0.939	0.072	0.01
73	6.08	0.30	0.090	0.935	0.081	0.01
74	6.17	0.30	0.090	0.931	0.081	0.01
75	6.25	0.30	0.090	0.926	0.081	0.01
76	6.33	0.30	0.090	0.922	0.081	0.01
77	6.42	0.30	0.090	0.918	0.081	0.01
78	6.50	0.30	0.090	0.914	0.081	0.01
79	6.58	0.33	0.100	0.910	0.090	0.01
80	6.67	0.33	0.100	0.906	0.090	0.01
81	6.75	0.33	0.100	0.902	0.090	0.01
82	6.83	0.33	0.100	0.898	0.090	0.01
83	6.92	0.33	0.100	0.894	0.090	0.01
84	7.00	0.33	0.100	0.890	0.090	0.01
85	7.08	0.33	0.100	0.886	0.090	0.01
86	7.17	0.33	0.100	0.882	0.090	0.01
87	7.25	0.33	0.100	0.878	0.090	0.01
88	7.33	0.37	0.110	0.874	0.099	0.01
89	7.42	0.37	0.110	0.870	0.099	0.01
90	7.50	0.37	0.110	0.866	0.099	0.01
91	7.58	0.40	0.120	0.862	0.108	0.01
92	7.67	0.40	0.120	0.858	0.108	0.01
93	7.75	0.40	0.120	0.854	0.108	0.01
94	7.83	0.43	0.130	0.850	0.117	0.01
95	7.92	0.43	0.130	0.846	0.117	0.01
96	8.00	0.43	0.130	0.842	0.117	0.01
97	8.08	0.50	0.150	0.838	0.135	0.01
98	8.17	0.50	0.150	0.834	0.135	0.01
99	8.25	0.50	0.150	0.830	0.135	0.01
100	8.33	0.50	0.150	0.826	0.135	0.01
101	8.42	0.50	0.150	0.822	0.135	0.01
102	8.50	0.50	0.150	0.819	0.135	0.01
103	8.58	0.53	0.160	0.815	0.144	0.02
104	8.67	0.53	0.160	0.811	0.144	0.02
105	8.75	0.53	0.160	0.807	0.144	0.02
106	8.83	0.57	0.170	0.803	0.153	0.02
107	8.92	0.57	0.170	0.799	0.153	0.02
108	9.00	0.57	0.170	0.796	0.153	0.02
109	9.08	0.63	0.190	0.792	0.171	0.02
110	9.17	0.63	0.190	0.788	0.171	0.02
111	9.25	0.63	0.190	0.784	0.171	0.02
112	9.33	0.67	0.200	0.781	0.180	0.02

113	9.42	0.67	0.200	0.777	0.180	0.02
114	9.50	0.67	0.200	0.773	0.180	0.02
115	9.58	0.70	0.210	0.770	0.189	0.02
116	9.67	0.70	0.210	0.766	0.189	0.02
117	9.75	0.70	0.210	0.762	0.189	0.02
118	9.83	0.73	0.220	0.758	0.198	0.02
119	9.92	0.73	0.220	0.755	0.198	0.02
120	10.00	0.73	0.220	0.751	0.198	0.02
121	10.08	0.50	0.150	0.748	0.135	0.01
122	10.17	0.50	0.150	0.744	0.135	0.01
123	10.25	0.50	0.150	0.740	0.135	0.01
124	10.33	0.50	0.150	0.737	0.135	0.01
125	10.42	0.50	0.150	0.733	0.135	0.01
126	10.50	0.50	0.150	0.730	0.135	0.01
127	10.58	0.67	0.200	0.726	0.180	0.02
128	10.67	0.67	0.200	0.722	0.180	0.02
129	10.75	0.67	0.200	0.719	0.180	0.02
130	10.83	0.67	0.200	0.715	0.180	0.02
131	10.92	0.67	0.200	0.712	0.180	0.02
132	11.00	0.67	0.200	0.708	0.180	0.02
133	11.08	0.63	0.190	0.705	0.171	0.02
134	11.17	0.63	0.190	0.701	0.171	0.02
135	11.25	0.63	0.190	0.698	0.171	0.02
136	11.33	0.63	0.190	0.695	0.171	0.02
137	11.42	0.63	0.190	0.691	0.171	0.02
138	11.50	0.63	0.190	0.688	0.171	0.02
139	11.58	0.57	0.170	0.684	0.153	0.02
140	11.67	0.57	0.170	0.681	0.153	0.02
141	11.75	0.57	0.170	0.677	0.153	0.02
142	11.83	0.60	0.180	0.674	0.162	0.02
143	11.92	0.60	0.180	0.671	0.162	0.02
144	12.00	0.60	0.180	0.667	0.162	0.02
145	12.08	0.83	0.250	0.664	0.225	0.02
146	12.17	0.83	0.250	0.661	0.225	0.02
147	12.25	0.83	0.250	0.657	0.225	0.02
148	12.33	0.87	0.260	0.654	0.234	0.03
149	12.42	0.87	0.260	0.651	0.234	0.03
150	12.50	0.87	0.260	0.648	0.234	0.03
151	12.58	0.93	0.280	0.644	0.252	0.03
152	12.67	0.93	0.280	0.641	0.252	0.03
153	12.75	0.93	0.280	0.638	0.252	0.03
154	12.83	0.97	0.290	0.635	0.261	0.03
155	12.92	0.97	0.290	0.631	0.261	0.03
156	13.00	0.97	0.290	0.628	0.261	0.03
157	13.08	1.13	0.340	0.625	0.306	0.03
158	13.17	1.13	0.340	0.622	0.306	0.03
159	13.25	1.13	0.340	0.619	0.306	0.03
160	13.33	1.13	0.340	0.616	0.306	0.03
161	13.42	1.13	0.340	0.612	0.306	0.03
162	13.50	1.13	0.340	0.609	0.306	0.03
163	13.58	0.77	0.230	0.606	0.207	0.02
164	13.67	0.77	0.230	0.603	0.207	0.02
165	13.75	0.77	0.230	0.600	0.207	0.02
166	13.83	0.77	0.230	0.597	0.207	0.02
167	13.92	0.77	0.230	0.594	0.207	0.02
168	14.00	0.77	0.230	0.591	0.207	0.02
169	14.08	0.90	0.270	0.588	0.243	0.03
170	14.17	0.90	0.270	0.585	0.243	0.03
171	14.25	0.90	0.270	0.582	0.243	0.03
172	14.33	0.87	0.260	0.579	0.234	0.03
173	14.42	0.87	0.260	0.576	0.234	0.03
174	14.50	0.87	0.260	0.573	0.234	0.03
175	14.58	0.87	0.260	0.570	0.234	0.03
176	14.67	0.87	0.260	0.567	0.234	0.03
177	14.75	0.87	0.260	0.564	0.234	0.03
178	14.83	0.83	0.250	0.561	0.225	0.02
179	14.92	0.83	0.250	0.558	0.225	0.02
180	15.00	0.83	0.250	0.556	0.225	0.02
181	15.08	0.80	0.240	0.553	0.216	0.02
182	15.17	0.80	0.240	0.550	0.216	0.02
183	15.25	0.80	0.240	0.547	0.216	0.02
184	15.33	0.77	0.230	0.544	0.207	0.02
185	15.42	0.77	0.230	0.541	0.207	0.02
186	15.50	0.77	0.230	0.539	0.207	0.02
187	15.58	0.63	0.190	0.536	0.171	0.02
188	15.67	0.63	0.190	0.533	0.171	0.02
189	15.75	0.63	0.190	0.530	0.171	0.02
190	15.83	0.63	0.190	0.528	0.171	0.02
191	15.92	0.63	0.190	0.525	0.171	0.02
192	16.00	0.63	0.190	0.522	0.171	0.02
193	16.08	0.13	0.040	0.520	0.036	0.00

194	16.17	0.13	0.040	0.517	0.036	0.00
195	16.25	0.13	0.040	0.514	0.036	0.00
196	16.33	0.13	0.040	0.512	0.036	0.00
197	16.42	0.13	0.040	0.509	0.036	0.00
198	16.50	0.13	0.040	0.507	0.036	0.00
199	16.58	0.10	0.030	0.504	0.027	0.00
200	16.67	0.10	0.030	0.501	0.027	0.00
201	16.75	0.10	0.030	0.499	0.027	0.00
202	16.83	0.10	0.030	0.496	0.027	0.00
203	16.92	0.10	0.030	0.494	0.027	0.00
204	17.00	0.10	0.030	0.491	0.027	0.00
205	17.08	0.17	0.050	0.489	0.045	0.00
206	17.17	0.17	0.050	0.486	0.045	0.00
207	17.25	0.17	0.050	0.484	0.045	0.00
208	17.33	0.17	0.050	0.482	0.045	0.00
209	17.42	0.17	0.050	0.479	0.045	0.00
210	17.50	0.17	0.050	0.477	0.045	0.00
211	17.58	0.17	0.050	0.474	0.045	0.00
212	17.67	0.17	0.050	0.472	0.045	0.00
213	17.75	0.17	0.050	0.470	0.045	0.00
214	17.83	0.13	0.040	0.467	0.036	0.00
215	17.92	0.13	0.040	0.465	0.036	0.00
216	18.00	0.13	0.040	0.463	0.036	0.00
217	18.08	0.13	0.040	0.460	0.036	0.00
218	18.17	0.13	0.040	0.458	0.036	0.00
219	18.25	0.13	0.040	0.456	0.036	0.00
220	18.33	0.13	0.040	0.454	0.036	0.00
221	18.42	0.13	0.040	0.451	0.036	0.00
222	18.50	0.13	0.040	0.449	0.036	0.00
223	18.58	0.10	0.030	0.447	0.027	0.00
224	18.67	0.10	0.030	0.445	0.027	0.00
225	18.75	0.10	0.030	0.443	0.027	0.00
226	18.83	0.07	0.020	0.441	0.018	0.00
227	18.92	0.07	0.020	0.439	0.018	0.00
228	19.00	0.07	0.020	0.437	0.018	0.00
229	19.08	0.10	0.030	0.434	0.027	0.00
230	19.17	0.10	0.030	0.432	0.027	0.00
231	19.25	0.10	0.030	0.430	0.027	0.00
232	19.33	0.13	0.040	0.428	0.036	0.00
233	19.42	0.13	0.040	0.426	0.036	0.00
234	19.50	0.13	0.040	0.424	0.036	0.00
235	19.58	0.10	0.030	0.422	0.027	0.00
236	19.67	0.10	0.030	0.421	0.027	0.00
237	19.75	0.10	0.030	0.419	0.027	0.00
238	19.83	0.07	0.020	0.417	0.018	0.00
239	19.92	0.07	0.020	0.415	0.018	0.00
240	20.00	0.07	0.020	0.413	0.018	0.00
241	20.08	0.10	0.030	0.411	0.027	0.00
242	20.17	0.10	0.030	0.409	0.027	0.00
243	20.25	0.10	0.030	0.408	0.027	0.00
244	20.33	0.10	0.030	0.406	0.027	0.00
245	20.42	0.10	0.030	0.404	0.027	0.00
246	20.50	0.10	0.030	0.402	0.027	0.00
247	20.58	0.10	0.030	0.401	0.027	0.00
248	20.67	0.10	0.030	0.399	0.027	0.00
249	20.75	0.10	0.030	0.397	0.027	0.00
250	20.83	0.07	0.020	0.396	0.018	0.00
251	20.92	0.07	0.020	0.394	0.018	0.00
252	21.00	0.07	0.020	0.393	0.018	0.00
253	21.08	0.10	0.030	0.391	0.027	0.00
254	21.17	0.10	0.030	0.390	0.027	0.00
255	21.25	0.10	0.030	0.388	0.027	0.00
256	21.33	0.07	0.020	0.387	0.018	0.00
257	21.42	0.07	0.020	0.385	0.018	0.00
258	21.50	0.07	0.020	0.384	0.018	0.00
259	21.58	0.10	0.030	0.382	0.027	0.00
260	21.67	0.10	0.030	0.381	0.027	0.00
261	21.75	0.10	0.030	0.379	0.027	0.00
262	21.83	0.07	0.020	0.378	0.018	0.00
263	21.92	0.07	0.020	0.377	0.018	0.00
264	22.00	0.07	0.020	0.376	0.018	0.00
265	22.08	0.10	0.030	0.374	0.027	0.00
266	22.17	0.10	0.030	0.373	0.027	0.00
267	22.25	0.10	0.030	0.372	0.027	0.00
268	22.33	0.07	0.020	0.371	0.018	0.00
269	22.42	0.07	0.020	0.370	0.018	0.00
270	22.50	0.07	0.020	0.369	0.018	0.00
271	22.58	0.07	0.020	0.367	0.018	0.00
272	22.67	0.07	0.020	0.366	0.018	0.00
273	22.75	0.07	0.020	0.365	0.018	0.00
274	22.83	0.07	0.020	0.365	0.018	0.00

275	22.92	0.07	0.020	0.364	0.018	0.00
276	23.00	0.07	0.020	0.363	0.018	0.00
277	23.08	0.07	0.020	0.362	0.018	0.00
278	23.17	0.07	0.020	0.361	0.018	0.00
279	23.25	0.07	0.020	0.360	0.018	0.00
280	23.33	0.07	0.020	0.360	0.018	0.00
281	23.42	0.07	0.020	0.359	0.018	0.00
282	23.50	0.07	0.020	0.358	0.018	0.00
283	23.58	0.07	0.020	0.358	0.018	0.00
284	23.67	0.07	0.020	0.357	0.018	0.00
285	23.75	0.07	0.020	0.357	0.018	0.00
286	23.83	0.07	0.020	0.356	0.018	0.00
287	23.92	0.07	0.020	0.356	0.018	0.00
288	24.00	0.07	0.020	0.356	0.018	0.00
Sum =		100.0			Sum =	3.0

Flood volume = Effective rainfall 0.25(In)
times area 291.2(Ac.)/[(In)/(Ft.)] = 6.1(Ac.Ft)
Total soil loss = 2.25(In)
Total soil loss = 54.569(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 264113.7 Cubic Feet
Total soil loss = 2377023.3 Cubic Feet

Peak flow rate of this hydrograph = 9.461(CFS)

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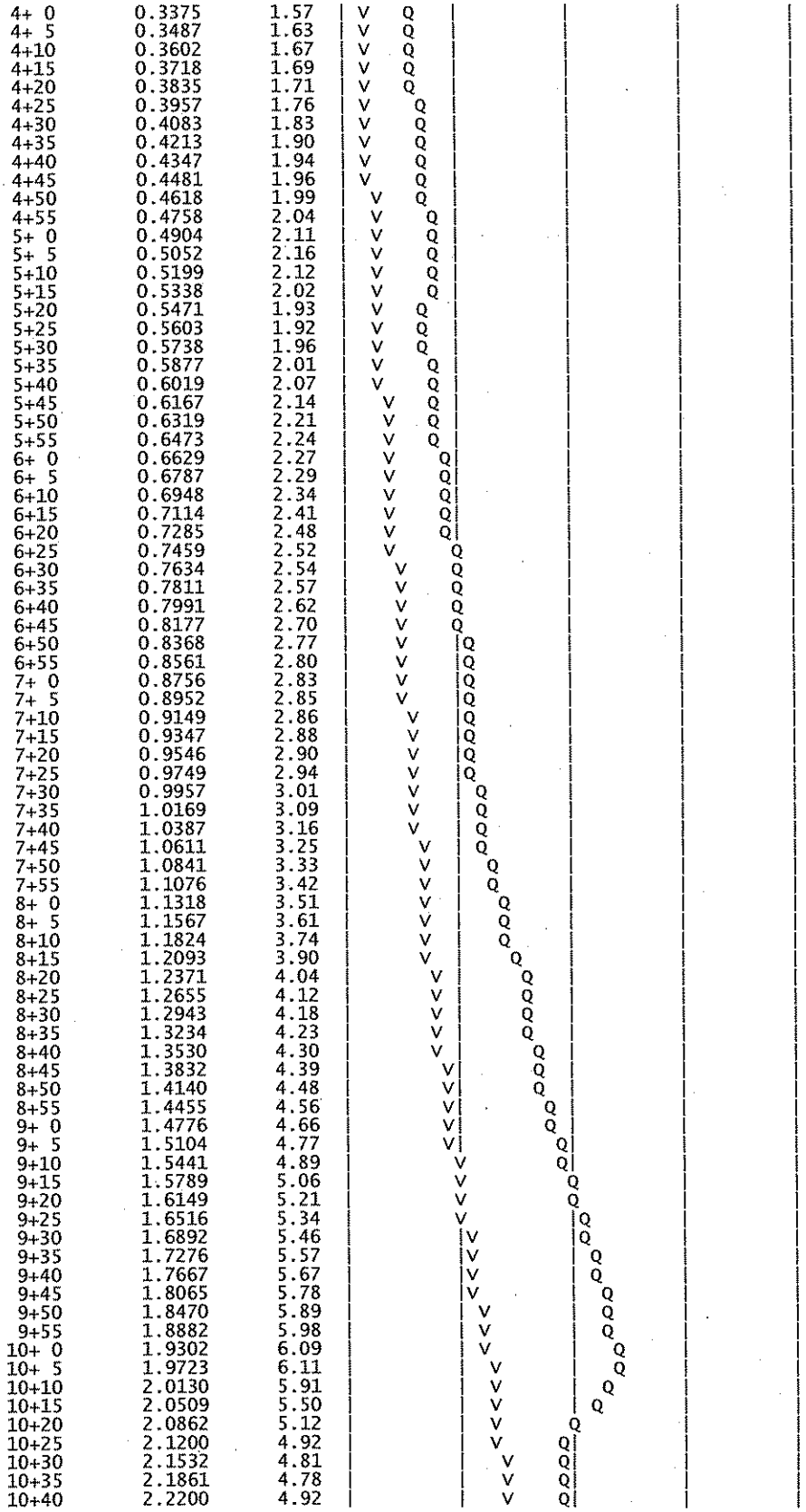
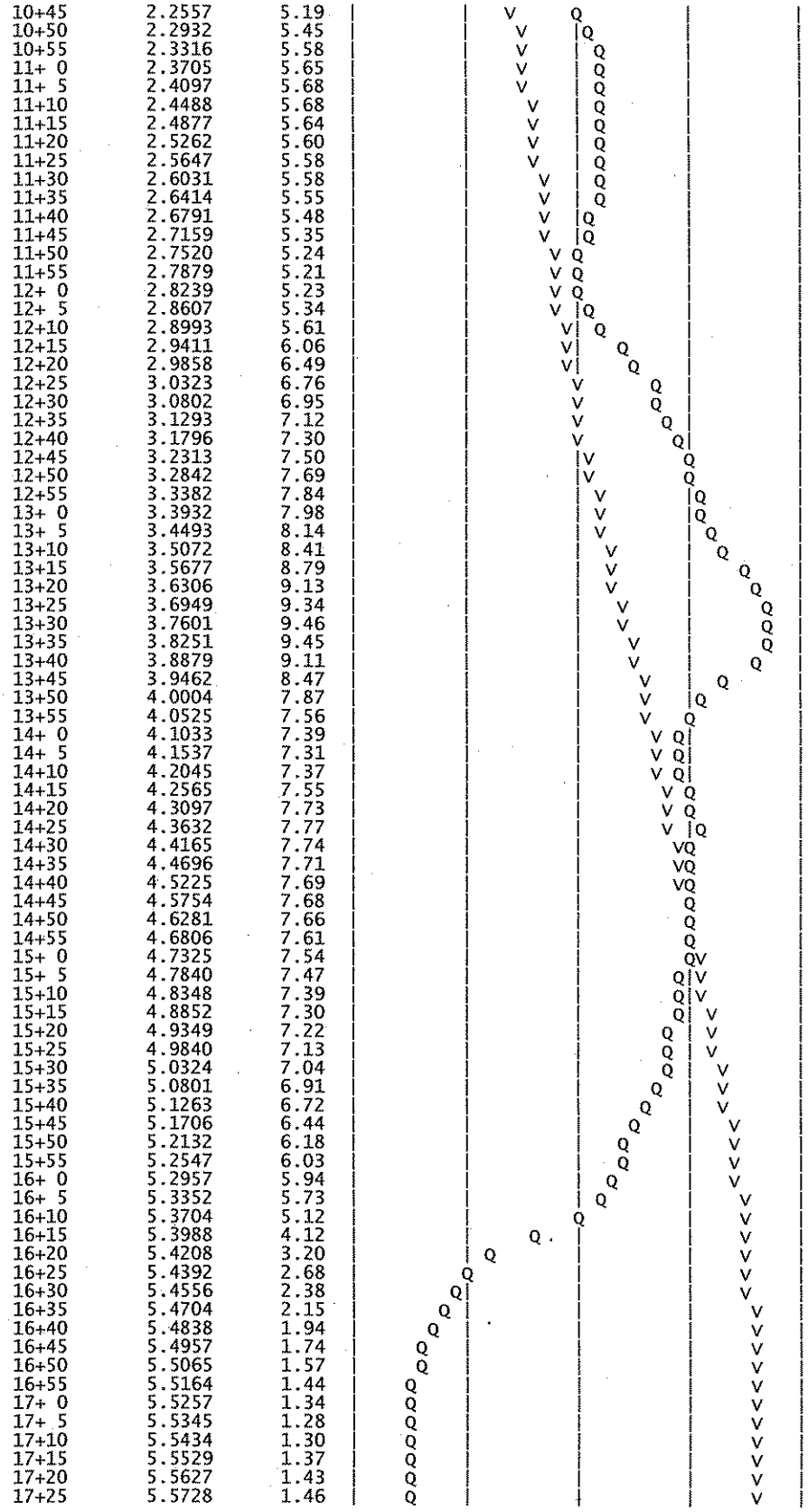
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

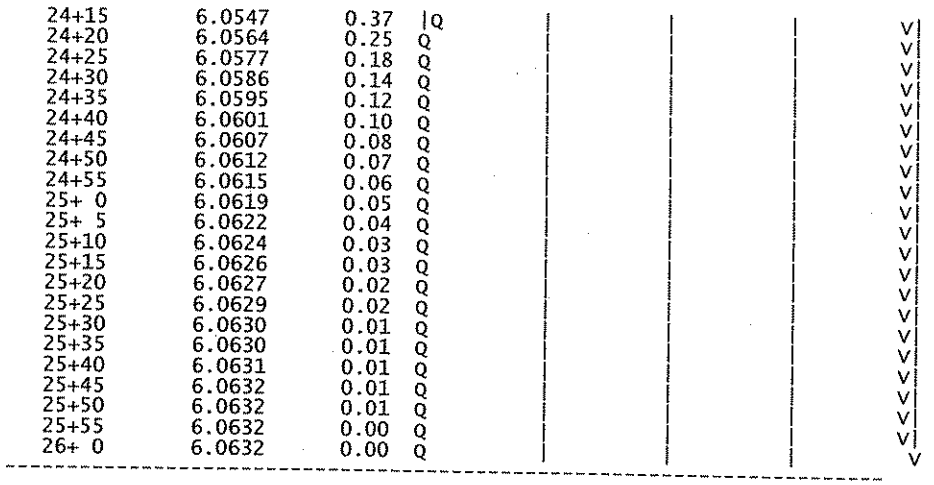
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q	|	|	|	|
0+10	0.0008	0.09	Q	|	|	|	|
0+15	0.0023	0.22	Q	|	|	|	|
0+20	0.0047	0.35	VQ	|	|	|	|
0+25	0.0078	0.45	VQ	|	|	|	|
0+30	0.0117	0.55	V Q	|	|	|	|
0+35	0.0161	0.64	V Q	|	|	|	|
0+40	0.0208	0.69	V Q	|	|	|	|
0+45	0.0258	0.73	V Q	|	|	|	|
0+50	0.0311	0.76	V Q	|	|	|	|
0+55	0.0368	0.82	V Q	|	|	|	|
1+ 0	0.0430	0.90	V Q	|	|	|	|
1+ 5	0.0496	0.97	V Q	|	|	|	|
1+10	0.0563	0.97	V Q	|	|	|	|
1+15	0.0628	0.94	V Q	|	|	|	|
1+20	0.0690	0.90	V Q	|	|	|	|
1+25	0.0751	0.89	V Q	|	|	|	|
1+30	0.0812	0.88	V Q	|	|	|	|
1+35	0.0873	0.88	V Q	|	|	|	|
1+40	0.0934	0.88	V Q	|	|	|	|
1+45	0.0994	0.88	V Q	|	|	|	|
1+50	0.1056	0.89	V Q	|	|	|	|
1+55	0.1120	0.93	V Q	|	|	|	|
2+ 0	0.1189	1.00	V Q	|	|	|	|
2+ 5	0.1262	1.06	V Q	|	|	|	|
2+10	0.1337	1.09	V Q	|	|	|	|
2+15	0.1413	1.11	V Q	|	|	|	|
2+20	0.1490	1.12	V Q	|	|	|	|
2+25	0.1568	1.13	|V Q	|	|	|	|
2+30	0.1646	1.14	|V Q	|	|	|	|
2+35	0.1726	1.15	|V Q	|	|	|	|
2+40	0.1808	1.20	|V Q	|	|	|	|
2+45	0.1895	1.26	|V Q	|	|	|	|
2+50	0.1986	1.33	|V Q	|	|	|	|
2+55	0.2080	1.36	|V Q	|	|	|	|
3+ 0	0.2175	1.38	|V Q	|	|	|	|
3+ 5	0.2271	1.40	|V Q	|	|	|	|
3+10	0.2368	1.41	|V Q	|	|	|	|
3+15	0.2466	1.42	|V Q	|	|	|	|
3+20	0.2565	1.43	|V Q	|	|	|	|
3+25	0.2663	1.43	|V Q	|	|	|	|
3+30	0.2762	1.44	|V Q	|	|	|	|
3+35	0.2862	1.44	|V Q	|	|	|	|
3+40	0.2962	1.45	|V Q	|	|	|	|
3+45	0.3062	1.45	| V Q	|	|	|	|
3+50	0.3163	1.47	| V Q	|	|	|	|
3+55	0.3266	1.51	| V Q	|	|	|	|




10+45 2.2557 5.19
10+50 2.2932 5.45
10+55 2.3316 5.58
11+ 0 2.3705 5.65
11+ 5 2.4097 5.68
11+10 2.4488 5.68
11+15 2.4877 5.64
11+20 2.5262 5.60
11+25 2.5647 5.58
11+30 2.6031 5.58
11+35 2.6414 5.55
11+40 2.6791 5.48
11+45 2.7159 5.35
11+50 2.7520 5.24
11+55 2.7879 5.21
12+ 0 2.8239 5.23
12+ 5 2.8607 5.34
12+10 2.8993 5.61
12+15 2.9411 6.06
12+20 2.9858 6.49
12+25 3.0323 6.76
12+30 3.0802 6.95
12+35 3.1293 7.12
12+40 3.1796 7.30
12+45 3.2313 7.50
12+50 3.2842 7.69
12+55 3.3382 7.84
13+ 0 3.3932 7.98
13+ 5 3.4493 8.14
13+10 3.5072 8.41
13+15 3.5677 8.79
13+20 3.6306 9.13
13+25 3.6949 9.34
13+30 3.7601 9.46
13+35 3.8251 9.45
13+40 3.8879 9.11
13+45 3.9462 8.47
13+50 4.0004 7.87
13+55 4.0525 7.56
14+ 0 4.1033 7.39
14+ 5 4.1537 7.31
14+10 4.2045 7.37
14+15 4.2565 7.55
14+20 4.3097 7.73
14+25 4.3632 7.77
14+30 4.4165 7.74
14+35 4.4696 7.71
14+40 4.5225 7.69
14+45 4.5754 7.68
14+50 4.6281 7.66
14+55 4.6806 7.61
15+ 0 4.7325 7.54
15+ 5 4.7840 7.47
15+10 4.8348 7.39
15+15 4.8852 7.30
15+20 4.9349 7.22
15+25 4.9840 7.13
15+30 5.0324 7.04
15+35 5.0801 6.91
15+40 5.1263 6.72
15+45 5.1706 6.44
15+50 5.2132 6.18
15+55 5.2547 6.03
16+ 0 5.2957 5.94
16+ 5 5.3352 5.73
16+10 5.3704 5.12
16+15 5.3988 4.12
16+20 5.4208 3.20
16+25 5.4392 2.68
16+30 5.4556 2.38
16+35 5.4704 2.15
16+40 5.4838 1.94
16+45 5.4957 1.74
16+50 5.5065 1.57
16+55 5.5164 1.44
17+ 0 5.5257 1.34
17+ 5 5.5345 1.28
17+10 5.5434 1.30
17+15 5.5529 1.37
17+20 5.5627 1.43
17+25 5.5728 1.46

17+30	5.5828	1.46	Q	|	|	|	V |
17+35	5.5929	1.46	Q	|	|	|	V |
17+40	5.6029	1.45	Q	|	|	|	V |
17+45	5.6129	1.45	Q	|	|	|	V |
17+50	5.6228	1.44	Q	|	|	|	V |
17+55	5.6324	1.40	Q	|	|	|	V |
18+ 0	5.6415	1.32	Q	|	|	|	V |
18+ 5	5.6502	1.26	Q	|	|	|	V |
18+10	5.6588	1.24	Q	|	|	|	V |
18+15	5.6672	1.22	Q	|	|	|	V |
18+20	5.6755	1.21	Q	|	|	|	V |
18+25	5.6838	1.21	Q	|	|	|	V |
18+30	5.6921	1.20	Q	|	|	|	V |
18+35	5.7003	1.19	Q	|	|	|	V |
18+40	5.7081	1.15	Q	|	|	|	V |
18+45	5.7156	1.08	Q	|	|	|	V |
18+50	5.7225	1.01	Q	|	|	|	V |
18+55	5.7290	0.94	Q	|	|	|	V |
19+ 0	5.7349	0.85	Q	|	|	|	V |
19+ 5	5.7403	0.79	Q	|	|	|	V |
19+10	5.7457	0.78	Q	|	|	|	V |
19+15	5.7513	0.82	Q	|	|	|	V |
19+20	5.7573	0.87	Q	|	|	|	V |
19+25	5.7636	0.92	Q	|	|	|	V |
19+30	5.7704	0.99	Q	|	|	|	V |
19+35	5.7776	1.04	Q	|	|	|	V |
19+40	5.7847	1.03	Q	|	|	|	V |
19+45	5.7915	0.99	Q	|	|	|	V |
19+50	5.7979	0.93	Q	|	|	|	V |
19+55	5.8039	0.87	Q	|	|	|	V |
20+ 0	5.8094	0.80	Q	|	|	|	V |
20+ 5	5.8146	0.74	Q	|	|	|	V |
20+10	5.8197	0.74	Q	|	|	|	V |
20+15	5.8251	0.78	Q	|	|	|	V |
20+20	5.8308	0.83	Q	|	|	|	V |
20+25	5.8366	0.85	Q	|	|	|	V |
20+30	5.8425	0.86	Q	|	|	|	V |
20+35	5.8484	0.86	Q	|	|	|	V |
20+40	5.8544	0.86	Q	|	|	|	V |
20+45	5.8603	0.87	Q	|	|	|	V |
20+50	5.8663	0.86	Q	|	|	|	V |
20+55	5.8719	0.82	Q	|	|	|	V |
21+ 0	5.8772	0.76	Q	|	|	|	V |
21+ 5	5.8821	0.71	Q	|	|	|	V |
21+10	5.8871	0.72	Q	|	|	|	V |
21+15	5.8923	0.77	Q	|	|	|	V |
21+20	5.8979	0.80	Q	|	|	|	V |
21+25	5.9033	0.79	Q	|	|	|	V |
21+30	5.9084	0.73	Q	|	|	|	V |
21+35	5.9131	0.69	Q	|	|	|	V |
21+40	5.9180	0.70	Q	|	|	|	V |
21+45	5.9231	0.75	Q	|	|	|	V |
21+50	5.9286	0.79	Q	|	|	|	V |
21+55	5.9339	0.78	Q	|	|	|	V |
22+ 0	5.9389	0.73	Q	|	|	|	V |
22+ 5	5.9437	0.69	Q	|	|	|	V |
22+10	5.9485	0.70	Q	|	|	|	V |
22+15	5.9536	0.75	Q	|	|	|	V |
22+20	5.9590	0.79	Q	|	|	|	V |
22+25	5.9644	0.77	Q	|	|	|	V |
22+30	5.9693	0.72	Q	|	|	|	V |
22+35	5.9740	0.67	Q	|	|	|	V |
22+40	5.9784	0.65	Q	|	|	|	V |
22+45	5.9828	0.63	Q	|	|	|	V |
22+50	5.9871	0.62	Q	|	|	|	V |
22+55	5.9913	0.62	Q	|	|	|	V |
23+ 0	5.9956	0.61	Q	|	|	|	V |
23+ 5	5.9998	0.61	Q	|	|	|	V |
23+10	6.0039	0.60	Q	|	|	|	V |
23+15	6.0081	0.60	Q	|	|	|	V |
23+20	6.0122	0.60	Q	|	|	|	V |
23+25	6.0163	0.60	Q	|	|	|	V |
23+30	6.0204	0.60	Q	|	|	|	V |
23+35	6.0245	0.59	Q	|	|	|	V |
23+40	6.0286	0.59	Q	|	|	|	V |
23+45	6.0327	0.59	Q	|	|	|	V |
23+50	6.0367	0.59	Q	|	|	|	V |
23+55	6.0408	0.59	Q	|	|	|	V |
24+ 0	6.0449	0.59	Q	|	|	|	V |
24+ 5	6.0488	0.57	Q	|	|	|	V |
24+10	6.0522	0.49	Q	|	|	|	V |


24+15 6.0547 0.37 |Q
24+20 6.0564 0.25 Q
24+25 6.0577 0.18 Q
24+30 6.0586 0.14 Q
24+35 6.0595 0.12 Q
24+40 6.0601 0.10 Q
24+45 6.0607 0.08 Q
24+50 6.0612 0.07 Q
24+55 6.0615 0.06 Q
25+ 0 6.0619 0.05 Q
25+ 5 6.0622 0.04 Q
25+10 6.0624 0.03 Q
25+15 6.0626 0.03 Q
25+20 6.0627 0.02 Q
25+25 6.0629 0.02 Q
25+30 6.0630 0.01 Q
25+35 6.0630 0.01 Q
25+40 6.0631 0.01 Q
25+45 6.0632 0.01 Q
25+50 6.0632 0.01 Q
25+55 6.0632 0.00 Q
26+ 0 6.0632 0.00 Q

APPENDIX F: HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION FOR AREA "A" (HYDROGRAPH METHOD)

APPENDIX F.1: 100- YEAR/1-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: AUHMDP1100.out

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RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	32.0	0.742	0.500	0.408	0.199	0.081
41.1	41.1	0.659	0.500	0.363	0.049	0.018
38.7	38.7	0.682	0.500	0.375	0.163	0.061
53.6	53.6	0.535	0.500	0.294	0.058	0.017
32.0	32.0	0.742	0.650	0.308	0.115	0.036
48.8	48.8	0.584	0.650	0.242	0.048	0.012
51.2	51.2	0.560	0.650	0.232	0.070	0.016
44.0	44.0	0.631	0.020	0.619	0.037	0.023
32.0	32.0	0.742	0.900	0.141	0.052	0.007
34.4	34.4	0.720	0.900	0.137	0.132	0.018
46.4	46.4	0.607	0.900	0.115	0.075	0.009
					Sum (F) =	0.298

Area averaged mean soil loss (F) (In/Hr) = 0.298
Minimum soil loss rate ((In/Hr)) = 0.149
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.403

Slope of intensity-duration curve for a 1 hour storm =0.4800

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	57.612	7.682		18.434
2	0.167	115.223	32.234		77.348
3	0.250	172.835	27.325		65.569
4	0.333	230.446	10.771		25.846
5	0.417	288.058	6.239		14.972
6	0.500	345.669	4.246		10.189
7	0.583	403.281	3.076		7.382
8	0.667	460.892	2.152		5.163
9	0.750	518.504	1.742		4.181
10	0.833	576.115	1.350		3.239
11	0.917	633.727	1.032		2.476
12	1.000	691.339	0.767		1.841
13	1.083	748.950	0.585		1.405
14	1.167	806.562	0.799		1.916
			Sum = 100.000	Sum=	239.960

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.738	0.298	---	0.44
2	0.17	4.50	0.754	0.298	---	0.46
3	0.25	5.40	0.905	0.298	---	0.61
4	0.33	5.40	0.905	0.298	---	0.61
5	0.42	5.70	0.956	0.298	---	0.66
6	0.50	6.40	1.073	0.298	---	0.77
7	0.58	7.90	1.324	0.298	---	1.03
8	0.67	9.10	1.526	0.298	---	1.23
9	0.75	12.80	2.146	0.298	---	1.85
10	0.83	25.60	4.292	0.298	---	3.99
11	0.92	7.90	1.324	0.298	---	1.03
12	1.00	4.90	0.821	0.298	---	0.52
Sum =		100.0			Sum =	13.2

Flood volume = Effective rainfall 1.10(In)
times area 238.1(Ac.)/[(In)/(Ft.)] = 21.8(Ac.Ft)
Total soil loss = 0.30(In)
Total soil loss = 5.915(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 949751.3 Cubic Feet
Total soil loss = 257662.0 Cubic Feet

Peak flow rate of this hydrograph = 517.287(CFS)

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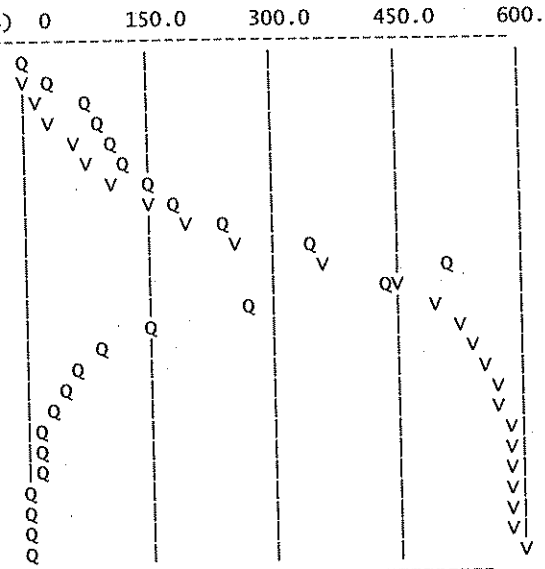
1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)
0+ 5	0.0558	8.11
0+10	0.3480	42.43
0+15	0.8669	75.34
0+20	1.5520	99.48
0+25	2.3600	117.32
0+30	3.2691	132.01
0+35	4.3346	154.70
0+40	5.6487	190.80
0+45	7.3094	241.14
0+50	9.7402	352.96
0+55	13.3028	517.29
1+ 0	16.3554	443.24
1+ 5	18.2186	270.54
1+10	19.3437	163.37
1+15	20.0385	100.88
1+20	20.5271	70.95
1+25	20.8804	51.31
1+30	21.1500	39.14
1+35	21.3546	29.70
1+40	21.5096	22.50
1+45	21.6235	16.54
1+50	21.7085	12.34
1+55	21.7778	10.06
2+ 0	21.7964	2.70
2+ 5	21.8033	1.00



APPENDIX F.2: 100-YEAR/24-HOURHYDROGRAPH CALCULATIONS

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 07/01/10 File: AUHMDP24100.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - MASTER DRAINAGE STUDY (PROPOSED CONDITION)
AREA "A" FOR AREAS "A1" TO "A20"
100 YEAR - 1, 3, 6, 24 HOUR
FN: AUHMDP

Drainage Area = 238.10(Ac.) = 0.372 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 238.10(Ac.) = 0.372 Sq. Mi.
Length along longest watercourse = 8300.00(Ft.)
Length along longest watercourse measured to centroid = 4370.00(Ft.)
Length along longest watercourse = 1.572 Mi.
Length along longest watercourse measured to centroid = 0.828 Mi.
Difference in elevation = 323.00(Ft.)
Slope along watercourse = 205.4747 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.145 Hr.
Lag time = 8.68 Min.
25% of lag time = 2.17 Min.
40% of lag time = 3.47 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]
238.10	2.50	595.25

100 YEAR Area rainfall data:

Area(AC.)[1]	Rainfall(In)[2]	Weighting[1*2]
238.10	8.00	1904.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 8.000(In)

Point rain (area averaged) = 8.000(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 7.996(In)

Sub-Area Data:

Area(AC.)	Runoff Index	Impervious %
47.500	32.00	0.500
11.600	41.10	0.500
38.800	38.70	0.500
13.900	53.60	0.500
27.500	32.00	0.650
11.500	48.80	0.650
16.600	51.20	0.650
8.900	44.00	0.020
12.500	32.00	0.900
31.500	34.40	0.900
17.800	46.40	0.900

Total Area Entered = 238.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	32.0	0.742	0.500	0.408	0.199	0.081
41.1	41.1	0.659	0.500	0.363	0.049	0.018
38.7	38.7	0.682	0.500	0.375	0.163	0.061
53.6	53.6	0.535	0.500	0.294	0.058	0.017
32.0	32.0	0.742	0.650	0.308	0.115	0.036
48.8	48.8	0.584	0.650	0.242	0.048	0.012
51.2	51.2	0.560	0.650	0.232	0.070	0.016
44.0	44.0	0.631	0.020	0.619	0.037	0.023
32.0	32.0	0.742	0.900	0.141	0.052	0.007
34.4	34.4	0.720	0.900	0.137	0.132	0.018
46.4	46.4	0.607	0.900	0.115	0.075	0.009
					Sum (F) =	0.298

Area averaged mean soil loss (F) (In/Hr) = 0.298
Minimum soil loss rate ((In/Hr)) = 0.149
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.403

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	57.612	7.682	18.434
2	0.167	115.223	32.234	77.348
3	0.250	172.835	27.325	65.569
4	0.333	230.446	10.771	25.846
5	0.417	288.058	6.239	14.972
6	0.500	345.669	4.246	10.189
7	0.583	403.281	3.076	7.382
8	0.667	460.892	2.152	5.163
9	0.750	518.504	1.742	4.181
10	0.833	576.115	1.350	3.239
11	0.917	633.727	1.032	2.476
12	1.000	691.339	0.767	1.841
13	1.083	748.950	0.585	1.405
14	1.167	806.562	0.799	1.916
			Sum = 100.000	Sum= 239.960

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.064	0.528	0.026	0.04
2	0.17	0.07	0.064	0.526	0.026	0.04
3	0.25	0.07	0.064	0.524	0.026	0.04
4	0.33	0.10	0.096	0.522	0.039	0.06
5	0.42	0.10	0.096	0.520	0.039	0.06
6	0.50	0.10	0.096	0.518	0.039	0.06
7	0.58	0.10	0.096	0.516	0.039	0.06
8	0.67	0.10	0.096	0.514	0.039	0.06
9	0.75	0.10	0.096	0.512	0.039	0.06
10	0.83	0.13	0.128	0.510	0.052	0.08
11	0.92	0.13	0.128	0.508	0.052	0.08
12	1.00	0.13	0.128	0.506	0.052	0.08
13	1.08	0.10	0.096	0.504	0.039	0.06
14	1.17	0.10	0.096	0.502	0.039	0.06
15	1.25	0.10	0.096	0.500	0.039	0.06
16	1.33	0.10	0.096	0.498	0.039	0.06
17	1.42	0.10	0.096	0.496	0.039	0.06
18	1.50	0.10	0.096	0.494	0.039	0.06
19	1.58	0.10	0.096	0.492	0.039	0.06
20	1.67	0.10	0.096	0.490	0.039	0.06
21	1.75	0.10	0.096	0.488	0.039	0.06
22	1.83	0.13	0.128	0.486	0.052	0.08
23	1.92	0.13	0.128	0.484	0.052	0.08
24	2.00	0.13	0.128	0.482	0.052	0.08
25	2.08	0.13	0.128	0.481	0.052	0.08
26	2.17	0.13	0.128	0.479	0.052	0.08
27	2.25	0.13	0.128	0.477	0.052	0.08
28	2.33	0.13	0.128	0.475	0.052	0.08
29	2.42	0.13	0.128	0.473	0.052	0.08
30	2.50	0.13	0.128	0.471	0.052	0.08
31	2.58	0.17	0.160	0.469	0.064	0.10
32	2.67	0.17	0.160	0.467	0.064	0.10

33	2.75	0.17	0.160	0.465	0.064	0.10
34	2.83	0.17	0.160	0.463	0.064	0.10
35	2.92	0.17	0.160	0.461	0.064	0.10
36	3.00	0.17	0.160	0.459	0.064	0.10
37	3.08	0.17	0.160	0.457	0.064	0.10
38	3.17	0.17	0.160	0.456	0.064	0.10
39	3.25	0.17	0.160	0.454	0.064	0.10
40	3.33	0.17	0.160	0.452	0.064	0.10
41	3.42	0.17	0.160	0.450	0.064	0.10
42	3.50	0.17	0.160	0.448	0.064	0.10
43	3.58	0.17	0.160	0.446	0.064	0.10
44	3.67	0.17	0.160	0.444	0.064	0.10
45	3.75	0.17	0.160	0.442	0.064	0.10
46	3.83	0.20	0.192	0.440	0.077	0.11
47	3.92	0.20	0.192	0.439	0.077	0.11
48	4.00	0.20	0.192	0.437	0.077	0.11
49	4.08	0.20	0.192	0.435	0.077	0.11
50	4.17	0.20	0.192	0.433	0.077	0.11
51	4.25	0.20	0.192	0.431	0.077	0.11
52	4.33	0.23	0.224	0.429	0.090	0.13
53	4.42	0.23	0.224	0.428	0.090	0.13
54	4.50	0.23	0.224	0.426	0.090	0.13
55	4.58	0.23	0.224	0.424	0.090	0.13
56	4.67	0.23	0.224	0.422	0.090	0.13
57	4.75	0.23	0.224	0.420	0.090	0.13
58	4.83	0.27	0.256	0.418	0.103	0.15
59	4.92	0.27	0.256	0.417	0.103	0.15
60	5.00	0.27	0.256	0.415	0.103	0.15
61	5.08	0.20	0.192	0.413	0.077	0.11
62	5.17	0.20	0.192	0.411	0.077	0.11
63	5.25	0.20	0.192	0.409	0.077	0.11
64	5.33	0.23	0.224	0.408	0.090	0.13
65	5.42	0.23	0.224	0.406	0.090	0.13
66	5.50	0.23	0.224	0.404	0.090	0.13
67	5.58	0.27	0.256	0.402	0.103	0.15
68	5.67	0.27	0.256	0.401	0.103	0.15
69	5.75	0.27	0.256	0.399	0.103	0.15
70	5.83	0.27	0.256	0.397	0.103	0.15
71	5.92	0.27	0.256	0.395	0.103	0.15
72	6.00	0.27	0.256	0.394	0.103	0.15
73	6.08	0.30	0.288	0.392	0.116	0.17
74	6.17	0.30	0.288	0.390	0.116	0.17
75	6.25	0.30	0.288	0.388	0.116	0.17
76	6.33	0.30	0.288	0.387	0.116	0.17
77	6.42	0.30	0.288	0.385	0.116	0.17
78	6.50	0.30	0.288	0.383	0.116	0.17
79	6.58	0.33	0.320	0.381	0.129	0.19
80	6.67	0.33	0.320	0.380	0.129	0.19
81	6.75	0.33	0.320	0.378	0.129	0.19
82	6.83	0.33	0.320	0.376	0.129	0.19
83	6.92	0.33	0.320	0.375	0.129	0.19
84	7.00	0.33	0.320	0.373	0.129	0.19
85	7.08	0.33	0.320	0.371	0.129	0.19
86	7.17	0.33	0.320	0.369	0.129	0.19
87	7.25	0.33	0.320	0.368	0.129	0.19
88	7.33	0.37	0.352	0.366	0.142	0.21
89	7.42	0.37	0.352	0.364	0.142	0.21
90	7.50	0.37	0.352	0.363	0.142	0.21
91	7.58	0.40	0.384	0.361	---	0.02
92	7.67	0.40	0.384	0.359	---	0.02
93	7.75	0.40	0.384	0.358	---	0.03
94	7.83	0.43	0.416	0.356	---	0.06
95	7.92	0.43	0.416	0.354	---	0.06
96	8.00	0.43	0.416	0.353	---	0.06
97	8.08	0.50	0.480	0.351	---	0.13
98	8.17	0.50	0.480	0.350	---	0.13
99	8.25	0.50	0.480	0.348	---	0.13
100	8.33	0.50	0.480	0.346	---	0.13
101	8.42	0.50	0.480	0.345	---	0.14
102	8.50	0.50	0.480	0.343	---	0.14
103	8.58	0.53	0.512	0.341	---	0.17
104	8.67	0.53	0.512	0.340	---	0.17
105	8.75	0.53	0.512	0.338	---	0.17
106	8.83	0.57	0.544	0.337	---	0.21
107	8.92	0.57	0.544	0.335	---	0.21
108	9.00	0.57	0.544	0.333	---	0.21
109	9.08	0.63	0.608	0.332	---	0.28
110	9.17	0.63	0.608	0.330	---	0.28
111	9.25	0.63	0.608	0.329	---	0.28
112	9.33	0.67	0.640	0.327	---	0.31
113	9.42	0.67	0.640	0.326	---	0.31

114	9.50	0.67	0.640	0.324	---	0.32
115	9.58	0.70	0.672	0.322	---	0.35
116	9.67	0.70	0.672	0.321	---	0.35
117	9.75	0.70	0.672	0.319	---	0.35
118	9.83	0.73	0.704	0.318	---	0.39
119	9.92	0.73	0.704	0.316	---	0.39
120	10.00	0.73	0.704	0.315	---	0.39
121	10.08	0.50	0.480	0.313	---	0.17
122	10.17	0.50	0.480	0.312	---	0.17
123	10.25	0.50	0.480	0.310	---	0.17
124	10.33	0.50	0.480	0.309	---	0.17
125	10.42	0.50	0.480	0.307	---	0.17
126	10.50	0.50	0.480	0.306	---	0.17
127	10.58	0.67	0.640	0.304	---	0.34
128	10.67	0.67	0.640	0.303	---	0.34
129	10.75	0.67	0.640	0.301	---	0.34
130	10.83	0.67	0.640	0.300	---	0.34
131	10.92	0.67	0.640	0.298	---	0.34
132	11.00	0.67	0.640	0.297	---	0.34
133	11.08	0.63	0.608	0.295	---	0.31
134	11.17	0.63	0.608	0.294	---	0.31
135	11.25	0.63	0.608	0.293	---	0.32
136	11.33	0.63	0.608	0.291	---	0.32
137	11.42	0.63	0.608	0.290	---	0.32
138	11.50	0.63	0.608	0.288	---	0.32
139	11.58	0.57	0.544	0.287	---	0.26
140	11.67	0.57	0.544	0.285	---	0.26
141	11.75	0.57	0.544	0.284	---	0.26
142	11.83	0.60	0.576	0.282	---	0.29
143	11.92	0.60	0.576	0.281	---	0.29
144	12.00	0.60	0.576	0.280	---	0.30
145	12.08	0.83	0.800	0.278	---	0.52
146	12.17	0.83	0.800	0.277	---	0.52
147	12.25	0.83	0.800	0.276	---	0.52
148	12.33	0.87	0.832	0.274	---	0.56
149	12.42	0.87	0.832	0.273	---	0.56
150	12.50	0.87	0.832	0.271	---	0.56
151	12.58	0.93	0.896	0.270	---	0.63
152	12.67	0.93	0.896	0.269	---	0.63
153	12.75	0.93	0.896	0.267	---	0.63
154	12.83	0.97	0.928	0.266	---	0.66
155	12.92	0.97	0.928	0.265	---	0.66
156	13.00	0.97	0.928	0.263	---	0.66
157	13.08	1.13	1.087	0.262	---	0.83
158	13.17	1.13	1.087	0.261	---	0.83
159	13.25	1.13	1.087	0.259	---	0.83
160	13.33	1.13	1.087	0.258	---	0.83
161	13.42	1.13	1.087	0.257	---	0.83
162	13.50	1.13	1.087	0.255	---	0.83
163	13.58	0.77	0.736	0.254	---	0.48
164	13.67	0.77	0.736	0.253	---	0.48
165	13.75	0.77	0.736	0.251	---	0.48
166	13.83	0.77	0.736	0.250	---	0.49
167	13.92	0.77	0.736	0.249	---	0.49
168	14.00	0.77	0.736	0.248	---	0.49
169	14.08	0.90	0.864	0.246	---	0.62
170	14.17	0.90	0.864	0.245	---	0.62
171	14.25	0.90	0.864	0.244	---	0.62
172	14.33	0.87	0.832	0.243	---	0.59
173	14.42	0.87	0.832	0.241	---	0.59
174	14.50	0.87	0.832	0.240	---	0.59
175	14.58	0.87	0.832	0.239	---	0.59
176	14.67	0.87	0.832	0.238	---	0.59
177	14.75	0.87	0.832	0.236	---	0.60
178	14.83	0.83	0.800	0.235	---	0.56
179	14.92	0.83	0.800	0.234	---	0.57
180	15.00	0.83	0.800	0.233	---	0.57
181	15.08	0.80	0.768	0.232	---	0.54
182	15.17	0.80	0.768	0.230	---	0.54
183	15.25	0.80	0.768	0.229	---	0.54
184	15.33	0.77	0.736	0.228	---	0.51
185	15.42	0.77	0.736	0.227	---	0.51
186	15.50	0.77	0.736	0.226	---	0.51
187	15.58	0.63	0.608	0.225	---	0.38
188	15.67	0.63	0.608	0.223	---	0.38
189	15.75	0.63	0.608	0.222	---	0.39
190	15.83	0.63	0.608	0.221	---	0.39
191	15.92	0.63	0.608	0.220	---	0.39
192	16.00	0.63	0.608	0.219	---	0.39
193	16.08	0.13	0.128	0.218	0.052	0.08
194	16.17	0.13	0.128	0.217	0.052	0.08

195	16.25	0.13	0.128	0.216	0.052	0.08
196	16.33	0.13	0.128	0.214	0.052	0.08
197	16.42	0.13	0.128	0.213	0.052	0.08
198	16.50	0.13	0.128	0.212	0.052	0.08
199	16.58	0.10	0.096	0.211	0.039	0.06
200	16.67	0.10	0.096	0.210	0.039	0.06
201	16.75	0.10	0.096	0.209	0.039	0.06
202	16.83	0.10	0.096	0.208	0.039	0.06
203	16.92	0.10	0.096	0.207	0.039	0.06
204	17.00	0.10	0.096	0.206	0.039	0.06
205	17.08	0.17	0.160	0.205	0.064	0.10
206	17.17	0.17	0.160	0.204	0.064	0.10
207	17.25	0.17	0.160	0.203	0.064	0.10
208	17.33	0.17	0.160	0.202	0.064	0.10
209	17.42	0.17	0.160	0.201	0.064	0.10
210	17.50	0.17	0.160	0.200	0.064	0.10
211	17.58	0.17	0.160	0.199	0.064	0.10
212	17.67	0.17	0.160	0.198	0.064	0.10
213	17.75	0.17	0.160	0.197	0.064	0.10
214	17.83	0.13	0.128	0.196	0.052	0.08
215	17.92	0.13	0.128	0.195	0.052	0.08
216	18.00	0.13	0.128	0.194	0.052	0.08
217	18.08	0.13	0.128	0.193	0.052	0.08
218	18.17	0.13	0.128	0.192	0.052	0.08
219	18.25	0.13	0.128	0.191	0.052	0.08
220	18.33	0.13	0.128	0.190	0.052	0.08
221	18.42	0.13	0.128	0.189	0.052	0.08
222	18.50	0.13	0.128	0.188	0.052	0.08
223	18.58	0.10	0.096	0.187	0.039	0.06
224	18.67	0.10	0.096	0.186	0.039	0.06
225	18.75	0.10	0.096	0.186	0.039	0.06
226	18.83	0.07	0.064	0.185	0.026	0.04
227	18.92	0.07	0.064	0.184	0.026	0.04
228	19.00	0.07	0.064	0.183	0.026	0.04
229	19.08	0.10	0.096	0.182	0.039	0.06
230	19.17	0.10	0.096	0.181	0.039	0.06
231	19.25	0.10	0.096	0.180	0.039	0.06
232	19.33	0.13	0.128	0.180	0.052	0.08
233	19.42	0.13	0.128	0.179	0.052	0.08
234	19.50	0.13	0.128	0.178	0.052	0.08
235	19.58	0.10	0.096	0.177	0.039	0.06
236	19.67	0.10	0.096	0.176	0.039	0.06
237	19.75	0.10	0.096	0.175	0.039	0.06
238	19.83	0.07	0.064	0.175	0.026	0.04
239	19.92	0.07	0.064	0.174	0.026	0.04
240	20.00	0.07	0.064	0.173	0.026	0.04
241	20.08	0.10	0.096	0.172	0.039	0.06
242	20.17	0.10	0.096	0.172	0.039	0.06
243	20.25	0.10	0.096	0.171	0.039	0.06
244	20.33	0.10	0.096	0.170	0.039	0.06
245	20.42	0.10	0.096	0.169	0.039	0.06
246	20.50	0.10	0.096	0.169	0.039	0.06
247	20.58	0.10	0.096	0.168	0.039	0.06
248	20.67	0.10	0.096	0.167	0.039	0.06
249	20.75	0.10	0.096	0.167	0.039	0.06
250	20.83	0.07	0.064	0.166	0.026	0.04
251	20.92	0.07	0.064	0.165	0.026	0.04
252	21.00	0.07	0.064	0.165	0.026	0.04
253	21.08	0.10	0.096	0.164	0.039	0.06
254	21.17	0.10	0.096	0.163	0.039	0.06
255	21.25	0.10	0.096	0.163	0.039	0.06
256	21.33	0.07	0.064	0.162	0.026	0.04
257	21.42	0.07	0.064	0.161	0.026	0.04
258	21.50	0.07	0.064	0.161	0.026	0.04
259	21.58	0.10	0.096	0.160	0.039	0.06
260	21.67	0.10	0.096	0.160	0.039	0.06
261	21.75	0.10	0.096	0.159	0.039	0.06
262	21.83	0.07	0.064	0.158	0.026	0.04
263	21.92	0.07	0.064	0.158	0.026	0.04
264	22.00	0.07	0.064	0.157	0.026	0.04
265	22.08	0.10	0.096	0.157	0.039	0.06
266	22.17	0.10	0.096	0.156	0.039	0.06
267	22.25	0.10	0.096	0.156	0.039	0.06
268	22.33	0.07	0.064	0.155	0.026	0.04
269	22.42	0.07	0.064	0.155	0.026	0.04
270	22.50	0.07	0.064	0.154	0.026	0.04
271	22.58	0.07	0.064	0.154	0.026	0.04
272	22.67	0.07	0.064	0.154	0.026	0.04
273	22.75	0.07	0.064	0.153	0.026	0.04
274	22.83	0.07	0.064	0.153	0.026	0.04
275	22.92	0.07	0.064	0.152	0.026	0.04

276	23.00	0.07	0.064	0.152	0.026	0.04
277	23.08	0.07	0.064	0.152	0.026	0.04
278	23.17	0.07	0.064	0.151	0.026	0.04
279	23.25	0.07	0.064	0.151	0.026	0.04
280	23.33	0.07	0.064	0.151	0.026	0.04
281	23.42	0.07	0.064	0.150	0.026	0.04
282	23.50	0.07	0.064	0.150	0.026	0.04
283	23.58	0.07	0.064	0.150	0.026	0.04
284	23.67	0.07	0.064	0.150	0.026	0.04
285	23.75	0.07	0.064	0.149	0.026	0.04
286	23.83	0.07	0.064	0.149	0.026	0.04
287	23.92	0.07	0.064	0.149	0.026	0.04
288	24.00	0.07	0.064	0.149	0.026	0.04
	Sum =	100.0			Sum =	56.2

Flood volume = Effective rainfall 4.68(In)
times area 238.1(Ac.)/[(In)/(Ft.)] = 92.9(Ac.Ft)
Total soil loss = 3.32(In)
Total soil loss = 65.808(Ac.Ft)
Total rainfall = 8.00(In)
Flood volume = 4044624.0 Cubic Feet
Total soil loss = 2866584.5 Cubic Feet

Peak flow rate of this hydrograph = 193.984(CFS)

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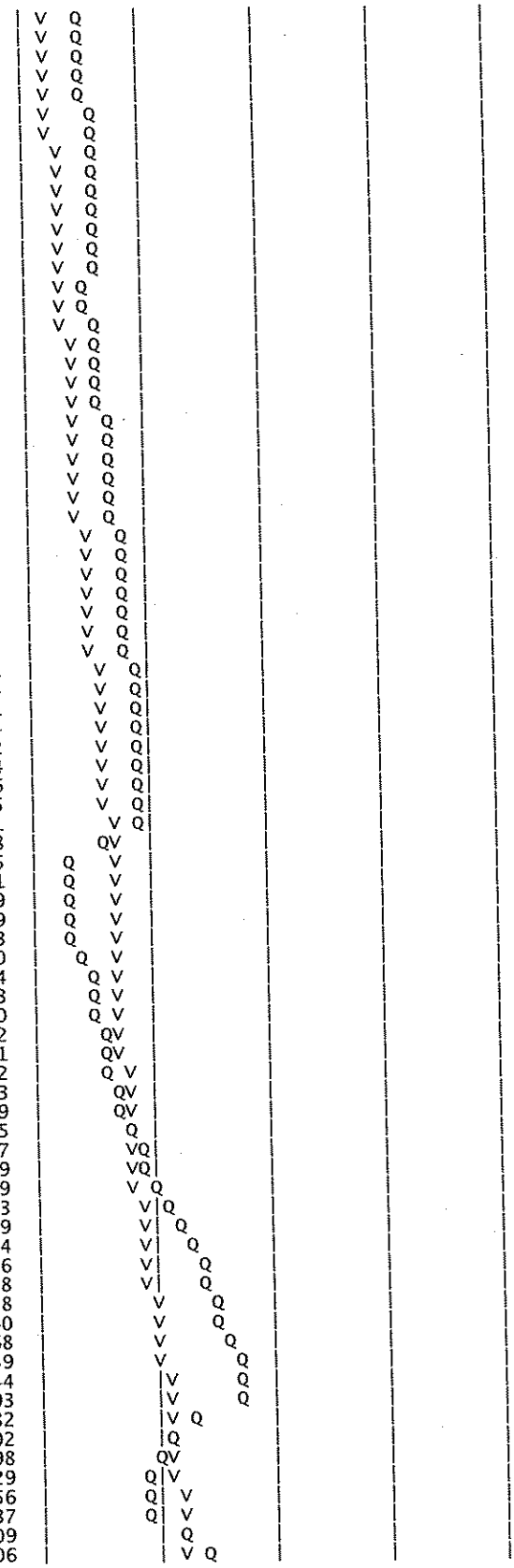
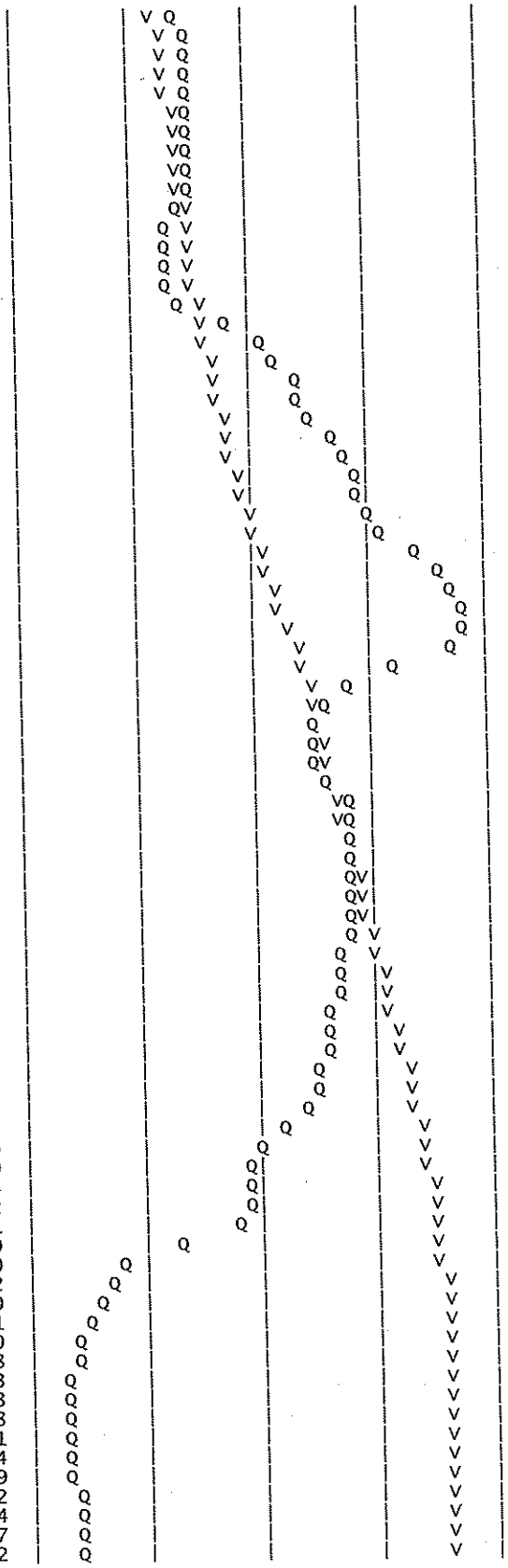
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

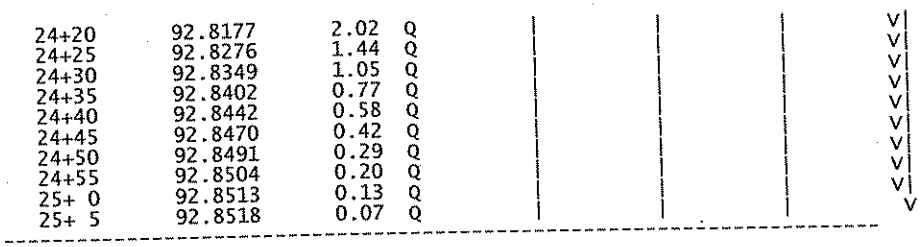
Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0048	0.70	Q				
0+10	0.0300	3.66	Q				
0+15	0.0725	6.16	VQ				
0+20	0.1242	7.50	VQ				
0+25	0.1899	9.55	VQ				
0+30	0.2670	11.19	V Q				
0+35	0.3495	11.97	V Q				
0+40	0.4352	12.45	V Q				
0+45	0.5234	12.81	V Q				
0+50	0.6159	13.42	V Q				
0+55	0.7198	15.09	V Q				
1+ 0	0.8334	16.50	V Q				
1+ 5	0.9488	16.75	V Q				
1+10	1.0568	15.68	V Q				
1+15	1.1577	14.66	V Q				
1+20	1.2565	14.33	V Q				
1+25	1.3541	14.18	V Q				
1+30	1.4510	14.07	V Q				
1+35	1.5474	13.99	V Q				
1+40	1.6434	13.94	V Q				
1+45	1.7390	13.89	V Q				
1+50	1.8369	14.21	V Q				
1+55	1.9449	15.68	V Q				
2+ 0	2.0612	16.89	V Q				
2+ 5	2.1808	17.36	V Q				
2+10	2.3021	17.61	V Q				
2+15	2.4247	17.80	|V Q				
2+20	2.5483	17.95	|V Q				
2+25	2.6725	18.04	|V Q				
2+30	2.7974	18.12	|V Q				
2+35	2.9250	18.54	|V Q				
2+40	3.0632	20.06	|V Q				
2+45	3.2102	21.35	|V Q				
2+50	3.3609	21.87	|V Q				
2+55	3.5137	22.19	|V Q				
3+ 0	3.6679	22.39	|V Q				
3+ 5	3.8230	22.53	|V Q				
3+10	3.9789	22.63	|V Q				
3+15	4.1353	22.71	|V Q				
3+20	4.2921	22.77	|V Q				
3+25	4.4492	22.82	|V Q				
3+30	4.6066	22.85	|V Q				
3+35	4.7641	22.88	| V Q				
3+40	4.9220	22.91	| V Q				
3+45	5.0798	22.91	| V Q				
3+50	5.2400	23.27	| V Q				
3+55	5.4104	24.74	| V Q				
4+ 0	5.5895	26.00	| V Q				

4+ 5	5.7719	26.49	
4+10	5.9563	26.78	
4+15	6.1420	26.97	
4+20	6.3312	27.46	
4+25	6.5312	29.04	
4+30	6.7403	30.37	
4+35	6.9533	30.93	
4+40	7.1686	31.26	
4+45	7.3855	31.49	
4+50	7.6059	32.01	
4+55	7.8375	33.62	
5+ 0	8.0782	34.95	
5+ 5	8.3179	34.81	
5+10	8.5396	32.18	
5+15	8.7456	29.91	
5+20	8.9484	29.44	
5+25	9.1583	30.48	
5+30	9.3747	31.43	
5+35	9.5955	32.05	
5+40	9.8273	33.66	
5+45	10.0683	34.99	
5+50	10.3129	35.52	
5+55	10.5598	35.85	
6+ 0	10.8081	36.06	
6+ 5	11.0599	36.56	
6+10	11.3223	38.11	
6+15	11.5942	39.47	
6+20	11.8701	40.06	
6+25	12.1485	40.43	
6+30	12.4285	40.66	
6+35	12.7121	41.18	
6+40	13.0067	42.79	
6+45	13.3106	44.12	
6+50	13.6183	44.68	
6+55	13.9283	45.01	
7+ 0	14.2398	45.24	
7+ 5	14.5525	45.41	
7+10	14.8662	45.54	
7+15	15.1804	45.62	
7+20	15.4974	46.04	
7+25	15.8250	47.56	
7+30	16.1614	48.85	
7+35	16.4776	45.91	
7+40	16.6965	31.78	
7+45	16.8332	19.85	
7+50	16.9434	16.01	
7+55	17.0542	16.09	
8+ 0	17.1691	16.69	
8+ 5	17.2912	17.73	
8+10	17.4469	22.60	
8+15	17.6310	26.74	
8+20	17.8268	28.43	
8+25	18.0300	29.50	
8+30	18.2388	30.32	
8+35	18.4565	31.61	
8+40	18.6943	34.52	
8+45	18.9514	37.33	
8+50	19.2227	39.39	
8+55	19.5185	42.95	
9+ 0	19.8344	45.87	
9+ 5	20.1690	48.59	
9+10	20.5457	54.69	
9+15	20.9570	59.73	
9+20	21.3888	62.69	
9+25	21.8484	66.74	
9+30	22.3310	70.06	
9+35	22.8301	72.48	
9+40	23.3555	76.28	
9+45	23.9023	79.40	
9+50	24.4649	81.68	
9+55	25.0530	85.39	
10+ 0	25.6620	88.44	
10+ 5	26.2539	85.93	
10+10	26.7347	69.82	
10+15	27.1205	56.02	
10+20	27.4716	50.98	
10+25	27.8042	48.29	
10+30	28.1248	46.56	
10+35	28.4580	48.37	
10+40	28.8718	60.09	
10+45	29.3544	70.06	

10+50	29.8632	73.88
10+55	30.3875	76.14
11+ 0	30.9227	77.71
11+ 5	31.4622	78.34
11+10	31.9899	76.61
11+15	32.5101	75.54
11+20	33.0306	75.58
11+25	33.5529	75.84
11+30	34.0774	76.16
11+35	34.5961	75.32
11+40	35.0841	70.85
11+45	35.5446	66.87
11+50	35.9994	66.04
11+55	36.4665	67.82
12+ 0	36.9455	69.55
12+ 5	37.4574	74.33
12+10	38.0915	92.08
12+15	38.8295	107.16
12+20	39.6140	113.90
12+25	40.4410	120.07
12+30	41.3005	124.80
12+35	42.1876	128.81
12+40	43.1221	135.68
12+45	44.0968	141.53
12+50	45.0962	145.11
12+55	46.1268	149.65
13+ 0	47.1824	153.27
13+ 5	48.2723	158.26
13+10	49.4588	172.28
13+15	50.7243	183.74
13+20	52.0238	188.69
13+25	53.3446	191.79
13+30	54.6806	193.98
13+35	55.9835	189.19
13+40	57.1081	163.30
13+45	58.0810	141.26
13+50	58.9972	133.04
13+55	59.8824	128.53
14+ 0	60.7471	125.55
14+ 5	61.6138	125.84
14+10	62.5403	134.54
14+15	63.5167	141.76
14+20	64.5060	143.65
14+25	65.4875	142.52
14+30	66.4612	141.38
14+35	67.4343	141.30
14+40	68.4061	141.10
14+45	69.3813	141.61
14+50	70.3558	141.49
14+55	71.3162	139.46
15+ 0	72.2650	137.76
15+ 5	73.2065	136.71
15+10	74.1308	134.21
15+15	75.0399	132.01
15+20	75.9394	130.60
15+25	76.8188	127.70
15+30	77.6827	125.43
15+35	78.5241	122.18
15+40	79.2944	111.84
15+45	80.0051	103.20
15+50	80.6924	99.79
15+55	81.3662	97.84
16+ 0	82.0316	96.62
16+ 5	82.6516	90.01
16+10	83.1006	65.20
16+15	83.4050	44.20
16+20	83.6509	35.72
16+25	83.8624	30.70
16+30	84.0505	27.31
16+35	84.2192	24.50
16+40	84.3650	21.18
16+45	84.4934	18.63
16+50	84.6113	17.13
16+55	84.7221	16.08
17+ 0	84.8275	15.31
17+ 5	84.9338	15.44
17+10	85.0557	17.69
17+15	85.1943	20.12
17+20	85.3392	21.04
17+25	85.4878	21.57
17+30	85.6388	21.92



17+35	85.7915	22.18	Q
17+40	85.9454	22.34	Q
17+45	86.1003	22.50	Q
17+50	86.2537	22.27	Q
17+55	86.3975	20.89	Q
18+ 0	86.5333	19.71	Q
18+ 5	86.6659	19.27	Q
18+10	86.7972	19.05	Q
18+15	86.9270	18.86	Q
18+20	87.0560	18.72	Q
18+25	87.1842	18.62	Q
18+30	87.3119	18.54	Q
18+35	87.4367	18.13	Q
18+40	87.5510	16.60	Q
18+45	87.6565	15.31	Q
18+50	87.7560	14.44	Q
18+55	87.8430	12.64	Q
19+ 0	87.9201	11.19	Q
19+ 5	87.9953	10.91	Q
19+10	88.0779	12.00	Q
19+15	88.1673	12.98	Q
19+20	88.2612	13.63	Q
19+25	88.3662	15.24	Q
19+30	88.4803	16.57	Q
19+35	88.5958	16.77	Q
19+40	88.7032	15.59	Q
19+45	88.8036	14.58	Q
19+50	88.8994	13.91	Q
19+55	88.9838	12.26	Q
20+ 0	89.0590	10.92	Q
20+ 5	89.1329	10.73	Q
20+10	89.2149	11.91	Q
20+15	89.3039	12.92	Q
20+20	89.3950	13.24	Q
20+25	89.4874	13.41	Q
20+30	89.5803	13.49	Q
20+35	89.6736	13.54	Q
20+40	89.7670	13.56	Q
20+45	89.8607	13.60	Q
20+50	89.9522	13.29	Q
20+55	90.0336	11.82	Q
21+ 0	90.1066	10.60	Q
21+ 5	90.1789	10.49	Q
21+10	90.2596	11.72	Q
21+15	90.3475	12.77	Q
21+20	90.4355	12.78	Q
21+25	90.5146	11.49	Q
21+30	90.5859	10.35	Q
21+35	90.6567	10.29	Q
21+40	90.7361	11.53	Q
21+45	90.8231	12.63	Q
21+50	90.9103	12.67	Q
21+55	90.9888	11.39	Q
22+ 0	91.0596	10.28	Q
22+ 5	91.1302	10.25	Q
22+10	91.2096	11.53	Q
22+15	91.2965	12.63	Q
22+20	91.3838	12.67	Q
22+25	91.4622	11.39	Q
22+30	91.5330	10.28	Q
22+35	91.6012	9.90	Q
22+40	91.6680	9.70	Q
22+45	91.7337	9.55	Q
22+50	91.7988	9.44	Q
22+55	91.8632	9.35	Q
23+ 0	91.9273	9.31	Q
23+ 5	91.9912	9.28	Q
23+10	92.0550	9.26	Q
23+15	92.1186	9.23	Q
23+20	92.1819	9.20	Q
23+25	92.2451	9.17	Q
23+30	92.3082	9.17	Q
23+35	92.3713	9.17	Q
23+40	92.4344	9.17	Q
23+45	92.4976	9.17	Q
23+50	92.5607	9.17	Q
23+55	92.6238	9.17	Q
24+ 0	92.6869	9.17	Q
24+ 5	92.7452	8.46	Q
24+10	92.7831	5.51	Q
24+15	92.8038	3.00	Q


24+20 92.8177 2.02 Q
24+25 92.8276 1.44 Q
24+30 92.8349 1.05 Q
24+35 92.8402 0.77 Q
24+40 92.8442 0.58 Q
24+45 92.8470 0.42 Q
24+50 92.8491 0.29 Q
24+55 92.8504 0.20 Q
25+ 0 92.8513 0.13 Q
25+ 5 92.8518 0.07 Q

APPENDIX F.3: 2- YEAR/1-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: A1UHMDP12.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - MASTER DRAINAGE STUDY (PROPOSED CONDITION)
AREA "A" FOR AREAS "A1" TO "A20"
2 YEAR - 1, 3, 6, 24 HOUR
FN: A1UHMDP

Drainage Area = 238.10(Ac.) = 0.372 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 238.10(Ac.) = 0.372 Sq. Mi.
Length along longest watercourse = 8300.00(Ft.)
Length along longest watercourse measured to centroid = 4370.00(Ft.)
Length along longest watercourse = 1.572 Mi.
Length along longest watercourse measured to centroid = 0.828 Mi.
Difference in elevation = 323.00(Ft.)
Slope along watercourse = 205.4747 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.145 Hr.
Lag time = 8.68 Min.
25% of lag time = 2.17 Min.
40% of lag time = 3.47 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]
238.10	0.55	130.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
238.10	1.40	333.34

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.400(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.78 %
Adjusted average point rain = 0.549(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
47.500	32.00	0.500
11.600	41.10	0.500
38.800	38.70	0.500
13.900	53.60	0.500
27.500	32.00	0.650
11.500	48.80	0.650
16.600	51.20	0.650
8.900	44.00	0.020
12.500	32.00	0.900
31.500	34.40	0.900
17.800	46.40	0.900

Total Area Entered = 238.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	16.2	0.870	0.500	0.479	0.199	0.096
41.1	22.9	0.817	0.500	0.449	0.049	0.022
38.7	21.0	0.832	0.500	0.458	0.163	0.075
53.6	33.9	0.725	0.500	0.399	0.058	0.023
32.0	16.2	0.870	0.650	0.361	0.115	0.042
48.8	29.8	0.762	0.650	0.316	0.048	0.015
51.2	32.0	0.742	0.650	0.308	0.070	0.021
44.0	25.2	0.798	0.020	0.784	0.037	0.029
32.0	16.2	0.870	0.900	0.165	0.052	0.009
34.4	17.6	0.859	0.900	0.163	0.132	0.022
46.4	27.4	0.781	0.900	0.148	0.075	0.011
					Sum (F) =	0.364

Area averaged mean soil loss (F) (In/Hr) = 0.364
Minimum soil loss rate ((In/Hr)) = 0.182
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.403

Slope of intensity-duration curve for a 1 hour storm =0.4800

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	57.612	7.682	18.434
2	0.167	115.223	32.234	77.348
3	0.250	172.835	27.325	65.569
4	0.333	230.446	10.771	25.846
5	0.417	288.058	6.239	14.972
6	0.500	345.669	4.246	10.189
7	0.583	403.281	3.076	7.382
8	0.667	460.892	2.152	5.163
9	0.750	518.504	1.742	4.181
10	0.833	576.115	1.350	3.239
11	0.917	633.727	1.032	2.476
12	1.000	691.339	0.767	1.841
13	1.083	748.950	0.585	1.405
14	1.167	806.562	0.799	1.916
			Sum = 100.000	Sum= 239.960

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.290	0.364	0.117	0.17
2	0.17	4.50	0.296	0.364	0.119	0.18
3	0.25	5.40	0.356	0.364	0.143	0.21
4	0.33	5.40	0.356	0.364	0.143	0.21
5	0.42	5.70	0.375	0.364	---	0.01
6	0.50	6.40	0.421	0.364	---	0.06
7	0.58	7.90	0.520	0.364	---	0.16
8	0.67	9.10	0.599	0.364	---	0.23
9	0.75	12.80	0.843	0.364	---	0.48
10	0.83	25.60	1.686	0.364	---	1.32
11	0.92	7.90	0.520	0.364	---	0.16
12	1.00	4.90	0.323	0.364	0.130	0.19
	Sum =	100.0			Sum =	3.4

Flood volume = Effective rainfall 0.28(In)
times area 238.1(Ac.)/[(In)/(Ft.)] = 5.6(Ac.Ft)
Total soil loss = 0.27(In)
Total soil loss = 5.298(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 243568.0 Cubic Feet
Total soil loss = 230772.9 Cubic Feet

Peak flow rate of this hydrograph = 148.600(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0220	3.19	Q				
0+10	0.1366	16.65	V Q				
0+15	0.3360	28.95	V Q				
0+20	0.5867	36.41	V Q				
0+25	0.8465	37.72	VQ				
0+30	1.0237	25.73	Q V				
0+35	1.1598	19.76	Q V				
0+40	1.3524	27.97	Q V				
0+45	1.6571	44.24	Q V				
0+50	2.2478	85.78	VQ				
0+55	3.2713	148.60	V Q				
1+ 0	4.1156	122.61	Q V				
1+ 5	4.6125	72.14	Q			V	
1+10	4.9269	45.65	Q			V	
1+15	5.1158	27.43	Q			V	
1+20	5.2471	19.06	Q			V	
1+25	5.3409	13.62	Q			V	
1+30	5.4116	10.28	Q			V	
1+35	5.4659	7.88	Q			V	
1+40	5.5079	6.10	Q			V	
1+45	5.5393	4.57	Q			V	
1+50	5.5637	3.54	Q			V	
1+55	5.5851	3.11	Q			V	
2+ 0	5.5890	0.57	Q			V	
2+ 5	5.5916	0.37	Q			V	

APPENDIX F.4: 2- YEAR/24-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: A1UHMDP242.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - MASTER DRAINAGE STUDY (PROPOSED CONDITION)
AREA "A" FOR AREAS "A1" TO "A20"
2 YEAR - 1, 3, 6, 24 HOUR
FN: A1UHMDP

Drainage Area = 238.10(Ac.) = 0.372 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 238.10(Ac.) = 0.372 Sq. Mi.
Length along longest watercourse = 8300.00(Ft.)
Length along longest watercourse measured to centroid = 4370.00(Ft.)
Length along longest watercourse = 1.572 Mi.
Length along longest watercourse measured to centroid = 0.828 Mi.
Difference in elevation = 323.00(Ft.)
Slope along watercourse = 205.4747 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.145 Hr.
Lag time = 8.68 Min.
25% of lag time = 2.17 Min.
40% of lag time = 3.47 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]
238.10	2.50	595.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
238.10	8.00	1904.80

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 8.000(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 2.499(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
47.500	32.00	0.500
11.600	41.10	0.500
38.800	38.70	0.500
13.900	53.60	0.500
27.500	32.00	0.650
11.500	48.80	0.650
16.600	51.20	0.650
8.900	44.00	0.020
12.500	32.00	0.900
31.500	34.40	0.900
17.800	46.40	0.900

Total Area Entered = 238.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	16.2	0.870	0.500	0.479	0.199	0.096
41.1	22.9	0.817	0.500	0.449	0.049	0.022
38.7	21.0	0.832	0.500	0.458	0.163	0.075
53.6	33.9	0.725	0.500	0.399	0.058	0.023
32.0	16.2	0.870	0.650	0.361	0.115	0.042
48.8	29.8	0.762	0.650	0.316	0.048	0.015
51.2	32.0	0.742	0.650	0.308	0.070	0.021
44.0	25.2	0.798	0.020	0.784	0.037	0.029
32.0	16.2	0.870	0.900	0.165	0.052	0.009
34.4	17.6	0.859	0.900	0.163	0.132	0.022
46.4	27.4	0.781	0.900	0.148	0.075	0.011
					Sum (F) =	0.364

Area averaged mean soil loss (F) (In/Hr) = 0.364
Minimum soil loss rate ((In/Hr)) = 0.182
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.403

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	57.612	7.682		18.434
2	0.167	115.223	32.234		77.348
3	0.250	172.835	27.325		65.569
4	0.333	230.446	10.771		25.846
5	0.417	288.058	6.239		14.972
6	0.500	345.669	4.246		10.189
7	0.583	403.281	3.076		7.382
8	0.667	460.892	2.152		5.163
9	0.750	518.504	1.742		4.181
10	0.833	576.115	1.350		3.239
11	0.917	633.727	1.032		2.476
12	1.000	691.339	0.767		1.841
13	1.083	748.950	0.585		1.405
14	1.167	806.562	0.799		1.916
			Sum = 100.000	Sum=	239.960

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.020	0.646	0.008	0.01
2	0.17	0.07	0.020	0.643	0.008	0.01
3	0.25	0.07	0.020	0.641	0.008	0.01
4	0.33	0.10	0.030	0.639	0.012	0.02
5	0.42	0.10	0.030	0.636	0.012	0.02
6	0.50	0.10	0.030	0.634	0.012	0.02
7	0.58	0.10	0.030	0.631	0.012	0.02
8	0.67	0.10	0.030	0.629	0.012	0.02
9	0.75	0.10	0.030	0.626	0.012	0.02
10	0.83	0.13	0.040	0.624	0.016	0.02
11	0.92	0.13	0.040	0.621	0.016	0.02
12	1.00	0.13	0.040	0.619	0.016	0.02
13	1.08	0.10	0.030	0.616	0.012	0.02
14	1.17	0.10	0.030	0.614	0.012	0.02
15	1.25	0.10	0.030	0.611	0.012	0.02
16	1.33	0.10	0.030	0.609	0.012	0.02
17	1.42	0.10	0.030	0.607	0.012	0.02
18	1.50	0.10	0.030	0.604	0.012	0.02
19	1.58	0.10	0.030	0.602	0.012	0.02
20	1.67	0.10	0.030	0.599	0.012	0.02
21	1.75	0.10	0.030	0.597	0.012	0.02
22	1.83	0.13	0.040	0.595	0.016	0.02
23	1.92	0.13	0.040	0.592	0.016	0.02
24	2.00	0.13	0.040	0.590	0.016	0.02
25	2.08	0.13	0.040	0.587	0.016	0.02
26	2.17	0.13	0.040	0.585	0.016	0.02
27	2.25	0.13	0.040	0.583	0.016	0.02
28	2.33	0.13	0.040	0.580	0.016	0.02
29	2.42	0.13	0.040	0.578	0.016	0.02
30	2.50	0.13	0.040	0.576	0.016	0.02
31	2.58	0.17	0.050	0.573	0.020	0.03
32	2.67	0.17	0.050	0.571	0.020	0.03

33	2.75	0.17	0.050	0.568	0.020	0.03
34	2.83	0.17	0.050	0.566	0.020	0.03
35	2.92	0.17	0.050	0.564	0.020	0.03
36	3.00	0.17	0.050	0.561	0.020	0.03
37	3.08	0.17	0.050	0.559	0.020	0.03
38	3.17	0.17	0.050	0.557	0.020	0.03
39	3.25	0.17	0.050	0.554	0.020	0.03
40	3.33	0.17	0.050	0.552	0.020	0.03
41	3.42	0.17	0.050	0.550	0.020	0.03
42	3.50	0.17	0.050	0.548	0.020	0.03
43	3.58	0.17	0.050	0.545	0.020	0.03
44	3.67	0.17	0.050	0.543	0.020	0.03
45	3.75	0.17	0.050	0.541	0.020	0.03
46	3.83	0.20	0.060	0.538	0.024	0.04
47	3.92	0.20	0.060	0.536	0.024	0.04
48	4.00	0.20	0.060	0.534	0.024	0.04
49	4.08	0.20	0.060	0.532	0.024	0.04
50	4.17	0.20	0.060	0.529	0.024	0.04
51	4.25	0.20	0.060	0.527	0.024	0.04
52	4.33	0.23	0.070	0.525	0.028	0.04
53	4.42	0.23	0.070	0.523	0.028	0.04
54	4.50	0.23	0.070	0.520	0.028	0.04
55	4.58	0.23	0.070	0.518	0.028	0.04
56	4.67	0.23	0.070	0.516	0.028	0.04
57	4.75	0.23	0.070	0.514	0.028	0.04
58	4.83	0.27	0.080	0.511	0.032	0.05
59	4.92	0.27	0.080	0.509	0.032	0.05
60	5.00	0.27	0.080	0.507	0.032	0.05
61	5.08	0.20	0.060	0.505	0.024	0.04
62	5.17	0.20	0.060	0.503	0.024	0.04
63	5.25	0.20	0.060	0.500	0.024	0.04
64	5.33	0.23	0.070	0.498	0.028	0.04
65	5.42	0.23	0.070	0.496	0.028	0.04
66	5.50	0.23	0.070	0.494	0.028	0.04
67	5.58	0.27	0.080	0.492	0.032	0.05
68	5.67	0.27	0.080	0.490	0.032	0.05
69	5.75	0.27	0.080	0.487	0.032	0.05
70	5.83	0.27	0.080	0.485	0.032	0.05
71	5.92	0.27	0.080	0.483	0.032	0.05
72	6.00	0.27	0.080	0.481	0.032	0.05
73	6.08	0.30	0.090	0.479	0.036	0.05
74	6.17	0.30	0.090	0.477	0.036	0.05
75	6.25	0.30	0.090	0.475	0.036	0.05
76	6.33	0.30	0.090	0.472	0.036	0.05
77	6.42	0.30	0.090	0.470	0.036	0.05
78	6.50	0.30	0.090	0.468	0.036	0.05
79	6.58	0.33	0.100	0.466	0.040	0.06
80	6.67	0.33	0.100	0.464	0.040	0.06
81	6.75	0.33	0.100	0.462	0.040	0.06
82	6.83	0.33	0.100	0.460	0.040	0.06
83	6.92	0.33	0.100	0.458	0.040	0.06
84	7.00	0.33	0.100	0.456	0.040	0.06
85	7.08	0.33	0.100	0.454	0.040	0.06
86	7.17	0.33	0.100	0.452	0.040	0.06
87	7.25	0.33	0.100	0.450	0.040	0.06
88	7.33	0.37	0.110	0.447	0.044	0.07
89	7.42	0.37	0.110	0.445	0.044	0.07
90	7.50	0.37	0.110	0.443	0.044	0.07
91	7.58	0.40	0.120	0.441	0.048	0.07
92	7.67	0.40	0.120	0.439	0.048	0.07
93	7.75	0.40	0.120	0.437	0.048	0.07
94	7.83	0.43	0.130	0.435	0.052	0.08
95	7.92	0.43	0.130	0.433	0.052	0.08
96	8.00	0.43	0.130	0.431	0.052	0.08
97	8.08	0.50	0.150	0.429	0.060	0.09
98	8.17	0.50	0.150	0.427	0.060	0.09
99	8.25	0.50	0.150	0.425	0.060	0.09
100	8.33	0.50	0.150	0.423	0.060	0.09
101	8.42	0.50	0.150	0.421	0.060	0.09
102	8.50	0.50	0.150	0.419	0.060	0.09
103	8.58	0.53	0.160	0.417	0.064	0.10
104	8.67	0.53	0.160	0.415	0.064	0.10
105	8.75	0.53	0.160	0.413	0.064	0.10
106	8.83	0.57	0.170	0.411	0.069	0.10
107	8.92	0.57	0.170	0.410	0.069	0.10
108	9.00	0.57	0.170	0.408	0.069	0.10
109	9.08	0.63	0.190	0.406	0.077	0.11
110	9.17	0.63	0.190	0.404	0.077	0.11
111	9.25	0.63	0.190	0.402	0.077	0.11
112	9.33	0.67	0.200	0.400	0.081	0.12
113	9.42	0.67	0.200	0.398	0.081	0.12

114	9.50	0.67	0.200	0.396	0.081	0.12
115	9.58	0.70	0.210	0.394	0.085	0.13
116	9.67	0.70	0.210	0.392	0.085	0.13
117	9.75	0.70	0.210	0.390	0.085	0.13
118	9.83	0.73	0.220	0.389	0.089	0.13
119	9.92	0.73	0.220	0.387	0.089	0.13
120	10.00	0.73	0.220	0.385	0.089	0.13
121	10.08	0.50	0.150	0.383	0.060	0.09
122	10.17	0.50	0.150	0.381	0.060	0.09
123	10.25	0.50	0.150	0.379	0.060	0.09
124	10.33	0.50	0.150	0.377	0.060	0.09
125	10.42	0.50	0.150	0.376	0.060	0.09
126	10.50	0.50	0.150	0.374	0.060	0.09
127	10.58	0.67	0.200	0.372	0.081	0.12
128	10.67	0.67	0.200	0.370	0.081	0.12
129	10.75	0.67	0.200	0.368	0.081	0.12
130	10.83	0.67	0.200	0.366	0.081	0.12
131	10.92	0.67	0.200	0.365	0.081	0.12
132	11.00	0.67	0.200	0.363	0.081	0.12
133	11.08	0.63	0.190	0.361	0.077	0.11
134	11.17	0.63	0.190	0.359	0.077	0.11
135	11.25	0.63	0.190	0.358	0.077	0.11
136	11.33	0.63	0.190	0.356	0.077	0.11
137	11.42	0.63	0.190	0.354	0.077	0.11
138	11.50	0.63	0.190	0.352	0.077	0.11
139	11.58	0.57	0.170	0.351	0.069	0.10
140	11.67	0.57	0.170	0.349	0.069	0.10
141	11.75	0.57	0.170	0.347	0.069	0.10
142	11.83	0.60	0.180	0.345	0.073	0.11
143	11.92	0.60	0.180	0.344	0.073	0.11
144	12.00	0.60	0.180	0.342	0.073	0.11
145	12.08	0.83	0.250	0.340	0.101	0.15
146	12.17	0.83	0.250	0.338	0.101	0.15
147	12.25	0.83	0.250	0.337	0.101	0.15
148	12.33	0.87	0.260	0.335	0.105	0.16
149	12.42	0.87	0.260	0.333	0.105	0.16
150	12.50	0.87	0.260	0.332	0.105	0.16
151	12.58	0.93	0.280	0.330	0.113	0.17
152	12.67	0.93	0.280	0.328	0.113	0.17
153	12.75	0.93	0.280	0.327	0.113	0.17
154	12.83	0.97	0.290	0.325	0.117	0.17
155	12.92	0.97	0.290	0.323	0.117	0.17
156	13.00	0.97	0.290	0.322	0.117	0.17
157	13.08	1.13	0.340	0.320	---	0.02
158	13.17	1.13	0.340	0.319	---	0.02
159	13.25	1.13	0.340	0.317	---	0.02
160	13.33	1.13	0.340	0.315	---	0.02
161	13.42	1.13	0.340	0.314	---	0.03
162	13.50	1.13	0.340	0.312	---	0.03
163	13.58	0.77	0.230	0.311	0.093	0.14
164	13.67	0.77	0.230	0.309	0.093	0.14
165	13.75	0.77	0.230	0.307	0.093	0.14
166	13.83	0.77	0.230	0.306	0.093	0.14
167	13.92	0.77	0.230	0.304	0.093	0.14
168	14.00	0.77	0.230	0.303	0.093	0.14
169	14.08	0.90	0.270	0.301	0.109	0.16
170	14.17	0.90	0.270	0.300	0.109	0.16
171	14.25	0.90	0.270	0.298	0.109	0.16
172	14.33	0.87	0.260	0.297	0.105	0.16
173	14.42	0.87	0.260	0.295	0.105	0.16
174	14.50	0.87	0.260	0.294	0.105	0.16
175	14.58	0.87	0.260	0.292	0.105	0.16
176	14.67	0.87	0.260	0.291	0.105	0.16
177	14.75	0.87	0.260	0.289	0.105	0.16
178	14.83	0.83	0.250	0.288	0.101	0.15
179	14.92	0.83	0.250	0.286	0.101	0.15
180	15.00	0.83	0.250	0.285	0.101	0.15
181	15.08	0.80	0.240	0.283	0.097	0.14
182	15.17	0.80	0.240	0.282	0.097	0.14
183	15.25	0.80	0.240	0.280	0.097	0.14
184	15.33	0.77	0.230	0.279	0.093	0.14
185	15.42	0.77	0.230	0.277	0.093	0.14
186	15.50	0.77	0.230	0.276	0.093	0.14
187	15.58	0.63	0.190	0.275	0.077	0.11
188	15.67	0.63	0.190	0.273	0.077	0.11
189	15.75	0.63	0.190	0.272	0.077	0.11
190	15.83	0.63	0.190	0.270	0.077	0.11
191	15.92	0.63	0.190	0.269	0.077	0.11
192	16.00	0.63	0.190	0.268	0.077	0.11
193	16.08	0.13	0.040	0.266	0.016	0.02
194	16.17	0.13	0.040	0.265	0.016	0.02

195	16.25	0.13	0.040	0.264	0.016	0.02
196	16.33	0.13	0.040	0.262	0.016	0.02
197	16.42	0.13	0.040	0.261	0.016	0.02
198	16.50	0.13	0.040	0.260	0.016	0.02
199	16.58	0.10	0.030	0.258	0.012	0.02
200	16.67	0.10	0.030	0.257	0.012	0.02
201	16.75	0.10	0.030	0.256	0.012	0.02
202	16.83	0.10	0.030	0.254	0.012	0.02
203	16.92	0.10	0.030	0.253	0.012	0.02
204	17.00	0.10	0.030	0.252	0.012	0.02
205	17.08	0.17	0.050	0.250	0.020	0.03
206	17.17	0.17	0.050	0.249	0.020	0.03
207	17.25	0.17	0.050	0.248	0.020	0.03
208	17.33	0.17	0.050	0.247	0.020	0.03
209	17.42	0.17	0.050	0.245	0.020	0.03
210	17.50	0.17	0.050	0.244	0.020	0.03
211	17.58	0.17	0.050	0.243	0.020	0.03
212	17.67	0.17	0.050	0.242	0.020	0.03
213	17.75	0.17	0.050	0.241	0.020	0.03
214	17.83	0.13	0.040	0.239	0.016	0.02
215	17.92	0.13	0.040	0.238	0.016	0.02
216	18.00	0.13	0.040	0.237	0.016	0.02
217	18.08	0.13	0.040	0.236	0.016	0.02
218	18.17	0.13	0.040	0.235	0.016	0.02
219	18.25	0.13	0.040	0.234	0.016	0.02
220	18.33	0.13	0.040	0.232	0.016	0.02
221	18.42	0.13	0.040	0.231	0.016	0.02
222	18.50	0.13	0.040	0.230	0.016	0.02
223	18.58	0.10	0.030	0.229	0.012	0.02
224	18.67	0.10	0.030	0.228	0.012	0.02
225	18.75	0.10	0.030	0.227	0.012	0.02
226	18.83	0.07	0.020	0.226	0.008	0.01
227	18.92	0.07	0.020	0.225	0.008	0.01
228	19.00	0.07	0.020	0.224	0.008	0.01
229	19.08	0.10	0.030	0.223	0.012	0.02
230	19.17	0.10	0.030	0.222	0.012	0.02
231	19.25	0.10	0.030	0.220	0.012	0.02
232	19.33	0.13	0.040	0.219	0.016	0.02
233	19.42	0.13	0.040	0.218	0.016	0.02
234	19.50	0.13	0.040	0.217	0.016	0.02
235	19.58	0.10	0.030	0.216	0.012	0.02
236	19.67	0.10	0.030	0.215	0.012	0.02
237	19.75	0.10	0.030	0.214	0.012	0.02
238	19.83	0.07	0.020	0.214	0.008	0.01
239	19.92	0.07	0.020	0.213	0.008	0.01
240	20.00	0.07	0.020	0.212	0.008	0.01
241	20.08	0.10	0.030	0.211	0.012	0.02
242	20.17	0.10	0.030	0.210	0.012	0.02
243	20.25	0.10	0.030	0.209	0.012	0.02
244	20.33	0.10	0.030	0.208	0.012	0.02
245	20.42	0.10	0.030	0.207	0.012	0.02
246	20.50	0.10	0.030	0.206	0.012	0.02
247	20.58	0.10	0.030	0.205	0.012	0.02
248	20.67	0.10	0.030	0.204	0.012	0.02
249	20.75	0.10	0.030	0.204	0.012	0.02
250	20.83	0.07	0.020	0.203	0.008	0.01
251	20.92	0.07	0.020	0.202	0.008	0.01
252	21.00	0.07	0.020	0.201	0.008	0.01
253	21.08	0.10	0.030	0.200	0.012	0.02
254	21.17	0.10	0.030	0.200	0.012	0.02
255	21.25	0.10	0.030	0.199	0.012	0.02
256	21.33	0.07	0.020	0.198	0.008	0.01
257	21.42	0.07	0.020	0.197	0.008	0.01
258	21.50	0.07	0.020	0.197	0.008	0.01
259	21.58	0.10	0.030	0.196	0.012	0.02
260	21.67	0.10	0.030	0.195	0.012	0.02
261	21.75	0.10	0.030	0.194	0.012	0.02
262	21.83	0.07	0.020	0.194	0.008	0.01
263	21.92	0.07	0.020	0.193	0.008	0.01
264	22.00	0.07	0.020	0.192	0.008	0.01
265	22.08	0.10	0.030	0.192	0.012	0.02
266	22.17	0.10	0.030	0.191	0.012	0.02
267	22.25	0.10	0.030	0.191	0.012	0.02
268	22.33	0.07	0.020	0.190	0.008	0.01
269	22.42	0.07	0.020	0.189	0.008	0.01
270	22.50	0.07	0.020	0.189	0.008	0.01
271	22.58	0.07	0.020	0.188	0.008	0.01
272	22.67	0.07	0.020	0.188	0.008	0.01
273	22.75	0.07	0.020	0.187	0.008	0.01
274	22.83	0.07	0.020	0.187	0.008	0.01
275	22.92	0.07	0.020	0.186	0.008	0.01

276	23.00	0.07	0.020	0.186	0.008	0.01
277	23.08	0.07	0.020	0.185	0.008	0.01
278	23.17	0.07	0.020	0.185	0.008	0.01
279	23.25	0.07	0.020	0.185	0.008	0.01
280	23.33	0.07	0.020	0.184	0.008	0.01
281	23.42	0.07	0.020	0.184	0.008	0.01
282	23.50	0.07	0.020	0.184	0.008	0.01
283	23.58	0.07	0.020	0.183	0.008	0.01
284	23.67	0.07	0.020	0.183	0.008	0.01
285	23.75	0.07	0.020	0.183	0.008	0.01
286	23.83	0.07	0.020	0.182	0.008	0.01
287	23.92	0.07	0.020	0.182	0.008	0.01
288	24.00	0.07	0.020	0.182	0.008	0.01
Sum =		100.0			Sum =	16.8

Flood volume = Effective rainfall 1.40(In)
times area 238.1(Ac.)/[(In)/(Ft.)] = 27.8(Ac.Ft)
Total soil loss = 1.10(In)
Total soil loss = 21.768(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 1211538.8 Cubic Feet
Total soil loss = 948213.8 Cubic Feet

Peak flow rate of this hydrograph = 40.530(CFS)

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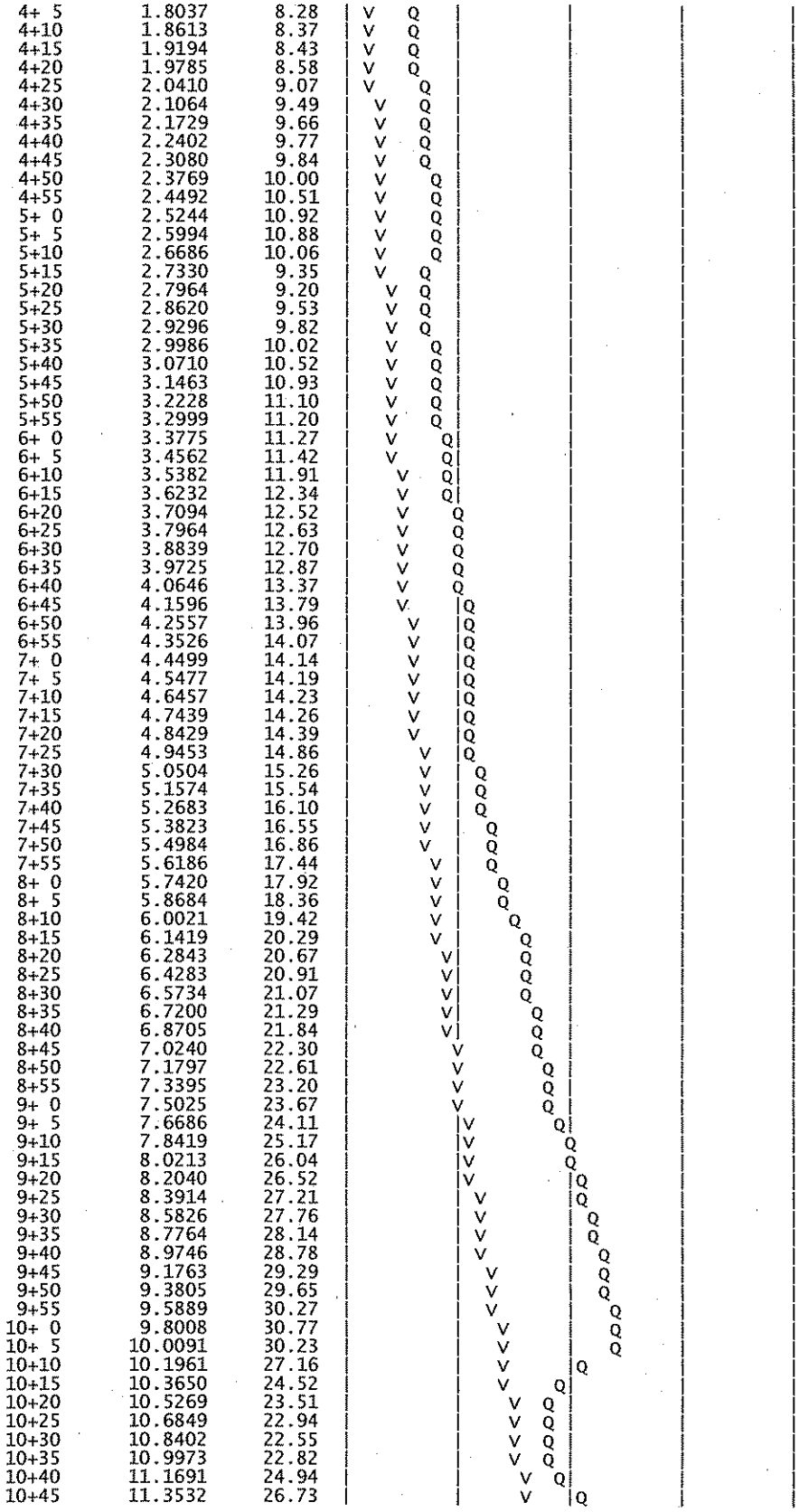
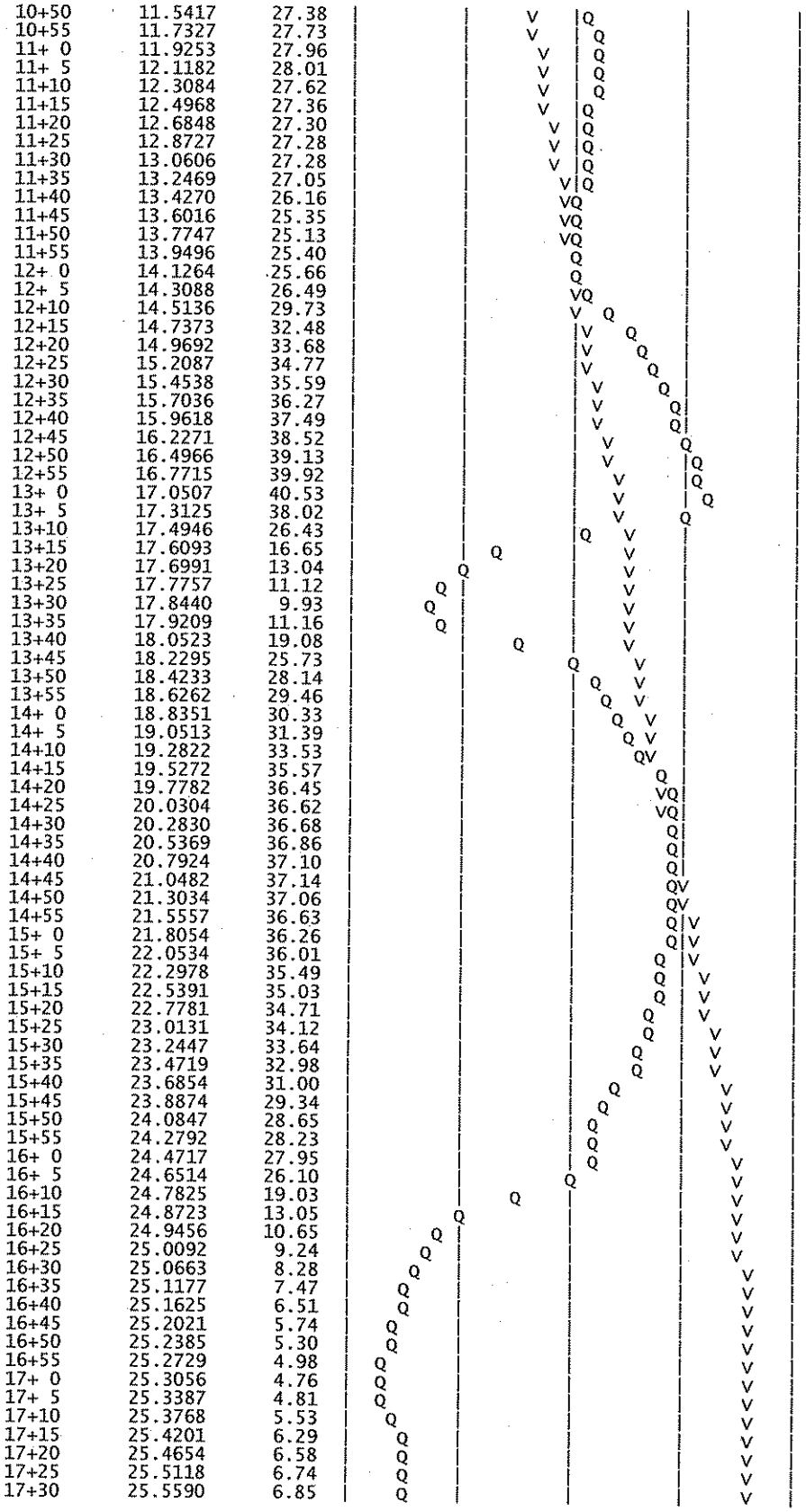
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0015	0.22	Q	|	|	|	|
0+10	0.0094	1.14	Q	|	|	|	|
0+15	0.0227	1.93	VQ	|	|	|	|
0+20	0.0388	2.34	VQ	|	|	|	|
0+25	0.0594	2.98	V Q	|	|	|	|
0+30	0.0834	3.50	V Q	|	|	|	|
0+35	0.1092	3.74	V Q	|	|	|	|
0+40	0.1360	3.89	V Q	|	|	|	|
0+45	0.1636	4.00	V Q	|	|	|	|
0+50	0.1925	4.19	V Q	|	|	|	|
0+55	0.2249	4.72	V Q	|	|	|	|
1+ 0	0.2604	5.15	V Q	|	|	|	|
1+ 5	0.2965	5.24	V Q	|	|	|	|
1+10	0.3302	4.90	V Q	|	|	|	|
1+15	0.3618	4.58	V Q	|	|	|	|
1+20	0.3926	4.48	V Q	|	|	|	|
1+25	0.4232	4.43	V Q	|	|	|	|
1+30	0.4534	4.40	V Q	|	|	|	|
1+35	0.4836	4.37	V Q	|	|	|	|
1+40	0.5136	4.36	V Q	|	|	|	|
1+45	0.5435	4.34	V Q	|	|	|	|
1+50	0.5740	4.44	V Q	|	|	|	|
1+55	0.6078	4.90	V Q	|	|	|	|
2+ 0	0.6441	5.28	V Q	|	|	|	|
2+ 5	0.6815	5.43	V Q	|	|	|	|
2+10	0.7194	5.50	|V Q	|	|	|	|
2+15	0.7577	5.56	|V Q	|	|	|	|
2+20	0.7963	5.61	|V Q	|	|	|	|
2+25	0.8352	5.64	|V Q	|	|	|	|
2+30	0.8742	5.66	|V Q	|	|	|	|
2+35	0.9141	5.79	|V Q	|	|	|	|
2+40	0.9573	6.27	|V Q	|	|	|	|
2+45	1.0032	6.67	|V Q	|	|	|	|
2+50	1.0503	6.83	|V Q	|	|	|	|
2+55	1.0980	6.94	|V Q	|	|	|	|
3+ 0	1.1462	7.00	|V Q	|	|	|	|
3+ 5	1.1947	7.04	|V Q	|	|	|	|
3+10	1.2434	7.07	|V Q	|	|	|	|
3+15	1.2923	7.10	|V Q	|	|	|	|
3+20	1.3413	7.12	|V Q	|	|	|	|
3+25	1.3904	7.13	|V Q	|	|	|	|
3+30	1.4396	7.14	| V Q	|	|	|	|
3+35	1.4888	7.15	| V Q	|	|	|	|
3+40	1.5381	7.16	| V Q	|	|	|	|
3+45	1.5874	7.16	| V Q	|	|	|	|
3+50	1.6375	7.27	| V Q	|	|	|	|
3+55	1.6908	7.73	| V Q	|	|	|	|
4+ 0	1.7467	8.12	| V Q	|	|	|	|



10+50	11.5417	27.38
10+55	11.7327	27.73
11+ 0	11.9253	27.96
11+ 5	12.1182	28.01
11+10	12.3084	27.62
11+15	12.4968	27.36
11+20	12.6848	27.30
11+25	12.8727	27.28
11+30	13.0606	27.28
11+35	13.2469	27.05
11+40	13.4270	26.16
11+45	13.6016	25.35
11+50	13.7747	25.13
11+55	13.9496	25.40
12+ 0	14.1264	25.66
12+ 5	14.3088	26.49
12+10	14.5136	29.73
12+15	14.7373	32.48
12+20	14.9692	33.68
12+25	15.2087	34.77
12+30	15.4538	35.59
12+35	15.7036	36.27
12+40	15.9618	37.49
12+45	16.2271	38.52
12+50	16.4966	39.13
12+55	16.7715	39.92
13+ 0	17.0507	40.53
13+ 5	17.3125	38.02
13+10	17.4946	26.43
13+15	17.6093	16.65
13+20	17.6991	13.04
13+25	17.7757	11.12
13+30	17.8440	9.93
13+35	17.9209	11.16
13+40	18.0523	19.08
13+45	18.2295	25.73
13+50	18.4233	28.14
13+55	18.6262	29.46
14+ 0	18.8351	30.33
14+ 5	19.0513	31.39
14+10	19.2822	33.53
14+15	19.5272	35.57
14+20	19.7782	36.45
14+25	20.0304	36.62
14+30	20.2830	36.68
14+35	20.5369	36.86
14+40	20.7924	37.10
14+45	21.0482	37.14
14+50	21.3034	37.06
14+55	21.5557	36.63
15+ 0	21.8054	36.26
15+ 5	22.0534	36.01
15+10	22.2978	35.49
15+15	22.5391	35.03
15+20	22.7781	34.71
15+25	23.0131	34.12
15+30	23.2447	33.64
15+35	23.4719	32.98
15+40	23.6854	31.00
15+45	23.8874	29.34
15+50	24.0847	28.65
15+55	24.2792	28.23
16+ 0	24.4717	27.95
16+ 5	24.6514	26.10
16+10	24.7825	19.03
16+15	24.8723	13.05
16+20	24.9456	10.65
16+25	25.0092	9.24
16+30	25.0663	8.28
16+35	25.1177	7.47
16+40	25.1625	6.51
16+45	25.2021	5.74
16+50	25.2385	5.30
16+55	25.2729	4.98
17+ 0	25.3056	4.76
17+ 5	25.3387	4.81
17+10	25.3768	5.53
17+15	25.4201	6.29
17+20	25.4654	6.58
17+25	25.5118	6.74
17+30	25.5590	6.85



17+35	25.6068	6.93	
17+40	25.6548	6.98	
17+45	25.7033	7.03	
17+50	25.7512	6.96	
17+55	25.7962	6.53	
18+ 0	25.8386	6.16	
18+ 5	25.8800	6.02	
18+10	25.9210	5.95	
18+15	25.9616	5.89	
18+20	26.0019	5.85	
18+25	26.0420	5.82	
18+30	26.0819	5.79	
18+35	26.1209	5.66	
18+40	26.1566	5.19	
18+45	26.1896	4.79	
18+50	26.2207	4.51	
18+55	26.2479	3.95	
19+ 0	26.2720	3.50	
19+ 5	26.2954	3.41	
19+10	26.3213	3.75	
19+15	26.3492	4.06	
19+20	26.3785	4.26	
19+25	26.4113	4.76	
19+30	26.4470	5.18	
19+35	26.4831	5.24	
19+40	26.5167	4.87	
19+45	26.5480	4.56	
19+50	26.5780	4.35	
19+55	26.6043	3.83	
20+ 0	26.6279	3.41	
20+ 5	26.6509	3.35	
20+10	26.6766	3.72	
20+15	26.7044	4.04	
20+20	26.7329	4.14	
20+25	26.7617	4.19	
20+30	26.7908	4.22	
20+35	26.8199	4.23	
20+40	26.8491	4.24	
20+45	26.8784	4.25	
20+50	26.9070	4.15	
20+55	26.9324	3.69	
21+ 0	26.9552	3.31	
21+ 5	26.9778	3.28	
21+10	27.0030	3.66	
21+15	27.0305	3.99	
21+20	27.0580	3.99	
21+25	27.0827	3.59	
21+30	27.1050	3.23	
21+35	27.1271	3.21	
21+40	27.1520	3.60	
21+45	27.1791	3.95	
21+50	27.2064	3.96	
21+55	27.2309	3.56	
22+ 0	27.2530	3.21	
22+ 5	27.2751	3.20	
22+10	27.2999	3.60	
22+15	27.3271	3.95	
22+20	27.3543	3.96	
22+25	27.3789	3.56	
22+30	27.4010	3.21	
22+35	27.4223	3.09	
22+40	27.4432	3.03	
22+45	27.4637	2.98	
22+50	27.4840	2.95	
22+55	27.5042	2.92	
23+ 0	27.5242	2.91	
23+ 5	27.5442	2.90	
23+10	27.5641	2.90	
23+15	27.5840	2.88	
23+20	27.6038	2.88	
23+25	27.6235	2.86	
23+30	27.6432	2.86	
23+35	27.6630	2.86	
23+40	27.6827	2.86	
23+45	27.7024	2.86	
23+50	27.7221	2.86	
23+55	27.7419	2.86	
24+ 0	27.7616	2.86	
24+ 5	27.7798	2.64	
24+10	27.7917	1.72	
24+15	27.7981	0.94	

24+20	27.8025	0.63	Q	|	|	|	V|
24+25	27.8056	0.45	Q	|	|	|	V|
24+30	27.8078	0.33	Q	|	|	|	V|
24+35	27.8095	0.24	Q	|	|	|	V|
24+40	27.8107	0.18	Q	|	|	|	V|
24+45	27.8116	0.13	Q	|	|	|	V|
24+50	27.8122	0.09	Q	|	|	|	V|
24+55	27.8127	0.06	Q	|	|	|	V|
25+ 0	27.8129	0.04	Q	|	|	|	V|
25+ 5	27.8131	0.02	Q	|	|	|	V|
							V

APPENDIX G: HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION FOR AREA "B" (HYDROGRAPH METHOD)

APPENDIX G.1:100-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

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 06/18/10 File: BEUH1100.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "B" FOR AREAS "B1" TO "B8"
100 YEAR - 1, 3, 6, 24 HOUR
FN: BEUH

Drainage Area = 56.20(Ac.) = 0.088 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 56.20(Ac.) = 0.088 Sq. Mi.
Length along longest watercourse = 3070.00(Ft.)
Length along longest watercourse measured to centroid = 1415.00(Ft.)
Length along longest watercourse = 0.581 Mi.
Length along longest watercourse measured to centroid = 0.268 Mi.
Difference in elevation = 182.00(Ft.)
Slope along watercourse = 313.0163 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.38 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]
56.20	0.55	30.91

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
56.20	1.40	78.68

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.400(In)

Point rain (area averaged) = 1.400(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 1.399(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.800	71.00	0.000
2.900	69.00	0.000
12.100	70.00	0.000
3.100	83.00	0.000
6.300	78.00	0.000
7.100	80.50	0.000
9.000	74.00	0.000
13.900	79.00	0.000

Total Area Entered = 56.20(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)

71.0	71.0	0.350	0.000	0.350	0.032	0.011
69.0	69.0	0.373	0.000	0.373	0.052	0.019
70.0	70.0	0.362	0.000	0.362	0.215	0.078
83.0	83.0	0.210	0.000	0.210	0.055	0.012
78.0	78.0	0.268	0.000	0.268	0.112	0.030
80.5	80.5	0.238	0.000	0.238	0.126	0.030
74.0	74.0	0.315	0.000	0.315	0.160	0.050
79.0	79.0	0.256	0.000	0.256	0.247	0.063
					Sum (F) =	0.294

Area averaged mean soil loss (F) (In/Hr) = 0.294
Minimum soil loss rate ((In/Hr)) = 0.147
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.4800

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.874	18.204	10.311
2	0.167	167.748	37.786	21.402
3	0.250	251.622	14.197	8.041
4	0.333	335.496	8.176	4.631
5	0.417	419.370	5.231	2.963
6	0.500	503.244	3.746	2.122
7	0.583	587.117	2.989	1.693
8	0.667	670.991	2.417	1.369
9	0.750	754.865	1.992	1.128
10	0.833	838.739	1.604	0.909
11	0.917	922.613	1.510	0.855
12	1.000	1006.487	2.148	1.217
			Sum = 100.000	Sum= 56.639

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.739	0.294	---	0.45
2	0.17	4.50	0.756	0.294	---	0.46
3	0.25	5.40	0.907	0.294	---	0.61
4	0.33	5.40	0.907	0.294	---	0.61
5	0.42	5.70	0.957	0.294	---	0.66
6	0.50	6.40	1.075	0.294	---	0.78
7	0.58	7.90	1.327	0.294	---	1.03
8	0.67	9.10	1.528	0.294	---	1.23
9	0.75	12.80	2.149	0.294	---	1.86
10	0.83	25.60	4.299	0.294	---	4.00
11	0.92	7.90	1.327	0.294	---	1.03
12	1.00	4.90	0.823	0.294	---	0.53
Sum =		100.0			Sum =	13.3

Flood volume = Effective rainfall 1.11(In)
times area 56.2(Ac.)/[(In)/(Ft.)] = 5.2(Ac.Ft)
Total soil loss = 0.29(In)
Total soil loss = 1.376(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 225536.4 Cubic Feet
Total soil loss = 59926.5 Cubic Feet

Peak flow rate of this hydrograph = 125.231(CFS)

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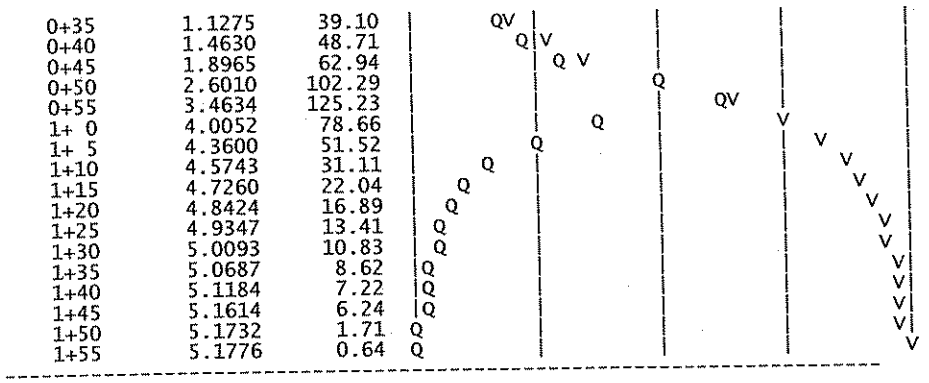
1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0316	4.59	Q	|	|	|	|
0+10	0.1301	14.29	|VQ	|	|	|	|
0+15	0.2664	19.79	| VQ	|	|	|	|
0+20	0.4401	25.23	| V Q	|	|	|	|
0+25	0.6355	28.36	| VQ	|	|	|	|
0+30	0.8582	32.35	| Q	|	|	|	|


0+35 1.1275 39.10
0+40 1.4630 48.71
0+45 1.8965 62.94
0+50 2.6010 102.29
0+55 3.4634 125.23
1+ 0 4.0052 78.66
1+ 5 4.3600 51.52
1+10 4.5743 31.11
1+15 4.7260 22.04
1+20 4.8424 16.89
1+25 4.9347 13.41
1+30 5.0093 10.83
1+35 5.0687 8.62
1+40 5.1184 7.22
1+45 5.1614 6.24
1+50 5.1732 1.71
1+55 5.1776 0.64

APPENDIX G.2:100-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

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 06/18/10 File: BEUH24100.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "B" FOR AREAS "B1" TO "B8"
100 YEAR - 1, 3, 6, 24 HOUR
FN: BEUH

Drainage Area = 56.20(Ac.) = 0.088 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 56.20(Ac.) = 0.088 Sq. Mi.
Length along longest watercourse = 3070.00(Ft.)
Length along longest watercourse measured to centroid = 1415.00(Ft.)
Length along longest watercourse = 0.581 Mi.
Length along longest watercourse measured to centroid = 0.268 Mi.
Difference in elevation = 182.00(Ft.)
Slope along watercourse = 313.0163 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.38 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]
56.20	2.50	140.50

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
56.20	8.00	449.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 8.000(In)

Point rain (area averaged) = 8.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 7.999(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.800	71.00	0.000
2.900	69.00	0.000
12.100	70.00	0.000
3.100	83.00	0.000
6.300	78.00	0.000
7.100	80.50	0.000
9.000	74.00	0.000
13.900	79.00	0.000

Total Area Entered = 56.20(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
71.0	71.0	0.350	0.000	0.350	0.032	0.011

69.0	69.0	0.373	0.000	0.373	0.052	0.019
70.0	70.0	0.362	0.000	0.362	0.215	0.078
83.0	83.0	0.210	0.000	0.210	0.055	0.012
78.0	78.0	0.268	0.000	0.268	0.112	0.030
80.5	80.5	0.238	0.000	0.238	0.126	0.030
74.0	74.0	0.315	0.000	0.315	0.160	0.050
79.0	79.0	0.256	0.000	0.256	0.247	0.063
					Sum (F) =	0.294

Area averaged mean soil loss (F) (In/Hr) = 0.294
Minimum soil loss rate ((In/Hr)) = 0.147
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
MOUNTAIN S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	83.874	18.204		10.311
2	0.167	167.748	37.786		21.402
3	0.250	251.622	14.197		8.041
4	0.333	335.496	8.176		4.631
5	0.417	419.370	5.231		2.963
6	0.500	503.244	3.746		2.122
7	0.583	587.117	2.989		1.693
8	0.667	670.991	2.417		1.369
9	0.750	754.865	1.992		1.128
10	0.833	838.739	1.604		0.909
11	0.917	922.613	1.510		0.855
12	1.000	1006.487	2.148		1.217
			Sum = 100.000	Sum=	56.639

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.064	0.521	0.058	0.01
2	0.17	0.07	0.064	0.519	0.058	0.01
3	0.25	0.07	0.064	0.517	0.058	0.01
4	0.33	0.10	0.096	0.515	0.086	0.01
5	0.42	0.10	0.096	0.513	0.086	0.01
6	0.50	0.10	0.096	0.511	0.086	0.01
7	0.58	0.10	0.096	0.509	0.086	0.01
8	0.67	0.10	0.096	0.507	0.086	0.01
9	0.75	0.10	0.096	0.505	0.086	0.01
10	0.83	0.13	0.128	0.503	0.115	0.01
11	0.92	0.13	0.128	0.501	0.115	0.01
12	1.00	0.13	0.128	0.499	0.115	0.01
13	1.08	0.10	0.096	0.497	0.086	0.01
14	1.17	0.10	0.096	0.495	0.086	0.01
15	1.25	0.10	0.096	0.493	0.086	0.01
16	1.33	0.10	0.096	0.491	0.086	0.01
17	1.42	0.10	0.096	0.489	0.086	0.01
18	1.50	0.10	0.096	0.487	0.086	0.01
19	1.58	0.10	0.096	0.485	0.086	0.01
20	1.67	0.10	0.096	0.483	0.086	0.01
21	1.75	0.10	0.096	0.481	0.086	0.01
22	1.83	0.13	0.128	0.479	0.115	0.01
23	1.92	0.13	0.128	0.477	0.115	0.01
24	2.00	0.13	0.128	0.475	0.115	0.01
25	2.08	0.13	0.128	0.473	0.115	0.01
26	2.17	0.13	0.128	0.472	0.115	0.01
27	2.25	0.13	0.128	0.470	0.115	0.01
28	2.33	0.13	0.128	0.468	0.115	0.01
29	2.42	0.13	0.128	0.466	0.115	0.01
30	2.50	0.13	0.128	0.464	0.115	0.01
31	2.58	0.17	0.160	0.462	0.144	0.02
32	2.67	0.17	0.160	0.460	0.144	0.02
33	2.75	0.17	0.160	0.458	0.144	0.02
34	2.83	0.17	0.160	0.456	0.144	0.02
35	2.92	0.17	0.160	0.454	0.144	0.02
36	3.00	0.17	0.160	0.453	0.144	0.02
37	3.08	0.17	0.160	0.451	0.144	0.02
38	3.17	0.17	0.160	0.449	0.144	0.02
39	3.25	0.17	0.160	0.447	0.144	0.02
40	3.33	0.17	0.160	0.445	0.144	0.02
41	3.42	0.17	0.160	0.443	0.144	0.02

42	3.50	0.17	0.160	0.441	0.144	0.02
43	3.58	0.17	0.160	0.440	0.144	0.02
44	3.67	0.17	0.160	0.438	0.144	0.02
45	3.75	0.17	0.160	0.436	0.144	0.02
46	3.83	0.20	0.192	0.434	0.173	0.02
47	3.92	0.20	0.192	0.432	0.173	0.02
48	4.00	0.20	0.192	0.430	0.173	0.02
49	4.08	0.20	0.192	0.429	0.173	0.02
50	4.17	0.20	0.192	0.427	0.173	0.02
51	4.25	0.20	0.192	0.425	0.173	0.02
52	4.33	0.23	0.224	0.423	0.202	0.02
53	4.42	0.23	0.224	0.421	0.202	0.02
54	4.50	0.23	0.224	0.419	0.202	0.02
55	4.58	0.23	0.224	0.418	0.202	0.02
56	4.67	0.23	0.224	0.416	0.202	0.02
57	4.75	0.23	0.224	0.414	0.202	0.02
58	4.83	0.27	0.256	0.412	0.230	0.03
59	4.92	0.27	0.256	0.411	0.230	0.03
60	5.00	0.27	0.256	0.409	0.230	0.03
61	5.08	0.20	0.192	0.407	0.173	0.02
62	5.17	0.20	0.192	0.405	0.173	0.02
63	5.25	0.20	0.192	0.403	0.173	0.02
64	5.33	0.23	0.224	0.402	0.202	0.02
65	5.42	0.23	0.224	0.400	0.202	0.02
66	5.50	0.23	0.224	0.398	0.202	0.02
67	5.58	0.27	0.256	0.396	0.230	0.03
68	5.67	0.27	0.256	0.395	0.230	0.03
69	5.75	0.27	0.256	0.393	0.230	0.03
70	5.83	0.27	0.256	0.391	0.230	0.03
71	5.92	0.27	0.256	0.389	0.230	0.03
72	6.00	0.27	0.256	0.388	0.230	0.03
73	6.08	0.30	0.288	0.386	0.259	0.03
74	6.17	0.30	0.288	0.384	0.259	0.03
75	6.25	0.30	0.288	0.383	0.259	0.03
76	6.33	0.30	0.288	0.381	0.259	0.03
77	6.42	0.30	0.288	0.379	0.259	0.03
78	6.50	0.30	0.288	0.377	0.259	0.03
79	6.58	0.33	0.320	0.376	0.288	0.03
80	6.67	0.33	0.320	0.374	0.288	0.03
81	6.75	0.33	0.320	0.372	0.288	0.03
82	6.83	0.33	0.320	0.371	0.288	0.03
83	6.92	0.33	0.320	0.369	0.288	0.03
84	7.00	0.33	0.320	0.367	0.288	0.03
85	7.08	0.33	0.320	0.366	0.288	0.03
86	7.17	0.33	0.320	0.364	0.288	0.03
87	7.25	0.33	0.320	0.362	0.288	0.03
88	7.33	0.37	0.352	0.361	0.317	0.04
89	7.42	0.37	0.352	0.359	0.317	0.04
90	7.50	0.37	0.352	0.357	0.317	0.04
91	7.58	0.40	0.384	0.356	---	0.03
92	7.67	0.40	0.384	0.354	---	0.03
93	7.75	0.40	0.384	0.353	---	0.03
94	7.83	0.43	0.416	0.351	---	0.07
95	7.92	0.43	0.416	0.349	---	0.07
96	8.00	0.43	0.416	0.348	---	0.07
97	8.08	0.50	0.480	0.346	---	0.13
98	8.17	0.50	0.480	0.344	---	0.14
99	8.25	0.50	0.480	0.343	---	0.14
100	8.33	0.50	0.480	0.341	---	0.14
101	8.42	0.50	0.480	0.340	---	0.14
102	8.50	0.50	0.480	0.338	---	0.14
103	8.58	0.53	0.512	0.336	---	0.18
104	8.67	0.53	0.512	0.335	---	0.18
105	8.75	0.53	0.512	0.333	---	0.18
106	8.83	0.57	0.544	0.332	---	0.21
107	8.92	0.57	0.544	0.330	---	0.21
108	9.00	0.57	0.544	0.329	---	0.22
109	9.08	0.63	0.608	0.327	---	0.28
110	9.17	0.63	0.608	0.325	---	0.28
111	9.25	0.63	0.608	0.324	---	0.28
112	9.33	0.67	0.640	0.322	---	0.32
113	9.42	0.67	0.640	0.321	---	0.32
114	9.50	0.67	0.640	0.319	---	0.32
115	9.58	0.70	0.672	0.318	---	0.35
116	9.67	0.70	0.672	0.316	---	0.36
117	9.75	0.70	0.672	0.315	---	0.36
118	9.83	0.73	0.704	0.313	---	0.39
119	9.92	0.73	0.704	0.312	---	0.39
120	10.00	0.73	0.704	0.310	---	0.39
121	10.08	0.50	0.480	0.309	---	0.17
122	10.17	0.50	0.480	0.307	---	0.17

123	10.25	0.50	0.480	0.306	---	0.17
124	10.33	0.50	0.480	0.304	---	0.18
125	10.42	0.50	0.480	0.303	---	0.18
126	10.50	0.50	0.480	0.301	---	0.18
127	10.58	0.67	0.640	0.300	---	0.34
128	10.67	0.67	0.640	0.298	---	0.34
129	10.75	0.67	0.640	0.297	---	0.34
130	10.83	0.67	0.640	0.295	---	0.34
131	10.92	0.67	0.640	0.294	---	0.35
132	11.00	0.67	0.640	0.293	---	0.35
133	11.08	0.63	0.608	0.291	---	0.32
134	11.17	0.63	0.608	0.290	---	0.32
135	11.25	0.63	0.608	0.288	---	0.32
136	11.33	0.63	0.608	0.287	---	0.32
137	11.42	0.63	0.608	0.285	---	0.32
138	11.50	0.63	0.608	0.284	---	0.32
139	11.58	0.57	0.544	0.283	---	0.26
140	11.67	0.57	0.544	0.281	---	0.26
141	11.75	0.57	0.544	0.280	---	0.26
142	11.83	0.60	0.576	0.278	---	0.30
143	11.92	0.60	0.576	0.277	---	0.30
144	12.00	0.60	0.576	0.276	---	0.30
145	12.08	0.83	0.800	0.274	---	0.53
146	12.17	0.83	0.800	0.273	---	0.53
147	12.25	0.83	0.800	0.271	---	0.53
148	12.33	0.87	0.832	0.270	---	0.56
149	12.42	0.87	0.832	0.269	---	0.56
150	12.50	0.87	0.832	0.267	---	0.56
151	12.58	0.93	0.896	0.266	---	0.63
152	12.67	0.93	0.896	0.265	---	0.63
153	12.75	0.93	0.896	0.263	---	0.63
154	12.83	0.97	0.928	0.262	---	0.67
155	12.92	0.97	0.928	0.261	---	0.67
156	13.00	0.97	0.928	0.259	---	0.67
157	13.08	1.13	1.088	0.258	---	0.83
158	13.17	1.13	1.088	0.257	---	0.83
159	13.25	1.13	1.088	0.255	---	0.83
160	13.33	1.13	1.088	0.254	---	0.83
161	13.42	1.13	1.088	0.253	---	0.83
162	13.50	1.13	1.088	0.252	---	0.84
163	13.58	0.77	0.736	0.250	---	0.49
164	13.67	0.77	0.736	0.249	---	0.49
165	13.75	0.77	0.736	0.248	---	0.49
166	13.83	0.77	0.736	0.247	---	0.49
167	13.92	0.77	0.736	0.245	---	0.49
168	14.00	0.77	0.736	0.244	---	0.49
169	14.08	0.90	0.864	0.243	---	0.62
170	14.17	0.90	0.864	0.242	---	0.62
171	14.25	0.90	0.864	0.240	---	0.62
172	14.33	0.87	0.832	0.239	---	0.59
173	14.42	0.87	0.832	0.238	---	0.59
174	14.50	0.87	0.832	0.237	---	0.60
175	14.58	0.87	0.832	0.235	---	0.60
176	14.67	0.87	0.832	0.234	---	0.60
177	14.75	0.87	0.832	0.233	---	0.60
178	14.83	0.83	0.800	0.232	---	0.57
179	14.92	0.83	0.800	0.231	---	0.57
180	15.00	0.83	0.800	0.229	---	0.57
181	15.08	0.80	0.768	0.228	---	0.54
182	15.17	0.80	0.768	0.227	---	0.54
183	15.25	0.80	0.768	0.226	---	0.54
184	15.33	0.77	0.736	0.225	---	0.51
185	15.42	0.77	0.736	0.224	---	0.51
186	15.50	0.77	0.736	0.222	---	0.51
187	15.58	0.63	0.608	0.221	---	0.39
188	15.67	0.63	0.608	0.220	---	0.39
189	15.75	0.63	0.608	0.219	---	0.39
190	15.83	0.63	0.608	0.218	---	0.39
191	15.92	0.63	0.608	0.217	---	0.39
192	16.00	0.63	0.608	0.216	---	0.39
193	16.08	0.13	0.128	0.215	0.115	0.01
194	16.17	0.13	0.128	0.214	0.115	0.01
195	16.25	0.13	0.128	0.212	0.115	0.01
196	16.33	0.13	0.128	0.211	0.115	0.01
197	16.42	0.13	0.128	0.210	0.115	0.01
198	16.50	0.13	0.128	0.209	0.115	0.01
199	16.58	0.10	0.096	0.208	0.086	0.01
200	16.67	0.10	0.096	0.207	0.086	0.01
201	16.75	0.10	0.096	0.206	0.086	0.01
202	16.83	0.10	0.096	0.205	0.086	0.01
203	16.92	0.10	0.096	0.204	0.086	0.01

204	17.00	0.10	0.096	0.203	0.086	0.01
205	17.08	0.17	0.160	0.202	0.144	0.02
206	17.17	0.17	0.160	0.201	0.144	0.02
207	17.25	0.17	0.160	0.200	0.144	0.02
208	17.33	0.17	0.160	0.199	0.144	0.02
209	17.42	0.17	0.160	0.198	0.144	0.02
210	17.50	0.17	0.160	0.197	0.144	0.02
211	17.58	0.17	0.160	0.196	0.144	0.02
212	17.67	0.17	0.160	0.195	0.144	0.02
213	17.75	0.17	0.160	0.194	0.144	0.02
214	17.83	0.13	0.128	0.193	0.115	0.01
215	17.92	0.13	0.128	0.192	0.115	0.01
216	18.00	0.13	0.128	0.191	0.115	0.01
217	18.08	0.13	0.128	0.190	0.115	0.01
218	18.17	0.13	0.128	0.189	0.115	0.01
219	18.25	0.13	0.128	0.188	0.115	0.01
220	18.33	0.13	0.128	0.187	0.115	0.01
221	18.42	0.13	0.128	0.186	0.115	0.01
222	18.50	0.13	0.128	0.186	0.115	0.01
223	18.58	0.10	0.096	0.185	0.086	0.01
224	18.67	0.10	0.096	0.184	0.086	0.01
225	18.75	0.10	0.096	0.183	0.086	0.01
226	18.83	0.07	0.064	0.182	0.058	0.01
227	18.92	0.07	0.064	0.181	0.058	0.01
228	19.00	0.07	0.064	0.180	0.058	0.01
229	19.08	0.10	0.096	0.179	0.086	0.01
230	19.17	0.10	0.096	0.179	0.086	0.01
231	19.25	0.10	0.096	0.178	0.086	0.01
232	19.33	0.13	0.128	0.177	0.115	0.01
233	19.42	0.13	0.128	0.176	0.115	0.01
234	19.50	0.13	0.128	0.175	0.115	0.01
235	19.58	0.10	0.096	0.174	0.086	0.01
236	19.67	0.10	0.096	0.174	0.086	0.01
237	19.75	0.10	0.096	0.173	0.086	0.01
238	19.83	0.07	0.064	0.172	0.058	0.01
239	19.92	0.07	0.064	0.171	0.058	0.01
240	20.00	0.07	0.064	0.171	0.058	0.01
241	20.08	0.10	0.096	0.170	0.086	0.01
242	20.17	0.10	0.096	0.169	0.086	0.01
243	20.25	0.10	0.096	0.168	0.086	0.01
244	20.33	0.10	0.096	0.168	0.086	0.01
245	20.42	0.10	0.096	0.167	0.086	0.01
246	20.50	0.10	0.096	0.166	0.086	0.01
247	20.58	0.10	0.096	0.165	0.086	0.01
248	20.67	0.10	0.096	0.165	0.086	0.01
249	20.75	0.10	0.096	0.164	0.086	0.01
250	20.83	0.07	0.064	0.163	0.058	0.01
251	20.92	0.07	0.064	0.163	0.058	0.01
252	21.00	0.07	0.064	0.162	0.058	0.01
253	21.08	0.10	0.096	0.161	0.086	0.01
254	21.17	0.10	0.096	0.161	0.086	0.01
255	21.25	0.10	0.096	0.160	0.086	0.01
256	21.33	0.07	0.064	0.160	0.058	0.01
257	21.42	0.07	0.064	0.159	0.058	0.01
258	21.50	0.07	0.064	0.158	0.058	0.01
259	21.58	0.10	0.096	0.158	0.086	0.01
260	21.67	0.10	0.096	0.157	0.086	0.01
261	21.75	0.10	0.096	0.157	0.086	0.01
262	21.83	0.07	0.064	0.156	0.058	0.01
263	21.92	0.07	0.064	0.156	0.058	0.01
264	22.00	0.07	0.064	0.155	0.058	0.01
265	22.08	0.10	0.096	0.155	0.086	0.01
266	22.17	0.10	0.096	0.154	0.086	0.01
267	22.25	0.10	0.096	0.154	0.086	0.01
268	22.33	0.07	0.064	0.153	0.058	0.01
269	22.42	0.07	0.064	0.153	0.058	0.01
270	22.50	0.07	0.064	0.152	0.058	0.01
271	22.58	0.07	0.064	0.152	0.058	0.01
272	22.67	0.07	0.064	0.151	0.058	0.01
273	22.75	0.07	0.064	0.151	0.058	0.01
274	22.83	0.07	0.064	0.151	0.058	0.01
275	22.92	0.07	0.064	0.150	0.058	0.01
276	23.00	0.07	0.064	0.150	0.058	0.01
277	23.08	0.07	0.064	0.149	0.058	0.01
278	23.17	0.07	0.064	0.149	0.058	0.01
279	23.25	0.07	0.064	0.149	0.058	0.01
280	23.33	0.07	0.064	0.148	0.058	0.01
281	23.42	0.07	0.064	0.148	0.058	0.01
282	23.50	0.07	0.064	0.148	0.058	0.01
283	23.58	0.07	0.064	0.148	0.058	0.01
284	23.67	0.07	0.064	0.147	0.058	0.01

285	23.75	0.07	0.064	0.147	0.058	0.01
286	23.83	0.07	0.064	0.147	0.058	0.01
287	23.92	0.07	0.064	0.147	0.058	0.01
288	24.00	0.07	0.064	0.147	0.058	0.01
Sum =		100.0			Sum =	43.5

Flood volume = Effective rainfall 3.62(In)
times area 56.2(Ac.)/[(In)/(Ft.)] = 17.0(Ac.Ft)
Total soil loss = 4.38(In)
Total soil loss = 20.505(Ac.Ft)
Total rainfall = 8.00(In)
Flood volume = 738683.9 Cubic Feet
Total soil loss = 893185.0 Cubic Feet

Peak flow rate of this hydrograph = 45.975(CFS)

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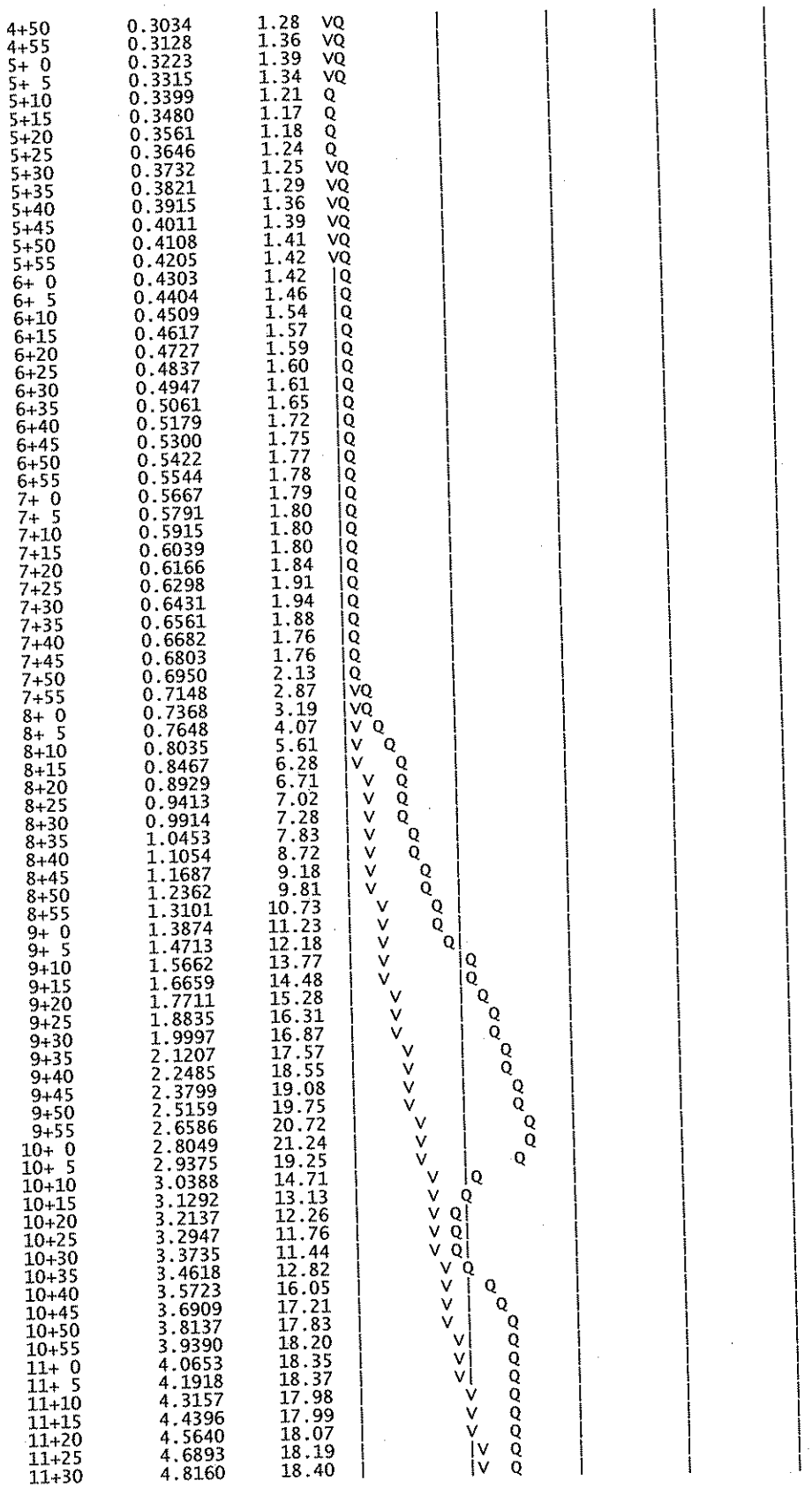
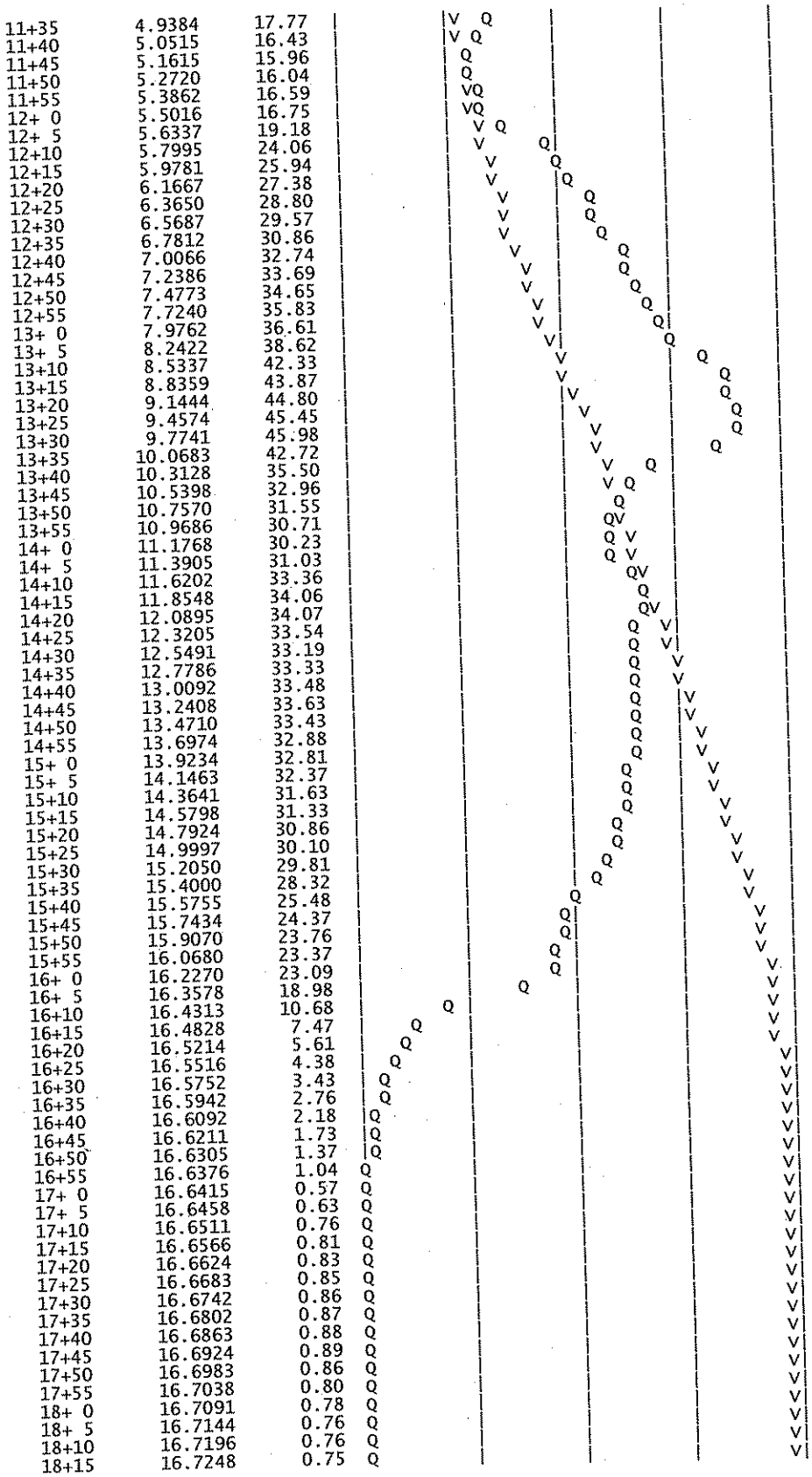
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0005	0.07	Q				
0+10	0.0019	0.20	Q				
0+15	0.0036	0.25	Q				
0+20	0.0058	0.32	Q				
0+25	0.0086	0.40	Q				
0+30	0.0116	0.44	Q				
0+35	0.0149	0.47	Q				
0+40	0.0182	0.49	Q				
0+45	0.0217	0.50	Q				
0+50	0.0254	0.55	Q				
0+55	0.0297	0.62	Q				
1+ 0	0.0343	0.66	Q				
1+ 5	0.0388	0.65	Q				
1+10	0.0428	0.59	Q				
1+15	0.0468	0.58	Q				
1+20	0.0507	0.57	Q				
1+25	0.0545	0.56	Q				
1+30	0.0584	0.56	Q				
1+35	0.0622	0.55	Q				
1+40	0.0660	0.55	Q				
1+45	0.0698	0.55	Q				
1+50	0.0738	0.58	Q				
1+55	0.0783	0.65	Q				
2+ 0	0.0829	0.67	Q				
2+ 5	0.0877	0.69	Q				
2+10	0.0925	0.70	Q				
2+15	0.0973	0.70	Q				
2+20	0.1022	0.71	Q				
2+25	0.1071	0.71	Q				
2+30	0.1120	0.72	Q				
2+35	0.1172	0.75	Q				
2+40	0.1228	0.82	Q				
2+45	0.1287	0.85	Q				
2+50	0.1347	0.87	Q				
2+55	0.1407	0.88	Q				
3+ 0	0.1468	0.88	Q				
3+ 5	0.1529	0.89	Q				
3+10	0.1591	0.89	Q				
3+15	0.1653	0.90	Q				
3+20	0.1715	0.90	Q				
3+25	0.1777	0.90	Q				
3+30	0.1839	0.91	Q				
3+35	0.1902	0.91	Q				
3+40	0.1964	0.91	Q				
3+45	0.2027	0.91	Q				
3+50	0.2091	0.94	Q				
3+55	0.2161	1.01	Q				
4+ 0	0.2232	1.03	Q				
4+ 5	0.2304	1.05	Q				
4+10	0.2377	1.06	Q				
4+15	0.2450	1.06	Q				
4+20	0.2526	1.10	Q				
4+25	0.2607	1.18	Q				
4+30	0.2690	1.21	Q				
4+35	0.2775	1.22	Q				
4+40	0.2860	1.24	Q				
4+45	0.2946	1.25	Q				



11+35	4.9384	17.77	
11+40	5.0515	16.43	
11+45	5.1615	15.96	
11+50	5.2720	16.04	
11+55	5.3862	16.59	
12+ 0	5.5016	16.75	
12+ 5	5.6337	19.18	
12+10	5.7995	24.06	
12+15	5.9781	25.94	
12+20	6.1667	27.38	
12+25	6.3650	28.80	
12+30	6.5687	29.57	
12+35	6.7812	30.86	
12+40	7.0066	32.74	
12+45	7.2386	33.69	
12+50	7.4773	34.65	
12+55	7.7240	35.83	
13+ 0	7.9762	36.61	
13+ 5	8.2422	38.62	
13+10	8.5337	42.33	
13+15	8.8359	43.87	
13+20	9.1444	44.80	
13+25	9.4574	45.45	
13+30	9.7741	45.98	
13+35	10.0683	42.72	
13+40	10.3128	35.50	
13+45	10.5398	32.96	
13+50	10.7570	31.55	
13+55	10.9686	30.71	
14+ 0	11.1768	30.23	
14+ 5	11.3905	31.03	
14+10	11.6202	33.36	
14+15	11.8548	34.06	
14+20	12.0895	34.07	
14+25	12.3205	33.54	
14+30	12.5491	33.19	
14+35	12.7786	33.33	
14+40	13.0092	33.48	
14+45	13.2408	33.63	
14+50	13.4710	33.43	
14+55	13.6974	32.88	
15+ 0	13.9234	32.81	
15+ 5	14.1463	32.37	
15+10	14.3641	31.63	
15+15	14.5798	31.33	
15+20	14.7924	30.86	
15+25	14.9997	30.10	
15+30	15.2050	29.81	
15+35	15.4000	28.32	
15+40	15.5755	25.48	
15+45	15.7434	24.37	
15+50	15.9070	23.76	
15+55	16.0680	23.37	
16+ 0	16.2270	23.09	
16+ 5	16.3578	18.98	
16+10	16.4313	10.68	
16+15	16.4828	7.47	
16+20	16.5214	5.61	
16+25	16.5516	4.38	
16+30	16.5752	3.43	
16+35	16.5942	2.76	
16+40	16.6092	2.18	
16+45	16.6211	1.73	
16+50	16.6305	1.37	
16+55	16.6376	1.04	
17+ 0	16.6415	0.57	
17+ 5	16.6458	0.63	
17+10	16.6511	0.76	
17+15	16.6566	0.81	
17+20	16.6624	0.83	
17+25	16.6683	0.85	
17+30	16.6742	0.86	
17+35	16.6802	0.87	
17+40	16.6863	0.88	
17+45	16.6924	0.89	
17+50	16.6983	0.86	
17+55	16.7038	0.80	
18+ 0	16.7091	0.78	
18+ 5	16.7144	0.76	
18+10	16.7196	0.76	
18+15	16.7248	0.75	



18+20	16.7299	0.74	Q
18+25	16.7350	0.74	Q
18+30	16.7400	0.73	Q
18+35	16.7448	0.70	Q
18+40	16.7492	0.63	Q
18+45	16.7533	0.60	Q
18+50	16.7571	0.55	Q
18+55	16.7603	0.47	Q
19+ 0	16.7634	0.44	Q
19+ 5	16.7665	0.45	Q
19+10	16.7700	0.51	Q
19+15	16.7736	0.52	Q
19+20	16.7774	0.56	Q
19+25	16.7818	0.63	Q
19+30	16.7863	0.66	Q
19+35	16.7907	0.64	Q
19+40	16.7948	0.58	Q
19+45	16.7987	0.57	Q
19+50	16.8023	0.53	Q
19+55	16.8054	0.46	Q
20+ 0	16.8084	0.43	Q
20+ 5	16.8114	0.45	Q
20+10	16.8149	0.50	Q
20+15	16.8185	0.52	Q
20+20	16.8222	0.53	Q
20+25	16.8258	0.53	Q
20+30	16.8295	0.53	Q
20+35	16.8331	0.53	Q
20+40	16.8368	0.53	Q
20+45	16.8405	0.53	Q
20+50	16.8440	0.50	Q
20+55	16.8470	0.44	Q
21+ 0	16.8499	0.42	Q
21+ 5	16.8529	0.43	Q
21+10	16.8563	0.49	Q
21+15	16.8598	0.51	Q
21+20	16.8632	0.49	Q
21+25	16.8661	0.43	Q
21+30	16.8689	0.40	Q
21+35	16.8718	0.42	Q
21+40	16.8751	0.48	Q
21+45	16.8786	0.50	Q
21+50	16.8819	0.48	Q
21+55	16.8848	0.42	Q
22+ 0	16.8876	0.40	Q
22+ 5	16.8905	0.42	Q
22+10	16.8939	0.48	Q
22+15	16.8973	0.50	Q
22+20	16.9007	0.48	Q
22+25	16.9036	0.42	Q
22+30	16.9063	0.40	Q
22+35	16.9090	0.39	Q
22+40	16.9117	0.38	Q
22+45	16.9143	0.38	Q
22+50	16.9168	0.37	Q
22+55	16.9194	0.37	Q
23+ 0	16.9220	0.37	Q
23+ 5	16.9245	0.37	Q
23+10	16.9270	0.37	Q
23+15	16.9295	0.36	Q
23+20	16.9320	0.36	Q
23+25	16.9345	0.36	Q
23+30	16.9370	0.36	Q
23+35	16.9395	0.36	Q
23+40	16.9420	0.36	Q
23+45	16.9445	0.36	Q
23+50	16.9470	0.36	Q
23+55	16.9495	0.36	Q
24+ 0	16.9520	0.36	Q
24+ 5	16.9540	0.30	Q
24+10	16.9551	0.16	Q
24+15	16.9559	0.11	Q
24+20	16.9564	0.08	Q
24+25	16.9568	0.06	Q
24+30	16.9571	0.05	Q
24+35	16.9574	0.04	Q
24+40	16.9576	0.03	Q
24+45	16.9577	0.02	Q
24+50	16.9578	0.01	Q
24+55	16.9578	0.01	Q

APPENDIX G.3: 2-YEAR/1-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: BE1UH12.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "B" FOR AREAS "B1" TO "B8"
2 YEAR - 1, 3, 6, 24 HOUR
FN: BE1UH

Drainage Area = 56.20(Ac.) = 0.088 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 56.20(Ac.) = 0.088 Sq. Mi.
Length along longest watercourse = 3070.00(Ft.)
Length along longest watercourse measured to centroid = 1415.00(Ft.)
Length along longest watercourse = 0.581 Mi.
Length along longest watercourse measured to centroid = 0.268 Mi.
Difference in elevation = 182.00(Ft.)
Slope along watercourse = 313.0163 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.38 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]
56.20	0.55	30.91

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
56.20	1.40	78.68

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.400(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 0.550(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.800	71.00	0.000
2.900	69.00	0.000
12.100	70.00	0.000
3.100	83.00	0.000
6.300	78.00	0.000
7.100	80.50	0.000
9.000	74.00	0.000
13.900	79.00	0.000

Total Area Entered = 56.20(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)

71.0	52.2	0.550	0.000	0.550	0.032	0.018
69.0	49.8	0.574	0.000	0.574	0.052	0.030
70.0	51.0	0.562	0.000	0.562	0.215	0.121
83.0	67.2	0.392	0.000	0.392	0.055	0.022
78.0	60.6	0.464	0.000	0.464	0.112	0.052
80.5	63.7	0.430	0.000	0.430	0.126	0.054
74.0	55.8	0.513	0.000	0.513	0.160	0.082
79.0	61.8	0.451	0.000	0.451	0.247	0.111
					Sum (F) =	0.490

Area averaged mean soil loss (F) (In/Hr) = 0.490
Minimum soil loss rate ((In/Hr)) = 0.245
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.4800

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.874	18.204	10.311
2	0.167	167.748	37.786	21.402
3	0.250	251.622	14.197	8.041
4	0.333	335.496	8.176	4.631
5	0.417	419.370	5.231	2.963
6	0.500	503.244	3.746	2.122
7	0.583	587.117	2.989	1.693
8	0.667	670.991	2.417	1.369
9	0.750	754.865	1.992	1.128
10	0.833	838.739	1.604	0.909
11	0.917	922.613	1.510	0.855
12	1.000	1006.487	2.148	1.217
			Sum = 100.000	Sum= 56.639

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.290	0.490	0.261	0.03
2	0.17	4.50	0.297	0.490	0.267	0.03
3	0.25	5.40	0.356	0.490	0.321	0.04
4	0.33	5.40	0.356	0.490	0.321	0.04
5	0.42	5.70	0.376	0.490	0.338	0.04
6	0.50	6.40	0.422	0.490	0.380	0.04
7	0.58	7.90	0.521	0.490	---	0.03
8	0.67	9.10	0.600	0.490	---	0.11
9	0.75	12.80	0.844	0.490	---	0.35
10	0.83	25.60	1.689	0.490	---	1.20
11	0.92	7.90	0.521	0.490	---	0.03
12	1.00	4.90	0.323	0.490	0.291	0.03
Sum =		100.0			Sum =	2.0

Flood volume = Effective rainfall 0.16(In)
times area 56.2(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 0.39(In)
Total soil loss = 1.806(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 33481.5 Cubic Feet
Total soil loss = 78664.7 Cubic Feet

Peak flow rate of this hydrograph = 29.754(CFS)

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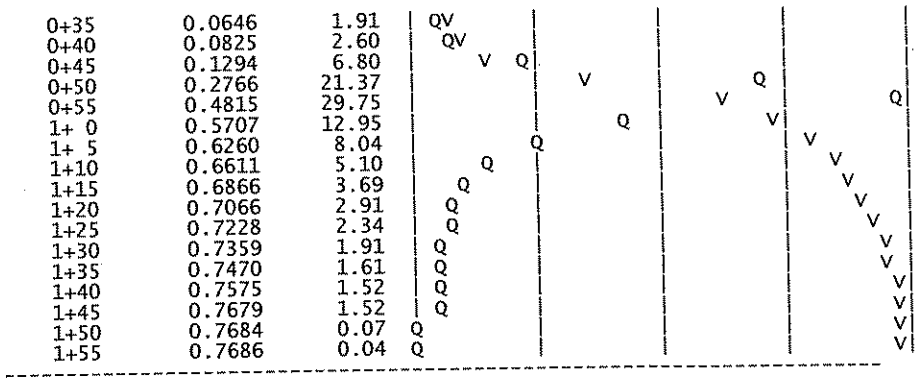
1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0021	0.30	Q				
0+10	0.0085	0.93	VQ				
0+15	0.0170	1.24	VQ				
0+20	0.0273	1.50	VQ				
0+25	0.0388	1.66	Q				
0+30	0.0514	1.84	Q				


0+35 0.0646 1.91
0+40 0.0825 2.60
0+45 0.1294 6.80
0+50 0.2766 21.37
0+55 0.4815 29.75
1+ 0 0.5707 12.95
1+ 5 0.6260 8.04
1+10 0.6611 5.10
1+15 0.6866 3.69
1+20 0.7066 2.91
1+25 0.7228 2.34
1+30 0.7359 1.91
1+35 0.7470 1.61
1+40 0.7575 1.52
1+45 0.7679 1.52
1+50 0.7684 0.07
1+55 0.7686 0.04

APPENDIX G.4: 2-YEAR/24-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: BE1UH242.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - EXISTING CONDITION
AREA "B" FOR AREAS "B1" TO "B8"
2 YEAR - 1, 3, 6, 24 HOUR
FN: BE1UH

Drainage Area = 56.20(Ac.) = 0.088 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 56.20(Ac.) = 0.088 Sq. Mi.
Length along longest watercourse = 3070.00(Ft.)
Length along longest watercourse measured to centroid = 1415.00(Ft.)
Length along longest watercourse = 0.581 Mi.
Length along longest watercourse measured to centroid = 0.268 Mi.
Difference in elevation = 182.00(Ft.)
Slope along watercourse = 313.0163 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.38 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]
56.20	2.50	140.50

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
56.20	8.00	449.60

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 8.000(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.800	71.00	0.000
2.900	69.00	0.000
12.100	70.00	0.000
3.100	83.00	0.000
6.300	78.00	0.000
7.100	80.50	0.000
9.000	74.00	0.000
13.900	79.00	0.000

Total Area Entered = 56.20(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
71.0	52.2	0.550	0.000	0.550	0.032	0.018

69.0	49.8	0.574	0.000	0.574	0.052	0.030
70.0	51.0	0.562	0.000	0.562	0.215	0.121
83.0	67.2	0.392	0.000	0.392	0.055	0.022
78.0	60.6	0.464	0.000	0.464	0.112	0.052
80.5	63.7	0.430	0.000	0.430	0.126	0.054
74.0	55.8	0.513	0.000	0.513	0.160	0.082
79.0	61.8	0.451	0.000	0.451	0.247	0.111
					Sum (F) =	0.490

Area averaged mean soil loss (F) (In/Hr) = 0.490
Minimum soil loss rate ((In/Hr)) = 0.245
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	83.874	18.204		10.311
2	0.167	167.748	37.786		21.402
3	0.250	251.622	14.197		8.041
4	0.333	335.496	8.176		4.631
5	0.417	419.370	5.231		2.963
6	0.500	503.244	3.746		2.122
7	0.583	587.117	2.989		1.693
8	0.667	670.991	2.417		1.369
9	0.750	754.865	1.992		1.128
10	0.833	838.739	1.604		0.909
11	0.917	922.613	1.510		0.855
12	1.000	1006.487	2.148		1.217
			Sum = 100.000	Sum=	56.639

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.020	0.868	0.018	0.00
2	0.17	0.07	0.020	0.865	0.018	0.00
3	0.25	0.07	0.020	0.861	0.018	0.00
4	0.33	0.10	0.030	0.858	0.027	0.00
5	0.42	0.10	0.030	0.855	0.027	0.00
6	0.50	0.10	0.030	0.851	0.027	0.00
7	0.58	0.10	0.030	0.848	0.027	0.00
8	0.67	0.10	0.030	0.845	0.027	0.00
9	0.75	0.10	0.030	0.841	0.027	0.00
10	0.83	0.13	0.040	0.838	0.036	0.00
11	0.92	0.13	0.040	0.835	0.036	0.00
12	1.00	0.13	0.040	0.831	0.036	0.00
13	1.08	0.10	0.030	0.828	0.027	0.00
14	1.17	0.10	0.030	0.825	0.027	0.00
15	1.25	0.10	0.030	0.822	0.027	0.00
16	1.33	0.10	0.030	0.818	0.027	0.00
17	1.42	0.10	0.030	0.815	0.027	0.00
18	1.50	0.10	0.030	0.812	0.027	0.00
19	1.58	0.10	0.030	0.809	0.027	0.00
20	1.67	0.10	0.030	0.805	0.027	0.00
21	1.75	0.10	0.030	0.802	0.027	0.00
22	1.83	0.13	0.040	0.799	0.036	0.00
23	1.92	0.13	0.040	0.796	0.036	0.00
24	2.00	0.13	0.040	0.792	0.036	0.00
25	2.08	0.13	0.040	0.789	0.036	0.00
26	2.17	0.13	0.040	0.786	0.036	0.00
27	2.25	0.13	0.040	0.783	0.036	0.00
28	2.33	0.13	0.040	0.780	0.036	0.00
29	2.42	0.13	0.040	0.777	0.036	0.00
30	2.50	0.13	0.040	0.773	0.036	0.00
31	2.58	0.17	0.050	0.770	0.045	0.00
32	2.67	0.17	0.050	0.767	0.045	0.00
33	2.75	0.17	0.050	0.764	0.045	0.00
34	2.83	0.17	0.050	0.761	0.045	0.00
35	2.92	0.17	0.050	0.758	0.045	0.00
36	3.00	0.17	0.050	0.754	0.045	0.00
37	3.08	0.17	0.050	0.751	0.045	0.00
38	3.17	0.17	0.050	0.748	0.045	0.00
39	3.25	0.17	0.050	0.745	0.045	0.00
40	3.33	0.17	0.050	0.742	0.045	0.00
41	3.42	0.17	0.050	0.739	0.045	0.00

42	3.50	0.17	0.050	0.736	0.045	0.00
43	3.58	0.17	0.050	0.733	0.045	0.00
44	3.67	0.17	0.050	0.730	0.045	0.00
45	3.75	0.17	0.050	0.727	0.045	0.00
46	3.83	0.20	0.060	0.724	0.054	0.01
47	3.92	0.20	0.060	0.720	0.054	0.01
48	4.00	0.20	0.060	0.717	0.054	0.01
49	4.08	0.20	0.060	0.714	0.054	0.01
50	4.17	0.20	0.060	0.711	0.054	0.01
51	4.25	0.20	0.060	0.708	0.054	0.01
52	4.33	0.23	0.070	0.705	0.063	0.01
53	4.42	0.23	0.070	0.702	0.063	0.01
54	4.50	0.23	0.070	0.699	0.063	0.01
55	4.58	0.23	0.070	0.696	0.063	0.01
56	4.67	0.23	0.070	0.693	0.063	0.01
57	4.75	0.23	0.070	0.690	0.063	0.01
58	4.83	0.27	0.080	0.687	0.072	0.01
59	4.92	0.27	0.080	0.684	0.072	0.01
60	5.00	0.27	0.080	0.681	0.072	0.01
61	5.08	0.20	0.060	0.678	0.054	0.01
62	5.17	0.20	0.060	0.675	0.054	0.01
63	5.25	0.20	0.060	0.673	0.054	0.01
64	5.33	0.23	0.070	0.670	0.063	0.01
65	5.42	0.23	0.070	0.667	0.063	0.01
66	5.50	0.23	0.070	0.664	0.063	0.01
67	5.58	0.27	0.080	0.661	0.072	0.01
68	5.67	0.27	0.080	0.658	0.072	0.01
69	5.75	0.27	0.080	0.655	0.072	0.01
70	5.83	0.27	0.080	0.652	0.072	0.01
71	5.92	0.27	0.080	0.649	0.072	0.01
72	6.00	0.27	0.080	0.646	0.072	0.01
73	6.08	0.30	0.090	0.643	0.081	0.01
74	6.17	0.30	0.090	0.641	0.081	0.01
75	6.25	0.30	0.090	0.638	0.081	0.01
76	6.33	0.30	0.090	0.635	0.081	0.01
77	6.42	0.30	0.090	0.632	0.081	0.01
78	6.50	0.30	0.090	0.629	0.081	0.01
79	6.58	0.33	0.100	0.626	0.090	0.01
80	6.67	0.33	0.100	0.624	0.090	0.01
81	6.75	0.33	0.100	0.621	0.090	0.01
82	6.83	0.33	0.100	0.618	0.090	0.01
83	6.92	0.33	0.100	0.615	0.090	0.01
84	7.00	0.33	0.100	0.612	0.090	0.01
85	7.08	0.33	0.100	0.610	0.090	0.01
86	7.17	0.33	0.100	0.607	0.090	0.01
87	7.25	0.33	0.100	0.604	0.090	0.01
88	7.33	0.37	0.110	0.601	0.099	0.01
89	7.42	0.37	0.110	0.599	0.099	0.01
90	7.50	0.37	0.110	0.596	0.099	0.01
91	7.58	0.40	0.120	0.593	0.108	0.01
92	7.67	0.40	0.120	0.590	0.108	0.01
93	7.75	0.40	0.120	0.588	0.108	0.01
94	7.83	0.43	0.130	0.585	0.117	0.01
95	7.92	0.43	0.130	0.582	0.117	0.01
96	8.00	0.43	0.130	0.579	0.117	0.01
97	8.08	0.50	0.150	0.577	0.135	0.01
98	8.17	0.50	0.150	0.574	0.135	0.01
99	8.25	0.50	0.150	0.571	0.135	0.01
100	8.33	0.50	0.150	0.569	0.135	0.01
101	8.42	0.50	0.150	0.566	0.135	0.01
102	8.50	0.50	0.150	0.563	0.135	0.01
103	8.58	0.53	0.160	0.561	0.144	0.02
104	8.67	0.53	0.160	0.558	0.144	0.02
105	8.75	0.53	0.160	0.556	0.144	0.02
106	8.83	0.57	0.170	0.553	0.153	0.02
107	8.92	0.57	0.170	0.550	0.153	0.02
108	9.00	0.57	0.170	0.548	0.153	0.02
109	9.08	0.63	0.190	0.545	0.171	0.02
110	9.17	0.63	0.190	0.543	0.171	0.02
111	9.25	0.63	0.190	0.540	0.171	0.02
112	9.33	0.67	0.200	0.537	0.180	0.02
113	9.42	0.67	0.200	0.535	0.180	0.02
114	9.50	0.67	0.200	0.532	0.180	0.02
115	9.58	0.70	0.210	0.530	0.189	0.02
116	9.67	0.70	0.210	0.527	0.189	0.02
117	9.75	0.70	0.210	0.525	0.189	0.02
118	9.83	0.73	0.220	0.522	0.198	0.02
119	9.92	0.73	0.220	0.520	0.198	0.02
120	10.00	0.73	0.220	0.517	0.198	0.02
121	10.08	0.50	0.150	0.515	0.135	0.01
122	10.17	0.50	0.150	0.512	0.135	0.01

123	10.25	0.50	0.150	0.510	0.135	0.01
124	10.33	0.50	0.150	0.507	0.135	0.01
125	10.42	0.50	0.150	0.505	0.135	0.01
126	10.50	0.50	0.150	0.502	0.135	0.01
127	10.58	0.67	0.200	0.500	0.180	0.02
128	10.67	0.67	0.200	0.497	0.180	0.02
129	10.75	0.67	0.200	0.495	0.180	0.02
130	10.83	0.67	0.200	0.492	0.180	0.02
131	10.92	0.67	0.200	0.490	0.180	0.02
132	11.00	0.67	0.200	0.488	0.180	0.02
133	11.08	0.63	0.190	0.485	0.171	0.02
134	11.17	0.63	0.190	0.483	0.171	0.02
135	11.25	0.63	0.190	0.480	0.171	0.02
136	11.33	0.63	0.190	0.478	0.171	0.02
137	11.42	0.63	0.190	0.476	0.171	0.02
138	11.50	0.63	0.190	0.473	0.171	0.02
139	11.58	0.57	0.170	0.471	0.153	0.02
140	11.67	0.57	0.170	0.469	0.153	0.02
141	11.75	0.57	0.170	0.466	0.153	0.02
142	11.83	0.60	0.180	0.464	0.162	0.02
143	11.92	0.60	0.180	0.462	0.162	0.02
144	12.00	0.60	0.180	0.459	0.162	0.02
145	12.08	0.83	0.250	0.457	0.225	0.02
146	12.17	0.83	0.250	0.455	0.225	0.02
147	12.25	0.83	0.250	0.453	0.225	0.02
148	12.33	0.87	0.260	0.450	0.234	0.03
149	12.42	0.87	0.260	0.448	0.234	0.03
150	12.50	0.87	0.260	0.446	0.234	0.03
151	12.58	0.93	0.280	0.443	0.252	0.03
152	12.67	0.93	0.280	0.441	0.252	0.03
153	12.75	0.93	0.280	0.439	0.252	0.03
154	12.83	0.97	0.290	0.437	0.261	0.03
155	12.92	0.97	0.290	0.435	0.261	0.03
156	13.00	0.97	0.290	0.432	0.261	0.03
157	13.08	1.13	0.340	0.430	0.306	0.03
158	13.17	1.13	0.340	0.428	0.306	0.03
159	13.25	1.13	0.340	0.426	0.306	0.03
160	13.33	1.13	0.340	0.424	0.306	0.03
161	13.42	1.13	0.340	0.422	0.306	0.03
162	13.50	1.13	0.340	0.419	0.306	0.03
163	13.58	0.77	0.230	0.417	0.207	0.02
164	13.67	0.77	0.230	0.415	0.207	0.02
165	13.75	0.77	0.230	0.413	0.207	0.02
166	13.83	0.77	0.230	0.411	0.207	0.02
167	13.92	0.77	0.230	0.409	0.207	0.02
168	14.00	0.77	0.230	0.407	0.207	0.02
169	14.08	0.90	0.270	0.405	0.243	0.03
170	14.17	0.90	0.270	0.403	0.243	0.03
171	14.25	0.90	0.270	0.401	0.243	0.03
172	14.33	0.87	0.260	0.398	0.234	0.03
173	14.42	0.87	0.260	0.396	0.234	0.03
174	14.50	0.87	0.260	0.394	0.234	0.03
175	14.58	0.87	0.260	0.392	0.234	0.03
176	14.67	0.87	0.260	0.390	0.234	0.03
177	14.75	0.87	0.260	0.388	0.234	0.03
178	14.83	0.83	0.250	0.386	0.225	0.02
179	14.92	0.83	0.250	0.384	0.225	0.02
180	15.00	0.83	0.250	0.382	0.225	0.02
181	15.08	0.80	0.240	0.380	0.216	0.02
182	15.17	0.80	0.240	0.379	0.216	0.02
183	15.25	0.80	0.240	0.377	0.216	0.02
184	15.33	0.77	0.230	0.375	0.207	0.02
185	15.42	0.77	0.230	0.373	0.207	0.02
186	15.50	0.77	0.230	0.371	0.207	0.02
187	15.58	0.63	0.190	0.369	0.171	0.02
188	15.67	0.63	0.190	0.367	0.171	0.02
189	15.75	0.63	0.190	0.365	0.171	0.02
190	15.83	0.63	0.190	0.363	0.171	0.02
191	15.92	0.63	0.190	0.361	0.171	0.02
192	16.00	0.63	0.190	0.360	0.171	0.02
193	16.08	0.13	0.040	0.358	0.036	0.00
194	16.17	0.13	0.040	0.356	0.036	0.00
195	16.25	0.13	0.040	0.354	0.036	0.00
196	16.33	0.13	0.040	0.352	0.036	0.00
197	16.42	0.13	0.040	0.351	0.036	0.00
198	16.50	0.13	0.040	0.349	0.036	0.00
199	16.58	0.10	0.030	0.347	0.027	0.00
200	16.67	0.10	0.030	0.345	0.027	0.00
201	16.75	0.10	0.030	0.343	0.027	0.00
202	16.83	0.10	0.030	0.342	0.027	0.00
203	16.92	0.10	0.030	0.340	0.027	0.00

204	17.00	0.10	0.030	0.338	0.027	0.00
205	17.08	0.17	0.050	0.337	0.045	0.00
206	17.17	0.17	0.050	0.335	0.045	0.00
207	17.25	0.17	0.050	0.333	0.045	0.00
208	17.33	0.17	0.050	0.331	0.045	0.00
209	17.42	0.17	0.050	0.330	0.045	0.00
210	17.50	0.17	0.050	0.328	0.045	0.00
211	17.58	0.17	0.050	0.327	0.045	0.00
212	17.67	0.17	0.050	0.325	0.045	0.00
213	17.75	0.17	0.050	0.323	0.045	0.00
214	17.83	0.13	0.040	0.322	0.036	0.00
215	17.92	0.13	0.040	0.320	0.036	0.00
216	18.00	0.13	0.040	0.318	0.036	0.00
217	18.08	0.13	0.040	0.317	0.036	0.00
218	18.17	0.13	0.040	0.315	0.036	0.00
219	18.25	0.13	0.040	0.314	0.036	0.00
220	18.33	0.13	0.040	0.312	0.036	0.00
221	18.42	0.13	0.040	0.311	0.036	0.00
222	18.50	0.13	0.040	0.309	0.036	0.00
223	18.58	0.10	0.030	0.308	0.027	0.00
224	18.67	0.10	0.030	0.306	0.027	0.00
225	18.75	0.10	0.030	0.305	0.027	0.00
226	18.83	0.07	0.020	0.303	0.018	0.00
227	18.92	0.07	0.020	0.302	0.018	0.00
228	19.00	0.07	0.020	0.300	0.018	0.00
229	19.08	0.10	0.030	0.299	0.027	0.00
230	19.17	0.10	0.030	0.298	0.027	0.00
231	19.25	0.10	0.030	0.296	0.027	0.00
232	19.33	0.13	0.040	0.295	0.036	0.00
233	19.42	0.13	0.040	0.294	0.036	0.00
234	19.50	0.13	0.040	0.292	0.036	0.00
235	19.58	0.10	0.030	0.291	0.027	0.00
236	19.67	0.10	0.030	0.290	0.027	0.00
237	19.75	0.10	0.030	0.288	0.027	0.00
238	19.83	0.07	0.020	0.287	0.018	0.00
239	19.92	0.07	0.020	0.286	0.018	0.00
240	20.00	0.07	0.020	0.284	0.018	0.00
241	20.08	0.10	0.030	0.283	0.027	0.00
242	20.17	0.10	0.030	0.282	0.027	0.00
243	20.25	0.10	0.030	0.281	0.027	0.00
244	20.33	0.10	0.030	0.279	0.027	0.00
245	20.42	0.10	0.030	0.278	0.027	0.00
246	20.50	0.10	0.030	0.277	0.027	0.00
247	20.58	0.10	0.030	0.276	0.027	0.00
248	20.67	0.10	0.030	0.275	0.027	0.00
249	20.75	0.10	0.030	0.274	0.027	0.00
250	20.83	0.07	0.020	0.272	0.018	0.00
251	20.92	0.07	0.020	0.271	0.018	0.00
252	21.00	0.07	0.020	0.270	0.018	0.00
253	21.08	0.10	0.030	0.269	0.027	0.00
254	21.17	0.10	0.030	0.268	0.027	0.00
255	21.25	0.10	0.030	0.267	0.027	0.00
256	21.33	0.07	0.020	0.266	0.018	0.00
257	21.42	0.07	0.020	0.265	0.018	0.00
258	21.50	0.07	0.020	0.264	0.018	0.00
259	21.58	0.10	0.030	0.263	0.027	0.00
260	21.67	0.10	0.030	0.262	0.027	0.00
261	21.75	0.10	0.030	0.261	0.027	0.00
262	21.83	0.07	0.020	0.260	0.018	0.00
263	21.92	0.07	0.020	0.259	0.018	0.00
264	22.00	0.07	0.020	0.259	0.018	0.00
265	22.08	0.10	0.030	0.258	0.027	0.00
266	22.17	0.10	0.030	0.257	0.027	0.00
267	22.25	0.10	0.030	0.256	0.027	0.00
268	22.33	0.07	0.020	0.255	0.018	0.00
269	22.42	0.07	0.020	0.254	0.018	0.00
270	22.50	0.07	0.020	0.254	0.018	0.00
271	22.58	0.07	0.020	0.253	0.018	0.00
272	22.67	0.07	0.020	0.252	0.018	0.00
273	22.75	0.07	0.020	0.252	0.018	0.00
274	22.83	0.07	0.020	0.251	0.018	0.00
275	22.92	0.07	0.020	0.250	0.018	0.00
276	23.00	0.07	0.020	0.250	0.018	0.00
277	23.08	0.07	0.020	0.249	0.018	0.00
278	23.17	0.07	0.020	0.249	0.018	0.00
279	23.25	0.07	0.020	0.248	0.018	0.00
280	23.33	0.07	0.020	0.247	0.018	0.00
281	23.42	0.07	0.020	0.247	0.018	0.00
282	23.50	0.07	0.020	0.247	0.018	0.00
283	23.58	0.07	0.020	0.246	0.018	0.00
284	23.67	0.07	0.020	0.246	0.018	0.00

285	23.75	0.07	0.020	0.246	0.018	0.00
286	23.83	0.07	0.020	0.245	0.018	0.00
287	23.92	0.07	0.020	0.245	0.018	0.00
288	24.00	0.07	0.020	0.245	0.018	0.00
Sum =		100.0			Sum =	3.0

Flood volume = Effective rainfall 0.25(In)
times area 56.2(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
Total soil loss = 2.25(In)
Total soil loss = 10.536(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 50995.9 Cubic Feet
Total soil loss = 458963.1 Cubic Feet

Peak flow rate of this hydrograph = 1.888(CFS)

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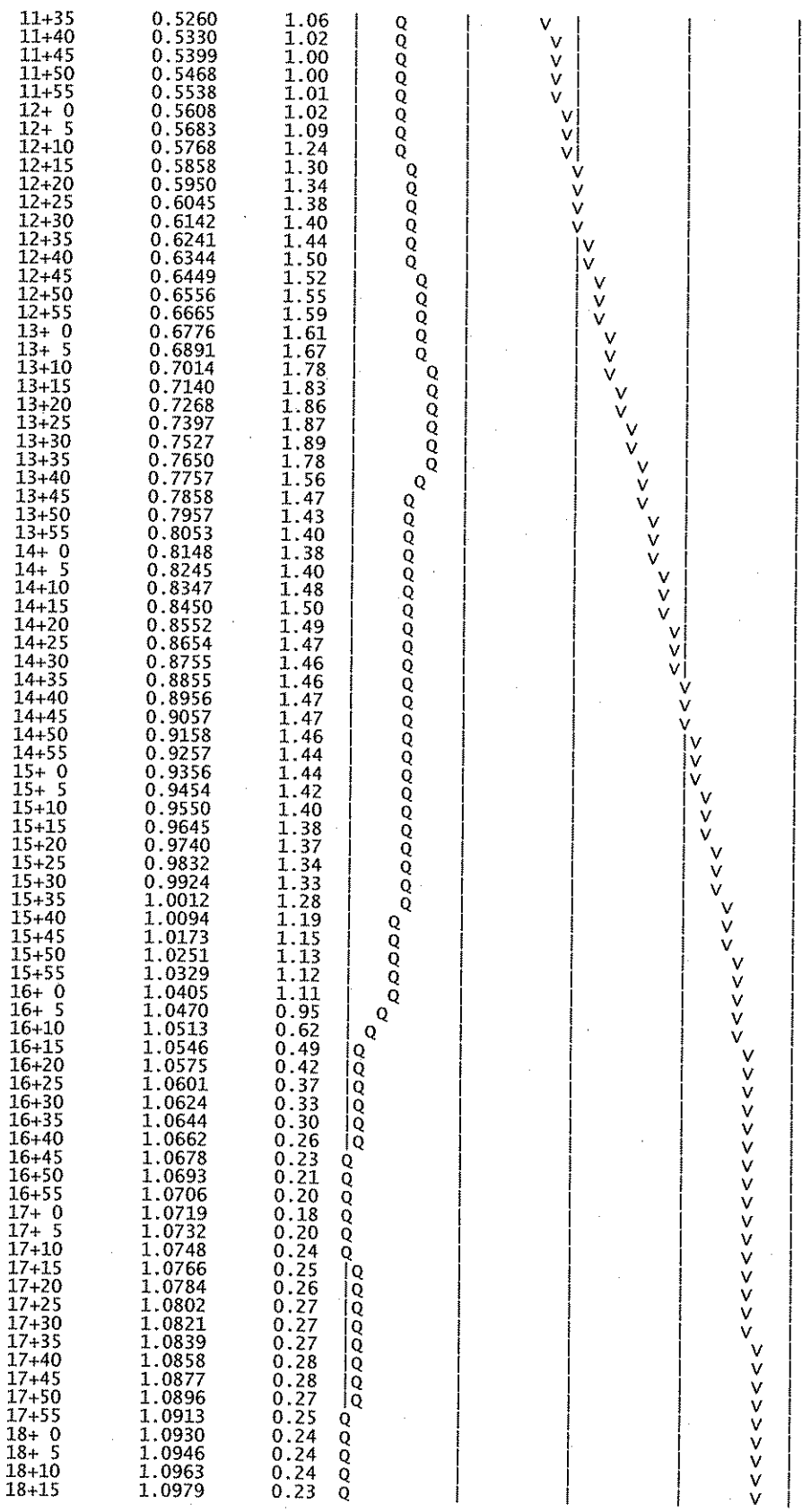
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q				
0+10	0.0006	0.06	Q				
0+15	0.0011	0.08	Q				
0+20	0.0018	0.10	Q				
0+25	0.0027	0.13	Q				
0+30	0.0036	0.14	Q				
0+35	0.0046	0.15	Q				
0+40	0.0057	0.15	Q				
0+45	0.0068	0.16	Q				
0+50	0.0080	0.17	Q				
0+55	0.0093	0.20	Q				
1+ 0	0.0107	0.21	Q				
1+ 5	0.0121	0.20	Q				
1+10	0.0134	0.18	Q				
1+15	0.0146	0.18	Q				
1+20	0.0158	0.18	Q				
1+25	0.0170	0.18	Q				
1+30	0.0182	0.17	Q				
1+35	0.0194	0.17	Q				
1+40	0.0206	0.17	Q				
1+45	0.0218	0.17	Q				
1+50	0.0231	0.18	Q				
1+55	0.0245	0.20	Q				
2+ 0	0.0259	0.21	Q				
2+ 5	0.0274	0.21	Q				
2+10	0.0289	0.22	Q				
2+15	0.0304	0.22	QV				
2+20	0.0319	0.22	QV				
2+25	0.0335	0.22	QV				
2+30	0.0350	0.22	QV				
2+35	0.0366	0.23	QV				
2+40	0.0384	0.26	|Q				
2+45	0.0402	0.27	|Q				
2+50	0.0421	0.27	|Q				
2+55	0.0440	0.27	|Q				
3+ 0	0.0459	0.28	|Q				
3+ 5	0.0478	0.28	|Q				
3+10	0.0497	0.28	|Q				
3+15	0.0516	0.28	|Q				
3+20	0.0536	0.28	|Q				
3+25	0.0555	0.28	|Q				
3+30	0.0575	0.28	|Q				
3+35	0.0594	0.28	|QV				
3+40	0.0614	0.28	|QV				
3+45	0.0633	0.28	|QV				
3+50	0.0654	0.29	|QV				
3+55	0.0675	0.32	|QV				
4+ 0	0.0697	0.32	|QV				
4+ 5	0.0720	0.33	|QV				
4+10	0.0743	0.33	|QV				
4+15	0.0766	0.33	|QV				
4+20	0.0789	0.34	|QV				
4+25	0.0815	0.37	|QV				
4+30	0.0841	0.38	|QV				
4+35	0.0867	0.38	|QV				
4+40	0.0894	0.39	|Q V				
4+45	0.0920	0.39	|Q V				

4+50	0.0948	0.40	Q V				
4+55	0.0977	0.42	Q V				
5+ 0	0.1007	0.43	Q V				
5+ 5	0.1036	0.42	Q V				
5+10	0.1062	0.38	Q V				
5+15	0.1087	0.37	Q V				
5+20	0.1113	0.37	Q V				
5+25	0.1139	0.39	Q V				
5+30	0.1166	0.39	Q V				
5+35	0.1194	0.40	Q V				
5+40	0.1223	0.43	Q V				
5+45	0.1253	0.44	Q V				
5+50	0.1284	0.44	Q V				
5+55	0.1314	0.44	Q V				
6+ 0	0.1345	0.44	Q V				
6+ 5	0.1376	0.46	Q V				
6+10	0.1409	0.48	Q V				
6+15	0.1443	0.49	Q V				
6+20	0.1477	0.50	Q V				
6+25	0.1511	0.50	Q V				
6+30	0.1546	0.50	Q V				
6+35	0.1582	0.51	Q V				
6+40	0.1619	0.54	Q V				
6+45	0.1656	0.55	Q V				
6+50	0.1694	0.55	Q V				
6+55	0.1733	0.56	Q V				
7+ 0	0.1771	0.56	Q V				
7+ 5	0.1810	0.56	Q V				
7+10	0.1848	0.56	Q V				
7+15	0.1887	0.56	Q V				
7+20	0.1927	0.57	Q V				
7+25	0.1968	0.60	Q V				
7+30	0.2010	0.61	Q V				
7+35	0.2053	0.62	Q V				
7+40	0.2097	0.65	Q V				
7+45	0.2142	0.66	Q V				
7+50	0.2189	0.67	Q V				
7+55	0.2237	0.70	Q V				
8+ 0	0.2285	0.71	Q V				
8+ 5	0.2336	0.74	Q V				
8+10	0.2390	0.79	Q V				
8+15	0.2446	0.81	Q V				
8+20	0.2502	0.82	Q V				
8+25	0.2559	0.83	Q V				
8+30	0.2616	0.83	Q V				
8+35	0.2675	0.85	Q V				
8+40	0.2735	0.87	Q V				
8+45	0.2796	0.88	Q V				
8+50	0.2858	0.90	Q V				
8+55	0.2922	0.93	Q V				
9+ 0	0.2986	0.94	Q V				
9+ 5	0.3053	0.97	Q V				
9+10	0.3123	1.01	Q V				
9+15	0.3194	1.03	Q V				
9+20	0.3266	1.05	Q V				
9+25	0.3341	1.08	Q V				
9+30	0.3417	1.10	Q V				
9+35	0.3494	1.12	Q V				
9+40	0.3573	1.15	Q V				
9+45	0.3653	1.16	Q V				
9+50	0.3734	1.18	Q V				
9+55	0.3817	1.21	Q V				
10+ 0	0.3901	1.22	Q V				
10+ 5	0.3980	1.15	Q V				
10+10	0.4050	1.01	Q V				
10+15	0.4116	0.96	Q V				
10+20	0.4180	0.93	Q V				
10+25	0.4242	0.91	Q V				
10+30	0.4304	0.90	Q V				
10+35	0.4369	0.94	Q V				
10+40	0.4440	1.04	Q V				
10+45	0.4514	1.07	Q V				
10+50	0.4589	1.09	Q V				
10+55	0.4664	1.10	Q V				
11+ 0	0.4740	1.10	Q V				
11+ 5	0.4815	1.10	Q V				
11+10	0.4889	1.08	Q V				
11+15	0.4964	1.08	Q V				
11+20	0.5038	1.08	Q V				
11+25	0.5112	1.08	Q V				
11+30	0.5187	1.08	Q V				



18+20	1.0995	0.23	Q
18+25	1.1011	0.23	Q
18+30	1.1026	0.23	Q
18+35	1.1041	0.22	Q
18+40	1.1055	0.20	Q
18+45	1.1068	0.19	Q
18+50	1.1080	0.17	Q
18+55	1.1090	0.15	Q
19+ 0	1.1099	0.14	Q
19+ 5	1.1109	0.14	Q
19+10	1.1120	0.16	Q
19+15	1.1131	0.16	Q
19+20	1.1143	0.18	Q
19+25	1.1157	0.20	Q
19+30	1.1171	0.21	Q
19+35	1.1185	0.20	Q
19+40	1.1197	0.18	Q
19+45	1.1210	0.18	Q
19+50	1.1221	0.16	Q
19+55	1.1231	0.14	Q
20+ 0	1.1240	0.13	Q
20+ 5	1.1250	0.14	Q
20+10	1.1260	0.16	Q
20+15	1.1272	0.16	Q
20+20	1.1283	0.17	Q
20+25	1.1294	0.17	Q
20+30	1.1306	0.17	Q
20+35	1.1317	0.17	Q
20+40	1.1329	0.17	Q
20+45	1.1340	0.17	Q
20+50	1.1351	0.16	Q
20+55	1.1361	0.14	Q
21+ 0	1.1370	0.13	Q
21+ 5	1.1379	0.14	Q
21+10	1.1390	0.15	Q
21+15	1.1401	0.16	Q
21+20	1.1411	0.15	Q
21+25	1.1420	0.13	Q
21+30	1.1429	0.13	Q
21+35	1.1438	0.13	Q
21+40	1.1449	0.15	Q
21+45	1.1459	0.16	Q
21+50	1.1470	0.15	Q
21+55	1.1479	0.13	Q
22+ 0	1.1488	0.13	Q
22+ 5	1.1497	0.13	Q
22+10	1.1507	0.15	Q
22+15	1.1518	0.16	Q
22+20	1.1528	0.15	Q
22+25	1.1537	0.13	Q
22+30	1.1546	0.13	Q
22+35	1.1554	0.12	Q
22+40	1.1563	0.12	Q
22+45	1.1571	0.12	Q
22+50	1.1579	0.12	Q
22+55	1.1587	0.12	Q
23+ 0	1.1595	0.12	Q
23+ 5	1.1603	0.12	Q
23+10	1.1611	0.11	Q
23+15	1.1619	0.11	Q
23+20	1.1626	0.11	Q
23+25	1.1634	0.11	Q
23+30	1.1642	0.11	Q
23+35	1.1650	0.11	Q
23+40	1.1658	0.11	Q
23+45	1.1665	0.11	Q
23+50	1.1673	0.11	Q
23+55	1.1681	0.11	Q
24+ 0	1.1689	0.11	Q
24+ 5	1.1695	0.09	Q
24+10	1.1699	0.05	Q
24+15	1.1701	0.03	Q
24+20	1.1703	0.02	Q
24+25	1.1704	0.02	Q
24+30	1.1705	0.01	Q
24+35	1.1706	0.01	Q
24+40	1.1706	0.01	Q
24+45	1.1707	0.01	Q
24+50	1.1707	0.00	Q
24+55	1.1707	0.00	Q

APPENDIX H: HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION FOR AREA "B" (HYDROGRAPH METHOD)

APPENDIX H.1: 100- YEAR/ 1-HOUR HYDROGRAPH CALCULATIONS

U n i t H y d r o g r a p h A n a l y s i s

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - MASTER DRAINAGE STUDY (PROPOSED CONDITION)
AREA "B" FOR AREAS "B1" & "B2"
100 YEAR - 1, 3, 6, 24 HOUR
FN: BUHMDP

Drainage Area = 22.90(Ac.) = 0.036 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 22.90(Ac.) = 0.036 Sq. Mi.
Length along longest watercourse = 2025.00(Ft.)
Length along longest watercourse measured to centroid = 1140.00(Ft.)
Length along longest watercourse = 0.384 Mi.
Length along longest watercourse measured to centroid = 0.216 Mi.
Difference in elevation = 83.00(Ft.)
Slope along watercourse = 216.4148 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.050 Hr.
Lag time = 3.02 Min.
25% of lag time = 0.75 Min.
40% of lag time = 1.21 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.90	0.55	12.60

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.90	1.40	32.06

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.400(In)

Point rain (area averaged) = 1.400(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.400(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.000	57.30	0.650
14.900	59.90	0.650

Total Area Entered = 22.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.3	57.3	0.498	0.650	0.206	0.349	0.072
59.9	59.9	0.471	0.650	0.195	0.651	0.127
					Sum (F) =	0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199
Minimum soil loss rate ((In/Hr)) = 0.100
(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.380

Slope of intensity-duration curve for a 1 hour storm =0.4800

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	165.713	36.773	8.487
2	0.167	331.426	45.837	10.579
3	0.250	497.140	10.346	2.388
4	0.333	662.853	4.400	1.015
5	0.417	828.566	2.644	0.610
			Sum = 100.000 Sum=	23.079

Unit Time		Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	4.40	0.739	0.199	---	0.54
2	0.17	4.50	0.756	0.199	---	0.56
3	0.25	5.40	0.907	0.199	---	0.71
4	0.33	5.40	0.907	0.199	---	0.71
5	0.42	5.70	0.957	0.199	---	0.76
6	0.50	6.40	1.075	0.199	---	0.88
7	0.58	7.90	1.327	0.199	---	1.13
8	0.67	9.10	1.528	0.199	---	1.33
9	0.75	12.80	2.150	0.199	---	1.95
10	0.83	25.60	4.300	0.199	---	4.10
11	0.92	7.90	1.327	0.199	---	1.13
12	1.00	4.90	0.823	0.199	---	0.62
Sum =		100.0			Sum =	14.4

Flood volume = Effective rainfall 1.20(In)
times area 22.9(Ac.)/[(In)/(Ft.)] = 2.3(Ac.Ft)
Total soil loss = 0.20(In)
Total soil loss = 0.380(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 99784.9 Cubic Feet
Total soil loss = 16568.7 Cubic Feet

Peak flow rate of this hydrograph = 60.321(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0316	4.58	V Q				
0+10	0.1035	10.44	V Q				
0+15	0.1943	13.19	V Q				
0+20	0.3002	15.38	V Q				
0+25	0.4139	16.51	V Q				
0+30	0.5393	18.21	VQ				
0+35	0.6895	21.80	Q				
0+40	0.8721	26.52	Q				
0+45	1.1109	34.68	Q				
0+50	1.5264	60.32	V			Q	
0+55	1.9373	59.67				VQ	
1+ 0	2.1427	29.82	Q			V	
1+ 5	2.2436	14.65	Q			V	
1+10	2.2790	5.14	Q			V	
1+15	2.2881	1.32	Q			V	
1+20	2.2907	0.38	Q			V	

APPENDIX H.2: 100- YEAR/ 24-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: BUHMDP24100.out

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Soil low loss rate (decimal) = 0.380

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	165.713	36.773	8.487
2	0.167	331.426	45.837	10.579
3	0.250	497.140	10.346	2.388
4	0.333	662.853	4.400	1.015
5	0.417	828.566	2.644	0.610
			Sum = 100.000 Sum=	23.079

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.064	0.353	0.024	0.04
2	0.17	0.07	0.064	0.352	0.024	0.04
3	0.25	0.07	0.064	0.351	0.024	0.04
4	0.33	0.10	0.096	0.349	0.036	0.06
5	0.42	0.10	0.096	0.348	0.036	0.06
6	0.50	0.10	0.096	0.347	0.036	0.06
7	0.58	0.10	0.096	0.345	0.036	0.06
8	0.67	0.10	0.096	0.344	0.036	0.06
9	0.75	0.10	0.096	0.342	0.036	0.06
10	0.83	0.13	0.128	0.341	0.049	0.08
11	0.92	0.13	0.128	0.340	0.049	0.08
12	1.00	0.13	0.128	0.338	0.049	0.08
13	1.08	0.10	0.096	0.337	0.036	0.06
14	1.17	0.10	0.096	0.336	0.036	0.06
15	1.25	0.10	0.096	0.334	0.036	0.06
16	1.33	0.10	0.096	0.333	0.036	0.06
17	1.42	0.10	0.096	0.332	0.036	0.06
18	1.50	0.10	0.096	0.330	0.036	0.06
19	1.58	0.10	0.096	0.329	0.036	0.06
20	1.67	0.10	0.096	0.328	0.036	0.06
21	1.75	0.10	0.096	0.327	0.036	0.06
22	1.83	0.13	0.128	0.325	0.049	0.08
23	1.92	0.13	0.128	0.324	0.049	0.08
24	2.00	0.13	0.128	0.323	0.049	0.08
25	2.08	0.13	0.128	0.321	0.049	0.08
26	2.17	0.13	0.128	0.320	0.049	0.08
27	2.25	0.13	0.128	0.319	0.049	0.08
28	2.33	0.13	0.128	0.317	0.049	0.08
29	2.42	0.13	0.128	0.316	0.049	0.08
30	2.50	0.13	0.128	0.315	0.049	0.08
31	2.58	0.17	0.160	0.314	0.061	0.10
32	2.67	0.17	0.160	0.312	0.061	0.10
33	2.75	0.17	0.160	0.311	0.061	0.10
34	2.83	0.17	0.160	0.310	0.061	0.10
35	2.92	0.17	0.160	0.308	0.061	0.10
36	3.00	0.17	0.160	0.307	0.061	0.10
37	3.08	0.17	0.160	0.306	0.061	0.10
38	3.17	0.17	0.160	0.305	0.061	0.10
39	3.25	0.17	0.160	0.303	0.061	0.10
40	3.33	0.17	0.160	0.302	0.061	0.10
41	3.42	0.17	0.160	0.301	0.061	0.10
42	3.50	0.17	0.160	0.300	0.061	0.10
43	3.58	0.17	0.160	0.298	0.061	0.10
44	3.67	0.17	0.160	0.297	0.061	0.10
45	3.75	0.17	0.160	0.296	0.061	0.10
46	3.83	0.20	0.192	0.295	0.073	0.12
47	3.92	0.20	0.192	0.293	0.073	0.12
48	4.00	0.20	0.192	0.292	0.073	0.12
49	4.08	0.20	0.192	0.291	0.073	0.12
50	4.17	0.20	0.192	0.290	0.073	0.12
51	4.25	0.20	0.192	0.288	0.073	0.12
52	4.33	0.23	0.224	0.287	0.085	0.14
53	4.42	0.23	0.224	0.286	0.085	0.14
54	4.50	0.23	0.224	0.285	0.085	0.14
55	4.58	0.23	0.224	0.283	0.085	0.14
56	4.67	0.23	0.224	0.282	0.085	0.14
57	4.75	0.23	0.224	0.281	0.085	0.14
58	4.83	0.27	0.256	0.280	0.097	0.16
59	4.92	0.27	0.256	0.279	0.097	0.16

60	5.00	0.27	0.256	0.277	0.097	0.16
61	5.08	0.20	0.192	0.276	0.073	0.12
62	5.17	0.20	0.192	0.275	0.073	0.12
63	5.25	0.20	0.192	0.274	0.073	0.12
64	5.33	0.23	0.224	0.273	0.085	0.14
65	5.42	0.23	0.224	0.271	0.085	0.14
66	5.50	0.23	0.224	0.270	0.085	0.14
67	5.58	0.27	0.256	0.269	0.097	0.16
68	5.67	0.27	0.256	0.268	0.097	0.16
69	5.75	0.27	0.256	0.267	0.097	0.16
70	5.83	0.27	0.256	0.265	0.097	0.16
71	5.92	0.27	0.256	0.264	0.097	0.16
72	6.00	0.27	0.256	0.263	0.097	0.16
73	6.08	0.30	0.288	0.262	---	0.03
74	6.17	0.30	0.288	0.261	---	0.03
75	6.25	0.30	0.288	0.260	---	0.03
76	6.33	0.30	0.288	0.258	---	0.03
77	6.42	0.30	0.288	0.257	---	0.03
78	6.50	0.30	0.288	0.256	---	0.03
79	6.58	0.33	0.320	0.255	---	0.07
80	6.67	0.33	0.320	0.254	---	0.07
81	6.75	0.33	0.320	0.253	---	0.07
82	6.83	0.33	0.320	0.252	---	0.07
83	6.92	0.33	0.320	0.250	---	0.07
84	7.00	0.33	0.320	0.249	---	0.07
85	7.08	0.33	0.320	0.248	---	0.07
86	7.17	0.33	0.320	0.247	---	0.07
87	7.25	0.33	0.320	0.246	---	0.07
88	7.33	0.37	0.352	0.245	---	0.11
89	7.42	0.37	0.352	0.244	---	0.11
90	7.50	0.37	0.352	0.243	---	0.11
91	7.58	0.40	0.384	0.241	---	0.14
92	7.67	0.40	0.384	0.240	---	0.14
93	7.75	0.40	0.384	0.239	---	0.14
94	7.83	0.43	0.416	0.238	---	0.18
95	7.92	0.43	0.416	0.237	---	0.18
96	8.00	0.43	0.416	0.236	---	0.18
97	8.08	0.50	0.480	0.235	---	0.25
98	8.17	0.50	0.480	0.234	---	0.25
99	8.25	0.50	0.480	0.233	---	0.25
100	8.33	0.50	0.480	0.232	---	0.25
101	8.42	0.50	0.480	0.230	---	0.25
102	8.50	0.50	0.480	0.229	---	0.25
103	8.58	0.53	0.512	0.228	---	0.28
104	8.67	0.53	0.512	0.227	---	0.28
105	8.75	0.53	0.512	0.226	---	0.29
106	8.83	0.57	0.544	0.225	---	0.32
107	8.92	0.57	0.544	0.224	---	0.32
108	9.00	0.57	0.544	0.223	---	0.32
109	9.08	0.63	0.608	0.222	---	0.39
110	9.17	0.63	0.608	0.221	---	0.39
111	9.25	0.63	0.608	0.220	---	0.39
112	9.33	0.67	0.640	0.219	---	0.42
113	9.42	0.67	0.640	0.218	---	0.42
114	9.50	0.67	0.640	0.217	---	0.42
115	9.58	0.70	0.672	0.216	---	0.46
116	9.67	0.70	0.672	0.215	---	0.46
117	9.75	0.70	0.672	0.214	---	0.46
118	9.83	0.73	0.704	0.213	---	0.49
119	9.92	0.73	0.704	0.212	---	0.49
120	10.00	0.73	0.704	0.210	---	0.49
121	10.08	0.50	0.480	0.209	---	0.27
122	10.17	0.50	0.480	0.208	---	0.27
123	10.25	0.50	0.480	0.207	---	0.27
124	10.33	0.50	0.480	0.206	---	0.27
125	10.42	0.50	0.480	0.205	---	0.27
126	10.50	0.50	0.480	0.204	---	0.28
127	10.58	0.67	0.640	0.203	---	0.44
128	10.67	0.67	0.640	0.202	---	0.44
129	10.75	0.67	0.640	0.201	---	0.44
130	10.83	0.67	0.640	0.200	---	0.44
131	10.92	0.67	0.640	0.199	---	0.44
132	11.00	0.67	0.640	0.198	---	0.44
133	11.08	0.63	0.608	0.198	---	0.41
134	11.17	0.63	0.608	0.197	---	0.41
135	11.25	0.63	0.608	0.196	---	0.41
136	11.33	0.63	0.608	0.195	---	0.41
137	11.42	0.63	0.608	0.194	---	0.41
138	11.50	0.63	0.608	0.193	---	0.42
139	11.58	0.57	0.544	0.192	---	0.35
140	11.67	0.57	0.544	0.191	---	0.35

141	11.75	0.57	0.544	0.190	---	0.35
142	11.83	0.60	0.576	0.189	---	0.39
143	11.92	0.60	0.576	0.188	---	0.39
144	12.00	0.60	0.576	0.187	---	0.39
145	12.08	0.83	0.800	0.186	---	0.61
146	12.17	0.83	0.800	0.185	---	0.61
147	12.25	0.83	0.800	0.184	---	0.62
148	12.33	0.87	0.832	0.183	---	0.65
149	12.42	0.87	0.832	0.182	---	0.65
150	12.50	0.87	0.832	0.181	---	0.65
151	12.58	0.93	0.896	0.181	---	0.72
152	12.67	0.93	0.896	0.180	---	0.72
153	12.75	0.93	0.896	0.179	---	0.72
154	12.83	0.97	0.928	0.178	---	0.75
155	12.92	0.97	0.928	0.177	---	0.75
156	13.00	0.97	0.928	0.176	---	0.75
157	13.08	1.13	1.088	0.175	---	0.91
158	13.17	1.13	1.088	0.174	---	0.91
159	13.25	1.13	1.088	0.173	---	0.91
160	13.33	1.13	1.088	0.172	---	0.92
161	13.42	1.13	1.088	0.172	---	0.92
162	13.50	1.13	1.088	0.171	---	0.92
163	13.58	0.77	0.736	0.170	---	0.57
164	13.67	0.77	0.736	0.169	---	0.57
165	13.75	0.77	0.736	0.168	---	0.57
166	13.83	0.77	0.736	0.167	---	0.57
167	13.92	0.77	0.736	0.166	---	0.57
168	14.00	0.77	0.736	0.166	---	0.57
169	14.08	0.90	0.864	0.165	---	0.70
170	14.17	0.90	0.864	0.164	---	0.70
171	14.25	0.90	0.864	0.163	---	0.70
172	14.33	0.87	0.832	0.162	---	0.67
173	14.42	0.87	0.832	0.161	---	0.67
174	14.50	0.87	0.832	0.161	---	0.67
175	14.58	0.87	0.832	0.160	---	0.67
176	14.67	0.87	0.832	0.159	---	0.67
177	14.75	0.87	0.832	0.158	---	0.67
178	14.83	0.83	0.800	0.157	---	0.64
179	14.92	0.83	0.800	0.156	---	0.64
180	15.00	0.83	0.800	0.156	---	0.64
181	15.08	0.80	0.768	0.155	---	0.61
182	15.17	0.80	0.768	0.154	---	0.61
183	15.25	0.80	0.768	0.153	---	0.61
184	15.33	0.77	0.736	0.153	---	0.58
185	15.42	0.77	0.736	0.152	---	0.58
186	15.50	0.77	0.736	0.151	---	0.59
187	15.58	0.63	0.608	0.150	---	0.46
188	15.67	0.63	0.608	0.149	---	0.46
189	15.75	0.63	0.608	0.149	---	0.46
190	15.83	0.63	0.608	0.148	---	0.46
191	15.92	0.63	0.608	0.147	---	0.46
192	16.00	0.63	0.608	0.146	---	0.46
193	16.08	0.13	0.128	0.146	0.049	0.08
194	16.17	0.13	0.128	0.145	0.049	0.08
195	16.25	0.13	0.128	0.144	0.049	0.08
196	16.33	0.13	0.128	0.143	0.049	0.08
197	16.42	0.13	0.128	0.143	0.049	0.08
198	16.50	0.13	0.128	0.142	0.049	0.08
199	16.58	0.10	0.096	0.141	0.036	0.06
200	16.67	0.10	0.096	0.141	0.036	0.06
201	16.75	0.10	0.096	0.140	0.036	0.06
202	16.83	0.10	0.096	0.139	0.036	0.06
203	16.92	0.10	0.096	0.138	0.036	0.06
204	17.00	0.10	0.096	0.138	0.036	0.06
205	17.08	0.17	0.160	0.137	---	0.02
206	17.17	0.17	0.160	0.136	---	0.02
207	17.25	0.17	0.160	0.136	---	0.02
208	17.33	0.17	0.160	0.135	---	0.03
209	17.42	0.17	0.160	0.134	---	0.03
210	17.50	0.17	0.160	0.134	---	0.03
211	17.58	0.17	0.160	0.133	---	0.03
212	17.67	0.17	0.160	0.132	---	0.03
213	17.75	0.17	0.160	0.132	---	0.03
214	17.83	0.13	0.128	0.131	0.049	0.08
215	17.92	0.13	0.128	0.130	0.049	0.08
216	18.00	0.13	0.128	0.130	0.049	0.08
217	18.08	0.13	0.128	0.129	0.049	0.08
218	18.17	0.13	0.128	0.128	0.049	0.08
219	18.25	0.13	0.128	0.128	---	0.00
220	18.33	0.13	0.128	0.127	---	0.00
221	18.42	0.13	0.128	0.127	---	0.00

222	18.50	0.13	0.128	0.126	---	0.00
223	18.58	0.10	0.096	0.125	0.036	0.06
224	18.67	0.10	0.096	0.125	0.036	0.06
225	18.75	0.10	0.096	0.124	0.036	0.06
226	18.83	0.07	0.064	0.123	0.024	0.04
227	18.92	0.07	0.064	0.123	0.024	0.04
228	19.00	0.07	0.064	0.122	0.024	0.04
229	19.08	0.10	0.096	0.122	0.036	0.06
230	19.17	0.10	0.096	0.121	0.036	0.06
231	19.25	0.10	0.096	0.121	0.036	0.06
232	19.33	0.13	0.128	0.120	---	0.01
233	19.42	0.13	0.128	0.119	---	0.01
234	19.50	0.13	0.128	0.119	---	0.01
235	19.58	0.10	0.096	0.118	0.036	0.06
236	19.67	0.10	0.096	0.118	0.036	0.06
237	19.75	0.10	0.096	0.117	0.036	0.06
238	19.83	0.07	0.064	0.117	0.024	0.04
239	19.92	0.07	0.064	0.116	0.024	0.04
240	20.00	0.07	0.064	0.116	0.024	0.04
241	20.08	0.10	0.096	0.115	0.036	0.06
242	20.17	0.10	0.096	0.115	0.036	0.06
243	20.25	0.10	0.096	0.114	0.036	0.06
244	20.33	0.10	0.096	0.114	0.036	0.06
245	20.42	0.10	0.096	0.113	0.036	0.06
246	20.50	0.10	0.096	0.113	0.036	0.06
247	20.58	0.10	0.096	0.112	0.036	0.06
248	20.67	0.10	0.096	0.112	0.036	0.06
249	20.75	0.10	0.096	0.111	0.036	0.06
250	20.83	0.07	0.064	0.111	0.024	0.04
251	20.92	0.07	0.064	0.110	0.024	0.04
252	21.00	0.07	0.064	0.110	0.024	0.04
253	21.08	0.10	0.096	0.110	0.036	0.06
254	21.17	0.10	0.096	0.109	0.036	0.06
255	21.25	0.10	0.096	0.109	0.036	0.06
256	21.33	0.07	0.064	0.108	0.024	0.04
257	21.42	0.07	0.064	0.108	0.024	0.04
258	21.50	0.07	0.064	0.107	0.024	0.04
259	21.58	0.10	0.096	0.107	0.036	0.06
260	21.67	0.10	0.096	0.107	0.036	0.06
261	21.75	0.10	0.096	0.106	0.036	0.06
262	21.83	0.07	0.064	0.106	0.024	0.04
263	21.92	0.07	0.064	0.106	0.024	0.04
264	22.00	0.07	0.064	0.105	0.024	0.04
265	22.08	0.10	0.096	0.105	0.036	0.06
266	22.17	0.10	0.096	0.105	0.036	0.06
267	22.25	0.10	0.096	0.104	0.036	0.06
268	22.33	0.07	0.064	0.104	0.024	0.04
269	22.42	0.07	0.064	0.104	0.024	0.04
270	22.50	0.07	0.064	0.103	0.024	0.04
271	22.58	0.07	0.064	0.103	0.024	0.04
272	22.67	0.07	0.064	0.103	0.024	0.04
273	22.75	0.07	0.064	0.102	0.024	0.04
274	22.83	0.07	0.064	0.102	0.024	0.04
275	22.92	0.07	0.064	0.102	0.024	0.04
276	23.00	0.07	0.064	0.102	0.024	0.04
277	23.08	0.07	0.064	0.101	0.024	0.04
278	23.17	0.07	0.064	0.101	0.024	0.04
279	23.25	0.07	0.064	0.101	0.024	0.04
280	23.33	0.07	0.064	0.101	0.024	0.04
281	23.42	0.07	0.064	0.101	0.024	0.04
282	23.50	0.07	0.064	0.100	0.024	0.04
283	23.58	0.07	0.064	0.100	0.024	0.04
284	23.67	0.07	0.064	0.100	0.024	0.04
285	23.75	0.07	0.064	0.100	0.024	0.04
286	23.83	0.07	0.064	0.100	0.024	0.04
287	23.92	0.07	0.064	0.100	0.024	0.04
288	24.00	0.07	0.064	0.100	0.024	0.04
	Sum =	100.0			Sum =	62.9

Flood volume = Effective rainfall 5.24(In)
times area 22.9(Ac.)/[(In)/(Ft.)] = 10.0(Ac.Ft)
Total soil loss = 2.76(In)
Total soil loss = 5.266(Ac.Ft)
Total rainfall = 8.00(In)
Flood volume = 435614.5 Cubic Feet
Total soil loss = 229371.8 Cubic Feet

Peak flow rate of this hydrograph = 21.161(CFS)

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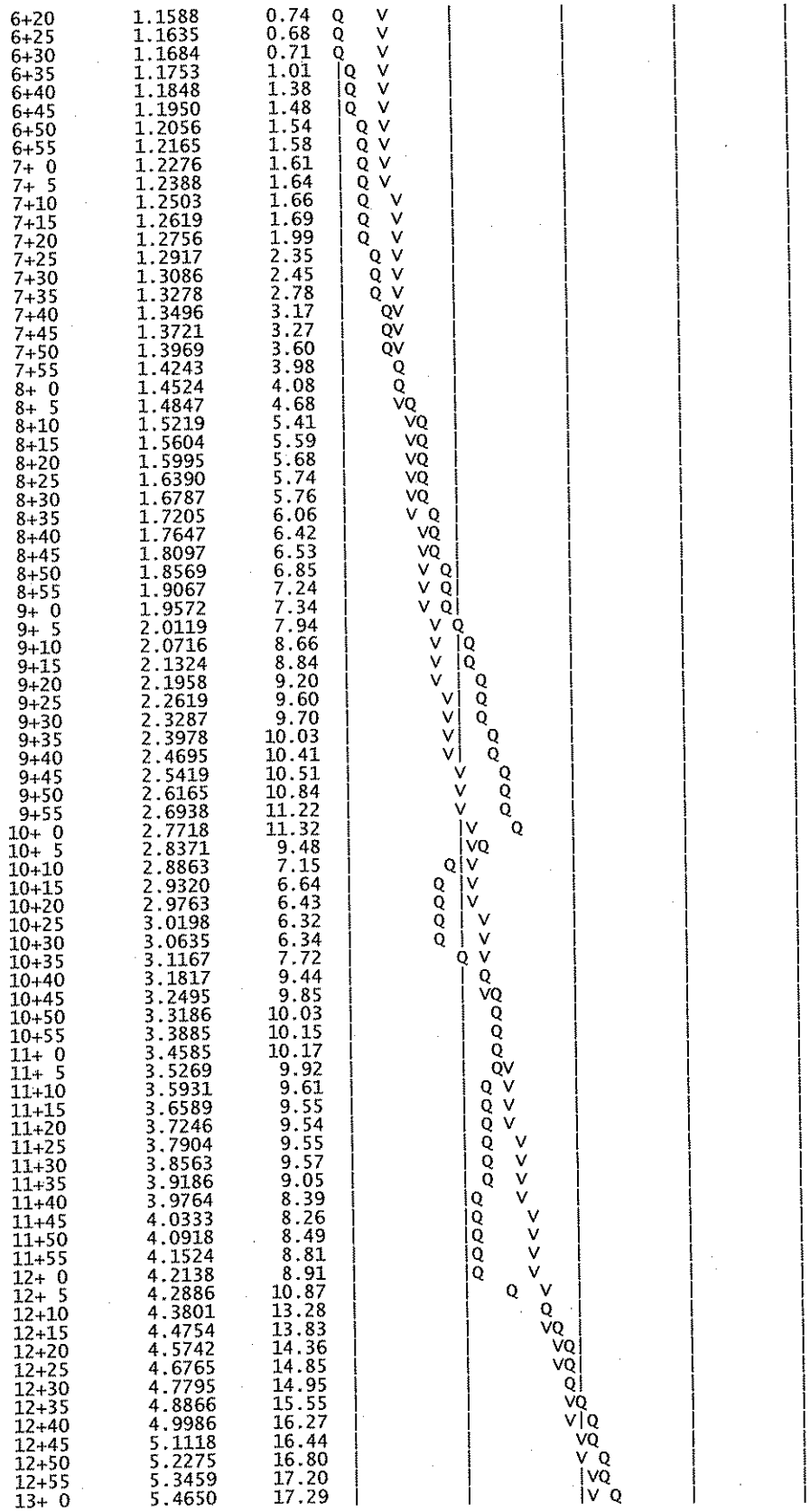
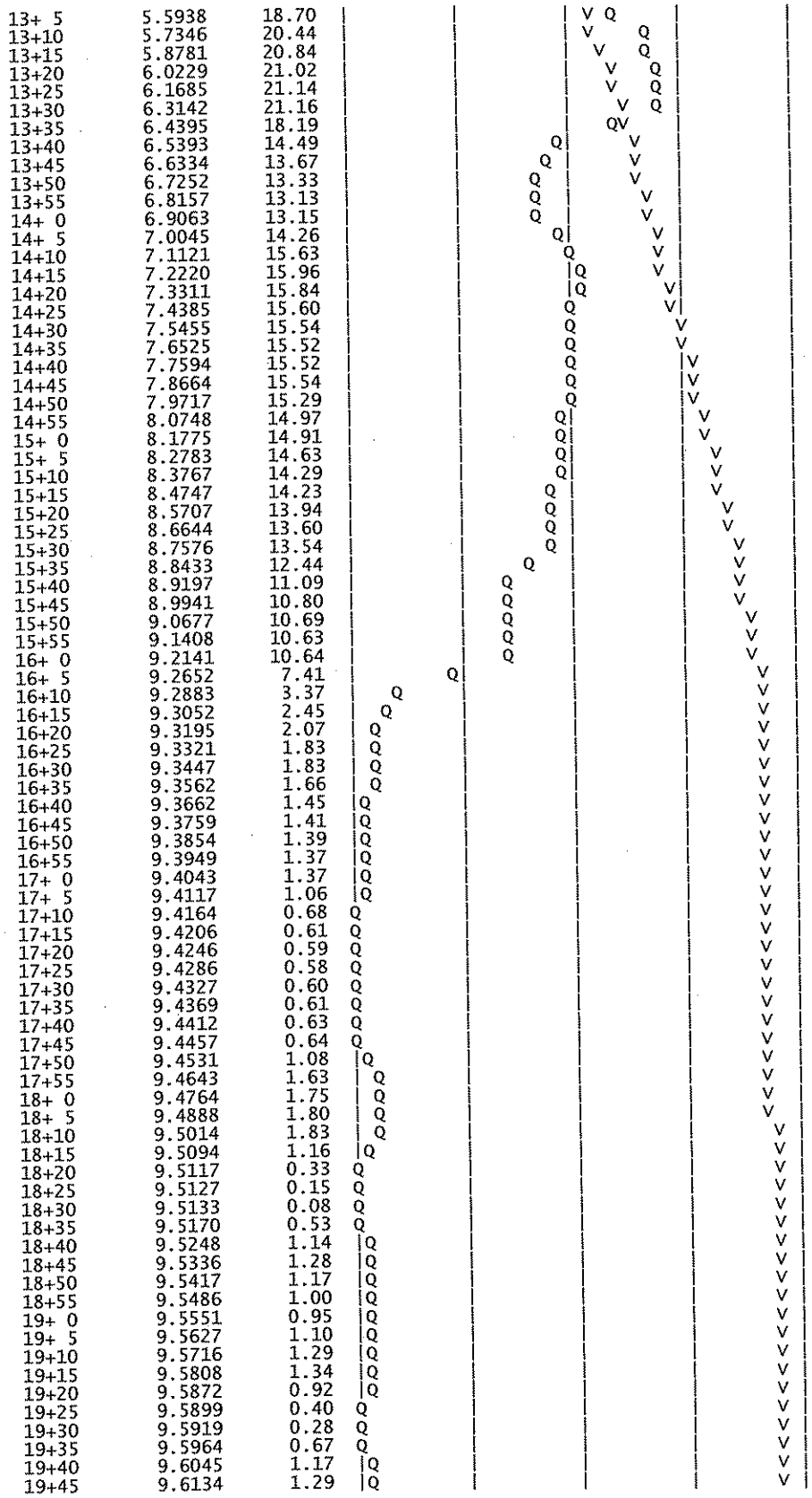
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0023	0.34	Q				
0+10	0.0075	0.76	VQ				
0+15	0.0134	0.85	VQ				
0+20	0.0207	1.06	VQ				
0+25	0.0296	1.29	VQ				
0+30	0.0389	1.34	VQ				
0+35	0.0482	1.36	VQ				
0+40	0.0577	1.37	VQ				
0+45	0.0672	1.37	VQ				
0+50	0.0778	1.54	V Q				
0+55	0.0899	1.75	V Q				
1+ 0	0.1023	1.80	V Q				
1+ 5	0.1136	1.65	V Q				
1+10	0.1237	1.45	VQ				
1+15	0.1333	1.41	VQ				
1+20	0.1429	1.39	VQ				
1+25	0.1524	1.37	VQ				
1+30	0.1618	1.37	VQ				
1+35	0.1713	1.37	VQ				
1+40	0.1808	1.37	VQ				
1+45	0.1902	1.37	VQ				
1+50	0.2008	1.54	V Q				
1+55	0.2129	1.75	V Q				
2+ 0	0.2253	1.80	V Q				
2+ 5	0.2378	1.82	V Q				
2+10	0.2505	1.83	|VQ				
2+15	0.2631	1.83	|VQ				
2+20	0.2757	1.83	|VQ				
2+25	0.2883	1.83	|VQ				
2+30	0.3009	1.83	|VQ				
2+35	0.3147	2.00	|VQ				
2+40	0.3300	2.21	|VQ				
2+45	0.3455	2.26	|V Q				
2+50	0.3612	2.28	|V Q				
2+55	0.3770	2.29	|V Q				
3+ 0	0.3927	2.29	|V Q				
3+ 5	0.4085	2.29	|V Q				
3+10	0.4243	2.29	|V Q				
3+15	0.4401	2.29	|V Q				
3+20	0.4558	2.29	|V Q				
3+25	0.4716	2.29	|V Q				
3+30	0.4874	2.29	|V Q				
3+35	0.5032	2.29	| VQ				
3+40	0.5189	2.29	| VQ				
3+45	0.5347	2.29	| VQ				
3+50	0.5517	2.46	| VQ				
3+55	0.5700	2.67	| VQ				
4+ 0	0.5887	2.72	| VQ				
4+ 5	0.6076	2.74	| VQ				
4+10	0.6265	2.75	| VQ				
4+15	0.6454	2.75	| VQ				
4+20	0.6655	2.92	| VQ				
4+25	0.6871	3.13	| V Q				
4+30	0.7089	3.17	| V Q				
4+35	0.7309	3.19	| V Q				
4+40	0.7530	3.21	| VQ				
4+45	0.7751	3.21	| VQ				
4+50	0.7984	3.38	| VQ				
4+55	0.8230	3.59	| VQ				
5+ 0	0.8481	3.63	| VQ				
5+ 5	0.8709	3.32	| VQ				
5+10	0.8909	2.91	| Q				
5+15	0.9103	2.81	| Q				
5+20	0.9306	2.94	| Q				
5+25	0.9521	3.13	| VQ				
5+30	0.9740	3.17	| VQ				
5+35	0.9971	3.36	| VQ				
5+40	1.0218	3.59	| Q				
5+45	1.0468	3.63	| Q				
5+50	1.0720	3.65	| Q				
5+55	1.0972	3.66	| Q				
6+ 0	1.1225	3.66	| Q				
6+ 5	1.1399	2.54	| QV				
6+10	1.1478	1.14	|Q V				
6+15	1.1537	0.85	|Q V				





19+50	9.6215	1.18	Q				V
19+55	9.6284	1.00	Q				V
20+ 0	9.6349	0.95	Q				V
20+ 5	9.6424	1.10	Q				V
20+10	9.6514	1.29	Q				V
20+15	9.6606	1.34	Q				V
20+20	9.6700	1.36	Q				V
20+25	9.6794	1.37	Q				V
20+30	9.6889	1.37	Q				V
20+35	9.6984	1.37	Q				V
20+40	9.7078	1.37	Q				V
20+45	9.7173	1.37	Q				V
20+50	9.7256	1.21	Q				V
20+55	9.7325	1.00	Q				V
21+ 0	9.7390	0.95	Q				V
21+ 5	9.7466	1.10	Q				V
21+10	9.7555	1.29	Q				V
21+15	9.7647	1.34	Q				V
21+20	9.7729	1.19	Q				V
21+25	9.7798	1.00	Q				V
21+30	9.7863	0.95	Q				V
21+35	9.7939	1.10	Q				V
21+40	9.8028	1.29	Q				V
21+45	9.8120	1.34	Q				V
21+50	9.8203	1.19	Q				V
21+55	9.8271	1.00	Q				V
22+ 0	9.8336	0.95	Q				V
22+ 5	9.8412	1.10	Q				V
22+10	9.8501	1.29	Q				V
22+15	9.8594	1.34	Q				V
22+20	9.8676	1.19	Q				V
22+25	9.8744	1.00	Q				V
22+30	9.8810	0.95	Q				V
22+35	9.8874	0.93	Q				V
22+40	9.8937	0.92	Q				V
22+45	9.9000	0.92	Q				V
22+50	9.9063	0.92	Q				V
22+55	9.9126	0.92	Q				V
23+ 0	9.9189	0.92	Q				V
23+ 5	9.9252	0.92	Q				V
23+10	9.9315	0.92	Q				V
23+15	9.9378	0.92	Q				V
23+20	9.9442	0.92	Q				V
23+25	9.9505	0.92	Q				V
23+30	9.9568	0.92	Q				V
23+35	9.9631	0.92	Q				V
23+40	9.9694	0.92	Q				V
23+45	9.9757	0.92	Q				V
23+50	9.9820	0.92	Q				V
23+55	9.9883	0.92	Q				V
24+ 0	9.9946	0.92	Q				V
24+ 5	9.9986	0.58	Q				V
24+10	9.9997	0.16	Q				V
24+15	10.0002	0.06	Q				V
24+20	10.0003	0.02	Q				V

APPENDIX H.3: 2- YEAR/ 1-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: B1UHMDP12.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - MASTER DRAINAGE STUDY (PROPOSED CONDITION)
AREA "B" FOR AREAS "B1" & "B2"
2 YEAR - 1, 3, 6, 24 HOUR
FN: B1UHMDP

Drainage Area = 22.90(Ac.) = 0.036 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 22.90(Ac.) = 0.036 Sq. Mi.
Length along longest watercourse = 2025.00(Ft.)
Length along longest watercourse measured to centroid = 1140.00(Ft.)
Length along longest watercourse = 0.384 Mi.
Length along longest watercourse measured to centroid = 0.216 Mi.
Difference in elevation = 83.00(Ft.)
Slope along watercourse = 216.4148 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.050 Hr.
Lag time = 3.02 Min.
25% of lag time = 0.75 Min.
40% of lag time = 1.21 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.90	0.55	12.60

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.90	1.40	32.06

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.400(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 0.550(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.000	57.30	0.650
14.900	59.90	0.650

Total Area Entered = 22.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.3	37.3	0.694	0.650	0.288	0.349	0.101
59.9	39.9	0.671	0.650	0.278	0.651	0.181
					Sum (F) =	0.282

Area averaged mean soil loss (F) (In/Hr) = 0.282
Minimum soil loss rate ((In/Hr)) = 0.141
(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.380

Slope of intensity-duration curve for a 1 hour storm =0.4800

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	165.713	36.773	8.487
2	0.167	331.426	45.837	10.579
3	0.250	497.140	10.346	2.388
4	0.333	662.853	4.400	1.015
5	0.417	828.566	2.644	0.610
			Sum = 100.000 Sum=	23.079

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1 0.08	4.40	0.290	0.282	---	0.01
2 0.17	4.50	0.297	0.282	---	0.02
3 0.25	5.40	0.356	0.282	---	0.07
4 0.33	5.40	0.356	0.282	---	0.07
5 0.42	5.70	0.376	0.282	---	0.09
6 0.50	6.40	0.422	0.282	---	0.14
7 0.58	7.90	0.521	0.282	---	0.24
8 0.67	9.10	0.600	0.282	---	0.32
9 0.75	12.80	0.845	0.282	---	0.56
10 0.83	25.60	1.689	0.282	---	1.41
11 0.92	7.90	0.521	0.282	---	0.24
12 1.00	4.90	0.323	0.282	---	0.04
Sum =	100.0			Sum =	3.2

Flood volume = Effective rainfall 0.27(In)
times area 22.9(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.28(In)
Total soil loss = 0.538(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 22283.8 Cubic Feet
Total soil loss = 23426.5 Cubic Feet

Peak flow rate of this hydrograph = 18.998(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 5.0 10.0 15.0 20.0
0+ 5	0.0005	0.07	Q
0+10	0.0020	0.22	Q
0+15	0.0076	0.81	VQ
0+20	0.0177	1.47	VQ
0+25	0.0300	1.79	VQ
0+30	0.0469	2.45	VQ
0+35	0.0735	3.87	V Q
0+40	0.1129	5.72	V Q
0+45	0.1744	8.92	V Q
0+50	0.3052	19.00	V Q
0+55	0.4343	18.74	V Q
1+ 0	0.4826	7.02	Q V
1+ 5	0.5018	2.78	Q V
1+10	0.5101	1.20	Q V
1+15	0.5114	0.19	Q V
1+20	0.5116	0.03	Q V

APPENDIX H.4: 2- YEAR/ 24-HOUR HYDROGRAPH CALCULATIONS

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 07/01/10 File: B1UHMDP242.out

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

TRI-8 Builders - S/N 615

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

English Units used in output format

TENTATIVE TRACT MAP 36294 - MASTER DRAINAGE STUDY (PROPOSED CONDITION)
AREA "B" FOR AREAS "B1" & "B2"
2 YEAR - 1, 3, 6, 24 HOUR
FN: B1UHMDP

Drainage Area = 22.90(Ac.) = 0.036 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 22.90(Ac.) = 0.036 Sq. Mi.
Length along longest watercourse = 2025.00(Ft.)
Length along longest watercourse measured to centroid = 1140.00(Ft.)
Length along longest watercourse = 0.384 Mi.
Length along longest watercourse measured to centroid = 0.216 Mi.
Difference in elevation = 83.00(Ft.)
Slope along watercourse = 216.4148 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.050 Hr.
Lag time = 3.02 Min.
25% of lag time = 0.75 Min.
40% of lag time = 1.21 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.90	2.50	57.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.90	8.00	183.20

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 8.000(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.000	57.30	0.650
14.900	59.90	0.650

Total Area Entered = 22.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.3	37.3	0.694	0.650	0.288	0.349	0.101
59.9	39.9	0.671	0.650	0.278	0.651	0.181
					Sum (F) =	0.282

Area averaged mean soil loss (F) (In/Hr) = 0.282
Minimum soil loss rate ((In/Hr)) = 0.141
(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.380

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	165.713	36.773	8.487
2	0.167	331.426	45.837	10.579
3	0.250	497.140	10.346	2.388
4	0.333	662.853	4.400	1.015
5	0.417	828.566	2.644	0.610
			Sum = 100.000	Sum= 23.079

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.020	0.500	0.008	0.01
2	0.17	0.07	0.020	0.498	0.008	0.01
3	0.25	0.07	0.020	0.496	0.008	0.01
4	0.33	0.10	0.030	0.494	0.011	0.02
5	0.42	0.10	0.030	0.492	0.011	0.02
6	0.50	0.10	0.030	0.490	0.011	0.02
7	0.58	0.10	0.030	0.488	0.011	0.02
8	0.67	0.10	0.030	0.486	0.011	0.02
9	0.75	0.10	0.030	0.484	0.011	0.02
10	0.83	0.13	0.040	0.482	0.015	0.02
11	0.92	0.13	0.040	0.480	0.015	0.02
12	1.00	0.13	0.040	0.479	0.015	0.02
13	1.08	0.10	0.030	0.477	0.011	0.02
14	1.17	0.10	0.030	0.475	0.011	0.02
15	1.25	0.10	0.030	0.473	0.011	0.02
16	1.33	0.10	0.030	0.471	0.011	0.02
17	1.42	0.10	0.030	0.469	0.011	0.02
18	1.50	0.10	0.030	0.467	0.011	0.02
19	1.58	0.10	0.030	0.465	0.011	0.02
20	1.67	0.10	0.030	0.464	0.011	0.02
21	1.75	0.10	0.030	0.462	0.011	0.02
22	1.83	0.13	0.040	0.460	0.015	0.02
23	1.92	0.13	0.040	0.458	0.015	0.02
24	2.00	0.13	0.040	0.456	0.015	0.02
25	2.08	0.13	0.040	0.454	0.015	0.02
26	2.17	0.13	0.040	0.452	0.015	0.02
27	2.25	0.13	0.040	0.451	0.015	0.02
28	2.33	0.13	0.040	0.449	0.015	0.02
29	2.42	0.13	0.040	0.447	0.015	0.02
30	2.50	0.13	0.040	0.445	0.015	0.02
31	2.58	0.17	0.050	0.443	0.019	0.03
32	2.67	0.17	0.050	0.441	0.019	0.03
33	2.75	0.17	0.050	0.440	0.019	0.03
34	2.83	0.17	0.050	0.438	0.019	0.03
35	2.92	0.17	0.050	0.436	0.019	0.03
36	3.00	0.17	0.050	0.434	0.019	0.03
37	3.08	0.17	0.050	0.432	0.019	0.03
38	3.17	0.17	0.050	0.431	0.019	0.03
39	3.25	0.17	0.050	0.429	0.019	0.03
40	3.33	0.17	0.050	0.427	0.019	0.03
41	3.42	0.17	0.050	0.425	0.019	0.03
42	3.50	0.17	0.050	0.423	0.019	0.03
43	3.58	0.17	0.050	0.422	0.019	0.03
44	3.67	0.17	0.050	0.420	0.019	0.03
45	3.75	0.17	0.050	0.418	0.019	0.03
46	3.83	0.20	0.060	0.416	0.023	0.04
47	3.92	0.20	0.060	0.415	0.023	0.04
48	4.00	0.20	0.060	0.413	0.023	0.04
49	4.08	0.20	0.060	0.411	0.023	0.04
50	4.17	0.20	0.060	0.409	0.023	0.04
51	4.25	0.20	0.060	0.408	0.023	0.04
52	4.33	0.23	0.070	0.406	0.027	0.04
53	4.42	0.23	0.070	0.404	0.027	0.04
54	4.50	0.23	0.070	0.402	0.027	0.04
55	4.58	0.23	0.070	0.401	0.027	0.04
56	4.67	0.23	0.070	0.399	0.027	0.04
57	4.75	0.23	0.070	0.397	0.027	0.04
58	4.83	0.27	0.080	0.396	0.030	0.05
59	4.92	0.27	0.080	0.394	0.030	0.05

60	5.00	0.27	0.080	0.392	0.030	0.05
61	5.08	0.20	0.060	0.390	0.023	0.04
62	5.17	0.20	0.060	0.389	0.023	0.04
63	5.25	0.20	0.060	0.387	0.023	0.04
64	5.33	0.23	0.070	0.385	0.027	0.04
65	5.42	0.23	0.070	0.384	0.027	0.04
66	5.50	0.23	0.070	0.382	0.027	0.04
67	5.58	0.27	0.080	0.380	0.030	0.05
68	5.67	0.27	0.080	0.379	0.030	0.05
69	5.75	0.27	0.080	0.377	0.030	0.05
70	5.83	0.27	0.080	0.375	0.030	0.05
71	5.92	0.27	0.080	0.374	0.030	0.05
72	6.00	0.27	0.080	0.372	0.030	0.05
73	6.08	0.30	0.090	0.370	0.034	0.06
74	6.17	0.30	0.090	0.369	0.034	0.06
75	6.25	0.30	0.090	0.367	0.034	0.06
76	6.33	0.30	0.090	0.365	0.034	0.06
77	6.42	0.30	0.090	0.364	0.034	0.06
78	6.50	0.30	0.090	0.362	0.034	0.06
79	6.58	0.33	0.100	0.361	0.038	0.06
80	6.67	0.33	0.100	0.359	0.038	0.06
81	6.75	0.33	0.100	0.357	0.038	0.06
82	6.83	0.33	0.100	0.356	0.038	0.06
83	6.92	0.33	0.100	0.354	0.038	0.06
84	7.00	0.33	0.100	0.352	0.038	0.06
85	7.08	0.33	0.100	0.351	0.038	0.06
86	7.17	0.33	0.100	0.349	0.038	0.06
87	7.25	0.33	0.100	0.348	0.038	0.06
88	7.33	0.37	0.110	0.346	0.042	0.07
89	7.42	0.37	0.110	0.344	0.042	0.07
90	7.50	0.37	0.110	0.343	0.042	0.07
91	7.58	0.40	0.120	0.341	0.046	0.07
92	7.67	0.40	0.120	0.340	0.046	0.07
93	7.75	0.40	0.120	0.338	0.046	0.07
94	7.83	0.43	0.130	0.337	0.049	0.08
95	7.92	0.43	0.130	0.335	0.049	0.08
96	8.00	0.43	0.130	0.334	0.049	0.08
97	8.08	0.50	0.150	0.332	0.057	0.09
98	8.17	0.50	0.150	0.330	0.057	0.09
99	8.25	0.50	0.150	0.329	0.057	0.09
100	8.33	0.50	0.150	0.327	0.057	0.09
101	8.42	0.50	0.150	0.326	0.057	0.09
102	8.50	0.50	0.150	0.324	0.057	0.09
103	8.58	0.53	0.160	0.323	0.061	0.10
104	8.67	0.53	0.160	0.321	0.061	0.10
105	8.75	0.53	0.160	0.320	0.061	0.10
106	8.83	0.57	0.170	0.318	0.065	0.11
107	8.92	0.57	0.170	0.317	0.065	0.11
108	9.00	0.57	0.170	0.315	0.065	0.11
109	9.08	0.63	0.190	0.314	0.072	0.12
110	9.17	0.63	0.190	0.312	0.072	0.12
111	9.25	0.63	0.190	0.311	0.072	0.12
112	9.33	0.67	0.200	0.309	0.076	0.12
113	9.42	0.67	0.200	0.308	0.076	0.12
114	9.50	0.67	0.200	0.306	0.076	0.12
115	9.58	0.70	0.210	0.305	0.080	0.13
116	9.67	0.70	0.210	0.303	0.080	0.13
117	9.75	0.70	0.210	0.302	0.080	0.13
118	9.83	0.73	0.220	0.300	0.084	0.14
119	9.92	0.73	0.220	0.299	0.084	0.14
120	10.00	0.73	0.220	0.298	0.084	0.14
121	10.08	0.50	0.150	0.296	0.057	0.09
122	10.17	0.50	0.150	0.295	0.057	0.09
123	10.25	0.50	0.150	0.293	0.057	0.09
124	10.33	0.50	0.150	0.292	0.057	0.09
125	10.42	0.50	0.150	0.290	0.057	0.09
126	10.50	0.50	0.150	0.289	0.057	0.09
127	10.58	0.67	0.200	0.288	0.076	0.12
128	10.67	0.67	0.200	0.286	0.076	0.12
129	10.75	0.67	0.200	0.285	0.076	0.12
130	10.83	0.67	0.200	0.283	0.076	0.12
131	10.92	0.67	0.200	0.282	0.076	0.12
132	11.00	0.67	0.200	0.281	0.076	0.12
133	11.08	0.63	0.190	0.279	0.072	0.12
134	11.17	0.63	0.190	0.278	0.072	0.12
135	11.25	0.63	0.190	0.277	0.072	0.12
136	11.33	0.63	0.190	0.275	0.072	0.12
137	11.42	0.63	0.190	0.274	0.072	0.12
138	11.50	0.63	0.190	0.272	0.072	0.12
139	11.58	0.57	0.170	0.271	0.065	0.11
140	11.67	0.57	0.170	0.270	0.065	0.11

141	11.75	0.57	0.170	0.268	0.065	0.11
142	11.83	0.60	0.180	0.267	0.068	0.11
143	11.92	0.60	0.180	0.266	0.068	0.11
144	12.00	0.60	0.180	0.264	0.068	0.11
145	12.08	0.83	0.250	0.263	0.095	0.15
146	12.17	0.83	0.250	0.262	0.095	0.15
147	12.25	0.83	0.250	0.260	0.095	0.15
148	12.33	0.87	0.260	0.259	---	0.00
149	12.42	0.87	0.260	0.258	---	0.00
150	12.50	0.87	0.260	0.257	---	0.00
151	12.58	0.93	0.280	0.255	---	0.02
152	12.67	0.93	0.280	0.254	---	0.03
153	12.75	0.93	0.280	0.253	---	0.03
154	12.83	0.97	0.290	0.251	---	0.04
155	12.92	0.97	0.290	0.250	---	0.04
156	13.00	0.97	0.290	0.249	---	0.04
157	13.08	1.13	0.340	0.248	---	0.09
158	13.17	1.13	0.340	0.246	---	0.09
159	13.25	1.13	0.340	0.245	---	0.09
160	13.33	1.13	0.340	0.244	---	0.10
161	13.42	1.13	0.340	0.243	---	0.10
162	13.50	1.13	0.340	0.241	---	0.10
163	13.58	0.77	0.230	0.240	0.087	0.14
164	13.67	0.77	0.230	0.239	0.087	0.14
165	13.75	0.77	0.230	0.238	0.087	0.14
166	13.83	0.77	0.230	0.237	0.087	0.14
167	13.92	0.77	0.230	0.235	0.087	0.14
168	14.00	0.77	0.230	0.234	0.087	0.14
169	14.08	0.90	0.270	0.233	---	0.04
170	14.17	0.90	0.270	0.232	---	0.04
171	14.25	0.90	0.270	0.231	---	0.04
172	14.33	0.87	0.260	0.229	---	0.03
173	14.42	0.87	0.260	0.228	---	0.03
174	14.50	0.87	0.260	0.227	---	0.03
175	14.58	0.87	0.260	0.226	---	0.03
176	14.67	0.87	0.260	0.225	---	0.04
177	14.75	0.87	0.260	0.224	---	0.04
178	14.83	0.83	0.250	0.222	---	0.03
179	14.92	0.83	0.250	0.221	---	0.03
180	15.00	0.83	0.250	0.220	---	0.03
181	15.08	0.80	0.240	0.219	---	0.02
182	15.17	0.80	0.240	0.218	---	0.02
183	15.25	0.80	0.240	0.217	---	0.02
184	15.33	0.77	0.230	0.216	---	0.01
185	15.42	0.77	0.230	0.215	---	0.02
186	15.50	0.77	0.230	0.213	---	0.02
187	15.58	0.63	0.190	0.212	0.072	0.12
188	15.67	0.63	0.190	0.211	0.072	0.12
189	15.75	0.63	0.190	0.210	0.072	0.12
190	15.83	0.63	0.190	0.209	0.072	0.12
191	15.92	0.63	0.190	0.208	0.072	0.12
192	16.00	0.63	0.190	0.207	0.072	0.12
193	16.08	0.13	0.040	0.206	0.015	0.02
194	16.17	0.13	0.040	0.205	0.015	0.02
195	16.25	0.13	0.040	0.204	0.015	0.02
196	16.33	0.13	0.040	0.203	0.015	0.02
197	16.42	0.13	0.040	0.202	0.015	0.02
198	16.50	0.13	0.040	0.201	0.015	0.02
199	16.58	0.10	0.030	0.200	0.011	0.02
200	16.67	0.10	0.030	0.199	0.011	0.02
201	16.75	0.10	0.030	0.198	0.011	0.02
202	16.83	0.10	0.030	0.197	0.011	0.02
203	16.92	0.10	0.030	0.196	0.011	0.02
204	17.00	0.10	0.030	0.195	0.011	0.02
205	17.08	0.17	0.050	0.194	0.019	0.03
206	17.17	0.17	0.050	0.193	0.019	0.03
207	17.25	0.17	0.050	0.192	0.019	0.03
208	17.33	0.17	0.050	0.191	0.019	0.03
209	17.42	0.17	0.050	0.190	0.019	0.03
210	17.50	0.17	0.050	0.189	0.019	0.03
211	17.58	0.17	0.050	0.188	0.019	0.03
212	17.67	0.17	0.050	0.187	0.019	0.03
213	17.75	0.17	0.050	0.186	0.019	0.03
214	17.83	0.13	0.040	0.185	0.015	0.02
215	17.92	0.13	0.040	0.184	0.015	0.02
216	18.00	0.13	0.040	0.183	0.015	0.02
217	18.08	0.13	0.040	0.182	0.015	0.02
218	18.17	0.13	0.040	0.182	0.015	0.02
219	18.25	0.13	0.040	0.181	0.015	0.02
220	18.33	0.13	0.040	0.180	0.015	0.02
221	18.42	0.13	0.040	0.179	0.015	0.02

222	18.50	0.13	0.040	0.178	0.015	0.02
223	18.58	0.10	0.030	0.177	0.011	0.02
224	18.67	0.10	0.030	0.176	0.011	0.02
225	18.75	0.10	0.030	0.175	0.011	0.02
226	18.83	0.07	0.020	0.175	0.008	0.01
227	18.92	0.07	0.020	0.174	0.008	0.01
228	19.00	0.07	0.020	0.173	0.008	0.01
229	19.08	0.10	0.030	0.172	0.011	0.02
230	19.17	0.10	0.030	0.171	0.011	0.02
231	19.25	0.10	0.030	0.171	0.011	0.02
232	19.33	0.13	0.040	0.170	0.015	0.02
233	19.42	0.13	0.040	0.169	0.015	0.02
234	19.50	0.13	0.040	0.168	0.015	0.02
235	19.58	0.10	0.030	0.167	0.011	0.02
236	19.67	0.10	0.030	0.167	0.011	0.02
237	19.75	0.10	0.030	0.166	0.011	0.02
238	19.83	0.07	0.020	0.165	0.008	0.01
239	19.92	0.07	0.020	0.164	0.008	0.01
240	20.00	0.07	0.020	0.164	0.008	0.01
241	20.08	0.10	0.030	0.163	0.011	0.02
242	20.17	0.10	0.030	0.162	0.011	0.02
243	20.25	0.10	0.030	0.162	0.011	0.02
244	20.33	0.10	0.030	0.161	0.011	0.02
245	20.42	0.10	0.030	0.160	0.011	0.02
246	20.50	0.10	0.030	0.159	0.011	0.02
247	20.58	0.10	0.030	0.159	0.011	0.02
248	20.67	0.10	0.030	0.158	0.011	0.02
249	20.75	0.10	0.030	0.157	0.011	0.02
250	20.83	0.07	0.020	0.157	0.008	0.01
251	20.92	0.07	0.020	0.156	0.008	0.01
252	21.00	0.07	0.020	0.156	0.008	0.01
253	21.08	0.10	0.030	0.155	0.011	0.02
254	21.17	0.10	0.030	0.154	0.011	0.02
255	21.25	0.10	0.030	0.154	0.011	0.02
256	21.33	0.07	0.020	0.153	0.008	0.01
257	21.42	0.07	0.020	0.153	0.008	0.01
258	21.50	0.07	0.020	0.152	0.008	0.01
259	21.58	0.10	0.030	0.151	0.011	0.02
260	21.67	0.10	0.030	0.151	0.011	0.02
261	21.75	0.10	0.030	0.150	0.011	0.02
262	21.83	0.07	0.020	0.150	0.008	0.01
263	21.92	0.07	0.020	0.149	0.008	0.01
264	22.00	0.07	0.020	0.149	0.008	0.01
265	22.08	0.10	0.030	0.148	0.011	0.02
266	22.17	0.10	0.030	0.148	0.011	0.02
267	22.25	0.10	0.030	0.147	0.011	0.02
268	22.33	0.07	0.020	0.147	0.008	0.01
269	22.42	0.07	0.020	0.146	0.008	0.01
270	22.50	0.07	0.020	0.146	0.008	0.01
271	22.58	0.07	0.020	0.146	0.008	0.01
272	22.67	0.07	0.020	0.145	0.008	0.01
273	22.75	0.07	0.020	0.145	0.008	0.01
274	22.83	0.07	0.020	0.144	0.008	0.01
275	22.92	0.07	0.020	0.144	0.008	0.01
276	23.00	0.07	0.020	0.144	0.008	0.01
277	23.08	0.07	0.020	0.143	0.008	0.01
278	23.17	0.07	0.020	0.143	0.008	0.01
279	23.25	0.07	0.020	0.143	0.008	0.01
280	23.33	0.07	0.020	0.142	0.008	0.01
281	23.42	0.07	0.020	0.142	0.008	0.01
282	23.50	0.07	0.020	0.142	0.008	0.01
283	23.58	0.07	0.020	0.142	0.008	0.01
284	23.67	0.07	0.020	0.141	0.008	0.01
285	23.75	0.07	0.020	0.141	0.008	0.01
286	23.83	0.07	0.020	0.141	0.008	0.01
287	23.92	0.07	0.020	0.141	0.008	0.01
288	24.00	0.07	0.020	0.141	0.008	0.01
	Sum =	100.0			Sum =	14.3

Flood volume = Effective rainfall 1.19(In)
times area 22.9(Ac.)/[(In)/(Ft.)] = 2.3(Ac.Ft)
Total soil loss = 1.31(In)
Total soil loss = 2.501(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 98883.6 Cubic Feet
Total soil loss = 108924.6 Cubic Feet

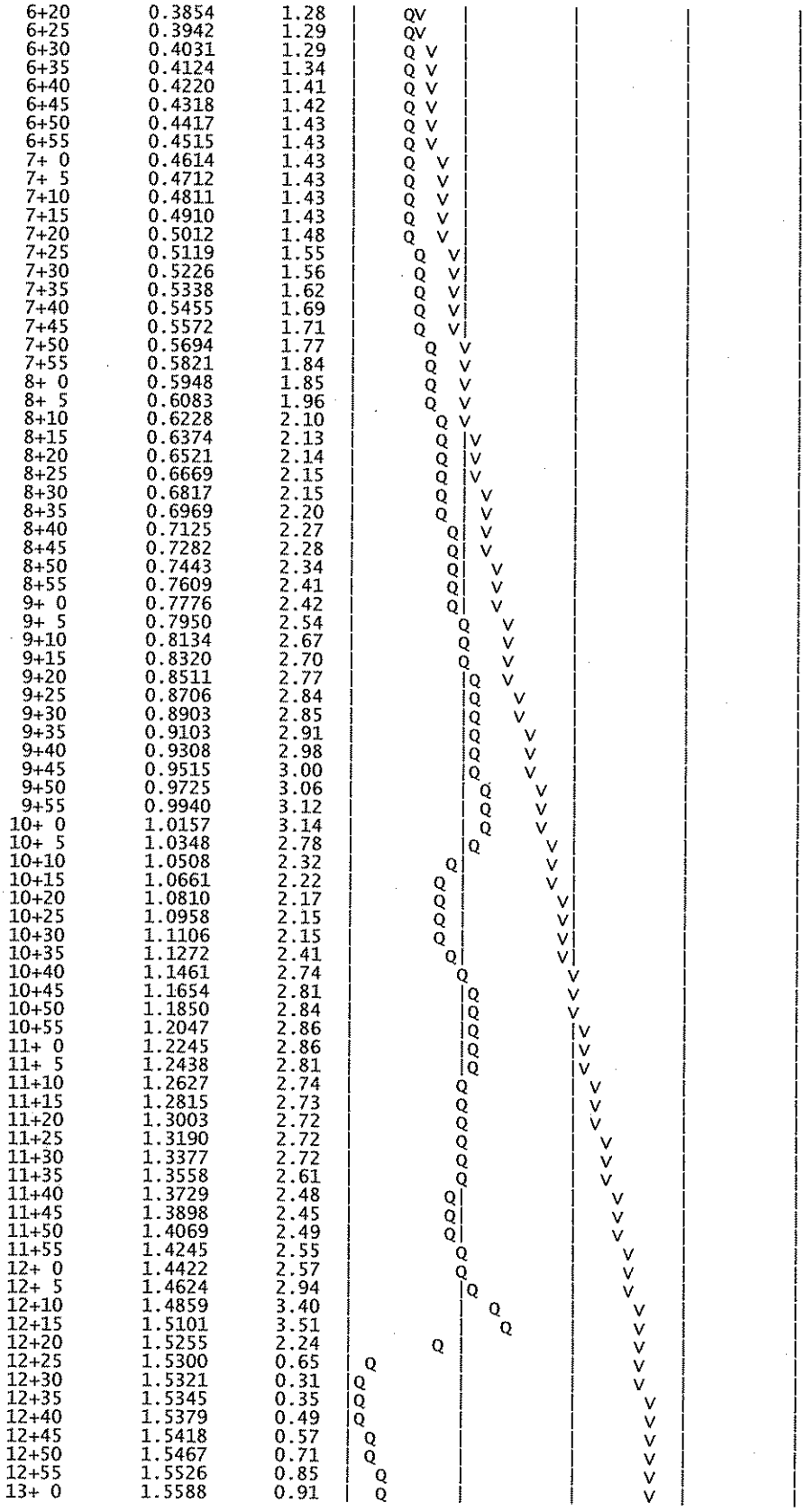
Peak flow rate of this hydrograph = 3.508(CFS)

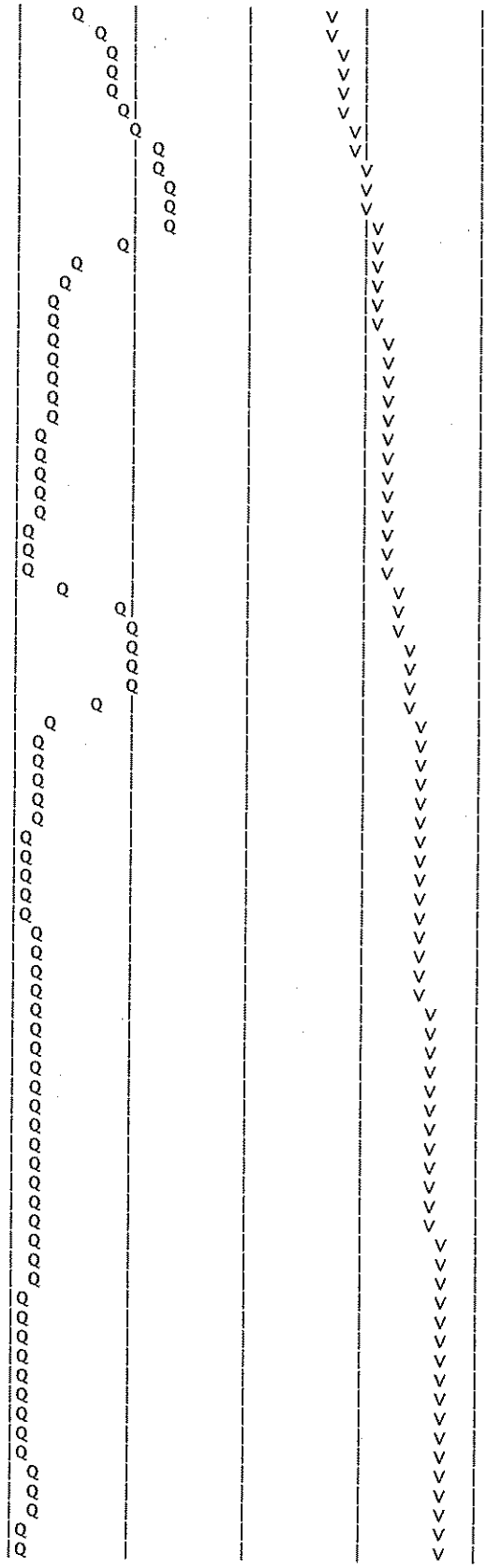
++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0007	0.11	Q				
0+10	0.0024	0.24	Q				
0+15	0.0042	0.27	VQ				
0+20	0.0065	0.33	VQ				
0+25	0.0093	0.40	VQ				
0+30	0.0121	0.42	VQ				
0+35	0.0151	0.43	VQ				
0+40	0.0180	0.43	VQ				
0+45	0.0210	0.43	VQ				
0+50	0.0243	0.48	VQ				
0+55	0.0281	0.55	V Q				
1+ 0	0.0320	0.56	V Q				
1+ 5	0.0355	0.52	V Q				
1+10	0.0386	0.45	VQ				
1+15	0.0417	0.44	VQ				
1+20	0.0447	0.43	VQ				
1+25	0.0476	0.43	VQ				
1+30	0.0506	0.43	VQ				
1+35	0.0535	0.43	VQ				
1+40	0.0565	0.43	VQ				
1+45	0.0594	0.43	|Q				
1+50	0.0628	0.48	|Q				
1+55	0.0665	0.55	|VQ				
2+ 0	0.0704	0.56	|VQ				
2+ 5	0.0743	0.57	|VQ				
2+10	0.0783	0.57	|VQ				
2+15	0.0822	0.57	|VQ				
2+20	0.0862	0.57	|VQ				
2+25	0.0901	0.57	|VQ				
2+30	0.0940	0.57	|VQ				
2+35	0.0984	0.63	|VQ				
2+40	0.1031	0.69	|VQ				
2+45	0.1080	0.71	|VQ				
2+50	0.1129	0.71	|VQ				
2+55	0.1178	0.72	| Q				
3+ 0	0.1227	0.72	| Q				
3+ 5	0.1277	0.72	| Q				
3+10	0.1326	0.72	| Q				
3+15	0.1375	0.72	| Q				
3+20	0.1425	0.72	| Q				
3+25	0.1474	0.72	| Q				
3+30	0.1523	0.72	| Q				
3+35	0.1572	0.72	| Q				
3+40	0.1622	0.72	| Q				
3+45	0.1671	0.72	| Q				
3+50	0.1724	0.77	| Q				
3+55	0.1781	0.83	| Q				
4+ 0	0.1840	0.85	| Q				
4+ 5	0.1899	0.86	| Q				
4+10	0.1958	0.86	| Q				
4+15	0.2017	0.86	| Q				
4+20	0.2080	0.91	| Q				
4+25	0.2147	0.98	| Q				
4+30	0.2215	0.99	| Q				
4+35	0.2284	1.00	| QV				
4+40	0.2353	1.00	| Q				
4+45	0.2422	1.00	| Q				
4+50	0.2495	1.05	| Q				
4+55	0.2572	1.12	| Q				
5+ 0	0.2650	1.14	| Q				
5+ 5	0.2722	1.04	| Q				
5+10	0.2784	0.91	| QV				
5+15	0.2845	0.88	| Q V				
5+20	0.2908	0.92	| Q V				
5+25	0.2975	0.98	| Q V				
5+30	0.3044	0.99	| Q V				
5+35	0.3116	1.05	| QV				
5+40	0.3193	1.12	| QV				
5+45	0.3271	1.14	| QV				
5+50	0.3350	1.14	| QV				
5+55	0.3429	1.15	| Q V				
6+ 0	0.3508	1.15	| Q V				
6+ 5	0.3590	1.20	| Q V				
6+10	0.3677	1.26	| QV				
6+15	0.3765	1.28	| QV				



13+ 5	1.5682	1.37	
13+10	1.5816	1.94	
13+15	1.5959	2.08	
13+20	1.6108	2.16	
13+25	1.6261	2.22	
13+30	1.6416	2.25	
13+35	1.6598	2.64	
13+40	1.6813	3.11	
13+45	1.7035	3.22	
13+50	1.7259	3.27	
13+55	1.7486	3.29	
14+ 0	1.7713	3.29	
14+ 5	1.7878	2.40	
14+10	1.7967	1.29	
14+15	1.8040	1.06	
14+20	1.8102	0.89	
14+25	1.8153	0.75	
14+30	1.8205	0.75	
14+35	1.8258	0.77	
14+40	1.8313	0.79	
14+45	1.8369	0.82	
14+50	1.8421	0.76	
14+55	1.8468	0.68	
15+ 0	1.8515	0.68	
15+ 5	1.8557	0.61	
15+10	1.8594	0.53	
15+15	1.8630	0.53	
15+20	1.8662	0.46	
15+25	1.8688	0.37	
15+30	1.8714	0.38	
15+35	1.8799	1.24	
15+40	1.8958	2.31	
15+45	1.9134	2.55	
15+50	1.9317	2.66	
15+55	1.9505	2.72	
16+ 0	1.9692	2.72	
16+ 5	1.9825	1.93	
16+10	1.9890	0.95	
16+15	1.9940	0.72	
16+20	1.9983	0.63	
16+25	2.0023	0.57	
16+30	2.0062	0.57	
16+35	2.0098	0.52	
16+40	2.0129	0.45	
16+45	2.0159	0.44	
16+50	2.0189	0.43	
16+55	2.0219	0.43	
17+ 0	2.0248	0.43	
17+ 5	2.0285	0.53	
17+10	2.0331	0.67	
17+15	2.0379	0.70	
17+20	2.0428	0.71	
17+25	2.0477	0.72	
17+30	2.0526	0.72	
17+35	2.0576	0.72	
17+40	2.0625	0.72	
17+45	2.0674	0.72	
17+50	2.0720	0.66	
17+55	2.0761	0.60	
18+ 0	2.0801	0.58	
18+ 5	2.0841	0.58	
18+10	2.0880	0.57	
18+15	2.0920	0.57	
18+20	2.0959	0.57	
18+25	2.0999	0.57	
18+30	2.1038	0.57	
18+35	2.1074	0.52	
18+40	2.1105	0.45	
18+45	2.1136	0.44	
18+50	2.1162	0.38	
18+55	2.1183	0.31	
19+ 0	2.1204	0.30	
19+ 5	2.1227	0.34	
19+10	2.1255	0.40	
19+15	2.1284	0.42	
19+20	2.1317	0.48	
19+25	2.1355	0.55	
19+30	2.1393	0.56	
19+35	2.1429	0.52	
19+40	2.1460	0.45	
19+45	2.1490	0.44	

19+50	2.1517	0.38	Q				V
19+55	2.1538	0.31	Q				V
20+ 0	2.1559	0.30	Q				V
20+ 5	2.1582	0.34	Q				V
20+10	2.1610	0.40	Q				V
20+15	2.1639	0.42	Q				V
20+20	2.1668	0.43	Q				V
20+25	2.1698	0.43	Q				V
20+30	2.1727	0.43	Q				V
20+35	2.1757	0.43	Q				V
20+40	2.1787	0.43	Q				V
20+45	2.1816	0.43	Q				V
20+50	2.1842	0.38	Q				V
20+55	2.1863	0.31	Q				V
21+ 0	2.1884	0.30	Q				V
21+ 5	2.1907	0.34	Q				V
21+10	2.1935	0.40	Q				V
21+15	2.1964	0.42	Q				V
21+20	2.1990	0.37	Q				V
21+25	2.2011	0.31	Q				V
21+30	2.2032	0.30	Q				V
21+35	2.2055	0.34	Q				V
21+40	2.2083	0.40	Q				V
21+45	2.2112	0.42	Q				V
21+50	2.2138	0.37	Q				V
21+55	2.2159	0.31	Q				V
22+ 0	2.2180	0.30	Q				V
22+ 5	2.2203	0.34	Q				V
22+10	2.2231	0.40	Q				V
22+15	2.2260	0.42	Q				V
22+20	2.2286	0.37	Q				V
22+25	2.2307	0.31	Q				V
22+30	2.2328	0.30	Q				V
22+35	2.2348	0.29	Q				V
22+40	2.2367	0.29	Q				V
22+45	2.2387	0.29	Q				V
22+50	2.2407	0.29	Q				V
22+55	2.2426	0.29	Q				V
23+ 0	2.2446	0.29	Q				V
23+ 5	2.2466	0.29	Q				V
23+10	2.2486	0.29	Q				V
23+15	2.2505	0.29	Q				V
23+20	2.2525	0.29	Q				V
23+25	2.2545	0.29	Q				V
23+30	2.2564	0.29	Q				V
23+35	2.2584	0.29	Q				V
23+40	2.2604	0.29	Q				V
23+45	2.2624	0.29	Q				V
23+50	2.2643	0.29	Q				V
23+55	2.2663	0.29	Q				V
24+ 0	2.2683	0.29	Q				V
24+ 5	2.2695	0.18	Q				V
24+10	2.2699	0.05	Q				V
24+15	2.2700	0.02	Q				V
24+20	2.2701	0.01	Q				V

APPENDIX I: HYDRAULIC ANALYSIS FOR PROPOSED MDP FACILITIES BASED ON NORMAL-DEPTH METHOD

APPENDIX I.1: PROPOSED MASTER DRAINAGE PLAN

Worksheet for Trapezoidal Channel NODE 104-105

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.05000	ft/ft
Normal Depth	1.70	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft

Results

Discharge	197.33	ft^3/s
Flow Area	9.18	ft^2
Wetted Perimeter	9.60	ft
Hydraulic Radius	0.96	ft
Top Width	8.80	ft
Critical Depth	3.14	ft
Critical Slope	0.00307	ft/ft
Velocity	21.50	ft/s
Velocity Head	7.18	ft
Specific Energy	8.88	ft
Froude Number	3.71	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.70	ft
Critical Depth	3.14	ft
Channel Slope	0.05000	ft/ft

Worksheet for Trapezoidal Channel NODE 104-105

GVF Output Data

Critical Slope	0.00307	ft/ft

Worksheet for Trapezoidal Channel NODE 105-106

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.03500	ft/ft
Normal Depth	2.10	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft

Results

Discharge	263.78	ft^3/s
Flow Area	13.02	ft^2
Wetted Perimeter	11.39	ft
Hydraulic Radius	1.14	ft
Top Width	10.40	ft
Critical Depth	3.58	ft
Critical Slope	0.00296	ft/ft
Velocity	20.26	ft/s
Velocity Head	6.38	ft
Specific Energy	8.48	ft
Froude Number	3.19	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.10	ft
Critical Depth	3.58	ft
Channel Slope	0.03500	ft/ft

Worksheet for Trapezoidal Channel NODE 105-106

GVF Output Data

Critical Slope	0.00296	ft/ft

Worksheet for Trapezoidal Channel NODE 106-107

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.02800	ft/ft
Normal Depth	2.30	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft

Results

Discharge	289.73	ft^3/s
Flow Area	15.18	ft^2
Wetted Perimeter	12.29	ft
Hydraulic Radius	1.24	ft
Top Width	11.20	ft
Critical Depth	3.73	ft
Critical Slope	0.00293	ft/ft
Velocity	19.09	ft/s
Velocity Head	5.66	ft
Specific Energy	7.96	ft
Froude Number	2.89	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.30	ft
Critical Depth	3.73	ft
Channel Slope	0.02800	ft/ft

Worksheet for Trapezoidal Channel NODE 106-107

GVF Output Data

Critical Slope	0.00293	ft/ft

Worksheet for Trapezoidal Channel NODE 108-109

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01000	ft/ft
Normal Depth	3.10	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	5.00	ft

Results

Discharge	516.56	ft^3/s
Flow Area	34.72	ft^2
Wetted Perimeter	18.86	ft
Hydraulic Radius	1.84	ft
Top Width	17.40	ft
Critical Depth	4.21	ft
Critical Slope	0.00268	ft/ft
Velocity	14.88	ft/s
Velocity Head	3.44	ft
Specific Energy	6.54	ft
Froude Number	1.86	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.10	ft
Critical Depth	4.21	ft
Channel Slope	0.01000	ft/ft

Worksheet for Trapezoidal Channel NODE 108-109

GVF Output Data

Critical Slope	0.00268	ft/ft

Worksheet for Trapezoidal Channel NODE 109-110

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01000	ft/ft
Normal Depth	3.10	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	5.00	ft

Results

Discharge	516.56	ft^3/s
Flow Area	34.72	ft^2
Wetted Perimeter	18.86	ft
Hydraulic Radius	1.84	ft
Top Width	17.40	ft
Critical Depth	4.21	ft
Critical Slope	0.00268	ft/ft
Velocity	14.88	ft/s
Velocity Head	3.44	ft
Specific Energy	6.54	ft
Froude Number	1.86	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.10	ft
Critical Depth	4.21	ft
Channel Slope	0.01000	ft/ft

Worksheet for Trapezoidal Channel NODE 109-110

GVF Output Data

Critical Slope	0.00268	ft/ft

Worksheet for Trapezoidal Channel NODE 1001-1002

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01000	ft/ft
Normal Depth	1.50	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft

Results

Discharge	67.25	ft^3/s
Flow Area	7.50	ft^2
Wetted Perimeter	8.71	ft
Hydraulic Radius	0.86	ft
Top Width	8.00	ft
Critical Depth	1.90	ft
Critical Slope	0.00353	ft/ft
Velocity	8.97	ft/s
Velocity Head	1.25	ft
Specific Energy	2.75	ft
Froude Number	1.63	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.90	ft
Channel Slope	0.01000	ft/ft

Worksheet for Trapezoidal Channel NODE 1001-1002

GVF Output Data

Critical Slope	0.00353	ft/ft

Worksheet for NODE 103-203 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00710	ft/ft
Diameter	4.50	ft
Discharge	115.00	ft³/s

Results

Normal Depth	3.05	ft
Flow Area	11.46	ft²
Wetted Perimeter	8.70	ft
Hydraulic Radius	1.32	ft
Top Width	4.21	ft
Critical Depth	3.16	ft
Percent Full	67.7	%
Critical Slope	0.00646	ft/ft
Velocity	10.03	ft/s
Velocity Head	1.56	ft
Specific Energy	4.61	ft
Froude Number	1.07	
Maximum Discharge	154.47	ft³/s
Discharge Full	143.60	ft³/s
Slope Full	0.00455	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	67.71	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 103-203 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.05	ft
Critical Depth	3.16	ft
Channel Slope	0.00710	ft/ft
Critical Slope	0.00646	ft/ft

Worksheet for NODE 202-203 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01070	ft/ft
Diameter	3.00	ft
Discharge	46.50	ft³/s

Results

Normal Depth	1.99	ft
Flow Area	4.97	ft²
Wetted Perimeter	5.71	ft
Hydraulic Radius	0.87	ft
Top Width	2.84	ft
Critical Depth	2.22	ft
Percent Full	66.3	%
Critical Slope	0.00802	ft/ft
Velocity	9.35	ft/s
Velocity Head	1.36	ft
Specific Energy	3.35	ft
Froude Number	1.24	
Maximum Discharge	64.32	ft³/s
Discharge Full	59.79	ft³/s
Slope Full	0.00647	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	66.29	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 202-203 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.99	ft
Critical Depth	2.22	ft
Channel Slope	0.01070	ft/ft
Critical Slope	0.00802	ft/ft

Worksheet for NODE 203-104 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01250	ft/ft
Diameter	4.50	ft
Discharge	155.80	ft³/s

Results

Normal Depth	3.09	ft
Flow Area	11.66	ft²
Wetted Perimeter	8.80	ft
Hydraulic Radius	1.33	ft
Top Width	4.17	ft
Critical Depth	3.66	ft
Percent Full	68.8	%
Critical Slope	0.00849	ft/ft
Velocity	13.36	ft/s
Velocity Head	2.77	ft
Specific Energy	5.87	ft
Froude Number	1.41	
Maximum Discharge	204.96	ft³/s
Discharge Full	190.54	ft³/s
Slope Full	0.00836	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	68.76	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 203-104 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.09	ft
Critical Depth	3.66	ft
Channel Slope	0.01250	ft/ft
Critical Slope	0.00849	ft/ft

Worksheet for NODE 402-403 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00615	ft/ft
Diameter	3.00	ft
Discharge	35.80	ft³/s

Results

Normal Depth	2.01	ft
Flow Area	5.04	ft²
Wetted Perimeter	5.75	ft
Hydraulic Radius	0.88	ft
Top Width	2.82	ft
Critical Depth	1.95	ft
Percent Full	67.0	%
Critical Slope	0.00675	ft/ft
Velocity	7.11	ft/s
Velocity Head	0.79	ft
Specific Energy	2.80	ft
Froude Number	0.94	
Maximum Discharge	48.76	ft³/s
Discharge Full	45.33	ft³/s
Slope Full	0.00384	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	67.03	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 402-403 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.01	ft
Critical Depth	1.95	ft
Channel Slope	0.00615	ft/ft
Critical Slope	0.00675	ft/ft

Worksheet for NODE 601-403 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.10000	ft/ft
Diameter	1.50	ft
Discharge	10.10	ft³/s

Results

Normal Depth	0.61	ft
Flow Area	0.68	ft²
Wetted Perimeter	2.08	ft
Hydraulic Radius	0.33	ft
Top Width	1.47	ft
Critical Depth	1.22	ft
Percent Full	40.9	%
Critical Slope	0.01240	ft/ft
Velocity	14.86	ft/s
Velocity Head	3.43	ft
Specific Energy	4.04	ft
Froude Number	3.86	
Maximum Discharge	30.97	ft³/s
Discharge Full	28.79	ft³/s
Slope Full	0.01231	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	40.90	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 601-403 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.61	ft
Critical Depth	1.22	ft
Channel Slope	0.10000	ft/ft
Critical Slope	0.01240	ft/ft

Worksheet for NODE 403-404 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00655	ft/ft
Diameter	3.50	ft
Discharge	45.30	ft^3/s

Results

Normal Depth	2.04	ft
Flow Area	5.82	ft^2
Wetted Perimeter	6.08	ft
Hydraulic Radius	0.96	ft
Top Width	3.45	ft
Critical Depth	2.10	ft
Percent Full	58.3	%
Critical Slope	0.00599	ft/ft
Velocity	7.79	ft/s
Velocity Head	0.94	ft
Specific Energy	2.98	ft
Froude Number	1.06	
Maximum Discharge	75.91	ft^3/s
Discharge Full	70.56	ft^3/s
Slope Full	0.00270	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	58.27	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 403-404 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.04	ft
Critical Depth	2.10	ft
Channel Slope	0.00655	ft/ft
Critical Slope	0.00599	ft/ft

Worksheet for NODE 301-404 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.02000	ft/ft
Diameter	2.00	ft
Discharge	14.10	ft³/s

Results

Normal Depth	1.01	ft
Flow Area	1.59	ft²
Wetted Perimeter	3.16	ft
Hydraulic Radius	0.50	ft
Top Width	2.00	ft
Critical Depth	1.35	ft
Percent Full	50.5	%
Critical Slope	0.00809	ft/ft
Velocity	8.87	ft/s
Velocity Head	1.22	ft
Specific Energy	2.23	ft
Froude Number	1.75	
Maximum Discharge	29.82	ft³/s
Discharge Full	27.73	ft³/s
Slope Full	0.00517	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	50.49	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 301-404 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.01	ft
Critical Depth	1.35	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00809	ft/ft

Worksheet for NODE 404-105 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00500	ft/ft
Diameter	3.50	ft
Discharge	59.20	ft³/s

Results

Normal Depth	2.75	ft
Flow Area	8.11	ft²
Wetted Perimeter	7.63	ft
Hydraulic Radius	1.06	ft
Top Width	2.87	ft
Critical Depth	2.41	ft
Percent Full	78.6	%
Critical Slope	0.00686	ft/ft
Velocity	7.30	ft/s
Velocity Head	0.83	ft
Specific Energy	3.58	ft
Froude Number	0.77	
Maximum Discharge	66.32	ft³/s
Discharge Full	61.65	ft³/s
Slope Full	0.00461	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	78.60	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 404-105 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.75	ft
Critical Depth	2.41	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00686	ft/ft

Worksheet for NODE 502-503 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00670	ft/ft
Diameter	3.50	ft
Discharge	62.60	ft³/s

Results

Normal Depth	2.54	ft
Flow Area	7.48	ft²
Wetted Perimeter	7.14	ft
Hydraulic Radius	1.05	ft
Top Width	3.12	ft
Critical Depth	2.48	ft
Percent Full	72.6	%
Critical Slope	0.00712	ft/ft
Velocity	8.37	ft/s
Velocity Head	1.09	ft
Specific Energy	3.63	ft
Froude Number	0.95	
Maximum Discharge	76.77	ft³/s
Discharge Full	71.37	ft³/s
Slope Full	0.00515	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	72.61	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 502-503 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.54	ft
Critical Depth	2.48	ft
Channel Slope	0.00670	ft/ft
Critical Slope	0.00712	ft/ft

Worksheet for NODE 702-503 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00950	ft/ft
Diameter	3.50	ft
Discharge	62.00	ft^3/s

Results

Normal Depth	2.22	ft
Flow Area	6.43	ft^2
Wetted Perimeter	6.45	ft
Hydraulic Radius	1.00	ft
Top Width	3.37	ft
Critical Depth	2.47	ft
Percent Full	63.4	%
Critical Slope	0.00708	ft/ft
Velocity	9.64	ft/s
Velocity Head	1.44	ft
Specific Energy	3.66	ft
Froude Number	1.23	
Maximum Discharge	91.42	ft^3/s
Discharge Full	84.98	ft^3/s
Slope Full	0.00506	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	63.39	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 702-503 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.22	ft
Critical Depth	2.47	ft
Channel Slope	0.00950	ft/ft
Critical Slope	0.00708	ft/ft

Worksheet for NODE 702-503 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00950	ft/ft
Diameter	3.50	ft
Discharge	62.00	ft^3/s

Results

Normal Depth	2.22	ft
Flow Area	6.43	ft^2
Wetted Perimeter	6.45	ft
Hydraulic Radius	1.00	ft
Top Width	3.37	ft
Critical Depth	2.47	ft
Percent Full	63.4	%
Critical Slope	0.00708	ft/ft
Velocity	9.64	ft/s
Velocity Head	1.44	ft
Specific Energy	3.66	ft
Froude Number	1.23	
Maximum Discharge	91.42	ft^3/s
Discharge Full	84.98	ft^3/s
Slope Full	0.00506	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	63.39	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 702-503 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.22	ft
Critical Depth	2.47	ft
Channel Slope	0.00950	ft/ft
Critical Slope	0.00708	ft/ft

Worksheet for NODE 503-504 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01333	ft/ft
Diameter	4.00	ft
Discharge	119.70	ft^3/s

Results

Normal Depth	2.79	ft
Flow Area	9.35	ft^2
Wetted Perimeter	7.90	ft
Hydraulic Radius	1.18	ft
Top Width	3.68	ft
Critical Depth	3.29	ft
Percent Full	69.7	%
Critical Slope	0.00917	ft/ft
Velocity	12.80	ft/s
Velocity Head	2.54	ft
Specific Energy	5.33	ft
Froude Number	1.41	
Maximum Discharge	154.60	ft^3/s
Discharge Full	143.72	ft^3/s
Slope Full	0.00925	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	69.72	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 503-504 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.79	ft
Critical Depth	3.29	ft
Channel Slope	0.01333	ft/ft
Critical Slope	0.00917	ft/ft

Worksheet for NODE 107-504 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.00950	ft/ft
Diameter	6.00	ft
Discharge	310.80	ft³/s

Results

Normal Depth	4.32	ft
Flow Area	21.81	ft²
Wetted Perimeter	12.17	ft
Hydraulic Radius	1.79	ft
Top Width	5.38	ft
Critical Depth	4.81	ft
Percent Full	72.1	%
Critical Slope	0.00747	ft/ft
Velocity	14.25	ft/s
Velocity Head	3.16	ft
Specific Energy	7.48	ft
Froude Number	1.25	
Maximum Discharge	384.81	ft³/s
Discharge Full	357.73	ft³/s
Slope Full	0.00717	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	72.06	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 107-504 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.32	ft
Critical Depth	4.81	ft
Channel Slope	0.00950	ft/ft
Critical Slope	0.00747	ft/ft

Worksheet for NODE 504-108 (PIPE)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01820	ft/ft
Diameter	6.00	ft
Discharge	420.20	ft³/s

Results

Normal Depth	4.24	ft
Flow Area	21.38	ft²
Wetted Perimeter	11.99	ft
Hydraulic Radius	1.78	ft
Top Width	5.46	ft
Critical Depth	5.42	ft
Percent Full	70.7	%
Critical Slope	0.01150	ft/ft
Velocity	19.65	ft/s
Velocity Head	6.00	ft
Specific Energy	10.25	ft
Froude Number	1.75	
Maximum Discharge	532.62	ft³/s
Discharge Full	495.14	ft³/s
Slope Full	0.01311	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	70.73	%
Downstream Velocity	Infinity	ft/s

Worksheet for NODE 504-108 (PIPE)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.24	ft
Critical Depth	5.42	ft
Channel Slope	0.01820	ft/ft
Critical Slope	0.01150	ft/ft

APPENDIX I.2: PROPOSED ALTERNATE MASTER DRAINAGE PLAN

Worksheet for NODE 104-105 (PIPE)
Worksheet for Circular Channel

Project Description	
Worksheet	NODE 104-10
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.015	
Slope	050000	ft/ft
Diameter	54	in
Discharge	181.00	cfs

Results		
Depth	2.18	ft
Flow Area	7.7	ft²
Wetted Perime	6.94	ft
Top Width	4.50	ft
Critical Depth	3.89	ft
Percent Full	48.5	%
Critical Slope	0.010360	ft/ft
Velocity	23.65	ft/s
Velocity Head	8.69	ft
Specific Energy	10.88	ft
Froude Numbe	3.20	
Maximum Disc	409.92	cfs
Discharge Full	381.07	cfs
Slope Full	0.011280	ft/ft
Flow Type	Supercritical	

Worksheet for NODE 105-106 (PIPE)
Worksheet for Circular Channel

Project Description	
Worksheet	NODE 105-10
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.015	
Slope	035000	ft/ft
Diameter	54	in
Discharge	261.60	cfs

Results		
Depth	3.10	ft
Flow Area	11.7	ft²
Wetted Perime	8.82	ft
Top Width	4.16	ft
Critical Depth	4.31	ft
Percent Full	68.9	%
Critical Slope	0.020493	ft/ft
Velocity	22.37	ft/s
Velocity Head	7.78	ft
Specific Energ	10.88	ft
Froude Numbe	2.35	
Maximum Disc	342.96	cfs
Discharge Full	318.83	cfs
Slope Full	0.023563	ft/ft
Flow Type	Supercritical	

Worksheet for NODE 106-107 (PIPE)
Worksheet for Circular Channel

Project Description	
Worksheet	NODE 106-107
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.015	
Slope	028000	ft/ft
Diameter	60	in
Discharge	277.20	cfs

Results		
Depth	3.18	ft
Flow Area	13.2	ft²
Wetted Perime	9.24	ft
Top Width	4.81	ft
Critical Depth	4.57	ft
Percent Full	63.7	%
Critical Slope	0.013132	ft/ft
Velocity	21.02	ft/s
Velocity Head	6.87	ft
Specific Energ	10.05	ft
Froude Numbe	2.24	
Maximum Disc	406.27	cfs
Discharge Full	377.68	cfs
Slope Full	0.015084	ft/ft
Flow Type	Supercritical	

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Worksheet for NODE 107-504 (PIPE)
Worksheet for Circular Channel

Project Description	
Worksheet	NODE 107-504
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.015	
Slope	009500	ft/ft
Diameter	72	in
Discharge	309.60	cfs

Results		
Depth	4.31	ft
Flow Area	21.7	ft²
Wetted Perime	12.14	ft
Top Width	5.40	ft
Critical Depth	4.80	ft
Percent Full	71.8	%
Critical Slope	0.007438	ft/ft
Velocity	14.24	ft/s
Velocity Head	3.15	ft
Specific Energ	7.46	ft
Froude Numbe	1.25	
Maximum Disc	384.81	cfs
Discharge Full	357.73	cfs
Slope Full	0.007116	ft/ft
Flow Type	Supercritical	

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Worksheet for NODE 504-108 (PIPE)
Worksheet for Circular Channel

Project Description	
Worksheet	NODE 504-10
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.015	
Slope	018180	ft/ft
Diameter	72	in
Discharge	423.40	cfs

Results		
Depth	4.27	ft
Flow Area	21.5	ft²
Wetted Perime	12.05	ft
Top Width	5.43	ft
Critical Depth	5.44	ft
Percent Full	71.2	%
Critical Slope	0.011658	ft/ft
Velocity	19.67	ft/s
Velocity Head	6.01	ft
Specific Energ	10.28	ft
Froude Numbe	1.74	
Maximum Disc	532.33	cfs
Discharge Full	494.87	cfs
Slope Full	0.013308	ft/ft
Flow Type	Supercritical	

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Worksheet for NODE 108-109 (PIPE)
Worksheet for Circular Channel

Project Description	
Worksheet	NODE 108-10
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.015	
Slope	010000	ft/ft
Diameter	84	in
Discharge	463.20	cfs

Results		
Depth	4.90	ft
Flow Area	28.8	ft²
Wetted Perime	13.87	ft
Top Width	6.42	ft
Critical Depth	5.65	ft
Percent Full	70.0	%
Critical Slope	0.007205	ft/ft
Velocity	16.11	ft/s
Velocity Head	4.03	ft
Specific Energ	8.93	ft
Froude Numbe	1.34	
Maximum Disc	595.54	cfs
Discharge Full	553.62	cfs
Slope Full	0.007000	ft/ft
Flow Type	Supercritical	

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Worksheet for NODE 109-110 (PIPE)
Worksheet for Circular Channel

Project Description	
Worksheet	NODE 109-11(
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.015	
Slope	010000	ft/ft
Diameter	84	in
Discharge	510.50	cfs

Results		
Depth	5.30	ft
Flow Area	31.3	ft²
Wetted Perime	14.78	ft
Top Width	6.00	ft
Critical Depth	5.89	ft
Percent Full	75.7	%
Critical Slope	0.008124	ft/ft
Velocity	16.33	ft/s
Velocity Head	4.14	ft
Specific Energ	9.44	ft
Froude Numbe	1.26	
Maximum Disc	595.54	cfs
Discharge Full	553.62	cfs
Slope Full	0.008503	ft/ft
Flow Type	Supercritical	

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APPENDIX J: BASIN ROUTING CALCULATIONS FOR DETENTION BASIN "B"

APPENDIX J.1: 100- YEAR/ 1- HOUR BASIN ROUTING CALCULATIONS

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2001
Study date: 09/21/10

ARANTINE HILLS-TRACT MAP 36294
FLOOD HYDROGRAPH ROUTING FOR BASIN A
FOR 100YR.-1 HR.
FN:BASINA

TRI-8 Builders - S/N 615

********** HYDROGRAPH INFORMATION **********

From study/file name: AUHMDP1100.rte

**********HYDROGRAPH DATA**********

Number of intervals = 25
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 517.287 (CFS)
Total volume = 21.803 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 100.000 to Point/Station 101.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 25
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.400	0.500	0.398	0.402
2.000	1.600	1.000	1.597	1.603
3.000	3.500	2.000	3.493	3.507
4.000	5.700	3.000	5.690	5.710
5.000	8.300	105.000	7.938	8.662
6.000	10.900	160.000	10.349	11.451
7.000	13.700	200.000	13.011	14.389
7.400	14.500	210.000	13.777	15.223

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 129.3 258.64 387.97 517.29	Depth (Ft.)
0.083	8.11	0.03	0.028	O | | | | |	0.07
0.167	42.43	0.25	0.201	O I | | | | |	0.50
0.250	75.34	0.58	0.603	O I | | | | |	1.17
0.333	99.48	0.83	1.201	O I | | | | |	1.67
0.417	117.32	1.18	1.940	O I| | | | |	2.18
0.500	132.01	1.63	2.789	O I | | | |	2.63
0.583	154.70	2.12	3.763	O |I | | | |	3.12
0.667	190.80	2.65	4.937	O | I | | | |	3.65
0.750	241.14	27.36	6.321	|O | I | | |	4.24
0.833	352.96	91.55	7.957	| O | | I | |	4.87
0.917	517.29	143.98	10.143	| O | | | I	5.71

1.000	443.24	180.47	12.333		O		I		6.51
1.083	270.54	197.02	13.491		O	I			6.93
1.167	163.37	198.89	13.622		I O				6.97
1.250	100.88	192.63	13.184	I	O				6.82
1.333	70.95	182.62	12.483	I	O				6.57
1.417	51.31	171.23	11.686	I	O				6.28
1.500	39.14	159.15	10.860	I	O				5.98
1.583	29.70	142.21	10.059	I	O				5.68
1.667	22.50	126.44	9.314	I	O				5.39
1.750	16.54	111.92	8.627	I	O				5.13
1.833	12.34	93.93	8.018	I	O				4.89
1.917	10.06	74.24	7.516	I	O				4.70
2.000	2.70	58.09	7.104	I	O				4.54
2.083	1.00	44.70	6.763	I	O				4.41
2.167	0.00	34.18	6.495	I	O				4.31
2.250	0.00	26.05	6.287	I	O				4.23
2.333	0.00	19.85	6.129	I	O				4.17
2.417	0.00	15.12	6.009	O					4.12
2.500	0.00	11.52	5.917	O					4.08
2.583	0.00	8.78	5.847	O					4.06
2.667	0.00	6.69	5.794	O					4.04
2.750	0.00	5.10	5.753	O					4.02
2.833	0.00	3.88	5.723	O					4.01
2.917	0.00	3.00	5.699	O					4.00
3.000	0.00	2.99	5.678	O					3.99
3.083	0.00	2.98	5.658	O					3.98
3.167	0.00	2.97	5.637	O					3.97
3.250	0.00	2.96	5.617	O					3.96
3.333	0.00	2.95	5.596	O					3.95
3.417	0.00	2.94	5.576	O					3.94
3.500	0.00	2.93	5.556	O					3.93
3.583	0.00	2.93	5.536	O					3.93
3.667	0.00	2.92	5.516	O					3.92
3.750	0.00	2.91	5.495	O					3.91
3.833	0.00	2.90	5.475	O					3.90
3.917	0.00	2.89	5.456	O					3.89
4.000	0.00	2.88	5.436	O					3.88
4.083	0.00	2.87	5.416	O					3.87
4.167	0.00	2.86	5.396	O					3.86
4.250	0.00	2.85	5.376	O					3.85
4.333	0.00	2.84	5.357	O					3.84
4.417	0.00	2.84	5.337	O					3.84
4.500	0.00	2.83	5.318	O					3.83
4.583	0.00	2.82	5.298	O					3.82
4.667	0.00	2.81	5.279	O					3.81
4.750	0.00	2.80	5.260	O					3.80
4.833	0.00	2.79	5.240	O					3.79
4.917	0.00	2.78	5.221	O					3.78
5.000	0.00	2.77	5.202	O					3.77
5.083	0.00	2.77	5.183	O					3.77
5.167	0.00	2.76	5.164	O					3.76
5.250	0.00	2.75	5.145	O					3.75
5.333	0.00	2.74	5.126	O					3.74
5.417	0.00	2.73	5.107	O					3.73
5.500	0.00	2.72	5.089	O					3.72
5.583	0.00	2.71	5.070	O					3.71
5.667	0.00	2.71	5.051	O					3.71
5.750	0.00	2.70	5.033	O					3.70
5.833	0.00	2.69	5.014	O					3.69
5.917	0.00	2.68	4.996	O					3.68
6.000	0.00	2.67	4.977	O					3.67
6.083	0.00	2.66	4.959	O					3.66
6.167	0.00	2.65	4.940	O					3.65
6.250	0.00	2.65	4.922	O					3.65
6.333	0.00	2.64	4.904	O					3.64
6.417	0.00	2.63	4.886	O					3.63
6.500	0.00	2.62	4.868	O					3.62
6.583	0.00	2.61	4.850	O					3.61
6.667	0.00	2.61	4.832	O					3.61
6.750	0.00	2.60	4.814	O					3.60
6.833	0.00	2.59	4.796	O					3.59
6.917	0.00	2.58	4.778	O					3.58
7.000	0.00	2.57	4.760	O					3.57
7.083	0.00	2.56	4.743	O					3.56
7.167	0.00	2.56	4.725	O					3.56
7.250	0.00	2.55	4.708	O					3.55
7.333	0.00	2.54	4.690	O					3.54
7.417	0.00	2.53	4.673	O					3.53
7.500	0.00	2.53	4.655	O					3.53
7.583	0.00	2.52	4.638	O					3.52
7.667	0.00	2.51	4.620	O					3.51

7.750	0.00	2.50	4.603	o					3.50
7.833	0.00	2.49	4.586	o					3.49
7.917	0.00	2.49	4.569	o					3.49
8.000	0.00	2.48	4.552	o					3.48
8.083	0.00	2.47	4.535	o					3.47
8.167	0.00	2.46	4.518	o					3.46
8.250	0.00	2.45	4.501	o					3.45
8.333	0.00	2.45	4.484	o					3.45
8.417	0.00	2.44	4.467	o					3.44
8.500	0.00	2.43	4.450	o					3.43
8.583	0.00	2.42	4.434	o					3.42
8.667	0.00	2.42	4.417	o					3.42
8.750	0.00	2.41	4.400	o					3.41
8.833	0.00	2.40	4.384	o					3.40
8.917	0.00	2.39	4.367	o					3.39
9.000	0.00	2.39	4.351	o					3.39
9.083	0.00	2.38	4.334	o					3.38
9.167	0.00	2.37	4.318	o					3.37
9.250	0.00	2.36	4.302	o					3.36
9.333	0.00	2.36	4.285	o					3.36
9.417	0.00	2.35	4.269	o					3.35
9.500	0.00	2.34	4.253	o					3.34
9.583	0.00	2.33	4.237	o					3.33
9.667	0.00	2.33	4.221	o					3.33
9.750	0.00	2.32	4.205	o					3.32
9.833	0.00	2.31	4.189	o					3.31
9.917	0.00	2.31	4.173	o					3.31
10.000	0.00	2.30	4.157	o					3.30
10.083	0.00	2.29	4.141	o					3.29
10.167	0.00	2.28	4.126	o					3.28
10.250	0.00	2.28	4.110	o					3.28
10.333	0.00	2.27	4.094	o					3.27
10.417	0.00	2.26	4.079	o					3.26
10.500	0.00	2.26	4.063	o					3.26
10.583	0.00	2.25	4.048	o					3.25
10.667	0.00	2.24	4.032	o					3.24
10.750	0.00	2.23	4.017	o					3.23
10.833	0.00	2.23	4.001	o					3.23
10.917	0.00	2.22	3.986	o					3.22
11.000	0.00	2.21	3.971	o					3.21
11.083	0.00	2.21	3.955	o					3.21
11.167	0.00	2.20	3.940	o					3.20
11.250	0.00	2.19	3.925	o					3.19
11.333	0.00	2.19	3.910	o					3.19
11.417	0.00	2.18	3.895	o					3.18
11.500	0.00	2.17	3.880	o					3.17
11.583	0.00	2.17	3.865	o					3.17
11.667	0.00	2.16	3.850	o					3.16
11.750	0.00	2.15	3.835	o					3.15
11.833	0.00	2.15	3.821	o					3.15
11.917	0.00	2.14	3.806	o					3.14
12.000	0.00	2.13	3.791	o					3.13
12.083	0.00	2.13	3.776	o					3.13
12.167	0.00	2.12	3.762	o					3.12
12.250	0.00	2.11	3.747	o					3.11
12.333	0.00	2.11	3.733	o					3.11
12.417	0.00	2.10	3.718	o					3.10
12.500	0.00	2.09	3.704	o					3.09
12.583	0.00	2.09	3.689	o					3.09
12.667	0.00	2.08	3.675	o					3.08
12.750	0.00	2.07	3.661	o					3.07
12.833	0.00	2.07	3.647	o					3.07
12.917	0.00	2.06	3.632	o					3.06
13.000	0.00	2.05	3.618	o					3.05
13.083	0.00	2.05	3.604	o					3.05
13.167	0.00	2.04	3.590	o					3.04
13.250	0.00	2.03	3.576	o					3.03
13.333	0.00	2.03	3.562	o					3.03
13.417	0.00	2.02	3.548	o					3.02
13.500	0.00	2.02	3.534	o					3.02
13.583	0.00	2.01	3.520	o					3.01
13.667	0.00	2.00	3.506	o					3.00
13.750	0.00	2.00	3.493	o					3.00
13.833	0.00	1.99	3.479	o					2.99
13.917	0.00	1.98	3.465	o					2.98
14.000	0.00	1.97	3.452	o					2.97
14.083	0.00	1.97	3.438	o					2.97
14.167	0.00	1.96	3.425	o					2.96
14.250	0.00	1.95	3.411	o					2.95
14.333	0.00	1.95	3.398	o					2.95
14.417	0.00	1.94	3.384	o					2.94

14.500	0.00	1.93	3.371	o					2.93
14.583	0.00	1.93	3.358	o					2.93
14.667	0.00	1.92	3.344	o					2.92
14.750	0.00	1.91	3.331	o					2.91
14.833	0.00	1.90	3.318	o					2.90
14.917	0.00	1.90	3.305	o					2.90
15.000	0.00	1.89	3.292	o					2.89
15.083	0.00	1.88	3.279	o					2.88
15.167	0.00	1.88	3.266	o					2.88
15.250	0.00	1.87	3.253	o					2.87
15.333	0.00	1.86	3.240	o					2.86
15.417	0.00	1.86	3.227	o					2.86
15.500	0.00	1.85	3.215	o					2.85
15.583	0.00	1.84	3.202	o					2.84
15.667	0.00	1.84	3.189	o					2.84
15.750	0.00	1.83	3.177	o					2.83
15.833	0.00	1.82	3.164	o					2.82
15.917	0.00	1.82	3.152	o					2.82
16.000	0.00	1.81	3.139	o					2.81
16.083	0.00	1.80	3.127	o					2.80
16.167	0.00	1.80	3.114	o					2.80
16.250	0.00	1.79	3.102	o					2.79
16.333	0.00	1.78	3.090	o					2.78
16.417	0.00	1.78	3.077	o					2.78
16.500	0.00	1.77	3.065	o					2.77
16.583	0.00	1.76	3.053	o					2.76
16.667	0.00	1.76	3.041	o					2.76
16.750	0.00	1.75	3.029	o					2.75
16.833	0.00	1.75	3.017	o					2.75
16.917	0.00	1.74	3.005	o					2.74
17.000	0.00	1.73	2.993	o					2.73
17.083	0.00	1.73	2.981	o					2.73
17.167	0.00	1.72	2.969	o					2.72
17.250	0.00	1.71	2.957	o					2.71
17.333	0.00	1.71	2.945	o					2.71
17.417	0.00	1.70	2.934	o					2.70
17.500	0.00	1.70	2.922	o					2.70
17.583	0.00	1.69	2.910	o					2.69
17.667	0.00	1.68	2.899	o					2.68
17.750	0.00	1.68	2.887	o					2.68
17.833	0.00	1.67	2.875	o					2.67
17.917	0.00	1.67	2.864	o					2.67
18.000	0.00	1.66	2.853	o					2.66
18.083	0.00	1.65	2.841	o					2.65
18.167	0.00	1.65	2.830	o					2.65
18.250	0.00	1.64	2.818	o					2.64
18.333	0.00	1.64	2.807	o					2.64
18.417	0.00	1.63	2.796	o					2.63
18.500	0.00	1.62	2.785	o					2.62
18.583	0.00	1.62	2.774	o					2.62
18.667	0.00	1.61	2.762	o					2.61
18.750	0.00	1.61	2.751	o					2.61
18.833	0.00	1.60	2.740	o					2.60
18.917	0.00	1.59	2.729	o					2.59
19.000	0.00	1.59	2.718	o					2.59
19.083	0.00	1.58	2.707	o					2.58
19.167	0.00	1.58	2.697	o					2.58
19.250	0.00	1.57	2.686	o					2.57
19.333	0.00	1.57	2.675	o					2.57
19.417	0.00	1.56	2.664	o					2.56
19.500	0.00	1.55	2.653	o					2.55
19.583	0.00	1.55	2.643	o					2.55
19.667	0.00	1.54	2.632	o					2.54
19.750	0.00	1.54	2.621	o					2.54
19.833	0.00	1.53	2.611	o					2.53
19.917	0.00	1.53	2.600	o					2.53
20.000	0.00	1.52	2.590	o					2.52
20.083	0.00	1.52	2.579	o					2.52
20.167	0.00	1.51	2.569	o					2.51
20.250	0.00	1.50	2.559	o					2.50
20.333	0.00	1.50	2.548	o					2.50
20.417	0.00	1.49	2.538	o					2.49
20.500	0.00	1.49	2.528	o					2.49
20.583	0.00	1.48	2.517	o					2.48
20.667	0.00	1.48	2.507	o					2.48
20.750	0.00	1.47	2.497	o					2.47
20.833	0.00	1.47	2.487	o					2.47
20.917	0.00	1.46	2.477	o					2.46
21.000	0.00	1.46	2.467	o					2.46
21.083	0.00	1.45	2.457	o					2.45
21.167	0.00	1.45	2.447	o					2.45

21.250	0.00	1.44	2.437	o					2.44
21.333	0.00	1.44	2.427	o					2.44
21.417	0.00	1.43	2.417	o					2.43
21.500	0.00	1.42	2.407	o					2.42
21.583	0.00	1.42	2.398	o					2.42
21.667	0.00	1.41	2.388	o					2.41
21.750	0.00	1.41	2.378	o					2.41
21.833	0.00	1.40	2.368	o					2.40
21.917	0.00	1.40	2.359	o					2.40
22.000	0.00	1.39	2.349	o					2.39
22.083	0.00	1.39	2.339	o					2.39
22.167	0.00	1.38	2.330	o					2.38
22.250	0.00	1.38	2.320	o					2.38
22.333	0.00	1.37	2.311	o					2.37
22.417	0.00	1.37	2.301	o					2.37
22.500	0.00	1.36	2.292	o					2.36
22.583	0.00	1.36	2.283	o					2.36
22.667	0.00	1.35	2.273	o					2.35
22.750	0.00	1.35	2.264	o					2.35
22.833	0.00	1.34	2.255	o					2.34
22.917	0.00	1.34	2.246	o					2.34
23.000	0.00	1.33	2.236	o					2.33
23.083	0.00	1.33	2.227	o					2.33
23.167	0.00	1.33	2.218	o					2.33
23.250	0.00	1.32	2.209	o					2.32
23.333	0.00	1.32	2.200	o					2.32
23.417	0.00	1.31	2.191	o					2.31
23.500	0.00	1.31	2.182	o					2.31
23.583	0.00	1.30	2.173	o					2.30
23.667	0.00	1.30	2.164	o					2.30
23.750	0.00	1.29	2.155	o					2.29
23.833	0.00	1.29	2.146	o					2.29
23.917	0.00	1.28	2.137	o					2.28
24.000	0.00	1.28	2.128	o					2.28
24.083	0.00	1.27	2.120	o					2.27
24.167	0.00	1.27	2.111	o					2.27
24.250	0.00	1.26	2.102	o					2.26
24.333	0.00	1.26	2.093	o					2.26
24.417	0.00	1.26	2.085	o					2.26
24.500	0.00	1.25	2.076	o					2.25
24.583	0.00	1.25	2.068	o					2.25
24.667	0.00	1.24	2.059	o					2.24
24.750	0.00	1.24	2.050	o					2.24
24.833	0.00	1.23	2.042	o					2.23
24.917	0.00	1.23	2.033	o					2.23
25.000	0.00	1.22	2.025	o					2.22
25.083	0.00	1.22	2.017	o					2.22
25.167	0.00	1.21	2.008	o					2.21
25.250	0.00	1.21	2.000	o					2.21
25.333	0.00	1.21	1.992	o					2.21
25.417	0.00	1.20	1.983	o					2.20
25.500	0.00	1.20	1.975	o					2.20
25.583	0.00	1.19	1.967	o					2.19
25.667	0.00	1.19	1.959	o					2.19
25.750	0.00	1.18	1.950	o					2.18
25.833	0.00	1.18	1.942	o					2.18
25.917	0.00	1.18	1.934	o					2.18
26.000	0.00	1.17	1.926	o					2.17
26.083	0.00	1.17	1.918	o					2.17
26.167	0.00	1.16	1.910	o					2.16
26.250	0.00	1.16	1.902	o					2.16
26.333	0.00	1.15	1.894	o					2.15
26.417	0.00	1.15	1.886	o					2.15
26.500	0.00	1.15	1.878	o					2.15
26.583	0.00	1.14	1.870	o					2.14
26.667	0.00	1.14	1.862	o					2.14
26.750	0.00	1.13	1.855	o					2.13
26.833	0.00	1.13	1.847	o					2.13
26.917	0.00	1.13	1.839	o					2.13
27.000	0.00	1.12	1.831	o					2.12
27.083	0.00	1.12	1.824	o					2.12
27.167	0.00	1.11	1.816	o					2.11
27.250	0.00	1.11	1.808	o					2.11
27.333	0.00	1.11	1.801	o					2.11
27.417	0.00	1.10	1.793	o					2.10
27.500	0.00	1.10	1.785	o					2.10
27.583	0.00	1.09	1.778	o					2.09
27.667	0.00	1.09	1.770	o					2.09
27.750	0.00	1.09	1.763	o					2.09
27.833	0.00	1.08	1.755	o					2.08
27.917	0.00	1.08	1.748	o					2.08

28.000	0.00	1.07	1.741	o					2.07
28.083	0.00	1.07	1.733	o					2.07
28.167	0.00	1.07	1.726	o					2.07
28.250	0.00	1.06	1.718	o					2.06
28.333	0.00	1.06	1.711	o					2.06
28.417	0.00	1.05	1.704	o					2.05
28.500	0.00	1.05	1.697	o					2.05
28.583	0.00	1.05	1.689	o					2.05
28.667	0.00	1.04	1.682	o					2.04
28.750	0.00	1.04	1.675	o					2.04
28.833	0.00	1.04	1.668	o					2.04
28.917	0.00	1.03	1.661	o					2.03
29.000	0.00	1.03	1.654	o					2.03
29.083	0.00	1.02	1.647	o					2.02
29.167	0.00	1.02	1.640	o					2.02
29.250	0.00	1.02	1.633	o					2.02
29.333	0.00	1.01	1.626	o					2.01
29.417	0.00	1.01	1.619	o					2.01
29.500	0.00	1.01	1.612	o					2.01
29.583	0.00	1.00	1.605	o					2.00
29.667	0.00	1.00	1.598	o					2.00
29.750	0.00	1.00	1.591	o					1.99
29.833	0.00	0.99	1.584	o					1.99
29.917	0.00	0.99	1.577	o					1.98
30.000	0.00	0.99	1.571	o					1.98
30.083	0.00	0.98	1.564	o					1.97
30.167	0.00	0.98	1.557	o					1.96
30.250	0.00	0.98	1.550	o					1.96
30.333	0.00	0.98	1.543	o					1.95
30.417	0.00	0.97	1.537	o					1.95
30.500	0.00	0.97	1.530	o					1.94
30.583	0.00	0.97	1.523	o					1.94
30.667	0.00	0.97	1.517	o					1.93
30.750	0.00	0.96	1.510	o					1.93
30.833	0.00	0.96	1.503	o					1.92
30.917	0.00	0.96	1.497	o					1.91
31.000	0.00	0.95	1.490	o					1.91
31.083	0.00	0.95	1.484	o					1.90
31.167	0.00	0.95	1.477	o					1.90
31.250	0.00	0.95	1.471	o					1.89
31.333	0.00	0.94	1.464	o					1.89
31.417	0.00	0.94	1.458	o					1.88
31.500	0.00	0.94	1.451	o					1.88
31.583	0.00	0.94	1.445	o					1.87
31.667	0.00	0.93	1.438	o					1.87
31.750	0.00	0.93	1.432	o					1.86
31.833	0.00	0.93	1.425	o					1.85
31.917	0.00	0.92	1.419	o					1.85
32.000	0.00	0.92	1.413	o					1.84
32.083	0.00	0.92	1.406	o					1.84
32.167	0.00	0.92	1.400	o					1.83
32.250	0.00	0.91	1.394	o					1.83
32.333	0.00	0.91	1.387	o					1.82
32.417	0.00	0.91	1.381	o					1.82
32.500	0.00	0.91	1.375	o					1.81
32.583	0.00	0.90	1.369	o					1.81
32.667	0.00	0.90	1.363	o					1.80
32.750	0.00	0.90	1.356	o					1.80
32.833	0.00	0.90	1.350	o					1.79
32.917	0.00	0.89	1.344	o					1.79
33.000	0.00	0.89	1.338	o					1.78
33.083	0.00	0.89	1.332	o					1.78
33.167	0.00	0.89	1.326	o					1.77
33.250	0.00	0.88	1.320	o					1.77
33.333	0.00	0.88	1.313	o					1.76
33.417	0.00	0.88	1.307	o					1.76
33.500	0.00	0.88	1.301	o					1.75
33.583	0.00	0.87	1.295	o					1.75
33.667	0.00	0.87	1.289	o					1.74
33.750	0.00	0.87	1.283	o					1.74
33.833	0.00	0.87	1.277	o					1.73
33.917	0.00	0.86	1.271	o					1.73
34.000	0.00	0.86	1.265	o					1.72
34.083	0.00	0.86	1.260	o					1.72
34.167	0.00	0.86	1.254	o					1.71
34.250	0.00	0.85	1.248	o					1.71
34.333	0.00	0.85	1.242	o					1.70
34.417	0.00	0.85	1.236	o					1.70
34.500	0.00	0.85	1.230	o					1.69
34.583	0.00	0.84	1.224	o					1.69
34.667	0.00	0.84	1.219	o					1.68

34.750	0.00	0.84	1.213	o					1.68
34.833	0.00	0.84	1.207	o					1.67
34.917	0.00	0.83	1.201	o					1.67
35.000	0.00	0.83	1.196	o					1.66
35.083	0.00	0.83	1.190	o					1.66
35.167	0.00	0.83	1.184	o					1.65
35.250	0.00	0.82	1.178	o					1.65
35.333	0.00	0.82	1.173	o					1.64
35.417	0.00	0.82	1.167	o					1.64
35.500	0.00	0.82	1.161	o					1.63
35.583	0.00	0.81	1.156	o					1.63
35.667	0.00	0.81	1.150	o					1.63
35.750	0.00	0.81	1.145	o					1.62
35.833	0.00	0.81	1.139	o					1.62
35.917	0.00	0.81	1.134	o					1.61
36.000	0.00	0.80	1.128	o					1.61
36.083	0.00	0.80	1.122	o					1.60
36.167	0.00	0.80	1.117	o					1.60
36.250	0.00	0.80	1.111	o					1.59
36.333	0.00	0.79	1.106	o					1.59
36.417	0.00	0.79	1.101	o					1.58
36.500	0.00	0.79	1.095	o					1.58
36.583	0.00	0.79	1.090	o					1.57
36.667	0.00	0.79	1.084	o					1.57
36.750	0.00	0.78	1.079	o					1.57
36.833	0.00	0.78	1.073	o					1.56
36.917	0.00	0.78	1.068	o					1.56
37.000	0.00	0.78	1.063	o					1.55
37.083	0.00	0.77	1.057	o					1.55
37.167	0.00	0.77	1.052	o					1.54
37.250	0.00	0.77	1.047	o					1.54
37.333	0.00	0.77	1.041	o					1.53
37.417	0.00	0.77	1.036	o					1.53
37.500	0.00	0.76	1.031	o					1.53
37.583	0.00	0.76	1.026	o					1.52
37.667	0.00	0.76	1.020	o					1.52
37.750	0.00	0.76	1.015	o					1.51
37.833	0.00	0.75	1.010	o					1.51
37.917	0.00	0.75	1.005	o					1.50
38.000	0.00	0.75	1.000	o					1.50
38.083	0.00	0.75	0.995	o					1.50
38.167	0.00	0.75	0.989	o					1.49
38.250	0.00	0.74	0.984	o					1.49
38.333	0.00	0.74	0.979	o					1.48
38.417	0.00	0.74	0.974	o					1.48
38.500	0.00	0.74	0.969	o					1.47
38.583	0.00	0.73	0.964	o					1.47
38.667	0.00	0.73	0.959	o					1.47
38.750	0.00	0.73	0.954	o					1.46
38.833	0.00	0.73	0.949	o					1.46
38.917	0.00	0.73	0.944	o					1.45
39.000	0.00	0.72	0.939	o					1.45
39.083	0.00	0.72	0.934	o					1.44
39.167	0.00	0.72	0.929	o					1.44
39.250	0.00	0.72	0.924	o					1.44
39.333	0.00	0.72	0.919	o					1.43
39.417	0.00	0.71	0.914	o					1.43
39.500	0.00	0.71	0.909	o					1.42
39.583	0.00	0.71	0.904	o					1.42
39.667	0.00	0.71	0.899	o					1.42
39.750	0.00	0.71	0.894	o					1.41
39.833	0.00	0.70	0.890	o					1.41
39.917	0.00	0.70	0.885	o					1.40
40.000	0.00	0.70	0.880	o					1.40
40.083	0.00	0.70	0.875	o					1.40
40.167	0.00	0.70	0.870	o					1.39
40.250	0.00	0.69	0.866	o					1.39
40.333	0.00	0.69	0.861	o					1.38
40.417	0.00	0.69	0.856	o					1.38
40.500	0.00	0.69	0.851	o					1.38
40.583	0.00	0.69	0.847	o					1.37
40.667	0.00	0.68	0.842	o					1.37
40.750	0.00	0.68	0.837	o					1.36
40.833	0.00	0.68	0.832	o					1.36
40.917	0.00	0.68	0.828	o					1.36
41.000	0.00	0.68	0.823	o					1.35
41.083	0.00	0.67	0.818	o					1.35
41.167	0.00	0.67	0.814	o					1.34
41.250	0.00	0.67	0.809	o					1.34
41.333	0.00	0.67	0.805	o					1.34
41.417	0.00	0.67	0.800	o					1.33

41.500	0.00	0.66	0.795	o					1.33
41.583	0.00	0.66	0.791	o					1.33
41.667	0.00	0.66	0.786	o					1.32
41.750	0.00	0.66	0.782	o					1.32
41.833	0.00	0.66	0.777	o					1.31
41.917	0.00	0.66	0.773	o					1.31
42.000	0.00	0.65	0.768	o					1.31
42.083	0.00	0.65	0.764	o					1.30
42.167	0.00	0.65	0.759	o					1.30
42.250	0.00	0.65	0.755	o					1.30
42.333	0.00	0.65	0.750	o					1.29
42.417	0.00	0.64	0.746	o					1.29
42.500	0.00	0.64	0.741	o					1.28
42.583	0.00	0.64	0.737	o					1.28
42.667	0.00	0.64	0.733	o					1.28
42.750	0.00	0.64	0.728	o					1.27
42.833	0.00	0.63	0.724	o					1.27
42.917	0.00	0.63	0.719	o					1.27
43.000	0.00	0.63	0.715	o					1.26
43.083	0.00	0.63	0.711	o					1.26
43.167	0.00	0.63	0.706	o					1.26
43.250	0.00	0.63	0.702	o					1.25
43.333	0.00	0.62	0.698	o					1.25
43.417	0.00	0.62	0.693	o					1.24
43.500	0.00	0.62	0.689	o					1.24
43.583	0.00	0.62	0.685	o					1.24
43.667	0.00	0.62	0.681	o					1.23
43.750	0.00	0.62	0.676	o					1.23
43.833	0.00	0.61	0.672	o					1.23
43.917	0.00	0.61	0.668	o					1.22
44.000	0.00	0.61	0.664	o					1.22
44.083	0.00	0.61	0.660	o					1.22
44.167	0.00	0.61	0.655	o					1.21
44.250	0.00	0.60	0.651	o					1.21
44.333	0.00	0.60	0.647	o					1.21
44.417	0.00	0.60	0.643	o					1.20
44.500	0.00	0.60	0.639	o					1.20
44.583	0.00	0.60	0.635	o					1.20
44.667	0.00	0.60	0.631	o					1.19
44.750	0.00	0.59	0.626	o					1.19
44.833	0.00	0.59	0.622	o					1.19
44.917	0.00	0.59	0.618	o					1.18
45.000	0.00	0.59	0.614	o					1.18
45.083	0.00	0.59	0.610	o					1.18
45.167	0.00	0.59	0.606	o					1.17
45.250	0.00	0.58	0.602	o					1.17
45.333	0.00	0.58	0.598	o					1.17
45.417	0.00	0.58	0.594	o					1.16
45.500	0.00	0.58	0.590	o					1.16
45.583	0.00	0.58	0.586	o					1.16
45.667	0.00	0.58	0.582	o					1.15
45.750	0.00	0.57	0.578	o					1.15
45.833	0.00	0.57	0.574	o					1.15
45.917	0.00	0.57	0.570	o					1.14
46.000	0.00	0.57	0.566	o					1.14
46.083	0.00	0.57	0.562	o					1.14
46.167	0.00	0.57	0.559	o					1.13
46.250	0.00	0.56	0.555	o					1.13
46.333	0.00	0.56	0.551	o					1.13
46.417	0.00	0.56	0.547	o					1.12
46.500	0.00	0.56	0.543	o					1.12
46.583	0.00	0.56	0.539	o					1.12
46.667	0.00	0.56	0.535	o					1.11
46.750	0.00	0.55	0.532	o					1.11
46.833	0.00	0.55	0.528	o					1.11
46.917	0.00	0.55	0.524	o					1.10
47.000	0.00	0.55	0.520	o					1.10
47.083	0.00	0.55	0.516	o					1.10
47.167	0.00	0.55	0.513	o					1.09
47.250	0.00	0.55	0.509	o					1.09
47.333	0.00	0.54	0.505	o					1.09
47.417	0.00	0.54	0.501	o					1.08
47.500	0.00	0.54	0.498	o					1.08
47.583	0.00	0.54	0.494	o					1.08
47.667	0.00	0.54	0.490	o					1.08
47.750	0.00	0.54	0.486	o					1.07
47.833	0.00	0.53	0.483	o					1.07
47.917	0.00	0.53	0.479	o					1.07
48.000	0.00	0.53	0.475	o					1.06
48.083	0.00	0.53	0.472	o					1.06
48.167	0.00	0.53	0.468	o					1.06

48.250	0.00	0.53	0.464	o					1.05
48.333	0.00	0.53	0.461	o					1.05
48.417	0.00	0.52	0.457	o					1.05
48.500	0.00	0.52	0.454	o					1.04
48.583	0.00	0.52	0.450	o					1.04
48.667	0.00	0.52	0.446	o					1.04
48.750	0.00	0.52	0.443	o					1.04
48.833	0.00	0.52	0.439	o					1.03
48.917	0.00	0.51	0.436	o					1.03
49.000	0.00	0.51	0.432	o					1.03
49.083	0.00	0.51	0.429	o					1.02
49.167	0.00	0.51	0.425	o					1.02
49.250	0.00	0.51	0.422	o					1.02
49.333	0.00	0.51	0.418	o					1.02
49.417	0.00	0.51	0.415	o					1.01
49.500	0.00	0.50	0.411	o					1.01
49.583	0.00	0.50	0.408	o					1.01
49.667	0.00	0.50	0.404	o					1.00
49.750	0.00	0.50	0.401	o					1.00
49.833	0.00	0.50	0.397	o					0.99
49.917	0.00	0.49	0.394	o					0.98
50.000	0.00	0.49	0.391	o					0.98
50.083	0.00	0.48	0.387	o					0.97
50.167	0.00	0.48	0.384	o					0.96
50.250	0.00	0.48	0.381	o					0.95
50.333	0.00	0.47	0.377	o					0.94
50.417	0.00	0.47	0.374	o					0.94
50.500	0.00	0.46	0.371	o					0.93
50.583	0.00	0.46	0.368	o					0.92
50.667	0.00	0.46	0.365	o					0.91
50.750	0.00	0.45	0.361	o					0.90
50.833	0.00	0.45	0.358	o					0.90
50.917	0.00	0.44	0.355	o					0.89
51.000	0.00	0.44	0.352	o					0.88
51.083	0.00	0.44	0.349	o					0.87
51.167	0.00	0.43	0.346	o					0.87
51.250	0.00	0.43	0.343	o					0.86
51.333	0.00	0.43	0.340	o					0.85
51.417	0.00	0.42	0.337	o					0.84
51.500	0.00	0.42	0.335	o					0.84
51.583	0.00	0.41	0.332	o					0.83
51.667	0.00	0.41	0.329	o					0.82
51.750	0.00	0.41	0.326	o					0.82
51.833	0.00	0.40	0.323	o					0.81
51.917	0.00	0.40	0.320	o					0.80
52.000	0.00	0.40	0.318	o					0.79
52.083	0.00	0.39	0.315	o					0.79
52.167	0.00	0.39	0.312	o					0.78
52.250	0.00	0.39	0.310	o					0.77
52.333	0.00	0.38	0.307	o					0.77
52.417	0.00	0.38	0.304	o					0.76
52.500	0.00	0.38	0.302	o					0.75
52.583	0.00	0.37	0.299	o					0.75
52.667	0.00	0.37	0.297	o					0.74
52.750	0.00	0.37	0.294	o					0.74
52.833	0.00	0.36	0.291	o					0.73
52.917	0.00	0.36	0.289	o					0.72
53.000	0.00	0.36	0.287	o					0.72
53.083	0.00	0.36	0.284	o					0.71
53.167	0.00	0.35	0.282	o					0.70
53.250	0.00	0.35	0.279	o					0.70
53.333	0.00	0.35	0.277	o					0.69
53.417	0.00	0.34	0.274	o					0.69
53.500	0.00	0.34	0.272	o					0.68
53.583	0.00	0.34	0.270	o					0.67
53.667	0.00	0.33	0.267	o					0.67
53.750	0.00	0.33	0.265	o					0.66
53.833	0.00	0.33	0.263	o					0.66
53.917	0.00	0.33	0.261	o					0.65
54.000	0.00	0.32	0.258	o					0.65
54.083	0.00	0.32	0.256	o					0.64
54.167	0.00	0.32	0.254	o					0.63
54.250	0.00	0.31	0.252	o					0.63
54.333	0.00	0.31	0.250	o					0.62
54.417	0.00	0.31	0.248	o					0.62
54.500	0.00	0.31	0.245	o					0.61
54.583	0.00	0.30	0.243	o					0.61
54.667	0.00	0.30	0.241	o					0.60
54.750	0.00	0.30	0.239	o					0.60
54.833	0.00	0.30	0.237	o					0.59
54.917	0.00	0.29	0.235	o					0.59

55.000	0.00	0.29	0.233	o					0.58
55.083	0.00	0.29	0.231	o					0.58
55.167	0.00	0.29	0.229	o					0.57
55.250	0.00	0.28	0.227	o					0.57
55.333	0.00	0.28	0.225	o					0.56
55.417	0.00	0.28	0.223	o					0.56
55.500	0.00	0.28	0.221	o					0.55
55.583	0.00	0.27	0.219	o					0.55
55.667	0.00	0.27	0.218	o					0.54
55.750	0.00	0.27	0.216	o					0.54
55.833	0.00	0.27	0.214	o					0.53
55.917	0.00	0.26	0.212	o					0.53
56.000	0.00	0.26	0.210	o					0.53
56.083	0.00	0.26	0.208	o					0.52
56.167	0.00	0.26	0.207	o					0.52
56.250	0.00	0.26	0.205	o					0.51
56.333	0.00	0.25	0.203	o					0.51
56.417	0.00	0.25	0.201	o					0.50
56.500	0.00	0.25	0.200	o					0.50
56.583	0.00	0.25	0.198	o					0.49
56.667	0.00	0.25	0.196	o					0.49
56.750	0.00	0.24	0.194	o					0.49
56.833	0.00	0.24	0.193	o					0.48
56.917	0.00	0.24	0.191	o					0.48
57.000	0.00	0.24	0.190	o					0.47
57.083	0.00	0.23	0.188	o					0.47
57.167	0.00	0.23	0.186	o					0.47
57.250	0.00	0.23	0.185	o					0.46
57.333	0.00	0.23	0.183	o					0.46
57.417	0.00	0.23	0.182	o					0.45
57.500	0.00	0.22	0.180	o					0.45
57.583	0.00	0.22	0.178	o					0.45
57.667	0.00	0.22	0.177	o					0.44
57.750	0.00	0.22	0.175	o					0.44
57.833	0.00	0.22	0.174	o					0.43
57.917	0.00	0.22	0.172	o					0.43
58.000	0.00	0.21	0.171	o					0.43
58.083	0.00	0.21	0.169	o					0.42
58.167	0.00	0.21	0.168	o					0.42
58.250	0.00	0.21	0.167	o					0.42
58.333	0.00	0.21	0.165	o					0.41
58.417	0.00	0.20	0.164	o					0.41
58.500	0.00	0.20	0.162	o					0.41
58.583	0.00	0.20	0.161	o					0.40
58.667	0.00	0.20	0.160	o					0.40
58.750	0.00	0.20	0.158	o					0.40
58.833	0.00	0.20	0.157	o					0.39
58.917	0.00	0.19	0.155	o					0.39
59.000	0.00	0.19	0.154	o					0.39
59.083	0.00	0.19	0.153	o					0.38
59.167	0.00	0.19	0.152	o					0.38
59.250	0.00	0.19	0.150	o					0.38
59.333	0.00	0.19	0.149	o					0.37
59.417	0.00	0.18	0.148	o					0.37
59.500	0.00	0.18	0.146	o					0.37
59.583	0.00	0.18	0.145	o					0.36
59.667	0.00	0.18	0.144	o					0.36
59.750	0.00	0.18	0.143	o					0.36
59.833	0.00	0.18	0.141	o					0.35
59.917	0.00	0.18	0.140	o					0.35
60.000	0.00	0.17	0.139	o					0.35
60.083	0.00	0.17	0.138	o					0.34
60.167	0.00	0.17	0.137	o					0.34
60.250	0.00	0.17	0.135	o					0.34
60.333	0.00	0.17	0.134	o					0.34
60.417	0.00	0.17	0.133	o					0.33
60.500	0.00	0.17	0.132	o					0.33
60.583	0.00	0.16	0.131	o					0.33
60.667	0.00	0.16	0.130	o					0.32
60.750	0.00	0.16	0.129	o					0.32
60.833	0.00	0.16	0.128	o					0.32
60.917	0.00	0.16	0.126	o					0.32
61.000	0.00	0.16	0.125	o					0.31
61.083	0.00	0.16	0.124	o					0.31
61.167	0.00	0.15	0.123	o					0.31
61.250	0.00	0.15	0.122	o					0.31
61.333	0.00	0.15	0.121	o					0.30
61.417	0.00	0.15	0.120	o					0.30
61.500	0.00	0.15	0.119	o					0.30
61.583	0.00	0.15	0.118	o					0.30
61.667	0.00	0.15	0.117	o					0.29

61.750	0.00	0.15	0.116	o	|	|	|	|	0.29
61.833	0.00	0.14	0.115	o	|	|	|	|	0.29
61.917	0.00	0.14	0.114	o	|	|	|	|	0.29
62.000	0.00	0.14	0.113	o	|	|	|	|	0.28
62.083	0.00	0.14	0.112	o	|	|	|	|	0.28
62.167	0.00	0.14	0.111	o	|	|	|	|	0.28
62.250	0.00	0.14	0.110	o	|	|	|	|	0.28
62.333	0.00	0.14	0.109	o	|	|	|	|	0.27
62.417	0.00	0.14	0.108	o	|	|	|	|	0.27
62.500	0.00	0.13	0.107	o	|	|	|	|	0.27
62.583	0.00	0.13	0.106	o	|	|	|	|	0.27
62.667	0.00	0.13	0.106	o	|	|	|	|	0.26
62.750	0.00	0.13	0.105	o	|	|	|	|	0.26
62.833	0.00	0.13	0.104	o	|	|	|	|	0.26
62.917	0.00	0.13	0.103	o	|	|	|	|	0.26
63.000	0.00	0.13	0.102	o	|	|	|	|	0.25
63.083	0.00	0.13	0.101	o	|	|	|	|	0.25
63.167	0.00	0.13	0.100	o	|	|	|	|	0.25
63.250	0.00	0.12	0.099	o	|	|	|	|	0.25
63.333	0.00	0.12	0.099	o	|	|	|	|	0.25
63.417	0.00	0.12	0.098	o	|	|	|	|	0.24
63.500	0.00	0.12	0.097	o	|	|	|	|	0.24
63.583	0.00	0.12	0.096	o	|	|	|	|	0.24
63.667	0.00	0.12	0.095	o	|	|	|	|	0.24
63.750	0.00	0.12	0.094	o	|	|	|	|	0.24
63.833	0.00	0.12	0.094	o	|	|	|	|	0.23
63.917	0.00	0.12	0.093	o	|	|	|	|	0.23
64.000	0.00	0.11	0.092	o	|	|	|	|	0.23
64.083	0.00	0.11	0.091	o	|	|	|	|	0.23
64.167	0.00	0.11	0.090	o	|	|	|	|	0.23
64.250	0.00	0.11	0.090	o	|	|	|	|	0.22
64.333	0.00	0.11	0.089	o	|	|	|	|	0.22
64.417	0.00	0.11	0.088	o	|	|	|	|	0.22
64.500	0.00	0.11	0.087	o	|	|	|	|	0.22
64.583	0.00	0.11	0.087	o	|	|	|	|	0.22
64.667	0.00	0.11	0.086	o	|	|	|	|	0.21
64.750	0.00	0.11	0.085	o	|	|	|	|	0.21
64.833	0.00	0.11	0.084	o	|	|	|	|	0.21
64.917	0.00	0.10	0.084	o	|	|	|	|	0.21
65.000	0.00	0.10	0.083	o	|	|	|	|	0.21
65.083	0.00	0.10	0.082	o	|	|	|	|	0.21
65.167	0.00	0.10	0.082	o	|	|	|	|	0.20
65.250	0.00	0.10	0.081	o	|	|	|	|	0.20
65.333	0.00	0.10	0.080	o	|	|	|	|	0.20
65.417	0.00	0.10	0.079	o	|	|	|	|	0.20

Remaining water in basin = 0.08 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 785
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 198.886 (CFS)
Total volume = 21.724 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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APPENDIX J.2: 2-YEAR/ 1-HOUR BASIN ROUTING CALCULATIONS

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2001
Study date: 07/01/10

ARANTINE HILLS-TRACT MAP 36294
FLOOD HYDROGRAPH ROUTING FOR BASIN A
FOR 2YR.-1 HR.
FN:BASINA1

TRI-8 Builders - S/N 615

********** HYDROGRAPH INFORMATION **********

From study/file name: A1UHMDP12.rte

**********HYDROGRAPH DATA**********

Number of intervals = 25
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 148.600 (CFS)
Total volume = 5.592 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 100.000 to Point/Station 101.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 25
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.300	7.500	0.274	0.326
2.000	1.500	25.000	1.414	1.586
3.000	3.200	40.000	3.062	3.338
3.500	4.300	45.400	4.144	4.456

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 37.2 74.30 111.45 148.60	Depth (Ft.)
0.083	3.19	0.25	0.010	O | | | | |	0.03
0.167	16.65	1.78	0.071	O I | | | | |	0.24
0.250	28.95	5.12	0.205	O I | | | | |	0.68
0.333	36.41	8.70	0.382	O I | | | | |	1.07
0.417	37.72	11.41	0.568	O I | | | | |	1.22
0.500	25.73	13.35	0.701	O I | | | | |	1.33
0.583	19.76	14.25	0.763	OI | | | | |	1.39
0.667	27.97	15.17	0.826	O I | | | | |	1.44
0.750	44.24	17.17	0.963	O I | | | | |	1.55
0.833	85.78	21.75	1.277	O | I | | |	1.81
0.917	148.60	28.62	1.911	O | | | | I	2.24
1.000	122.61	34.93	2.626	O | | | I |	2.66
1.083	72.14	38.61	3.043	O | I | | |	2.91
1.167	45.65	39.81	3.179	OI | | | |	2.99
1.250	27.43	39.62	3.157	I O | | | |	2.97

1.333	19.06	38.65	3.047	| I O | | |				2.91
1.417	13.62	37.34	2.898	| I O | | |				2.82
1.500	10.28	35.84	2.728	| I O | | |				2.72
1.583	7.88	34.26	2.550	|I O | | |				2.62
1.667	6.10	32.65	2.367	|I O | | |				2.51
1.750	4.57	31.04	2.185	I O | | |				2.40
1.833	3.54	29.45	2.004	I O | | |				2.30
1.917	3.11	27.91	1.830	I O | | |				2.19
2.000	0.57	26.37	1.655	I O | | |				2.09
2.083	0.37	24.75	1.483	I O | | |				1.99
2.167	0.00	22.40	1.322	I O | | |				1.85
2.250	0.00	20.26	1.175	I O | | |				1.73
2.333	0.00	18.32	1.042	I O | | |				1.62
2.417	0.00	16.57	0.922	I O | | |				1.52
2.500	0.00	14.98	0.813	I O | | |				1.43
2.583	0.00	13.55	0.715	I O | | |				1.35
2.667	0.00	12.25	0.626	I O | | |				1.27
2.750	0.00	11.08	0.546	I O | | |				1.20
2.833	0.00	10.02	0.473	I O | | |				1.14
2.917	0.00	9.06	0.407	IO | | |				1.09
3.000	0.00	8.20	0.348	IO | | |				1.04
3.083	0.00	7.36	0.294	IO | | |				0.98
3.167	0.00	6.19	0.248	IO | | |				0.83
3.250	0.00	5.21	0.208	IO | | |				0.69
3.333	0.00	4.38	0.175	O | | |				0.58
3.417	0.00	3.69	0.148	O | | |				0.49
3.500	0.00	3.10	0.124	O | | |				0.41
3.583	0.00	2.61	0.104	O | | |				0.35
3.667	0.00	2.20	0.088	O | | |				0.29
3.750	0.00	1.85	0.074	O | | |				0.25
3.833	0.00	1.56	0.062	O | | |				0.21
3.917	0.00	1.31	0.052	O | | |				0.17
4.000	0.00	1.10	0.044	O | | |				0.15
4.083	0.00	0.93	0.037	O | | |				0.12
4.167	0.00	0.78	0.031	O | | |				0.10
4.250	0.00	0.66	0.026	O | | |				0.09
4.333	0.00	0.55	0.022	O | | |				0.07
4.417	0.00	0.46	0.019	O | | |				0.06
4.500	0.00	0.39	0.016	O | | |				0.05
4.583	0.00	0.33	0.013	O | | |				0.04
4.667	0.00	0.28	0.011	O | | |				0.04
4.750	0.00	0.23	0.009	O | | |				0.03
4.833	0.00	0.20	0.008	O | | |				0.03
4.917	0.00	0.16	0.007	O | | |				0.02
5.000	0.00	0.14	0.006	O | | |				0.02
5.083	0.00	0.12	0.005	O | | |				0.02
5.167	0.00	0.10	0.004	O | | |				0.01

Remaining water in basin = 0.00 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 62
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 39.811 (CFS)
Total volume = 5.588 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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APPENDIX J.3: 2-YEAR/24-HOUR BASIN ROUTING CALCULATIONS

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 07/06/10

ARANTINE HILLS-TRACT MAP 36294
FLOOD HYDROGRAPH ROUTING FOR BASIN A
FOR 2YR.-24 HR.
FN:BASINA24

TRI-8 Builders - S/N 615

********** HYDROGRAPH INFORMATION **********

From study/file name: A1UHMDP242.rte
**********HYDROGRAPH DATA**********
Number of intervals = 301
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 40.530 (CFS)
Total volume = 27.813 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 100.000 to Point/Station 101.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 301
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

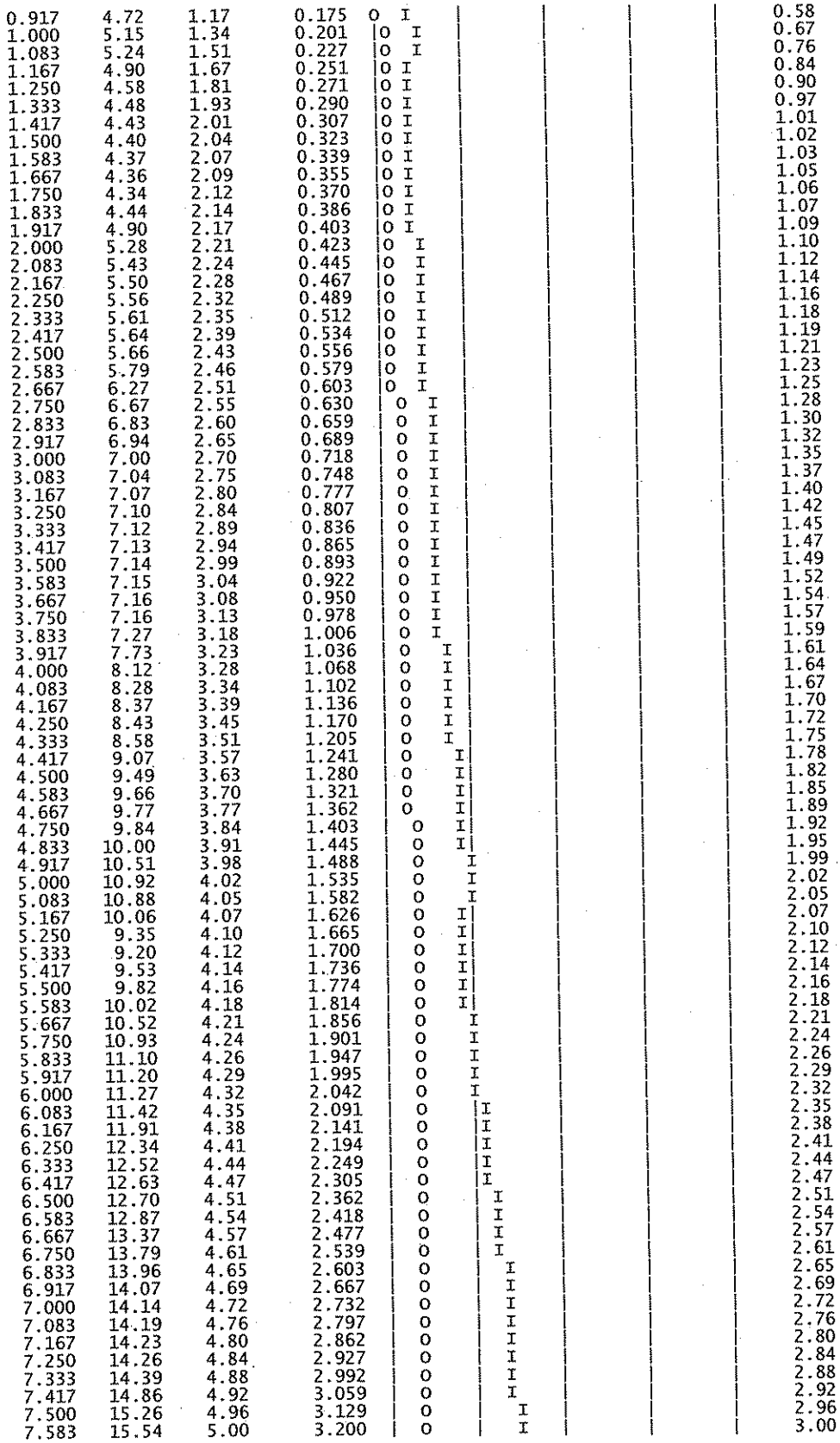
Depth vs. Storage and Depth vs. Discharge data:

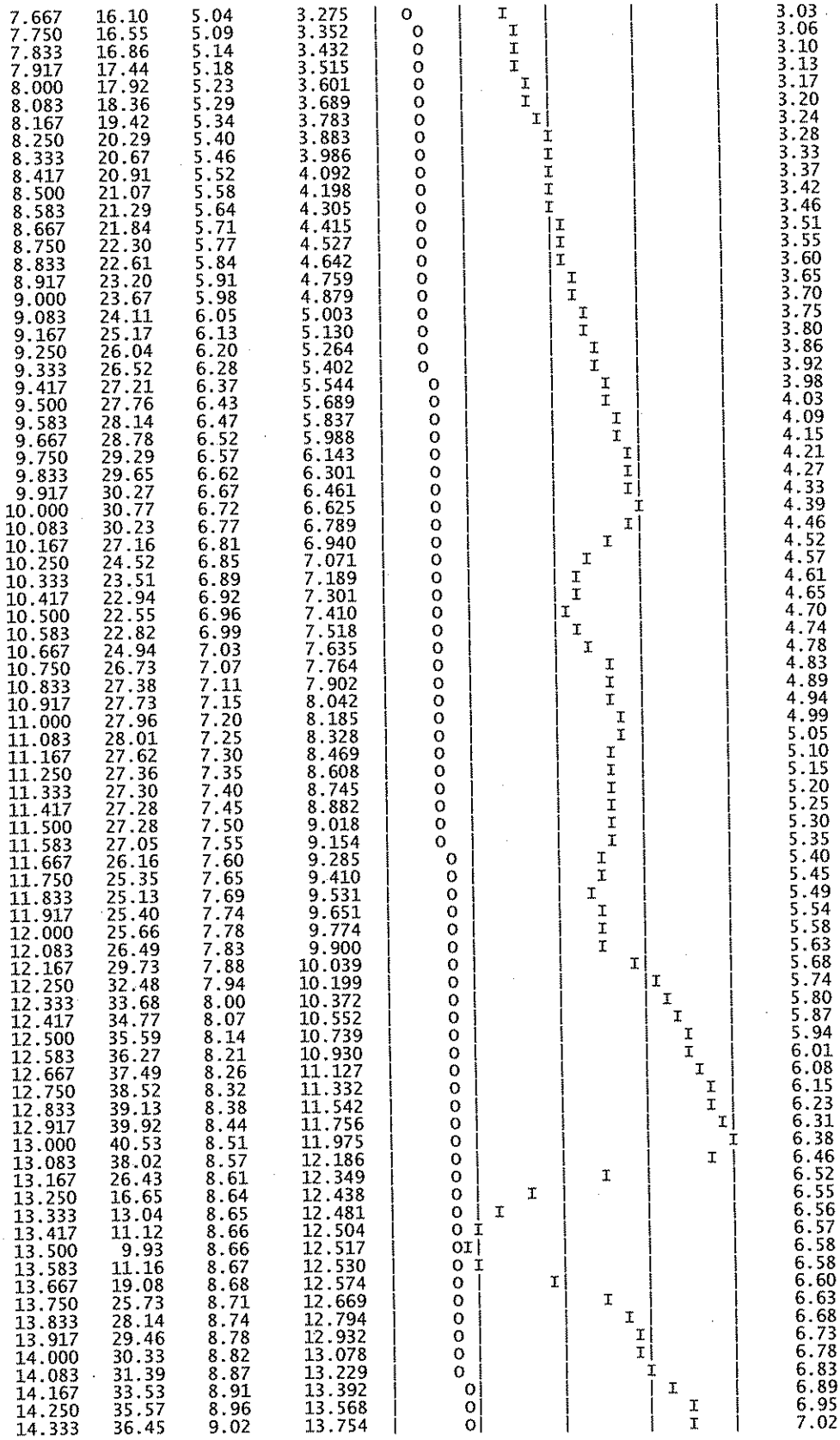
Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.300	2.000	0.293	0.307
2.000	1.500	4.000	1.486	1.514
3.000	3.200	5.000	3.183	3.217
4.000	5.600	6.400	5.578	5.622
5.000	8.200	7.200	8.175	8.225
6.000	10.900	8.200	10.872	10.928
7.000	13.700	9.000	13.669	13.731
8.000	16.700	10.000	16.666	16.734
9.000	19.800	10.900	19.762	19.838

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 10.1 20.27 30.40 40.53	Depth (Ft.)
0.083	0.22	0.00	0.001	O	0.00
0.167	1.14	0.04	0.005	O	0.02
0.250	1.93	0.10	0.015	OI	0.05
0.333	2.34	0.19	0.029	OI	0.10
0.417	2.98	0.30	0.046	O I	0.15
0.500	3.50	0.44	0.065	O I	0.22
0.583	3.74	0.58	0.087	O I	0.29
0.667	3.89	0.72	0.109	O I	0.36
0.750	4.00	0.87	0.130	O I	0.43
0.833	4.19	1.01	0.152	O I	0.51


0.917 4.72 1.17 0.175 0.58
1.000 5.15 1.34 0.201 0.67
1.083 5.24 1.51 0.227 0.76
1.167 4.90 1.67 0.251 0.84
1.250 4.58 1.81 0.271 0.90
1.333 4.48 1.93 0.290 0.97
1.417 4.43 2.01 0.307 1.01
1.500 4.40 2.04 0.323 1.02
1.583 4.37 2.07 0.339 1.03
1.667 4.36 2.09 0.355 1.05
1.750 4.34 2.12 0.370 1.06
1.833 4.44 2.14 0.386 1.07
1.917 4.90 2.17 0.403 1.09
2.000 5.28 2.21 0.423 1.10
2.083 5.43 2.24 0.445 1.12
2.167 5.50 2.28 0.467 1.14
2.250 5.56 2.32 0.489 1.16
2.333 5.61 2.35 0.512 1.18
2.417 5.64 2.39 0.534 1.19
2.500 5.66 2.43 0.556 1.21
2.583 5.79 2.46 0.579 1.23
2.667 6.27 2.51 0.603 1.25
2.750 6.67 2.55 0.630 1.28
2.833 6.83 2.60 0.659 1.30
2.917 6.94 2.65 0.689 1.32
3.000 7.00 2.70 0.718 1.35
3.083 7.04 2.75 0.748 1.37
3.167 7.07 2.80 0.777 1.40
3.250 7.10 2.84 0.807 1.42
3.333 7.12 2.89 0.836 1.45
3.417 7.13 2.94 0.865 1.47
3.500 7.14 2.99 0.893 1.49
3.583 7.15 3.04 0.922 1.52
3.667 7.16 3.08 0.950 1.54
3.750 7.16 3.13 0.978 1.57
3.833 7.27 3.18 1.006 1.59
3.917 7.73 3.23 1.036 1.61
4.000 8.12 3.28 1.068 1.64
4.083 8.28 3.34 1.102 1.67
4.167 8.37 3.39 1.136 1.70
4.250 8.43 3.45 1.170 1.72
4.333 8.58 3.51 1.205 1.75
4.417 9.07 3.57 1.241 1.78
4.500 9.49 3.63 1.280 1.82
4.583 9.66 3.70 1.321 1.85
4.667 9.77 3.77 1.362 1.89
4.750 9.84 3.84 1.403 1.92
4.833 10.00 3.91 1.445 1.95
4.917 10.51 3.98 1.488 1.99
5.000 10.92 4.02 1.535 2.02
5.083 10.88 4.05 1.582 2.05
5.167 10.06 4.07 1.626 2.07
5.250 9.35 4.10 1.665 2.10
5.333 9.20 4.12 1.700 2.12
5.417 9.53 4.14 1.736 2.14
5.500 9.82 4.16 1.774 2.16
5.583 10.02 4.18 1.814 2.18
5.667 10.52 4.21 1.856 2.21
5.750 10.93 4.24 1.901 2.24
5.833 11.10 4.26 1.947 2.26
5.917 11.20 4.29 1.995 2.29
6.000 11.27 4.32 2.042 2.32
6.083 11.42 4.35 2.091 2.35
6.167 11.91 4.38 2.141 2.38
6.250 12.34 4.41 2.194 2.41
6.333 12.52 4.44 2.249 2.44
6.417 12.63 4.47 2.305 2.47
6.500 12.70 4.51 2.362 2.51
6.583 12.87 4.54 2.418 2.54
6.667 13.37 4.57 2.477 2.57
6.750 13.79 4.61 2.539 2.61
6.833 13.96 4.65 2.603 2.65
6.917 14.07 4.69 2.667 2.69
7.000 14.14 4.72 2.732 2.72
7.083 14.19 4.76 2.797 2.76
7.167 14.23 4.80 2.862 2.80
7.250 14.26 4.84 2.927 2.84
7.333 14.39 4.88 2.992 2.88
7.417 14.86 4.92 3.059 2.92
7.500 15.26 4.96 3.129 2.96
7.583 15.54 5.00 3.200 3.00



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14.500	36.68	9.14	14.133	O			I		7.14
14.583	36.86	9.21	14.323	O			I		7.21
14.667	37.10	9.27	14.514	O			I		7.27
14.750	37.14	9.34	14.706	O			I		7.34
14.833	37.06	9.40	14.897	O			I		7.40
14.917	36.63	9.46	15.086	O			I		7.46
15.000	36.26	9.52	15.271	O			I		7.52
15.083	36.01	9.58	15.454	O			I		7.58
15.167	35.49	9.64	15.634	O			I		7.64
15.250	35.03	9.70	15.810	O			I		7.70
15.333	34.71	9.76	15.983	O			I		7.76
15.417	34.12	9.82	16.153	O			I		7.82
15.500	33.64	9.87	16.319	O			I		7.87
15.583	32.98	9.93	16.480	O			I		7.93
15.667	31.00	9.98	16.632	O			I		7.98
15.750	29.34	10.02	16.770	O			I		8.02
15.833	28.65	10.06	16.901	O			I		8.06
15.917	28.23	10.10	17.027	O			I		8.11
16.000	27.95	10.13	17.151	O			I		8.15
16.083	26.10	10.16	17.268	O		I			8.18
16.167	19.03	10.19	17.353	O	I				8.21
16.250	13.05	10.20	17.393	O I					8.22
16.333	10.65	10.20	17.404	O					8.23
16.417	9.24	10.20	17.403	IO					8.23
16.500	8.28	10.20	17.393	I O					8.22
16.583	7.47	10.20	17.377	I O					8.22
16.667	6.51	10.19	17.355	I O					8.21
16.750	5.74	10.18	17.327	I O					8.20
16.833	5.30	10.17	17.294	I O					8.19
16.917	4.98	10.16	17.260	I O					8.18
17.000	4.76	10.15	17.223	I O					8.17
17.083	4.81	10.14	17.187	I O					8.16
17.167	5.53	10.13	17.152	I O					8.15
17.250	6.29	10.12	17.123	I O					8.14
17.333	6.58	10.12	17.098	I O					8.13
17.417	6.74	10.11	17.074	I O					8.12
17.500	6.85	10.10	17.051	I O					8.11
17.583	6.93	10.10	17.029	I O					8.11
17.667	6.98	10.09	17.008	I O					8.10
17.750	7.03	10.08	16.986	I O					8.09
17.833	6.96	10.08	16.965	I O					8.09
17.917	6.53	10.07	16.942	I O					8.08
18.000	6.16	10.06	16.917	I O					8.07
18.083	6.02	10.05	16.889	I O					8.06
18.167	5.95	10.05	16.861	I O					8.05
18.250	5.89	10.04	16.833	I O					8.04
18.333	5.85	10.03	16.804	I O					8.03
18.417	5.82	10.02	16.775	I O					8.02
18.500	5.79	10.01	16.746	I O					8.01
18.583	5.66	10.00	16.717	I O					8.01
18.667	5.19	10.00	16.685	I O					8.00
18.750	4.79	9.98	16.651	I O					7.98
18.833	4.51	9.97	16.614	I O					7.97
18.917	3.95	9.96	16.575	I O					7.96
19.000	3.50	9.94	16.532	I O					7.94
19.083	3.41	9.93	16.487	I O					7.93
19.167	3.75	9.91	16.444	I O					7.91
19.250	4.06	9.90	16.402	I O					7.90
19.333	4.26	9.89	16.363	I O					7.89
19.417	4.76	9.88	16.326	I O					7.88
19.500	5.18	9.86	16.292	I O					7.86
19.583	5.24	9.85	16.260	I O					7.85
19.667	4.87	9.84	16.227	I O					7.84
19.750	4.56	9.83	16.192	I O					7.83
19.833	4.35	9.82	16.155	I O					7.82
19.917	3.83	9.81	16.115	I O					7.81
20.000	3.41	9.79	16.073	I O					7.79
20.083	3.35	9.78	16.029	I O					7.78
20.167	3.72	9.76	15.986	I O					7.76
20.250	4.04	9.75	15.945	I O					7.75
20.333	4.14	9.74	15.906	I O					7.74
20.417	4.19	9.72	15.868	I O					7.72
20.500	4.22	9.71	15.830	I O					7.71
20.583	4.23	9.70	15.792	I O					7.70
20.667	4.24	9.68	15.755	I O					7.68
20.750	4.25	9.67	15.717	I O					7.67
20.833	4.15	9.66	15.680	I O					7.66
20.917	3.69	9.65	15.640	I O					7.65
21.000	3.31	9.63	15.598	I O					7.63
21.083	3.28	9.62	15.554	I O					7.62

21.167	3.66	9.60	15.512	I	O				7.60
21.250	3.99	9.59	15.472	I	O				7.59
21.333	3.99	9.58	15.434	I	O				7.58
21.417	3.59	9.56	15.394	I	O				7.56
21.500	3.23	9.55	15.352	I	O				7.55
21.583	3.21	9.54	15.308	I	O				7.54
21.667	3.60	9.52	15.266	I	O				7.52
21.750	3.95	9.51	15.226	I	O				7.51
21.833	3.96	9.50	15.188	I	O				7.50
21.917	3.56	9.48	15.149	I	O				7.48
22.000	3.21	9.47	15.107	I	O				7.47
22.083	3.20	9.45	15.064	I	O				7.45
22.167	3.60	9.44	15.022	I	O				7.44
22.250	3.95	9.43	14.983	I	O				7.43
22.333	3.96	9.42	14.945	I	O				7.42
22.417	3.56	9.40	14.906	I	O				7.40
22.500	3.21	9.39	14.865	I	O				7.39
22.583	3.09	9.37	14.822	I	O				7.37
22.667	3.03	9.36	14.779	I	O				7.36
22.750	2.98	9.35	14.735	I	O				7.35
22.833	2.95	9.33	14.691	I	O				7.33
22.917	2.92	9.32	14.647	I	O				7.32
23.000	2.91	9.30	14.603	I	O				7.30
23.083	2.90	9.29	14.559	I	O				7.29
23.167	2.90	9.27	14.515	I	O				7.27
23.250	2.88	9.26	14.471	I	O				7.26
23.333	2.88	9.24	14.427	I	O				7.24
23.417	2.86	9.23	14.384	I	O				7.23
23.500	2.86	9.21	14.340	I	O				7.21
23.583	2.86	9.20	14.296	I	O				7.20
23.667	2.86	9.18	14.253	I	O				7.18
23.750	2.86	9.17	14.209	I	O				7.17
23.833	2.86	9.16	14.166	I	O				7.16
23.917	2.86	9.14	14.122	I	O				7.14
24.000	2.86	9.13	14.079	I	O				7.13
24.083	2.64	9.11	14.035	I	O				7.11
24.167	1.72	9.10	13.988	I	O				7.10
24.250	0.94	9.08	13.934	I	O				7.08
24.333	0.63	9.06	13.877	I	O				7.06
24.417	0.45	9.04	13.819	I	O				7.04
24.500	0.33	9.02	13.759	I	O				7.02
24.583	0.24	9.00	13.699	I	O				7.00
24.667	0.18	8.98	13.639	I	O				6.98
24.750	0.13	8.97	13.578	I	O				6.96
24.833	0.09	8.95	13.517	I	O				6.93
24.917	0.06	8.93	13.456	I	O				6.91
25.000	0.04	8.91	13.395	I	O				6.89
25.083	0.02	8.90	13.334	I	O				6.87
25.167	0.00	8.88	13.273	I	O				6.85
25.250	0.00	8.86	13.212	I	O				6.83
25.333	0.00	8.84	13.151	I	O				6.80
25.417	0.00	8.83	13.090	I	O				6.78
25.500	0.00	8.81	13.029	I	O				6.76
25.583	0.00	8.79	12.968	I	O				6.74
25.667	0.00	8.77	12.908	I	O				6.72
25.750	0.00	8.76	12.848	I	O				6.70
25.833	0.00	8.74	12.787	I	O				6.67
25.917	0.00	8.72	12.727	I	O				6.65
26.000	0.00	8.70	12.667	I	O				6.63
26.083	0.00	8.69	12.607	I	O				6.61
26.167	0.00	8.67	12.548	I	O				6.59
26.250	0.00	8.65	12.488	I	O				6.57
26.333	0.00	8.64	12.428	I	O				6.55
26.417	0.00	8.62	12.369	I	O				6.52
26.500	0.00	8.60	12.310	I	O				6.50
26.583	0.00	8.59	12.250	I	O				6.48
26.667	0.00	8.57	12.191	I	O				6.46
26.750	0.00	8.55	12.132	I	O				6.44
26.833	0.00	8.54	12.074	I	O				6.42
26.917	0.00	8.52	12.015	I	O				6.40
27.000	0.00	8.50	11.956	I	O				6.38
27.083	0.00	8.49	11.898	I	O				6.36
27.167	0.00	8.47	11.839	I	O				6.34
27.250	0.00	8.45	11.781	I	O				6.31
27.333	0.00	8.44	11.723	I	O				6.29
27.417	0.00	8.42	11.665	I	O				6.27
27.500	0.00	8.40	11.607	I	O				6.25
27.583	0.00	8.39	11.549	I	O				6.23
27.667	0.00	8.37	11.491	I	O				6.21
27.750	0.00	8.35	11.434	I	O				6.19
27.833	0.00	8.34	11.376	I	O				6.17

27.917	0.00	8.32	11.319	I	O	|	|	|	|	6.15
28.000	0.00	8.30	11.262	I	O	|	|	|	|	6.13
28.083	0.00	8.29	11.205	I	O	|	|	|	|	6.11
28.167	0.00	8.27	11.148	I	O	|	|	|	|	6.09
28.250	0.00	8.25	11.091	I	O	|	|	|	|	6.07
28.333	0.00	8.24	11.034	I	O	|	|	|	|	6.05
28.417	0.00	8.22	10.977	I	O	|	|	|	|	6.03
28.500	0.00	8.21	10.921	I	O	|	|	|	|	6.01
28.583	0.00	8.19	10.864	I	O	|	|	|	|	5.99
28.667	0.00	8.17	10.808	I	O	|	|	|	|	5.97
28.750	0.00	8.15	10.752	I	O	|	|	|	|	5.95
28.833	0.00	8.12	10.696	I	O	|	|	|	|	5.92
28.917	0.00	8.10	10.640	I	O	|	|	|	|	5.90
29.000	0.00	8.08	10.584	I	O	|	|	|	|	5.88
29.083	0.00	8.06	10.529	I	O	|	|	|	|	5.86
29.167	0.00	8.04	10.473	I	O	|	|	|	|	5.84
29.250	0.00	8.02	10.418	I	O	|	|	|	|	5.82
29.333	0.00	8.00	10.363	I	O	|	|	|	|	5.80
29.417	0.00	7.98	10.308	I	O	|	|	|	|	5.78
29.500	0.00	7.96	10.253	I	O	|	|	|	|	5.76
29.583	0.00	7.94	10.198	I	O	|	|	|	|	5.74
29.667	0.00	7.92	10.143	I	O	|	|	|	|	5.72
29.750	0.00	7.90	10.089	I	O	|	|	|	|	5.70
29.833	0.00	7.88	10.034	I	O	|	|	|	|	5.68
29.917	0.00	7.86	9.980	I	O	|	|	|	|	5.66
30.000	0.00	7.84	9.926	I	O	|	|	|	|	5.64
30.083	0.00	7.82	9.872	I	O	|	|	|	|	5.62
30.167	0.00	7.80	9.819	I	O	|	|	|	|	5.60
30.250	0.00	7.78	9.765	I	O	|	|	|	|	5.58
30.333	0.00	7.76	9.711	I	O	|	|	|	|	5.56
30.417	0.00	7.74	9.658	I	O	|	|	|	|	5.54
30.500	0.00	7.72	9.605	I	O	|	|	|	|	5.52
30.583	0.00	7.70	9.552	I	O	|	|	|	|	5.50
30.667	0.00	7.68	9.499	I	O	|	|	|	|	5.48
30.750	0.00	7.66	9.446	I	O	|	|	|	|	5.46
30.833	0.00	7.64	9.393	I	O	|	|	|	|	5.44
30.917	0.00	7.62	9.341	I	O	|	|	|	|	5.42
31.000	0.00	7.60	9.288	I	O	|	|	|	|	5.40
31.083	0.00	7.58	9.236	I	O	|	|	|	|	5.38
31.167	0.00	7.56	9.184	I	O	|	|	|	|	5.36
31.250	0.00	7.55	9.132	I	O	|	|	|	|	5.35
31.333	0.00	7.53	9.080	I	O	|	|	|	|	5.33
31.417	0.00	7.51	9.028	I	O	|	|	|	|	5.31
31.500	0.00	7.49	8.976	I	O	|	|	|	|	5.29
31.583	0.00	7.47	8.925	I	O	|	|	|	|	5.27
31.667	0.00	7.45	8.874	I	O	|	|	|	|	5.25
31.750	0.00	7.43	8.822	I	O	|	|	|	|	5.23
31.833	0.00	7.41	8.771	I	O	|	|	|	|	5.21
31.917	0.00	7.39	8.720	I	O	|	|	|	|	5.19
32.000	0.00	7.37	8.669	I	O	|	|	|	|	5.17
32.083	0.00	7.36	8.619	I	O	|	|	|	|	5.16
32.167	0.00	7.34	8.568	I	O	|	|	|	|	5.14
32.250	0.00	7.32	8.518	I	O	|	|	|	|	5.12
32.333	0.00	7.30	8.467	I	O	|	|	|	|	5.10
32.417	0.00	7.28	8.417	I	O	|	|	|	|	5.08
32.500	0.00	7.26	8.367	I	O	|	|	|	|	5.06
32.583	0.00	7.24	8.317	I	O	|	|	|	|	5.04
32.667	0.00	7.22	8.267	I	O	|	|	|	|	5.02
32.750	0.00	7.21	8.217	I	O	|	|	|	|	5.01
32.833	0.00	7.19	8.168	I	O	|	|	|	|	4.99
32.917	0.00	7.17	8.118	I	O	|	|	|	|	4.97
33.000	0.00	7.16	8.069	I	O	|	|	|	|	4.95
33.083	0.00	7.14	8.020	I	O	|	|	|	|	4.93
33.167	0.00	7.13	7.971	I	O	|	|	|	|	4.91
33.250	0.00	7.11	7.922	I	O	|	|	|	|	4.89
33.333	0.00	7.10	7.873	I	O	|	|	|	|	4.87
33.417	0.00	7.08	7.824	I	O	|	|	|	|	4.86
33.500	0.00	7.07	7.775	I	O	|	|	|	|	4.84
33.583	0.00	7.05	7.726	I	O	|	|	|	|	4.82
33.667	0.00	7.04	7.678	I	O	|	|	|	|	4.80
33.750	0.00	7.02	7.630	I	O	|	|	|	|	4.78
33.833	0.00	7.01	7.581	I	O	|	|	|	|	4.76
33.917	0.00	6.99	7.533	I	O	|	|	|	|	4.74
34.000	0.00	6.98	7.485	I	O	|	|	|	|	4.72
34.083	0.00	6.97	7.437	I	O	|	|	|	|	4.71
34.167	0.00	6.95	7.389	I	O	|	|	|	|	4.69
34.250	0.00	6.94	7.341	I	O	|	|	|	|	4.67
34.333	0.00	6.92	7.293	I	O	|	|	|	|	4.65
34.417	0.00	6.91	7.246	I	O	|	|	|	|	4.63
34.500	0.00	6.89	7.198	I	O	|	|	|	|	4.61
34.583	0.00	6.88	7.151	I	O	|	|	|	|	4.60

34.667	0.00	6.86	7.104	I	O	|	|	|	|	4.58
34.750	0.00	6.85	7.056	I	O	|	|	|	|	4.56
34.833	0.00	6.83	7.009	I	O	|	|	|	|	4.54
34.917	0.00	6.82	6.962	I	O	|	|	|	|	4.52
35.000	0.00	6.80	6.915	I	O	|	|	|	|	4.51
35.083	0.00	6.79	6.868	I	O	|	|	|	|	4.49
35.167	0.00	6.78	6.822	I	O	|	|	|	|	4.47
35.250	0.00	6.76	6.775	I	O	|	|	|	|	4.45
35.333	0.00	6.75	6.729	I	O	|	|	|	|	4.43
35.417	0.00	6.73	6.682	I	O	|	|	|	|	4.42
35.500	0.00	6.72	6.636	I	O	|	|	|	|	4.40
35.583	0.00	6.70	6.590	I	O	|	|	|	|	4.38
35.667	0.00	6.69	6.544	I	O	|	|	|	|	4.36
35.750	0.00	6.68	6.497	I	O	|	|	|	|	4.35
35.833	0.00	6.66	6.452	I	O	|	|	|	|	4.33
35.917	0.00	6.65	6.406	I	O	|	|	|	|	4.31
36.000	0.00	6.63	6.360	I	O	|	|	|	|	4.29
36.083	0.00	6.62	6.314	I	O	|	|	|	|	4.27
36.167	0.00	6.61	6.269	I	O	|	|	|	|	4.26
36.250	0.00	6.59	6.223	I	O	|	|	|	|	4.24
36.333	0.00	6.58	6.178	I	O	|	|	|	|	4.22
36.417	0.00	6.56	6.133	I	O	|	|	|	|	4.20
36.500	0.00	6.55	6.088	I	O	|	|	|	|	4.19
36.583	0.00	6.54	6.043	I	O	|	|	|	|	4.17
36.667	0.00	6.52	5.998	I	O	|	|	|	|	4.15
36.750	0.00	6.51	5.953	I	O	|	|	|	|	4.14
36.833	0.00	6.49	5.908	I	O	|	|	|	|	4.12
36.917	0.00	6.48	5.863	I	O	|	|	|	|	4.10
37.000	0.00	6.47	5.819	I	O	|	|	|	|	4.08
37.083	0.00	6.45	5.774	I	O	|	|	|	|	4.07
37.167	0.00	6.44	5.730	I	O	|	|	|	|	4.05
37.250	0.00	6.43	5.685	I	O	|	|	|	|	4.03
37.333	0.00	6.41	5.641	I	O	|	|	|	|	4.02
37.417	0.00	6.40	5.597	I	O	|	|	|	|	4.00
37.500	0.00	6.37	5.553	I	O	|	|	|	|	3.98
37.583	0.00	6.35	5.509	I	O	|	|	|	|	3.96
37.667	0.00	6.32	5.466	I	O	|	|	|	|	3.94
37.750	0.00	6.30	5.422	I	O	|	|	|	|	3.93
37.833	0.00	6.27	5.379	I	O	|	|	|	|	3.91
37.917	0.00	6.25	5.336	I	O	|	|	|	|	3.89
38.000	0.00	6.22	5.293	I	O	|	|	|	|	3.87
38.083	0.00	6.20	5.250	I	O	|	|	|	|	3.85
38.167	0.00	6.17	5.208	I	O	|	|	|	|	3.84
38.250	0.00	6.15	5.165	I	O	|	|	|	|	3.82
38.333	0.00	6.12	5.123	I	O	|	|	|	|	3.80
38.417	0.00	6.10	5.081	I	O	|	|	|	|	3.78
38.500	0.00	6.07	5.039	I	O	|	|	|	|	3.77
38.583	0.00	6.05	4.997	I	O	|	|	|	|	3.75
38.667	0.00	6.02	4.956	I	O	|	|	|	|	3.73
38.750	0.00	6.00	4.914	I	O	|	|	|	|	3.71
38.833	0.00	5.98	4.873	I	O	|	|	|	|	3.70
38.917	0.00	5.95	4.832	I	O	|	|	|	|	3.68
39.000	0.00	5.93	4.791	I	O	|	|	|	|	3.66
39.083	0.00	5.90	4.750	I	O	|	|	|	|	3.65
39.167	0.00	5.88	4.710	I	O	|	|	|	|	3.63
39.250	0.00	5.86	4.669	I	O	|	|	|	|	3.61
39.333	0.00	5.83	4.629	I	O	|	|	|	|	3.60
39.417	0.00	5.81	4.589	I	O	|	|	|	|	3.58
39.500	0.00	5.79	4.549	I	O	|	|	|	|	3.56
39.583	0.00	5.76	4.509	I	O	|	|	|	|	3.55
39.667	0.00	5.74	4.470	I	O	|	|	|	|	3.53
39.750	0.00	5.72	4.430	I	O	|	|	|	|	3.51
39.833	0.00	5.69	4.391	I	O	|	|	|	|	3.50
39.917	0.00	5.67	4.352	I	O	|	|	|	|	3.48
40.000	0.00	5.65	4.313	I	O	|	|	|	|	3.46
40.083	0.00	5.63	4.274	I	O	|	|	|	|	3.45
40.167	0.00	5.60	4.235	I	O	|	|	|	|	3.43
40.250	0.00	5.58	4.197	I	O	|	|	|	|	3.42
40.333	0.00	5.56	4.158	I	O	|	|	|	|	3.40
40.417	0.00	5.54	4.120	I	O	|	|	|	|	3.38
40.500	0.00	5.51	4.082	I	O	|	|	|	|	3.37
40.583	0.00	5.49	4.044	I	O	|	|	|	|	3.35
40.667	0.00	5.47	4.006	I	O	|	|	|	|	3.34
40.750	0.00	5.45	3.969	I	O	|	|	|	|	3.32
40.833	0.00	5.43	3.931	I	O	|	|	|	|	3.30
40.917	0.00	5.40	3.894	I	O	|	|	|	|	3.29
41.000	0.00	5.38	3.857	I	O	|	|	|	|	3.27
41.083	0.00	5.36	3.820	I	O	|	|	|	|	3.26
41.167	0.00	5.34	3.783	I	O	|	|	|	|	3.24
41.250	0.00	5.32	3.746	I	O	|	|	|	|	3.23
41.333	0.00	5.30	3.710	I	O	|	|	|	|	3.21

41.417	0.00	5.28	3.673	I	o	|	|	|	3.20
41.500	0.00	5.25	3.637	I	o	|	|	|	3.18
41.583	0.00	5.23	3.601	I	o	|	|	|	3.17
41.667	0.00	5.21	3.565	I	o	|	|	|	3.15
41.750	0.00	5.19	3.529	I	o	|	|	|	3.14
41.833	0.00	5.17	3.494	I	o	|	|	|	3.12
41.917	0.00	5.15	3.458	I	o	|	|	|	3.11
42.000	0.00	5.13	3.423	I	o	|	|	|	3.09
42.083	0.00	5.11	3.387	I	o	|	|	|	3.08
42.167	0.00	5.09	3.352	I	o	|	|	|	3.06
42.250	0.00	5.07	3.317	I	o	|	|	|	3.05
42.333	0.00	5.05	3.282	I	o	|	|	|	3.03
42.417	0.00	5.03	3.248	I	o	|	|	|	3.02
42.500	0.00	5.01	3.213	I	o	|	|	|	3.01
42.583	0.00	4.99	3.179	I	o	|	|	|	2.99
42.667	0.00	4.97	3.144	I	o	|	|	|	2.97
42.750	0.00	4.95	3.110	I	o	|	|	|	2.95
42.833	0.00	4.93	3.076	I	o	|	|	|	2.93
42.917	0.00	4.91	3.042	I	o	|	|	|	2.91
43.000	0.00	4.89	3.009	I	o	|	|	|	2.89
43.083	0.00	4.87	2.975	I	o	|	|	|	2.87
43.167	0.00	4.85	2.942	I	o	|	|	|	2.85
43.250	0.00	4.83	2.908	I	o	|	|	|	2.83
43.333	0.00	4.81	2.875	I	o	|	|	|	2.81
43.417	0.00	4.79	2.842	I	o	|	|	|	2.79
43.500	0.00	4.77	2.809	I	o	|	|	|	2.77
43.583	0.00	4.75	2.776	I	o	|	|	|	2.75
43.667	0.00	4.73	2.744	I	o	|	|	|	2.73
43.750	0.00	4.71	2.711	I	o	|	|	|	2.71
43.833	0.00	4.69	2.679	I	o	|	|	|	2.69
43.917	0.00	4.67	2.647	I	o	|	|	|	2.67
44.000	0.00	4.66	2.614	I	o	|	|	|	2.66
44.083	0.00	4.64	2.582	I	o	|	|	|	2.64
44.167	0.00	4.62	2.551	I	o	|	|	|	2.62
44.250	0.00	4.60	2.519	I	o	|	|	|	2.60
44.333	0.00	4.58	2.487	I	o	|	|	|	2.58
44.417	0.00	4.56	2.456	I	o	|	|	|	2.56
44.500	0.00	4.54	2.424	I	o	|	|	|	2.54
44.583	0.00	4.53	2.393	I	o	|	|	|	2.53
44.667	0.00	4.51	2.362	I	o	|	|	|	2.51
44.750	0.00	4.49	2.331	I	o	|	|	|	2.49
44.833	0.00	4.47	2.300	I	o	|	|	|	2.47
44.917	0.00	4.45	2.269	I	o	|	|	|	2.45
45.000	0.00	4.43	2.239	I	o	|	|	|	2.43
45.083	0.00	4.42	2.208	I	o	|	|	|	2.42
45.167	0.00	4.40	2.178	I	o	|	|	|	2.40
45.250	0.00	4.38	2.148	I	o	|	|	|	2.38
45.333	0.00	4.36	2.118	I	o	|	|	|	2.36
45.417	0.00	4.35	2.088	I	o	|	|	|	2.35
45.500	0.00	4.33	2.058	I	o	|	|	|	2.33
45.583	0.00	4.31	2.028	I	o	|	|	|	2.31
45.667	0.00	4.29	1.998	I	o	|	|	|	2.29
45.750	0.00	4.28	1.969	I	o	|	|	|	2.28
45.833	0.00	4.26	1.940	I	o	|	|	|	2.26
45.917	0.00	4.24	1.910	I	o	|	|	|	2.24
46.000	0.00	4.22	1.881	I	o	|	|	|	2.22
46.083	0.00	4.21	1.852	I	o	|	|	|	2.21
46.167	0.00	4.19	1.823	I	o	|	|	|	2.19
46.250	0.00	4.17	1.794	I	o	|	|	|	2.17
46.333	0.00	4.16	1.766	I	o	|	|	|	2.16
46.417	0.00	4.14	1.737	I	o	|	|	|	2.14
46.500	0.00	4.12	1.709	I	o	|	|	|	2.12
46.583	0.00	4.11	1.680	I	o	|	|	|	2.11
46.667	0.00	4.09	1.652	I	o	|	|	|	2.09
46.750	0.00	4.07	1.624	I	o	|	|	|	2.07
46.833	0.00	4.06	1.596	I	o	|	|	|	2.06
46.917	0.00	4.04	1.568	I	o	|	|	|	2.04
47.000	0.00	4.02	1.540	I	o	|	|	|	2.02
47.083	0.00	4.01	1.513	I	o	|	|	|	2.01
47.167	0.00	3.98	1.485	I	o	|	|	|	1.99
47.250	0.00	3.93	1.458	I	o	|	|	|	1.97
47.333	0.00	3.89	1.431	I	o	|	|	|	1.94
47.417	0.00	3.84	1.405	I	o	|	|	|	1.92
47.500	0.00	3.80	1.378	I	o	|	|	|	1.90
47.583	0.00	3.75	1.352	I	o	|	|	|	1.88
47.667	0.00	3.71	1.327	I	o	|	|	|	1.86
47.750	0.00	3.67	1.301	I	o	|	|	|	1.83
47.833	0.00	3.63	1.276	I	o	|	|	|	1.81
47.917	0.00	3.59	1.251	I	o	|	|	|	1.79
48.000	0.00	3.54	1.227	I	o	|	|	|	1.77
48.083	0.00	3.50	1.202	I	o	|	|	|	1.75

48.167	0.00	3.46	1.178	I O				1.73
48.250	0.00	3.42	1.155	I O				1.71
48.333	0.00	3.39	1.131	I O				1.69
48.417	0.00	3.35	1.108	I O				1.67
48.500	0.00	3.31	1.085	I O				1.65
48.583	0.00	3.27	1.062	I O				1.64
48.667	0.00	3.23	1.040	I O				1.62
48.750	0.00	3.20	1.018	I O				1.60
48.833	0.00	3.16	0.996	I O				1.58
48.917	0.00	3.12	0.974	I O				1.56
49.000	0.00	3.09	0.953	I O				1.54
49.083	0.00	3.05	0.932	I O				1.53
49.167	0.00	3.02	0.911	I O				1.51
49.250	0.00	2.98	0.890	I O				1.49
49.333	0.00	2.95	0.870	I O				1.47
49.417	0.00	2.92	0.850	I O				1.46
49.500	0.00	2.88	0.830	I O				1.44
49.583	0.00	2.85	0.810	I O				1.42
49.667	0.00	2.82	0.790	I O				1.41
49.750	0.00	2.79	0.771	I O				1.39
49.833	0.00	2.75	0.752	I O				1.38
49.917	0.00	2.72	0.733	I O				1.36
50.000	0.00	2.69	0.715	I O				1.35
50.083	0.00	2.66	0.696	I O				1.33
50.167	0.00	2.63	0.678	I O				1.31
50.250	0.00	2.60	0.660	I O				1.30
50.333	0.00	2.57	0.642	I O				1.29
50.417	0.00	2.54	0.624	I O				1.27
50.500	0.00	2.51	0.607	IO				1.26
50.583	0.00	2.48	0.590	IO				1.24
50.667	0.00	2.45	0.573	IO				1.23
50.750	0.00	2.43	0.556	IO				1.21
50.833	0.00	2.40	0.539	IO				1.20
50.917	0.00	2.37	0.523	IO				1.19
51.000	0.00	2.34	0.507	IO				1.17
51.083	0.00	2.32	0.491	IO				1.16
51.167	0.00	2.29	0.475	IO				1.15
51.250	0.00	2.27	0.459	IO				1.13
51.333	0.00	2.24	0.444	IO				1.12
51.417	0.00	2.21	0.428	IO				1.11
51.500	0.00	2.19	0.413	IO				1.09
51.583	0.00	2.16	0.398	IO				1.08
51.667	0.00	2.14	0.383	IO				1.07
51.750	0.00	2.11	0.369	IO				1.06
51.833	0.00	2.09	0.354	IO				1.05
51.917	0.00	2.07	0.340	IO				1.03
52.000	0.00	2.04	0.326	IO				1.02
52.083	0.00	2.02	0.312	IO				1.01
52.167	0.00	1.99	0.298	IO				0.99
52.250	0.00	1.90	0.285	IO				0.95
52.333	0.00	1.81	0.272	IO				0.91
52.417	0.00	1.73	0.260	IO				0.87
52.500	0.00	1.65	0.248	IO				0.83
52.583	0.00	1.58	0.237	IO				0.79
52.667	0.00	1.51	0.226	IO				0.75
52.750	0.00	1.44	0.216	IO				0.72
52.833	0.00	1.38	0.206	IO				0.69
52.917	0.00	1.31	0.197	IO				0.66
53.000	0.00	1.25	0.188	O				0.63
53.083	0.00	1.20	0.180	O				0.60
53.167	0.00	1.14	0.172	O				0.57
53.250	0.00	1.09	0.164	O				0.55
53.333	0.00	1.04	0.157	O				0.52
53.417	0.00	1.00	0.150	O				0.50
53.500	0.00	0.95	0.143	O				0.48
53.583	0.00	0.91	0.136	O				0.45
53.667	0.00	0.87	0.130	O				0.43
53.750	0.00	0.83	0.125	O				0.42
53.833	0.00	0.79	0.119	O				0.40
53.917	0.00	0.76	0.114	O				0.38
54.000	0.00	0.72	0.108	O				0.36
54.083	0.00	0.69	0.104	O				0.35
54.167	0.00	0.66	0.099	O				0.33
54.250	0.00	0.63	0.095	O				0.32
54.333	0.00	0.60	0.090	O				0.30
54.417	0.00	0.57	0.086	O				0.29
54.500	0.00	0.55	0.082	O				0.27
54.583	0.00	0.52	0.079	O				0.26
54.667	0.00	0.50	0.075	O				0.25
54.750	0.00	0.48	0.072	O				0.24
54.833	0.00	0.46	0.069	O				0.23

54.917	0.00	0.44	0.065	o	|	|	|	|	0.22
55.000	0.00	0.42	0.063	o	|	|	|	|	0.21
55.083	0.00	0.40	0.060	o	|	|	|	|	0.20
55.167	0.00	0.38	0.057	o	|	|	|	|	0.19
55.250	0.00	0.36	0.054	o	|	|	|	|	0.18
55.333	0.00	0.35	0.052	o	|	|	|	|	0.17
55.417	0.00	0.33	0.050	o	|	|	|	|	0.17
55.500	0.00	0.32	0.047	o	|	|	|	|	0.16
55.583	0.00	0.30	0.045	o	|	|	|	|	0.15
55.667	0.00	0.29	0.043	o	|	|	|	|	0.14
55.750	0.00	0.28	0.041	o	|	|	|	|	0.14
55.833	0.00	0.26	0.040	o	|	|	|	|	0.13
55.917	0.00	0.25	0.038	o	|	|	|	|	0.13
56.000	0.00	0.24	0.036	o	|	|	|	|	0.12
56.083	0.00	0.23	0.034	o	|	|	|	|	0.11
56.167	0.00	0.22	0.033	o	|	|	|	|	0.11
56.250	0.00	0.21	0.031	o	|	|	|	|	0.10
56.333	0.00	0.20	0.030	o	|	|	|	|	0.10
56.417	0.00	0.19	0.029	o	|	|	|	|	0.10
56.500	0.00	0.18	0.027	o	|	|	|	|	0.09
56.583	0.00	0.17	0.026	o	|	|	|	|	0.09
56.667	0.00	0.17	0.025	o	|	|	|	|	0.08
56.750	0.00	0.16	0.024	o	|	|	|	|	0.08
56.833	0.00	0.15	0.023	o	|	|	|	|	0.08
56.917	0.00	0.14	0.022	o	|	|	|	|	0.07
57.000	0.00	0.14	0.021	o	|	|	|	|	0.07
57.083	0.00	0.13	0.020	o	|	|	|	|	0.07
57.167	0.00	0.13	0.019	o	|	|	|	|	0.06
57.250	0.00	0.12	0.018	o	|	|	|	|	0.06
57.333	0.00	0.12	0.017	o	|	|	|	|	0.06
57.417	0.00	0.11	0.017	o	|	|	|	|	0.06
57.500	0.00	0.11	0.016	o	|	|	|	|	0.05
57.583	0.00	0.10	0.015	o	|	|	|	|	0.05
57.667	0.00	0.10	0.014	o	|	|	|	|	0.05

Remaining water in basin = 0.01 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 692
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 10.205 (CFS)
Total volume = 27.799 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX J.4: STORAGE VOLUME CALCULATIONS

TTM 36294-ARANTINE HILLS

100-YR. VOLUME CAPACITY CALCULATIONS FOR BASIN "A"					
ELEVATION	DEPTH	AREA (SF)	AREA (AC)	VOLUME (AC-FT)	VOLUME TOTAL (AC-FT)
890		687.9	0.0	0.0	0.0
	1				
891		41858.4	1.0	0.4	0.4
	1				
892		68609.2	1.6	1.3	1.6
	1				
893		91506.5	2.1	1.8	3.5
	1				
894		108660.8	2.5	2.3	5.7
	1				
895		112992.0	2.6	2.5	8.3
	1				
896		117383.5	2.7	2.6	10.9
	1				
897		122038.5	2.8	2.7	13.7
	0.3				
897.3		**123671.6**	**2.8**	**0.8**	**14.5**
	0.7				
898		127411.5	2.9	2.0	16.5
	1				
899		133288.6	3.1	3.0	19.5
	1				
900		139639.6	3.2	3.1	22.7
	1				
901		146327.0	3.4	3.3	26.0

APPENDIX K: BASIN ROUTING CALCULATIONS FOR DETENTION BASIN "B"

APPENDIX K.1: 100-YEAR/ 1-HOUR BASIN ROUTING CALCULATIONS

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2001
Study date: 06/23/10

ARANTINE HILLS
BASIN ROUTING RUN FOR BASIN B
100 yr., 1 Hr.
FN:BASINB

TRI-8 Builders - S/N 615

********** HYDROGRAPH INFORMATION **********

From study/file name: BUHMDP1100.rte

**********HYDROGRAPH DATA**********

Number of intervals = 16
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 60.321 (CFS)
Total volume = 2.291 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 100.000 to Point/Station 101.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 16
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.100	6.500	0.078	0.122
2.000	0.400	14.500	0.350	0.450
3.000	0.800	26.000	0.710	0.890
4.000	1.200	33.500	1.085	1.315
4.520	1.400	35.700	1.277	1.523

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 15.1 30.16 45.24 60.32	Depth (Ft.)
0.083	4.58	0.84	0.013	O I	0.13
0.167	10.44	3.28	0.050	O I	0.50
0.250	13.19	6.40	0.098	O I	0.98
0.333	15.38	7.78	0.148	O I	1.16
0.417	16.51	9.15	0.200	O I	1.33
0.500	18.21	10.53	0.251	O I	1.50
0.583	21.80	12.13	0.311	O I	1.70
0.667	26.52	14.15	0.387	O I	1.96
0.750	34.68	17.09	0.490	O I	2.23
0.833	60.32	22.57	0.681	O I	2.70
0.917	59.67	28.23	0.919	O I	3.30
1.000	29.82	30.23	1.026	IO	3.56
1.083	14.65	29.26	0.974	I O	3.44
1.167	5.14	26.91	0.849	I O	3.12

1.250	1.32	23.09	0.699	I		O			2.75
1.333	0.38	19.08	0.559	I		O			2.40
1.417	0.00	15.68	0.441	I		O			2.10
1.500	0.00	12.96	0.342	I	O				1.81
1.583	0.00	10.78	0.261	I	O				1.54
1.667	0.00	8.97	0.193	I	O				1.31
1.750	0.00	7.46	0.136	I O					1.12
1.833	0.00	5.86	0.090	I O					0.90
1.917	0.00	3.72	0.057	IO					0.57
2.000	0.00	2.36	0.036	IO					0.36
2.083	0.00	1.49	0.023	O					0.23
2.167	0.00	0.95	0.015	O					0.15
2.250	0.00	0.60	0.009	O					0.09
2.333	0.00	0.38	0.006	O					0.06
2.417	0.00	0.24	0.004	O					0.04
2.500	0.00	0.15	0.002	O					0.02
2.583	0.00	0.10	0.001	O					0.01

Remaining water in basin = 0.00 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 31
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 30.233 (CFS)
Total volume = 2.290 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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APPENDIX K.2: 2-YEAR/1-HOUR BASIN ROUTING CALCULATIONS

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2001
Study date: 07/01/10

ARANTINE HILLS-TRACT MAP 36294
FLOOD HYDROGRAPH ROUTING FOR BASIN B
FOR 2YR.-1 HR.
FN:BASINB1

TRI-8 Builders - S/N 615

********** HYDROGRAPH INFORMATION **********

From study/file name: B1UHMDP12.rte

**********HYDROGRAPH DATA**********

Number of intervals = 16
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 18.998 (CFS)
Total volume = 0.512 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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++

Process from Point/Station 100.000 to Point/Station 101.000

**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 16
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.100	7.200	0.075	0.125
1.500	0.200	15.100	0.148	0.252

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 4.7 9.50 14.25 19.00	Depth (Ft.)
0.083	0.07	0.01	0.000	O	0.00
0.167	0.22	0.07	0.001	O	0.01
0.250	0.81	0.25	0.003	OI	0.03
0.333	1.47	0.60	0.008	OI	0.08
0.417	1.79	1.01	0.014	O I	0.14
0.500	2.45	1.45	0.020	O I	0.20
0.583	3.87	2.13	0.030	O I	0.30
0.667	5.72	3.19	0.044	O I	0.44
0.750	8.92	4.83	0.067	O I	0.67
0.833	19.00	8.55	0.117	O I	1.09
0.917	18.74	12.97	0.173	O I	1.37
1.000	7.02	12.93	0.173	I O	1.36
1.083	2.78	9.50	0.129	I O	1.15
1.167	1.20	6.35	0.088	I O	0.88
1.250	0.19	4.10	0.057	I O	0.57
1.333	0.03	2.52	0.035	I O	0.35
1.417	0.00	1.52	0.021	I O	0.21

1.500	0.00	0.92	0.013	IO	|	|	|	|	0.13
1.583	0.00	0.55	0.008	O	|	|	|	|	0.08
1.667	0.00	0.33	0.005	O	|	|	|	|	0.05
1.750	0.00	0.20	0.003	O	|	|	|	|	0.03
1.833	0.00	0.12	0.002	O	|	|	|	|	0.02
1.917	0.00	0.07	0.001	O	|	|	|	|	0.01

**********HYDROGRAPH DATA**********

Number of intervals = 23
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 12.967 (CFS)
Total volume = 0.511 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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APPENDIX K.3: 2-YEAR/24-HOUR BASIN ROUTING CALCULATIONS

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2001
Study date: 07/06/10

ARANTINE HILLS-TRACT MAP 36294
FLOOD HYDROGRAPH ROUTING FOR BASIN B
FOR 2YR.-24 HR.
FN:BASINB24

TRI-8 Builders - S/N 615

********** HYDROGRAPH INFORMATION **********

From study/file name: B1UHMDP242.rte

**********HYDROGRAPH DATA**********

Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 3.508 (CFS)
Total volume = 2.270 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 100.000 to Point/Station 101.000

**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

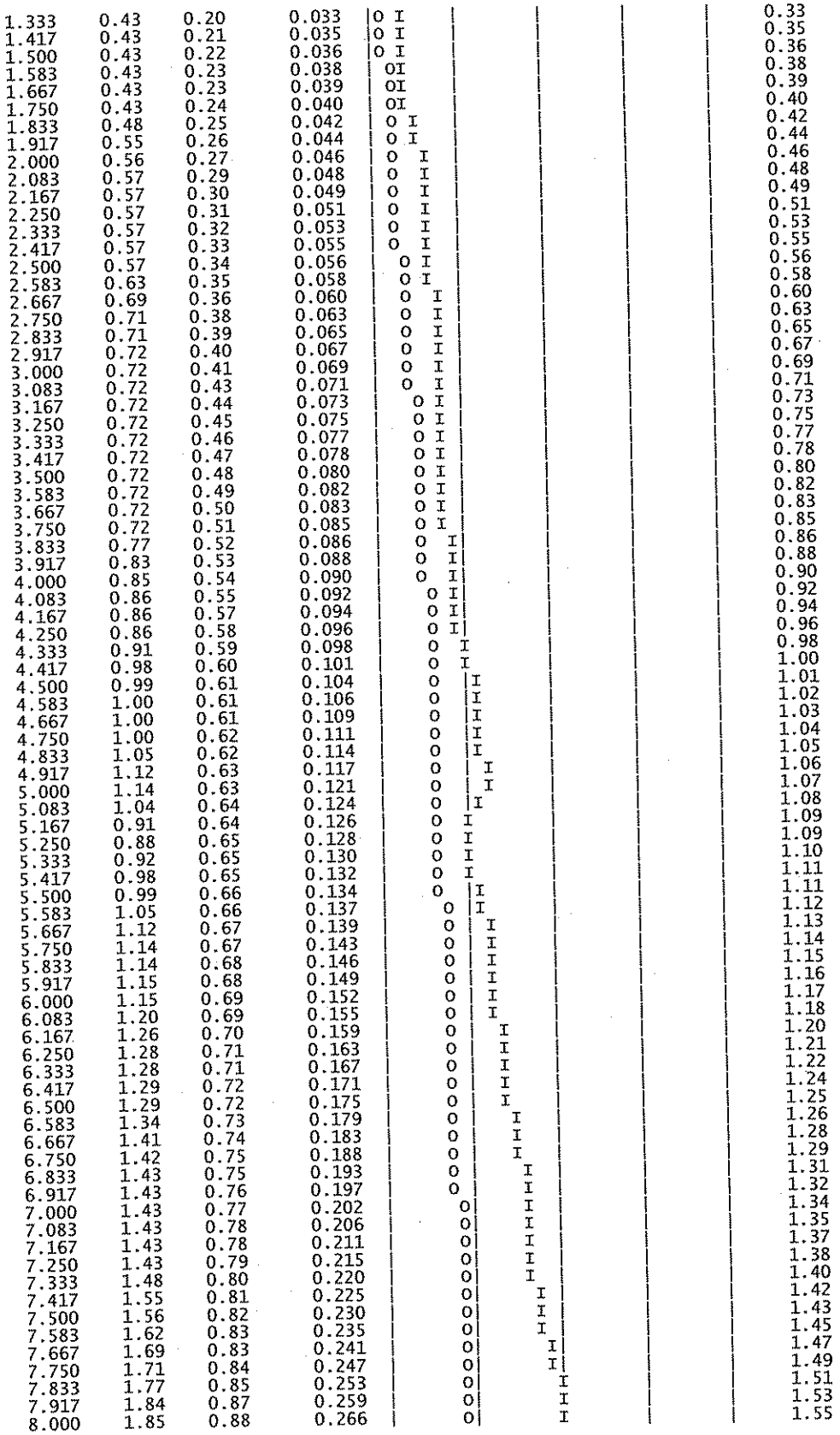
Depth vs. Storage and Depth vs. Discharge data:

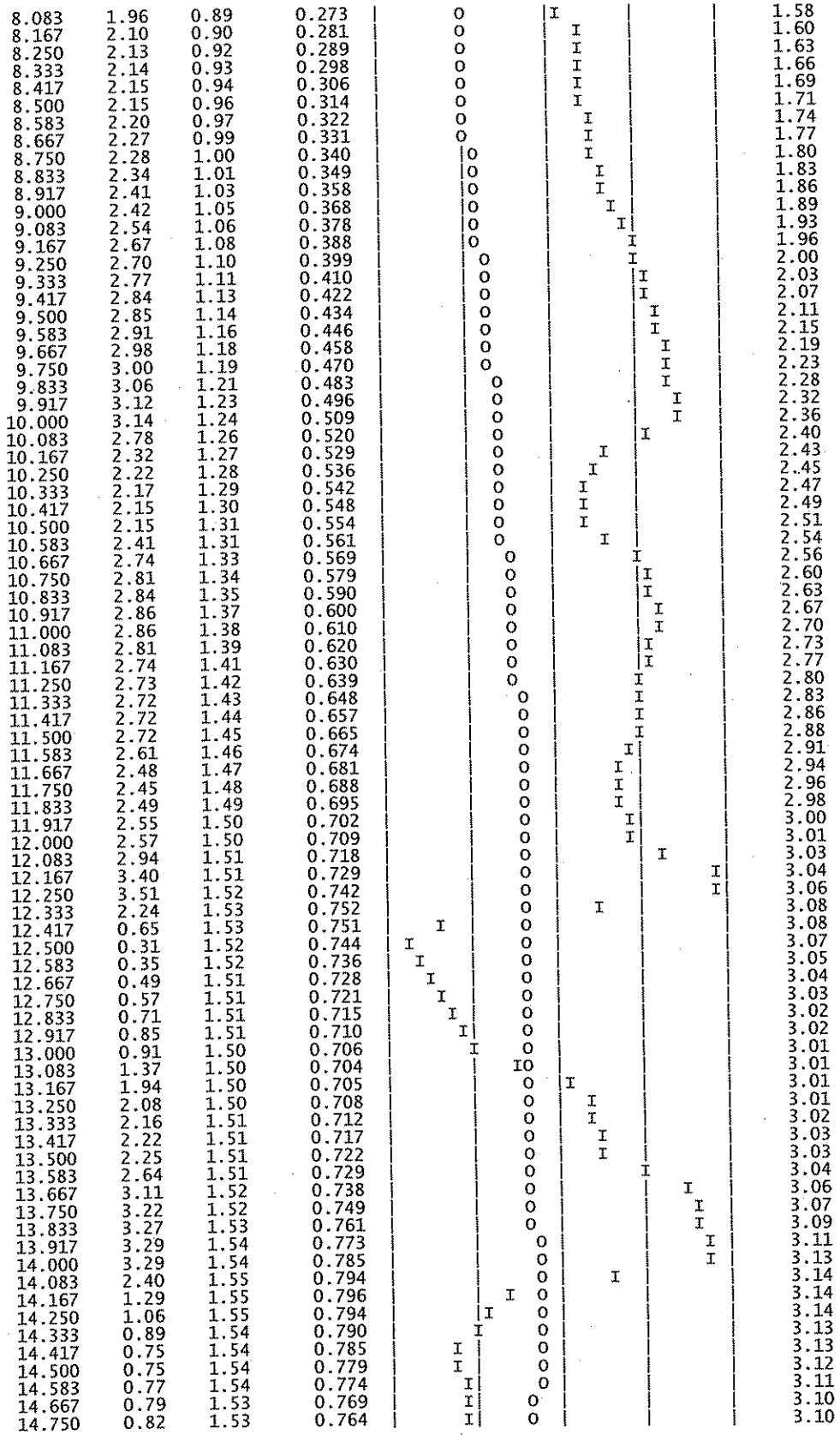
Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.100	0.600	0.098	0.102
2.000	0.400	1.100	0.396	0.404
3.000	0.700	1.500	0.695	0.705
3.300	0.900	1.600	0.894	0.906

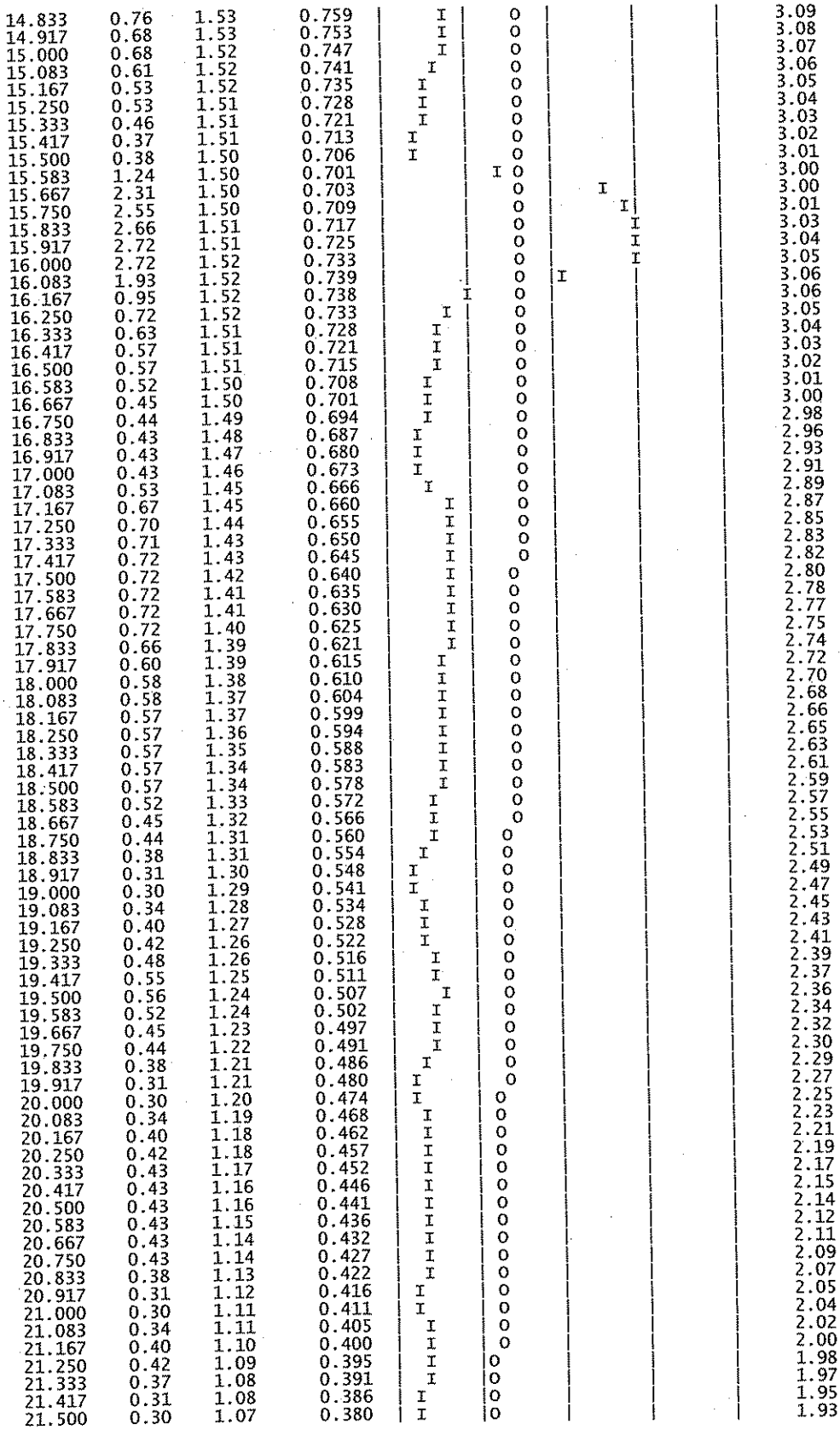
Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.9	1.75	2.63	3.51	Depth (Ft.)
0.083	0.11	0.00	0.000	O	|	|	|	|	0.00
0.167	0.24	0.01	0.001	O I	|	|	|	|	0.01
0.250	0.27	0.02	0.003	O I	|	|	|	|	0.03
0.333	0.33	0.03	0.005	O I	|	|	|	|	0.05
0.417	0.40	0.04	0.007	O I	|	|	|	|	0.07
0.500	0.42	0.06	0.010	O I	|	|	|	|	0.10
0.583	0.43	0.07	0.012	O I	|	|	|	|	0.12
0.667	0.43	0.09	0.015	O I	|	|	|	|	0.15
0.750	0.43	0.10	0.017	O I	|	|	|	|	0.17
0.833	0.48	0.12	0.019	|O I	|	|	|	|	0.19
0.917	0.55	0.13	0.022	|O I	|	|	|	|	0.22
1.000	0.56	0.15	0.025	|O I	|	|	|	|	0.25
1.083	0.52	0.17	0.028	|O I	|	|	|	|	0.28
1.167	0.45	0.18	0.030	|O I	|	|	|	|	0.30
1.250	0.44	0.19	0.031	|O I	|	|	|	|	0.31







21.583	0.34	1.06	0.375	| I |o	|	|	|	1.92
21.667	0.40	1.05	0.370	| I |o	|	|	|	1.90
21.750	0.42	1.04	0.366	| I |o	|	|	|	1.89
21.833	0.37	1.04	0.362	| I |o	|	|	|	1.87
21.917	0.31	1.03	0.357	| I |o	|	|	|	1.86
22.000	0.30	1.02	0.352	| I |o	|	|	|	1.84
22.083	0.34	1.01	0.347	| I |o	|	|	|	1.82
22.167	0.40	1.00	0.343	| I |o	|	|	|	1.81
22.250	0.42	1.00	0.339	| I |o	|	|	|	1.80
22.333	0.37	0.99	0.335	| I |o	|	|	|	1.78
22.417	0.31	0.98	0.330	| I o	|	|	|	1.77
22.500	0.30	0.98	0.326	| I o	|	|	|	1.75
22.583	0.29	0.97	0.321	| I o	|	|	|	1.74
22.667	0.29	0.96	0.316	| I o	|	|	|	1.72
22.750	0.29	0.95	0.312	| I o	|	|	|	1.71
22.833	0.29	0.95	0.307	| I o	|	|	|	1.69
22.917	0.29	0.94	0.302	| I o	|	|	|	1.67
23.000	0.29	0.93	0.298	| I o	|	|	|	1.66
23.083	0.29	0.92	0.294	| I o	|	|	|	1.65
23.167	0.29	0.92	0.289	| I o	|	|	|	1.63
23.250	0.29	0.91	0.285	| I o	|	|	|	1.62
23.333	0.29	0.90	0.281	| I o	|	|	|	1.60
23.417	0.29	0.89	0.276	| I o	|	|	|	1.59
23.500	0.29	0.89	0.272	| I o	|	|	|	1.57
23.583	0.29	0.88	0.268	| I o	|	|	|	1.56
23.667	0.29	0.87	0.264	| I o|	|	|	|	1.55
23.750	0.29	0.87	0.260	| I o|	|	|	|	1.53
23.833	0.29	0.86	0.256	| I o|	|	|	|	1.52
23.917	0.29	0.85	0.252	| I o|	|	|	|	1.51
24.000	0.29	0.85	0.248	| I o|	|	|	|	1.49
24.083	0.18	0.84	0.244	|I o|	|	|	|	1.48
24.167	0.05	0.83	0.239	I o|	|	|	|	1.46
24.250	0.02	0.82	0.234	I o|	|	|	|	1.45
24.333	0.01	0.81	0.228	I o|	|	|	|	1.43
24.417	0.00	0.80	0.223	I o|	|	|	|	1.41
24.500	0.00	0.80	0.217	I o|	|	|	|	1.39
24.583	0.00	0.79	0.212	I o|	|	|	|	1.37
24.667	0.00	0.78	0.206	I o|	|	|	|	1.35
24.750	0.00	0.77	0.201	I o|	|	|	|	1.34
24.833	0.00	0.76	0.196	I o |	|	|	|	1.32
24.917	0.00	0.75	0.191	I o |	|	|	|	1.30
25.000	0.00	0.74	0.185	I o |	|	|	|	1.28
25.083	0.00	0.73	0.180	I o |	|	|	|	1.27
25.167	0.00	0.73	0.175	I o |	|	|	|	1.25
25.250	0.00	0.72	0.170	I o |	|	|	|	1.23
25.333	0.00	0.71	0.165	I o |	|	|	|	1.22
25.417	0.00	0.70	0.161	I o |	|	|	|	1.20
25.500	0.00	0.69	0.156	I o |	|	|	|	1.19
25.583	0.00	0.68	0.151	I o |	|	|	|	1.17
25.667	0.00	0.68	0.146	I o |	|	|	|	1.15
25.750	0.00	0.67	0.142	I o |	|	|	|	1.14
25.833	0.00	0.66	0.137	I o |	|	|	|	1.12
25.917	0.00	0.65	0.133	I o |	|	|	|	1.11
26.000	0.00	0.65	0.128	I o |	|	|	|	1.09
26.083	0.00	0.64	0.124	I o |	|	|	|	1.08
26.167	0.00	0.63	0.119	I o |	|	|	|	1.06
26.250	0.00	0.62	0.115	I o |	|	|	|	1.05
26.333	0.00	0.62	0.111	I o |	|	|	|	1.04
26.417	0.00	0.61	0.106	I o |	|	|	|	1.02
26.500	0.00	0.60	0.102	I o |	|	|	|	1.01
26.583	0.00	0.59	0.098	I o |	|	|	|	0.98
26.667	0.00	0.56	0.094	I o |	|	|	|	0.94
26.750	0.00	0.54	0.090	I o |	|	|	|	0.90
26.833	0.00	0.52	0.087	I o |	|	|	|	0.87
26.917	0.00	0.50	0.083	I o |	|	|	|	0.83
27.000	0.00	0.48	0.080	I o |	|	|	|	0.80
27.083	0.00	0.46	0.077	I o |	|	|	|	0.77
27.167	0.00	0.44	0.073	I o |	|	|	|	0.73
27.250	0.00	0.42	0.070	I o |	|	|	|	0.70
27.333	0.00	0.41	0.068	I o |	|	|	|	0.68
27.417	0.00	0.39	0.065	I o |	|	|	|	0.65
27.500	0.00	0.37	0.062	I o |	|	|	|	0.62
27.583	0.00	0.36	0.060	I o |	|	|	|	0.60
27.667	0.00	0.34	0.057	I o |	|	|	|	0.57
27.750	0.00	0.33	0.055	I o |	|	|	|	0.55
27.833	0.00	0.32	0.053	I o |	|	|	|	0.53
27.917	0.00	0.30	0.051	I o |	|	|	|	0.51
28.000	0.00	0.29	0.049	I o |	|	|	|	0.49
28.083	0.00	0.28	0.047	I o |	|	|	|	0.47
28.167	0.00	0.27	0.045	I o |	|	|	|	0.45
28.250	0.00	0.26	0.043	I o |	|	|	|	0.43

28.333	0.00	0.25	0.041	I O	|	|	|	0.41
28.417	0.00	0.24	0.040	I O	|	|	|	0.40
28.500	0.00	0.23	0.038	I O	|	|	|	0.38
28.583	0.00	0.22	0.036	IO	|	|	|	0.36
28.667	0.00	0.21	0.035	IO	|	|	|	0.35
28.750	0.00	0.20	0.034	IO	|	|	|	0.34
28.833	0.00	0.19	0.032	IO	|	|	|	0.32
28.917	0.00	0.19	0.031	IO	|	|	|	0.31
29.000	0.00	0.18	0.030	IO	|	|	|	0.30
29.083	0.00	0.17	0.028	IO	|	|	|	0.28
29.167	0.00	0.16	0.027	IO	|	|	|	0.27
29.250	0.00	0.16	0.026	IO	|	|	|	0.26
29.333	0.00	0.15	0.025	IO	|	|	|	0.25
29.417	0.00	0.14	0.024	IO	|	|	|	0.24
29.500	0.00	0.14	0.023	IO	|	|	|	0.23
29.583	0.00	0.13	0.022	IO	|	|	|	0.22
29.667	0.00	0.13	0.021	IO	|	|	|	0.21
29.750	0.00	0.12	0.020	IO	|	|	|	0.20
29.833	0.00	0.12	0.020	IO	|	|	|	0.20
29.917	0.00	0.11	0.019	IO	|	|	|	0.19
30.000	0.00	0.11	0.018	O	|	|	|	0.18
30.083	0.00	0.10	0.017	O	|	|	|	0.17
30.167	0.00	0.10	0.017	O	|	|	|	0.17

Remaining water in basin = 0.02 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 362
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 1.548 (CFS)
Total volume = 2.254 (Ac.Ft)

Status of hydrographs being held in storage

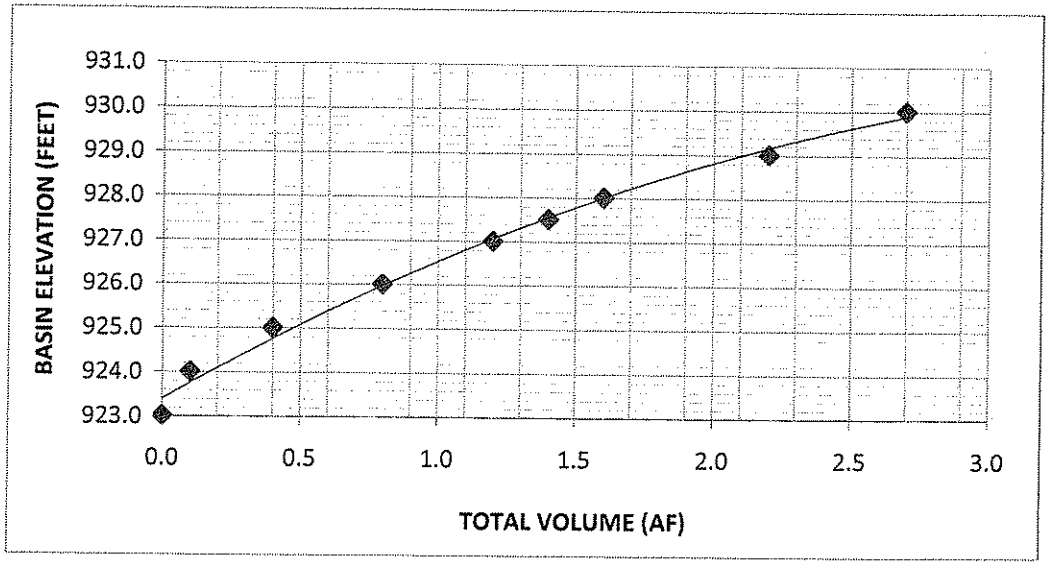
	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX K.4: STORAGE VOLUME CALCULATIONS

BASIN STORAGE VOLUME CURVE

TOTAL VOLUME (AF)	BASIN ELEVATION (FEET)
0.0	923.0
0.1	924.0
0.4	925.0
0.8	926.0
1.2	927.0
1.4	**927.5**
1.6	928.0
2.2	929.0
2.7	930.0

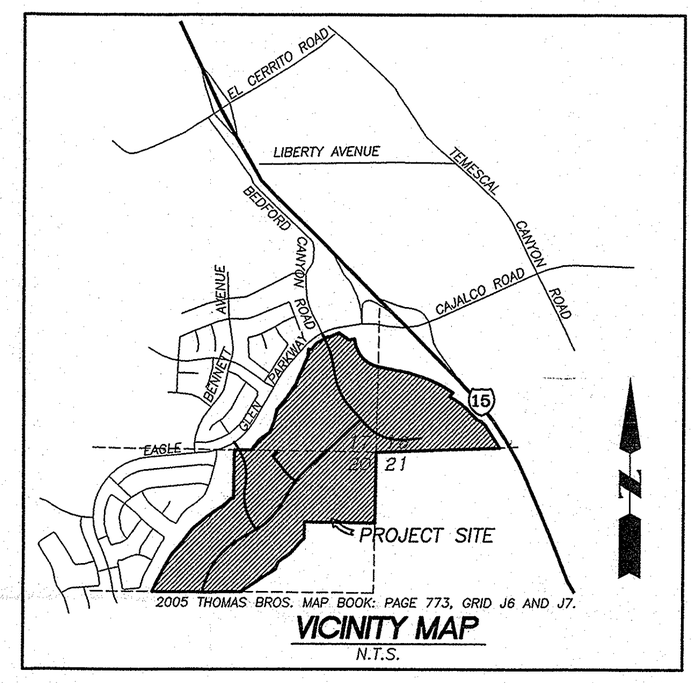


NOTES:

1. These were the numbers you provided the other day using the spreadsheet below.
2. The chart to the right above is created to see if your volume calculation results are accurate

EXHIBIT A: PROPOSED MDP FACILITIES MAP (SCALE: 1"= 300')

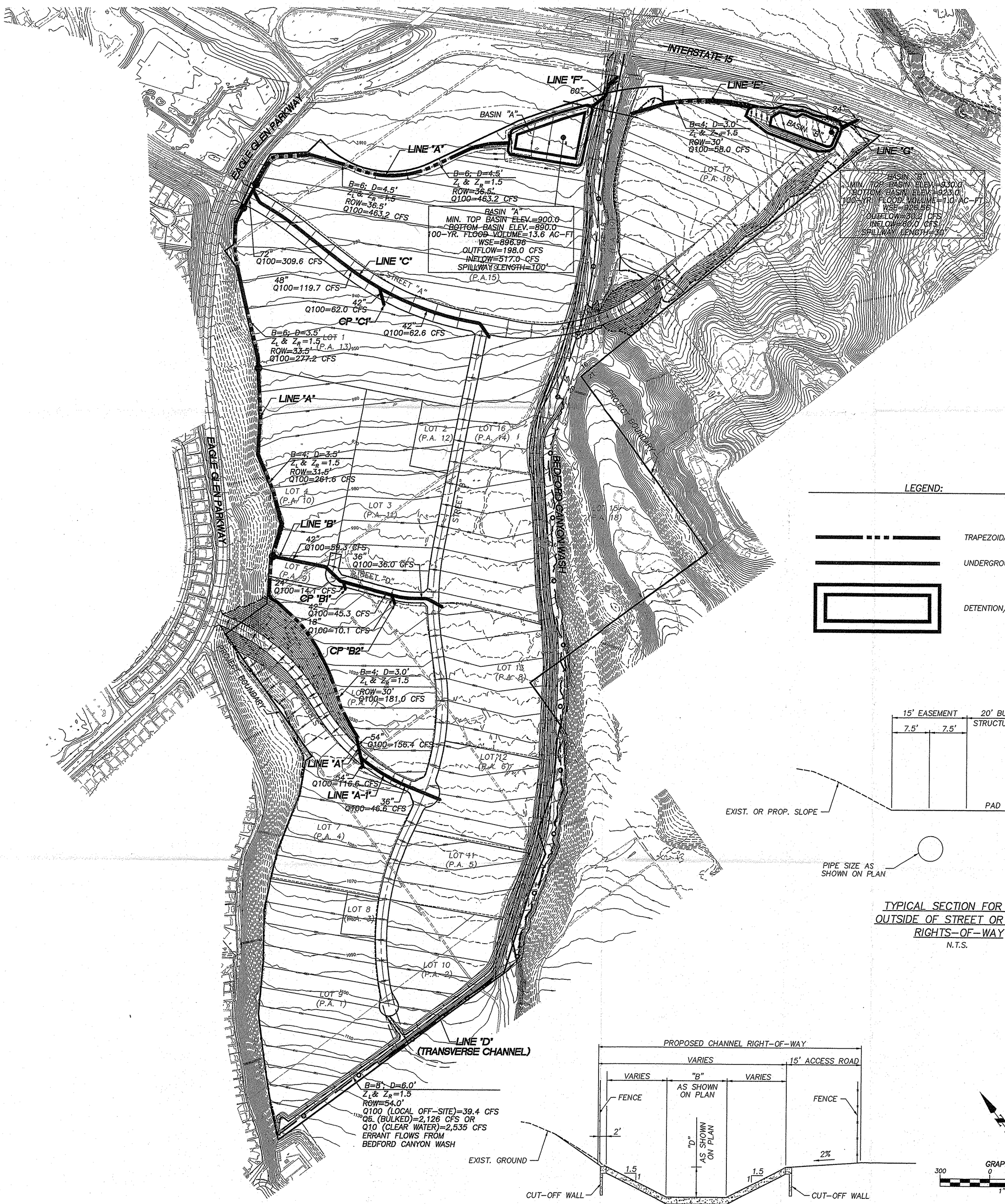
EXHIBIT "A" : ARANTINE HILLS
MASTER DRAINAGE PLAN FACILITY MAP
(TENTATIVE TRACT MAP NO. 36294)



2005 THOMAS BROS. MAP BOOK: PAGE 773, GRID J6 AND J7.

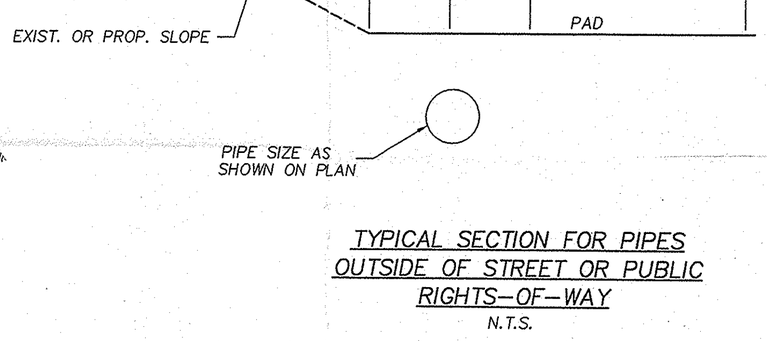
VICINITY MAP

N.T.S.



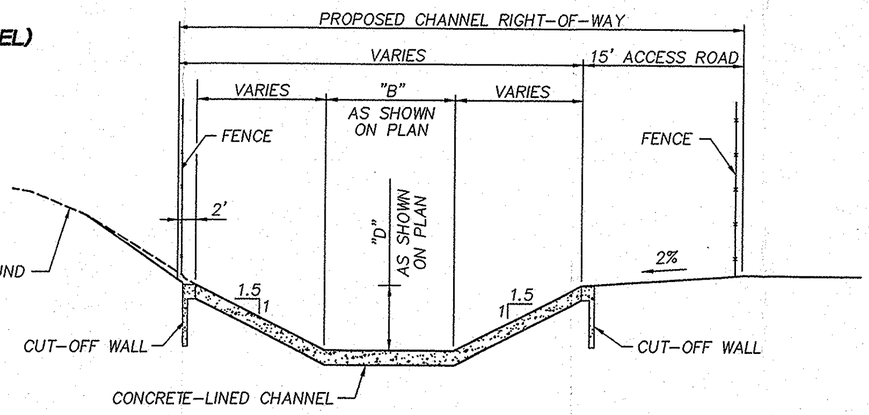
LEGEND:

- TRAPEZOIDAL CHANNEL
- UNDERGROUND PIPE
- DETENTION/WATER QUALITY BASIN



TYPICAL SECTION FOR PIPES OUTSIDE OF STREET OR PUBLIC RIGHTS-OF-WAY

N.T.S.



TYPICAL CHANNEL SECTION

N.T.S.

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

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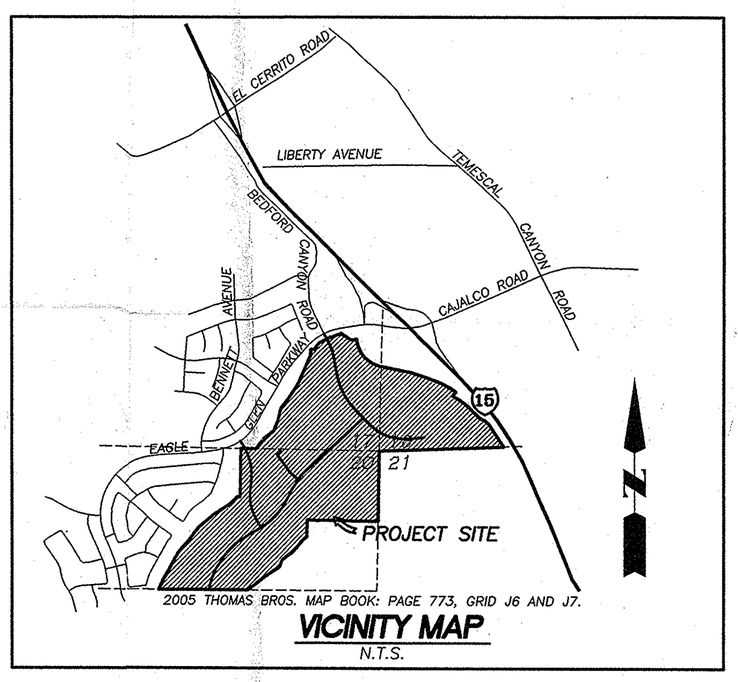
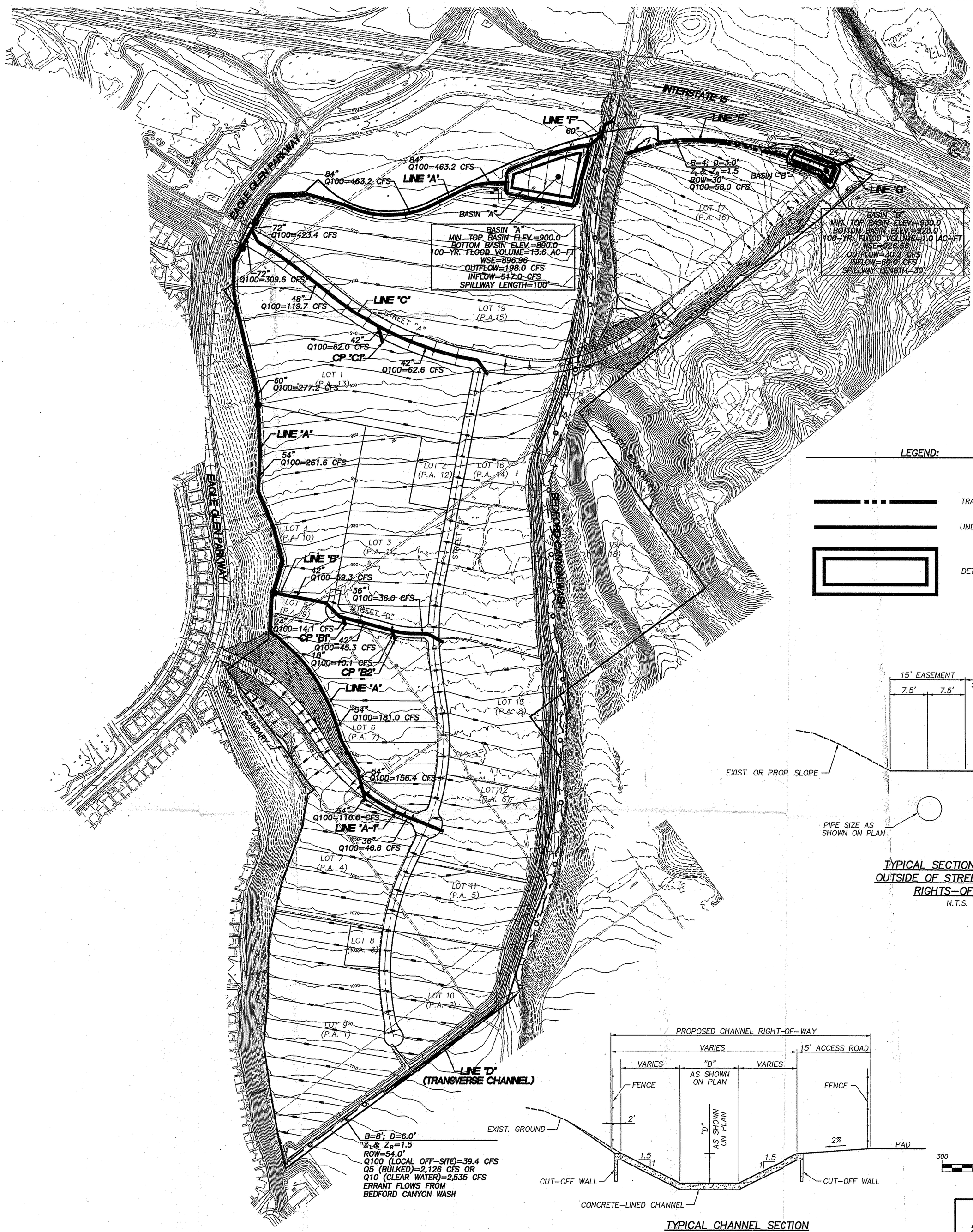
EXHIBIT B: PROPOSED ALTERNATE MDP FACILITIES MAP (SCALE 1" = 300")

EXHIBIT "B" : ARANTINE HILLS
MASTER DRAINAGE PLAN FACILITY MAP
(TENTATIVE TRACT MAP NO. 36294)
(ALTERNATE PLAN)

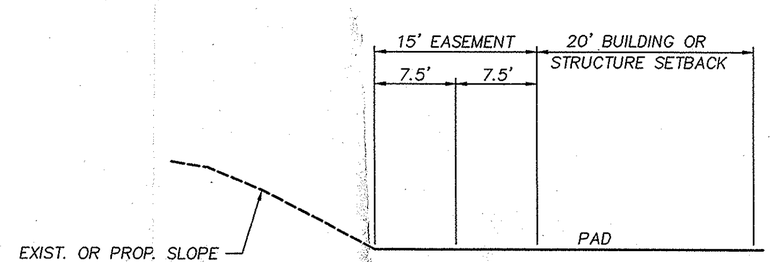


VICINITY MAP
N.T.S.



LEGEND:

- TRAPEZOIDAL CHANNEL
- UNDERGROUND PIPE (RCP)
- DETENTION/WATER QUALITY BASIN



TYPICAL SECTION FOR PIPES OUTSIDE OF STREET OR PUBLIC RIGHTS-OF-WAY
N.T.S.

TYPICAL CHANNEL SECTION
N.T.S.

GRAPHIC SCALE
300 0 150 300 600
1" = 300'

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EXHIBIT C: HYDROLOGY MAP BASED ON EXISTING CONDITION-RATIONAL TABLING METHOD (SCALE 1"= 200')

EXHIBIT "C" : ARANTINE HILLS
EXISTING CONDITION HYDROLOGY MAP (TENTATIVE TRACT MAP NO. 36294)
(RATIONAL TABLING METHOD)

EAGLE GLEN PARKWAY

INTERSTATE 15

BEDFORD CANYON WASH

STREET "A"

LOT 19 (P.M. 15)

LOT 15 (P.M. 15)

PROJECT BOUNDARY

L=1,900'

L=2,135'

L=2,339'

L=1,635'

L=1,705'

L=1,705'

L=1,430'

L=1,000'

L=985'

L=2,260'

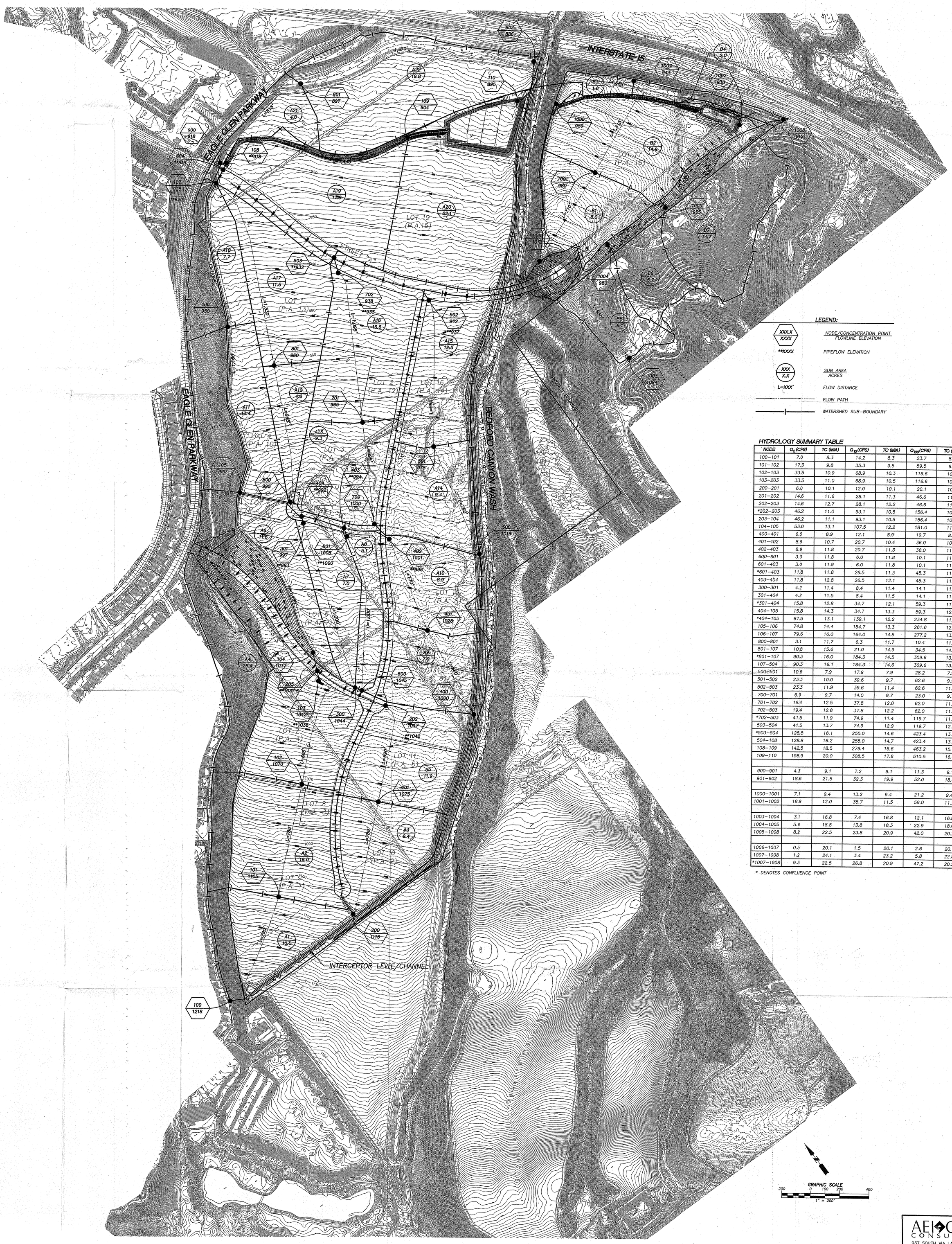
L=1,000'

L=1,000'

L=1,000

EXHIBIT D: HYDROLOGY MAP BASED ON PROPOSED CONDITION – RATIONAL TABLING METHOD (SCALE 1"= 200')

EXHIBIT "D" : ARANTINE HILLS
MASTER DRAINAGE PLAN HYDROLOGY MAP (TENTATIVE TRACT MAP NO. 36294)
(RATIONAL TABLING METHOD)



HYDROLOGY SUMMARY TABLE

NODE	Q_2(CFS)	TC (MIN.)	Q_{10}(CFS)	TC (MIN.)	Q_{100}(CFS)	TC (MIN.)
100–101	7.0	8.3	14.2	8.3	23.7	8.3
101–102	17.3	9.8	35.3	9.5	59.5	9.3
102–103	33.5	10.9	68.9	10.3	116.6	10.0
103–203	33.5	11.0	68.9	10.5	116.6	10.2
200–201	6.0	10.1	12.0	10.1	20.1	10.1
201–202	14.6	11.6	28.1	11.3	46.6	11.1
202–203	14.6	12.7	28.1	12.2	46.6	11.9
*202–203	46.2	11.0	93.1	10.5	156.4	10.2
203–104	46.2	11.1	93.1	10.5	156.4	10.2
104–105	53.0	13.1	107.5	12.2	181.0	11.6
400–401	6.5	8.9	12.1	8.9	19.7	8.9
401–402	8.9	10.7	20.7	10.4	36.0	10.2
402–403	8.9	11.8	20.7	11.3	36.0	11.0
600–601	3.0	11.8	6.0	11.8	10.1	11.8
601–403	3.0	11.9	6.0	11.8	10.1	11.8
*601–403	11.8	11.8	26.5	11.3	45.3	11.0
403–404	11.8	12.8	26.5	12.1	45.3	11.6
300–301	4.2	11.4	8.4	11.4	14.1	11.4
301–404	4.2	11.5	8.4	11.5	14.1	11.5
*301–404	15.8	12.8	34.7	12.1	59.3	11.6
404–105	15.8	14.3	34.7	13.3	59.3	12.8
*404–105	67.5	13.1	139.1	12.2	234.8	11.6
105–106	74.8	14.4	154.7	13.3	261.6	12.6
106–107	79.6	16.0	164.0	14.5	277.2	13.6
800–801	3.1	11.7	6.3	11.7	10.4	11.7
801–107	10.8	15.6	21.0	14.9	34.5	14.5
*801–107	90.3	16.0	184.3	14.5	309.6	13.6
107–504	90.3	16.1	184.3	14.6	309.6	13.7
500–501	10.6	7.9	17.9	7.9	28.2	7.9
501–502	23.3	10.0	39.6	9.7	62.6	9.5
502–503	23.3	11.9	39.6	11.4	62.6	11.0
700–701	6.9	9.7	14.0	9.7	23.0	9.7
701–702	19.4	12.5	37.8	12.0	62.0	11.7
702–503	19.4	12.8	37.8	12.2	62.0	11.9
*702–503	41.5	11.9	74.9	11.4	119.7	11.0
503–504	41.5	13.7	74.9	12.9	119.7	12.3
*503–504	128.8	16.1	255.0	14.6	423.4	13.7
504–108	128.8	16.2	255.0	14.7	423.4	13.8
108–109	142.5	18.5	279.4	16.6	463.2	15.4
109–110	158.9	20.0	308.5	17.8	510.5	16.5
900–901	4.3	9.1	7.2	9.1	11.3	9.1
901–902	18.6	21.5	32.3	19.9	52.0	18.6
1000–1001	7.1	9.4	13.2	9.4	21.2	9.4
1001–1002	18.9	12.0	35.7	11.5	58.0	11.2
1003–1004	3.1	16.8	7.4	16.8	12.1	16.8
1004–1005	5.6	18.8	13.8	18.3	22.9	18.0
1005–1008	8.2	22.5	23.8	20.9	42.0	20.2
1006–1007	0.5	20.1	1.5	20.1	2.6	20.1
1007–1008	1.2	24.1	3.4	23.2	5.8	22.8
*1007–1008	9.3	22.5	26.8	20.9	47.2	20.2

* DENOTES CONFLUENCE POINT

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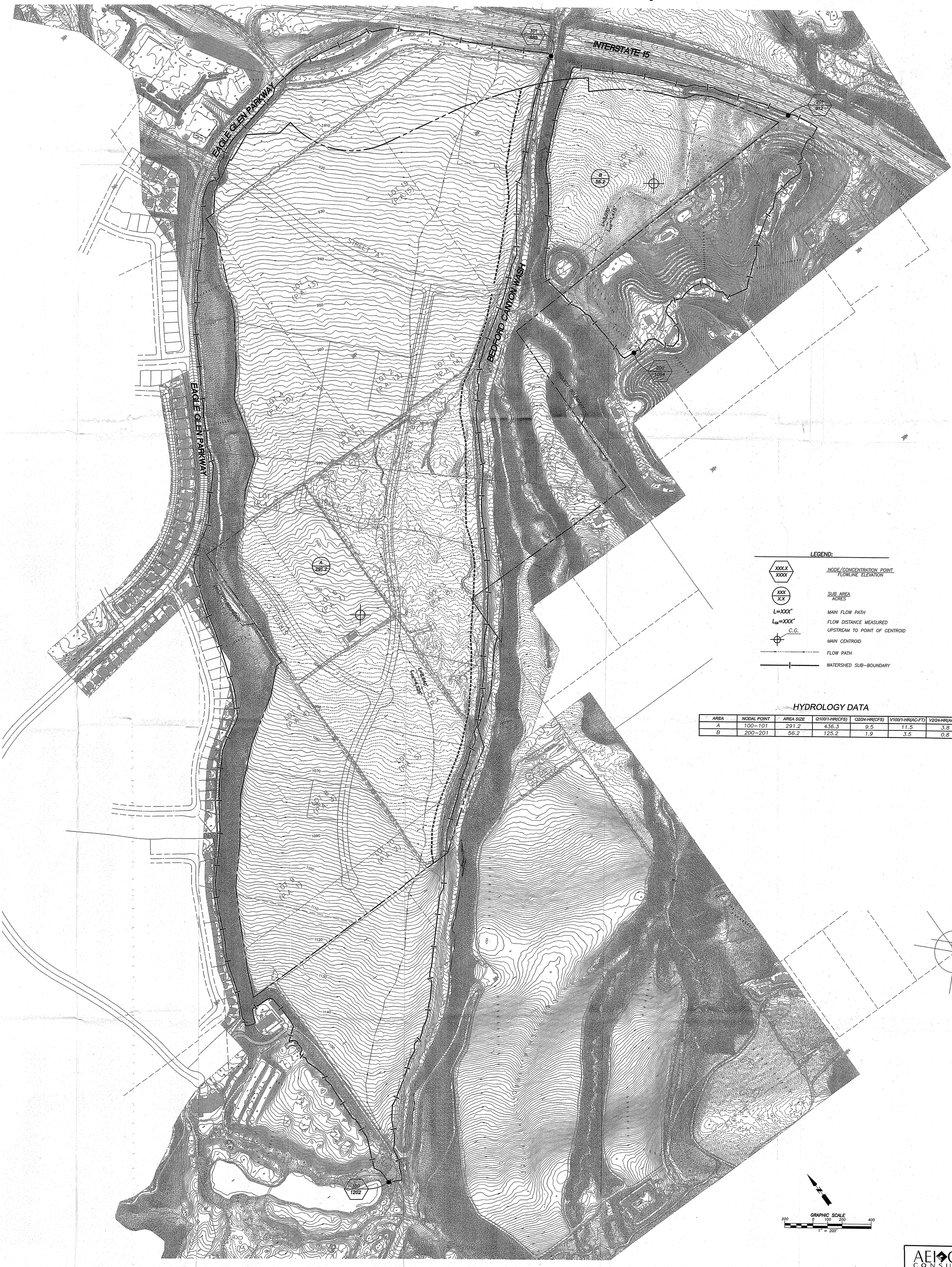
EXHIBIT E: HYDROLOGY MAP BASED ON EXISTING CONDITION-HYDROGRAPH METHOD (SCALE 1"= 200')

EXHIBIT "E" : ARANTINE HILLS
EXISTING CONDITION HYDROLOGY MAP (TENTATIVE TRACT MAP NO. 36294)
(HYDROGRAPH METHOD)



LEGEND:

XXX.X / XXXX	NODE/CONCENTRATION POINT / FLOWLINE ELEVATION
XXX / X.X	SUB AREA / ACRES
L=XXX'	MAIN FLOW PATH
L_{CA}=XXX'	FLOW DISTANCE MEASURED UPSTREAM TO POINT OF CENTROID
C.G.	MAIN CENTROID
	FLOW PATH
	WATERSHED SUB-BOUNDARY

HYDROLOGY DATA

AREA	NODAL POINT	AREA SIZE	Q100/1-HR(CFS)	Q2/24-HR(CFS)	V100/1-HR(AC-FT)	V2/24-HR(AC-FT)
A	100-101	291.2	436.3	9.5	11.5	3.8
B	200-201	56.2	125.2	1.9	3.5	0.8

GRAPHIC SCALE
200 0 100 200 400
1" = 200'

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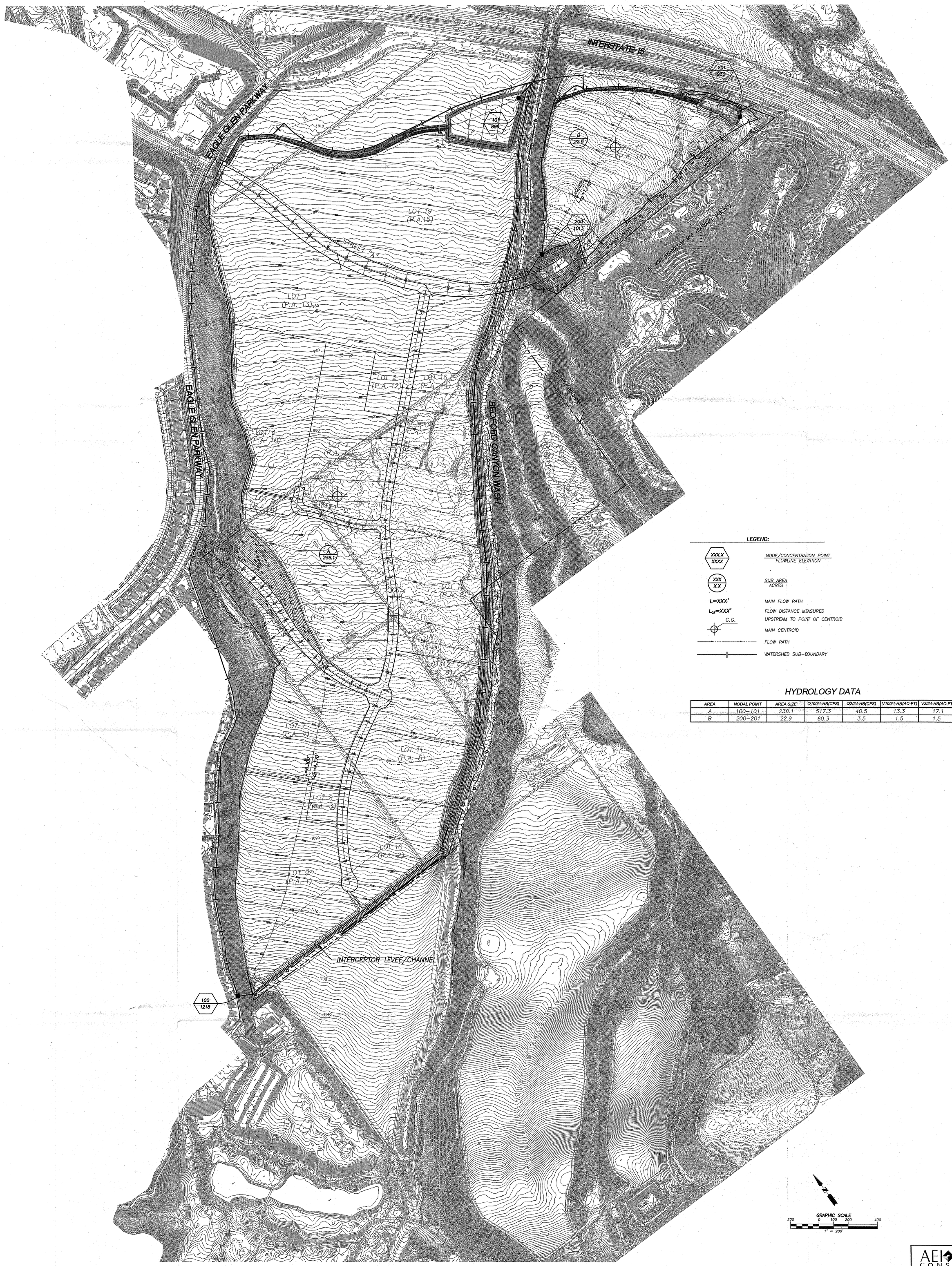
EXHIBIT F: HYDROLOGY MAP BASED ON PROPOSED CONDITION – HYDROGRAPH METHOD (SCALE 1" = 200')

EXHIBIT "F" : ARANTINE HILLS
MASTER DRAINAGE PLAN HYDROLOGY MAP (TENTATIVE TRACT MAP NO. 36294)
(HYDROGRAPH METHOD)



LEGEND:

XXX.X / XXXX	NODE/CONCENTRATION POINT / FLOWLINE ELEVATION
XXX / X.X	SUB AREA / ACRES
L=XXX'	MAIN FLOW PATH
L_{CA}=XXX'	FLOW DISTANCE MEASURED UPSTREAM TO POINT OF CENTROID
C.G.	MAIN CENTROID
	FLOW PATH
	WATERSHED SUB-BOUNDARY

HYDROLOGY DATA

AREA	NODAL POINT	AREA SIZE	Q100/1-HR(CFS)	Q2/24-HR(CFS)	V100/1-HR(AC-FT)	V2/24-HR(AC-FT)
A	100–101	238.1	517.3	40.5	13.3	17.1
B	200–201	22.9	60.3	3.5	1.5	1.5

GRAPHIC SCALE
200 0 100 200 400
1" = 200'

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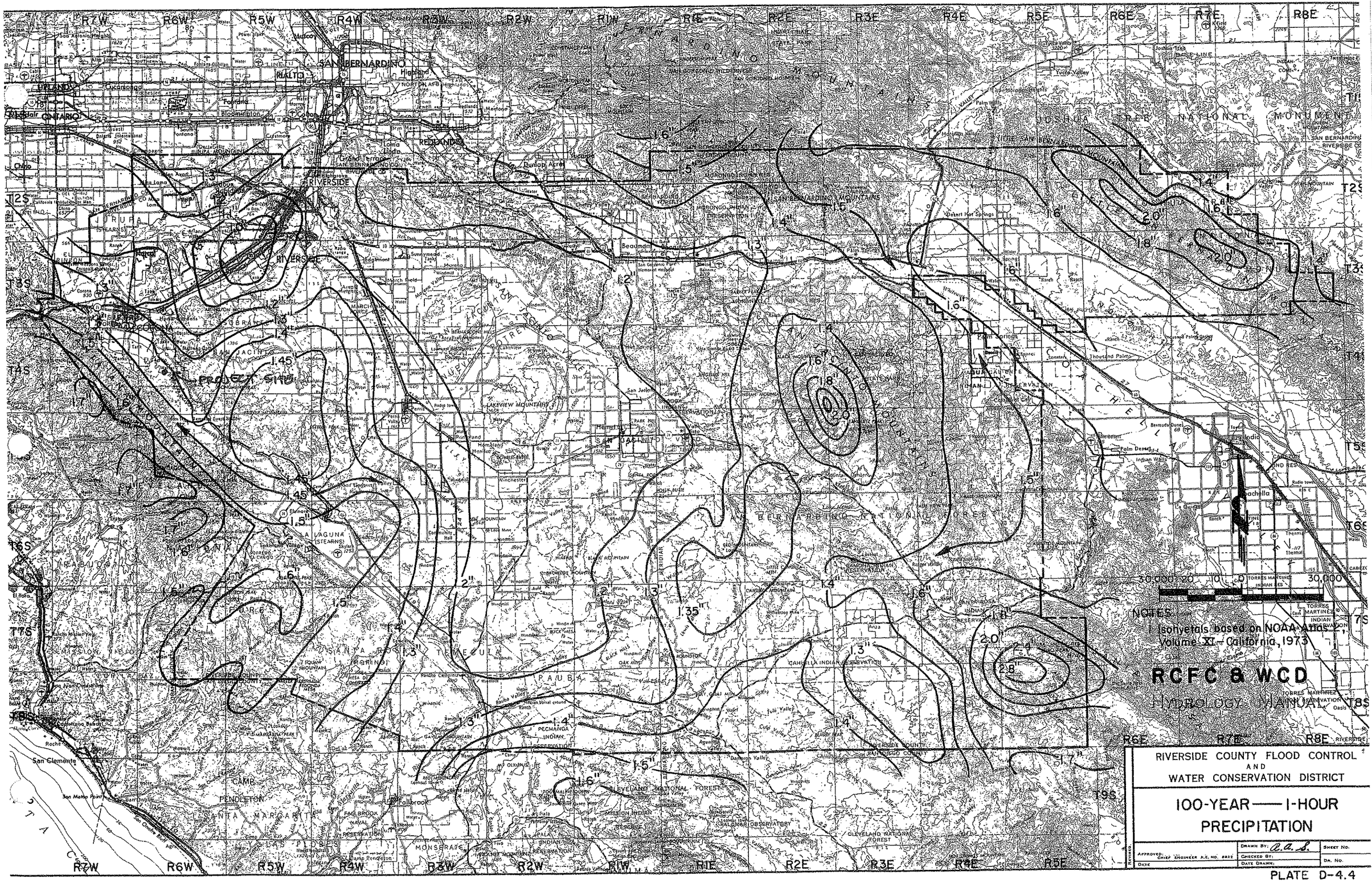
EXHIBIT G: 100-YEAR/1-HOUR RAINFALL MAP



NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973

RCFC & WCD
HYDROLOGY MANUAL

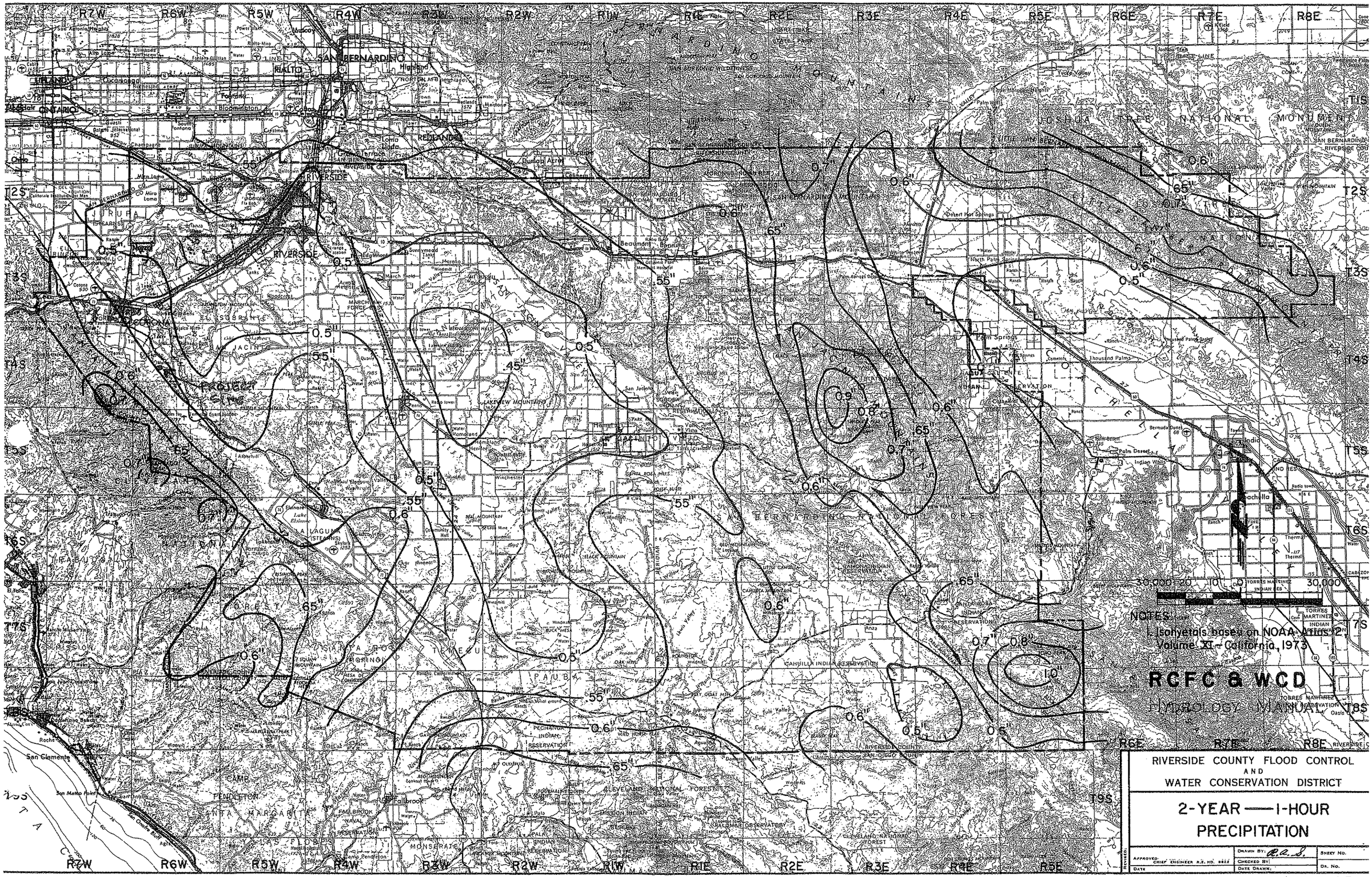
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 1-HOUR PRECIPITATION

APPROVED: CHIEF ENGINEER R.E. NO. 8822	DRAWN BY: A.A.S.	SHEET NO.
DATE	CHECKED BY:	DR. NO.
	DATE DRAWN:	

PLATE D-4.4

EXHIBIT H: 2-YEAR/1-HOUR RAINFALL MAP



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 8822	DRAWN BY: R.A.S.	SHEET NO.
DATE	CHECKED BY:	
	DATE DRAWN:	DR. NO.

PLATE D-4.3

EXHIBIT I: 100-YEAR/24-HOUR RAINFALL MAP

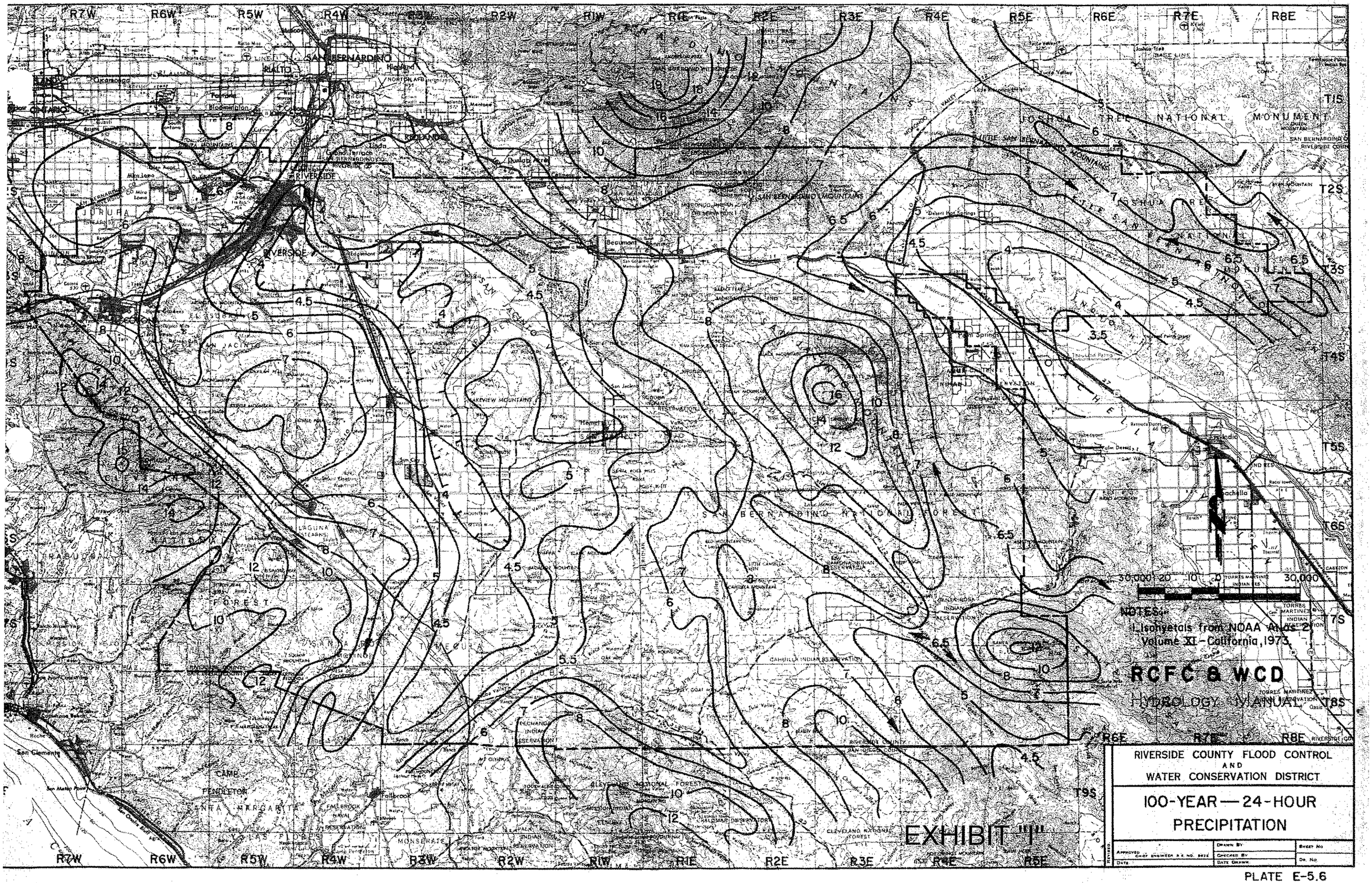

NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
EXHIBIT "J"
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6

EXHIBIT J: 2-YEAR/24-HOUR RAINFALL MAP

NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

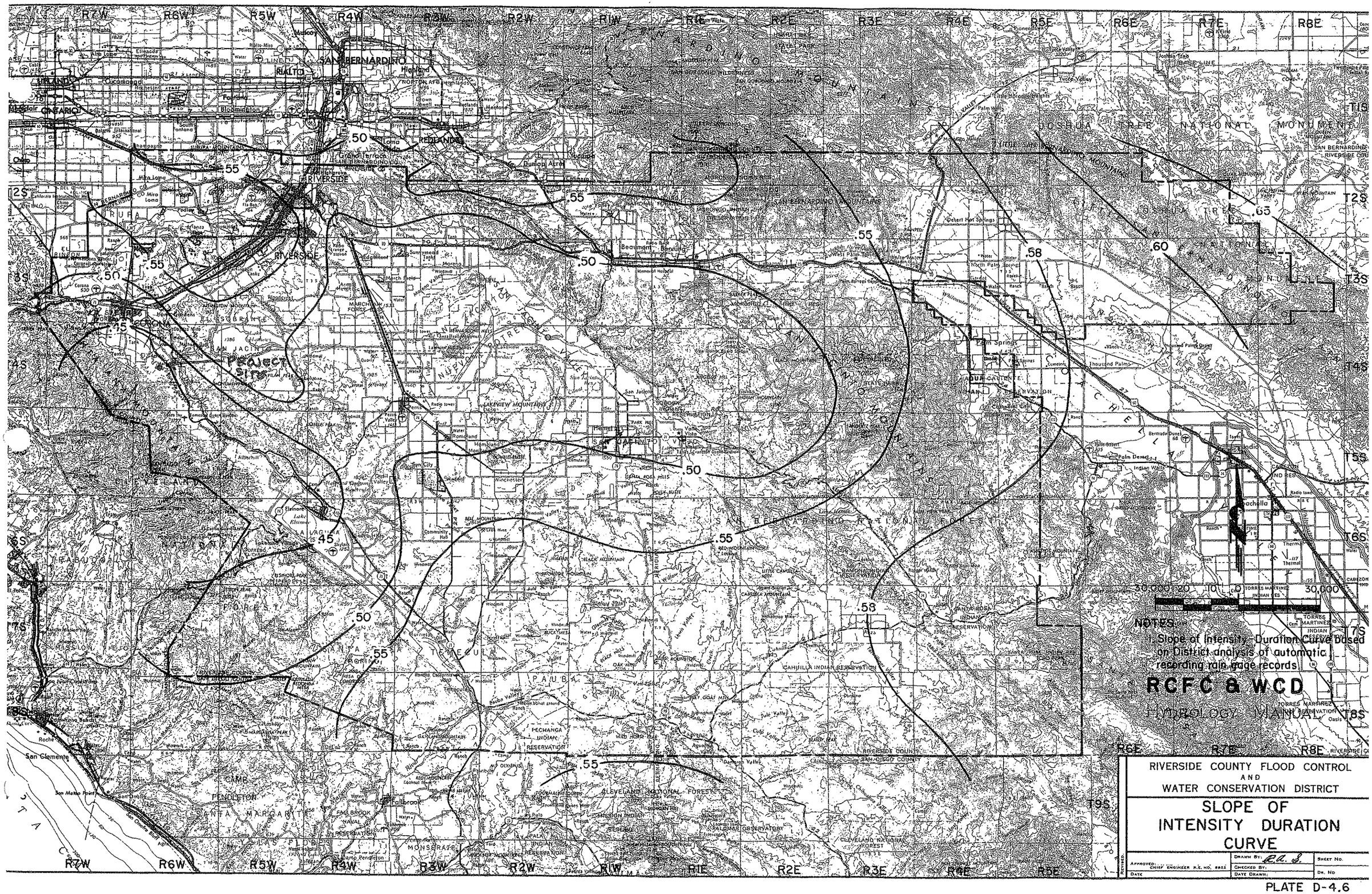
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 24-HOUR PRECIPITATION

EXHIBIT "J"

PLATE E-5.5

EXHIBIT K: SLOPE OF INTENSITY DURATION CURVE



NOTES:

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

RCFC & WCD

HYDROLOGY MANUAL

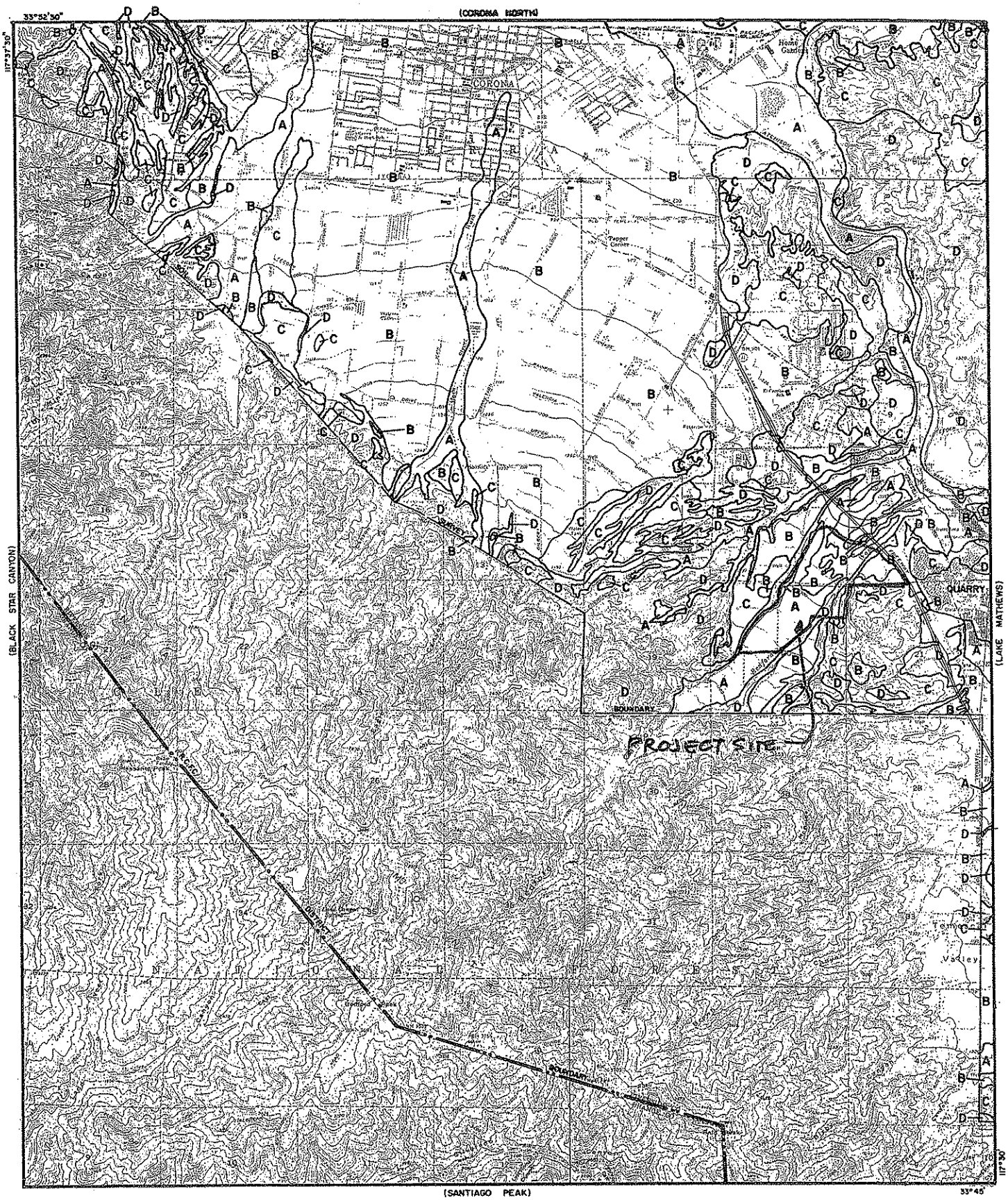
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

SLOPE OF INTENSITY DURATION CURVE

APPROVED: CHIEF ENGINEER R.E. NO. 8822	DRAWN BY: R.A.S.	SHEET NO.
DATE	CHECKED BY:	DR. NO
REVISED	DATE DRAWN:	

PLATE D-4.6

EXHIBIT L: HYDROLOGIC SOILS MAP



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

HYDROLOGY MANUAL

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HYDROLOGIC SOILS GROUP MAP FOR CORONA-SOUTH

PLATE C-1.27