

TECHNICAL ADDENDUM
MASTER DEVELOPMENT DRAINAGE PLAN
CHAPEL HILLS CROSSING

JANUARY 1989

JOB NO. 8335

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TABLE OF CONTENTS

CALCULATIONS:

HYDROLOGIC CALCULATIONS

HYDRAULIC CALCULATIONS

DESIGN CHARTS

TR-20 MODEL - FULLPRINT

ASBUILT DATA

MAPS:

OFFSITE BASIN MAPS 1, 2, & 3

POND "A" WORKSHEET

POND "B" WORKSHEET

PRELIMINARY GRADING PLAN

HYDROLOGIC CALCULATIONS



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CLIENT R/D

JOB NO. 8335

PROJECT CHC

BY JWD

DATE 1-3-89

SUBJECT HYDROLOGY - BASINS 1,2,3

SHEET NO. 1 OF 2

BASIN 1

$$T_c = 1.87 (1.1 - C_{10}) L^{0.5} S^{-0.33}$$

$$= 1.87 (1.1 - 0.25) 115^{0.5} 2^{-0.33}$$

$$= 1.87 (0.85) 10.72 (0.79) = 13.5 \text{ MIN.}$$

T_T : ALONG BRIMGATE BLVD TO UNION

$$V = 59 (S)^{\frac{1}{2}} = 59 (0.02)^{\frac{1}{2}} = 8 \text{ FPS}$$

$$= 2650 \text{ LF @ } 8 \text{ FPS} = 5.5 \text{ MIN.}$$

TOTAL = 19 MIN.

BASIN 2

$$T_c = 1.87 (0.35) 50^{0.5} 0.79$$

= 9 MIN

$$T_T = S = \frac{8}{355} = 2.25\%$$

$$V = 59 (0.0225)^{\frac{1}{2}}$$

$$= 600 \text{ LF @ } 5 \text{ FPS} = 2 \text{ MIN.}$$

TOTAL = 11 MIN.



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JOB NO. 8235

PROJECT CHC

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DATE 1-3-89

SUBJECT HYDROLOGY - TYPICAL T_c

SHEET NO. 2 OF 2

T_c FOR TYPICAL BIRIARGATE RESIDENTIAL SUBDIVISION

$$T_c = 1.87(1.1 - 0.25)^{0.5 - 0.33} / 115 \quad 2.0 = 13.5 \text{ MIN}$$

$$T_f = 1000 \text{ LF @ } 10 \text{ FPS} = 1.5 \text{ MIN}$$

TOTAL = 15.0 MIN

BASIN 11 TO BIRIARGATE BLVD.

$$T_c = 1.87(1.1 - 0.25)^{0.5 - 0.33} / 130 \quad 2 = 14.3 \text{ MIN}$$

$$T_f = 3300 \text{ LF @ } 10 \text{ FPS} = 5.5 \text{ MIN}$$

TOTAL = 20. MIN.

BASIN 20 THRU ANDEIROSA ESTATES

$$T_c = 1.87(1.1 - 0.25)^{0.5 - 0.33} / 130 \quad 2.0 = 14.3 \text{ MIN}$$

$$T_f = 3250 \text{ @ } 10 \text{ FPS} = 5.5 \text{ MIN}$$

TOTAL = 20 MIN.



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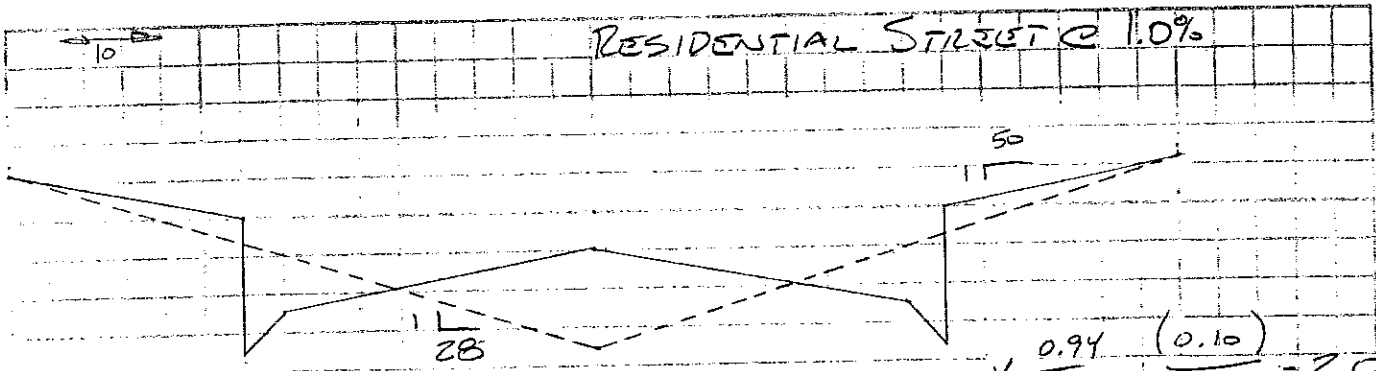
PROJECT CHK

BY JWD

DATE 1-8-89

SUBJECT X & M VALUES FOR REACH

SHEET NO. 1 OF 4



$$X = \frac{0.94}{0.016} \left(\frac{0.10}{0.33} \right) = 2.0$$

$$M = 1.33$$

$$Q = \frac{1.486}{N} A R^{2/3} S^{1/2}$$

$$Q_2'' = 2 \left[\frac{1.486}{0.016} (0.17) 0.08^{0.66} (0.01)^{0.5} \right]$$

$$= 2 [92.87 (0.17) 0.18 (0.10)] = 1 \text{ CFS}$$

$$Q_6'' = 2 \left[92.87 (3.47) 0.19^{0.66} 0.10 \right]$$

$$= 21 \text{ CFS} \quad A = 0.83 \quad P = 18.5$$

$$\frac{2.64}{3.47}$$

$$Q_9'' = 2 \left[92.87 (6.61) 0.36^{0.66} 0.10 \right]$$

$$= 61 \text{ CFS} \quad A = 1.17 \quad P = 18.67$$

$$\frac{5.47}{6.61}$$

$$Q_{12}'' = 2 \left[92.87 (15.27) 0.43^{0.66} 0.10 \right]$$

$$= 163 \text{ CFS} \quad A = 2.72 \quad P = 35.17$$

$$= 1.83$$

$$= 10.72$$

$$= 15.27$$

$$Q_{24}'' = 2 \left[92.87 (74.77) 0.88^{0.66} 0.10 \right]$$

$$= 1273 \text{ CFS}$$

$$A = 44.22 \quad P = 85.17$$

$$= 3.83$$

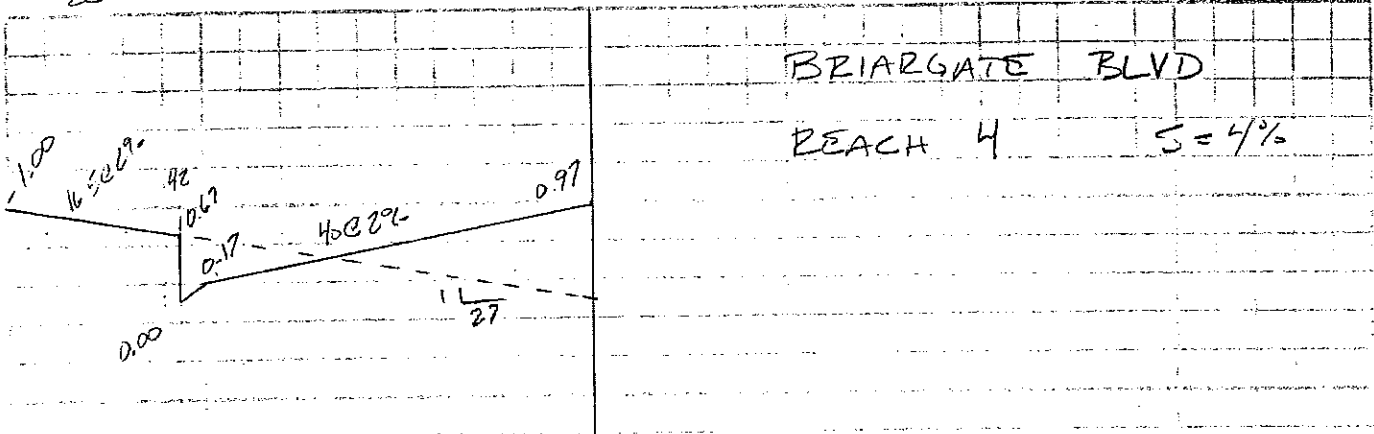
$$= 26.72$$

$$74.77$$

H

10
8
6
4
2
0

50 100 150 200



A. ACTUAL

$$Q_{12} = 2 \left[\frac{1.486}{0.016} (21.75) 0.24^{0.66} (0.04)^{0.50} \right] = 315 \text{ cfs}$$

A = 2.72	P = 39.17
1.83	
17.20	
21.75	

B. TRIANGLE

$$315 = 92.87 (A) (S)^{0.66} (0.2)$$

$$16.95 = A S^{0.66} \text{ WITH } Y=1' \text{ } S=0.5$$

$$26.9 = A$$

TRY Z=50
A=50
P=100
USE: Z=27

C. EQ. H-14

$$X = \frac{0.94}{0.016} \frac{(0.20)}{27^{0.33}} = 58.75 \frac{(0.20)}{3}$$

$$X = \frac{0.94}{n} \frac{S^{1/2}}{Z^{1/3}}$$

$$X = 3.9$$

$$M = 1.33$$



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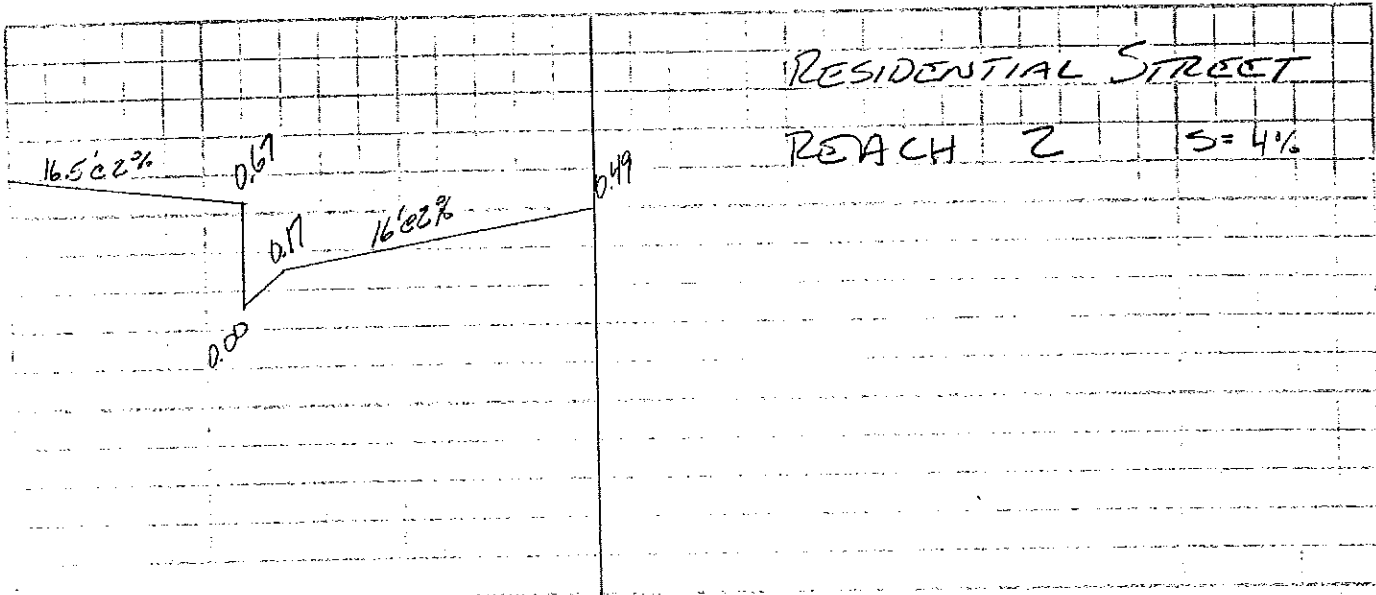
PROJECT CHC

BY JWD

DATE 1-8-89

SUBJECT X & M VALUES

SHEET NO. 3 OF 4



A. MANNINGS

$$Q_{12} = Z \left[92.87 (15.27)^{0.66} (0.43)^{0.2} \right] = 325$$

B. TRIANGLE

$$325 = 92.87 (A)^{0.63} (0.2)$$

$$A = 23 = Z$$

C. EQ. H-14

$$X = \frac{0.94}{0.016} \frac{0.20}{23^{0.33}} = 3.9$$

$$M = 1.33$$



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PROJECT CHC

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DATE 1-8-89

SUBJECT XEM VALUES

SHEET NO. 4 OF 4

RESIDENTIAL STREET

S = 2%

A. MANNINGS

$$Q_{12} = 2 \left[92.87 (15.27) (0.43)^{0.66} (0.14) \right] = 226 \text{ cfs}$$

B. TRIANGLES

$$Z = \frac{226}{92.87 (0.63) (0.14)} = 28$$

C. EO H.14

$$X = \frac{0.94}{0.016} \frac{0.14}{28 \cdot 0.33} = 2.74$$

$$M = 1.33$$

HYDRAULIC CALCULATIONS



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CLIENT E/D

JOB NO. 3335

PROJECT CHC

BY JWD

DATE 1.9.89

SUBJECT HYDRAULICS - BASIN - 1, 2, 3


SHEET NO. 1 OF 8

1. GRATE INLET $2\frac{1}{2}' \times 7\frac{1}{2}'$

$$P = 2(2.5 + 7.5) = 20$$

$$F = 1.7$$

$$Q = \frac{3.0(20)(0.5)^{1.5}}{1.7} = 12.5 \text{ CFS}$$

2. 8' DIOR ON CONTINUOUS GRADE - ASSUME 2% 

$$Q_{10} = 16$$

$$Z = 3:2.5$$

USING SIMPLE

$$Q_{100} = 29$$

$$n$$

$$y = 0.36'$$

$$S = 0.02$$

$$T = 18' \sim \phi 0.16$$

ACCORDING TO FIG 7.9 $Q_c = 4.5 \text{ CFS}$

FIG 7.10 $Q_c = 5.0 \text{ CFS}$

ACCORDING TO TAB 7.2 $Q_c = 4.8 \text{ CFS}$

ACCORDING TO FIG 7.8 $Q_c = 5.12 \text{ CFS}$



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PROJECT CHC

BY JWD

DATE 1-9-89

SUBJECT HYDRAULICS - BASIN // DIVERSION

SHEET NO. 2 OF 8

10' INLET @ 2%

$$Q_{10} = 27 \quad Q_{100} = 47$$

ESTIMATED QC INLET = 9 CFS

PK 7.2

$$Y = 0.3 \quad T = 15$$

$$PK 7.8 \quad F_w = 16.4 \left[(1-2) S_x \right]^{1/2} S_o^{1/2}$$

$$= 16.4 \quad 0.8 \quad 0.14$$

$$= 1.84$$

$$F_w T = 27.6$$

$$\frac{L_i}{F_w T} = \frac{10}{27.6} = 0.36$$

$$\frac{Q_i}{Q} = 0.5 \quad Q_i = 5 \text{ CFS}$$

4' INLET @ 4%

$$Q_{EST} = 18 - 5 = 13 \text{ CFS}$$

$$Y = 0.34 \quad T = 17'$$

$$F_w = 16.4 (0.30)^{0.1667} (0.04)^{0.5}$$

$$= 16.4 \quad 0.82 \quad 0.2 = 2.7$$

$$F_w T = 45.7$$

$$\frac{L_i}{F_w T} = \frac{4}{45.7} = 0.09$$

PICK UP = 10% OR 2 CFS

6' INLET @ 4%

$$Q_{EST} = 9 \text{ CFS}$$

$$Y = 0.3 \quad T = 15$$

$$F_w = 16.4 (0.80)^{0.20} = 2.62$$

$$F_w T = 39 \quad \frac{L_i}{F_w T} = \frac{6}{39} = 0.15$$

PICK UP = 20% OR 2 CFS

TOTAL INLET L = 20'

TOTAL 10 YR PICK UP = 9 CFS

Q_{22" CMP} = 22 CFS @ 1.0%



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DATE 1.10.89

SUBJECT HYDRAULICS 4,5,6,7,8,9,10

SHEET NO. 3 OF 8

BRIARCLIFF VINTAGE (NORTH)

$Q_{100} = 90$

$Q_{CS} = 45$

$\gamma = 0.53$

$T = 26.5$

$F_w = 16.4 (0.33) 0.11 =$

$F_{WT} = 54.5 \quad \frac{L_i}{F_{WT}} = \frac{18}{54.5} = 0.33$

PICK UP 43% OR 22 CFS

$43\% \text{ CMP @ } 2.2\% \text{ } \overset{\text{PSR}}{=} 115 \text{ CFS}$

HYDRAULICS - 11, 12, 13

PICK UP INLETS:
50
40
44

134

PIPS:
48" C.C.S = 86
48" C.C.B = 115
SURFACE = 23
41" INLET = 30

163 INTO POND
234
- 166

66 ²³⁴



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DATE 1-10-89

SUBJECT BASIN 16 - HYDRAULICS

SHEET NO. 4 OF 8

			$Q_{10} = 26$	$Q_{100} = 47$
2 CURB INLETS	2' x 10'	W/	36" CMP	
	12-18" SWAMP			
			$S = 1.0\%$	CAP = 47 CFS ✓

W/ 6" PAVING: $Q = \frac{3.0 (48) (0.5)^{1.5}}{1.7} = 30 \text{ CFS}$

W/ 12" PAVING: $Q = \frac{3.0 P d^{1.5}}{F} = \frac{3(48)(1.0)^{1.5}}{1.7} = 85 \text{ CFS}$

$Q = 5.37 (40) (1.0)^{0.5} = 215 \text{ CFS}$

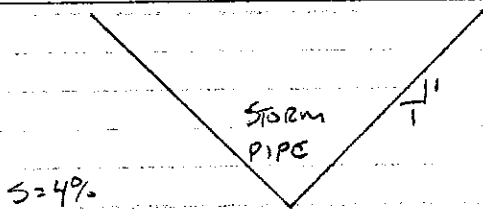
BETWEEN ↑
↓

∴ HAS CAPACITY FOR 47 CFS (ALL 100 YR)

DOWNSTREAM LIMITATION:

48" CMP @ 4.0% = 110 CFS

X & M VALUES FOR REACH:



$H = 14$

$$X = \frac{0.94}{n} \frac{C}{Z^{\frac{1}{2}}}$$

$$= \frac{0.94}{0.024} \frac{(0.04)^{\frac{1}{2}}}{1^{\frac{1}{3}}}$$

$X = 39 (0.2) = 7.8$

$M = 1.33$



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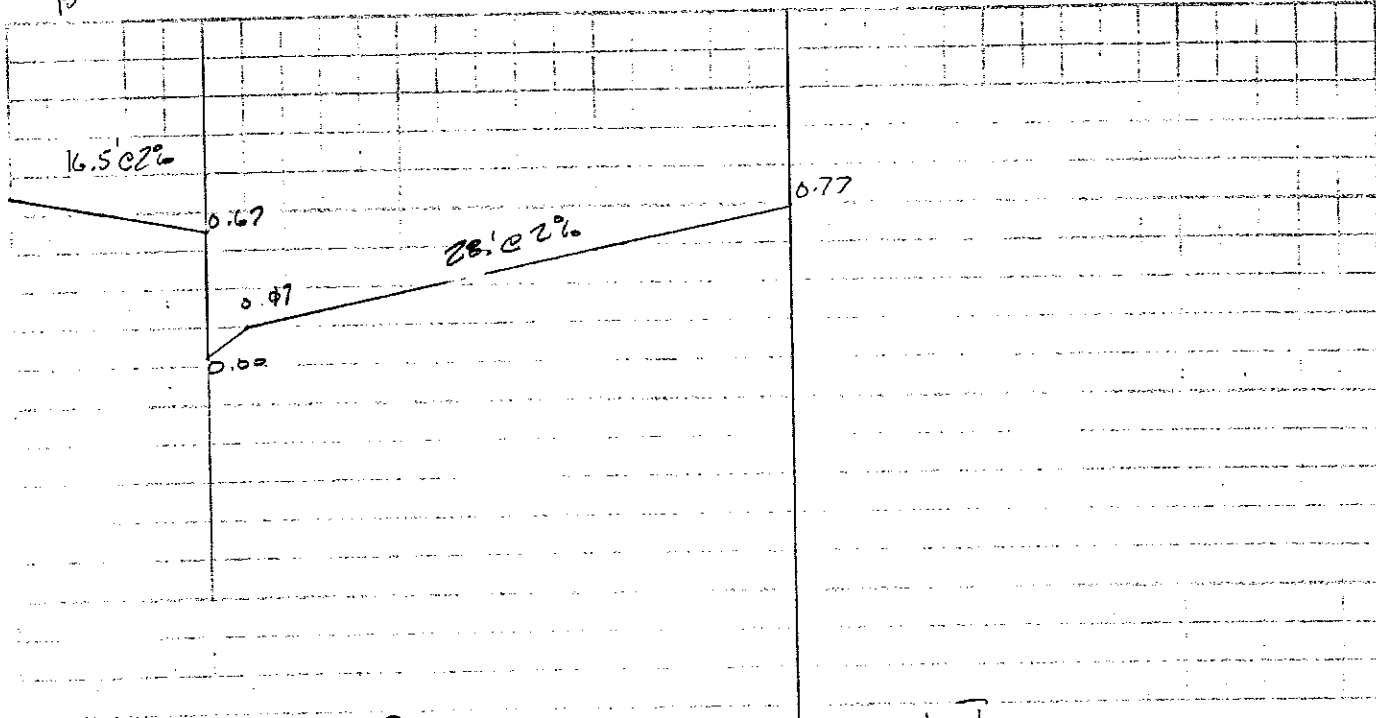
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SUBJECT BASINS 14, 15, 13, 19 - HYDRAULICS

SHEET NO. 5 OF 8



1) SIDE $Q_{0.77} = \left[\frac{1.486}{0.016} (10.02) 0.27 (0.04)^{\frac{1}{2}} \right]$

$A = 0.25 \quad P = 35.67$

1.37

8.40

10.02

$= [92.87 (10.02) 0.42 (0.20)]$

$= 78.37 \text{ cfs}$



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SUBJECT BASIN 17 - HYDRAULICS

SHEET NO. 6 OF 8

$Q_{10} = 36$ $Q_{100} = 65$

2 GRATE INLETS 2' x 10' w/ 36" CMP

6" - 12" SUMP

$S = 3.2\%$ CAP = 65 CFS

w/ 12" PONDING; MIN. CAPACITY =

$$Q = 3.0 \frac{P}{F} d^{1.5} = \frac{3.0 (48 \times 1.0)^{1.5}}{1.7}$$

= 84.7 CFS

∴ HAS CAPACITY FOR 65 CFS TO POND B



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SUBJECT STRUCTURE 04 - POND "A"

SHEET NO. 7 OF 8

	ELEVATION [FT]	DISCHARGE [CFS]	STORAGE [AC-FT]
0	94	0	0
1	96	0	0.0005
2	96	0	0.0056
3	97	0	0.1935
4	98	0	0.5406
5	99	0	1.0806
6	100	0	1.7751
7	101	0	2.5498
8	102	0	3.4121
9	103	0	4.3693
10	104	PIPE: 23	5.4379
11	105	PIPE & SPILL 161	6.6186
12	106	PIPE & SPILL 415	7.900

42" CMP STANDPIPE : INV OUT = 103.21

WEIR FLOW @ 104 : $Q = 3.0 L d^{1.5}$

$= 3.0 (11) 0.79^{1.5} = 23 \text{ CFS}$

105 $= 3.0 (11) 1.79^{1.5} = 79 \text{ CFS}$

106 $= 3.0 (11) 2.79^{1.5} = 154 \text{ CFS}$



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DATE 1.11.89

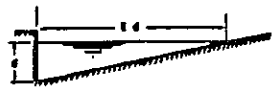
SUBJECT STRUCTURE OS - POND "B"

SHEET NO. 8 OF 8

18" CMP OUTFALL

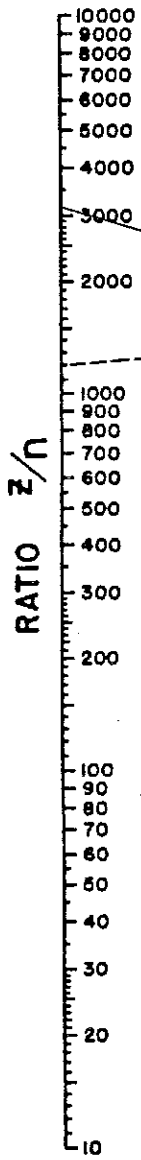
	ELEV.	DISCHARGE	STORAGE
	94.	0.0	0.00
1	95.	3.0	0.01
2	96.	9.0	0.03
3	97.	12.0	0.09
4	98.	15.0	0.17
5	99.	17.0	0.23
6	100.	20.0	0.40
7	101	75.0	0.53

DESIGN CHARTS



EQUATION: $Q = 0.56 (A) S^{1/2} d^{5/2}$
 n IS ROUGHNESS COEFFICIENT IN MANNING FORMULA APPROPRIATE TO MATERIAL IN BOTTOM OF CHANNEL
 S IS RECIPROCAL OF GROSS SLOPE
 REFERENCE: H. R. S. PROCEEDINGS 1948, PAGE 120, EQUATION (14)

EXAMPLE (SEE DASHED LINES)
 GIVEN: $S = 0.03$
 $n = .04$ $Z/n = 1000$
 $d = 0.21$
 FIND: $Q = 20,473$



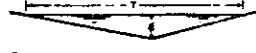
TURNING LINE



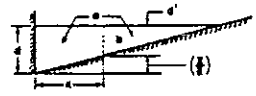
INSTRUCTIONS

1. CONNECT Z/n RATIO WITH SLOPE (S) AND CONNECT DISCHARGE (Q) WITH DEPTH (d). THESE TWO LINES MUST INTERSECT AT TURNING LINE FOR COMPLETE SOLUTION.

2. FOR SHALLOW V-SHAPED CHANNEL AS SHOWN USE NOMOGRAPH WITH $n = \frac{1}{4}$



3. TO DETERMINE DISCHARGE Q_2 IN PORTION OF CHANNEL HAVING WIDTH x : DETERMINE DEPTH d FOR TOTAL DISCHARGE IN ENTIRE SECTION B . THEN USE NOMOGRAPH TO DETERMINE Q_2 IN SECTION x FOR DEPTH $d' = d - (\frac{x}{B})d$



4. TO DETERMINE DISCHARGE IN COMPOSITE SECTION -- FOLLOW INSTRUCTION 3. TO OBTAIN DISCHARGE IN SECTION x AT ASSUMED DEPTH d , OBTAIN Q_1 FOR SLOPE RATIO S_1 AND DEPTH d' THEN $Q_2 = Q_1 + Q_3$

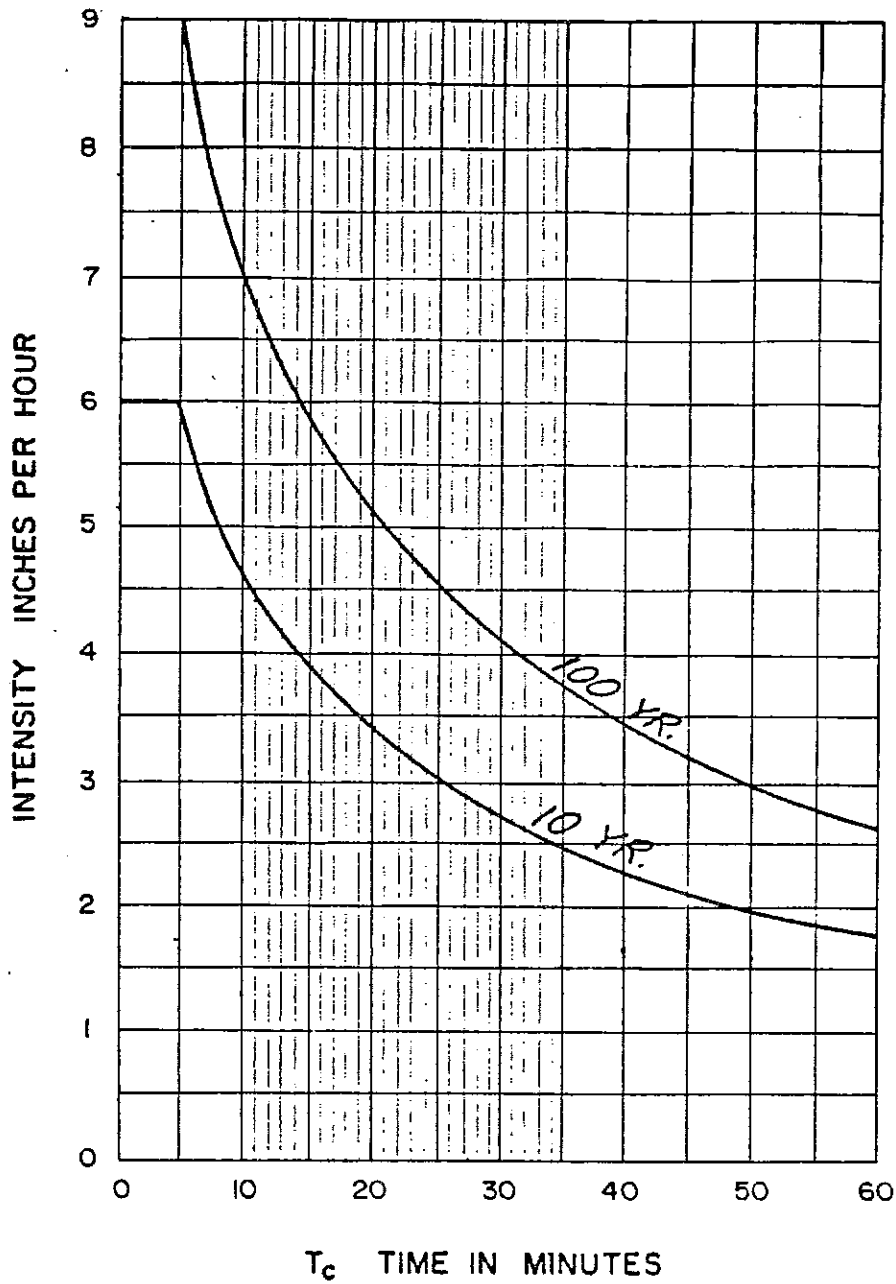


11-15-68
 Denver Regional Council of Governments



The City of Colorado Springs / El Paso County
 Drainage Criteria Manual
 NOMOGRAPH FOR FLOW IN TRIANGULAR GUTTERS.

Date
 OCT. 1987
 Figure
 7 - 2



RE: Based upon Pikes Peak area council of governments/
areawide urban runoff control manual.



HDR Infrastructure, Inc.
A Centerra Company

The City of Colorado Springs / El Paso County
Drainage Criteria Manual

Storm Rainfall
Time Intensity-Frequency Curves

Date

OCT. 1987

Figure

5 - 1

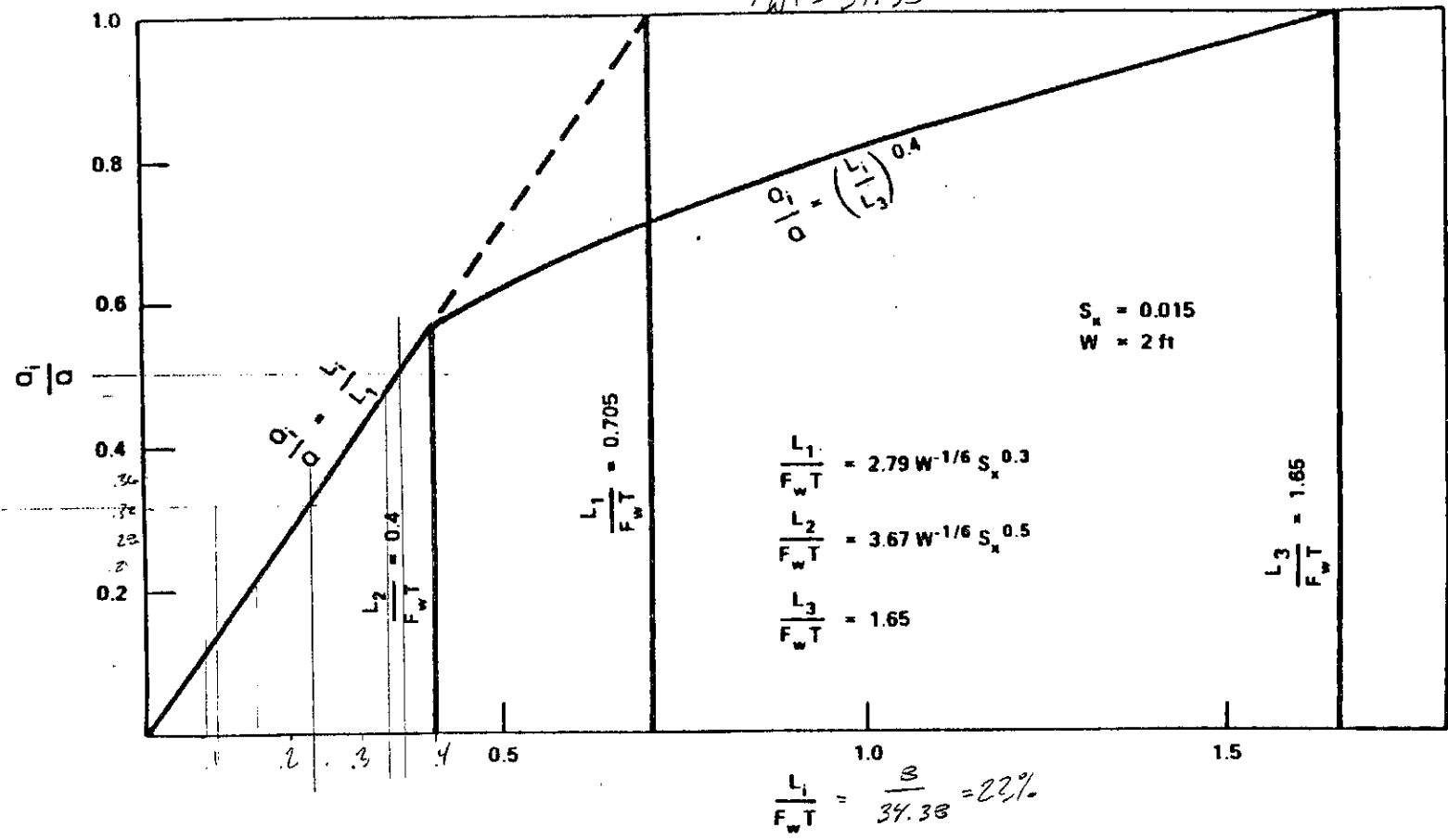
$$L_i = 0'$$

$$\bar{W} = 16.4 \left[(F-L) S_x \right]^{1/2} S_o$$

$$= 16.4 (0.82) .14$$

$$= 1.91$$

$$F_{WT} = 34.33$$



Dimensionless Graph of Q_i/Q vs. L_i/F_{WT}

REFERENCE :

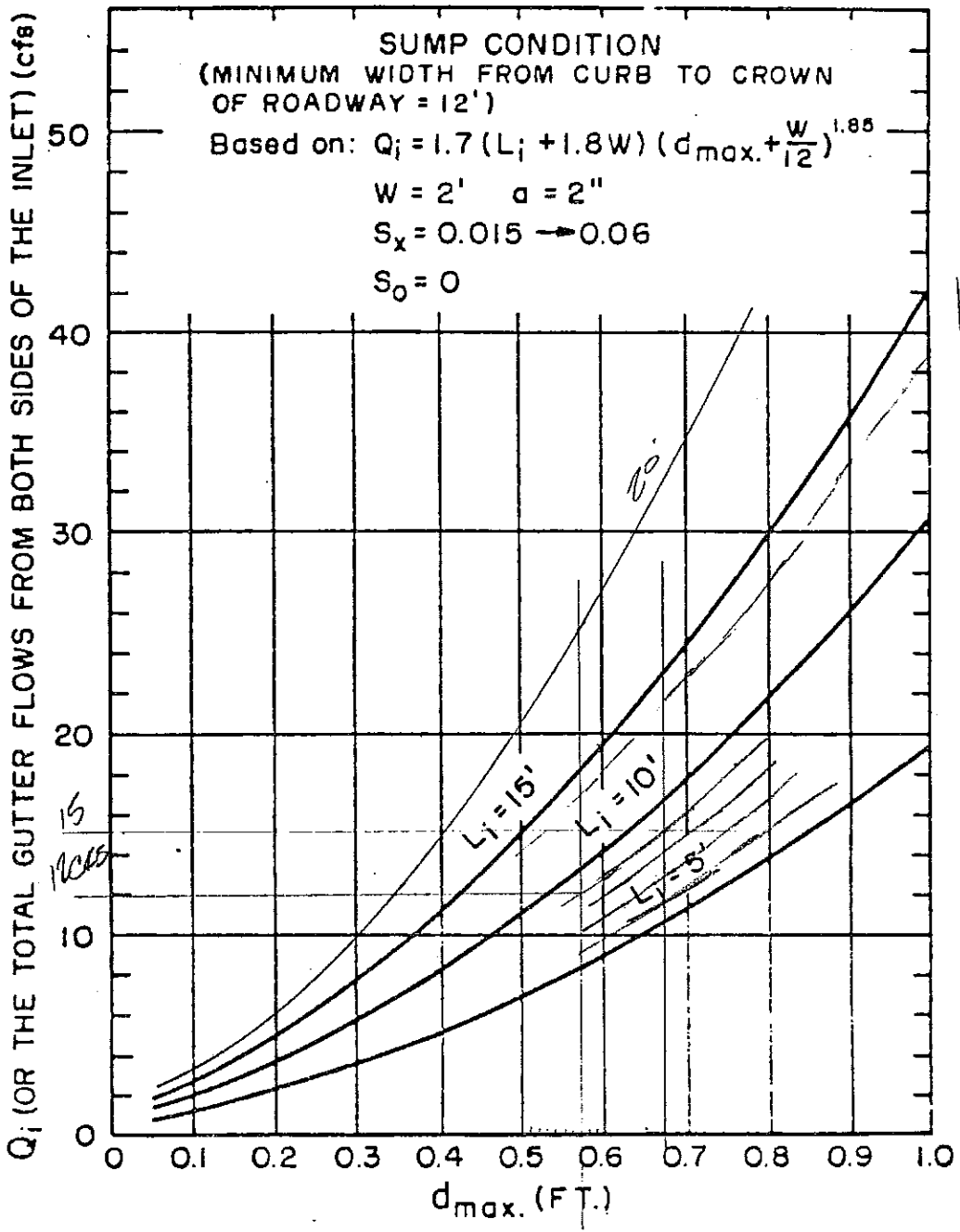
Federal Highway Administration, Hydraulic Engineering Circular No. 12, Washington DC, 1969;
 Drainage of Highway Pavements



The City of Colorado Springs / El Paso County
 Drainage Criteria Manual

Date	OCT. 1987
Figure	7 - 8

6/9



$h_m = \text{MIN H OF OPEN}$
 $20.0' \text{ FOR } S_x = 0.06$

$d_w + a$
 $0.32 + 0.25 = 0.57$
 $0.31 + 0.25 = 0.56$

REFERENCE : Izzard, Carl. F., Report presented at the Annual Meeting of the National Transportation Board, January 1977; Simplified Method For Design of Curb-opening Inlets

Sump Capacity for Curb-opening Inlets



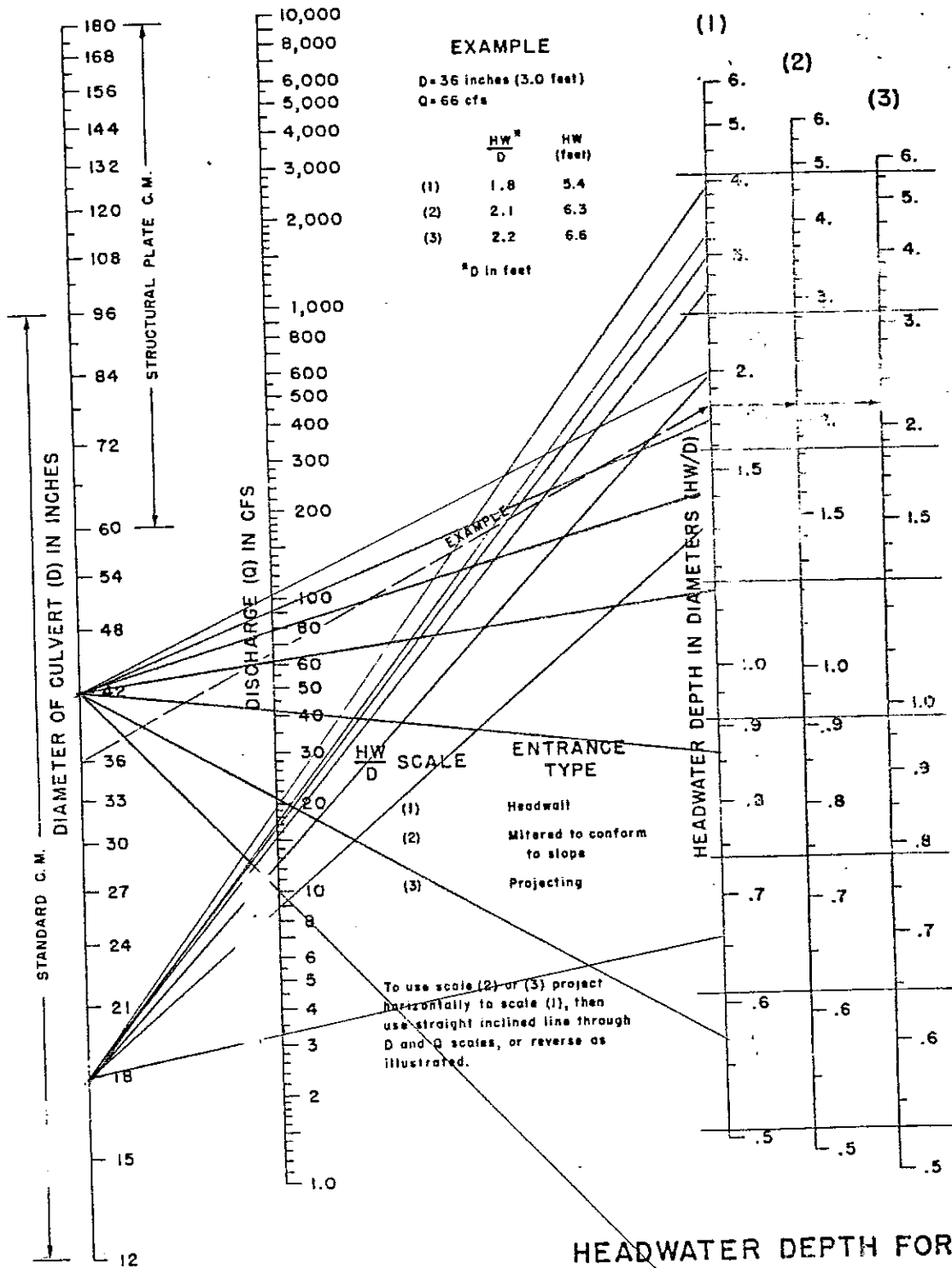
HDR Infrastructure, Inc.
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 Drainage Criteria Manual

Date
 OCT. 1987

Figure
 7 - 11

CHART 5



**HEADWATER DEPTH FOR
C. M. PIPE CULVERTS
WITH INLET CONTROL**

TR-20 MODEL - FULLPRINT

09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
 CORRECT COMBINATION OF RATING TABLES FOR DIVERT
 CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
 ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 1
 REV PC 09/83(1.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 2

EXECUTIVE CONTROL OPERATION INCREM RECORD ID 1100
 + MAIN TIME INCREMENT = .10 HOURS

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID 1110
 + FROM STRUCTURE 1

+ TO XSECTION 11
 STARTING TIME = .00 RAIN DEPTH = 3.20 RAIN DURATION= 1.00 RAIN TABLE NO.= 2 ANT. MOIST. COND= 2
 ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF STRUCTURE 1
 OUTPUT HYDROGRAPH= -6
 AREA= .04 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .32 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0427 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	46.16	(RUNOFF)
7.66	2.39	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 37.88 CFS-HRS, 3.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
 SURFACE ELEVATION= .00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	46.16	(NULL)
7.66	2.39	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 37.88 CFS-HRS, 3.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 1
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 LENGTH = 1.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33
 0 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 1 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	46.16	(NULL)
7.66	2.39	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 37.88 CFS-HRS, 3.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 1
 INPUT HYDROGRAPH = 5 OUTPUT #1 HYDROGRAPH = 7 OUTPUT #2 HYDROGRAPH = 1
 XSECTION = 1 XSECTION = 1 DIVERTED XSECTION = 2

OUTPUT #1 HYDROGRAPH

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 1
 REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	46.16	(DIVERT)
7.66	2.39	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 37.88 CFS-HRS, 3.13 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 2
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 4
 LENGTH = 1900.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, M= 1.33

*** WARNING REACH 2 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF STRUCTURE 2
 OUTPUT HYDROGRAPH= 6
 AREA= .09 SQ MI INPUT RUNOFF CURVE= 83. TIME OF CONCENTRATION= .25 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	127.38	(RUNOFF)
7.66	5.70	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.61 WATERSHED INCHES, 93.30 CFS-HRS, 7.71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
 SURFACE ELEVATION= .00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	127.38	(NULL)
7.66	5.70	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.61 WATERSHED INCHES, 93.30 CFS-HRS, 7.71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 2
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 LENGTH = 250.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, M= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 2 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

1

TR20 XED 01-13-89 10:52	CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY	20	JOB 1	PASS 1
REV PC 09/83(1.2)	24 HR, IIA, 10&100 YEAR, INCREMENT=0.10	21		PAGE 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	127.38	(NULL)
7.66	5.70	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.61 WATERSHED INCHES, 93.30 CFS-HRS, 7.71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 2
 INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	127.38	(NULL)
7.66	5.70	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.11 WATERSHED INCHES, 93.30 CFS-HRS, 7.71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 2
 INPUT HYDROGRAPH = 6 OUTPUT #1 HYDROGRAPH = 2 OUTPUT #2 HYDROGRAPH = 3
 XSECTION = 2 XSECTION = 2 DIVERTED XSECTION = 6

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	127.38	(DIVERT)
7.66	5.70	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.11 WATERSHED INCHES, 93.30 CFS-HRS, 7.71 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF STRUCTURE 3

OUTPUT HYDROGRAPH= 6

AREA= .02 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .25 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.79 25.73 (RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 18.93 CFS-HRS, 1.56 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 3

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7

SURFACE ELEVATION= .00

1

TR20 XEQ 01-13-89 10:52
REV PC 09/83(1.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 PASS 1
PAGE 5

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.79 25.73 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 18.93 CFS-HRS, 1.56 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 3

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5

LENGTH = 1.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

0

*** WARNING REACH 3 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.79 25.73 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 18.93 CFS-HRS, 1.56 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 3

INPUT HYDROGRAPH = 5 OUTPUT #1 HYDROGRAPH = 6 OUTPUT #2 HYDROGRAPH = 7
XSECTION = 3 XSECTION = 3 DIVERTED XSECTION = 4

OUTPUT #1 HYDROGRAPH

+

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.77 22.16 (DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 18.68 CFS-HRS, 1.54 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.80 3.67 (DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = .02 WATERSHED INCHES, .31 CFS-HRS, .03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 4
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
LENGTH = 3300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, M= 1.33
MODIFIED ATT-KIN ROUTING COEFFICIENT = .27 PEAK TRAVEL TIME = .20 HOURS

*** WARNING REACH 4 LENGTH FACTOR (K*) GREATER THAN 1.0, CONSIDER DIVIDING REACH LENGTH ***

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .98 CFS.

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
6.00 .98 (NULL)

TR20 XED 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 1
REV PC 09/83(2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 6

RUNOFF VOLUME ABOVE BASEFLOW = .03 WATERSHED INCHES, .34 CFS-HRS, .03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 4
OUTPUT HYDROGRAPH= 6
AREA= .05 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .25 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.79 64.32 (RUNOFF)
7.66 2.99 (RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 47.32 CFS-HRS, 3.91 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.79 64.32 (NULL)

7.65

3.00

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.05 WATERSHED INCHES, 47.66 CFS-HRS, 3.94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 5

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5

LENGTH = 250.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, N= 1.33

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	64.32	(NULL)
7.65	3.00	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.05 WATERSHED INCHES, 47.66 CFS-HRS, 3.94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 5

INPUT HYDROGRAPH = 5	OUTPUT #1 HYDROGRAPH = 6	OUTPUT #2 HYDROGRAPH = 4
XSECTION = 5	XSECTION = 5	DIVERTED XSECTION = 6

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	64.32	(DIVERT)
7.65	3.00	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.05 WATERSHED INCHES, 47.66 CFS-HRS, 3.94 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 01-13-89 10:52
REV PC 09/83(1.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 PASS 1
PAGE 7

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD STRUCTURE 4

INPUT HYDROGRAPHS= 2,6 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	191.68	105.12
7.66	8.69	102.69
9.66	4.43	98.43
19.65	2.32	96.32
23.55	1.20	95.20

RUNOFF VOLUME ABOVE BASEFLOW = 140.96 CFS-HRS, 11.65 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 7
SURFACE ELEVATION= .00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.11	47.25	104.18

RUNOFF VOLUME ABOVE BASEFLOW = 141.21 CFS-HRS, 11.67 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT STRUCTURE 4
INPUT HYDROGRAPH = 7 OUTPUT #1 HYDROGRAPH = 2 OUTPUT #2 HYDROGRAPH = 1
STRUCTURE = 4 STRUCTURE = 4 DIVERTED XSECTION = 10

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.11	47.25	104.18

RUNOFF VOLUME ABOVE BASEFLOW = 141.21 CFS-HRS, 11.67 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 6

1

TRD XEQ 01-13-89 10:52	CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY	20	JOB 1	PASS 1
REV PC 09/B3(1.2)	24 HR, IIA, 10&100 YEAR, INCREMENT=0.10	21		PAGE 8

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 6
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
LENGTH = 3200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 6
 OUTPUT HYDROGRAPH= 6
 AREA= .03 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .25 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	38.59	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 28.39 CFS-HRS, 2.35 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 6
 INPUT HYDROGRAPHS= 6,7 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	38.59	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .19 WATERSHED INCHES, 28.39 CFS-HRS, 2.35 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 7
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
 LENGTH = 600.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 7.80, N= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 7 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.11	47.25	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .19 WATERSHED INCHES, 141.21 CFS-HRS, 11.67 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 7
 OUTPUT HYDROGRAPH= 4
 AREA= .02 SQ MI INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .25 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	24.48	(RUNOFF)

1

TRZO XED 01-13-89 10:52	CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY	20	JOB 1	PASS 1
REV PC 09/83(1.2)	24 HR, IIA, 10&100 YEAR, INCREMENT=0.10	21		PAGE 9

RUNOFF VOLUME ABOVE BASEFLOW = 1.40 WATERSHED INCHES, 18.06 CFS-HRS, 1.49 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 7
 INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
6.10 52.15 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 12.34 WATERSHED INCHES, 159.27 CFS-HRS, 13.16 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 7
 INPUT HYDROGRAPH = 2 OUTPUT #1 HYDROGRAPH = 3 OUTPUT #2 HYDROGRAPH = 4
 XSECTION = 7 XSECTION = 7 DIVERTED XSECTION = 6

+ OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
6.10 52.15 (DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 12.34 WATERSHED INCHES, 159.27 CFS-HRS, 13.16 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF STRUCTURE 5
 OUTPUT HYDROGRAPH= 6
 AREA= .03 SQ MI INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .25 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.79 36.71 (RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.40 WATERSHED INCHES, 27.09 CFS-HRS, 2.24 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 5
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
 SURFACE ELEVATION= .00

*** WARNING - STRUCTURE 5 DELTA T IS TOO LARGE. D /2 > S /DELTA T OCCURED 1 TIMES STARTING WITH POINT245

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.92 22.41 100.04

RUNOFF VOLUME ABOVE BASEFLOW = 1.41 WATERSHED INCHES, 27.29 CFS-HRS, 2.26 ACRE-FEET; BASEFLOW = .00 CFS

1

TR20 XEQ 01-13-89 10:52
REV PC 09/83(1.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 PASS 1
PAGE 10

OPERATION ADDHYD CROSS SECTION 6
 INPUT HYDROGRAPHS= 7,4 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.79 38.59 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .16 WATERSHED INCHES, 28.39 CFS-HRS, 2.35 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 6
 INPUT HYDROGRAPH = 6 OUTPUT #1 HYDROGRAPH = 7 OUTPUT #2 HYDROGRAPH = 5
 XSECTION = 6 XSECTION = 6 DIVERTED XSECTION = 20

+ OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.79 38.59 (DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = .16 WATERSHED INCHES, 28.39 CFS-HRS, 2.35 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 6
 INPUT HYDROGRAPH = 5 OUTPUT #1 HYDROGRAPH = 6 OUTPUT #2 HYDROGRAPH = 4
 XSECTION = 6 XSECTION = 6 DIVERTED XSECTION = 30

+ OUTPUT #1 HYDROGRAPH

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 9
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 3
 LENGTH = 1100.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33

*** WARNING REACH 9 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

1

OPERATION ADDHYD CROSS SECTION 9
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.09	70.43	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.03 WATERSHED INCHES, 186.56 CFS-HRS, 15.42 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 10
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 2
LENGTH = 3250.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33

*** WARNING REACH 10 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 10
OUTPUT HYDROGRAPH= 3
AREA= .11 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .33 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0440 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.83	124.76	(RUNOFF)
7.66	6.58	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 104.22 CFS-HRS, 8.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 10
INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.83	124.76	(NULL)
7.66	6.58	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.47 WATERSHED INCHES, 104.22 CFS-HRS, 8.61 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 10
INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.85	177.32	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.16 WATERSHED INCHES, 290.77 CFS-HRS, 24.03 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XED 01-13-89 10:52
REV PC 09/83(.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 PASS 1
PAGE 13

OPERATION DIVERT CROSS SECTION 10
INPUT HYDROGRAPH = 3 OUTPUT #1 HYDROGRAPH = 6 OUTPUT #2 HYDROGRAPH = 5
XSECTION = 10 XSECTION = 10 DIVERTED XSECTION = 15

+ OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.85 177.32 (DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.16 WATERSHED INCHES, 290.77 CFS-HRS, 24.03 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 11
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 7.80, M= 1.33
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

0 *** WARNING REACH 11 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.85 177.32 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 290.77 CFS-HRS, 24.03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 11
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 4
LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33

*** WARNING REACH 11 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

RUNOFF VOLUME ABOVE BASEFLOW = .00 WATERSHED INCHES, .00 CFS-HRS, .00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11
INPUT HYDROGRAPHS= 4,7 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.85 177.32 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.16 WATERSHED INCHES, 290.77 CFS-HRS, 24.03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 11

1

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 1
 REV PC 09/83(.2) 24 HR, IIA, 10%100 YEAR, INCREMENT=0.10 21 PAGE 14

OUTPUT HYDROGRAPH= 1
 AREA= .07 SQ MI INPUT RUNOFF CURVE= 83. TIME OF CONCENTRATION= .30 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0400 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.81	92.14	(RUNOFF)
7.66	4.42	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 1.61 WATERSHED INCHES, 72.62 CFS-HRS, 6.00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11

INPUT HYDROGRAPHS= 1,5 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.83	268.26	(NULL)
12.48	12.87	(NULL)
20.96	5.94	(NULL)
23.49	3.46	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.22 WATERSHED INCHES, 363.40 CFS-HRS, 30.03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 11

OUTPUT HYDROGRAPH= 6
 AREA= .04 SQ MI INPUT RUNOFF CURVE= 98. TIME OF CONCENTRATION= .17 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0227 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.68	97.37	(RUNOFF)
7.65	3.30	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.94 WATERSHED INCHES, 75.80 CFS-HRS, 6.26 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11

INPUT HYDROGRAPHS= 2,6 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.79	355.81	(NULL)
12.48	14.12	(NULL)
13.47	12.89	(NULL)
20.97	6.37	(NULL)
23.49	3.89	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.36 WATERSHED INCHES, 439.19 CFS-HRS, 36.29 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP

RECORD ID 1120

COMPUTATIONS COMPLETED FOR PASS 1

TR20 XEQ 01-13-89 10:52
REV PC 09/83(1.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 PASS 2
PAGE 15

EXECUTIVE CONTROL OPERATION COMPUT

RECORD ID 1130

FROM STRUCTURE 1

TO XSECTION 11

STARTING TIME = .00 RAIN DEPTH = 4.50 RAIN DURATION= 1.00 RAIN TABLE NO.= 2 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 2 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF STRUCTURE 1

OUTPUT HYDROGRAPH= 6

AREA= .04 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .32 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0427 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.81	81.79	(RUNOFF)
7.65	3.81	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 65.71 CFS-HRS, 5.43 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7

SURFACE ELEVATION= .00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.81	81.79	(NULL)
7.65	3.81	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 65.71 CFS-HRS, 5.43 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 1

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5

LENGTH = 1.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 1 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.81	81.79	(NULL)
7.65	3.81	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 65.71 CFS-HRS, 5.43 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 1
 INPUT HYDROGRAPH = 5 OUTPUT #1 HYDROGRAPH = 7 OUTPUT #2 HYDROGRAPH = 1
 XSECTION = 1 XSECTION = 1 DIVERTED XSECTION = 2

OUTPUT #1 HYDROGRAPH

TR20 XED 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
 REV FC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.70	46.00	(DIVERT)
	*	* FIRST POINT OF FLAT PEAK
7.65	3.81	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 56.95 CFS-HRS, 4.71 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.81	35.79	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = .34 WATERSHED INCHES, 8.76 CFS-HRS, .72 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 2
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 4
 LENGTH = 1900.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, N= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .92 PEAK TRAVEL TIME = .10 HOURS

*** WARNING REACH 2 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.92	34.67	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .31 WATERSHED INCHES, 8.02 CFS-HRS, .66 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF STRUCTURE 2
 OUTPUT HYDROGRAPH= 6
 AREA= .09 SQ MI INPUT RUNOFF CURVE= 83. TIME OF CONCENTRATION= .25 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.78	216.25	(RUNOFF)
7.66	8.89	(RUNOFF)
9.66	4.50	(RUNOFF)
19.65	2.32	(RUNOFF)
23.55	1.19	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.72 WATERSHED INCHES, 158.03 CFS-HRS, 13.06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVDOR STRUCTURE 2
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
 SURFACE ELEVATION= .00

1

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
 REV PC 09/83(1.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 17

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.78	216.25	(NULL)
7.66	8.89	(NULL)
9.66	4.50	(NULL)
19.65	2.32	(NULL)
23.55	1.19	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.72 WATERSHED INCHES, 158.03 CFS-HRS, 13.06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 2
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 LENGTH = 250.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, M= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

0

*** WARNING REACH 2 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.78	216.25	(NULL)
7.66	8.89	(NULL)
9.66	4.50	(NULL)
19.65	2.32	(NULL)
23.55	1.19	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.72 WATERSHED INCHES, 158.03 CFS-HRS, 13.06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 2
 INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	233.61	(NULL)

7.66	8.89	(NULL)
9.66	4.50	(NULL)
19.65	2.32	(NULL)
23.55	1.19	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.98 WATERSHED INCHES, 166.05 CFS-HRS, 13.72 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 2
 INPUT HYDROGRAPH = 6 OUTPUT #1 HYDROGRAPH = 2 OUTPUT #2 HYDROGRAPH = 3
 XSECTION = 2 XSECTION = 2 DIVERTED XSECTION = 6

OUTPUT #1 HYDROGRAPH

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
 REV PC 09/83(1.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 18

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.70	168.00	(DIVERT)
	*	* FIRST POINT OF FLAT PEAK
7.66	8.89	(DIVERT)
9.66	4.50	(DIVERT)
19.65	2.32	(DIVERT)
23.55	1.19	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.98 WATERSHED INCHES, 155.70 CFS-HRS, 12.87 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	65.61	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = .12 WATERSHED INCHES, 10.35 CFS-HRS, .86 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF STRUCTURE 3
 OUTPUT HYDROGRAPH= 6
 AREA= .02 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .25 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.78	44.94	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.54 WATERSHED INCHES, 32.83 CFS-HRS, 2.71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVDR STRUCTURE 3
 INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7

SURFACE ELEVATION= .00

PEAK TIME(HRS) 5.78 PEAK DISCHARGE(CFS) 44.94 PEAK ELEVATION(FEET) (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.54 WATERSHED INCHES, 32.83 CFS-HRS, 2.71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 3
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
LENGTH = 1.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 3 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS) 5.78 PEAK DISCHARGE(CFS) 44.94 PEAK ELEVATION(FEET) (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.54 WATERSHED INCHES, 32.83 CFS-HRS, 2.71 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 19

OPERATION DIVERT CROSS SECTION 3
INPUT HYDROGRAPH = 5 OUTPUT #1 HYDROGRAPH = 6 OUTPUT #2 HYDROGRAPH = 7
XSECTION = 3 XSECTION = 3 DIVERTED XSECTION = 4

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) 5.60 PEAK DISCHARGE(CFS) 22.00 PEAK ELEVATION(FEET) (DIVERT)

* FIRST POINT OF FLAT PEAK

RUNOFF VOLUME ABOVE BASEFLOW = 2.54 WATERSHED INCHES, 27.15 CFS-HRS, 2.24 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

PEAK TIME(HRS) 5.78 PEAK DISCHARGE(CFS) 22.94 PEAK ELEVATION(FEET) (DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = .44 WATERSHED INCHES, 5.68 CFS-HRS, .47 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 4
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
LENGTH = 3300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, M= 1.33
MODIFIED ATT-KIN ROUTING COEFFICIENT = .61 PEAK TRAVEL TIME = .12 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.91	18.57	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .45 WATERSHED INCHES, 5.78 CFS-HRS, .48 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 4

OUTPUT HYDROGRAPH= 6
 AREA= .05 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .25 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.78	112.36	(RUNOFF)
7.66	4.76	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.54 WATERSHED INCHES, 82.08 CFS-HRS, 6.78 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	123.79	(NULL)
7.66	4.76	(NULL)

TR20 XED 01-13-89 10:52	CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY	20	JOB 1	PASS 2
REV PC 09/83(1.2)	24 HR, IIA, 10&100 YEAR, INCREMENT=0.10	21		PAGE 20

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 87.86 CFS-HRS, 7.26 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 5

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 LENGTH = 250.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 3.90, N= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 5 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	123.79	(NULL)
7.66	4.76	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 87.86 CFS-HRS, 7.26 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 5

INPUT HYDROGRAPH = 5 OUTPUT #1 HYDROGRAPH = 6 OUTPUT #2 HYDROGRAPH = 4
 XSECTION = 5 XSECTION = 5 DIVERTED XSECTION = 6

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.70	86.00	(DIVERT)
	*	* FIRST POINT OF FLAT PEAK
7.66	4.76	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 81.32 CFS-HRS, 6.72 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	37.79	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = .14 WATERSHED INCHES, 6.54 CFS-HRS, .54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD STRUCTURE 4
 INPUT HYDROGRAPHS= 2,6 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.70	254.00	105.37
	*	* FIRST POINT OF FLAT PEAK
7.66	13.66	103.33
9.66	6.92	100.92
19.65	3.57	97.57
23.55	1.83	95.83

RUNOFF VOLUME ABOVE BASEFLOW = .14 WATERSHED INCHES, 237.03 CFS-HRS, 19.59 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 01-13-89 10:52	CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY	20	JOB 1	PASS 2
REV PC 09/83(1.2)	24 HR, IIA, 10&100 YEAR, INCREMENT=0.10	21		PAGE 21

OPERATION RESVDR STRUCTURE 4
 INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 7
 SURFACE ELEVATION= .00

*** WARNING-RAIN TIME INCREMENT MAY BE TOO LARGE.
 COMPUTED PEAK(221.15) AT STRUCTURE 4 EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 7 %.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.95	221.15	105.24

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
5.00	DISCHG	.00 .00	.00 .08	1.67 4.72 6.75	8.82 84.60	206.40
6.00	DISCHG	205.13 133.94	85.75 57.70	42.29 32.33 26.03	22.96 22.68	22.27

7.00	DISCHG	21.63	20.87	20.12	19.42	18.78	18.22	17.71	17.26	16.85	16.35
8.00	DISCHG	15.64	14.80	13.98	13.22	12.53	11.91	11.36	10.87	10.43	10.04
9.00	DISCHG	9.70	9.39	9.11	8.99	8.97	8.96	8.94	8.92	8.91	8.89
10.00	DISCHG	8.86	8.84	8.81	8.78	8.75	8.72	8.69	8.66	8.63	8.60
11.00	DISCHG	8.58	8.55	8.52	8.49	8.47	8.44	8.41	8.39	8.36	8.34
12.00	DISCHG	8.31	8.28	8.26	8.23	8.21	8.19	8.16	8.14	8.11	8.09
13.00	DISCHG	8.06	8.03	8.01	7.98	7.94	7.91	7.88	7.85	7.82	7.79
14.00	DISCHG	7.76	7.73	7.70	7.66	7.63	7.60	7.57	7.54	7.51	7.48
15.00	DISCHG	7.44	7.41	7.37	7.34	7.30	7.27	7.24	7.20	7.17	7.14
16.00	DISCHG	7.10	7.07	7.04	7.01	6.97	6.93	6.89	6.85	6.81	6.77
17.00	DISCHG	6.73	6.69	6.66	6.62	6.58	6.55	6.51	6.48	6.44	6.41
18.00	DISCHG	6.38	6.34	6.31	6.28	6.25	6.21	6.18	6.15	6.12	6.09
19.00	DISCHG	6.06	6.03	6.00	5.97	5.95	5.92	5.89	5.86	5.84	5.80
20.00	DISCHG	5.77	5.72	5.68	5.63	5.59	5.54	5.50	5.46	5.41	5.37
21.00	DISCHG	5.33	5.29	5.25	5.21	5.16	5.13	5.09	5.05	5.01	4.97
22.00	DISCHG	4.92	4.88	4.84	4.80	4.75	4.71	4.67	4.64	4.60	4.56
23.00	DISCHG	4.52	4.48	4.45	4.41	4.37	4.34	4.30	4.27	4.23	4.19
24.00	DISCHG	4.15	4.09	4.04	3.92	3.61	3.32	3.06	2.81	2.59	2.39
25.00	DISCHG	2.20	2.02	1.86	1.71	1.58	1.45	1.34	1.23	1.13	1.04
26.00	DISCHG	.96	.88	.81	.75	.69	.64	.58	.54	.50	.46
27.00	DISCHG	.42	.39	.36	.33	.30	.28	.26	.24	.22	.20
28.00	DISCHG	.18	.17	.16	.14	.13	.12	.11	.10	.09	.09
29.00	DISCHG	.08	.07	.07	.06	.06	.05	.05	.05	.04	.04

RUNOFF VOLUME ABOVE BASEFLOW = .14 WATERSHED INCHES, 236.62 CFS-HRS, 19.55 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT STRUCTURE 4
 INPUT HYDROGRAPH = 7 OUTPUT #1 HYDROGRAPH = 2 OUTPUT #2 HYDROGRAPH = 1
 STRUCTURE = 4 STRUCTURE = 4 DIVERTED XSECTION = 10

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.90 96.00 104.53

* *
 * FIRST POINT OF FLAT PEAK

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
 REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 22

RUNOFF VOLUME ABOVE BASEFLOW = .14 WATERSHED INCHES, 209.57 CFS-HRS, 17.32 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

*** WARNING-MAIN TIME INCREMENT MAY BE TOO LARGE.

COMPUTED PEAK(123.73) AT EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 12 %.
 STRUCTURE 4

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.95 123.73 (DIVERT)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .00 SQ.MI.
5.00 DISCHG .00 .00 .00 .00 .00 .00 .00 .00 110.40
6.00 DISCHG 109.13 37.94 .00

RUNOFF VOLUME ABOVE BASEFLOW = .14 WATERSHED INCHES, 27.05 CFS-HRS, 2.24 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.80 103.39 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .13 WATERSHED INCHES, 16.89 CFS-HRS, 1.40 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 6
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7
LENGTH = 3200.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33
MODIFIED ATT-KIN ROUTING COEFFICIENT = .67 PEAK TRAVEL TIME = .10 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.91 78.64 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .14 WATERSHED INCHES, 18.31 CFS-HRS, 1.51 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 6
OUTPUT HYDROGRAPH= 6
AREA= .03 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .25 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.78 67.42 (RUNOFF)
7.66 2.86 (RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.54 WATERSHED INCHES, 49.25 CFS-HRS, 4.07 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XED 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
REV PC 09/83(1.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 23

OPERATION ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 6,7 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.89 127.18 (NULL)

7.66

2.86

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .46 WATERSHED INCHES, 67.56 CFS-HRS, 5.58 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 7
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 3
LENGTH = 600.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 7.80, M= 1.33
MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 7 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS) 5.90
PEAK DISCHARGE(CFS) 96.00
PEAK ELEVATION(FEET) (NULL)

* FIRST POINT OF FLAT PEAK

RUNOFF VOLUME ABOVE BASEFLOW = .46 WATERSHED INCHES, 209.57 CFS-HRS, 17.32 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 7
OUTPUT HYDROGRAPH= 4
AREA= .02 SQ MI INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .25 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS) 5.78
PEAK DISCHARGE(CFS) 43.40
PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.46 WATERSHED INCHES, 31.72 CFS-HRS, 2.62 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 7
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 2

*** WARNING-MAIN TIME INCREMENT MAY BE TOO LARGE.

COMPUTED PEAK(137.78) AT XSECTION 7 EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 7 %.

PEAK TIME(HRS) 5.85
PEAK DISCHARGE(CFS) 137.78
PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.02 SQ.MI.
5.00	DISCHG	.00 .00 .00	.19	5.43	19.57	34.25
6.00	DISCHG	111.46 104.61 91.78	62.70	46.32	35.54	28.94
7.00	DISCHG	23.71 22.81 22.00	21.28	20.64	20.08	19.57
8.00	DISCHG	16.81 15.83 14.95	14.17	13.47	12.85	12.30
9.00	DISCHG	10.64 10.33 10.06	9.94	9.92	9.90	9.89

TR20 XED 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 24

10.00 DISCHG 9.64 9.58 9.53 9.49 9.46 9.44 9.41 9.37 9.34 9.32

11.00	DISCHG	9.30	9.27	9.24	9.20	9.18	9.16	9.14	9.10	9.07	9.05
12.00	DISCHG	9.03	9.01	8.98	8.95	8.93	8.91	8.89	8.86	8.83	8.77
13.00	DISCHG	8.72	8.68	8.63	8.60	8.57	8.55	8.52	8.48	8.44	8.40
14.00	DISCHG	8.35	8.31	8.28	8.25	8.21	8.18	8.15	8.12	8.09	8.02
15.00	DISCHG	7.95	7.90	7.86	7.83	7.79	7.76	7.72	7.69	7.66	7.62
16.00	DISCHG	7.59	7.56	7.52	7.49	7.45	7.41	7.37	7.33	7.30	7.26
17.00	DISCHG	7.22	7.18	7.15	7.11	7.07	7.04	7.00	6.97	6.93	6.90
18.00	DISCHG	6.87	6.83	6.80	6.77	6.74	6.70	6.67	6.64	6.61	6.58
19.00	DISCHG	6.55	6.52	6.49	6.47	6.44	6.41	6.38	6.35	6.32	6.21
20.00	DISCHG	6.08	6.00	5.93	5.88	5.83	5.80	5.75	5.70	5.65	5.62
21.00	DISCHG	5.58	5.54	5.49	5.45	5.41	5.38	5.34	5.29	5.25	5.21
22.00	DISCHG	5.17	5.13	5.08	5.04	5.00	4.97	4.93	4.88	4.84	4.80
23.00	DISCHG	4.77	4.73	4.69	4.65	4.62	4.59	4.55	4.51	4.46	4.34
24.00	DISCHG	4.21	4.12	4.05	3.92	3.61	3.32	3.06	2.81	2.59	2.39
25.00	DISCHG	2.20	2.02	1.86	1.71	1.58	1.45	1.34	1.23	1.13	1.04
26.00	DISCHG	.96	.88	.81	.75	.69	.64	.58	.54	.50	.46
27.00	DISCHG	.42	.39	.36	.33	.30	.28	.26	.24	.22	.20
28.00	DISCHG	.18	.17	.16	.14	.13	.12	.11	.10	.09	.09
29.00	DISCHG	.08	.07	.07	.06	.06	.05	.05	.05	.04	.04

RUNOFF VOLUME ABOVE BASEFLOW = 18.69 WATERSHED INCHES, 241.29 CFS-HRS, 19.94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 7
 INPUT HYDROGRAPH = 2 OUTPUT #1 HYDROGRAPH = 3 OUTPUT #2 HYDROGRAPH = 4
 XSECTION = 7 XSECTION = 7 DIVERTED XSECTION = 6

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.80 110.00 (DIVERT)

* FIRST POINT OF FLAT PEAK

RUNOFF VOLUME ABOVE BASEFLOW = 18.69 WATERSHED INCHES, 237.68 CFS-HRS, 19.64 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

*** WARNING-MAIN TIME INCREMENT MAY BE TOO LARGE.

COMPUTED PEAK(19.84) AT XSECTION 7 EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 11 %.

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.85 19.84 (DIVERT)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .02 SQ.MI.
 5.00 DISCHG .00 .00 .00 .00 .00 .00 .00 .00 17.72 17.45
 6.00 DISCHG 1.46 .00

RUNOFF VOLUME ABOVE BASEFLOW = .28 WATERSHED INCHES, 3.63 CFS-HRS, .30 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF STRUCTURE 5

OUTPUT HYDROGRAPH= 6

AREA= .03 SQ MI INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .25 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0333 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.78	65.10	(RUNOFF)
7.66	2.80	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.46 WATERSHED INCHES, 47.58 CFS-HRS, 3.93 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 5

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7

SURFACE ELEVATION= .00

*** WARNING - STRUCTURE 5 DELTA T IS TOO LARGE. D / 2 > S / DELTA T OCCURED 1 TIMES STARTING WITH POINT245

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	69.51	100.90
7.66	2.80	94.93

RUNOFF VOLUME ABOVE BASEFLOW = 2.43 WATERSHED INCHES, 47.13 CFS-HRS, 3.90 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 8

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

LENGTH = 1.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 7.80, M= 1.33

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 8 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	69.51	(NULL)
7.66	2.80	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.43 WATERSHED INCHES, 47.13 CFS-HRS, 3.90 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 8

INPUT HYDROGRAPHS= 6,3 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.84	186.14	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 14.71 WATERSHED INCHES, 284.81 CFS-HRS, 23.54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 8

INPUT HYDROGRAPH = 7 OUTPUT #1 HYDROGRAPH = 2 OUTPUT #2 HYDROGRAPH = 3

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 26

XSECTION = 8 XSECTION = 8 DIVERTED XSECTION = 6

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.80 110.00 (DIVERT)
* * FIRST POINT OF FLAT PEAK

RUNOFF VOLUME ABOVE BASEFLOW = 14.71 WATERSHED INCHES, 269.37 CFS-HRS, 22.26 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

*** WARNING-MAIN TIME INCREMENT MAY BE TOO LARGE.
COMPUTED PEAK(72.55) AT XSECTION 8 EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 5 %.

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.83 72.55 (DIVERT)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .03 SQ.MI.
5.00 DISCHG .00 .00 .00 .00 .00 .00 .00 .00 68.47 52.52
6.00 DISCHG 30.46 13.82 .00

RUNOFF VOLUME ABOVE BASEFLOW = .80 WATERSHED INCHES, 15.44 CFS-HRS, 1.28 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 5,3 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.87 183.82 (NULL)
7.66 2.86 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .49 WATERSHED INCHES, 83.00 CFS-HRS, 6.86 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 7,4 OUTPUT HYDROGRAPH= 6

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
5.86 203.12 (NULL)
7.66 2.86 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .48 WATERSHED INCHES, 86.60 CFS-HRS, 7.16 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 6
 INPUT HYDROGRAPH = 6 OUTPUT #1 HYDROGRAPH = 7 OUTPUT #2 HYDROGRAPH = 5
 XSECTION = 6 XSECTION = 6 DIVERTED XSECTION = 20

TR20 XED 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
 REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 27

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	100.00	(DIVERT)
	*	* FIRST POINT OF FLAT PEAK
7.66	2.86	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = .48 WATERSHED INCHES, 68.08 CFS-HRS, 5.63 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

*** WARNING-RAIN TIME INCREMENT MAY BE TOO LARGE.
 COMPUTED PEAK(103.12) AT XSECTION 6 EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 6 %.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.86	103.12	(DIVERT)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.28 SQ.MI.
5.00 DISCHG	.00	.00	.00	.00	.00	80.34
6.00 DISCHG	4.51	.00				96.47

RUNOFF VOLUME ABOVE BASEFLOW = .10 WATERSHED INCHES, 18.59 CFS-HRS, 1.54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 6
 INPUT HYDROGRAPH = 5 OUTPUT #1 HYDROGRAPH = 6 OUTPUT #2 HYDROGRAPH = 4
 XSECTION = 6 XSECTION = 6 DIVERTED XSECTION = 30

OUTPUT #1 HYDROGRAPH

*** WARNING-RAIN TIME INCREMENT MAY BE TOO LARGE.
 COMPUTED PEAK(67.50) AT XSECTION 6 EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 12 %.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.85	67.50	(DIVERT)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .00 SQ.MI.
 5.00 DISCHG .00 .00 .00 .00 .00 .00 .00 60.00 60.00
 6.00 DISCHG 4.51 .00

RUNOFF VOLUME ABOVE BASEFLOW = .10 WATERSHED INCHES, 12.38 CFS-HRS, 1.02 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.88 37.45 (DIVERT)

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
 REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 28

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .28 SQ.MI.
 5.00 DISCHG .00 .00 .00 .00 .00 .00 .00 20.34 36.47
 6.00 DISCHG .00

RUNOFF VOLUME ABOVE BASEFLOW = .03 WATERSHED INCHES, 6.22 CFS-HRS, .51 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 9
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 3
 LENGTH = 1100.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 9 ATT-KIN COEFF. (C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.88 37.45 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .03 WATERSHED INCHES, 6.22 CFS-HRS, .51 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 9
 INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 5.88 147.45 (NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.53 WATERSHED INCHES, 275.59 CFS-HRS, 22.77 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 10
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 2
 LENGTH = 3250.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .67 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)

6.09

97.74

(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.53 WATERSHED INCHES, 25.09 CFS-HRS, 2.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 10

OUTPUT HYDROGRAPH= 3

AREA= .11 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .33 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0440 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	221.33	(RUNOFF)
7.65	10.47	(RUNOFF)
9.66	5.31	(RUNOFF)
19.65	2.75	(RUNOFF)
23.59	1.40	(RUNOFF)

1

TR20 XED 01-13-89 10:52
REV PC 09/83(.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 PASS 2
PAGE 29

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 180.79 CFS-HRS, 14.94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 10

INPUT HYDROGRAPHS= 2,3 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.82	221.33	(NULL)
5.96	207.84	(NULL)
7.65	10.47	(NULL)
9.66	5.31	(NULL)
19.65	2.75	(NULL)
23.59	1.40	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.90 WATERSHED INCHES, 205.88 CFS-HRS, 17.01 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 10

INPUT HYDROGRAPHS= 4,5 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.85	361.11	(NULL)
12.53	14.04	(NULL)
13.48	13.02	(NULL)
23.48	6.35	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.91 WATERSHED INCHES, 481.47 CFS-HRS, 39.79 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION DIVERT CROSS SECTION 10

INPUT HYDROGRAPH = 3
XSECTION = 10

OUTPUT #1 HYDROGRAPH = 6
XSECTION = 10

OUTPUT #2 HYDROGRAPH = 5
DIVERTED XSECTION = 15

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	287.00	(DIVERT)
	*	* FIRST POINT OF FLAT PEAK
12.53	14.04	(DIVERT)
13.48	13.02	(DIVERT)
23.48	6.35	(DIVERT)

RUNOFF VOLUME ABOVE BASEFLOW = 1.91 WATERSHED INCHES, 467.28 CFS-HRS, 38.62 ACRE-FEET; BASEFLOW = .00 CFS

OUTPUT #2 DIVERTED HYDROGRAPH FOLLOWS

*** WARNING-MAIN TIME INCREMENT MAY BE TOO LARGE.

COMPUTED PEAK(70.58) AT XSECTION 10 EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 10 %.

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 PASS 2
REV PC 09/83(.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 30

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.84	70.58	(DIVERT)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.39 SQ.MI.
5.00	DISCHG	.00 .00 .00 .00	.00 .00 .00 .00	.00 63.80 60.40		
6.00	DISCHG	28.24 .00				

RUNOFF VOLUME ABOVE BASEFLOW = .06 WATERSHED INCHES, 14.66 CFS-HRS, 1.21 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 11

INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 7

LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 7.80, M= 1.33

MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00 PEAK TRAVEL TIME = .00 HOURS

*** WARNING REACH 11 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	287.00	(NULL)
	*	* FIRST POINT OF FLAT PEAK
12.53	14.04	(NULL)
13.48	13.02	(NULL)
23.48	6.35	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .06 WATERSHED INCHES, 467.28 CFS-HRS, 38.62 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION REACH CROSS SECTION 11

INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 4
 LENGTH = 2300.00 FEET INPUT = COEFFICIENTS RELATED TO CROSS SECTIONAL AREA, X= 2.70, M= 1.33
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .76 PEAK TRAVEL TIME = .20 HOURS

*** WARNING REACH 11 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.98	58.32	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = .06 WATERSHED INCHES, 15.89 CFS-HRS, 1.31 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11

INPUT HYDROGRAPHS= 4,7 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.98	345.62	(NULL)
12.53	14.04	(NULL)
13.48	13.02	(NULL)
23.48	6.35	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 1.92 WATERSHED INCHES, 483.18 CFS-HRS, 39.93 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XED 01-13-89 10:52
 REV PC 09/83(1.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20 JOB 1 PASS 2
 21 PAGE 31

OPERATION RUNOFF CROSS SECTION 11

OUTPUT HYDROGRAPH= 1
 AREA= .07 SQ MI INPUT RUNOFF CURVE= 83. TIME OF CONCENTRATION= .30 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0400 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	157.96	(RUNOFF)
7.65	6.91	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 2.72 WATERSHED INCHES, 123.01 CFS-HRS, 10.17 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11

INPUT HYDROGRAPHS= 1,5 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.88	468.84	(NULL)
12.55	16.72	(NULL)
13.52	15.34	(NULL)
23.52	7.27	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.04 WATERSHED INCHES, 606.18 CFS-HRS, 50.09 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 11

OUTPUT HYDROGRAPH= 6

AREA= .04 SQ MI INPUT RUNOFF CURVE= 98. TIME OF CONCENTRATION= .17 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0227 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.67	138.12	(RUNOFF)
7.65	4.65	(RUNOFF)

RUNOFF VOLUME ABOVE BASEFLOW = 4.22 WATERSHED INCHES, 108.90 CFS-HRS, 9.00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 11

INPUT HYDROGRAPHS= 2,6 OUTPUT HYDROGRAPH= 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.80	572.60	(NULL)
12.53	18.46	(NULL)
13.51	16.86	(NULL)
23.51	7.87	(NULL)

RUNOFF VOLUME ABOVE BASEFLOW = 2.22 WATERSHED INCHES, 715.08 CFS-HRS, 59.09 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP

COMPUTATIONS COMPLETED FOR PASS 2

RECORD ID 1140

TR20 REQ 01-13-89 10:52
REV PC 09/83(2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 PASS 3
PAGE 32

EXECUTIVE CONTROL OPERATION ENDJOB

RECORD ID 1150

TR20 REQ 01-13-89 10:52
REV PC 09/83(2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 SUMMARY
PAGE 33

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MDIST COND	MAIN TIME INCRM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE 1 STORM 1													
STRUCTURE 1	RUNOFF	.04	2	2	.10	.0	3.20	23.75	1.47	---	5.82	46.16	1154.1
STRUCTURE 1	RESVOR	.04	2	2	.10	.0	3.20	23.75	1.47	---	5.82	46.16	1154.1
XSECTION 1	REACH	.04	2	2	.10	.0	3.20	23.75	1.47	---	5.82	46.16	1154.1
XSECTION 1	DIVERT	.00	2	2	.10	.0	3.20	23.75	1.47	---	5.82	46.16	*****
XSECTION 2	DIVERT	.04	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION 2	REACH	.04	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
STRUCTURE 2	RUNOFF	.09	2	2	.10	.0	3.20	23.75	1.61	---	5.79	127.38	1415.4
STRUCTURE 2	RESVOR	.09	2	2	.10	.0	3.20	23.75	1.61	---	5.79	127.38	1415.4
XSECTION 2	REACH	.09	2	2	.10	.0	3.20	23.75	1.61	---	5.79	127.38	1415.4
XSECTION 2	ADDHYD	.13	2	2	.10	.0	3.20	23.75	1.11	---	5.79	127.38	979.9
XSECTION 2	DIVERT	.00	2	2	.10	.0	3.20	23.75	1.11	---	5.79	127.38	*****
XSECTION 6	DIVERT	.13	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
STRUCTURE 3	RUNOFF	.02	2	2	.10	.0	3.20	23.75	1.47	---	5.79	25.73	1286.3
STRUCTURE 3	RESVOR	.02	2	2	.10	.0	3.20	23.75	1.47	---	5.79	25.73	1286.3
XSECTION 3	REACH	.02	2	2	.10	.0	3.20	23.75	1.47	---	5.79	25.73	1286.3
XSECTION 3	DIVERT	.00	2	2	.10	.0	3.20	23.75	1.47	---	5.77	22.16	*****
XSECTION 4	DIVERT	.02	2	2	.10	.0	3.20	23.75	.02	---	5.80	3.67	183.7
XSECTION 4	REACH	.02	2	2	.10	.0	3.20	23.75	.03	---	6.00?	.98?	49.0
XSECTION 4	RUNOFF	.05	2	2	.10	.0	3.20	23.75	1.47	---	5.79	64.32	1286.3
XSECTION 4	ADDHYD	.07	2	2	.10	.0	3.20	23.75	1.05	---	5.79	64.32	918.8
XSECTION 5	REACH	.07	2	2	.10	.0	3.20	23.75	1.05	---	5.79	64.32	918.8
XSECTION 5	DIVERT	.00	2	2	.10	.0	3.20	23.75	1.05	---	5.79	64.32	*****
XSECTION 6	DIVERT	.07	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
STRUCTURE 4	ADDHYD	.00	2	2	.10	.0	3.20	23.75	.00	105.12	5.79	191.68	*****
STRUCTURE 4	RESVOR	.00	2	2	.10	.0	3.20	23.75	.00	104.18	6.11	47.25	*****
STRUCTURE 4	DIVERT	.00	2	2	.10	.0	3.20	23.75	.00	104.18	6.11	47.25	*****
XSECTION 10	DIVERT	.00	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	*****
XSECTION 6	ADDHYD	.20	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION 6	REACH	.20	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION 6	RUNOFF	.03	2	2	.10	.0	3.20	23.75	1.47	---	5.79	38.59	1286.3
XSECTION 6	ADDHYD	.23	2	2	.10	.0	3.20	23.75	.19	---	5.79	38.59	167.8
XSECTION 7	REACH	.00	2	2	.10	.0	3.20	23.75	.19	---	6.11	47.25	*****

TR20 XEQ 01-13-89 10:52
REV PC 09/831.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 SUMMARY
PAGE 34

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
 (A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
 A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MDIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE 1 STORM 1														
XSECTION	7	RUNOFF	.02	2	2	.10	.0	3.20	23.75	1.40	---	5.79	24.48	1223.8
XSECTION	7	ADDHYD	.02	2	2	.10	.0	3.20	23.75	12.34	---	6.10	52.15	2607.5
XSECTION	7	DIVERT	.00	2	2	.10	.0	3.20	23.75	12.34	---	6.10	52.15	*****
XSECTION	6	DIVERT	.02	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
STRUCTURE	5	RUNOFF	.03	2	2	.10	.0	3.20	23.75	1.40	---	5.79	36.71	1223.8
STRUCTURE	5	RESVOR	.03	2	2	.10	.0	3.20	23.75	1.41	100.04	5.92	22.41	747.1
XSECTION	8	REACH	.03	2	2	.10	.0	3.20	23.75	1.41	---	5.92	22.41	747.1
XSECTION	8	ADDHYD	.03	2	2	.10	.0	3.20	23.75	9.64	---	6.09	70.43	2347.7
XSECTION	8	DIVERT	.00	2	2	.10	.0	3.20	23.75	9.64	---	6.09	70.43	*****
XSECTION	6	DIVERT	.03	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION	6	ADDHYD	.26	2	2	.10	.0	3.20	23.75	.17	---	5.79	38.59	148.4
XSECTION	6	ADDHYD	.28	2	2	.10	.0	3.20	23.75	.16	---	5.79	38.59	137.8
XSECTION	6	DIVERT	.00	2	2	.10	.0	3.20	23.75	.16	---	5.79	38.59	*****
XSECTION	20	DIVERT	.28	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION	6	DIVERT	.00	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	*****
XSECTION	30	DIVERT	.28	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION	9	REACH	.28	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION	9	ADDHYD	.28	2	2	.10	.0	3.20	23.75	1.03	---	6.09	70.43	251.5
XSECTION	10	REACH	.00	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	*****
XSECTION	10	RUNOFF	.11	2	2	.10	.0	3.20	23.75	1.47	---	5.83	124.76	1134.1
XSECTION	10	ADDHYD	.11	2	2	.10	.0	3.20	23.75	1.47	---	5.83	124.76	1134.1
XSECTION	10	ADDHYD	.39	2	2	.10	.0	3.20	23.75	1.16	---	5.85	177.32	454.7
XSECTION	10	DIVERT	.00	2	2	.10	.0	3.20	23.75	1.16	---	5.85	177.32	*****
XSECTION	15	DIVERT	.39	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION	11	REACH	.00	2	2	.10	.0	3.20	23.75	.00	---	5.85	177.32	*****
XSECTION	11	REACH	.39	2	2	.10	.0	3.20	23.75	.00	---	.00	.00	.0
XSECTION	11	ADDHYD	.39	2	2	.10	.0	3.20	23.75	1.16	---	5.85	177.32	454.7
XSECTION	11	RUNOFF	.07	2	2	.10	.0	3.20	23.75	1.61	---	5.81	92.14	1316.2
XSECTION	11	ADDHYD	.46	2	2	.10	.0	3.20	23.75	1.22	---	5.83	268.26	583.2
XSECTION	11	RUNOFF	.04	2	2	.10	.0	3.20	23.75	2.94	---	5.68	97.37	2434.1
XSECTION	11	ADDHYD	.50	2	2	.10	.0	3.20	23.75	1.36	---	5.79	355.81	711.6
ALTERNATE 1 STORM 2														
STRUCTURE	1	RUNOFF	.04	2	2	.10	.0	4.50	23.75	2.55	---	5.81	81.79	2044.7
STRUCTURE	1	RESVOR	.04	2	2	.10	.0	4.50	23.75	2.55	---	5.81	81.79	2044.7

XSECTION	1	REACH	.04	2	2	.10	.0	4.50	23.75	2.55	---	5.81	81.79	2044.7
XSECTION	1	DIVERT	.00	2	2	.10	.0	4.50	23.75	2.55	---	5.70*	46.00*****	

TR20 XEQ 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 SUMMARY
REV PC 09/83(2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 35

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC NDIST COND	MAIN TIME INCREM (HR)	PRECIPITATION				PEAK DISCHARGE				
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)	RUNOFF AMOUNT (IN)	ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
ALTERNATE	1	STORM	2											
XSECTION	2	DIVERT	.04	2	2	.10	.0	4.50	23.75	.34	---	5.81	35.79	894.7
XSECTION	2	REACH	.04	2	2	.10	.0	4.50	23.75	.31	---	5.92	34.67	866.8
STRUCTURE	2	RUNOFF	.09	2	2	.10	.0	4.50	23.75	2.72	---	5.78	216.25	2402.8
STRUCTURE	2	RESVOR	.09	2	2	.10	.0	4.50	23.75	2.72	---	5.78	216.25	2402.8
XSECTION	2	REACH	.09	2	2	.10	.0	4.50	23.75	2.72	---	5.78	216.25	2402.8
XSECTION	2	ADDHYD	.13	2	2	.10	.0	4.50	23.75	1.98	---	5.80	233.61	1797.0
XSECTION	2	DIVERT	.00	2	2	.10	.0	4.50	23.75	1.98	---	5.70*	168.00*****	
XSECTION	6	DIVERT	.13	2	2	.10	.0	4.50	23.75	.12	---	5.80	65.61	504.7
STRUCTURE	3	RUNOFF	.02	2	2	.10	.0	4.50	23.75	2.54	---	5.78	44.94	2247.2
STRUCTURE	3	RESVOR	.02	2	2	.10	.0	4.50	23.75	2.54	---	5.78	44.94	2247.2
XSECTION	3	REACH	.02	2	2	.10	.0	4.50	23.75	2.54	---	5.78	44.94	2247.2
XSECTION	3	DIVERT	.00	2	2	.10	.0	4.50	23.75	2.54	---	5.60*	22.00*****	
XSECTION	4	DIVERT	.02	2	2	.10	.0	4.50	23.75	.44	---	5.78	22.94	1147.2
XSECTION	4	REACH	.02	2	2	.10	.0	4.50	23.75	.45	---	5.91	18.57	928.6
XSECTION	4	RUNOFF	.05	2	2	.10	.0	4.50	23.75	2.54	---	5.78	112.36	2247.2
XSECTION	4	ADDHYD	.07	2	2	.10	.0	4.50	23.75	1.94	---	5.80	123.79	1768.4
XSECTION	5	REACH	.07	2	2	.10	.0	4.50	23.75	1.94	---	5.80	123.79	1768.4
XSECTION	5	DIVERT	.00	2	2	.10	.0	4.50	23.75	1.94	---	5.70*	86.00*****	
XSECTION	6	DIVERT	.07	2	2	.10	.0	4.50	23.75	.14	---	5.80	37.79	539.8
STRUCTURE	4	ADDHYD	.00	2	2	.10	.0	4.50	23.75	.14	105.37	5.70*	254.00*****	
STRUCTURE	4	RESVOR	.00	2	2	.10	.0	4.50	23.75	.14	105.24	5.95	221.15 *****	
STRUCTURE	4	DIVERT	.00	2	2	.10	.0	4.50	23.75	.14	104.53	5.90*	96.00*****	
XSECTION	10	DIVERT	.00	2	2	.10	.0	4.50	23.75	.14	---	5.95	123.73 *****	
XSECTION	6	ADDHYD	.20	2	2	.10	.0	4.50	23.75	.13	---	5.80	103.39	517.0
XSECTION	6	REACH	.20	2	2	.10	.0	4.50	23.75	.14	---	5.91	78.64	393.2
XSECTION	6	RUNOFF	.03	2	2	.10	.0	4.50	23.75	2.54	---	5.78	67.42	2247.2
XSECTION	6	ADDHYD	.23	2	2	.10	.0	4.50	23.75	.46	---	5.89	127.18	552.9

XSECTION	7	REACH	.00	2	2	.10	.0	4.50	23.75	.46	---	5.90*	96.00*****
XSECTION	7	RUNOFF	.02	2	2	.10	.0	4.50	23.75	2.46	---	5.78	43.40 2170.1
XSECTION	7	ADDHYD	.02	2	2	.10	.0	4.50	23.75	18.69	---	5.85	137.78 6888.9
XSECTION	7	DIVERT	.00	2	2	.10	.0	4.50	23.75	18.69	---	5.80*	110.00*****
XSECTION	6	DIVERT	.02	2	2	.10	.0	4.50	23.75	.28	---	5.85	19.84 991.8
STRUCTURE	5	RUNOFF	.03	2	2	.10	.0	4.50	23.75	2.46	---	5.78	65.10 2170.1
STRUCTURE	5	RESVDR	.03	2	2	.10	.0	4.50	23.75	2.43	100.90	5.82	69.51 2316.9
XSECTION	8	REACH	.03	2	2	.10	.0	4.50	23.75	2.43	---	5.82	69.51 2316.9
XSECTION	8	ADDHYD	.03	2	2	.10	.0	4.50	23.75	14.71	---	5.84	186.14 6204.6

TR20 XEQ 01-13-89 10:52
REV PC 09/83(2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
21

JOB 1 SUMMARY
PAGE 36

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MDIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
						BESIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSH)
ALTERNATE	1	STORM	2										
XSECTION	8	DIVERT	.00	2	2	.10	.0	4.50	23.75	14.71	---	5.80*	110.00*****
XSECTION	6	DIVERT	.03	2	2	.10	.0	4.50	23.75	.80	---	5.83	72.55 2418.3
XSECTION	6	ADDHYD	.26	2	2	.10	.0	4.50	23.75	.49	---	5.87	183.82 707.0
XSECTION	6	ADDHYD	.28	2	2	.10	.0	4.50	23.75	.48	---	5.86	203.12 725.4
XSECTION	6	DIVERT	.00	2	2	.10	.0	4.50	23.75	.48	---	5.80*	100.00*****
XSECTION	20	DIVERT	.28	2	2	.10	.0	4.50	23.75	.10	---	5.86	103.12 368.3
XSECTION	6	DIVERT	.00	2	2	.10	.0	4.50	23.75	.10	---	5.85	67.50 *****
XSECTION	26	DIVERT	.28	2	2	.10	.0	4.50	23.75	.03	---	5.88	37.45 133.8
XSECTION	9	REACH	.28	2	2	.10	.0	4.50	23.75	.03	---	5.88	37.45 133.8
XSECTION	9	ADDHYD	.28	2	2	.10	.0	4.50	23.75	1.53	---	5.88	147.45 526.6
XSECTION	10	REACH	.00	2	2	.10	.0	4.50	23.75	1.53	---	6.09	97.74 *****
XSECTION	10	RUNOFF	.11	2	2	.10	.0	4.50	23.75	2.55	---	5.82	221.33 2012.1
XSECTION	10	ADDHYD	.11	2	2	.10	.0	4.50	23.75	2.90	---	5.82	221.33 2012.1
XSECTION	10	ADDHYD	.39	2	2	.10	.0	4.50	23.75	1.91	---	5.85	361.11 925.9
XSECTION	10	DIVERT	.00	2	2	.10	.0	4.50	23.75	1.91	---	5.80*	287.00*****
XSECTION	15	DIVERT	.39	2	2	.10	.0	4.50	23.75	.06	---	5.84	70.58 181.0
XSECTION	11	REACH	.00	2	2	.10	.0	4.50	23.75	.06	---	5.80*	287.00*****
XSECTION	11	REACH	.39	2	2	.10	.0	4.50	23.75	.06	---	5.98	58.32 149.5
XSECTION	11	ADDHYD	.39	2	2	.10	.0	4.50	23.75	1.92	---	5.99	345.62 866.2
XSECTION	11	RUNOFF	.07	2	2	.10	.0	4.50	23.75	2.72	---	5.80	157.96 2256.6

XSECTION	11	ADDHYD	.46	2	2	.10	.0	4.50	23.75	2.04	---	5.88	468.84	1019.2
XSECTION	11	RUNOFF	.04	2	2	.10	.0	4.50	23.75	4.22	---	5.67	138.12	3453.1
XSECTION	11	ADDHYD	.50	2	2	.10	.0	4.50	23.75	2.22	---	5.80	572.60	1145.2

TR20 XED 01-13-89 10:52 CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY 20 JOB 1 SUMMARY
REV PC 09/83(1.2) 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10 21 PAGE 37

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

HYDROGRAPH INFORMATION														ROUTING PARAMETERS					PEAK		
-----														-----					-----		
OUTFLOW+														VOLUME	MAIN	ITER-	Q AND A	PEAK	S/Q	ATT-	TRAVEL TIME
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION	LENGTH	RATIO	QPEAK	KIN	STOR-	KINE-			
ID	LENGTH	PEAK	TIME	PEAK	TIME	PEAK	TIME	FLOW	BASE	INCR	*	COEFF	POWER	FACTOR	D/I	(K)	COEFF	AGE	MATIC		
	(FT)	(CFS)	(HR)	(CFS)	(HR)	(CFS)	(HR)	(CFS)	(IN)	(HR)		(X)	(M)	(K*)	(Q*)	(SEC)	(C)	(HR)	(HR)		
ALTERNATE		1	STORM	1																	

+	1	1	46	5.8	46	5.8			0	1.47	.10	0	2.70	1.33	.000	1.000	0	1.00?	.00	.00	
+	2	1900	0	5.8	0	5.8			0	.00	.10	0	3.90	1.33	.000	.000	0	1.00?	.00	.00	
+	2	250	127	5.8	127	5.8			0	1.61	.10	0	3.90	1.33	.002	1.000	20	1.00?	.00	.00	
+	3	1	26	5.8	26	5.8			0	1.47	.10	0	2.70	1.33	.000	1.000	0	1.00?	.00	.00	
+	4	3300	4	5.8	1	6.0			0	.02	.10	1	3.90	1.33	5.450	.267	1169	.277	.10	.20	
+	5	250	64	5.8	64	5.8			0	1.05	.10	0	3.90	1.33	.003	1.000	24	1.00?	.00	.00	
+	6	3200	0	5.8	0	5.8			0	.00	.10	0	2.70	1.33	.003	.000	24	1.00?	.00	.00	
+	7	600	47	6.1	47	6.1			0	.00	.10	0	7.80	1.33	.001	1.000	37	1.00?	.00	.00	
+																			7.80		

+ 8	1	22	5.9	22	5.9			0	1.41	.10	0	1.33	.000	1.000	0	1.00?	.00	.00
+						---	---					2.70						
+ 9	1100	0	5.9	0	5.9			0	.00	.10	0	1.33	.000	.000	0	1.00?	.00	.00
+						---	---					2.70						
+ 10	3250	0	5.9	0	5.9			0	.00	.10	0	1.33	.000	.000	0	1.00?	.00	.00
+						123	5.8					7.80						
+ 11	2300	173	5.8	173	5.8			0	.00	.10	0	1.33	.006	1.000	103	1.00?	.00	.00
+						---	---					2.70						
+ 11	2300	0	5.8	0	5.8			0	.00	.10	0	1.33	.006	.000	103	1.00?	.00	.00
+						---	---					2.70						
	ALTERNATE	1	STORN	2														
+	-----																	
+ 1	1	82	5.8	82	5.8			0	2.55	.10	0	1.33	.000	1.000	0	1.00?	.00	.00
+						---	---					3.90						
+ 2	1900	36	5.8	34	5.9			0	.34	.10	1	1.33	.218	.964	212	.92?	.10	.06
+						---	---					3.90						
+ 2	250	214	5.8	214	5.8			0	2.72	.10	0	1.33	.002	1.000	18	1.00?	.00	.00
+						234	5.8					2.70						
+ 3	1	45	5.8	45	5.8			0	2.54	.10	0	1.33	.000	1.000	0	1.00?	.00	.00
+						---	---					3.90						
+ 4	3300	23	5.8	19	5.9			0	.44	.10	1	1.33	.512	.821	411	.61	.10	.12
+						124	5.8					3.90						
+ 5	250	124	5.8	124	5.8			0	1.94	.10	0	1.33	.002	1.000	20	1.00?	.00	.00
+						---	---					2.70						
+ 6	3200	103	5.8	78	5.9			0	.13	.10	1	1.33	.762	.754	361	.67	.10	.10
+						127	5.9					7.80						
+ 7	600	96	5.9	96	5.9			0	.00	.10	0	1.33	.001	1.000	31	1.00?	.00	.00
+						128	5.8					7.80						
+ 8	1	68	5.8	68	5.8			0	2.43	.10	0	1.33	.000	1.000	0	1.00?	.00	.00
+						---	---					2.70						
+ 9	1100	36	5.9	36	5.9			0	.03	.10	0	1.33	.246	1.000	161	1.00?	.00	.00
+						---	---					2.70						
+ 10	3250	110	5.9	97	6.1			0	.00	.10	1	1.33	.444	.881	360	.67	.20	.10
+						220	5.8					7.80						
+ 11	2300	287	5.8	287	5.8			0	.00	.10	0	1.33	.006	1.000	91	1.00?	.00	.00

+
 + 11 2300 64 5.8 58 6.0 0 .06 .10 1 2.70 1.33 .382 .903 292 .767 .20 .08
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TR20 XEQ 01-13-89 10:52
 REV PC 09/83(.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
 24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

20
 21

JOB 1 SUMMARY
 PAGE 38

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....	
		1	2
0 STRUCTURE 5	.03		
+----- ALTERNATE 1		22.41	69.51
0 STRUCTURE 4	.00		
+----- ALTERNATE 1		47.25	96.00
0 STRUCTURE 3	.02		
+----- ALTERNATE 1		25.73	44.94
0 STRUCTURE 2	.09		
+----- ALTERNATE 1		127.38	216.25
0 STRUCTURE 1	.04		
+----- ALTERNATE 1		46.16	81.79
0 XSECTION 1	.00		
+----- ALTERNATE 1		46.16	46.00
0 XSECTION 2	.00		
+----- ALTERNATE 1		127.38	168.00
0 XSECTION 3	.00		
+----- ALTERNATE 1		22.16	22.00
0 XSECTION 4	.07		
+----- ALTERNATE 1		64.32	123.79
0 XSECTION 5	.00		
+----- ALTERNATE 1		64.32	86.00
0 XSECTION 6	.00		
+----- ALTERNATE 1		.00	67.50
0 XSECTION 7	.00		
+----- ALTERNATE 1		52.15	110.00

0 XSECTION	8	.00		
+-----				
ALTERNATE	1		70.43	110.00
0 XSECTION	9	.28		
+-----				
ALTERNATE	1		70.43	147.45
1				

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REV PC 09/83(1.2)

CHAPEL HILLS CROSSING PRELIMINARY DRAINAGE STUDY
24 HR, IIA, 10&100 YEAR, INCREMENT=0.10

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JOB 1 SUMMARY
PAGE 39

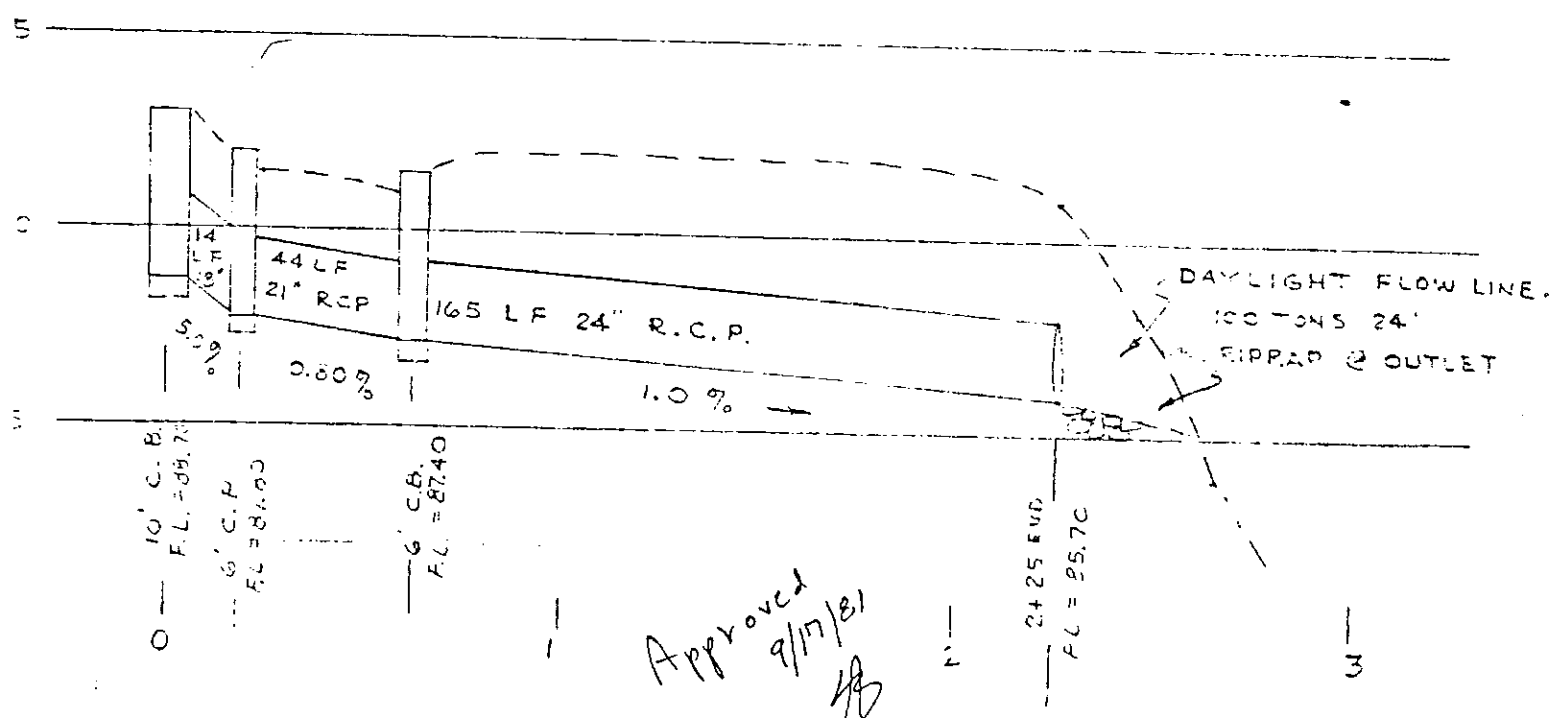
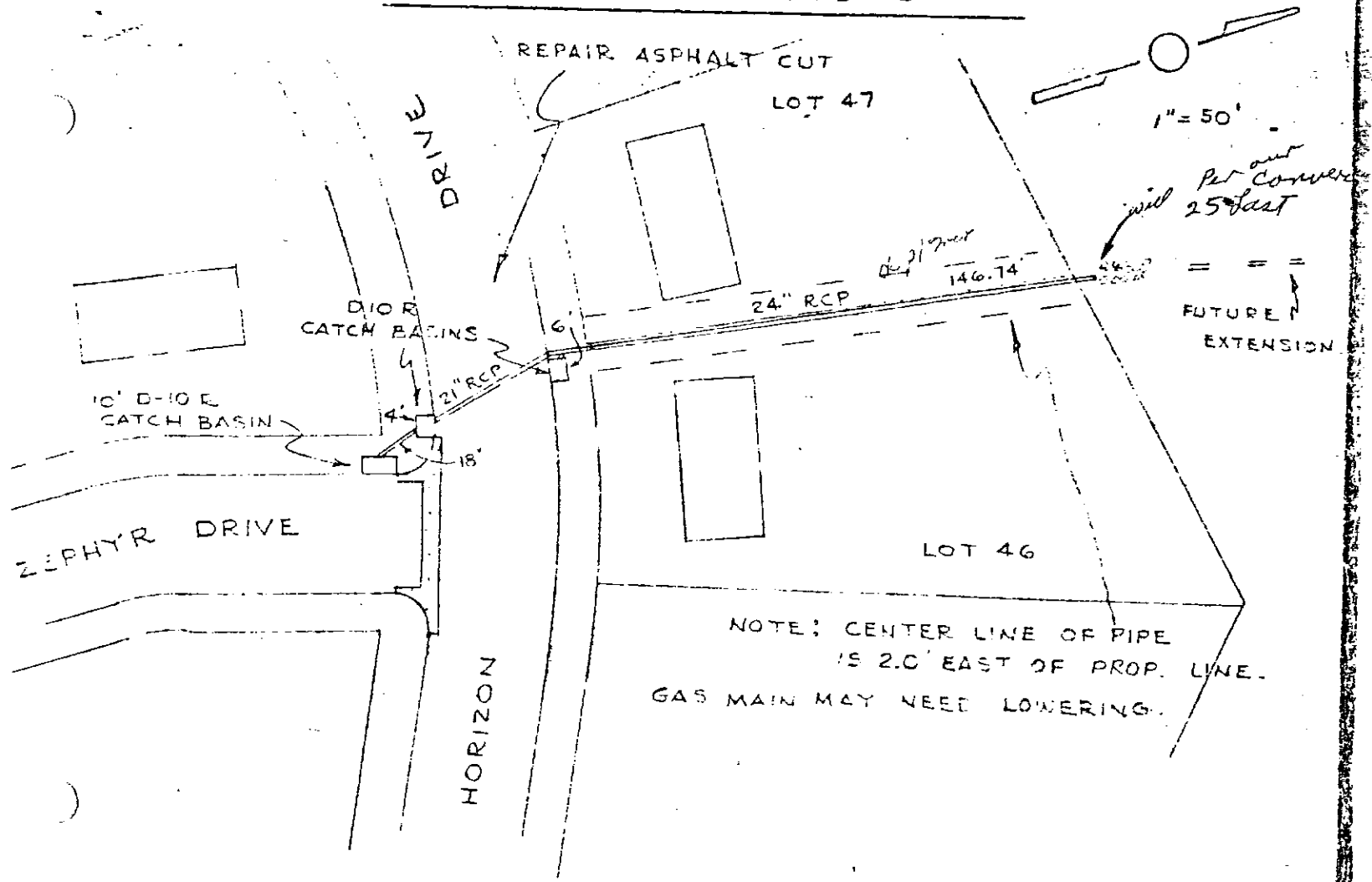
SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....	
		1	2
0 XSECTION 10	.00		
+-----			
ALTERNATE 1		177.32	287.00
0 XSECTION 11	.50		
+-----			
ALTERNATE 1		355.81	572.60
0 XSECTION 15	.39		
+-----			
ALTERNATE 1		.00	70.58
0 XSECTION 20	.28		
+-----			
ALTERNATE 1		.00	103.12
0 XSECTION 30	.28		
+-----			
ALTERNATE 1		.00	37.45

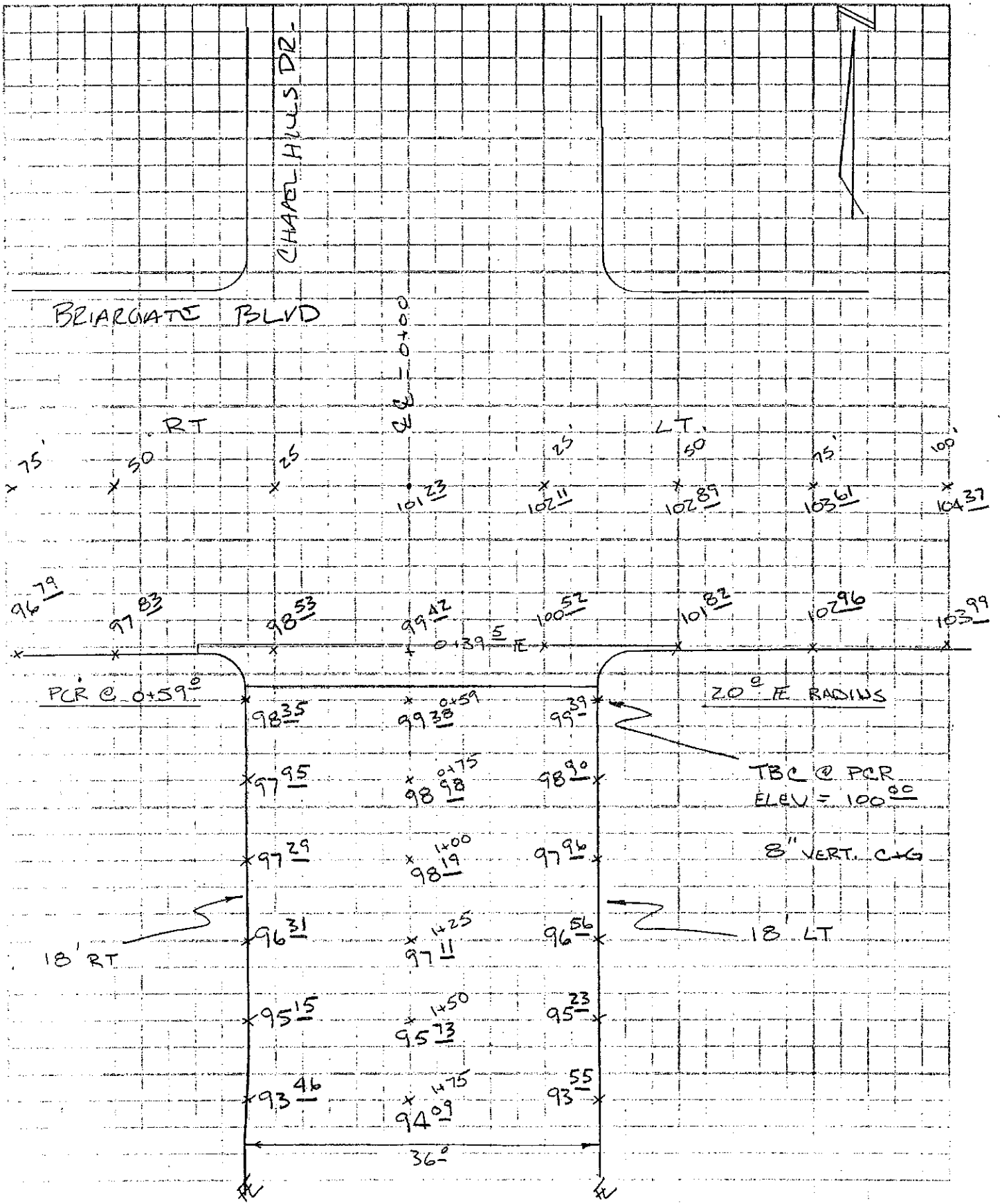
1END OF 1 JOBS IN THIS RUN

ASBUILT DATA

ADDITIONAL CATCH BASINS
BRIARGATE FILING 6



D. JEFFRIES
SEPT. 2, 1981
Revised SEPT 17, 1981





JR ENGINEERING, LTD.

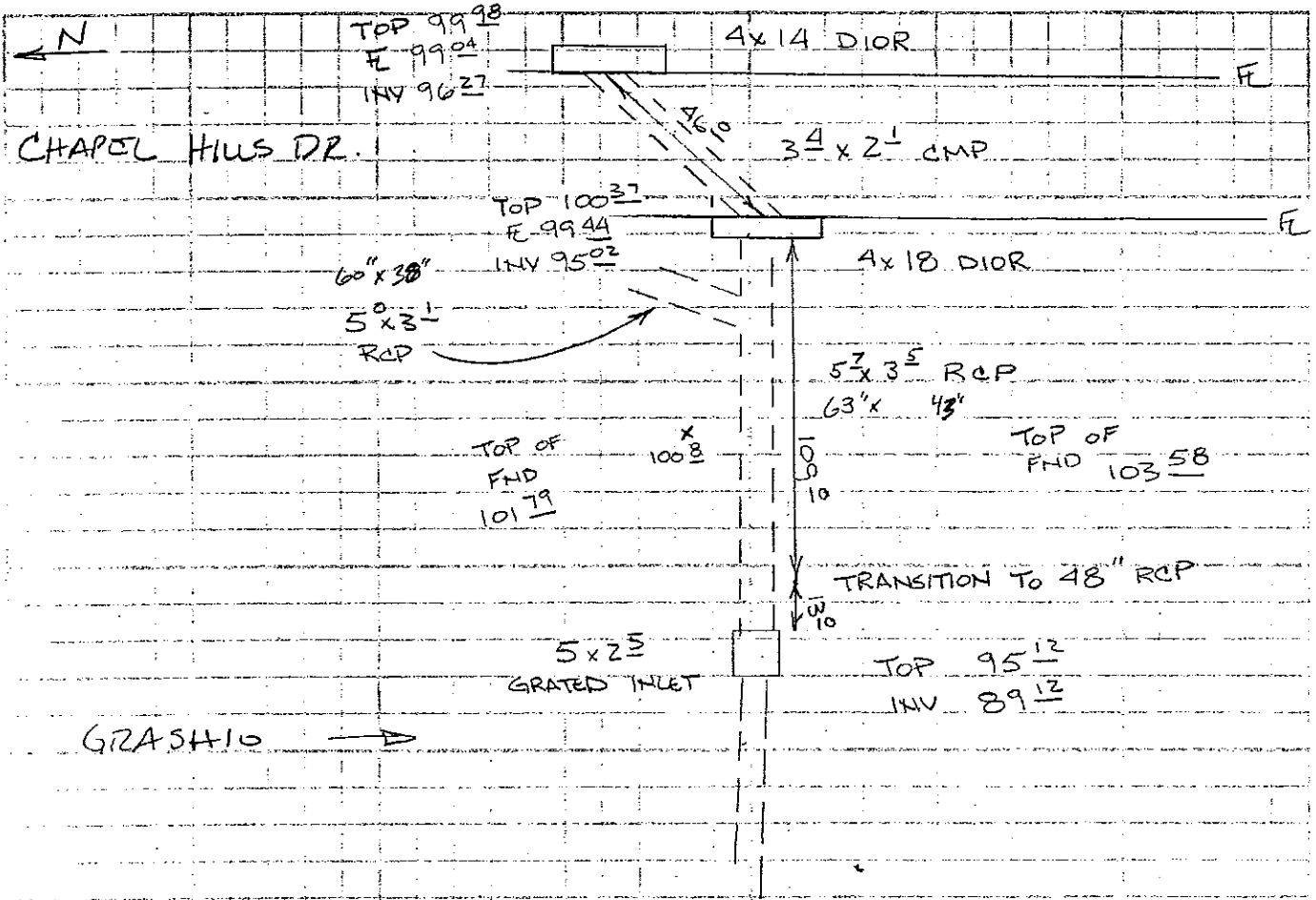
CLIENT R/D

JOB NO. 8335

PROJECT CHAPEL HILLS XING BY BRUCE, ROGER

DATE 1-5-88

SUBJECT STORM ASBUILT FROM CHAPEL HILLS DR. TO GRASHIO SHEET NO. 1 OF



OFFSITE BASIN MAPS 1, 2, & 3

POND "A" WORKSHEET

POND "B" WORKSHEET

PRELIMINARY GRADING PLAN

10.....11.....12.....13.....14.....15.....16.....17.....18.....19.....20.....

11	EH	0.17									
12	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									
13	EH	30	1010	1015	0	3000	30				
14	EH	0.1									
15	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									
16	EH	1000									
17	EH	0	0	0	0						
18	EH	100									
19	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									
20	EH	100									
21	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									
22	EH	100									
23	EH	100									
24	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									
25	EH	100									
26	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									
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42	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									
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99	EH	100									
100	EH	DRAINAGE AREA FROM DRAINAGE BASIN IV									

END OF INPUT

PAGE 3

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REC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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LINE	ID	1	2	3	4	5	6	7	8	9	10	
190	KKHCRWVHH											
191	KH	FLOW ON N CURB OF BRIARGATE BLVD APPROX 400' W OF E VINTAGE										
192	DTWCRWBVI											
193	DI	0	7.1	21.7	37	49.7	61.6	63	107	134.0	167	
194	DB	0	0	0	0	0	0	10	29	50	72	
195	KKHCRWVHH											
196	KH	FLOW BY PROPOSED 20' CD ON N CURB OF BRIARGATE BLVD										
197	DTPROPDBNW											
198	DI	0	1.2	7.6	17.4	18.7	26.6	36.5	48.3	62.3	78.5	
199	DI	97.2	110.5	142.4								
200	DB	0	4.2	6.7	9.7	13.1	17.3	20.8	24.2	26.8	30.6	
201	DB	34	36.7	39.9								
202	KKRTFLHCR											
203	KH	ROUTE FLOW ALONG N CURB OF BRIARGATE BLVD										
204	RK	130	.0234	.016	0	TRAP	0	33				
205	KKFLDYHCR											
206	KH	FLOW BY PROPOSED 20' CD ON N CURB OF BRIARGATE BLVD										
207	DTPROPDBNW											
208	DI	0	2.4	4.4	7.2	10.9	15.5	21.2	28.1	36.3	45.8	
209	DI	36.7	69	83								
210	DB	0	2.4	4.4	6.5	8.7	11.4	14.8	18.8	23.2	27.4	
					HEC-1 INPUT							
211	DB	28.4	31.1	33.2								
212	KKDRRTMCRD											
213	KH	ROUTE FLOW ALONG N CURB OF BRIARGATE BLVD TO W VINTAGE										
214	RK	250	.045	.016	0	TRAP	0	33				
215	KK	D-1-2										
216	KH	RUNOFF FROM BASINS D-1 AND D-2										
217	BA	.0273										
218	LS	0	70									
219	UD	.05										
220	KKEDRWVHH											
221	KH	FLOW ALONG E CURB OF W VINTAGE JUST N OF DISTINCTIVE DR										
222	DTWCRWBVI											
223	DI	0	10	20	30	40	50	60	70	80	90	
224	DB	0	5	10	15	20	25	30	35	40	45	
225	KK	D-3										
226	KH	RUNOFF FROM BASIN D-3										
227	BA	.00717										
228	LS	0	70									
229	UD	.04										
230	KK EDWVHH											
231	KH	RUNOFF ON E CURB OF W VINTAGE AT DISTINCTIVE INTERSECTION										
232	DC	2										
233	DTWCRWBVI											
234	DI	0	10	20	30	40	50	60	70	80	90	
235	DB	0	5	10	15	20	25	30	35	40	45	

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193

INCREASING
KM FLOW THAT CROSSES FROM E TO W CURB OF W VINTAGE S OF LEGEND
DECREASING

REC 1 INPUT

PAGE 8

LINE

TO.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

294
295
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KK 9-6
KM RUNOFF FROM BASIN D-6
DA .0038
LS 0 80
UD .033

299
300
301

KKFLOWVDR
KM COMBINE RUNOFF ON N CURB BRIARGATE AT W VINTAGE INTERSECTION
HC 6

302
303
304
305
306
307
308
309

KKFLOWDR6R
KM FLOW ALONG N CURB OF BRIARGATE BLVD W OF W VINTAGE DR
KD 1 2
DTVINWDRR
DI 0 3.4 6.1 9.9 14.7 21.3 29.1 38.6 49.8 62.8
DI 77.7 94.7 113.8
DD 0 2 3.2 4.2 5.1 6.2 7.3 8.1 9.5 10
DD 11.7 13.3 14.8

310
311
312

KK CRGVR
KM FLOW THAT CROSSES FROM N TO S CURB OF BRIARGATE
DR CRGVR

313
314
315

KK RT001
KM ROUTE FLOW ALONG S CURB OF BRIARGATE TO E VINTAGE
RK 1700 .045 .016 0 TRAP 0 33

316
317
318
319
320

KK 9-3
KM RUNOFF FROM BASIN D-3
DA .00466
LS 0 98
UD .07

321
322
323
324
325

KK 9-5
KM RUNOFF FROM BASIN D-5
DA .00574
LS 0 77
UD .04

326
327
328

KK CH10
KM COMBINE FLOW ALONG S CURB OF BRIARGATE BLVD
HC 3

329
330
331
332
333

UNDERFLY
KM FLOW BY EXIST TO UD AT SE CORNER OF BRIARGATE VINTAGE
DTVINWVVI
DI 0 5.8 10.4 17 25.7 36.6 50.4 66.4 85.6 108
DD 0 4.7 11.9 18.7 26.8 38.9 53.1 71.6 93.7 120.7

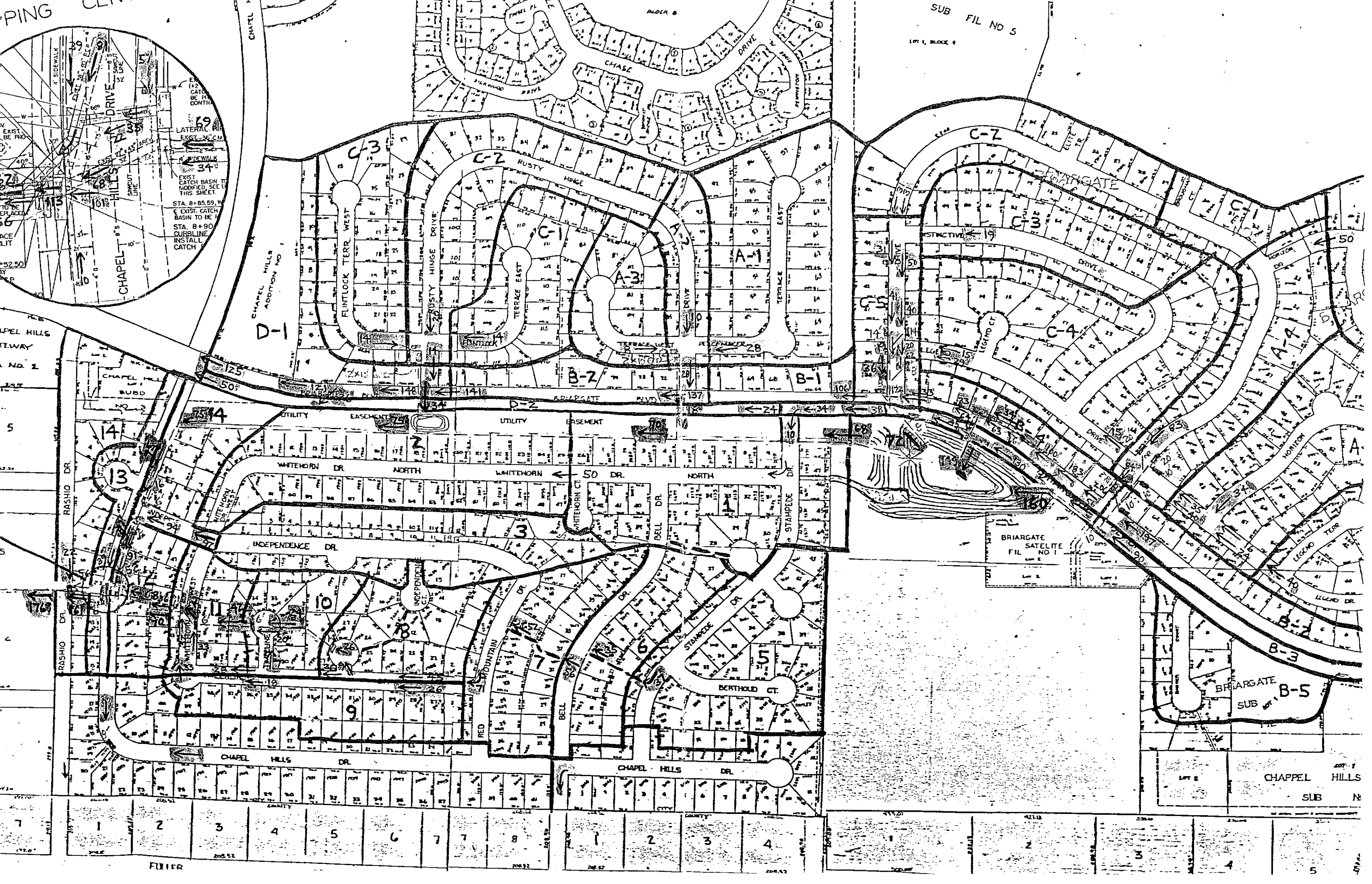
100.0 112.0

334

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PING

SUB FIL NO 5
LOT 1, BLOCK 4

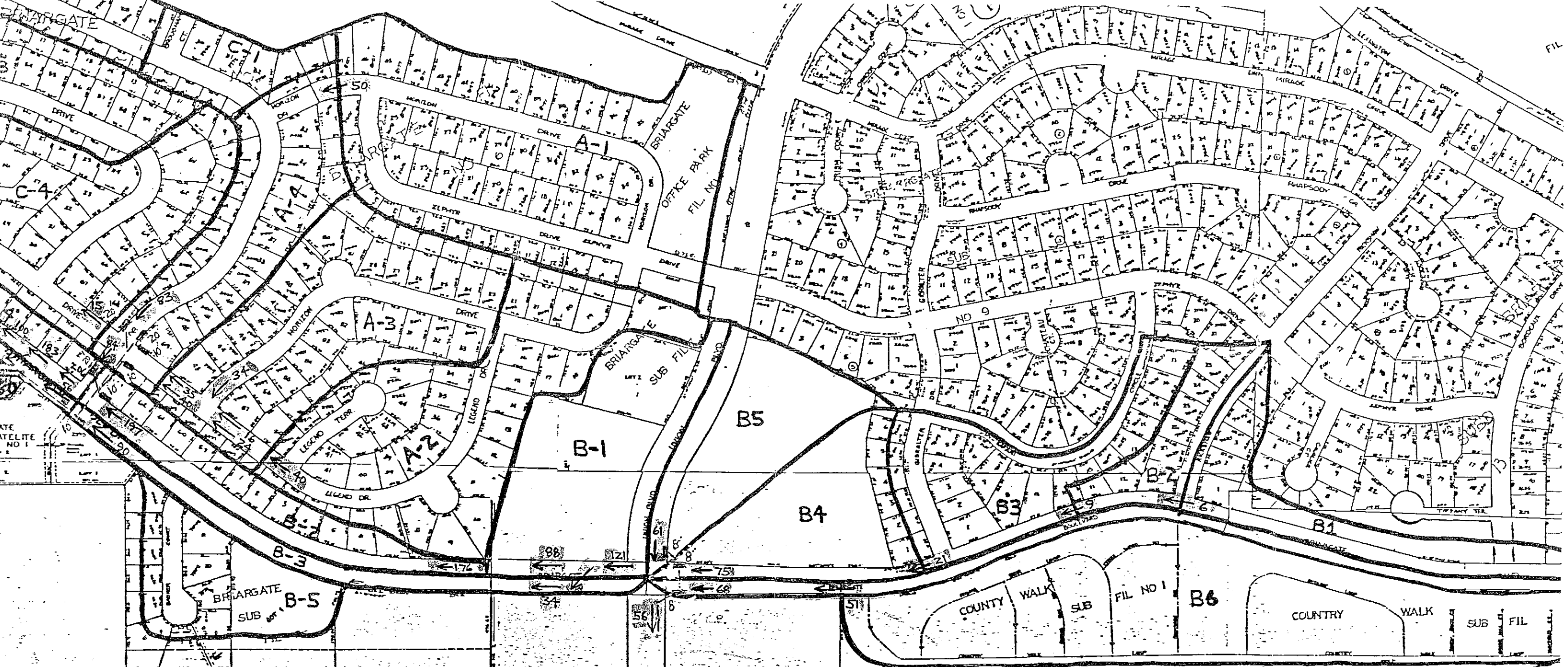


69
LATERAL PIPE
EXIST. 36" CM
EXIST. 12" SATURATED
CONTR.
EXIST. SIDEWALK
EXIST. 34"
EXIST. CATCH BASIN TO
MODIFIED. SEE
THIS SHEET.
STA. 8+85.59, V.
EXIST. CATCH
BASIN TO BE
STA. 8+90
CURBLINE
INSTALL
CATCH

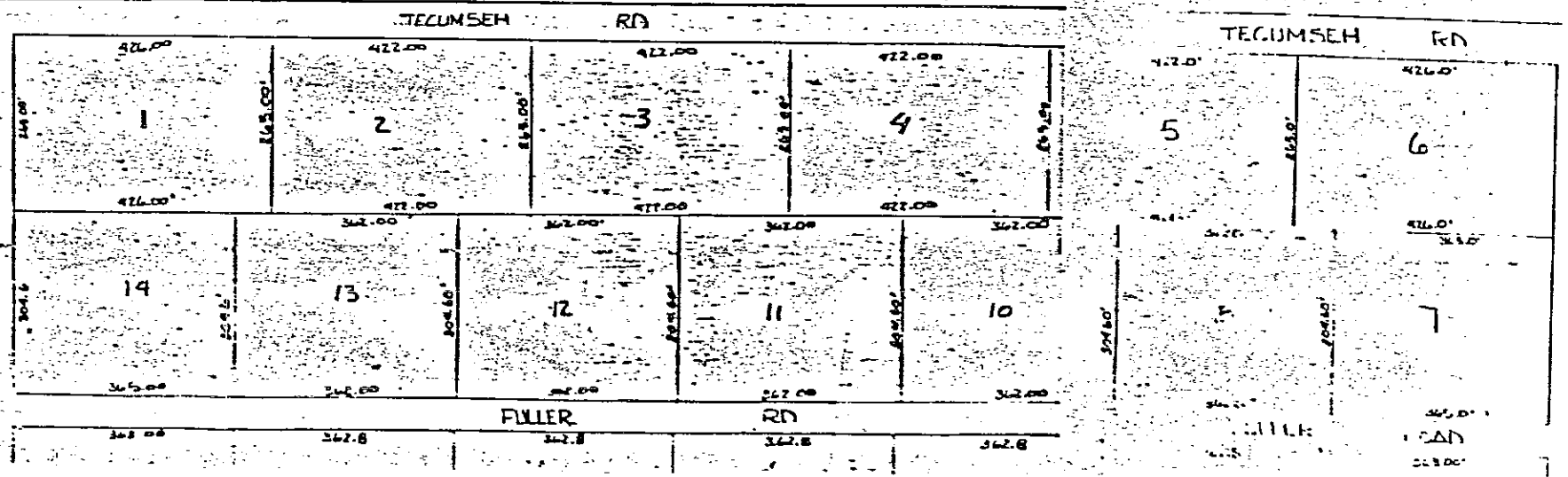
BRIARGATE
SATELITE
FIL NO 1

CHAPPEL HILLS
SUB N

FIXER



CHAPPEL HILLS
SUB NO 2



THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3.

HEC-1 INPUT

PAGE 1

LINE	ID	1	2	3	4	5	6	7	8	9	10	
1	ID	MODEL OF BRIARGATE BLVD/ANDEROSA ESTATES URBAN WATERSHED										
2	ID	NOVEMBER, 1985										
3	ID	MODEL OF BRIARGATE SUB. NO. 1 AND ANDEROSA ESTATES SUB.										
4	ID	100-YEAR STORM (3.5 INCHES, 6 HOUR DURATION)										
	DIAGRAM											
5	ET	2	3	4	5	6	7	8	9	10	11	
6	ID	5										
7	KKELWNCRR											
8	KM	FLOW ALONG N CURB OF BRIARGATE BLVD W OF W VINTAGE DR										
9	IN	7										
10	QT	0	0	0	0	0	0	0	0	0	0	
11	QT	0	0	0	0	0	0	0	0	0	0	
12	QT	0	0	0	0	0	0	0	0	0	0	
13	QT	0	0	0	1	1	64	106	94	64	41	
14	QT	0	0	0	1	1	64	106	94	64	41	
15	QT	25	15	9	5	4	3	2	1	1	1	
16	KK	BASA-1										
17	KM	RUNOFF FROM BASIN A-1										
18	BA	.0180										
19	LS	0	65									
20	LN	5										
21	PB	3.5										
22	PC	0	.007	.014	.0245	.0315	.0385	.0455	.056	.063	.07	
23	PC	.0805	.0945	.105	.1225	.14	.15	.165	.185	.21	.22	
24	PC	2.625	2.7125	2.7825	2.8175	2.835	2.8225	2.794	2.7575	2.715	2.661	
25	PC	3.0205	3.028	3.045	3.065	3.085	3.078	3.115	3.15	3.29	3.33	
26	PC	3.171	3.185	3.204	3.22	3.245	3.255	3.27	3.378	3.395	3.41	
27	PC	3.315	3.25	3.336	3.345	3.353	3.38	3.37	3.378	3.395	3.41	
28	PC	3.42	3.427	3.43	3.437	3.441	3.451	3.465	3.472	3.476	3.483	
29	PC	3.49	3.49	3.5								
30	UB	.056										
31	KK	BASA-2										
32	KM	RUNOFF FROM BASIN A-2										
33	BA	.0035										
34	LS	0	70									
35	UD	.03										
36	KK	BASA-3										
37	KM	RUNOFF FROM BASIN A-3										
38	BA	.00437										
39	LS	0	65									
40	UB	.03										

41 KK CHA
 42 KM COMBINE FLOW AT WEST SIDE OF PEACEMAKER/E. RUSTY HINGE INTER.
 43 HC 2

HEC-1 INPUT

LINE ID 1 2 3 4 5 6 7 8 9 10

44 KKFLBYPERH
 45 KM RUNOFF NOT COLLECTED BY GRATED INLETS AT PEACEMAKER/E. RUSTY HINGE INTER.
 46 DTGRINRUPE
 47 DI 0 20 34 50 75
 48 DQ 0 20 34 34 34

49 KK CHB
 50 KM RUNOFF FLOWING S. ON E RUSTY HINGE ONTO N CURB OF BRIARGATE BLVD
 51 HC 2

52 KK BASB-1
 53 KM RUNOFF FROM BASIN B-1
 54 BA .002
 55 LS 0 70
 56 UD .021

57 KK CHC
 58 KM COMBINE RUNOFF ON N CURB OF BRIARGATE BLVD I W OF E RUSTY HINGE DRIVE
 59 HC 3

60 KK RTA
 61 KM ROUTE FLOW ALONG N CURB OF BRIARGATE BLVD
 62 RK 900 .025 .016 0 TRAF 0

63 KK BASB-2
 64 KM RUNOFF FROM BASIN B-2
 65 BA .0053
 66 LS 0 70
 67 UD .036

68 KK CHD
 69 KM RUNOFF ON N CURB OF BRIARGATE JUST E OF W RUSTY HINGE DR
 70 HC 4

71 KK BASC-1
 72 KM RUNOFF FROM BASIN C-1
 73 BA .00725
 74 LS 0 65
 75 UD .05

76 KK BASC-2
 77 KM RUNOFF FROM BASIN C-2
 78 BA .01223
 79 LS 0 65
 80 UD .052

81 KK BASC-3
 82 KM RUNOFF FROM BASIN C-3
 83 BA .00872
 84 LS 0 65
 85 UD .054

HEC-1 INPUT

LINE ID 1 2 3 4 5 6 7 8 9 10

86 KK CHE

89 LKCHHRRH
 90 LH RUNOFF NOT COLLECTED BY GRADED INLETS AT PLINTLOCK/ W RUSTY HINGE INTERSE
 91 DTGRHHRH
 92 DI 0 20 34 50 75
 93 DG 0 20 34 34 34

94 KK CHH
 95 KH RUNOFF FLOWING S ON W RUSTY HINGE ONTO N CURB OF BRIARGATE
 96 HC 2

97 KK CHH
 98 KH COMBINE RUNOFF ON N CURB OF BRIARGATE J W OF W RUSTY HINGE DR
 99 HC 2

100 KKNCRBRRH
 101 KH RUNOFF ALONG N CURB OF BRIARGATE J W OF W RUSTY HINGE DR
 102 DTGRBRRH
 103 DI 0 30 67 80 90 100 110 120 130 140
 104 DG 0 0 0 5 8 12 15 18 21 24

105 KK RTAB
 106 KH ROUTE FLOW ALONG N CURB OF BRIARGATE TO W BOUNDARY OF BRIAR SUBDIVISION
 107 RK 600 .018 .016 0 TRAP 0 33

108 KK BASD-1
 109 KH RUNOFF FROM BASIN D-1
 110 BA .0110
 111 LS 0 65
 112 UD .048

113 KK CHH
 114 KH RUNOFF ALONG N CURB OF BRIARGATE AT W BOUNDARY OF BRIARGATE SUBDIVISION N
 115 HC 2

116 KK ELEC
 117 KH RUNOFF FROM ELECTRIC SUBSTATION
 118 BA .0247
 119 LS 0 73
 120 UD .125

121 KKFLDYS'DB
 122 KM FLOW ALONG S CURB OF BRIARGATE BLVD W OF W VINTAGE DR
 123 IN 2
 124 DI 0 0 0 0 0 0 0 0 0 0
 125 DI 0 0 0 0 0 0 0 0 0 0
 126 DI 0 0 0 0 0 0 0 0 0 0
 127 DI 0 0 0 0 0 0 0 0 0 0
 128 DT 0 0 1 2 4 8 26 38 24 8
 129 DI 2 0 0 0 0 0 0 0 0 0

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

130 KK RT1
 131 KH ROUTE FLOW ALONG S CURB OF BRIARGATE FROM W VINTAGE TO STANPEDE
 132 RK 350 .04 .016 0 TRAP 0 33

133 KKFLDYS'DB
 134 KH FLOW ALONG S CURB OF BRIARGATE WEST OF STANPEDE DR
 135 DT 0 0 0 0 0 0 0 0 0 0
 136 DI 0 0 0 0 0 0 0 0 0 0
 137 DI 0 0 0 0 0 0 0 0 0 0

137	KK	RT1							
138	KM		ROUTE FLOW ALONG S CURB OF BRIARGATE FROM STAMPEDE TO C HILLS DRIVE						
139	RK		700	.033	.016	0	TRAP	0	33
141	KK	D-2							
142	KM		RUNOFF FROM D-2						
143	BA		.0025						
144	LS		0	98					
145	UD		.09						
146	KK	DRSCRBRR1							
147	KM		CROSSOVER FLOW FROM N TO S CURB OF BRIARGATE						
148	DR	DRSCRBRR1							
149	KK	CH11							
150	KM		COMBINE FLOWS IN S CURB OF BRIARGATE AT C HILLS INTERSECTION						
151	HC		3						
152	KK	STMPDR							
153	KM		FLOW SOUTH ON STAMPEDE JUST SOUTH OF BRIARGATE BLVD						
154	DR	STMPDR							
155	KK	RT2							
156	KM		ROUTE FLOW ALONG STAMPEDE THEN W ON WHITEHORN TO WHITE. CIR.						
157	RK		700	.05	.016	0	TRAP	0	33
158	KK	BAS1							
159	KM		RUNOFF FROM BASIN 1						
160	BA		.0193						
161	LS		0	70					
162	UD		.054						
163	KK	CH1							
164	KM		COMBINE FLOW ON WHITEHORN DR AT WHITEHORN CIR						
165	HC		2						
166	KK	RT3							
167	KM		ROUTE FLOW FROM WHITEHORN CIR TO INDEPENDENCE DR						
168	RK		1400	.036	.016	0	TRAP	0	33

HEC-1 INPUT

PAGE 5

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

169	KK	BAS2							
170	KM		RUNOFF FROM BASIN 2						
171	BA		.0155						
172	LS		0	70					
173	UD		.066						
174	KK	BAS3							
175	KM		RUNOFF FROM BASIN 3						
176	BA		.01						
177	LS		0	70					
178	UD		.06						
179	KK	CH2							
180	KM		COMBINE FLOWS AT INTERSECTION OF WHITEHORN & INDEPENDENCE DR						
181	HC		3						
182	KK	RT4							
183	KM		ROUTE FLOW ALONG INDEPENDENCE DR TO CHAPEL HILLS DR						
184	RK		700	.033	.016	0	TRAP	0	33

172	DT	0	11.4	21.7	32.1	42.5	52.9	63.3	73.7	84.1
173	DQ	0	11.4	21.7	32.1	42.5	52.9	63.3	73.7	84.1

170 KK BAS4
 191 KH RUNOFF FROM BASIN 4
 192 DA .005
 193 LS 0 70
 194 UD .020

195 KK CH3A
 196 KM COMBINE FLOW AT INTERSECTION OF INDEPENDENCE AND C. HILLS
 197 HC 2

198 KKEDRCHLS
 199 KM FLOW ALONG E CURB OF C. HILLS JUST S OF INDEPENDENCE DR
 200 DTWCRBCHLS
 201 DI 0 10 20 45 62 75 92 104 130
 202 DQ 0 0 0 7.3 15 25 40 50 65

203 KK RT4A
 204 KM ROUTE FLOW SOUTH ALONG E CRB OF CHAPEL HILLS DR TO SUMP
 205 RK 250 .01 .016 0 TRAP 0 33

206 KK BAS12
 207 KM RUNOFF FROM BASIN 12
 208 DA .0042
 209 LS 0 70
 210 UD .034

HEC-1 INPUT

PAGE 6

1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

211 KK CH4A
 212 KM COMBINE FLOW IN E CURB OF CHAPEL HILLS DRIVE AT SUMP
 213 HC 2

214 KK EXSCHLS
 215 KM EXCESS FLOW THAT IS NOT COLLECTED BY PROPOSED 14' C.D.
 216 DTCBECCHLS
 217 DI 0 20 34.5 50 75 100 125
 218 DQ 0 20 34.5 34.5 34.5 34.5 34.5

219 KK DRSOVR
 220 KM FLOW CROSSES OVER TO W CURB OF CHAPEL HILLS DRIVE
 221 DT EXCHLS
 222 DI 0 20 40 60 80 100 120
 223 DQ 0 20 40 60 80 100 120

224 KK BAS5
 225 KM RUNOFF FROM BASIN 5
 226 DA .0121
 227 LS 0 70
 228 UD .029

229 KK RTC
 230 KM ROUTE FLOW THROUGH CONCRETE CHUTE
 231 RK 240 .008 .015 0 TRAP 4 0

232 KK BAS6
 233 KM RUNOFF FROM BASIN 6
 234 DA .0075
 235 LS 0 70
 236 UD .027

237 KK RT6
 238 KM COMBINE FLOWS AT SUMP ON BELL DRIVE
 239 RK 2

 240 KK RT6
 241 KM ROUTE FLOW THROUGH CONCRETE CHUTE
 242 RK 240 .021 .015 0 TRAP 6 0

 243 KK RT7
 244 KM ROUTE FLOW SOUTHWARD ON RED MOUNTAIN DR TO INTER. W/ TIMBERLINE DRIVE
 245 RK 200 .06 .016 0 TRAP 0 33

 246 KK BAS7
 247 KM RUNOFF FROM BASIN 7
 248 BA .0086
 249 LS 0 70
 250 UD .031

HEC-1 INPUT

PAGE 7

1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

251 KK CH4
 252 KM COMBINE FLOWS AT INTERSECTION OF RED MOUNTAIN AND TIMBERLINE
 253 RK 2

254 KKNCRDTIMB
 255 KM FLOW ALONG N CURB OF TIMBERLINE J W OF RED MOUNTAIN
 256 DTSCRTIMB
 257 DI 0 40.9 45 52.7 66.5 80 90
 258 DR 0 0 0 7.7 21.5 35 45

259 KK RT7
 260 KM ROUTE FLOW ALONG N CURB OF TIMBERLINE DR TO CUL-DE-SAC
 261 RK 400 .05 .016 0 TRAP 0 33

262 KKNCRDTIM
 263 KM FLOW ALONG N CURB OF TIMBERLINE J W OF CUL-DE-SAC
 264 DTSCRTIMB
 265 DI 0 5 10 20 30 40 50 60 70 80
 266 DR 0 0 2 4 6 8 10 12 14 16

267 KK RT8
 268 KM ROUTE FLOW ALONG N CURB OF TIMBERLINE TO TIMBERLINE CT.
 269 RK 200 .022 .016 0 TRAP 0 33

270 KK NCTIM
 271 KM FLOW ALONG N CURB OF TIMBERLINE W OF TIMBERLINE CT.
 272 DTSCRTIMB
 273 DI 0 10 20 30 40 50 60 70 80
 274 DR 0 2 4 6 8 10 12 14 16

275 KK RT9
 276 KM ROUTE FLOW TO SUMP IN WHITEHORN DR
 277 RK 350 .02 .016 0 TRAP 0 33

278 KK BAS11
 279 KM RUNOFF FROM BASIN 11
 280 BA .0042
 281 LS 0 70
 282 UD .026

283 KK RT10
 284 KM COMBINE FLOWS ON E CURB OF WHITEHORN DR AT EXIST. INTERSECTION

LINE 10.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

291 KXSCRTIMB
 292 KH FLOW ALONG S CURB OF TIMBERLINE W OF RED MOUNTAIN
 293 DRSCRTIMB

294 KK RT10
 295 KH ROUTE FLOW ALONG S CURB OF TIMBERLINE TO WHITEHORN DR
 296 RK 1000 .025 .016 0 TRAP 0 33

297 KK BAS9
 298 KH RUNOFF FROM BASIN 9
 299 BA .0066
 300 LS 0 70
 301 UD .061

302 KK CH6
 303 KM COMBINE FLOWS AT TIMBERLINE/WHITEHORN INTERSECTION
 304 HC 2

305 KK RT11
 306 KH ROUTE FLOW ALONG W CURB OF WHITEHORN TO EXIST 6' CB
 307 RK 200 .036 .016 0 TRAP 0 33

308 KKFLBYWCRB
 309 KM FLOW BY EXIST. 6' CB ON W CURB OF WHITEHORN
 310 DTCBWCRRWHI
 311 DI 0 10 12.8 20 30 40
 312 DD 0 6 6 6 6 6

313 KK CH10
 314 KM COMBINE FLOWS AT SUMP ON W CURB OF WHITEHORN
 315 HC 2

316 KK XCSFLOW
 317 KH FLOW THAT IS NOT COLLECTED BY PROPOSED 10' CB ON W CURB OF WHITEHORN
 318 DTXCSFLOW
 319 DI 0 10 23 40 70 100
 320 DD 0 10 23 23 23 23

321 KKXROSSOVR
 322 KH FLOW CROSSES OVER TO W CURB OF WHITEHORN
 323 DT XCSFLOW
 324 DI 0 20 40 60 80 100 120
 325 DD 0 20 40 60 80 100 120

326 KKCH DESAC
 327 KH FLOW THAT COLLECTS IN EASTERN CUL-DE-SAC OFF OF TIMBERLINE
 328 DRCHLDESAC

329 KK BAS8
 330 KH RUNOFF FROM BASIN 8
 331 BA .0066
 332 LS 0
 333 UD .061

331 KK CH7
 332 KM COMBINE FLOWS IN CH -DE-SAC
 333 HC 2

 337 KK RT12
 338 KM ROUTE FLOW THROUGH 30" CMP
 339 RK 294 .026 .024 0 CIRC 2.5 0

 340 KK TIMB CRT
 341 KM FLOW THAT IS DIRECTED INTO TIMBERLINE COURT CUL-DE-SAC
 342 DR TIMB CRT

343 KK DAS10
 344 KM RUNOFF FROM BASIN 10
 345 BA .0044
 346 LS 0 70
 347 UD .024

348 KK CH8
 349 KM COMBINE FLOWS IN TIMBERLINE COURT
 350 HC 2

351 KK CH9
 352 KM COMBINE FLOWS IN 36" CMP BENEATH TIMBERLINE COURT
 353 HC 2

354 KK RT13
 355 KM ROUTE FLOW THROUGH EXIST 36" CMP
 356 RK 215 .028 .024 0 CIRC 3

357 KK RT14
 358 KM ROUTE FLOW THROUGH EXIST 36" CMP
 359 RK 65 .025 .024 0 CIRC 3

360 KKDCBWRWHI
 361 KM FLOW COLLECTED BY EXIST. 6' CB ON W CURB OF WHITEHORN
 362 DRDCBWRWHI

363 KK CH9A
 364 KM COMBINE FLOWS IN EXIST 36" CMP
 365 HC 2

366 KKPROPCBWW
 367 KM FLOW COLLECTED BY PROPOSED 10' CB ON W CURB OF WHITEHORN
 368 DRPROPCBWW

369 KK CH10
 370 KM COMBINE FLOWS IN EXIST 36" CMP
 371 HC 2

HEC-1 INPUT

PAGE 10

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

372 KK RT15
 373 KM ROUTE FLOW THROUGH 36" CMP FROM WHITEHORN TO C HILLS
 374 RK 272 .035 .024 0 CIRC 3

375 KK RT16
 376 KM ROUTE FLOW THROUGH 27" CMP
 377 RK 49 .031 .024 0 CIRC

381
382

383 KK XCSFLOW
384 KM FLOW THAT IS NOT COLLECTED BY ST. S SYSTEM ON WHITEHORN
385 DR XCSFLOW

386 KK RT17
387 KM ROUTE XCSFLOW TO CHAPEL HILLS DR
388 RK 272 .03 .04 0 TRAP 5 5

389 KK EXCHLS
390 KM EXCESS FLOW FROM CHAPEL HILLS DRIVE
391 DR EXCHLS

392 KKMCRBCHLS
393 KM FLOW ALONG W CURB OF CHAPEL HILLS DRIVE
394 DRMCRBCHLS

395 KK CH11
396 KM COMBINE ALL OF FLOWS ON C. HILLS DR AT 18' CB ON W CURB IN SUMP
397 HC 4

398 KKCBWCRBCH
399 KM FLOW COLLECTED BY PROPOSED 18' CB ON W CURB OF C. HILLS
400 DTLEFTOVER
401 DI 0 20 44.4 60 80 100 120 140 180 220
402 DO 0 0 0 15.6 35.6 55.6 75.6 95.6 135.6 175.6

403 KK CH12
404 KM COMBINE FLOWS IN 43" x 68" RCP JUST DOWNSTREAM OF PROPOSED 18' C.B.
405 HC 2

406 KKDR/ANPHD
407 KM FLOW IN OUTLET PIPE FROM BRIARGATE/ANDEROSA DETENTION POND
408 IN 2
409 DI 0 0 0 0 0 0 0 0 0 0
410 DI 0 0 0 0 0 0 0 0 0 0
411 DI 0 0 0 0 0 0 0 0 0 0
412 DI 0 0 0 0 0 0 0 0 0 0
413 DI 0 0 0 0 1 4 5 6 6 37
414 DI 51 64 66 67 68 68 68 67 66 65
415 DI 24 63 62 61 60 58 54 50 46 42

HEC-1 INPUT

PAGE 11

LINE	ID	1	2	3	4	5	6	7	8	9	10
416	DI	38	34	32	30	28	26	25	23	22	20
417	DI	19	18	17	17	16	16	16	16	16	16
418	DI	16	16	16	16	16	16	16	15	15	15
419	DI	14	13	13	13	13	13	13	13	14	14
420	DI	14	13	13	13	13	12	12	12	12	12
421	DI	13	13	13	13	13	13	13	12	12	11
422	DI	13	16	17	21	21	21	20	19	17	16
423	DI	15	14	13	13	12	12	12	12	12	13
424	DI	13	12	12	12	11	10	10	9	8	8
425	KI	RT24									
426	KM	ROUTE FLOW THROUGH 36" CMP									
427	RK	200	.05	.023	0	PIPE	3				
428	KI	RT11									
429	KM	ROUTE FLOW THROUGH 36" CMP									
430	RK	200	.05	.023	0	PIPE	3				

431 RI RT11
 432 RI ROUTE FLOW THROUGH 36" CMP
 433 RK 125 .015 .024 0 CIRC 3

434 RI RT11
 435 KM ROUTE FLOW THROUGH 36" CMP
 436 RK 400 .035 .024 0 CIRC 3

437 KKGRINRUFE
 438 KH FLOW COLLECTED BY GRADED INLETS AT PEACEMAKER/E RUSTY HINGE INTERSECTION
 439 DRGRINRUFE

440 KK CH14A
 441 KM COMBINE FLOW IN STORM SEWER SYSTEM
 442 HC 2

443 KK RT24
 444 KM ROUTE FLOW THROUGH 42" CMP
 445 RK 500 .04 .024 0 CIRC 3.5

446 KKGRINRUFL
 447 KH FLOW COLLECTED BY GR INLETS AT FLINTLOCK/W RUSTY HINGE INTER.
 448 DRGRINRUFL

449 KK CH14D
 450 KM COMBINE FLOWS IN STORM SEWER SYSTEM
 451 HC 2

452 KK RT25
 453 KM ROUTE FLOW THROUGH 42" CMP
 454 RK 520 .03 .024 0 CIRC 3.5
 HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

455 KK RT26
 456 KM ROUTE FLOW THROUGH 42" CMP
 457 RK 305 .048 .024 0 CIRC 3.5

458 KK RT27
 459 KM ROUTE FLOW THROUGH 42" CMP
 460 RK 450 .036 .024 0 CIRC 3.5

461 KK CBINDCH
 462 KH FLOW COLLECTED BY EXIST 8' CB AT INDEPENDENCE/C. HILLS
 463 DR CBINDCH

464 KK CH15
 465 KM COMBINE FLOWS IN STORM SEWER SYSTEM
 466 HC 2

467 KK RT28
 468 KM ROUTE FLOW THROUGH 38" X 60" RCP
 469 RK 300 .0076 .013 0 CIRC 4

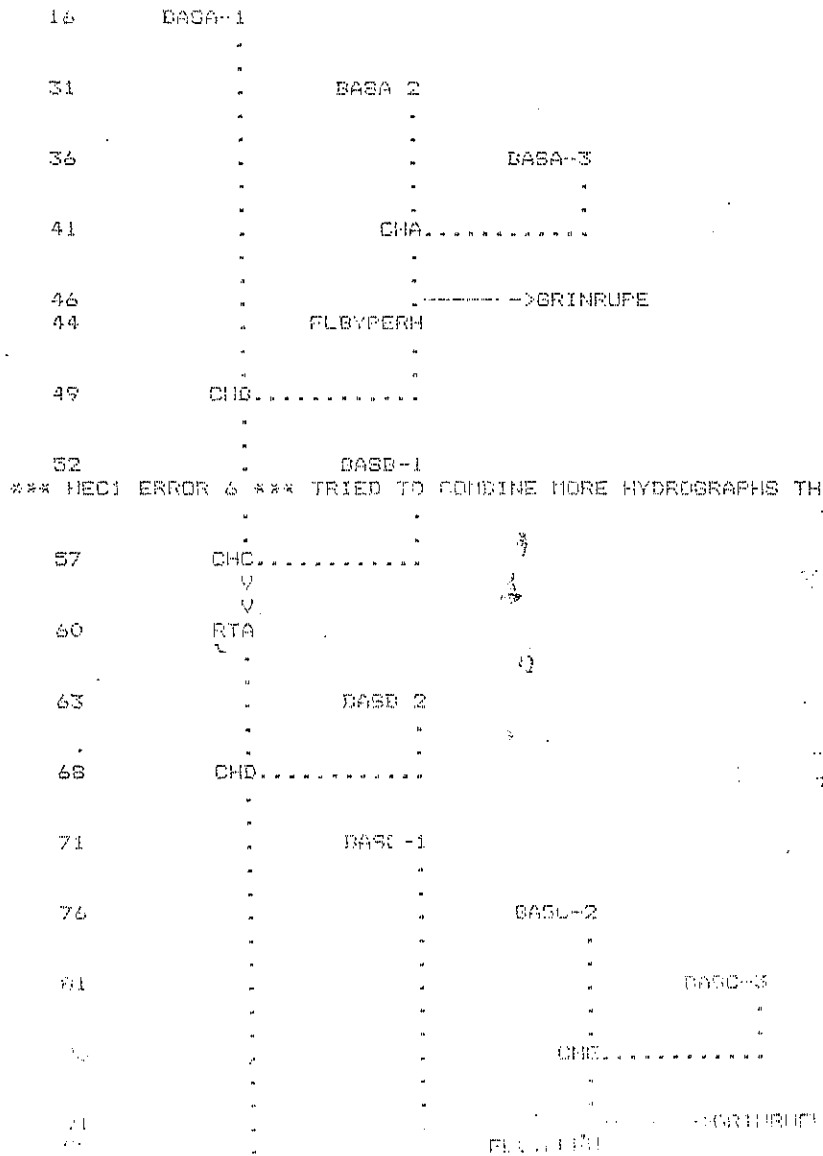
470 KK CH16
 471 KM COMBINE FLOWS IN 48" X 60" RCP
 472 HC 2

473 KK RT29
 474 KM ROUTE FLOW THROUGH 48" X 60" RCP
 475 RK 300 .0076 .013 0 CIRC 4

401 PL 0117
 402 RM CONDINE FLOWS IN STORM SEWER JUST EAST OF GRASHIO DRIVE
 403 HC 2
 404 27

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
 NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW



*** HEC1 ERROR & *** TRIED TO COMBINE MORE HYDROGRAPHS THAN AVAILABLE



WARNING *** TIME INTERVAL IS GREATER THAN .27*LAG
 WARNING *** TIME INTERVAL IS GREATER THAN .27*LAG
 WARNING *** TIME INTERVAL IS GREATER THAN .27*LAG
 WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
 WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
 WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

1

RUNOFF SUMMARY
 FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	FLWNCRBR	106.	1.53	3.	3.	3.	.00		
HYDROGRAPH AT	BASA-1	28.	1.53	2.	2.	2.	.02		
HYDROGRAPH AT	BASA-2	10.	1.50	0.	0.	0.	.00		
HYDROGRAPH AT	BASA-3	8.	1.53	0.	0.	0.	.00		
2 COMBINED AT	CHA	18.	1.50	1.	1.	1.	.01		
DIVERSION TO	GRINRUPE	18.	.03	1.	1.	1.	.01		
HYDROGRAPH AT	FLEBYPERH	0.	.03	0.	0.	0.	.01		
2 COMBINED AT	CHB	28.	1.53	2.	2.	2.	.03		
HYDROGRAPH AT	BASB-1	7.	1.50	0.	0.	0.	.00		
3 COMBINED AT	CHC	137.	1.53	5.	5.	5.	.03		
ROUTED TO	RTA	133.	1.57	5.	5.	5.	.03		
HYDROGRAPH AT	BASB 2	14.	1.53	1.	1.	1.	.01		
2 COMBINED AT	CHD	141.	1.57	6.	6.	6.	.03		
HYDROGRAPH AT	BASB 3	14.	1.53	1.	1.	1.	.01		
HYDROGRAPH AT	BASB 4	14.	1.53	1.	1.	1.	.01		

		1.	1.53	1.	1.	1.	1.	.01
2 COMBINED AT	CHC	54.	1.53	2.	2.	2.	2.	.02
DIVERSION TO								
HYDROGRAPH AT	GRIBRUF	34.	1.03	2.	2.	2.	2.	.02
HYDROGRAPH AT	FLBYFLRH	0.	1.03	0.	0.	0.	0.	.02
2 COMBINED AT	CHF	14.	1.50	1.	1.	1.	1.	.03
2 COMBINED AT	CHG	148.	1.57	6.	6.	6.	6.	.06
DIVERSION TO								
HYDROGRAPH AT	SCRBRRH	26.	1.57	0.	0.	0.	0.	.06
HYDROGRAPH AT	NCRBRRH	121.	1.57	6.	6.	6.	6.	.06
ROUTED TO								
HYDROGRAPH AT	RTAB	114.	1.60	6.	6.	6.	6.	.06
HYDROGRAPH AT	BASD-1	19.	1.53	1.	1.	1.	1.	.01
2 COMBINED AT	CHH	125.	1.57	7.	7.	7.	7.	.07
HYDROGRAPH AT	EIEC	44.	1.60	3.	3.	3.	3.	.02
HYDROGRAPH AT	FLDYS'CB	38.	1.57	2.	2.	2.	2.	.02
ROUTED TO								
HYDROGRAPH AT	RT1	34.	1.57	2.	2.	2.	2.	.02
DIVERSION TO								
HYDROGRAPH AT	STHPDR	10.	1.57	1.	1.	1.	1.	.02
HYDROGRAPH AT	FLDYSTMP	24.	1.57	1.	1.	1.	1.	.02
ROUTED TO								
HYDROGRAPH AT	RTBC	19.	1.63	1.	1.	1.	1.	.02
HYDROGRAPH AT	D-2	19.	1.57	1.	1.	1.	1.	.00
HYDROGRAPH AT	SCRBRRH	26.	1.57	0.	0.	0.	0.	.00
3 COMBINED AT	CHCH	80.	1.57	3.	3.	3.	3.	.03
HYDROGRAPH AT								
HYDROGRAPH AT	STHPDR	10.	1.57	1.	1.	1.	1.	.00
ROUTED TO								
HYDROGRAPH AT	RT	10.	1.57	1.	1.	1.	1.	.00

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		CH11	41.	1.53	2.	2.	2.	.01
	2 COMBINED AT	CH11	50.	1.53	3.	3.	3.	.02
	ROUTED TO	RT3	45.	1.57	3.	3.	3.	.02
	HYDROGRAPH AT	BAS2	32.	1.53	2.	2.	2.	.02
	HYDROGRAPH AT	BAS3	23.	1.53	1.	1.	1.	.01
	3 COMBINED AT	CH2	97.	1.57	6.	6.	6.	.04
	ROUTED TO	RT4	94.	1.57	6.	6.	6.	.04
	DIVERSION TO	CDINDCH	9.	1.57	2.	2.	2.	.04
	HYDROGRAPH AT	FLECCHLS	85.	1.57	3.	3.	3.	.04
	HYDROGRAPH AT	BAS4	16.	1.50	1.	1.	1.	.00
	2 COMBINED AT	CH3A	91.	1.57	4.	4.	4.	.05
	DIVERSION TO	WDRCHLS	39.	1.57	1.	1.	1.	.05
	HYDROGRAPH AT	EDRCHLS	52.	1.57	3.	3.	3.	.05
	ROUTED TO	RT4A	51.	1.57	3.	3.	3.	.05
	HYDROGRAPH AT	BAS12	11.	1.50	0.	0.	0.	.00
	2 COMBINED AT	CH4A	57.	1.57	4.	4.	4.	.05
	DIVERSION TO	CDCCCHLS	35.	1.57	3.	3.	3.	.05
	HYDROGRAPH AT	EXSCHLS	22.	1.57	0.	0.	0.	.05
	DIVERSION TO	FXCHLS	22.	.03	0.	0.	0.	.05
	HYDROGRAPH AT	CRSOVR	0.	.03	0.	0.	0.	.05
	HYDROGRAPH AT	BAS5	37.	1.50	1.	1.	1.	.01
	ROUTED TO	RT5	37.	1.50	1.	1.	1.	.01

		RT1	21.	1.50	1.	1.	1.	.01
	2 COMBINED AT	RT2	50.	1.50	2.	2.	2.	.02
	ROUTED TO	RT3	52.	1.50	2.	2.	2.	.02
	ROUTED TO	RT4	50.	1.53	2.	2.	2.	.02
	HYDROGRAPH AT	BAS7	25.	1.50	1.	1.	1.	.01
	2 COMBINED AT	CH1	71.	1.53	3.	3.	3.	.03
	DIVERSION TO	SCRPTIIB	26.	1.50	0.	0.	0.	.03
	HYDROGRAPH AT	NOBRTIME	45.	1.50	3.	3.	3.	.03
	ROUTED TO	RT7	45.	1.53	3.	3.	3.	.03
	DIVERSION TO	BU DESAC	9.	1.53	0.	0.	0.	.03
	HYDROGRAPH AT	HOURSTIN	36.	1.53	3.	3.	3.	.03
	ROUTED TO	RT8	35.	1.57	3.	3.	3.	.03
	DIVERSION TO	FIMBERT	7.	1.57	1.	1.	1.	.03
	HYDROGRAPH AT	INDTIM	20.	1.57	2.	2.	2.	.03
	ROUTED TO	RT9	28.	1.57	2.	2.	2.	.03
	HYDROGRAPH AT	BAS11	14.	1.50	0.	0.	0.	.00
	2 COMBINED AT	CH5	33.	1.57	3.	3.	3.	.03
	DIVERSION TO	COEGRWHI	0.	1.57	0.	0.	0.	.03
	HYDROGRAPH AT	FLDYECRE	33.	1.57	3.	3.	3.	.03
	HYDROGRAPH AT	SCRPTIIB	26.	1.53	0.	0.	0.	.00
	ROUTED TO	RT10	10.	1.57	0.	0.	0.	.00
	HYDROGRAPH AT	RT11	15.	1.50	1.	1.	1.	.01

		13.	1.57	1.	1.	1.	.01
	ROUTED TO						
		12.	1.57	1.	1.	1.	.01
	DIVERSION TO						
		6.	1.57	0.	0.	0.	.01
	HYDROGRAPH AT						
		26.	1.57	1.	1.	1.	.01
	2 COMBINED AT						
		59.	1.57	3.	3.	3.	.04
	DIVERSION TO						
		23.	1.57	3.	3.	3.	.04
	HYDROGRAPH AT						
		36.	1.57	1.	1.	1.	.04
	DIVERSION TO						
		36.	.03	1.	1.	1.	.04
	HYDROGRAPH AT						
		0.	.03	0.	0.	0.	.04
	HYDROGRAPH AT						
		7.	1.53	0.	0.	0.	.00
	HYDROGRAPH AT						
		19.	1.50	1.	1.	1.	.01
	2 COMBINED AT						
		26.	1.50	1.	1.	1.	.01
	ROUTED TO						
		24.	1.53	1.	1.	1.	.01
	HYDROGRAPH AT						
		7.	1.57	1.	1.	1.	.00
	HYDROGRAPH AT						
		15.	1.50	0.	0.	0.	.00
	2 COMBINED AT						
		20.	1.50	1.	1.	1.	.00
	2 COMBINED AT						
		42.	1.50	2.	2.	2.	.01
	ROUTED TO						
		41.	1.53	2.	2.	2.	.01
	ROUTED TO						
		41.	1.53	2.	2.	2.	.01
	HYDROGRAPH AT						
		6.	1.53	0.	0.	0.	.00
	2 COMBINED AT						
		47.	1.53	2.	2.	2.	.01
	HYDROGRAPH AT						
		0.	1.50	3.	3.	3.	.00

ROUTED TO	RT15	23.	1.53	5.	5.	5.	.01
ROUTED TO	RT16	59.	1.53	5.	5.	5.	.01
HYDROGRAPH AT	GAS13	10.	1.50	0.	0.	0.	.00
HYDROGRAPH AT	ACSF10N	36.	1.57	1.	1.	1.	.00
ROUTED TO	RT17	34.	1.57	1.	1.	1.	.00
HYDROGRAPH AT	EXCH1	22.	1.57	0.	0.	0.	.00
HYDROGRAPH AT	MCROCHLS	39.	1.57	1.	1.	1.	.00
4 COMBINED AT	CH11	101.	1.57	2.	2.	2.	.00
DIVERSION TO	LEFTOVER	56.	1.53	1.	1.	1.	.00
HYDROGRAPH AT	CENCRECH	44.	1.53	1.	1.	1.	.00
2 COMBINED AT	CH12	113.	1.53	6.	6.	6.	.01
HYDROGRAPH AT	BR/ANPND	68.	1.80	16.	16.	16.	.00
ROUTED TO	RT20	68.	1.83	16.	16.	16.	.00
ROUTED TO	RT21	68.	1.87	16.	16.	16.	.00
ROUTED TO	RT22	68.	1.87	16.	16.	16.	.00
ROUTED TO	RT23	68.	1.87	16.	16.	16.	.00
HYDROGRAPH AT	GRINRUPE	18.	1.50	1.	1.	1.	.00
2 COMBINED AT	CH14G	70.	1.83	17.	17.	17.	.00
ROUTED TO	RT24	70.	1.83	17.	17.	17.	.00
HYDROGRAPH AT	GRINRUPE	1.	1.53	2.	2.	2.	.00
ROUTED TO	RT25	1.	1.53	12.	12.	12.	.00

		RT25	75.	1.83	18.	18.	18.	.00
	ROUTED TO	RT25	75.	1.83	18.	18.	18.	.00
	ROUTED TO	RT27	75.	1.83	18.	18.	18.	.00
	HYDROGRAPH AT	CH100H	7.	1.53	2.	2.	2.	.00
	2 COMBINED AT	CH15	81.	1.83	21.	21.	21.	.00
	ROUTED TO	RT18	81.	1.83	21.	21.	21.	.00
	2 COMBINED AT	CH16	162.	1.57	27.	27.	27.	.02
	ROUTED TO	RT29	161.	1.57	27.	27.	27.	.02
	HYDROGRAPH AT	SAS14	22.	1.53	1.	1.	1.	.01
	2 COMBINED AT	CH17	176.	1.57	28.	28.	28.	.03

*** NORMAL END OF HEC-1 ***

131	KK	RT101						
132	KH	ROUTE FLOW THROUGH 36" CUP						
133	RK	85	10724	1013	0	CIRC	3	
134	KIPSDURSORE							
135	KH	ROUTE FLOW THROUGH 36" CUP TO REGION UNIT II BASH						
136	ORSDURSORE							
137	KK	RT102						
138	KH	ROUTE FLOW TO STORM SEWER SYSTEM						
139	RF	2						
140	KK	RT203						
141	KH	ROUTE FLOW THROUGH 42" RCP						
142	RK	31.5	12446	1013	0	CIRC	3.5	
143	KK	RT204						
144	KH	ROUTE FLOW THROUGH 42" RCP TO OUTFALL INTO DETENTION POND						
145	RK	31	10307	1013	0	CIRC	3.5	
146	KRODOWVILLE							
147	KH	FLOW COLLECTED BY EXIST 11' CB AT NE CORNER OF W VINTAGE/LEGEND						
148	ORCOWVILLE							
149	KK	RT301						
150	KH	ROUTE FLOW THROUGH 36" CUP						
151	RK	57	10225	1024	0	CIRC	3	
						HCO-1 INPUT		

LINE	10.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
452	KKRODOWVILLE
453	KH FLOW COLLECTED BY EXIST 14' CB AT NW CORNER W VINTAGE/LEGEND
454	ORRODOWVILLE
455	KK RT302
456	KH ROUTE FLOW THROUGH 36" CUP
457	RK 42 10335 1024 0 CIRC 3
458	KK CH301
459	KH EXISTING FLOWS TO STORM SEWER SYSTEM
460	HC 2
461	KK RT303
462	KH ROUTE FLOW THROUGH 36" CUP
463	RK 72 10115 1024 0 CIRC 3
464	KKRODSEEVLL
465	KH FLOW COLLECTED BY EXIST 6' CB AT SE CORNER W VINTAGE/LEGEND
466	ORRODSEEVLL
467	KK RT304
468	KH ROUTE FLOW THROUGH 24" CUP
469	RK 52 1116 1024 0 CIRC 2
470	KK RT305
471	KH ROUTE FLOW TO STORM SEWER
472	RF 2

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KK 11100
 KM COMBINE FLOW IN STORM SEWER
 KC 2
 KK 11200
 KM ROUTE FLOW THROUGH 42" STORM SEWER
 KC 100 101 102 0 CIRC 3.5
 KK 11300
 KM FLOW COLLECTED BY EXIST 8' CD ON S CURB OF BRIARGATE
 KC 11300

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KK 11400
 KM COMBINE ALL FLOWS IN STORM SEWER
 KC 2
 MED-1 INPUT

LINE 10.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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KK 11500
 KM ROUTE FLOW THROUGH 42" CIP TO OUTFALL INTO DETENTION POND
 KC 80 105 1024 0 CIRC 3.5

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KK 11600
 KM INFLOW HYDROGRAPH TO BRIARGATE II/ANDERSON ESTATES DETENTION POND
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KK 11700
 KM ROUTE FLOW THROUGH BRIARGATE I/ANDERSON ESTATES DETENTION POND
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KK 11800
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WARNING *** TIME INTERVAL IS GREATER THAN 24 HOURS

WATERSHED SUMMARY
 FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6 HOUR	24 HOUR	72 HOUR			
HYDROGRAPH AT	B1	6.	1.60	0.	0.	0.	.01		
ROUTED TO	RT1	6.	1.63	0.	0.	0.	.01		
HYDROGRAPH AT	B2	6.	1.53	0.	0.	0.	.00		
2 COMBINED AT	CH1	9.	1.60	1.	1.	1.	.01		
ROUTED TO	RT2	9.	1.60	1.	1.	1.	.01		
HYDROGRAPH AT	B3	13.	1.53	1.	1.	1.	.01		
2 COMBINED AT	CH2	21.	1.57	2.	2.	2.	.02		
ROUTED TO	RT3	21.	1.57	2.	2.	2.	.02		
HYDROGRAPH AT	B4	70.	1.50	2.	2.	2.	.01		
2 COMBINED AT	CH3	75.	1.53	4.	4.	4.	.03		
DIVERSION TO	NFCB	12.	1.53	2.	2.	2.	.03		
HYDROGRAPH AT	NFCB	64.	1.53	2.	2.	2.	.03		
HYDROGRAPH AT	B5	61.	1.50	2.	2.	2.	.01		
2 COMBINED AT	CH4	121.	1.50	4.	4.	4.	.04		
DIVERSION TO	ORCAF	71.	1.50	1.	1.	1.	.01		
HYDROGRAPH AT	ORCAF	71.	1.50	1.	1.	1.	.01		

1	HYDROGRAPH AT	WDRLEVI	18.	1.53	1.	1.	1.	1.	.06
2	HYDROGRAPH AT	WDRLEVI	21.	1.53	1.	1.	1.	1.	.03
3	2 COMBINED AT	WDR	56.	1.53	1.	1.	1.	1.	.07
4	HYDROGRAPH AT	WDRLEVI	24.	1.53	1.	1.	1.	1.	.00
5	HYDROGRAPH AT	WDRLEVI	15.	1.53	0.	0.	0.	0.	.00
6	2 COMBINED AT	WDRLEVI	40.	1.53	1.	1.	1.	1.	.00
7	DIVERSION TO	WDRLEVI	12.	1.53	1.	1.	1.	1.	.00
8	HYDROGRAPH AT	WDRLEVI	28.	1.53	0.	0.	0.	0.	.00
9	2 COMBINED AT	WDRLEVI	84.	1.53	2.	2.	2.	2.	.07
10	DIVERSION TO	WDRLEVI	35.	1.53	1.	1.	1.	1.	.07
11	HYDROGRAPH AT	WDRLEVI	49.	1.53	1.	1.	1.	1.	.07
12	2 COMBINED AT	WDRLEVI	206.	1.53	5.	5.	5.	5.	.12
13	ROUTED TO	WDRLEVI	183.	1.53	5.	5.	5.	5.	.12
14	DIVERSION TO	WDRLEVI	83.	1.53	1.	1.	1.	1.	.12
15	HYDROGRAPH AT	WDRLEVI	100.	1.53	4.	4.	4.	4.	.12
16	DIVERSION TO	WDRLEVI	34.	1.53	2.	2.	2.	2.	.12
17	HYDROGRAPH AT	WDRLEVI	66.	1.53	2.	2.	2.	2.	.12
18	ROUTED TO	WDRLEVI	63.	1.53	2.	2.	2.	2.	.12
19	DIVERSION TO	WDRLEVI	30.	1.53	1.	1.	1.	1.	.12
20	HYDROGRAPH AT	WDRLEVI	77.	1.53	1.	1.	1.	1.	.12
21	ROUTED TO	WDRLEVI	77.	1.53	1.	1.	1.	1.	.12

HYDROGRAPH AT	EDWATH1	31.	1.53	2.	2.	2.	.03
HYDROGRAPH AT	EDWATH1	31.	1.53	2.	2.	2.	.03
HYDROGRAPH AT	EDWATH1	19.	1.53	1.	1.	1.	.01
2 COMBINED AT	EDWATH1	50.	1.53	2.	2.	2.	.03
DIVERSION TO	EDWATH1	10.	1.53	0.	0.	0.	.03
HYDROGRAPH AT	EDWATH2	40.	1.53	2.	2.	2.	.03
DIVERSION TO	EDWATH2	20.	1.53	2.	2.	2.	.03
HYDROGRAPH AT	EDWATH3	20.	1.53	1.	1.	1.	.03
HYDROGRAPH AT	EDWATH4	15.	1.53	1.	1.	1.	.00
ROUTED TO	EDWATH5	15.	1.60	1.	1.	1.	.00
HYDROGRAPH AT	EDWATH6	29.	1.53	1.	1.	1.	.01
3 COMBINED AT	EDWATH7	62.	1.53	2.	2.	2.	.05
DIVERSION TO	EDWATH8	18.	1.53	0.	0.	0.	.05
HYDROGRAPH AT	EDWATH9	44.	1.53	2.	2.	2.	.05
DIVERSION TO	EDWATH10	14.	1.53	1.	1.	1.	.05
HYDROGRAPH AT	EDWATH11	30.	1.53	1.	1.	1.	.05
HYDROGRAPH AT	EDWATH12	31.	1.53	2.	2.	2.	.00
HYDROGRAPH AT	EDWATH13	10.	1.53	0.	0.	0.	.00
2 COMBINED AT	EDWATH14	41.	1.53	2.	2.	2.	.00
ROUTED TO	EDWATH15	36.	1.53	2.	2.	2.	.00
HYDROGRAPH AT	EDWATH16	1.	1.53	1.	1.	1.	.00

		11.	1.53	1.	1.	1.	.01
HYDROGRAPH AT	CRSNOVII	13.	1.53	0.	0.	0.	.00
HYDROGRAPH AT	D-6	21.	1.50	1.	1.	1.	.00
3 COMBINED AT	FLWBNVDR	122.	1.53	4.	4.	4.	.18
DIVERSION TO	WINNCRBR	15.	1.53	1.	1.	1.	.18
HYDROGRAPH AT	FLWNCRRR	106.	1.53	3.	3.	3.	.18
HYDROGRAPH AT	CRSOVR	34.	1.50	1.	1.	1.	.00
ROUTED TO	RT001	33.	1.57	2.	2.	2.	.00
HYDROGRAPH AT	B-3	41.	1.53	2.	2.	2.	.00
HYDROGRAPH AT	D-5	23.	1.53	1.	1.	1.	.01
3 COMBINED AT	DN10	90.	1.53	4.	4.	4.	.01
DIVERSION TO	SECBERV1	33.	1.53	2.	2.	2.	.01
HYDROGRAPH AT	SCBRFLBY	56.	1.53	2.	2.	2.	.01
HYDROGRAPH AT	CRSCBR1	83.	1.53	1.	1.	1.	.00
2 COMBINED AT	SCDWEVIN	139.	1.53	3.	3.	3.	.01
ROUTED TO	RT101	130.	1.57	3.	3.	3.	.01
DIVERSION TO	SDOBSDBR	85.	1.57	2.	2.	2.	.01
HYDROGRAPH AT	FLBYSDBD	45.	1.57	1.	1.	1.	.01
ROUTED TO	RT102	43.	1.57	1.	1.	1.	.01
HYDROGRAPH AT	D-4	19.	1.50	0.	0.	0.	.00
3 COMBINED AT	CH101	47.	1.57	1.	1.	1.	.01
DIVERSION TO	SECDWVDR	9.	1.57	0.	0.	0.	.01

1	HYDROGRAPH AT	CD1	30.	1.53	1.	1.	1.	.01
1	ROUTED TO	RTSS1	32.	1.53	3.	3.	3.	.00
1	HYDROGRAPH AT	CD2	15.	1.53	1.	1.	1.	.00
+	ROUTED TO	RTSS2	14.	1.53	1.	1.	1.	.00
+	2 COMBINED AT	CH1A	47.	1.53	4.	4.	4.	.00
+	HYDROGRAPH AT	CD3	12.	1.53	1.	1.	1.	.00
+	2 COMBINED AT	CH7	58.	1.53	5.	5.	5.	.00
+	ROUTED TO	RTSS3	58.	1.53	5.	5.	5.	.00
1	HYDROGRAPH AT	CD4	35.	1.53	1.	1.	1.	.00
+	2 COMBINED AT	CH6	73.	1.53	6.	6.	6.	.00
+	ROUTED TO	RTSS4	72.	1.53	6.	6.	6.	.00
+	HYDROGRAPH AT	CD5	40.	1.53	3.	3.	3.	.00
+	2 COMBINED AT	CH9	132.	1.53	10.	10.	10.	.00
1	ROUTED TO	RTSS5	131.	1.53	10.	10.	10.	.00
+	HYDROGRAPH AT	SECDDRV1	33.	1.53	2.	2.	2.	.00
+	2 COMBINED AT	CH11	164.	1.53	12.	12.	12.	.00
+	ROUTED TO	RTSS6	162.	1.53	12.	12.	12.	.00
1	ROUTED TO	RTSS7	160.	1.53	12.	12.	12.	.00
1	HYDROGRAPH AT	CD6	30.	1.53	2.	2.	2.	.00
1	ROUTED TO	RTSS8	31.	1.53	2.	2.	2.	.00

2 COMBINED AT	CH101	11.	1.53	3.	3.	3.	.00
ROUTED TO	RT202	14.	1.53	3.	3.	3.	.00
HYDROGRAPH AT	SODDSDOR	85.	1.57	2.	2.	2.	.00
2 COMBINED AT	CH202	149.	1.57	5.	5.	5.	.00
ROUTED TO	RT203	149.	1.57	5.	5.	5.	.00
ROUTED TO	RT204	149.	1.57	5.	5.	5.	.00
HYDROGRAPH AT	CDWVINLE	20.	1.53	2.	2.	2.	.00
ROUTED TO	RT301	20.	1.53	2.	2.	2.	.00
HYDROGRAPH AT	WDRWVILE	18.	1.57	1.	1.	1.	.00
ROUTED TO	RT302	17.	1.57	1.	1.	1.	.00
2 COMBINED AT	CH301	36.	1.53	3.	3.	3.	.00
ROUTED TO	RT303	35.	1.53	3.	3.	3.	.00
HYDROGRAPH AT	CBSEEV&L	14.	1.53	1.	1.	1.	.00
ROUTED TO	RT304	14.	1.53	1.	1.	1.	.00
2 COMBINED AT	CH302	49.	1.53	4.	4.	4.	.00
ROUTED TO	RT305	48.	1.53	4.	4.	4.	.00
HYDROGRAPH AT	VINWDBR	15.	1.53	1.	1.	1.	.00
2 COMBINED AT	CH3022	64.	1.53	5.	5.	5.	.00
ROUTED TO	RT3055	63.	1.57	5.	5.	5.	.00
HYDROGRAPH AT	SPDRPBR	7.	1.57	0.	0.	0.	.00
2 COMBINED AT	CH301	36.	1.53	3.	3.	3.	.00

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL	15.	15.	15.	15.	15.
POWER TO	HR	10	1.13	11.30					
HYDROGRAPH AT	NO	51	1.20	61.20					
HYDROGRAPH AT	NO	12	1.57	18.84					
2 COMBINED AT	SURBOR	10	1.40	14.00					
DIVERSION TO	SECR	12	1.60	19.20					
HYDROGRAPH AT	SFCB	56	1.60	90.40					
HYDROGRAPH AT	NECD	12	1.53	18.36					
2 COMBINED AT	CHBR	15	1.57	23.55					

W&M

*** NORMAL END OF HEC-J ***