DRAINAGE REPORT

Sweetwater Vistas
Spring Valley, CA
October 2016

Prepared For: Sweetwater Vistas, LLC

Prepared By: Fuscoe Engineering, Inc.

Job Number: 02780.002.01

FUSCOE ENGINEERING

full circle thinking

HYDROLOGY and HYDRAULICS STUDY

Sweetwater Vistas

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PROJECT ADDRESS: Sweetwater Springs and Jamacha Blvd
APN: 505-672-03, 07, 09, 10, 11, 23 & 37
TRUST ACCOUNT NO.: 2030222-D-02695

COUNTY OF SAN DIEGO, CA

Prepared By:

Robert A. Chase, PE RCE 41903 EXP: 03-31-18
Fuscoe Engineering, Inc.
6390 Greenwich Dr., Ste 170
San Diego, CA 92122

For

Sweetwater Vistas, LLC
1620 Fifth Avenue, Suite 400
San Diego, CA 92101
619-906-4353

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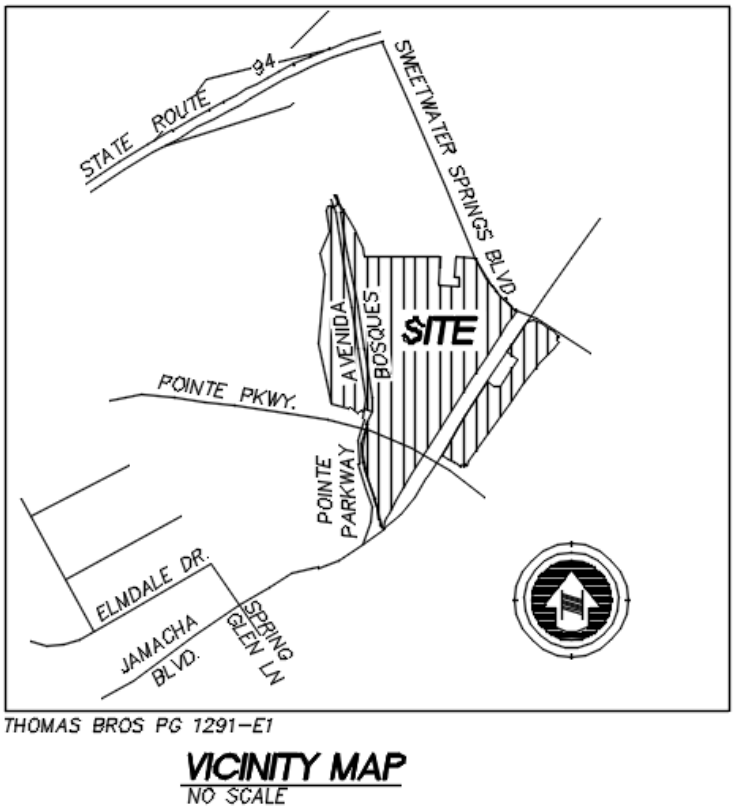


Figure 1 Vicinity Map

1.0 PROJECT DESCRIPTION

The Sweetwater Vistas project consists of approximately 52.0 acres and is located in the unincorporated area of Spring Valley. Approximately 43.5 acres of the project are located at the northwest corner of Jamacha Boulevard and Sweetwater Springs Boulevard (the "Western Parcel"). Approximately 8.5 acres of the project are located at the southeast corner of Jamacha Boulevard and Sweetwater Springs Boulevard, directly west of the Otay Water District offices (the "Eastern Parcel"). These sites are bisected by Jamacha Boulevard. The project proposes the development of a new master planned community consisting of 218 multi-family residential units on three pads and the extension of Avenida Bosques, all in the Western Parcel. Approximately 25.9 acres of the total project will be proposed for reservation as biological open space.

2.0 SITE INFORMATION

The following sections summarize the site conditions which relate to drainage and hydromodification, including the geotechnical conditions, drainage basins, and the low flow threshold determination.

2.1 GEOTECHNICAL CONDITIONS

The Hydrologic Soils Group for the project was determined from the SANGIS Hydromod BMP Website. The site for this project is a mix of Hydrologic Soil Group C and Group D.

Please refer to Appendix 2 for the custom soils map.

2.2 BASIN DESCIPTION

The existing site consists of one main basin, which is divided into two sub-basins. Runoff from the first sub-basin (A1) drains into a large existing detention basin located north of the intersection of Jamacha Blvd. and Pointe Parkway. Multiple residences adjacent to the project site, discharges their runoff onto the property which conveys into a natural flow path where it is picked up by an existing 84" RCP storm drain that extends below Jamacha Blvd.

To account for both existing and proposed runoff, the following design is prepared:

- An existing 30" Storm Drain located on California Waters Drive is now to be connected with the existing 36" Storm Drain located on the Avenida Bosques at station 23+70.

- The existing 36" storm drain will continue south along the proposed road (Avenida Bosques) instead of discharging onto the project site, which is the existing design condition.

- Additional runoff is collected from Foothill Court and Fabled Waters Court, which outlets through an existing 18" storm drain. This runoff crosses over natural terrain and is picked up by a brow ditch and discharged into the same 36" storm drain as mentioned above. The runoff within the 36" storm drain is clean and outlets into the natural area located at station 11+50.

- Roadway runoff from the proposed road (Avenida Boques) is picked up by four sets of inlets located at 7+10, 13+20, 15+40, and 19+50. This runoff discharges into a 36" storm drain that runs along Avenida Bosques. The runoff outlets at station 7+10 where it is treated by a water quality basin. It then confluences with the runoff from Lot 2, which is also treated by a water quality basin. This treated and clean water from the proposed road and lot 2 conveys into a natural flow path into the existing detention basin.

- Lots 1 and 3 are also treated by water quality basins and convey into a natural flow path. All natural flow paths lead into the large existing detention basin, where it is then discharged through the existing 84" storm drain system that extends below Jamacha Blvd.

The second sub-basin (A2) collects runoff from Sweetwater Springs Blvd, Jamacha Blvd. and Pointe Parkway which confluences at the intersection of Jamacha Blvd. and Pointe Parkway (existing node number 36 and proposed node number 28), where the runoff discharges into the same existing storm drain system along Jamacha Blvd.

Please refer to Appendices 6 and 7 for a graphical depiction of these drainage patterns.
Please refer to Appendix 8 for the As-built drawings that illustrate the locations of the existing utilities.

3.0 METHODOLOGY

3.1 RATIONAL METHOD

The design criteria, as found in the County of San Diego Department of Public Works Flood Control Division Hydrology Manual, specifies the design runoff conditions within the San Diego County Flood Control District will be based on the 100-year storm frequency, as follows:

1.) Design for areas over 1 square mile will be based on the 100-year frequency storm.
2.) For areas under 1 square mile –
    a. The storm drain system shall be designed so that the combination of storm drain system capacity and overflow both inside and outside the right of way will be able to carry the 100 year frequency storm without damaging adjacent existing buildings or potential building sites.
    b. The storm drain system shall be designed so that the combination of storm drain system capacity and allowable street overflow will be able to carry the 50 year frequency storm without damaging adjacent property.
    c. Where a storm drain is required under headings 1 or 2 above, then as a minimum, the drain shall be designed to carry the 10-year frequency storm.
3.) Sump areas are to be designed for a sump capacity or outfall of a 100-year frequency storm.

Runoff produced on the project site will be calculated for the 100-year storm event using the methodology outlined in the 2003 San Diego County Hydrology Manual. Runoff will be calculated using the Rational Method, which is given by the following equation:

$Q = C \times I \times A$

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)

Soil Type – Hydrologic soil groups C and D are the prevalent soil groups on the project site as can be seen in the Soil Hydrologic Groups map provided in appendix 2. Group C soils have slow infiltration rates when thoroughly wetted. This consists of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. Group D soils have a very slow infiltration rate when thoroughly wetted. Consisting chiefly of clay soils with a high swelling potential, soils with a high permanent water table, soils with clay pan or clay layer at or near the surface, and shallow soils over nearly impervious materials. Both type C & D soils have a very slow rate of water transmission.

Runoff Coefficient – In accordance with the County of San Diego standards, the appropriate runoff coefficients were determined based on table 3-1 from the 2003 San Diego County Hydrology Manual. Pervious areas were assigned a runoff coefficient of C= 0.30 for type C soil and C= 0.35 for type D soil. Sub-basins that consists of a mixture of pervious and impervious surfaces were assigned a runoff coefficient of C= 0.69 for type C soil and C= 0.71 for type D soil, which was based on a density of 24.0 DU/A or less. The proposed roads through the site were given a C factor of 0.81 or 0.82 based on the road section being 85% impervious, which is in accordance to table 3-1. When both soil types C and D are present, a weighted average is utilized to determine the proper runoff coefficient for each basin.

	Soil Type C	Soil Type D
Pervious	0.30	0.35
Impervious	0.69	0.71
Proposed Roads	0.81	0.82

3.2 Cistern Detention Analysis

The cisterns on the project have dual purposes. The first purpose is to provide the storage necessary to satisfy the project's hydromodification requirements (0.1 Q2 - Q10). The second purpose is to provide storage for larger events (Q10-Q100) so that the outgoing flows will remain at or below the existing levels.

Per the hydromodification report, each cistern was sized with a small orifice at the bottom. The maximum ponding depth for the 10 year storm was determined and then a larger orifice was added at that elevation. During storm events where hydromodifcation is required, only the single small orifice at the bottom will be utilized. Once a storm becomes large enough where hydromodification is no longer required, the upper orifice will be utilized as well.

	Cistern Dimensions			Orifice Sizing				Ponding Depth		Post Detention Results
				Lower		Upper				
DMA	Cistern Area (sf)	Bottom Elev	Top Elev	size (in)	elev (ft)	size (in)	elev (ft)	Q10 W.S (ft)	Q100 W.S. (ft)	Q100 out (cfs)
1.1, 1.2	3,645	440	446	0.7	440	12	445	445	445.6	1.3
1.3	2,700	447	452	0.8	447	12	450.6	450.6	451.3	1.7
2	4,420	399	404	1	399	12	402.6	402.6	403.4	2.1
3	6,000	412	427.5	0.9	412	6	422.2	422.2	425.3	1.4
4	4,000	357	373.5	0.9	357	6	368.6	368.6	372.5	1.6

The calculations summarized in the table above can be found in Appendix 5.

Once a post-detention Q100 was obtained at the outlet of each detention area, the resulting Q was input into AES at the appropriate node number. The resulting downstream post detention Q's are reported in Section 4.0 below.

4.0 CALCULATIONS/RESULTS

The results of the hydrology analysis are presented below:

Basin A1

	A (Acre)	Tc (Min.)	Q (CFS)
Existing	47.0	17.4	576
Proposed (Post Detention)	49.6	17.4	577
Change	+2.6	0	+1

See appendix 3 & 4 for AES Analysis, Appendix 5 for Cistern Detention

Basin A2

	A (Acre)	Tc (Min.)	Q (CFS)
Existing	11.2	11.1	31
Proposed	8.8	11.5	31
Change	-2.4	+0.4	0

See appendix 5 & 6 for AES Analysis

5.0 INUNDATION LINE

In order to determine an inundation line for the 100 year storm, flows at the bottom of the canyon were analyzed using HEC-RAS 4.1 software developed by the Army Corps of Engineers. The input data for this software was developed from cross sections of the canyon. A mannings factor of 0.1 was used to model the flow path in a "heavily vegetated" condition. Output from the software is attached in Appendix 9 and includes a summary of 100 year storm water surface elevations. An inundation line was plotted based on the water surface elevations and can be found on the HEC-RAS Analysis exhibit.

6.0 SUMMARY AND CONCLUSIONS

The storm drain system for Sweetwater Vistas has been designed for the 100 year storm event. The overall area increases by 0.2 AC, which is reflective of excluding the Avenida Bosques cul-de-sac in the existing AES calculation. However, with the proposed extension of Avenida Bosques, the cul-de-sac area must be accounted for when calculating the proposed drainage rates.

Tables from Section 4.0 Calculations/Results summarize both existing and proposed conditions of this project. Through the use of underground cisterns, the project will not see a significant increase in 100 Year storm event flows leaving the site. Basin A1 sees an increase from 576 to 577 cfs (0.2%) which is insignificant, especially when taking into consideration that the AES results were kept conservative by applying a short Tc to the output of each cistern. The proposed hydrology design yields no impact to either the present adjacent residents or the future residents upon completion of the project. AES calculations support that the proposed road was adequately designed and will not flood during a 100 year storm event.

For reservoir and storage calculations please see the Hydromodification Management Plan prepared for this submittal as well as Appendix 5 of this report.

Flows during the 100 year storm will remain well below the level of any proposed storm drain outlets or grading. Detailed results from the HEC-RAS study can be found in Appedix 9 and a 100 year inundation line has been plotted on the HEC-RAS Analysis Exhibit.

7.0 APPENDICES

Appendix 1: Hydrology Manual Excerpts
Appendix 2: Soils Map
Appendix 3: AES Existing Hydrology Analysis
Appendix 4: AES Proposed Hydrology Analysis
Appendix 5: Cistern Detention Analysis
Appendix 6: Existing Drainage Map
Appendix 7: Proposed Drainage Map
Appendix 8: As-Built Drawings – Existing Utilities
Appendix 9: HEC-RAS Study

APPENDIX 1: HYDROLOGY MANUAL EXCERPTS

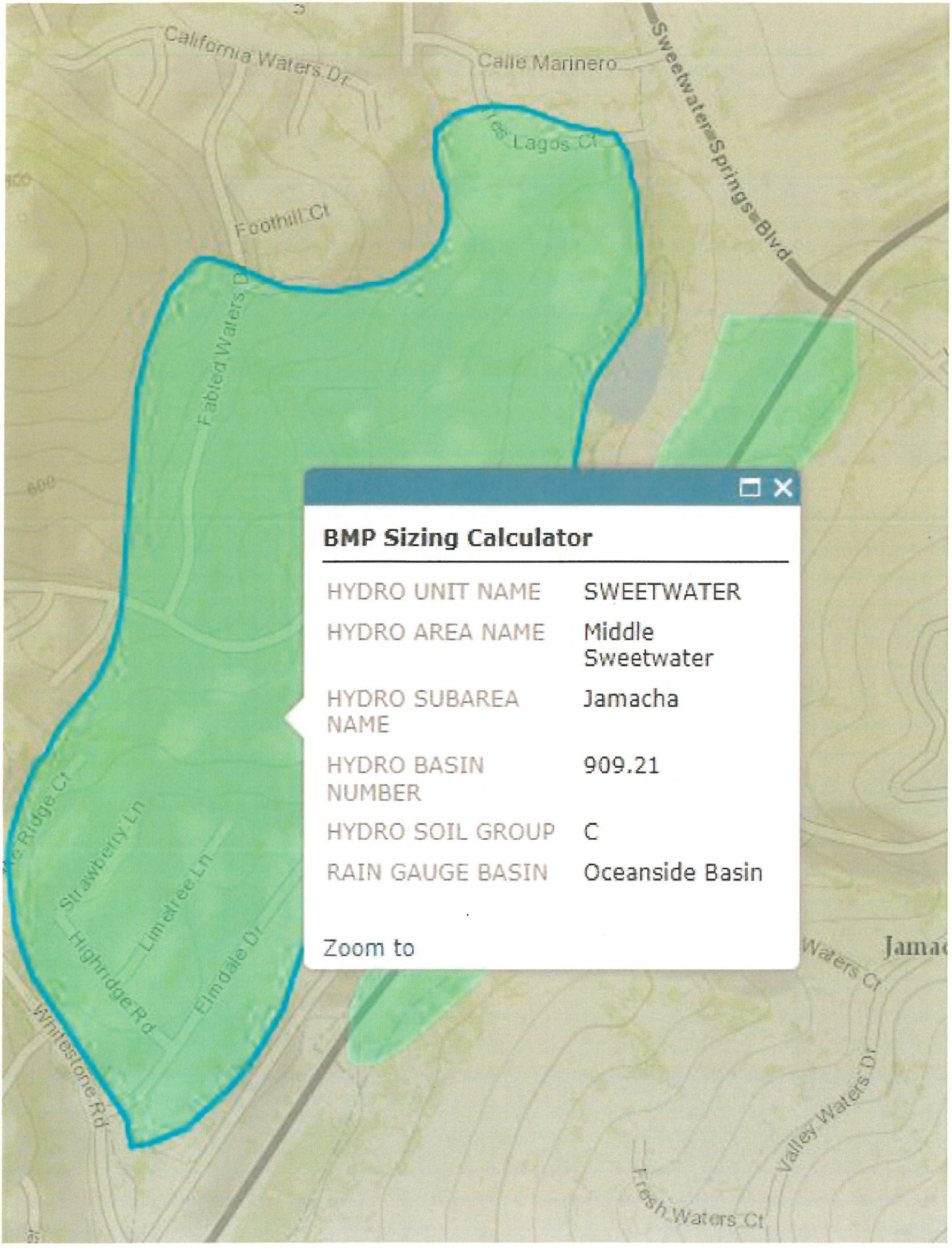
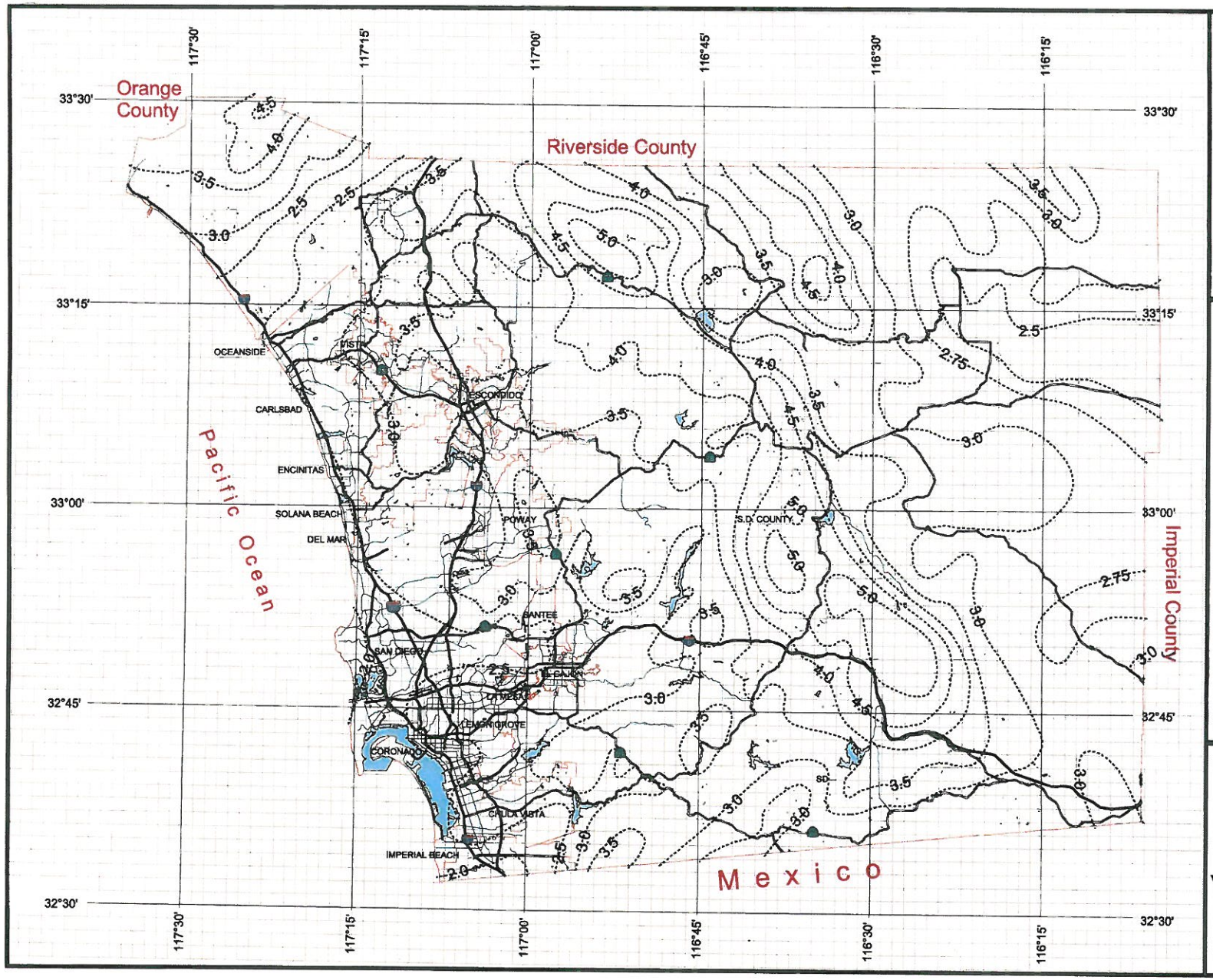

California Waters Dr
Calle Marinero
Sweetwater Springs Blvd
Los Lagos Ct
Foothill Ct
Fabled Waters Dr
Strawberry Ln
Limetree Ln
Highridge Rd
Elmdale Dr
Whitestone Rd
Waters Ct
Valley Waters Dr
Fresh Waters Ct
BMP Sizing Calculator
HYDRO UNIT NAME SWEETWATER
HYDRO AREA NAME Middle Sweetwater
HYDRO SUBAREA NAME Jamacha
HYDRO BASIN NUMBER 909.21
HYDRO SOIL GROUP C
RAIN GAUGE BASIN Oceanside Basin
Zoom to

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

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

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



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

$P_6 = 3.0$

DPW GIS
Department of Public Works
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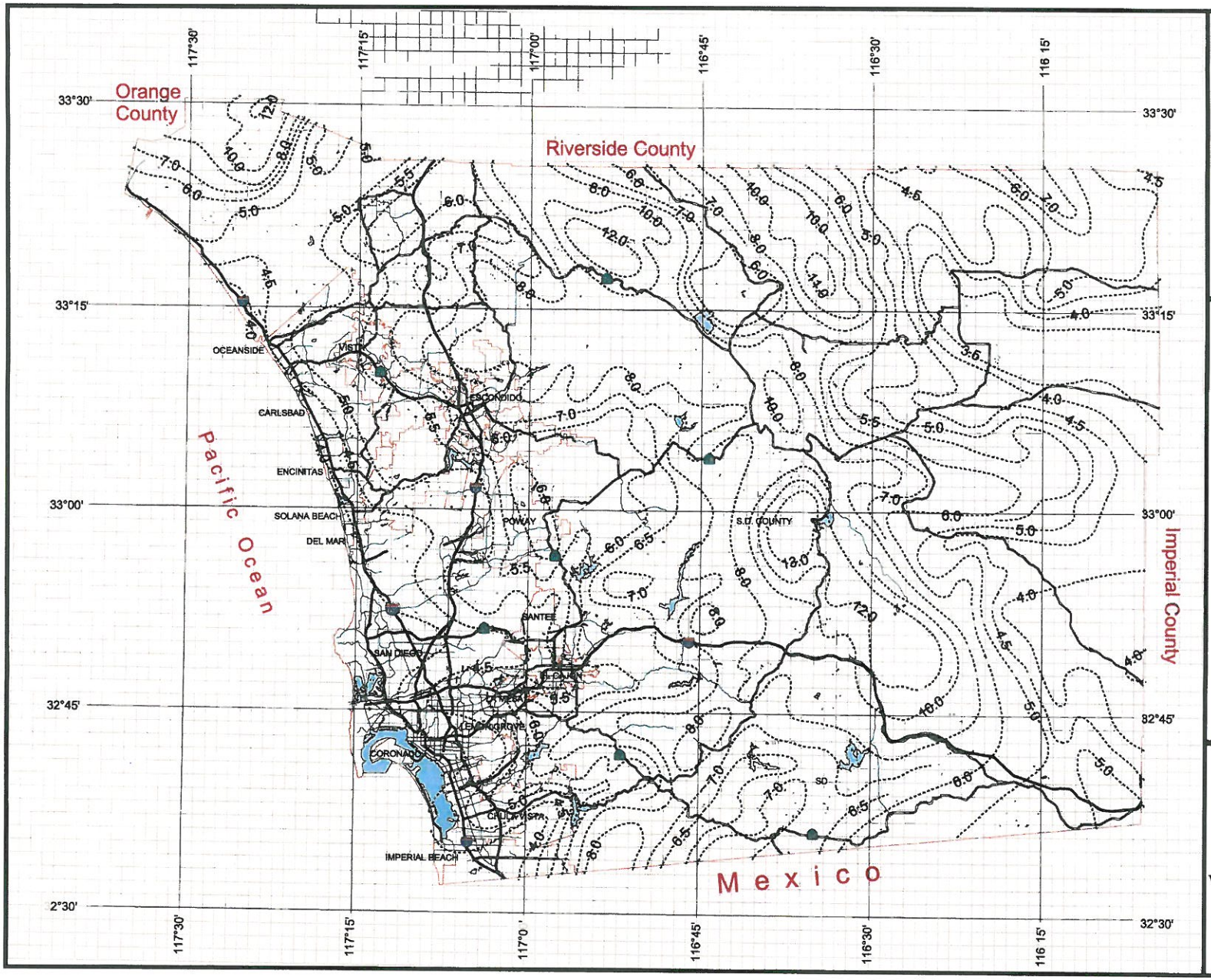
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

$P_{24} = 6.0$

DPW GIS
Department of Public Works
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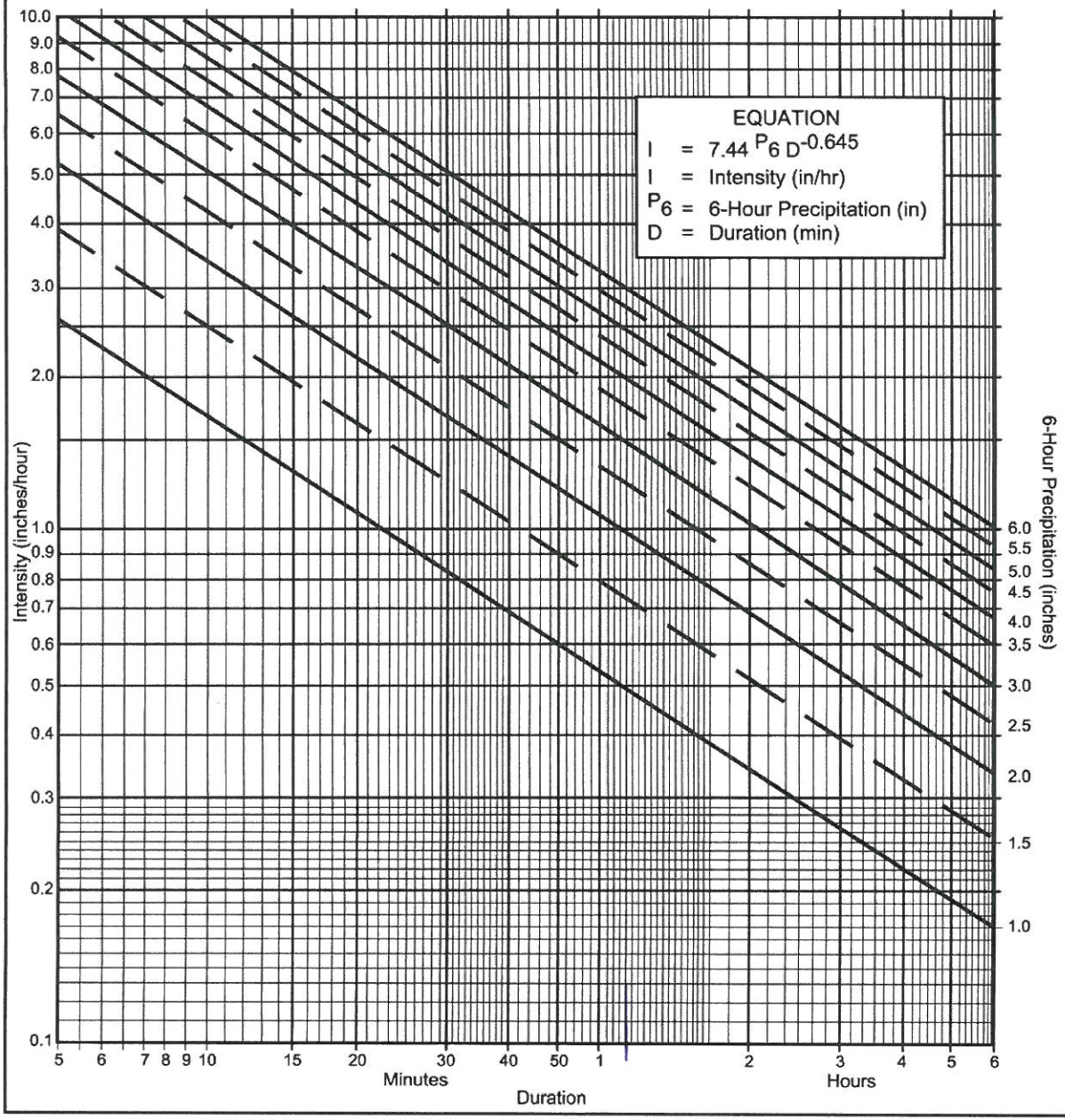
N W E S

3 0 3 Miles



Directions for Application:

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

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

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

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

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

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 3.0 in., P_{24} = 6.0, $\frac{P_6}{P_{24}}$ = 50 %(2)

(c) Adjusted $P_6^{(2)}$ = _____ in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

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

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

Intensity-Duration Design Chart - Template

FIGURE 3-1

APPENDIX 2: SOILS MAP

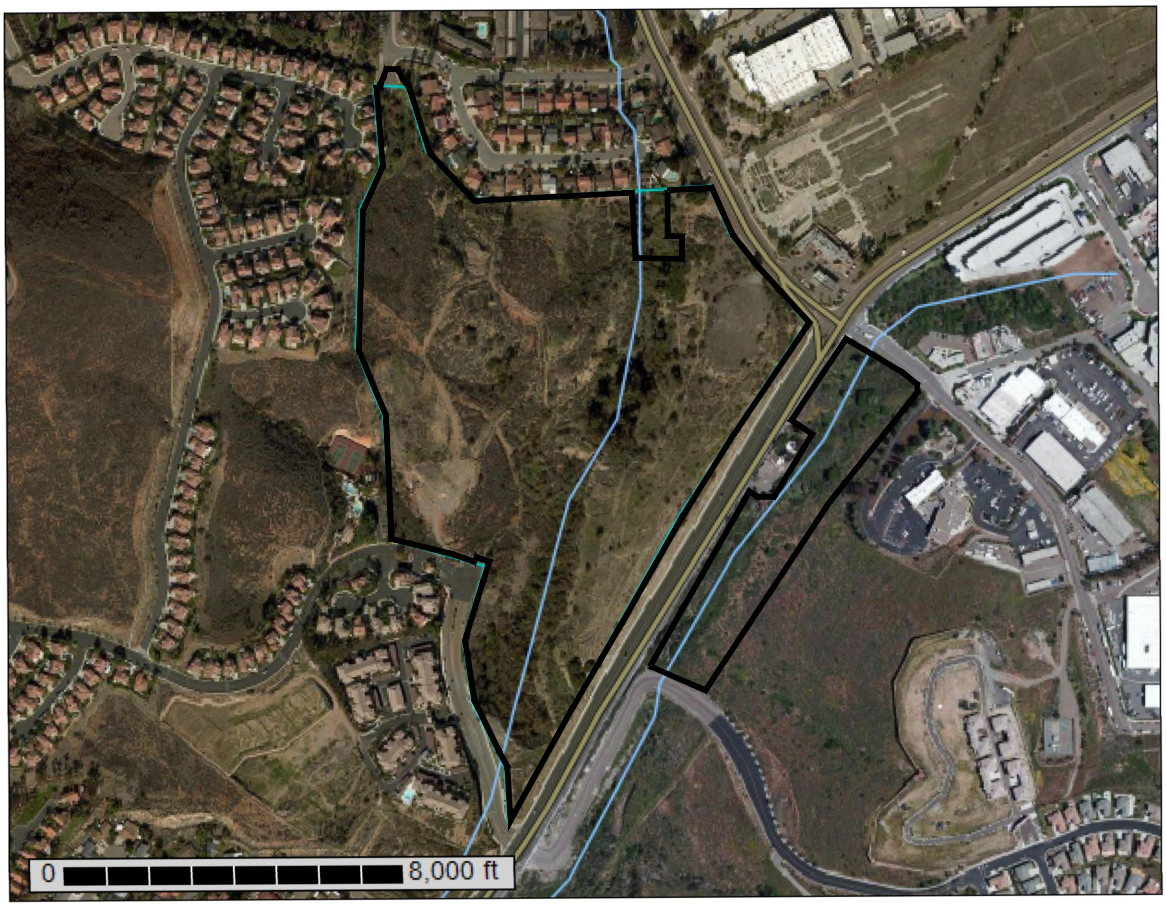
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

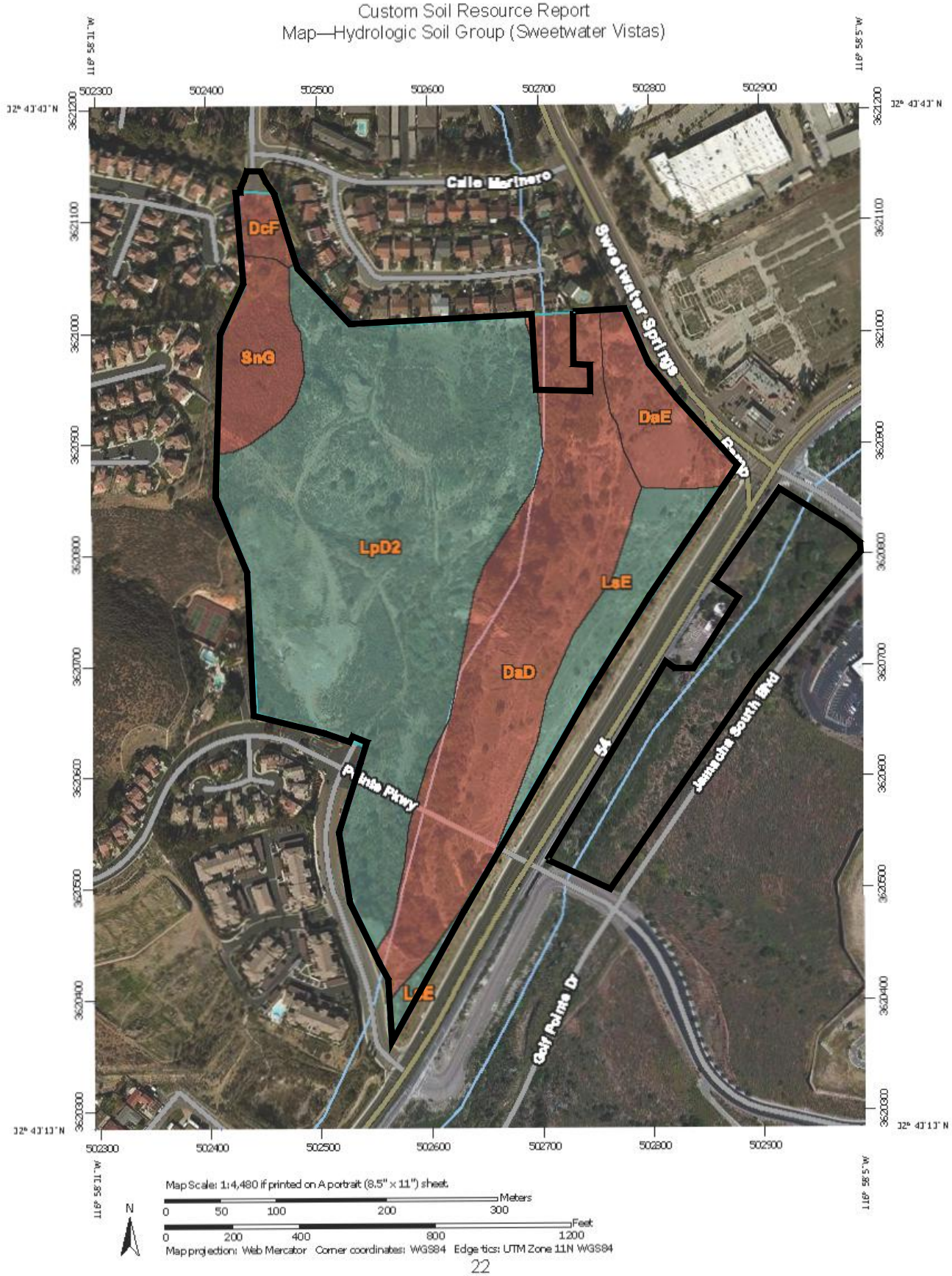
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Diego County Area, California



July 6, 2015

Custom Soil Resource Report
Map—Hydrologic Soil Group (Sweetwater Vistas)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 8, Sep 17, 2014

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

Date(s) aerial images were photographed: May 3, 2010—Jan 4, 2015

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

Table—Hydrologic Soil Group (Sweetwater Vistas)

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
DaD	Diablo clay, 9 to 15 percent slopes	D	12.2	27.7%
DaE	Diablo clay, 15 to 30 percent slopes	D	2.4	5.5%
DcF	Diablo-Urban land complex, 15 to 50 percent slopes	D	0.6	1.4%
LpD2	Las Posas fine sandy loam, 9 to 15 percent slopes, erod ed	C	23.2	52.5%
LsE	Linne clay loam, 9 to 30 percent slopes	C	3.2	7.3%
SnG	San Miguel-Exchequer rocky silt loams, 9 to 70 percent slopes	D	2.5	5.6%
Totals for Area of Interest			**44.1**	**100.0%**

Rating Options—Hydrologic Soil Group (Sweetwater Vistas)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX 3: AES EXISTING HYDROLOGY ANALYSIS
(SEE APPENDIX 6-EXISTING DRAINAGE MAP)

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Sweetwater Vistas Date: 7/10/15

Job #: 2780-002 Run Name: E1.DAT

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK 1	BANK 2	BANK 3
96	94	2	488	483	70	0.35	0.16				
94	94	1						1 of 2			
98	98	7	Q=49.1 Tc=10min A=0								
98	94	5	491	483	90	0.35					
94	94	1						2 of 2			
94	92	5	483	460	360	0.34	2.18				
92	90	5	460	457	165	0.34	2.33				
90	88	5	457	418	580	0.3	3.89				
88	82	5	418	352	480	0.3	1.49				
82	82	1						1 of 2			
91	89	2	606.4	604.5	40	0.9	0.08				
89	87	6	604.5	558.1	350	0.54	2.45	2 SIDES OF STREET			
87	86	3	554.1	552.2	190						
86	84	5	552.2	386	830	0.32	4.28				
84	82	5	386	352	275	0.3	0.59				
82	82	1						2 of 2			
82	74	5	352	337	165	0.3	1.06				
74	74	10						save to bank 1			
81	79	2	443.8	443.2	53	0.9	0.12				
79	78	6	443.2	440	440	0.9	0.63	ONE SIDE OF STREET			
78	76	5	440	391	325	0.35	1.09				
76	76	1						1 of 2			
77	77	7	Q=500 Tc=15 min A=0								
77	76	5	415	391	130						
76	76	1						2 of 2			
76	74	5	391	337	1,050	0.34	10.28				
74	74	11						add bank 1			
74	70	5	337	335	75	0.35	0.58				
70	70	1						1 of 2			
75	74	2	606.4	603.5	93.5	0.9	0.16				
74	73	6	603.5	570.6	310	0.54	2.02	2 SIDES OF STREET			
73	72	3	564.6	559	95						
72	70	5	555	335	1,385	0.3	6.44				
70	70	1						2 of 2			
70	68	5	335	323	750	0.33	7.12				
							46.95				

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                              Analysis prepared by:

                                Fuscoe Engineering
                               6390 Greenwich Drive
                                    Suite 200
                               San Diego, CA 92122

 ************************** DESCRIPTION OF STUDY **************************
* SWEETWATER VISTAS                                                      *
* EXISTING HYDROLOGY                                                     *
* RUN 1                                                                  *
 **************************************************************************

  FILE NAME: E1.DAT
  TIME/DATE OF STUDY: 15:26 02/17/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     94.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    488.00
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.865
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.131
```

```
 SUBAREA RUNOFF(CFS) =      0.40
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
 FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.87
 RAINFALL INTENSITY(INCH/HR) =   7.13
 TOTAL STREAM AREA(ACRES) =     0.16
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.40

****************************************************************************
 FLOW PROCESS FROM NODE     98.00 TO NODE     98.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  10.00   RAIN INTENSITY(INCH/HOUR) =  5.05
 TOTAL AREA(ACRES) =     0.01   TOTAL RUNOFF(CFS) =     49.10

****************************************************************************
 FLOW PROCESS FROM NODE     98.00 TO NODE     94.00 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0889
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .0889 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =      49.10
 FLOW VELOCITY(FEET/SEC) =   6.11 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.25   Tc(MIN.) =   10.25
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE     94.00 =      90.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.25
 RAINFALL INTENSITY(INCH/HR) =   4.98
 TOTAL STREAM AREA(ACRES) =     0.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.10

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        0.40     5.87        7.131          0.16
     2       49.10    10.25        4.976          0.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
```

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)
1	28.51	5.87	7.131
2	49.38	10.25	4.976

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 49.38 Tc(MIN.) = 10.25
TOTAL AREA(ACRES) = 0.2
LONGEST FLOWPATH FROM NODE 0.00 TO NODE 94.00 = 90.00 FEET.

****
FLOW PROCESS FROM NODE 94.00 TO NODE 92.00 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 483.00 DOWNSTREAM(FEET) = 460.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0639
CHANNEL BASE(FEET) = 3.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.793
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3400
S.C.S. CURVE NUMBER (AMC II) = 0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 51.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.76
AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 0.61
Tc(MIN.) = 10.86
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 3.55
AREA-AVERAGE RUNOFF COEFFICIENT = 4.473
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 50.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 9.70
LONGEST FLOWPATH FROM NODE 0.00 TO NODE 92.00 = 450.00 FEET.

****
FLOW PROCESS FROM NODE 92.00 TO NODE 90.00 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 457.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 165.00 CHANNEL SLOPE = 0.0182
CHANNEL BASE(FEET) = 3.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.670
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3400
S.C.S. CURVE NUMBER (AMC II) = 0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.19
AVERAGE FLOW DEPTH(FEET) = 1.44 TRAVEL TIME(MIN.) = 0.44
Tc(MIN.) = 11.31
SUBAREA AREA(ACRES) = 2.33 SUBAREA RUNOFF(CFS) = 3.70
AREA-AVERAGE RUNOFF COEFFICIENT = 2.415
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 52.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.44 FLOW VELOCITY(FEET/SEC.) = 6.20
LONGEST FLOWPATH FROM NODE 0.00 TO NODE 90.00 = 615.00 FEET.

****
FLOW PROCESS FROM NODE 90.00 TO NODE 88.00 IS CODE = 51

```
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00   CHANNEL SLOPE =  0.0672
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.433
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      55.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.16
  AVERAGE FLOW DEPTH(FEET) =   1.06   TRAVEL TIME(MIN.) =   0.95
  Tc(MIN.) =   12.26
  SUBAREA AREA(ACRES) =     3.89       SUBAREA RUNOFF(CFS) =    5.17
  AREA-AVERAGE RUNOFF COEFFICIENT =  1.455
  TOTAL AREA(ACRES) =        8.6         PEAK FLOW RATE(CFS) =      55.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =  10.14
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     88.00 =    1195.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     82.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    352.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   480.00   CHANNEL SLOPE =  0.1375
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.297
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      56.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.22
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   0.60
  Tc(MIN.) =   12.86
  SUBAREA AREA(ACRES) =     1.49       SUBAREA RUNOFF(CFS) =    1.92
  AREA-AVERAGE RUNOFF COEFFICIENT =  1.284
  TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =      55.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.88   FLOW VELOCITY(FEET/SEC.) =  13.21
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     82.00 =    1675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     82.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.86
  RAINFALL INTENSITY(INCH/HR) =   4.30
  TOTAL STREAM AREA(ACRES) =    10.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     55.51

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     91.00 TO NODE     89.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
 UPSTREAM ELEVATION(FEET) =    606.40
 DOWNSTREAM ELEVATION(FEET) =    604.50
 ELEVATION DIFFERENCE(FEET) =      1.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.355
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.57
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
 FLOW PROCESS FROM NODE     89.00 TO NODE     87.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  604.50  DOWNSTREAM ELEVATION(FEET) =  558.10
 STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.41
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.55
 STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    2.27
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5400
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.551
 SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =   10.46
 TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =      11.03

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.97
 FLOW VELOCITY(FEET/SEC.) =  7.31   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
 LONGEST FLOWPATH FROM NODE     91.00 TO NODE     87.00 =     390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     87.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   554.10  DOWNSTREAM(FEET) =   552.20
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.03
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    2.73
 LONGEST FLOWPATH FROM NODE     91.00 TO NODE     86.00 =     580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     86.00 TO NODE     84.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    552.20  DOWNSTREAM(FEET) =    386.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00   CHANNEL SLOPE =  0.2002
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3200
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.44
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.52
 AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   1.31
 Tc(MIN.) =    4.04
 SUBAREA AREA(ACRES) =     4.28       SUBAREA RUNOFF(CFS) =   10.83
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.406
 TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =      21.85

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =  11.39
 LONGEST FLOWPATH FROM NODE     91.00 TO NODE     84.00 =    1410.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     84.00 TO NODE     82.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    386.00  DOWNSTREAM(FEET) =    352.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.1236
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.55
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.78
 AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   0.47
 Tc(MIN.) =    4.51
 SUBAREA AREA(ACRES) =     0.59       SUBAREA RUNOFF(CFS) =    1.40
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.398
 TOTAL AREA(ACRES) =        7.4         PEAK FLOW RATE(CFS) =      23.25

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.57   FLOW VELOCITY(FEET/SEC.) =   9.87
 LONGEST FLOWPATH FROM NODE     91.00 TO NODE     82.00 =    1685.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     82.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.51
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     7.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.25

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       55.51    12.86        4.297         10.06
      2       23.25     4.51        7.904          7.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       53.43     4.51       7.904
      2       68.15    12.86       4.297

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      68.15   Tc(MIN.) =   12.86
  TOTAL AREA(ACRES) =       17.5
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     82.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     74.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    352.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   165.00   CHANNEL SLOPE =  0.0909
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.249
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      68.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.01
  AVERAGE FLOW DEPTH(FEET) =   1.10   TRAVEL TIME(MIN.) =   0.23
  Tc(MIN.) =   13.09
  SUBAREA AREA(ACRES) =     1.06       SUBAREA RUNOFF(CFS) =    1.35
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.873
  TOTAL AREA(ACRES) =       18.5         PEAK FLOW RATE(CFS) =      68.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.10   FLOW VELOCITY(FEET/SEC.) =  11.99
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     74.00 =    1850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     79.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    53.00
  UPSTREAM ELEVATION(FEET) =    443.80
  DOWNSTREAM ELEVATION(FEET) =    443.20
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.515
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.85

******************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     78.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  443.20  DOWNSTREAM ELEVATION(FEET) =  440.00
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.60   Tc(MIN.) =    6.11
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.945
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    3.94
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.87
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     78.00 =     493.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     76.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    391.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.1508
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.417
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.80
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   0.80
  Tc(MIN.) =    6.91
  SUBAREA AREA(ACRES) =     1.09       SUBAREA RUNOFF(CFS) =    2.45
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.574
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       6.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   7.10
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     76.00 =     818.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     76.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.91
  RAINFALL INTENSITY(INCH/HR) =   6.42
  TOTAL STREAM AREA(ACRES) =     1.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.78

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     77.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  15.00   RAIN INTENSITY(INCH/HOUR) =  3.89
  TOTAL AREA(ACRES) =     0.00   TOTAL RUNOFF(CFS) =    500.00

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     76.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    415.00  DOWNSTREAM(FEET) =    391.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.1846
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1523 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     500.00
  FLOW VELOCITY(FEET/SEC) =  17.31 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =   15.13
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     76.00 =    1815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     76.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.13
  RAINFALL INTENSITY(INCH/HR) =   3.87
  TOTAL STREAM AREA(ACRES) =     0.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    500.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.78     6.91        6.417          1.84
      2      500.00    15.13        3.871          0.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1      235.10     6.91        6.417
      2      504.09    15.13        3.871

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     504.09   Tc(MIN.) =   15.13
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     76.00 =    1815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     74.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    391.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.0514
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.704
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     510.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  16.43
  AVERAGE FLOW DEPTH(FEET) =   3.26   TRAVEL TIME(MIN.) =   1.06
  Tc(MIN.) =   16.19
  SUBAREA AREA(ACRES) =    10.28       SUBAREA RUNOFF(CFS) =   12.95
  AREA-AVERAGE RUNOFF COEFFICIENT = 10.977
  TOTAL AREA(ACRES) =       12.1         PEAK FLOW RATE(CFS) =     504.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.25   FLOW VELOCITY(FEET/SEC.) =  16.37
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     74.00 =    2865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
```

```
    1      504.09    16.19       3.704        12.12
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     74.00 =    2865.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
    1        68.73    13.09       4.249        18.52
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     74.00 =    1850.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      476.31      13.09        4.249
    2      564.02      16.19        3.704

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     564.02   Tc(MIN.) =   16.19
  TOTAL AREA(ACRES) =       30.6

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     70.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    337.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    75.00   CHANNEL SLOPE =  0.0267
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.691
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     564.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.17
  AVERAGE FLOW DEPTH(FEET) =   3.94   TRAVEL TIME(MIN.) =   0.09
  Tc(MIN.) =   16.29
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    0.75
  AREA-AVERAGE RUNOFF COEFFICIENT =  4.786
  TOTAL AREA(ACRES) =       31.2          PEAK FLOW RATE(CFS) =     564.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.94   FLOW VELOCITY(FEET/SEC.) =  13.16
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     70.00 =    2940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.29
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =    31.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    564.02

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.50
  UPSTREAM ELEVATION(FEET) =    606.40
  DOWNSTREAM ELEVATION(FEET) =    603.50
  ELEVATION DIFFERENCE(FEET) =      2.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.387
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.14
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.14

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     73.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  603.50  DOWNSTREAM ELEVATION(FEET) =  570.60
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.42
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    3.27
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.566
  SUBAREA AREA(ACRES) =    2.02      SUBAREA RUNOFF(CFS) =    8.62
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       9.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.97
  FLOW VELOCITY(FEET/SEC.) =  6.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
  LONGEST FLOWPATH FROM NODE     75.00 TO NODE     73.00 =     403.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     72.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.60  DOWNSTREAM(FEET) =   559.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.96
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.76
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    3.40
  LONGEST FLOWPATH FROM NODE     75.00 TO NODE     72.00 =     498.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     70.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    555.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1385.00   CHANNEL SLOPE =  0.1588
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.214
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.77
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   2.36
  Tc(MIN.) =    5.76
  SUBAREA AREA(ACRES) =     6.44       SUBAREA RUNOFF(CFS) =   13.94
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.367
  TOTAL AREA(ACRES) =        8.6         PEAK FLOW RATE(CFS) =      22.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.53   FLOW VELOCITY(FEET/SEC.) =  10.63
  LONGEST FLOWPATH FROM NODE     75.00 TO NODE     70.00 =    1883.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.76
  RAINFALL INTENSITY(INCH/HR) =   7.21
  TOTAL STREAM AREA(ACRES) =     8.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.85

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      564.02    16.29        3.691         31.22
      2       22.85     5.76        7.214          8.62

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      222.37     5.76        7.214
      2      575.70    16.29        3.691

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     575.70   Tc(MIN.) =   16.29
  TOTAL AREA(ACRES) =       39.8
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     70.00 =    2940.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     68.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    335.00  DOWNSTREAM(FEET) =    323.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.533
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     579.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.96
  AVERAGE FLOW DEPTH(FEET) =   4.45   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =   17.43
  SUBAREA AREA(ACRES) =     7.12       SUBAREA RUNOFF(CFS) =    7.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  3.295
  TOTAL AREA(ACRES) =       47.0         PEAK FLOW RATE(CFS) =     575.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  4.44   FLOW VELOCITY(FEET/SEC.) =  10.93
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     68.00 =    3690.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       47.0  TC(MIN.) =     17.43
  PEAK FLOW RATE(CFS)   =     575.70
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

♀
```

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ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Sweetwater Vistas

Date: 7/10/15

Job #: 2780-002

Run Name:
E2.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
50	48	2	440.6	440	55	0.9	0.07				
48	42	6	440.0	362.0	1,750	0.9	2.49	ONE SIDE			
42	42	1						1 OF 2			
46	44	2	442.3	442.0	50	0.35	0.12				
44	42	5	442.0	362.0	1,300	0.31	3.90				
42	42	1						2 OF 2			
42	36	6	362.0	313.0	800	0.6	2.34	50% IMP. 1 SIDE			
36	36	1									
40	38	2	390.5	390.0	55	0.9	0.07				
38	36	6	390.0	313.0	930	0.9	1.19	ONE SIDE			
36	36	1						2 OF 2			
36	34	6	313.0	296.0	375	0.54	1.00	40% IMP			
							11.18				

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2010 Advanced Engineering Software (aes)
              Ver. 17.0 Release Date: 07/01/2010  License ID 1355

                              Analysis prepared by:

                              FUSCOE ENGINEERING INC



 ************************** DESCRIPTION OF STUDY **************************
* SWEETWATER VISTAS                                                      *
* EXISTING HYDROLOGY                                                     *
* RUN 2                                                                  *
 **************************************************************************

  FILE NAME: E2.DAT
  TIME/DATE OF STUDY: 15:17 07/10/2015
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     48.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    440.60
  DOWNSTREAM ELEVATION(FEET) =    440.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.594
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     42.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  440.00  DOWNSTREAM ELEVATION(FEET) =  362.00
  STREET LENGTH(FEET) =  1750.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.78
  STREET FLOW TRAVEL TIME(MIN.) =   5.77   Tc(MIN.) =    8.36
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.674
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    2.49      SUBAREA RUNOFF(CFS) =   12.72
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =      13.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.49
  FLOW VELOCITY(FEET/SEC.) =  5.89   DEPTH*VELOCITY(FT*FT/SEC.) =   2.45
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     42.00 =    1805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.36
  RAINFALL INTENSITY(INCH/HR) =   5.67
  TOTAL STREAM AREA(ACRES) =     2.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.07

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    442.30
 DOWNSTREAM ELEVATION(FEET) =    442.00
 ELEVATION DIFFERENCE(FEET) =      0.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.318
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.667
 SUBAREA RUNOFF(CFS) =      0.20
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE     44.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    362.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1300.00   CHANNEL SLOPE =  0.0615
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.561
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3100
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.68
 AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   5.89
 Tc(MIN.) =   17.21
 SUBAREA AREA(ACRES) =     3.90       SUBAREA RUNOFF(CFS) =    4.31
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.311
 TOTAL AREA(ACRES) =        4.0         PEAK FLOW RATE(CFS) =       4.46

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   4.63
 LONGEST FLOWPATH FROM NODE     46.00 TO NODE     42.00 =    1350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   17.21
 RAINFALL INTENSITY(INCH/HR) =   3.56
 TOTAL STREAM AREA(ACRES) =     4.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.46

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       13.07     8.36        5.674          2.56
     2        4.46    17.21        3.561          4.02

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       15.24     8.36        5.674
     2       12.66    17.21        3.561
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.24   Tc(MIN.) =    8.36
 TOTAL AREA(ACRES) =        6.6
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     42.00 =    1805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     42.00 TO NODE     36.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  362.00  DOWNSTREAM ELEVATION(FEET) =  313.00
 STREET LENGTH(FEET) =   800.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.74
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.44
   HALFSTREET FLOOD WIDTH(FEET) =   15.74
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.22
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.18
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.21
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.989
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .6000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.556
 SUBAREA AREA(ACRES) =    2.34      SUBAREA RUNOFF(CFS) =    7.00
 TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      24.74

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.54
 FLOW VELOCITY(FEET/SEC.) =  7.74   DEPTH*VELOCITY(FT*FT/SEC.) =   3.69
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     36.00 =    2605.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.21
 RAINFALL INTENSITY(INCH/HR) =   4.99
 TOTAL STREAM AREA(ACRES) =     8.92
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.74

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .9000
```

```
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
 UPSTREAM ELEVATION(FEET) =    390.50
 DOWNSTREAM ELEVATION(FEET) =    390.00
 ELEVATION DIFFERENCE(FEET) =      0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.756
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.50
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
 FLOW PROCESS FROM NODE     38.00 TO NODE     36.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  390.00  DOWNSTREAM ELEVATION(FEET) =  313.00
 STREET LENGTH(FEET) =   930.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.52
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.11
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
 STREET FLOW TRAVEL TIME(MIN.) =   2.66   Tc(MIN.) =    5.41
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.510
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
 SUBAREA AREA(ACRES) =    1.19      SUBAREA RUNOFF(CFS) =    8.04
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       8.52

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.74
 FLOW VELOCITY(FEET/SEC.) =  6.69   DEPTH*VELOCITY(FT*FT/SEC.) =   2.28
 LONGEST FLOWPATH FROM NODE     40.00 TO NODE     36.00 =     985.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.41
 RAINFALL INTENSITY(INCH/HR) =   7.51
 TOTAL STREAM AREA(ACRES) =     1.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.52
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.74    10.21        4.989          8.92
      2        8.52     5.41        7.510          1.26

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       24.95     5.41       7.510
      2       30.40    10.21       4.989

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.40   Tc(MIN.) =   10.21
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     36.00 =    2605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     34.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  313.00  DOWNSTREAM ELEVATION(FEET) =  296.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      31.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   22.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.90
  STREET FLOW TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =   11.07
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.735
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.593
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.56
  TOTAL AREA(ACRES) =       11.2        PEAK FLOW RATE(CFS) =      31.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  22.17
  FLOW VELOCITY(FEET/SEC.) =  7.27   DEPTH*VELOCITY(FT*FT/SEC.) =   3.89
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     34.00 =    2980.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.2  TC(MIN.) =     11.07
  PEAK FLOW RATE(CFS)   =      31.41
============================================================================
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END OF RATIONAL METHOD ANALYSIS

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APPENDIX 4: AES PROPOSED HYDROLOGY ANALYSIS
(SEE APPENDIX 7-PROPOSED DRAINAGE MAP)

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Sweetwater Vistas Date: 8/09/16

Job #: 2780-002 Run Name: P1.DAT

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
99	98	2	490	488	70	0.9	0.07				
98	97	6	488	464	430	0.82	0.46	1 SIDE OF STREET			
97	97	1						1 OF 2			
96	95	2	489	489	40	0.9	0.04				
95	97	6	489	464	435	0.82	0.31	1 SIDE OF STREET			
97	97	1						2 OF 2			
97	94	3	458	446	410						
94	94	1						1 OF 3			
93	92	2	464	463	70	0.81	0.12				
92	94	6	463	454	328	0.81	0.56	1 SIDE OF STREET			
94	94	1						2 OF 3			
91	90	2	464	463	75	0.81	0.05				
90	94	6	463	454	328	0.81	0.23	1 SIDE OF STREET			
94	94	1						3 OF 3			
94	89	3	448	415	308						
89	89	1						1 OF 3			
88	87	2	454	451	41	0.81	0.06				
87	89	6	451	431	183	0.81	0.16	1 SIDE OF STREET			
89	89	1						2 OF 3			
86	85	2	454	451	41	0.81	0.03				
85	89	6	451	431	175	0.81	0.12	1 SIDE OF STREET			
89	89	1						3			
89	84	3	425	389.5	435						
84	84	1						1 OF 3			
83	82	2	431	423	75	0.81	0.05				
82	84	6	423	384	520	0.81	0.64	1 SIDE OF STREET			
84	84	1						2 OF 3			
81	80	2	431	423	70	0.81	0.05				
80	84	6	423	390	565	0.81	0.42	1 SIDE OF STREET			
84	84	1						3 OF 3			
84	79.9	3	384	373	40						
79.9	79.9	10						SAVE BANK 1			

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Sweetwater Vistas Date: 8/09/16

Job #: 2780-002 Run Name: P1.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
79.8	79.7	2	517	486	90	0.3	0.05				
79.7	79.6	5	486	410	555	0.3	0.43				
79.6	79.5	3	408	399	225						
79.5	79.5	1						1 OF 2			
79.4	79.3	2	443	416	75	0.69	0.08				
79.3	79.5	5	416	399	475	0.69	3.23				
79.5	79.5	1						2 OF 2			
79.5	79.9	3	399	373	170						
79.9	79.9	11						ADD BANK 1			
79.9	79.9	12						CLEAR BANK 1			
79.9	79	3	373.0	368.0	175						
79	36	5	368.0	335.0	183	0.3					
36	36	10						SAVE BANK 1			
74	73	2	491	483	70	0.35	0.08				
73	67.9	5	483	418	1040	0.35	1.22				
67.9	67.9	1						1 OF 2			
63	62	2	464	458	80	0.69	0.08				
62	67.8	5	458	453	355	0.69	1.87				
67.8	67.9	3	452	421	185						
67.9	67.9	1						2 of 2			
67.9	67	5	421	386	105		*				
67	67	1						1 of 3			
78	77	2	443.8	443.2	55	0.9	0.12				
77	76	6	443.2	440	440	0.9	0.63	1 sided			
76	67	5	440	386	370	0.35	1.36				
67	67	1						2 of 3			
67.5	67.5	7	Q=500 cfs Tc=15 min A=0								
67.5	67	5	415	386	190		*				
67	67	1						3 of 3			

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6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Sweetwater Vistas Date: 8/09/16

Job #: 2780-002 Run Name: P1.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
67	75	5	392	351	695	0.35	3.97				
75	75	10						Save Bank 2			
68	66	2	449	411	118	0.3	0.08				
66	72	5	411	410	217	0.3	0.26				
72	72	1						1 of 3			
71	70	2	450	411	82	0.3	0.05				
70	72	5	411	410	124	0.3	0.13				
72	72	1						2 of 3			
72.9	72.8	2	460	456	80	0.69	0.08				
72.8	61	5	456	448	360	0.69	3.2				
61	72	3	443.0	410.0	95						
72	72	1						3 of 3			
72	64	3	410	377	95						
64	75	5	377	351	150	0.32	0.27				
75	75	11						Add Bank 2			
75	75	12						Clear Bank 2			
75	60	5	351	350	70	0.35	0.61				
60	60	1						1 OF 2			
59	58	2	440	438.5	75	0.71	0.19				
58	57	5	438.5	428	830	0.70	5				
57	56	3	428	378	170						
56	60	5	373	350	108	0.35	*				
60	60	1						2 OF 2			
60	55	5	350	337	280	0.35	1.57				
55	55	10						SAVE BANK 2			
55.9	55.9	7	Q= 49.1	Tc= 10 MINS	A= 0						
55.9	55.8	3	482	464	350						
55.8	55.8	1						1 OF 2			
54	53	2	561	542	75	0.35	0.07				
53	52	5	542	473	355	0.35	1.7				
52	55.8	3	467	464	45						
55.8	55.8	1						2 OF 2			
55.8	51	3	464	434	680						
51	51	10						SAVE BANK 3			

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Job Name: Sweetwater Vistas

Date: 8/09/16

Job #: 2780-002

Run Name:
P1.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
50	49	2	606.4	604.5	40	0.9	0.08				
49	48	5	604.5	558.1	350	0.9	2.45				
48	47	3	552.1	546.2	195						
47	46	5	552.2	444	525	0.33	1.67				
46	46	1						1 OF 2			
45	44	2	606.4	603.5	93.5	0.9	0.16				
44	43	5	603.5	570.6	310	0.9	2.02				
43	42	3	564.6	559	95						
42	46	5	565	444	505	0.3	1.98				
46	46	1						2 OF 2			
46	51	3	438	434	50						
51	51	11						ADD BANK 3			
51	51	12						CLEAR BANK 3			
51	41	3	434	399	235						
41	37	5	399	385	115						
37	37	1						1 OF 2			
39	38	2	452	434	75	0.3	0.06				
38	37	5	434	385	215	0.3	1.08				
37	37	1						2 of 2			
37	55	5	385	336	420	0.3	2.40				
55	55	11						ADD BANK 2			
55	55	12						CLEAR BANK 2			
55	36	5	336	335	60	0.3	*				
36	36	11						ADD BANK 1			
36	36	12						CLEAR BANK 1			
36	35	5	335	314	760	0.34	7.93				
							49.53				

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                              Analysis prepared by:

                                 Fuscoe Engineering
                           6390 Greenwich Drive, Suite 170
                                   San Diego, CA
                                       92122

 ************************** DESCRIPTION OF STUDY **************************
* SWEETWATER VISTAS                                                      *
* PROPOSED HYDROLOGY - NO DETENTION                                      *
* RUN 1                                                                  *
 ************************************************************************

  FILE NAME: P1.DAT
  TIME/DATE OF STUDY: 09:05 08/10/2016
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    490.00
  DOWNSTREAM ELEVATION(FEET) =    488.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.123
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     97.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  488.00  DOWNSTREAM ELEVATION(FEET) =  464.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    5.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =    3.84
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.831
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    2.98
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       3.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.91
  FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     97.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.84
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.48

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     95.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  UPSTREAM ELEVATION(FEET) =    489.00
  DOWNSTREAM ELEVATION(FEET) =    488.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.114
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     97.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  488.50  DOWNSTREAM ELEVATION(FEET) =  464.00
```

```
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    3.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.829
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    2.01
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.45
  FLOW VELOCITY(FEET/SEC.) =  4.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
  LONGEST FLOWPATH FROM NODE     96.00 TO NODE     97.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.96
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.29

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)	(ACRE)
1	3.48	3.84	7.904	0.53
2	2.29	3.96	7.904	0.35

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	5.70	3.84	7.904
2	5.77	3.96	7.904

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 5.77 Tc(MIN.) = 3.96
TOTAL AREA(ACRES) = 0.9
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 97.00 = 500.00 FEET.

****
FLOW PROCESS FROM NODE 97.00 TO NODE 94.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 458.00 DOWNSTREAM(FEET) = 446.00
FLOW LENGTH(FEET) = 410.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.72
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.77
PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 4.75
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 94.00 = 910.00 FEET.

****
FLOW PROCESS FROM NODE 94.00 TO NODE 94.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 4.75
RAINFALL INTENSITY(INCH/HR) = 7.90
TOTAL STREAM AREA(ACRES) = 0.88
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.77

****
FLOW PROCESS FROM NODE 93.00 TO NODE 92.00 IS CODE = 21

```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    463.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.878
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.77

************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     94.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  463.00  DOWNSTREAM ELEVATION(FEET) =  454.00
  STREET LENGTH(FEET) =   328.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    5.54
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.402
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.56      SUBAREA RUNOFF(CFS) =    3.36
```

```
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       4.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.90
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     93.00 TO NODE     94.00 =     398.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.54
  RAINFALL INTENSITY(INCH/HR) =   7.40
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.08

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     90.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    463.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.968
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     94.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.00  DOWNSTREAM ELEVATION(FEET) =  454.00
```

```
  STREET LENGTH(FEET) =   328.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    5.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.071
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    1.32
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.45
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     94.00 =     403.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   7.07
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.60

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1        5.77     4.75        7.904          0.88
     2        4.08     5.54        7.402          0.68
     3        1.60     5.94        7.071          0.28

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.55     4.75       7.904
      2       10.98     5.54       7.402
      3       10.66     5.94       7.071

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.98   Tc(MIN.) =    5.54
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     94.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     89.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.98
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.84
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     89.00 =    1218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.84
  RAINFALL INTENSITY(INCH/HR) =   7.15
  TOTAL STREAM AREA(ACRES) =     1.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.98

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     88.00 TO NODE     87.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8100
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    454.00
 DOWNSTREAM ELEVATION(FEET) =    451.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.848
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     87.00 TO NODE     89.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  431.00
 STREET LENGTH(FEET) =   183.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.17
   HALFSTREET FLOOD WIDTH(FEET) =    2.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.67
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   0.54   Tc(MIN.) =    3.39
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8100
 S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    1.02
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   3.86
  FLOW VELOCITY(FEET/SEC.) =  5.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     89.00 =     258.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.39
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     85.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    41.00
  UPSTREAM ELEVATION(FEET) =    454.00
  DOWNSTREAM ELEVATION(FEET) =    451.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.722
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     89.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  431.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.46   Tc(MIN.) =    2.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.77
  TOTAL AREA(ACRES) =        0.1        PEAK FLOW RATE(CFS) =       0.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.17   HALFSTREET FLOOD WIDTH(FEET) =   2.33
  FLOW VELOCITY(FEET/SEC.) =  5.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     86.00 TO NODE     89.00 =     216.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    2.18
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.96

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.98     5.84        7.148          1.84
```

```
     2        1.41     3.39        7.904          0.22
     3        0.96     2.18        7.904          0.15

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.79     2.18       7.904
      2       12.30     3.39       7.904
      3       13.12     5.84       7.148

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.12   Tc(MIN.) =    5.84
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     89.00 =    1218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   389.50
  FLOW LENGTH(FEET) =   435.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.12
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     84.00 =    1653.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.30
  RAINFALL INTENSITY(INCH/HR) =   6.81
  TOTAL STREAM AREA(ACRES) =     2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.12

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     82.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    431.00
  DOWNSTREAM ELEVATION(FEET) =    423.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.098
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  423.00  DOWNSTREAM ELEVATION(FEET) =  384.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    3.87
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.64      SUBAREA RUNOFF(CFS) =    4.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       4.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.24
  FLOW VELOCITY(FEET/SEC.) =  5.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.61
  LONGEST FLOWPATH FROM NODE     83.00 TO NODE     84.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.87
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.42

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     80.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    431.00
  DOWNSTREAM ELEVATION(FEET) =    423.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.027
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  423.00  DOWNSTREAM ELEVATION(FEET) =  390.00
  STREET LENGTH(FEET) =   565.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   2.27   Tc(MIN.) =    4.30
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    2.69
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       3.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.31
  FLOW VELOCITY(FEET/SEC.) =  4.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     84.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.30
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1       13.12     6.30        6.807          2.21
     2        4.42     3.87        7.904          0.69
     3        3.01     4.30        7.904          0.47

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       18.43     3.87       7.904
      2       18.73     4.30       7.904
      3       19.52     6.30       6.807

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.52   Tc(MIN.) =    6.30
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     84.00 =    1653.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     79.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   384.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.52
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.33
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     79.90 =    1693.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.90 TO NODE     79.90 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     79.80 TO NODE     79.70 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    486.00
  ELEVATION DIFFERENCE(FEET) =     31.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.341
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.781
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE     79.70 TO NODE     79.60 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   555.00   CHANNEL SLOPE =  0.1369
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.027
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.47
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   3.74
  Tc(MIN.) =   10.09
  SUBAREA AREA(ACRES) =     0.43       SUBAREA RUNOFF(CFS) =    0.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       0.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.60 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.60 TO NODE     79.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   399.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.72
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.50 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.50 TO NODE     79.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.80
  RAINFALL INTENSITY(INCH/HR) =   4.81
  TOTAL STREAM AREA(ACRES) =     0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.72

****************************************************************************
  FLOW PROCESS FROM NODE     79.40 TO NODE     79.30 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    443.00
  DOWNSTREAM ELEVATION(FEET) =    416.00
  ELEVATION DIFFERENCE(FEET) =     27.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.967
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     79.30 TO NODE     79.50 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    399.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   475.00   CHANNEL SLOPE =  0.0358
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.82
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =    4.61
  SUBAREA AREA(ACRES) =     3.23       SUBAREA RUNOFF(CFS) =   17.62
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
  TOTAL AREA(ACRES) =        3.3         PEAK FLOW RATE(CFS) =      18.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   5.89
  LONGEST FLOWPATH FROM NODE     79.40 TO NODE     79.50 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.50 TO NODE     79.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.61
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.72    10.80        4.810          0.48
      2       18.05     4.61        7.904          3.31

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       18.36     4.61       7.904
      2       11.71    10.80       4.810

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.36   Tc(MIN.) =    4.61
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.50 =     870.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     79.50 TO NODE     79.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   399.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.36
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.74
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.90 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.90 TO NODE     79.90 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       18.36     4.74       7.904        3.79
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.90 =    1040.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       19.52     6.33       6.790        3.37
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     79.90 =    1693.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      32.98       4.74        7.904
      2      35.29       6.33        6.790

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.29   Tc(MIN.) =    6.33
  TOTAL AREA(ACRES) =        7.2

****************************************************************************
  FLOW PROCESS FROM NODE     79.90 TO NODE     79.90 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE     79.90 TO NODE     79.00 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   368.00
 FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.16
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      35.29
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    6.55
 LONGEST FLOWPATH FROM NODE     99.00 TO NODE     79.00 =    1868.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE     79.00 TO NODE     36.00 IS CODE =  53
--------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    368.00  DOWNSTREAM(FEET) =    335.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   183.00   CHANNEL SLOPE =  0.1803
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .1502 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =      35.29
 FLOW VELOCITY(FEET/SEC) =   7.11 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.43   Tc(MIN.) =    6.98
 LONGEST FLOWPATH FROM NODE     99.00 TO NODE     36.00 =    2051.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
--------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE     74.00 TO NODE     73.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    491.00
```

```
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.243
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.666
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     67.90 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1040.00   CHANNEL SLOPE =  0.0625
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.714
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   5.90
  Tc(MIN.) =   11.14
  SUBAREA AREA(ACRES) =     1.22       SUBAREA RUNOFF(CFS) =    2.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.58
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.90 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.90 TO NODE     67.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   4.71
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.15

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     62.00 IS CODE =  21
```

```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    458.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.372
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     67.80 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    458.00  DOWNSTREAM(FEET) =    453.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   355.00   CHANNEL SLOPE =  0.0141
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.537
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.46   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =    5.38
  SUBAREA AREA(ACRES) =     1.87       SUBAREA RUNOFF(CFS) =    9.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =      10.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   3.60
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     67.80 =     435.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     67.80 TO NODE     67.90 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   452.00  DOWNSTREAM(FEET) =   421.00
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.15
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.14
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.54
 LONGEST FLOWPATH FROM NODE     63.00 TO NODE     67.90 =     620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     67.90 TO NODE     67.90 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.54
 RAINFALL INTENSITY(INCH/HR) =   7.40
 TOTAL STREAM AREA(ACRES) =     1.95
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.14

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.15    11.14        4.714          1.30
     2       10.14     5.54        7.395          1.95

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       11.21     5.54       7.395
     2        8.61    11.14       4.714

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      11.21   Tc(MIN.) =    5.54
 TOTAL AREA(ACRES) =        3.2
 LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.90 =    1110.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     67.90 TO NODE     67.00 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    421.00  DOWNSTREAM(FEET) =    386.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   105.00   CHANNEL SLOPE =  0.3333
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2023 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      11.21
  FLOW VELOCITY(FEET/SEC) =   5.63 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =    5.85
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.00 =    1215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     67.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.85
  RAINFALL INTENSITY(INCH/HR) =   7.14
  TOTAL STREAM AREA(ACRES) =     3.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.21

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    443.80
  DOWNSTREAM ELEVATION(FEET) =    443.20
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.594
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     76.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  443.20  DOWNSTREAM ELEVATION(FEET) =  440.00
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.57   Tc(MIN.) =    6.16
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.905
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    3.92
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.79
  FLOW VELOCITY(FEET/SEC.) =  2.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     76.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     67.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    386.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   370.00   CHANNEL SLOPE =  0.1459
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.325
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.86
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   0.90
```

```
  Tc(MIN.) =    7.06
  SUBAREA AREA(ACRES) =     1.36       SUBAREA RUNOFF(CFS) =    3.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.545
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       7.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   7.15
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     67.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     67.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.28

****************************************************************************
  FLOW PROCESS FROM NODE     67.50 TO NODE     67.50 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  15.00   RAIN INTENSITY(INCH/HOUR) =  3.89
  TOTAL AREA(ACRES) =     0.00   TOTAL RUNOFF(CFS) =    500.00

****************************************************************************
  FLOW PROCESS FROM NODE     67.50 TO NODE     67.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    415.00  DOWNSTREAM(FEET) =    386.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   190.00   CHANNEL SLOPE =  0.1526
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1363 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     500.00
  FLOW VELOCITY(FEET/SEC) =  16.38 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =   15.19
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     67.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     67.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.19
  RAINFALL INTENSITY(INCH/HR) =   3.86
  TOTAL STREAM AREA(ACRES) =     0.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    500.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.21     5.85        7.140          3.25
      2        7.28     7.06        6.325          2.11
      3      500.00    15.19        3.859          0.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      209.90     5.85       7.140
      2      249.68     7.06       6.325
      3      510.50    15.19       3.859

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     510.50   Tc(MIN.) =   15.19
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.00 =    1215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     75.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    392.00  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.0590
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.754
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     513.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.32
```

```
  AVERAGE FLOW DEPTH(FEET) =   3.17   TRAVEL TIME(MIN.) =   0.67
  Tc(MIN.) =   15.86
  SUBAREA AREA(ACRES) =     3.97       SUBAREA RUNOFF(CFS) =    5.22
  AREA-AVERAGE RUNOFF COEFFICIENT = 14.236
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =     510.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.16   FLOW VELOCITY(FEET/SEC.) =  17.30
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     75.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     66.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   118.00
  UPSTREAM ELEVATION(FEET) =    449.00
  DOWNSTREAM ELEVATION(FEET) =    411.00
  ELEVATION DIFFERENCE(FEET) =     38.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.554
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     72.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   217.00   CHANNEL SLOPE =  0.0046
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.693
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.80
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   4.53
  Tc(MIN.) =   11.22
  SUBAREA AREA(ACRES) =     0.26       SUBAREA RUNOFF(CFS) =    0.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     68.00 TO NODE     72.00 =     335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   4.69
  TOTAL STREAM AREA(ACRES) =     0.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     70.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    82.00
  UPSTREAM ELEVATION(FEET) =    450.00
  DOWNSTREAM ELEVATION(FEET) =    411.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.053
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.988
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     72.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   124.00   CHANNEL SLOPE =  0.0081
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.604
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.84
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   2.47
  Tc(MIN.) =    8.52
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.22
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE     71.00 TO NODE     72.00 =     206.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.52
  RAINFALL INTENSITY(INCH/HR) =   5.60
  TOTAL STREAM AREA(ACRES) =     0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE     72.90 TO NODE     72.80 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    460.00
  DOWNSTREAM ELEVATION(FEET) =    456.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.860
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.44
TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
FLOW PROCESS FROM NODE     72.80 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    456.00  DOWNSTREAM(FEET) =    448.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00   CHANNEL SLOPE =  0.0222
CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.567
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6900
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.82
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.03
AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   1.49
Tc(MIN.) =    5.35
SUBAREA AREA(ACRES) =     3.20       SUBAREA RUNOFF(CFS) =   16.71
AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
TOTAL AREA(ACRES) =        3.3         PEAK FLOW RATE(CFS) =      17.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   4.92
LONGEST FLOWPATH FROM NODE     72.90 TO NODE     61.00 =     440.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     61.00 TO NODE     72.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   410.00
FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  28.83
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      17.13
PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.40
LONGEST FLOWPATH FROM NODE     72.90 TO NODE     72.00 =     535.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.40
 RAINFALL INTENSITY(INCH/HR) =   7.52
 TOTAL STREAM AREA(ACRES) =     3.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.13

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        0.48    11.22        4.693          0.34
     2        0.30     8.52        5.604          0.18
     3       17.13     5.40        7.518          3.28

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       17.55     5.40       7.518
     2       13.43     8.52       5.604
     3       11.42    11.22       4.693

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      17.55   Tc(MIN.) =    5.40
 TOTAL AREA(ACRES) =        3.8
 LONGEST FLOWPATH FROM NODE     72.90 TO NODE     72.00 =     535.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     72.00 TO NODE     64.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   377.00
 FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  29.02
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.55
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.46
```

```
 LONGEST FLOWPATH FROM NODE     72.90 TO NODE     64.00 =     630.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     64.00 TO NODE     75.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    377.00  DOWNSTREAM(FEET) =    351.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.1733
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.262
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3200
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.86
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.25
 AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.24
 Tc(MIN.) =    5.70
 SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.63
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.616
 TOTAL AREA(ACRES) =        4.1         PEAK FLOW RATE(CFS) =      18.19

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =  10.28
 LONGEST FLOWPATH FROM NODE     72.90 TO NODE     75.00 =     780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       18.19     5.70       7.262        4.07
 LONGEST FLOWPATH FROM NODE     72.90 TO NODE     75.00 =     780.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1      510.50    15.86       3.754        9.33
 LONGEST FLOWPATH FROM NODE     74.00 TO NODE     75.00 =    1910.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
```

```
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     201.72       5.70        7.262
      2     519.91      15.86        3.754

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     519.91   Tc(MIN.) =   15.86
  TOTAL AREA(ACRES) =       13.4

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     60.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    351.00  DOWNSTREAM(FEET) =    350.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0143
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.736
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     520.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.22
  AVERAGE FLOW DEPTH(FEET) =   4.35   TRAVEL TIME(MIN.) =   0.11
  Tc(MIN.) =   15.98
  SUBAREA AREA(ACRES) =     0.61       SUBAREA RUNOFF(CFS) =    0.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  9.675
  TOTAL AREA(ACRES) =       14.0         PEAK FLOW RATE(CFS) =     519.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  4.35   FLOW VELOCITY(FEET/SEC.) =  10.21
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     60.00 =    1980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.98
```

```
  RAINFALL INTENSITY(INCH/HR) =   3.74
  TOTAL STREAM AREA(ACRES) =    14.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    519.91

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     58.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    438.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.825
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     57.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    438.50  DOWNSTREAM(FEET) =    428.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00   CHANNEL SLOPE =  0.0127
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.511
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.53
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   3.92
  Tc(MIN.) =    8.74
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   19.29
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  TOTAL AREA(ACRES) =        5.2         PEAK FLOW RATE(CFS) =      20.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   4.20
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     57.00 =     905.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     56.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   428.00  DOWNSTREAM(FEET) =   378.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.03
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.84
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     56.00 =    1075.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     60.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    373.00  DOWNSTREAM(FEET) =    350.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.2130
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1665 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      20.03
  FLOW VELOCITY(FEET/SEC) =   6.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    9.14
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     60.00 =    1183.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   5.36
  TOTAL STREAM AREA(ACRES) =     5.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.03

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      519.91    15.98        3.736         14.01
```

```
     2       20.03     9.14        5.358          5.19

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      317.32     9.14       5.358
      2      533.88    15.98       3.736

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     533.88   Tc(MIN.) =   15.98
  TOTAL AREA(ACRES) =       19.2
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     60.00 =    1980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     55.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   280.00   CHANNEL SLOPE =  0.0464
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.693
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     534.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  15.99
  AVERAGE FLOW DEPTH(FEET) =   3.41   TRAVEL TIME(MIN.) =   0.29
  Tc(MIN.) =   16.27
  SUBAREA AREA(ACRES) =     1.57       SUBAREA RUNOFF(CFS) =    2.03
  AREA-AVERAGE RUNOFF COEFFICIENT =  6.727
  TOTAL AREA(ACRES) =       20.8         PEAK FLOW RATE(CFS) =     533.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.41   FLOW VELOCITY(FEET/SEC.) =  15.98
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    2260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     55.90 TO NODE     55.90 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.00   RAIN INTENSITY(INCH/HOUR) =  5.05
  TOTAL AREA(ACRES) =     0.00   TOTAL RUNOFF(CFS) =     49.10

****************************************************************************
  FLOW PROCESS FROM NODE     55.90 TO NODE     55.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.10
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.32
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.80 =    2610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.80 TO NODE     55.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.32
  RAINFALL INTENSITY(INCH/HR) =   4.95
  TOTAL STREAM AREA(ACRES) =     0.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.10

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    561.00
  DOWNSTREAM ELEVATION(FEET) =    542.00
  ELEVATION DIFFERENCE(FEET) =     19.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.427
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.497
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     52.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    542.00  DOWNSTREAM(FEET) =    473.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   355.00   CHANNEL SLOPE =  0.1944
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.686
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.61
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =    6.48
  SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    3.98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   6.84
  LONGEST FLOWPATH FROM NODE     54.00 TO NODE     52.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.55
  LONGEST FLOWPATH FROM NODE     54.00 TO NODE     55.80 =     475.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     55.80 TO NODE     55.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.55
  RAINFALL INTENSITY(INCH/HR) =   6.64
  TOTAL STREAM AREA(ACRES) =     1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.14

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       49.10    10.32        4.954          0.00
      2        4.14     6.55        6.639          1.77

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       35.32     6.55       6.639
      2       52.19    10.32       4.954

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.19   Tc(MIN.) =   10.32
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.80 =    2610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.80 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   434.00
  FLOW LENGTH(FEET) =   680.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.41
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.19
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     51.00 =    3290.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  UPSTREAM ELEVATION(FEET) =    606.40
  DOWNSTREAM ELEVATION(FEET) =    604.50
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.355
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     48.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    604.50  DOWNSTREAM(FEET) =    558.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.1326
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.61
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =    2.12
  SUBAREA AREA(ACRES) =     2.45       SUBAREA RUNOFF(CFS) =   17.43
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  TOTAL AREA(ACRES) =        2.5         PEAK FLOW RATE(CFS) =      18.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
 DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   9.34
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     48.00 =     390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     48.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   552.10  DOWNSTREAM(FEET) =   546.20
 FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.72
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.00
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    2.40
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     47.00 =     585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     46.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    552.20  DOWNSTREAM(FEET) =    444.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   525.00   CHANNEL SLOPE =  0.2061
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3300
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.34
 AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.77
 Tc(MIN.) =    3.17
 SUBAREA AREA(ACRES) =     1.67       SUBAREA RUNOFF(CFS) =    4.36
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.673
 TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =      22.35

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =  11.65
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     46.00 =    1110.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.17
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     4.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.35

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.50
  UPSTREAM ELEVATION(FEET) =    606.40
  DOWNSTREAM ELEVATION(FEET) =    603.50
  ELEVATION DIFFERENCE(FEET) =      2.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.387
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.14
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.14

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    603.50  DOWNSTREAM(FEET) =    570.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.1061
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.82
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    3.14
  SUBAREA AREA(ACRES) =     2.02       SUBAREA RUNOFF(CFS) =   14.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =      15.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   8.25
  LONGEST FLOWPATH FROM NODE     45.00 TO NODE     43.00 =     403.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     42.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.60  DOWNSTREAM(FEET) =   559.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.51
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    3.25
  LONGEST FLOWPATH FROM NODE     45.00 TO NODE     42.00 =     498.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     46.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    565.00  DOWNSTREAM(FEET) =    444.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   505.00   CHANNEL SLOPE =  0.2396
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.43
  AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   0.74
  Tc(MIN.) =    3.99
  SUBAREA AREA(ACRES) =     1.98       SUBAREA RUNOFF(CFS) =    4.70
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.614
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =      20.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =  11.85
  LONGEST FLOWPATH FROM NODE     45.00 TO NODE     46.00 =    1003.50 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.99
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     4.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.35     3.17        7.904          4.20
      2       20.20     3.99        7.904          4.16

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       38.40     3.17       7.904
      2       42.56     3.99       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      42.56   Tc(MIN.) =    3.99
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     46.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   434.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.56
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    4.03
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =    1160.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       42.56     4.03       7.904        8.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =    1160.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       52.19    10.97       4.762        1.77
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     51.00 =    3290.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      61.73       4.03        7.904
      2      77.83      10.97        4.762

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.83   Tc(MIN.) =   10.97
  TOTAL AREA(ACRES) =       10.1

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   399.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.83
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     41.00 =    3525.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     37.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    399.00  DOWNSTREAM(FEET) =    385.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   115.00   CHANNEL SLOPE =  0.1217
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1162 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      77.83
  FLOW VELOCITY(FEET/SEC) =   8.14 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.24   Tc(MIN.) =   11.34
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     37.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.34
  RAINFALL INTENSITY(INCH/HR) =   4.66
  TOTAL STREAM AREA(ACRES) =    10.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     77.83

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    452.00
  DOWNSTREAM ELEVATION(FEET) =    434.00
  ELEVATION DIFFERENCE(FEET) =     18.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.789
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.192
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     37.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    434.00  DOWNSTREAM(FEET) =    385.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   215.00   CHANNEL SLOPE =  0.2279
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.602
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.37
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.82
  Tc(MIN.) =    6.61
  SUBAREA AREA(ACRES) =     1.08       SUBAREA RUNOFF(CFS) =    2.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       2.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   5.56
  LONGEST FLOWPATH FROM NODE     39.00 TO NODE     37.00 =     290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.61
  RAINFALL INTENSITY(INCH/HR) =   6.60
  TOTAL STREAM AREA(ACRES) =     1.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       77.83    11.34        4.662         10.13
      2        2.26     6.61        6.602          1.14

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       47.63     6.61       6.602
      2       79.42    11.34       4.662

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.42   Tc(MIN.) =   11.34
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     37.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     55.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    385.00  DOWNSTREAM(FEET) =    336.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.1167
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.532
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      81.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.73
  AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   0.51
  Tc(MIN.) =   11.85
  SUBAREA AREA(ACRES) =     2.40       SUBAREA RUNOFF(CFS) =    3.26
  AREA-AVERAGE RUNOFF COEFFICIENT =  1.227
  TOTAL AREA(ACRES) =       13.7         PEAK FLOW RATE(CFS) =      79.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.11   FLOW VELOCITY(FEET/SEC.) =  13.69
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    4060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       79.42    11.85       4.532       13.67
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    4060.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      533.88    16.27       3.693       20.77
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    2260.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     468.15      11.85        4.532
      2     598.60      16.27        3.693

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     598.60   Tc(MIN.) =   16.27
  TOTAL AREA(ACRES) =       34.4

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     36.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    336.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0167
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0167 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     598.60
  FLOW VELOCITY(FEET/SEC) =   6.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =   16.43
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     36.00 =    4120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      598.60    16.43       3.669       34.44
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     36.00 =    4120.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       35.29      6.98        6.375        7.16
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     36.00 =    2051.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF        Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1     289.49        6.98         6.375
      2     618.91       16.43         3.669

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     618.91   Tc(MIN.) =   16.43
  TOTAL AREA(ACRES) =       41.6

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    335.00  DOWNSTREAM(FEET) =    314.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   760.00   CHANNEL SLOPE =  0.0276
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.542
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     623.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.70
  AVERAGE FLOW DEPTH(FEET) =   4.08   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =   17.36
  SUBAREA AREA(ACRES) =     7.93       SUBAREA RUNOFF(CFS) =    9.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  3.319
  TOTAL AREA(ACRES) =       49.5         PEAK FLOW RATE(CFS) =     618.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  4.07   FLOW VELOCITY(FEET/SEC.) =  13.65
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     35.00 =    4880.00 FEET.
============================================================================
```

```
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       49.5  TC(MIN.) =     17.36
  PEAK FLOW RATE(CFS)   =     618.91
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Sweetwater Vistas Date: 10/18/16

Job #: 2780-002 Run Name: P1-d.DAT

See detention analysis for post detention Q determination (code 7's)

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
99	98	2	490	488	70	0.9	0.07				
98	97	6	488	464	430	0.82	0.46	1 SIDE OF STREET			
97	97	1						1 OF 2			
96	95	2	489	489	40	0.9	0.04				
95	97	6	489	464	435	0.82	0.31	1 SIDE OF STREET			
97	97	1						2 OF 2			
97	94	3	458	446	410						
94	94	1						1 OF 3			
93	92	2	464	463	70	0.81	0.12				
92	94	6	463	454	328	0.81	0.56	1 SIDE OF STREET			
94	94	1						2 OF 3			
91	90	2	464	463	75	0.81	0.05				
90	94	6	463	454	328	0.81	0.23	1 SIDE OF STREET			
94	94	1						3 OF 3			
94	89	3	448	415	308						
89	89	1						1 OF 3			
88	87	2	454	451	41	0.81	0.06				
87	89	6	451	431	183	0.81	0.16	1 SIDE OF STREET			
89	89	1						2 OF 3			
86	85	2	454	451	41	0.81	0.03				
85	89	6	451	431	175	0.81	0.12	1 SIDE OF STREET			
89	89	1						3			
89	84	3	425	389.5	435						
84	84	1						1 OF 3			
83	82	2	431	423	75	0.81	0.05				
82	84	6	423	384	520	0.81	0.64	1 SIDE OF STREET			
84	84	1						2 OF 3			
81	80	2	431	423	70	0.81	0.05				
80	84	6	423	390	565	0.81	0.42	1 SIDE OF STREET			
84	84	1						3 OF 3			
84	84	7	Tc=6.30	A=3.40	Q=1.6			DMA 4 POST DETENTION			
84	79.9	3	384	373	40						
79.9	79.9	10						SAVE BANK 1			

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Job Name: Sweetwater Vistas Date: 8/09/16

Job #: 2780-002 Run Name: P1-d.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
79.8	79.7	2	517	486	90	0.3	0.05				
79.7	79.6	5	486	410	555	0.3	0.43				
79.6	79.5	3	408	399	225						
79.5	79.5	1						1 OF 2			
79.4	79.3	2	443	416	75	0.69	0.08				
79.3	79.5	5	416	399	475	0.69	3.23				
79.5	79.5	7	Tc=5.00 A=3.30 Q=2.06					DMA 2 POST DETENTION			
79.5	79.5	1						2 OF 2			
79.5	79.9	3	399	373	170						
79.9	79.9	11						ADD BANK 1			
79.9	79.9	12						CLEAR BANK 1			
79.9	79	3	373.0	368.0	175						
79	36	5	368.0	335.0	183	0.3					
36	36	10						SAVE BANK 1			
74	73	2	491	483	70	0.35	0.08				
73	67.9	5	483	418	1040	0.35	1.22				
67.9	67.9	1						1 OF 2			
63	62	2	464	458	80	0.69	0.08				
62	67.8	5	458	453	355	0.69	1.87				
67.8	67.8	7	Tc=5.38 A=2.0 Q=1.73					DMA 1.3 POST DETENTION			
67.8	67.9	3	452	421	185						
67.9	67.9	1						2 of 2			
67.9	67	5	421	386	105		*				
67	67	1						1 of 3			
78	77	2	443.8	443.2	55	0.9	0.12				
77	76	6	443.2	440	440	0.9	0.63	1 sided			
76	67	5	440	386	370	0.35	1.36				
67	67	1						2 of 3			
67.5	67.5	7	Q=500 cfs Tc=15 min A=0					Incoming SD from offsite			
67.5	67	5	415	386	190		*				
67	67	1						3 of 3			

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Job Name: Sweetwater Vistas Date: 8/09/16

Job #: 2780-002 Run Name: P1-d.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK 1	BANK 2	BANK 3
67	75	5	392	351	695	0.35	3.97				
75	75	10						Save Bank 2			
68	66	2	449	411	118	0.3	0.08				
66	72	5	411	410	217	0.3	0.26				
72	72	1						1 of 3			
71	70	2	450	411	82	0.3	0.05				
70	72	5	411	410	124	0.3	0.13				
72	72	1						2 of 3			
72.9	72.8	2	460	456	80	0.69	0.08				
72.8	61	5	456	448	360	0.69	3.2				
61	61	7	Tc=5.35	A=3.30	Q=1.32			DMA 1.1,2 POST DETENTION			
61	72	3	443.0	410.0	95						
72	72	1						3 of 3			
72	64	3	410	377	95						
64	75	5	377	351	150	0.32	0.27				
75	75	11						Add Bank 2			
75	75	12						Clear Bank 2			
75	60	5	351	350	70	0.35	0.61				
60	60	1						1 OF 2			
59	58	2	440	438.5	75	0.71	0.19				
58	57	5	438.5	428	830	0.70	5				
57	57	7	Tc=8.74	A=5.20	Q=1.4			DMA 3 POST DETENTION			
57	56	3	428	378	170						
56	60	5	373	350	108	0.35	*				
60	60	1						2 OF 2			
60	55	5	350	337	280	0.35	1.57				
55	55	10						SAVE BANK 2			
55.9	55.9	7	Q= 49.1	Tc= 10 MINS	A= 0			Incoming Q from offsite			
55.9	55.8	3	482	464	350						
55.8	55.8	1						1 OF 2			
54	53	2	561	542	75	0.35	0.07				
53	52	5	542	473	355	0.35	1.7				
52	55.8	3	467	464	45						
55.8	55.8	1						2 OF 2			
55.8	51	3	464	434	680						
51	51	10						SAVE BANK 3			

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Date: 8/09/16

Job #: 2780-002

Run Name:
P1-d.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
50	49	2	606.4	604.5	40	0.9	0.08				
49	48	5	604.5	558.1	350	0.9	2.45				
48	47	3	552.1	546.2	195						
47	46	5	552.2	444	525	0.33	1.67				
46	46	1						1 OF 2			
45	44	2	606.4	603.5	93.5	0.9	0.16				
44	43	5	603.5	570.6	310	0.9	2.02				
43	42	3	564.6	559	95						
42	46	5	565	444	505	0.3	1.98				
46	46	1						2 OF 2			
46	51	3	438	434	50						
51	51	11						ADD BANK 3			
51	51	12						CLEAR BANK 3			
51	41	3	434	399	235						
41	37	5	399	385	115						
37	37	1						1 OF 2			
39	38	2	452	434	75	0.3	0.06				
38	37	5	434	385	215	0.3	1.08				
37	37	1						2 of 2			
37	55	5	385	336	420	0.3	2.40				
55	55	11						ADD BANK 2			
55	55	12						CLEAR BANK 2			
55	36	5	336	335	60	0.3	*				
36	36	11						ADD BANK 1			
36	36	12						CLEAR BANK 1			
36	35	5	335	314	760	0.34	7.93				
							49.53				

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                              Analysis prepared by:

                                Fuscoe Engineering
                               6390 Greenwich Drive
                                    Suite 200
                               San Diego, CA 92122

 ************************* DESCRIPTION OF STUDY *************************
* SWEETWATER VISTAS                                                      *
* PROPOSED HYDROLOGY WITH CISTERN DETENTION                              *
* RUN 1                                                                  *
 ************************************************************************

  FILE NAME: P1-D.DAT
  TIME/DATE OF STUDY: 09:57 11/04/2016
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    490.00
  DOWNSTREAM ELEVATION(FEET) =    488.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.123
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     97.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  488.00  DOWNSTREAM ELEVATION(FEET) =  464.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    5.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =    3.84
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.831
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    2.98
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       3.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.91
  FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     97.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.84
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.48

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     95.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  UPSTREAM ELEVATION(FEET) =    489.00
  DOWNSTREAM ELEVATION(FEET) =    488.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.114
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     97.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  488.50  DOWNSTREAM ELEVATION(FEET) =  464.00
```

```
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    3.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.829
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    2.01
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.45
  FLOW VELOCITY(FEET/SEC.) =  4.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
  LONGEST FLOWPATH FROM NODE     96.00 TO NODE     97.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.96
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.29

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.48     3.84        7.904          0.53
      2        2.29     3.96        7.904          0.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.70     3.84       7.904
      2        5.77     3.96       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.77   Tc(MIN.) =    3.96
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     97.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     94.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   458.00  DOWNSTREAM(FEET) =   446.00
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.77
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    4.75
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     94.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.75
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.77

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     92.00 IS CODE =  21
```

```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    463.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.878
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.77

******************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     94.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  463.00  DOWNSTREAM ELEVATION(FEET) =  454.00
  STREET LENGTH(FEET) =   328.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    5.54
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.402
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.56      SUBAREA RUNOFF(CFS) =    3.36
```

```
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       4.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.90
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     93.00 TO NODE     94.00 =     398.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.54
  RAINFALL INTENSITY(INCH/HR) =   7.40
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.08

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     90.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    463.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.968
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     94.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.00  DOWNSTREAM ELEVATION(FEET) =  454.00
```

```
  STREET LENGTH(FEET) =   328.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    5.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.071
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    1.32
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.45
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE     91.00 TO NODE     94.00 =     403.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   7.07
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.60

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1        5.77     4.75        7.904          0.88
     2        4.08     5.54        7.402          0.68
     3        1.60     5.94        7.071          0.28

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.55     4.75       7.904
      2       10.98     5.54       7.402
      3       10.66     5.94       7.071

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.98   Tc(MIN.) =    5.54
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     94.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     89.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.98
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.84
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     89.00 =    1218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.84
  RAINFALL INTENSITY(INCH/HR) =   7.15
  TOTAL STREAM AREA(ACRES) =     1.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.98

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     88.00 TO NODE     87.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8100
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    454.00
 DOWNSTREAM ELEVATION(FEET) =    451.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.848
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     87.00 TO NODE     89.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  431.00
 STREET LENGTH(FEET) =   183.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.17
   HALFSTREET FLOOD WIDTH(FEET) =    2.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.67
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   0.54   Tc(MIN.) =    3.39
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8100
 S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    1.02
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   3.86
  FLOW VELOCITY(FEET/SEC.) =  5.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     89.00 =     258.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.39
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     85.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    41.00
  UPSTREAM ELEVATION(FEET) =    454.00
  DOWNSTREAM ELEVATION(FEET) =    451.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.722
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     89.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  431.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.46   Tc(MIN.) =    2.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.77
  TOTAL AREA(ACRES) =        0.1        PEAK FLOW RATE(CFS) =       0.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.17   HALFSTREET FLOOD WIDTH(FEET) =   2.33
  FLOW VELOCITY(FEET/SEC.) =  5.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     86.00 TO NODE     89.00 =     216.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    2.18
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.96

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.98     5.84        7.148          1.84
```

```
     2        1.41     3.39        7.904          0.22
     3        0.96     2.18        7.904          0.15

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.79     2.18       7.904
      2       12.30     3.39       7.904
      3       13.12     5.84       7.148

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.12   Tc(MIN.) =    5.84
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     89.00 =    1218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   389.50
  FLOW LENGTH(FEET) =   435.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.12
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     84.00 =    1653.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.30
  RAINFALL INTENSITY(INCH/HR) =   6.81
  TOTAL STREAM AREA(ACRES) =     2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.12

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     82.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    431.00
  DOWNSTREAM ELEVATION(FEET) =    423.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.098
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  423.00  DOWNSTREAM ELEVATION(FEET) =  384.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    3.87
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.64      SUBAREA RUNOFF(CFS) =    4.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       4.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.24
  FLOW VELOCITY(FEET/SEC.) =  5.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.61
  LONGEST FLOWPATH FROM NODE     83.00 TO NODE     84.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.87
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.42

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     80.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    431.00
  DOWNSTREAM ELEVATION(FEET) =    423.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.027
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  423.00  DOWNSTREAM ELEVATION(FEET) =  390.00
  STREET LENGTH(FEET) =   565.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   2.27   Tc(MIN.) =    4.30
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    2.69
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       3.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.31
  FLOW VELOCITY(FEET/SEC.) =  4.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     84.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.30
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1       13.12     6.30        6.807          2.21
     2        4.42     3.87        7.904          0.69
     3        3.01     4.30        7.904          0.47

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       18.43     3.87       7.904
      2       18.73     4.30       7.904
      3       19.52     6.30       6.807

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.52   Tc(MIN.) =    6.30
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     84.00 =    1653.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.30   RAIN INTENSITY(INCH/HOUR) =  6.81
  TOTAL AREA(ACRES) =     3.40   TOTAL RUNOFF(CFS) =      1.60

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     79.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   384.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.60
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.35
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     79.90 =    1693.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.90 TO NODE     79.90 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
```

```
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE     79.80 TO NODE     79.70 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    486.00
  ELEVATION DIFFERENCE(FEET) =     31.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.341
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.781
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.10

**************************************************************************
  FLOW PROCESS FROM NODE     79.70 TO NODE     79.60 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   555.00   CHANNEL SLOPE =  0.1369
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.027
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.47
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   3.74
  Tc(MIN.) =   10.09
  SUBAREA AREA(ACRES) =     0.43       SUBAREA RUNOFF(CFS) =    0.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       0.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.60 =     645.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     79.60 TO NODE     79.50 IS CODE =  31
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   399.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.72
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.50 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.50 TO NODE     79.50 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.80
  RAINFALL INTENSITY(INCH/HR) =   4.81
  TOTAL STREAM AREA(ACRES) =     0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.72

****************************************************************************
  FLOW PROCESS FROM NODE     79.40 TO NODE     79.30 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    443.00
  DOWNSTREAM ELEVATION(FEET) =    416.00
  ELEVATION DIFFERENCE(FEET) =     27.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.967
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     79.30 TO NODE     79.50 IS CODE =  51
------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    399.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   475.00   CHANNEL SLOPE =  0.0358
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.82
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =    4.61
  SUBAREA AREA(ACRES) =     3.23       SUBAREA RUNOFF(CFS) =   17.62
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
  TOTAL AREA(ACRES) =        3.3         PEAK FLOW RATE(CFS) =      18.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   5.89
  LONGEST FLOWPATH FROM NODE     79.40 TO NODE     79.50 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.50 TO NODE     79.50 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  7.90
  TOTAL AREA(ACRES) =     3.30   TOTAL RUNOFF(CFS) =      2.06

****************************************************************************
  FLOW PROCESS FROM NODE     79.50 TO NODE     79.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     3.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.06

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.72    10.80        4.810          0.48
      2        2.06     5.00        7.904          3.30

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.40     5.00       7.904
      2        1.98    10.80       4.810

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.40   Tc(MIN.) =    5.00
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.50 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.50 TO NODE     79.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   399.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    5.23
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.90 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.90 TO NODE     79.90 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.40     5.23       7.677         3.78
  LONGEST FLOWPATH FROM NODE     79.80 TO NODE     79.90 =    1040.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.60     6.35       6.775        3.40
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     79.90 =    1693.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.71       5.23        7.677
      2       3.71       6.35        6.775

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.71   Tc(MIN.) =    6.35
  TOTAL AREA(ACRES) =        7.2

****************************************************************************
  FLOW PROCESS FROM NODE     79.90 TO NODE     79.90 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     79.90 TO NODE     79.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   368.00
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.71
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     79.00 =    1868.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     36.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    368.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   183.00   CHANNEL SLOPE =  0.1803
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1502 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.71
  FLOW VELOCITY(FEET/SEC) =   3.36 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
  TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    7.64
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     36.00 =    2051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     73.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    491.00
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.243
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.666
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     67.90 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1040.00   CHANNEL SLOPE =  0.0625
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.714
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   5.90
  Tc(MIN.) =   11.14
  SUBAREA AREA(ACRES) =     1.22       SUBAREA RUNOFF(CFS) =    2.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.15
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.58
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.90 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.90 TO NODE     67.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   4.71
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.15

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    458.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.372
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     67.80 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    458.00  DOWNSTREAM(FEET) =    453.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   355.00   CHANNEL SLOPE =  0.0141
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.537
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.46   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =    5.38
  SUBAREA AREA(ACRES) =     1.87       SUBAREA RUNOFF(CFS) =    9.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =      10.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   3.60
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     67.80 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.80 TO NODE     67.80 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.38   RAIN INTENSITY(INCH/HOUR) =  7.54
  TOTAL AREA(ACRES) =     2.00   TOTAL RUNOFF(CFS) =      1.73

****************************************************************************
  FLOW PROCESS FROM NODE     67.80 TO NODE     67.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.00  DOWNSTREAM(FEET) =   421.00
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.73
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    5.65
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     67.90 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.90 TO NODE     67.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.65
  RAINFALL INTENSITY(INCH/HR) =   7.31
```

```
  TOTAL STREAM AREA(ACRES) =     2.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.73

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.15    11.14        4.714          1.30
      2        1.73     5.65        7.306          2.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.82     5.65       7.306
      2        3.26    11.14       4.714

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.26   Tc(MIN.) =   11.14
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.90 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.90 TO NODE     67.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    421.00  DOWNSTREAM(FEET) =    386.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   105.00   CHANNEL SLOPE =  0.3333
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2023 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.26
  FLOW VELOCITY(FEET/SEC) =   3.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.47   Tc(MIN.) =   11.61
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.00 =    1215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     67.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.61
  RAINFALL INTENSITY(INCH/HR) =   4.59
  TOTAL STREAM AREA(ACRES) =     3.30
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.26

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    443.80
  DOWNSTREAM ELEVATION(FEET) =    443.20
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.594
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     76.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  443.20  DOWNSTREAM ELEVATION(FEET) =  440.00
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.57   Tc(MIN.) =    6.16
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.905
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    3.92
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.79
  FLOW VELOCITY(FEET/SEC.) =  2.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     76.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     67.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    386.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   370.00   CHANNEL SLOPE =  0.1459
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.325
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.86
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   0.90
  Tc(MIN.) =    7.06
  SUBAREA AREA(ACRES) =     1.36       SUBAREA RUNOFF(CFS) =    3.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.545
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       7.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   7.15
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     67.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     67.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.28
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     67.50 TO NODE     67.50 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  15.00   RAIN INTENSITY(INCH/HOUR) =  3.89
  TOTAL AREA(ACRES) =     0.00   TOTAL RUNOFF(CFS) =    500.00

****************************************************************************
  FLOW PROCESS FROM NODE     67.50 TO NODE     67.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    415.00  DOWNSTREAM(FEET) =    386.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   190.00   CHANNEL SLOPE =  0.1526
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1363 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     500.00
  FLOW VELOCITY(FEET/SEC) =  16.38 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =   15.19
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     67.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     67.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.19
  RAINFALL INTENSITY(INCH/HR) =   3.86
  TOTAL STREAM AREA(ACRES) =     0.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    500.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.26    11.61        4.591          3.30
      2        7.28     7.06        6.325          2.11
      3      500.00    15.19        3.859          0.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      242.12     7.06       6.325
      2      390.61    11.61       4.591
      3      507.18    15.19       3.859

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     507.18   Tc(MIN.) =   15.19
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     67.00 =    1215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     75.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    392.00  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.0590
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.753
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     509.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.28
  AVERAGE FLOW DEPTH(FEET) =   3.16   TRAVEL TIME(MIN.) =   0.67
  Tc(MIN.) =   15.86
  SUBAREA AREA(ACRES) =     3.97       SUBAREA RUNOFF(CFS) =    5.22
  AREA-AVERAGE RUNOFF COEFFICIENT = 14.041
  TOTAL AREA(ACRES) =        9.4         PEAK FLOW RATE(CFS) =     507.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.16   FLOW VELOCITY(FEET/SEC.) =  17.26
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     75.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     66.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   118.00
  UPSTREAM ELEVATION(FEET) =    449.00
  DOWNSTREAM ELEVATION(FEET) =    411.00
  ELEVATION DIFFERENCE(FEET) =     38.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.554
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     72.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   217.00   CHANNEL SLOPE =  0.0046
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.693
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.80
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   4.53
  Tc(MIN.) =   11.22
  SUBAREA AREA(ACRES) =     0.26       SUBAREA RUNOFF(CFS) =    0.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     68.00 TO NODE     72.00 =     335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
```

```
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   4.69
  TOTAL STREAM AREA(ACRES) =     0.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     70.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    82.00
  UPSTREAM ELEVATION(FEET) =    450.00
  DOWNSTREAM ELEVATION(FEET) =    411.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.053
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.988
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     72.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   124.00   CHANNEL SLOPE =  0.0081
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.604
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.84
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   2.47
  Tc(MIN.) =    8.52
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.22
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE     71.00 TO NODE     72.00 =     206.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.52
  RAINFALL INTENSITY(INCH/HR) =   5.60
  TOTAL STREAM AREA(ACRES) =     0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE     72.90 TO NODE     72.80 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    460.00
  DOWNSTREAM ELEVATION(FEET) =    456.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.860
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     72.80 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    456.00  DOWNSTREAM(FEET) =    448.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00   CHANNEL SLOPE =  0.0222
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.567
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.82
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.03
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   1.49
  Tc(MIN.) =    5.35
  SUBAREA AREA(ACRES) =     3.20       SUBAREA RUNOFF(CFS) =   16.71
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
  TOTAL AREA(ACRES) =        3.3         PEAK FLOW RATE(CFS) =      17.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   4.92
  LONGEST FLOWPATH FROM NODE     72.90 TO NODE     61.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.35   RAIN INTENSITY(INCH/HOUR) =  7.57
  TOTAL AREA(ACRES) =     3.30   TOTAL RUNOFF(CFS) =      1.32

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     72.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.32
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.47
  LONGEST FLOWPATH FROM NODE     72.90 TO NODE     72.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.47
  RAINFALL INTENSITY(INCH/HR) =   7.46
  TOTAL STREAM AREA(ACRES) =     3.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.32
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.48    11.22        4.693          0.34
      2        0.30     8.52        5.604          0.18
      3        1.32     5.47        7.462          3.30

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        1.75     5.47       7.462
      2        1.66     8.52       5.604
      3        1.56    11.22       4.693

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.75   Tc(MIN.) =    5.47
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE     72.90 TO NODE     72.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     64.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   377.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.75
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.57
  LONGEST FLOWPATH FROM NODE     72.90 TO NODE     64.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     75.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    377.00  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.1733
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
```

```
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.970
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3200
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.05
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.96
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =    6.08
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.60
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.102
  TOTAL AREA(ACRES) =        4.1         PEAK FLOW RATE(CFS) =       2.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   5.57
  LONGEST FLOWPATH FROM NODE     72.90 TO NODE     75.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.91     6.08       6.970        4.09
  LONGEST FLOWPATH FROM NODE     72.90 TO NODE     75.00 =     780.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      507.18    15.86       3.753        9.38
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     75.00 =    1910.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     197.19       6.08        6.970
      2     508.75      15.86        3.753

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     508.75   Tc(MIN.) =   15.86
  TOTAL AREA(ACRES) =       13.5

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =  12
----------------------------------------------------------------------------
```

```
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     60.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    351.00  DOWNSTREAM(FEET) =    350.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0143
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.736
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     509.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.15
  AVERAGE FLOW DEPTH(FEET) =   4.31   TRAVEL TIME(MIN.) =   0.11
  Tc(MIN.) =   15.98
  SUBAREA AREA(ACRES) =     0.61       SUBAREA RUNOFF(CFS) =    0.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  9.399
  TOTAL AREA(ACRES) =       14.1         PEAK FLOW RATE(CFS) =     508.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  4.31   FLOW VELOCITY(FEET/SEC.) =  10.17
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     60.00 =    1980.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.98
  RAINFALL INTENSITY(INCH/HR) =   3.74
  TOTAL STREAM AREA(ACRES) =    14.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    508.75

********************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     58.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7100
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    438.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.825
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     57.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    438.50  DOWNSTREAM(FEET) =    428.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00   CHANNEL SLOPE =  0.0127
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.511
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.53
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   3.92
  Tc(MIN.) =    8.74
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   19.29
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  TOTAL AREA(ACRES) =        5.2         PEAK FLOW RATE(CFS) =      20.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   4.20
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     57.00 =     905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.74   RAIN INTENSITY(INCH/HOUR) =  5.51
  TOTAL AREA(ACRES) =     5.20   TOTAL RUNOFF(CFS) =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     56.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   428.00  DOWNSTREAM(FEET) =   378.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.39
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     56.00 =    1075.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     60.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    373.00  DOWNSTREAM(FEET) =    350.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.2130
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1665 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.39
  FLOW VELOCITY(FEET/SEC) =   2.55 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    9.66
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     60.00 =    1183.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.66
  RAINFALL INTENSITY(INCH/HR) =   5.17
  TOTAL STREAM AREA(ACRES) =     5.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.39

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      508.75    15.98        3.736         14.08
      2        1.39     9.66        5.168          5.20
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      309.05     9.66       5.168
      2      509.75    15.98       3.736

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     509.75   Tc(MIN.) =   15.98
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     60.00 =    1980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     55.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   280.00   CHANNEL SLOPE =  0.0464
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.692
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     510.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  15.81
  AVERAGE FLOW DEPTH(FEET) =   3.34   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =   16.27
  SUBAREA AREA(ACRES) =     1.57       SUBAREA RUNOFF(CFS) =    2.03
  AREA-AVERAGE RUNOFF COEFFICIENT =  6.386
  TOTAL AREA(ACRES) =       20.9         PEAK FLOW RATE(CFS) =     509.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.34   FLOW VELOCITY(FEET/SEC.) =  15.79
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    2260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.90 TO NODE     55.90 IS CODE =   7
```

```
------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.00   RAIN INTENSITY(INCH/HOUR) =  5.05
  TOTAL AREA(ACRES) =     0.00   TOTAL RUNOFF(CFS) =     49.10

************************************************************************
  FLOW PROCESS FROM NODE     55.90 TO NODE     55.80 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.10
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.32
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.80 =    2610.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     55.80 TO NODE     55.80 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.32
  RAINFALL INTENSITY(INCH/HR) =   4.95
  TOTAL STREAM AREA(ACRES) =     0.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.10

************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     53.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    561.00
  DOWNSTREAM ELEVATION(FEET) =    542.00
  ELEVATION DIFFERENCE(FEET) =     19.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.427
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.497
SUBAREA RUNOFF(CFS) =      0.18
TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
FLOW PROCESS FROM NODE     53.00 TO NODE     52.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    542.00  DOWNSTREAM(FEET) =    473.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   355.00   CHANNEL SLOPE =  0.1944
CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.686
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.61
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.05
Tc(MIN.) =    6.48
SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    3.98
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   6.84
LONGEST FLOWPATH FROM NODE     54.00 TO NODE     52.00 =     430.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     52.00 TO NODE     55.80 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   464.00
FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       4.14
PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.55
LONGEST FLOWPATH FROM NODE     54.00 TO NODE     55.80 =     475.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     55.80 TO NODE     55.80 IS CODE =   1
```

```
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.55
  RAINFALL INTENSITY(INCH/HR) =   6.64
  TOTAL STREAM AREA(ACRES) =     1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.14

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       49.10    10.32        4.954          0.00
      2        4.14     6.55        6.639          1.77

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       35.32     6.55       6.639
      2       52.19    10.32       4.954

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.19   Tc(MIN.) =   10.32
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.80 =    2610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.80 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   434.00
  FLOW LENGTH(FEET) =   680.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.41
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.19
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     51.00 =    3290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  10
```

```
------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     49.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  UPSTREAM ELEVATION(FEET) =    606.40
  DOWNSTREAM ELEVATION(FEET) =    604.50
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.355
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.57

************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     48.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    604.50  DOWNSTREAM(FEET) =    558.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.1326
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.61
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =    2.12
  SUBAREA AREA(ACRES) =     2.45       SUBAREA RUNOFF(CFS) =   17.43
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  TOTAL AREA(ACRES) =        2.5         PEAK FLOW RATE(CFS) =      18.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   9.34
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     48.00 =     390.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   552.10  DOWNSTREAM(FEET) =   546.20
  FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.72
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.00
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    2.40
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     47.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     46.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    552.20  DOWNSTREAM(FEET) =    444.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   525.00   CHANNEL SLOPE =  0.2061
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.34
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =    3.17
  SUBAREA AREA(ACRES) =     1.67       SUBAREA RUNOFF(CFS) =    4.36
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.673
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =      22.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =  11.65
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     46.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.17
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     4.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.35

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.50
  UPSTREAM ELEVATION(FEET) =    606.40
  DOWNSTREAM ELEVATION(FEET) =    603.50
  ELEVATION DIFFERENCE(FEET) =      2.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.387
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.14
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.14

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    603.50  DOWNSTREAM(FEET) =    570.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.1061
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.82
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    3.14
  SUBAREA AREA(ACRES) =     2.02       SUBAREA RUNOFF(CFS) =   14.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =      15.51
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   8.25
  LONGEST FLOWPATH FROM NODE     45.00 TO NODE     43.00 =     403.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     42.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.60  DOWNSTREAM(FEET) =   559.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.51
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    3.25
  LONGEST FLOWPATH FROM NODE     45.00 TO NODE     42.00 =     498.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     46.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    565.00  DOWNSTREAM(FEET) =    444.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   505.00   CHANNEL SLOPE =  0.2396
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.43
  AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   0.74
  Tc(MIN.) =    3.99
  SUBAREA AREA(ACRES) =     1.98       SUBAREA RUNOFF(CFS) =    4.70
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.614
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =      20.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =  11.85
  LONGEST FLOWPATH FROM NODE     45.00 TO NODE     46.00 =    1003.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =   1
```

```
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.99
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     4.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.35     3.17        7.904          4.20
      2       20.20     3.99        7.904          4.16

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       38.40     3.17       7.904
      2       42.56     3.99       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      42.56   Tc(MIN.) =    3.99
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     46.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   434.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.56
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    4.03
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  11
```

```
------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       42.56     4.03       7.904        8.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =    1160.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       52.19    10.97       4.762        1.77
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     51.00 =    3290.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      61.73       4.03        7.904
      2      77.83      10.97        4.762

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.83   Tc(MIN.) =   10.97
  TOTAL AREA(ACRES) =       10.1

************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  12
------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     41.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   399.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.83
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     41.00 =    3525.00 FEET.

************************************************************************
```

```
 FLOW PROCESS FROM NODE     41.00 TO NODE     37.00 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    399.00  DOWNSTREAM(FEET) =    385.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   115.00   CHANNEL SLOPE =  0.1217
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .1162 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =      77.83
 FLOW VELOCITY(FEET/SEC) =   8.14 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.24   Tc(MIN.) =   11.34
 LONGEST FLOWPATH FROM NODE     74.00 TO NODE     37.00 =    3640.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.34
 RAINFALL INTENSITY(INCH/HR) =   4.66
 TOTAL STREAM AREA(ACRES) =    10.13
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     77.83

****************************************************************************
 FLOW PROCESS FROM NODE     39.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    452.00
 DOWNSTREAM ELEVATION(FEET) =    434.00
 ELEVATION DIFFERENCE(FEET) =     18.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.789
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.192
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE     38.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    434.00  DOWNSTREAM(FEET) =    385.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   215.00   CHANNEL SLOPE =  0.2279
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.602
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.37
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.82
  Tc(MIN.) =    6.61
  SUBAREA AREA(ACRES) =     1.08       SUBAREA RUNOFF(CFS) =    2.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       2.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   5.56
  LONGEST FLOWPATH FROM NODE     39.00 TO NODE     37.00 =     290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.61
  RAINFALL INTENSITY(INCH/HR) =   6.60
  TOTAL STREAM AREA(ACRES) =     1.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       77.83    11.34        4.662         10.13
      2        2.26     6.61        6.602          1.14

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       47.63     6.61       6.602
```

```
     2       79.42    11.34       4.662

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.42   Tc(MIN.) =   11.34
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     37.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     55.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    385.00  DOWNSTREAM(FEET) =    336.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.1167
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.532
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      81.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.73
  AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   0.51
  Tc(MIN.) =   11.85
  SUBAREA AREA(ACRES) =     2.40       SUBAREA RUNOFF(CFS) =    3.26
  AREA-AVERAGE RUNOFF COEFFICIENT =  1.227
  TOTAL AREA(ACRES) =       13.7         PEAK FLOW RATE(CFS) =      79.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.11   FLOW VELOCITY(FEET/SEC.) =  13.69
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    4060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       79.42    11.85       4.532       13.67
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    4060.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
```

```
    1      509.75    16.27       3.692       20.85
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     55.00 =    2260.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     450.46      11.85        4.532
      2     574.46      16.27        3.692

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     574.46   Tc(MIN.) =   16.27
  TOTAL AREA(ACRES) =       34.5

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     36.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    336.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0167
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0167 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     574.46
  FLOW VELOCITY(FEET/SEC) =   6.00 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.17   Tc(MIN.) =   16.44
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     36.00 =    4120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1      574.46    16.44       3.668       34.52
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     36.00 =    4120.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.71     7.64       6.013        7.18
  LONGEST FLOWPATH FROM NODE     99.00 TO NODE     36.00 =    2051.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     270.65       7.64        6.013
      2     576.73      16.44        3.668

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     576.73   Tc(MIN.) =   16.44
  TOTAL AREA(ACRES) =       41.7

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    335.00  DOWNSTREAM(FEET) =    314.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   760.00   CHANNEL SLOPE =  0.0276
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.539
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     581.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.47
  AVERAGE FLOW DEPTH(FEET) =   3.96   TRAVEL TIME(MIN.) =   0.94
  Tc(MIN.) =   17.38
  SUBAREA AREA(ACRES) =     7.93       SUBAREA RUNOFF(CFS) =    9.54
  AREA-AVERAGE RUNOFF COEFFICIENT =  3.088
  TOTAL AREA(ACRES) =       49.6         PEAK FLOW RATE(CFS) =     576.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.95   FLOW VELOCITY(FEET/SEC.) =  13.41
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     35.00 =    4880.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       49.6  TC(MIN.) =     17.38
```

```
  PEAK FLOW RATE(CFS)   =     576.73
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Sweetwater Vistas

Date: 7/14/15

Job #: 2780-002

Run Name: P2.DAT

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments	BANK		
									1	2	3
30	29	2	391	390	85	0.9	0.07				
29	28	6	390	313	890	0.9	1.15	1 SIDE OF STREET			
28	28	10						SAVE BANK 1			
27	26	2	440.6	440	56.18	0.9	0.09				
26	25	6	440	363	1755	0.9	1.95	1 SIDE OF STREET			
25	25	1						1 OF 2			
24	23	2	428	424	100	0.3	0.07				
23	25	5	424	362	1180	0.3	2.14				
25	25	1						2 OF 2			
25	28	6	362	313	795	0.9	2.34				
28	28	11						ADD BANK 1			
28	28	12						CLEAR BANK 1			
28	22	6	313	296	375	0.9	1.00				
							8.81				

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                              Analysis prepared by:

                                 Fuscoe Engineering
                           6390 Greenwich Drive, Suite 170
                                   San Diego, CA
                                       92122

 ************************** DESCRIPTION OF STUDY **************************
* SWEETWATER VISTAS                                                      *
* PROPOSED HYDROLOGY                                                     *
* RUN 2                                                                  *
 **************************************************************************

  FILE NAME: P2.DAT
  TIME/DATE OF STUDY: 07:43 08/10/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     29.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    391.00
  DOWNSTREAM ELEVATION(FEET) =    390.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.117
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.65
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     28.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  390.50  DOWNSTREAM ELEVATION(FEET) =  313.00
  STREET LENGTH(FEET) =   890.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.66
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =    5.65
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.303
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    1.15      SUBAREA RUNOFF(CFS) =    7.56
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       8.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.35
  FLOW VELOCITY(FEET/SEC.) =  6.74   DEPTH*VELOCITY(FT*FT/SEC.) =   2.25
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     28.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    56.18
  UPSTREAM ELEVATION(FEET) =    440.60
  DOWNSTREAM ELEVATION(FEET) =    440.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.640
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     25.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  440.00  DOWNSTREAM ELEVATION(FEET) =  363.00
  STREET LENGTH(FEET) =  1755.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.59
  STREET FLOW TRAVEL TIME(MIN.) =   6.11   Tc(MIN.) =    8.75
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.509
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    1.95      SUBAREA RUNOFF(CFS) =    9.67
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =      10.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.16
  FLOW VELOCITY(FEET/SEC.) =  5.46   DEPTH*VELOCITY(FT*FT/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     25.00 =    1811.18 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.75
  RAINFALL INTENSITY(INCH/HR) =   5.51
  TOTAL STREAM AREA(ACRES) =     2.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.12

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    428.00
  DOWNSTREAM ELEVATION(FEET) =    424.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.958
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    97.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.427
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    424.00  DOWNSTREAM(FEET) =    362.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1180.00   CHANNEL SLOPE =  0.0525
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.780
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.92
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   6.73
  Tc(MIN.) =   15.69
  SUBAREA AREA(ACRES) =     2.14       SUBAREA RUNOFF(CFS) =    2.43
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       2.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.62
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     25.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   15.69
  RAINFALL INTENSITY(INCH/HR) =   3.78
  TOTAL STREAM AREA(ACRES) =     2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.51

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.12     8.75        5.509          2.04
      2        2.51    15.69        3.780          2.21

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.51     8.75       5.509
      2        9.45    15.69       3.780

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.51   Tc(MIN.) =    8.75
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     25.00 =    1811.18 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     28.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  362.00  DOWNSTREAM ELEVATION(FEET) =  313.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.96
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.00
  STREET FLOW TRAVEL TIME(MIN.) =   1.88   Tc(MIN.) =   10.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.859
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.699
  SUBAREA AREA(ACRES) =    2.34      SUBAREA RUNOFF(CFS) =   10.23
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =      22.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  7.58   DEPTH*VELOCITY(FT*FT/SEC.) =   3.51
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     28.00 =    2606.18 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       22.38    10.63       4.859        6.59
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     28.00 =    2606.18 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        8.02     5.65       7.303        1.22
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     28.00 =     975.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      19.92       5.65        7.303
      2      27.71      10.63        4.859

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.71   Tc(MIN.) =   10.63
  TOTAL AREA(ACRES) =        7.8

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     22.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  313.00  DOWNSTREAM ELEVATION(FEET) =  296.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   21.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.78
  STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =   11.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.619
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.749
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    4.16
  TOTAL AREA(ACRES) =        8.8        PEAK FLOW RATE(CFS) =      30.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  21.70
  FLOW VELOCITY(FEET/SEC.) =  7.23   DEPTH*VELOCITY(FT*FT/SEC.) =   3.83
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     22.00 =    2981.18 FEET.
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.8  TC(MIN.) =     11.50
  PEAK FLOW RATE(CFS)   =      30.50
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 5: CISTERN DETENTION ANALYSIS

10 YEAR

DMA 1.1-1.2

RATIONAL METHOD HYDROGRAPH PROGRAM

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RUN DATE 8/12/2016

TIME OF CONCENTRATION 6 MIN.

6 HOUR RAINFALL 1.9 INCHES

BASIN AREA 3.28 ACRES

RUNOFF COEFFICIENT 0.69

PEAK DISCHARGE 10.55 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 6 DISCHARGE (CFS) = 0.3

TIME (MIN) = 12 DISCHARGE (CFS) = 0.3

TIME (MIN) = 18 DISCHARGE (CFS) = 0.3

TIME (MIN) = 24 DISCHARGE (CFS) = 0.3

TIME (MIN) = 30 DISCHARGE (CFS) = 0.3

TIME (MIN) = 36 DISCHARGE (CFS) = 0.3

TIME (MIN) = 42 DISCHARGE (CFS) = 0.3

TIME (MIN) = 48 DISCHARGE (CFS) = 0.3

TIME (MIN) = 54 DISCHARGE (CFS) = 0.3

TIME (MIN) = 60 DISCHARGE (CFS) = 0.3

TIME (MIN) = 66 DISCHARGE (CFS) = 0.3

TIME (MIN) = 72 DISCHARGE (CFS) = 0.3

TIME (MIN) = 78 DISCHARGE (CFS) = 0.3

TIME (MIN) = 84 DISCHARGE (CFS) = 0.3

TIME (MIN) = 90 DISCHARGE (CFS) = 0.3

TIME (MIN) = 96 DISCHARGE (CFS) = 0.3

TIME (MIN) = 102 DISCHARGE (CFS) = 0.4

TIME (MIN) = 108 DISCHARGE (CFS) = 0.4

TIME (MIN) = 114 DISCHARGE (CFS) = 0.4

TIME (MIN) = 120 DISCHARGE (CFS) = 0.4

TIME (MIN) = 126 DISCHARGE (CFS) = 0.4

TIME (MIN) = 132 DISCHARGE (CFS) = 0.4

TIME (MIN) = 138 DISCHARGE (CFS) = 0.4

TIME (MIN) = 144 DISCHARGE (CFS) = 0.4

TIME (MIN) = 150 DISCHARGE (CFS) = 0.5

TIME (MIN) = 156 DISCHARGE (CFS) = 0.5

TIME (MIN) = 162 DISCHARGE (CFS) = 0.5

TIME (MIN) = 168 DISCHARGE (CFS) = 0.5

TIME (MIN) = 174 DISCHARGE (CFS) = 0.6

TIME (MIN) = 180 DISCHARGE (CFS) = 0.6

TIME (MIN) = 186 DISCHARGE (CFS) = 0.6

TIME (MIN) = 192 DISCHARGE (CFS) = 0.7

TIME (MIN) = 198 DISCHARGE (CFS) = 0.7

TIME (MIN) = 204 DISCHARGE (CFS) = 0.8

TIME (MIN) = 210 DISCHARGE (CFS) = 0.9

TIME (MIN) = 216 DISCHARGE (CFS) = 1

TIME (MIN) = 222 DISCHARGE (CFS) = 1.2

TIME (MIN) = 228 DISCHARGE (CFS) = 1.4

TIME (MIN) = 234 DISCHARGE (CFS) = 2

TIME (MIN) = 240 DISCHARGE (CFS) = 2.3

TIME (MIN) = 246 DISCHARGE (CFS) = 10.55

TIME (MIN) = 252 DISCHARGE (CFS) = 1.6

TIME (MIN) = 258 DISCHARGE (CFS) = 1.1

TIME (MIN) = 264 DISCHARGE (CFS) = 0.8

TIME (MIN) = 270 DISCHARGE (CFS) = 0.7

TIME (MIN) = 276 DISCHARGE (CFS) = 0.6

TIME (MIN) = 282 DISCHARGE (CFS) = 0.5

TIME (MIN) = 288 DISCHARGE (CFS) = 0.5

TIME (MIN) = 294 DISCHARGE (CFS) = 0.5

TIME (MIN) = 300 DISCHARGE (CFS) = 0.4

TIME (MIN) = 306 DISCHARGE (CFS) = 0.4

TIME (MIN) = 312 DISCHARGE (CFS) = 0.4

TIME (MIN) = 318 DISCHARGE (CFS) = 0.4

TIME (MIN) = 324 DISCHARGE (CFS) = 0.3

TIME (MIN) = 330 DISCHARGE (CFS) = 0.3

TIME (MIN) = 336 DISCHARGE (CFS) = 0.3

TIME (MIN) = 342 DISCHARGE (CFS) = 0.3

TIME (MIN) = 348 DISCHARGE (CFS) = 0.3

TIME (MIN) = 354 DISCHARGE (CFS) = 0.3

TIME (MIN) = 360 DISCHARGE (CFS) = 0.3

TIME (MIN) = 366 DISCHARGE (CFS) = 0

Hydrograph Report

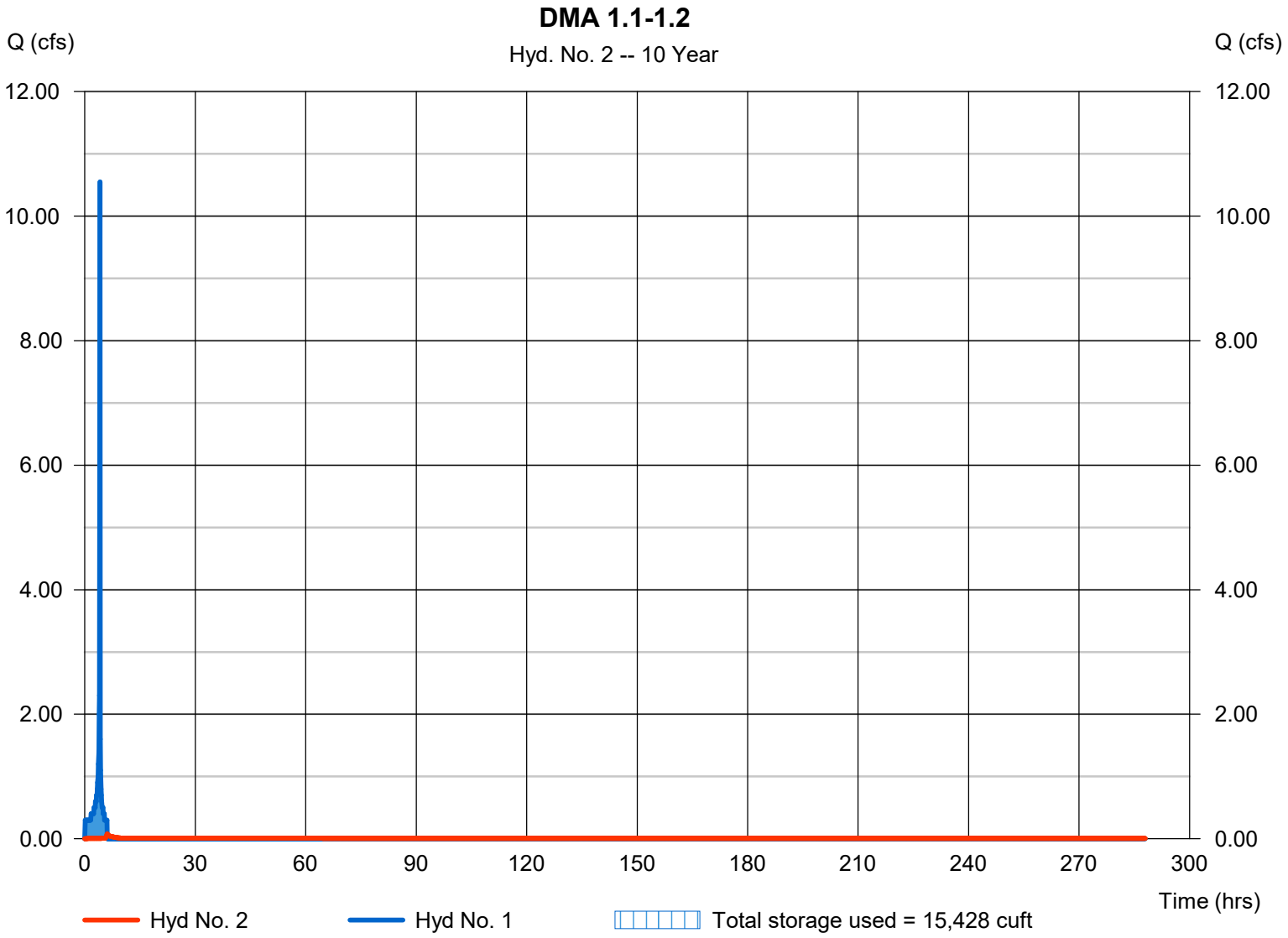
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 1.1-1.2

Hydrograph type	= Reservoir	Peak discharge	= 0.080 cfs
Storm frequency	= 10 yrs	Time to peak	= 6.10 hrs
Time interval	= 6 min	Hyd. volume	= 7,366 cuft
Inflow hyd. No.	= 1 - DMA 1.1-1.2	Max. Elevation	= 445.13 ft
Reservoir name	= DMA 1.1-1.2	Max. Storage	= 15,428 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 1.1-1.2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 440.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	440.00	00	0	0
1.00	441.00	3,645	1,154	1,154
2.00	442.00	3,645	3,462	4,617
3.00	443.00	3,645	3,462	8,079
4.00	444.00	3,645	3,462	11,541
5.00	445.00	3,645	3,462	15,004
6.00	446.00	3,645	3,462	18,466

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.70	12.00	0.00	0.00
Span (in)	= 0.70	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 440.00	445.00	0.00	0.00
Length (ft)	= 30.00	30.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

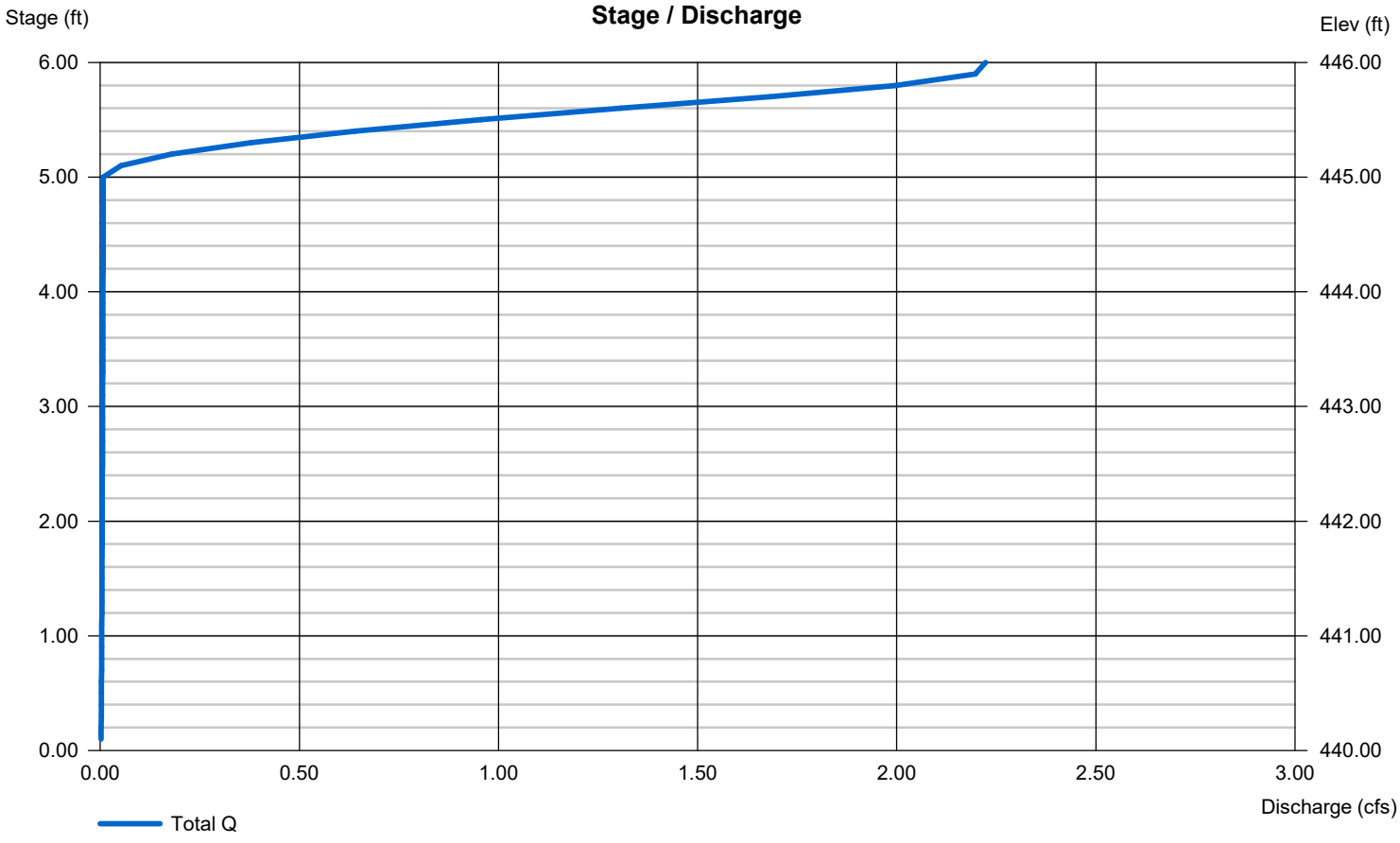
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

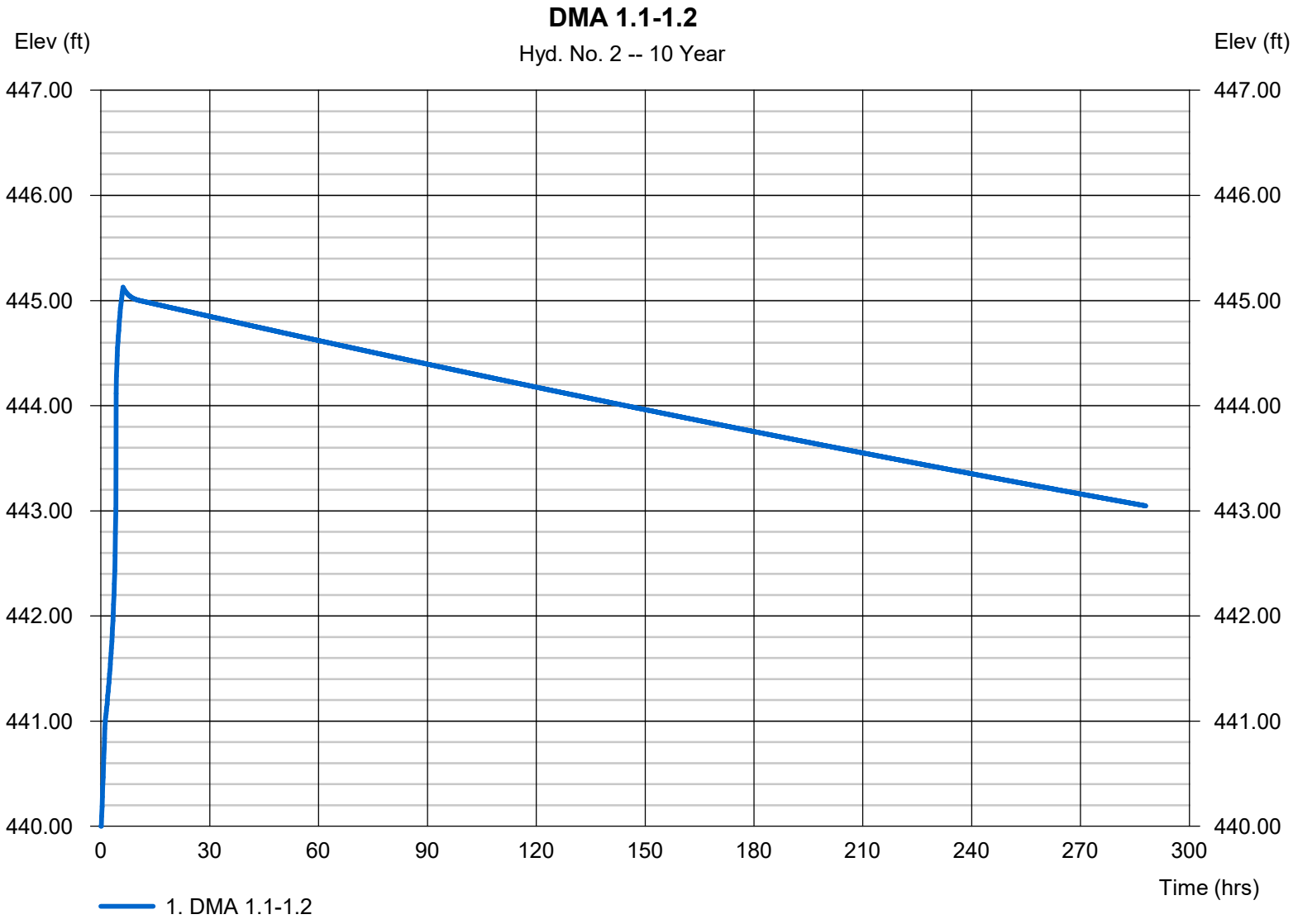
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 1.1-1.2

Hydrograph type	= Reservoir	Peak discharge	= 0.080 cfs
Storm frequency	= 10 yrs	Time to peak	= 6.10 hrs
Time interval	= 6 min	Hyd. volume	= 7,366 cuft
Inflow hyd. No.	= 1 - DMA 1.1-1.2	Max. Elevation	= 445.13 ft
Reservoir name	= DMA 1.1-1.2	Max. Storage	= 15,428 cuft

Storage Indication method used.



DMA 1.1/1.2 100 Year

RATIONAL METHOD HYDROGRAPH PROGRAM

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RUN DATE 8/11/2016

TIME OF CONCENTRATION 5 MIN.

6 HOUR RAINFALL 3 INCHES

BASIN AREA 3.28 ACRES

RUNOFF COEFFICIENT 0.69

PEAK DISCHARGE 17.13 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 5 DISCHARGE (CFS) = 0.4

TIME (MIN) = 10 DISCHARGE (CFS) = 0.4

TIME (MIN) = 15 DISCHARGE (CFS) = 0.4

TIME (MIN) = 20 DISCHARGE (CFS) = 0.4

TIME (MIN) = 25 DISCHARGE (CFS) = 0.4

TIME (MIN) = 30 DISCHARGE (CFS) = 0.4

TIME (MIN) = 35 DISCHARGE (CFS) = 0.4

TIME (MIN) = 40 DISCHARGE (CFS) = 0.4

TIME (MIN) = 45 DISCHARGE (CFS) = 0.5

TIME (MIN) = 50 DISCHARGE (CFS) = 0.5

TIME (MIN) = 55 DISCHARGE (CFS) = 0.5

TIME (MIN) = 60 DISCHARGE (CFS) = 0.5

TIME (MIN) = 65 DISCHARGE (CFS) = 0.5

TIME (MIN) = 70 DISCHARGE (CFS) = 0.5

TIME (MIN) = 75 DISCHARGE (CFS) = 0.5

TIME (MIN) = 80 DISCHARGE (CFS) = 0.5

TIME (MIN) = 85 DISCHARGE (CFS) = 0.5

TIME (MIN) = 90 DISCHARGE (CFS) = 0.5

TIME (MIN) = 95 DISCHARGE (CFS) = 0.5

TIME (MIN) = 100 DISCHARGE (CFS) = 0.6

TIME (MIN) = 105 DISCHARGE (CFS) = 0.6

TIME (MIN) = 110 DISCHARGE (CFS) = 0.6

TIME (MIN) = 115 DISCHARGE (CFS) = 0.6

TIME (MIN) = 120 DISCHARGE (CFS) = 0.6

TIME (MIN) = 125 DISCHARGE (CFS) = 0.6

TIME (MIN) = 130 DISCHARGE (CFS) = 0.6

TIME (MIN) = 135 DISCHARGE (CFS) = 0.7

TIME (MIN) = 140 DISCHARGE (CFS) = 0.7

TIME (MIN) = 145 DISCHARGE (CFS) = 0.7

TIME (MIN) = 150 DISCHARGE (CFS) = 0.7

TIME (MIN) = 155 DISCHARGE (CFS) = 0.8

TIME (MIN) = 160 DISCHARGE (CFS) = 0.8

TIME (MIN) = 165 DISCHARGE (CFS) = 0.8

TIME (MIN) = 170 DISCHARGE (CFS) = 0.9

TIME (MIN) = 175 DISCHARGE (CFS) = 0.9

TIME (MIN) = 180 DISCHARGE (CFS) = 0.9

TIME (MIN) = 185 DISCHARGE (CFS) = 1

TIME (MIN) = 190 DISCHARGE (CFS) = 1

TIME (MIN) = 195 DISCHARGE (CFS) = 1.1

TIME (MIN) = 200 DISCHARGE (CFS) = 1.2

TIME (MIN) = 205 DISCHARGE (CFS) = 1.3

TIME (MIN) = 210 DISCHARGE (CFS) = 1.4

TIME (MIN) = 215 DISCHARGE (CFS) = 1.6

TIME (MIN) = 220 DISCHARGE (CFS) = 1.7

TIME (MIN) = 225 DISCHARGE (CFS) = 2.1

TIME (MIN) = 230 DISCHARGE (CFS) = 2.4

TIME (MIN) = 235 DISCHARGE (CFS) = 3.5

TIME (MIN) = 240 DISCHARGE (CFS) = 5.7

TIME (MIN) = 245 DISCHARGE (CFS) = 17.13

TIME (MIN) = 250 DISCHARGE (CFS) = 2.8

TIME (MIN) = 255 DISCHARGE (CFS) = 1.9

TIME (MIN) = 260 DISCHARGE (CFS) = 1.5

TIME (MIN) = 265 DISCHARGE (CFS) = 1.2

TIME (MIN) = 270 DISCHARGE (CFS) = 1.1

TIME (MIN) = 275 DISCHARGE (CFS) = 1

TIME (MIN) = 280 DISCHARGE (CFS) = 0.9

TIME (MIN) = 285 DISCHARGE (CFS) = 0.8

TIME (MIN) = 290 DISCHARGE (CFS) = 0.7

TIME (MIN) = 295 DISCHARGE (CFS) = 0.7

TIME (MIN) = 300 DISCHARGE (CFS) = 0.7

TIME (MIN) = 305 DISCHARGE (CFS) = 0.6

TIME (MIN) = 310 DISCHARGE (CFS) = 0.6

TIME (MIN) = 315 DISCHARGE (CFS) = 0.6

TIME (MIN) = 320 DISCHARGE (CFS) = 0.5

TIME (MIN) = 325 DISCHARGE (CFS) = 0.5

TIME (MIN) = 330 DISCHARGE (CFS) = 0.5

TIME (MIN) = 335 DISCHARGE (CFS) = 0.5

TIME (MIN) = 340 DISCHARGE (CFS) = 0.5

TIME (MIN) = 345 DISCHARGE (CFS) = 0.5

TIME (MIN) = 350 DISCHARGE (CFS) = 0.4

TIME (MIN) = 355 DISCHARGE (CFS) = 0.4

TIME (MIN) = 360 DISCHARGE (CFS) = 0.4

TIME (MIN) = 365 DISCHARGE (CFS) = 0

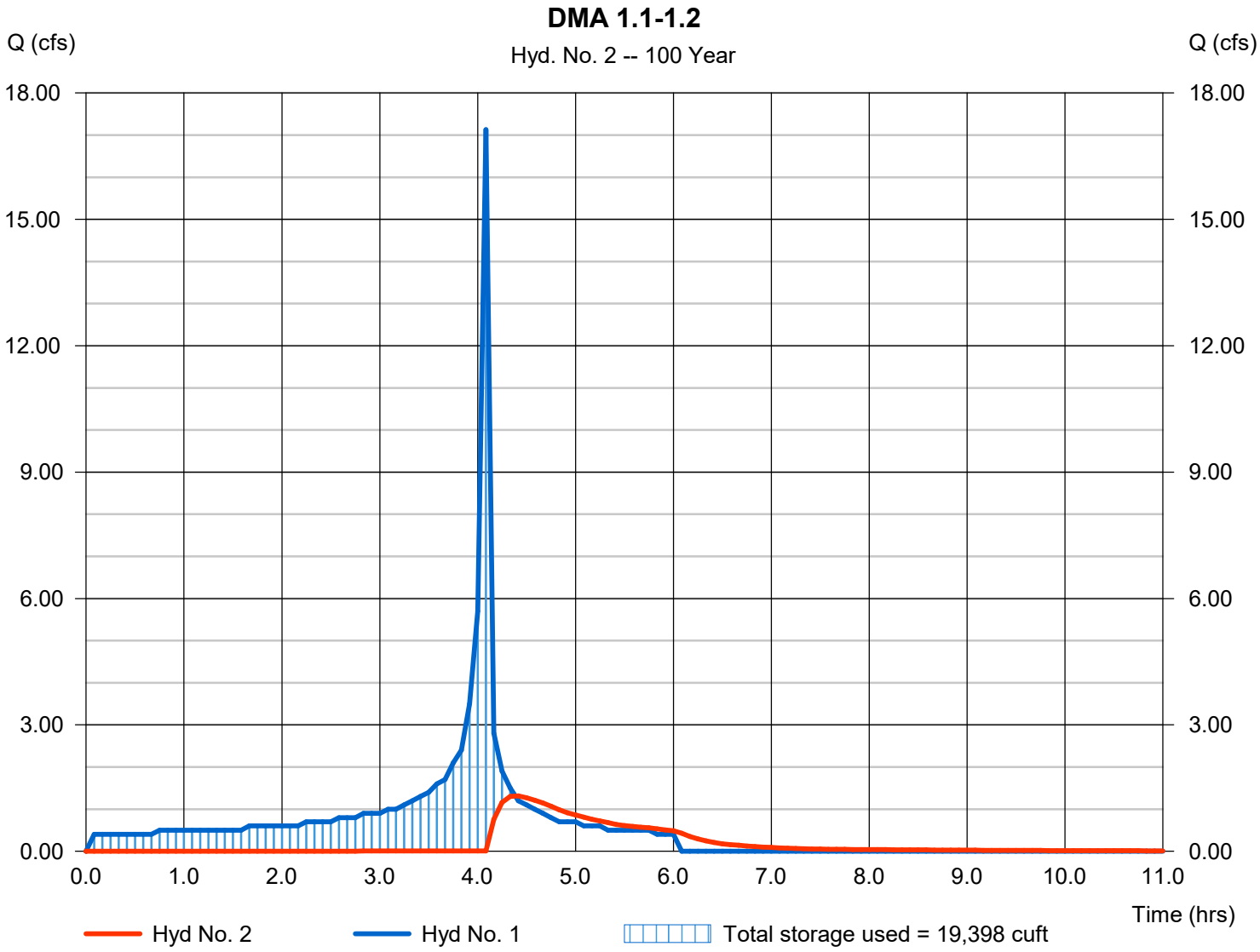
Hydrograph Report

Hyd. No. 2

DMA 1.1-1.2

Hydrograph type	=	Reservoir	Peak discharge	=	1.317 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.42 hrs
Time interval	=	5 min	Hyd. volume	=	12,740 cuft
Inflow hyd. No.	=	1 - DMA 1.1-1.2	Max. Elevation	=	445.61 ft
Reservoir name	=	Cistern 1.1-1.2	Max. Storage	=	19,398 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Cistern 1.1-1.2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 440.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	440.00	3,645	0	0
1.00	441.00	3,645	3,462	3,462
2.00	442.00	3,645	3,462	6,925
3.00	443.00	3,645	3,462	10,387
4.00	444.00	3,645	3,462	13,850
5.00	445.00	3,645	3,462	17,312
6.00	446.00	3,645	3,462	20,774
7.00	447.00	3,645	3,462	24,237
8.00	448.00	3,645	3,462	27,699
9.00	449.00	3,645	3,462	31,162

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.70	12.00	0.00	0.00
Span (in)	= 0.70	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 440.00	445.00	0.00	0.00
Length (ft)	= 30.00	30.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

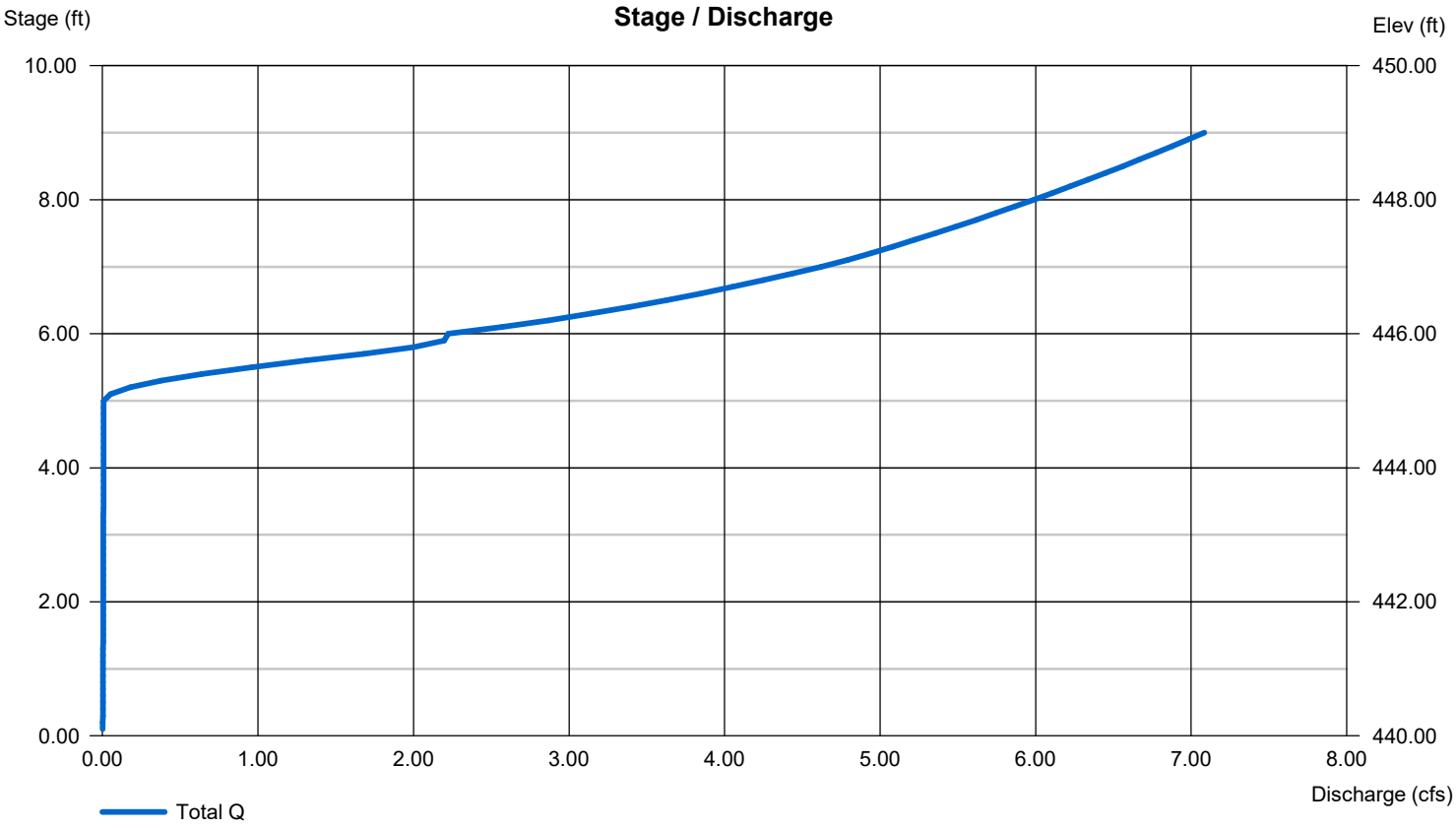
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

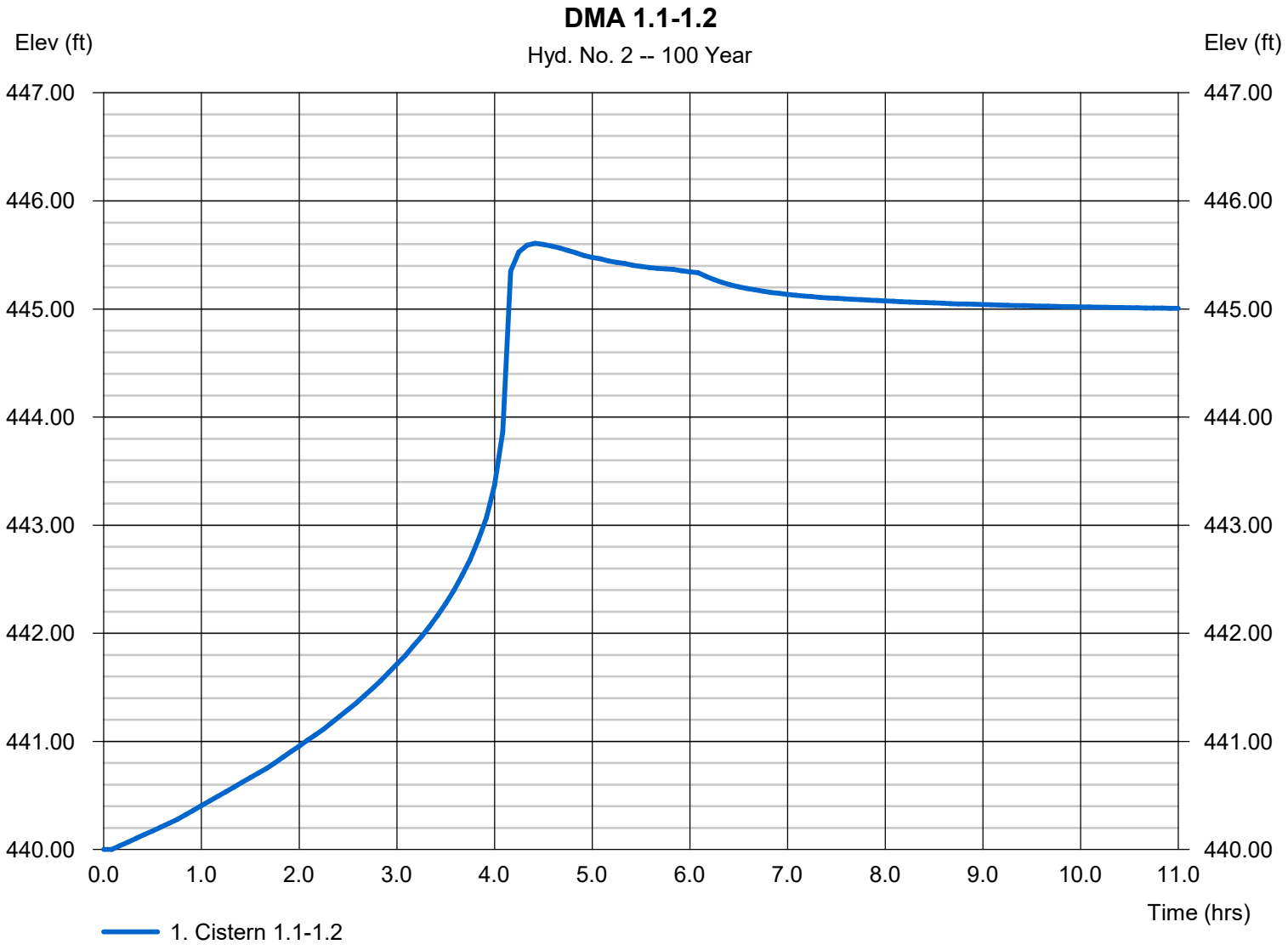
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 1.1-1.2

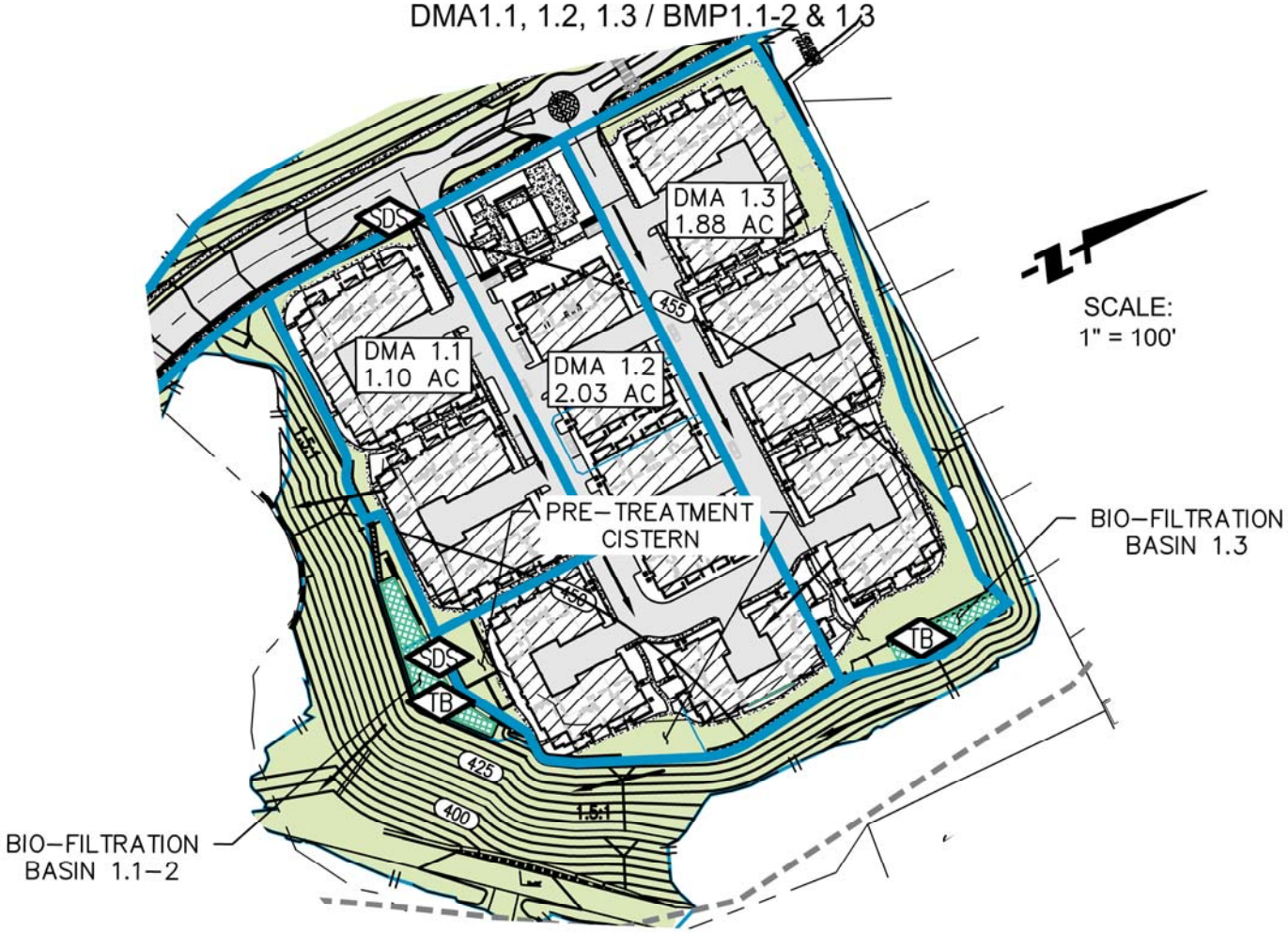
Hydrograph type	= Reservoir	Peak discharge	= 1.317 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.42 hrs
Time interval	= 5 min	Hyd. volume	= 12,740 cuft
Inflow hyd. No.	= 1 - DMA 1.1-1.2	Max. Elevation	= 445.61 ft
Reservoir name	= Cistern 1.1-1.2	Max. Storage	= 19,398 cuft

Storage Indication method used.



STRUCTURAL BMP DMA MAPBOOK

DMA1.1, 1.2, 1.3 / BMP1.1-2 & 1.3



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
1.1	1.1-2	2-HOA	*BF BASIN + CISTERN	✓	✓
1.2	1.1-2	2-HOA	*BF BASIN + CISTERN	✓	✓
1.3	1.3	2-HOA	*BF BASIN + CISTERN	✓	✓

*BF= BIOFILTRATION BASIN

LEGEND

LOT LINE

PROPOSED TREATMENT BMP AREA

LANDSCAPING AREA

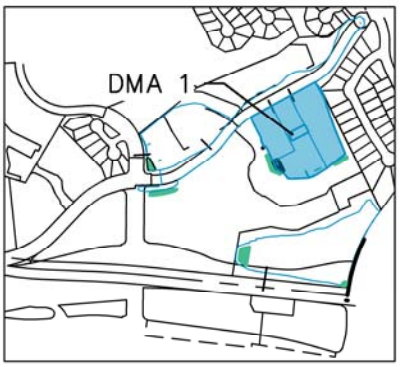
BASIN LIMITS

FLOW DIRECTION

STORM DRAIN INLET STENCILING (SDS)

TREATMENT BASIN (TB)

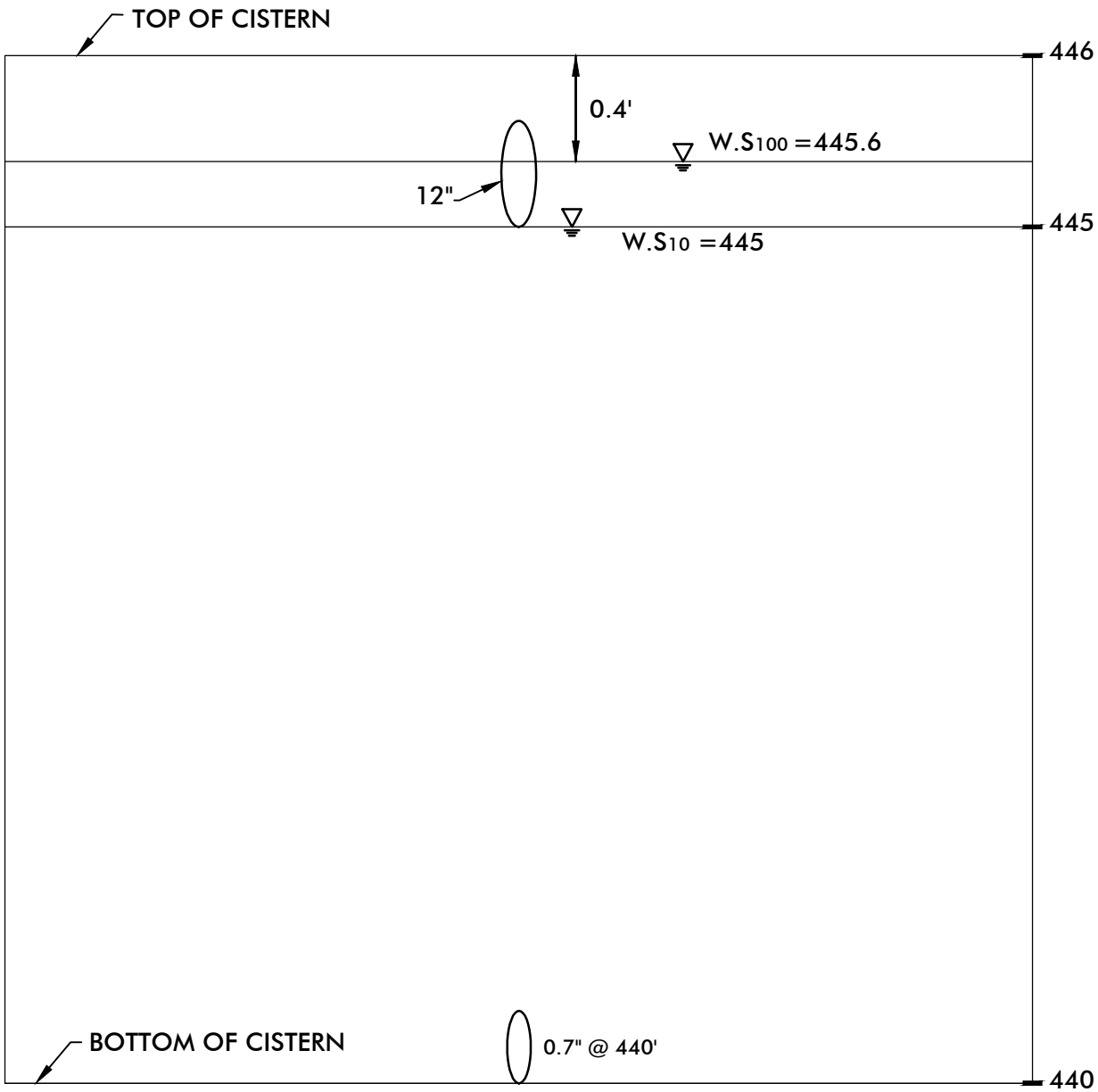
INDEX MAP
NO SCALE



FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 ◦ fax 949.474.5315 ◦ www.fuscoe.com

F:\PROJECTS\2780\002_SUPPORT FILES\REPORTS\SWMP\BMP DMA MAPBOOK\DMA 1.DWG (10-18-2016 9:48:05AM) Plotted by: ESMITH

DMA 1.1, 1.2



COMBINED AREA= 3,645 SF

SWEETWATER VISTAS
DMA 1.1, 1.2
DATE: 10/10/16

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

DMA 1.3

10 Year

RATIONAL METHOD HYDROGRAPH PROGRAM

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RUN DATE 8/12/2016

TIME OF CONCENTRATION 6 MIN.

6 HOUR RAINFALL 1.9 INCHES

BASIN AREA 1.96 ACRES

RUNOFF COEFFICIENT 0.69

PEAK DISCHARGE 6.18 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 6 DISCHARGE (CFS) = 0.2

TIME (MIN) = 12 DISCHARGE (CFS) = 0.2

TIME (MIN) = 18 DISCHARGE (CFS) = 0.2

TIME (MIN) = 24 DISCHARGE (CFS) = 0.2

TIME (MIN) = 30 DISCHARGE (CFS) = 0.2

TIME (MIN) = 36 DISCHARGE (CFS) = 0.2

TIME (MIN) = 42 DISCHARGE (CFS) = 0.2

TIME (MIN) = 48 DISCHARGE (CFS) = 0.2

TIME (MIN) = 54 DISCHARGE (CFS) = 0.2

TIME (MIN) = 60 DISCHARGE (CFS) = 0.2

TIME (MIN) = 66 DISCHARGE (CFS) = 0.2

TIME (MIN) = 72 DISCHARGE (CFS) = 0.2

TIME (MIN) = 78 DISCHARGE (CFS) = 0.2

TIME (MIN) = 84 DISCHARGE (CFS) = 0.2

TIME (MIN) = 90 DISCHARGE (CFS) = 0.2

TIME (MIN) = 96 DISCHARGE (CFS) = 0.2

TIME (MIN) = 102 DISCHARGE (CFS) = 0.2

TIME (MIN) = 108 DISCHARGE (CFS) = 0.2

TIME (MIN) = 114 DISCHARGE (CFS) = 0.2

TIME (MIN) = 120 DISCHARGE (CFS) = 0.2

TIME (MIN) = 126 DISCHARGE (CFS) = 0.2

TIME (MIN) = 132 DISCHARGE (CFS) = 0.2

TIME (MIN) = 138 DISCHARGE (CFS) = 0.3

TIME (MIN) = 144 DISCHARGE (CFS) = 0.3

TIME (MIN) = 150 DISCHARGE (CFS) = 0.3

TIME (MIN) = 156 DISCHARGE (CFS) = 0.3

TIME (MIN) = 162 DISCHARGE (CFS) = 0.3

TIME (MIN) = 168 DISCHARGE (CFS) = 0.3

TIME (MIN) = 174 DISCHARGE (CFS) = 0.3

TIME (MIN) = 180 DISCHARGE (CFS) = 0.4

TIME (MIN) = 186 DISCHARGE (CFS) = 0.4

TIME (MIN) = 192 DISCHARGE (CFS) = 0.4

TIME (MIN) = 198 DISCHARGE (CFS) = 0.4

TIME (MIN) = 204 DISCHARGE (CFS) = 0.5

TIME (MIN) = 210 DISCHARGE (CFS) = 0.5

TIME (MIN) = 216 DISCHARGE (CFS) = 0.6

TIME (MIN) = 222 DISCHARGE (CFS) = 0.7

TIME (MIN) = 228 DISCHARGE (CFS) = 0.8

TIME (MIN) = 234 DISCHARGE (CFS) = 1.2

TIME (MIN) = 240 DISCHARGE (CFS) = 1.5

TIME (MIN) = 246 DISCHARGE (CFS) = 6.18

TIME (MIN) = 252 DISCHARGE (CFS) = 1

TIME (MIN) = 258 DISCHARGE (CFS) = 0.6

TIME (MIN) = 264 DISCHARGE (CFS) = 0.5

TIME (MIN) = 270 DISCHARGE (CFS) = 0.4

TIME (MIN) = 276 DISCHARGE (CFS) = 0.4

TIME (MIN) = 282 DISCHARGE (CFS) = 0.3

TIME (MIN) = 288 DISCHARGE (CFS) = 0.3

TIME (MIN) = 294 DISCHARGE (CFS) = 0.3

TIME (MIN) = 300 DISCHARGE (CFS) = 0.3

TIME (MIN) = 306 DISCHARGE (CFS) = 0.2

TIME (MIN) = 312 DISCHARGE (CFS) = 0.2

TIME (MIN) = 318 DISCHARGE (CFS) = 0.2

TIME (MIN) = 324 DISCHARGE (CFS) = 0.2

TIME (MIN) = 330 DISCHARGE (CFS) = 0.2

TIME (MIN) = 336 DISCHARGE (CFS) = 0.2

TIME (MIN) = 342 DISCHARGE (CFS) = 0.2

TIME (MIN) = 348 DISCHARGE (CFS) = 0.2

TIME (MIN) = 354 DISCHARGE (CFS) = 0.2

TIME (MIN) = 360 DISCHARGE (CFS) = 0.2

TIME (MIN) = 366 DISCHARGE (CFS) = 0

Hydrograph Report

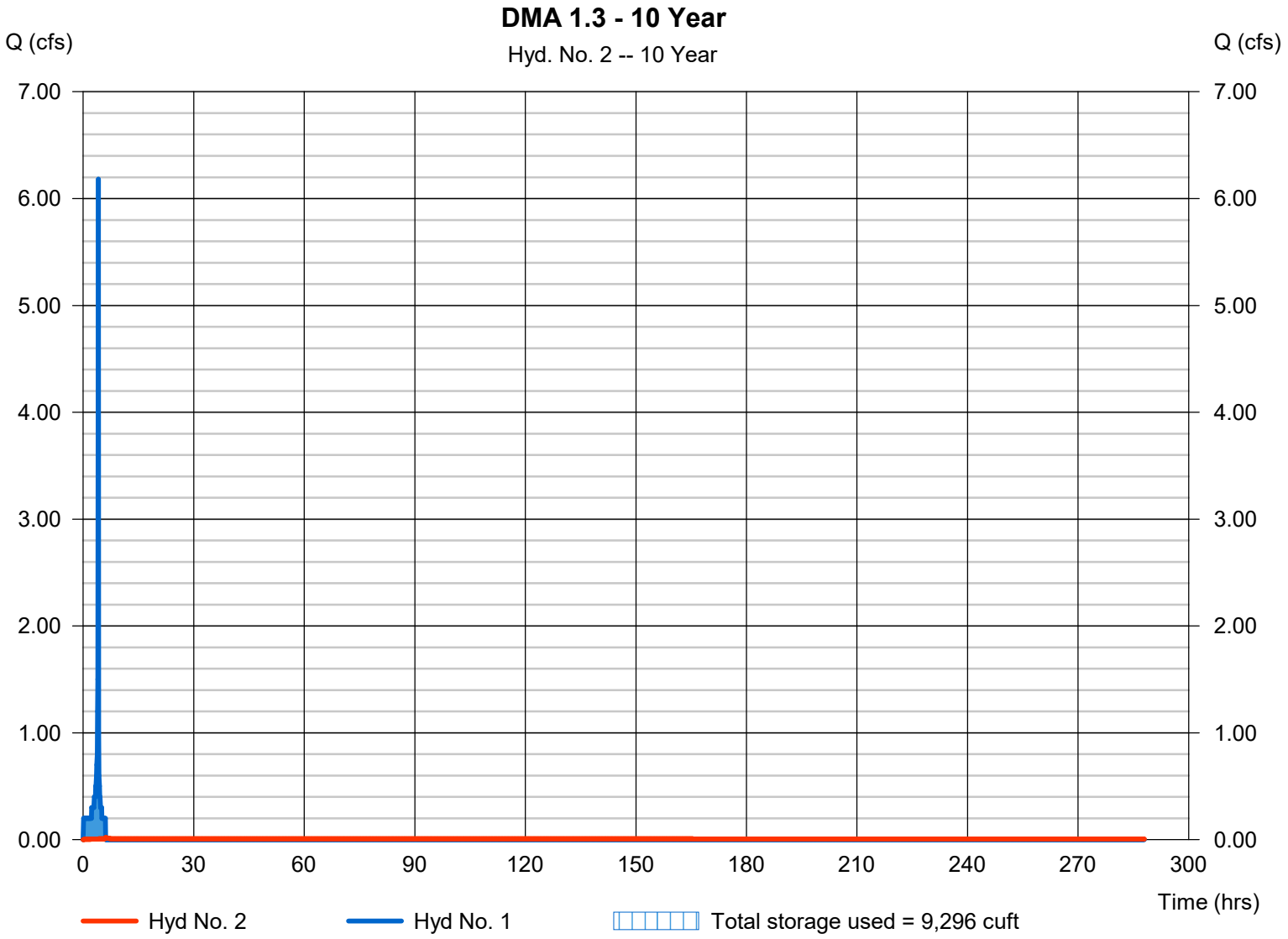
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 1.3 - 10 Year

Hydrograph type	= Reservoir	Peak discharge	= 0.020 cfs
Storm frequency	= 10 yrs	Time to peak	= 6.10 hrs
Time interval	= 6 min	Hyd. volume	= 7,287 cuft
Inflow hyd. No.	= 1 - DMA 1.3 - 10 Year	Max. Elevation	= 450.63 ft
Reservoir name	= DMA 1.3	Max. Storage	= 9,296 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 1.3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 447.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	447.00	2,700	0	0
1.00	448.00	2,700	2,565	2,565
2.00	449.00	2,700	2,565	5,129
3.00	450.00	2,700	2,565	7,694
4.00	451.00	2,700	2,565	10,259
5.00	452.00	2,700	2,565	12,824

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.80	12.00	0.00	0.00
Span (in)	= 0.80	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 447.00	450.60	0.00	0.00
Length (ft)	= 30.00	30.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

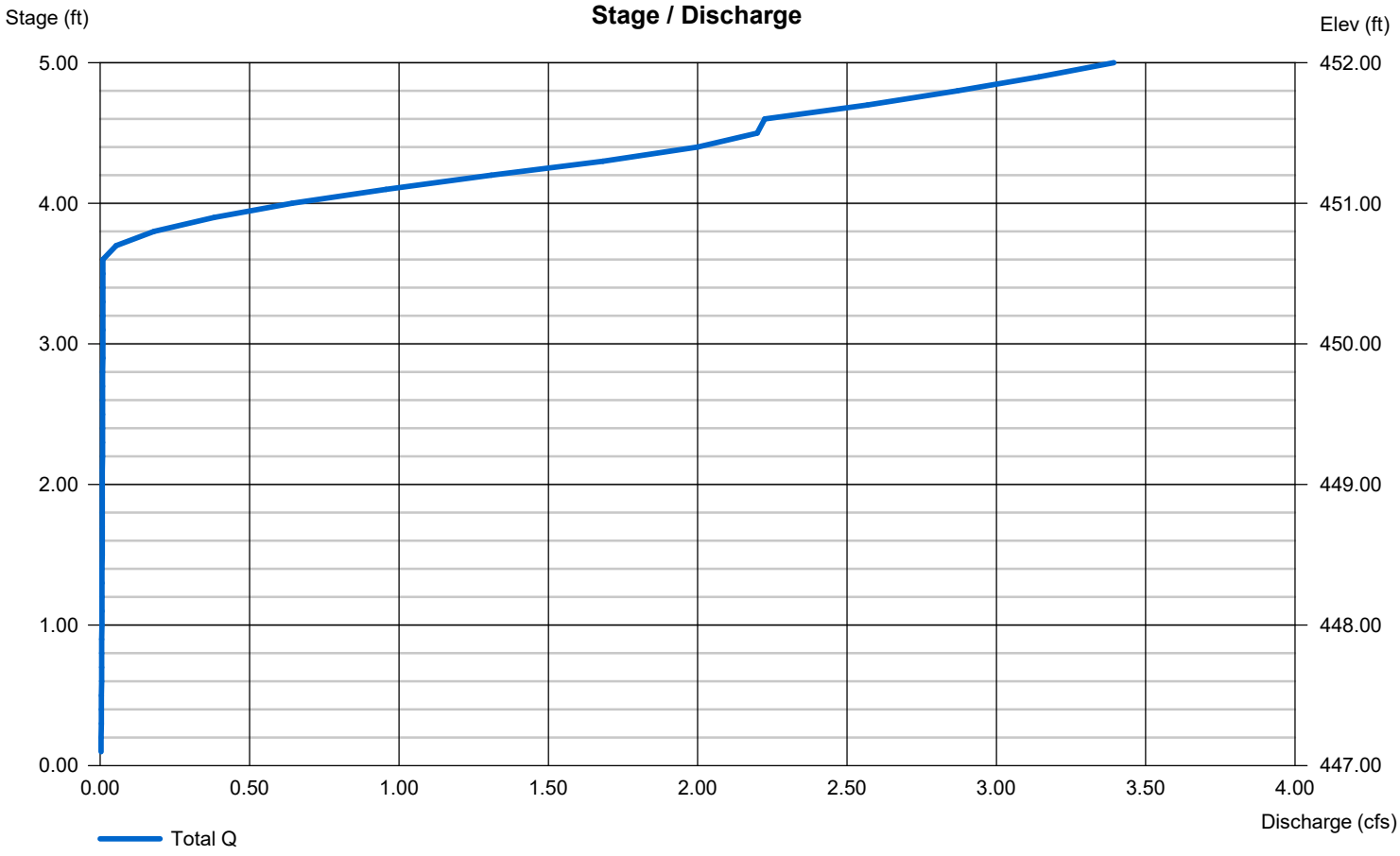
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

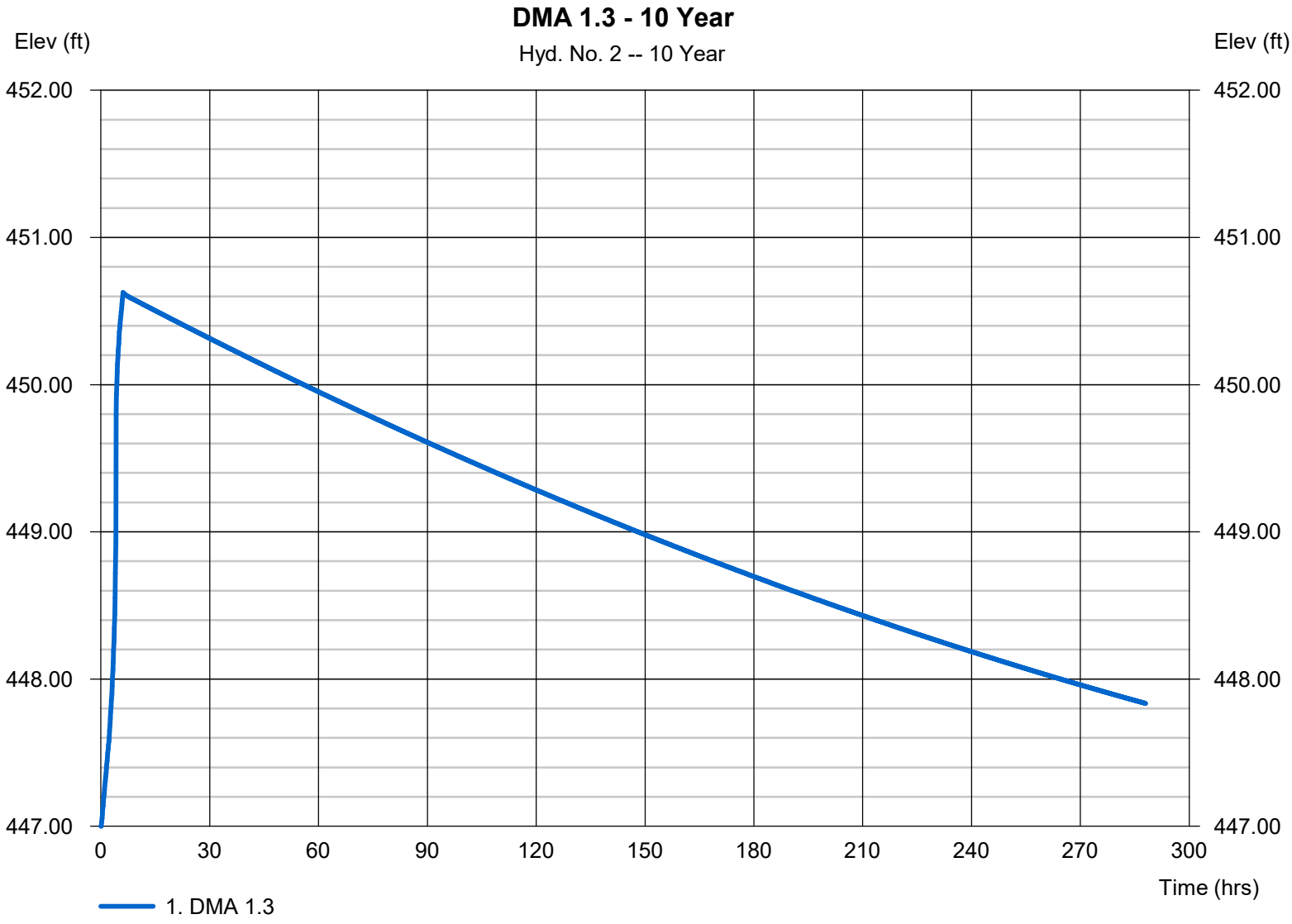
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 1.3 - 10 Year

Hydrograph type	= Reservoir	Peak discharge	= 0.020 cfs
Storm frequency	= 10 yrs	Time to peak	= 6.10 hrs
Time interval	= 6 min	Hyd. volume	= 7,287 cuft
Inflow hyd. No.	= 1 - DMA 1.3 - 10 Year	Max. Elevation	= 450.63 ft
Reservoir name	= DMA 1.3	Max. Storage	= 9,296 cuft

Storage Indication method used.



DMA 1.3

100 Year

RATIONAL METHOD HYDROGRAPH PROGRAM

COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 8/11/2016

TIME OF CONCENTRATION 5 MIN.

6 HOUR RAINFALL 3 INCHES

BASIN AREA 1.96 ACRES

RUNOFF COEFFICIENT 0.69

PEAK DISCHARGE 10.14 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 5 DISCHARGE (CFS) = 0.2

TIME (MIN) = 10 DISCHARGE (CFS) = 0.2

TIME (MIN) = 15 DISCHARGE (CFS) = 0.2

TIME (MIN) = 20 DISCHARGE (CFS) = 0.3

TIME (MIN) = 25 DISCHARGE (CFS) = 0.3

TIME (MIN) = 30 DISCHARGE (CFS) = 0.3

TIME (MIN) = 35 DISCHARGE (CFS) = 0.3

TIME (MIN) = 40 DISCHARGE (CFS) = 0.3

TIME (MIN) = 45 DISCHARGE (CFS) = 0.3

TIME (MIN) = 50 DISCHARGE (CFS) = 0.3

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TIME (MIN) = 70 DISCHARGE (CFS) = 0.3

TIME (MIN) = 75 DISCHARGE (CFS) = 0.3

TIME (MIN) = 80 DISCHARGE (CFS) = 0.3

TIME (MIN) = 85 DISCHARGE (CFS) = 0.3

TIME (MIN) = 90 DISCHARGE (CFS) = 0.3

TIME (MIN) = 95 DISCHARGE (CFS) = 0.3

TIME (MIN) = 100 DISCHARGE (CFS) = 0.3

TIME (MIN) = 105 DISCHARGE (CFS) = 0.3

TIME (MIN) = 110 DISCHARGE (CFS) = 0.3

TIME (MIN) = 115 DISCHARGE (CFS) = 0.4

TIME (MIN) = 120 DISCHARGE (CFS) = 0.4

TIME (MIN) = 125 DISCHARGE (CFS) = 0.4

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TIME (MIN) = 140 DISCHARGE (CFS) = 0.4

TIME (MIN) = 145 DISCHARGE (CFS) = 0.4

TIME (MIN) = 150 DISCHARGE (CFS) = 0.4

TIME (MIN) = 155 DISCHARGE (CFS) = 0.5

TIME (MIN) = 160 DISCHARGE (CFS) = 0.5

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TIME (MIN) = 175 DISCHARGE (CFS) = 0.5

TIME (MIN) = 180 DISCHARGE (CFS) = 0.6

TIME (MIN) = 185 DISCHARGE (CFS) = 0.6

TIME (MIN) = 190 DISCHARGE (CFS) = 0.6

TIME (MIN) = 195 DISCHARGE (CFS) = 0.7

TIME (MIN) = 200 DISCHARGE (CFS) = 0.7

TIME (MIN) = 205 DISCHARGE (CFS) = 0.8

TIME (MIN) = 210 DISCHARGE (CFS) = 0.8

TIME (MIN) = 215 DISCHARGE (CFS) = 1

TIME (MIN) = 220 DISCHARGE (CFS) = 1

TIME (MIN) = 225 DISCHARGE (CFS) = 1.3

TIME (MIN) = 230 DISCHARGE (CFS) = 1.4

TIME (MIN) = 235 DISCHARGE (CFS) = 2.1

TIME (MIN) = 240 DISCHARGE (CFS) = 3.5

TIME (MIN) = 245 DISCHARGE (CFS) = 10.14

TIME (MIN) = 250 DISCHARGE (CFS) = 1.7

TIME (MIN) = 255 DISCHARGE (CFS) = 1.1

TIME (MIN) = 260 DISCHARGE (CFS) = 0.9

TIME (MIN) = 265 DISCHARGE (CFS) = 0.7

TIME (MIN) = 270 DISCHARGE (CFS) = 0.6

TIME (MIN) = 275 DISCHARGE (CFS) = 0.6

TIME (MIN) = 280 DISCHARGE (CFS) = 0.5

TIME (MIN) = 285 DISCHARGE (CFS) = 0.5

TIME (MIN) = 290 DISCHARGE (CFS) = 0.4

TIME (MIN) = 295 DISCHARGE (CFS) = 0.4

TIME (MIN) = 300 DISCHARGE (CFS) = 0.4

TIME (MIN) = 305 DISCHARGE (CFS) = 0.4

TIME (MIN) = 310 DISCHARGE (CFS) = 0.4

TIME (MIN) = 315 DISCHARGE (CFS) = 0.3

TIME (MIN) = 320 DISCHARGE (CFS) = 0.3

TIME (MIN) = 325 DISCHARGE (CFS) = 0.3

TIME (MIN) = 330 DISCHARGE (CFS) = 0.3

TIME (MIN) = 335 DISCHARGE (CFS) = 0.3

TIME (MIN) = 340 DISCHARGE (CFS) = 0.3

TIME (MIN) = 345 DISCHARGE (CFS) = 0.3

TIME (MIN) = 350 DISCHARGE (CFS) = 0.3

TIME (MIN) = 355 DISCHARGE (CFS) = 0.3

TIME (MIN) = 360 DISCHARGE (CFS) = 0.2

TIME (MIN) = 365 DISCHARGE (CFS) = 0

Hydrograph Report

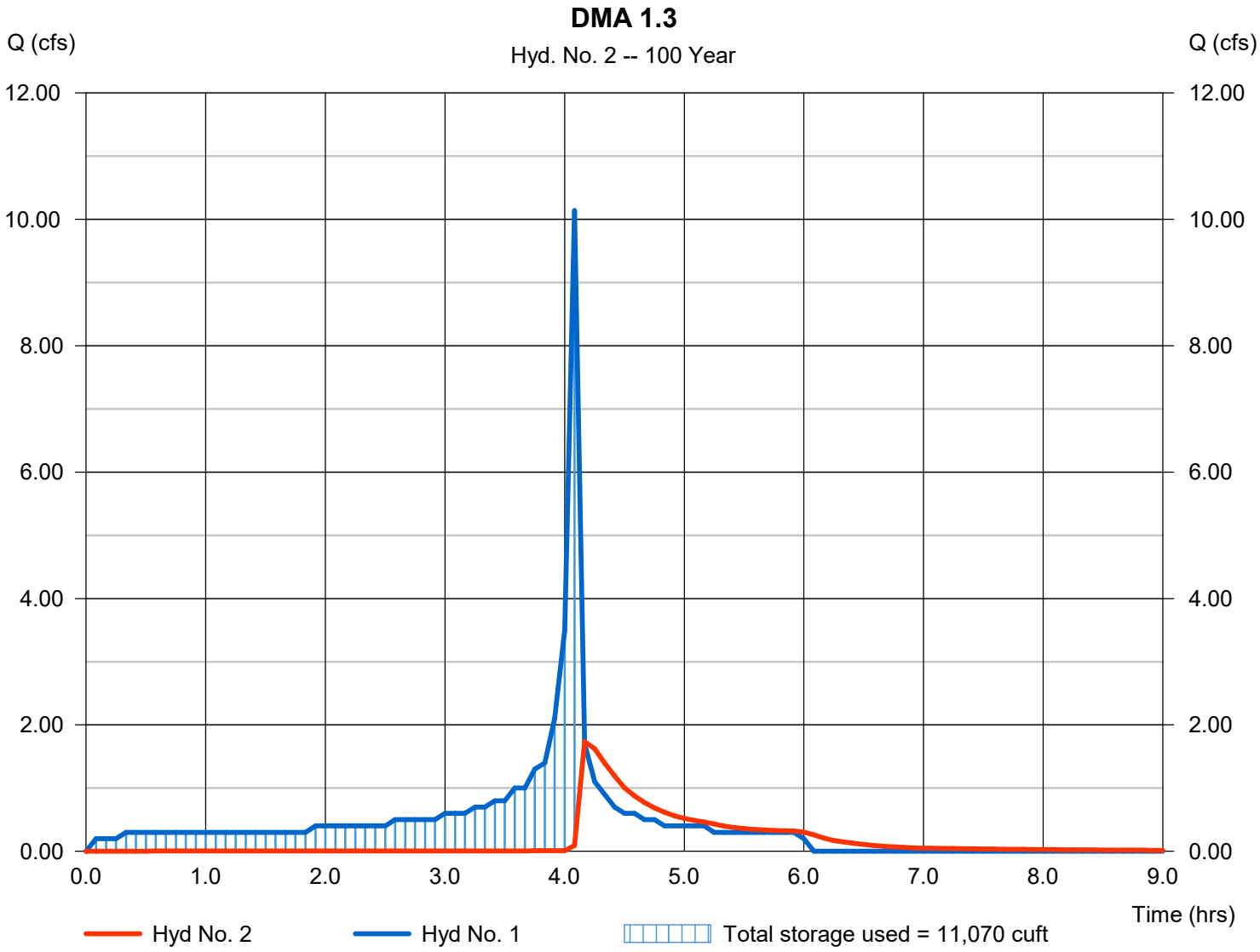
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 1.3

Hydrograph type	= Reservoir	Peak discharge	= 1.734 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 11,534 cuft
Inflow hyd. No.	= 1 - DMA 1.3	Max. Elevation	= 451.32 ft
Reservoir name	= DMA 1.3	Max. Storage	= 11,070 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 1.3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 447.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	447.00	2,700	0	0
1.00	448.00	2,700	2,565	2,565
2.00	449.00	2,700	2,565	5,129
3.00	450.00	2,700	2,565	7,694
4.00	451.00	2,700	2,565	10,259
5.00	452.00	2,700	2,565	12,824
6.00	453.00	2,700	2,565	15,388
7.00	454.00	2,700	2,565	17,953
8.00	455.00	2,700	2,565	20,518

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.80	12.00	0.00	0.00
Span (in)	= 0.80	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 447.00	450.60	0.00	0.00
Length (ft)	= 30.00	30.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

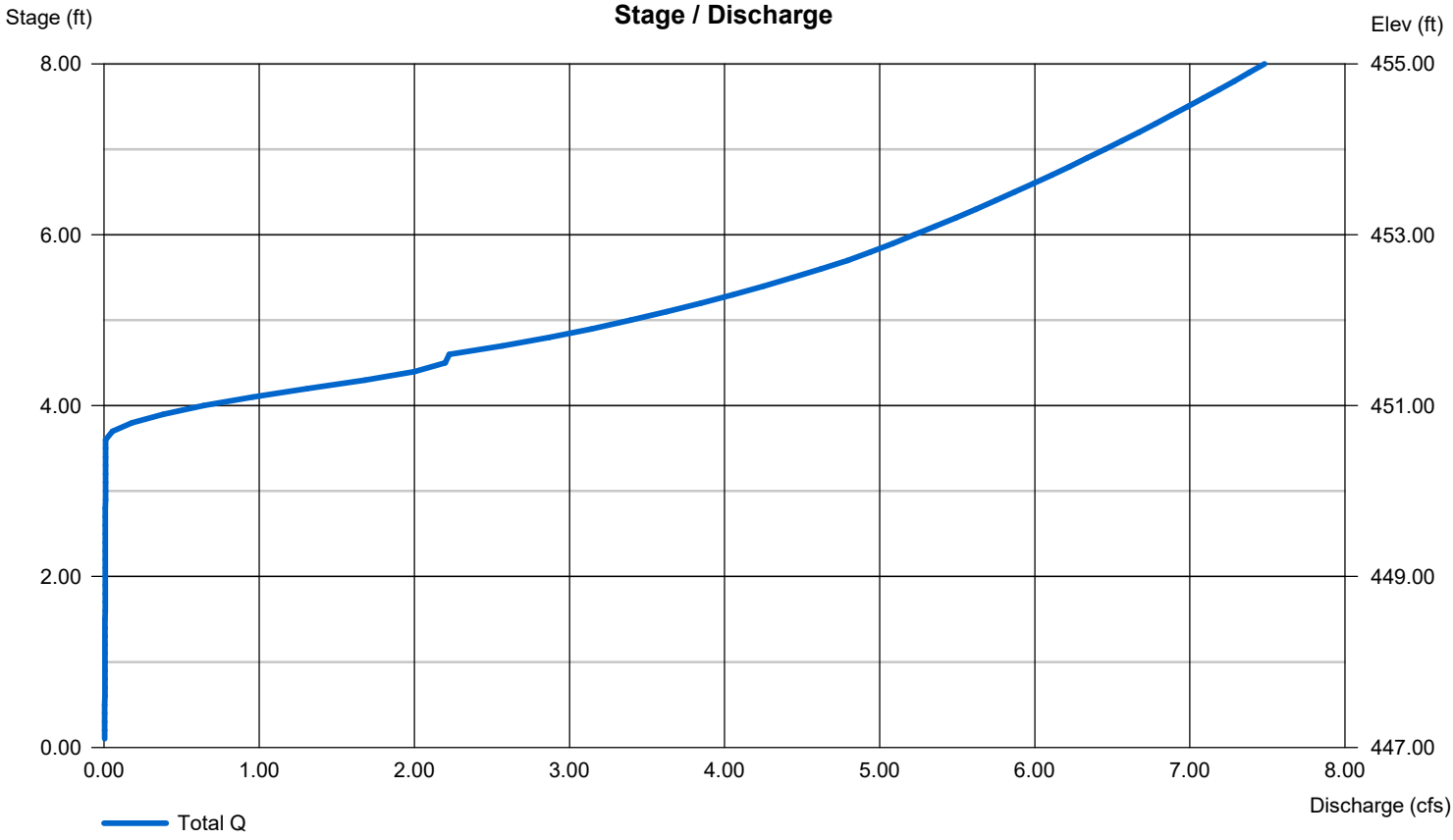
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

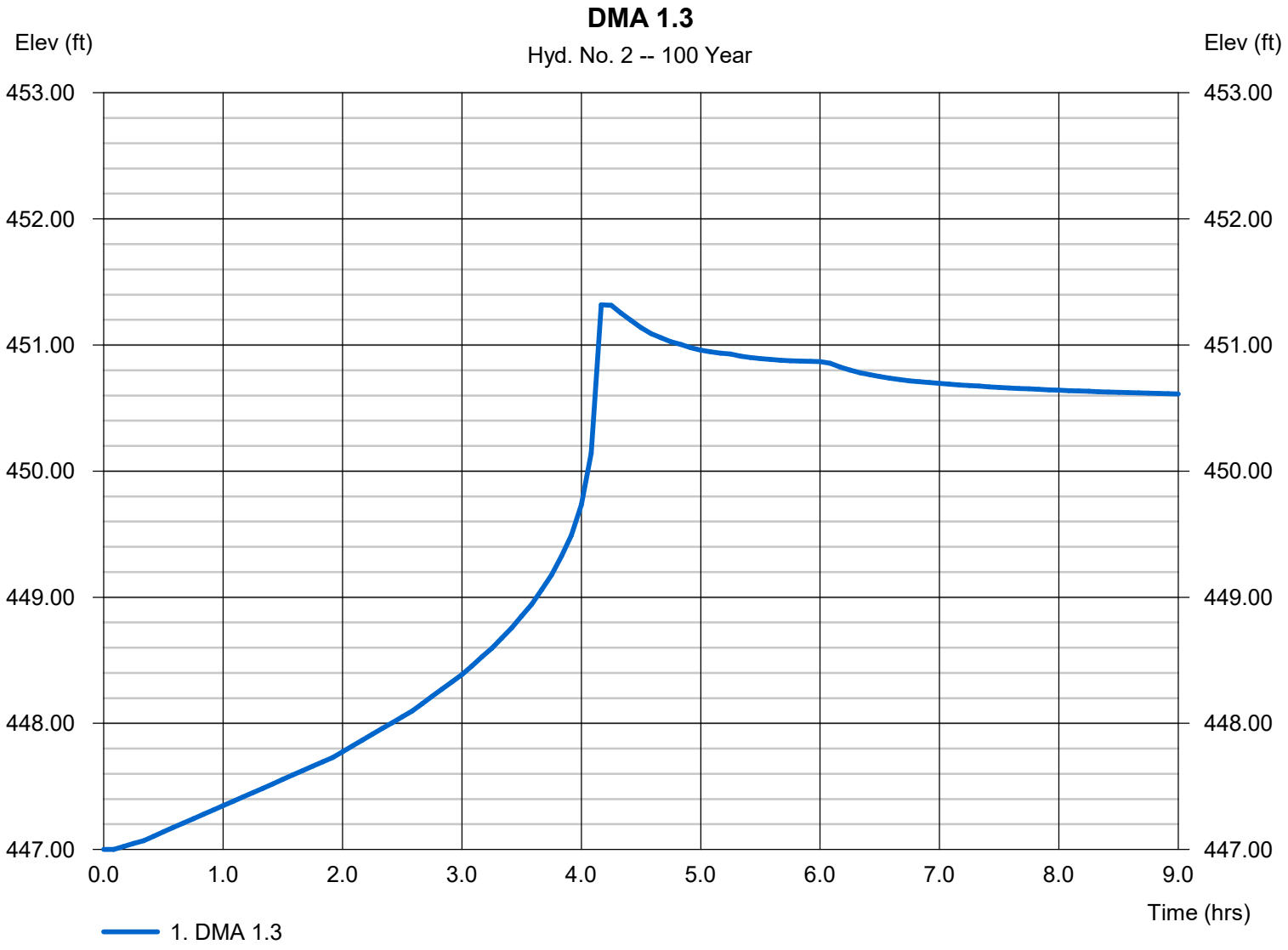
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 1.3

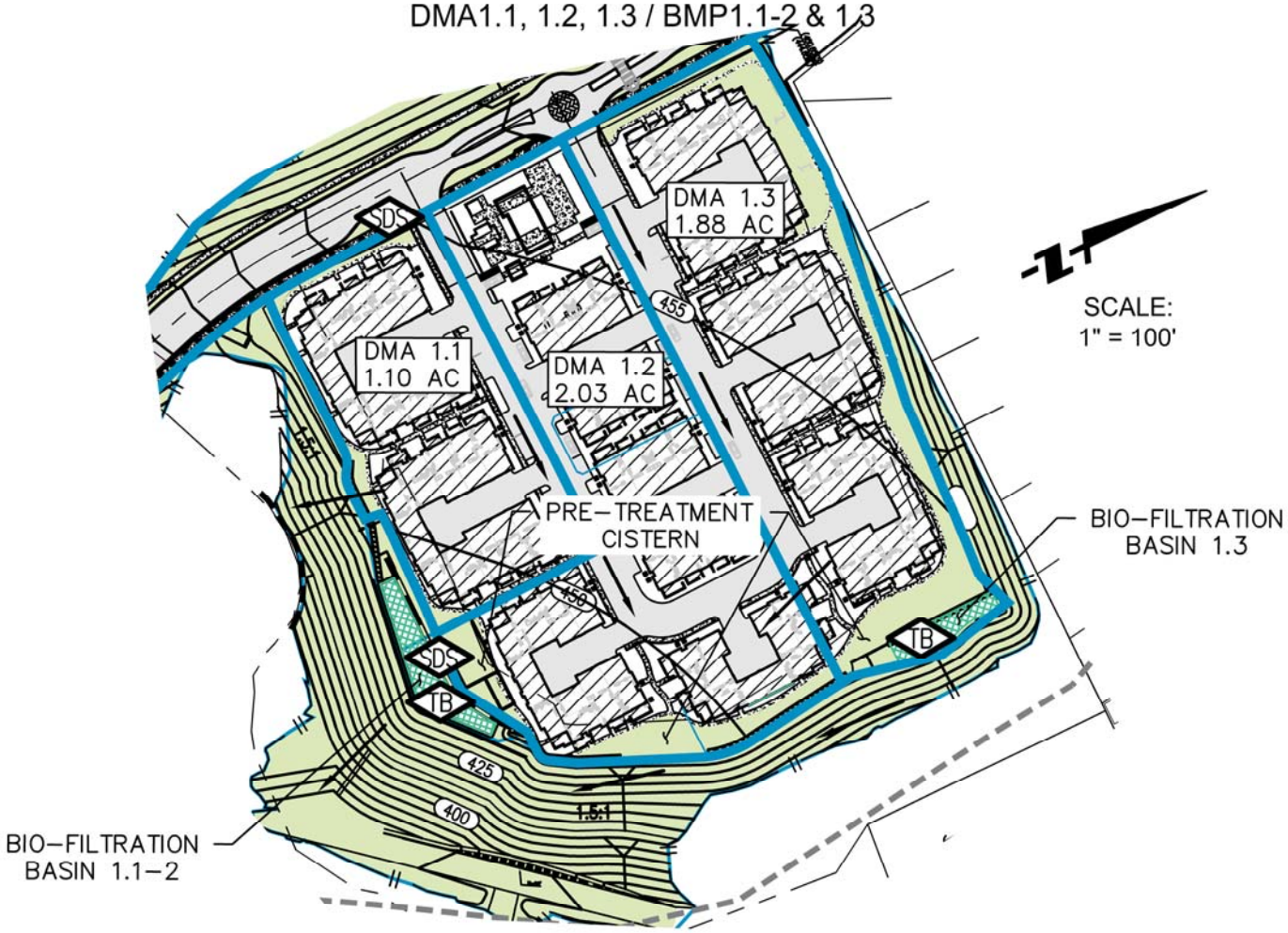
Hydrograph type	= Reservoir	Peak discharge	= 1.734 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 11,534 cuft
Inflow hyd. No.	= 1 - DMA 1.3	Max. Elevation	= 451.32 ft
Reservoir name	= DMA 1.3	Max. Storage	= 11,070 cuft

Storage Indication method used.



STRUCTURAL BMP DMA MAPBOOK

DMA1.1, 1.2, 1.3 / BMP1.1-2 & 1.3



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
1.1	1.1-2	2-HOA	*BF BASIN + CISTERN	✓	✓
1.2	1.1-2	2-HOA	*BF BASIN + CISTERN	✓	✓
1.3	1.3	2-HOA	*BF BASIN + CISTERN	✓	✓

*BF= BIOFILTRATION BASIN

LEGEND

LOT LINE

PROPOSED TREATMENT BMP AREA

LANDSCAPING AREA

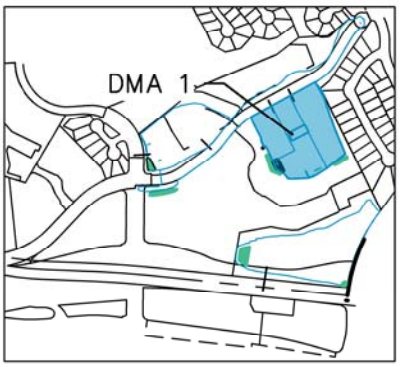
BASIN LIMITS

FLOW DIRECTION

STORM DRAIN INLET STENCILING (SDS)

TREATMENT BASIN (TB)

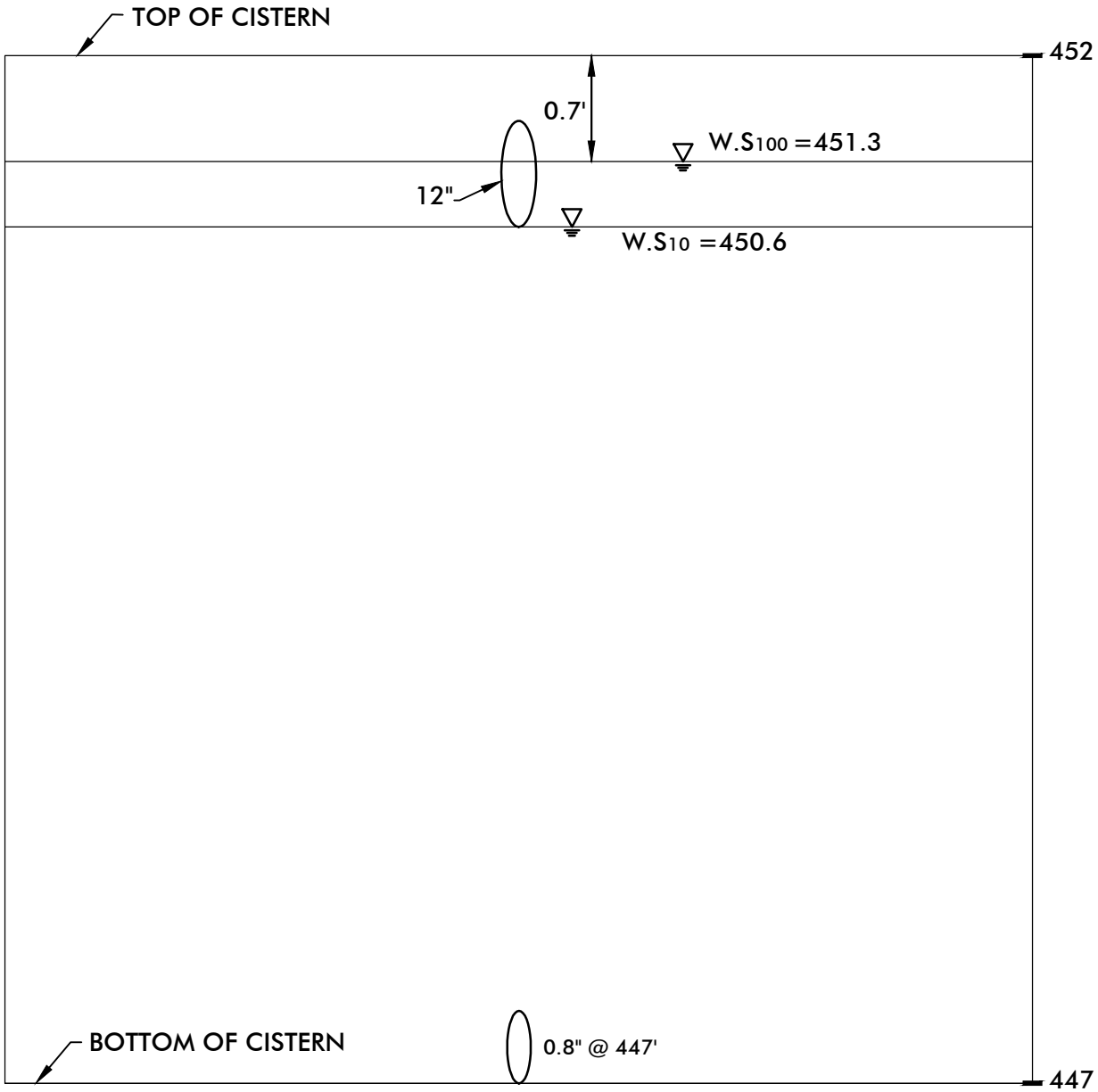
INDEX MAP
NO SCALE



FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 ◦ fax 949.474.5315 ◦ www.fuscoe.com

F:\PROJECTS\2780\002_SUPPORT FILES\REPORTS\SWMP\BMP DMA MAPBOOK\DMA 1.DWG (10-18-2016 9:48:05AM) Plotted by: ESMITH

DMA 1.3



AREA= 2,700 SF

SWEETWATER VISTAS
DMA 1.3
DATE: 10/10/16

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

DMA 2

10 YEAR

RATIONAL METHOD HYDROGRAPH PROGRAM

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RUN DATE 8/12/2016

TIME OF CONCENTRATION 5 MIN.

6 HOUR RAINFALL 1.9 INCHES

BASIN AREA 3.26 ACRES

RUNOFF COEFFICIENT 0.69

PEAK DISCHARGE 11.43 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 5 DISCHARGE (CFS) = 0.3

TIME (MIN) = 10 DISCHARGE (CFS) = 0.3

TIME (MIN) = 15 DISCHARGE (CFS) = 0.3

TIME (MIN) = 20 DISCHARGE (CFS) = 0.3

TIME (MIN) = 25 DISCHARGE (CFS) = 0.3

TIME (MIN) = 30 DISCHARGE (CFS) = 0.3

TIME (MIN) = 35 DISCHARGE (CFS) = 0.3

TIME (MIN) = 40 DISCHARGE (CFS) = 0.3

TIME (MIN) = 45 DISCHARGE (CFS) = 0.3

TIME (MIN) = 50 DISCHARGE (CFS) = 0.3

TIME (MIN) = 55 DISCHARGE (CFS) = 0.3

TIME (MIN) = 60 DISCHARGE (CFS) = 0.3

TIME (MIN) = 65 DISCHARGE (CFS) = 0.3

TIME (MIN) = 70 DISCHARGE (CFS) = 0.3

TIME (MIN) = 75 DISCHARGE (CFS) = 0.3

TIME (MIN) = 80 DISCHARGE (CFS) = 0.3

TIME (MIN) = 85 DISCHARGE (CFS) = 0.3

TIME (MIN) = 90 DISCHARGE (CFS) = 0.3

TIME (MIN) = 95 DISCHARGE (CFS) = 0.3

TIME (MIN) = 100 DISCHARGE (CFS) = 0.4

TIME (MIN) = 105 DISCHARGE (CFS) = 0.4

TIME (MIN) = 110 DISCHARGE (CFS) = 0.4

TIME (MIN) = 115 DISCHARGE (CFS) = 0.4

TIME (MIN) = 120 DISCHARGE (CFS) = 0.4

TIME (MIN) = 125 DISCHARGE (CFS) = 0.4

TIME (MIN) = 130 DISCHARGE (CFS) = 0.4

TIME (MIN) = 135 DISCHARGE (CFS) = 0.4

TIME (MIN) = 140 DISCHARGE (CFS) = 0.4

TIME (MIN) = 145 DISCHARGE (CFS) = 0.5

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TIME (MIN) = 165 DISCHARGE (CFS) = 0.5

TIME (MIN) = 170 DISCHARGE (CFS) = 0.5

TIME (MIN) = 175 DISCHARGE (CFS) = 0.6

TIME (MIN) = 180 DISCHARGE (CFS) = 0.6

TIME (MIN) = 185 DISCHARGE (CFS) = 0.6

TIME (MIN) = 190 DISCHARGE (CFS) = 0.7

TIME (MIN) = 195 DISCHARGE (CFS) = 0.7

TIME (MIN) = 200 DISCHARGE (CFS) = 0.7

TIME (MIN) = 205 DISCHARGE (CFS) = 0.8

TIME (MIN) = 210 DISCHARGE (CFS) = 0.9

TIME (MIN) = 215 DISCHARGE (CFS) = 1

TIME (MIN) = 220 DISCHARGE (CFS) = 1.1

TIME (MIN) = 225 DISCHARGE (CFS) = 1.3

TIME (MIN) = 230 DISCHARGE (CFS) = 1.5

TIME (MIN) = 235 DISCHARGE (CFS) = 2.2

TIME (MIN) = 240 DISCHARGE (CFS) = 3

TIME (MIN) = 245 DISCHARGE (CFS) = 11.43

TIME (MIN) = 250 DISCHARGE (CFS) = 1.8

TIME (MIN) = 255 DISCHARGE (CFS) = 1.2

TIME (MIN) = 260 DISCHARGE (CFS) = 0.9

TIME (MIN) = 265 DISCHARGE (CFS) = 0.8

TIME (MIN) = 270 DISCHARGE (CFS) = 0.7

TIME (MIN) = 275 DISCHARGE (CFS) = 0.6

TIME (MIN) = 280 DISCHARGE (CFS) = 0.6

TIME (MIN) = 285 DISCHARGE (CFS) = 0.5

TIME (MIN) = 290 DISCHARGE (CFS) = 0.5

TIME (MIN) = 295 DISCHARGE (CFS) = 0.4

TIME (MIN) = 300 DISCHARGE (CFS) = 0.4

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TIME (MIN) = 320 DISCHARGE (CFS) = 0.3

TIME (MIN) = 325 DISCHARGE (CFS) = 0.3

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TIME (MIN) = 350 DISCHARGE (CFS) = 0.3

TIME (MIN) = 355 DISCHARGE (CFS) = 0.3

TIME (MIN) = 360 DISCHARGE (CFS) = 0.3

TIME (MIN) = 365 DISCHARGE (CFS) = 0

Hydrograph Report

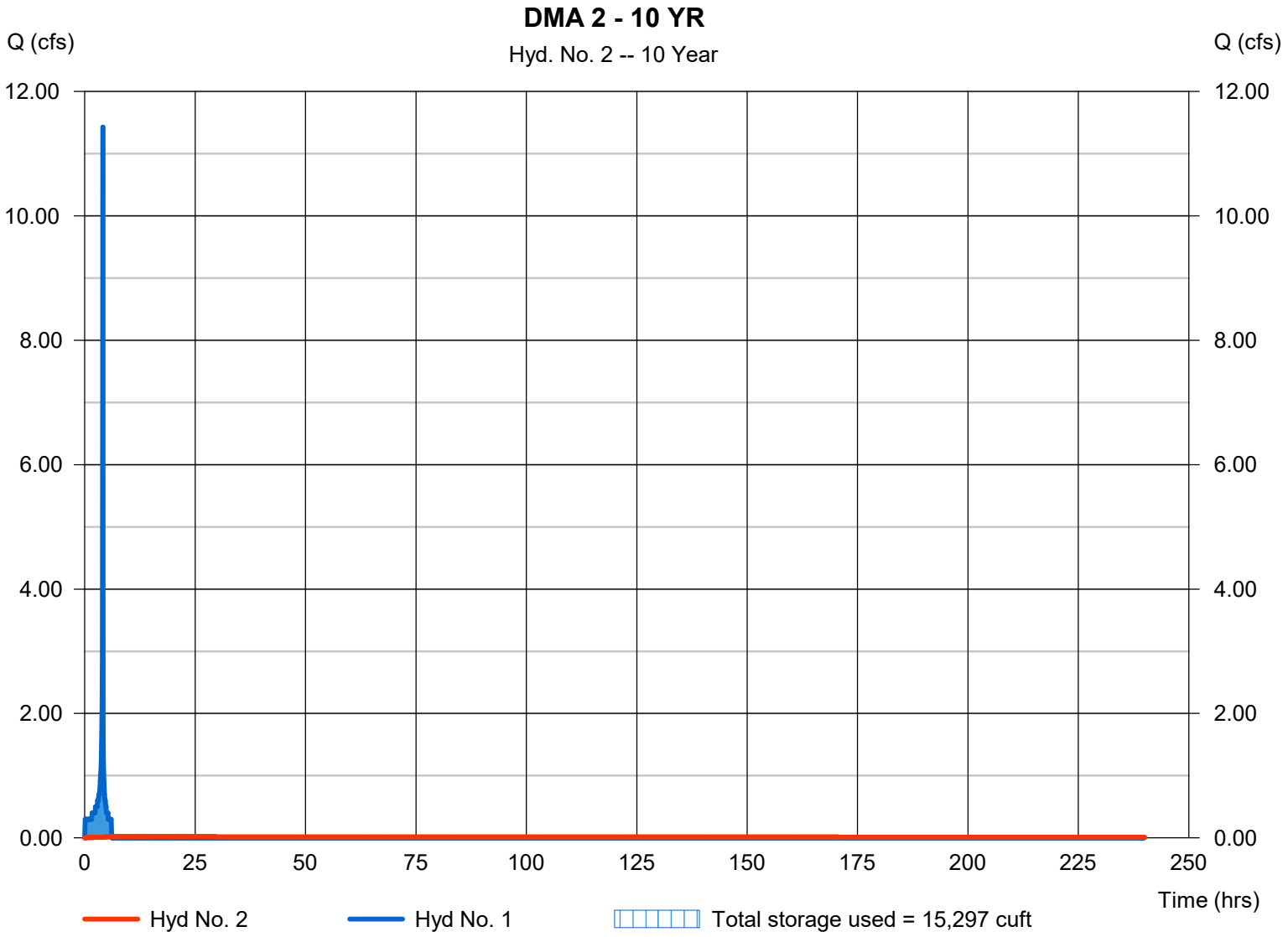
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 2 - 10 YR

Hydrograph type	=	Reservoir	Peak discharge	=	0.017 cfs
Storm frequency	=	10 yrs	Time to peak	=	6.08 hrs
Time interval	=	5 min	Hyd. volume	=	11,188 cuft
Inflow hyd. No.	=	1 - DMA 2 - 10 Year	Max. Elevation	=	402.64 ft
Reservoir name	=	DMA 2	Max. Storage	=	15,297 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 399.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	399.00	4,420	0	0
1.00	400.00	4,420	4,199	4,199
2.00	401.00	4,420	4,199	8,397
3.00	402.00	4,420	4,199	12,596
4.00	403.00	4,420	4,199	16,794
5.00	404.00	4,420	4,199	20,993

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 1.00	0.00	0.00	0.00
Span (in)	= 1.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 399.00	0.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

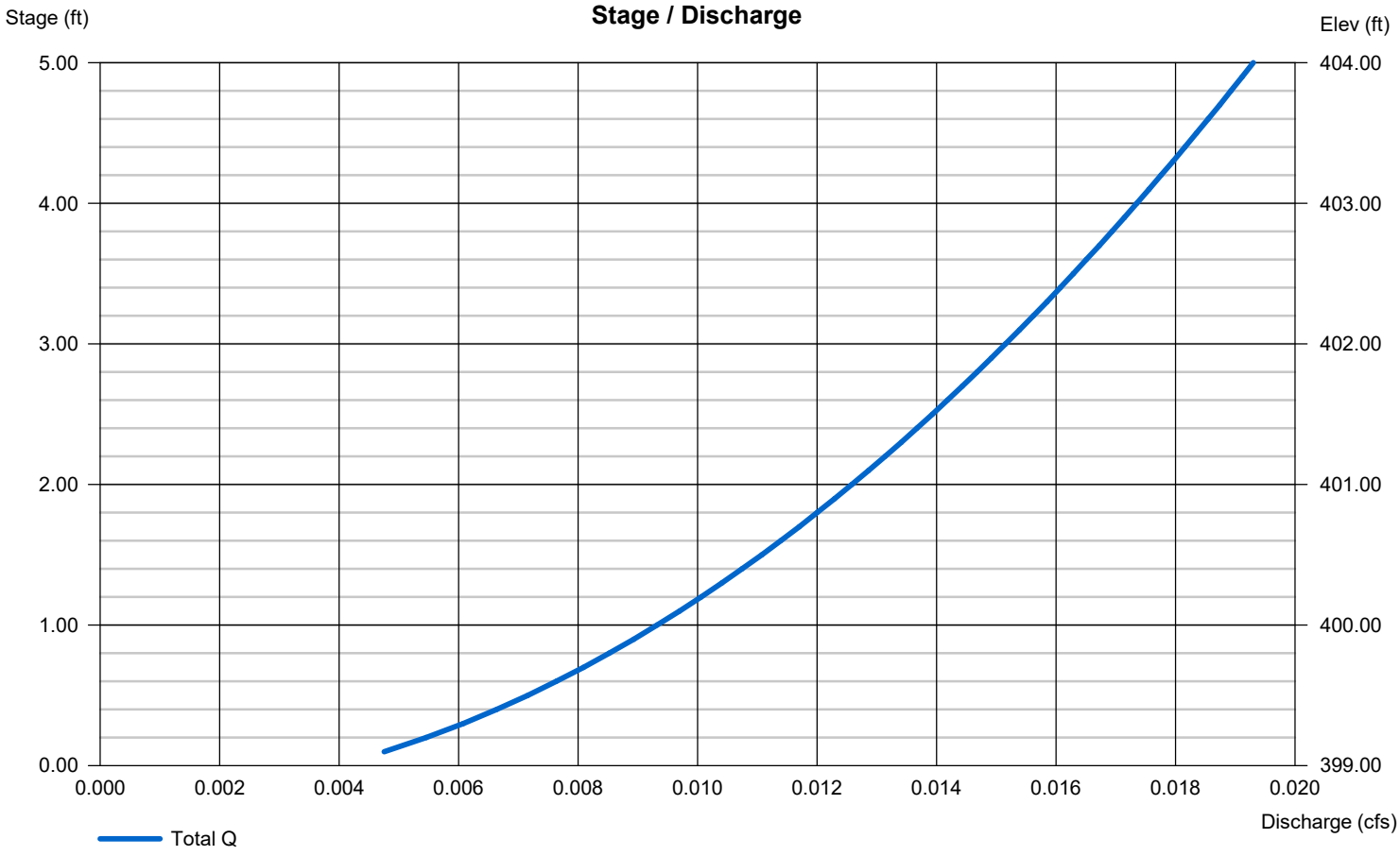
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

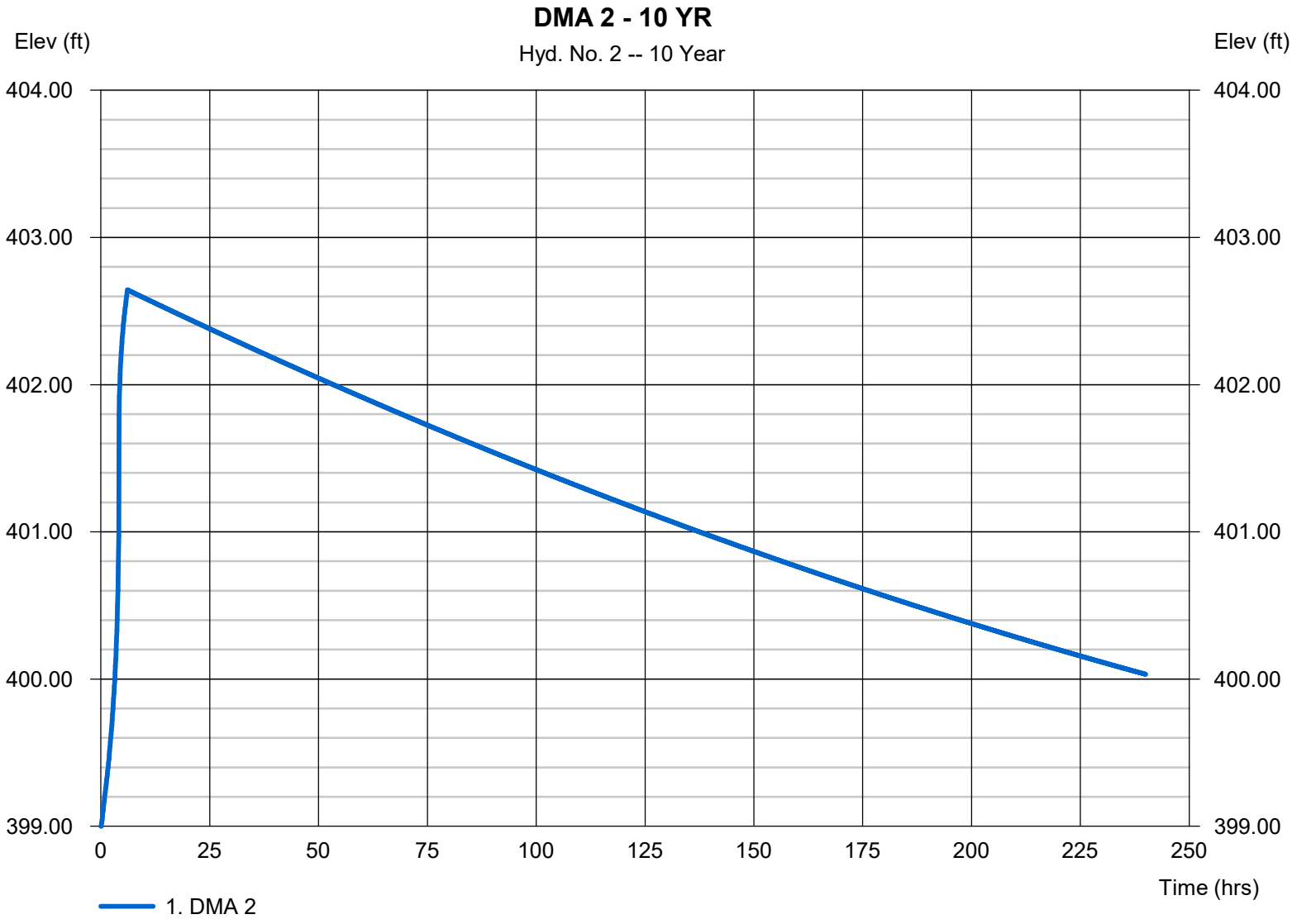
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 10 / 7 / 2016

Hyd. No. 2

DMA 2 - 10 YR

Hydrograph type	= Reservoir	Peak discharge	= 0.017 cfs
Storm frequency	= 10 yrs	Time to peak	= 6.08 hrs
Time interval	= 5 min	Hyd. volume	= 11,188 cuft
Inflow hyd. No.	= 1 - DMA 2 - 10 Year	Max. Elevation	= 402.64 ft
Reservoir name	= DMA 2	Max. Storage	= 15,297 cuft

Storage Indication method used.



DMA 2

100 Year

RATIONAL METHOD HYDROGRAPH PROGRAM

COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 8/11/2016

TIME OF CONCENTRATION 5 MIN.

6 HOUR RAINFALL 3 INCHES

BASIN AREA 3.26 ACRES

RUNOFF COEFFICIENT 0.69

PEAK DISCHARGE 18.05 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 5 DISCHARGE (CFS) = 0.4

TIME (MIN) = 10 DISCHARGE (CFS) = 0.4

TIME (MIN) = 15 DISCHARGE (CFS) = 0.4

TIME (MIN) = 20 DISCHARGE (CFS) = 0.4

TIME (MIN) = 25 DISCHARGE (CFS) = 0.4

TIME (MIN) = 30 DISCHARGE (CFS) = 0.4

TIME (MIN) = 35 DISCHARGE (CFS) = 0.4

TIME (MIN) = 40 DISCHARGE (CFS) = 0.4

TIME (MIN) = 45 DISCHARGE (CFS) = 0.5

TIME (MIN) = 50 DISCHARGE (CFS) = 0.5

TIME (MIN) = 55 DISCHARGE (CFS) = 0.5

TIME (MIN) = 60 DISCHARGE (CFS) = 0.5

TIME (MIN) = 65 DISCHARGE (CFS) = 0.5

TIME (MIN) = 70 DISCHARGE (CFS) = 0.5

TIME (MIN) = 75 DISCHARGE (CFS) = 0.5

TIME (MIN) = 80 DISCHARGE (CFS) = 0.5

TIME (MIN) = 85 DISCHARGE (CFS) = 0.5

TIME (MIN) = 90 DISCHARGE (CFS) = 0.5

TIME (MIN) = 95 DISCHARGE (CFS) = 0.5

TIME (MIN) = 100 DISCHARGE (CFS) = 0.6

TIME (MIN) = 105 DISCHARGE (CFS) = 0.6

TIME (MIN) = 110 DISCHARGE (CFS) = 0.6

TIME (MIN) = 115 DISCHARGE (CFS) = 0.6

TIME (MIN) = 120 DISCHARGE (CFS) = 0.6

TIME (MIN) = 125 DISCHARGE (CFS) = 0.6

TIME (MIN) = 130 DISCHARGE (CFS) = 0.6

TIME (MIN) = 135 DISCHARGE (CFS) = 0.7

TIME (MIN) = 140 DISCHARGE (CFS) = 0.7

TIME (MIN) = 145 DISCHARGE (CFS) = 0.7

TIME (MIN) = 150 DISCHARGE (CFS) = 0.7

TIME (MIN) = 155 DISCHARGE (CFS) = 0.8

TIME (MIN) = 160 DISCHARGE (CFS) = 0.8

TIME (MIN) = 165 DISCHARGE (CFS) = 0.8

TIME (MIN) = 170 DISCHARGE (CFS) = 0.8

TIME (MIN) = 175 DISCHARGE (CFS) = 0.9

TIME (MIN) = 180 DISCHARGE (CFS) = 0.9

TIME (MIN) = 185 DISCHARGE (CFS) = 1

TIME (MIN) = 190 DISCHARGE (CFS) = 1

TIME (MIN) = 195 DISCHARGE (CFS) = 1.1

TIME (MIN) = 200 DISCHARGE (CFS) = 1.2

TIME (MIN) = 205 DISCHARGE (CFS) = 1.3

TIME (MIN) = 210 DISCHARGE (CFS) = 1.4

TIME (MIN) = 215 DISCHARGE (CFS) = 1.6

TIME (MIN) = 220 DISCHARGE (CFS) = 1.7

TIME (MIN) = 225 DISCHARGE (CFS) = 2.1

TIME (MIN) = 230 DISCHARGE (CFS) = 2.4

TIME (MIN) = 235 DISCHARGE (CFS) = 3.5

TIME (MIN) = 240 DISCHARGE (CFS) = 4.7

TIME (MIN) = 245 DISCHARGE (CFS) = 18.05

TIME (MIN) = 250 DISCHARGE (CFS) = 2.8

TIME (MIN) = 255 DISCHARGE (CFS) = 1.9

TIME (MIN) = 260 DISCHARGE (CFS) = 1.5

TIME (MIN) = 265 DISCHARGE (CFS) = 1.2

TIME (MIN) = 270 DISCHARGE (CFS) = 1.1

TIME (MIN) = 275 DISCHARGE (CFS) = 1

TIME (MIN) = 280 DISCHARGE (CFS) = 0.9

TIME (MIN) = 285 DISCHARGE (CFS) = 0.8

TIME (MIN) = 290 DISCHARGE (CFS) = 0.7

TIME (MIN) = 295 DISCHARGE (CFS) = 0.7

TIME (MIN) = 300 DISCHARGE (CFS) = 0.7

TIME (MIN) = 305 DISCHARGE (CFS) = 0.6

TIME (MIN) = 310 DISCHARGE (CFS) = 0.6

TIME (MIN) = 315 DISCHARGE (CFS) = 0.6

TIME (MIN) = 320 DISCHARGE (CFS) = 0.5

TIME (MIN) = 325 DISCHARGE (CFS) = 0.5

TIME (MIN) = 330 DISCHARGE (CFS) = 0.5

TIME (MIN) = 335 DISCHARGE (CFS) = 0.5

TIME (MIN) = 340 DISCHARGE (CFS) = 0.5

TIME (MIN) = 345 DISCHARGE (CFS) = 0.4

TIME (MIN) = 350 DISCHARGE (CFS) = 0.4

TIME (MIN) = 355 DISCHARGE (CFS) = 0.4

TIME (MIN) = 360 DISCHARGE (CFS) = 0.4

TIME (MIN) = 365 DISCHARGE (CFS) = 0

Hydrograph Report

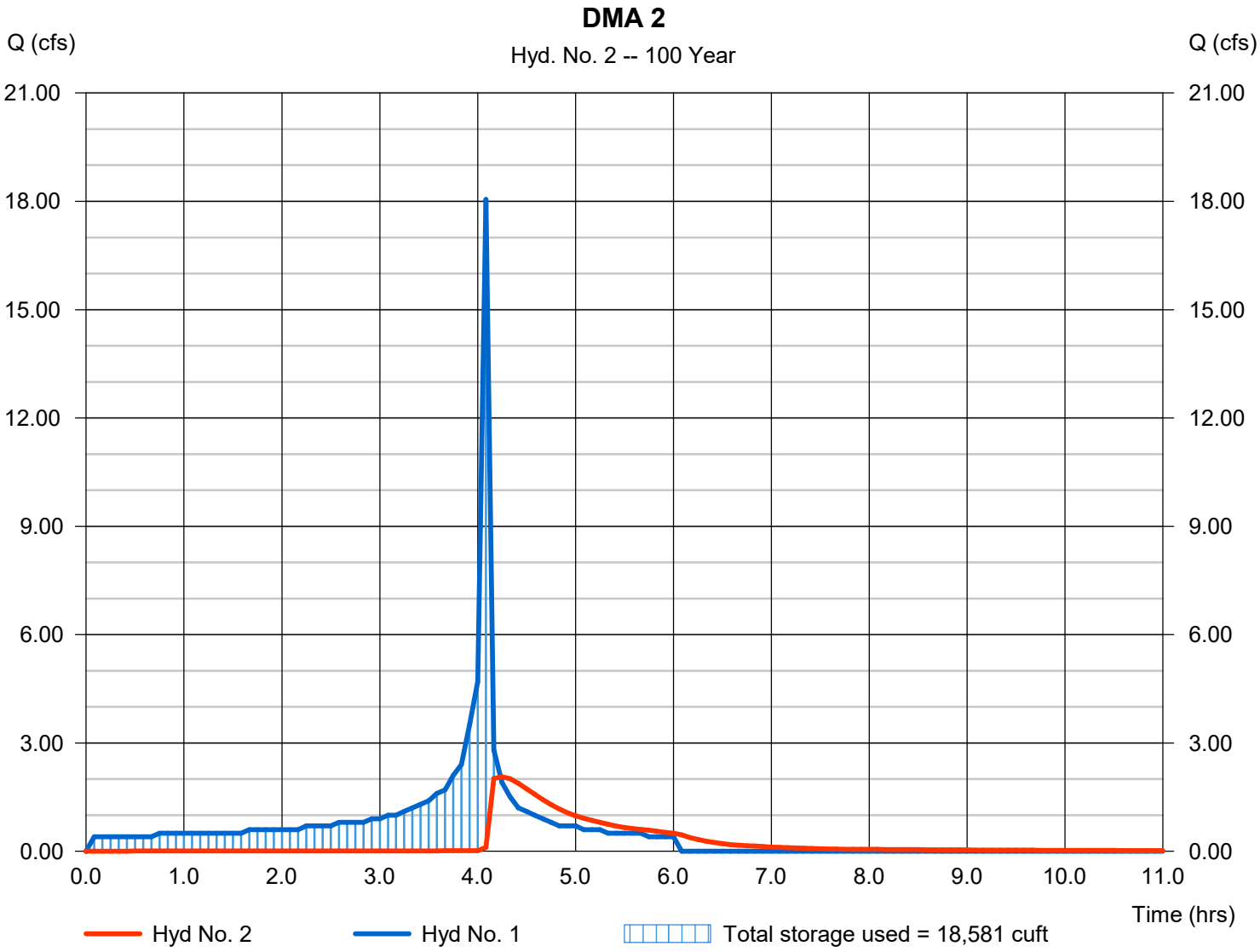
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Monday, 10 / 17 / 2016

Hyd. No. 2

DMA 2

Hydrograph type	=	Reservoir	Peak discharge	=	2.059 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.25 hrs
Time interval	=	5 min	Hyd. volume	=	19,890 cuft
Inflow hyd. No.	=	1 - DMA 2	Max. Elevation	=	403.43 ft
Reservoir name	=	DMA 2	Max. Storage	=	18,581 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 399.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	399.00	4,420	0	0
1.00	400.00	4,420	4,199	4,199
2.00	401.00	4,420	4,199	8,397
3.00	402.00	4,420	4,199	12,596
4.00	403.00	4,420	4,199	16,794
5.00	404.00	4,420	4,199	20,993
6.00	405.00	4,420	4,199	25,191
7.00	406.00	4,420	4,199	29,390
8.00	407.00	4,420	4,199	33,589

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 1.00	12.00	0.00	0.00
Span (in)	= 1.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 399.00	402.60	0.00	0.00
Length (ft)	= 30.00	30.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

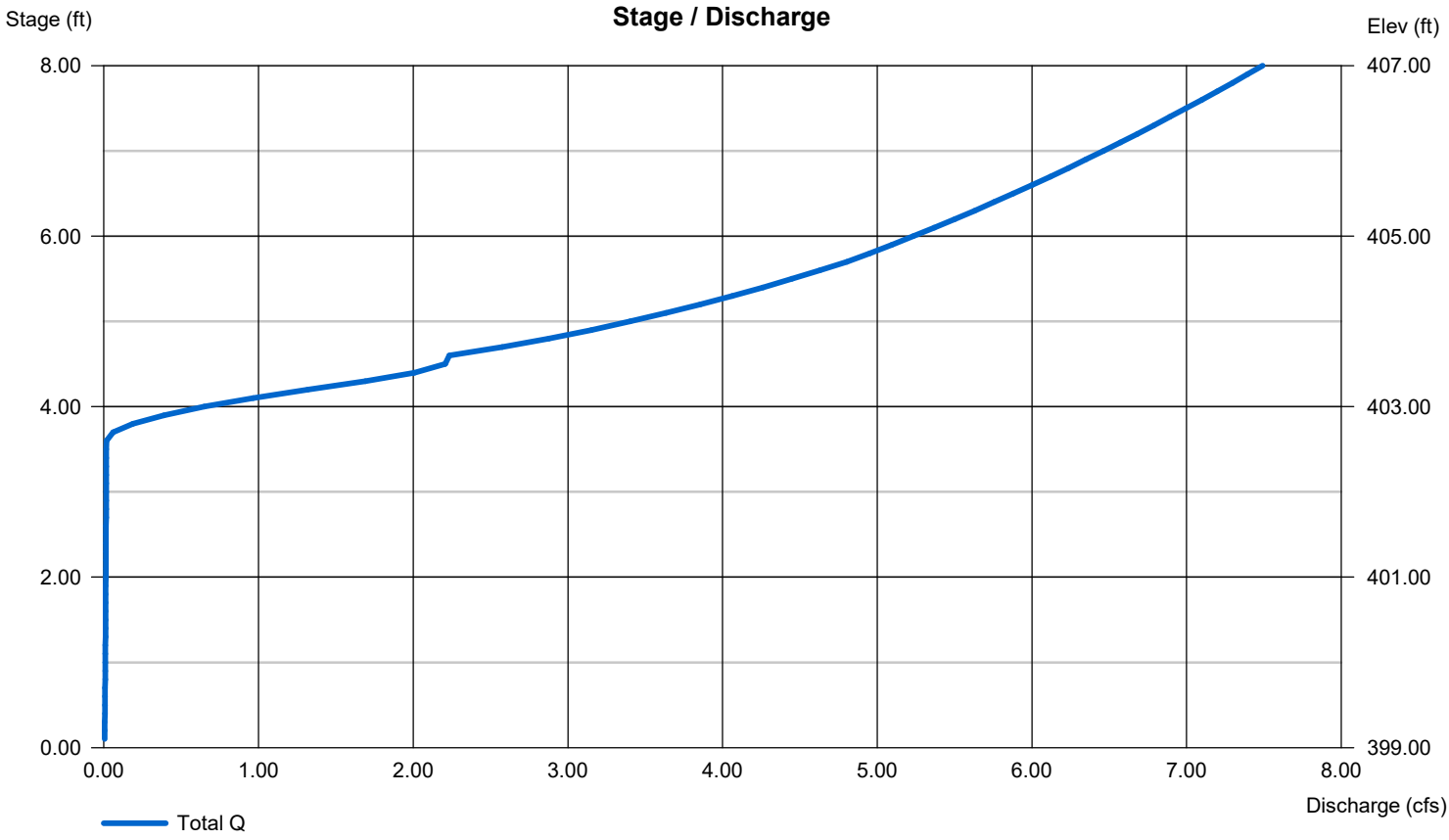
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

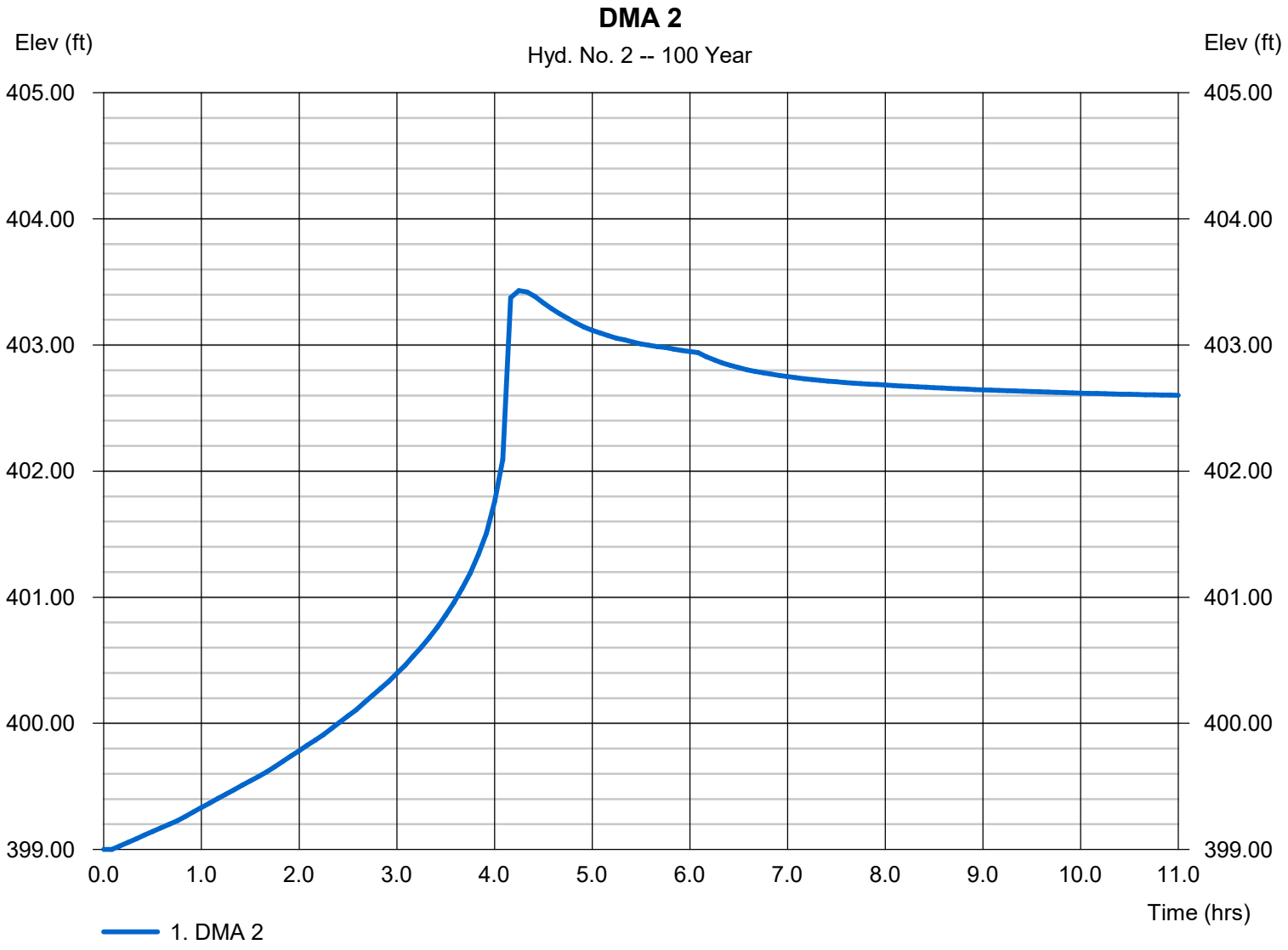
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Monday, 10 / 17 / 2016

Hyd. No. 2

DMA 2

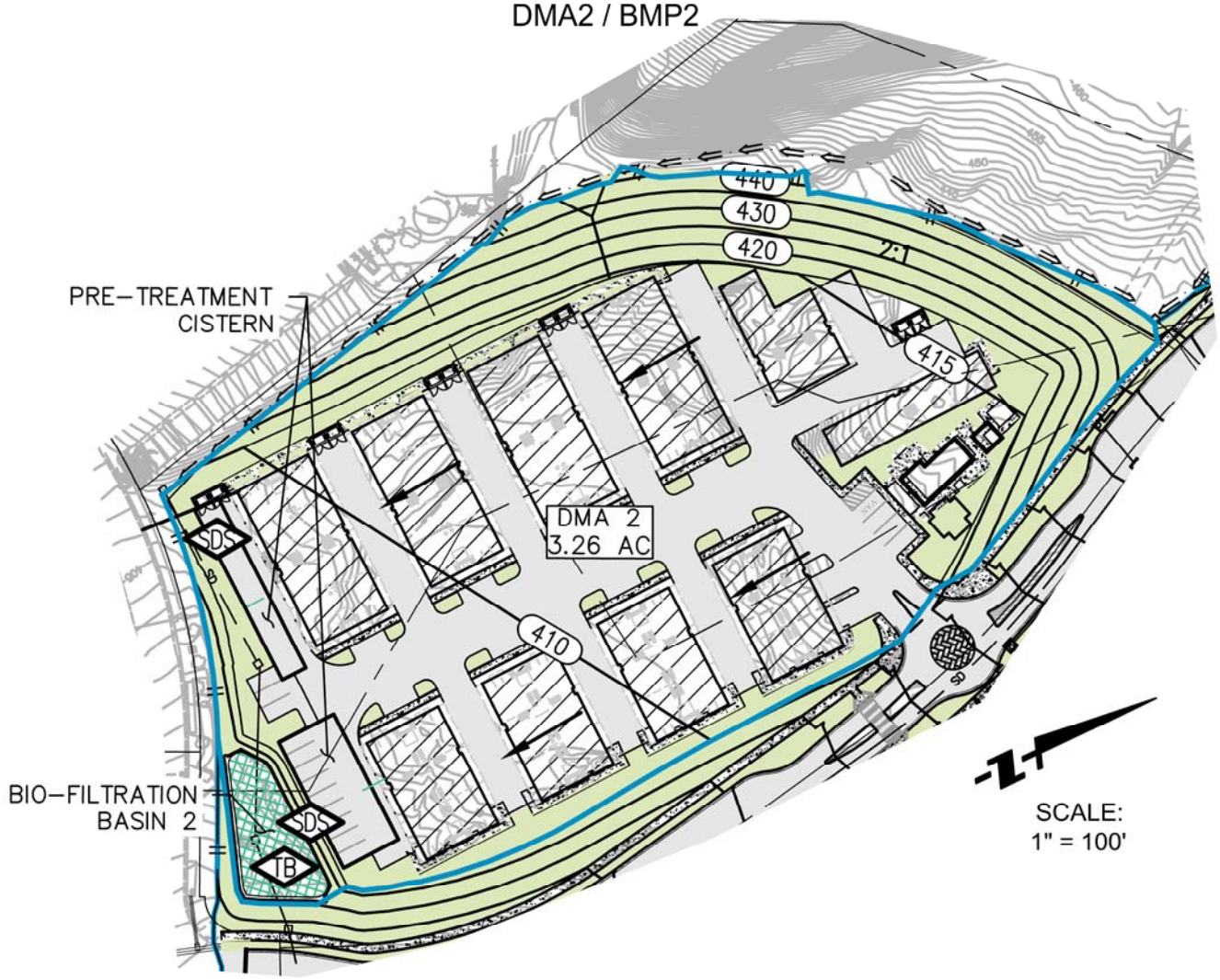
Hydrograph type	= Reservoir	Peak discharge	= 2.059 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.25 hrs
Time interval	= 5 min	Hyd. volume	= 19,890 cuft
Inflow hyd. No.	= 1 - DMA 2	Max. Elevation	= 403.43 ft
Reservoir name	= DMA 2	Max. Storage	= 18,581 cuft

Storage Indication method used.



STRUCTURAL BMP DMA MAPBOOK

DMA2 / BMP2



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
2	2	2-HOA	*BF BASIN + CISTERN	✓	✓

*BF= BIOFILTRATION BASIN

LEGEND

LOT LINE

PROPOSED TREATMENT BMP AREA

LANDSCAPING AREA

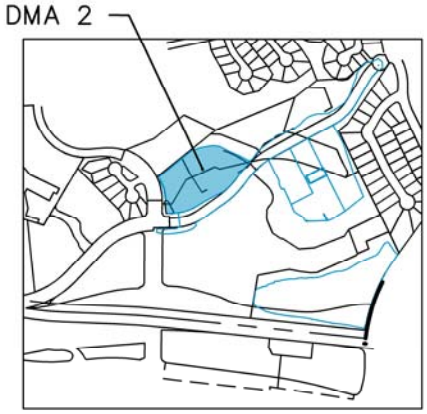
BASIN LIMITS

FLOW DIRECTION

STORM DRAIN INLET STENCILING (SDS)

TREATMENT BASIN (TB)

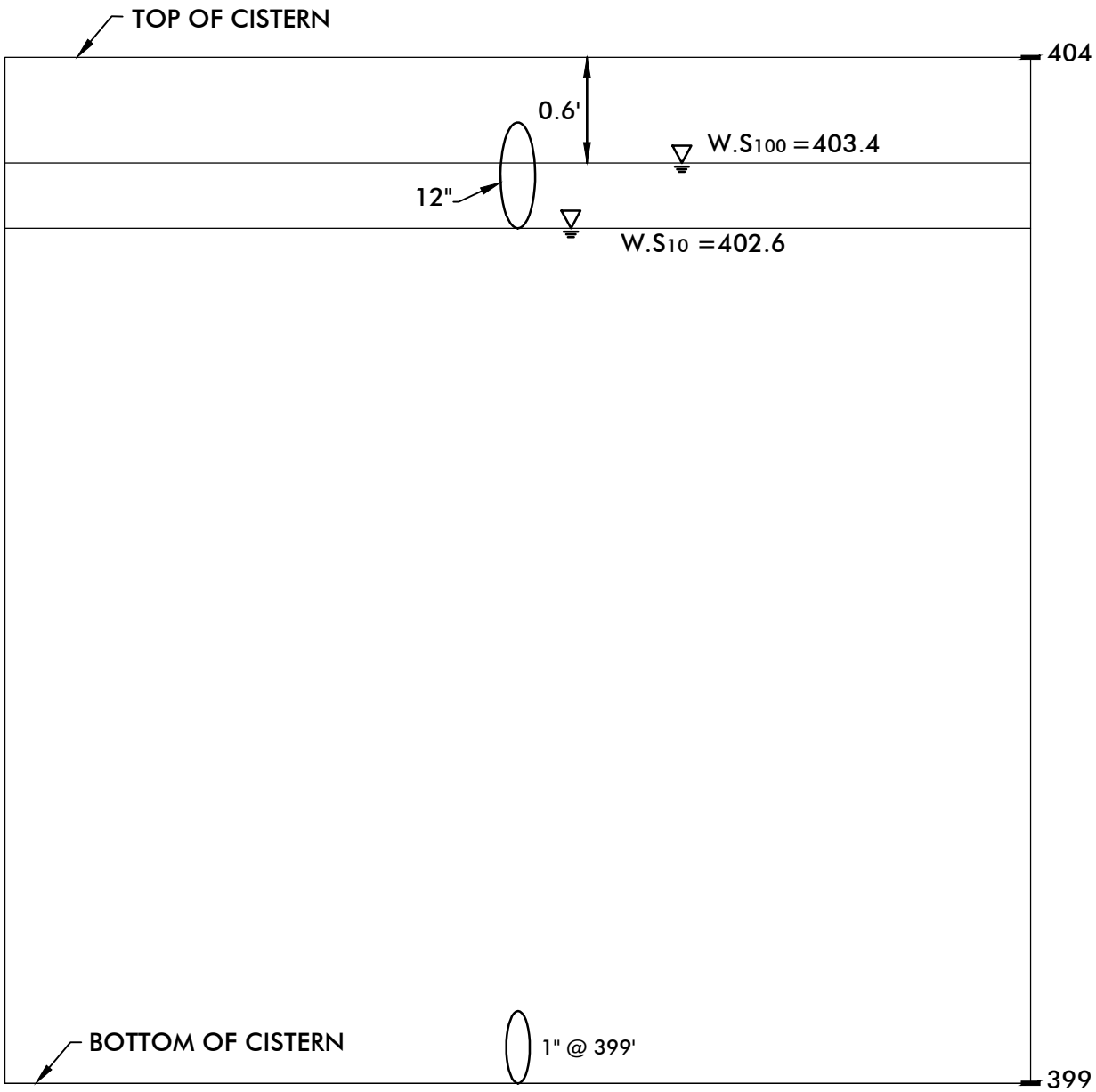
INDEX MAP
NO SCALE



FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 ◦ fax 949.474.5315 ◦ www.fuscoe.com

F:\PROJECTS\2780\002_SUPPORT FILES\REPORTS\SWMP\BMP DMA MAPBOOK\DMA 2.DWG (10-18-2016 9:36:45AM) Plotted by: ESMITH

DMA 2



AREA= 4,420 SF

SWEETWATER VISTAS
DMA 2
DATE: 10/10/16

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

DMA 3

10 YEAR

RATIONAL METHOD HYDROGRAPH PROGRAM

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RUN DATE 8/12/2016

TIME OF CONCENTRATION 9 MIN.

6 HOUR RAINFALL 1.9 INCHES

BASIN AREA 5.14 ACRES

RUNOFF COEFFICIENT 0.7

PEAK DISCHARGE 12.15 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 9 DISCHARGE (CFS) = 0.3

TIME (MIN) = 18 DISCHARGE (CFS) = 0.4

TIME (MIN) = 27 DISCHARGE (CFS) = 0.4

TIME (MIN) = 36 DISCHARGE (CFS) = 0.4

TIME (MIN) = 45 DISCHARGE (CFS) = 0.4

TIME (MIN) = 54 DISCHARGE (CFS) = 0.5

TIME (MIN) = 63 DISCHARGE (CFS) = 0.5

TIME (MIN) = 72 DISCHARGE (CFS) = 0.5

TIME (MIN) = 81 DISCHARGE (CFS) = 0.5

TIME (MIN) = 90 DISCHARGE (CFS) = 0.5

TIME (MIN) = 99 DISCHARGE (CFS) = 0.5

TIME (MIN) = 108 DISCHARGE (CFS) = 0.6

TIME (MIN) = 117 DISCHARGE (CFS) = 0.6

TIME (MIN) = 126 DISCHARGE (CFS) = 0.6

TIME (MIN) = 135 DISCHARGE (CFS) = 0.6

TIME (MIN) = 144 DISCHARGE (CFS) = 0.7

TIME (MIN) = 153 DISCHARGE (CFS) = 0.7

TIME (MIN) = 162 DISCHARGE (CFS) = 0.8

TIME (MIN) = 171 DISCHARGE (CFS) = 0.8

TIME (MIN) = 180 DISCHARGE (CFS) = 0.9

TIME (MIN) = 189 DISCHARGE (CFS) = 1

TIME (MIN) = 198 DISCHARGE (CFS) = 1.1

TIME (MIN) = 207 DISCHARGE (CFS) = 1.2

TIME (MIN) = 216 DISCHARGE (CFS) = 1.5

TIME (MIN) = 225 DISCHARGE (CFS) = 1.7

TIME (MIN) = 234 DISCHARGE (CFS) = 2.4

TIME (MIN) = 243 DISCHARGE (CFS) = 3.6

TIME (MIN) = 252 DISCHARGE (CFS) = 12.15

TIME (MIN) = 261 DISCHARGE (CFS) = 2

TIME (MIN) = 270 DISCHARGE (CFS) = 1.3

TIME (MIN) = 279 DISCHARGE (CFS) = 1

TIME (MIN) = 288 DISCHARGE (CFS) = 0.9

TIME (MIN) = 297 DISCHARGE (CFS) = 0.7

TIME (MIN) = 306 DISCHARGE (CFS) = 0.7

TIME (MIN) = 315 DISCHARGE (CFS) = 0.6

TIME (MIN) = 324 DISCHARGE (CFS) = 0.6

TIME (MIN) = 333 DISCHARGE (CFS) = 0.5

TIME (MIN) = 342 DISCHARGE (CFS) = 0.5

TIME (MIN) = 351 DISCHARGE (CFS) = 0.5

TIME (MIN) = 360 DISCHARGE (CFS) = 0.4

TIME (MIN) = 369 DISCHARGE (CFS) = 0

Hydrograph Report

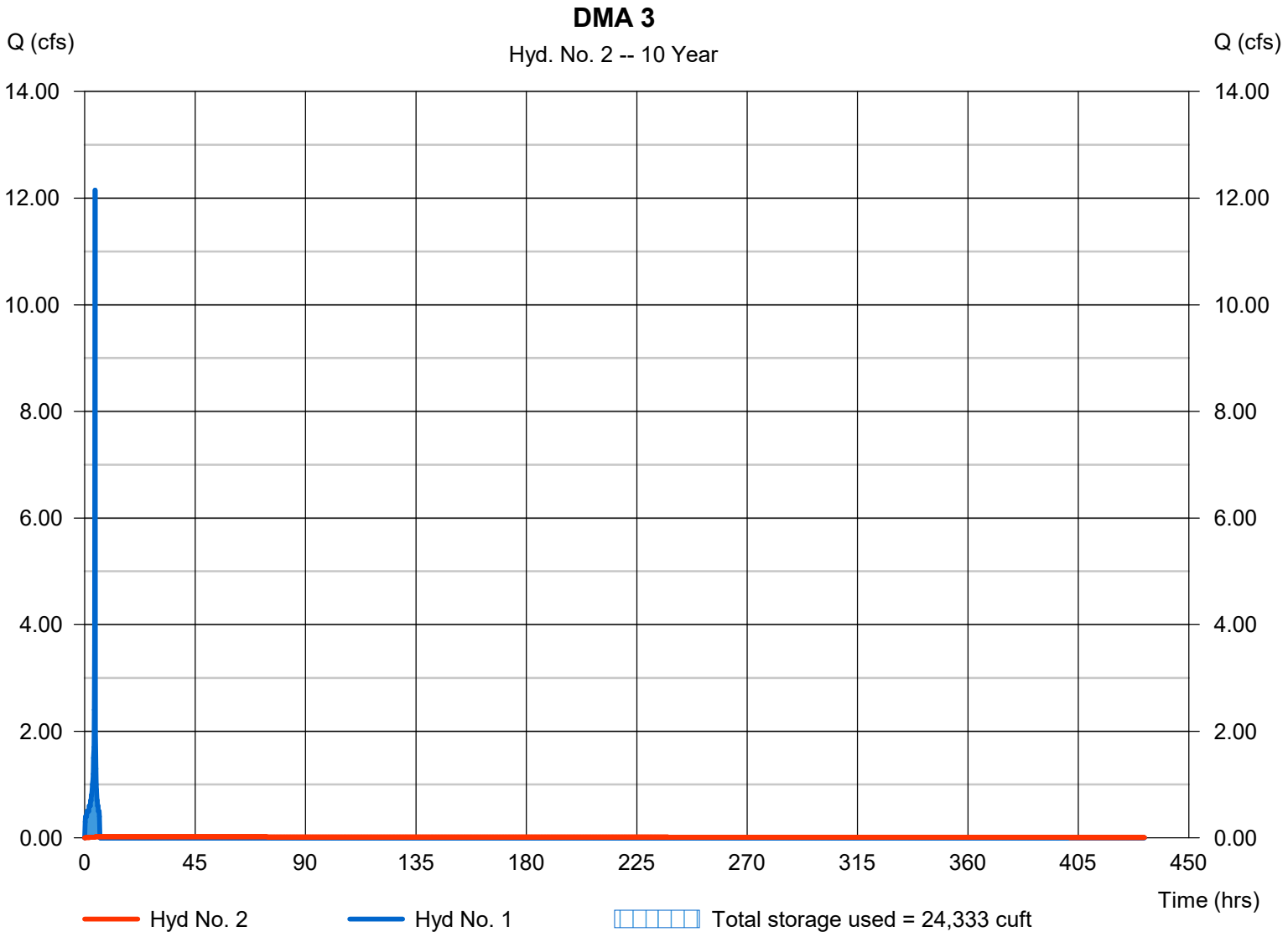
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 3

Hydrograph type	=	Reservoir	Peak discharge	=	0.021 cfs
Storm frequency	=	10 yrs	Time to peak	=	6.15 hrs
Time interval	=	9 min	Hyd. volume	=	21,833 cuft
Inflow hyd. No.	=	1 - DMA 3	Max. Elevation	=	422.14 ft
Reservoir name	=	DMA 3	Max. Storage	=	24,333 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 412.00 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	412.00	6,000	0	0
1.00	413.00	6,000	2,400	2,400
2.00	414.00	6,000	2,400	4,800
3.00	415.00	6,000	2,400	7,199
4.00	416.00	6,000	2,400	9,599
5.00	417.00	6,000	2,400	11,999
6.00	418.00	6,000	2,400	14,399
7.00	419.00	6,000	2,400	16,798
8.00	420.00	6,000	2,400	19,198
9.00	421.00	6,000	2,400	21,598
10.00	422.00	6,000	2,400	23,998
11.00	423.00	6,000	2,400	26,397
12.00	424.00	6,000	2,400	28,797
13.00	425.00	6,000	2,400	31,197
14.00	426.00	6,000	2,400	33,597
15.00	427.00	6,000	2,400	35,996
15.50	427.50	6,000	1,200	37,196

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.90	0.00	0.00	0.00
Span (in)	= 0.90	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 412.00	0.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

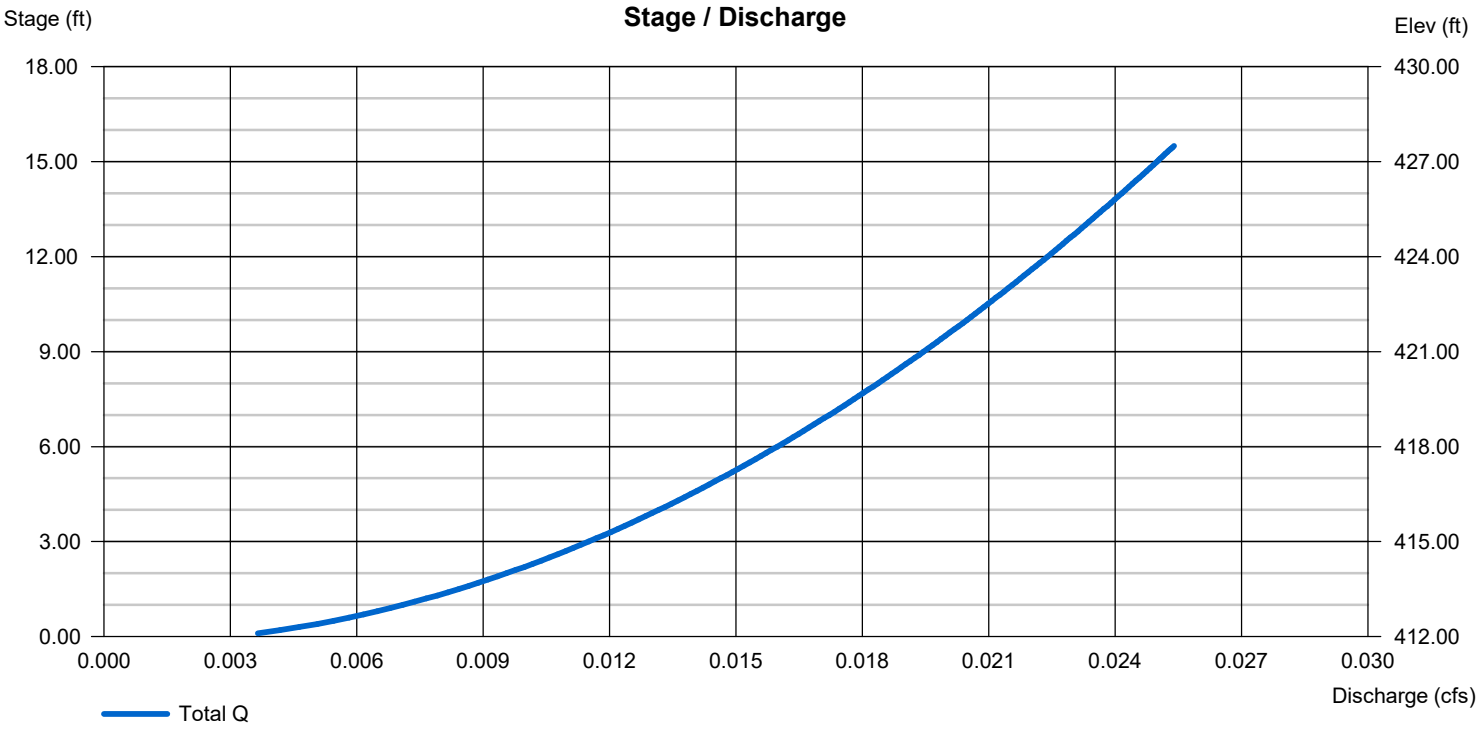
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

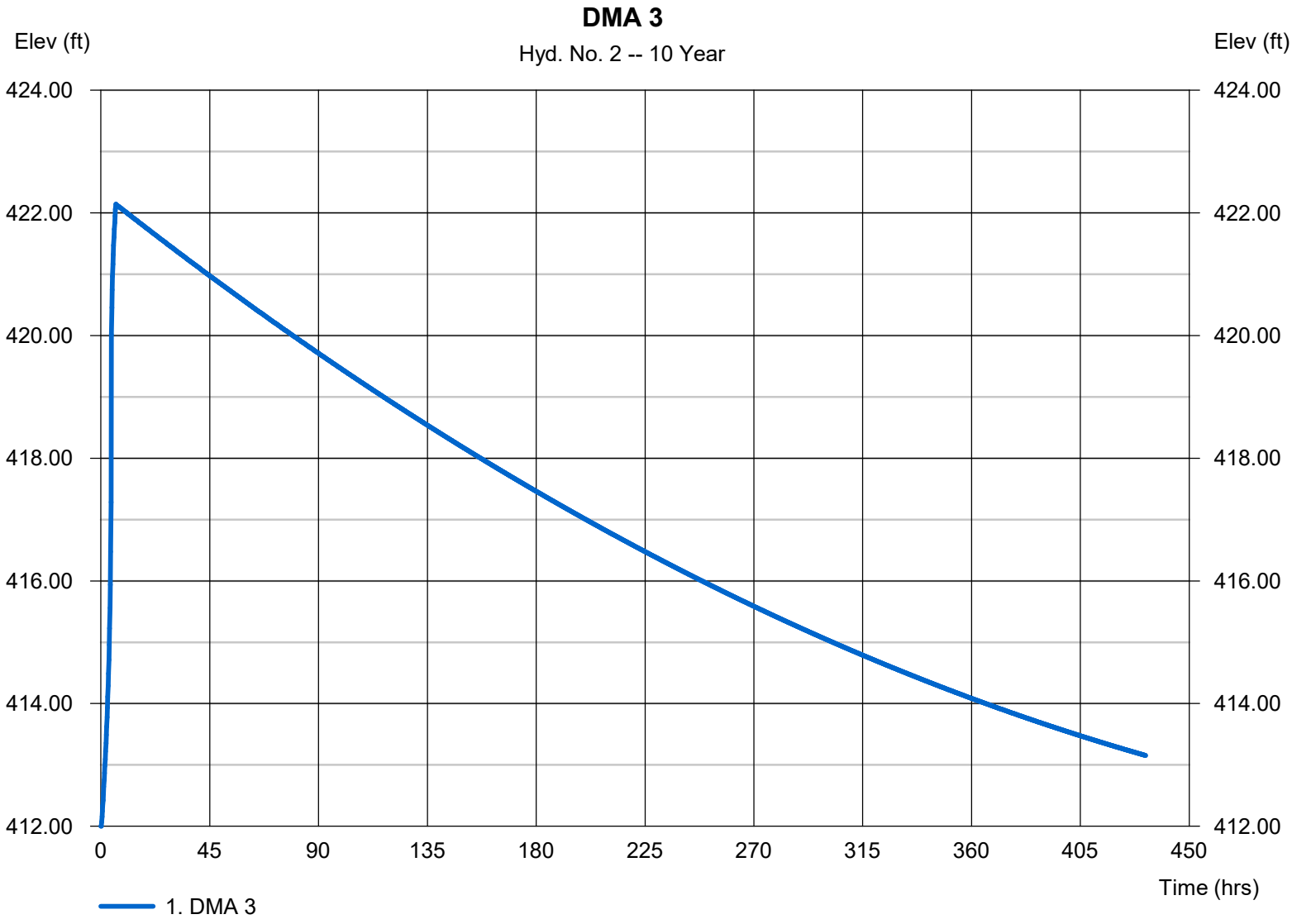
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 3

Hydrograph type	= Reservoir	Peak discharge	= 0.021 cfs
Storm frequency	= 10 yrs	Time to peak	= 6.15 hrs
Time interval	= 9 min	Hyd. volume	= 21,833 cuft
Inflow hyd. No.	= 1 - DMA 3	Max. Elevation	= 422.14 ft
Reservoir name	= DMA 3	Max. Storage	= 24,333 cuft

Storage Indication method used.



DMA 3

100 YEAR

RATIONAL METHOD HYDROGRAPH PROGRAM

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RUN DATE 8/11/2016

TIME OF CONCENTRATION 9 MIN.

6 HOUR RAINFALL 3 INCHES

BASIN AREA 5.14 ACRES

RUNOFF COEFFICIENT 0.7

PEAK DISCHARGE 20.03 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 9 DISCHARGE (CFS) = 0.4

TIME (MIN) = 18 DISCHARGE (CFS) = 0.7

TIME (MIN) = 27 DISCHARGE (CFS) = 0.7

TIME (MIN) = 36 DISCHARGE (CFS) = 0.7

TIME (MIN) = 45 DISCHARGE (CFS) = 0.7

TIME (MIN) = 54 DISCHARGE (CFS) = 0.7

TIME (MIN) = 63 DISCHARGE (CFS) = 0.7

TIME (MIN) = 72 DISCHARGE (CFS) = 0.8

TIME (MIN) = 81 DISCHARGE (CFS) = 0.8

TIME (MIN) = 90 DISCHARGE (CFS) = 0.8

TIME (MIN) = 99 DISCHARGE (CFS) = 0.9

TIME (MIN) = 108 DISCHARGE (CFS) = 0.9

TIME (MIN) = 117 DISCHARGE (CFS) = 0.9

TIME (MIN) = 126 DISCHARGE (CFS) = 1

TIME (MIN) = 135 DISCHARGE (CFS) = 1

TIME (MIN) = 144 DISCHARGE (CFS) = 1.1

TIME (MIN) = 153 DISCHARGE (CFS) = 1.1

TIME (MIN) = 162 DISCHARGE (CFS) = 1.2

TIME (MIN) = 171 DISCHARGE (CFS) = 1.3

TIME (MIN) = 180 DISCHARGE (CFS) = 1.4

TIME (MIN) = 189 DISCHARGE (CFS) = 1.5

TIME (MIN) = 198 DISCHARGE (CFS) = 1.7

TIME (MIN) = 207 DISCHARGE (CFS) = 1.9

TIME (MIN) = 216 DISCHARGE (CFS) = 2.3

TIME (MIN) = 225 DISCHARGE (CFS) = 2.6

TIME (MIN) = 234 DISCHARGE (CFS) = 3.9

TIME (MIN) = 243 DISCHARGE (CFS) = 4.9

TIME (MIN) = 252 DISCHARGE (CFS) = 20.03

TIME (MIN) = 261 DISCHARGE (CFS) = 3.1

TIME (MIN) = 270 DISCHARGE (CFS) = 2.1

TIME (MIN) = 279 DISCHARGE (CFS) = 1.6

TIME (MIN) = 288 DISCHARGE (CFS) = 1.4

TIME (MIN) = 297 DISCHARGE (CFS) = 1.2

TIME (MIN) = 306 DISCHARGE (CFS) = 1.1

TIME (MIN) = 315 DISCHARGE (CFS) = 1

TIME (MIN) = 324 DISCHARGE (CFS) = 0.9

TIME (MIN) = 333 DISCHARGE (CFS) = 0.8

TIME (MIN) = 342 DISCHARGE (CFS) = 0.8

TIME (MIN) = 351 DISCHARGE (CFS) = 0.7

TIME (MIN) = 360 DISCHARGE (CFS) = 0.7

TIME (MIN) = 369 DISCHARGE (CFS) = 0

Hydrograph Report

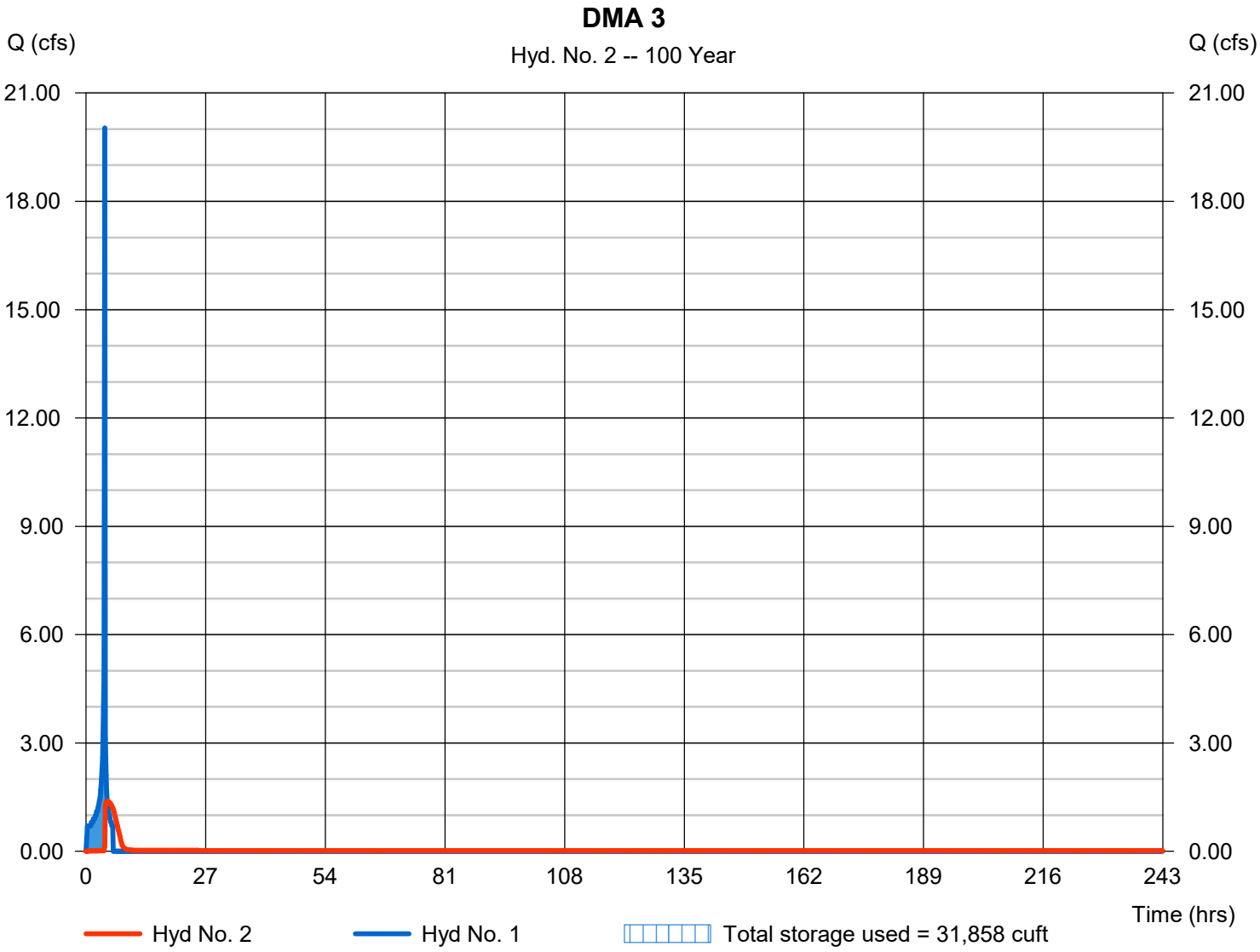
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 3

Hydrograph type	=	Reservoir	Peak discharge	=	1.387 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.80 hrs
Time interval	=	9 min	Hyd. volume	=	35,945 cuft
Inflow hyd. No.	=	1 - DMA 3	Max. Elevation	=	425.28 ft
Reservoir name	=	DMA 3	Max. Storage	=	31,858 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 412.00 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	412.00	6,000	0	0
1.00	413.00	6,000	2,400	2,400
2.00	414.00	6,000	2,400	4,800
3.00	415.00	6,000	2,400	7,199
4.00	416.00	6,000	2,400	9,599
5.00	417.00	6,000	2,400	11,999
6.00	418.00	6,000	2,400	14,399
7.00	419.00	6,000	2,400	16,798
8.00	420.00	6,000	2,400	19,198
9.00	421.00	6,000	2,400	21,598
10.00	422.00	6,000	2,400	23,998
11.00	423.00	6,000	2,400	26,397
12.00	424.00	6,000	2,400	28,797
13.00	425.00	6,000	2,400	31,197
14.00	426.00	6,000	2,400	33,597
15.00	427.00	6,000	2,400	35,996
15.50	427.50	6,000	1,200	37,196

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.90	6.00	0.00	0.00
Span (in)	= 0.90	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 412.00	422.20	0.00	0.00
Length (ft)	= 30.00	30.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

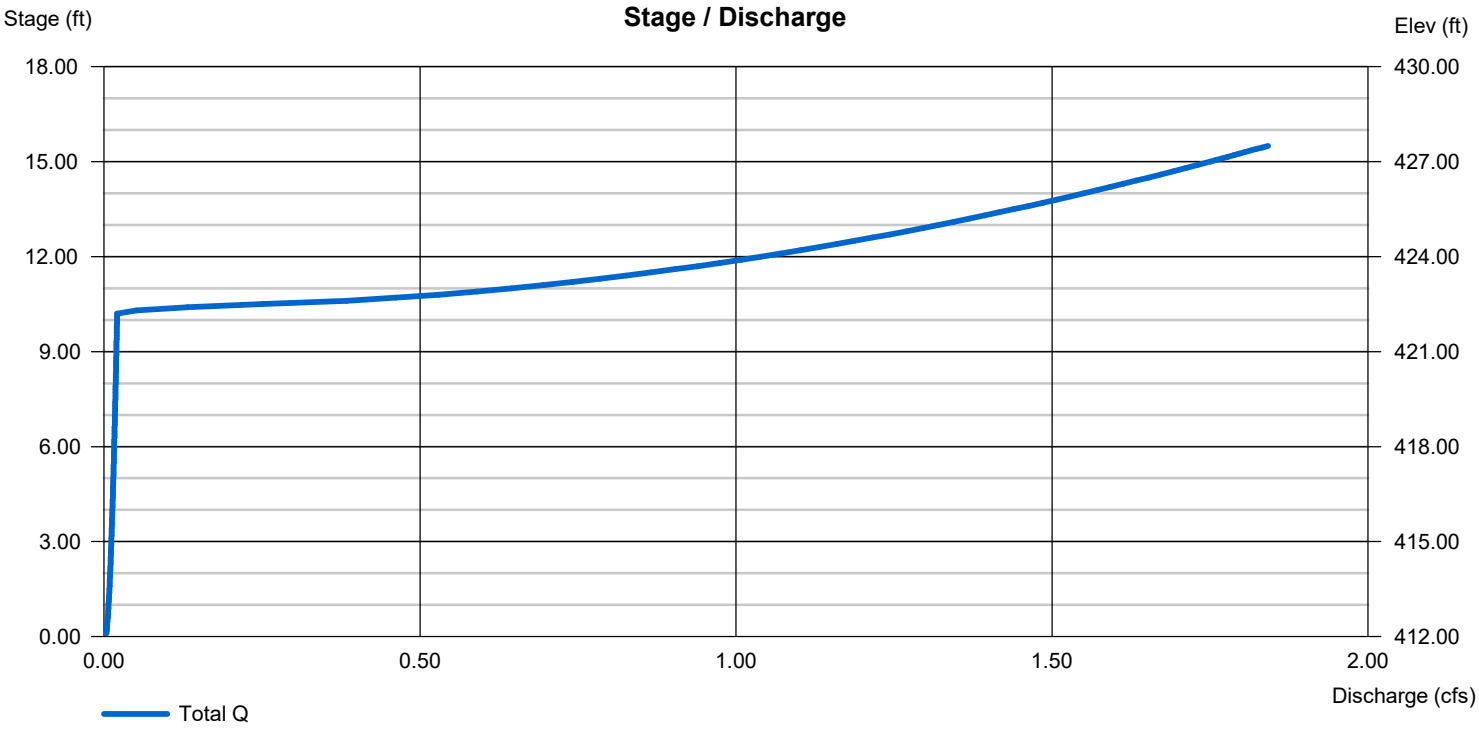
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

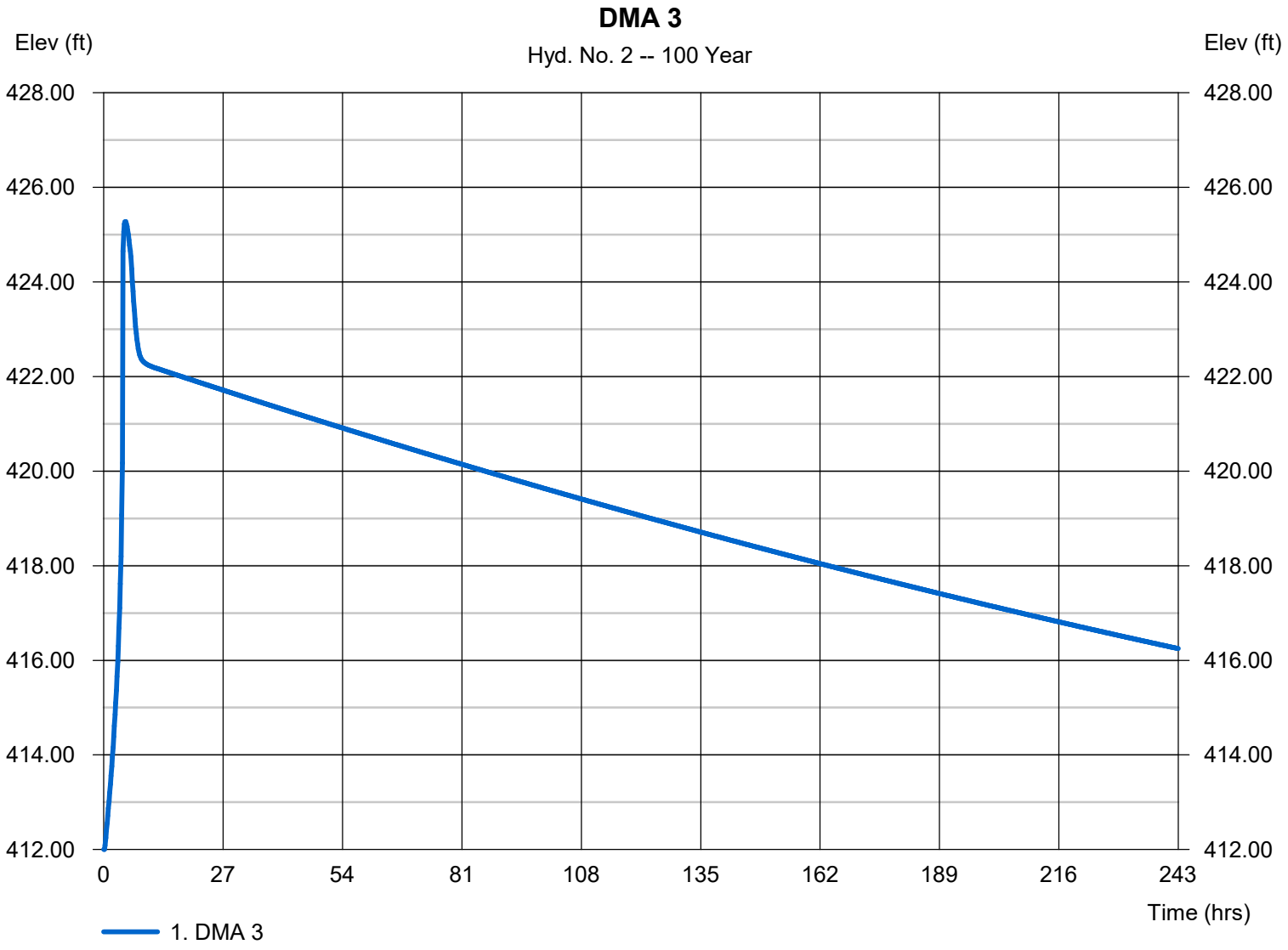
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 3

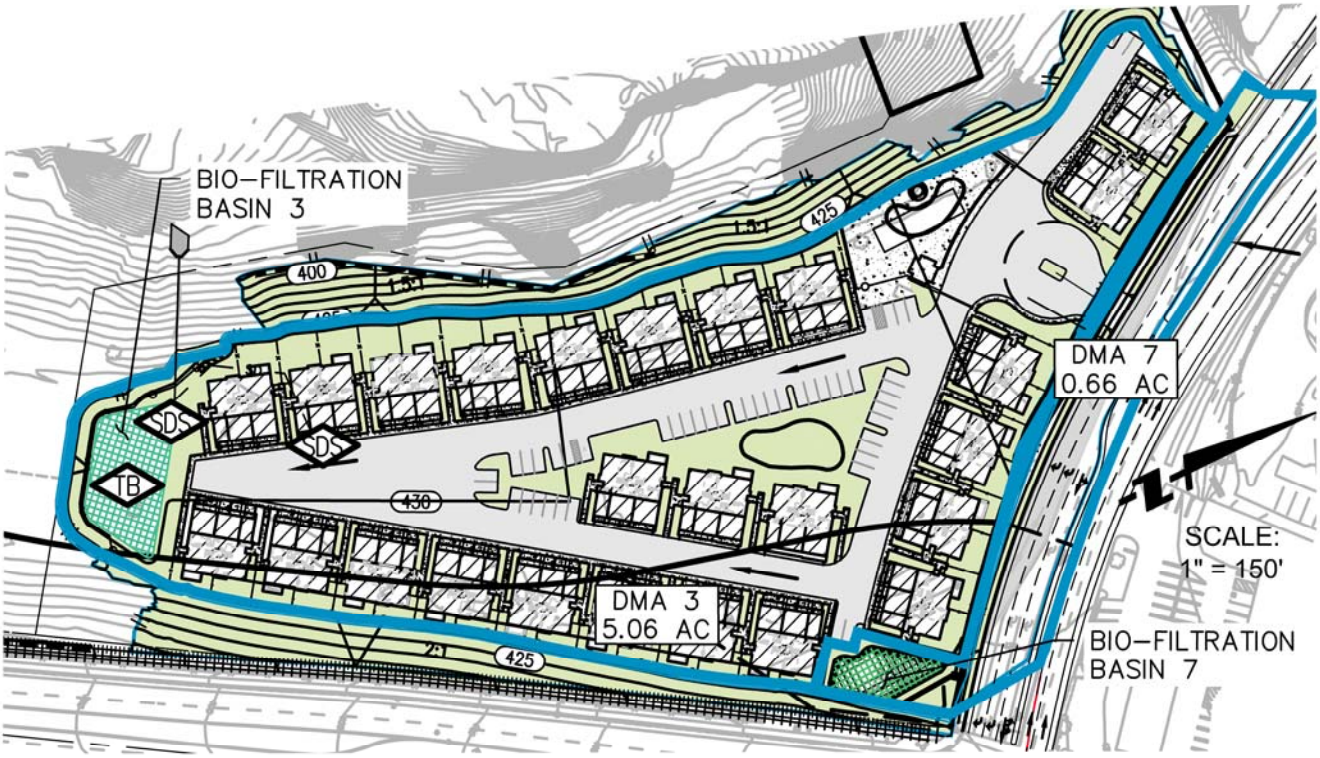
Hydrograph type	=	Reservoir	Peak discharge	=	1.387 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.80 hrs
Time interval	=	9 min	Hyd. volume	=	35,945 cuft
Inflow hyd. No.	=	1 - DMA 3	Max. Elevation	=	425.28 ft
Reservoir name	=	DMA 3	Max. Storage	=	31,858 cuft

Storage Indication method used.



SWEETWATER VISTAS
STRUCTURAL BMP DMA MAPBOOK

DMA3 & 7 / BMP3 & 7



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
3	3	2-HOA	*BF BASIN + CISTERN	✓	✓
7	7	2-HOA	*BF BASIN	✓	

*BF= BIOFILTRATION BASIN

LEGEND

LOT LINE

PROPOSED TREATMENT BMP AREA

LANDSCAPING AREA

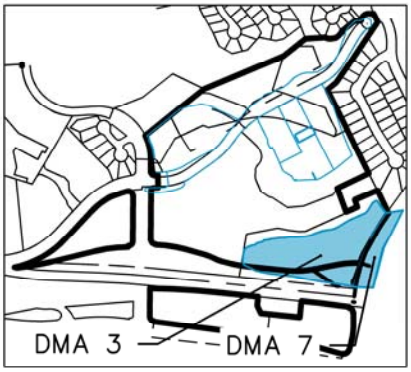
BASIN LIMITS

FLOW DIRECTION

STORM DRAIN INLET STENCILING — SDS

TREATMENT BASIN — TB

INDEX MAP
NO SCALE



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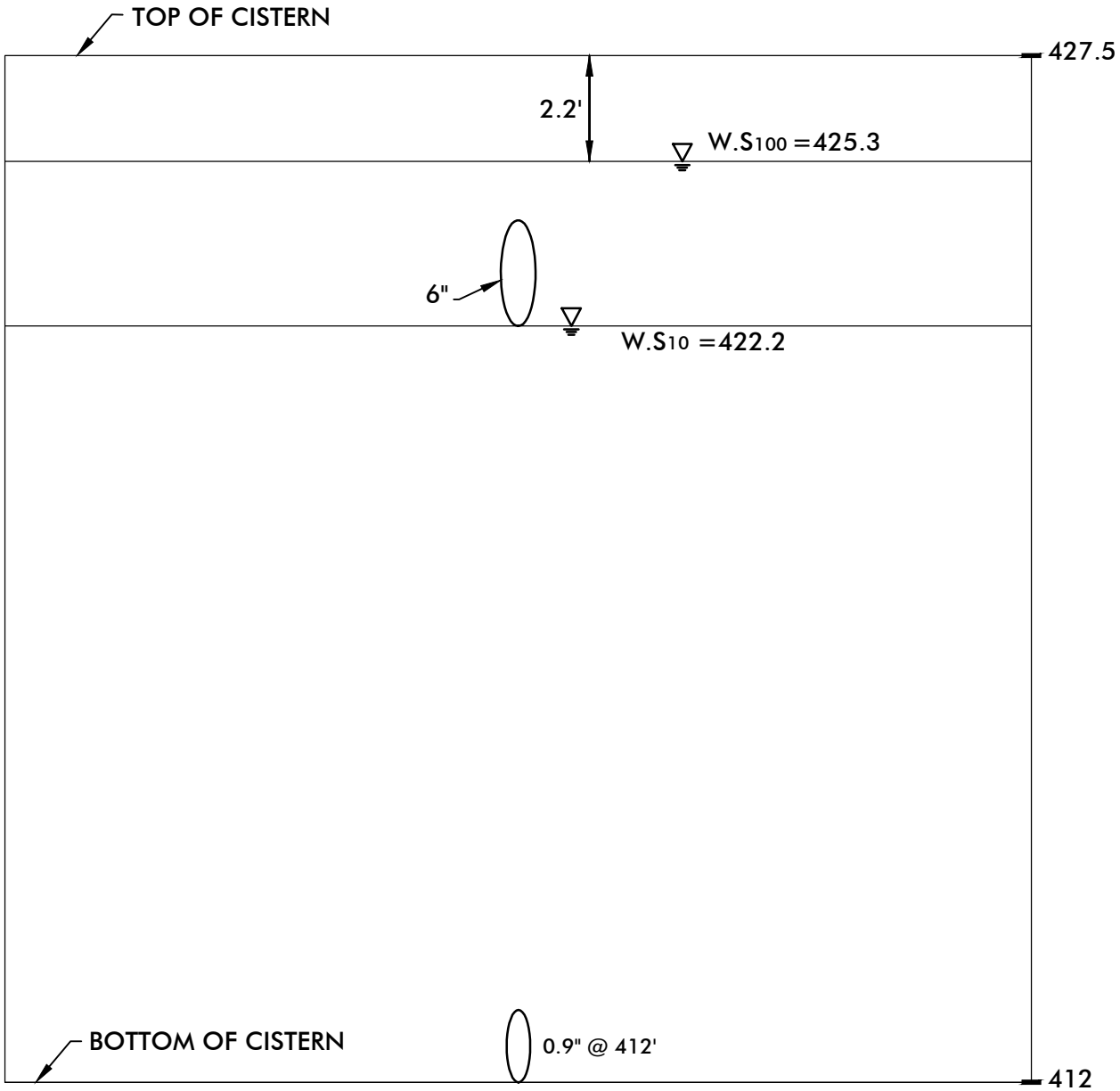
tel 949.474.1960 ◦ fax 949.474.5315 ◦ www.fuscoe.com

F:\PROJECTS\2780\002_SUPPORT FILES\REPORTS\SWMP\BMP DMA MAPBOOK\DMA 3.DWG (11–04–2016 12:45:33PM) Plotted by: esmith

DMA 3



AREA= 6,000 SF

SWEETWATER VISTAS
DMA 3
DATE: 10/10/16

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ∘ fax 858.597.0335
www.fuscoe.com

DMA 4

10 YEAR

RATIONAL METHOD HYDROGRAPH PROGRAM

COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 8/12/2016

TIME OF CONCENTRATION 7 MIN.

6 HOUR RAINFALL 1.9 INCHES

BASIN AREA 3.4 ACRES

RUNOFF COEFFICIENT 0.81

PEAK DISCHARGE 12.12 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 7 DISCHARGE (CFS) = 0.3

TIME (MIN) = 14 DISCHARGE (CFS) = 0.3

TIME (MIN) = 21 DISCHARGE (CFS) = 0.3

TIME (MIN) = 28 DISCHARGE (CFS) = 0.3

TIME (MIN) = 35 DISCHARGE (CFS) = 0.3

TIME (MIN) = 42 DISCHARGE (CFS) = 0.3

TIME (MIN) = 49 DISCHARGE (CFS) = 0.4

TIME (MIN) = 56 DISCHARGE (CFS) = 0.4

TIME (MIN) = 63 DISCHARGE (CFS) = 0.4

TIME (MIN) = 70 DISCHARGE (CFS) = 0.4

TIME (MIN) = 77 DISCHARGE (CFS) = 0.4

TIME (MIN) = 84 DISCHARGE (CFS) = 0.4

TIME (MIN) = 91 DISCHARGE (CFS) = 0.4

TIME (MIN) = 98 DISCHARGE (CFS) = 0.4

TIME (MIN) = 105 DISCHARGE (CFS) = 0.4

TIME (MIN) = 112 DISCHARGE (CFS) = 0.5

TIME (MIN) = 119 DISCHARGE (CFS) = 0.5

TIME (MIN) = 126 DISCHARGE (CFS) = 0.5

TIME (MIN) = 133 DISCHARGE (CFS) = 0.5

TIME (MIN) = 140 DISCHARGE (CFS) = 0.5

TIME (MIN) = 147 DISCHARGE (CFS) = 0.6

TIME (MIN) = 154 DISCHARGE (CFS) = 0.6

TIME (MIN) = 161 DISCHARGE (CFS) = 0.6

TIME (MIN) = 168 DISCHARGE (CFS) = 0.6

TIME (MIN) = 175 DISCHARGE (CFS) = 0.7

TIME (MIN) = 182 DISCHARGE (CFS) = 0.7

TIME (MIN) = 189 DISCHARGE (CFS) = 0.8

TIME (MIN) = 196 DISCHARGE (CFS) = 0.9

TIME (MIN) = 203 DISCHARGE (CFS) = 1

TIME (MIN) = 210 DISCHARGE (CFS) = 1.1

TIME (MIN) = 217 DISCHARGE (CFS) = 1.3

TIME (MIN) = 224 DISCHARGE (CFS) = 1.5

TIME (MIN) = 231 DISCHARGE (CFS) = 2.2

TIME (MIN) = 238 DISCHARGE (CFS) = 2.1

TIME (MIN) = 245 DISCHARGE (CFS) = 12.12

TIME (MIN) = 252 DISCHARGE (CFS) = 1.8

TIME (MIN) = 259 DISCHARGE (CFS) = 1.2

TIME (MIN) = 266 DISCHARGE (CFS) = 0.9

TIME (MIN) = 273 DISCHARGE (CFS) = 0.8

TIME (MIN) = 280 DISCHARGE (CFS) = 0.7

TIME (MIN) = 287 DISCHARGE (CFS) = 0.6

TIME (MIN) = 294 DISCHARGE (CFS) = 0.5

TIME (MIN) = 301 DISCHARGE (CFS) = 0.5

TIME (MIN) = 308 DISCHARGE (CFS) = 0.5

TIME (MIN) = 315 DISCHARGE (CFS) = 0.4

TIME (MIN) = 322 DISCHARGE (CFS) = 0.4

TIME (MIN) = 329 DISCHARGE (CFS) = 0.4

TIME (MIN) = 336 DISCHARGE (CFS) = 0.4

TIME (MIN) = 343 DISCHARGE (CFS) = 0.4

TIME (MIN) = 350 DISCHARGE (CFS) = 0.3

TIME (MIN) = 357 DISCHARGE (CFS) = 0.3

TIME (MIN) = 364 DISCHARGE (CFS) = 0

Hydrograph Report

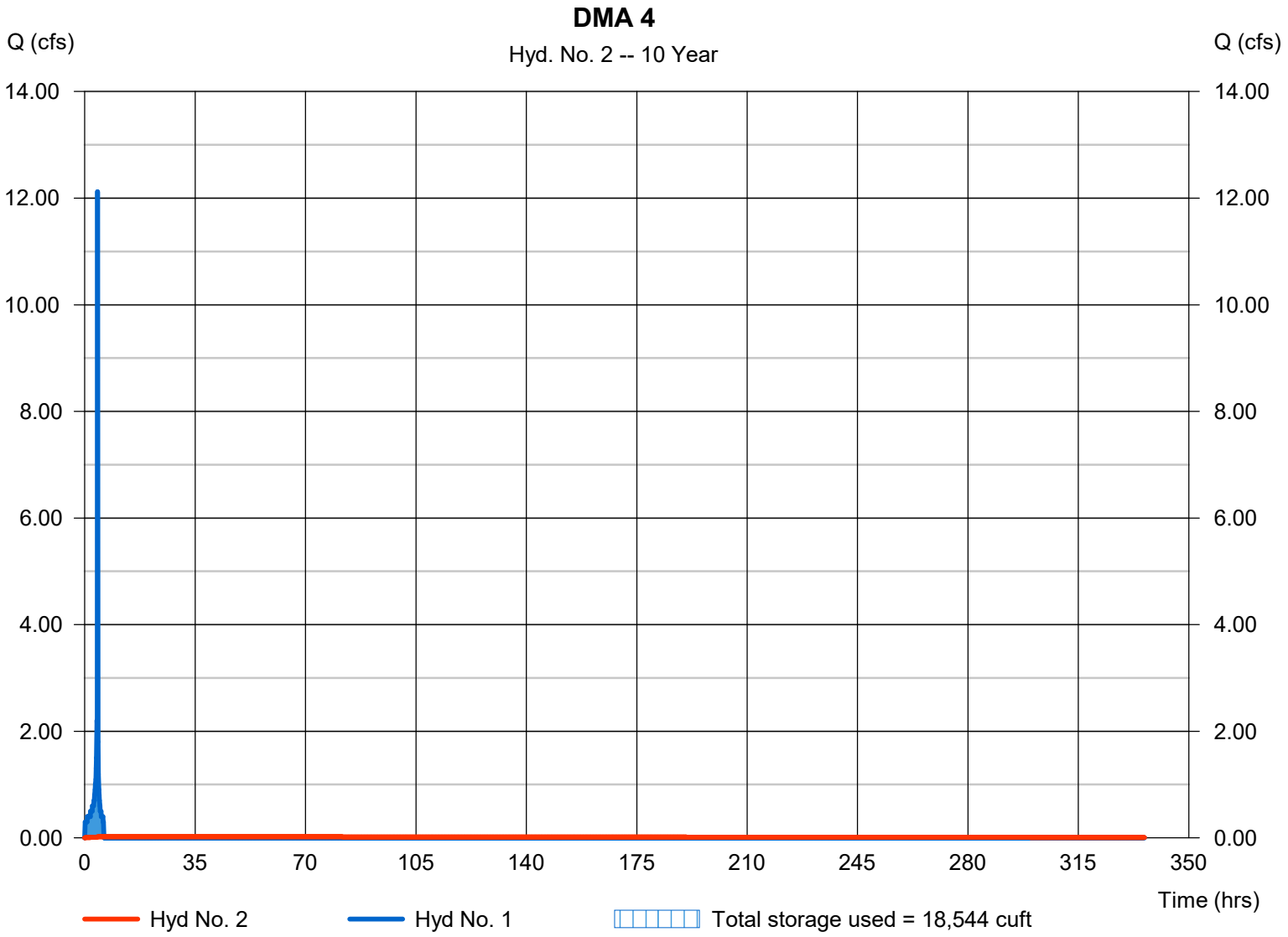
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 4

Hydrograph type	=	Reservoir	Peak discharge	=	0.022 cfs
Storm frequency	=	10 yrs	Time to peak	=	6.07 hrs
Time interval	=	7 min	Hyd. volume	=	17,388 cuft
Inflow hyd. No.	=	1 - DMA 4	Max. Elevation	=	368.59 ft
Reservoir name	=	DMA 4	Max. Storage	=	18,544 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 357.00 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	357.00	4,000	0	0
1.00	358.00	4,000	1,600	1,600
2.00	359.00	4,000	1,600	3,200
3.00	360.00	4,000	1,600	4,800
4.00	361.00	4,000	1,600	6,399
5.00	362.00	4,000	1,600	7,999
6.00	363.00	4,000	1,600	9,599
7.00	364.00	4,000	1,600	11,199
8.00	365.00	4,000	1,600	12,799
9.00	366.00	4,000	1,600	14,399
10.00	367.00	4,000	1,600	15,998
11.00	368.00	4,000	1,600	17,598
12.00	369.00	4,000	1,600	19,198
13.00	370.00	4,000	1,600	20,798
14.00	371.00	4,000	1,600	22,398
15.00	372.00	4,000	1,600	23,998
16.00	373.00	4,000	1,600	25,597
16.50	373.50	4,000	800	26,397

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.90	0.00	0.00	0.00
Span (in)	= 0.90	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 357.00	0.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

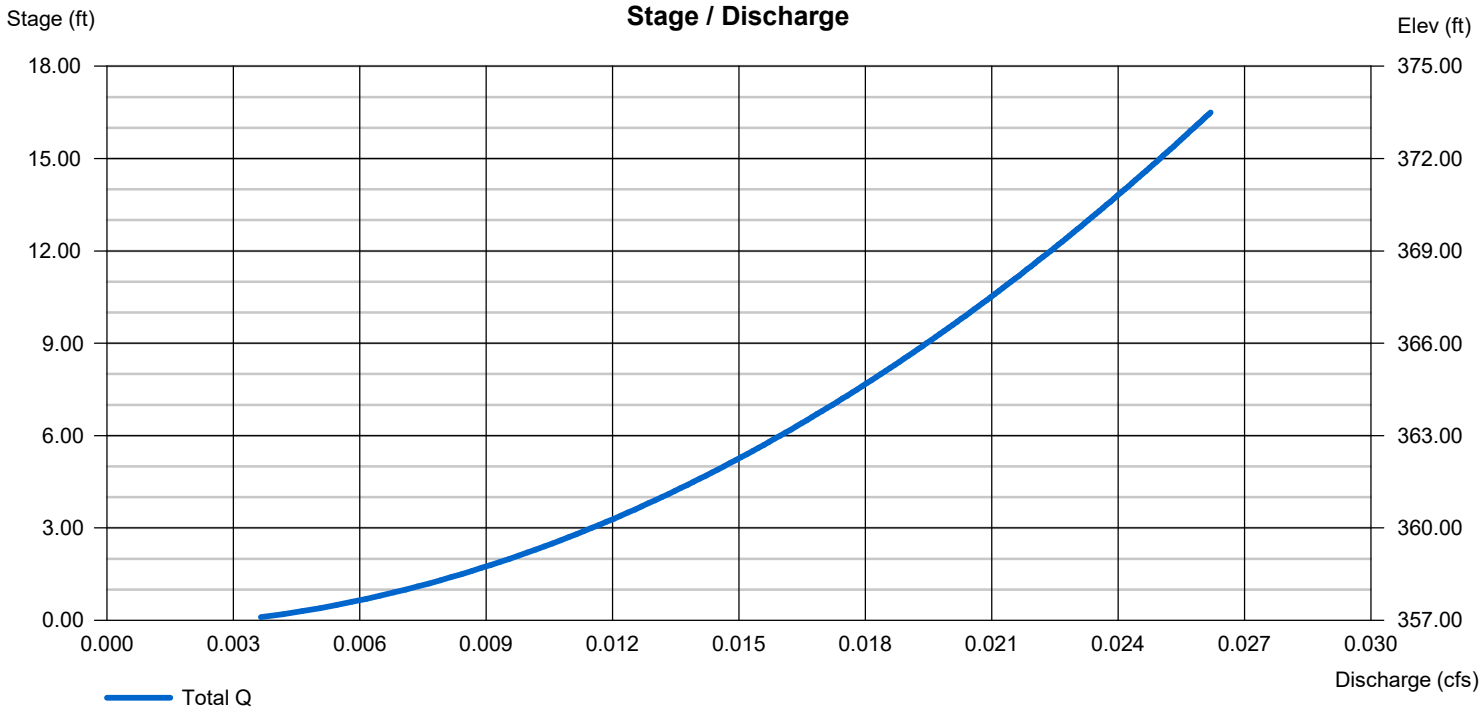
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

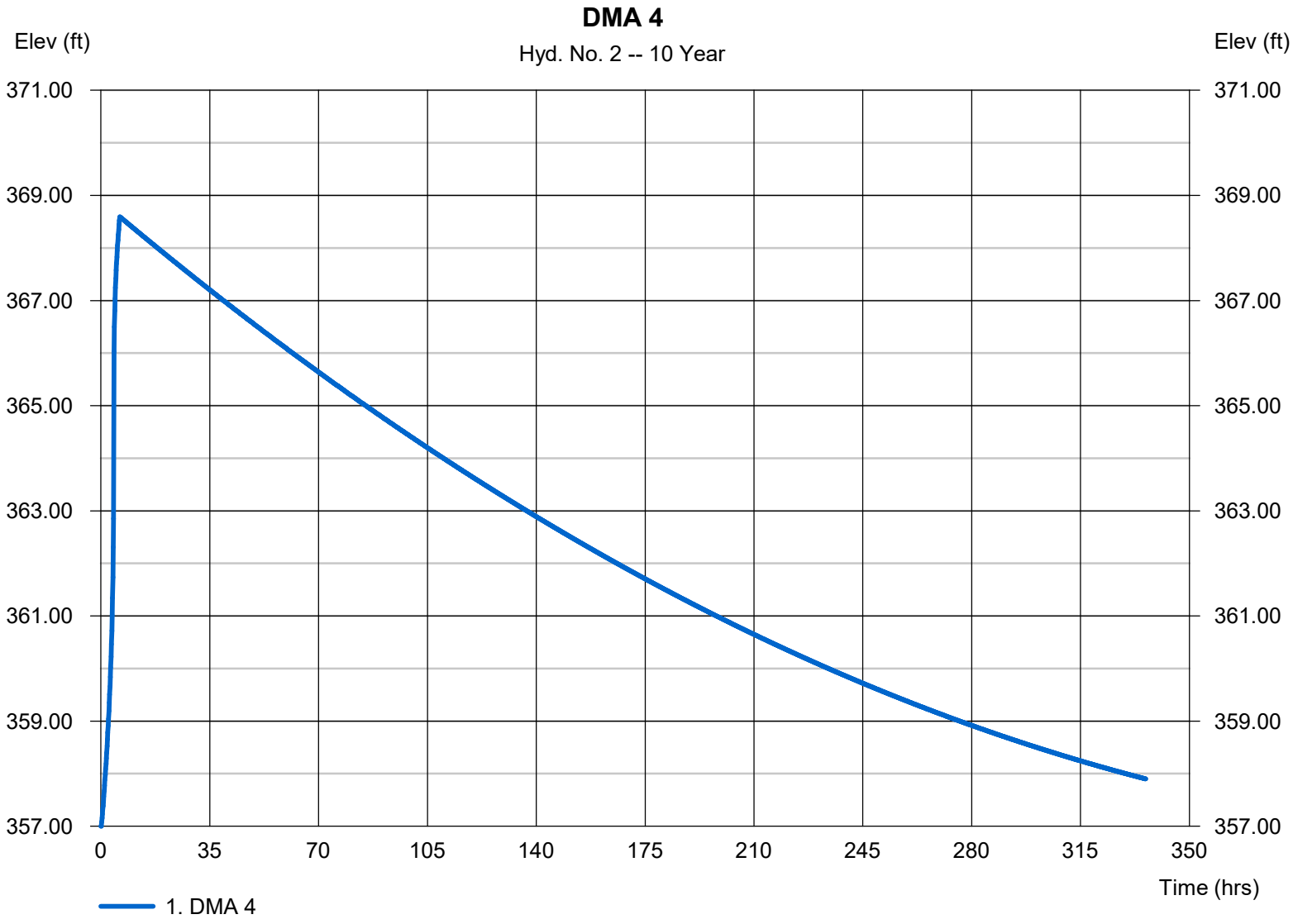
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 4

Hydrograph type	=	Reservoir	Peak discharge	=	0.022 cfs
Storm frequency	=	10 yrs	Time to peak	=	6.07 hrs
Time interval	=	7 min	Hyd. volume	=	17,388 cuft
Inflow hyd. No.	=	1 - DMA 4	Max. Elevation	=	368.59 ft
Reservoir name	=	DMA 4	Max. Storage	=	18,544 cuft

Storage Indication method used.



DMA 4

100 Year

RATIONAL METHOD HYDROGRAPH PROGRAM

COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 8/11/2016

TIME OF CONCENTRATION 6 MIN.

6 HOUR RAINFALL 3 INCHES

BASIN AREA 3.61 ACRES

RUNOFF COEFFICIENT 0.81

PEAK DISCHARGE 19.52 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0

TIME (MIN) = 6 DISCHARGE (CFS) = 0.5

TIME (MIN) = 12 DISCHARGE (CFS) = 0.5

TIME (MIN) = 18 DISCHARGE (CFS) = 0.5

TIME (MIN) = 24 DISCHARGE (CFS) = 0.5

TIME (MIN) = 30 DISCHARGE (CFS) = 0.6

TIME (MIN) = 36 DISCHARGE (CFS) = 0.6

TIME (MIN) = 42 DISCHARGE (CFS) = 0.6

TIME (MIN) = 48 DISCHARGE (CFS) = 0.6

TIME (MIN) = 54 DISCHARGE (CFS) = 0.6

TIME (MIN) = 60 DISCHARGE (CFS) = 0.6

TIME (MIN) = 66 DISCHARGE (CFS) = 0.6

TIME (MIN) = 72 DISCHARGE (CFS) = 0.6

TIME (MIN) = 78 DISCHARGE (CFS) = 0.7

TIME (MIN) = 84 DISCHARGE (CFS) = 0.7

TIME (MIN) = 90 DISCHARGE (CFS) = 0.7

TIME (MIN) = 96 DISCHARGE (CFS) = 0.7

TIME (MIN) = 102 DISCHARGE (CFS) = 0.7

TIME (MIN) = 108 DISCHARGE (CFS) = 0.7

TIME (MIN) = 114 DISCHARGE (CFS) = 0.8

TIME (MIN) = 120 DISCHARGE (CFS) = 0.8

TIME (MIN) = 126 DISCHARGE (CFS) = 0.8

TIME (MIN) = 132 DISCHARGE (CFS) = 0.8

TIME (MIN) = 138 DISCHARGE (CFS) = 0.9

TIME (MIN) = 144 DISCHARGE (CFS) = 0.9

TIME (MIN) = 150 DISCHARGE (CFS) = 1

TIME (MIN) = 156 DISCHARGE (CFS) = 1

TIME (MIN) = 162 DISCHARGE (CFS) = 1

TIME (MIN) = 168 DISCHARGE (CFS) = 1.1

TIME (MIN) = 174 DISCHARGE (CFS) = 1.2

TIME (MIN) = 180 DISCHARGE (CFS) = 1.2

TIME (MIN) = 186 DISCHARGE (CFS) = 1.3

TIME (MIN) = 192 DISCHARGE (CFS) = 1.4

TIME (MIN) = 198 DISCHARGE (CFS) = 1.5

TIME (MIN) = 204 DISCHARGE (CFS) = 1.6

TIME (MIN) = 210 DISCHARGE (CFS) = 1.8

TIME (MIN) = 216 DISCHARGE (CFS) = 2

TIME (MIN) = 222 DISCHARGE (CFS) = 2.4

TIME (MIN) = 228 DISCHARGE (CFS) = 2.8

TIME (MIN) = 234 DISCHARGE (CFS) = 4.1

TIME (MIN) = 240 DISCHARGE (CFS) = 6.8

TIME (MIN) = 246 DISCHARGE (CFS) = 19.52

TIME (MIN) = 252 DISCHARGE (CFS) = 3.3

TIME (MIN) = 258 DISCHARGE (CFS) = 2.2

TIME (MIN) = 264 DISCHARGE (CFS) = 1.7

TIME (MIN) = 270 DISCHARGE (CFS) = 1.4

TIME (MIN) = 276 DISCHARGE (CFS) = 1.2

TIME (MIN) = 282 DISCHARGE (CFS) = 1.1

TIME (MIN) = 288 DISCHARGE (CFS) = 1

TIME (MIN) = 294 DISCHARGE (CFS) = 0.9

TIME (MIN) = 300 DISCHARGE (CFS) = 0.9

TIME (MIN) = 306 DISCHARGE (CFS) = 0.8

TIME (MIN) = 312 DISCHARGE (CFS) = 0.8

TIME (MIN) = 318 DISCHARGE (CFS) = 0.7

TIME (MIN) = 324 DISCHARGE (CFS) = 0.7

TIME (MIN) = 330 DISCHARGE (CFS) = 0.6

TIME (MIN) = 336 DISCHARGE (CFS) = 0.6

TIME (MIN) = 342 DISCHARGE (CFS) = 0.6

TIME (MIN) = 348 DISCHARGE (CFS) = 0.6

TIME (MIN) = 354 DISCHARGE (CFS) = 0.6

TIME (MIN) = 360 DISCHARGE (CFS) = 0.5

TIME (MIN) = 366 DISCHARGE (CFS) = 0

Hydrograph Report

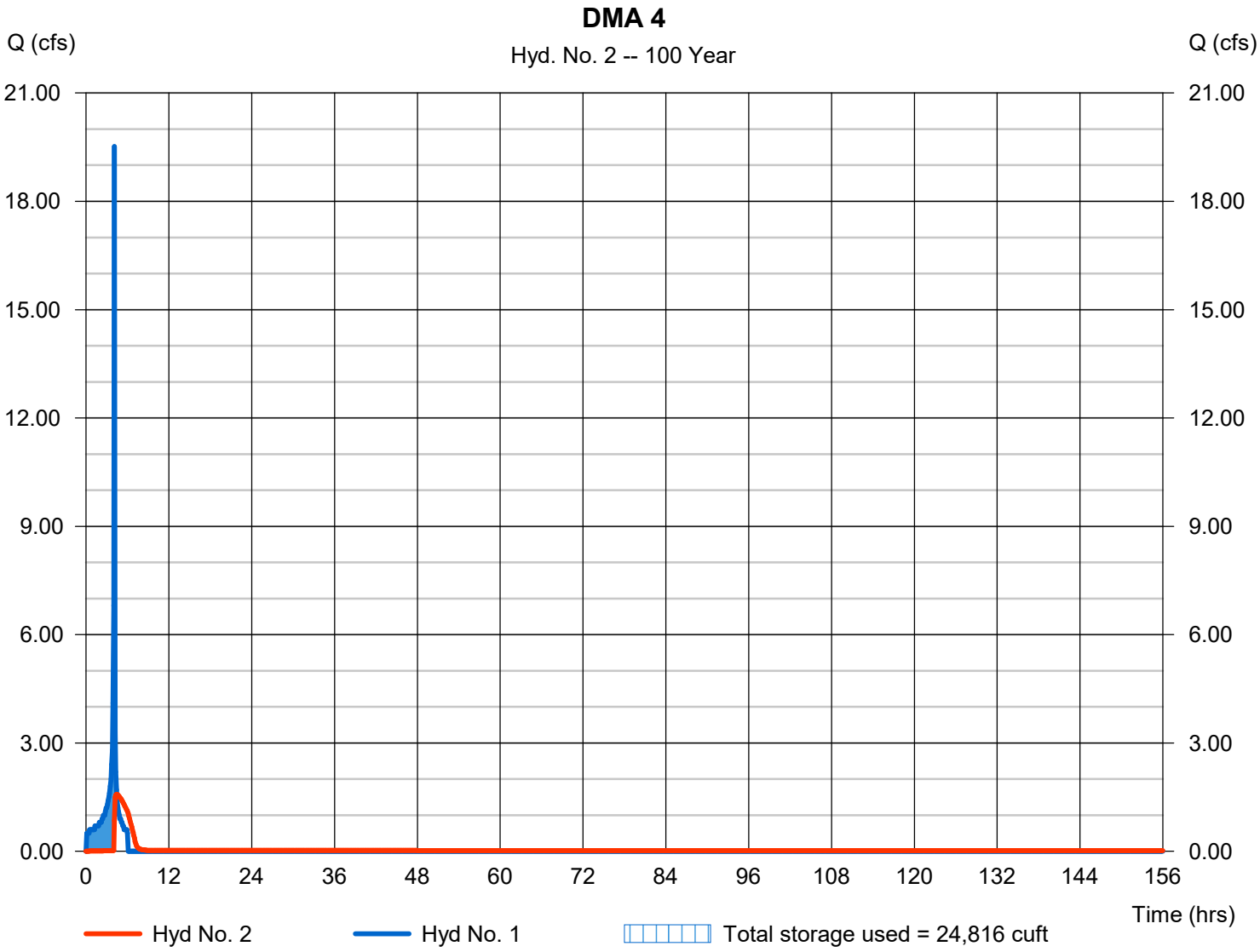
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 4

Hydrograph type	=	Reservoir	Peak discharge	=	1.575 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.40 hrs
Time interval	=	6 min	Hyd. volume	=	28,745 cuft
Inflow hyd. No.	=	1 - DMA 4	Max. Elevation	=	372.53 ft
Reservoir name	=	DMA 4	Max. Storage	=	24,816 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DMA 4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 357.00 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	357.00	4,000	0	0
1.00	358.00	4,000	1,600	1,600
2.00	359.00	4,000	1,600	3,200
3.00	360.00	4,000	1,600	4,800
4.00	361.00	4,000	1,600	6,399
5.00	362.00	4,000	1,600	7,999
6.00	363.00	4,000	1,600	9,599
7.00	364.00	4,000	1,600	11,199
8.00	365.00	4,000	1,600	12,799
9.00	366.00	4,000	1,600	14,399
10.00	367.00	4,000	1,600	15,998
11.00	368.00	4,000	1,600	17,598
12.00	369.00	4,000	1,600	19,198
13.00	370.00	4,000	1,600	20,798
14.00	371.00	4,000	1,600	22,398
15.00	372.00	4,000	1,600	23,998
16.00	373.00	4,000	1,600	25,597
16.50	373.50	4,000	800	26,397

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.90	6.00	0.00	0.00
Span (in)	= 0.90	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 357.00	368.60	0.00	0.00
Length (ft)	= 30.00	30.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

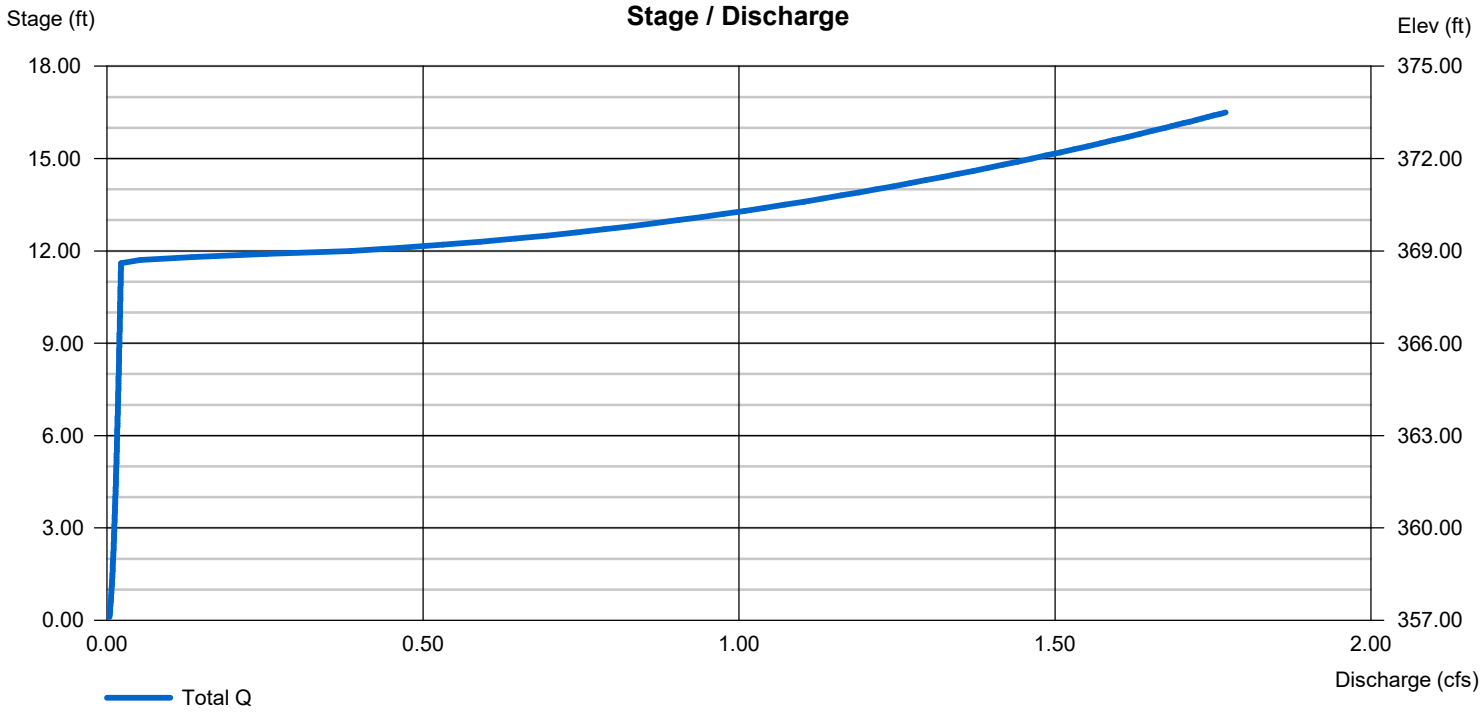
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

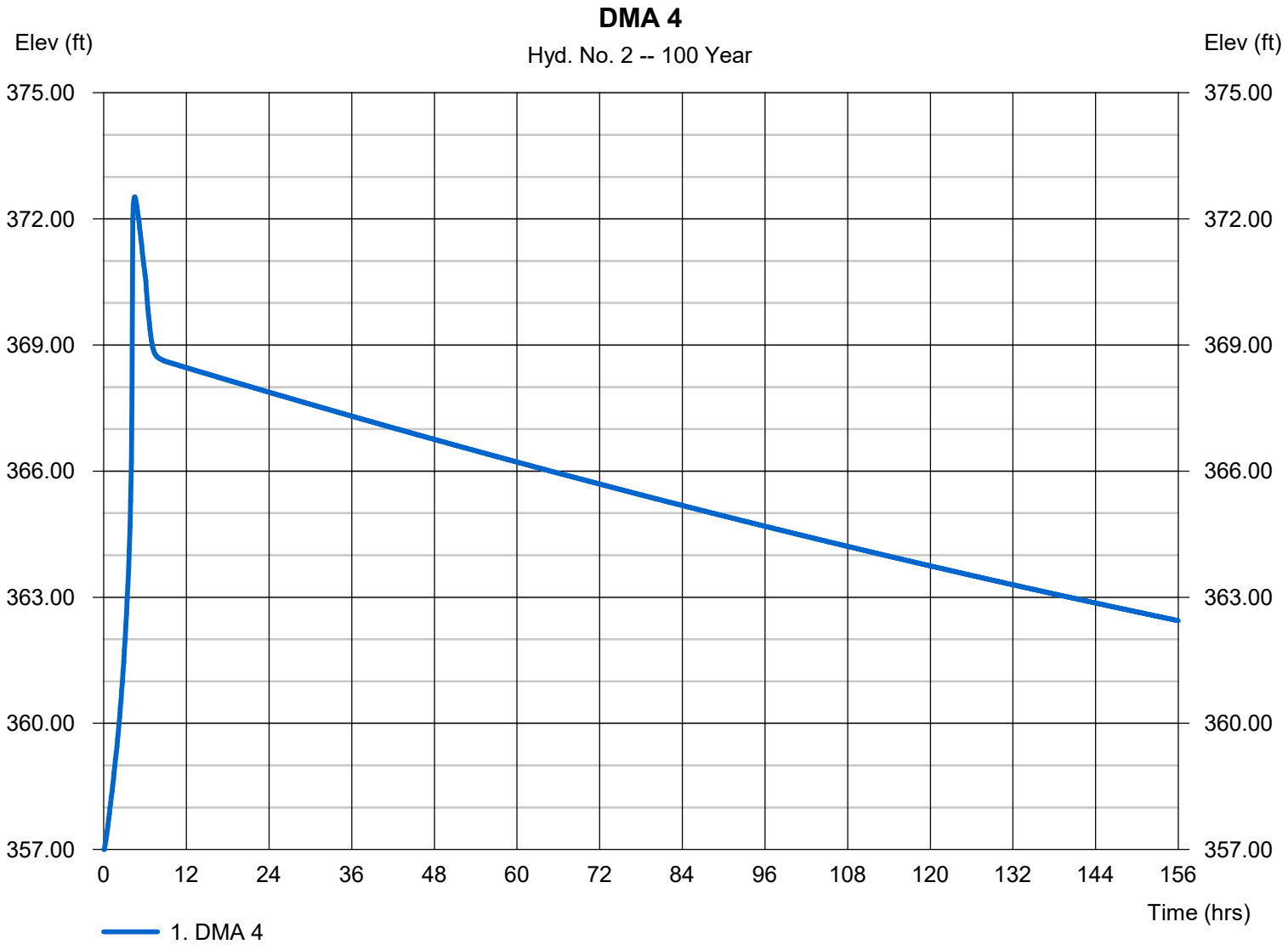
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Friday, 11 / 4 / 2016

Hyd. No. 2

DMA 4

Hydrograph type	= Reservoir	Peak discharge	= 1.575 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.40 hrs
Time interval	= 6 min	Hyd. volume	= 28,745 cuft
Inflow hyd. No.	= 1 - DMA 4	Max. Elevation	= 372.53 ft
Reservoir name	= DMA 4	Max. Storage	= 24,816 cuft

Storage Indication method used.

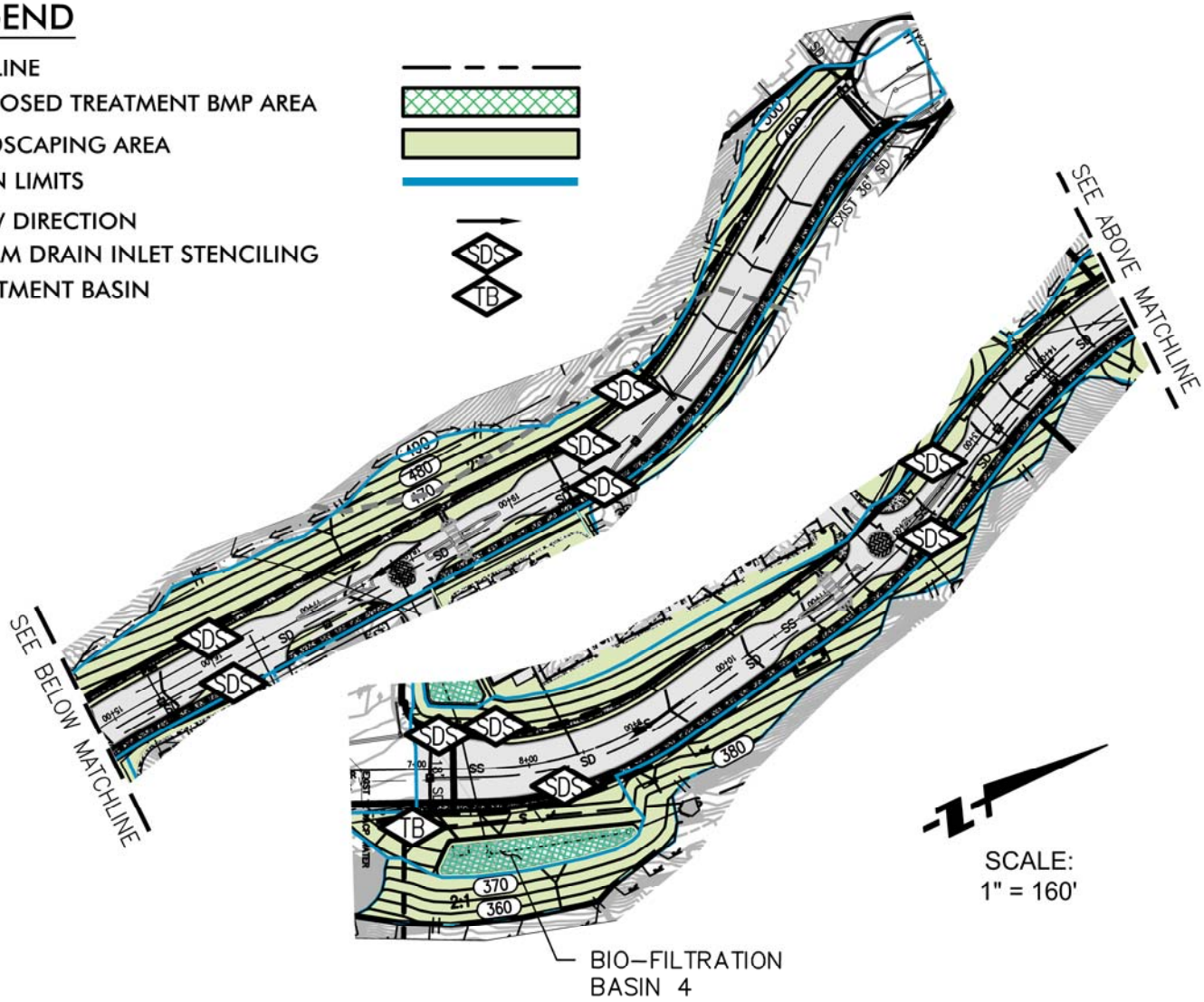


SWEETWATER VISTAS
STRUCTURAL BMP DMA MAPBOOK

DMA4 / BMP4

LEGEND

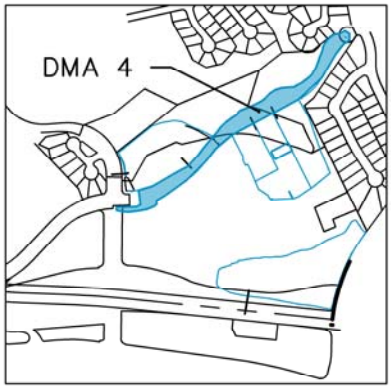
- LOT LINE
- PROPOSED TREATMENT BMP AREA
- LANDSCAPING AREA
- BASIN LIMITS
- FLOW DIRECTION
- STORM DRAIN INLET STENCILING
- TREATMENT BASIN



SCALE:
1" = 160'

DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
4	4	2-HOA	*BF BASIN + CISTERN	✓	✓

*BF= BIOFILTRATION BASIN

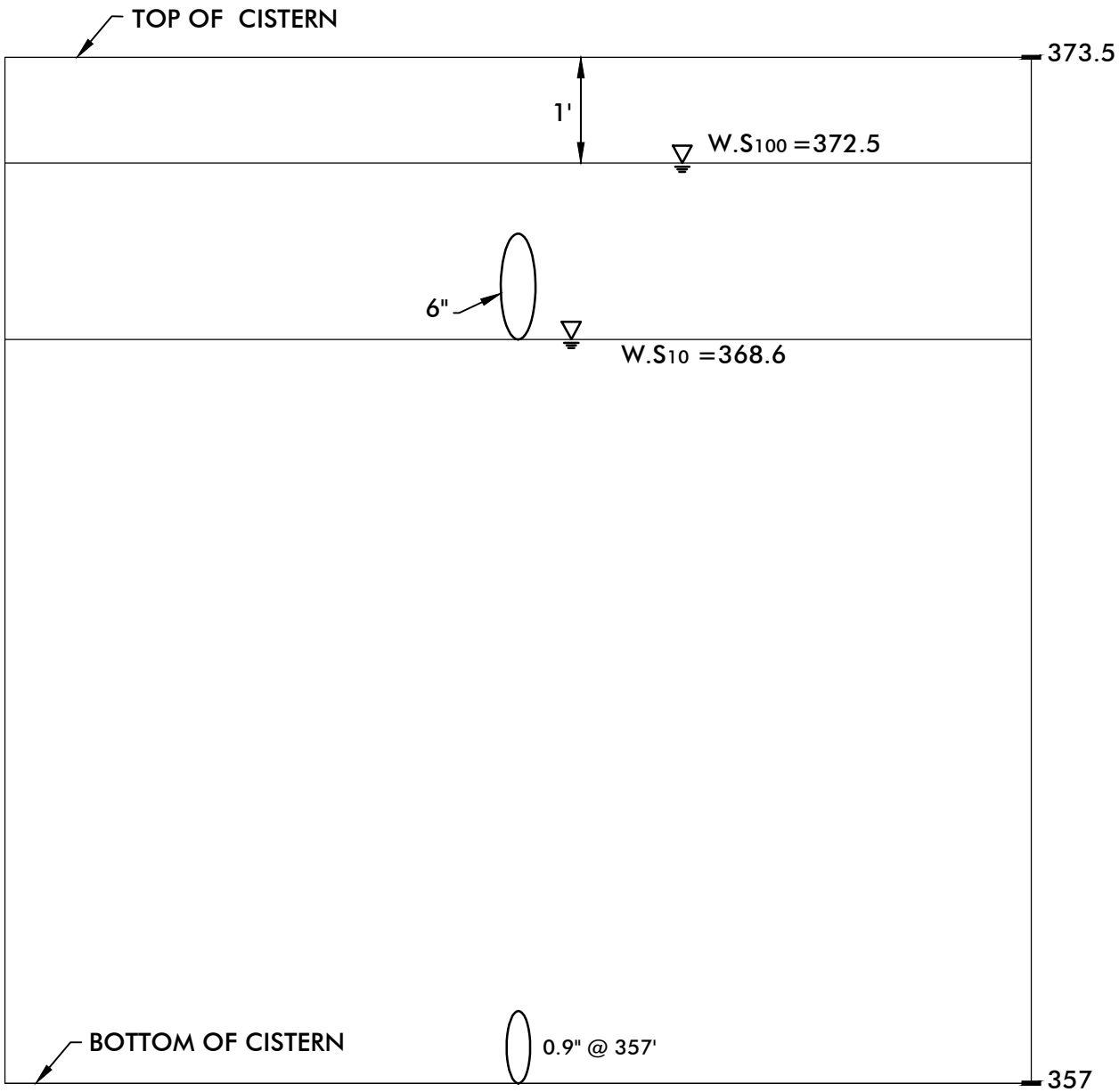


INDEX MAP
NO SCALE

FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 ◦ fax 949.474.5315 ◦ www.fuscoe.com

F:\PROJECTS\2780\002_SUPPORT FILES\REPORTS\SWMP\BMP DMA MAPBOOK\DMA 4.DWG (10-18-2016 9:31:53AM) Plotted by: ESMITH

DMA 4



AREA= 4,000 SF

SWEETWATER VISTAS
DMA 4
DATE: 10/10/16

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ∘ fax 858.597.0335
www.fuscoe.com

APPENDIX 6: EXISTING DRAINAGE MAP

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San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

SCALE: 1" = 80'

80 40 0 80 160 240
GRAPHIC SCALE IN FEET

SWEETWATER VISTAS
EXISTING 100-YEAR HYDROLOGY
COUNTY OF SAN DIEGO, CA

PROJECT NUMBER: 2780-002
DATE: OCTOBER 18, 2016

APPENDIX 7: PROPOSED DRAINAGE MAP

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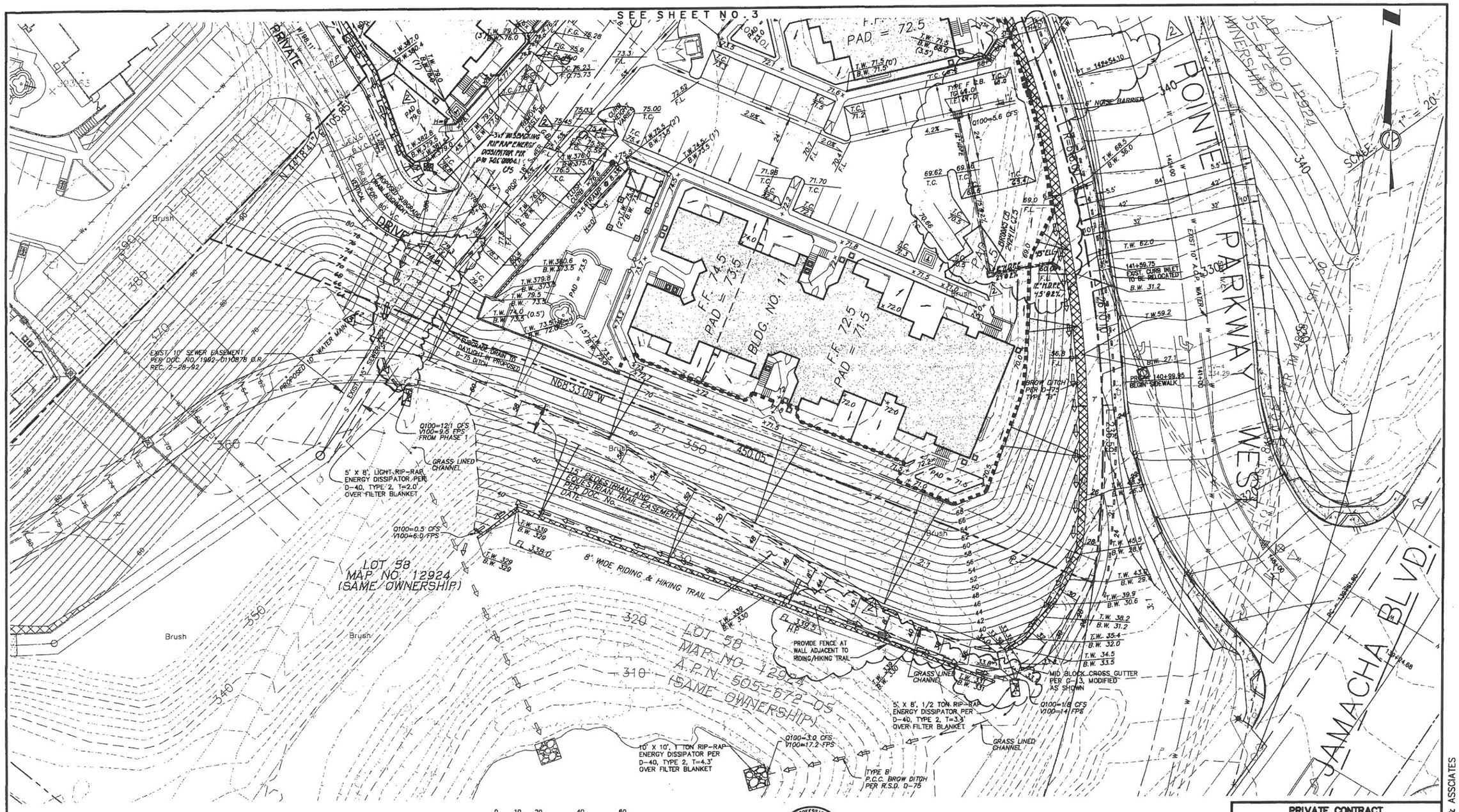
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

SWEETWATER VISTAS
PROPOSED 100-YEAR HYDROLOGY
COUNTY OF SAN DIEGO, CA

PROJECT NUMBER: 2780-002
DATE: OCTOBER 18, 2016

APPENDIX 8: AS-BUILT DRAWINGS – EXISTING UTILITIES



REGISTERED PROFESSIONAL ENGINEER RALPH E. DILTS No. C39504 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

NOTE:

EXISTING TOPOGRAPHY IS BY AERIAL PHOTOGRAMMETRY BASED ON PHOTOGRAPHY DATED SEPTEMBER 10, 1999 SITE HAS BEEN PREVIOUSLY GRADED PER L-2130, SHEETS 10 & 13

RECORD PLAN

BY: Ralph E. Dilts DATE: 7-18-08
R.C.E. 39504
EXPIRES: 12-31-09

ENGINEER OF WORK

CRAIG & ASSOCIATES, INC.
CIVIL ENGINEERING - LAND SURVEYING - LAND PLANNING
2611 ADAMS AVE - SAN DIEGO, CA 92116 - (619) 297-3974

BENCH MARK

DESCRIPTION: CONCRETE MONUMENT W/STANDARD DISK
LOCATION: INT. JAMACHA BLVD. & SWEETWATER BLVD. 15' FROM END OF ASPHALT CB. 17' S.E. OF PP NO 270850
RECORD FROM: COUNTY OF SAN DIEGO
ELEVATION: 427.625 DATUM: M.S.L.

COUNTY APPROVED CHANGES

NO.	DESCRIPTION:	APPROVED BY:	DATE:
1	NEW SHEET REPLACES SHEET 4		3/15/05
2	REVISE DRAINAGE 12" H.D.P.E. WITH BURRITO WRAP OF FABRIC & 1/4 CRUSHED ROCK.		8/14/05
3	MOVE P.C.C. DITCH		
4	RECORD PLAN		7/22/08

PRIVATE CONTRACT

SHEET 4A | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | SHEETS 24

GRADING PLAN FOR:
LAKEVIEW POINTE PHASE II
CALIFORNIA COORDINATE INDEX 202-1773

APPROVED DOUGLAS M. SNELL COUNTY ENGINEER BY: B Beech 03/18/05

ENGINEER OF WORK Ralph E. Dilts
L-14415
GRADING PERMIT NO.

ENGINEER'S NAME: CRAIG & ASSOCIATES
PHONE NO. (619) 297-3974

W.O. 01-087

FILE NO.

J:\01-087 LakeView 2\dwg\GP\GP-1 SHTS 1-4.dwg, SHEET 4A, 3/11/2005 12:25:37 PM

GRADING PLANS FOR THE POINTE SAN DIEGO TRACT 4828 RPL UNITS 4, 5, 6, & 7

GENERAL NOTES

1. ALL MATERIAL SHALL BE UNIFORM FROM A.S.T.M. C-33.
2. NO CONSTRUCTION, EXCAVATION OR EQUIPMENT WITHIN 7 FEET FROM THE EDGE OF PUBLIC WORKS WILL BE PERMITTED UNLESS APPROVED BY THE COUNTY RIGHT-OF-WAY.
3. ALL PERMANENT SLOPES OVER 3 FEET IN HEIGHT SHALL BE PLANTED, IRRIGATED IN ACCORDANCE WITH SAN DIEGO SPECIFICATIONS AND WITH PLANTS APPROVED BY THE
4. THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES BEFORE COMMENCING WORK. NOTIFY THE FOLLOWING AGENCIES AT LEAST 48 HOURS BEFORE BEGINNING WORK:

UNDERGROUND SERVICE ALERT	(619) 232-1181
CABLE TV FRANCHISE	(619) 454-1881
GAS & ELECTRIC	(619) 696-2000
TELEPHONE	(619) 654-1550
SEWER & WATER	(619) 527-3500
CITY OF SAN DIEGO - TRAFFIC SIGNAL SHOP	(619) 527-7511
CITY OF SAN DIEGO - STREET LIGHTING	(619) 527-7511
WATER DISTRICT	(619) 670-2222

A SOILS REPORT MAY BE REQUIRED BY THE BUILDING OFFICIAL FOR BUILDING PERMIT.

5. APPROVAL OF THESE PLANS BY THE DIRECTOR OF PUBLIC WORKS DOES NOT AUTHORIZE ANY WORK OR GRADING TO BE PERFORMED UNTIL THE PROPERTY OWNER'S PERMISSION HAS BEEN OBTAINED AND A VALID GRADING PERMIT HAS BEEN ISSUED.
6. THE DIRECTOR OF PUBLIC WORKS' APPROVAL OF THESE PLANS DOES NOT CONSTITUTE COUNTY BUILDING OFFICIAL APPROVAL OF ANY FOUNDATIONS FOR STRUCTURES TO BE PLACED ON THE AREA COVERED BY THESE PLANS OR APPROVAL OF ANY WAIVER OF THE TWO INCHES (2") OF EXPANSIVE SOIL COVER REQUIRED BY SECTION 87.403 AND THE THREE INCHES (3") OF EXPANSIVE SOIL COVER REQUIRED BY SECTION 87.417 OF THE SAN DIEGO COUNTY GRADING ORDINANCE. ANY SUCH WAIVER MUST BE OBTAINED FROM THE DIRECTOR OF PUBLIC WORKS.
10. ALL OPERATIONS CONDUCTED ON THE PREMISES, INCLUDING THE WARMING UP, REPAIR, ARRIVAL, DEPARTURE OR PLANNING OF TRUCKS, EARTH MOVING EQUIPMENT, CONSTRUCTION EQUIPMENT AND ANY OTHER ASSOCIATED GRADING EQUIPMENT SHALL BE LIMITED TO THE PERIOD BETWEEN 7:00 a.m. AND 6:00 p.m. EACH DAY, MONDAY THROUGH SATURDAY, AND NO EARTH MOVING OR GRADING OPERATIONS SHALL BE CONDUCTED ON THE PREMISES ON SUNDAYS OR HOLIDAYS.
11. ALL MAJOR SLOPES SHALL BE ROUNDED INTO EXISTING TERRAIN TO PRODUCE A CONTOURED TRANSITION FROM CUT OR FILL FACES TO NATURAL GROUND AND ABUTTING CUT OR FILL SURFACES.
12. NOTWITHSTANDING THE MINIMUM STANDARDS SET FORTH IN THE GRADING ORDINANCE AND NOTWITHSTANDING THE APPROVAL OF THESE GRADING PLANS, THE PERMITTEE IS RESPONSIBLE FOR THE PREVENTION OF DAMAGE TO THE ADJACENT PROPERTY. NO PERSON SHALL EXCAVATE LAND SO CLOSE TO THE PROPERTY LINE AS TO ENDANGER ANY ADJOINING PUBLIC STREET, SIDEWALK, ALLEY, FUNCTION OF ANY SEWAGE DISPOSAL SYSTEM OR ANY OTHER PUBLIC OR PRIVATE PROPERTY WITHOUT SUPPORTING AND PROTECTING SUCH PROPERTY FROM SETTLING CRACKING, EROSION, SILTING, SCOUR OR OTHER DAMAGE WHICH MIGHT RESULT FROM THE GRADING DESCRIBED ON THIS PLAN. THE COUNTY WILL HOLD THE PERMITTEE RESPONSIBLE FOR CORRECTION OF NON-DEDICATED IMPROVEMENTS WHICH DAMAGE ADJACENT PROPERTY.
13. SLOPE RATIOS

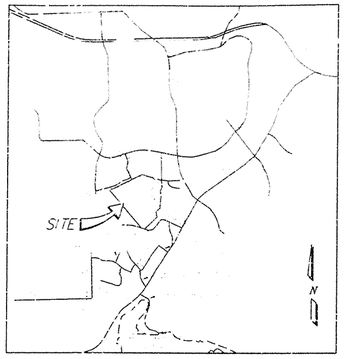
    CUT 1.5:1 FOR MINOR SLOPES; 2:1 FOR MAJOR SLOPES OR AS SPECIFIED IN SOILS REPORT.

    FILL 2:1 OR AS SPECIFIED IN SOILS REPORT.

    EXCAVATION: 369,500 C.Y. FILL: 369,500 C.Y.

    WASTE/IMPORT 0 C.Y.

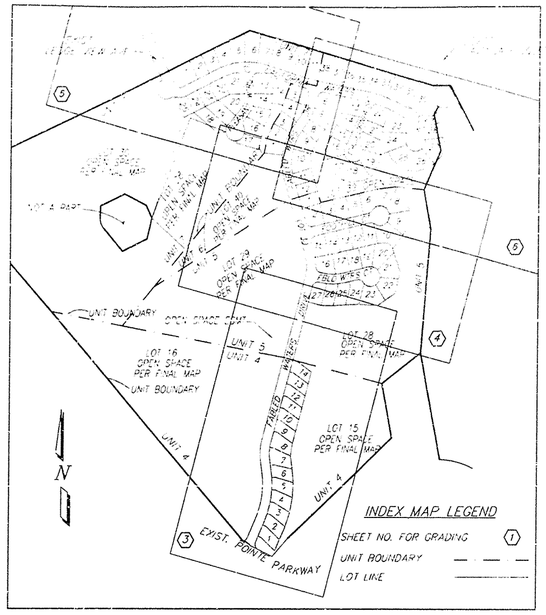
    A SEPARATE PERMIT MUST BE OBTAINED FOR WASTE OR IMPORT AREA.
14. SPECIAL CONDITION: IF ANY ARCHAEOLOGICAL RESOURCES ARE DISCOVERED ON THE SITE OF THIS GRADING DURING OPERATIONS, SUCH OPERATIONS WILL CEASE IMMEDIATELY AND THE PERMITTEE WILL NOTIFY THE DIRECTOR OF PUBLIC WORKS OF THE DISCOVERY. GRADING OPERATIONS WILL NOT RECOMMENCE UNTIL THE PERMITTEE HAS RECEIVED WRITTEN AUTHORITY FROM THE DIRECTOR OF PUBLIC WORKS TO DO SO.
15. ALL GRADING DETAILS WILL BE IN ACCORDANCE WITH SAN DIEGO COUNTY STANDARD DRAWING; DS-8, DS-10, DS-11, DS-75.
16. THE CONSTRUCTION OF ONE PCC STANDARD DRIVEWAY PER LOT, LOCATION TO BE DETERMINED IN THE FIELD BY THE ENGINEER OF WORK. PCC SURFACING OF DRIVEWAY TO EXTEND FROM CURB TO PROPERTY LINE. USE STANDARD DRAWINGS G-14, G-15, AND G-16. (SEE IMPROVEMENT PLANS TM 4828-4, 5, 6, 7)
17. FOR STREET AND DRAINAGE IMPROVEMENTS SEE IMPROVEMENT PLAN TM 4828-4, 5, 6, AND 7.
18. A LICENSED ENGINEERING GEOLOGIST SHALL BE RETAINED TO CONDUCT A SUBSURFACE INVESTIGATION OF ALL PROPOSED GRADING SITES TO ADDRESS GEOTECHNICAL REPORTS, DEGREES OF RECOMPACTION OF FRIANT AND SAXE WATER FORMATION SOILS, EVALUATE FOUNDATION DESIGN IN THE SANTIAGO VOLCANICS, AND GRADING SPECIFICATIONS FOR SOIL AND ROCK FILLS. THE GEOLOGIST SHALL INITIAL APPROVAL OF ALL GRADING PLANS.
19. A LICENSED ENGINEERING GEOLOGIST SHALL BE RETAINED TO CONDUCT AN INVESTIGATION OF THE ABILITY OF ISHAM SPRINGS TO MAINTAIN THE CURRENT RATE OF FLOW AFTER BLASTING OF NEARBY IGNEOUS ROCK HAS OCCURRED. UNLESS THIS REPORT STATES OTHERWISE, BLASTING SHALL BE NO CLOSER THAN 500 FEET FROM ISHAM SPRINGS.
20. THIS PLAN SHALL CONFORM WITH THE RECOMMENDATIONS OF THE SOILS REPORT REGARDING SITE PREPARATION, FOOTINGS, DISTANCE FROM THE FILL SLOPE TOP, AND OTHER SPECIFICATIONS.
21. GRADING INDICATED ON THE FINAL GRADING PLANS SHALL BE IN SUBSTANTIAL CONFORMANCE WITH THAT SHOWN ON THE APPROVED REPLACEMENT TENTATIVE MAP, DATED APRIL 3, 1990. ANY DEVIATION FROM THE REPLACEMENT TENTATIVE MAP GRADING PLANS IN EXCESS OF TEN PERCENT OF THE TOTAL GRADING QUANTITIES AND/OR TOTAL GRADING QUANTITIES IN EXCESS OF 350,000 CUBIC YARDS OF EARTHWORK MAY REQUIRE ADDITIONAL ENVIRONMENTAL REVIEW. ANY DEVIATION IN MAXIMUM SLOPE HEIGHTS FROM THE APPROVED TENTATIVE MAP IN EXCESS OF FIVE FEET MAY ALSO REQUIRE ADDITIONAL ENVIRONMENTAL REVIEW.



VICINITY MAP
NOT TO SCALE

TABLE OF CONTENTS

SHEET No.	DESCRIPTION
1	TITLE SHEET
2	DETAIL SHEET
3-7	GRADING PLANS
8-11	EROSION CONTROL
12-13	WALL DETAILS



INDEX MAP LEGEND

SHEET NO. FOR GRADING	①
UNIT BOUNDARY	— — —
LOT LINE	———

SHEET INDEX
Scale 1" = 300'

SOILS ENGINEER'S CERTIFICATE

THESE GRADING PLANS HAVE BEEN REVIEWED BY THE UNDERSIGNED AND FOUND TO BE IN COMPLIANCE WITH THE RECOMMENDATIONS OUTLINED IN OUR SOILS REPORT DATE 5/26/98

BY _____ DATE 6/29/98
NAME

PCE No 43345 / GE 2173 EXPIRES 6-30-00

BY _____ DATE 6/26/98
NAME

CEG No. 1890 EXPIRES 5/00

COUNTY OF SAN DIEGO
DEPARTMENT OF PLANNING AND LAND USE

APPROVED FOR COMPLIANCE WITH TM CONDITIONS: C.6.a.(1,2,3); C.6.b.(1,2); AND C.6.b.5, C.6.b.(7,8); C.5.b.10; C.6.C.(1,2,3), C.10; C.12.h; C.18.a, IN SUBSTANTIAL CONFORMANCE WITH THE TENTATIVE MAP (4828RPL)(UNIT 4,5,6,7 ONLY)

APPROVED BY _____ 6 24 98
COUNTY OF SAN DIEGO DATE

SOLAR STATEMENT

THIS IS A SOLAR SUBDIVISION AS REQUIRED BY SECTION 81-401(n), SUBDIVISION ORDINANCE. ALL LOTS HAVE AT LEAST 100 SQ. FT. OF UNOBSTRUCTED ACCESS TO SUNLIGHT ON THE BUILDABLE PORTION OF THE LOT.

BY _____ DATE 7/2/98
NAME

PCE No. 30724 EXPIRES 6/30/00

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

DAVID EVANS AND ASSOCIATES, INC.
7676 HAZARD CENTER DRIVE SUITE 880
SAN DIEGO, CA 92108
(619) 294-7260

BY _____ DATE 7/2/98
NAME: MANUEL NIETO

PCE No. 30724 EXPIRES 6/30/00

DAVID EVANS AND ASSOCIATES, INC.
7676 HAZARD CENTER DRIVE, SUITE 880
SAN DIEGO, CA. 92108 (619) 260-3420

LEGAL DESCRIPTION

WORK TO BE DONE

IMPROVEMENTS

IMPROVEMENTS	STD. DWGS.	QUANTITY	SYMBOL

SEE SHEET 5

LOT 28
OPEN SPACE
3.71 ACRES
PER FINAL MAP

UNIT 7

UNIT 6

LOT 40
OPEN SPACE
2.07 ACRES
PER FINAL MAP

UNIT 5

LOT 29
OPEN SPACE
7.08 ACRES
PER FINAL MAP

LOT 1
MAP 13354

LOT 2
MAP 13354

UNIT 3

LOT 30

LOT 31

LOT 32

FOOTHILL COURT

FABLED WATERS DRIVE

PROVIDE TYPE "B" DITCH PER SDRSD D-75

STA. 24+17.30
FABLED WATERS DRIVE=
STA. 10+00
FOOTHILL COURT

OPEN SPACE ESMT
PER DOC. 98-325112
RECD 6/1/98

PROVIDE TEMPORARY FENCING ALONG OPEN SPACE EASEMENT (SEE SHEETS 8-11)

STA. 22+34.66
FABLED WATERS DRIVE=
STA. 10+00
FABLED WATERS COURT

PROVIDE TEMPORARY FENCING (SEE SHEETS 8-11)

LINE B-1

LINE B-2

LINE C-1

.20+74 LT.
TYPE "F" C.B.

20+74=10+00 SD STA.
LINE C-1
B-1 INLET

TYPE "U" HDWL
10+53.97 SD STA.
LINE C-1

ROCK CLASS: 1/2 TON GROUTED STONE
STONE LAYER THICKNESS: 3.4'
FILTER BLANKET MAT'L
UPPER LAYER: 1.0' OF 3/4"-1 1/2" P.B.
LOWER LAYER: FILTER FABRIC

SEE SHEET 3

STORM DRAIN DATA						
L/C	DELTA	BEARING	RADIUS	DIST.	REMARK	D-LOAD
4		N85°40'15"W		81.56'	18" RCP	1350-D
5		N45°49'53"W		137.10'	18" RCP	1350-D
6		N51°40'40"W		179.00'	18" RCP	1350-D

NOTE:
1. FOR STREET & DRAINAGE IMPROVEMENTS PLEASE SEE TM 4828-4, 5, 6, & 7.
2. FOR TYPICAL PAD GRADING, SEE DETAIL ON SHEET 2.
3. FOR STORM DRAIN PROFILES, SEE SHEET 7.

GRAPHIC SCALE: 1"=40'

REGISTERED PROFESSIONAL ENGINEER
MANUEL E. NIETO
No. 30724
Exp. 6/30/00
CIVIL
STATE OF CALIFORNIA

ENGINEER OF WORK

MANUEL E. NIETO R.C.E. 30724 — DATE 7/2/98

EXPIRES ON: 6/30/00

DAVID EVANS AND ASSOCIATES, INC.
7676 HAZARD CENTER DRIVE, SUITE 880
SAN DIEGO, CA. 92108 (619) 260-3420

PRECISION
AUG 10 1998
MICROFILMED

COUNTY APPROVED CHANGES			
No.	Description	Approved By	Date

PERMITS	
HPL 96-002	
MAJOR USE PERMIT	P89-013, 013, 016
REZONE PERMIT NO.	R88-09
SPECIAL USE PERMIT NO.	SPA 88-001
TENTATIVE MAP NO.	TM 4828RPL UNITS 4, 5, 6, 7
NOT	

BENCH MARK

DESCRIPTION: CONCRETE MONUMENT WITH STANDARD DISK

LOCATION: AT JAMACHA BLVD. & SWEETWATER RIVER

FROM: END OF ASPHALT C.B. S.E. OF ABUT.

RECORD FROM: COUNTY VERTICAL CONTROL W 1968

ELEVATION: 427.635 NAVD 1929 DATUM

PRIVATE CONTRACT

1 | 18

POINTE SAN DIEGO

UNIT 5

RECOMMENDED FOR APPROVAL

DATE

DAVID EVANS AND ASSOCIATES, INC.

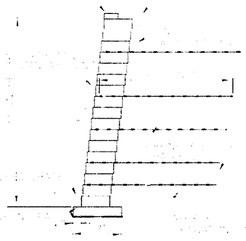
SHEET 2 OF 21 SHEETS

DRAWING NO. 4828-2

DAVID EVANS AND ASSOCIATES, INC. PLANNING ENGINEERING SURVEYING

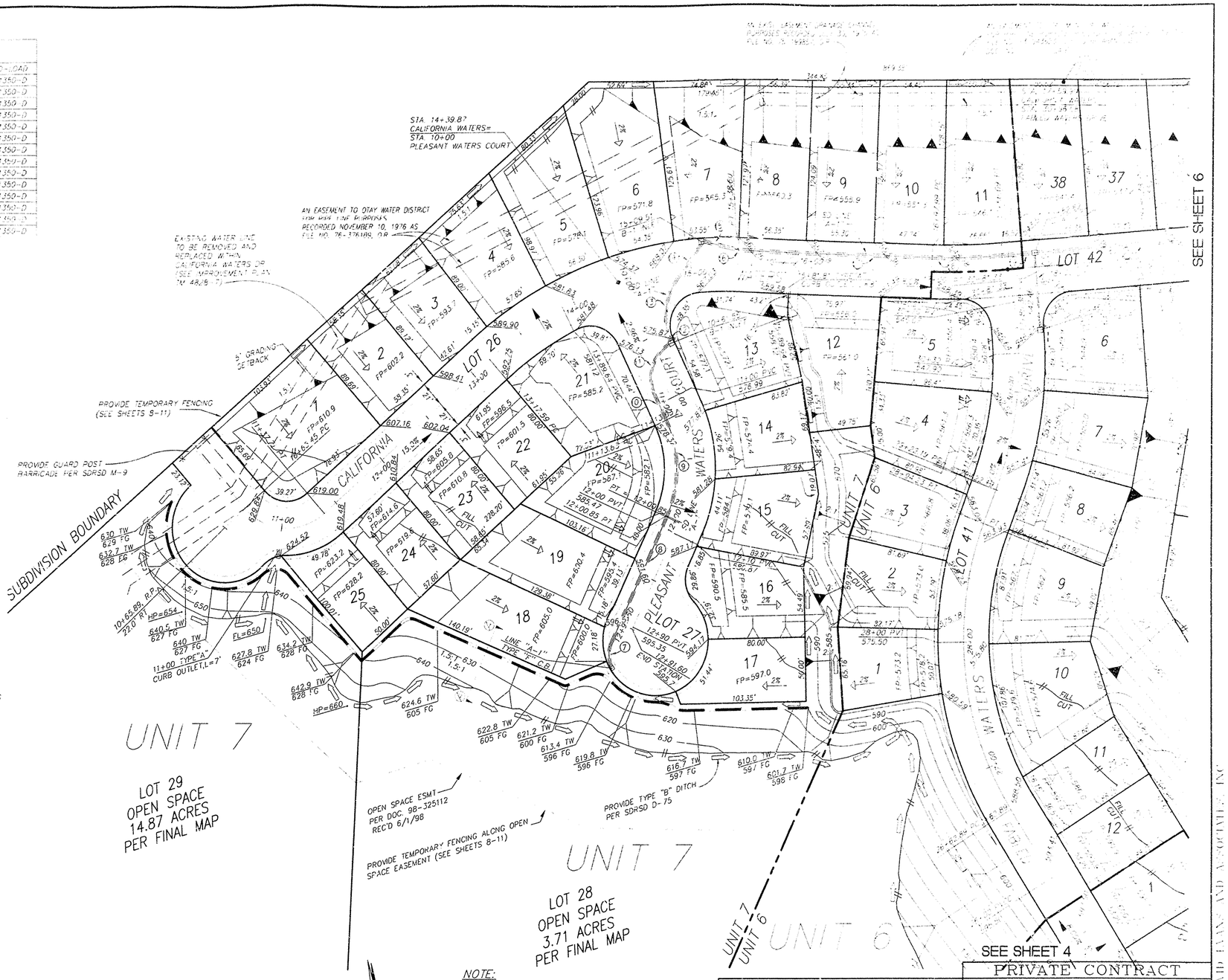
STORM DRAIN DATA

	DELTA	BEARING	RADIUS	DIST.	REMARK	D-LOAD
7	49°52'32"		22.00'	19.15'	24" RCP	1350-D
8		N40°13'25"E		107.20'	24" RCP	1350-D
9	49°58'35"		89.00'	77.63'	24" RCP	1350-D
10		N09°45'09"W		22.25'	24" RCP	1350-D
11	83°43'57"		30.00'	44.37'	24" RCP	1350-D
12		N02°57'58"W		3.19'	24" RCP	1350-D
13	54°55'32"		50.00'	47.93'	24" RCP	1350-D
14		N51°57'34"E		32.55'	24" RCP	1350-D
15		N60°37'23"E		19.35'	30" RCP	1350-D
16	11°33'23"		100.00'	20.17'	30" RCP	1350-D
17		N72°10'47"W		149.27'	30" RCP	1350-D
18	06°39'29"		489.00'	56.82'	30" RCP	1350-D
19		N79°50'16"W		24.54'	30" RCP	1350-D
20		N11°09'44"E		56.00'	18" RCP	1350-D



KEYSTONE RETAINING WALL (TYP)
SECTION A-A
NOT TO SCALE

1. KEYSTONE RETAINING WALL WILL BE CONSTRUCTED WITH FULL SPECIAL INSPECTION ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
2. KEYSTONE RETAINING WALL WILL BE CERTIFIED BY THE ENGINEER OF WORK AS BEING CONSTRUCTED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.



NOTE:
1. FOR STREET & DRAINAGE IMPROVEMENTS PLEASE SEE TM 4828-4, 5, 6, & 7.
2. FOR TYPICAL PAD GRADING, SEE DETAIL ON SHEET 2.
3. FOR STORM DRAIN PROFILES, SEE SHEET 7.

N

40' 0' 40' 80' 120'
GRAPHIC SCALE: 1"=40'

REGISTERED PROFESSIONAL ENGINEER MANUEL E. NIETO No. 30724 Exp. 6/30/00 CIVIL STATE OF CALIFORNIA

ENGINEER OF WORK

MANUEL E. NIETO R.C.E. 30724 7/2/98
EXPIRES ON 6/30/00 DATE

DAVID EVANS AND ASSOCIATES, INC.
7676 HAZARD CENTER DRIVE, SUITE 880
SAN DIEGO, CA. 92108 (619) 260-3420

PERMITS

HPL 96-002	
MAJOR USE PERMIT	P89-014, 015, 016
REZONE PERMIT NO.	R88-09
SPECIAL USE PERMIT NO.	SPA 88-001
TENTATIVE MAP NO.	TM 4828RPL UNITS 4, 5, 6, 7
N.O.I.	

COUNTY APPROVED CHANGES

No.	Description	Approved by	Date

BENCH MARK

DESCRIPTION: CONCRETE MONUMENT WITH STANDARD DISK
LOCATION: INT. JAMACHA BLVD. & SWEETWATER BLVD. THE FROM END OF ASPHALT C.B. [illegible]
RECORD FROM: COUNTY VERTICAL CONTROL [illegible]
ELEVATION: 427.625 DATUM: MEAN SEA LEVEL

PRIVATE CONTRACT

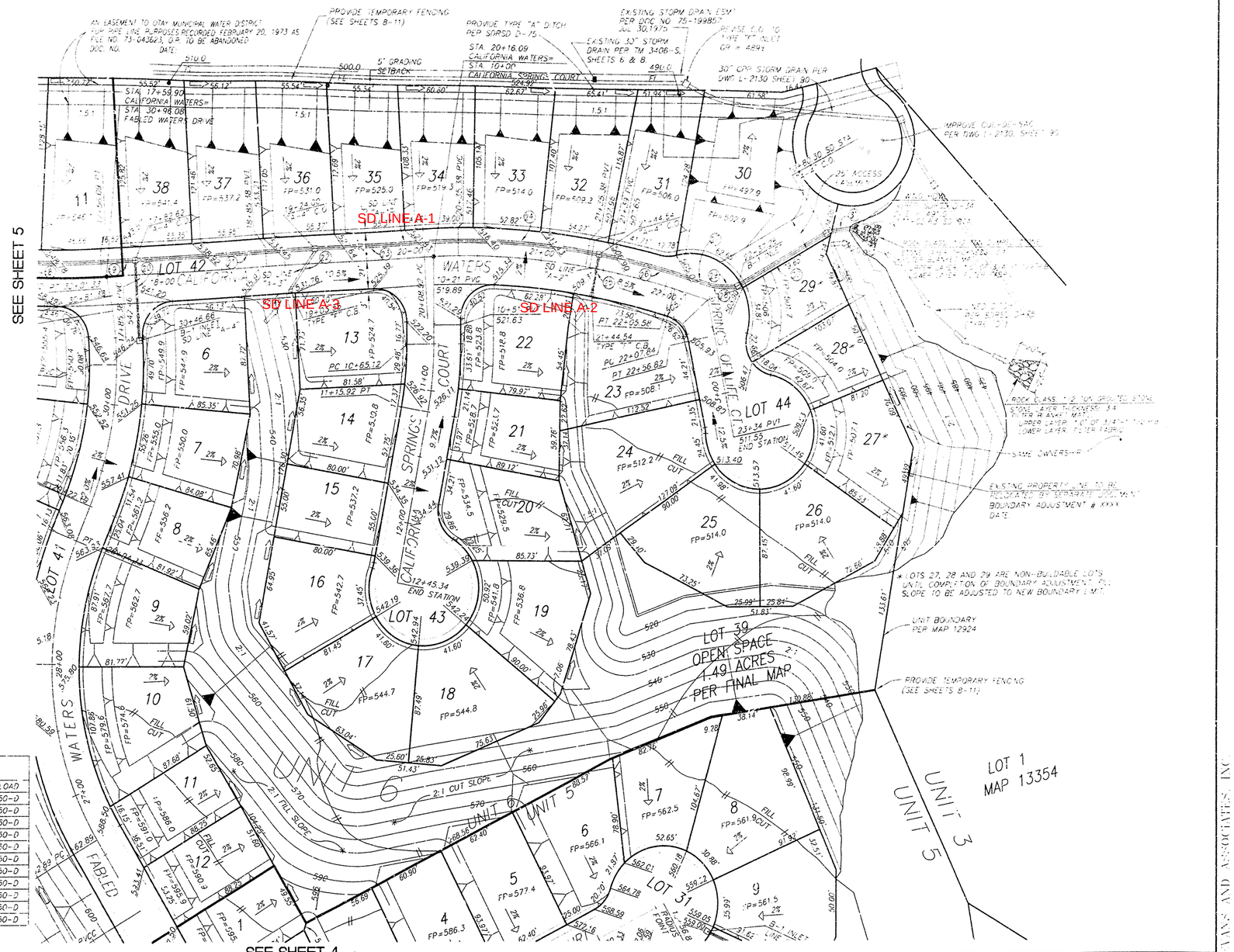
SHEET 5 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 13

GRADING PLANS FOR
POINTE SAN DIEGO
COUNTY OF SAN DIEGO [illegible]
POINTE SAN DIEGO
CALIFORNIA COORDINATE INDEX

Approved Outside Mapping Area
Approved Inside Mapping Area
[illegible] 30724
[illegible]

ENGINEERS NAME: DAVID EVANS AND ASSOCIATES, INC.
PHONE NO. (619) 260-3420

PRECISION
AUG 10 1998
MICROFILMED



STORM DRAIN DATA						
L/C	DELTA	BEARING	RADIUS	DIST.	REMARK	D-LOAD
L1		N78°50'16"W		137.37'	30" RCP	1350-D
L2		N48°31'02"E		34.02'	18" RCP	1350-D
L3		N78°50'16"W		82.92'	30" RCP	1350-D
L4	13°55'27"		561.00'	136.34'	30" RCP	1350-D
L5		N25°17'26"E		27.04'	18" RCP	1350-D
L6	05°53'27"		561.00'	57.68'	30" RCP	1350-D
L7		N58°36'49"W		29.90'	30" RCP	1350-D
L8	15°29'42"		30.00'	8.11'	30" RCP	1350-D
L9		N74°05'51"W		12.95'	18" RCP	1350-D
L10		N75°08'21"E		76.30'	30" RCP	1350-D
L11		N83°11'52"W		20.33'	30" RCP	1:50-D

NOTE:
1. FOR STREET & DRAINAGE IMPROVEMENTS PLEASE SEE TM 4828-4, 5, 6, & 7.
2. FOR TYPICAL PAD GRADING, SEE DETAIL ON SHEET 2.
3. FOR STORM DRAIN PROFILES, SEE SHEET 7.

GRAPHIC SCALE: 1"=40'

ENGINEER OF WORK

REGISTERED PROFESSIONAL ENGINEER MANUEL E. NIETO No. 30724 Exp. 6/30/00 CIVIL STATE OF CALIFORNIA

MANUEL E. NIETO R.C.E. 30724 EXPIRES ON 6/30/00 — 7/2/98 DATE

DAVID EVANS AND ASSOCIATES, INC.
7676 HAZARD CENTER DRIVE, SUITE 880
SAN DIEGO, CA. 92108 (619) 260-3420

PRECISION AUG 10 1998 MICROFILMED

PERMITS	
HPL 98-002	
MAJOR USE PERMIT	P89-014, 015, 016
REZONE PERMIT NO.	R88-09
SPECIAL USE PERMIT NO.	SPA 88-001
TENTATIVE MAP NO	TM 4828RPL UNITS 4, 5, 6, 7
N.O.I.	

COUNTY APPROVED CHANGES			
No.	Description	Approved by	Date

BENCH MARK
DESCRIPTION: CONCRETE MONUMENT WITH STANDARD DISK
LOCATION: INT JAVACHA BLVD & SWEETWATER R.D. 15' FROM END OF ASPHALT C.B. 17' S.E. OF PP# 270866
RECORD FROM: COUNTY VERTICAL CONTROL M 0154
ELEVATION: 427.625 DATUM: MEAN SEA LEVEL

PRIVATE CONTRACT

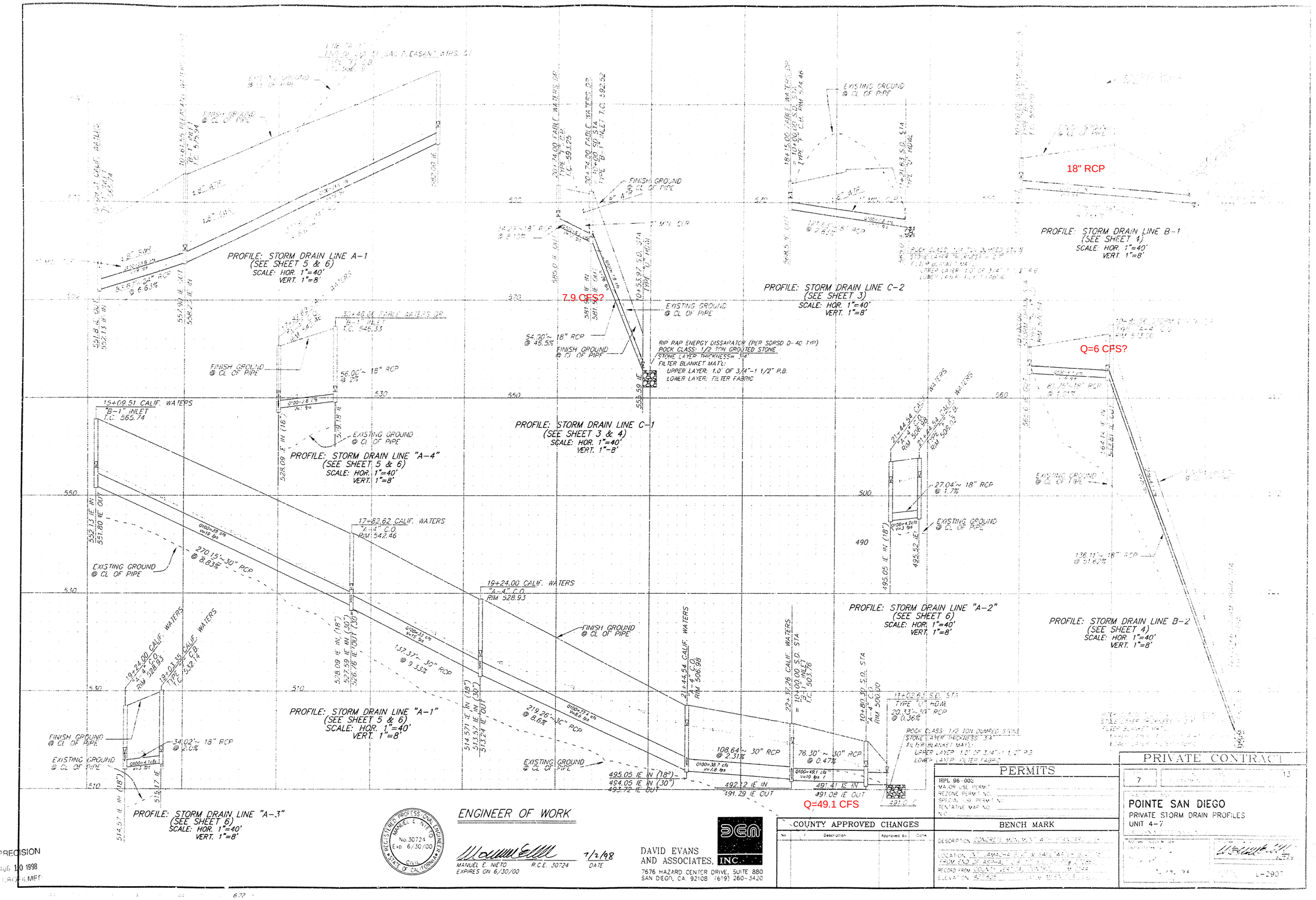
SHEET	COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS	SHEETS
6		13

GRADING PLANS FOR
POINTE SAN DIEGO
COUNTY OF SAN DIEGO, FROM THE RANCHO DE LA PUNTA
POINTE SAN DIEGO UNITS 4, 5, 6, & 7
CALIFORNIA COORDINATE SYSTEM ZONE

Approved Designer M. Nieto
County Engineering
By
R.C.E. 30724
Date 6-29-98

ENGINEER'S NAME DAVID EVANS AND ASSOCIATES, INC
PHONE NO (619) 260-3420

D C B A 1 5 10 A B C D
4 3 2 1



ENGINEER OF WORK

MANUEL E. NIETO R.C.E. 30724 7/2/98 DATE
EXPIRES ON 6/30/00

REGISTERED PROFESSIONAL ENGINEER
MANUEL E. NIETO
No. 30724
Exp. 6/30/00
CIVIL
STATE OF CALIFORNIA

DAVID EVANS AND ASSOCIATES, INC.
7676 HAZARD CENTER DRIVE, SUITE 880
SAN DIEGO, CA. 92108 (619) 260-3420

PERMITS
HPL 96-002
MAJOR USE PERMIT
REZONE PERMIT NO.
SPECIAL USE PERMIT NO.
TENTATIVE MAP NO.
NO.

COUNTY APPROVED CHANGES

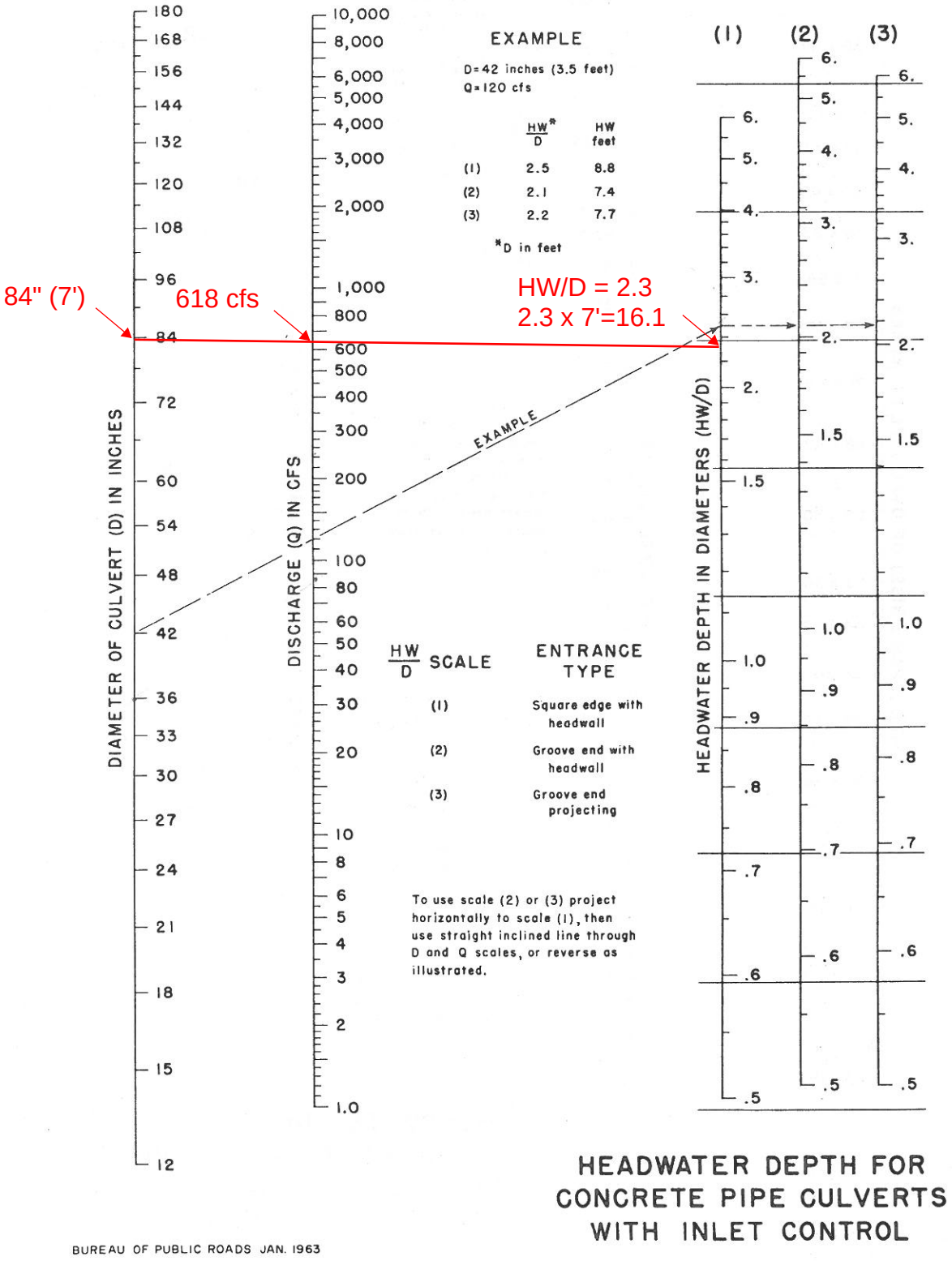
No.	Description	Approved by	Date

BENCH MARK
DESCRIPTION CONCRETE MONUMENT WITH STANDARD DISK
LOCATION INT. JAMAICA BLVD. & SWEETWATER BLVD. FROM END OF ASPHALT
RECORD FROM COUNTY VERT. CALIFORNIA
ELEVATION 427.626

PRIVATE CONTRACT
7 13
POINTE SAN DIEGO
PRIVATE STORM DRAIN PROFILES
UNIT 4-7
L-2907

PRECISION
AUG 10 1998
PROFILMED

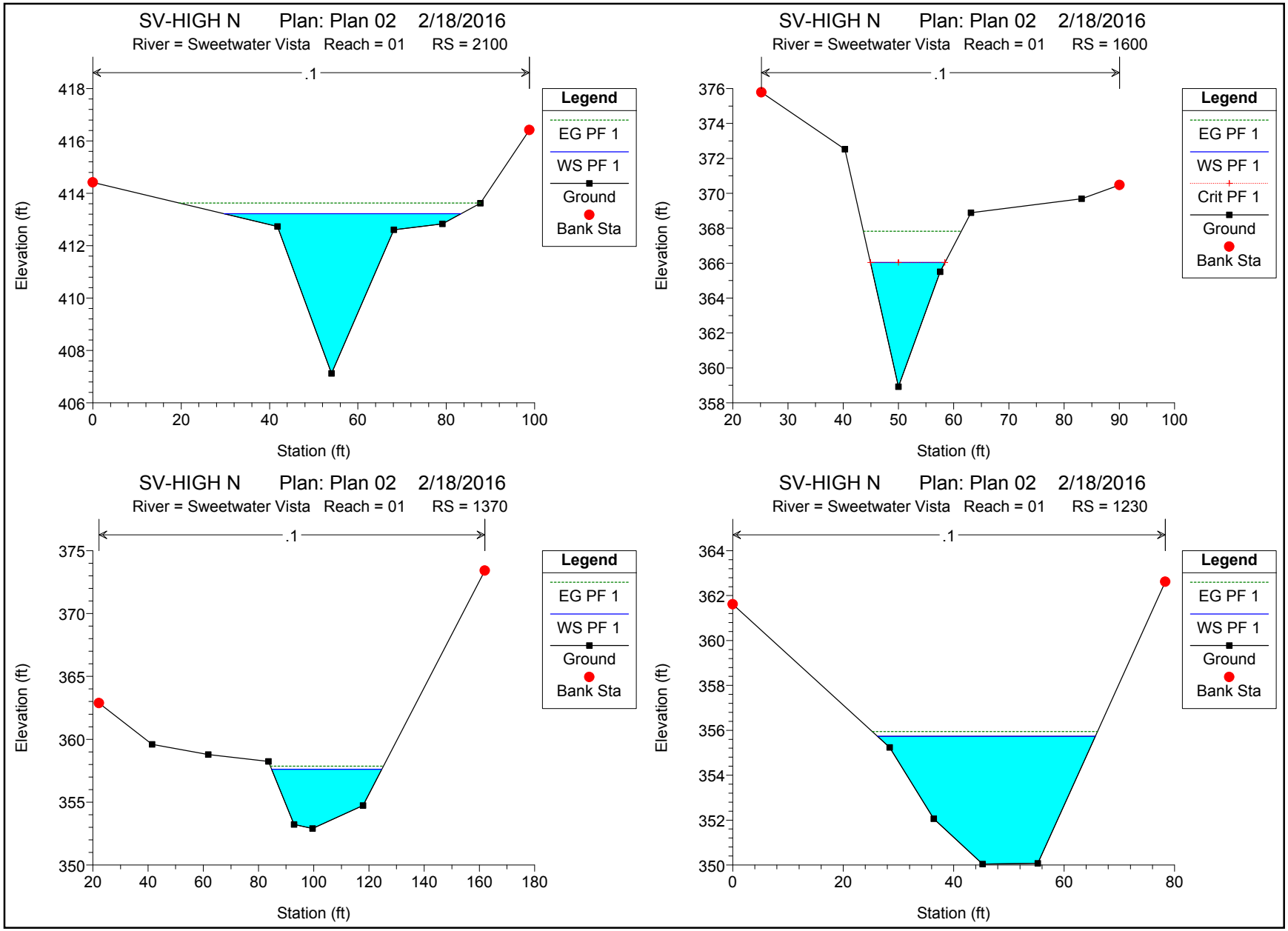
APPENDIX 9: HEC-RAS STUDY

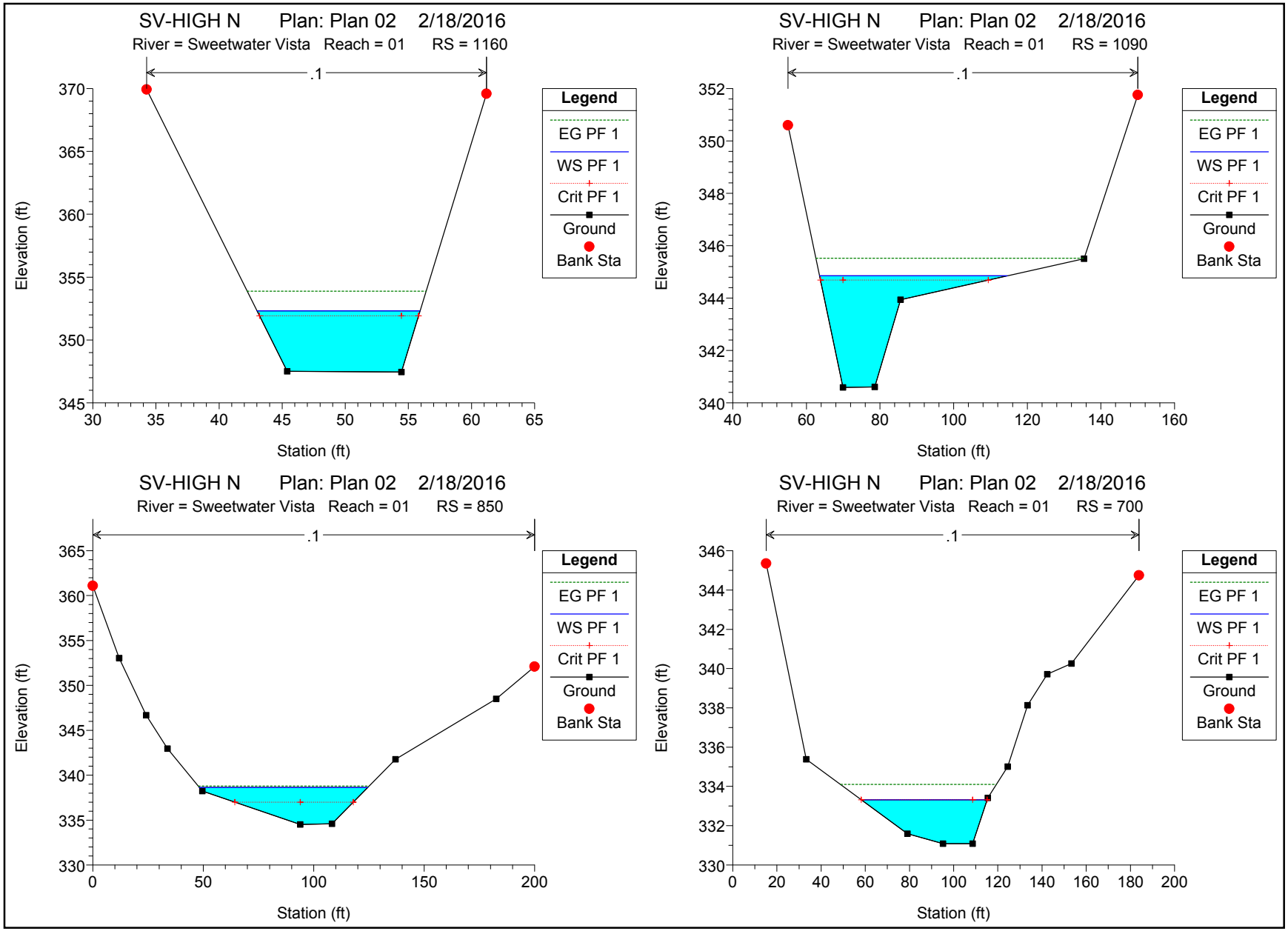


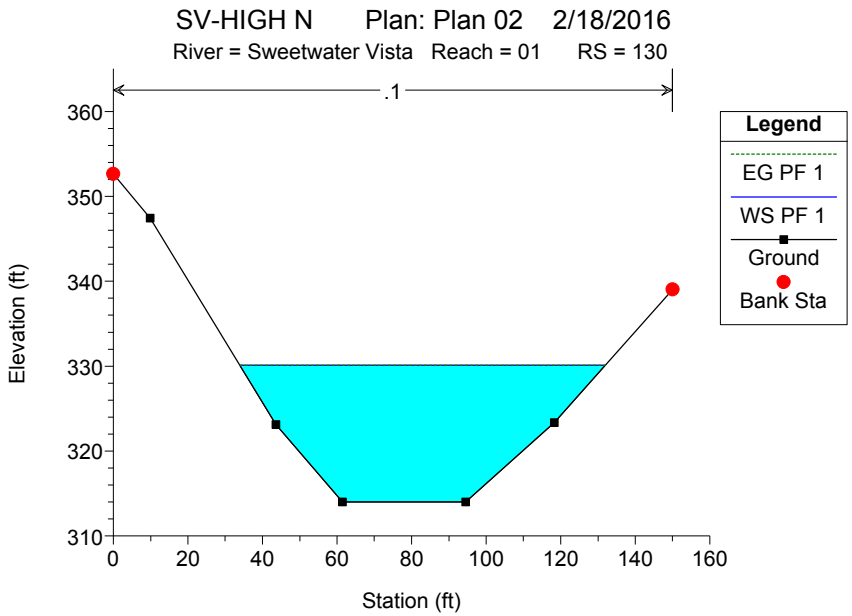
EXISTING 84" SD ~ ELEV 314 AT ENTRANCE

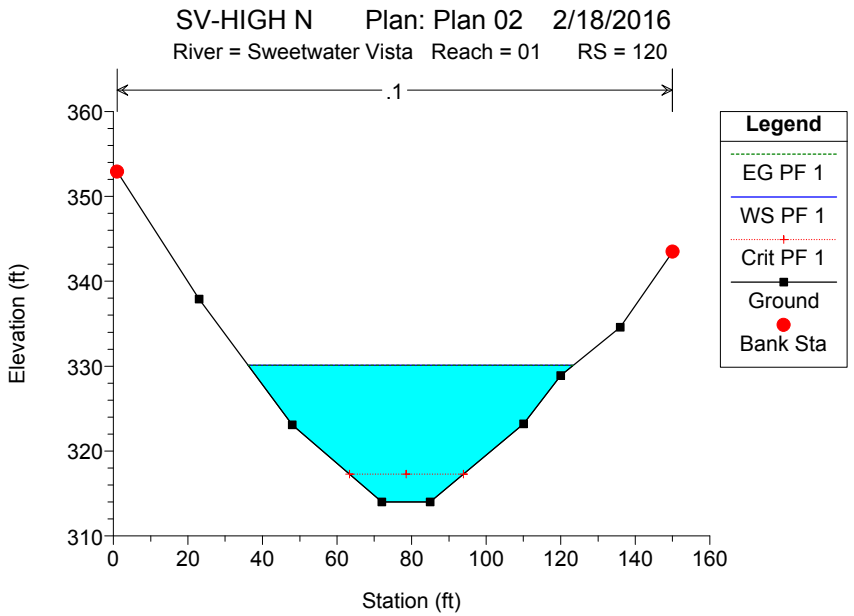
314 + 16.1 => W.S. = 330.1

USE KNOWN W.S. ELEV 330.1 AT RIVER STA 1+20


SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 2100
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 1600
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 1370
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 1230
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

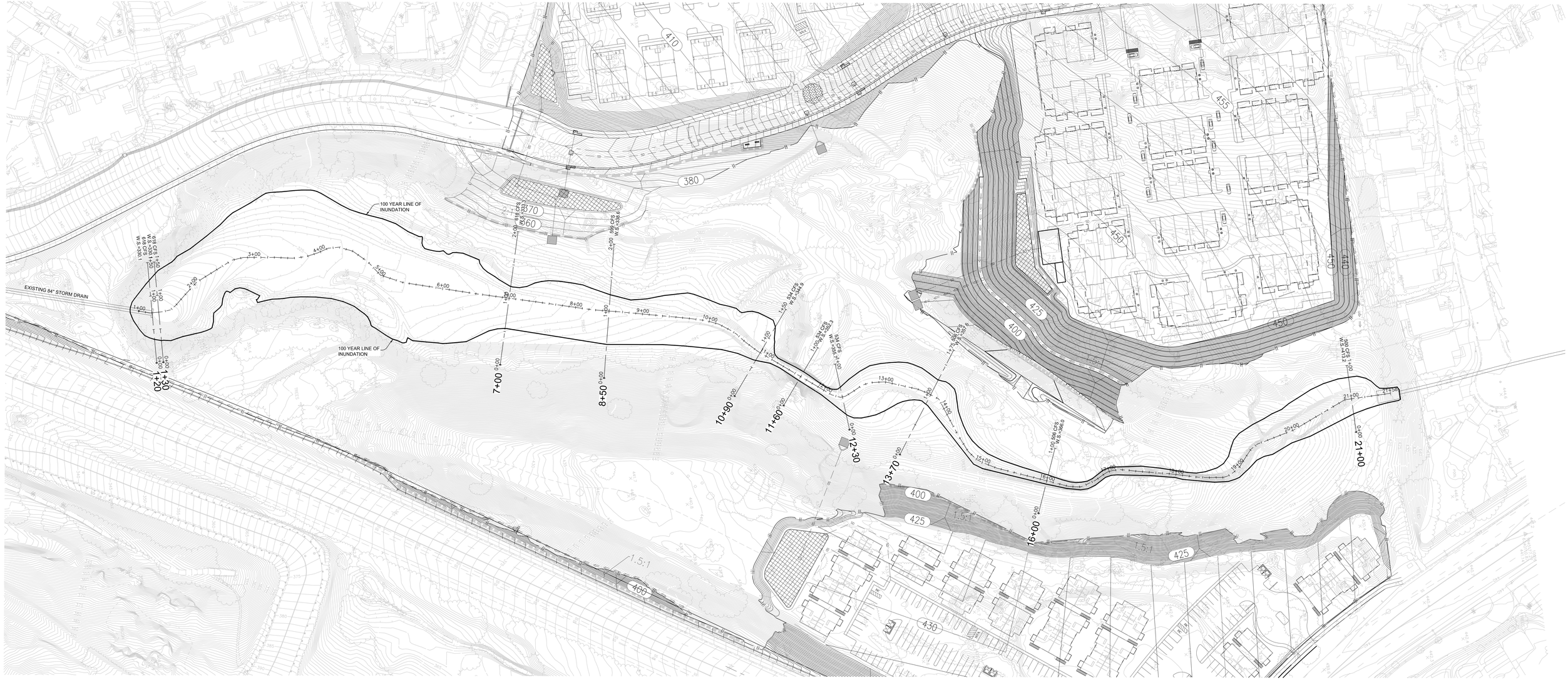

SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 1160
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 1090
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 850
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 700
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 130
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


SV-HIGH N Plan: Plan 02 2/18/2016
River = Sweetwater Vista Reach = 01 RS = 120
.1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

HEC-RAS Plan: Plan 02 River: Sweetwater Vista Reach: 01 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
01	2100	PF 1	500.00	407.12	413.22		413.63	0.057978	5.16	96.85	53.60	0.68
01	1600	PF 1	506.00	358.92	366.04	366.04	367.82	0.163272	10.72	47.21	13.51	1.01
01	1370	PF 1	506.00	352.90	357.61		357.86	0.016070	3.97	127.52	39.92	0.39
01	1230	PF 1	534.00	350.04	355.73		355.94	0.011767	3.69	144.68	39.42	0.34
01	1160	PF 1	534.00	347.46	352.31	351.92	353.89	0.121447	10.09	52.94	12.91	0.88
01	1090	PF 1	534.00	340.59	344.85	344.69	345.52	0.110378	6.57	81.32	50.96	0.92
01	850	PF 1	599.00	334.51	338.62	337.00	338.78	0.013109	3.13	191.62	76.23	0.35
01	700	PF 1	618.00	331.08	333.32	333.32	334.10	0.130250	7.09	87.19	56.93	1.01
01	130	PF 1	618.00	314.00	330.10		330.11	0.000065	0.57	1089.43	98.00	0.03
01	120	PF 1	618.00	314.00	330.10	317.27	330.11	0.000123	0.72	857.91	87.19	0.04



50' 0' 25' 50' 100'

SCALE: 1" = 50'

SWEETWATER VISTAS

HEC□RAS STUDY

FEBRUARY □□16

FUSCOE ENGINEERING

6390 Greenwich Dr., Suite 170, San Diego, California 92122

tel 858.554.1500 ◦ fax 858.597.0335 ◦ www.fuscoe.com