

JOB FILE
NBT-0015

Revised Mitigative Drainage Study

Cherry Hill Estates
Newburyport, Massachusetts

February 16, 2000



Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880

**REVISED MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS**

February 16, 2000

INTRODUCTION

This report presents an analysis of the hydrologic character of the subject property and its tributary watersheds. The study presents an analysis of the proposed land use conditions of the site and the area tributary to the three selected points of comparison. For the comparative purposes of this study, three points of comparison near the property boundaries were selected, as shown on the accompanying watershed maps. These three points correspond to the three points where concentrated flow leaves the subject property and enters the downstream drainage system on Phillips Drive.

Proposed land use changes of the property include the construction of roadways, homes, driveways, lawn areas and other similar improvements. Proposed topographic changes will be incorporated into the site development design to provide appropriate grading, as well as provide for mitigation of drainage effects from the fully developed project site in order to comply with the goals of the stormwater management policy of the Department of Environmental Protection.

The goal of the project drainage design was two-fold: to mitigate peak rates of runoff from the property that would otherwise result from the proposed site development, and to provide appropriately-sized stormwater management areas for mitigation of water quality and a properly-designed roadway stormwater collection system.

METHODOLOGY - GENERAL

The methodology of runoff analysis contained in this study was to develop watershed parameters based on the Urban Hydrology for Small Watersheds method, described in Technical Release No. 55 of the United States Department of Agriculture, Soil Conservation Service, and, using these parameters, to model the runoff characteristics of the watershed.

Hydrologic soil types are an important parameter in the determination of surficial runoff. The USDA Soil Conservation Service Mapping was consulted to obtain information concerning soil types in the tributary watersheds. Generally, the site is comprised of soils that are classified as hydrologic soil groups A and B, with small areas of hydrologic soil group C soils near Storey Avenue. The large wetland areas, generally as indicated on the NRCS mapping, were assigned to hydrologic soil group D.

A 24-hour rainfall event with a Type III S.C.S. distribution, using the procedures specified in Technical Release No. 20 by the Soil Conservation Service, was utilized.

EXISTING CONDITION METHODOLOGY

A mathematical model of the equivalent existing condition watersheds to the design points of comparison was developed using the general methodology discussed above. Existing condition sub-area Be was further subdivided along the hydrologic soil group D boundary to provide a more homogeneous assessment of runoff potential for the Be sub-area, given its high percentage of soils in hydrologic soil group A. Similarly, existing condition sub-area De was subdivided along the hydrologic soil group D boundary. The results of the existing condition runoff analyses have been presented in the summary tables below for each of the three points of comparison; similarly, the routing effects of the existing wetlands (RES 10 – RES 13, inclusive) have been summarized in the comparative assessment tables below.

PROPOSED CONDITION METHODOLOGY

The proposed condition watershed parameters and analysis were determined, based on the revised plan. Watershed schematics for each of the three points of comparison that describe the inter-relationship of the various sub-areas and their respective location in and around the project site have been included in this study. These schematics identify the TR-20 section numbers and reservoir number for each of the three proposed upland stormwater management areas used in the proposed condition calculations.

The general design approach of the drainage system for the subdivision was to collect, in the roadway drainage system, runoff from portions of the developed site and, where topographically feasible, direct that runoff to each of the four proposed stormwater management areas. The stormwater management area effectively serves two purposes: to provide areas for water quality mitigation, particularly for typically frequent rainfalls; and to provide areas available for stormwater detention for more intense, less frequent rainfall events. A water quality volume, equivalent to one inch of runoff from all proposed impervious areas in the subject sub-area, was provided for in the design. Proposed building footprint areas, in each of the proposed sub-areas, were excluded from the runoff assessment provided for the water quality volume calculations, since it is proposed that the first one inch of runoff from all proposed buildings will be infiltrated into the surrounding soil by the proposed dry wells, as noted on the plan. The building footprint areas, in addition to all other impervious areas, were, however, included in the runoff assessment provided for the peak flow rate mitigative design, since the dry wells would not have sufficient design capacity in excess of one inch of runoff.

It should be noted that, in preparing the proposed condition TR-55 runoff curve numbers for the various sub-areas, all dwellings within the subdivision were assumed to have associated with them 2,000 square feet of impervious roof, located within the building envelopes shown on the plan. The balance of the area, between the dwelling and the building envelope, was assumed to be lawn. Each of the three proposed stormwater management areas is being proposed as a constructed pocket wetland with a presumptive TSS removal rate of 80%.

Runoff from portions of the developed project site is proposed to be discharged to the stormwater management system via a closed pipe drainage system. A portion of that system, the deep sump/hooded catch basins, are specifically designed to provide initial water quality pre-treatment in terms of total suspended solids removal. Flow from the closed pipe drainage systems will discharge to the stormwater management areas that have been proposed. Outflow from these areas will be regulated by smaller diameter outlet pipes and spillways. These regulated outflows will be discharged upgradient of any identified wetlands.

CONCLUSION

A series of summary tables has been provided in this study which summarizes the existing and proposed condition peak rates of runoff to the three points of comparison. A summary table of the performance characteristics of each of the three proposed stormwater management areas has also been included in this study, as well as a comparative assessment of each of the four existing wetland areas (RES 10 – RES 13, inclusive). Furthermore, the water quality mitigation goals toward the wetland resource area will be achieved for those discharges which occur within the 100-foot buffer zone inasmuch as that stormwater management system has been designed to remove in excess of 80% of the average annual TSS load. As can be seen by examining the summary tables, the project design is effective in providing for proper stormwater management of runoff from the project site and its surrounding watershed. Furthermore, the roadway drainage system has been designed based on a 25-year storm capacity, with calculations to demonstrate that sufficient capacity exists in the 100-year storm to provide assurances that the watershed boundaries remain correct for those infrequent design storms. Similarly, the three roadway culverts have been designed based on the 100-year storm.

**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

Summary Tables

**Hayes Engineering, Inc.
February 14, 2000**

February 8, 2000

**RES 11
PEAK FLOW RATE
SUMMARY
TO DOWNSTREAM**

Storm Event	Existing Condition cfs	Proposed Condition cfs	Change cfs
2 yr. 3.1"/24 hr.	2.4	1.6	- 0.8
10 yr. 4.6"/24 hr.	3.4	3.1	- 0.3
25 yr. 5.4"/24 hr.	9.8	5.3	- 4.5
100 yr. 7.0"/24 hr.	26.1	9.9	- 16.1

February 8, 2000

**RES 12
PEAK FLOW RATE
SUMMARY
TO DOWNSTREAM**

Storm Event	Existing Condition cfs	Proposed Condition cfs	Change cfs
2 yr. 3.1"/24 hr.	2.3	2.3	0
10 yr. 4.6"/24 hr.	10.1	3.6	- 6.5
25 yr. 5.4"/24 hr.	11.7	4.5	- 7.2
100 yr. 7.0"/24 hr.	13.0	6.2	- 6.8

February 8, 2000

**RES 13
PEAK FLOW RATE
SUMMARY
TO DOWNSTREAM**

Storm Event	Existing Condition cfs	Proposed Condition cfs	Change cfs
2 yr. 3.1"/24 hr.	2.5	2.2	- 0.3
10 yr. 4.6"/24 hr.	4.3	3.5	- 0.8
25 yr. 5.4"/24 hr.	5.5	4.1	- 1.4
100 yr. 7.0"/24 hr.	6.9	5.3	- 1.6

February 8, 2000

**STORMWATER MANAGEMENT
PERFORMANCE SUMMARY**

**RES 01 15" @ 64.0
 10' spillway @ 67.0**

Storm Event	Peak Flow In cfs	Peak Flow Out cfs	Max. W. L. Elev.
2 yr. 3.1"/24 hr.	7.1	2.3	64.63
10 yr. 4.6"/24 hr.	18.5	6.3	65.71
25 yr. 5.4"/24 hr.	25.8	8.4	66.37
100 yr. 7.0"/24 hr.	41.7	21.4	67.39

February 8, 2000

**STORMWATER MANAGEMENT
PERFORMANCE SUMMARY**

RES 02 10" @ 67.0
 10' spillway @ 69.5

Storm Event	Peak Flow In cfs	Peak Flow Out cfs	Max. W. L. Elev.
2 yr. 3.1"/24 hr.	2.7	1.1	67.62
10 yr. 4.6"/24 hr.	5.8	2.4	68.43
25 yr. 5.4"/24 hr.	7.7	3.1	68.90
100 yr. 7.0"/24 hr.	11.6	7.2	69.67

February 8, 2000

**STORMWATER MANAGEMENT
PERFORMANCE SUMMARY**

RES 04 8" @ 64.0
 10' spillway @ 67.8

Storm Event	Peak Flow In cfs	Peak Flow Out cfs	Max. W. L. Elev.
2 yr. 3.1"/24 hr.	3.5	1.2	65.09
10 yr. 4.6"/24 hr.	6.4	2.2	66.04
25 yr. 5.4"/24 hr.	8.0	2.5	66.50
100 yr. 7.0"/24 hr.	11.4	3.1	67.52

February 8, 2000

**COMPARATIVE PERFORMANCE SUMMARY
EXISTING WETLAND AREA**

RES 10

Storm Event	Existing			Proposed		
	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.
2 yr. 3.1"/24 hr.	3.5	3.1	56.20	5.3	1.5	59.28
10 yr. 4.6"/24 hr.	7.8	7.7	57.50	15.0	3.1	60.72
25 yr. 5.4"/24 hr.	13.2	13.1	58.00	21.5	5.1	61.01
100 yr. 7.0"/24 hr.	27.6	27.6	58.17	41.6	9.3	61.64

February 8, 2000

**COMPARATIVE PERFORMANCE SUMMARY
EXISTING WETLAND AREA**

RES 11

Storm Event	Existing			Proposed		
	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.
2 yr. 3.1"/24 hr.	3.1	2.4	54.71	1.6	1.6	53.58
10 yr. 4.6"/24 hr.	8.6	3.4	56.88	3.3	3.1	56.13
25 yr. 5.4"/24 hr.	14.5	9.8	57.31	5.4	5.3	57.16
100 yr. 7.0"/24 hr.	31.7	26.1	57.87	9.9	9.9	57.32

February 8, 2000

**COMPARATIVE PERFORMANCE SUMMARY
EXISTING WETLAND AREA**

RES 12

Storm Event	Existing			Proposed		
	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.
2 yr. 3.1"/24 hr.	2.3	2.3	62.45	2.7	2.3	64.02
10 yr. 4.6"/24 hr.	11.2	10.1	64.04	11.3	3.6	64.77
25 yr. 5.4"/24 hr.	17.4	11.7	64.54	15.1	4.5	64.99
100 yr. 7.0"/24 hr.	32.0	13.0	65.12	24.5	6.2	65.32

February 8, 2000

**COMPARATIVE PERFORMANCE SUMMARY
EXISTING WETLAND AREA**

RES 13

Storm Event	Existing			Proposed		
	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.	Peak Flow In (cfs)	Peak Flow Out (cfs)	Max. W. L. Elev.
2 yr. 3.1"/24 hr.	2.8	2.5	61.86	2.5	2.2	61.74
10 yr. 4.6"/24 hr.	7.9	4.3	62.82	5.4	3.5	62.34
25 yr. 5.4"/24 hr.	11.1	5.5	63.52	6.9	4.1	62.67
100 yr. 7.0"/24 hr.	18.0	6.9	64.19	9.9	5.3	63.38

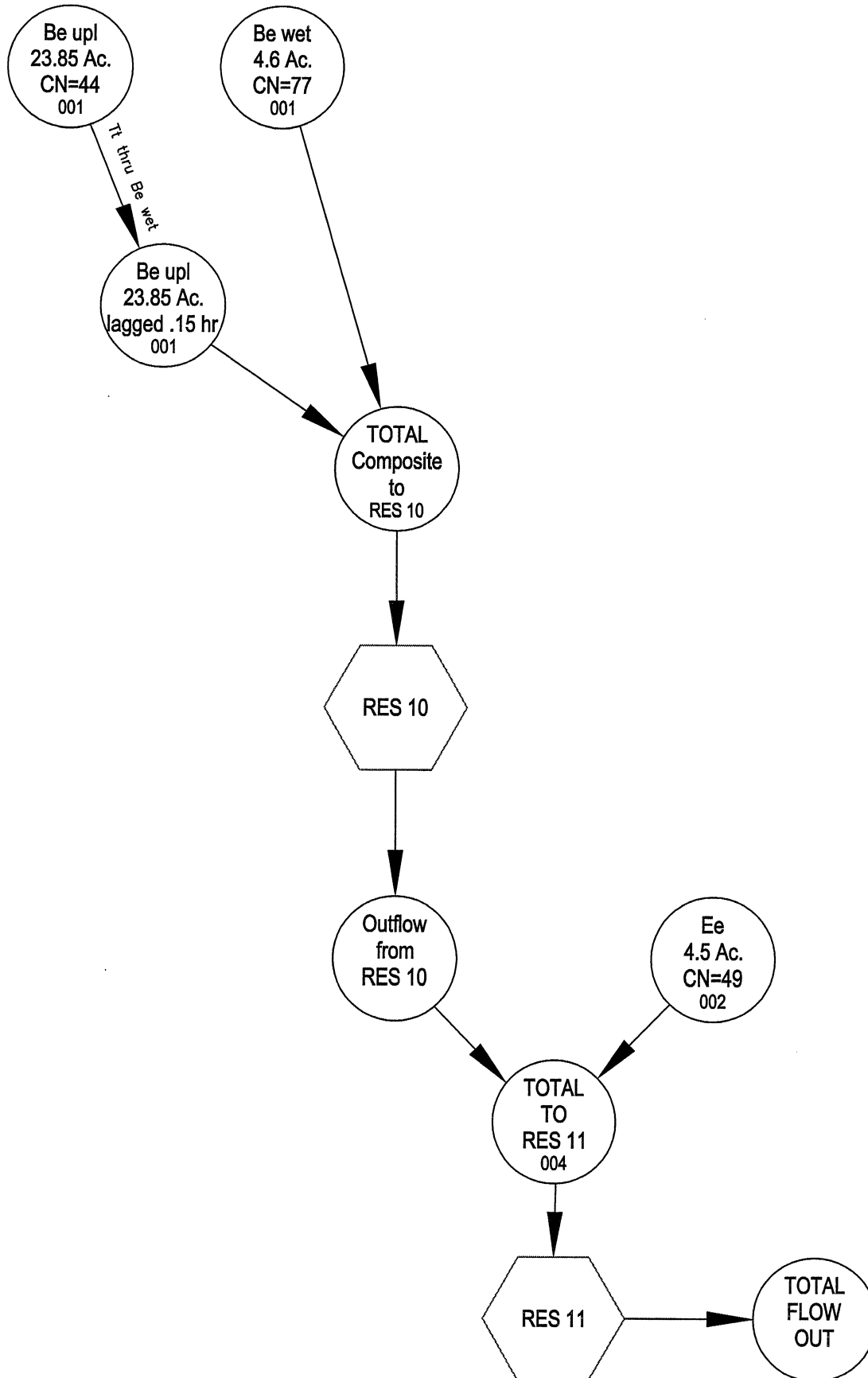
**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

Existing Condition Analysis

To RES 11 Design Point

**Hayes Engineering, Inc.
February 14, 2000**

EXISTING CONDITION WATERSHED SCHEMATIC TO RES 11 WETLAND OUTLET





HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # _____
NAME _____
DATE _____

MADE BY _____

- MEMO
- CALCULATION

RES 10 - STAGE STORAGE

ELEV	AREA FT ²	Avg. FT ²	Inc. D FT	Inc. Vol FT ³	Cum Vol AcFt
55	0				0
		10	1	10	
56	20±				.0002
		1235	2	2470	
58*	2450				.057
		7625	1	7625	
59	12800				.232
		22550	1	22550	
60	32300				.750
		64066	2	128132	
62	2.2A.				3.69

* EQUAL TO ROAD TOP ELEV. OF EXISTING PATH
USE 55-59 ELEV. DATA FOR EXISTING. @ Q = 100⁺ cfs

SEE ATTACHED HY-8 ANALYSIS, HOWEVER REFER ALSO TO RES 11
STAGE DISCHARGE CALC'S WHICH GOVERN AT HEADWATER ELEV.
OF 56 & 57.1, BASED ON THAT DOWNSTREAM CONTROL
ABOVE 57.1 - FLOW WILL OVERTOP YARD DOWNSTREAM AT RES 11

CUMULATIVE VOL @ 57.1 ESTIMATED AT 0.03 AcFt. $(1235 \text{ ft}^2 \times 1) + 10 \approx .03$

REL TO EXISTING
STAGE DISCHARGE

1/3

CURRENT DATE: 07-23-1999
CURRENT TIME: 08:16:11

FILE DATE: 07-23-1999
FILE NAME: NBT10

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C	SITE DATA				CULVERT SHAPE, MATERIAL, INLET			
U								
L	INLET	OUTLET	CULVERT	BARRELS				
V	ELEV.	ELEV.	LENGTH	SHAPE	SPAN	RISE	MANNING	INLET
NO.	(ft)	(ft)	(ft)	MATERIAL	(ft)	(ft)	n	TYPE
1	55.00	54.82	18.00	1 RCP	1.50	1.50	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: NBT10 DATE: 07-23-1999

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
55.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
57.26	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
58.36	20.0	13.6	0.0	0.0	0.0	0.0	0.0	6.19	12
58.52	30.0	14.1	0.0	0.0	0.0	0.0	0.0	15.73	9
58.62	40.0	14.4	0.0	0.0	0.0	0.0	0.0	25.26	6
58.70	50.0	14.6	0.0	0.0	0.0	0.0	0.0	34.97	5
58.77	60.0	14.8	0.0	0.0	0.0	0.0	0.0	44.86	5
58.83	70.0	14.9	0.0	0.0	0.0	0.0	0.0	54.76	5
58.88	80.0	15.1	0.0	0.0	0.0	0.0	0.0	64.22	4
58.94	90.0	15.2	0.0	0.0	0.0	0.0	0.0	74.03	4
58.99	100.0	15.3	0.0	0.0	0.0	0.0	0.0	83.93	4
58.00	12.6	12.6	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: NBT10 DATE: 07-23-1999

HEAD	HEAD	TOTAL	FLOW	% FLOW
ELEV (ft)	ERROR (ft)	FLOW (cfs)	ERROR (cfs)	ERROR
55.00	0.000	0.00	0.00	0.00
57.26	0.000	10.00	0.00	0.00
58.36	-0.002	20.00	0.17	0.85
58.52	-0.002	30.00	0.20	0.67
58.62	-0.004	40.00	0.38	0.95
58.70	-0.004	50.00	0.47	0.94
58.77	-0.003	60.00	0.39	0.65
58.83	-0.003	70.00	0.33	0.47
58.88	-0.006	80.00	0.72	0.90
58.94	-0.006	90.00	0.77	0.86
58.99	-0.006	100.00	0.73	0.73

1¢ TOLERANCE (ft) = 0.010

2¢ TOLERANCE (%) = 1.000

3/3

CURRENT DATE: 07-23-1999
CURRENT TIME: 08:16:11

FILE DATE: 07-23-1999
FILE NAME: NBT10

TAILWATER

CONSTANT WATER SURFACE ELEVATION
54.82

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE
EMBANKMENT TOP WIDTH

GRAVEL
10.00 ft

***** USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X ft	Y ft
1	0.00	60.10
2	43.00	59.00
3	63.00	58.00
4	68.10	58.10
5	105.50	58.60



HAYES ENGINEERING, INC.
603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # _____
NAME _____
DATE _____

MADE BY _____

- MEMO
 CALCULATION

RES 11 - (LOCATED DOWNSTREAM OF RES 10)

ELEV	AREA FT ²	AUG. FT ²	INC. D. FT	INC. VOL FT ³	CUM VOL Ac Ft.
52.5	0				0
		5	.5	2.5	
53	10	230	1	230	neg. use .0001
54	450	2075	2	4150	.005
56	3700	8850	1.1	9735	.100
57.1*	14000	18500	.9	16550	.324
58	23000				.704

* 0' TOP ELEV. = 57.1 IN D/S. YARD AREA

SEE ATTACHED HY-8 ANALYSIS OF 12" CMP DRAIN. - HELD D/S.
TW = 52.5 AS INVERT OF DRAIN EXITING DMH IN PHILLIPS DR.

RES 11
STAGE DISCHARGE

1/3

CURRENT DATE: 07-23-1999
CURRENT TIME: 08:13:55

FILE DATE: 07-23-1999
FILE NAME: NBT11

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C	SITE DATA				CULVERT SHAPE, MATERIAL, INLET				
U	L	INLET	OUTLET	CULVERT	BARRELS				
V	ELEV.	ELEV.	LENGTH	SHAPE	SPAN	RISE	MANNING	INLET	
NO.	(ft)	(ft)	(ft)	MATERIAL	(ft)	(ft)	n	TYPE	
1	51.60	50.59	135.00	1 CSP	1.00	1.00	.024	CONVENTIONAL	
2									
3									
4									
5									
6									

SUMMARY OF CULVERT FLOWS (cfs) FILE: NBT11 DATE: 07-23-1999

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
52.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
52.56	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
52.75	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
53.07	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
53.52	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
54.09	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
54.79	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
55.62	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
56.58	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
57.66	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
58.87	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: NBT11 DATE: 07-23-1999

HEAD	HEAD	TOTAL	FLOW	% FLOW
ELEV (ft)	ERROR (ft)	FLOW (cfs)	ERROR (cfs)	ERROR
52.50	0.000	0.00	0.00	0.00
52.56	0.000	0.40	0.00	0.00
52.75	0.000	0.80	0.00	0.00
53.07	0.000	1.20	0.00	0.00
53.52	0.000	1.60	0.00	0.00
54.09	0.000	2.00	0.00	0.00
54.79	0.000	2.40	0.00	0.00
55.62	0.000	2.80	0.00	0.00
56.58	0.000	3.20	0.00	0.00
57.66	0.000	3.60	0.00	0.00
58.87	0.000	4.00	0.00	0.00

1¢ TOLERANCE (ft) = 0.010

2¢ TOLERANCE (%) = 1.000

CURRENT DATE: 07-23-1999
CURRENT TIME: 08:13:55

FILE DATE: 07-23-1999
FILE NAME: NBT11

2/3

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.00 (ft) BY 1.00 (ft)) CSP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4# (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	52.50	0.00	0.90	0-NF	0.00	0.00	0.00	1.91	0.00	0.00
0.40	52.56	0.36	0.96	4-FFt	0.33	0.26	1.00	1.91	0.51	0.00
0.80	52.75	0.52	1.15	4-FFt	0.49	0.37	1.00	1.91	1.02	0.00
1.20	53.07	0.66	1.47	4-FFt	0.63	0.46	1.00	1.91	1.53	0.00
1.60	53.52	0.78	1.92	4-FFt	0.78	0.53	1.00	1.91	2.04	0.00
2.00	54.09	0.91	2.49	4-FFt	1.00	0.60	1.00	1.91	2.55	0.00
2.40	54.79	1.03	3.19	4-FFt	1.00	0.66	1.00	1.91	3.06	0.00
2.80	55.62	1.17	4.02	4-FFt	1.00	0.72	1.00	1.91	3.57	0.00
3.20	56.58	1.32	4.98	4-FFt	1.00	0.76	1.00	1.91	4.07	0.00
3.60	57.66	1.49	6.06	4-FFt	1.00	0.81	1.00	1.91	4.58	0.00
4.00	58.87	1.67	7.27	4-FFt	1.00	0.84	1.00	1.91	5.09	0.00

El. inlet face invert 51.60 ft El. outlet invert 50.59 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
INLET ELEVATION 51.60 ft
OUTLET STATION 135.00 ft
OUTLET ELEVATION 50.59 ft
NUMBER OF BARRELS 1
SLOPE (V/H) 0.0075
CULVERT LENGTH ALONG SLOPE 135.00 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
BARREL DIAMETER 1.00 ft
BARREL MATERIAL CORRUGATED STEEL
BARREL MANNING'S n 0.024
INLET TYPE CONVENTIONAL
INLET EDGE AND WALL SQUARE EDGE WITH HEADWALL
INLET DEPRESSION NONE

CURRENT DATE: 07-23-1999
CURRENT TIME: 08:13:55

FILE DATE: 07-23-1999
FILE NAME: NBT11

TAILWATER

CONSTANT WATER SURFACE ELEVATION
52.50

ROADWAY OVERTOPPING DATA

WEIR COEFFICIENT 2.50
EMBANKMENT TOP WIDTH 10.00 ft

***** USER DEFINED ROADWAY PROFILE - YARD

CROSS-SECTION	X	Y
COORD. NO.	ft	ft
1	0.00	58.00
2	11.00	57.10
3	34.00	58.00

ANALYSIS w/ EXPANDED DISCH. RANGE
TO MODEL O' TOP IN YARD AT 57.1+

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
52.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
56.08	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.00	1
57.45	6.0	3.5	0.0	0.0	0.0	0.0	0.0	2.43	15
57.58	9.0	3.6	0.0	0.0	0.0	0.0	0.0	5.35	10
57.67	12.0	3.6	0.0	0.0	0.0	0.0	0.0	8.30	8
57.75	15.0	3.6	0.0	0.0	0.0	0.0	0.0	11.27	7
57.81	18.0	3.7	0.0	0.0	0.0	0.0	0.0	14.22	6
57.87	21.0	3.7	0.0	0.0	0.0	0.0	0.0	17.13	5
57.92	24.0	3.7	0.0	0.0	0.0	0.0	0.0	20.15	5
57.96	27.0	3.7	0.0	0.0	0.0	0.0	0.0	23.17	5
58.01	30.0	3.7	0.0	0.0	0.0	0.0	0.0	26.11	4

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CHERRY HILL ESTATES User: CFB Date: 01-28-2000

County : State: Checked: _____ Date: _____

Subtitle: EXISTING CONDITION SUBAREA ANALYSIS

Subarea : Be upl

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Residential districts Avg % imperv				
(by average lot size)				
1 acre 20	.5(51)	.5(68)	-	-
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	5.66(30)	5.39(58)	-	-
Woods good	5.6(30)	6.2(55)	-	-
Total Area (by Hydrologic Soil Group)	11.7	12.0		
	====	====		

SUBAREA: Be upl TOTAL DRAINAGE AREA: 23.85 Acres WEIGHTED CURVE NUMBER: 44

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CHERRY HILL ESTATES User: CFB Date: 01-28-2000

County : State: Checked: _____ Date: _____

Subtitle: EXISTING CONDITION SUBAREA ANALYSIS

Subarea : Be wet

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

OTHER AGRICULTURAL LANDS				
Woods good	-	-	-	4.6(77)

Total Area (by Hydrologic Soil Group) 4.6
=====

SUBAREA: Be wet TOTAL DRAINAGE AREA: 4.6 Acres WEIGHTED CURVE NUMBER: 77

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CHERRY HILL ESTATES

User: CFB

Date: 01-28-2000

County :

State:

Checked: _____

Date: _____

Subtitle: EXISTING CONDITION SUBAREA ANALYSIS

Subarea : Ee

COVER DESCRIPTION	Hydrologic Soil Group				
	A	B	C	D	
Acres (CN)					

FULLY DEVELOPED URBAN AREAS (Veg Estab.)					
Residential districts	Avg % imperv				
(by average lot size)					
1 acre	20	.34(51)	.34(68)	-	-
OTHER AGRICULTURAL LANDS					
Meadow -cont. grass (non grazed)	----	1.5(30)	-	-	-
Woods	good	.5(30)	.82(55)	-	1(77)
Total Area (by Hydrologic Soil Group)	2.34	1.16		1	
	====	====		====	

SUBAREA: Ee TOTAL DRAINAGE AREA: 4.5 Acres WEIGHTED CURVE NUMBER: 49

Project : CHERRY HILL ESTATES User: CFB Date: 01-28-2000

County : State: Checked: _____ Date: _____
 Subtitle: EXISTING CONDITION SUBAREA ANALYSIS

----- Subarea #1 - Be upl -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	H					0.209
Shallow Concent'd		220	.05	U					0.017
Shallow Concent'd		370	.04	U					0.032
Time of Concentration = 0.26*									=====

----- Subarea #2 - Be wet -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.008	H					0.301
Shallow Concent'd		550	.01	U					0.095
Open Channel		380	.013		.04	1.5	4		0.048
Time of Concentration = 0.44*									=====

Shallow Concent'd		600	.01	U					0.103
Open Channel		380	.013		.04	1.4	4		0.050
Travel Time = 0.15*									=====

----- Subarea #3 - Ee -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		600	.02	U					0.073
Shallow Concent'd		300	.3	U					0.009
Open Channel		200	.016		.04	1.5	4		0.023
Time of Concentration = 0.24*									=====

--- Sheet Flow Surface Codes ---

- | | | |
|------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated 20 % Res. | H Woods, Light | P Paved |
| D Cultivated 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

WS Be upl

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 10 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5	RAINFL	9		.25						
8			0.0	.0025	.005	.0075	.010			
8			.0125	.015	.0175	.020	.0225			
8			.026	.0285	.031	.0345	.037			
8			.0405	.043	.0465	.050	.0535			
8			.057	.0605	.064	.068	.072			
8			.076	.080	.0845	.089	.094			
8			.100	.1075	.115	.1225	.130			
8			.1385	.148	.157	.167	.178			
8			.189	.202	.216	.2315	.250			
8			.271	.298	.3455	.500	.6555			
8			.702	.7295	.751	.769	.785			
8			.7985	.811	.823	.834	.8435			
8			.853	.862	.870	.8785	.886			
8			.8935	.900	.907	.911	.916			
8			.920	.9245	.929	.9325	.936			
8			.940	.944	.947	.951	.954			
8			.957	.9605	.963	.9665	.969			
8			.9725	.975	.9775	.981	.9835			
8			.986	.9885	.991	.9935	.996			
8			.9985	1.0	1.0	1.0	1.0			
9	ENDTBL									
6	RUNOFF	1 001	2	.03726563	44.	.26	1 1 1 1			
	ENDATA									
7	INCREM	6		0.1						
7	COMPUT	7 001 001		0.0	3.1	1.0	9 2 01 01		2 YR	
	ENDCMP	1								
7	COMPUT	7 001 001		0.0	4.6	1.0	9 2 01 02		10 YR	
	ENDCMP	1								
7	COMPUT	7 001 001		0.0	5.4	1.0	9 2 01 03		25 YR	
	ENDCMP	1								
7	COMPUT	7 001 001		0.0	7.0	1.0	9 2 01 04		100 YR	
	ENDCMP	1								
	ENDJOB	2								

*****END OF 80-80 LIST*****

WS Be upl. 2yr.

TR20 XEQ 01-31-00 13:07 EXISTING CONDITION WATERSHED - TO RES 10 AREA
REV PC 09/83(.2) TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 1

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

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 3.10 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 2
AREA= .04 SQ MI INPUT RUNOFF CURVE= 44. TIME OF CONCENTRATION= .26 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0347 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .06 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.06	(RUNOFF)
16.80	.08	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.04 SQ.MI.
14.00	DISCHG	.00	.00	.00	.01	.02
15.00	DISCHG	.03	.04	.05	.05	.06
16.00	DISCHG	.06	.07	.07	.07	.08
17.00	DISCHG	.06	.06	.06	.06	.06
18.00	DISCHG	.07	.06	.06	.05	.06
19.00	DISCHG	.07	.06	.06	.06	.07
20.00	DISCHG	.06	.06	.06	.05	.06
21.00	DISCHG	.06	.06	.07	.06	.05
22.00	DISCHG	.07	.07	.06	.06	.06
23.00	DISCHG	.06	.06	.06	.06	.06
24.00	DISCHG	.04	.03	.02	.01	.00

RUNOFF VOLUME ABOVE BASEFLOW = .02 WATERSHED INCHES, .56 CFS-HRS, .05 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

WS Be upl. 10 yr.

TR20 XEQ 01-31-00 13:07
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 2
PAGE 2

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 2 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 2
AREA= .04 SQ MI INPUT RUNOFF CURVE= 44. TIME OF CONCENTRATION= .26 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0347 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.44 2.04 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.04 SQ.MI.			
12.00	DISCHG	.00 .00 .22	1.30	1.98	1.89	1.78	1.55	1.41	1.31
13.00	DISCHG	1.22 1.18 1.12	1.09	1.06	1.03	1.01	.96	.93	.91
14.00	DISCHG	.89 .89 .88	.88	.87	.85	.83	.79	.77	.76
15.00	DISCHG	.77 .77 .76	.75	.73	.70	.70	.72	.73	.71
16.00	DISCHG	.69 .68 .68	.68	.65	.62	.62	.63	.64	.56
17.00	DISCHG	.46 .42 .45	.46	.44	.41	.41	.42	.43	.44
18.00	DISCHG	.44 .43 .39	.37	.36	.35	.36	.38	.40	.40
19.00	DISCHG	.41 .39 .35	.33	.35	.39	.39	.35	.33	.32
20.00	DISCHG	.32 .32 .35	.36	.33	.29	.29	.33	.35	.33
21.00	DISCHG	.30 .30 .33	.36	.34	.30	.28	.28	.28	.31
22.00	DISCHG	.35 .36 .32	.29	.28	.28	.28	.28	.28	.28
23.00	DISCHG	.28 .28 .28	.28	.28	.28	.28	.28	.28	.28
24.00	DISCHG	.20 .16 .08	.03	.01	.00				

RUNOFF VOLUME ABOVE BASEFLOW = .29 WATERSHED INCHES, 6.86 CFS-HRS, .57 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 2 RECORD ID

WS Be Upl 25yr.

TR20 XEQ 01-31-00 13:07
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 3
PAGE 3

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 3 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 2
AREA= .04 SQ MI INPUT RUNOFF CURVE= 44. TIME OF CONCENTRATION= .26 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0347 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.37 6.07 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA = .04 SQ.MI.						
12.00	DISCHG	.03	.66	2.81	5.63	6.02	4.80	4.03	3.28	2.84	2.54
13.00	DISCHG	2.32	2.20	2.05	1.97	1.90	1.84	1.78	1.68	1.62	1.57
14.00	DISCHG	1.53	1.52	1.50	1.49	1.46	1.43	1.39	1.32	1.27	1.26
15.00	DISCHG	1.26	1.26	1.24	1.23	1.18	1.14	1.13	1.16	1.18	1.15
16.00	DISCHG	1.10	1.09	1.08	1.08	1.04	.99	.98	1.01	1.01	.88
17.00	DISCHG	.72	.67	.70	.73	.70	.65	.64	.66	.68	.69
18.00	DISCHG	.69	.67	.61	.57	.56	.55	.56	.59	.62	.63
19.00	DISCHG	.63	.61	.55	.51	.55	.60	.60	.55	.51	.49
20.00	DISCHG	.49	.50	.53	.55	.51	.45	.45	.51	.54	.51
21.00	DISCHG	.45	.45	.51	.55	.51	.46	.43	.42	.43	.48
22.00	DISCHG	.54	.54	.49	.45	.43	.43	.42	.42	.42	.42
23.00	DISCHG	.43	.43	.43	.43	.43	.43	.43	.43	.42	.37
24.00	DISCHG	.31	.24	.12	.05	.02	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = .52 WATERSHED INCHES, 12.56 CFS-HRS, 1.04 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 3 RECORD ID

WS Be upl. 100yr.

TR20 XEQ 01-31-00 13:07
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 4
PAGE 4

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 4 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 2
AREA= .04 SQ MI INPUT RUNOFF CURVE= 44. TIME OF CONCENTRATION= .26 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0347 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.32 18.47 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.04 SQ.MI.
11.00	DISCHG	.00 .00	.00 .00	.00 .00	.00 .01	.63
12.00	DISCHG	3.50 8.33	13.73 18.29	16.70 12.19	7.47 6.25	5.48
13.00	DISCHG	4.91 4.60	4.26 4.06	3.88 3.72	3.59 3.36	3.22 3.11
14.00	DISCHG	3.02 2.98	2.94 2.91	2.84 2.76	2.68 2.53	2.44 2.41
15.00	DISCHG	2.41 2.39	2.35 2.32	2.24 2.14	2.13 2.17	2.20 2.14
16.00	DISCHG	2.06 2.02	2.01 2.00	1.92 1.83	1.81 1.85	1.86 1.62
17.00	DISCHG	1.32 1.23	1.29 1.34	1.27 1.18	1.16 1.20	1.24 1.25
18.00	DISCHG	1.26 1.22	1.11 1.03	1.01 1.00	1.02 1.07	1.11 1.13
19.00	DISCHG	1.14 1.10	.98 .92	.98 1.08	1.08 .98	.91 .89
20.00	DISCHG	.88 .89	.95 .98	.91 .81	.81 .90	.97 .91
21.00	DISCHG	.81 .81	.91 .97	.91 .81	.77 .75	.76 .85
22.00	DISCHG	.96 .96	.86 .79	.76 .75	.75 .75	.75 .75
23.00	DISCHG	.75 .75	.75 .75	.75 .75	.76 .76	.75 .65
24.00	DISCHG	.54 .42	.21 .08	.03 .01	.00 .00	

RUNOFF VOLUME ABOVE BASEFLOW = 1.15 WATERSHED INCHES, 27.75 CFS-HRS, 2.29 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 4 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)
<u>ALTERNATE 1 STORM 1</u>													
XSECTION 1	RUNOFF	.04	9	2	.10	.0	3.10	24.00	.02	---	16.80	.08	2.1
<u>ALTERNATE 1 STORM 2</u>													
XSECTION 1	RUNOFF	.04	9	2	.10	.0	4.60	24.00	.29	---	12.44	2.04	54.6
<u>ALTERNATE 1 STORM 3</u>													
XSECTION 1	RUNOFF	.04	9	2	.10	.0	5.40	24.00	.52	---	12.37	6.07	162.9
<u>ALTERNATE 1 STORM 4</u>													
XSECTION 1	RUNOFF	.04	9	2	.10	.0	7.00	24.00	1.15	---	12.32	18.47	495.7

TR20 XEQ 01-31-00 13:07
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 6

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	3	4
<u>XSECTION 1</u>	<u>.04</u>				
ALTERNATE 1		.08	2.04	6.07	18.47

242

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 10 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5 RAINFL 9 .25									
8	0.0	.0025	.005	.0075	.010				
8	.0125	.015	.0175	.020	.0225				
8	.026	.0285	.031	.0345	.037				
8	.0405	.043	.0465	.050	.0535				
8	.057	.0605	.064	.068	.072				
8	.076	.080	.0845	.089	.094				
8	.100	.1075	.115	.1225	.130				
8	.1385	.148	.157	.167	.178				
8	.189	.202	.216	.2315	.250				
8	.271	.298	.3455	.500	.6555				
8	.702	.7295	.751	.769	.785				
8	.7985	.811	.823	.834	.8435				
8	.853	.862	.870	.8785	.886				
8	.8935	.900	.907	.911	.916				
8	.920	.9245	.929	.9325	.936				
8	.940	.944	.947	.951	.954				
8	.957	.9605	.963	.9665	.969				
8	.9725	.975	.9775	.981	.9835				
8	.986	.9885	.991	.9935	.996				
8	.9985	1.0	1.0	1.0	1.0				
9 ENDTBL									
3 STRUCT 10									
8		55.	0.0	0.0					
8		56.	3.	.0002					
8		57.1	3.5	.03					
8		58.	13.	.057					
8		59.	100.	.232					
9 ENDTBL									
3 STRUCT 11									
8		52.5	0.0	0.0					
8		53.	1.	.0001					
8		54.	2.	.005					
8		56.	3.	.100					
8		57.1	3.5	.324					
8		58.	30.	.704					
8		58.3	60.	.87					
9 ENDTBL									
6	RUNOFF 1 001	3	.0071875	77.	.44	1	1	1	1
6	ADDHYD 4 003	3 2 1				1	1	1	1
6	RESVOR 2	10 1 3	55.			1	1	1	1
6	RUNOFF 1 002	7	.00703125	49.	.24	1	1	1	1
6	ADDHYD 4 004	3 7 1				1	1	1	1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6 RESVOR 2 11 1 6 52.5 1 1 1 1 1

ENDATA

7 INCREM 6 0.07

7 READHD 8 2

7 READHD 9 14.15 .2 .03726563 0.0

8 0.0 0.0 0.07 0.01 0.02 *WS Be upl Zgr.*

8 .03 .04 .05 .05 .06

8 .06 .07 .07 .07 .08

8 .06 .06 .06 .06 .06

8 .07 .06 .05 .06 .06

8 .07 .06 .06 .07 .06

8 .06 .06 .06 .05 .07

8 .06 .06 .06 .05 .05

8 .07 .06 .06 .06 .06

8 .06 .06 .06 .06 .06

8 .04 .02 0.0 0.0 0.0

9 ENDTBL

7 COMPUT 7 001 11 0.0 3.1 1.0 9 2 02 01

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 01-31-00 13:29
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 14.15 TIME INCREMENT= .20 DRAINAGE AREA= .04 BASE FLOW= .00

8	.00	.00	.07	.01	.02
8	.03	.04	.05	.05	.06
8	.06	.07	.07	.07	.08
8	.06	.06	.06	.06	.06
8	.07	.06	.05	.06	.06
8	.07	.06	.06	.07	.06
8	.06	.06	.06	.05	.07
8	.06	.06	.06	.05	.05
8	.07	.06	.06	.06	.06
8	.06	.06	.06	.06	.06
8	.04	.02	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 3.10 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .07 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.38 3.47 (RUNOFF)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .01 SQ.MI.

9.80	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
10.50	DISCHG	.01	.02	.02	.03	.03	.04	.05	.06	.07	.08
11.20	DISCHG	.10	.11	.13	.15	.17	.20	.23	.29	.37	.49
11.90	DISCHG	.73	1.10	1.58	2.09	2.59	3.03	3.37	3.46	3.28	2.93
12.60	DISCHG	2.52	2.12	1.79	1.54	1.33	1.17	1.04	.94	.86	.80
13.30	DISCHG	.75	.70	.67	.64	.61	.59	.56	.54	.52	.50
14.00	DISCHG	.49	.48	.47	.46	.45	.45	.44	.43	.42	.41
14.70	DISCHG	.40	.39	.38	.37	.36	.36	.36	.35	.35	.34
15.40	DISCHG	.34	.33	.32	.32	.31	.31	.31	.31	.31	.30
16.10	DISCHG	.30	.29	.29	.29	.29	.28	.27	.27	.26	.26
16.80	DISCHG	.26	.26	.24	.23	.21	.19	.19	.19	.19	.18
17.50	DISCHG	.18	.17	.17	.17	.17	.17	.17	.17	.17	.17
18.20	DISCHG	.17	.16	.15	.15	.14	.14	.14	.14	.15	.15

TR20 XEQ 01-31-00 13:29
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 2

18.90	DISCHG	.15	.15	.15	.15	.15	.14	.14	.13	.14	.14
19.60	DISCHG	.14	.14	.14	.13	.13	.13	.12	.12	.12	.13
20.30	DISCHG	.13	.13	.13	.12	.12	.11	.12	.12	.12	.12

RUNOFF VOLUME ABOVE BASEFLOW = 1.06 WATERSHED INCHES, 4.93 CFS-HRS, .41 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.38		3.47				(NULL)					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS			DRAINAGE AREA = .04 SQ.MI.		
9.80	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
10.50	DISCHG	.01	.02	.02	.03	.03	.04	.05	.06	.07	.08
11.20	DISCHG	.10	.11	.13	.15	.17	.20	.23	.29	.37	.49
11.90	DISCHG	.73	1.10	1.58	2.09	2.59	3.03	3.37	3.46	3.28	2.93
12.60	DISCHG	2.52	2.12	1.79	1.54	1.33	1.17	1.04	.94	.86	.80
13.30	DISCHG	.75	.70	.67	.64	.61	.59	.56	.54	.52	.50
14.00	DISCHG	.49	.48	.47	.46	.45	.45	.46	.48	.49	.46
14.70	DISCHG	.43	.40	.39	.39	.38	.38	.38	.38	.38	.38
15.40	DISCHG	.38	.38	.37	.37	.36	.36	.37	.37	.37	.36
16.10	DISCHG	.36	.36	.36	.36	.36	.35	.34	.34	.33	.33
16.80	DISCHG	.33	.33	.32	.30	.27	.25	.25	.25	.25	.24
17.50	DISCHG	.24	.23	.23	.23	.23	.23	.23	.23	.24	.24
18.20	DISCHG	.23	.22	.21	.21	.20	.19	.20	.20	.21	.21
18.90	DISCHG	.21	.21	.22	.22	.22	.21	.20	.19	.20	.20
19.60	DISCHG	.21	.21	.21	.20	.19	.19	.18	.18	.18	.19
20.30	DISCHG	.19	.19	.19	.18	.18	.17	.17	.18	.19	.19

RUNOFF VOLUME ABOVE BASEFLOW = .18 WATERSHED INCHES, 5.30 CFS-HRS, .44 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
SURFACE ELEVATION= 55.00

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)				
12.50		3.09				56.20				
12.80		2.08				55.69				
12.95		1.66				55.55				

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS			DRAINAGE AREA = .04 SQ.MI.		
9.80	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
9.80	ELEV	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00
10.50	DISCHG	.01	.02	.02	.03	.03	.04	.05	.06	.07	.08
10.50	ELEV	55.00	55.01	55.01	55.01	55.01	55.01	55.02	55.02	55.02	55.03

TR20 XEQ 01-31-00 13:29
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 3

11.20	DISCHG	.10	.11	.13	.15	.17	.20	.23	.29	.36	.49
11.20	ELEV	55.03	55.04	55.04	55.05	55.06	55.07	55.08	55.10	55.12	55.16
11.90	DISCHG	.72	1.09	1.57	2.08	2.58	3.00	3.02	3.06	3.09	3.09
11.90	ELEV	55.24	55.36	55.52	55.69	55.86	56.00	56.04	56.13	56.19	56.19
12.60	DISCHG	3.05	2.70	1.24	2.07	.82	1.65	.58	1.39	.44	1.20
12.60	ELEV	56.12	55.90	55.41	55.69	55.27	55.55	55.19	55.46	55.15	55.40
13.30	DISCHG	.36	1.07	.32	.97	.29	.89	.27	.82	.25	.76
13.30	ELEV	55.12	55.36	55.11	55.32	55.10	55.30	55.09	55.27	55.08	55.25
14.00	DISCHG	.25	.71	.25	.67	.25	.64	.28	.66	.32	.62
14.00	ELEV	55.08	55.24	55.08	55.22	55.08	55.21	55.09	55.22	55.11	55.21
14.70	DISCHG	.27	.55	.25	.52	.26	.51	.27	.50	.28	.48
14.70	ELEV	55.09	55.18	55.08	55.17	55.09	55.17	55.09	55.17	55.09	55.16
15.40	DISCHG	.28	.47	.28	.45	.28	.44	.29	.44	.30	.43
15.40	ELEV	55.09	55.16	55.09	55.15	55.09	55.15	55.10	55.15	55.10	55.14
16.10	DISCHG	.30	.41	.30	.41	.30	.40	.30	.38	.29	.37
16.10	ELEV	55.10	55.14	55.10	55.14	55.10	55.13	55.10	55.13	55.10	55.12
16.80	DISCHG	.30	.37	.29	.33	.24	.29	.22	.28	.22	.27
16.80	ELEV	55.10	55.12	55.10	55.11	55.08	55.10	55.07	55.09	55.07	55.09
17.50	DISCHG	.21	.26	.21	.25	.21	.25	.21	.25	.22	.26
17.50	ELEV	55.07	55.09	55.07	55.08	55.07	55.08	55.07	55.08	55.07	55.09
18.20	DISCHG	.22	.24	.20	.22	.18	.20	.18	.21	.19	.22
18.20	ELEV	55.07	55.08	55.07	55.07	55.06	55.07	55.06	55.07	55.06	55.07
18.90	DISCHG	.20	.22	.21	.23	.21	.22	.19	.20	.19	.21
18.90	ELEV	55.07	55.07	55.07	55.08	55.07	55.07	55.06	55.07	55.06	55.07
19.60	DISCHG	.20	.21	.20	.21	.19	.19	.18	.19	.18	.19
19.60	ELEV	55.07	55.07	55.07	55.07	55.06	55.06	55.06	55.06	55.06	55.06
20.30	DISCHG	.18	.19	.18	.18	.17	.17	.17	.18	.18	.19
20.30	ELEV	55.06	55.06	55.06	55.06	55.06	55.06	55.06	55.06	55.06	55.06

RUNOFF VOLUME ABOVE BASEFLOW = .20 WATERSHED INCHES, 5.59 CFS-HRS, .46 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH= 7

AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .24 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0320 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .03 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
20.79	.03	(RUNOFF)
14.35	.05	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.01 SQ.MI.
11.90	DISCHG	.00	.00	.00	.00	.01
12.60	DISCHG	.02	.03	.04	.05	.05
13.30	DISCHG	.05	.05	.05	.05	.05
14.00	DISCHG	.05	.05	.05	.05	.05
14.70	DISCHG	.05	.05	.05	.05	.05
15.40	DISCHG	.05	.05	.05	.05	.05

TR20 XEQ 01-31-00 13:29
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 4

16.10	DISCHG	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
16.80	DISCHG	.05	.04	.04	.03	.03	.03	.03	.04	.03	.03
17.50	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
18.20	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
18.90	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
19.60	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
20.30	DISCHG	.03	.03	.02	.02	.02	.03	.03	.03	.03	.03

RUNOFF VOLUME ABOVE BASEFLOW = .07 WATERSHED INCHES, .33 CFS-HRS, .03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4
INPUT HYDROGRAPHS= 3,7 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.52	3.10	(NULL)
12.80	2.12	(NULL)
12.95	1.70	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.05 SQ.MI.
9.80	DISCHG	.00	.00	.00	.00	.01
10.50	DISCHG	.01	.02	.02	.03	.08
11.20	DISCHG	.10	.11	.13	.15	.49
11.90	DISCHG	.72	1.09	1.57	2.08	3.10
12.60	DISCHG	3.08	2.73	1.27	2.11	1.25
13.30	DISCHG	.41	1.13	.37	1.03	.81
14.00	DISCHG	.30	.76	.30	.72	.67
14.70	DISCHG	.32	.60	.30	.57	.54
15.40	DISCHG	.33	.52	.33	.50	.48
16.10	DISCHG	.35	.46	.35	.46	.42
16.80	DISCHG	.34	.41	.33	.37	.30
17.50	DISCHG	.24	.29	.24	.28	.29
18.20	DISCHG	.25	.27	.23	.25	.25
18.90	DISCHG	.23	.26	.24	.26	.24
19.60	DISCHG	.23	.24	.23	.23	.22
20.30	DISCHG	.21	.22	.21	.20	.22

RUNOFF VOLUME ABOVE BASEFLOW = .18 WATERSHED INCHES, 5.93 CFS-HRS, .49 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 6
SURFACE ELEVATION= 52.50

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.68	2.36	54.71

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.05 SQ.MI.
9.80	DISCHG	.00	.00	.00	.00	.01
9.80	ELEV	52.50	52.50	52.50	52.50	52.50

TR20 XEQ 01-31-00 13:29
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 5

10.50	DISCHG	.01	.02	.02	.03	.03	.04	.05	.06	.07	.08
10.50	ELEV	52.51	52.51	52.51	52.51	52.52	52.52	52.53	52.53	52.54	52.54
11.20	DISCHG	.10	.11	.13	.15	.17	.19	.23	.29	.36	.49
11.20	ELEV	52.55	52.56	52.56	52.57	52.58	52.60	52.62	52.64	52.68	52.74
11.90	DISCHG	.72	1.03	1.26	1.68	2.01	2.06	2.12	2.17	2.22	2.27
11.90	ELEV	52.86	53.03	53.26	53.68	54.03	54.12	54.23	54.34	54.45	54.55
12.60	DISCHG	2.32	2.36	2.34	2.30	2.25	2.19	2.13	2.07	2.00	1.18
12.60	ELEV	54.65	54.71	54.67	54.60	54.50	54.39	54.26	54.13	54.00	53.18
13.30	DISCHG	.80	.74	.75	.65	.72	.58	.69	.51	.66	.46
13.30	ELEV	52.90	52.87	52.88	52.82	52.86	52.79	52.85	52.76	52.83	52.73
14.00	DISCHG	.64	.43	.63	.40	.62	.39	.63	.42	.66	.40
14.00	ELEV	52.82	52.71	52.81	52.70	52.81	52.69	52.81	52.71	52.83	52.70
14.70	DISCHG	.59	.34	.55	.33	.54	.33	.54	.33	.54	.34
14.70	ELEV	52.79	52.67	52.78	52.66	52.77	52.67	52.77	52.67	52.77	52.67
15.40	DISCHG	.53	.33	.51	.33	.50	.33	.50	.34	.50	.34
15.40	ELEV	52.76	52.67	52.76	52.66	52.75	52.67	52.75	52.67	52.75	52.67
16.10	DISCHG	.48	.33	.47	.34	.47	.33	.45	.32	.44	.33
16.10	ELEV	52.74	52.67	52.74	52.67	52.73	52.67	52.72	52.66	52.72	52.66
16.80	DISCHG	.43	.33	.41	.29	.35	.24	.33	.24	.32	.24
16.80	ELEV	52.72	52.66	52.70	52.64	52.68	52.62	52.66	52.62	52.66	52.62
17.50	DISCHG	.31	.23	.29	.23	.29	.23	.29	.24	.30	.25
17.50	ELEV	52.65	52.61	52.65	52.61	52.65	52.62	52.65	52.62	52.65	52.62
18.20	DISCHG	.29	.23	.26	.21	.25	.20	.24	.21	.25	.22
18.20	ELEV	52.64	52.61	52.63	52.61	52.62	52.60	52.62	52.61	52.63	52.61
18.90	DISCHG	.26	.23	.27	.24	.26	.22	.24	.21	.24	.22
18.90	ELEV	52.63	52.62	52.63	52.62	52.63	52.61	52.62	52.61	52.62	52.61
19.60	DISCHG	.25	.23	.25	.22	.23	.20	.22	.20	.22	.21
19.60	ELEV	52.62	52.61	52.62	52.61	52.61	52.60	52.61	52.60	52.61	52.60
20.30	DISCHG	.22	.21	.22	.20	.20	.19	.20	.20	.22	.21
20.30	ELEV	52.61	52.60	52.61	52.60	52.60	52.59	52.60	52.60	52.61	52.61

RUNOFF VOLUME ABOVE BASEFLOW = .17 WATERSHED INCHES, 5.50 CFS-HRS, .45 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB

RECORD ID

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 MOIST 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 2 STORM 1													
XSECTION 1	RUNOFF	.01	9	2	.07	.0	3.10	24.00	1.06	---	12.38	3.47	482.4
XSECTION 3	ADDHYD	.04	9	2	.07	.0	3.10	24.00	.18	---	12.38	3.47	78.0
STRUCTURE 10	RESVOR	.04	9	2	.07	.0	3.10	24.00	.20	56.20	12.50	3.09	69.5
XSECTION 2	RUNOFF	.01	9	2	.07	.0	3.10	24.00	.07	---	14.35	.05	7.8
XSECTION 4	ADDHYD	.05	9	2	.07	.0	3.10	24.00	.18	---	12.52	3.10	60.2
STRUCTURE 11	RESVOR	.05	9	2	.07	.0	3.10	24.00	.17	54.71	12.68	2.36	45.8

TR20 XEQ 01-31-00 13:29
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 7

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
<u>STRUCTURE 11</u>	<u>.05</u>	
ALTERNATE 2		2.36
<u>STRUCTURE 10</u>	<u>.04</u>	
ALTERNATE 2		3.09
<u>XSECTION 1</u>	<u>.01</u>	
ALTERNATE 2		3.47
<u>XSECTION 2</u>	<u>.01</u>	
ALTERNATE 2		.05
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		3.47
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		3.10

10 yr.

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 10 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5 RAINFL 9	.25				
8	0.0	.0025	.005	.0075	.010
8	.0125	.015	.0175	.020	.0225
8	.026	.0285	.031	.0345	.037
8	.0405	.043	.0465	.050	.0535
8	.057	.0605	.064	.068	.072
8	.076	.080	.0845	.089	.094
8	.100	.1075	.115	.1225	.130
8	.1385	.148	.157	.167	.178
8	.189	.202	.216	.2315	.250
8	.271	.298	.3455	.500	.6555
8	.702	.7295	.751	.769	.785
8	.7985	.811	.823	.834	.8435
8	.853	.862	.870	.8785	.886
8	.8935	.900	.907	.911	.916
8	.920	.9245	.929	.9325	.936
8	.940	.944	.947	.951	.954
8	.957	.9605	.963	.9665	.969
8	.9725	.975	.9775	.981	.9835
8	.986	.9885	.991	.9935	.996
8	.9985	1.0	1.0	1.0	1.0

9 ENDTBL

3 STRUCT 10

8	55.	0.0	0.0
8	56.	3.	.0002
8	57.1	3.5	.03
8	58.	13.	.057
8	59.	100.	.232

9 ENDTBL

3 STRUCT 11

8	52.5	0.0	0.0
8	53.	1.	.0001
8	54.	2.	.005
8	56.	3.	.100
8	57.1	3.5	.324
8	58.	30.	.704
8	58.3	60.	.87

9 ENDTBL

6 RUNOFF 1 001	3	.0071875	77.	.44	1	1	1	1
6 ADDHYD 4 003	3 2 1				1	1	1	1
6 RESVOR 2	10 1 3	55.			1	1	1	1
6 RUNOFF 1 002	7	.00703125	49.	.24	1	1	1	1
6 ADDHYD 4 004	3 7 1				1	1	1	1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6 RESVOR 2 11 1 6 52.5 1 1 1 1 1

ENDATA

7 INCREM 6 0.07

7 READHD 8 2

7 READHD 9 12.15 .2 .03726563 0.0

8 0.0 .22 1.98 1.78 1.41

8 1.22 1.12 1.06 1.01 .93

8 .89 .88 .87 .83 .77

8 .77 .76 .73 .70 .73

8 .69 .68 .65 .62 .64

8 .46 .45 .44 .41 .43

8 .44 .39 .36 .36 .40

8 .41 .35 .35 .39 .33

8 .32 .35 .33 .29 .35

8 .30 .33 .34 .28 .28

8 .35 .32 .28 .28 .28

8 .28 .28 .28 .28 .28

8 .10 .08 .01 0.0 0.0

9 ENDTBL

7 COMPUT 7 001 11 0.0 4.6 1.0 9 2 02 02

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 01-31-00 13:41
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 12.15 TIME INCREMENT= .20 DRAINAGE AREA= .04 BASE FLOW= .00

8	.00	.22	1.98	1.78	1.41
8	1.22	1.12	1.06	1.01	.93
8	.89	.88	.87	.83	.77
8	.77	.76	.73	.70	.73
8	.69	.68	.65	.62	.64
8	.46	.45	.44	.41	.43
8	.44	.39	.36	.36	.40
8	.41	.35	.35	.39	.33
8	.32	.35	.33	.29	.35
8	.30	.33	.34	.28	.28
8	.35	.32	.28	.28	.28
8	.28	.28	.28	.28	.28
8	.10	.08	.01	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 2 MAIN TIME INCREMENT = .07 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) 12.36 PEAK DISCHARGE(CFS) 7.08 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .01 SQ.MI.

8.40	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02
9.10	DISCHG	.02	.03	.03	.04	.04	.05	.06	.06	.07	.08
9.80	DISCHG	.09	.10	.11	.11	.12	.13	.14	.16	.17	.19
10.50	DISCHG	.20	.21	.23	.25	.26	.28	.31	.33	.36	.39
11.20	DISCHG	.42	.45	.49	.54	.59	.65	.74	.88	1.07	1.37
11.90	DISCHG	1.90	2.72	3.73	4.75	5.68	6.46	6.99	7.03	6.57	5.79
12.60	DISCHG	4.92	4.10	3.44	2.93	2.52	2.20	1.95	1.76	1.60	1.48
13.30	DISCHG	1.38	1.29	1.22	1.17	1.12	1.07	1.02	.98	.94	.91
14.00	DISCHG	.88	.86	.84	.83	.81	.80	.79	.77	.76	.74
14.70	DISCHG	.72	.69	.67	.66	.65	.64	.63	.63	.62	.61
15.40	DISCHG	.60	.59	.57	.56	.56	.56	.56	.55	.55	.54

TR20 XEQ 01-31-00 13:41
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 2

16.10	DISCHG	.53	.52	.51	.51	.50	.49	.48	.47	.46	.46
16.80	DISCHG	.46	.45	.43	.40	.36	.34	.33	.33	.33	.32
17.50	DISCHG	.31	.30	.30	.29	.30	.30	.30	.30	.30	.30
18.20	DISCHG	.29	.28	.27	.26	.25	.25	.25	.25	.25	.26
18.90	DISCHG	.26	.27	.27	.27	.26	.25	.24	.23	.24	.24
19.60	DISCHG	.25	.25	.24	.23	.23	.22	.22	.21	.21	.22
20.30	DISCHG	.22	.22	.22	.21	.20	.20	.20	.21	.22	.21

RUNOFF VOLUME ABOVE BASEFLOW = 2.16 WATERSHED INCHES, 10.00 CFS-HRS, .83 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
 INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

PEAK TIME(HRS) 12.46 PEAK DISCHARGE(CFS) 7.76 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.04 SQ.MI.
8.40	DISCHG	.00 .00 .00	.00 .00 .00	.01 .01 .02		
9.10	DISCHG	.02 .03 .03	.04 .04 .05	.06 .07 .08		
9.80	DISCHG	.09 .10 .11	.11 .12 .13	.14 .16 .17		
10.50	DISCHG	.20 .21 .23	.25 .26 .28	.31 .33 .36		
11.20	DISCHG	.42 .45 .49	.54 .59 .65	.74 .88 1.07		
11.90	DISCHG	1.90 2.72 3.73	4.75 5.72 6.57	7.17 7.61 7.76		
12.60	DISCHG	6.85 5.96 5.23	4.60 4.06 3.61	3.29 3.03 2.82		
13.30	DISCHG	2.52 2.41 2.32	2.24 2.17 2.10	2.04 1.98 1.91		
14.00	DISCHG	1.80 1.77 1.73	1.71 1.70 1.68	1.66 1.65 1.62		
14.70	DISCHG	1.56 1.52 1.48	1.44 1.42 1.41	1.40 1.40 1.38		
15.40	DISCHG	1.35 1.33 1.31	1.28 1.27 1.26	1.27 1.28 1.28		
16.10	DISCHG	1.23 1.21 1.20	1.19 1.18 1.16	1.13 1.11 1.10		
16.80	DISCHG	1.08 1.08 1.07	.98 .89 .80	.79 .78 .78		
17.50	DISCHG	.75 .74 .72	.71 .71 .72	.73 .73 .74		
18.20	DISCHG	.72 .69 .66	.64 .62 .61	.61 .61 .62		
18.90	DISCHG	.65 .67 .67	.67 .66 .63	.60 .58 .59		
19.60	DISCHG	.61 .62 .63	.61 .58 .55	.54 .54 .55		
20.30	DISCHG	.57 .57 .56	.54 .53 .51	.50 .51 .54		

RUNOFF VOLUME ABOVE BASEFLOW = .55 WATERSHED INCHES, 15.87 CFS-HRS, 1.31 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 55.00

PEAK TIME(HRS) 12.49 PEAK DISCHARGE(CFS) 7.72 PEAK ELEVATION(FEET) 57.50

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .04 SQ.MI.

8.40	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02
8.40	ELEV	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.01
9.10	DISCHG	.02	.03	.03	.04	.04	.05	.06	.06	.07	.08
9.10	ELEV	55.01	55.01	55.01	55.01	55.01	55.02	55.02	55.02	55.02	55.03
9.80	DISCHG	.09	.10	.11	.11	.12	.13	.14	.16	.17	.18
9.80	ELEV	55.03	55.03	55.04	55.04	55.04	55.04	55.05	55.05	55.06	55.06
10.50	DISCHG	.20	.21	.23	.25	.26	.28	.31	.33	.36	.39
10.50	ELEV	55.07	55.07	55.08	55.08	55.09	55.09	55.10	55.11	55.12	55.13
11.20	DISCHG	.42	.45	.49	.53	.59	.65	.74	.88	1.06	1.36
11.20	ELEV	55.14	55.15	55.16	55.18	55.20	55.22	55.25	55.29	55.35	55.45
11.90	DISCHG	1.89	2.71	3.03	3.15	3.34	4.58	6.89	7.39	7.68	7.68
11.90	ELEV	55.63	55.90	56.07	56.32	56.75	57.20	57.42	57.47	57.50	57.50
12.60	DISCHG	7.22	6.40	5.59	4.91	4.33	3.83	3.49	3.46	3.41	3.35
12.60	ELEV	57.45	57.37	57.30	57.23	57.18	57.13	57.09	57.02	56.91	56.77
13.30	DISCHG	3.28	3.21	3.13	3.05	2.37	1.91	2.23	1.80	2.08	1.69
13.30	ELEV	56.62	56.45	56.28	56.11	55.79	55.64	55.74	55.60	55.69	55.56
14.00	DISCHG	1.96	1.62	1.87	1.58	1.83	1.56	1.78	1.53	1.73	1.49
14.00	ELEV	55.65	55.54	55.62	55.53	55.61	55.52	55.59	55.51	55.58	55.50
14.70	DISCHG	1.65	1.43	1.57	1.36	1.50	1.33	1.48	1.33	1.45	1.31
14.70	ELEV	55.55	55.48	55.52	55.45	55.50	55.44	55.49	55.44	55.48	55.44
15.40	DISCHG	1.41	1.27	1.36	1.23	1.32	1.21	1.31	1.23	1.32	1.21
15.40	ELEV	55.47	55.42	55.45	55.41	55.44	55.40	55.44	55.41	55.44	55.40
16.10	DISCHG	1.27	1.17	1.23	1.16	1.21	1.13	1.16	1.09	1.12	1.06
16.10	ELEV	55.42	55.39	55.41	55.39	55.40	55.38	55.39	55.36	55.37	55.35
16.80	DISCHG	1.11	1.06	1.09	.96	.91	.78	.80	.77	.79	.75
16.80	ELEV	55.37	55.35	55.36	55.32	55.30	55.26	55.27	55.26	55.26	55.25
17.50	DISCHG	.77	.73	.74	.70	.72	.71	.74	.72	.75	.73
17.50	ELEV	55.26	55.24	55.25	55.23	55.24	55.24	55.25	55.24	55.25	55.24
18.20	DISCHG	.73	.68	.67	.63	.63	.60	.61	.60	.62	.63
18.20	ELEV	55.24	55.23	55.22	55.21	55.21	55.20	55.20	55.20	55.21	55.21
18.90	DISCHG	.66	.66	.68	.67	.67	.63	.60	.58	.59	.59
18.90	ELEV	55.22	55.22	55.23	55.22	55.22	55.21	55.20	55.19	55.20	55.20
19.60	DISCHG	.61	.62	.63	.60	.58	.55	.54	.53	.54	.55
19.60	ELEV	55.20	55.21	55.21	55.20	55.19	55.18	55.18	55.18	55.18	55.18
20.30	DISCHG	.57	.57	.56	.54	.53	.51	.50	.51	.54	.56
20.30	ELEV	55.19	55.19	55.19	55.18	55.18	55.17	55.17	55.17	55.18	55.19

RUNOFF VOLUME ABOVE BASEFLOW = .55 WATERSHED INCHES, 15.77 CFS-HRS, 1.30 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH= 7

AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .24 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0320 HOURS

PEAK TIME(HRS) 12.34 PEAK DISCHARGE(CFS) 1.25 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS) 11.90 DISCHG .00 .00 .07 .26 .58 .96 1.23 1.16 .95 .81

TR20 XEQ 01-31-00 13:41
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 4

12.60	DISCHG	.71	.60	.53	.49	.45	.42	.40	.39	.37	.35
13.30	DISCHG	.34	.34	.33	.32	.31	.30	.29	.28	.28	.27
14.00	DISCHG	.27	.26	.26	.26	.26	.26	.25	.25	.24	.24
14.70	DISCHG	.23	.22	.22	.22	.22	.22	.22	.21	.21	.21
15.40	DISCHG	.20	.20	.19	.20	.20	.20	.20	.20	.19	.19
16.10	DISCHG	.19	.19	.19	.18	.18	.17	.17	.17	.17	.17
16.80	DISCHG	.17	.16	.13	.12	.11	.12	.12	.13	.12	.11
17.50	DISCHG	.11	.11	.11	.11	.12	.12	.12	.12	.12	.11
18.20	DISCHG	.10	.10	.10	.09	.09	.09	.10	.10	.10	.11
18.90	DISCHG	.11	.11	.11	.10	.09	.09	.09	.09	.10	.10
19.60	DISCHG	.10	.10	.09	.09	.08	.08	.08	.08	.09	.09
20.30	DISCHG	.09	.09	.08	.08	.08	.08	.09	.09	.09	.08

RUNOFF VOLUME ABOVE BASEFLOW = .44 WATERSHED INCHES, 1.98 CFS-HRS, .16 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4
 INPUT HYDROGRAPHS= 3,7 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS) 12.45 PEAK DISCHARGE(CFS) 8.63 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.05 SQ.MI.
8.40	DISCHG	.00	.00	.00	.01	.02
9.10	DISCHG	.02	.03	.04	.06	.08
9.80	DISCHG	.09	.11	.12	.16	.18
10.50	DISCHG	.20	.23	.26	.33	.39
11.20	DISCHG	.42	.49	.59	.88	1.36
11.90	DISCHG	1.89	3.10	3.92	8.56	8.48
12.60	DISCHG	7.93	6.12	4.78	3.85	3.70
13.30	DISCHG	3.63	3.45	2.68	2.08	1.96
14.00	DISCHG	2.22	2.14	2.08	1.78	1.73
14.70	DISCHG	1.88	1.78	1.72	1.54	1.52
15.40	DISCHG	1.62	1.56	1.52	1.43	1.40
16.10	DISCHG	1.45	1.42	1.39	1.25	1.23
16.80	DISCHG	1.28	1.22	1.02	.89	.87
17.50	DISCHG	.88	.85	.84	.84	.84
18.20	DISCHG	.83	.76	.72	.70	.74
18.90	DISCHG	.77	.79	.76	.69	.69
19.60	DISCHG	.71	.72	.66	.62	.64
20.30	DISCHG	.66	.64	.60	.60	.64

RUNOFF VOLUME ABOVE BASEFLOW = .53 WATERSHED INCHES, 17.75 CFS-HRS, 1.47 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 6
 SURFACE ELEVATION= 52.50

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 13.48 3.40 56.88

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.05 SQ.MI.
8.40	DISCHG	.00	.00	.00	.01	.01
8.40	ELEV	52.50	52.50	52.50	52.50	52.51
9.10	DISCHG	.02	.03	.04	.06	.07
9.10	ELEV	52.51	52.51	52.52	52.53	52.54
9.80	DISCHG	.09	.10	.11	.14	.15
9.80	ELEV	52.54	52.55	52.56	52.57	52.58
10.50	DISCHG	.20	.21	.22	.28	.30
10.50	ELEV	52.60	52.61	52.62	52.64	52.65
11.20	DISCHG	.42	.45	.49	.65	.74
11.20	ELEV	52.71	52.73	52.74	52.79	52.83
11.90	DISCHG	1.51	2.01	2.13	2.37	2.63
11.90	ELEV	53.51	54.02	54.12	54.44	55.27
12.60	DISCHG	3.20	3.26	3.30	3.37	3.38
12.60	ELEV	56.44	56.56	56.66	56.81	56.83
13.30	DISCHG	3.40	3.40	3.40	3.38	3.37
13.30	ELEV	56.87	56.88	56.88	56.84	56.81
14.00	DISCHG	3.31	3.29	3.28	3.24	3.23
14.00	ELEV	56.68	56.65	56.61	56.54	56.50
14.70	DISCHG	3.14	3.13	3.11	3.07	3.05
14.70	ELEV	56.32	56.28	56.24	56.16	56.12
15.40	DISCHG	2.83	2.75	2.68	2.54	2.48
15.40	ELEV	55.65	55.50	55.36	55.08	54.95
16.10	DISCHG	2.21	2.16	2.12	2.03	1.88
16.10	ELEV	54.42	54.32	54.23	54.06	53.88
16.80	DISCHG	1.26	1.25	1.23	1.08	.98
16.80	ELEV	53.26	53.25	53.23	53.08	52.99
17.50	DISCHG	.82	.89	.79	.79	.87
17.50	ELEV	52.91	52.95	52.90	52.93	52.93
18.20	DISCHG	.80	.81	.73	.70	.72
18.20	ELEV	52.90	52.91	52.87	52.85	52.86
18.90	DISCHG	.74	.79	.77	.74	.73
18.90	ELEV	52.87	52.89	52.88	52.87	52.87
19.60	DISCHG	.70	.73	.71	.65	.64
19.60	ELEV	52.85	52.86	52.86	52.83	52.82
20.30	DISCHG	.65	.67	.64	.60	.60
20.30	ELEV	52.83	52.83	52.82	52.80	52.80

RUNOFF VOLUME ABOVE BASEFLOW = .54 WATERSHED INCHES, 17.88 CFS-HRS, 1.48 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 01-31-00 13:41
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 2
PAGE 6

8

EXECUTIVE CONTROL OPERATION ENDJOB

RECORD ID

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 MOIST 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)
<u>ALTERNATE 2 STORM 2</u>													
XSECTION 1	RUNOFF	.01	9	2	.07	.0	4.60	24.00	2.16	---	12.36	7.08	984.7
XSECTION 3	ADDHYD	.04	9	2	.07	.0	4.60	24.00	.55	---	12.46	7.76	174.5
STRUCTURE 10	RESVOR	.04	9	2	.07	.0	4.60	24.00	.55	57.50	12.49	7.72	173.6
XSECTION 2	RUNOFF	.01	9	2	.07	.0	4.60	24.00	.44	---	12.34	1.25	177.5
XSECTION 4	ADDHYD	.05	9	2	.07	.0	4.60	24.00	.53	---	12.45	8.63	167.7
STRUCTURE 11	RESVOR	.05	9	2	.07	.0	4.60	24.00	.54	56.88	13.48	3.40	66.1

TR20 XEQ 01-31-00 13:41
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 8

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 2
<u>STRUCTURE 11</u>	<u>.05</u>	
ALTERNATE 2		3.40
<u>STRUCTURE 10</u>	<u>.04</u>	
ALTERNATE 2		7.72
<u>XSECTION 1</u>	<u>.01</u>	
ALTERNATE 2		7.08
<u>XSECTION 2</u>	<u>.01</u>	
ALTERNATE 2		1.25
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		7.76
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		8.63

254R

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 10 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5 RAINFL 9	.25				
8	0.0	.0025	.005	.0075	.010
8	.0125	.015	.0175	.020	.0225
8	.026	.0285	.031	.0345	.037
8	.0405	.043	.0465	.050	.0535
8	.057	.0605	.064	.068	.072
8	.076	.080	.0845	.089	.094
8	.100	.1075	.115	.1225	.130
8	.1385	.148	.157	.167	.178
8	.189	.202	.216	.2315	.250
8	.271	.298	.3455	.500	.6555
8	.702	.7295	.751	.769	.785
8	.7985	.811	.823	.834	.8435
8	.853	.862	.870	.8785	.886
8	.8935	.900	.907	.911	.916
8	.920	.9245	.929	.9325	.936
8	.940	.944	.947	.951	.954
8	.957	.9605	.963	.9665	.969
8	.9725	.975	.9775	.981	.9835
8	.986	.9885	.991	.9935	.996
8	.9985	1.0	1.0	1.0	1.0

9 ENDTBL

3 STRUCT 10

8	55.	0.0	0.0
8	56.	3.	.0002
8	57.1	3.5	.03
8	58.	13.	.057
8	59.	100.	.232

9 ENDTBL

3 STRUCT 11

8	52.5	0.0	0.0
8	53.	1.	.0001
8	54.	2.	.005
8	56.	3.	.100
8	57.1	3.5	.324
8	58.	30.	.704
8	58.3	60.	.87

9 ENDTBL

6 RUNOFF 1 001	3	.0071875	77.	.44	1	1	1	1
6 ADDHYD 4 003	3 2 1				1	1	1	1
6 RESVOR 2	10 1	3 55.			1	1	1	1
6 RUNOFF 1 002	7	.00703125	49.	.24	1	1	1	1
6 ADDHYD 4 004	3 7 1				1	1	1	1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

```
6 RESVOR 2 11 1 6 52.5 1 1 1 1 1
  ENDATA
7 INCREM 6 0.07
7 READHD 8 2
7 READHD 9 12.15 .2 .03726563 0.0
8 .03 2.81 6.02 4.03 2.84
8 2.32 2.05 1.90 1.78 1.62
8 1.53 1.50 1.46 1.39 1.27
8 1.26 1.24 1.18 1.13 1.18
8 1.1 1.08 1.04 .98 1.01
8 .72 .70 .70 .64 .68
8 .69 .61 .56 .56 .62
8 .63 .55 .55 .60 .51
8 .49 .53 .51 .45 .54
8 .45 .51 .51 .43 .43
8 .54 .49 .43 .42 .42
8 .43 .43 .43 .42 .42
8 .31 .12 .02 0.0 0.0
9 ENDTBL
7 COMPUT 7 001 11 0.0 5.4 1.0 9 2 02 03
  ENDCMP 1
  ENDJOB 2
```

*****END OF 80-80 LIST*****

TR20 XEQ 01-31-00 14:09
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 12.15 TIME INCREMENT= .20 DRAINAGE AREA= .04 BASE FLOW= .00

8	.03	2.81	6.02	4.03	2.84
8	2.32	2.05	1.90	1.78	1.62
8	1.53	1.50	1.46	1.39	1.27
8	1.26	1.24	1.18	1.13	1.18
8	1.10	1.08	1.04	.98	1.01
8	.72	.70	.70	.64	.68
8	.69	.61	.56	.56	.62
8	.63	.55	.55	.60	.51
8	.49	.53	.51	.45	.54
8	.45	.51	.51	.43	.43
8	.54	.49	.43	.42	.42
8	.43	.43	.43	.42	.42
8	.31	.12	.02	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 3 MAIN TIME INCREMENT = .07 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) 12.36 PEAK DISCHARGE(CFS) 9.13 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .01 SQ.MI.

7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01
8.40	DISCHG	.02	.02	.03	.03	.04	.05	.05	.06	.07	.08
9.10	DISCHG	.09	.09	.10	.11	.12	.12	.13	.14	.15	.17
9.80	DISCHG	.18	.19	.20	.21	.22	.24	.25	.27	.29	.31
10.50	DISCHG	.33	.35	.37	.39	.42	.44	.47	.51	.55	.59
11.20	DISCHG	.63	.67	.72	.78	.85	.94	1.06	1.25	1.50	1.90
11.90	DISCHG	2.61	3.70	5.01	6.31	7.48	8.43	9.05	9.06	8.42	7.40
12.60	DISCHG	6.27	5.21	4.36	3.71	3.18	2.76	2.45	2.20	2.01	1.85
13.30	DISCHG	1.72	1.61	1.53	1.45	1.39	1.33	1.27	1.22	1.17	1.13
14.00	DISCHG	1.10	1.07	1.05	1.03	1.01	.99	.98	.96	.94	.92
14.70	DISCHG	.89	.86	.84	.82	.80	.79	.79	.78	.77	.76

TR20 XEQ 01-31-00 14:09
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 2

15.40	DISCHG	.74	.73	.71	.70	.69	.69	.69	.69	.68	.66
16.10	DISCHG	.65	.64	.63	.63	.62	.61	.59	.58	.57	.57
16.80	DISCHG	.57	.55	.53	.49	.45	.42	.41	.40	.40	.40
17.50	DISCHG	.38	.37	.36	.36	.36	.37	.37	.37	.37	.37
18.20	DISCHG	.36	.34	.33	.32	.31	.31	.30	.31	.31	.32
18.90	DISCHG	.32	.33	.33	.33	.32	.31	.29	.29	.29	.30
19.60	DISCHG	.31	.31	.30	.29	.28	.27	.26	.26	.26	.27
20.30	DISCHG	.27	.28	.27	.26	.25	.24	.25	.26	.26	.26

RUNOFF VOLUME ABOVE BASEFLOW = 2.79 WATERSHED INCHES, 12.96 CFS-HRS, 1.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

	PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)						
	12.50		13.22		(NULL)						
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.04 SQ.MI.					
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01
8.40	DISCHG	.02	.02	.03	.03	.04	.05	.05	.06	.07	.08
9.10	DISCHG	.09	.09	.10	.11	.12	.12	.13	.14	.15	.17
9.80	DISCHG	.18	.19	.20	.21	.22	.24	.25	.27	.29	.31
10.50	DISCHG	.33	.35	.37	.39	.42	.44	.47	.51	.55	.59
11.20	DISCHG	.63	.67	.72	.78	.85	.94	1.06	1.25	1.50	1.90
11.90	DISCHG	2.61	3.70	5.01	6.31	7.93	9.85	11.44	12.51	13.00	13.09
12.60	DISCHG	11.79	10.03	8.49	7.38	6.44	5.60	5.10	4.68	4.32	4.06
13.30	DISCHG	3.84	3.65	3.51	3.38	3.27	3.17	3.07	2.97	2.87	2.77
14.00	DISCHG	2.70	2.64	2.58	2.55	2.52	2.49	2.46	2.43	2.39	2.35
14.70	DISCHG	2.30	2.24	2.17	2.11	2.07	2.06	2.05	2.03	2.02	2.00
15.40	DISCHG	1.97	1.93	1.89	1.86	1.84	1.82	1.84	1.85	1.85	1.81
16.10	DISCHG	1.77	1.74	1.73	1.71	1.69	1.67	1.64	1.61	1.58	1.55
16.80	DISCHG	1.55	1.55	1.54	1.41	1.27	1.14	1.12	1.11	1.10	1.10
17.50	DISCHG	1.08	1.07	1.04	1.01	1.01	1.03	1.04	1.05	1.06	1.06
18.20	DISCHG	1.03	.99	.94	.91	.89	.87	.86	.87	.88	.90
18.90	DISCHG	.93	.95	.95	.96	.94	.90	.86	.84	.84	.85
19.60	DISCHG	.87	.89	.90	.86	.82	.78	.77	.76	.76	.77
20.30	DISCHG	.79	.80	.79	.77	.75	.72	.71	.73	.76	.79

RUNOFF VOLUME ABOVE BASEFLOW = .84 WATERSHED INCHES, 24.01 CFS-HRS, 1.98 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
SURFACE ELEVATION= 55.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.52	13.07	58.00

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .04 SQ.MI.		
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01
7.70	ELEV	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00
8.40	DISCHG	.02	.02	.03	.03	.04	.05	.05	.05	.06	.07	.08
8.40	ELEV	55.01	55.01	55.01	55.01	55.01	55.02	55.02	55.02	55.02	55.02	55.03
9.10	DISCHG	.09	.09	.10	.11	.12	.12	.13	.14	.15	.17	.17
9.10	ELEV	55.03	55.03	55.03	55.04	55.04	55.04	55.04	55.05	55.05	55.06	55.06
9.80	DISCHG	.18	.19	.20	.21	.22	.24	.25	.27	.29	.31	.31
9.80	ELEV	55.06	55.06	55.07	55.07	55.07	55.08	55.08	55.09	55.10	55.10	55.10
10.50	DISCHG	.33	.35	.37	.39	.42	.44	.47	.51	.55	.59	.59
10.50	ELEV	55.11	55.12	55.12	55.13	55.14	55.15	55.16	55.17	55.18	55.20	55.20
11.20	DISCHG	.63	.67	.72	.78	.85	.94	1.06	1.25	1.50	1.89	1.89
11.20	ELEV	55.21	55.22	55.24	55.26	55.28	55.31	55.35	55.42	55.50	55.63	55.63
11.90	DISCHG	2.60	3.03	3.15	3.39	6.03	8.92	10.66	11.99	12.76	13.06	13.06
11.90	ELEV	55.87	56.07	56.34	56.85	57.34	57.61	57.78	57.90	57.98	58.00	58.00
12.60	DISCHG	12.43	10.90	9.25	7.93	6.90	6.01	5.35	4.89	4.49	4.19	4.19
12.60	ELEV	57.95	57.80	57.64	57.52	57.42	57.34	57.28	57.23	57.19	57.16	57.16
13.30	DISCHG	3.95	3.74	3.58	3.49	3.48	3.46	3.42	3.39	3.34	3.30	3.30
13.30	ELEV	57.14	57.12	57.11	57.09	57.05	57.00	56.93	56.85	56.76	56.65	56.65
14.00	DISCHG	3.24	3.19	3.14	3.08	3.03	2.66	2.31	2.58	2.25	2.48	2.48
14.00	ELEV	56.54	56.42	56.30	56.18	56.07	55.89	55.77	55.86	55.75	55.83	55.83
14.70	DISCHG	2.17	2.36	2.06	2.22	1.97	2.16	1.95	2.13	1.93	2.08	2.08
14.70	ELEV	55.72	55.79	55.69	55.74	55.66	55.72	55.65	55.71	55.64	55.69	55.69
15.40	DISCHG	1.89	2.01	1.82	1.93	1.77	1.88	1.77	1.91	1.80	1.87	1.87
15.40	ELEV	55.63	55.67	55.61	55.64	55.59	55.63	55.59	55.64	55.60	55.62	55.62
16.10	DISCHG	1.72	1.79	1.68	1.76	1.65	1.71	1.60	1.64	1.54	1.59	1.59
16.10	ELEV	55.57	55.60	55.56	55.59	55.55	55.57	55.53	55.55	55.51	55.53	55.53
16.80	DISCHG	1.52	1.58	1.51	1.44	1.24	1.17	1.09	1.14	1.08	1.12	1.12
16.80	ELEV	55.51	55.53	55.50	55.48	55.41	55.39	55.36	55.38	55.36	55.37	55.37
17.50	DISCHG	1.06	1.09	1.02	1.03	.99	1.04	1.03	1.07	1.04	1.07	1.07
17.50	ELEV	55.35	55.36	55.34	55.34	55.33	55.35	55.34	55.36	55.35	55.36	55.36
18.20	DISCHG	1.01	1.00	.93	.93	.88	.88	.85	.88	.87	.91	.91
18.20	ELEV	55.34	55.33	55.31	55.31	55.29	55.29	55.28	55.29	55.29	55.30	55.30
18.90	DISCHG	.92	.96	.95	.96	.93	.90	.85	.84	.84	.85	.85
18.90	ELEV	55.31	55.32	55.32	55.32	55.31	55.30	55.28	55.28	55.28	55.28	55.28
19.60	DISCHG	.86	.89	.89	.87	.81	.78	.76	.76	.75	.78	.78
19.60	ELEV	55.29	55.30	55.30	55.29	55.27	55.26	55.25	55.25	55.25	55.26	55.26
20.30	DISCHG	.79	.81	.79	.78	.75	.73	.71	.73	.76	.80	.80
20.30	ELEV	55.26	55.27	55.26	55.26	55.25	55.24	55.24	55.24	55.25	55.27	55.27

RUNOFF VOLUME ABOVE BASEFLOW = .84 WATERSHED INCHES, 24.08 CFS-HRS, 1.99 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2
 OUTPUT HYDROGRAPH= 7
 AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .24 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0320 HOURS

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.32		2.44				(RUNOFF)					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .01 SQ.MI.	
11.90	DISCHG	.03	.21	.58	1.06	1.59	2.12	2.44	2.16	1.70	1.40
12.60	DISCHG	1.20	1.00	.87	.79	.73	.67	.63	.61	.58	.55
13.30	DISCHG	.54	.52	.50	.49	.48	.46	.44	.43	.42	.41
14.00	DISCHG	.40	.40	.40	.39	.39	.39	.38	.37	.37	.35
14.70	DISCHG	.34	.33	.33	.32	.32	.32	.32	.32	.32	.31
15.40	DISCHG	.30	.29	.29	.29	.29	.30	.30	.29	.28	.28
16.10	DISCHG	.27	.27	.27	.27	.26	.25	.25	.25	.25	.25
16.80	DISCHG	.25	.23	.20	.17	.16	.17	.18	.18	.18	.17
17.50	DISCHG	.16	.16	.16	.17	.17	.17	.17	.17	.17	.16
18.20	DISCHG	.15	.14	.14	.14	.14	.14	.14	.15	.15	.15
18.90	DISCHG	.15	.16	.15	.15	.14	.13	.13	.13	.14	.15
19.60	DISCHG	.15	.14	.13	.12	.12	.12	.12	.12	.13	.13
20.30	DISCHG	.13	.13	.12	.11	.11	.12	.13	.13	.13	.12

RUNOFF VOLUME ABOVE BASEFLOW = .73 WATERSHED INCHES, 3.29 CFS-HRS, .27 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4
 INPUT HYDROGRAPHS= 3,7 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.49		14.49				(NULL)					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .05 SQ.MI.	
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01
8.40	DISCHG	.02	.02	.03	.03	.04	.05	.05	.06	.07	.08
9.10	DISCHG	.09	.09	.10	.11	.12	.12	.13	.14	.15	.17
9.80	DISCHG	.18	.19	.20	.21	.22	.24	.25	.27	.29	.31
10.50	DISCHG	.33	.35	.37	.39	.42	.44	.47	.51	.55	.59
11.20	DISCHG	.63	.67	.72	.78	.85	.94	1.06	1.25	1.50	1.89
11.90	DISCHG	2.63	3.24	3.73	4.45	7.62	11.04	13.10	14.15	14.46	14.46
12.60	DISCHG	13.63	11.90	10.12	8.72	7.62	6.68	5.98	5.50	5.07	4.74
13.30	DISCHG	4.49	4.26	4.08	3.99	3.96	3.92	3.87	3.82	3.76	3.71
14.00	DISCHG	3.65	3.59	3.53	3.48	3.42	3.04	2.69	2.95	2.62	2.83
14.70	DISCHG	2.51	2.69	2.38	2.55	2.29	2.48	2.27	2.44	2.24	2.39
15.40	DISCHG	2.19	2.30	2.11	2.22	2.06	2.18	2.07	2.20	2.08	2.14
16.10	DISCHG	1.99	2.06	1.95	2.03	1.91	1.96	1.85	1.89	1.79	1.84
16.80	DISCHG	1.77	1.81	1.70	1.61	1.41	1.34	1.27	1.32	1.26	1.29
17.50	DISCHG	1.22	1.24	1.18	1.20	1.16	1.21	1.20	1.24	1.21	1.23
18.20	DISCHG	1.16	1.14	1.07	1.06	1.01	1.01	.99	1.02	1.02	1.06
18.90	DISCHG	1.07	1.11	1.10	1.11	1.07	1.03	.98	.98	.98	1.01
19.60	DISCHG	1.01	1.03	1.02	.99	.94	.90	.88	.88	.88	.91
20.30	DISCHG	.92	.93	.90	.88	.86	.85	.83	.86	.89	.91

RUNOFF VOLUME ABOVE BASEFLOW = .82 WATERSHED INCHES, 27.37 CFS-HRS, 2.26 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 6
 SURFACE ELEVATION= 52.50

		PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)			
		12.76		9.80				57.31			
TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .05 SQ.MI.	
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01
7.70	ELEV	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.51
8.40	DISCHG	.02	.02	.03	.03	.04	.05	.05	.06	.07	.08
8.40	ELEV	52.51	52.51	52.51	52.52	52.52	52.52	52.53	52.53	52.53	52.54
9.10	DISCHG	.09	.09	.10	.11	.12	.12	.13	.14	.15	.17
9.10	ELEV	52.54	52.55	52.55	52.55	52.56	52.56	52.57	52.57	52.58	52.58
9.80	DISCHG	.18	.19	.20	.21	.22	.24	.25	.27	.29	.31
9.80	ELEV	52.59	52.60	52.60	52.61	52.61	52.62	52.63	52.64	52.64	52.65
10.50	DISCHG	.33	.35	.37	.39	.42	.44	.47	.51	.55	.59
10.50	ELEV	52.66	52.67	52.68	52.70	52.71	52.72	52.74	52.75	52.77	52.79
11.20	DISCHG	.63	.67	.72	.78	.85	.94	1.02	1.12	1.31	1.59
11.20	ELEV	52.81	52.84	52.86	52.89	52.93	52.97	53.02	53.12	53.31	53.59
11.90	DISCHG	2.01	2.06	2.15	2.26	2.48	2.89	3.09	3.23	3.37	3.84
11.90	ELEV	54.01	54.12	54.29	54.52	54.97	55.78	56.21	56.50	56.82	57.11
12.60	DISCHG	7.27	9.11	9.75	9.64	9.15	8.48	7.76	7.08	6.48	5.95
12.60	ELEV	57.23	57.29	57.31	57.31	57.29	57.27	57.24	57.22	57.20	57.18
13.30	DISCHG	5.50	5.12	4.80	4.55	4.35	4.22	4.11	4.02	3.94	3.87
13.30	ELEV	57.17	57.16	57.14	57.14	57.13	57.12	57.12	57.12	57.11	57.11
14.00	DISCHG	3.81	3.74	3.68	3.62	3.57	3.50	3.49	3.48	3.47	3.46
14.00	ELEV	57.11	57.11	57.11	57.10	57.10	57.10	57.08	57.06	57.04	57.02
14.70	DISCHG	3.45	3.44	3.43	3.42	3.41	3.39	3.38	3.37	3.35	3.34
14.70	ELEV	57.00	56.97	56.95	56.92	56.89	56.86	56.83	56.80	56.78	56.75
15.40	DISCHG	3.33	3.31	3.30	3.28	3.27	3.25	3.24	3.23	3.21	3.20
15.40	ELEV	56.72	56.69	56.66	56.62	56.59	56.56	56.53	56.50	56.47	56.43
16.10	DISCHG	3.18	3.17	3.15	3.14	3.12	3.11	3.09	3.08	3.06	3.05
16.10	ELEV	56.40	56.37	56.34	56.30	56.27	56.24	56.20	56.17	56.13	56.10
16.80	DISCHG	3.03	3.01	2.99	2.91	2.83	2.74	2.66	2.58	2.50	2.43
16.80	ELEV	56.06	56.03	55.97	55.82	55.65	55.48	55.31	55.15	55.00	54.85
17.50	DISCHG	2.36	2.29	2.23	2.17	2.11	2.05	2.00	1.45	1.28	1.24
17.50	ELEV	54.71	54.58	54.45	54.33	54.21	54.11	54.01	53.45	53.28	53.24
18.20	DISCHG	1.21	1.17	1.12	1.08	1.05	1.02	1.01	1.01	1.02	1.03
18.20	ELEV	53.21	53.17	53.12	53.08	53.05	53.02	53.01	53.01	53.02	53.03
18.90	DISCHG	1.06	1.09	1.10	1.10	1.09	1.06	1.02	.97	.99	.99
18.90	ELEV	53.06	53.09	53.10	53.10	53.09	53.06	53.02	52.98	53.00	53.00
19.60	DISCHG	1.01	1.02	1.02	1.01	.93	.91	.88	.89	.88	.91
19.60	ELEV	53.01	53.02	53.02	53.01	52.97	52.95	52.94	52.94	52.94	52.96
20.30	DISCHG	.92	.93	.90	.88	.86	.85	.84	.86	.89	.91
20.30	ELEV	52.96	52.97	52.95	52.94	52.93	52.92	52.92	52.93	52.94	52.96

TR20 XEQ 01-31-00 14:09
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 6

RUNOFF VOLUME ABOVE BASEFLOW = .82 WATERSHED INCHES, 27.28 CFS-HRS, 2.25 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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 2 STORM 3													
XSECTION 1	RUNOFF	.01	9	2	.07	.0	5.40	24.00	2.79	---	12.36	9.13	1270.7
XSECTION 3	ADDHYD	.04	9	2	.07	.0	5.40	24.00	.84	---	12.50	13.22	297.5
STRUCTURE 10	RESVOR	.04	9	2	.07	.0	5.40	24.00	.84	58.00	12.52	13.07	294.0
XSECTION 2	RUNOFF	.01	9	2	.07	.0	5.40	24.00	.73	---	12.32	2.44	346.4
XSECTION 4	ADDHYD	.05	9	2	.07	.0	5.40	24.00	.82	---	12.49	14.49	281.5
STRUCTURE 11	RESVOR	.05	9	2	.07	.0	5.40	24.00	.82	57.31	12.76	9.80	190.3

TR20 XEQ 01-31-00 14:09
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 8

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 3
<u>STRUCTURE 11</u>	<u>.05</u>	
ALTERNATE 2		9.80
<u>STRUCTURE 10</u>	<u>.04</u>	
ALTERNATE 2		13.07
<u>XSECTION 1</u>	<u>.01</u>	
ALTERNATE 2		9.13
<u>XSECTION 2</u>	<u>.01</u>	
ALTERNATE 2		2.44
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		13.22
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		14.49

100 yr.

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 10 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5 RAINFL	9	.25						
8	0.0	.0025	.005	.0075	.010			
8	.0125	.015	.0175	.020	.0225			
8	.026	.0285	.031	.0345	.037			
8	.0405	.043	.0465	.050	.0535			
8	.057	.0605	.064	.068	.072			
8	.076	.080	.0845	.089	.094			
8	.100	.1075	.115	.1225	.130			
8	.1385	.148	.157	.167	.178			
8	.189	.202	.216	.2315	.250			
8	.271	.298	.3455	.500	.6555			
8	.702	.7295	.751	.769	.785			
8	.7985	.811	.823	.834	.8435			
8	.853	.862	.870	.8785	.886			
8	.8935	.900	.907	.911	.916			
8	.920	.9245	.929	.9325	.936			
8	.940	.944	.947	.951	.954			
8	.957	.9605	.963	.9665	.969			
8	.9725	.975	.9775	.981	.9835			
8	.986	.9885	.991	.9935	.996			
8	.9985	1.0	1.0	1.0	1.0			
9	ENDTBL							
3	STRUCT	10						
8		55.	0.0	0.0				
8		56.	3.	.0002				
8		57.1	3.5	.03				
8		58.	13.	.057				
8		59.	100.	.232				
9	ENDTBL							
3	STRUCT	11						
8		52.5	0.0	0.0				
8		53.	1.	.0001				
8		54.	2.	.005				
8		56.	3.	.100				
8		57.1	3.5	.324				
8		58.	30.	.704				
8		58.3	60.	.87				
9	ENDTBL							
6	RUNOFF	1 001	3 .0071875	77.	.44	1 1	1 1	1
6	ADDHYD	4 003	3 2 1			1 1	1 1	1
6	RESVOR	2 10 1	3 55.			1 1	1 1	1
6	RUNOFF	1 002	7 .00703125	49.	.24	1 1	1 1	1
6	ADDHYD	4 004	3 7 1			1 1	1 1	1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6 RESVOR 2 11 1 6 52.5 1 1 1 1 1
ENDATA
7 INCREM 6 0.07
7 READHD 8 2
7 READHD 9 11.15 .2 .03726563 0.0
8 0.0 0.0 0.0 0.0 .01
8 3.5 13.73 16.7 9.58 6.25
8 4.91 4.26 3.88 3.59 3.22
8 3.02 2.94 2.84 2.68 2.44
8 2.41 2.35 2.24 2.13 2.20
8 2.06 2.01 1.92 1.81 1.86
8 1.32 1.29 1.27 1.16 1.24
8 1.26 1.11 1.01 1.02 1.11
8 1.14 .98 .98 1.08 .91
8 .88 .95 .91 .81 .97
8 .81 .91 .91 .77 .76
8 .96 .86 .76 .75 .75
8 .75 .75 .75 .76 .75
8 .54 .21 .03 0.0 0.0
9 ENDTBL
7 COMPUT 7 001 11 0.0 7.0 1.0 9 2 02 02
ENDCMP 1
ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 01-31-00 14:20
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 11.15 TIME INCREMENT= .20 DRAINAGE AREA= .04 BASE FLOW= .00

8	.00	.00	.00	.00	.01
8	3.50	13.73	16.70	9.58	6.25
8	4.91	4.26	3.88	3.59	3.22
8	3.02	2.94	2.84	2.68	2.44
8	2.41	2.35	2.24	2.13	2.20
8	2.06	2.01	1.92	1.81	1.86
8	1.32	1.29	1.27	1.16	1.24
8	1.26	1.11	1.01	1.02	1.11
8	1.14	.98	.98	1.08	.91
8	.88	.95	.91	.81	.97
8	.81	.91	.91	.77	.76
8	.96	.86	.76	.75	.75
8	.75	.75	.75	.76	.75
8	.54	.21	.03	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 2 MAIN TIME INCREMENT = .07 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) 12.35 PEAK DISCHARGE(CFS) 13.37 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .01 SQ.MI.
7.00	DISCHG	.00	.01	.03
7.70	DISCHG	.04	.08	.12
8.40	DISCHG	.13	.16	.23
9.10	DISCHG	.25	.29	.37
9.80	DISCHG	.39	.46	.60
10.50	DISCHG	.63	.76	1.03
11.20	DISCHG	1.09	1.44	3.05
11.90	DISCHG	4.13	11.23	10.67
12.60	DISCHG	9.01	4.51	2.60
13.30	DISCHG	2.41	1.94	1.58

TR20 XEQ 01-31-00 14:20
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 2

14.00	DISCHG	1.53	1.49	1.46	1.43	1.40	1.38	1.36	1.33	1.30	1.27
14.70	DISCHG	1.23	1.19	1.16	1.13	1.11	1.10	1.09	1.07	1.06	1.05
15.40	DISCHG	1.03	1.00	.98	.96	.95	.95	.95	.95	.93	.92
16.10	DISCHG	.90	.89	.88	.87	.86	.84	.82	.80	.79	.78
16.80	DISCHG	.78	.76	.73	.67	.62	.58	.56	.56	.55	.55
17.50	DISCHG	.53	.51	.50	.50	.50	.50	.51	.51	.51	.51
18.20	DISCHG	.49	.47	.45	.44	.43	.42	.42	.42	.43	.44
18.90	DISCHG	.44	.45	.45	.45	.44	.42	.40	.40	.40	.41
19.60	DISCHG	.42	.42	.41	.39	.38	.37	.36	.36	.36	.37
20.30	DISCHG	.38	.38	.37	.35	.34	.34	.34	.35	.36	.36

RUNOFF VOLUME ABOVE BASEFLOW = 4.14 WATERSHED INCHES, 19.19 CFS-HRS, 1.59 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
 INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

		PEAK TIME(HRS)	PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)						
		12.43	27.62		(NULL)						
TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS		TIME INCREMENT = .07 HOURS			DRAINAGE AREA = .04 SQ.MI.				
7.00	DISCHG	.00	.00	.00	.01	.01	.01	.02	.02	.03	.03
7.70	DISCHG	.04	.05	.06	.07	.08	.09	.10	.10	.11	.12
8.40	DISCHG	.13	.14	.14	.15	.16	.17	.19	.20	.22	.23
9.10	DISCHG	.25	.26	.27	.28	.29	.30	.32	.33	.35	.37
9.80	DISCHG	.39	.41	.43	.44	.46	.48	.51	.54	.57	.60
10.50	DISCHG	.63	.66	.69	.73	.76	.80	.85	.91	.97	1.03
11.20	DISCHG	1.09	1.16	1.24	1.33	1.44	1.57	1.76	2.05	2.44	3.05
11.90	DISCHG	4.14	6.12	9.27	12.38	16.26	21.13	25.49	27.53	27.57	27.08
12.60	DISCHG	23.93	19.89	16.17	13.86	11.93	10.16	9.24	8.42	7.70	7.25
13.30	DISCHG	6.84	6.48	6.22	5.99	5.78	5.59	5.41	5.22	5.02	4.84
14.00	DISCHG	4.70	4.59	4.49	4.42	4.37	4.32	4.26	4.20	4.13	4.05
14.70	DISCHG	3.95	3.85	3.73	3.62	3.55	3.52	3.50	3.47	3.44	3.40
15.40	DISCHG	3.35	3.29	3.23	3.17	3.12	3.08	3.11	3.12	3.13	3.06
16.10	DISCHG	2.99	2.94	2.91	2.89	2.85	2.80	2.75	2.70	2.65	2.60
16.80	DISCHG	2.60	2.60	2.58	2.37	2.13	1.90	1.87	1.86	1.84	1.83
17.50	DISCHG	1.80	1.77	1.72	1.68	1.67	1.70	1.74	1.75	1.76	1.76
18.20	DISCHG	1.71	1.64	1.57	1.52	1.47	1.43	1.43	1.44	1.45	1.49
18.90	DISCHG	1.53	1.56	1.58	1.58	1.55	1.48	1.41	1.38	1.38	1.39
19.60	DISCHG	1.42	1.46	1.48	1.42	1.35	1.28	1.26	1.25	1.25	1.28
20.30	DISCHG	1.31	1.32	1.30	1.27	1.24	1.20	1.17	1.20	1.26	1.31

RUNOFF VOLUME ABOVE BASEFLOW = 1.54 WATERSHED INCHES, 44.26 CFS-HRS, 3.66 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 55.00

		PEAK TIME(HRS)			PEAK DISCHARGE(CFS)			PEAK ELEVATION(FEET)				
		12.47			27.67			58.17				
TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .04 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.01	.01	.01	.02	.02	.03	.03	
7.00	ELEV	55.00	55.00	55.00	55.00	55.00	55.01	55.01	55.01	55.01	55.01	
7.70	DISCHG	.04	.05	.06	.07	.08	.09	.10	.10	.11	.12	
7.70	ELEV	55.01	55.02	55.02	55.02	55.03	55.03	55.03	55.03	55.04	55.04	
8.40	DISCHG	.13	.14	.14	.15	.16	.17	.19	.20	.22	.23	
8.40	ELEV	55.04	55.05	55.05	55.05	55.05	55.06	55.06	55.07	55.07	55.08	
9.10	DISCHG	.25	.26	.27	.28	.29	.30	.32	.33	.35	.37	
9.10	ELEV	55.08	55.09	55.09	55.09	55.10	55.10	55.11	55.11	55.12	55.12	
9.80	DISCHG	.39	.41	.43	.44	.46	.48	.51	.54	.57	.60	
9.80	ELEV	55.13	55.14	55.14	55.15	55.15	55.16	55.17	55.18	55.19	55.20	
10.50	DISCHG	.63	.66	.69	.73	.76	.80	.85	.91	.97	1.03	
10.50	ELEV	55.21	55.22	55.23	55.24	55.25	55.27	55.28	55.30	55.32	55.34	
11.20	DISCHG	1.09	1.16	1.24	1.33	1.44	1.57	1.76	2.04	2.43	3.00	
11.20	ELEV	55.36	55.39	55.41	55.44	55.48	55.52	55.59	55.68	55.81	56.00	
11.90	DISCHG	3.06	3.25	5.25	10.88	14.58	19.43	24.01	26.96	27.66	27.26	
11.90	ELEV	56.13	56.55	57.27	57.80	58.02	58.07	58.13	58.16	58.17	58.16	
12.60	DISCHG	25.19	21.32	17.44	14.58	12.65	11.03	9.69	8.82	8.05	7.47	
12.60	ELEV	58.14	58.10	58.05	58.02	57.97	57.81	57.69	57.60	57.53	57.48	
13.30	DISCHG	7.04	6.66	6.35	6.10	5.88	5.68	5.50	5.31	5.12	4.93	
13.30	ELEV	57.44	57.40	57.37	57.35	57.33	57.31	57.29	57.27	57.25	57.24	
14.00	DISCHG	4.77	4.64	4.54	4.45	4.40	4.35	4.29	4.23	4.17	4.09	
14.00	ELEV	57.22	57.21	57.20	57.19	57.18	57.18	57.17	57.17	57.16	57.16	
14.70	DISCHG	4.00	3.90	3.79	3.67	3.58	3.54	3.51	3.50	3.49	3.49	
14.70	ELEV	57.15	57.14	57.13	57.12	57.11	57.10	57.10	57.10	57.09	57.07	
15.40	DISCHG	3.48	3.46	3.44	3.42	3.40	3.37	3.34	3.32	3.30	3.28	
15.40	ELEV	57.05	57.02	56.98	56.93	56.87	56.81	56.75	56.71	56.67	56.62	
16.10	DISCHG	3.26	3.23	3.20	3.18	3.15	3.12	3.09	3.05	3.02	2.61	
16.10	ELEV	56.57	56.51	56.45	56.39	56.33	56.26	56.19	56.12	56.04	55.87	
16.80	DISCHG	2.60	2.61	2.58	2.38	2.13	1.90	1.87	1.86	1.84	1.83	
16.80	ELEV	55.87	55.87	55.86	55.79	55.71	55.63	55.62	55.62	55.61	55.61	
17.50	DISCHG	1.80	1.78	1.72	1.68	1.67	1.71	1.73	1.76	1.76	1.77	
17.50	ELEV	55.60	55.59	55.57	55.56	55.56	55.57	55.58	55.59	55.59	55.59	
18.20	DISCHG	1.71	1.64	1.57	1.52	1.47	1.43	1.43	1.44	1.45	1.49	
18.20	ELEV	55.57	55.55	55.52	55.51	55.49	55.48	55.48	55.48	55.48	55.50	
18.90	DISCHG	1.53	1.56	1.57	1.58	1.55	1.48	1.41	1.38	1.38	1.39	
18.90	ELEV	55.51	55.52	55.52	55.53	55.52	55.49	55.47	55.46	55.46	55.46	
19.60	DISCHG	1.42	1.46	1.48	1.43	1.35	1.28	1.26	1.25	1.24	1.28	
19.60	ELEV	55.47	55.49	55.49	55.48	55.45	55.43	55.42	55.42	55.41	55.43	
20.30	DISCHG	1.31	1.32	1.30	1.27	1.24	1.20	1.17	1.20	1.26	1.31	
20.30	ELEV	55.44	55.44	55.43	55.42	55.41	55.40	55.39	55.40	55.42	55.44	

RUNOFF VOLUME ABOVE BASEFLOW = 1.54 WATERSHED INCHES, 44.28 CFS-HRS, 3.66 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 01-31-00 14:20
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 4

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH= 7

AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .24 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0320 HOURS

PEAK TIME(HRS) 12.31 PEAK DISCHARGE(CFS) 5.37 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.01 SQ.MI.
11.20	DISCHG	.00 .00 .00 .00	.00 .00 .02	.06 .14 .36		
11.90	DISCHG	.92 1.73 2.60 3.45	4.26 5.02 5.34	4.56 3.48 2.79		
12.60	DISCHG	2.35 1.93 1.64 1.49	1.35 1.24 1.17	1.12 1.05 1.00		
13.30	DISCHG	.98 .95 .91 .89	.87 .83 .79	.77 .75 .73		
14.00	DISCHG	.72 .71 .70 .69	.69 .68 .66	.65 .64 .62		
14.70	DISCHG	.59 .57 .57 .56	.56 .56 .56	.55 .54 .54		
15.40	DISCHG	.52 .50 .49 .50	.50 .51 .51	.50 .48 .47		
16.10	DISCHG	.47 .47 .47 .46	.45 .43 .42	.42 .42 .43		
16.80	DISCHG	.43 .39 .33 .29	.28 .29 .30	.31 .30 .28		
17.50	DISCHG	.27 .26 .27 .28	.28 .29 .29	.29 .28 .27		
18.20	DISCHG	.25 .24 .23 .23	.23 .23 .24	.25 .25 .26		
18.90	DISCHG	.26 .26 .26 .25	.23 .21 .21	.22 .24 .25		
19.60	DISCHG	.25 .23 .21 .20	.20 .20 .20	.20 .21 .22		
20.30	DISCHG	.22 .21 .19 .18	.18 .20 .21	.22 .21 .20		

RUNOFF VOLUME ABOVE BASEFLOW = 1.45 WATERSHED INCHES, 6.59 CFS-HRS, .54 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

INPUT HYDROGRAPHS= 3,7 OUTPUT HYDROGRAPH= 1

PEAK TIME(HRS) 12.41 PEAK DISCHARGE(CFS) 31.68 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.05 SQ.MI.
7.00	DISCHG	.00 .00 .00 .01	.01 .01 .02	.02 .03 .03		
7.70	DISCHG	.04 .05 .06 .07	.08 .09 .10	.10 .11 .12		
8.40	DISCHG	.13 .14 .14 .15	.16 .17 .19	.20 .22 .23		
9.10	DISCHG	.25 .26 .27 .28	.29 .30 .32	.33 .35 .37		
9.80	DISCHG	.39 .41 .43 .44	.46 .48 .51	.54 .57 .60		
10.50	DISCHG	.63 .66 .69 .73	.76 .80 .85	.91 .97 1.03		
11.20	DISCHG	1.09 1.16 1.24 1.33	1.44 1.57 1.78	2.11 2.57 3.36		
11.90	DISCHG	3.97 4.98 7.85 14.33	18.84 24.45 29.35	31.52 31.13 30.05		
12.60	DISCHG	27.53 23.25 19.08 16.07	14.00 12.27 10.86	9.94 9.11 8.48		
13.30	DISCHG	8.01 7.60 7.26 6.99	6.75 6.51 6.29	6.08 5.87 5.66		
14.00	DISCHG	5.48 5.35 5.24 5.15	5.09 5.03 4.95	4.88 4.81 4.71		
14.70	DISCHG	4.59 4.47 4.36 4.24	4.15 4.10 4.07	4.05 4.04 4.02		
15.40	DISCHG	4.00 3.97 3.94 3.92	3.90 3.88 3.85	3.82 3.78 3.76		
16.10	DISCHG	3.73 3.70 3.67 3.64	3.60 3.55 3.50	3.47 3.44 3.04		

TR20 XEQ 01-31-00 14:20
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 5

16.80	DISCHG	3.03	2.99	2.91	2.67	2.41	2.19	2.17	2.17	2.14	2.11
17.50	DISCHG	2.07	2.04	1.99	1.96	1.95	1.99	2.02	2.05	2.04	2.03
18.20	DISCHG	1.96	1.88	1.80	1.75	1.70	1.66	1.67	1.69	1.70	1.75
18.90	DISCHG	1.79	1.82	1.83	1.83	1.78	1.69	1.62	1.60	1.62	1.64
19.60	DISCHG	1.67	1.69	1.70	1.63	1.55	1.48	1.46	1.45	1.46	1.50
20.30	DISCHG	1.53	1.54	1.49	1.45	1.42	1.39	1.38	1.42	1.47	1.51

RUNOFF VOLUME ABOVE BASEFLOW = 1.53 WATERSHED INCHES, 50.87 CFS-HRS, 4.20 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 6
 SURFACE ELEVATION= 52.50

PEAK TIME(HRS) 12.63 PEAK DISCHARGE(CFS) 26.07 PEAK ELEVATION(FEET) 57.87

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .05 SQ.MI.		
7.00	DISCHG	.00	.00	.00	.01	.01	.01	.02	.02	.03	.03	
7.00	ELEV	52.50	52.50	52.50	52.50	52.50	52.51	52.51	52.51	52.51	52.52	
7.70	DISCHG	.04	.05	.06	.07	.08	.09	.10	.10	.11	.12	
7.70	ELEV	52.52	52.53	52.53	52.53	52.54	52.54	52.55	52.55	52.56	52.56	
8.40	DISCHG	.13	.13	.14	.15	.16	.17	.19	.20	.22	.23	
8.40	ELEV	52.56	52.57	52.57	52.58	52.58	52.59	52.59	52.60	52.61	52.62	
9.10	DISCHG	.25	.26	.27	.28	.29	.30	.32	.33	.35	.37	
9.10	ELEV	52.62	52.63	52.63	52.64	52.64	52.65	52.66	52.67	52.68	52.69	
9.80	DISCHG	.39	.41	.43	.44	.46	.48	.51	.53	.57	.60	
9.80	ELEV	52.70	52.70	52.71	52.72	52.73	52.74	52.75	52.77	52.78	52.80	
10.50	DISCHG	.63	.66	.69	.72	.76	.80	.85	.91	.96	1.01	
10.50	ELEV	52.81	52.83	52.84	52.86	52.88	52.90	52.93	52.95	52.98	53.01	
11.20	DISCHG	1.05	1.11	1.17	1.25	1.35	1.46	1.62	1.86	2.02	2.07	
11.20	ELEV	53.05	53.11	53.17	53.25	53.35	53.46	53.62	53.86	54.03	54.15	
11.90	DISCHG	2.17	2.30	2.55	3.01	3.19	3.42	9.35	16.43	21.43	24.51	
11.90	ELEV	54.34	54.61	55.09	56.02	56.41	56.93	57.30	57.54	57.71	57.81	
12.60	DISCHG	25.95	25.76	24.22	21.99	19.65	17.46	15.48	13.78	12.35	11.15	
12.60	ELEV	57.86	57.86	57.80	57.73	57.65	57.57	57.51	57.45	57.40	57.36	
13.30	DISCHG	10.18	9.38	8.73	8.19	7.75	7.37	7.05	6.76	6.49	6.25	
13.30	ELEV	57.33	57.30	57.28	57.26	57.24	57.23	57.22	57.21	57.20	57.19	
14.00	DISCHG	6.02	5.82	5.64	5.49	5.37	5.26	5.17	5.09	5.00	4.92	
14.00	ELEV	57.19	57.18	57.17	57.17	57.16	57.16	57.16	57.15	57.15	57.15	
14.70	DISCHG	4.83	4.73	4.62	4.51	4.41	4.31	4.23	4.18	4.13	4.10	
14.70	ELEV	57.15	57.14	57.14	57.13	57.13	57.13	57.12	57.12	57.12	57.12	
15.40	DISCHG	4.07	4.04	4.01	3.98	3.96	3.93	3.91	3.89	3.86	3.83	
15.40	ELEV	57.12	57.12	57.12	57.12	57.12	57.11	57.11	57.11	57.11	57.11	
16.10	DISCHG	3.80	3.77	3.74	3.71	3.68	3.64	3.60	3.56	3.53	3.50	
16.10	ELEV	57.11	57.11	57.11	57.11	57.11	57.10	57.10	57.10	57.10	57.09	
16.80	DISCHG	3.49	3.49	3.48	3.47	3.46	3.44	3.43	3.41	3.39	3.38	
16.80	ELEV	57.08	57.07	57.05	57.03	57.01	56.97	56.94	56.90	56.87	56.83	
17.50	DISCHG	3.36	3.34	3.33	3.31	3.29	3.28	3.26	3.24	3.23	3.21	
17.50	ELEV	56.80	56.76	56.72	56.68	56.64	56.61	56.57	56.54	56.50	56.47	

TR20 XEQ 01-31-00 14:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 6

18.20	DISCHG	3.20	3.18	3.16	3.15	3.13	3.11	3.09	3.07	3.06	3.04
18.20	ELEV	56.44	56.40	56.36	56.32	56.28	56.24	56.20	56.16	56.12	56.08
18.90	DISCHG	3.02	3.01	2.96	2.89	2.83	2.76	2.70	2.63	2.57	2.52
18.90	ELEV	56.05	56.01	55.92	55.78	55.66	55.53	55.40	55.27	55.15	55.04
19.60	DISCHG	2.47	2.42	2.38	2.33	2.29	2.24	2.20	2.16	2.11	2.08
19.60	ELEV	54.93	54.84	54.75	54.67	54.58	54.49	54.40	54.31	54.23	54.15
20.30	DISCHG	2.04	2.01	1.79	1.56	1.47	1.42	1.39	1.40	1.43	1.48
20.30	ELEV	54.09	54.03	53.79	53.56	53.47	53.42	53.39	53.40	53.43	53.48

RUNOFF VOLUME ABOVE BASEFLOW = 1.53 WATERSHED INCHES, 50.79 CFS-HRS, 4.20 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

TR20 XEQ 01-31-00 14:20
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
 PAGE 7

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 MOIST 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)
<u>ALTERNATE 2 STORM 2</u>													
XSECTION 1	RUNOFF	.01	9	2	.07	.0	7.00	24.00	4.14	---	12.35	13.37	1859.5
XSECTION 3	ADDHYD	.04	9	2	.07	.0	7.00	24.00	1.54	---	12.43	27.62	621.3
STRUCTURE 10	RESVOR	.04	9	2	.07	.0	7.00	24.00	1.54	58.17	12.47	27.67	622.4
XSECTION 2	RUNOFF	.01	9	2	.07	.0	7.00	24.00	1.45	---	12.31	5.37	763.4
XSECTION 4	ADDHYD	.05	9	2	.07	.0	7.00	24.00	1.53	---	12.41	31.68	615.3
STRUCTURE 11	RESVOR	.05	9	2	.07	.0	7.00	24.00	1.53	57.87	12.63	26.07	506.3

TR20 XEQ 01-31-00 14:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 10 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 8

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 2
<u>STRUCTURE 11</u>	<u>.05</u>	
ALTERNATE 2		26.07
<u>STRUCTURE 10</u>	<u>.04</u>	
ALTERNATE 2		27.67
<u>XSECTION 1</u>	<u>.01</u>	
ALTERNATE 2		13.37
<u>XSECTION 2</u>	<u>.01</u>	
ALTERNATE 2		5.37
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		27.62
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		31.68

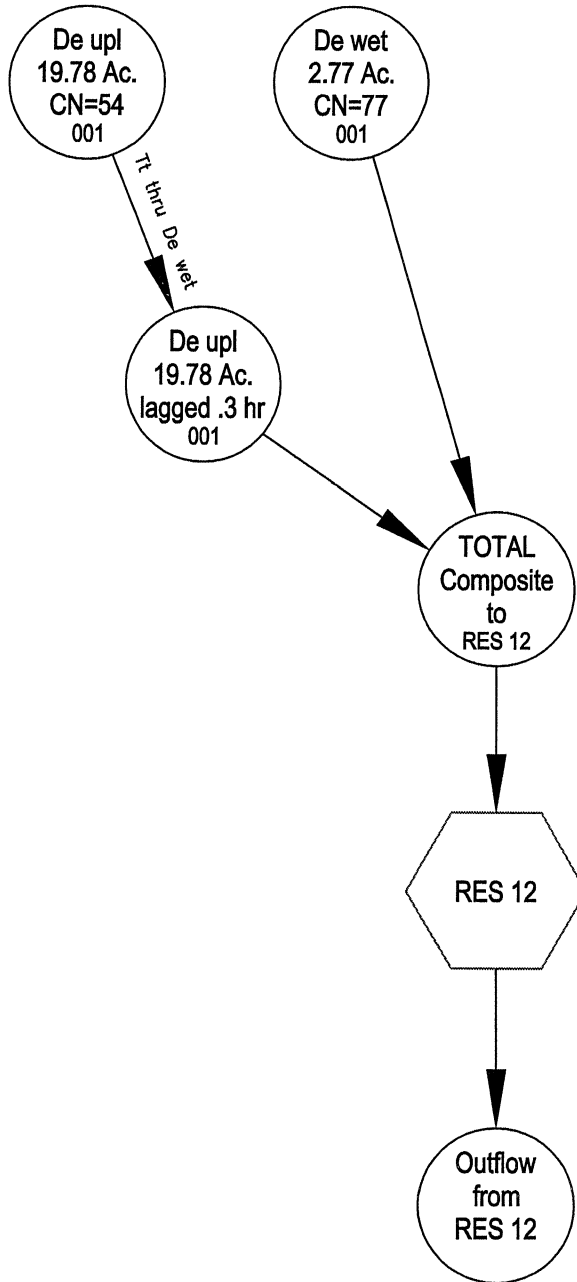
**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

Existing Condition Analysis

To RES 12 Design Point

**Hayes Engineering, Inc.
February 14, 2000**

EXISTING CONDITION WATERSHED SCHEMATIC TO RES 12 WETLAND OUTLET





HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # _____
NAME _____
DATE 1/25/00

MADE BY _____

- MEMO
- CALCULATION

RES 12

EXISTING CONDITION STAGE-DISCHARGE CAPACITY @ RES 12 - 18" @ 61.9

DOWNSTREAM: 12" @ 59.94 - ASSUME INLET CONTROL

HW Elev	Q-cfs	
59.94	0	AT 62.9 FLOW WILL OVERTOP & FLOW ACROSS
60	neg. ~ .05	YARD TOWARD PHILLIPS; 12" @ 62.9 ⇒ Q = 6.2 cfs
62	4.8	
64	7.7	WEIR FLOW OVER YARD: Q = 0 @ 62.9 Q = 80 @ 64 Q _{TOTAL} @ 64 = 87.7 cfs

18" CULVERT @ 61.9 - SEE ATTACHED HY-8 ANALYSIS

HW Elev.	Q-cfs	
61.9	0	
62	.09	
64	10.	* PATH O.TOP ELEV. (NOT AT CULVERT)
64.5	11.6	
65	12.5	
65.2*	13.3	FLOW WOULD OVERTOP ROADWAY/PATH
66	15.6	AT HEADWATERS IN EXCESS OF 66.5

CONSIDER AVAIL. STORAGE/ROUTING TO TEST WHETHER OVERTOP IS EXCEEDED AT PATH PRIOR TO INVOKING DIVERT OPTION.

ANALYSIS OF ROUTING EFFECTS INDICATES THAT MAX. HWELEV WILL NOT BE IN EXCESS OF PATH O.TOP ELEV. (WL₁₀₀ = 65.12 computed)



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # _____
NAME _____
DATE _____

MADE BY _____

- MEMO
 CALCULATION

RB12 - STAGE STORAGE

ELEV	AREA FT ²	AUG. FT ²	INC.D. FT	INC.VOL FT ³	Cum Vol Ac Ft.
61.9	0				0
		5	.1	.5	
62	10±				0.2000 (neg)
		15	2	30	
64	20±				.0007
		12364	.5	6182	
64.5	24709				.1426
		45854	.5	22927	
65	67000				.669
		68500	.2	13700	
65.2*	70000±				.98
		94000	.8	75200	
66	118000				2.7

* PATH O' TOP ELEV. - CHECK TO SEE IF EXCEEDED
IN 100 YR STORM.

RES12 (EXISTING)
STAGE DISCHARGE 1/3

CURRENT DATE: 07-24-1999
CURRENT TIME: 06:59:13

FILE DATE: 07-24-1999
FILE NAME: NBT12

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C	SITE DATA				CULVERT SHAPE, MATERIAL, INLET			
U								
L	INLET	OUTLET	CULVERT	BARRELS				
V	ELEV.	ELEV.	LENGTH	SHAPE	SPAN	RISE	MANNING	INLET
NO.	(ft)	(ft)	(ft)	MATERIAL	(ft)	(ft)	n	TYPE
1	61.90	61.50	15.01	1 RCP	1.50	1.50	.015	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: NBT12 DATE: 07-24-1999

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
61.90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
62.83	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.00	1
63.35	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.00	1
63.92	9.0	9.0	0.0	0.0	0.0	0.0	0.0	0.00	1
64.15	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
65.74	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.00	1
66.55	18.0	17.0	0.0	0.0	0.0	0.0	0.0	0.93	14
66.62	21.0	17.1	0.0	0.0	0.0	0.0	0.0	3.70	10
66.67	24.0	17.3	0.0	0.0	0.0	0.0	0.0	6.57	8
66.72	27.0	17.4	0.0	0.0	0.0	0.0	0.0	9.45	7
66.75	30.0	17.4	0.0	0.0	0.0	0.0	0.0	12.30	6
66.50	16.9	16.9	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING

NOTE: OVERTOP AT SECT 100
OCCURS @ 65.2 (LOWER THAN
"ROADWAY") -

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: NBT12 DATE: 07-24-1999

HEAD	HEAD	TOTAL	FLOW	% FLOW
ELEV (ft)	ERROR (ft)	FLOW (cfs)	ERROR (cfs)	ERROR
61.90	0.000	0.00	0.00	0.00
62.83	0.000	3.00	0.00	0.00
63.35	0.000	6.00	0.00	0.00
63.92	0.000	9.00	0.00	0.00
64.15	0.000	10.00	0.00	0.00
65.74	0.000	15.00	0.00	0.00
66.55	-0.004	18.00	0.10	0.56
66.62	-0.001	21.00	0.16	0.76
66.67	-0.002	24.00	0.18	0.75
66.72	-0.002	27.00	0.20	0.74
66.75	-0.002	30.00	0.26	0.87

=1c TOLERANCE (ft) = 0.010

=2c TOLERANCE (%) = 1.000

RES 12 (EXISTING.)

STAGE-DISCHARGE

3/3

CURRENT DATE: 07-24-1999
CURRENT TIME: 06:59:13

FILE DATE: 07-24-1999
FILE NAME: NBT12

TAILWATER

CONSTANT WATER SURFACE ELEVATION
61.50

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE
EMBANKMENT TOP WIDTH

GRAVEL
10.00 ft

***** USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X ft	Y ft
1	0.00	67.20
2	32.00	66.50
3	64.00	66.50
4	72.00	68.00

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CHERRY HILL ESTATES

User: cfb

Date: 01-26-2000

County :

State:

Checked: _____

Date: _____

Subtitle: EXISTING CONDITION ANALYSIS - ADJUSTED

Subarea : De upl

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	1.88(30)	11.4(58)	-	-
Woods good	-	6.5(55)	-	-
Total Area (by Hydrologic Soil Group)	1.88 ====	17.9 ====		

SUBAREA: De upl TOTAL DRAINAGE AREA: 19.78 Acres WEIGHTED CURVE NUMBER: 54

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CHERRY HILL ESTATES

User: cfb

Date: 01-26-2000

County :

State:

Checked: _____

Date: _____

Subtitle: EXISTING CONDITION ANALYSIS - ADJUSTED

Subarea : De wet

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
Acres (CN)				

OTHER AGRICULTURAL LANDS				
Woods	good	-	-	- 2.77(77)
Total Area (by Hydrologic Soil Group)				2.77
				====

SUBAREA: De wet TOTAL DRAINAGE AREA: 2.77 Acres WEIGHTED CURVE NUMBER: 77

Project : CHERRY HILL ESTATES User: cfb Date: 01-26-2000

County : State: Checked: _____ Date: _____
 Subtitle: EXISTING CONDITION ANALYSIS - ADJUSTED

----- Subarea #1 - De upl -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	H					0.209
Shallow Concent'd		330	.05	U					0.025
Shallow Concent'd		820	.04	U					0.071

Time of Concentration = 0.30*
 =====

----- Subarea #2 - De wet -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	H					0.209
Shallow Concent'd		240	.018	U					0.031
Open Channel		320	.0003			.04 2	5		0.254

Time of Concentration = 0.49*
 =====

Shallow Concent'd		290	.019	U					0.036
Open Channel		320	.0003			.04 2	5		0.254

Travel Time = 0.29*
 =====

TRAVEL TIME
 De upl. thru De wet.
 use 0.3hr.

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Bermuda	--- Surface Codes ---
C Cultivated = 20 % Res.	H Woods, Light	P Paved
D Cultivated < 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

De upl subarea

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

```
JOB TR-20                FULLPRINT          SUMMARY  NOPLOTS
TITLE 001 EXISTING CONDITION WATERSHED - TO RES 12 AREA
TITLE   TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00
5 RAINFL 9                .25
8          0.0             .0025      .005       .0075      .010
8          .0125          .015       .0175      .020       .0225
8          .026           .0285      .031       .0345      .037
8          .0405          .043       .0465      .050       .0535
8          .057           .0605      .064       .068       .072
8          .076           .080       .0845      .089       .094
8          .100           .1075      .115       .1225      .130
8          .1385          .148       .157       .167       .178
8          .189           .202       .216       .2315      .250
8          .271           .298       .3455      .500       .6555
8          .702           .7295      .751       .769       .785
8          .7985          .811       .823       .834       .8435
8          .853           .862       .870       .8785      .886
8          .8935          .900       .907       .911       .916
8          .920           .9245      .929       .9325      .936
8          .940           .944       .947       .951       .954
8          .957           .9605      .963       .9665      .969
8          .9725          .975       .9775      .981       .9835
8          .986           .9885      .991       .9935      .996
8          .9985          1.0        1.0        1.0        1.0
9 ENDTBL
6 RUNOFF 1 001           2 .03090625 54.        .3         1 1 1 1
  ENDATA
7 INCREM 6                0.1
7 COMPUT 7 001 001 0.0    3.1        1.0        9 2 01 01
  ENDCMP 1
7 COMPUT 7 001 001 0.0    4.6        1.0        9 2 01 02
  ENDCMP 1
7 COMPUT 7 001 001 0.0    5.4        1.0        9 2 01 03
  ENDCMP 1
7 COMPUT 7 001 001 0.0    7.0        1.0        9 2 01 04
  ENDCMP 1
ENDJOB 2
```

*****END OF 80-80 LIST*****

TR20 XEQ 01-26-00 09:24
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .10 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 3.10 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 2

AREA= .03 SQ MI INPUT RUNOFF CURVE= 54. TIME OF CONCENTRATION= .30 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0400 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .16 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.16	(RUNOFF)
12.50	1.10	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .03 SQ.MI.								
12.00	DISCHG .00 .00	.11 .62	1.07	1.10	1.04	.93	.83	.77			
13.00	DISCHG .72 .69	.65 .63	.61	.60	.58	.56	.54	.52			
14.00	DISCHG .51 .51	.50 .50	.50	.49	.48	.46	.44	.44			
15.00	DISCHG .44 .44	.43 .43	.42	.40	.40	.40	.41	.41			
16.00	DISCHG .39 .39	.38 .38	.37	.36	.35	.36	.36	.33			
17.00	DISCHG .27 .25	.25 .26	.25	.24	.23	.24	.24	.25			
18.00	DISCHG .25 .25	.23 .21	.20	.20	.20	.21	.22	.23			
19.00	DISCHG .23 .22	.21 .19	.20	.21	.22	.21	.19	.18			
20.00	DISCHG .18 .18	.19 .20	.19	.17	.17	.18	.20	.19			
21.00	DISCHG .17 .17	.18 .20	.19	.17	.16	.16	.16	.17			
22.00	DISCHG .19 .20	.19 .17	.16	.16	.16	.16	.16	.16			
23.00	DISCHG .16 .16	.16 .16	.16	.16	.16	.16	.16	.14			
24.00	DISCHG .12 .10	.06 .03	.01	.01	.00						

RUNOFF VOLUME ABOVE BASEFLOW = .20 WATERSHED INCHES, 3.92 CFS-HRS, .32 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

RECORD ID

TR20 XEQ 01-26-00 09:24
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 2
PAGE 2

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 2 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 2
AREA= .03 SQ MI INPUT RUNOFF CURVE= 54. TIME OF CONCENTRATION= .30 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0400 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.36 9.04 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.03 SQ.MI.
11.00	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .19				
12.00	DISCHG	1.26 3.48 6.21 8.72 8.85 6.94 5.43 4.31 3.54 3.07				
13.00	DISCHG	2.73 2.51 2.32 2.19 2.09 2.01 1.93 1.82 1.74 1.67				
14.00	DISCHG	1.62 1.59 1.57 1.55 1.52 1.48 1.44 1.37 1.31 1.29				
15.00	DISCHG	1.28 1.28 1.26 1.24 1.20 1.16 1.14 1.15 1.17 1.15				
16.00	DISCHG	1.11 1.08 1.08 1.07 1.04 .99 .97 .98 .99 .90				
17.00	DISCHG	.75 .67 .68 .71 .69 .64 .62 .64 .66 .66				
18.00	DISCHG	.67 .66 .61 .56 .54 .54 .54 .57 .59 .60				
19.00	DISCHG	.61 .59 .54 .50 .52 .56 .58 .54 .50 .48				
20.00	DISCHG	.47 .48 .50 .52 .49 .45 .43 .47 .51 .49				
21.00	DISCHG	.45 .43 .47 .51 .49 .45 .42 .41 .40 .44				
22.00	DISCHG	.50 .51 .47 .43 .41 .41 .40 .40 .40 .40				
23.00	DISCHG	.40 .40 .40 .40 .40 .40 .40 .40 .40 .36				
24.00	DISCHG	.31 .24 .15 .07 .03 .01 .01 .00				

RUNOFF VOLUME ABOVE BASEFLOW = .73 WATERSHED INCHES, 14.64 CFS-HRS, 1.21 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 2 RECORD ID

TR20 XEQ 01-26-00 09:24
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 3
PAGE 3

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 3 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 2
AREA= .03 SQ MI INPUT RUNOFF CURVE= 54. TIME OF CONCENTRATION= .30 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0400 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.34 15.05 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.03 SQ.MI.
11.00	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .02 .23 1.49				
12.00	DISCHG	4.28 7.93 11.70 14.82 14.31 10.91 8.34 6.52 5.29 4.55				
13.00	DISCHG	4.00 3.67 3.38 3.18 3.03 2.89 2.78 2.62 2.49 2.39				
14.00	DISCHG	2.32 2.27 2.23 2.21 2.16 2.10 2.04 1.94 1.85 1.82				
15.00	DISCHG	1.81 1.80 1.77 1.74 1.69 1.62 1.59 1.61 1.64 1.61				
16.00	DISCHG	1.55 1.51 1.50 1.49 1.44 1.38 1.35 1.37 1.38 1.24				
17.00	DISCHG	1.04 .94 .95 .98 .95 .89 .86 .88 .91 .92				
18.00	DISCHG	.93 .91 .84 .78 .75 .74 .75 .78 .81 .83				
19.00	DISCHG	.83 .81 .75 .69 .71 .77 .79 .74 .68 .66				
20.00	DISCHG	.65 .65 .69 .71 .68 .61 .59 .65 .70 .67				
21.00	DISCHG	.61 .59 .65 .70 .68 .61 .57 .55 .55 .60				
22.00	DISCHG	.68 .70 .65 .59 .57 .55 .55 .55 .55 .55				
23.00	DISCHG	.55 .55 .55 .55 .55 .55 .55 .55 .55 .49				
24.00	DISCHG	.42 .33 .20 .09 .04 .02 .01 .00				

RUNOFF VOLUME ABOVE BASEFLOW = 1.12 WATERSHED INCHES, 22.29 CFS-HRS, 1.84 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 3 RECORD ID

TR20 XEQ 01-26-00 09:24
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 4
PAGE 4

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO XSECTION 1 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 4 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 2
AREA= .03 SQ MI INPUT RUNOFF CURVE= 54. TIME OF CONCENTRATION= .30 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0400 HOURS

	PEAK TIME(HRS)	PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
	12.32	29.15				(RUNOFF)					
TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .03 SQ.MI.		
11.00	DISCHG	.00	.04	.12	.25	.44	.68	1.05	1.75	2.82	6.45
12.00	DISCHG	12.73	19.16	24.88	29.08	26.86	19.97	14.94	11.49	9.19	7.83
13.00	DISCHG	6.84	6.24	5.71	5.36	5.09	4.84	4.64	4.36	4.13	3.97
14.00	DISCHG	3.84	3.75	3.68	3.63	3.55	3.44	3.34	3.17	3.03	2.97
15.00	DISCHG	2.95	2.93	2.88	2.83	2.74	2.63	2.58	2.61	2.64	2.59
16.00	DISCHG	2.49	2.43	2.41	2.40	2.32	2.21	2.16	2.19	2.20	1.99
17.00	DISCHG	1.66	1.50	1.52	1.57	1.52	1.42	1.38	1.40	1.44	1.46
18.00	DISCHG	1.47	1.44	1.33	1.24	1.19	1.17	1.18	1.24	1.29	1.31
19.00	DISCHG	1.32	1.29	1.18	1.09	1.13	1.22	1.25	1.17	1.08	1.04
20.00	DISCHG	1.02	1.03	1.09	1.13	1.07	.97	.93	1.02	1.10	1.06
21.00	DISCHG	.96	.93	1.02	1.10	1.07	.97	.90	.87	.87	.95
22.00	DISCHG	1.07	1.10	1.02	.93	.89	.87	.86	.86	.86	.86
23.00	DISCHG	.86	.86	.86	.86	.86	.86	.86	.86	.85	.77
24.00	DISCHG	.65	.52	.31	.14	.06	.03	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.03 WATERSHED INCHES, 40.46 CFS-HRS, 3.34 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 4 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)
<u>ALTERNATE 1 STORM 1</u>													
XSECTION 1	RUNOFF	.03	9	2	.10	.0	3.10	24.00	.20	---	12.50	1.10	35.5
<u>ALTERNATE 1 STORM 2</u>													
XSECTION 1	RUNOFF	.03	9	2	.10	.0	4.60	24.00	.73	---	12.36	9.04	292.5
<u>ALTERNATE 1 STORM 3</u>													
XSECTION 1	RUNOFF	.03	9	2	.10	.0	5.40	24.00	1.12	---	12.34	15.05	487.1
<u>ALTERNATE 1 STORM 4</u>													
XSECTION 1	RUNOFF	.03	9	2	.10	.0	7.00	24.00	2.03	---	12.32	29.15	943.3

TR20 XEQ 01-26-00 09:24
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 6

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	3	4
<u>XSECTION 1</u>	<u>.03</u>				
ALTERNATE 1		1.10	9.04	15.05	29.15

De Tot 2 yr

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 12 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5 RAINFL 9		.25						
8	0.0	.0025	.005	.0075	.010			
8	.0125	.015	.0175	.020	.0225			
8	.026	.0285	.031	.0345	.037			
8	.0405	.043	.0465	.050	.0535			
8	.057	.0605	.064	.068	.072			
8	.076	.080	.0845	.089	.094			
8	.100	.1075	.115	.1225	.130			
8	.1385	.148	.157	.167	.178			
8	.189	.202	.216	.2315	.250			
8	.271	.298	.3455	.500	.6555			
8	.702	.7295	.751	.769	.785			
8	.7985	.811	.823	.834	.8435			
8	.853	.862	.870	.8785	.886			
8	.8935	.900	.907	.911	.916			
8	.920	.9245	.929	.9325	.936			
8	.940	.944	.947	.951	.954			
8	.957	.9605	.963	.9665	.969			
8	.9725	.975	.9775	.981	.9835			
8	.986	.9885	.991	.9935	.996			
8	.9985	1.0	1.0	1.0	1.0			
9 ENDTBL								
3 STRUCT 12								
8		61.9	0.0	0.0				
8		62.	.09	.0001				
8		64.	10.	.0007				
8		64.5	11.6	.1426				
8		65.	12.5	.669				
8		65.2	13.3	.98				
8		66.	15.6	2.7				
9 ENDTBL								
2 XSECTN 100		1.0	66.					
8		65.2	0.0	0.0				
8		66.	58.	24.				
8		66.2	100.	50.				
9 ENDTBL								
6 RUNOFF 1 001	3	.0043281	77.	.49	1 1	1 1		
6 ADDHYD 4 003	3 2 1				1 1	1 1		
6 RESVOR 2	12 1 3	61.9			1 1 1 1	1		
ENDATA								
7 INCREM 6		0.07						
7 READHD 8	2							
7 READHD 9	12.3	.2	.03090625	0.0				

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	0.0	.11	1.07	1.04	.83
8	.72	.65	.61	.58	.54
8	.51	.50	.50	.48	.44
8	.44	.43	.42	.40	.41
8	.39	.38	.37	.35	.36
8	.27	.25	.25	.23	.24
8	.25	.23	.20	.20	.22
8	.23	.21	.20	.22	.19
8	.18	.19	.19	.17	.20
8	.17	.18	.19	.16	.16
8	.19	.19	.16	.16	.16
8	.16	.16	.16	.16	.16
8	.12	.06	.01	0.0	0.0

9 ENDTBL

7 COMPUT 7 001 12 0.0 3.1 1.0 9 2 02 01

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 02-01-00 09:39
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES ¹² 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 2

18.20	DISCHG	.10	.10	.09	.09	.09	.09	.09	.09	.09	.09
18.90	DISCHG	.09	.09	.09	.09	.09	.09	.08	.08	.08	.08
19.60	DISCHG	.09	.09	.08	.08	.08	.08	.08	.07	.07	.08
20.30	DISCHG	.08	.08	.08	.07	.07	.07	.07	.07	.07	.07

RUNOFF VOLUME ABOVE BASEFLOW = 1.06 WATERSHED INCHES, 2.96 CFS-HRS, .24 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

PEAK TIME(HRS) 12.68 PEAK DISCHARGE(CFS) 2.31 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .04 SQ.MI.								
10.50	DISCHG .01 .01 .01 .01 .02 .02 .03 .03 .04 .05										
11.20	DISCHG .05 .06 .07 .08 .10 .11 .13 .16 .20 .27										
11.90	DISCHG .39 .58 .83 1.11 1.40 1.67 1.89 2.04 2.04 2.06										
12.60	DISCHG 2.19 2.31 2.24 2.07 1.92 1.76 1.60 1.46 1.36 1.27										
13.30	DISCHG 1.20 1.14 1.09 1.05 1.02 .99 .96 .93 .91 .88										
14.00	DISCHG .86 .84 .82 .80 .79 .78 .77 .76 .76 .75										
14.70	DISCHG .74 .73 .72 .70 .69 .67 .66 .65 .65 .65										
15.40	DISCHG .64 .63 .63 .62 .61 .61 .60 .59 .59 .59										
16.10	DISCHG .59 .58 .57 .56 .56 .55 .55 .54 .53 .53										
16.80	DISCHG .52 .51 .50 .50 .49 .46 .42 .39 .38 .37										
17.50	DISCHG .36 .36 .35 .35 .34 .34 .33 .34 .34 .34										
18.20	DISCHG .35 .35 .34 .33 .32 .31 .30 .29 .29 .29										
18.90	DISCHG .29 .30 .31 .31 .31 .31 .31 .30 .30 .29										
19.60	DISCHG .29 .29 .29 .29 .30 .29 .28 .27 .26 .26										
20.30	DISCHG .26 .26 .26 .26 .26 .26 .26 .25 .25 .25										

RUNOFF VOLUME ABOVE BASEFLOW = .28 WATERSHED INCHES, 6.28 CFS-HRS, .52 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
SURFACE ELEVATION= 61.90

PEAK TIME(HRS) 12.68 PEAK DISCHARGE(CFS) 2.31 PEAK ELEVATION(FEET) 62.45

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .04 SQ.MI.								
10.50	DISCHG .00 .01 .01 .01 .02 .02 .03 .03 .04 .05										
10.50	ELEV 61.90 61.91 61.91 61.92 61.92 61.92 61.93 61.94 61.94 61.95										
11.20	DISCHG .05 .06 .07 .08 .09 .11 .13 .16 .20 .27										
11.20	ELEV 61.96 61.97 61.98 61.99 62.00 62.00 62.01 62.01 62.02 62.04										
11.90	DISCHG .38 .58 .83 1.11 1.40 1.67 1.89 2.04 2.04 2.06										
11.90	ELEV 62.06 62.10 62.15 62.21 62.26 62.32 62.36 62.39 62.39 62.40										

TR20 XEQ 02-01-00 09:39
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES ¹²~~15~~ AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 3

12.60	DISCHG	2.19	2.31	2.24	2.07	1.92	1.76	1.60	1.46	1.36	1.28
12.60	ELEV	62.42	62.45	62.43	62.40	62.37	62.34	62.30	62.28	62.26	62.24
13.30	DISCHG	1.20	1.14	1.09	1.05	1.02	.99	.96	.93	.91	.89
13.30	ELEV	62.22	62.21	62.20	62.19	62.19	62.18	62.17	62.17	62.17	62.16
14.00	DISCHG	.86	.84	.82	.80	.79	.78	.77	.76	.76	.75
14.00	ELEV	62.16	62.15	62.15	62.14	62.14	62.14	62.14	62.14	62.13	62.13
14.70	DISCHG	.74	.73	.72	.70	.69	.67	.66	.65	.65	.65
14.70	ELEV	62.13	62.13	62.13	62.12	62.12	62.12	62.11	62.11	62.11	62.11
15.40	DISCHG	.64	.63	.63	.62	.61	.61	.60	.59	.59	.59
15.40	ELEV	62.11	62.11	62.11	62.11	62.11	62.10	62.10	62.10	62.10	62.10
16.10	DISCHG	.59	.58	.57	.56	.56	.55	.54	.54	.53	.53
16.10	ELEV	62.10	62.10	62.10	62.10	62.09	62.09	62.09	62.09	62.09	62.09
16.80	DISCHG	.52	.51	.50	.50	.49	.46	.42	.39	.38	.37
16.80	ELEV	62.09	62.08	62.08	62.08	62.08	62.07	62.07	62.06	62.06	62.06
17.50	DISCHG	.36	.36	.35	.35	.34	.34	.33	.34	.34	.34
17.50	ELEV	62.05	62.05	62.05	62.05	62.05	62.05	62.05	62.05	62.05	62.05
18.20	DISCHG	.35	.35	.34	.33	.32	.31	.30	.29	.29	.29
18.20	ELEV	62.05	62.05	62.05	62.05	62.05	62.04	62.04	62.04	62.04	62.04
18.90	DISCHG	.29	.30	.31	.31	.31	.31	.31	.30	.30	.29
18.90	ELEV	62.04	62.04	62.04	62.04	62.05	62.05	62.04	62.04	62.04	62.04
19.60	DISCHG	.29	.29	.29	.29	.30	.29	.28	.27	.26	.26
19.60	ELEV	62.04	62.04	62.04	62.04	62.04	62.04	62.04	62.04	62.03	62.03
20.30	DISCHG	.26	.26	.26	.26	.26	.26	.26	.25	.25	.25
20.30	ELEV	62.03	62.03	62.03	62.04	62.03	62.03	62.03	62.03	62.03	62.03

RUNOFF VOLUME ABOVE BASEFLOW = .28 WATERSHED INCHES, 6.28 CFS-HRS, .52 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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 2 STORM 1														
XSECTION	1	RUNOFF	.00	9	2	.07	.0	3.10	24.00	1.06	---	12.41	1.99	459.9
XSECTION	3	ADDHYD	.04	9	2	.07	.0	3.10	24.00	.28	---	12.68	2.31	65.5
STRUCTURE	12	RESVOR	.04	9	2	.07	.0	3.10	24.00	.28	62.45	12.68	2.31	65.5

TR20 XEQ 02-01-00 09:39
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 5

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
<u>STRUCTURE 12</u>	<u>.04</u>	
ALTERNATE 2		2.31
<u>XSECTION 1</u>	<u>.00</u>	
ALTERNATE 2		1.99
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		2.31

De Tot log.

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

```

JOB TR-20                FULLPRINT          SUMMARY  NOPLOTS
TITLE 001 EXISTING CONDITION WATERSHED - TO RES 12 AREA
TITLE   TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00
5 RAINFL 9                .25
8      0.0                .0025          .005          .0075          .010
8      .0125              .015          .0175          .020          .0225
8      .026                .0285          .031          .0345          .037
8      .0405              .043          .0465          .050          .0535
8      .057                .0605          .064          .068          .072
8      .076                .080          .0845          .089          .094
8      .100               .1075          .115          .1225          .130
8      .1385              .148          .157          .167          .178
8      .189               .202          .216          .2315          .250
8      .271               .298          .3455          .500          .6555
8      .702               .7295          .751          .769          .785
8      .7985              .811          .823          .834          .8435
8      .853               .862          .870          .8785          .886
8      .8935              .900          .907          .911          .916
8      .920               .9245          .929          .9325          .936
8      .940               .944          .947          .951          .954
8      .957               .9605          .963          .9665          .969
8      .9725              .975          .9775          .981          .9835
8      .986               .9885          .991          .9935          .996
8      .9985              1.0          1.0          1.0          1.0
9 ENDTBL
3 STRUCT    12
8          61.9           0.0          0.0
8          62.           .09          .0001
8          64.           10.          .0007
8          64.5          11.6          .1426
8          65.           12.5          .669
8          65.2          13.3          .98
8          66.           15.6          2.7
9 ENDTBL
2 XSECTN   100          1.0          66.
8          65.2          0.0          0.0
8          66.           58.          24.
8          66.2          100.         50.
9 ENDTBL
6 RUNOFF 1 001          3 .0043281    77.          .49          1 1 1 1
6 ADDHYD 4 003          3 2 1          1 1 1 1
6 RESVOR 2 12 1 3 61.9 1 1 1 1 1
  ENDATA
7 INCREM 6                0.07
7 READHD 8                2
7 READHD 9 11.3          .2          .03090625    0.0

```


*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	0.0	0.0	0.0	0.0	0.0
8	1.26	6.21	8.85	5.43	3.54
8	2.73	2.32	2.09	1.93	1.74
8	1.62	1.57	1.52	1.44	1.31
8	1.28	1.26	1.2	1.14	1.17
8	1.11	1.08	1.04	.97	.99
8	.75	.68	.69	.62	.66
8	.67	.61	.54	.54	.59
8	.61	.54	.52	.58	.50
8	.47	.50	.49	.43	.51
8	.45	.47	.49	.42	.40
8	.50	.47	.41	.40	.40
8	.40	.40	.40	.40	.40
8	.31	.15	.03	.01	0.0

9 ENDTBL

7 COMPUT 7 001 12 0.0 4.6 1.0 9 2 02 01

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 01-27-00 13:02
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 11.30 TIME INCREMENT= .20 DRAINAGE AREA= .03 BASE FLOW= .00

8	.00	.00	.00	.00	.00
8	1.26	6.21	8.85	5.43	3.54
8	2.73	2.32	2.09	1.93	1.74
8	1.62	1.57	1.52	1.44	1.31
8	1.28	1.26	1.20	1.14	1.17
8	1.11	1.08	1.04	.97	.99
8	.75	.68	.69	.62	.66
8	.67	.61	.54	.54	.59
8	.61	.54	.52	.58	.50
8	.47	.50	.49	.43	.51
8	.45	.47	.49	.42	.40
8	.50	.47	.41	.40	.40
8	.40	.40	.40	.40	.40
8	.31	.15	.03	.01	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 12

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .07 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .00 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .49 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0653 HOURS

PEAK TIME(HRS) 12.39 PEAK DISCHARGE(CFS) 4.08 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.00 SQ.MI.
8.40	DISCHG	.00	.00	.00	.00	.00	.01
9.10	DISCHG	.01	.02	.02	.02	.03	.04
9.80	DISCHG	.05	.06	.06	.07	.08	.09
10.50	DISCHG	.12	.12	.13	.14	.16	.18
11.20	DISCHG	.24	.26	.28	.31	.34	.42
11.90	DISCHG	1.02	1.45	1.99	2.56	3.12	3.61
12.60	DISCHG	3.16	2.70	2.28	1.95	1.68	1.46
13.30	DISCHG	.88	.83	.78	.73	.70	.67
14.00	DISCHG	.54	.53	.52	.51	.50	.49
14.70	DISCHG	.44	.43	.41	.40	.40	.39

TR20 XEQ 01-27-00 13:02
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 2

15.40	DISCHG	.36	.36	.35	.34	.34	.34	.34	.34	.33	.33
16.10	DISCHG	.32	.32	.31	.31	.30	.30	.29	.29	.28	.28
16.80	DISCHG	.28	.27	.26	.25	.23	.21	.21	.20	.20	.20
17.50	DISCHG	.19	.19	.18	.18	.18	.18	.18	.18	.18	.18
18.20	DISCHG	.18	.17	.16	.16	.15	.15	.15	.15	.15	.16
18.90	DISCHG	.16	.16	.16	.16	.16	.15	.15	.14	.14	.15
19.60	DISCHG	.15	.15	.15	.14	.14	.13	.13	.13	.13	.13
20.30	DISCHG	.13	.13	.13	.13	.12	.12	.12	.13	.13	.13

RUNOFF VOLUME ABOVE BASEFLOW = 2.15 WATERSHED INCHES, 6.01 CFS-HRS, .50 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
 INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

PEAK TIME(HRS) 12.66 PEAK DISCHARGE(CFS) 11.16 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.04 SQ.MI.
8.40	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .01				
9.10	DISCHG	.01 .02 .02 .02 .02 .03 .03 .04 .04 .05				
9.80	DISCHG	.05 .06 .06 .07 .07 .08 .08 .09 .10 .11				
10.50	DISCHG	.12 .12 .13 .14 .15 .16 .18 .19 .21 .23				
11.20	DISCHG	.24 .26 .28 .31 .34 .38 .42 .50 .59 .75				
11.90	DISCHG	1.02 1.45 1.99 2.63 3.63 4.55 5.71 7.56 9.16 10.21				
12.60	DISCHG	10.69 11.15 10.45 8.92 7.45 6.42 5.59 4.79 4.34 3.97				
13.30	DISCHG	3.61 3.41 3.22 3.04 2.93 2.81 2.71 2.63 2.55 2.46				
14.00	DISCHG	2.38 2.30 2.23 2.18 2.13 2.10 2.07 2.04 2.02 1.99				
14.70	DISCHG	1.96 1.92 1.88 1.84 1.78 1.73 1.69 1.68 1.66 1.65				
15.40	DISCHG	1.63 1.62 1.60 1.57 1.54 1.52 1.50 1.48 1.48 1.49				
16.10	DISCHG	1.49 1.46 1.44 1.42 1.40 1.39 1.37 1.35 1.33 1.31				
16.80	DISCHG	1.28 1.25 1.24 1.23 1.22 1.14 1.05 .96 .93 .90				
17.50	DISCHG	.87 .87 .87 .87 .84 .82 .80 .82 .83 .84				
18.20	DISCHG	.84 .84 .82 .80 .77 .74 .72 .69 .69 .70				
18.90	DISCHG	.70 .72 .74 .75 .76 .76 .75 .72 .70 .68				
19.60	DISCHG	.68 .67 .68 .70 .71 .69 .66 .63 .62 .61				
20.30	DISCHG	.60 .61 .62 .63 .62 .61 .61 .59 .57 .57				

RUNOFF VOLUME ABOVE BASEFLOW = .84 WATERSHED INCHES, 19.14 CFS-HRS, 1.58 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 61.90

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.75	10.14	64.04
13.01	7.54	63.50
13.16	6.11	63.21
13.30	5.23	63.04
13.44	4.70	62.93
13.58	4.29	62.85
13.72	3.96	62.78
13.86	3.70	62.73
14.00	3.44	62.68
14.14	3.21	62.63

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.04 SQ.MI.
8.40	DISCHG	.00	.00	.00	.00	.01
8.40	ELEV	61.90	61.90	61.90	61.90	61.91
9.10	DISCHG	.01	.01	.02	.03	.05
9.10	ELEV	61.91	61.92	61.92	61.93	61.95
9.80	DISCHG	.05	.06	.07	.08	.11
9.80	ELEV	61.96	61.96	61.97	61.98	62.00
10.50	DISCHG	.12	.12	.13	.16	.22
10.50	ELEV	62.01	62.01	62.01	62.01	62.03
11.20	DISCHG	.24	.26	.31	.37	.75
11.20	ELEV	62.03	62.03	62.04	62.06	62.13
11.90	DISCHG	1.02	1.44	1.98	3.61	10.01
11.90	ELEV	62.19	62.27	62.38	62.71	64.00
12.60	DISCHG	10.03	10.09	10.14	9.54	2.29
12.60	ELEV	64.01	64.03	64.04	63.91	62.44
13.30	DISCHG	5.23	1.87	4.70	4.29	1.36
13.30	ELEV	63.04	62.36	62.93	62.85	62.26
14.00	DISCHG	3.44	1.28	3.21	3.03	1.26
14.00	ELEV	62.68	62.24	62.63	62.59	62.24
14.70	DISCHG	2.66	1.25	2.52	2.37	1.17
14.70	ELEV	62.52	62.23	62.49	62.46	62.22
15.40	DISCHG	2.09	1.18	2.02	1.93	1.17
15.40	ELEV	62.40	62.22	62.39	62.37	62.22
16.10	DISCHG	1.79	1.18	1.72	1.66	1.10
16.10	ELEV	62.34	62.22	62.33	62.32	62.20
16.80	DISCHG	1.48	1.06	1.42	1.38	.77
16.80	ELEV	62.28	62.20	62.27	62.26	62.14
17.50	DISCHG	1.00	.74	.99	.95	.75
17.50	ELEV	62.18	62.13	62.18	62.17	62.13
18.20	DISCHG	.93	.76	.90	.84	.64
18.20	ELEV	62.17	62.13	62.16	62.15	62.11
18.90	DISCHG	.75	.66	.79	.80	.64
18.90	ELEV	62.13	62.12	62.14	62.14	62.11
19.60	DISCHG	.72	.64	.71	.74	.59
19.60	ELEV	62.13	62.11	62.13	62.13	62.10
20.30	DISCHG	.63	.59	.65	.64	.55

TR20 XEQ 01-27-00 13:02
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 4

20.30 ELEV 62.11 62.10 62.11 62.10 62.11 62.10 62.11 62.10 62.10 62.09

RUNOFF VOLUME ABOVE BASEFLOW = .79 WATERSHED INCHES, 17.99 CFS-HRS, 1.49 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

TR20 XEQ 01-27-00 13:02
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
 PAGE 5

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 MOIST 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)	
<u>ALTERNATE 2 STORM 1</u>														
XSECTION	1	RUNOFF	.00	9	2	.07	.0	4.60	24.00	2.15	---	12.39	4.08	941.9
XSECTION	3	ADDHYD	.04	9	2	.07	.0	4.60	24.00	.84	---	12.66	11.16	316.7
STRUCTURE	12	RESVOR	.04	9	2	.07	.0	4.60	24.00	.79	64.04	12.75	10.14	287.7

TR20 XEQ 01-27-00 13:02
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 6

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
<u>STRUCTURE 12</u>	<u>.04</u>	
ALTERNATE 2		10.14
<u>XSECTION 1</u>	<u>.00</u>	
ALTERNATE 2		4.08
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		11.16

De Tot 25 yr.

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 12 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5 RAINFL	9	.25				
8	0.0	.0025	.005	.0075	.010	
8	.0125	.015	.0175	.020	.0225	
8	.026	.0285	.031	.0345	.037	
8	.0405	.043	.0465	.050	.0535	
8	.057	.0605	.064	.068	.072	
8	.076	.080	.0845	.089	.094	
8	.100	.1075	.115	.1225	.130	
8	.1385	.148	.157	.167	.178	
8	.189	.202	.216	.2315	.250	
8	.271	.298	.3455	.500	.6555	
8	.702	.7295	.751	.769	.785	
8	.7985	.811	.823	.834	.8435	
8	.853	.862	.870	.8785	.886	
8	.8935	.900	.907	.911	.916	
8	.920	.9245	.929	.9325	.936	
8	.940	.944	.947	.951	.954	
8	.957	.9605	.963	.9665	.969	
8	.9725	.975	.9775	.981	.9835	
8	.986	.9885	.991	.9935	.996	
8	.9985	1.0	1.0	1.0	1.0	

9 ENDTBL

3 STRUCT 12

8		61.9	0.0	0.0
8		62.	.09	.0001
8		64.	10.	.0007
8		64.5	11.6	.1426
8		65.	12.5	.669
8		65.2	13.3	.98
8		66.	15.6	2.7

9 ENDTBL

2 XSECTN 100

8		65.2	0.0	0.0
8		66.	58.	24.
8		66.2	100.	50.

9 ENDTBL

6 RUNOFF 1 001 3 .0043281 77. .49 1 1 1 1

6 ADDHYD 4 003 3 2 1 1 1 1 1

6 RESVOR 2 12 1 3 61.9 1 1 1 1 1

ENDATA

7 INCREM 6 0.07

7 READHD 8 2

7 READHD 9 11.3 .2 .03090625 0.0

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	0.0	0.0	0.0	0.0	0.23
8	4.28	11.7	14.31	8.34	5.29
8	4.00	3.38	3.03	2.78	2.49
8	2.32	2.23	2.16	2.04	1.85
8	1.81	1.77	1.69	1.59	1.64
8	1.55	1.50	1.44	1.35	1.38
8	1.04	.95	.95	.86	.91
8	.93	.84	.75	.75	.81
8	.83	.75	.71	.79	.68
8	.65	.69	.68	.59	.70
8	.61	.65	.68	.57	.55
8	.68	.65	.57	.55	.55
8	.55	.55	.55	.55	.55
8	.42	.20	.04	.01	0.0
9	ENDTBL				
7	COMPUT 7 001	12 0.0	5.4	1.0	9 2 02 01
	ENDCMP 1				
	ENDJOB 2				

*****END OF 80-80 LIST*****

TR20 XEQ 01-27-00 13:18
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 11.30 TIME INCREMENT= .20 DRAINAGE AREA= .03 BASE FLOW= .00

8	.00	.00	.00	.00	.23
8	4.28	11.70	14.31	8.34	5.29
8	4.00	3.38	3.03	2.78	2.49
8	2.32	2.23	2.16	2.04	1.85
8	1.81	1.77	1.69	1.59	1.64
8	1.55	1.50	1.44	1.35	1.38
8	1.04	.95	.95	.86	.91
8	.93	.84	.75	.75	.81
8	.83	.75	.71	.79	.68
8	.65	.69	.68	.59	.70
8	.61	.65	.68	.57	.55
8	.68	.65	.57	.55	.55
8	.55	.55	.55	.55	.55
8	.42	.20	.04	.01	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 12

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .07 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .00 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .49 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0653 HOURS

PEAK TIME(HRS) 12.38 PEAK DISCHARGE(CFS) 5.27 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.00 SQ.MI.
7.70	DISCHG	.00	.00	.00	.00	.01
8.40	DISCHG	.01	.01	.02	.03	.04
9.10	DISCHG	.05	.05	.06	.07	.10
9.80	DISCHG	.10	.11	.12	.13	.18
10.50	DISCHG	.19	.20	.22	.23	.34
11.20	DISCHG	.37	.39	.42	.45	1.05
11.90	DISCHG	1.41	1.97	2.67	3.41	4.61
12.60	DISCHG	4.03	3.43	2.90	2.47	1.20
13.30	DISCHG	1.11	1.03	.97	.92	.70
14.00	DISCHG	.68	.66	.64	.63	.56

TR20 XEQ 01-27-00 13:18
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 2

14.70	DISCHG	.54	.53	.51	.50	.49	.48	.48	.47	.47	.46
15.40	DISCHG	.45	.44	.43	.42	.42	.42	.42	.41	.41	.40
16.10	DISCHG	.40	.39	.38	.38	.38	.37	.36	.35	.35	.34
16.80	DISCHG	.34	.34	.32	.30	.28	.26	.25	.25	.25	.24
17.50	DISCHG	.24	.23	.22	.22	.22	.22	.22	.22	.22	.22
18.20	DISCHG	.22	.21	.20	.20	.19	.19	.18	.19	.19	.19
18.90	DISCHG	.19	.20	.20	.20	.19	.19	.18	.18	.18	.18
19.60	DISCHG	.18	.18	.18	.18	.17	.16	.16	.16	.16	.16
20.30	DISCHG	.16	.17	.16	.16	.15	.15	.15	.15	.16	.16

RUNOFF VOLUME ABOVE BASEFLOW = 2.79 WATERSHED INCHES, 7.79 CFS-HRS, .64 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
 INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

TIME(HRS)	DISCHG	PEAK TIME(HRS) 12.65	PEAK DISCHARGE(CFS) 17.43	PEAK ELEVATION(FEET) (NULL)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .04 SQ.MI.
7.70	DISCHG	.00	.00	.00	.00	.00	.00
8.40	DISCHG	.01	.01	.01	.02	.02	.03
9.10	DISCHG	.05	.05	.06	.06	.07	.07
9.80	DISCHG	.10	.11	.12	.12	.13	.14
10.50	DISCHG	.19	.20	.22	.23	.24	.26
11.20	DISCHG	.37	.39	.42	.45	.49	.54
11.90	DISCHG	1.41	2.05	2.83	3.85	5.97	7.99
12.60	DISCHG	17.04	17.35	16.01	13.49	11.06	9.42
13.30	DISCHG	5.11	4.81	4.53	4.28	4.11	3.95
14.00	DISCHG	3.31	3.19	3.10	3.02	2.95	2.90
14.70	DISCHG	2.70	2.65	2.59	2.53	2.45	2.38
15.40	DISCHG	2.24	2.22	2.19	2.15	2.12	2.08
16.10	DISCHG	2.04	2.00	1.96	1.93	1.91	1.88
16.80	DISCHG	1.74	1.70	1.68	1.67	1.66	1.56
17.50	DISCHG	1.19	1.18	1.17	1.17	1.13	1.10
18.20	DISCHG	1.14	1.14	1.11	1.08	1.04	1.00
18.90	DISCHG	.94	.97	.99	1.01	1.01	1.01
19.60	DISCHG	.91	.90	.91	.93	.95	.93
20.30	DISCHG	.81	.83	.84	.85	.84	.83

RUNOFF VOLUME ABOVE BASEFLOW = 1.23 WATERSHED INCHES, 28.00 CFS-HRS, 2.31 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 61.90

PEAK TIME(HRS) 12.87 PEAK DISCHARGE(CFS) 11.67 PEAK ELEVATION(FEET) 64.54

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .04 SQ.MI.	
8.40	DISCHG	.01	.01	.01	.02	.02	.02	.03	.03	.04	.04
8.40	ELEV	61.91	61.91	61.92	61.92	61.92	61.93	61.93	61.94	61.94	61.95
9.10	DISCHG	.05	.05	.06	.06	.07	.07	.08	.08	.09	.10
9.10	ELEV	61.95	61.96	61.96	61.97	61.97	61.98	61.98	61.99	62.00	62.00
9.80	DISCHG	.10	.11	.12	.12	.13	.14	.15	.16	.17	.18
9.80	ELEV	62.00	62.00	62.01	62.01	62.01	62.01	62.01	62.01	62.02	62.02
10.50	DISCHG	.19	.20	.22	.23	.24	.26	.28	.30	.32	.34
10.50	ELEV	62.02	62.02	62.03	62.03	62.03	62.03	62.04	62.04	62.05	62.05
11.20	DISCHG	.36	.39	.42	.45	.49	.54	.61	.70	.83	1.04
11.20	ELEV	62.06	62.06	62.07	62.07	62.08	62.09	62.10	62.12	62.15	62.19
11.90	DISCHG	1.40	2.04	2.83	3.83	5.94	7.98	10.00	10.10	10.35	10.71
11.90	ELEV	62.26	62.39	62.55	62.76	63.18	63.59	64.00	64.03	64.11	64.22
12.60	DISCHG	11.10	11.48	11.63	11.66	11.67	11.66	11.63	11.52	11.20	10.87
12.60	ELEV	64.34	64.46	64.52	64.54	64.54	64.53	64.52	64.47	64.38	64.27
13.30	DISCHG	10.52	10.17	4.54	4.28	4.11	3.95	3.80	3.67	3.56	3.44
13.30	ELEV	64.16	64.05	62.90	62.85	62.81	62.78	62.75	62.72	62.70	62.68
14.00	DISCHG	3.31	3.19	3.10	3.02	2.95	2.90	2.86	2.82	2.78	2.74
14.00	ELEV	62.65	62.63	62.61	62.59	62.58	62.57	62.56	62.55	62.54	62.54
14.70	DISCHG	2.70	2.65	2.59	2.53	2.45	2.38	2.32	2.30	2.28	2.26
14.70	ELEV	62.53	62.52	62.50	62.49	62.48	62.46	62.45	62.45	62.44	62.44
15.40	DISCHG	2.24	2.22	2.19	2.15	2.12	2.08	2.05	2.01	2.01	2.03
15.40	ELEV	62.43	62.43	62.42	62.42	62.41	62.40	62.39	62.39	62.39	62.39
16.10	DISCHG	2.04	2.00	1.96	1.93	1.91	1.88	1.85	1.83	1.80	1.77
16.10	ELEV	62.39	62.39	62.38	62.37	62.37	62.36	62.36	62.35	62.34	62.34
16.80	DISCHG	1.74	1.70	1.68	1.67	1.66	1.56	1.43	1.31	1.26	1.22
16.80	ELEV	62.33	62.33	62.32	62.32	62.32	62.30	62.27	62.25	62.24	62.23
17.50	DISCHG	1.18	1.18	1.17	1.17	1.13	1.10	1.09	1.11	1.12	1.13
17.50	ELEV	62.22	62.22	62.22	62.22	62.21	62.20	62.20	62.21	62.21	62.21
18.20	DISCHG	1.14	1.14	1.11	1.08	1.04	1.00	.97	.94	.94	.94
18.20	ELEV	62.21	62.21	62.21	62.20	62.19	62.18	62.18	62.17	62.17	62.17
18.90	DISCHG	.94	.97	.99	1.01	1.01	1.01	1.00	.97	.94	.92
18.90	ELEV	62.17	62.18	62.18	62.19	62.19	62.19	62.18	62.18	62.17	62.17
19.60	DISCHG	.91	.90	.91	.93	.95	.93	.89	.85	.83	.82
19.60	ELEV	62.17	62.16	62.16	62.17	62.17	62.17	62.16	62.15	62.15	62.15
20.30	DISCHG	.81	.83	.84	.85	.84	.83	.82	.79	.77	.76
20.30	ELEV	62.15	62.15	62.15	62.15	62.15	62.15	62.15	62.14	62.14	62.14

RUNOFF VOLUME ABOVE BASEFLOW = 1.23 WATERSHED INCHES, 28.04 CFS-HRS, 2.32 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 01-27-00 13:18
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 2
PAGE 4

EXECUTIVE CONTROL OPERATION ENDJOB

RECORD ID

TR20 XEQ 01-27-00 13:18
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
 PAGE 5

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 MOIST 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 2 STORM 1													
XSECTION 1	RUNOFF	.00	9	2	.07	.0	5.40	24.00	2.79	---	12.38	5.27	1216.8
XSECTION 3	ADDHYD	.04	9	2	.07	.0	5.40	24.00	1.23	---	12.65	17.43	494.8
STRUCTURE 12	RESVOR	.04	9	2	.07	.0	5.40	24.00	1.23	64.54	12.87	11.67	331.2

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
<u>STRUCTURE 12</u>	<u>.04</u>	
ALTERNATE 2		11.67
<u>XSECTION 1</u>	<u>.00</u>	
ALTERNATE 2		5.27
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		17.43

De Tot 100 yr.

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 EXISTING CONDITION WATERSHED - TO RES 12 AREA

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

5 RAINFL 9		.25			
8	0.0	.0025	.005	.0075	.010
8	.0125	.015	.0175	.020	.0225
8	.026	.0285	.031	.0345	.037
8	.0405	.043	.0465	.050	.0535
8	.057	.0605	.064	.068	.072
8	.076	.080	.0845	.089	.094
8	.100	.1075	.115	.1225	.130
8	.1385	.148	.157	.167	.178
8	.189	.202	.216	.2315	.250
8	.271	.298	.3455	.500	.6555
8	.702	.7295	.751	.769	.785
8	.7985	.811	.823	.834	.8435
8	.853	.862	.870	.8785	.886
8	.8935	.900	.907	.911	.916
8	.920	.9245	.929	.9325	.936
8	.940	.944	.947	.951	.954
8	.957	.9605	.963	.9665	.969
8	.9725	.975	.9775	.981	.9835
8	.986	.9885	.991	.9935	.996
8	.9985	1.0	1.0	1.0	1.0

9 ENDTBL

3 STRUCT 12

8		61.9	0.0	0.0	
8		62.	.09	.0001	
8		64.	10.	.0007	
8		64.5	11.6	.1426	
8		65.	12.5	.669	
8		65.2	13.3	.98	
8		66.	15.6	2.7	

9 ENDTBL

2 XSECTN 100

8		65.2	0.0	0.0	
8		66.	58.	24.	
8		66.2	100.	50.	

9 ENDTBL

6 RUNOFF 1 001	3	.0043281	77.	.49	1	1	1	1
6 ADDHYD 4 003	3 2 1				1	1	1	1
6 RESVOR 2	12 1 3	61.9			1	1	1	1

ENDATA

7 INCREM 6		0.07						
7 READHD 8	2							
7 READHD 9	11.3	.2	.03090625	0.0				

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	0.0	.12	.44	1.05	2.82
8	12.73	24.88	26.86	14.94	9.19
8	6.84	5.71	5.09	4.64	4.13
8	3.84	3.68	3.55	3.34	3.03
8	2.95	2.88	2.74	2.58	2.64
8	2.49	2.41	2.32	2.16	2.20
8	1.66	1.52	1.52	1.38	1.44
8	1.47	1.33	1.19	1.18	1.29
8	1.32	1.18	1.13	1.25	1.08
8	1.02	1.09	1.07	.93	1.1
8	.96	1.02	1.07	.90	.87
8	1.07	1.02	.89	.86	.86
8	.86	.86	.86	.86	.85
8	.65	.31	.06	.01	0.0

9 ENDTBL
7 COMPUT 7 001 12 0.0 7.0 1.0 9 2 02 01
 ENDCMP 1
 ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 01-27-00 13:36
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 11.30 TIME INCREMENT= .20 DRAINAGE AREA= .03 BASE FLOW= .00

8	.00	.12	.44	1.05	2.82
8	12.73	24.88	26.86	14.94	9.19
8	6.84	5.71	5.09	4.64	4.13
8	3.84	3.68	3.55	3.34	3.03
8	2.95	2.88	2.74	2.58	2.64
8	2.49	2.41	2.32	2.16	2.20
8	1.66	1.52	1.52	1.38	1.44
8	1.47	1.33	1.19	1.18	1.29
8	1.32	1.18	1.13	1.25	1.08
8	1.02	1.09	1.07	.93	1.10
8	.96	1.02	1.07	.90	.87
8	1.07	1.02	.89	.86	.86
8	.86	.86	.86	.86	.85
8	.65	.31	.06	.01	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 12

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .07 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .00 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .49 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0653 HOURS

PEAK TIME(HRS) 12.37 PEAK DISCHARGE(CFS) 7.72 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.00 SQ.MI.
7.00	DISCHG	.00	.00	.00	.01	.02
7.70	DISCHG	.02	.03	.04	.05	.07
8.40	DISCHG	.07	.08	.09	.11	.13
9.10	DISCHG	.14	.15	.16	.18	.22
9.80	DISCHG	.23	.24	.26	.30	.35
10.50	DISCHG	.37	.39	.43	.50	.60
11.20	DISCHG	.64	.68	.77	.91	1.16
11.90	DISCHG	2.23	3.08	4.12	5.20	6.21
12.60	DISCHG	5.82	4.93	4.15	3.52	3.03
13.30	DISCHG	1.56	1.45	1.36	1.28	1.22

TR20 XEQ 01-27-00 13:36
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
 PAGE 2

14.00	DISCHG	.94	.91	.89	.87	.86	.84	.83	.81	.79	.78
14.70	DISCHG	.75	.73	.71	.69	.68	.67	.66	.65	.64	.64
15.40	DISCHG	.62	.61	.60	.59	.58	.58	.57	.57	.57	.56
16.10	DISCHG	.55	.54	.53	.53	.52	.51	.50	.49	.48	.47
16.80	DISCHG	.47	.46	.45	.42	.39	.36	.35	.34	.34	.33
17.50	DISCHG	.32	.31	.31	.30	.30	.30	.31	.31	.31	.30
18.20	DISCHG	.30	.29	.28	.27	.26	.26	.25	.25	.26	.26
18.90	DISCHG	.27	.27	.27	.27	.27	.26	.25	.24	.24	.25
19.60	DISCHG	.25	.25	.25	.24	.23	.23	.22	.22	.22	.22
20.30	DISCHG	.22	.23	.22	.22	.21	.20	.21	.21	.22	.22

RUNOFF VOLUME ABOVE BASEFLOW = 4.13 WATERSHED INCHES, 11.54 CFS-HRS, .95 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 3
 INPUT HYDROGRAPHS= 3,2 OUTPUT HYDROGRAPH= 1

*** WARNING - XSECTION 3 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 3 AND 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.56	32.05	(NULL)
16.08	3.19	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.04 SQ.MI.
7.00	DISCHG	.00	.00	.00	.01	.02
7.70	DISCHG	.02	.03	.04	.05	.07
8.40	DISCHG	.07	.08	.09	.11	.13
9.10	DISCHG	.14	.15	.16	.19	.22
9.80	DISCHG	.23	.24	.25	.28	.33
10.50	DISCHG	.37	.39	.41	.45	.56
11.20	DISCHG	.64	.68	.75	.94	1.59
11.90	DISCHG	3.28	4.75	6.41	8.52	12.99
12.60	DISCHG	31.69	31.50	28.62	23.83	19.16
13.30	DISCHG	8.40	7.89	7.41	6.96	6.68
14.00	DISCHG	5.33	5.12	4.96	4.84	4.73
14.70	DISCHG	4.30	4.21	4.11	4.02	3.89
15.40	DISCHG	3.54	3.50	3.45	3.39	3.33
16.10	DISCHG	3.19	3.13	3.07	3.01	2.98
16.80	DISCHG	2.71	2.65	2.61	2.60	2.58
17.50	DISCHG	1.84	1.83	1.83	1.82	1.77
18.20	DISCHG	1.75	1.75	1.72	1.66	1.60
18.90	DISCHG	1.45	1.49	1.53	1.56	1.57
19.60	DISCHG	1.41	1.39	1.40	1.44	1.47
20.30	DISCHG	1.24	1.27	1.29	1.31	1.29

RUNOFF VOLUME ABOVE BASEFLOW = 2.14 WATERSHED INCHES, 48.71 CFS-HRS, 4.03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12

INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 3
 SURFACE ELEVATION= 61.90

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.05	12.99	65.12
14.98	4.58	62.91
15.12	4.31	62.85
15.26	4.19	62.83
15.40	4.07	62.80
15.54	3.94	62.78

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.04 SQ.MI.
7.00	DISCHG	.00	.00	.00	.01	.02
7.00	ELEV	61.90	61.90	61.90	61.91	61.92
7.70	DISCHG	.02	.03	.03	.05	.07
7.70	ELEV	61.92	61.93	61.94	61.95	61.98
8.40	DISCHG	.07	.08	.08	.10	.13
8.40	ELEV	61.98	61.99	61.99	62.00	62.01
9.10	DISCHG	.14	.15	.16	.18	.22
9.10	ELEV	62.01	62.01	62.01	62.02	62.03
9.80	DISCHG	.23	.24	.25	.28	.35
9.80	ELEV	62.03	62.03	62.03	62.04	62.05
10.50	DISCHG	.37	.39	.41	.47	.60
10.50	ELEV	62.06	62.06	62.06	62.07	62.10
11.20	DISCHG	.64	.68	.74	1.11	2.52
11.20	ELEV	62.11	62.12	62.13	62.17	62.25
11.90	DISCHG	3.28	4.73	6.40	10.09	11.98
11.90	ELEV	62.64	62.94	63.27	64.03	64.60
12.60	DISCHG	12.17	12.36	12.55	12.89	12.90
12.60	ELEV	64.82	64.92	65.01	65.10	65.10
13.30	DISCHG	12.85	12.78	12.70	12.53	12.21
13.30	ELEV	65.09	65.07	65.05	65.01	64.84
14.00	DISCHG	12.14	12.08	12.01	11.87	11.04
14.00	ELEV	64.80	64.76	64.73	64.65	64.33
14.70	DISCHG	10.62	10.22	4.86	4.58	3.02
14.70	ELEV	64.19	64.07	62.96	62.91	62.59
15.40	DISCHG	4.07	2.99	3.94	3.79	2.81
15.40	ELEV	62.80	62.59	62.78	62.75	62.55
16.10	DISCHG	3.54	2.79	3.39	3.27	2.53
16.10	ELEV	62.70	62.54	62.67	62.64	62.49
16.80	DISCHG	2.94	2.43	2.82	2.78	1.75
16.80	ELEV	62.58	62.47	62.55	62.54	62.33
17.50	DISCHG	1.99	1.69	1.96	1.89	1.65
17.50	ELEV	62.38	62.32	62.38	62.36	62.31
18.20	DISCHG	1.85	1.66	1.81	1.69	1.38
18.20	ELEV	62.36	62.32	62.35	62.32	62.26
18.90	DISCHG	1.51	1.42	1.59	1.62	1.37
18.90	ELEV	62.29	62.27	62.30	62.31	62.26
19.60	DISCHG	1.45	1.35	1.44	1.51	1.23
19.60	ELEV	62.27	62.25	62.27	62.29	62.23

TR20 XEQ 01-27-00 13:36
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 PASS 1
PAGE 4

20.30	DISCHG	1.27	1.24	1.32	1.28	1.32	1.26	1.28	1.20	1.19	1.15
20.30	ELEV	62.24	62.23	62.25	62.24	62.25	62.24	62.24	62.22	62.22	62.21

RUNOFF VOLUME ABOVE BASEFLOW = 2.13 WATERSHED INCHES, 48.36 CFS-HRS, 4.00 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

TR20 XEQ 01-27-00 13:36
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
 PAGE 5

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 MOIST 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	2	STORM	1										
XSECTION	1	RUNOFF	.00	9	2	.07	.0	7.00	24.00	4.13	---	12.37	7.72	1783.6
XSECTION	3	ADDHYD	.04	9	2	.07	.0	7.00	24.00	2.14	---	12.56	32.05	909.7
STRUCTURE	12	RESVOR	.04	9	2	.07	.0	7.00	24.00	2.13	65.12	13.05	12.99	368.6

TR20 XEQ 01-27-00 13:36
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 12 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/26/00

JOB 1 SUMMARY
PAGE 6

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
<u>STRUCTURE 12</u>	<u>.04</u>	
ALTERNATE 2		12.99
<u>XSECTION 1</u>	<u>.00</u>	
ALTERNATE 2		7.72
<u>XSECTION 3</u>	<u>.04</u>	
ALTERNATE 2		32.05

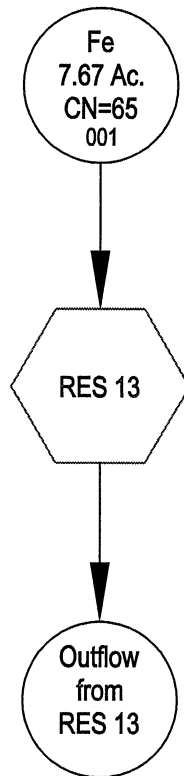
**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

Existing Condition Analysis

To RES 13 Design Point

**Hayes Engineering, Inc.
February 14, 2000**

EXISTING CONDITION WATERSHED SCHEMATIC TO RES 13 WETLAND OUTLET





HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # _____
NAME _____
DATE _____

MADE BY _____

MEMO

CALCULATION

RES 13 STAGE STORAGE

ELEV	AREA FT ²	AVG. FT ²	INC D. FT	INC. VOL FT ³	CUMUL AC FT.
60.9	0	900	1.1	990	0
62	1800	6050	2	12100	.0227
64	10300	18650	1.8	33570	.300
65.8	27000	28340	.2	5668	1.071
66	29680				1.201

12" TRANSIT - AC DRAIN AT 60.9 - ASSUME INLET CONTROL

ELEV	Q CFS
60.9	0.0
62	2.9
64	6.37
65.8	8.62
66	8.75

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CHERRY HILL ESTATES User: cfb Date: 01-26-2000

County : State: Checked: _____ Date: _____
 Subtitle: EXISTING CONDITION SUBARA
 Subarea : Fe

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Impervious Areas				
Paved parking lots, roofs, driveways	-	.02(98)	-	-
Streets and roads				
Dirt (w/ right-of-way)	-	.19(82)	.11(87)	-
Residential districts Avg % imperv				
(by average lot size)				
1 acre	20	-	.4(68)	.3(79)
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	-	2.75(58)	1.76(71)	-
Woods good	-	.9(55)	1.24(70)	-
Total Area (by Hydrologic Soil Group)	4.26	3.41		
	====	====		

SUBAREA: Fe TOTAL DRAINAGE AREA: 7.67 Acres WEIGHTED CURVE NUMBER: 65

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : CHERRY HILL ESTATES User: cfb Date: 01-26-2000

County : State: Checked: _____ Date: _____
 Subtitle: EXISTING CONDITION SUBARA

----- Subarea #1 - Fe -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	40	.03	H					0.149
Sheet		10	.03	F					0.033
Shallow Concent'd		150	.1	U					0.008
Shallow Concent'd		105	.01	U					0.018
Open Channel		280					1		0.078

Time of Concentration = 0.29*
 =====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated = 20 % Res. | H Woods, Light | P Paved |
| D Cultivated & 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

```

JOB TR-20                FULLPRINT        SUMMARY  NOPLOTS
TITLE 001 EXISTING CONDITION WATERSHED - TO RES 13 AREA
TITLE  TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00
5 RAINFL 9                .25
8      0.0                .0025      .005      .0075      .010
8      .0125              .015      .0175     .020      .0225
8      .026                .0285     .031      .0345     .037
8      .0405              .043      .0465     .050      .0535
8      .057                .0605     .064      .068      .072
8      .076                .080      .0845     .089      .094
8      .100               .1075     .115      .1225     .130
8      .1385              .148      .157      .167      .178
8      .189                .202      .216      .2315     .250
8      .271                .298      .3455     .500      .6555
8      .702                .7295     .751      .769      .785
8      .7985              .811      .823      .834      .8435
8      .853                .862      .870      .8785     .886
8      .8935              .900      .907      .911      .916
8      .920                .9245     .929      .9325     .936
8      .940                .944      .947      .951      .954
8      .957                .9605     .963      .9665     .969
8      .9725              .975      .9775     .981      .9835
8      .986                .9885     .991      .9935     .996
8      .9985              1.0      1.0      1.0      1.0
9 ENDTBL
3 STRUCT    13
8          60.9           0.0      0.0
8          62.            2.91     .0227
8          64.            6.37     .300
8          64.8           8.62     1.071
8          66.            8.75     1.201
9 ENDTBL
6 RUNOFF 1 001          3 .0119844  65.      .29      1 1  1  1
6 RESVOR 2   13 3     2 60.9      1 1  1  1
  ENDDATA
7 INCREM 6              0.1
7 COMPUT 7 001         13 0.0      3.1      1.0      9 2  02  01
  ENDCMP 1
7 COMPUT 7 001         13 0.0      4.6      1.0      9 2  02  02
  ENDCMP 1
7 COMPUT 7 001         13 0.0      5.4      1.0      9 2  02  03
  ENDCMP 1
7 COMPUT 7 001         13 0.0      7.0      1.0      9 2  02  04
  ENDCMP 1
  ENDJOB 2

```

*****END OF 80-80 LIST*****

TR20 XEQ 01-31-00 11:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .10 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 13

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 3.10 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1

OUTPUT HYDROGRAPH= 3

AREA= .01 SQ MI INPUT RUNOFF CURVE= 65. TIME OF CONCENTRATION= .29 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0387 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.34 2.80 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ.MI.
11.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .13		
12.00	DISCHG .58 1.28 2.06 2.74 2.65 2.02 1.56 1.23 1.01 .87		
13.00	DISCHG .77 .71 .66 .62 .60 .57 .55 .52 .49 .47		
14.00	DISCHG .46 .45 .44 .44 .43 .42 .41 .39 .37 .36		
15.00	DISCHG .36 .36 .35 .35 .34 .33 .32 .33 .33 .32		
16.00	DISCHG .31 .30 .30 .30 .29 .28 .27 .28 .28 .25		
17.00	DISCHG .21 .19 .19 .20 .19 .18 .17 .18 .18 .19		
18.00	DISCHG .19 .18 .17 .16 .15 .15 .15 .16 .16 .17		
19.00	DISCHG .17 .17 .15 .14 .14 .16 .16 .15 .14 .13		
20.00	DISCHG .13 .13 .14 .15 .14 .12 .12 .13 .14 .14		
21.00	DISCHG .12 .12 .13 .14 .14 .12 .12 .11 .11 .12		
22.00	DISCHG .14 .14 .13 .12 .12 .11 .11 .11 .11 .11		
23.00	DISCHG .11 .11 .11 .11 .11 .11 .11 .11 .11 .10		
24.00	DISCHG .08 .07 .04 .02 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = .55 WATERSHED INCHES, 4.27 CFS-HRS, .35 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 13

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 2

SURFACE ELEVATION= 60.90

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.43 2.53 61.86

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ.MI.
11.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .05		
11.00	ELEV 60.90 60.90 60.90 60.90 60.90 60.90 60.90 60.90 60.90 60.92		
12.00	DISCHG .26 .73 1.38 2.09 2.51 2.39 1.97 1.57 1.26 1.04		
12.00	ELEV 61.00 61.17 61.42 61.69 61.85 61.80 61.65 61.49 61.38 61.29		
13.00	DISCHG .89 .79 .72 .67 .63 .60 .57 .54 .52 .49		
13.00	ELEV 61.24 61.20 61.17 61.15 61.14 61.13 61.12 61.11 61.10 61.09		

TR20 XEQ 01-31-00 11:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 1
PAGE 2

14.00	DISCHG	.48	.46	.45	.45	.44	.43	.42	.40	.39	.37
14.00	ELEV	61.08	61.07	61.07	61.07	61.07	61.06	61.06	61.05	61.05	61.04
15.00	DISCHG	.37	.36	.36	.35	.35	.34	.33	.32	.33	.33
15.00	ELEV	61.04	61.04	61.04	61.03	61.03	61.03	61.02	61.02	61.02	61.02
16.00	DISCHG	.32	.31	.31	.30	.30	.29	.28	.28	.28	.27
16.00	ELEV	61.02	61.02	61.02	61.01	61.01	61.01	61.01	61.00	61.00	61.00
17.00	DISCHG	.24	.21	.20	.20	.20	.19	.18	.18	.18	.18
17.00	ELEV	60.99	60.98	60.97	60.97	60.97	60.97	60.97	60.97	60.97	60.97
18.00	DISCHG	.19	.19	.18	.17	.16	.15	.15	.15	.16	.16
18.00	ELEV	60.97	60.97	60.97	60.96	60.96	60.96	60.96	60.96	60.96	60.96
19.00	DISCHG	.17	.17	.16	.15	.14	.15	.16	.16	.15	.14
19.00	ELEV	60.96	60.96	60.96	60.96	60.95	60.96	60.96	60.96	60.96	60.95
20.00	DISCHG	.13	.13	.14	.14	.14	.13	.13	.13	.13	.14
20.00	ELEV	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.95
21.00	DISCHG	.13	.13	.13	.13	.14	.13	.12	.12	.11	.12
21.00	ELEV	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.94	60.94	60.94
22.00	DISCHG	.13	.14	.14	.13	.12	.12	.11	.11	.11	.11
22.00	ELEV	60.95	60.95	60.95	60.95	60.95	60.94	60.94	60.94	60.94	60.94
23.00	DISCHG	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11
23.00	ELEV	60.94	60.94	60.94	60.94	60.94	60.94	60.94	60.94	60.94	60.94
24.00	DISCHG	.10	.08	.06	.04	.02	.01	.00			
24.00	ELEV	60.94	60.93	60.92	60.91	60.91	60.90	60.90			

RUNOFF VOLUME ABOVE BASEFLOW = .55 WATERSHED INCHES, 4.27 CFS-HRS, .35 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

RECORD ID

TR20 XEQ 01-31-00 11:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 2
PAGE 3

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 13 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 2 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
OUTPUT HYDROGRAPH= 3
AREA= .01 SQ MI INPUT RUNOFF CURVE= 65. TIME OF CONCENTRATION= .29 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0387 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.31 7.90 (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ.MI.
11.00	DISCHG	.01 .04 .07 .11 .17 .24 .34	.55 .85 1.90	
12.00	DISCHG	3.66 5.36 6.83 7.90 7.10 5.18 3.87	2.96 2.38 2.03	
13.00	DISCHG	1.78 1.63 1.49 1.40 1.33 1.27 1.22	1.14 1.08 1.04	
14.00	DISCHG	1.00 .98 .97 .95 .93 .90 .87	.83 .79 .78	
15.00	DISCHG	.77 .77 .75 .74 .72 .69 .68	.68 .69 .68	
16.00	DISCHG	.65 .64 .63 .63 .61 .58 .57	.57 .58 .52	
17.00	DISCHG	.43 .39 .40 .41 .40 .37 .36	.37 .38 .38	
18.00	DISCHG	.38 .38 .35 .32 .31 .31 .31	.32 .34 .34	
19.00	DISCHG	.35 .34 .31 .28 .30 .32 .33	.30 .28 .27	
20.00	DISCHG	.27 .27 .28 .30 .28 .25 .24	.27 .29 .28	
21.00	DISCHG	.25 .24 .27 .29 .28 .25 .23	.23 .23 .25	
22.00	DISCHG	.28 .29 .26 .24 .23 .23 .22	.22 .22 .22	
23.00	DISCHG	.22 .22 .22 .22 .22 .22 .22	.23 .22 .20	
24.00	DISCHG	.17 .13 .08 .03 .01 .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 1.39 WATERSHED INCHES, 10.77 CFS-HRS, .89 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 13
INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 2
SURFACE ELEVATION= 60.90

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.57 4.33 62.82

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ.MI.
11.00	DISCHG	.00 .02 .04 .08 .12 .18 .25	.39 .60 1.14	
11.00	ELEV	60.90 60.91 60.92 60.93 60.95 60.97 61.00	61.05 61.13 61.33	
12.00	DISCHG	2.27 3.04 3.34 3.73 4.10 4.30 4.32	4.24 4.08 3.90	
12.00	ELEV	61.76 62.07 62.25 62.48 62.69 62.80 62.82	62.77 62.68 62.57	
13.00	DISCHG	3.70 3.51 3.32 3.13 2.96 2.11 1.51	1.28 1.16 1.09	
13.00	ELEV	62.46 62.34 62.23 62.13 62.03 61.70 61.47	61.38 61.34 61.31	
14.00	DISCHG	1.04 1.01 .99 .97 .95 .93 .90	.87 .83 .80	
14.00	ELEV	61.29 61.28 61.27 61.27 61.26 61.25 61.24	61.23 61.21 61.20	
15.00	DISCHG	.78 .77 .76 .75 .74 .71 .69	.68 .69 .69	

TR20 XEQ 01-31-00 11:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 2
PAGE 4

15.00	ELEV	61.20	61.19	61.19	61.18	61.18	61.17	61.16	61.16	61.16	61.16
16.00	DISCHG	.67	.65	.64	.63	.62	.60	.58	.57	.57	.56
16.00	ELEV	61.15	61.15	61.14	61.14	61.13	61.13	61.12	61.12	61.12	61.11
17.00	DISCHG	.50	.44	.41	.40	.40	.39	.37	.37	.37	.38
17.00	ELEV	61.09	61.06	61.05	61.05	61.05	61.05	61.04	61.04	61.04	61.04
18.00	DISCHG	.38	.38	.37	.34	.32	.31	.31	.31	.33	.34
18.00	ELEV	61.04	61.04	61.04	61.03	61.02	61.02	61.02	61.02	61.02	61.03
19.00	DISCHG	.34	.34	.33	.31	.29	.30	.32	.32	.30	.28
19.00	ELEV	61.03	61.03	61.02	61.02	61.01	61.01	61.02	61.02	61.01	61.01
20.00	DISCHG	.27	.27	.28	.29	.29	.27	.25	.26	.27	.28
20.00	ELEV	61.00	61.00	61.00	61.01	61.01	61.00	61.00	61.00	61.00	61.01
21.00	DISCHG	.27	.25	.26	.27	.28	.27	.25	.24	.23	.24
21.00	ELEV	61.00	61.00	61.00	61.00	61.01	61.00	60.99	60.99	60.99	60.99
22.00	DISCHG	.26	.28	.28	.26	.24	.23	.23	.23	.22	.22
22.00	ELEV	61.00	61.00	61.00	61.00	60.99	60.99	60.99	60.99	60.98	60.98
23.00	DISCHG	.22	.22	.22	.22	.22	.22	.22	.22	.22	.21
23.00	ELEV	60.98	60.98	60.98	60.98	60.98	60.98	60.98	60.99	60.98	60.98
24.00	DISCHG	.19	.16	.12	.08	.04	.02	.01	.00		
24.00	ELEV	60.97	60.96	60.95	60.93	60.92	60.91	60.90	60.90		

RUNOFF VOLUME ABOVE BASEFLOW = 1.39 WATERSHED INCHES, 10.76 CFS-HRS, .89 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 2

RECORD ID

TR20 XEQ 01-31-00 11:20
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 3
 PAGE 5

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 13 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 3 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
 OUTPUT HYDROGRAPH= 3
 AREA= .01 SQ MI INPUT RUNOFF CURVE= 65. TIME OF CONCENTRATION= .29 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0387 HOURS

PEAK TIME(HRS) 12.30 PEAK DISCHARGE(CFS) 11.08 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS		TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .01 SQ.MI.			
10.00	.00	.00	.00	.00	.01	.02	.05	.07	.11	.15	
11.00	.19	.24	.30	.36	.45	.57	.74	1.07	1.55	3.15	
12.00	5.71	7.99	9.83	11.08	9.81	7.08	5.25	3.99	3.19	2.71	
13.00	2.37	2.16	1.98	1.86	1.76	1.68	1.60	1.50	1.42	1.37	
14.00	1.32	1.29	1.27	1.25	1.22	1.18	1.14	1.08	1.03	1.01	
15.00	1.01	1.00	.98	.96	.93	.89	.88	.89	.90	.88	
16.00	.85	.83	.82	.81	.79	.75	.73	.74	.75	.67	
17.00	.56	.50	.51	.53	.51	.48	.46	.48	.49	.49	
18.00	.50	.49	.45	.42	.40	.40	.40	.42	.43	.44	
19.00	.45	.43	.40	.37	.38	.41	.42	.39	.36	.35	
20.00	.34	.35	.37	.38	.36	.32	.31	.34	.37	.35	
21.00	.32	.31	.34	.37	.36	.32	.30	.29	.29	.32	
22.00	.36	.37	.34	.31	.30	.29	.29	.29	.29	.29	
23.00	.29	.29	.29	.29	.29	.29	.29	.29	.28	.26	
24.00	.21	.17	.10	.04	.02	.01	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 1.92 WATERSHED INCHES, 14.88 CFS-HRS, 1.23 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 13
 INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 2
 SURFACE ELEVATION= 60.90

PEAK TIME(HRS) 12.59 PEAK DISCHARGE(CFS) 5.54 PEAK ELEVATION(FEET) 63.52

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS		TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .01 SQ.MI.			
10.00	.00	.00	.00	.00	.00	.01	.03	.05	.08	.11	
10.00	ELEV	60.90	60.90	60.90	60.90	60.90	60.91	60.92	60.93	60.94	
11.00	.15	.20	.25	.31	.38	.47	.59	.81	1.16	1.98	
11.00	ELEV	60.96	60.97	60.99	61.02	61.04	61.08	61.21	61.34	61.65	
12.00	DISCHG	3.02	3.39	3.94	4.57	5.15	5.47	5.45	5.27	5.04	
12.00	ELEV	62.06	62.28	62.59	62.96	63.29	63.48	63.52	63.47	63.36	
13.00	DISCHG	4.80	4.55	4.30	4.07	3.85	3.64	3.44	3.26	3.08	
13.00	ELEV	63.09	62.95	62.81	62.67	62.54	62.42	62.31	62.20	62.00	

TR20 XEQ 01-31-00 11:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 3
PAGE 6

14.00	DISCHG	1.87	1.48	1.34	1.28	1.25	1.21	1.18	1.13	1.08	1.04
14.00	ELEV	61.61	61.46	61.41	61.39	61.37	61.36	61.35	61.33	61.31	61.29
15.00	DISCHG	1.02	1.01	1.00	.98	.96	.93	.90	.89	.89	.89
15.00	ELEV	61.29	61.28	61.28	61.27	61.26	61.25	61.24	61.24	61.24	61.24
16.00	DISCHG	.87	.85	.83	.82	.81	.78	.75	.74	.74	.72
16.00	ELEV	61.23	61.22	61.21	61.21	61.20	61.19	61.18	61.18	61.18	61.17
17.00	DISCHG	.65	.56	.53	.52	.52	.50	.48	.47	.48	.49
17.00	ELEV	61.14	61.11	61.10	61.10	61.10	61.09	61.08	61.08	61.08	61.08
18.00	DISCHG	.49	.49	.47	.44	.42	.40	.40	.41	.42	.43
18.00	ELEV	61.09	61.09	61.08	61.07	61.06	61.05	61.05	61.05	61.06	61.06
19.00	DISCHG	.44	.44	.42	.39	.38	.39	.41	.41	.39	.36
19.00	ELEV	61.07	61.07	61.06	61.05	61.04	61.05	61.05	61.05	61.05	61.04
20.00	DISCHG	.35	.35	.35	.37	.37	.35	.33	.33	.35	.36
20.00	ELEV	61.03	61.03	61.03	61.04	61.04	61.03	61.02	61.02	61.03	61.04
21.00	DISCHG	.34	.33	.33	.35	.36	.34	.32	.30	.30	.30
21.00	ELEV	61.03	61.02	61.02	61.03	61.04	61.03	61.02	61.01	61.01	61.01
22.00	DISCHG	.33	.35	.35	.33	.31	.30	.29	.29	.29	.29
22.00	ELEV	61.02	61.03	61.03	61.03	61.02	61.01	61.01	61.01	61.01	61.01
23.00	DISCHG	.29	.29	.29	.29	.29	.29	.29	.29	.29	.28
23.00	ELEV	61.01	61.01	61.01	61.01	61.01	61.01	61.01	61.01	61.01	61.00
24.00	DISCHG	.25	.21	.16	.10	.05	.02	.01	.00		
24.00	ELEV	60.99	60.98	60.96	60.94	60.92	60.91	60.90	60.90		

RUNOFF VOLUME ABOVE BASEFLOW = 1.92 WATERSHED INCHES, 14.88 CFS-HRS, 1.23 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 3

RECORD ID

TR20 XEQ 01-31-00 11:20
 REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 4
 PAGE 7

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 13 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 4 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 1
 OUTPUT HYDROGRAPH= 3
 AREA= .01 SQ MI INPUT RUNOFF CURVE= 65. TIME OF CONCENTRATION= .29 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0387 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.29 17.98 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
9.00	DISCHG	.00 .00 .00 .00	.01	.03 .05	.07 .10 .12	
10.00	DISCHG	.15 .18 .22 .26	.30	.35 .39	.45 .51 .58	
11.00	DISCHG	.68 .77 .87 .98	1.15	1.36 1.68	2.32 3.19 6.04	
12.00	DISCHG	10.37 13.87 16.41 17.96	15.62	11.15 8.18	6.17 4.89 4.14	
13.00	DISCHG	3.61 3.28 3.00 2.81	2.66	2.52 2.41	2.26 2.14 2.05	
14.00	DISCHG	1.98 1.93 1.89 1.86	1.82	1.76 1.70	1.61 1.54 1.51	
15.00	DISCHG	1.49 1.48 1.45 1.43	1.38	1.32 1.30	1.31 1.33 1.30	
16.00	DISCHG	1.25 1.22 1.21 1.20	1.16	1.10 1.08	1.09 1.10 .98	
17.00	DISCHG	.81 .74 .75 .78	.75	.70 .68	.70 .71 .72	
18.00	DISCHG	.73 .71 .65 .61	.59	.58 .58	.61 .63 .65	
19.00	DISCHG	.65 .63 .58 .53	.55	.60 .61	.57 .53 .51	
20.00	DISCHG	.50 .51 .53 .55	.52	.47 .46	.50 .54 .52	
21.00	DISCHG	.47 .46 .50 .54	.52	.47 .44	.42 .42 .46	
22.00	DISCHG	.52 .54 .49 .45	.43	.42 .42	.42 .42 .42	
23.00	DISCHG	.42 .42 .42 .42	.42	.42 .42	.42 .41 .37	
24.00	DISCHG	.31 .25 .14 .06	.03	.01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.10 WATERSHED INCHES, 23.98 CFS-HRS, 1.98 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 13
 INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 2
 SURFACE ELEVATION= 60.90

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.67 6.91 64.19

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
9.00	DISCHG	.00 .00 .00 .00	.00	.01 .03	.05 .07 .10	
9.00	ELEV	60.90 60.90 60.90 60.90	60.90	60.91 60.91	60.92 60.93 60.94	
10.00	DISCHG	.12 .15 .18 .22	.26	.30 .35	.40 .45 .52	
10.00	ELEV	60.95 60.96 60.97 60.98	61.00	61.01 61.03	61.05 61.07 61.10	
11.00	DISCHG	.60 .68 .78 .88	1.01	1.18 1.42	1.82 2.47 3.06	
11.00	ELEV	61.12 61.16 61.19 61.23	61.28	61.35 61.44	61.59 61.83 62.09	
12.00	DISCHG	3.56 4.40 5.46 6.43	6.67	6.83 6.90	6.91 6.88 6.82	

TR20 XEQ 01-31-00 11:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 PASS 4
PAGE 8

12.00	ELEV	62.38	62.86	63.47	64.02	64.11	64.17	64.19	64.19	64.18	64.16
13.00	DISCHG	6.75	6.67	6.59	6.50	6.41	6.15	5.79	5.45	5.13	4.84
13.00	ELEV	64.13	64.11	64.08	64.05	64.01	63.88	63.67	63.47	63.29	63.11
14.00	DISCHG	4.56	4.30	4.07	3.85	3.66	3.47	3.30	3.14	2.99	2.44
14.00	ELEV	62.95	62.81	62.67	62.55	62.43	62.33	62.23	62.13	62.04	61.82
15.00	DISCHG	1.79	1.58	1.50	1.46	1.42	1.37	1.33	1.31	1.32	1.32
15.00	ELEV	61.58	61.50	61.47	61.45	61.44	61.42	61.40	61.40	61.40	61.40
16.00	DISCHG	1.29	1.25	1.22	1.21	1.19	1.15	1.11	1.09	1.09	1.06
16.00	ELEV	61.39	61.37	61.36	61.36	61.35	61.33	61.32	61.31	61.31	61.30
17.00	DISCHG	.95	.83	.77	.77	.77	.74	.70	.69	.70	.71
17.00	ELEV	61.26	61.21	61.19	61.19	61.19	61.18	61.17	61.16	61.17	61.17
18.00	DISCHG	.72	.72	.69	.65	.61	.59	.58	.59	.61	.63
18.00	ELEV	61.17	61.17	61.16	61.15	61.13	61.12	61.12	61.12	61.13	61.14
19.00	DISCHG	.64	.64	.62	.57	.55	.57	.60	.59	.56	.53
19.00	ELEV	61.14	61.14	61.13	61.12	61.11	61.12	61.13	61.12	61.11	61.10
20.00	DISCHG	.51	.51	.52	.53	.54	.51	.48	.48	.51	.52
20.00	ELEV	61.09	61.09	61.09	61.10	61.10	61.09	61.08	61.08	61.09	61.10
21.00	DISCHG	.50	.47	.48	.51	.52	.50	.47	.44	.43	.44
21.00	ELEV	61.09	61.08	61.08	61.09	61.10	61.09	61.08	61.07	61.06	61.07
22.00	DISCHG	.48	.51	.51	.48	.45	.43	.42	.42	.42	.42
22.00	ELEV	61.08	61.09	61.09	61.08	61.07	61.06	61.06	61.06	61.06	61.06
23.00	DISCHG	.42	.42	.42	.42	.42	.42	.42	.42	.42	.40
23.00	ELEV	61.06	61.06	61.06	61.06	61.06	61.06	61.06	61.06	61.06	61.05
24.00	DISCHG	.36	.30	.23	.14	.07	.04	.01	.00		
24.00	ELEV	61.04	61.01	60.99	60.95	60.93	60.91	60.91	60.90		

RUNOFF VOLUME ABOVE BASEFLOW = 3.10 WATERSHED INCHES, 23.98 CFS-HRS, 1.98 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 4 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)
<u>ALTERNATE 2 STORM 1</u>													
XSECTION 1	RUNOFF	.01	9	2	.10	.0	3.10	24.00	.55	---	12.34	2.80	233.6
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	3.10	24.00	.55	61.86	12.43	2.53	211.1
<u>ALTERNATE 2 STORM 2</u>													
XSECTION 1	RUNOFF	.01	9	2	.10	.0	4.60	24.00	1.39	---	12.31	7.90	659.5
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	4.60	24.00	1.39	62.82	12.57	4.33	361.2
<u>ALTERNATE 2 STORM 3</u>													
XSECTION 1	RUNOFF	.01	9	2	.10	.0	5.40	24.00	1.92	---	12.30	11.08	924.2
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	5.40	24.00	1.92	63.52	12.59	5.54	462.4
<u>ALTERNATE 2 STORM 4</u>													
XSECTION 1	RUNOFF	.01	9	2	.10	.0	7.00	24.00	3.10	---	12.29	17.98	1500.2
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	7.00	24.00	3.10	64.19	12.67	6.91	576.6

TR20 XEQ 01-31-00 11:20
REV PC 09/83(.2)

EXISTING CONDITION WATERSHED - TO RES 13 AREA
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 01/28/00

JOB 1 SUMMARY
PAGE 10

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	3	4
<u>STRUCTURE 13</u>	<u>.01</u>				
ALTERNATE 2		2.53	4.33	5.54	6.91
<u>XSECTION 1</u>	<u>.01</u>				
ALTERNATE 2		2.80	7.90	11.08	17.98

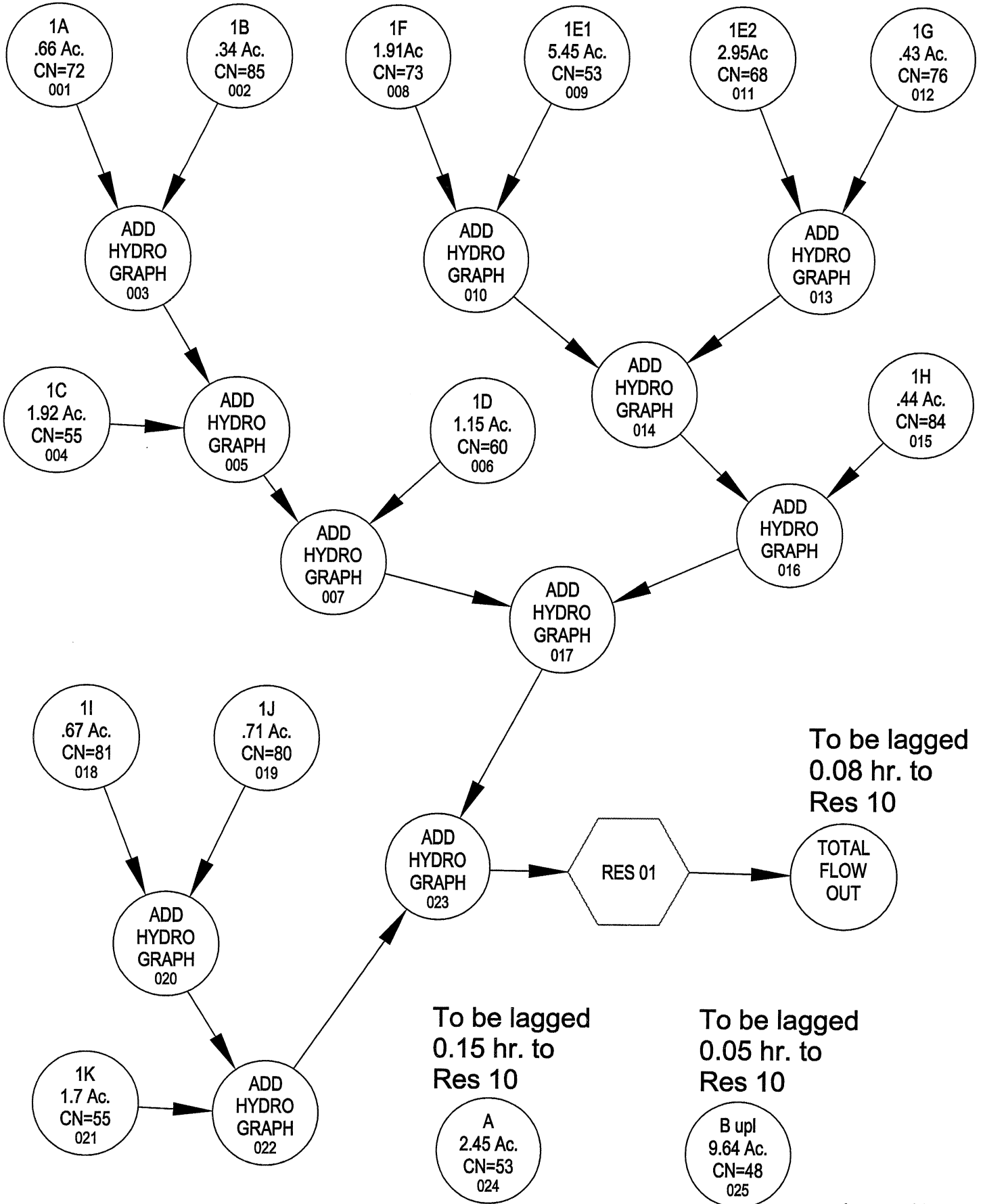
**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

Proposed Condition Analysis

To RES 11 Design Point

**Hayes Engineering, Inc.
February 14, 2000**

PROPOSED CONDITION WATERSHED SCHEMATIC TO RES 01 AND THOSE SUBAREAS TO BE LAGGED



To be lagged
0.08 hr. to
Res 10

To be lagged
0.15 hr. to
Res 10

To be lagged
0.05 hr. to
Res 10

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1A

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	.06(39)	.37(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	.03(98)	.20(98)	-	-
Total Area (by Hydrologic Soil Group)	.09	.57		
	====	====		

SUBAREA: 1A TOTAL DRAINAGE AREA: .66 Acres WEIGHTED CURVE NUMBER: 72

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1B

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	.02(39)	.09(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	.08(98)	.15(98)	-	-

Total Area (by Hydrologic Soil Group)	.1	.24		
	====	====		

 SUBAREA: 1B TOTAL DRAINAGE AREA: .34 Acres WEIGHTED CURVE NUMBER: 85

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1C

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	1.4(39)	-	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	.52(98)	-	-	-

Total Area (by Hydrologic Soil Group)	1.92			
	====			

SUBAREA: 1C TOTAL DRAINAGE AREA: 1.92 Acres WEIGHTED CURVE NUMBER: 55

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1D

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	.73(39)	.01(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	.41(98)	-	-	-

Total Area (by Hydrologic Soil Group)	1.14	.01		
	====	====		

 SUBAREA: 1D TOTAL DRAINAGE AREA: 1.15 Acres WEIGHTED CURVE NUMBER: 60

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1E1

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover > 75%	-	.89(61)	.03(74)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.1(98)	.02(98)	-
Residential districts	Avg % imperv			
(by average lot size)				
1 acre	20	-	1.5(68)	-
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	1.88(30)	1(58)	-	-
Woods	-	-	.03(70)	-
Total Area (by Hydrologic Soil Group)	1.88	3.49	.08	
	====	====	====	

SUBAREA: 1E1 TOTAL DRAINAGE AREA: 5.45 Acres WEIGHTED CURVE NUMBER: 53

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS
 Subarea : 1E2

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover ≥ 75%	.02(39)	1.64(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.45(98)	-	-
Residential districts Avg % imperv				
(by average lot size)				
1 acre 20	-	.84(68)	-	-
Total Area (by Hydrologic Soil Group)	.02	2.93		
	====	====		

 SUBAREA: 1E2 TOTAL DRAINAGE AREA: 2.95 Acres WEIGHTED CURVE NUMBER: 68

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1F

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	-	1(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.69(98)	-	-
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	.05(30)	.17(58)	-	-
Total Area (by Hydrologic Soil Group)	.05	1.86		
	====	====		

SUBAREA: 1F TOTAL DRAINAGE AREA: 1.91 Acres WEIGHTED CURVE NUMBER: 73

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1G

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	-	.25(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.18(98)	-	-
Total Area (by Hydrologic Soil Group)		.43		
		====		

 SUBAREA: 1G TOTAL DRAINAGE AREA: .43 Acres WEIGHTED CURVE NUMBER: 76

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1H

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover > 75%	-	.17(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.27(98)	-	-
Total Area (by Hydrologic Soil Group)		.44		
		====		

 SUBAREA: 1H TOTAL DRAINAGE AREA: .44 Acres WEIGHTED CURVE NUMBER: 84

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS
 Subarea : 1I

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	-	.30(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.37(98)	-	-

Total Area (by Hydrologic Soil Group)		.67		
		====		

 SUBAREA: 1I TOTAL DRAINAGE AREA: .67 Acres WEIGHTED CURVE NUMBER: 81

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: ____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1J

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
Acres (CN)				

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover < 75%	-	.34(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.37(98)	-	-

Total Area (by Hydrologic Soil Group)		.71		
		====		

 SUBAREA: 1J TOTAL DRAINAGE AREA: .71 Acres WEIGHTED CURVE NUMBER: 80

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: CFB Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 1K

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	1.25(39)	-	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	.45(98)	-	-	-
Total Area (by Hydrologic Soil Group)	1.7			
	====			

SUBAREA: 1K TOTAL DRAINAGE AREA: 1.7 Acres WEIGHTED CURVE NUMBER: 55

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: CFB Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : A

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover \geq 75%	.7(39)	-	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	.05(98)	-	-	-
Residential districts Avg % imperv				
(by average lot size)				
1/3 acre 30	1.7(57)	-	-	-
Total Area (by Hydrologic Soil Group)	2.45			
	====			

SUBAREA: A TOTAL DRAINAGE AREA: 2.45 Acres WEIGHTED CURVE NUMBER: 53

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: CFB Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : B upl

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover > 75%	1(39)	.5(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	.15(98)	.16(98)	-	-
Residential districts Avg % imperv				
(by average lot size)				
1 acre 20	1(51)	.5(68)	-	-
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	1.16(30)	1.4(58)	-	-
Woods good	1.9(30)	1.87(55)	-	-
Total Area (by Hydrologic Soil Group)	5.21	4.43		
	====	====		

 SUBAREA: B upl TOTAL DRAINAGE AREA: 9.64 Acres WEIGHTED CURVE NUMBER: 48

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: CFB Date: 12-21-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : B wet

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

OTHER AGRICULTURAL LANDS				
Woods	good	-	-	- 4.6(77)

Total Area (by Hydrologic Soil Group) 4.6
=====

SUBAREA: B wet TOTAL DRAINAGE AREA: 4.6 Acres WEIGHTED CURVE NUMBER: 77

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: ___ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

----- Subarea #1 - 1A -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.01	F					0.183
Shallow Concent'd		40	.01	U					0.007
Shallow Concent'd		280	.014	P					0.032

Time of Concentration = 0.22*
 =====

----- Subarea #2 - 1B -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.01	F					0.183
Shallow Concent'd		280	.014	P					0.032

Time of Concentration = 0.22*
 =====

----- Subarea #3 - 1C -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		120	.02	U					0.015
Shallow Concent'd		330	.015	P					0.037

Time of Concentration = 0.19*
 =====

----- Subarea #4 - 1D -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		160	.04	U					0.014
Shallow Concent'd		30	.3	U					0.001

Time of Concentration = 0.15*
 =====

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

----- Subarea #5 - 1E1 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	H					0.209
Shallow Concent'd		370	.05	U					0.028
Shallow Concent'd		400	.015	U					0.056

Time of Concentration = 0.29*
 =====

----- Subarea #6 - 1E2 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.04	F					0.105
Shallow Concent'd		260	.035	U					0.024

Time of Concentration = 0.13*
 =====

----- Subarea #7 - 1F -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	H					0.209
Shallow Concent'd		260	.04	U					0.022
Shallow Concent'd		320	.013	P					0.038

Time of Concentration = 0.27*
 =====

----- Subarea #8 - 1G -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.04	F					0.105
Shallow Concent'd		150	.01	P					0.020

Time of Concentration = 0.13*
 =====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Bermuda | --- Surface Codes --- |
| C Cultivated 20 % Res. | H Woods, Light | P Paved |
| D Cultivated < 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

----- Subarea #1 - 1H -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	40	.02	F					0.116
Shallow Concent'd		120	.01	P					0.016

Time of Concentration = 0.13*
 =====

----- Subarea #2 - 1I -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		200	.01	P					0.027

Time of Concentration = 0.17*
 =====

----- Subarea #3 - 1J -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		70	.01	P					0.010

Time of Concentration = 0.15*
 =====

----- Subarea #4 - 1K -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.05	F					0.096
Shallow Concent'd		80	.06	U					0.006

Time of Concentration = 0.10*
 =====

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-21-1999

County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

----- Subarea #5 - A -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.08	F					0.080
Shallow Concent'd		340	.04	U					0.029

Time of Concentration = 0.11*
 =====

----- Subarea #6 - B upl -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		260	.01	U					0.045
Shallow Concent'd		130	.18	U					0.005

Time of Concentration = 0.19*
 =====

----- Subarea #7 - B wet -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.01	H					0.276
Shallow Concent'd		910	.01	U					0.157

Time of Concentration = 0.43*
 =====

----- Subarea #8 - E -----

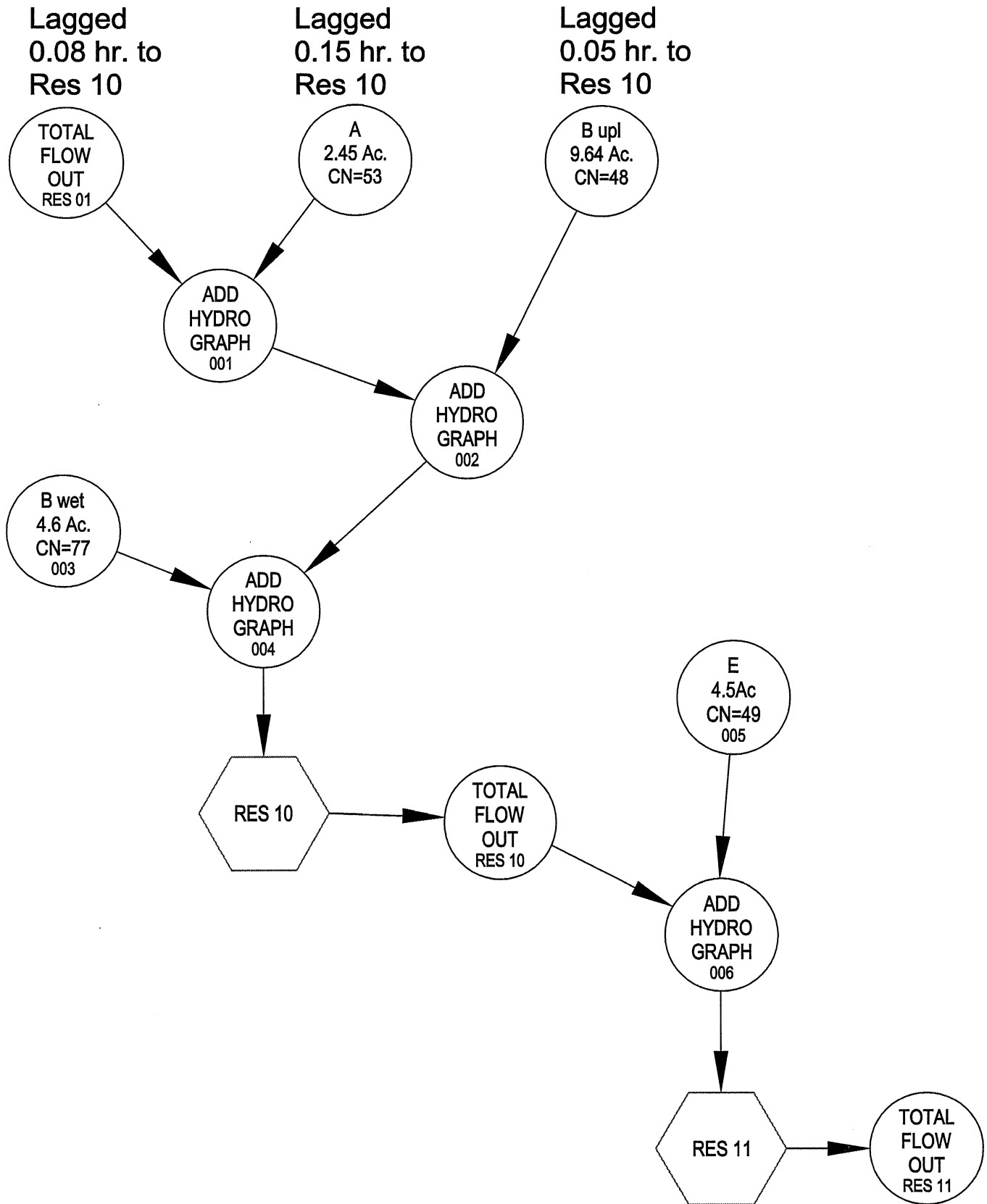
Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		600	.02	U					0.073
Shallow Concent'd		300	.3	U					0.009
Open Channel		200					1		0.056

Time of Concentration = 0.28*
 =====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Bermuda	--- Surface Codes ---
C Cultivated = 20 % Res.	H Woods, Light	P Paved
D Cultivated ≠ 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

PROPOSED CONDITION WATERSHED SCHEMATIC TO RES 11 POINT OF COMPARISON





HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT-0015

NAME _____

DATE _____

MADE BY _____

MEMO

CALCULATION

RES 10 - STAGE STORAGE

Elev	Area FT ²	Avg. FT ²	Inc. D FT	Inc. Vol FT ³	Cum Vol AcFt
55	0				0
56	20±	10	1	10	.0002
58*	2450	1235	2	2470	.057
59	12800	7625	1	7625	.232
60	32300	22550	1	22550	.750
62	2.2A.	64066	2	128132	3.69

STAGE STORAGE @ 60.5 ⇒ USE 1.12 AcFt Cum Vol. ASSUME VERT SIDES 60-60.5
STAGE DISCHARGE BASED ON PROP. CONTROL STRUCTURE
- 2-4" @ 55 + 2-15" @ 60.5

RES10 CONTROL SECTION

Low Flow Q²

CURRENT DATE: 02-03-2000
 CURRENT TIME: 09:00:42

FILE DATE: 02-03-2000
 FILE NAME: RES10UP

PERFORMANCE CURVE FOR CULVERT 1 - 2(0.33 (ft) BY 0.33 (ft)) RCP

DIS-CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW NORMAL HDS5 DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	55.00	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00
0.20	55.26	0.26	0.24	6-FFt	0.33	0.18	0.21	0.21	1.73
0.40	55.43	0.43	0.39	6-FFt	0.33	0.25	0.26	0.26	2.72
0.60	55.69	0.69	0.60	6-FFt	0.33	0.30	0.31	0.31	3.44
0.80	56.06	1.06	0.87	4-FFt	0.33	0.33	0.31	0.35	4.59
1.00	56.53	1.53	1.21	4-FFt	0.33	0.33	0.31	0.40	5.73
1.20	57.15	2.15	1.60	4-FFt	0.33	0.33	0.31	0.44	6.88
1.40	58.11	3.11	2.06	4-FFt	0.33	0.33	0.31	0.48	8.02
1.60	59.85	4.85	2.60	4-FFt	0.33	0.33	0.31	0.53	9.17
1.80	63.16	8.16	3.19	4-FFt	0.33	0.33	0.31	0.57	10.32
2.00	69.25	14.25	3.84	4-FFt	0.33	0.33	0.31	0.61	11.46

El. inlet face invert 55.00 ft El. outlet invert 55.00 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
 INLET ELEVATION 55.00 ft
 OUTLET STATION 1.00 ft
 OUTLET ELEVATION 55.00 ft
 NUMBER OF BARRELS 2
 SLOPE (V/H) 0.0010
 CULVERT LENGTH ALONG SLOPE 1.00 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
 BARREL DIAMETER 0.33 ft
 BARREL MATERIAL CONCRETE P/C
 BARREL MANNING'S n 0.010
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL SQUARE EDGE WITH HEADWALL
 INLET DEPRESSION NONE

CURRENT DATE: 02-03-2000
 CURRENT TIME: 09:00:42

FILE DATE: 02-03-2000
 FILE NAME: RES10UP

TAILWATER

TAILWATER RATING CURVE - DATA FROM RES 10 D/S OF
 CONTROL SECTION (24")

FLOW (cfs)	W.S.E.(ft)	DEPTH (ft)
0	55.00	0.00
0	55.21	0.21
0	55.26	0.26
1	55.31	0.31
1	55.35	0.35
1	55.40	0.40
1	55.44	0.44
1	55.48	0.48
2	55.53	0.53
2	55.57	0.57
2	55.61	0.61

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	1.00 ft
CREST LENGTH	55.00 ft
OVERTOPPING CREST ELEVATION	100.00 ft

RES10 High Flow Q Control Section 2

CURRENT DATE: 02-03-2000
CURRENT TIME: 10:25:45

FILE DATE: 02-03-2000
FILE NAME: RES10'

PERFORMANCE CURVE FOR CULVERT 1 - 2(1.25 (ft) BY 1.25 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4e	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	60.50	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
1.00	60.84	0.34	0.27	6-FFc	0.45	0.27	0.27	0.00	2.58	0.00
2.00	61.03	0.53	0.41	6-FFc	0.67	0.39	0.39	0.00	3.06	0.00
3.00	61.18	0.68	0.52	6-FFc	0.88	0.48	0.48	0.00	3.42	0.00
4.00	61.32	0.82	0.62	6-FFc	1.25	0.56	0.56	0.00	3.75	0.00
5.00	61.44	0.94	0.73	6-FFc	1.25	0.63	0.63	0.00	4.01	0.00
6.00	61.55	1.05	0.83	6-FFc	1.25	0.69	0.69	0.00	4.29	0.00
7.00	61.66	1.15	0.95	6-FFc	1.25	0.75	0.75	0.00	4.52	0.00
8.00	61.77	1.26	1.06	6-FFc	1.25	0.81	0.81	0.00	4.78	0.00
9.00	61.88	1.38	1.18	6-FFc	1.25	0.86	0.86	0.00	5.01	0.00
10.00	62.00	1.50	1.30	6-FFc	1.25	0.90	0.90	0.00	5.25	0.00

El. inlet face invert 60.50 ft El. outlet invert 60.50 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
INLET ELEVATION 60.50 ft
OUTLET STATION 1.00 ft
OUTLET ELEVATION 60.50 ft
NUMBER OF BARRELS 2
SLOPE (V/H) 0.0010
CULVERT LENGTH ALONG SLOPE 1.00 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
BARREL DIAMETER 1.25 ft
BARREL MATERIAL CONCRETE
BARREL MANNING'S n 0.015
INLET TYPE CONVENTIONAL
INLET EDGE AND WALL SQUARE EDGE WITH HEADWALL
INLET DEPRESSION NONE

RES 10 - DOWNSTREAM OF CONTROL SECTION - HIGH FLOW Q²

CURRENT DATE: 02-03-2000
 CURRENT TIME: 10:31:16

FILE DATE: 02-03-2000
 FILE NAME: RES10

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.25 (ft) BY 1.25 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 = F4@	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	55.00	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
1.00	55.52	0.52	0.23	6-FFc	0.34	0.39	0.39	0.00	3.06	0.00
2.00	55.81	0.81	0.46	6-FFc	0.50	0.56	0.56	0.00	3.75	0.00
3.00	56.04	1.04	0.70	6-FFc	0.63	0.69	0.69	0.00	4.29	0.00
4.00	56.26	1.26	0.96	6-FFc	0.75	0.81	0.81	0.00	4.78	0.00
5.00	56.50	1.50	1.24	6-FFc	0.88	0.90	0.90	0.00	5.25	0.00
6.00	56.78	1.78	1.68	6-FFc	1.04	0.99	0.99	0.00	5.76	0.00
7.00	57.11	2.11	1.98	6-FFc	1.25	1.05	1.05	0.00	6.37	0.00
8.00	57.51	2.51	2.32	6-FFc	1.25	1.11	1.11	0.00	6.95	0.00
9.00	57.96	2.96	2.69	6-FFc	1.25	1.17	1.17	0.00	7.47	0.00
10.00	58.47	3.47	3.11	6-FFc	1.25	1.23	1.23	0.00	8.21	0.00

El. inlet face invert 55.00 ft El. outlet invert 54.82 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****
 INLET STATION 0.00 ft
 INLET ELEVATION 55.00 ft
 OUTLET STATION 16.00 ft
 OUTLET ELEVATION 54.82 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0113
 CULVERT LENGTH ALONG SLOPE 16.00 ft

***** CULVERT DATA SUMMARY *****
 BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.25 ft
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S n 0.015
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL SQUARE EDGE WITH HEADWALL
 INLET DEPRESSION NONE



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # _____
NAME _____
DATE _____

MADE BY _____

- MEMO
- CALCULATION

NO CHANGE FROM EXISTING
RES 11 - (LOCATED DOWNSTREAM OF RES 10)

ELEV	AREA FT ²	AUG. FT ²	INC.D. FT	INC.VOL FT ³	CUM.VOL AcFt.
52.5	0				0
		5	.5	2.5	
53	10	230	1	230	neg. use .0001
54	450	2075	2	4150	.005
56	3700	8850	1.1	9735	.100
57.1*	14000	18500	.9	16550	.324
58	23000				.704

RF 11
 STAGE DISCHARGE

1/3

CURRENT DATE: 07-23-1999
 CURRENT TIME: 08:13:55

FILE DATE: 07-23-1999
 FILE NAME: NBT11

FHWA CULVERT ANALYSIS
 HY-8, VERSION 6.1

C	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
U								
L	INLET	OUTLET	CULVERT	BARRELS				
V	ELEV.	ELEV.	LENGTH	SHAPE	SPAN	RISE	MANNING	INLET
NO.	(ft)	(ft)	(ft)	MATERIAL	(ft)	(ft)	n	TYPE
1	51.60	50.59	135.00	1 CSP	1.00	1.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: NBT11 DATE: 07-23-1999

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY ITR
52.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
52.56	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
52.75	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
53.07	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
53.52	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
54.09	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
54.79	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
55.62	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
56.58	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
57.66	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
58.87	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00 0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 OVERTOPPING

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: NBT11 DATE: 07-23-1999

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
52.50	0.000	0.00	0.00	0.00
52.56	0.000	0.40	0.00	0.00
52.75	0.000	0.80	0.00	0.00
53.07	0.000	1.20	0.00	0.00
53.52	0.000	1.60	0.00	0.00
54.09	0.000	2.00	0.00	0.00
54.79	0.000	2.40	0.00	0.00
55.62	0.000	2.80	0.00	0.00
56.58	0.000	3.20	0.00	0.00
57.66	0.000	3.60	0.00	0.00
58.87	0.000	4.00	0.00	0.00

= 1¢ TOLERANCE (ft) = 0.010

= 2¢ TOLERANCE (%) = 1.000

CURRENT DATE: 07-23-1999
 CURRENT TIME: 08:13:55

FILE DATE: 07-23-1999
 FILE NAME: NBT11

2/3

PERFORMANCE CURVE FOR CULVERT 1 - (1.00 (ft) BY 1.00 (ft)) CSP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4€ (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	52.50	0.00	0.90	0-NF	0.00	0.00	0.00	1.91	0.00	0.00
0.40	52.56	0.36	0.96	4-FFt	0.33	0.26	1.00	1.91	0.51	0.00
0.80	52.75	0.52	1.15	4-FFt	0.49	0.37	1.00	1.91	1.02	0.00
1.20	53.07	0.66	1.47	4-FFt	0.63	0.46	1.00	1.91	1.53	0.00
1.60	53.52	0.78	1.92	4-FFt	0.78	0.53	1.00	1.91	2.04	0.00
2.00	54.09	0.91	2.49	4-FFt	1.00	0.60	1.00	1.91	2.55	0.00
2.40	54.79	1.03	3.19	4-FFt	1.00	0.66	1.00	1.91	3.06	0.00
2.80	55.62	1.17	4.02	4-FFt	1.00	0.72	1.00	1.91	3.57	0.00
3.20	56.58	1.32	4.98	4-FFt	1.00	0.76	1.00	1.91	4.07	0.00
3.60	57.66	1.49	6.06	4-FFt	1.00	0.81	1.00	1.91	4.58	0.00
4.00	58.87	1.67	7.27	4-FFt	1.00	0.84	1.00	1.91	5.09	0.00

El. inlet face invert 51.60 ft El. outlet invert 50.59 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****
 INLET STATION 0.00 ft
 INLET ELEVATION 51.60 ft
 OUTLET STATION 135.00 ft
 OUTLET ELEVATION 50.59 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0075
 CULVERT LENGTH ALONG SLOPE 135.00 ft

***** CULVERT DATA SUMMARY *****
 BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.00 ft
 BARREL MATERIAL CORRUGATED STEEL
 BARREL MANNING'S n 0.024
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL SQUARE EDGE WITH HEADWALL
 INLET DEPRESSION NONE

CURRENT DATE: 07-23-1999
CURRENT TIME: 08:13:55

FILE DATE: 07-23-1999
FILE NAME: NBT11

TAILWATER

CONSTANT WATER SURFACE ELEVATION
52.50

ROADWAY OVERTOPPING DATA

WEIR COEFFICIENT 2.50
EMBANKMENT TOP WIDTH 10.00 ft

***** USER DEFINED ROADWAY PROFILE - YARD

CROSS-SECTION	X	Y
COORD. NO.	ft	ft
1	0.00	58.00
2	11.00	57.10
3	34.00	58.00

ANALYSIS W/ EXPANDED DISCH. RANGE
TO MODEL O' TOP IN YARD AT 57.1+

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
52.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
56.08	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.00	1
57.45	6.0	3.5	0.0	0.0	0.0	0.0	0.0	2.43	15
57.58	9.0	3.6	0.0	0.0	0.0	0.0	0.0	5.35	10
57.67	12.0	3.6	0.0	0.0	0.0	0.0	0.0	8.30	8
57.75	15.0	3.6	0.0	0.0	0.0	0.0	0.0	11.27	7
57.81	18.0	3.7	0.0	0.0	0.0	0.0	0.0	14.22	6
57.87	21.0	3.7	0.0	0.0	0.0	0.0	0.0	17.13	5
57.92	24.0	3.7	0.0	0.0	0.0	0.0	0.0	20.15	5
57.96	27.0	3.7	0.0	0.0	0.0	0.0	0.0	23.17	5
58.01	30.0	3.7	0.0	0.0	0.0	0.0	0.0	26.11	4

~~TIME OF CONCENTRATION AND TRAVEL TIME~~ Version 2.10 - TR 55
CALCULATIONS

Project : CHERRY HILL ESTATES User: cfb Date: 01-28-2000
 County : State: Checked: ____ Date: ____
 Subtitle: PROPOSED CONDITION SUBAREA ANALYSIS

----- Subarea #1 - Tt WSA -----

Flow Type	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Shallow Concent'd	100	.044	U					0.008
Shallow Concent'd	550	.01	U					0.095
Open Channel	380	.013		.04	1.4	4		0.050
Travel Time = 0.15*								=====

----- Subarea #2 - Tt R01 -----

Flow Type	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Shallow Concent'd	180	.015	U					0.025
Open Channel	380	.013		.04	1.4	4		0.050
Travel Time = 0.08*								=====

----- Subarea #3 - Tt Bup -----

Flow Type	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Shallow Concent'd	280	.038	U					0.025
Open Channel	160	.014		.04	1.4	4		0.020
Travel Time = 0.05*								=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Bermuda	--- Surface Codes ---
C Cultivated = 20 % Res.	H Woods, Light	P Paved
D Cultivated & 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

RES 01 STAGE - STORAGE

Elev	Area (Sq Ft)	Avg Area (Sq Ft)	Inc Depth (Ft)	Inc Vol (Ac Ft)	Cum Vol (Ac Ft)
64	12530				-
		15145	2.00	1	
66	17760				0.695
		19380	1.00	0.445	
67	21000				1.140
		22370	1.00	0.514	
68	23740				1.654



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT-0015
NAME _____
DATE FEB 2000

MADE BY _____

- MEMO
- CALCULATION

RES 01 - WATER QUALITY VOL.

Cell 1:

ELEV	AREA FT ²	Avg FT ²	INC.D. FT	INC.VOL FT ³	CumVol FT ³
63	4990				0
		5315	.5	2657	
63.5	5640				2657

Calc 2:

ELEV	AREA FT ²	Avg FT ²	INC.D. FT	INC.VOL FT ³	CumVol FT ³
63	4720				0
		4985	.5	2492	
63.5	5250				2492
63.5	10890				25149
		11710	.5	5855	
64	12530				<u>11004</u>

TOTAL IMPERVIOUS AREA TRIB. TO RES 01 : WS 1A - 1J
A = 1.04 Ac. B = 2.78 Ac. C = .02 Ac.

PROPOSED BLDG FOOTPRINT AREAS
A = 11,900 FT² B = 38,300 FT² C = 0

NET IMPERVIOUS AREAS
A = 33,403 FT² B = 82,797 FT² C = 871 FT²

1" RUNOFF: 9756 CWT. ∴ OKAY SINCE 11,004 CWT PROVIDED.

SUMMARY PRINTOUT SECT 001 - 025

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	FULLPRINT	SUMMARY	NOPLOTS
TITLE 001 PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV			
TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/02/00			
5 RAINFL 9	.25		
8	0.0	.0025	.0075 .010
8	.0125	.015	.0175 .020 .0225
8	.026	.0285	.031 .0345 .037
8	.0405	.043	.0465 .050 .0535
8	.057	.0605	.064 .068 .072
8	.076	.080	.0845 .089 .094
8	.100	.1075	.115 .1225 .130
8	.1385	.148	.157 .167 .178
8	.189	.202	.216 .2315 .250
8	.271	.298	.3455 .500 .6555
8	.702	.7295	.751 .769 .785
8	.7985	.811	.823 .834 .8435
8	.853	.862	.870 .8785 .886
8	.8935	.900	.907 .911 .916
8	.920	.9245	.929 .9325 .936
8	.940	.944	.947 .951 .954
8	.957	.9605	.963 .9665 .969
8	.9725	.975	.9775 .981 .9835
8	.986	.9885	.991 .9935 .996
8	.9985	1.0	1.0 1.0
9 ENDTBL			
3 STRUCT	01		
8	64.	0.0	0.0
8	66.	7.4	.695
8	67.	10.	1.140
8	68.	39.2	1.654
9 ENDTBL			
6 RUNOFF 1 001	1 .00103125	72.	.22 1 1 1 1
6 RUNOFF 1 002	2 .00053125	85.	.22 1 1 1 1
6 ADDHYD 4 003	2 1 3		1 1 1 1
6 RUNOFF 1 004	1 .003	55.	.19 1 1 1 1
6 ADDHYD 4 005	3 1 4		1 1 1 1
6 RUNOFF 1 006	1 .00179688	60.	.15 1 1 1 1
6 ADDHYD 4 007	4 1 5		1 1 1 1
6 RUNOFF 1 008	1 .00298438	73.	.27 1 1 1 1
6 RUNOFF 1 009	2 .00851562	53.	.29 1 1 1 1
6 ADDHYD 4 010	2 1 3		1 1 1 1
6 RUNOFF 1 011	2 .00460938	68.	.13 1 1 1 1
6 RUNOFF 1 012	1 .00067187	76.	.13 1 1 1 1
6 ADDHYD 4 013	2 1 4		1 1 1 1
6 ADDHYD 4 014	4 3 2		1 1 1 1
6 RUNOFF 1 015	1 .0006875	84.	.13 1 1 1 1
6 ADDHYD 4 016	2 1 3		1 1 1 1
6 ADDHYD 4 017	3 5 4		1 1 1 1
6 RUNOFF 1 018	1 .00104688	81.	.17 1 1 1 1
6 RUNOFF 1 019	2 .00110938	80.	.15 1 1 1 1
6 ADDHYD 4 020	1 2 3		1 1 1 1
6 RUNOFF 1 021	1 .00265625	55.	.10 1 1 1 1
6 ADDHYD 4 022	3 1 2		1 1 1 1
6 ADDHYD 4 023	2 4 1		1 1 1 1
6 RESVOR 2 01 1	5 63.		1 1 1 1 1
6 RUNOFF 1 024	6 .0038281	53.	.11 1 1 1 1
6 RUNOFF 1 025	7 .0150625	48.	.19 1 1 1 1
ENDATA			

```

7 INCREM 6 .1
7 COMPUT 7 001 025 0.0 3.1 1.0 9 2 02 01
  ENDCMP 1
7 COMPUT 7 001 025 0.0 4.6 1.0 9 2 02 02
  ENDCMP 1
7 COMPUT 7 001 025 0.0 5.4 1.0 9 2 02 03
  ENDCMP 1
7 COMPUT 7 001 025 0.0 7.0 1.0 9 2 02 04
  ENDCMP 1
  ENDJOB 2

```

*****END OF 80-80 LIST*****

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 MOIST 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	2	STORM	1											
XSECTION	1	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.87	---	12.30	.45	436.0
XSECTION	2	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.66	---	12.30	.44	823.9
XSECTION	3	ADDHYD	.00	9	2	.10	.0	3.10	24.00	1.14	---	12.30	.89	567.9
XSECTION	4	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.22	---	12.30	.17	56.2
XSECTION	5	ADDHYD	.00	9	2	.10	.0	3.10	24.00	.54	---	12.30	1.06	231.4
XSECTION	6	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.37	---	12.30	.30	167.5
XSECTION	7	ADDHYD	.01	9	2	.10	.0	3.10	24.00	.49	---	12.29	1.36	213.8
XSECTION	8	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.92	---	12.30	1.32	442.7
XSECTION	9	RUNOFF	.01	9	2	.10	.0	3.10	24.00	.17	---	12.60	.22	26.2
XSECTION	10	ADDHYD	.01	9	2	.10	.0	3.10	24.00	.37	---	12.33	1.43	124.7
XSECTION	11	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.68	---	12.26	1.67	362.3
XSECTION	12	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.09	---	12.20	.38	559.4
XSECTION	13	ADDHYD	.01	9	2	.10	.0	3.10	24.00	.73	---	12.26	2.06	390.5
XSECTION	14	ADDHYD	.02	9	2	.10	.0	3.10	24.00	.48	---	12.27	3.43	204.5
XSECTION	15	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.60	---	12.20	.56	817.1
XSECTION	16	ADDHYD	.02	9	2	.10	.0	3.10	24.00	.53	---	12.27	3.99	228.6
XSECTION	17	ADDHYD	.02	9	2	.10	.0	3.10	24.00	.52	---	12.27	5.34	224.2
XSECTION	18	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.39	---	12.30	.74	702.1
XSECTION	19	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.33	---	12.20	.75	674.8
XSECTION	20	ADDHYD	.00	9	2	.10	.0	3.10	24.00	1.36	---	12.25	1.56	722.7
XSECTION	21	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.22	---	12.30	.20	73.7
XSECTION	22	ADDHYD	.00	9	2	.10	.0	3.10	24.00	.73	---	12.26	1.74	361.5
XSECTION	23	ADDHYD	.03	9	2	.10	.0	3.10	24.00	.55	---	12.27	7.08	247.1
STRUCTURE	1	RESVOR	.03	9	2	.10	.0	3.10	24.00	.55	64.63	12.67	2.34	81.7
XSECTION	24	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.17	---	12.30	.15	39.0
XSECTION	25	RUNOFF	.02	9	2	.10	.0	3.10	24.00	.07	---	15.80	.09	6.3

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST 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 2		STORM 2											
+													
XSECTION 1	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.89	---	12.30	.99	955.5
XSECTION 2	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.99	---	12.30	.76	1428.0
XSECTION 3	ADDHYD	.00	9	2	.10	.0	4.60	24.00	2.27	---	12.26	1.78	1141.8
XSECTION 4	RUNOFF	.00	9	2	.10	.0	4.60	24.00	.79	---	12.29	1.14	380.6
XSECTION 5	ADDHYD	.00	9	2	.10	.0	4.60	24.00	1.30	---	12.27	2.92	639.2
XSECTION 6	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.08	---	12.30	1.00	555.1
XSECTION 7	ADDHYD	.01	9	2	.10	.0	4.60	24.00	1.23	---	12.27	3.95	620.5
XSECTION 8	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.97	---	12.28	2.89	968.4
XSECTION 9	RUNOFF	.01	9	2	.10	.0	4.60	24.00	.68	---	12.35	2.27	266.4
XSECTION 10	ADDHYD	.01	9	2	.10	.0	4.60	24.00	1.02	---	12.32	5.10	443.5
XSECTION 11	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.61	---	12.23	3.84	833.4
XSECTION 12	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.22	---	12.20	.76	1135.7
XSECTION 13	ADDHYD	.01	9	2	.10	.0	4.60	24.00	1.69	---	12.23	4.60	871.4
XSECTION 14	ADDHYD	.02	9	2	.10	.0	4.60	24.00	1.23	---	12.27	9.66	575.4
XSECTION 15	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.92	---	12.20	.99	1444.2
XSECTION 16	ADDHYD	.02	9	2	.10	.0	4.60	24.00	1.29	---	12.27	10.63	608.7
XSECTION 17	ADDHYD	.02	9	2	.10	.0	4.60	24.00	1.28	---	12.27	14.58	611.9
XSECTION 18	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.64	---	12.23	1.37	1309.0
XSECTION 19	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.56	---	12.22	1.42	1280.9
XSECTION 20	ADDHYD	.00	9	2	.10	.0	4.60	24.00	2.60	---	12.22	2.79	1294.3
XSECTION 21	RUNOFF	.00	9	2	.10	.0	4.60	24.00	.79	---	12.20	1.01	381.9
XSECTION 22	ADDHYD	.00	9	2	.10	.0	4.60	24.00	1.60	---	12.23	3.83	795.3
XSECTION 23	ADDHYD	.03	9	2	.10	.0	4.60	24.00	1.33	---	12.26	18.50	645.9
STRUCTURE 1	RESVOR	.03	9	2	.10	.0	4.60	24.00	1.33	65.71	12.63	6.34	221.5
XSECTION 24	RUNOFF	.00	9	2	.10	.0	4.60	24.00	.69	---	12.26	1.30	340.3
XSECTION 25	RUNOFF	.02	9	2	.10	.0	4.60	24.00	.45	---	12.32	2.47	164.2

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST 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	2	STORM	3									
XSECTION 1	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.51	---	12.26	1.32	1282.2
XSECTION 2	RUNOFF	.00	9	2	.10	.0	5.40	24.00	3.73	---	12.20	.93	1753.5
XSECTION 3	ADDHYD	.00	9	2	.10	.0	5.40	24.00	2.92	---	12.26	2.29	1462.5
XSECTION 4	RUNOFF	.00	9	2	.10	.0	5.40	24.00	1.19	---	12.28	1.81	602.5
XSECTION 5	ADDHYD	.00	9	2	.10	.0	5.40	24.00	1.78	---	12.27	4.09	895.4
XSECTION 6	RUNOFF	.00	9	2	.10	.0	5.40	24.00	1.55	---	12.26	1.50	833.2
XSECTION 7	ADDHYD	.01	9	2	.10	.0	5.40	24.00	1.72	---	12.27	5.58	877.4
XSECTION 8	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.60	---	12.28	3.80	1274.2
XSECTION 9	RUNOFF	.01	9	2	.10	.0	5.40	24.00	1.05	---	12.33	3.90	457.6
XSECTION 10	ADDHYD	.01	9	2	.10	.0	5.40	24.00	1.45	---	12.31	7.63	663.5
XSECTION 11	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.18	---	12.22	5.19	1126.4
XSECTION 12	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.88	---	12.20	.98	1461.7
XSECTION 13	ADDHYD	.01	9	2	.10	.0	5.40	24.00	2.27	---	12.22	6.17	1168.5
XSECTION 14	ADDHYD	.02	9	2	.10	.0	5.40	24.00	1.71	---	12.27	13.76	819.7
XSECTION 15	RUNOFF	.00	9	2	.10	.0	5.40	24.00	3.65	---	12.18	1.23	1786.8
XSECTION 16	ADDHYD	.02	9	2	.10	.0	5.40	24.00	1.79	---	12.26	14.97	856.7
XSECTION 17	ADDHYD	.02	9	2	.10	.0	5.40	24.00	1.77	---	12.26	20.55	862.3
XSECTION 18	RUNOFF	.00	9	2	.10	.0	5.40	24.00	3.35	---	12.22	1.72	1641.2
XSECTION 19	RUNOFF	.00	9	2	.10	.0	5.40	24.00	3.26	---	12.21	1.79	1613.6
XSECTION 20	ADDHYD	.00	9	2	.10	.0	5.40	24.00	3.30	---	12.21	3.51	1626.7
XSECTION 21	RUNOFF	.00	9	2	.10	.0	5.40	24.00	1.19	---	12.22	1.63	612.6
XSECTION 22	ADDHYD	.00	9	2	.10	.0	5.40	24.00	2.14	---	12.22	5.13	1066.8
XSECTION 23	ADDHYD	.03	9	2	.10	.0	5.40	24.00	1.83	---	12.26	25.78	900.1
STRUCTURE 1	RESVOR	.03	9	2	.10	.0	5.40	24.00	1.82	66.37	12.64	8.37	292.2
XSECTION 24	RUNOFF	.00	9	2	.10	.0	5.40	24.00	1.06	---	12.25	2.04	532.4
XSECTION 25	RUNOFF	.02	9	2	.10	.0	5.40	24.00	.74	---	12.30	5.03	333.8

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST 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	2	STORM	4										
+													
XSECTION 1	RUNOFF	.00	9	2	.10	.0	7.00	24.00	3.83	---	12.26	1.99	1931.9
XSECTION 2	RUNOFF	.00	9	2	.10	.0	7.00	24.00	5.24	---	12.24	1.29	2431.6
XSECTION 3	ADDHYD	.00	9	2	.10	.0	7.00	24.00	4.31	---	12.25	3.32	2122.4
XSECTION 4	RUNOFF	.00	9	2	.10	.0	7.00	24.00	2.13	---	12.27	3.34	1112.7
XSECTION 5	ADDHYD	.00	9	2	.10	.0	7.00	24.00	2.87	---	12.26	6.65	1457.3
XSECTION 6	RUNOFF	.00	9	2	.10	.0	7.00	24.00	2.62	---	12.25	2.53	1406.5
XSECTION 7	ADDHYD	.01	9	2	.10	.0	7.00	24.00	2.80	---	12.26	9.17	1442.3
XSECTION 8	RUNOFF	.00	9	2	.10	.0	7.00	24.00	3.93	---	12.27	5.71	1912.7
XSECTION 9	RUNOFF	.01	9	2	.10	.0	7.00	24.00	1.94	---	12.31	7.72	907.0
XSECTION 10	ADDHYD	.01	9	2	.10	.0	7.00	24.00	2.45	---	12.30	13.37	1162.7
XSECTION 11	RUNOFF	.00	9	2	.10	.0	7.00	24.00	3.43	---	12.21	8.07	1751.6
XSECTION 12	RUNOFF	.00	9	2	.10	.0	7.00	24.00	4.28	---	12.19	1.43	2131.2
XSECTION 13	ADDHYD	.01	9	2	.10	.0	7.00	24.00	3.54	---	12.21	9.50	1799.4
XSECTION 14	ADDHYD	.02	9	2	.10	.0	7.00	24.00	2.80	---	12.26	22.82	1359.6
XSECTION 15	RUNOFF	.00	9	2	.10	.0	7.00	24.00	5.16	---	12.17	1.70	2470.4
XSECTION 16	ADDHYD	.02	9	2	.10	.0	7.00	24.00	2.89	---	12.26	24.49	1402.0
XSECTION 17	ADDHYD	.02	9	2	.10	.0	7.00	24.00	2.87	---	12.26	33.66	1412.8
XSECTION 18	RUNOFF	.00	9	2	.10	.0	7.00	24.00	4.82	---	12.21	2.42	2313.7
XSECTION 19	RUNOFF	.00	9	2	.10	.0	7.00	24.00	4.71	---	12.20	2.54	2288.8
XSECTION 20	ADDHYD	.00	9	2	.10	.0	7.00	24.00	4.76	---	12.20	4.96	2300.6
XSECTION 21	RUNOFF	.00	9	2	.10	.0	7.00	24.00	2.14	---	12.21	2.99	1124.2
XSECTION 22	ADDHYD	.00	9	2	.10	.0	7.00	24.00	3.31	---	12.20	7.95	1651.2
XSECTION 23	ADDHYD	.03	9	2	.10	.0	7.00	24.00	2.94	---	12.25	41.70	1455.9
STRUCTURE 1	RESVOR	.03	9	2	.10	.0	7.00	24.00	2.93	67.39	12.48	21.44	748.5
XSECTION 24	RUNOFF	.00	9	2	.10	.0	7.00	24.00	1.95	---	12.22	3.88	1014.2
XSECTION 25	RUNOFF	.02	9	2	.10	.0	7.00	24.00	1.49	---	12.28	11.36	754.0

24R STORM

OPERATION RUNOFF CROSS SECTION 24 "A"

OUTPUT HYDROGRAPH= 6

AREA= .00 SQ MI INPUT RUNOFF CURVE= 53. TIME OF CONCENTRATION= .11 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0147 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .02 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.02	(RUNOFF)
12.30	.15	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
12.00	DISCHG	.00	.03	.15	.11	.09
13.00	DISCHG	.07	.07	.07	.06	.06
14.00	DISCHG	.06	.06	.06	.05	.05
15.00	DISCHG	.05	.05	.05	.04	.05
16.00	DISCHG	.04	.04	.04	.04	.04
17.00	DISCHG	.02	.03	.03	.03	.03
18.00	DISCHG	.03	.02	.02	.02	.03
19.00	DISCHG	.03	.02	.02	.03	.02
20.00	DISCHG	.02	.02	.02	.02	.02
21.00	DISCHG	.02	.02	.02	.02	.02
22.00	DISCHG	.02	.02	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02
24.00	DISCHG	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = .17 WATERSHED INCHES, .43 CFS-HRS, .04 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 25 "Bupl"

OUTPUT HYDROGRAPH= 7

AREA= .02 SQ MI INPUT RUNOFF CURVE= 48. TIME OF CONCENTRATION= .19 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0253 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .05 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.05	(RUNOFF)
15.80	.09	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.02 SQ.MI.
12.00	DISCHG	.00	.00	.00	.00	.00
13.00	DISCHG	.06	.07	.07	.08	.08
14.00	DISCHG	.09	.09	.09	.09	.09
15.00	DISCHG	.09	.09	.09	.09	.09
16.00	DISCHG	.09	.09	.09	.08	.08
17.00	DISCHG	.06	.06	.07	.06	.06
18.00	DISCHG	.06	.06	.05	.05	.05
19.00	DISCHG	.06	.06	.05	.06	.06
20.00	DISCHG	.05	.05	.05	.05	.05
21.00	DISCHG	.04	.05	.05	.04	.04
22.00	DISCHG	.06	.05	.05	.04	.04
23.00	DISCHG	.04	.04	.04	.04	.05
24.00	DISCHG	.03	.02	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = .07 WATERSHED INCHES, .72 CFS-HRS, .06 ACRE-FEET; BASEFLOW = .00 CFS

2 YR STORM - RES 01

TR20 XEQ 02-03-00 07:45
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/02/00

JOB 1 PASS 1
PAGE 14

OPERATION RESVOR STRUCTURE 1
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 63.00

PEAK TIME(HRS) 12.67 PEAK DISCHARGE(CFS) 2.34 PEAK ELEVATION(FEET) 64.63

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.03 SQ.MI.
9.00	DISCHG	.00	.00	.00	.00	.01
9.00	ELEV	64.00	64.00	64.00	64.00	64.00
10.00	DISCHG	.01	.01	.02	.03	.04
10.00	ELEV	64.00	64.00	64.01	64.01	64.01
11.00	DISCHG	.05	.06	.07	.10	.15
11.00	ELEV	64.01	64.01	64.02	64.03	64.06
12.00	DISCHG	.59	1.33	1.78	2.11	2.27
12.00	ELEV	64.16	64.25	64.36	64.48	64.61
13.00	DISCHG	2.21	2.09	2.02	1.96	1.66
13.00	ELEV	64.60	64.58	64.56	64.53	64.45
14.00	DISCHG	1.60	1.50	1.45	1.41	1.21
14.00	ELEV	64.43	64.42	64.41	64.38	64.33
15.00	DISCHG	1.17	1.11	1.08	1.05	.93
15.00	ELEV	64.32	64.31	64.30	64.28	64.25
16.00	DISCHG	.91	.87	.85	.83	.74
16.00	ELEV	64.24	64.24	64.23	64.22	64.20
17.00	DISCHG	.72	.67	.65	.63	.55
17.00	ELEV	64.19	64.19	64.18	64.17	64.15
18.00	DISCHG	.53	.51	.50	.48	.43
18.00	ELEV	64.14	64.14	64.13	64.13	64.12
19.00	DISCHG	.43	.41	.41	.40	.37
19.00	ELEV	64.12	64.11	64.11	64.11	64.10
20.00	DISCHG	.36	.35	.35	.35	.33
20.00	ELEV	64.10	64.10	64.10	64.09	64.09
21.00	DISCHG	.32	.31	.31	.31	.29
21.00	ELEV	64.09	64.09	64.09	64.08	64.08
22.00	DISCHG	.30	.30	.29	.29	.27
22.00	ELEV	64.08	64.08	64.08	64.08	64.07
23.00	DISCHG	.27	.27	.27	.26	.25
23.00	ELEV	64.07	64.07	64.07	64.07	64.07
24.00	DISCHG	.25	.22	.20	.19	.12
24.00	ELEV	64.07	64.06	64.06	64.05	64.03
25.00	DISCHG	.11	.09	.08	.08	.05
25.00	ELEV	64.03	64.03	64.02	64.02	64.01
26.00	DISCHG	.05	.04	.04	.03	.02
26.00	ELEV	64.01	64.01	64.01	64.01	64.01
27.00	DISCHG	.02	.02	.01	.01	.01
27.00	ELEV	64.01	64.00	64.00	64.00	64.00

RUNOFF VOLUME ABOVE BASEFLOW = .55 WATERSHED INCHES, 10.17 CFS-HRS, .84 ACRE-FEET; BASEFLOW = .00 CFS

2 4 R STORM

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	FULLPRINT	SUMMARY	NOLOTS
TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.			
TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00			
5 RAINFL 9	.25		
8	0.0	.0025	.005 .0075 .010
8	.0125	.015	.0175 .020 .0225
8	.026	.0285	.031 .0345 .037
8	.0405	.043	.0465 .050 .0535
8	.057	.0605	.064 .068 .072
8	.076	.080	.0845 .089 .094
8	.100	.1075	.115 .1225 .130
8	.1385	.148	.157 .167 .178
8	.189	.202	.216 .2315 .250
8	.271	.298	.3455 .500 .6555
8	.702	.7295	.751 .769 .785
8	.7985	.811	.823 .834 .8435
8	.853	.862	.870 .8785 .886
8	.8935	.900	.907 .911 .916
8	.920	.9245	.929 .9325 .936
8	.940	.944	.947 .951 .954
8	.957	.9605	.963 .9665 .969
8	.9725	.975	.9775 .981 .9835
8	.986	.9885	.991 .9935 .996
8	.9985	1.0	1.0 1.0 1.0
9 ENDTBL			
3 STRUCT 10			
8	55.	0.0	0.0
8	56.	.77	.0002
8	57.1	1.18	.03
8	58.	1.38	.057
8	59.	1.5	.232
8	60.	1.61	.750
8	60.5	1.64	1.12
8	62.	11.7	3.69
9 ENDTBL			
3 STRUCT 11			
8	52.5	0.0	0.0
8	53.	1.	.0001
8	54.	2.	.005
8	56.	3.	.100
8	57.1	3.5	.324
8	58.	30.	.704
9 ENDTBL			
6 ADDHYD 4 001 1 2 4			1 1 1 1
6 ADDHYD 4 002 4 3 5			1 1 1 1
6 RUNOFF 1 003 6 .0071875 77.		.44	1 1 1 1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6	ADDHYD	4	004	6	5	7				1	1	1	1
6	RESVOR	2		10	7	5	55.			1	1	1	1
6	RUNOFF	1	005	6	.0070312	49.		.28		1	1	1	1
6	ADDHYD	4	006	6	5	4				1	1	1	1
6	RESVOR	2		11	4	5	52.5			1	1	1	1

ENDATA

7	INCREM	6		0.07									
7	READHD	8		1									
7	READHD	9	9.08	.2	.028640625	0.0							
8			0.0	0.0	0.0	0.0	0.0	0.0	0.0				
8			.01	.01	.02	.03	.03	.03					
8			.05	.06	.08	.12	.21						
8			.59	1.13	2.11	2.33	2.31						
8			2.21	2.09	1.96	1.84	1.72						
8			1.6	1.5	1.41	1.33	1.24						
8			1.17	1.11	1.05	.99	.95						
8			.91	.87	.83	.79	.76						
8			.72	.67	.63	.59	.56						
8			.53	.51	.48	.46	.44						
8			.43	.41	.40	.39	.38						
8			.36	.35	.35	.33	.33						
8			.32	.31	.31	.30	.30						
8			.30	.30	.29	.28	.28						
8			.27	.27	.26	.26	.26						
8			.25	.22	.19	.16	.13						
8			.11	.09	.08	.07	.05						
8			.05	.04	.03	.03	.02						
8			.02	.02	.01	.01	.01						

9 ENDTBL

7	READHD	8		2									
7	READHD	9	12.15	.2	.003828125	0.0							
8			0.0	.03	.10	.09	.08						
8			.07	.07	.06	.06	.06						
8			.06	.06	.05	.05	.05						
8			.05	.05	.04	.05	.05						
8			.04	.04	.04	.04	.04						
8			.02	.03	.03	.03	.03						
8			.03	.02	.02	.03	.03						
8			.03	.02	.02	.02	.02						
8			.02	.02	.02	.02	.02						
8			.02	.02	.02	.02	.02						
8			.02	.02	.02	.02	.02						
8			.02	.02	.02	.02	.02						
8			.01	0.0	0.0	0.0	0.0						

9 ENDTBL

7 READHD 8 3

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

7	READHD	9	12.05	.2	.0150625	0.0				
8			0.0	0.0	0.0	0.00	.04			
8			.06	.07	.08	.08	.08			
8			.09	.09	.09	.09	.09			
8			.09	.09	.09	.09	.09			
8			.09	.09	.09	.08	.09			
8			.06	.06	.06	.06	.06			
8			.06	.05	.05	.05	.06			
8			.06	.05	.06	.06	.05			
8			.05	.05	.05	.05	.06			
8			.04	.05	.05	.04	.04			
8			.06	.05	.05	.04	.04			
8			.04	.04	.04	.05	.04			
8			.03	.01	0.0	0.0	0.0			
9	ENDTBL									
7	COMPUT	7	001	11	0.0	3.1	1.0	9	2	02 01
	ENDCMP	1								
	ENDJOB	2								

*****END OF 80-80 LIST*****

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

	STARTING TIME= 9.08	TIME INCREMENT= .20	DRAINAGE AREA= .03	BASE FLOW= .00	
8	.00	.00	.00	.00	.00
8	.01	.01	.02	.03	.03
8	.05	.06	.08	.12	.21
8	.59	1.13	2.11	2.33	2.31
8	2.21	2.09	1.96	1.84	1.72
8	1.60	1.50	1.41	1.33	1.24
8	1.17	1.11	1.05	.99	.95
8	.91	.87	.83	.79	.76
8	.72	.67	.63	.59	.56
8	.53	.51	.48	.46	.44
8	.43	.41	.40	.39	.38
8	.36	.35	.35	.33	.33
8	.32	.31	.31	.30	.30
8	.30	.30	.29	.28	.28
8	.27	.27	.26	.26	.26
8	.25	.22	.19	.16	.13
8	.11	.09	.08	.07	.05
8	.05	.04	.03	.03	.02
8	.02	.02	.01	.01	.01

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

	STARTING TIME= 12.15	TIME INCREMENT= .20	DRAINAGE AREA= .00	BASE FLOW= .00	
8	.00	.03	.10	.09	.08
8	.07	.07	.06	.06	.06
8	.06	.06	.05	.05	.05
8	.05	.05	.04	.05	.05
8	.04	.04	.04	.04	.04
8	.02	.03	.03	.03	.03
8	.03	.02	.02	.03	.03
8	.03	.02	.02	.02	.02
8	.02	.02	.02	.02	.02
8	.02	.02	.02	.02	.02
8	.02	.02	.02	.02	.02
8	.02	.02	.02	.02	.02
8	.01	.00	.00	.00	.00

9 ENDTBL

TR20 XEQ 02-08-00 13:41
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 2

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 3

RECORD ID

STARTING TIME= 12.05 TIME INCREMENT= .20 DRAINAGE AREA= .02 BASE FLOW= .00

8	.00	.00	.00	.00	.04
8	.06	.07	.08	.08	.08
8	.09	.09	.09	.09	.09
8	.09	.09	.09	.09	.09
8	.09	.09	.09	.08	.09
8	.06	.06	.06	.06	.06
8	.06	.05	.05	.05	.06
8	.06	.05	.06	.06	.05
8	.05	.05	.05	.05	.06
8	.04	.05	.05	.04	.04
8	.06	.05	.05	.04	.04
8	.04	.04	.04	.05	.04
8	.03	.01	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 3.10 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .07 HOURS

OPERATION ADDHYD CROSS SECTION 1

INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS) 12.73 PEAK DISCHARGE(CFS) 2.42 PEAK ELEVATION(FEET) (NULL)

TIME(HRS) FIRST HYDROGRAPH POINT = 9.08 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .03 SQ.MI.

9.78	DISCHG	.00	.00	.00	.01	.01	.01	.01	.01	.01	.02
10.48	DISCHG	.02	.02	.03	.03	.03	.03	.03	.04	.05	.05
11.18	DISCHG	.05	.06	.06	.07	.08	.09	.10	.12	.15	.18
11.88	DISCHG	.21	.34	.48	.62	.81	1.01	1.25	1.61	1.98	2.23
12.58	DISCHG	2.32	2.39	2.42	2.41	2.40	2.37	2.33	2.29	2.24	2.20
13.28	DISCHG	2.16	2.11	2.07	2.02	1.97	1.93	1.89	1.85	1.80	1.76
13.98	DISCHG	1.72	1.68	1.64	1.61	1.57	1.54	1.50	1.47	1.44	1.41
14.68	DISCHG	1.38	1.35	1.32	1.29	1.26	1.24	1.21	1.19	1.17	1.15
15.38	DISCHG	1.13	1.10	1.08	1.06	1.04	1.03	1.02	1.00	.99	.97
16.08	DISCHG	.95	.94	.92	.91	.89	.88	.87	.85	.84	.83
16.78	DISCHG	.82	.80	.79	.77	.75	.73	.71	.70	.69	.67
17.48	DISCHG	.66	.65	.63	.62	.61	.60	.59	.58	.57	.56
18.18	DISCHG	.55	.54	.53	.51	.50	.50	.49	.49	.48	.48
18.88	DISCHG	.47	.47	.46	.46	.45	.44	.43	.43	.42	.42
19.58	DISCHG	.42	.41	.41	.40	.40	.40	.39	.38	.38	.37

TR20 XEQ 02-08-00 13:41
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 4

RUNOFF VOLUME ABOVE BASEFLOW = .37 WATERSHED INCHES, 11.26 CFS-HRS, .93 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 3

OUTPUT HYDROGRAPH= 6

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) 12.38
 PEAK DISCHARGE(CFS) 3.47
 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.01 SQ.MI.
9.80	DISCHG	.00 .00	.00 .00	.00 .00	.00 .00	.01
10.50	DISCHG	.01 .02	.02 .03	.03 .04	.05 .06	.08
11.20	DISCHG	.10 .11	.13 .15	.17 .20	.23 .29	.49
11.90	DISCHG	.73 1.10	1.58 2.09	2.59 3.03	3.37 3.46	3.28 2.93
12.60	DISCHG	2.52 2.12	1.79 1.54	1.33 1.17	1.04 .94	.86 .80
13.30	DISCHG	.75 .70	.67 .64	.61 .59	.56 .54	.52 .50
14.00	DISCHG	.49 .48	.47 .46	.45 .45	.44 .43	.42 .41
14.70	DISCHG	.40 .39	.38 .37	.36 .36	.36 .35	.35 .34
15.40	DISCHG	.34 .33	.32 .32	.31 .31	.31 .31	.31 .30
16.10	DISCHG	.30 .29	.29 .29	.29 .28	.27 .27	.26 .26
16.80	DISCHG	.26 .26	.24 .23	.21 .21	.19 .19	.19 .18
17.50	DISCHG	.18 .17	.17 .17	.17 .17	.17 .17	.17 .17
18.20	DISCHG	.17 .16	.15 .15	.14 .14	.14 .14	.14 .15
18.90	DISCHG	.15 .15	.15 .15	.15 .14	.14 .14	.13 .14
19.60	DISCHG	.14 .14	.14 .13	.13 .13	.12 .12	.12 .13
20.30	DISCHG	.13 .13	.13 .12	.12 .11	.12 .12	.12 .12

RUNOFF VOLUME ABOVE BASEFLOW = 1.06 WATERSHED INCHES, 4.93 CFS-HRS, .41 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

INPUT HYDROGRAPHS= 6,5 OUTPUT HYDROGRAPH= 7

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 5

PEAK TIME(HRS) 12.46
 PEAK DISCHARGE(CFS) 5.33
 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.05 SQ.MI.
9.80	DISCHG	.00 .00	.01 .01	.01 .01	.01 .01	.02
10.50	DISCHG	.03 .04	.05 .06	.06 .07	.09 .10	.14
11.20	DISCHG	.15 .17	.19 .22	.25 .29	.34 .41	.68
11.90	DISCHG	.97 1.48	2.09 2.76	3.45 4.11	4.72 5.18	5.18
12.60	DISCHG	4.86 4.52	4.22 3.97	3.76 3.57	3.41 3.28	3.06
13.30	DISCHG	2.97 2.88	2.80 2.72	2.65 2.59	2.52 2.46	2.34
14.00	DISCHG	2.28 2.23	2.19 2.14	2.10 2.06	2.02 1.98	1.90
14.70	DISCHG	1.86 1.82	1.78 1.74	1.71 1.68	1.65 1.63	1.58

TR20 XEQ 02-08-00 13:41
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 5

15.40	DISCHG	1.55	1.52	1.49	1.46	1.44	1.43	1.42	1.40	1.38	1.36
16.10	DISCHG	1.34	1.32	1.30	1.28	1.27	1.24	1.22	1.20	1.18	1.17
16.80	DISCHG	1.16	1.14	1.11	1.06	1.01	.98	.96	.94	.93	.91
17.50	DISCHG	.89	.87	.86	.84	.83	.82	.82	.81	.80	.78
18.20	DISCHG	.76	.74	.73	.71	.69	.69	.68	.68	.68	.68
18.90	DISCHG	.68	.68	.68	.67	.65	.63	.62	.62	.62	.62
19.60	DISCHG	.62	.61	.60	.59	.58	.57	.56	.55	.55	.55
20.30	DISCHG	.55	.55	.55	.54	.53	.52	.52	.53	.53	.52

RUNOFF VOLUME ABOVE BASEFLOW = .42 WATERSHED INCHES, 14.79 CFS-HRS, 1.22 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 55.00

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = 1.53 CFS.

PEAK TIME(HRS) 15.47 PEAK DISCHARGE(CFS) 1.53 PEAK ELEVATION(FEET) 59.28

FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .05 SQ.MI.

9.80	DISCHG	.00	.00	.00	.01	.01	.01	.01	.01	.01	.02
9.80	ELEV	55.00	55.00	55.00	55.01	55.01	55.01	55.01	55.01	55.02	55.03
10.50	DISCHG	.03	.04	.05	.06	.06	.07	.08	.10	.12	.14
10.50	ELEV	55.04	55.05	55.06	55.07	55.08	55.09	55.11	55.13	55.15	55.18
11.20	DISCHG	.15	.17	.19	.22	.25	.29	.34	.41	.52	.67
11.20	ELEV	55.20	55.22	55.25	55.28	55.32	55.37	55.44	55.53	55.67	55.87
11.90	DISCHG	.78	.81	.89	1.00	1.17	1.28	1.38	1.40	1.41	1.43
11.90	ELEV	56.02	56.11	56.31	56.63	57.06	57.56	58.03	58.14	58.27	58.40
12.60	DISCHG	1.44	1.45	1.47	1.48	1.49	1.49	1.50	1.50	1.51	1.51
12.60	ELEV	58.52	58.62	58.72	58.81	58.89	58.96	59.01	59.03	59.05	59.07
13.30	DISCHG	1.51	1.51	1.51	1.51	1.52	1.52	1.52	1.52	1.52	1.52
13.30	ELEV	59.08	59.10	59.11	59.13	59.14	59.15	59.16	59.17	59.18	59.19
14.00	DISCHG	1.52	1.52	1.52	1.52	1.53	1.53	1.53	1.53	1.53	1.53
14.00	ELEV	59.20	59.21	59.22	59.23	59.23	59.24	59.24	59.25	59.25	59.26
14.70	DISCHG	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
14.70	ELEV	59.26	59.27	59.27	59.27	59.27	59.28	59.28	59.28	59.28	59.28
15.40	DISCHG	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
15.40	ELEV	59.28	59.28	59.28	59.28	59.28	59.28	59.28	59.28	59.27	59.27
16.10	DISCHG	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
16.10	ELEV	59.27	59.27	59.27	59.26	59.26	59.26	59.25	59.25	59.25	59.24
16.80	DISCHG	1.53	1.53	1.53	1.52	1.52	1.52	1.52	1.52	1.52	1.52
16.80	ELEV	59.24	59.23	59.23	59.22	59.22	59.21	59.21	59.20	59.19	59.19
17.50	DISCHG	1.52	1.52	1.52	1.52	1.52	1.52	1.51	1.51	1.51	1.51
17.50	ELEV	59.18	59.17	59.17	59.16	59.15	59.14	59.14	59.13	59.12	59.11
18.20	DISCHG	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.50	1.50	1.50
18.20	ELEV	59.10	59.10	59.09	59.08	59.07	59.06	59.05	59.04	59.03	59.02
18.90	DISCHG	1.50	1.50	1.50	1.50	1.49	1.49	1.48	1.48	1.48	1.47
18.90	ELEV	59.01	59.00	58.99	58.96	58.93	58.90	58.87	58.85	58.82	58.79

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 6

19.60	DISCHG	1.47	1.47	1.46	1.46	1.46	1.45	1.45	1.45	1.44	1.44
19.60	ELEV	58.76	58.73	58.70	58.68	58.65	58.62	58.59	58.56	58.53	58.50
20.30	DISCHG	1.44	1.43	1.43	1.43	1.42	1.42	1.42	1.41	1.41	1.40
20.30	ELEV	58.47	58.44	58.41	58.38	58.35	58.32	58.29	58.26	58.24	58.21

RUNOFF VOLUME ABOVE BASEFLOW = .39 WATERSHED INCHES, 13.66 CFS-HRS, 1.13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 5

OUTPUT HYDROGRAPH= 6

AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .28 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0373 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .03 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
20.79	.03	(RUNOFF)
14.35	.05	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.01 SQ.MI.
11.90	DISCHG	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .01				
12.60	DISCHG	.02 .03 .03 .04 .04 .04 .05 .05 .05 .05 .05				
13.30	DISCHG	.05 .05 .05 .05 .05 .05 .05 .05 .05 .05 .05				
14.00	DISCHG	.05 .05 .05 .05 .05 .05 .05 .05 .05 .05 .05				
14.70	DISCHG	.05 .05 .05 .05 .05 .05 .05 .05 .05 .05 .05				
15.40	DISCHG	.05 .05 .05 .05 .05 .05 .05 .05 .05 .05 .05				
16.10	DISCHG	.05 .05 .05 .05 .05 .05 .05 .05 .05 .05 .05				
16.80	DISCHG	.05 .04 .04 .03 .03 .03 .03 .03 .03 .04 .03				
17.50	DISCHG	.03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03				
18.20	DISCHG	.03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03				
18.90	DISCHG	.03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03				
19.60	DISCHG	.03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03				
20.30	DISCHG	.03 .03 .03 .02 .02 .02 .03 .03 .03 .03 .03				

RUNOFF VOLUME ABOVE BASEFLOW = .07 WATERSHED INCHES, .33 CFS-HRS, .03 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 6

INPUT HYDROGRAPHS= 6,5 OUTPUT HYDROGRAPH= 4

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = 1.53 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
18.69	1.53	(NULL)
15.26	1.58	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.06 SQ.MI.
9.80	DISCHG	.00 .00 .00 .01 .01 .01 .01 .01 .01 .01 .01 .02				
10.50	DISCHG	.03 .04 .05 .06 .06 .07 .08 .08 .10 .12 .14				
11.20	DISCHG	.15 .17 .19 .22 .25 .29 .34 .41 .52 .67				

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 7

11.90	DISCHG	.78	.81	.89	1.00	1.17	1.28	1.38	1.40	1.41	1.44
12.60	DISCHG	1.46	1.48	1.50	1.51	1.53	1.54	1.55	1.55	1.55	1.56
13.30	DISCHG	1.56	1.56	1.56	1.57	1.57	1.57	1.57	1.57	1.57	1.57
14.00	DISCHG	1.57	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
14.70	DISCHG	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
15.40	DISCHG	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
16.10	DISCHG	1.58	1.58	1.58	1.58	1.58	1.58	1.57	1.57	1.57	1.57
16.80	DISCHG	1.57	1.57	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.55
17.50	DISCHG	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
18.20	DISCHG	1.54	1.54	1.54	1.54	1.54	1.53	1.53	1.53	1.53	1.53
18.90	DISCHG	1.53	1.53	1.53	1.53	1.52	1.52	1.51	1.51	1.51	1.51
19.60	DISCHG	1.50	1.50	1.49	1.49	1.48	1.48	1.48	1.47	1.47	1.47
20.30	DISCHG	1.47	1.46	1.46	1.45	1.45	1.44	1.44	1.44	1.44	1.43

RUNOFF VOLUME ABOVE BASEFLOW = .35 WATERSHED INCHES, 13.99 CFS-HRS, 1.16 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11
INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 52.50

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = 1.56 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
17.29	1.56	53.56
15.33	1.58	53.58

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.06 SQ.MI.
9.80	DISCHG	.00	.00	.01	.01	.02
9.80	ELEV	52.50	52.50	52.50	52.50	52.51
10.50	DISCHG	.03	.04	.05	.06	.14
10.50	ELEV	52.52	52.52	52.52	52.53	52.54
11.20	DISCHG	.15	.17	.19	.22	.67
11.20	ELEV	52.58	52.59	52.60	52.61	52.62
11.90	DISCHG	.78	.81	.88	1.00	1.42
11.90	ELEV	52.89	52.91	52.94	53.00	53.06
12.60	DISCHG	1.44	1.46	1.48	1.50	1.55
12.60	ELEV	53.44	53.46	53.48	53.50	53.51
13.30	DISCHG	1.56	1.56	1.56	1.57	1.57
13.30	ELEV	53.56	53.56	53.56	53.57	53.57
14.00	DISCHG	1.57	1.57	1.58	1.58	1.58
14.00	ELEV	53.57	53.57	53.58	53.58	53.58
14.70	DISCHG	1.58	1.58	1.58	1.58	1.58
14.70	ELEV	53.58	53.58	53.58	53.58	53.58
15.40	DISCHG	1.58	1.58	1.58	1.58	1.58
15.40	ELEV	53.58	53.58	53.58	53.58	53.58
16.10	DISCHG	1.58	1.58	1.58	1.58	1.57
16.10	ELEV	53.58	53.58	53.58	53.58	53.57
16.80	DISCHG	1.57	1.57	1.57	1.56	1.56
16.80	ELEV	53.57	53.57	53.57	53.56	53.56

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 8

17.50	DISCHG	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
17.50	ELEV	53.55	53.55	53.55	53.55	53.55	53.55	53.55	53.55	53.55	53.55
18.20	DISCHG	1.54	1.54	1.54	1.54	1.54	1.54	1.53	1.53	1.53	1.53
18.20	ELEV	53.54	53.54	53.54	53.54	53.54	53.54	53.53	53.53	53.53	53.53
18.90	DISCHG	1.53	1.53	1.53	1.53	1.52	1.52	1.52	1.51	1.51	1.51
18.90	ELEV	53.53	53.53	53.53	53.53	53.52	53.52	53.52	53.51	53.51	53.51
19.60	DISCHG	1.50	1.50	1.50	1.49	1.49	1.48	1.48	1.48	1.47	1.47
19.60	ELEV	53.50	53.50	53.50	53.49	53.49	53.48	53.48	53.48	53.47	53.47
20.30	DISCHG	1.47	1.46	1.46	1.45	1.45	1.45	1.44	1.44	1.44	1.44
20.30	ELEV	53.47	53.46	53.46	53.45	53.45	53.45	53.44	53.44	53.44	53.44

RUNOFF VOLUME ABOVE BASEFLOW = .35 WATERSHED INCHES, 13.97 CFS-HRS, 1.15 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)
<u>ALTERNATE 2 STORM 1</u>													
XSECTION 1	ADDHYD	.03	9	2	.07	9.1	.00	.00	.50	---	12.73	2.42	74.5
XSECTION 2	ADDHYD	.05	9	2	.07	9.1	.00	.00	.37	---	12.83	2.44	51.3
XSECTION 3	RUNOFF	.01	9	2	.07	.0	3.10	24.00	1.06	---	12.38	3.47	482.4
XSECTION 4	ADDHYD	.05	9	2	.07	.0	3.10	24.00	.42	---	12.46	5.33	97.4
STRUCTURE 10	RESVOR	.05	9	2	.07	.0	3.10	24.00	.39	59.28	15.47?	1.53?	28.0
XSECTION 5	RUNOFF	.01	9	2	.07	.0	3.10	24.00	.07	---	14.35	.05	7.8
XSECTION 6	ADDHYD	.06	9	2	.07	.0	3.10	24.00	.35	---	15.26	1.58	25.6
STRUCTURE 11	RESVOR	.06	9	2	.07	.0	3.10	24.00	.35	53.58	15.33	1.58	25.6

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 SUMMARY
PAGE 10

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
<u>STRUCTURE 11</u>	<u>.06</u>	
ALTERNATE 2		1.58
<u>STRUCTURE 10</u>	<u>.05</u>	
ALTERNATE 2		1.53
<u>XSECTION 1</u>	<u>.03</u>	
ALTERNATE 2		2.42
<u>XSECTION 2</u>	<u>.05</u>	
ALTERNATE 2		2.44
<u>XSECTION 3</u>	<u>.01</u>	
ALTERNATE 2		3.47
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		5.33
<u>XSECTION 5</u>	<u>.01</u>	
ALTERNATE 2		.05
<u>XSECTION 6</u>	<u>.06</u>	
ALTERNATE 2		1.58

1042- RES 01

TR20 XEQ 02-03-00 07:45
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/02/00

JOB 1 PASS 2
PAGE 30

OPERATION RESVOR STRUCTURE 1
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 63.00

PEAK TIME(HRS) 12.63 PEAK DISCHARGE(CFS) 6.34 PEAK ELEVATION(FEET) 65.71

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.03 SQ.MI.
8.00	DISCHG	.00	.00	.01	.01	.02
8.00	ELEV	64.00	64.00	64.00	64.00	64.01
9.00	DISCHG	.03	.03	.03	.04	.05
9.00	ELEV	64.01	64.01	64.01	64.01	64.02
10.00	DISCHG	.07	.08	.09	.10	.11
10.00	ELEV	64.02	64.02	64.02	64.03	64.04
11.00	DISCHG	.23	.26	.29	.33	.37
11.00	ELEV	64.06	64.07	64.08	64.09	64.10
12.00	DISCHG	1.84	2.76	3.85	5.00	5.84
12.00	ELEV	64.50	64.75	65.04	65.35	65.58
13.00	DISCHG	5.82	5.63	5.42	5.22	5.03
13.00	ELEV	65.57	65.52	65.47	65.41	65.36
14.00	DISCHG	3.96	3.81	3.66	3.53	3.41
14.00	ELEV	65.07	65.03	64.99	64.95	64.92
15.00	DISCHG	2.74	2.65	2.57	2.49	2.41
15.00	ELEV	64.74	64.72	64.69	64.67	64.65
16.00	DISCHG	2.04	1.98	1.93	1.89	1.84
16.00	ELEV	64.55	64.54	64.52	64.51	64.50
17.00	DISCHG	1.56	1.50	1.45	1.40	1.36
17.00	ELEV	64.42	64.41	64.39	64.38	64.37
18.00	DISCHG	1.14	1.12	1.09	1.05	1.02
18.00	ELEV	64.31	64.30	64.29	64.28	64.28
19.00	DISCHG	.90	.89	.87	.85	.83
19.00	ELEV	64.24	64.24	64.24	64.23	64.23
20.00	DISCHG	.76	.74	.73	.73	.72
20.00	ELEV	64.20	64.20	64.20	64.20	64.19
21.00	DISCHG	.66	.65	.65	.65	.65
21.00	ELEV	64.18	64.18	64.18	64.18	64.17
22.00	DISCHG	.61	.61	.61	.60	.59
22.00	ELEV	64.16	64.16	64.16	64.16	64.16
23.00	DISCHG	.55	.55	.54	.54	.54
23.00	ELEV	64.15	64.15	64.15	64.15	64.15
24.00	DISCHG	.50	.48	.45	.42	.39
24.00	ELEV	64.14	64.13	64.12	64.11	64.10
25.00	DISCHG	.23	.21	.19	.17	.16
25.00	ELEV	64.06	64.06	64.05	64.05	64.04
26.00	DISCHG	.09	.09	.08	.07	.07
26.00	ELEV	64.03	64.02	64.02	64.02	64.02
27.00	DISCHG	.04	.04	.03	.03	.03
27.00	ELEV	64.01	64.01	64.01	64.01	64.01
28.00	DISCHG	.02	.01	.01	.01	.01
28.00	ELEV	64.00	64.00	64.00	64.00	64.00

RUNOFF VOLUME ABOVE BASEFLOW = 1.33 WATERSHED INCHES, 24.53 CFS-HRS, 2.03 ACRE-FEET; BASEFLOW = .00 CFS

104R

OPERATION RUNOFF CROSS SECTION 24

OUTPUT HYDROGRAPH= 6

AREA= .00 SQ MI INPUT RUNOFF CURVE= 53. TIME OF CONCENTRATION= .11 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0147 HOURS

PEAK TIME(HRS) 12.26 PEAK DISCHARGE(CFS) 1.30 PEAK ELEVATION(FEET) (RUNOFF)

Table with 12 columns: TIME(HRS), DISCHG, and 10 columns for FIRST HYDROGRAPH POINT and TIME INCREMENT. Rows range from 11.00 to 24.00 hours.

RUNOFF VOLUME ABOVE BASEFLOW = .69 WATERSHED INCHES, 1.70 CFS-HRS, .14 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 25

OUTPUT HYDROGRAPH= 7

AREA= .02 SQ MI INPUT RUNOFF CURVE= 48. TIME OF CONCENTRATION= .19 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0253 HOURS

PEAK TIME(HRS) 12.32 PEAK DISCHARGE(CFS) 2.47 PEAK ELEVATION(FEET) (RUNOFF)

Table with 12 columns: TIME(HRS), DISCHG, and 10 columns for FIRST HYDROGRAPH POINT and TIME INCREMENT. Rows range from 12.00 to 24.00 hours.

RUNOFF VOLUME ABOVE BASEFLOW = .45 WATERSHED INCHES, 4.34 CFS-HRS, .36 ACRE-FEET; BASEFLOW = .00 CFS

10 YR STORM

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	FULLPRINT	SUMMARY	NOPLOTS
TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.			
TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00			
5 RAINFL 9	.25		
8	0.0	.0025	.005 .0075 .010
8	.0125	.015	.0175 .020 .0225
8	.026	.0285	.031 .0345 .037
8	.0405	.043	.0465 .050 .0535
8	.057	.0605	.064 .068 .072
8	.076	.080	.0845 .089 .094
8	.100	.1075	.115 .1225 .130
8	.1385	.148	.157 .167 .178
8	.189	.202	.216 .2315 .250
8	.271	.298	.3455 .500 .6555
8	.702	.7295	.751 .769 .785
8	.7985	.811	.823 .834 .8435
8	.853	.862	.870 .8785 .886
8	.8935	.900	.907 .911 .916
8	.920	.9245	.929 .9325 .936
8	.940	.944	.947 .951 .954
8	.957	.9605	.963 .9665 .969
8	.9725	.975	.9775 .981 .9835
8	.986	.9885	.991 .9935 .996
8	.9985	1.0	1.0 1.0 1.0
9 ENDTBL			
3 STRUCT	10		
8	55.	0.0	0.0
8	56.	.77	.0002
8	57.1	1.18	.03
8	58.	1.38	.057
8	59.	1.5	.232
8	60.	1.61	.750
8	60.5	1.64	1.12
8	62.	11.7	3.69
9 ENDTBL			
3 STRUCT	11		
8	52.5	0.0	0.0
8	53.	1.	.0001
8	54.	2.	.005
8	56.	3.	.100
8	57.1	3.5	.324
8	58.	30.	.704
9 ENDTBL			
6 ADDHYD 4 001	1 2 4		1 1 1 1
6 ADDHYD 4 002	4 3 5		1 1 1 1
6 RUNOFF 1 003	6 .0071875	77.	.44 1 1 1 1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6	ADDHYD	4	004	6	5	7				1	1	1	1
6	RESVOR	2		10	7	5	55.			1	1	1	1
6	RUNOFF	1	005	6	.0070312		49.		.28	1	1	1	1
6	ADDHYD	4	006	6	5	4				1	1	1	1
6	RESVOR	2		11	4	5	52.5			1	1	1	1

ENDATA

7	INCREM	6					0.07						
7	READHD	8		1									
7	READHD	9	8.08		.2		.028640625		0.0				
8			0.0		.01		.01		.01				.02
8			.03		.03		.04		.05				.06
8			.07		.09		.11		.14				.18
8			.23		.29		.37		.50				.77
8			1.84		3.85		5.84		6.34				6.18
8			5.82		5.42		5.03		4.65				4.29
8			3.96		3.66		3.41		3.17				2.94
8			2.74		2.57		2.41		2.27				2.15
8			2.04		1.93		1.84		1.75				1.67
8			1.56		1.45		1.36		1.27				1.20
8			1.14		1.09		1.02		.97				.93
8			.90		.87		.83		.82				.79
8			.76		.73		.72		.69				.68
8			.66		.65		.65		.63				.61
8			.61		.61		.59		.58				.56
8			.55		.54		.54		.53				.53
8			.50		.45		.39		.32				.27
8			.23		.19		.16		.13				.11
8			.09		.08		.07		.06				.05
8			.04		.03		.03		.02				.02
8			.02		.01		.01		.01				0.0

9 ENDTBL

7	READHD	8		2									
7	READHD	9	11.15		.2		.003828125		0.0				
8			0.0		0.0		0.0		0.0				0.0
8			.42		1.18		.61		.40				.33
8			.28		.25		.23		.20				.19
8			.19		.18		.17		.16				.15
8			.15		.15		.13		.14				.14
8			.13		.13		.11		.12				.11
8			.07		.09		.07		.08				.08
8			.08		.06		.06		.07				.07
8			.07		.06		.07		.06				.06
8			.06		.06		.05		.06				.06
8			.05		.06		.05		.05				.05
8			.07		.05		.05		.05				.05
8			.05		.05		.05		.05				.04

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	.03	0.0	0.0	0.0	0.0
9	ENDTBL				
7	READHD 8	3			
7	READHD 9	12.05	.2	.0150625	0.0
8	0.02	1.45	1.96	1.25	.91
8	.77	.68	.64	.60	.55
8	.52	.51	.50	.47	.43
8	.44	.42	.40	.39	.41
8	.37	.37	.35	.34	.35
8	.22	.25	.23	.22	.24
8	.24	.20	.19	.20	.22
8	.22	.18	.20	.20	.17
8	.17	.19	.16	.16	.19
8	.15	.19	.17	.15	.15
8	.20	.16	.15	.15	.15
8	.15	.15	.15	.15	.14
8	.10	.02	0.0	0.0	0.0
9	ENDTBL				
7	COMPUT 7 001	11 0.0	4.6	1.0	9 2 02 02
	ENDCMP 1				
	ENDJOB 2				

*****END OF 80-80 LIST*****

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

	STARTING TIME= 8.08	TIME INCREMENT= .20	DRAINAGE AREA= .03	BASE FLOW= .00	
8	.00	.01	.01	.01	.02
8	.03	.03	.04	.05	.06
8	.07	.09	.11	.14	.18
8	.23	.29	.37	.50	.77
8	1.84	3.85	5.84	6.34	6.18
8	5.82	5.42	5.03	4.65	4.29
8	3.96	3.66	3.41	3.17	2.94
8	2.74	2.57	2.41	2.27	2.15
8	2.04	1.93	1.84	1.75	1.67
8	1.56	1.45	1.36	1.27	1.20
8	1.14	1.09	1.02	.97	.93
8	.90	.87	.83	.82	.79
8	.76	.73	.72	.69	.68
8	.66	.65	.65	.63	.61
8	.61	.61	.59	.58	.56
8	.55	.54	.54	.53	.53
8	.50	.45	.39	.32	.27
8	.23	.19	.16	.13	.11
8	.09	.08	.07	.06	.05
8	.04	.03	.03	.02	.02
8	.02	.01	.01	.01	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

	STARTING TIME= 11.15	TIME INCREMENT= .20	DRAINAGE AREA= .00	BASE FLOW= .00	
8	.00	.00	.00	.00	.00
8	.42	1.18	.61	.40	.33
8	.28	.25	.23	.20	.19
8	.19	.18	.17	.16	.15
8	.15	.15	.13	.14	.14
8	.13	.13	.11	.12	.11
8	.07	.09	.07	.08	.08
8	.08	.06	.06	.07	.07
8	.07	.06	.07	.06	.06
8	.06	.06	.05	.06	.06
8	.05	.06	.05	.05	.05
8	.07	.05	.05	.05	.05

TR20 XEQ 02-08-00 13:41
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 2

8	.05	.05	.05	.05	.04
8	.03	.00	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 3 RECORD ID

STARTING TIME= 12.05 TIME INCREMENT= .20 DRAINAGE AREA= .02 BASE FLOW= .00

8	.02	1.45	1.96	1.25	.91
8	.77	.68	.64	.60	.55
8	.52	.51	.50	.47	.43
8	.44	.42	.40	.39	.41
8	.37	.37	.35	.34	.35
8	.22	.25	.23	.22	.24
8	.24	.20	.19	.20	.22
8	.22	.18	.20	.20	.17
8	.17	.19	.16	.16	.19
8	.15	.19	.17	.15	.15
8	.20	.16	.15	.15	.15
8	.15	.15	.15	.15	.14
8	.10	.02	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 2 MAIN TIME INCREMENT = .07 HOURS

OPERATION ADDHYD CROSS SECTION 1
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS) 12.68 PEAK DISCHARGE(CFS) 6.78 PEAK ELEVATION(FEET) (NULL)

TIME(HRS) FIRST HYDROGRAPH POINT = 8.08 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .03 SQ.MI.

8.08	DISCHG	.00	.00	.01	.01	.01	.01	.01	.01	.01
8.78	DISCHG	.01	.02	.02	.03	.03	.03	.03	.03	.04
9.48	DISCHG	.04	.04	.05	.05	.06	.06	.06	.07	.07
10.18	DISCHG	.08	.09	.09	.10	.11	.12	.13	.14	.17
10.88	DISCHG	.18	.20	.21	.23	.25	.27	.30	.33	.39
11.58	DISCHG	.43	.48	.55	.65	.74	1.04	1.52	2.04	3.79
12.28	DISCHG	4.76	5.73	6.22	6.65	6.64	6.74	6.78	6.66	6.58
12.98	DISCHG	6.32	6.18	6.03	5.87	5.72	5.58	5.43	5.29	5.15
13.68	DISCHG	4.86	4.72	4.59	4.47	4.35	4.23	4.12	4.01	3.91
14.38	DISCHG	3.71	3.62	3.53	3.45	3.36	3.27	3.19	3.11	3.03
15.08	DISCHG	2.89	2.83	2.77	2.71	2.66	2.59	2.53	2.48	2.43
15.78	DISCHG	2.35	2.31	2.27	2.23	2.19	2.14	2.10	2.07	2.03

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 3

16.48	DISCHG	1.96	1.92	1.89	1.86	1.84	1.81	1.77	1.73	1.67	1.62
17.18	DISCHG	1.58	1.55	1.52	1.49	1.45	1.41	1.38	1.35	1.33	1.30
17.88	DISCHG	1.28	1.26	1.24	1.22	1.20	1.17	1.15	1.12	1.09	1.07
18.58	DISCHG	1.06	1.04	1.03	1.02	1.00	.99	.98	.97	.96	.95
19.28	DISCHG	.93	.92	.91	.90	.90	.89	.88	.87	.86	.85
19.98	DISCHG	.84	.82	.81	.80	.79	.79	.78	.77	.76	.75
20.68	DISCHG	.75	.75	.74	.74	.73	.72	.71	.71	.71	.71
21.38	DISCHG	.71	.71	.70	.69	.68	.68	.67	.66	.66	.67
22.08	DISCHG	.67	.68	.67	.67	.65	.65	.64	.64	.63	.63
22.78	DISCHG	.62	.61	.61	.60	.60	.60	.59	.59	.59	.59
23.48	DISCHG	.59	.59	.58	.58	.58	.58	.57	.56	.54	.52
24.18	DISCHG	.50	.47	.44	.42	.40	.37	.35	.32	.31	.29
24.88	DISCHG	.27	.26	.24	.23	.21	.20	.19	.18	.17	.16
25.58	DISCHG	.15	.13	.13	.12	.11	.11	.10	.09	.09	.08
26.28	DISCHG	.08	.08	.07	.07	.07	.06	.06	.06	.05	.05
26.98	DISCHG	.05	.04	.04	.03	.03	.03	.03	.03	.03	.02
27.68	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.01	.01
28.38	DISCHG	.01	.01	.01	.01	.01	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 1.25 WATERSHED INCHES, 26.22 CFS-HRS, 2.17 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 2
INPUT HYDROGRAPHS= 4,3 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS) 12.50 PEAK DISCHARGE(CFS) 8.47 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 8.08 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .05 SQ.MI.								
8.08	DISCHG	.00	.00	.01	.01	.01	.01	.01	.01	.01	.01
8.78	DISCHG	.01	.02	.02	.03	.03	.03	.03	.03	.03	.04
9.48	DISCHG	.04	.04	.05	.05	.05	.06	.06	.06	.07	.07
10.18	DISCHG	.08	.09	.09	.10	.11	.12	.13	.14	.15	.17
10.88	DISCHG	.18	.20	.21	.23	.25	.27	.30	.33	.35	.39
11.58	DISCHG	.43	.48	.55	.65	.74	1.04	1.52	2.20	3.51	4.96
12.28	DISCHG	6.29	7.43	8.11	8.46	8.21	8.06	7.94	7.71	7.51	7.34
12.98	DISCHG	7.14	6.95	6.77	6.58	6.40	6.24	6.08	5.92	5.77	5.61
13.68	DISCHG	5.45	5.30	5.15	5.01	4.88	4.76	4.64	4.53	4.42	4.31
14.38	DISCHG	4.22	4.12	4.02	3.93	3.83	3.73	3.63	3.54	3.47	3.40
15.08	DISCHG	3.33	3.26	3.19	3.13	3.06	2.99	2.93	2.87	2.82	2.79
15.78	DISCHG	2.75	2.72	2.66	2.61	2.56	2.51	2.47	2.43	2.39	2.35
16.48	DISCHG	2.31	2.26	2.23	2.21	2.18	2.16	2.09	2.00	1.90	1.85
17.18	DISCHG	1.82	1.80	1.76	1.72	1.68	1.64	1.60	1.57	1.56	1.54
17.88	DISCHG	1.52	1.50	1.48	1.45	1.42	1.38	1.35	1.31	1.28	1.27
18.58	DISCHG	1.25	1.24	1.24	1.23	1.22	1.21	1.20	1.19	1.16	1.14
19.28	DISCHG	1.12	1.11	1.10	1.10	1.10	1.09	1.07	1.05	1.03	1.02
19.98	DISCHG	1.01	.99	.99	.99	.98	.97	.95	.93	.92	.91
20.68	DISCHG	.91	.92	.93	.92	.90	.88	.87	.88	.89	.89
21.38	DISCHG	.89	.88	.86	.85	.83	.83	.82	.82	.83	.86

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 4

22.08	DISCHG	.87	.86	.84	.82	.81	.80	.79	.79	.78	.78
22.78	DISCHG	.77	.76	.76	.75	.75	.75	.74	.74	.74	.74
23.48	DISCHG	.74	.74	.73	.73	.72	.72	.70	.67	.64	.60
24.18	DISCHG	.55	.49	.46	.42	.40	.37	.35	.32	.31	.29
24.88	DISCHG	.27	.26	.24	.23	.21	.20	.19	.18	.17	.16
25.58	DISCHG	.15	.13	.13	.12	.11	.11	.10	.09	.09	.08
26.28	DISCHG	.08	.08	.07	.07	.07	.06	.06	.06	.05	.05
26.98	DISCHG	.05	.04	.04	.03	.03	.03	.03	.03	.03	.02
27.68	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.01	.01
28.38	DISCHG	.01	.01	.01	.01	.01	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 1.00 WATERSHED INCHES, 30.54 CFS-HRS, 2.52 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 3

OUTPUT HYDROGRAPH= 6

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) 12.36 PEAK DISCHARGE(CFS) 7.08 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .01 SQ.MI.								
8.40	DISCHG	.00	.00	.00	.00	.00	.00	.01	.01	.02	
9.10	DISCHG	.02	.03	.03	.04	.04	.05	.06	.06	.08	
9.80	DISCHG	.09	.10	.11	.11	.12	.13	.14	.16	.19	
10.50	DISCHG	.20	.21	.23	.25	.26	.28	.31	.33	.39	
11.20	DISCHG	.42	.45	.49	.54	.59	.65	.74	.88	1.07	1.37
11.90	DISCHG	1.90	2.72	3.73	4.75	5.68	6.46	6.99	7.03	6.57	5.79
12.60	DISCHG	4.92	4.10	3.44	2.93	2.52	2.20	1.95	1.76	1.60	1.48
13.30	DISCHG	1.38	1.29	1.22	1.17	1.12	1.07	1.02	.98	.94	.91
14.00	DISCHG	.88	.86	.84	.83	.81	.80	.79	.77	.76	.74
14.70	DISCHG	.72	.69	.67	.66	.65	.64	.63	.63	.62	.61
15.40	DISCHG	.60	.59	.57	.56	.56	.56	.56	.55	.55	.54
16.10	DISCHG	.53	.52	.51	.51	.50	.49	.48	.47	.46	.46
16.80	DISCHG	.46	.45	.43	.40	.36	.34	.33	.33	.33	.32
17.50	DISCHG	.31	.30	.30	.29	.30	.30	.30	.30	.30	.30
18.20	DISCHG	.29	.28	.27	.26	.25	.25	.25	.25	.25	.26
18.90	DISCHG	.26	.27	.27	.27	.26	.25	.24	.23	.24	.24
19.60	DISCHG	.25	.25	.24	.23	.23	.22	.22	.21	.21	.22
20.30	DISCHG	.22	.22	.22	.21	.20	.20	.20	.21	.22	.21

RUNOFF VOLUME ABOVE BASEFLOW = 2.16 WATERSHED INCHES, 10.00 CFS-HRS, .83 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

INPUT HYDROGRAPHS= 6,5 OUTPUT HYDROGRAPH= 7

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 5

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.43		14.97				(NULL)					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .05 SQ.MI.	
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01
8.40	DISCHG	.01	.01	.01	.01	.01	.01	.02	.03	.04	.04
9.10	DISCHG	.05	.06	.06	.07	.08	.09	.10	.11	.12	.13
9.80	DISCHG	.15	.16	.17	.18	.19	.21	.23	.25	.27	.29
10.50	DISCHG	.31	.34	.36	.39	.42	.46	.50	.54	.58	.63
11.20	DISCHG	.69	.74	.80	.88	.96	1.07	1.20	1.40	1.67	2.07
11.90	DISCHG	2.81	4.04	5.64	7.70	10.02	12.18	13.93	14.85	14.88	14.11
12.60	DISCHG	13.05	12.09	11.25	10.53	9.93	9.42	8.98	8.60	8.26	7.96
13.30	DISCHG	7.69	7.44	7.21	7.00	6.79	6.59	6.39	6.20	6.02	5.85
14.00	DISCHG	5.69	5.55	5.42	5.29	5.17	5.06	4.95	4.84	4.72	4.61
14.70	DISCHG	4.49	4.37	4.25	4.15	4.08	4.00	3.92	3.85	3.78	3.70
15.40	DISCHG	3.62	3.54	3.47	3.41	3.36	3.32	3.29	3.24	3.18	3.12
16.10	DISCHG	3.06	3.01	2.97	2.92	2.87	2.82	2.76	2.72	2.68	2.65
16.80	DISCHG	2.63	2.57	2.47	2.34	2.24	2.17	2.14	2.11	2.07	2.02
17.50	DISCHG	1.97	1.92	1.88	1.86	1.84	1.83	1.81	1.79	1.76	1.73
18.20	DISCHG	1.69	1.64	1.59	1.56	1.53	1.51	1.49	1.49	1.49	1.49
18.90	DISCHG	1.48	1.47	1.46	1.44	1.41	1.37	1.35	1.34	1.34	1.34
19.60	DISCHG	1.34	1.33	1.30	1.27	1.25	1.23	1.21	1.21	1.20	1.20
20.30	DISCHG	1.20	1.18	1.16	1.14	1.12	1.11	1.12	1.14	1.14	1.12

RUNOFF VOLUME ABOVE BASEFLOW = 1.06 WATERSHED INCHES, 37.41 CFS-HRS, 3.09 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 55.00

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
16.03		3.15*				60.72 * FIRST POINT OF FLAT PEAK					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .05 SQ.MI.	
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01
7.70	ELEV	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.01	55.01
8.40	DISCHG	.01	.01	.01	.01	.01	.01	.02	.03	.04	.04
8.40	ELEV	55.01	55.01	55.01	55.01	55.01	55.02	55.02	55.04	55.05	55.06
9.10	DISCHG	.05	.06	.06	.07	.08	.09	.10	.11	.12	.13
9.10	ELEV	55.07	55.07	55.08	55.09	55.10	55.12	55.13	55.14	55.16	55.17
9.80	DISCHG	.15	.16	.17	.18	.19	.21	.23	.25	.27	.29
9.80	ELEV	55.19	55.20	55.22	55.23	55.25	55.27	55.30	55.32	55.35	55.38
10.50	DISCHG	.31	.34	.36	.39	.42	.46	.49	.54	.58	.63
10.50	ELEV	55.40	55.44	55.47	55.51	55.55	55.59	55.64	55.70	55.76	55.82
11.20	DISCHG	.68	.74	.77	.78	.79	.81	.83	.87	.92	.99
11.20	ELEV	55.89	55.96	56.00	56.02	56.05	56.09	56.16	56.26	56.40	56.59
11.90	DISCHG	1.10	1.23	1.38	1.40	1.43	1.47	1.50	1.52	1.54	1.55
11.90	ELEV	56.89	57.35	58.00	58.18	58.43	58.74	59.04	59.19	59.34	59.48

TR20 XEQ 02-08-00 13:41
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 6

12.60	DISCHG	1.57	1.58	1.59	1.60	1.61	1.62	1.62	1.62	1.63	1.63
12.60	ELEV	59.61	59.74	59.85	59.95	60.03	60.10	60.16	60.21	60.27	60.32
13.30	DISCHG	1.63	1.63	1.64	1.64	1.76	1.87	1.97	2.07	2.16	2.24
13.30	ELEV	60.37	60.41	60.46	60.50	60.52	60.53	60.55	60.56	60.58	60.59
14.00	DISCHG	2.32	2.39	2.46	2.53	2.59	2.65	2.70	2.75	2.79	2.83
14.00	ELEV	60.60	60.61	60.62	60.63	60.64	60.65	60.66	60.67	60.67	60.68
14.70	DISCHG	2.87	2.91	2.94	2.97	2.99	3.02	3.04	3.06	3.07	3.09
14.70	ELEV	60.68	60.69	60.69	60.70	60.70	60.71	60.71	60.71	60.71	60.72
15.40	DISCHG	3.10	3.11	3.12	3.13	3.13	3.14	3.14	3.15	3.15	3.15
15.40	ELEV	60.72	60.72	60.72	60.72	60.72	60.72	60.72	60.72	60.72	60.72
16.10	DISCHG	3.15	3.14	3.14	3.13	3.13	3.12	3.12	3.11	3.10	3.09
16.10	ELEV	60.72	60.72	60.72	60.72	60.72	60.72	60.72	60.72	60.72	60.72
16.80	DISCHG	3.08	3.07	3.06	3.04	3.02	3.01	2.99	2.97	2.95	2.93
16.80	ELEV	60.71	60.71	60.71	60.71	60.71	60.70	60.70	60.70	60.69	60.69
17.50	DISCHG	2.91	2.88	2.86	2.84	2.82	2.80	2.77	2.75	2.73	2.71
17.50	ELEV	60.69	60.69	60.68	60.68	60.68	60.67	60.67	60.67	60.66	60.66
18.20	DISCHG	2.69	2.66	2.64	2.62	2.59	2.57	2.54	2.52	2.50	2.47
18.20	ELEV	60.66	60.65	60.65	60.65	60.64	60.64	60.63	60.63	60.63	60.62
18.90	DISCHG	2.45	2.43	2.41	2.39	2.37	2.34	2.32	2.30	2.28	2.26
18.90	ELEV	60.62	60.62	60.61	60.61	60.61	60.60	60.60	60.60	60.60	60.59
19.60	DISCHG	2.24	2.22	2.20	2.18	2.16	2.14	2.11	2.09	2.07	2.05
19.60	ELEV	60.59	60.59	60.58	60.58	60.58	60.57	60.57	60.57	60.56	60.56
20.30	DISCHG	2.04	2.02	2.00	1.98	1.96	1.94	1.92	1.90	1.89	1.87
20.30	ELEV	60.56	60.56	60.55	60.55	60.55	60.54	60.54	60.54	60.54	60.53

RUNOFF VOLUME ABOVE BASEFLOW = .66 WATERSHED INCHES, 23.15 CFS-HRS, 1.91 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 5
 OUTPUT HYDROGRAPH= 6
 AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .28 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0373 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .09 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
20.79	.09	(RUNOFF)
12.39	1.14	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .01 SQ.MI.
11.90	DISCHG	.00 .00 .05 .20 .47 .81 1.11 1.14 1.00 .85	
12.60	DISCHG	.75 .65 .57 .51 .47 .44 .41 .39 .38 .36	
13.30	DISCHG	.35 .34 .33 .32 .32 .30 .29 .28 .28 .27	
14.00	DISCHG	.27 .27 .26 .26 .26 .26 .25 .25 .25 .24	
14.70	DISCHG	.23 .22 .22 .22 .22 .22 .22 .21 .21 .21	
15.40	DISCHG	.21 .20 .20 .20 .20 .20 .20 .20 .20 .19	
16.10	DISCHG	.19 .19 .19 .19 .18 .17 .17 .17 .17 .17	
16.80	DISCHG	.17 .16 .14 .13 .12 .12 .12 .12 .12 .12	
17.50	DISCHG	.11 .11 .11 .11 .12 .12 .12 .12 .12 .11	
18.20	DISCHG	.11 .10 .10 .10 .09 .09 .10 .10 .10 .11	

TR20 XEQ 02-08-00 13:41
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 7

18.90	DISCHG	.11	.11	.11	.10	.10	.09	.09	.09	.10	.10
19.60	DISCHG	.10	.10	.09	.09	.09	.08	.08	.08	.09	.09
20.30	DISCHG	.09	.09	.08	.08	.08	.08	.09	.09	.09	.08

RUNOFF VOLUME ABOVE BASEFLOW = .44 WATERSHED INCHES, 1.98 CFS-HRS, .16 ACRE-FEET; BASEFLOW = .00 CFS

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

PEAK TIME(HRS) 15.82
 PEAK DISCHARGE(CFS) 3.34*
 PEAK ELEVATION(FEET) (NULL) * FIRST POINT OF FLAT PEAK

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.06 SQ.MI.
7.70	DISCHG	.00	.00	.00	.00	.01
8.40	DISCHG	.01	.01	.01	.02	.04
9.10	DISCHG	.05	.06	.07	.10	.13
9.80	DISCHG	.15	.16	.18	.23	.29
10.50	DISCHG	.31	.34	.39	.49	.63
11.20	DISCHG	.68	.74	.78	.83	.99
11.90	DISCHG	1.10	1.23	1.60	2.61	2.41
12.60	DISCHG	2.32	2.23	2.12	2.03	1.99
13.30	DISCHG	1.98	1.97	1.96	2.17	2.51
14.00	DISCHG	2.59	2.66	2.79	2.95	3.07
14.70	DISCHG	3.10	3.13	3.19	3.23	3.30
15.40	DISCHG	3.31	3.31	3.32	3.34	3.34
16.10	DISCHG	3.33	3.33	3.32	3.30	3.26
16.80	DISCHG	3.25	3.23	3.17	3.12	3.04
17.50	DISCHG	3.02	2.99	2.95	2.89	2.82
18.20	DISCHG	2.79	2.76	2.71	2.66	2.58
18.90	DISCHG	2.56	2.54	2.49	2.43	2.36
19.60	DISCHG	2.34	2.31	2.26	2.22	2.15
20.30	DISCHG	2.13	2.11	2.08	2.01	1.96

RUNOFF VOLUME ABOVE BASEFLOW = .63 WATERSHED INCHES, 25.13 CFS-HRS, 2.08 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 52.50

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = 3.06 CFS.

PEAK TIME(HRS) 17.36
 PEAK DISCHARGE(CFS) 3.06
 PEAK ELEVATION(FEET) 56.13

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.06 SQ.MI.
7.70	DISCHG	.00	.00	.00	.00	.01
7.70	ELEV	52.50	52.50	52.50	52.50	52.51
8.40	DISCHG	.01	.01	.01	.02	.04

8.40	ELEV	52.50	52.51	52.50	52.51	52.51	52.51	52.51	52.51	52.52	52.52
9.10	DISCHG	.05	.06	.06	.07	.08	.09	.10	.11	.12	.13
9.10	ELEV	52.53	52.53	52.53	52.53	52.54	52.54	52.55	52.55	52.56	52.57
9.80	DISCHG	.14	.16	.17	.18	.19	.21	.23	.25	.27	.29
9.80	ELEV	52.57	52.58	52.58	52.59	52.60	52.60	52.61	52.62	52.63	52.64
10.50	DISCHG	.31	.34	.36	.39	.42	.45	.49	.54	.58	.63
10.50	ELEV	52.66	52.67	52.68	52.70	52.71	52.73	52.75	52.77	52.79	52.82
11.20	DISCHG	.68	.74	.77	.78	.79	.80	.83	.87	.92	.99
11.20	ELEV	52.84	52.87	52.89	52.89	52.89	52.90	52.91	52.93	52.96	52.99
11.90	DISCHG	1.04	1.13	1.28	1.46	1.67	1.98	2.03	2.06	2.09	2.12
11.90	ELEV	53.04	53.13	53.28	53.46	53.67	53.98	54.05	54.12	54.19	54.23
12.60	DISCHG	2.13	2.14	2.14	2.14	2.14	2.14	2.13	2.12	2.12	2.11
12.60	ELEV	54.26	54.28	54.28	54.28	54.28	54.27	54.26	54.25	54.23	54.22
13.30	DISCHG	2.10	2.09	2.09	2.08	2.08	2.08	2.09	2.10	2.12	2.14
13.30	ELEV	54.20	54.19	54.18	54.16	54.15	54.16	54.17	54.20	54.23	54.28
14.00	DISCHG	2.16	2.19	2.22	2.25	2.29	2.32	2.36	2.39	2.43	2.47
14.00	ELEV	54.33	54.38	54.44	54.50	54.57	54.64	54.71	54.78	54.86	54.93
14.70	DISCHG	2.50	2.54	2.57	2.61	2.64	2.68	2.71	2.75	2.78	2.81
14.70	ELEV	55.01	55.08	55.15	55.22	55.29	55.36	55.43	55.49	55.55	55.61
15.40	DISCHG	2.84	2.86	2.89	2.92	2.94	2.96	2.99	3.00	3.01	3.01
15.40	ELEV	55.67	55.73	55.78	55.83	55.88	55.93	55.97	56.00	56.01	56.02
16.10	DISCHG	3.01	3.02	3.02	3.03	3.03	3.03	3.04	3.04	3.04	3.05
16.10	ELEV	56.03	56.04	56.05	56.06	56.07	56.07	56.08	56.09	56.09	56.10
16.80	DISCHG	3.05	3.05	3.05	3.05	3.06	3.06	3.06	3.06	3.06	3.06
16.80	ELEV	56.11	56.11	56.12	56.12	56.12	56.13	56.13	56.13	56.13	56.13
17.50	DISCHG	3.06	3.06	3.06	3.06	3.05	3.05	3.05	3.05	3.05	3.04
17.50	ELEV	56.13	56.13	56.12	56.12	56.12	56.11	56.11	56.11	56.10	56.09
18.20	DISCHG	3.04	3.04	3.03	3.03	3.02	3.02	3.02	3.01	3.01	3.00
18.20	ELEV	56.09	56.08	56.07	56.06	56.05	56.04	56.03	56.02	56.01	56.00
18.90	DISCHG	2.97	2.95	2.92	2.90	2.87	2.85	2.82	2.80	2.77	2.75
18.90	ELEV	55.95	55.90	55.85	55.80	55.75	55.70	55.65	55.60	55.55	55.50
19.60	DISCHG	2.73	2.70	2.68	2.66	2.63	2.61	2.58	2.56	2.54	2.52
19.60	ELEV	55.45	55.41	55.36	55.31	55.26	55.22	55.17	55.12	55.08	55.03
20.30	DISCHG	2.49	2.47	2.45	2.43	2.40	2.38	2.36	2.34	2.32	2.30
20.30	ELEV	54.99	54.94	54.90	54.85	54.81	54.76	54.72	54.68	54.64	54.59

RUNOFF VOLUME ABOVE BASEFLOW = .62 WATERSHED INCHES, 24.73 CFS-HRS, 2.04 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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 2 STORM 2													
XSECTION 1	ADDHYD	.03	9	2	.07	8.1	.00	.00	1.25	---	12.68	6.78	208.9
XSECTION 2	ADDHYD	.05	9	2	.07	8.1	.00	.00	1.00	---	12.50	8.47	178.1
XSECTION 3	RUNOFF	.01	9	2	.07	.0	4.60	24.00	2.16	---	12.36	7.08	984.7
XSECTION 4	ADDHYD	.05	9	2	.07	.0	4.60	24.00	1.06	---	12.43	14.97	273.5
STRUCTURE 10	RESVOR	.05	9	2	.07	.0	4.60	24.00	.66	60.72	16.03*	3.15*	57.5
XSECTION 5	RUNOFF	.01	9	2	.07	.0	4.60	24.00	.44	---	12.39	1.14	162.2
XSECTION 6	ADDHYD	.06	9	2	.07	.0	4.60	24.00	.63	---	15.82*	3.34*	54.2
STRUCTURE 11	RESVOR	.06	9	2	.07	.0	4.60	24.00	.62	56.13	17.36?	3.06?	49.5

TR20 XEQ 02-08-00 13:41
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 SUMMARY
PAGE 10

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 2
<u>STRUCTURE 11</u>	<u>.06</u>	
ALTERNATE 2		3.06
<u>STRUCTURE 10</u>	<u>.05</u>	
ALTERNATE 2		3.15
<u>XSECTION 1</u>	<u>.03</u>	
ALTERNATE 2		6.78
<u>XSECTION 2</u>	<u>.05</u>	
ALTERNATE 2		8.47
<u>XSECTION 3</u>	<u>.01</u>	
ALTERNATE 2		7.08
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		14.97
<u>XSECTION 5</u>	<u>.01</u>	
ALTERNATE 2		1.14
<u>XSECTION 6</u>	<u>.06</u>	
ALTERNATE 2		3.34

25 YR STORM - RES 01

TR20 XEQ 02-03-00 07:45
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/02/00

JOB 1 PASS 3
PAGE 46

OPERATION RESVOR STRUCTURE 1
INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 63.00

PEAK TIME(HRS) 12.64 PEAK DISCHARGE(CFS) 8.37 PEAK ELEVATION(FEET) 66.37

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.03 SQ.MI.
7.00	DISCHG	.00	.00	.00	.00	.01
7.00	ELEV	64.00	64.00	64.00	64.00	64.00
8.00	DISCHG	.01	.02	.02	.03	.04
8.00	ELEV	64.00	64.00	64.01	64.01	64.01
9.00	DISCHG	.05	.06	.06	.07	.08
9.00	ELEV	64.01	64.02	64.02	64.02	64.03
10.00	DISCHG	.14	.16	.17	.19	.21
10.00	ELEV	64.04	64.04	64.05	64.05	64.06
11.00	DISCHG	.39	.44	.49	.54	.61
11.00	ELEV	64.11	64.12	64.13	64.15	64.16
12.00	DISCHG	2.81	4.14	5.68	7.27	7.96
12.00	ELEV	64.76	65.12	65.54	65.97	66.22
13.00	DISCHG	7.99	7.84	7.67	7.50	7.27
13.00	ELEV	66.23	66.17	66.10	66.04	65.96
14.00	DISCHG	5.60	5.37	5.15	4.95	4.76
14.00	ELEV	65.51	65.45	65.39	65.34	65.29
15.00	DISCHG	3.77	3.64	3.52	3.40	3.29
15.00	ELEV	65.02	64.98	64.95	64.92	64.89
16.00	DISCHG	2.74	2.66	2.59	2.52	2.46
16.00	ELEV	64.74	64.72	64.70	64.68	64.66
17.00	DISCHG	2.07	1.99	1.92	1.86	1.80
17.00	ELEV	64.56	64.54	64.52	64.50	64.49
18.00	DISCHG	1.50	1.47	1.42	1.38	1.34
18.00	ELEV	64.41	64.40	64.39	64.37	64.36
19.00	DISCHG	1.18	1.16	1.14	1.11	1.09
19.00	ELEV	64.32	64.31	64.31	64.30	64.29
20.00	DISCHG	.98	.97	.95	.95	.93
20.00	ELEV	64.27	64.26	64.26	64.26	64.25
21.00	DISCHG	.86	.85	.84	.84	.84
21.00	ELEV	64.23	64.23	64.23	64.23	64.23
22.00	DISCHG	.78	.79	.78	.77	.76
22.00	ELEV	64.21	64.21	64.21	64.21	64.21
23.00	DISCHG	.71	.71	.70	.70	.69
23.00	ELEV	64.19	64.19	64.19	64.19	64.19
24.00	DISCHG	.65	.62	.59	.54	.50
24.00	ELEV	64.18	64.17	64.16	64.15	64.13
25.00	DISCHG	.29	.27	.25	.23	.21
25.00	ELEV	64.08	64.07	64.07	64.06	64.06
26.00	DISCHG	.12	.11	.10	.09	.09
26.00	ELEV	64.03	64.03	64.03	64.03	64.02
27.00	DISCHG	.05	.05	.04	.04	.04
27.00	ELEV	64.01	64.01	64.01	64.01	64.01
28.00	DISCHG	.02	.02	.02	.02	.01
28.00	ELEV	64.01	64.01	64.00	64.00	64.00
29.00	DISCHG	.01				
29.00	ELEV	64.00				

RUNOFF VOLUME ABOVE BASEFLOW = 1.82 WATERSHED INCHES, 33.70 CFS-HRS, 2.79 ACRE-FEET; BASEFLOW = .00 CFS

25 YR STORM

OPERATION RUNOFF CROSS SECTION 24

OUTPUT HYDROGRAPH= 6

AREA= .00 SQ MI INPUT RUNOFF CURVE= 53. TIME OF CONCENTRATION= .11 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0147 HOURS

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)				DRAINAGE AREA =	
12.25		2.04				(RUNOFF)				.00 SQ.MI.	
TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	.00	.00	.00	.00	.00	.00
11.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.08	.54
12.00	DISCHG	1.06	1.55	1.99	1.98	.94	.82	.60	.52	.49	.42
13.00	DISCHG	.42	.37	.36	.35	.33	.33	.30	.28	.28	.27
14.00	DISCHG	.27	.26	.26	.26	.24	.24	.22	.21	.21	.21
15.00	DISCHG	.21	.21	.21	.20	.19	.18	.19	.20	.19	.18
16.00	DISCHG	.18	.18	.18	.17	.16	.16	.16	.17	.15	.10
17.00	DISCHG	.10	.11	.12	.12	.10	.10	.11	.11	.11	.11
18.00	DISCHG	.11	.09	.09	.09	.09	.09	.10	.10	.10	.10
19.00	DISCHG	.10	.08	.08	.08	.10	.10	.08	.08	.08	.08
20.00	DISCHG	.08	.08	.09	.08	.07	.06	.08	.09	.08	.07
21.00	DISCHG	.06	.08	.09	.08	.07	.06	.06	.06	.07	.09
22.00	DISCHG	.09	.07	.07	.07	.07	.07	.07	.07	.07	.07
23.00	DISCHG	.07	.07	.07	.07	.07	.07	.07	.07	.06	.04
24.00	DISCHG	.04	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 1.06 WATERSHED INCHES, 2.62 CFS-HRS, .22 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 25

OUTPUT HYDROGRAPH= 7

AREA= .02 SQ MI INPUT RUNOFF CURVE= 48. TIME OF CONCENTRATION= .19 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0253 HOURS

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)				DRAINAGE AREA =	
12.30		5.03				(RUNOFF)				.02 SQ.MI.	
TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	.00	.00	.00	.00	.00	.00
11.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04
12.00	DISCHG	.72	2.18	3.82	5.03	3.69	2.64	2.15	1.66	1.50	1.33
13.00	DISCHG	1.24	1.18	1.09	1.07	1.01	.99	.94	.88	.85	.82
14.00	DISCHG	.81	.80	.79	.79	.76	.75	.72	.67	.66	.66
15.00	DISCHG	.66	.65	.64	.63	.60	.58	.59	.61	.61	.58
16.00	DISCHG	.56	.55	.55	.55	.52	.50	.50	.52	.51	.40
17.00	DISCHG	.33	.33	.37	.37	.34	.32	.32	.34	.35	.35
18.00	DISCHG	.35	.33	.29	.28	.28	.28	.29	.31	.31	.32
19.00	DISCHG	.32	.30	.26	.25	.29	.31	.30	.26	.25	.24
20.00	DISCHG	.24	.26	.28	.28	.24	.21	.23	.27	.28	.24
21.00	DISCHG	.21	.23	.27	.28	.24	.22	.21	.21	.21	.26
22.00	DISCHG	.28	.26	.23	.21	.21	.21	.21	.21	.21	.21
23.00	DISCHG	.21	.21	.21	.21	.21	.21	.21	.21	.21	.16
24.00	DISCHG	.14	.09	.03	.01	.00					

RUNOFF VOLUME ABOVE BASEFLOW = .74 WATERSHED INCHES, 7.23 CFS-HRS, .60 ACRE-FEET; BASEFLOW = .00 CFS

25 42 STORM

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	FULLPRINT	SUMMARY	NOLOTS
TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.			
TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00			
5 RAINFL 9	.25		
8	0.0	.0025	.005 .0075 .010
8	.0125	.015	.0175 .020 .0225
8	.026	.0285	.031 .0345 .037
8	.0405	.043	.0465 .050 .0535
8	.057	.0605	.064 .068 .072
8	.076	.080	.0845 .089 .094
8	.100	.1075	.115 .1225 .130
8	.1385	.148	.157 .167 .178
8	.189	.202	.216 .2315 .250
8	.271	.298	.3455 .500 .6555
8	.702	.7295	.751 .769 .785
8	.7985	.811	.823 .834 .8435
8	.853	.862	.870 .8785 .886
8	.8935	.900	.907 .911 .916
8	.920	.9245	.929 .9325 .936
8	.940	.944	.947 .951 .954
8	.957	.9605	.963 .9665 .969
8	.9725	.975	.9775 .981 .9835
8	.986	.9885	.991 .9935 .996
8	.9985	1.0	1.0 1.0 1.0
9 ENDTBL			
3 STRUCT 10			
8	55.	0.0	0.0
8	56.	.77	.0002
8	57.1	1.18	.03
8	58.	1.38	.057
8	59.	1.5	.232
8	60.	1.61	.750
8	60.5	1.64	1.12
8	62.	11.7	3.69
9 ENDTBL			
3 STRUCT 11			
8	52.5	0.0	0.0
8	53.	1.	.0001
8	54.	2.	.005
8	56.	3.	.100
8	57.1	3.5	.324
8	58.	30.	.704
9 ENDTBL			
6 ADDHYD 4 001 1 2 4			1 1 1 1
6 ADDHYD 4 002 4 3 5			1 1 1 1
6 RUNOFF 1 003 6 .0071875 77.		.44	1 1 1 1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6	ADDHYD	4	004	6	5	7				1	1	1	1
6	RESVOR	2		10	7	5	55.			1	1	1	1
6	RUNOFF	1	005	6	.0070312	49.		.28		1	1	1	1
6	ADDHYD	4	006	6	5	4				1	1	1	1
6	RESVOR	2		11	4	5	52.5			1	1	1	1

ENDATA

7	INCREM	6				0.07							
7	READHD	8		1									
7	READHD	9	7.08		.2		.028640625	0.0					
8			0.0		0.0		0.0	0.0		.01			
8			.01		.02		.03	.03		.04			
8			.05		.06		.08	.10		.12			
8			.14		.17		.21	.26		.32			
8			.39		.49		.61	.79		1.20			
8			2.81		5.68		7.96	8.36		8.26			
8			7.99		7.67		7.27	6.67		6.11			
8			5.60		5.15		4.76	4.40		4.07			
8			3.77		3.52		3.29	3.07		2.90			
8			2.74		2.59		2.46	2.33		2.22			
8			2.07		1.92		1.80	1.67		1.58			
8			1.50		1.42		1.34	1.27		1.22			
8			1.18		1.14		1.09	1.06		1.03			
8			.98		.95		.93	.90		.88			
8			.86		.84		.84	.81		.79			
8			.78		.78		.76	.75		.73			
8			.71		.70		.69	.69		.68			
8			.65		.59		.50	.42		.35			
8			.29		.25		.21	.17		.15			
8			.12		.10		.09	.07		.06			
8			.05		.04		.04	.03		.03			
8			.02		.02		.01	.01		.01			

9 ENDTBL

7	READHD	8		2									
7	READHD	9	11.15		.2		.003828125	0.0					
8			0.0		0.0		0.0	0.0		.08			
8			1.06		1.99		.94	.60		.49			
8			.42		.36		.33	.30		.28			
8			.27		.26		.24	.22		.21			
8			.21		.21		.19	.19		.19			
8			.18		.18		.16	.16		.15			
8			.10		.12		.10	.11		.11			
8			.11		.09		.09	.10		.10			
8			.10		.08		.10	.08		.08			
8			.08		.09		.07	.08		.08			
8			.06		.09		.07	.06		.07			
8			.09		.07		.07	.07		.07			

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	.07	.07	.07	.07	.07
8	.04	0.0	0.0	0.0	0.0
9	ENDTBL				
7	READHD 8	3			
7	READHD 9	11.05	.2	.0150625	0.0
8	0.0	0.0	1.0	1.05	0.0
8	.72	3.82	3.69	2.15	1.50
8	1.24	1.09	1.01	.94	.85
8	.81	.79	.76	.72	.66
8	.66	.64	.60	.59	.61
8	.56	.55	.52	.50	.51
8	.33	.37	.34	.32	.35
8	.35	.29	.28	.29	.31
8	.32	.26	.29	.30	.25
8	.24	.28	.24	.23	.28
8	.21	.27	.24	.21	.21
8	.28	.23	.21	.21	.21
8	.21	.21	.21	.21	.21
8	.14	.03	0.0	0.0	0.0
9	ENDTBL				
7	COMPUT 7 001	11 0.0	5.4	1.0	9 2 02 03
	ENDCMP 1				
	ENDJOB 2				

*****END OF 80-80 LIST*****

TR20 XEQ 02-08-00 13:44
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

	STARTING TIME= 7.08	TIME INCREMENT= .20	DRAINAGE AREA= .03	BASE FLOW= .00	
8	.00	.00	.00	.00	.01
8	.01	.02	.03	.03	.04
8	.05	.06	.08	.10	.12
8	.14	.17	.21	.26	.32
8	.39	.49	.61	.79	1.20
8	2.81	5.68	7.96	8.36	8.26
8	7.99	7.67	7.27	6.67	6.11
8	5.60	5.15	4.76	4.40	4.07
8	3.77	3.52	3.29	3.07	2.90
8	2.74	2.59	2.46	2.33	2.22
8	2.07	1.92	1.80	1.67	1.58
8	1.50	1.42	1.34	1.27	1.22
8	1.18	1.14	1.09	1.06	1.03
8	.98	.95	.93	.90	.88
8	.86	.84	.84	.81	.79
8	.78	.78	.76	.75	.73
8	.71	.70	.69	.69	.68
8	.65	.59	.50	.42	.35
8	.29	.25	.21	.17	.15
8	.12	.10	.09	.07	.06
8	.05	.04	.04	.03	.03
8	.02	.02	.01	.01	.01

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

	STARTING TIME= 11.15	TIME INCREMENT= .20	DRAINAGE AREA= .00	BASE FLOW= .00	
8	.00	.00	.00	.00	.08
8	1.06	1.99	.94	.60	.49
8	.42	.36	.33	.30	.28
8	.27	.26	.24	.22	.21
8	.21	.21	.19	.19	.19
8	.18	.18	.16	.16	.15
8	.10	.12	.10	.11	.11
8	.11	.09	.09	.10	.10
8	.10	.08	.10	.08	.08
8	.08	.09	.07	.08	.08
8	.06	.09	.07	.06	.07

TR20 XEQ 02-08-00 13:44
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 2

8	.09	.07	.07	.07	.07
8	.07	.07	.07	.07	.07
8	.04	.00	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 3 RECORD ID

STARTING TIME= 11.05 TIME INCREMENT= .20 DRAINAGE AREA= .02 BASE FLOW= .00

8	.00	.00	1.00	1.05	.00
8	.72	3.82	3.69	2.15	1.50
8	1.24	1.09	1.01	.94	.85
8	.81	.79	.76	.72	.66
8	.66	.64	.60	.59	.61
8	.56	.55	.52	.50	.51
8	.33	.37	.34	.32	.35
8	.35	.29	.28	.29	.31
8	.32	.26	.29	.30	.25
8	.24	.28	.24	.23	.28
8	.21	.27	.24	.21	.21
8	.28	.23	.21	.21	.21
8	.21	.21	.21	.21	.21
8	.14	.03	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11 RECORD ID

STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 3 MAIN TIME INCREMENT = .07 HOURS

OPERATION ADDHYD CROSS SECTION 1
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.65	9.09	(NULL)
12.47	9.21	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 7.08 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .03 SQ.MI.
7.78	DISCHG .01 .01 .01 .01 .01 .01 .02 .02 .02 .03		
8.48	DISCHG .03 .03 .03 .03 .03 .04 .04 .04 .05 .05		
9.18	DISCHG .05 .06 .06 .07 .08 .08 .09 .10 .11 .11		
9.88	DISCHG .12 .13 .13 .14 .15 .16 .17 .19 .20 .22		
10.58	DISCHG .23 .25 .27 .29 .31 .34 .36 .39 .42 .45		
11.28	DISCHG .49 .53 .57 .62 .68 .74 .83 .98 1.15 1.51		
11.98	DISCHG 2.23 3.14 4.30 5.63 6.96 8.15 8.78 9.21 9.07 9.06		
12.68	DISCHG 9.08 8.93 8.85 8.77 8.64 8.52 8.40 8.26 8.13 7.98		
13.38	DISCHG 7.83 7.68 7.48 7.26 7.04 6.83 6.63 6.43 6.24 6.06		

TR20 XEQ 02-08-00 13:44
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 3

14.08	DISCHG	5.87	5.71	5.55	5.39	5.25	5.11	4.97	4.84	4.70	4.57
14.78	DISCHG	4.45	4.33	4.22	4.12	4.01	3.92	3.83	3.74	3.66	3.57
15.48	DISCHG	3.49	3.40	3.33	3.25	3.19	3.13	3.07	3.02	2.96	2.90
16.18	DISCHG	2.85	2.79	2.74	2.69	2.64	2.59	2.54	2.50	2.46	2.42
16.88	DISCHG	2.37	2.32	2.25	2.18	2.11	2.07	2.02	1.98	1.94	1.88
17.58	DISCHG	1.84	1.79	1.76	1.73	1.70	1.67	1.64	1.61	1.59	1.55
18.28	DISCHG	1.52	1.48	1.45	1.43	1.40	1.38	1.36	1.35	1.33	1.31
18.98	DISCHG	1.30	1.29	1.27	1.25	1.23	1.21	1.20	1.18	1.18	1.16
19.68	DISCHG	1.15	1.13	1.12	1.11	1.09	1.07	1.06	1.05	1.04	1.04
20.38	DISCHG	1.03	1.01	1.00	.99	.98	.97	.97	.96	.95	.94
21.08	DISCHG	.93	.91	.92	.92	.93	.92	.91	.90	.88	.87
21.78	DISCHG	.86	.86	.86	.86	.86	.87	.87	.86	.85	.84
22.48	DISCHG	.83	.83	.82	.82	.81	.81	.80	.79	.78	.78
23.18	DISCHG	.78	.77	.77	.76	.76	.76	.76	.76	.76	.75
23.88	DISCHG	.75	.74	.72	.70	.66	.63	.59	.55	.52	.49
24.58	DISCHG	.46	.43	.41	.38	.36	.34	.31	.29	.28	.26
25.28	DISCHG	.25	.24	.22	.21	.19	.18	.17	.16	.15	.15
25.98	DISCHG	.14	.12	.12	.11	.10	.10	.09	.09	.08	.08
26.68	DISCHG	.07	.07	.06	.06	.06	.05	.05	.05	.04	.04
27.38	DISCHG	.04	.04	.04	.03	.03	.03	.03	.03	.03	.02

RUNOFF VOLUME ABOVE BASEFLOW = 1.73 WATERSHED INCHES, 36.24 CFS-HRS, 3.00 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 2
INPUT HYDROGRAPHS= 4,3 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.45	12.77	(NULL)
22.07	1.14	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 7.08 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .05 SQ.MI.
7.78	DISCHG .01 .01 .01 .01 .01 .01 .01 .02	.02	.02 .02 .03
8.48	DISCHG .03 .03 .03 .03 .03 .03 .04 .04	.04	.04 .05 .05
9.18	DISCHG .05 .06 .06 .07 .08 .08 .09 .09	.10	.10 .11 .11
9.88	DISCHG .12 .13 .13 .14 .15 .16 .17 .17	.19	.19 .20 .22
10.58	DISCHG .23 .25 .27 .29 .31 .34 .36 .36	.39	.39 .42 .45
11.28	DISCHG .64 1.03 1.42 1.63 1.71 1.79 1.62 1.40	1.21	1.21 1.72
11.98	DISCHG 2.70 3.86 6.10 8.52 10.78 11.91 12.50 12.74	12.07	12.07 11.52
12.68	DISCHG 11.13 10.75 10.45 10.22 10.00 9.79 9.60 9.41	9.22	9.22 9.05
13.38	DISCHG 8.86 8.69 8.47 8.23 7.98 7.74 7.50 7.27	7.07	7.07 6.87
14.08	DISCHG 6.68 6.51 6.34 6.18 6.03 5.87 5.72 5.57	5.43	5.43 5.28
14.78	DISCHG 5.13 4.99 4.88 4.78 4.67 4.57 4.48 4.38	4.28	4.28 4.18
15.48	DISCHG 4.09 4.00 3.92 3.85 3.79 3.74 3.67 3.60	3.52	3.52 3.46
16.18	DISCHG 3.40 3.34 3.28 3.22 3.16 3.10 3.05 3.00	2.96	2.96 2.92
16.88	DISCHG 2.86 2.74 2.60 2.52 2.46 2.43 2.39 2.34	2.28	2.28 2.22
17.58	DISCHG 2.16 2.11 2.09 2.07 2.05 2.02 1.99 1.96	1.91	1.91 1.85
18.28	DISCHG 1.81 1.77 1.74 1.71 1.69 1.67 1.66 1.65	1.64	1.64 1.63
18.98	DISCHG 1.62 1.61 1.57 1.53 1.49 1.48 1.48 1.48	1.47	1.47 1.46

TR20 XEQ 02-08-00 13:44
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 4

19.68	DISCHG	1.44	1.40	1.38	1.36	1.33	1.31	1.31	1.31	1.32	1.30
20.38	DISCHG	1.28	1.25	1.23	1.22	1.21	1.22	1.24	1.23	1.20	1.17
21.08	DISCHG	1.15	1.15	1.18	1.19	1.18	1.17	1.14	1.12	1.09	1.08
21.78	DISCHG	1.07	1.07	1.09	1.12	1.14	1.13	1.11	1.09	1.07	1.05
22.48	DISCHG	1.04	1.04	1.03	1.03	1.02	1.02	1.01	1.00	.99	.99
23.18	DISCHG	.99	.98	.98	.97	.97	.97	.97	.97	.97	.96
23.88	DISCHG	.95	.91	.87	.81	.74	.67	.61	.56	.52	.49
24.58	DISCHG	.46	.43	.41	.38	.36	.34	.31	.29	.28	.26
25.28	DISCHG	.25	.24	.22	.21	.19	.18	.17	.16	.15	.15
25.98	DISCHG	.14	.12	.12	.11	.10	.10	.09	.09	.08	.08
26.68	DISCHG	.07	.07	.06	.06	.06	.05	.05	.05	.04	.04
27.38	DISCHG	.04	.04	.04	.03	.03	.03	.03	.03	.03	.02

RUNOFF VOLUME ABOVE BASEFLOW = 1.43 WATERSHED INCHES, 43.83 CFS-HRS, 3.62 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 3

OUTPUT HYDROGRAPH= 6

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) 12.36 PEAK DISCHARGE(CFS) 9.13 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .01 SQ.MI.
7.70	.00	.00	.00	.01
8.40	.02	.02	.03	.06
9.10	.09	.09	.10	.14
9.80	.18	.19	.20	.27
10.50	.33	.35	.37	.51
11.20	.63	.67	.72	.94
11.90	2.61	3.70	5.01	1.25
12.60	6.27	5.21	4.36	1.50
13.30	1.72	1.61	1.53	1.90
14.00	1.10	1.07	1.05	7.40
14.70	.89	.86	.84	8.43
15.40	.74	.73	.71	9.05
16.10	.65	.64	.63	9.06
16.80	.57	.55	.53	8.42
17.50	.38	.37	.36	2.45
18.20	.36	.34	.33	2.20
18.90	.32	.33	.33	2.01
19.60	.31	.31	.30	1.17
20.30	.27	.28	.27	1.13

RUNOFF VOLUME ABOVE BASEFLOW = 2.79 WATERSHED INCHES, 12.96 CFS-HRS, 1.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

INPUT HYDROGRAPHS= 6,5 OUTPUT HYDROGRAPH= 7

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 5

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.40		21.49				(NULL)					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .05 SQ.MI.	
7.70	DISCHG	.00	.00	.01	.01	.01	.01	.01	.02	.03	.04
8.40	DISCHG	.04	.05	.06	.06	.07	.08	.09	.10	.11	.12
9.10	DISCHG	.14	.15	.16	.17	.19	.20	.22	.23	.25	.27
9.80	DISCHG	.29	.31	.33	.34	.36	.39	.41	.44	.48	.51
10.50	DISCHG	.54	.58	.62	.66	.71	.75	.81	.87	.93	1.00
11.20	DISCHG	1.08	1.29	1.70	2.15	2.45	2.64	2.84	2.89	2.93	3.13
11.90	DISCHG	4.26	6.26	8.70	12.09	15.66	18.89	20.80	21.47	21.13	19.56
12.60	DISCHG	17.86	16.39	15.17	14.20	13.43	12.79	12.26	11.83	11.45	11.10
13.30	DISCHG	10.79	10.50	10.24	9.95	9.65	9.35	9.05	8.76	8.48	8.23
14.00	DISCHG	8.00	7.78	7.58	7.40	7.21	7.04	6.87	6.70	6.53	6.36
14.70	DISCHG	6.19	6.02	5.85	5.71	5.59	5.48	5.37	5.27	5.16	5.05
15.40	DISCHG	4.94	4.83	4.72	4.63	4.55	4.49	4.44	4.37	4.28	4.20
16.10	DISCHG	4.12	4.05	3.99	3.92	3.85	3.78	3.70	3.63	3.58	3.54
16.80	DISCHG	3.50	3.42	3.28	3.11	2.98	2.89	2.84	2.80	2.75	2.68
17.50	DISCHG	2.61	2.54	2.49	2.46	2.44	2.42	2.39	2.37	2.33	2.28
18.20	DISCHG	2.22	2.16	2.10	2.06	2.02	2.00	1.98	1.97	1.96	1.96
18.90	DISCHG	1.95	1.95	1.94	1.90	1.86	1.81	1.78	1.77	1.77	1.77
19.60	DISCHG	1.77	1.75	1.71	1.67	1.64	1.61	1.58	1.57	1.57	1.59
20.30	DISCHG	1.58	1.56	1.53	1.50	1.47	1.46	1.47	1.49	1.50	1.47

RUNOFF VOLUME ABOVE BASEFLOW = 1.49 WATERSHED INCHES, 52.68 CFS-HRS, 4.35 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 55.00

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
15.30		5.09				61.01					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .05 SQ.MI.	
7.70	DISCHG	.00	.00	.01	.01	.01	.01	.01	.02	.03	.04
7.70	ELEV	55.00	55.00	55.01	55.01	55.01	55.01	55.02	55.03	55.04	55.05
8.40	DISCHG	.04	.05	.06	.06	.07	.08	.09	.10	.11	.12
8.40	ELEV	55.06	55.07	55.07	55.08	55.09	55.10	55.12	55.13	55.15	55.16
9.10	DISCHG	.14	.15	.16	.17	.18	.20	.22	.23	.25	.27
9.10	ELEV	55.18	55.19	55.21	55.22	55.24	55.26	55.28	55.30	55.33	55.35
9.80	DISCHG	.29	.31	.33	.34	.36	.39	.41	.44	.47	.51
9.80	ELEV	55.38	55.40	55.42	55.45	55.47	55.50	55.54	55.57	55.62	55.66
10.50	DISCHG	.54	.58	.62	.66	.70	.75	.77	.78	.79	.80
10.50	ELEV	55.70	55.75	55.80	55.86	55.91	55.98	56.00	56.02	56.04	56.08
11.20	DISCHG	.82	.85	.90	.97	1.08	1.18	1.25	1.32	1.38	1.39
11.20	ELEV	56.13	56.20	56.34	56.55	56.82	57.12	57.41	57.72	58.00	58.06

TR20 XEQ 02-08-00 13:44
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 6

11.90	DISCHG	1.40	1.41	1.44	1.47	1.51	1.53	1.55	1.57	1.60	1.61
11.90	ELEV	58.13	58.26	58.46	58.76	59.06	59.23	59.44	59.66	59.88	60.06
12.60	DISCHG	1.62	1.63	1.64	1.72	1.99	2.24	2.47	2.68	2.88	3.07
12.60	ELEV	60.19	60.31	60.42	60.51	60.55	60.59	60.62	60.66	60.69	60.71
13.30	DISCHG	3.25	3.41	3.57	3.71	3.85	3.98	4.09	4.20	4.30	4.39
13.30	ELEV	60.74	60.76	60.79	60.81	60.83	60.85	60.87	60.88	60.90	60.91
14.00	DISCHG	4.47	4.55	4.62	4.69	4.74	4.80	4.85	4.89	4.93	4.96
14.00	ELEV	60.92	60.93	60.94	60.95	60.96	60.97	60.98	60.98	60.99	61.00
14.70	DISCHG	4.99	5.02	5.04	5.05	5.07	5.08	5.09	5.09	5.09	5.09
14.70	ELEV	61.00	61.00	61.01	61.01	61.01	61.01	61.01	61.01	61.01	61.01
15.40	DISCHG	5.09	5.09	5.08	5.07	5.06	5.05	5.03	5.02	5.00	4.99
15.40	ELEV	61.01	61.01	61.01	61.01	61.01	61.01	61.01	61.00	61.00	61.00
16.10	DISCHG	4.97	4.95	4.93	4.91	4.88	4.86	4.83	4.81	4.78	4.75
16.10	ELEV	61.00	60.99	60.99	60.99	60.98	60.98	60.98	60.97	60.97	60.96
16.80	DISCHG	4.73	4.70	4.67	4.63	4.60	4.56	4.52	4.49	4.45	4.41
16.80	ELEV	60.96	60.96	60.95	60.95	60.94	60.94	60.93	60.92	60.92	60.91
17.50	DISCHG	4.37	4.33	4.29	4.25	4.21	4.17	4.13	4.09	4.05	4.01
17.50	ELEV	60.91	60.90	60.89	60.89	60.88	60.88	60.87	60.87	60.86	60.85
18.20	DISCHG	3.97	3.93	3.89	3.85	3.81	3.77	3.73	3.69	3.65	3.61
18.20	ELEV	60.85	60.84	60.84	60.83	60.82	60.82	60.81	60.81	60.80	60.79
18.90	DISCHG	3.58	3.54	3.50	3.47	3.43	3.40	3.36	3.33	3.29	3.26
18.90	ELEV	60.79	60.78	60.78	60.77	60.77	60.76	60.76	60.75	60.75	60.74
19.60	DISCHG	3.22	3.19	3.16	3.13	3.09	3.06	3.03	2.99	2.96	2.93
19.60	ELEV	60.74	60.73	60.73	60.72	60.72	60.71	60.71	60.70	60.70	60.69
20.30	DISCHG	2.90	2.87	2.84	2.81	2.78	2.75	2.72	2.70	2.67	2.64
20.30	ELEV	60.69	60.68	60.68	60.67	60.67	60.67	60.66	60.66	60.65	60.65

RUNOFF VOLUME ABOVE BASEFLOW = 1.02 WATERSHED INCHES, 36.03 CFS-HRS, 2.98 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 5

OUTPUT HYDROGRAPH= 6

AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .28 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0373 HOURS

PEAK TIME(HRS) 12.34 PEAK DISCHARGE(CFS) 2.29 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.01 SQ.MI.					
11.90	DISCHG	.03	.16	.45	.88	1.38	1.89	2.27	2.19	1.84	1.51
12.60	DISCHG	1.29	1.10	.94	.84	.76	.70	.66	.62	.59	.56
13.30	DISCHG	.55	.53	.51	.50	.49	.47	.45	.44	.43	.42
14.00	DISCHG	.41	.40	.40	.40	.39	.39	.38	.37	.37	.36
14.70	DISCHG	.34	.33	.33	.33	.33	.33	.32	.32	.32	.31
15.40	DISCHG	.30	.30	.29	.29	.29	.30	.30	.29	.28	.28
16.10	DISCHG	.27	.27	.27	.27	.27	.26	.25	.25	.25	.25
16.80	DISCHG	.25	.24	.21	.18	.17	.17	.18	.18	.18	.17
17.50	DISCHG	.16	.16	.16	.16	.17	.17	.17	.17	.17	.16
18.20	DISCHG	.15	.14	.14	.14	.14	.14	.14	.14	.15	.15
18.90	DISCHG	.15	.15	.15	.15	.14	.13	.13	.13	.14	.15

TR20 XEQ 02-08-00 13:44
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 7

19.60	DISCHG	.15	.14	.13	.13	.12	.12	.12	.12	.13	.13
20.30	DISCHG	.13	.13	.12	.11	.11	.12	.12	.13	.13	.12

RUNOFF VOLUME ABOVE BASEFLOW = .72 WATERSHED INCHES, 3.29 CFS-HRS, .27 ACRE-FEET; BASEFLOW = .00 CFS

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

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.35	3.85	(NULL)
15.19	5.41*	(NULL) * FIRST POINT OF FLAT PEAK

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.06 SQ.MI.
7.70	DISCHG	.00 .00	.01 .01	.01 .01	.02 .03	.04
8.40	DISCHG	.04 .05	.06 .06	.07 .08	.09 .10	.11 .12
9.10	DISCHG	.14 .15	.16 .17	.18 .20	.22 .23	.25 .27
9.80	DISCHG	.29 .31	.33 .34	.36 .39	.41 .44	.47 .51
10.50	DISCHG	.54 .58	.62 .66	.70 .75	.77 .78	.79 .80
11.20	DISCHG	.82 .85	.90 .97	1.08 1.18	1.25 1.32	1.38 1.39
11.90	DISCHG	1.42 1.57	1.89 2.35	2.89 3.42	3.82 3.76	3.43 3.13
12.60	DISCHG	2.92 2.73	2.58 2.56	2.75 2.94	3.12 3.31	3.47 3.63
13.30	DISCHG	3.79 3.94	4.08 4.21	4.34 4.45	4.54 4.64	4.73 4.81
14.00	DISCHG	4.88 4.95	5.02 5.08	5.14 5.19	5.23 5.26	5.30 5.32
14.70	DISCHG	5.34 5.35	5.36 5.38	5.39 5.40	5.41 5.41	5.41 5.41
15.40	DISCHG	5.40 5.38	5.37 5.36	5.35 5.34	5.33 5.31	5.29 5.27
16.10	DISCHG	5.24 5.22	5.20 5.18	5.15 5.12	5.08 5.05	5.03 5.01
16.80	DISCHG	4.98 4.93	4.88 4.82	4.77 4.73	4.70 4.67	4.63 4.58
17.50	DISCHG	4.53 4.49	4.45 4.41	4.37 4.34	4.30 4.26	4.22 4.17
18.20	DISCHG	4.12 4.08	4.03 3.99	3.95 3.91	3.87 3.84	3.80 3.77
18.90	DISCHG	3.73 3.70	3.66 3.62	3.57 3.53	3.49 3.46	3.43 3.40
19.60	DISCHG	3.37 3.33	3.29 3.25	3.21 3.18	3.15 3.12	3.09 3.06
20.30	DISCHG	3.03 3.00	2.96 2.92	2.89 2.87	2.85 2.83	2.80 2.76

RUNOFF VOLUME ABOVE BASEFLOW = .99 WATERSHED INCHES, 39.32 CFS-HRS, 3.25 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 52.50

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
15.80	5.34	57.16

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.06 SQ.MI.
7.70	DISCHG	.00 .00	.01 .01	.01 .01	.02 .03	.03
7.70	ELEV	52.50 52.50	52.50 52.51	52.50 52.51	52.51 52.51	52.52
8.40	DISCHG	.04 .05	.06 .06	.07 .08	.09 .10	.11 .12
8.40	ELEV	52.52 52.53	52.53 52.53	52.53 52.54	52.54 52.55	52.56 52.56
9.10	DISCHG	.14 .15	.16 .17	.18 .20	.22 .23	.25 .27

9.10	ELEV	52.57	52.57	52.58	52.59	52.59	52.60	52.61	52.62	52.63	52.64
9.80	DISCHG	.29	.31	.33	.34	.36	.39	.41	.44	.47	.51
9.80	ELEV	52.64	52.65	52.66	52.67	52.68	52.69	52.71	52.72	52.74	52.75
10.50	DISCHG	.54	.58	.62	.66	.70	.75	.77	.78	.79	.80
10.50	ELEV	52.77	52.79	52.81	52.83	52.85	52.88	52.89	52.89	52.89	52.90
11.20	DISCHG	.82	.85	.89	.97	1.03	1.10	1.19	1.26	1.33	1.37
11.20	ELEV	52.91	52.92	52.95	52.99	53.03	53.10	53.19	53.26	53.33	53.37
11.90	DISCHG	1.40	1.47	1.66	2.00	2.04	2.10	2.19	2.29	2.36	2.42
11.90	ELEV	53.40	53.47	53.66	54.00	54.07	54.21	54.38	54.57	54.73	54.84
12.60	DISCHG	2.45	2.48	2.49	2.49	2.50	2.52	2.55	2.59	2.64	2.69
12.60	ELEV	54.91	54.95	54.97	54.98	55.00	55.04	55.10	55.18	55.27	55.38
13.30	DISCHG	2.75	2.82	2.89	2.96	3.01	3.03	3.05	3.07	3.09	3.11
13.30	ELEV	55.50	55.64	55.78	55.93	56.02	56.06	56.10	56.14	56.19	56.24
14.00	DISCHG	3.13	3.15	3.18	3.20	3.22	3.25	3.27	3.30	3.33	3.35
14.00	ELEV	56.29	56.34	56.39	56.44	56.49	56.55	56.60	56.66	56.72	56.77
14.70	DISCHG	3.38	3.40	3.43	3.45	3.48	3.53	4.16	4.58	4.86	5.04
14.70	ELEV	56.83	56.88	56.94	56.99	57.05	57.10	57.12	57.14	57.15	57.15
15.40	DISCHG	5.16	5.24	5.28	5.31	5.33	5.33	5.33	5.33	5.32	5.31
15.40	ELEV	57.16	57.16	57.16	57.16	57.16	57.16	57.16	57.16	57.16	57.16
16.10	DISCHG	5.29	5.27	5.25	5.23	5.21	5.18	5.15	5.13	5.10	5.07
16.10	ELEV	57.16	57.16	57.16	57.16	57.16	57.16	57.16	57.16	57.15	57.15
16.80	DISCHG	5.04	5.02	4.98	4.93	4.89	4.84	4.80	4.76	4.72	4.68
16.80	ELEV	57.15	57.15	57.15	57.15	57.15	57.15	57.14	57.14	57.14	57.14
17.50	DISCHG	4.64	4.60	4.55	4.51	4.47	4.43	4.39	4.36	4.32	4.28
17.50	ELEV	57.14	57.14	57.14	57.13	57.13	57.13	57.13	57.13	57.13	57.13
18.20	DISCHG	4.23	4.19	4.14	4.10	4.05	4.01	3.97	3.93	3.89	3.86
18.20	ELEV	57.12	57.12	57.12	57.12	57.12	57.12	57.12	57.11	57.11	57.11
18.90	DISCHG	3.82	3.78	3.75	3.71	3.67	3.63	3.59	3.55	3.52	3.50
18.90	ELEV	57.11	57.11	57.11	57.11	57.11	57.10	57.10	57.10	57.10	57.10
19.60	DISCHG	3.50	3.50	3.49	3.49	3.49	3.48	3.48	3.48	3.47	3.47
19.60	ELEV	57.10	57.09	57.09	57.08	57.07	57.06	57.06	57.05	57.03	57.02
20.30	DISCHG	3.46	3.45	3.45	3.44	3.43	3.43	3.42	3.41	3.41	3.40
20.30	ELEV	57.01	57.00	56.99	56.97	56.96	56.94	56.92	56.91	56.89	56.87

RUNOFF VOLUME ABOVE BASEFLOW = .90 WATERSHED INCHES, 35.96 CFS-HRS, 2.97 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)
<u>ALTERNATE 2 STORM 3</u>													
XSECTION 1	ADDHYD	.03	9	2	.07	7.1	.00	.00	1.73	---	12.47	9.21	283.5
XSECTION 2	ADDHYD	.05	9	2	.07	7.1	.00	.00	1.43	---	12.45	12.77	268.6
XSECTION 3	RUNOFF	.01	9	2	.07	.0	5.40	24.00	2.79	---	12.36	9.13	1270.7
XSECTION 4	ADDHYD	.05	9	2	.07	.0	5.40	24.00	1.49	---	12.40	21.49	392.6
STRUCTURE 10	RESVOR	.05	9	2	.07	.0	5.40	24.00	1.02	61.01	15.30	5.09	93.1
XSECTION 5	RUNOFF	.01	9	2	.07	.0	5.40	24.00	.72	---	12.34	2.29	325.9
XSECTION 6	ADDHYD	.06	9	2	.07	.0	5.40	24.00	.99	---	15.19*	5.41*	87.6
STRUCTURE 11	RESVOR	.06	9	2	.07	.0	5.40	24.00	.90	57.16	15.80	5.34	86.4

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 3
<u>STRUCTURE 11</u>	<u>.06</u>	
ALTERNATE 2		5.34
<u>STRUCTURE 10</u>	<u>.05</u>	
ALTERNATE 2		5.09
<u>XSECTION 1</u>	<u>.03</u>	
ALTERNATE 2		9.21
<u>XSECTION 2</u>	<u>.05</u>	
ALTERNATE 2		12.77
<u>XSECTION 3</u>	<u>.01</u>	
ALTERNATE 2		9.13
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		21.49
<u>XSECTION 5</u>	<u>.01</u>	
ALTERNATE 2		2.29
<u>XSECTION 6</u>	<u>.06</u>	
ALTERNATE 2		5.41

100 YR STORM

OPERATION RUNOFF CROSS SECTION 24

"A"

OUTPUT HYDROGRAPH= 6

AREA= .00 SQ MI INPUT RUNOFF CURVE= 53. TIME OF CONCENTRATION= .11 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0147 HOURS

PEAK TIME(HRS) 12.22 PEAK DISCHARGE(CFS) 3.88 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =		.00 HOURS		TIME INCREMENT = .10 HOURS			DRAINAGE AREA =			.00 SQ.MI.
11.00	DISCHG	.00	.00	.01	.04	.07	.10	.21	.31	.64	1.83
12.00	DISCHG	2.62	3.28	3.86	3.65	1.70	1.46	1.05	.90	.85	.73
13.00	DISCHG	.71	.64	.61	.60	.56	.55	.50	.48	.47	.45
14.00	DISCHG	.45	.44	.43	.43	.40	.40	.37	.35	.35	.35
15.00	DISCHG	.35	.34	.34	.33	.31	.30	.32	.32	.32	.29
16.00	DISCHG	.29	.29	.29	.28	.26	.25	.27	.27	.25	.17
17.00	DISCHG	.16	.18	.19	.19	.16	.16	.17	.18	.18	.18
18.00	DISCHG	.18	.15	.14	.14	.14	.14	.15	.16	.16	.16
19.00	DISCHG	.16	.13	.12	.13	.16	.16	.13	.12	.12	.12
20.00	DISCHG	.12	.14	.14	.13	.11	.10	.13	.14	.13	.11
21.00	DISCHG	.10	.13	.14	.13	.11	.10	.10	.10	.11	.14
22.00	DISCHG	.14	.12	.10	.10	.10	.10	.10	.10	.10	.10
23.00	DISCHG	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
24.00	DISCHG	.06	.02	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 1.95 WATERSHED INCHES, 4.82 CFS-HRS, .40 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 25

"Bupl."

OUTPUT HYDROGRAPH= 7

AREA= .02 SQ MI INPUT RUNOFF CURVE= 48. TIME OF CONCENTRATION= .19 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0253 HOURS

PEAK TIME(HRS) 12.28 PEAK DISCHARGE(CFS) 11.36 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =		.00 HOURS		TIME INCREMENT = .10 HOURS			DRAINAGE AREA =			.02 SQ.MI.
11.00	DISCHG	.00	.00	.00	.00	.00	.00	.08	.43		2.19
12.00	DISCHG	4.82	7.41	9.81	11.25	7.79	5.35	4.22	3.22	2.88	2.52
13.00	DISCHG	2.34	2.20	2.03	1.97	1.86	1.81	1.72	1.59	1.55	1.49
14.00	DISCHG	1.46	1.44	1.42	1.41	1.36	1.33	1.27	1.19	1.16	1.16
15.00	DISCHG	1.16	1.15	1.12	1.11	1.05	1.01	1.02	1.05	1.06	1.00
16.00	DISCHG	.97	.96	.96	.95	.89	.85	.86	.89	.88	.69
17.00	DISCHG	.57	.57	.63	.64	.58	.54	.55	.58	.59	.60
18.00	DISCHG	.60	.56	.50	.48	.47	.47	.49	.52	.53	.54
19.00	DISCHG	.54	.50	.44	.42	.49	.53	.50	.44	.42	.41
20.00	DISCHG	.41	.43	.46	.47	.40	.36	.39	.45	.47	.40
21.00	DISCHG	.36	.39	.45	.47	.40	.36	.35	.35	.36	.43
22.00	DISCHG	.47	.44	.38	.36	.35	.35	.35	.35	.35	.35
23.00	DISCHG	.35	.35	.35	.35	.35	.35	.35	.35	.34	.27
24.00	DISCHG	.23	.15	.05	.01	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 1.49 WATERSHED INCHES, 14.51 CFS-HRS, 1.20 ACRE-FEET; BASEFLOW = .00 CFS

100 YR STORM - RES 01

TR20 XEQ 02-03-00 07:45
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/02/00

JOB 1 PASS 4
 PAGE 63

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 63.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.48	21.44	67.39
22.10	1.16	64.31

TIME(HRS)		FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.03 SQ.MI.
6.00	DISCHG	.00	.00	.00	.00	.01	.01
6.00	ELEV	64.00	64.00	64.00	64.00	64.00	64.00
7.00	DISCHG	.01	.02	.02	.02	.03	.03
7.00	ELEV	64.00	64.00	64.00	64.01	64.01	64.01
8.00	DISCHG	.05	.06	.07	.07	.08	.09
8.00	ELEV	64.01	64.02	64.02	64.02	64.02	64.03
9.00	DISCHG	.15	.17	.18	.20	.22	.24
9.00	ELEV	64.04	64.04	64.05	64.05	64.06	64.07
10.00	DISCHG	.36	.39	.42	.46	.50	.54
10.00	ELEV	64.10	64.11	64.11	64.12	64.14	64.15
11.00	DISCHG	.83	.91	1.00	1.10	1.23	1.39
11.00	ELEV	64.22	64.25	64.27	64.30	64.33	64.37
12.00	DISCHG	5.28	7.48	8.89	12.85	20.60	21.39
12.00	ELEV	65.43	66.03	66.57	67.10	67.36	67.39
13.00	DISCHG	10.54	9.91	9.75	9.58	9.40	9.22
13.00	ELEV	67.02	66.96	66.90	66.84	66.77	66.70
14.00	DISCHG	8.27	8.08	7.90	7.72	7.55	7.36
14.00	ELEV	66.33	66.26	66.19	66.12	66.06	65.99
15.00	DISCHG	5.98	5.75	5.54	5.34	5.15	4.97
15.00	ELEV	65.62	65.55	65.50	65.44	65.39	65.34
16.00	DISCHG	4.23	4.10	3.99	3.88	3.77	3.66
16.00	ELEV	65.14	65.11	65.08	65.05	65.02	64.99
17.00	DISCHG	3.15	3.02	2.91	2.81	2.71	2.62
17.00	ELEV	64.85	64.82	64.79	64.76	64.73	64.71
18.00	DISCHG	2.26	2.20	2.14	2.07	2.01	1.95
18.00	ELEV	64.61	64.59	64.58	64.56	64.54	64.53
19.00	DISCHG	1.76	1.73	1.69	1.65	1.62	1.60
19.00	ELEV	64.48	64.47	64.46	64.45	64.44	64.43
20.00	DISCHG	1.46	1.43	1.41	1.40	1.38	1.35
20.00	ELEV	64.39	64.39	64.38	64.38	64.37	64.36
21.00	DISCHG	1.27	1.25	1.24	1.24	1.23	1.22
21.00	ELEV	64.34	64.34	64.34	64.33	64.33	64.33
22.00	DISCHG	1.15	1.16	1.15	1.14	1.12	1.11
22.00	ELEV	64.31	64.31	64.31	64.31	64.30	64.30
23.00	DISCHG	1.05	1.04	1.03	1.02	1.02	1.01
23.00	ELEV	64.28	64.28	64.28	64.28	64.28	64.27
24.00	DISCHG	.95	.92	.86	.80	.73	.67
24.00	ELEV	64.26	64.25	64.23	64.22	64.20	64.18
25.00	DISCHG	.43	.40	.36	.33	.30	.28
25.00	ELEV	64.12	64.11	64.10	64.09	64.08	64.08
26.00	DISCHG	.18	.16	.15	.14	.13	.12
26.00	ELEV	64.05	64.04	64.04	64.04	64.03	64.03
27.00	DISCHG	.07	.07	.06	.06	.05	.05
27.00	ELEV	64.02	64.02	64.02	64.02	64.01	64.01
28.00	DISCHG	.03	.03	.03	.02	.02	.02
28.00	ELEV	64.01	64.01	64.01	64.01	64.01	64.00
29.00	DISCHG	.01	.01	.01	.01	.01	.01
29.00	ELEV	64.00	64.00	64.00	64.00	64.00	64.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.93 WATERSHED INCHES, 54.12 CFS-HRS, 4.47 ACRE-FEET; BASEFLOW = .00 CFS

100 YR STORM
 *****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

5 RAINFL 9	.25				
8	0.0	.0025	.005	.0075	.010
8	.0125	.015	.0175	.020	.0225
8	.026	.0285	.031	.0345	.037
8	.0405	.043	.0465	.050	.0535
8	.057	.0605	.064	.068	.072
8	.076	.080	.0845	.089	.094
8	.100	.1075	.115	.1225	.130
8	.1385	.148	.157	.167	.178
8	.189	.202	.216	.2315	.250
8	.271	.298	.3455	.500	.6555
8	.702	.7295	.751	.769	.785
8	.7985	.811	.823	.834	.8435
8	.853	.862	.870	.8785	.886
8	.8935	.900	.907	.911	.916
8	.920	.9245	.929	.9325	.936
8	.940	.944	.947	.951	.954
8	.957	.9605	.963	.9665	.969
8	.9725	.975	.9775	.981	.9835
8	.986	.9885	.991	.9935	.996
8	.9985	1.0	1.0	1.0	1.0

9 ENDTBL

3 STRUCT 10

8	55.	0.0	0.0
8	56.	.77	.0002
8	57.1	1.18	.03
8	58.	1.38	.057
8	59.	1.5	.232
8	60.	1.61	.750
8	60.5	1.64	1.12
8	62.	11.7	3.69

9 ENDTBL

3 STRUCT 11

8	52.5	0.0	0.0
8	53.	1.	.0001
8	54.	2.	.005
8	56.	3.	.100
8	57.1	3.5	.324
8	58.	30.	.704

9 ENDTBL

6 ADDHYD 4 001	1 2 4			1 1	1 1
6 ADDHYD 4 002	4 3 5			1 1	1 1
6 RUNOFF 1 003	6 .0071875	77.	.44	1 1	1 1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6	ADDHYD	4	004	6	5	7				1	1	1	1
6	RESVOR	2	10	7	5	55.				1	1	1	1
6	RUNOFF	1	005		6	.0070312	49.		.28	1	1	1	1
6	ADDHYD	4	006	6	5	4				1	1	1	1
6	RESVOR	2	11	4	5	52.5				1	1	1	1

ENDATA

7	INCREM	6				0.07							
7	READHD	8		1									
7	READHD	9	6.08		.2		.028640625	0.0					
8			0.0		0.0		0.0	.01		.01			
8			.01		.02		.02	.03		.04			
8			.05		.07		.08	.10		.12			
8			.15		.18		.22	.26		.31			
8			.36		.42		.50	.59		.69			
8			.83		1.0		1.23	1.60		2.41			
8			5.28		8.89		20.6	19.56		14.35			
8			10.54		9.75		9.4	9.04		8.65			
8			8.27		7.9		7.55	7.06		6.48			
8			5.98		5.54		5.15	4.79		4.5			
8			4.23		3.99		3.77	3.55		3.38			
8			3.15		2.91		2.71	2.53		2.38			
8			2.26		2.14		2.01	1.89		1.82			
8			1.76		1.69		1.62	1.58		1.52			
8			1.46		1.41		1.38	1.32		1.3			
8			1.27		1.24		1.23	1.2		1.16			
8			1.15		1.15		1.12	1.1		1.07			
8			1.05		1.03		1.02	1.01		.99			
8			.95		.86		.73	.62		.52			
8			.43		.36		.30	.26		.21			
8			.18		.15		.13	.11		.09			
8			.07		.06		.05	.04		.04			
8			.03		.03		.02	.02		.02			
8			.01		.01		.01	0.0		0.0			

9 ENDTBL

7	READHD	8		2									
7	READHD	9	11.15		.2		.003828125	0.0					
8			0.0		.01		.07	.21		.64			
8			2.62		3.86		1.7	1.05		.85			
8			.71		.61		.56	.50		.47			
8			.45		.43		.40	.37		.35			
8			.35		.34		.31	.32		.32			
8			.29		.29		.26	.27		.25			
8			.16		.19		.16	.17		.18			
8			.18		.14		.14	.15		.16			
8			.16		.12		.16	.13		.12			
8			.12		.14		.11	.13		.13			

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	.10	.14	.11	.10	.11
8	.14	.10	.10	.10	.10
8	.10	.10	.10	.10	.10
8	.06	0.0	0.0	0.0	0.0

9 ENDTBL

7 READHD 8 3

7 READHD 9 11.05 .2 .0150625 0.0

8	0.0	0.0	0.0	0.0	.43
8	4.82	9.81	7.79	4.22	2.88
8	2.34	2.03	1.86	1.72	1.55
8	1.46	1.42	1.36	1.27	1.16
8	1.16	1.12	1.05	1.02	1.06
8	.97	.96	.89	.86	.88
8	.57	.63	.58	.55	.59
8	.60	.50	.47	.49	.53
8	.54	.44	.49	.50	.42
8	.41	.46	.40	.39	.47
8	.36	.45	.40	.39	.47
8	.47	.38	.35	.35	.35
8	.35	.35	.35	.35	.34
8	.23	.05	0.0	0.0	0.0

9 ENDTBL

7 COMPUT 7 001 11 0.0 7.0 1.0 9 2 02 04

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 02-08-00 13:46
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

	STARTING TIME=	6.08	TIME INCREMENT=	.20	DRAINAGE AREA=	.03	BASE FLOW=	.00
8		.00	.00	.00	.01	.01		
8		.01	.02	.02	.03	.04		
8		.05	.07	.08	.10	.12		
8		.15	.18	.22	.26	.31		
8		.36	.42	.50	.59	.69		
8		.83	1.00	1.23	1.60	2.41		
8		5.28	8.89	20.60	19.56	14.35		
8		10.54	9.75	9.40	9.04	8.65		
8		8.27	7.90	7.55	7.06	6.48		
8		5.98	5.54	5.15	4.79	4.50		
8		4.23	3.99	3.77	3.55	3.38		
8		3.15	2.91	2.71	2.53	2.38		
8		2.26	2.14	2.01	1.89	1.82		
8		1.76	1.69	1.62	1.58	1.52		
8		1.46	1.41	1.38	1.32	1.30		
8		1.27	1.24	1.23	1.20	1.16		
8		1.15	1.15	1.12	1.10	1.07		
8		1.05	1.03	1.02	1.01	.99		
8		.95	.86	.73	.62	.52		
8		.43	.36	.30	.26	.21		
8		.18	.15	.13	.11	.09		
8		.07	.06	.05	.04	.04		
8		.03	.03	.02	.02	.02		
8		.01	.01	.01	.00	.00		

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

	STARTING TIME=	11.15	TIME INCREMENT=	.20	DRAINAGE AREA=	.00	BASE FLOW=	.00
8		.00	.01	.07	.21	.64		
8		2.62	3.86	1.70	1.05	.85		
8		.71	.61	.56	.50	.47		
8		.45	.43	.40	.37	.35		
8		.35	.34	.31	.32	.32		
8		.29	.29	.26	.27	.25		
8		.16	.19	.16	.17	.18		
8		.18	.14	.14	.15	.16		
8		.16	.12	.16	.13	.12		

TR20 XEQ 02-08-00 13:46
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 2

8	.12	.14	.11	.13	.13
8	.10	.14	.11	.10	.11
8	.14	.10	.10	.10	.10
8	.10	.10	.10	.10	.10
8	.06	.00	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 3 RECORD ID

STARTING TIME= 11.05 TIME INCREMENT= .20 DRAINAGE AREA= .02 BASE FLOW= .00

8	.00	.00	.00	.00	.43
8	4.82	9.81	7.79	4.22	2.88
8	2.34	2.03	1.86	1.72	1.55
8	1.46	1.42	1.36	1.27	1.16
8	1.16	1.12	1.05	1.02	1.06
8	.97	.96	.89	.86	.88
8	.57	.63	.58	.55	.59
8	.60	.50	.47	.49	.53
8	.54	.44	.49	.50	.42
8	.41	.46	.40	.39	.47
8	.36	.45	.40	.39	.47
8	.47	.38	.35	.35	.35
8	.35	.35	.35	.35	.34
8	.23	.05	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 11 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 4 MAIN TIME INCREMENT = .07 HOURS

OPERATION ADDHYD CROSS SECTION 1
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.52	22.42	(NULL)
22.15	1.29	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 6.08 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .03 SQ.MI.
6.08	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .01 .01		
6.78	DISCHG .01 .01 .01 .01 .01 .01 .01 .02 .02 .02		
7.48	DISCHG .02 .02 .03 .03 .03 .04 .04 .04 .05 .05		
8.18	DISCHG .06 .07 .07 .08 .08 .09 .09 .10 .11 .11		
8.88	DISCHG .12 .13 .14 .15 .16 .17 .18 .20 .21 .23		
9.58	DISCHG .24 .25 .27 .29 .31 .32 .34 .36 .38 .40		
10.28	DISCHG .42 .45 .48 .50 .54 .57 .60 .63 .67 .71		

TR20 XEQ 02-08-00 13:46
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 3

10.98	DISCHG	.76	.81	.86	.93	.99	1.07	1.16	1.26	1.41	1.58
11.68	DISCHG	1.76	2.09	2.53	3.06	4.30	5.99	7.77	9.65	11.35	14.26
12.38	DISCHG	18.28	21.62	22.42	21.60	21.01	19.37	17.43	15.54	14.07	12.68
13.08	DISCHG	11.30	10.97	10.66	10.37	10.22	10.08	9.94	9.79	9.65	9.49
13.78	DISCHG	9.34	9.19	9.05	8.91	8.77	8.63	8.49	8.36	8.23	8.09
14.48	DISCHG	7.96	7.78	7.60	7.41	7.20	6.99	6.79	6.61	6.43	6.26
15.18	DISCHG	6.11	5.95	5.80	5.66	5.51	5.37	5.25	5.12	5.02	4.92
15.88	DISCHG	4.82	4.73	4.62	4.52	4.42	4.34	4.26	4.18	4.09	4.00
16.58	DISCHG	3.92	3.85	3.78	3.72	3.66	3.57	3.47	3.36	3.24	3.16
17.28	DISCHG	3.09	3.03	2.95	2.87	2.80	2.74	2.68	2.63	2.58	2.54
17.98	DISCHG	2.50	2.46	2.42	2.37	2.31	2.25	2.20	2.16	2.11	2.08
18.68	DISCHG	2.04	2.02	1.99	1.97	1.96	1.94	1.91	1.88	1.85	1.81
19.38	DISCHG	1.78	1.77	1.77	1.75	1.73	1.70	1.67	1.65	1.62	1.60
20.08	DISCHG	1.58	1.56	1.55	1.54	1.54	1.52	1.49	1.47	1.45	1.44
20.78	DISCHG	1.44	1.43	1.42	1.41	1.39	1.37	1.36	1.37	1.37	1.36
21.48	DISCHG	1.35	1.33	1.32	1.30	1.28	1.27	1.27	1.27	1.28	1.28
22.18	DISCHG	1.28	1.27	1.25	1.23	1.22	1.22	1.21	1.20	1.19	1.18
22.88	DISCHG	1.17	1.16	1.16	1.15	1.14	1.14	1.13	1.13	1.12	1.12
23.58	DISCHG	1.12	1.11	1.11	1.10	1.09	1.08	1.06	1.03	.99	.93
24.28	DISCHG	.88	.81	.77	.72	.69	.65	.61	.58	.54	.51
24.98	DISCHG	.48	.44	.42	.39	.37	.35	.32	.30	.29	.27
25.68	DISCHG	.26	.24	.23	.21	.20	.19	.18	.17	.16	.15
26.38	DISCHG	.14	.13	.13	.12	.11	.11	.10	.09	.08	.08

RUNOFF VOLUME ABOVE BASEFLOW = 2.81 WATERSHED INCHES, 58.89 CFS-HRS, 4.87 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 2
 INPUT HYDROGRAPHS= 4,3 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.47	29.61	(NULL)
22.02	1.75	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 6.08 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .05 SQ.MI.
6.08	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .01		
6.78	DISCHG .01 .01 .01 .01 .01 .01 .01 .02 .02 .02 .02		
7.48	DISCHG .02 .02 .03 .03 .03 .04 .04 .04 .04 .05 .05		
8.18	DISCHG .06 .07 .07 .08 .08 .09 .09 .09 .10 .11 .11		
8.88	DISCHG .12 .13 .14 .15 .16 .17 .18 .18 .20 .21 .23		
9.58	DISCHG .24 .25 .27 .29 .31 .32 .34 .34 .36 .38 .40		
10.28	DISCHG .42 .45 .48 .50 .54 .57 .60 .60 .63 .67 .71		
10.98	DISCHG .76 .81 .86 .93 .99 1.07 1.16 1.16 1.26 1.41 1.58		
11.68	DISCHG 1.83 2.31 2.89 4.37 7.14 10.38 13.83 13.83 17.46 20.91 23.46		
12.38	DISCHG 26.78 29.41 28.96 26.89 25.16 23.06 20.65 18.37 16.70 15.13		
13.08	DISCHG 13.59 13.16 12.74 12.37 12.15 11.95 11.76 11.57 11.37 11.16		
13.78	DISCHG 10.95 10.74 10.57 10.39 10.23 10.07 9.92 9.77 9.62 9.47		
14.48	DISCHG 9.31 9.09 8.88 8.66 8.41 8.16 7.95 7.77 7.59 7.41		
15.18	DISCHG 7.24 7.07 6.90 6.73 6.56 6.41 6.27 6.15 6.06 5.97		

TR20 XEQ 02-08-00 13:46
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 4

15.88	DISCHG	5.87	5.74	5.60	5.49	5.39	5.30	5.20	5.10	4.98	4.88
16.58	DISCHG	4.79	4.71	4.65	4.60	4.52	4.33	4.12	3.93	3.84	3.78
17.28	DISCHG	3.71	3.64	3.54	3.44	3.36	3.29	3.24	3.21	3.17	3.13
17.98	DISCHG	3.10	3.06	2.98	2.90	2.81	2.74	2.68	2.63	2.59	2.56
18.68	DISCHG	2.53	2.53	2.52	2.51	2.49	2.47	2.43	2.36	2.29	2.26
19.38	DISCHG	2.25	2.26	2.26	2.25	2.22	2.17	2.11	2.07	2.04	2.01
20.08	DISCHG	2.00	2.00	2.00	1.99	1.96	1.92	1.89	1.86	1.84	1.86
20.78	DISCHG	1.88	1.90	1.86	1.80	1.75	1.76	1.79	1.81	1.80	1.77
21.48	DISCHG	1.75	1.72	1.71	1.71	1.72	1.74	1.74	1.74	1.75	1.73
22.18	DISCHG	1.70	1.65	1.62	1.59	1.57	1.57	1.56	1.55	1.54	1.53
22.88	DISCHG	1.52	1.51	1.51	1.50	1.49	1.49	1.48	1.48	1.47	1.47
23.58	DISCHG	1.47	1.46	1.45	1.44	1.43	1.38	1.31	1.24	1.13	1.02
24.28	DISCHG	.92	.84	.78	.72	.69	.65	.61	.58	.54	.51
24.98	DISCHG	.48	.44	.42	.39	.37	.35	.32	.30	.29	.27
25.68	DISCHG	.26	.24	.23	.21	.20	.19	.18	.17	.16	.15
26.38	DISCHG	.14	.13	.13	.12	.11	.11	.10	.09	.08	.08

RUNOFF VOLUME ABOVE BASEFLOW = 2.39 WATERSHED INCHES, 73.32 CFS-HRS, 6.06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 3

OUTPUT HYDROGRAPH= 6

AREA= .01 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .44 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0587 HOURS

PEAK TIME(HRS) 12.35 PEAK DISCHARGE(CFS) 13.37 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.01 SQ.MI.
7.00	DISCHG	.00	.00	.01	.01	.02
7.70	DISCHG	.04	.05	.06	.07	.08
8.40	DISCHG	.13	.14	.14	.15	.16
9.10	DISCHG	.25	.26	.27	.28	.29
9.80	DISCHG	.39	.41	.43	.44	.46
10.50	DISCHG	.63	.66	.69	.73	.76
11.20	DISCHG	1.09	1.16	1.24	1.33	1.44
11.90	DISCHG	4.13	5.76	7.69	9.58	11.23
12.60	DISCHG	9.01	7.46	6.23	5.28	4.51
13.30	DISCHG	2.41	2.26	2.14	2.03	1.94
14.00	DISCHG	1.53	1.49	1.46	1.43	1.40
14.70	DISCHG	1.23	1.19	1.16	1.13	1.11
15.40	DISCHG	1.03	1.00	.98	.96	.95
16.10	DISCHG	.90	.89	.88	.87	.86
16.80	DISCHG	.78	.76	.73	.67	.62
17.50	DISCHG	.53	.51	.50	.50	.50
18.20	DISCHG	.49	.47	.45	.44	.43
18.90	DISCHG	.44	.45	.45	.45	.44
19.60	DISCHG	.42	.42	.41	.39	.38
20.30	DISCHG	.38	.38	.37	.35	.34

TR20 XEQ 02-08-00 13:46
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 5

RUNOFF VOLUME ABOVE BASEFLOW = 4.14 WATERSHED INCHES, 19.19 CFS-HRS, 1.59 ACRE-FEET; BASEFLOW = .00 CFS

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

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 5

		PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)					
		12.45		41.60		(NULL)					
TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS		TIME INCREMENT = .07 HOURS		DRAINAGE AREA = .05 SQ.MI.					
6.30	DISCHG	.00	.00	.00	.00	.00	.01	.01	.01	.01	.01
7.00	DISCHG	.01	.01	.01	.02	.03	.03	.04	.04	.05	.06
7.70	DISCHG	.07	.09	.10	.11	.12	.14	.15	.16	.18	.19
8.40	DISCHG	.20	.22	.23	.24	.26	.28	.30	.32	.35	.37
9.10	DISCHG	.40	.42	.44	.46	.49	.52	.55	.58	.61	.64
9.80	DISCHG	.68	.72	.75	.78	.82	.86	.91	.96	1.02	1.08
10.50	DISCHG	1.14	1.20	1.26	1.33	1.40	1.48	1.57	1.67	1.78	1.90
11.20	DISCHG	2.03	2.16	2.32	2.51	2.72	3.01	3.38	3.94	4.83	6.16
11.90	DISCHG	8.90	13.37	18.56	23.93	29.18	33.78	37.23	40.36	41.56	39.33
12.60	DISCHG	35.65	32.32	28.94	25.60	22.64	20.39	18.37	16.64	15.92	15.28
13.30	DISCHG	14.75	14.39	14.06	13.77	13.48	13.20	12.91	12.62	12.36	12.12
14.00	DISCHG	11.90	11.69	11.51	11.33	11.15	10.98	10.80	10.61	10.36	10.12
14.70	DISCHG	9.85	9.56	9.29	9.05	8.85	8.66	8.47	8.29	8.11	7.92
15.40	DISCHG	7.73	7.54	7.37	7.22	7.09	7.00	6.91	6.79	6.65	6.50
16.10	DISCHG	6.37	6.26	6.16	6.05	5.94	5.81	5.69	5.58	5.49	5.43
16.80	DISCHG	5.37	5.26	5.03	4.76	4.54	4.41	4.33	4.26	4.18	4.07
17.50	DISCHG	3.96	3.86	3.79	3.73	3.70	3.67	3.64	3.60	3.56	3.47
18.20	DISCHG	3.37	3.27	3.18	3.11	3.05	3.01	2.97	2.95	2.95	2.95
18.90	DISCHG	2.95	2.94	2.92	2.87	2.79	2.71	2.67	2.65	2.66	2.67
19.60	DISCHG	2.66	2.63	2.57	2.50	2.44	2.40	2.37	2.36	2.36	2.37
20.30	DISCHG	2.36	2.33	2.29	2.24	2.20	2.18	2.20	2.24	2.26	2.21

RUNOFF VOLUME ABOVE BASEFLOW = 2.45 WATERSHED INCHES, 86.35 CFS-HRS, 7.14 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 10
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 55.00

		PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)					
		14.84		9.30		61.64					
TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS		TIME INCREMENT = .07 HOURS		DRAINAGE AREA = .05 SQ.MI.					
6.30	DISCHG	.00	.00	.00	.00	.00	.01	.01	.01	.01	.01
6.30	ELEV	55.00	55.00	55.00	55.00	55.00	55.01	55.01	55.01	55.01	55.01
7.00	DISCHG	.01	.01	.01	.02	.03	.03	.04	.04	.05	.06
7.00	ELEV	55.01	55.01	55.02	55.03	55.04	55.04	55.05	55.05	55.07	55.08

TR20 XEQ 02-08-00 13:46
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 6

7.70	DISCHG	.07	.08	.10	.11	.12	.13	.15	.16	.18	.19
7.70	ELEV	55.09	55.11	55.13	55.14	55.16	55.18	55.19	55.21	55.23	55.25
8.40	DISCHG	.20	.21	.23	.24	.26	.28	.30	.32	.35	.37
8.40	ELEV	55.26	55.28	55.30	55.32	55.34	55.36	55.39	55.42	55.45	55.48
9.10	DISCHG	.40	.42	.44	.46	.49	.51	.54	.57	.61	.64
9.10	ELEV	55.52	55.55	55.57	55.60	55.63	55.67	55.71	55.75	55.79	55.83
9.80	DISCHG	.68	.72	.75	.77	.77	.78	.79	.80	.81	.83
9.80	ELEV	55.88	55.93	55.97	56.00	56.01	56.02	56.04	56.07	56.11	56.16
10.50	DISCHG	.85	.88	.90	.93	.97	1.00	1.04	1.09	1.14	1.19
10.50	ELEV	56.22	56.28	56.36	56.44	56.53	56.62	56.73	56.85	56.98	57.13
11.20	DISCHG	1.22	1.26	1.30	1.34	1.38	1.39	1.39	1.40	1.42	1.43
11.20	ELEV	57.27	57.44	57.62	57.83	58.01	58.06	58.12	58.20	58.29	58.43
11.90	DISCHG	1.46	1.49	1.52	1.54	1.57	1.61	1.62	1.75	2.63	3.48
11.90	ELEV	58.63	58.95	59.14	59.36	59.64	59.98	60.25	60.52	60.65	60.77
12.60	DISCHG	4.24	4.91	5.48	5.97	6.38	6.72	7.00	7.23	7.44	7.62
12.60	ELEV	60.89	60.99	61.07	61.15	61.21	61.26	61.30	61.33	61.36	61.39
13.30	DISCHG	7.79	7.94	8.08	8.21	8.33	8.44	8.55	8.64	8.73	8.81
13.30	ELEV	61.42	61.44	61.46	61.48	61.50	61.51	61.53	61.54	61.56	61.57
14.00	DISCHG	8.88	8.94	9.00	9.06	9.10	9.15	9.19	9.22	9.25	9.27
14.00	ELEV	61.58	61.59	61.60	61.61	61.61	61.62	61.63	61.63	61.63	61.64
14.70	DISCHG	9.29	9.30	9.30	9.30	9.29	9.28	9.26	9.24	9.22	9.19
14.70	ELEV	61.64	61.64	61.64	61.64	61.64	61.64	61.64	61.63	61.63	61.63
15.40	DISCHG	9.16	9.13	9.09	9.05	9.01	8.96	8.92	8.87	8.82	8.77
15.40	ELEV	61.62	61.62	61.61	61.60	61.60	61.59	61.59	61.58	61.57	61.56
16.10	DISCHG	8.72	8.67	8.61	8.56	8.50	8.44	8.38	8.32	8.26	8.19
16.10	ELEV	61.56	61.55	61.54	61.53	61.52	61.51	61.50	61.50	61.49	61.48
16.80	DISCHG	8.13	8.07	8.00	7.93	7.86	7.78	7.71	7.63	7.55	7.48
16.80	ELEV	61.47	61.46	61.45	61.44	61.43	61.42	61.40	61.39	61.38	61.37
17.50	DISCHG	7.40	7.32	7.24	7.17	7.09	7.01	6.94	6.86	6.79	6.72
17.50	ELEV	61.36	61.35	61.34	61.32	61.31	61.30	61.29	61.28	61.27	61.26
18.20	DISCHG	6.64	6.57	6.49	6.42	6.34	6.27	6.20	6.12	6.05	5.98
18.20	ELEV	61.25	61.23	61.22	61.21	61.20	61.19	61.18	61.17	61.16	61.15
18.90	DISCHG	5.91	5.85	5.78	5.72	5.65	5.59	5.52	5.46	5.40	5.34
18.90	ELEV	61.14	61.13	61.12	61.11	61.10	61.09	61.08	61.07	61.06	61.05
19.60	DISCHG	5.28	5.22	5.16	5.10	5.04	4.98	4.92	4.87	4.81	4.76
19.60	ELEV	61.04	61.03	61.02	61.02	61.01	61.00	60.99	60.98	60.97	60.96
20.30	DISCHG	4.70	4.65	4.60	4.54	4.49	4.44	4.39	4.34	4.30	4.25
20.30	ELEV	60.96	60.95	60.94	60.93	60.93	60.92	60.91	60.90	60.90	60.89

RUNOFF VOLUME ABOVE BASEFLOW = 1.83 WATERSHED INCHES, 64.73 CFS-HRS, 5.35 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 5

OUTPUT HYDROGRAPH= 6

AREA= .01 SQ MI INPUT RUNOFF CURVE= 49. TIME OF CONCENTRATION= .28 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0373 HOURS

PEAK TIME(HRS)
12.32

PEAK DISCHARGE(CFS)
5.13

PEAK ELEVATION(FEET)
(RUNOFF)

TR20 XEQ 02-08-00 13:46
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 7

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS			TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .01 SQ.MI.		
11.20	.00	.00	.00	.00	.00	.00	.01	.05	.11	.29	
11.90	.73	1.43	2.25	3.08	3.90	4.67	5.13	4.72	3.83	3.07	
12.60	2.57	2.14	1.81	1.59	1.44	1.31	1.21	1.15	1.08	1.03	
13.30	.99	.96	.93	.90	.88	.84	.81	.78	.76	.74	
14.00	.72	.71	.71	.70	.69	.68	.67	.66	.64	.63	
14.70	.60	.58	.57	.57	.57	.56	.56	.55	.55	.54	
15.40	.52	.51	.50	.50	.50	.51	.51	.50	.49	.48	
16.10	.47	.47	.47	.46	.45	.44	.42	.42	.42	.43	
16.80	.43	.40	.35	.31	.29	.29	.30	.31	.30	.29	
17.50	.27	.27	.27	.28	.28	.28	.29	.29	.29	.27	
18.20	.26	.24	.24	.23	.23	.23	.23	.24	.25	.25	
18.90	.26	.26	.26	.25	.23	.22	.21	.22	.23	.25	
19.60	.25	.23	.22	.21	.20	.20	.20	.20	.21	.22	
20.30	.22	.21	.20	.19	.18	.19	.21	.22	.21	.20	

RUNOFF VOLUME ABOVE BASEFLOW = 1.45 WATERSHED INCHES, 6.58 CFS-HRS, .54 ACRE-FEET; BASEFLOW = .00 CFS

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

PEAK TIME(HRS) 14.61
 PEAK DISCHARGE(CFS) 9.90
 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS			TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .06 SQ.MI.		
6.30	.00	.00	.00	.00	.00	.01	.01	.01	.01	.01	
7.00	.01	.01	.01	.02	.03	.03	.04	.04	.05	.06	
7.70	.07	.08	.10	.11	.12	.13	.15	.16	.18	.19	
8.40	.20	.21	.23	.24	.26	.28	.30	.32	.35	.37	
9.10	.40	.42	.44	.46	.49	.51	.54	.57	.61	.64	
9.80	.68	.72	.75	.77	.77	.78	.79	.80	.81	.83	
10.50	.85	.88	.90	.93	.97	1.00	1.04	1.09	1.14	1.19	
11.20	1.22	1.26	1.30	1.34	1.38	1.39	1.41	1.45	1.53	1.72	
11.90	2.18	2.92	3.76	4.62	5.47	6.28	6.75	6.47	6.47	6.55	
12.60	6.81	7.05	7.29	7.56	7.81	8.02	8.21	8.38	8.52	8.65	
13.30	8.78	8.90	9.01	9.11	9.21	9.28	9.35	9.42	9.48	9.54	
14.00	9.60	9.66	9.71	9.75	9.80	9.83	9.86	9.88	9.89	9.90	
14.70	9.89	9.88	9.87	9.86	9.85	9.84	9.82	9.79	9.77	9.73	
15.40	9.69	9.64	9.59	9.55	9.51	9.47	9.43	9.37	9.31	9.25	
16.10	9.19	9.13	9.08	9.02	8.95	8.88	8.80	8.74	8.68	8.62	
16.80	8.56	8.47	8.35	8.24	8.15	8.07	8.01	7.94	7.86	7.77	
17.50	7.67	7.59	7.51	7.44	7.37	7.30	7.22	7.15	7.07	6.99	
18.20	6.90	6.81	6.73	6.65	6.57	6.50	6.43	6.37	6.30	6.24	
18.90	6.17	6.11	6.04	5.97	5.89	5.81	5.74	5.68	5.63	5.58	
19.60	5.52	5.45	5.38	5.31	5.24	5.18	5.12	5.07	5.02	4.97	
20.30	4.92	4.86	4.80	4.73	4.67	4.63	4.60	4.56	4.51	4.45	

RUNOFF VOLUME ABOVE BASEFLOW = 1.79 WATERSHED INCHES, 71.31 CFS-HRS, 5.89 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 11
 INPUT HYDROGRAPH= 4 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 52.50

PEAK TIME(HRS) 14.84 PEAK DISCHARGE(CFS) 9.87 PEAK ELEVATION(FEET) 57.32

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .06 SQ.MI.		
6.30	DISCHG	.00	.00	.00	.00	.00	.01	.01	.01	.01	.01	
6.30	ELEV	52.50	52.50	52.50	52.50	52.50	52.50	52.51	52.50	52.51	52.50	
7.00	DISCHG	.01	.01	.01	.02	.03	.03	.04	.04	.05	.06	
7.00	ELEV	52.51	52.51	52.51	52.51	52.51	52.52	52.52	52.52	52.53	52.53	
7.70	DISCHG	.07	.08	.10	.11	.12	.13	.15	.16	.18	.19	
7.70	ELEV	52.54	52.54	52.55	52.55	52.56	52.57	52.57	52.58	52.59	52.60	
8.40	DISCHG	.20	.21	.23	.24	.26	.28	.30	.32	.35	.37	
8.40	ELEV	52.60	52.61	52.61	52.62	52.63	52.64	52.65	52.66	52.67	52.69	
9.10	DISCHG	.40	.42	.44	.46	.49	.51	.54	.57	.61	.64	
9.10	ELEV	52.70	52.71	52.72	52.73	52.74	52.76	52.77	52.79	52.80	52.82	
9.80	DISCHG	.68	.71	.75	.77	.77	.78	.79	.80	.81	.83	
9.80	ELEV	52.84	52.86	52.87	52.89	52.89	52.89	52.89	52.90	52.91	52.91	
10.50	DISCHG	.85	.88	.90	.93	.97	1.00	1.02	1.05	1.10	1.14	
10.50	ELEV	52.93	52.94	52.95	52.97	52.98	53.00	53.02	53.05	53.10	53.14	
11.20	DISCHG	1.19	1.22	1.26	1.30	1.35	1.37	1.39	1.42	1.47	1.58	
11.20	ELEV	53.19	53.22	53.26	53.30	53.35	53.37	53.39	53.42	53.47	53.58	
11.90	DISCHG	1.86	2.03	2.11	2.23	2.40	2.60	2.83	3.01	3.06	3.10	
11.90	ELEV	53.86	54.06	54.21	54.46	54.79	55.20	55.67	56.03	56.12	56.22	
12.60	DISCHG	3.15	3.20	3.25	3.30	3.36	3.41	3.48	4.47	5.81	6.74	
12.60	ELEV	56.32	56.43	56.54	56.66	56.78	56.91	57.05	57.13	57.18	57.21	
13.30	DISCHG	7.40	7.89	8.24	8.52	8.73	8.90	9.04	9.16	9.26	9.34	
13.30	ELEV	57.23	57.25	57.26	57.27	57.28	57.28	57.29	57.29	57.30	57.30	
14.00	DISCHG	9.42	9.49	9.55	9.61	9.67	9.72	9.76	9.80	9.83	9.85	
14.00	ELEV	57.30	57.30	57.31	57.31	57.31	57.31	57.31	57.31	57.31	57.32	
14.70	DISCHG	9.86	9.87	9.87	9.87	9.87	9.86	9.85	9.84	9.82	9.79	
14.70	ELEV	57.32	57.32	57.32	57.32	57.32	57.32	57.32	57.32	57.31	57.31	
15.40	DISCHG	9.77	9.73	9.69	9.65	9.61	9.57	9.53	9.49	9.44	9.38	
15.40	ELEV	57.31	57.31	57.31	57.31	57.31	57.31	57.30	57.30	57.30	57.30	
16.10	DISCHG	9.33	9.27	9.22	9.16	9.10	9.04	8.97	8.90	8.84	8.78	
16.10	ELEV	57.30	57.30	57.29	57.29	57.29	57.29	57.29	57.28	57.28	57.28	
16.80	DISCHG	8.71	8.65	8.57	8.48	8.38	8.29	8.21	8.13	8.05	7.97	
16.80	ELEV	57.28	57.27	57.27	57.27	57.27	57.26	57.26	57.26	57.25	57.25	
17.50	DISCHG	7.89	7.80	7.72	7.64	7.56	7.48	7.41	7.33	7.26	7.18	
17.50	ELEV	57.25	57.25	57.24	57.24	57.24	57.24	57.23	57.23	57.23	57.23	
18.20	DISCHG	7.10	7.02	6.94	6.85	6.77	6.69	6.62	6.54	6.47	6.40	
18.20	ELEV	57.22	57.22	57.22	57.21	57.21	57.21	57.21	57.20	57.20	57.20	
18.90	DISCHG	6.34	6.27	6.20	6.14	6.07	5.99	5.92	5.85	5.78	5.72	
18.90	ELEV	57.20	57.19	57.19	57.19	57.19	57.18	57.18	57.18	57.18	57.18	

TR20 XEQ 02-08-00 13:46
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 11 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 9

19.60	DISCHG	5.67	5.61	5.54	5.47	5.41	5.34	5.28	5.22	5.16	5.11
19.60	ELEV	57.17	57.17	57.17	57.17	57.16	57.16	57.16	57.16	57.16	57.15
20.30	DISCHG	5.05	5.00	4.94	4.88	4.82	4.77	4.72	4.67	4.62	4.58
20.30	ELEV	57.15	57.15	57.15	57.15	57.14	57.14	57.14	57.14	57.14	57.14

RUNOFF VOLUME ABOVE BASEFLOW = 1.69 WATERSHED INCHES, 67.21 CFS-HRS, 5.55 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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	2	STORM	4										
XSECTION	1	ADDHYD	.03	9	2	.07	6.1	.00	.00	2.81	---	12.52	22.42	690.4
XSECTION	2	ADDHYD	.05	9	2	.07	6.1	.00	.00	2.39	---	12.47	29.61	622.9
XSECTION	3	RUNOFF	.01	9	2	.07	.0	7.00	24.00	4.14	---	12.35	13.37	1859.5
XSECTION	4	ADDHYD	.05	9	2	.07	.0	7.00	24.00	2.45	---	12.45	41.60	760.2
STRUCTURE	10	RESVOR	.05	9	2	.07	.0	7.00	24.00	1.83	61.64	14.84	9.30	170.0
XSECTION	5	RUNOFF	.01	9	2	.07	.0	7.00	24.00	1.45	---	12.32	5.13	729.5
XSECTION	6	ADDHYD	.06	9	2	.07	.0	7.00	24.00	1.79	---	14.61	9.90	160.3
STRUCTURE	11	RESVOR	.06	9	2	.07	.0	7.00	24.00	1.69	57.32	14.84	9.87	159.9

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 4
<u>STRUCTURE 11</u>	<u>.06</u>	
ALTERNATE 2		9.87
<u>STRUCTURE 10</u>	<u>.05</u>	
ALTERNATE 2		9.30
<u>XSECTION 1</u>	<u>.03</u>	
ALTERNATE 2		22.42
<u>XSECTION 2</u>	<u>.05</u>	
ALTERNATE 2		29.61
<u>XSECTION 3</u>	<u>.01</u>	
ALTERNATE 2		13.37
<u>XSECTION 4</u>	<u>.05</u>	
ALTERNATE 2		41.60
<u>XSECTION 5</u>	<u>.01</u>	
ALTERNATE 2		5.13
<u>XSECTION 6</u>	<u>.06</u>	
ALTERNATE 2		9.90

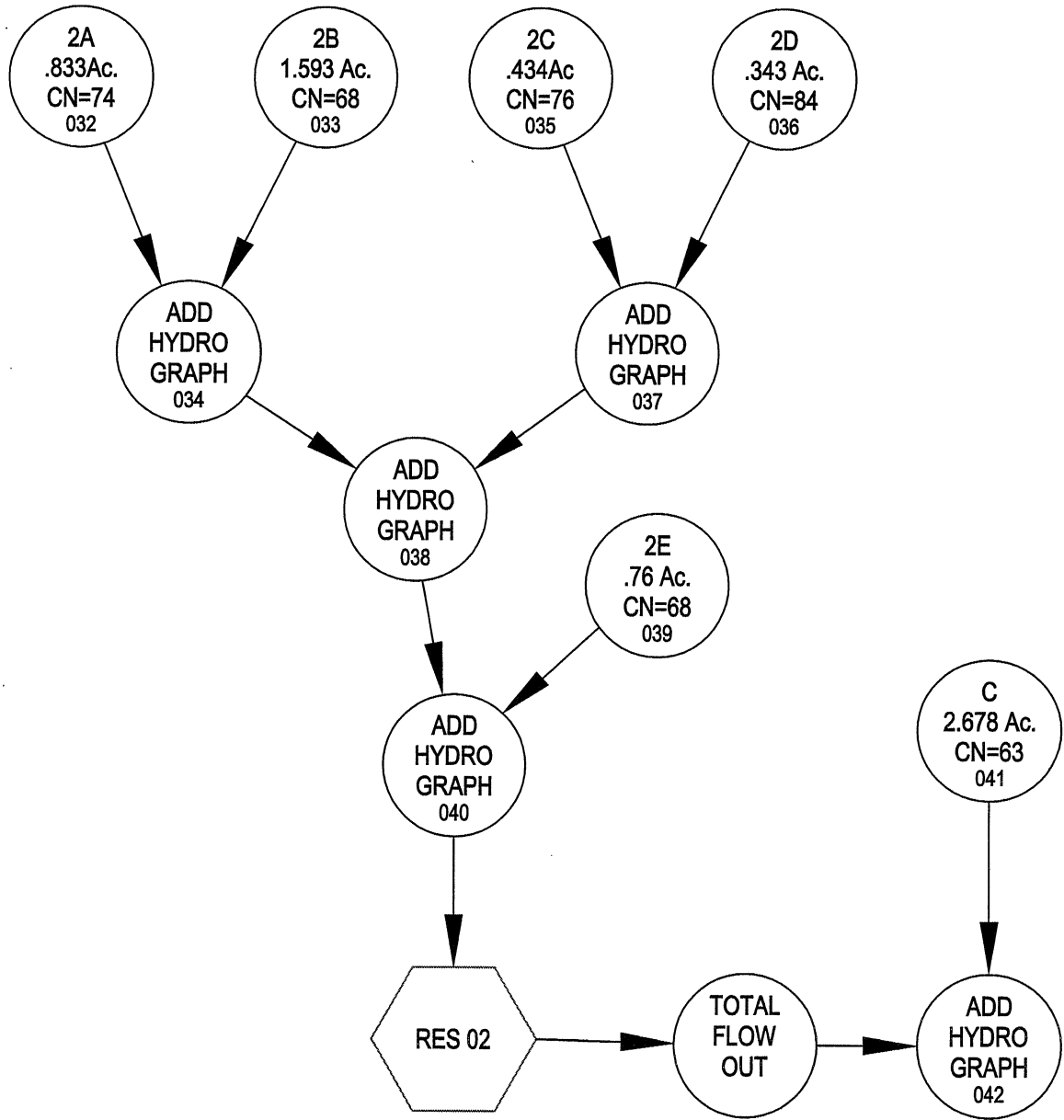
**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

Proposed Condition Analysis

To RES 12 Design Point

**Hayes Engineering, Inc.
February 14, 2000**

PROPOSED CONDITION WATERSHED SCHEMATIC TO RES 02 AND THOSE SUBAREAS TO BE LAGGED



To be lagged
0.2 hr. to
Res 12



To be lagged
0.3 hr. to
Res 12

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS
 Subarea : 2A

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	-	.276(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.318(98)	-	-

OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	-	.239(58)	-	-

Total Area (by Hydrologic Soil Group)		.833		
		====		

SUBAREA: 2A TOTAL DRAINAGE AREA: .833 Acres WEIGHTED CURVE NUMBER: 74

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 2B

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover > 75%	-	.374(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.374(98)	-	-
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	-	.845(58)	-	-
 Total Area (by Hydrologic Soil Group)		1.59		
		====		

SUBAREA: 2B TOTAL DRAINAGE AREA: 1.593 Acres WEIGHTED CURVE NUMBER: 68

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 2C

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	-	.26(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.174(98)	-	-

Total Area (by Hydrologic Soil Group)		.434		
		====		

 SUBAREA: 2C TOTAL DRAINAGE AREA: .434 Acres WEIGHTED CURVE NUMBER: 76

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999

County : State: Checked: ____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 2D

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
Acres (CN)				
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	-	.134(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.209(98)	-	-
Total Area (by Hydrologic Soil Group)		.343		
		====		

SUBAREA: 2D TOTAL DRAINAGE AREA: .343 Acres WEIGHTED CURVE NUMBER: 84

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999

County : State: Checked: _____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : 2E

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover > 75%	-	.614(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.146(98)	-	-

Total Area (by Hydrologic Soil Group)		.760		
		====		

SUBAREA: 2E TOTAL DRAINAGE AREA: .76 Acres WEIGHTED CURVE NUMBER: 68

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999

County : State: Checked: ____ Date: _____

Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

Subarea : D upl

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
Acres (CN)				

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover ≥ 75%	-	1.2(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.2(98)	-	-
OTHER AGRICULTURAL LANDS				
Woods good	-	3.28(55)	-	-
Total Area (by Hydrologic Soil Group)		4.68		
		====		

 SUBAREA: D upl TOTAL DRAINAGE AREA: 4.68 Acres WEIGHTED CURVE NUMBER: 58

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS
 Subarea : D wet

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
<hr/>				
OTHER AGRICULTURAL LANDS				
Woods	good	-	-	- 2.55(77)
Total Area (by Hydrologic Soil Group)				2.55
				====

SUBAREA: D wet TOTAL DRAINAGE AREA: 2.55 Acres WEIGHTED CURVE NUMBER: 77

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999

County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

----- Subarea #1 - 2A -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		50	.02	U					0.006
Shallow Concent'd		260	.015	P					0.029
Time of Concentration = 0.17*									=====

----- Subarea #2 - 2B -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.015	F					0.156
Shallow Concent'd		340	.022	U					0.039
Shallow Concent'd		200	.015	P					0.022
Time of Concentration = 0.22*									=====

----- Subarea #3 - 2C -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		50	.02	U					0.006
Time of Concentration = 0.14*									=====

----- Subarea #4 - 2D -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	30	.02	F					0.092
Shallow Concent'd		70	.01	P					0.010
Time of Concentration = 0.10*									=====

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.10

Project : CURZON MILLS SUBDIVISION User: cfb Date: 12-30-1999

County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION WATERSHED PARAMETERS

----- Subarea #5 - 2E -----
 Flow Type 2 year Length Slope Surface n Area Wp Velocity Time
 rain (ft) (ft/ft) code (sq/ft) (ft) (ft/sec) (hr)

 Sheet 3.1 50 .04 F 0.105
 Shallow Concent'd 110 .05 U 0.008
 Time of Concentration = 0.11*
 =====

----- Subarea #6 - C -----
 Flow Type 2 year Length Slope Surface n Area Wp Velocity Time
 rain (ft) (ft/ft) code (sq/ft) (ft) (ft/sec) (hr)

 Sheet 3.1 50 .02 F 0.139
 Shallow Concent'd 470 .02 U 0.057
 Time of Concentration = 0.20*
 =====

----- Subarea #7 - D upl -----
 Flow Type 2 year Length Slope Surface n Area Wp Velocity Time
 rain (ft) (ft/ft) code (sq/ft) (ft) (ft/sec) (hr)

 Sheet 3.1 50 .05 H 0.145
 Shallow Concent'd 210 .10 U 0.011
 Time of Concentration = 0.16*
 =====

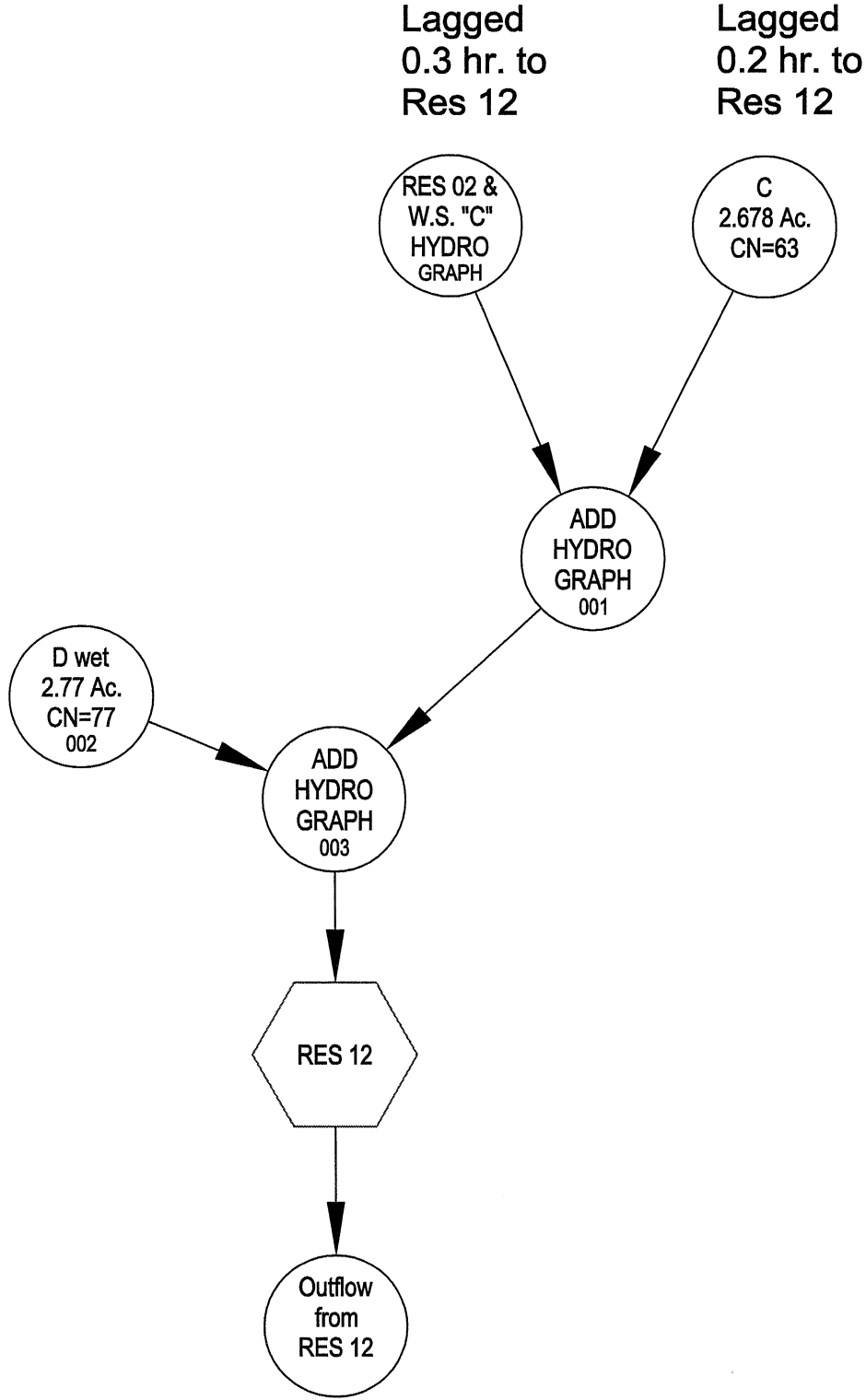
----- Subarea #8 - D wet -----
 Flow Type 2 year Length Slope Surface n Area Wp Velocity Time
 rain (ft) (ft/ft) code (sq/ft) (ft) (ft/sec) (hr)

 Sheet 3.1 50 .04 H 0.158
 Shallow Concent'd 550 .008 U 0.106
 Time of Concentration = 0.26*
 =====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated = 20 % Res.	H Woods, Light	P Paved
D Cultivated & 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

PROPOSED CONDITION WATERSHED SCHEMATIC
TO RES 12 POINT OF COMPARISON





HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # _____

NAME _____

DATE _____

MADE BY _____

MEMO

CALCULATION

RES 12 - STAGE STORAGE

ELEV	AREA FT ²	AUG. FT ²	INC.D. FT	INC.VOL FT ³	CUM.VOL Ac.Ft.
61.9	0	5	.1	.5	0
62	10±	15	2	30	0.20001 (neg)
64	20±	12364	.5	6182	.0007
64.5	24709	45854	.5	22927	.1426
65	67000	68500	.2	13700	.669
65.2	70000±	94000	.8	75200	.98
66	118000				2.7

STAGE DISCHARGE BASED ON PROP. CONTROL STRUCTURE

• 1-8" @ 61.9

• 1-18" @ 64.5

SEE ATTACHED H4-8 ANALYSIS

RES 12 Low Flow Q D/S OF CONTROL SECTION

CURRENT DATE: 02-09-2000
CURRENT TIME: 10:24:35

FILE DATE: 02-09-2000
FILE NAME: RES12

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.25 (ft) BY 1.25 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4@ (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	61.60	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
0.35	61.87	0.27	0.13	6-FFc	0.21	0.22	0.22	0.00	2.31	0.00
0.70	62.01	0.41	0.23	6-FFc	0.31	0.32	0.32	0.00	2.78	0.00
1.05	62.14	0.54	0.32	6-FFc	0.38	0.40	0.40	0.00	3.12	0.00
1.40	62.25	0.65	0.40	6-FFc	0.44	0.46	0.46	0.00	3.36	0.00
1.75	62.35	0.75	0.48	6-FFc	0.50	0.52	0.52	0.00	3.60	0.00
2.10	62.44	0.84	0.56	6-FFc	0.56	0.57	0.57	0.00	3.81	0.00
2.45	62.52	0.92	0.64	6-FFc	0.61	0.63	0.63	0.00	3.98	0.00
2.80	62.60	1.00	0.72	6-FFc	0.66	0.67	0.67	0.00	4.19	0.00
3.15	62.67	1.07	0.80	6-FFc	0.71	0.71	0.71	0.00	4.36	0.00
3.50	62.75	1.15	0.89	6-FFc	0.76	0.75	0.75	0.00	4.52	0.00

El. inlet face invert 61.60 ft El. outlet invert 61.50 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
 INLET ELEVATION 61.60 ft
 OUTLET STATION 12.00 ft
 OUTLET ELEVATION 61.50 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0083
 CULVERT LENGTH ALONG SLOPE 12.00 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.25 ft
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S n 0.015
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL SQUARE EDGE WITH HEADWALL
 INLET DEPRESSION NONE

RES 12 High Flow Q

CURRENT DATE: 02-09-2000
CURRENT TIME: 10:45:35

FILE DATE: 02-09-2000
FILE NAME: RES12'

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.50 (ft) BY 1.50 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 = F4t (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	64.50	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
0.70	64.74	0.24	-2.69	6-FFc	0.13	0.31	0.31	0.00	2.68	0.00
1.40	64.94	0.44	-2.54	6-FFc	0.18	0.44	0.44	0.00	3.21	0.00
2.10	65.12	0.62	-2.42	6-FFc	0.22	0.54	0.54	0.00	3.63	0.00
2.80	65.27	0.77	-2.29	6-FFc	0.26	0.63	0.63	0.00	3.96	0.00
3.50	65.40	0.90	-2.17	6-FFc	0.30	0.71	0.71	0.00	4.24	0.00
4.20	65.53	1.03	-2.05	6-FFc	0.33	0.78	0.78	0.00	4.50	0.00
4.90	65.64	1.14	-1.93	6-FFc	0.35	0.85	0.85	0.00	4.76	0.00
5.60	65.76	1.26	-1.79	6-FFc	0.38	0.91	0.91	0.00	4.98	0.00
6.30	65.88	1.38	-1.66	6-FFc	0.40	0.97	0.97	0.00	5.24	0.00
7.00	66.00	1.50	-1.52	6-FFc	0.42	1.02	1.02	0.00	5.46	0.00

El. inlet face invert 64.50 ft El. outlet invert 61.50 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
INLET ELEVATION 64.50 ft
OUTLET STATION 16.00 ft
OUTLET ELEVATION 61.50 ft
NUMBER OF BARRELS 1
SLOPE (V/H) 0.1875
CULVERT LENGTH ALONG SLOPE 16.28 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
BARREL DIAMETER 1.50 ft
BARREL MATERIAL CONCRETE
BARREL MANNING'S n 0.015
INLET TYPE CONVENTIONAL
INLET EDGE AND WALL SQUARE EDGE WITH HEADWALL
INLET DEPRESSION NONE

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : CHERRY HILL ESTATES User: Date: 02-04-2000

County : State: Checked: Date: Subtitle: PROPOSED CONDITION ANALYSIS

----- Subarea #1 - D wet -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	H					0.209
Shallow Concent'd		240	.018	U					0.031
Open Channel		320	.0003			.04 2	5		0.254

Time of Concentration = 0.49*
=====

----- Subarea #2 - D upl -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.066	F					0.086
Shallow Concent'd		240	.09	U					0.014

Time of Concentration = 0.10*
=====

----- Subarea #3 - C -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.1	50	.02	F					0.139
Shallow Concent'd		470	.02	U					0.057

Time of Concentration = 0.20*
=====

TRAVEL TIME

----- Subarea #4 - 02 -----

Flow Type	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Shallow Concent'd	205	.017	U					0.027
Open Channel	320	.0003			.04 2	5		0.254

Travel Time = 0.28* Use 0.3hr.
=====

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : CHERRY HILL ESTATES User: Date: 02-04-2000

County : State: Checked: ___ Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS

----- Subarea #5 - upl d -----

Flow Type	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Shallow Concent'd	150	.02	U					0.018
Open Channel	190	.0003		.04	2	5		0.151
Travel Time = 0.17*								Use 0.2 hr
=====								

----- Subarea #6 - culv c -----

Flow Type	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Shallow Concent'd	290	.018	U					0.037
Open Channel	320	.0003		.04	2	5		0.254
Travel Time = 0.29*								Use 0.3 hr.
=====								

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Bermuda | --- Surface Codes --- |
| C Cultivated = 20 % Res. | H Woods, Light | P Paved |
| D Cultivated ≠ 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

SINCE OUTFLOW from RES02 & culvert C have travel times that are equal, combine hydrographs and lag composite to Res 12

RES 02 STAGE STORAGE

Elev	Area (Sq Ft)	Avg Area (Sq Ft)	Inc Depth (Ft)	Inc Vol (Ac Ft)	Cum Vol (Ac Ft)
67	4440				-
		5020	1.00	0	
68	5600				0.115
		6235	1.00	0.143	
69	6870				0.258
		7205	0.50	0.083	
69.5	7540				0.341
		7885	0.50	0.091	
70	8230				0.432



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT-0015

NAME _____

DATE FEB 2000

MADE BY _____

MEMO

CALCULATION

RES 02 - WATER QUALITY VOL

ELEV	AREA FT ²	AVG. FT ²	INC.D. FT	INC.VOL FT ³	Cum Vol FT ³
66	3375				0
		3907	1	3907	
67	4440				3907

TOTAL IMPERVIOUS AREA TRIBUTARY TO RES 02 :

W SZA-2E = 1.221 Ac. - AU B soil

TOTAL PROPOSED BUILDING FOOTPRINT AREAS = 15500 FT²

NET IMPERVIOUS AREA : 37687 FT²

1" RUNOFF : 3141 FT³ ∴ OKAY SINCE 3907 FT³ PROVIDED

CURRENT DATE: 02-07-2000
CURRENT TIME: 10:01:07

FILE DATE: 02-07-2000
FILE NAME: RES02

PERFORMANCE CURVE FOR CULVERT 1 - 1(0.83 (ft) BY 0.83 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 =F4c (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	67.00	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
0.43	67.38	0.38	-0.70	6-FFc	0.17	0.28	0.28	0.00	2.65	0.00
0.85	67.59	0.59	-0.50	6-FFc	0.24	0.41	0.41	0.00	3.21	0.00
1.28	67.76	0.76	-0.30	6-FFc	0.29	0.50	0.50	0.00	3.70	0.00
1.70	67.94	0.94	-0.06	6-FFc	0.34	0.59	0.59	0.00	4.17	0.00
2.13	68.16	1.16	0.30	6-FFc	0.39	0.65	0.65	0.00	4.67	0.00
2.55	68.42	1.42	0.57	6-FFc	0.43	0.70	0.70	0.00	5.19	0.00
2.98	68.74	1.74	0.88	6-FFc	0.47	0.75	0.75	0.00	5.78	0.00
3.40	69.11	2.11	1.24	6-FFc	0.52	0.80	0.80	0.00	6.27	0.00
3.83	69.53	2.53	1.64	6-FFc	0.56	0.83	0.83	0.00	7.07	0.00
4.25	70.00	3.00	2.06	6-FFc	0.61	0.83	0.83	0.00	7.85	0.00

El. inlet face invert 67.00 ft El. outlet invert 66.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION	0.00 ft
INLET ELEVATION	67.00 ft
OUTLET STATION	35.00 ft
OUTLET ELEVATION	66.00 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0286
CULVERT LENGTH ALONG SLOPE	35.01 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	0.83 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.010
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE WITH HEADWALL
INLET DEPRESSION	NONE

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS
 TITLE 001 PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/07/00

5 RAINFL 9	.25							
8	0.0	.0025	.005	.0075	.010			
8	.0125	.015	.0175	.020	.0225			
8	.026	.0285	.031	.0345	.037			
8	.0405	.043	.0465	.050	.0535			
8	.057	.0605	.064	.068	.072			
8	.076	.080	.0845	.089	.094			
8	.100	.1075	.115	.1225	.130			
8	.1385	.148	.157	.167	.178			
8	.189	.202	.216	.2315	.250			
8	.271	.298	.3455	.500	.6555			
8	.702	.7295	.751	.769	.785			
8	.7985	.811	.823	.834	.8435			
8	.853	.862	.870	.8785	.886			
8	.8935	.900	.907	.911	.916			
8	.920	.9245	.929	.9325	.936			
8	.940	.944	.947	.951	.954			
8	.957	.9605	.963	.9665	.969			
8	.9725	.975	.9775	.981	.9835			
8	.986	.9885	.991	.9935	.996			
8	.9985	1.0	1.0	1.0	1.0			
9	ENDTBL							
3	STRUCT	02						
8		67.	0.0	0.0				
8		68.	1.82	.115				
8		69.	3.27	.258				
8		69.5	3.8	.341				
8		70.	13.7	.432				
9	ENDTBL							
6	RUNOFF 1 032	1 .00130156	74.	.17	1 1 1 1			
6	RUNOFF 1 033	2 .00248906	68.	.22	1 1 1 1			
6	ADDHYD 4 034	2 1 3			1 1 1 1			
6	RUNOFF 1 035	1 .00067812	76.	.14	1 1 1 1			
6	RUNOFF 1 036	2 .00053594	84.	.10	1 1 1 1			
6	ADDHYD 4 037	2 1 4			1 1 1 1			
6	ADDHYD 4 038	4 3 5			1 1 1 1			
6	RUNOFF 1 039	1 .0011875	68.	.11	1 1 1 1			
6	ADDHYD 4 040	5 1 3			1 1 1 1			
6	RESVOR 2 02 3	5 67.			1 1 1 1 1			
6	RUNOFF 1 041	1 .00418438	63.	.20	1 1 1 1			
6	ADDHYD 4 042	5 1 3			1 1 1 1			
6	RUNOFF 1 043	2 .0073125	58.	.10	1 1 1 1			
	ENDATA							
7	INCREM 6	.1						
7	COMPUT 7 032	043 0.0	3.1	1.0	9 2 02 01			24R
	ENDCMP 1							
7	COMPUT 7 032	043 0.0	4.6	1.0	9 2 02 02			104R
	ENDCMP 1							
7	COMPUT 7 032	043 0.0	5.4	1.0	9 2 02 03			254R
	ENDCMP 1							
7	COMPUT 7 032	043 0.0	7.0	1.0	9 2 02 04			1004R
	ENDCMP 1							
	ENDJOB 2							

*****END OF 80-80 LIST*****

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 MOIST 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 2 STORM 1														
+														
XSECTION	32	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.97	---	12.30	.65	502.1
XSECTION	33	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.68	---	12.30	.83	331.5
XSECTION	34	ADDHYD	.00	9	2	.10	.0	3.10	24.00	.78	---	12.28	1.50	394.6
XSECTION	35	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.09	---	12.20	.38	554.1
XSECTION	36	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.60	---	12.20	.44	829.7
XSECTION	37	ADDHYD	.00	9	2	.10	.0	3.10	24.00	1.31	---	12.20	.82	675.8
XSECTION	38	ADDHYD	.01	9	2	.10	.0	3.10	24.00	.91	---	12.26	2.31	461.2
XSECTION	39	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.68	---	12.20	.41	342.8
XSECTION	40	ADDHYD	.01	9	2	.10	.0	3.10	24.00	.87	---	12.26	2.73	441.6
STRUCTURE	2	RESVOR	.01	9	2	.10	.0	3.10	24.00	.86	67.62	12.52	1.14	183.6
XSECTION	41	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.48	---	12.30	.92	218.8
XSECTION	42	ADDHYD	.01	9	2	.10	.0	3.10	24.00	.71	---	12.33	1.91	183.6
XSECTION	43	RUNOFF	.01	9	2	.10	.0	3.10	24.00	.31	---	12.30	.93	127.1
ALTERNATE 2 STORM 2														
+														
XSECTION	32	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.06	---	12.25	1.41	1084.6
XSECTION	33	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.60	---	12.27	2.04	819.6
XSECTION	34	ADDHYD	.00	9	2	.10	.0	4.60	24.00	1.76	---	12.26	3.44	908.8
XSECTION	35	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.22	---	12.20	.77	1128.7
XSECTION	36	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.92	---	12.20	.78	1458.5
XSECTION	37	ADDHYD	.00	9	2	.10	.0	4.60	24.00	2.53	---	12.19	1.55	1275.7
XSECTION	38	ADDHYD	.01	9	2	.10	.0	4.60	24.00	1.94	---	12.25	4.98	994.4
XSECTION	39	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.61	---	12.20	1.00	841.8
XSECTION	40	ADDHYD	.01	9	2	.10	.0	4.60	24.00	1.88	---	12.24	5.80	937.3
STRUCTURE	2	RESVOR	.01	9	2	.10	.0	4.60	24.00	1.87	68.43	12.51	2.44	393.7
XSECTION	41	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.26	---	12.27	2.73	651.3
XSECTION	42	ADDHYD	.01	9	2	.10	.0	4.60	24.00	1.62	---	12.30	4.90	472.2
XSECTION	43	RUNOFF	.01	9	2	.10	.0	4.60	24.00	.96	---	12.23	3.58	490.2

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST 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 2 STORM 3														
+														
XSECTION	32	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.69	---	12.25	1.76	1356.0
XSECTION	33	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.17	---	12.27	2.77	1112.6
XSECTION	34	ADDHYD	.00	9	2	.10	.0	5.40	24.00	2.35	---	12.26	4.60	1212.4
XSECTION	35	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.88	---	12.20	.99	1454.1
XSECTION	36	RUNOFF	.00	9	2	.10	.0	5.40	24.00	3.65	---	12.20	.96	1797.7
XSECTION	37	ADDHYD	.00	9	2	.10	.0	5.40	24.00	3.22	---	12.18	1.95	1609.2
XSECTION	38	ADDHYD	.01	9	2	.10	.0	5.40	24.00	2.56	---	12.24	6.32	1263.2
XSECTION	39	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.18	---	12.20	1.35	1139.6
XSECTION	40	ADDHYD	.01	9	2	.10	.0	5.40	24.00	2.49	---	12.23	7.66	1237.0
STRUCTURE	2	RESVOR	.01	9	2	.10	.0	5.40	24.00	2.48	68.90	12.52	3.13	504.7
XSECTION	41	RUNOFF	.00	9	2	.10	.0	5.40	24.00	1.77	---	12.27	3.86	921.6
XSECTION	42	ADDHYD	.01	9	2	.10	.0	5.40	24.00	2.19	---	12.29	6.61	636.6
XSECTION	43	RUNOFF	.01	9	2	.10	.0	5.40	24.00	1.40	---	12.22	5.35	732.2
ALTERNATE 2 STORM 4														
+														
XSECTION	32	RUNOFF	.00	9	2	.10	.0	7.00	24.00	4.06	---	12.23	2.61	2006.0
XSECTION	33	RUNOFF	.00	9	2	.10	.0	7.00	24.00	3.41	---	12.26	4.32	1737.2
XSECTION	34	ADDHYD	.00	9	2	.10	.0	7.00	24.00	3.63	---	12.25	7.02	1852.2
XSECTION	35	RUNOFF	.00	9	2	.10	.0	7.00	24.00	4.28	---	12.20	1.44	2121.6
XSECTION	36	RUNOFF	.00	9	2	.10	.0	7.00	24.00	5.15	---	12.16	1.34	2509.1
XSECTION	37	ADDHYD	.00	9	2	.10	.0	7.00	24.00	4.66	---	12.18	2.78	2287.4
XSECTION	38	ADDHYD	.01	9	2	.10	.0	7.00	24.00	3.88	---	12.23	9.48	1894.1
XSECTION	39	RUNOFF	.00	9	2	.10	.0	7.00	24.00	3.43	---	12.19	2.10	1772.5
XSECTION	40	ADDHYD	.01	9	2	.10	.0	7.00	24.00	3.80	---	12.22	11.56	1867.6
STRUCTURE	2	RESVOR	.01	9	2	.10	.0	7.00	24.00	3.77	69.67	12.43	7.23	1167.2
XSECTION	41	RUNOFF	.00	9	2	.10	.0	7.00	24.00	2.90	---	12.26	6.33	1512.4
XSECTION	42	ADDHYD	.01	9	2	.10	.0	7.00	24.00	3.42	---	12.38	11.41	1099.3
XSECTION	43	RUNOFF	.01	9	2	.10	.0	7.00	24.00	2.42	---	12.20	9.35	1278.4

2 4R STORM

OPERATION ADDHYD CROSS SECTION 42

INPUT HYDROGRAPHS= 5,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.33 1.91 (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
10.00	DISCHG	.00	.00	.01	.01	.01	.01
11.00	DISCHG	.01	.02	.02	.03	.04	.05
12.00	DISCHG	.50	.95	1.45	1.88	1.79	1.62
13.00	DISCHG	1.14	1.08	1.01	.96	.91	.86
14.00	DISCHG	.66	.64	.61	.59	.57	.55
15.00	DISCHG	.45	.44	.43	.42	.40	.39
16.00	DISCHG	.35	.34	.34	.33	.32	.31
17.00	DISCHG	.25	.25	.24	.24	.23	.22
18.00	DISCHG	.20	.20	.19	.18	.18	.17
19.00	DISCHG	.17	.17	.16	.15	.16	.16
20.00	DISCHG	.14	.14	.15	.15	.14	.13
21.00	DISCHG	.13	.13	.14	.14	.13	.12
22.00	DISCHG	.13	.13	.13	.12	.12	.12
23.00	DISCHG	.11	.11	.11	.11	.11	.11
24.00	DISCHG	.09	.08	.07	.05	.05	.04
25.00	DISCHG	.02	.02	.02	.01	.01	.01

RUNOFF VOLUME ABOVE BASEFLOW = .71 WATERSHED INCHES, 4.72 CFS-HRS, .39 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 43

OUTPUT HYDROGRAPH= 2

AREA= .01 SQ MI INPUT RUNOFF CURVE= 58. TIME OF CONCENTRATION= .10 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .05 CFS.

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 23.70 .05 (RUNOFF)
 12.30 .93 (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
12.00	DISCHG	.02	.35	.78	.93	.47	.45
13.00	DISCHG	.25	.23	.22	.22	.21	.21
14.00	DISCHG	.17	.17	.17	.17	.16	.16
15.00	DISCHG	.15	.14	.14	.14	.13	.13
16.00	DISCHG	.12	.12	.12	.12	.11	.11
17.00	DISCHG	.07	.08	.09	.08	.07	.07
18.00	DISCHG	.08	.07	.06	.06	.06	.06
19.00	DISCHG	.07	.06	.05	.06	.07	.07
20.00	DISCHG	.06	.06	.06	.06	.05	.05
21.00	DISCHG	.05	.06	.07	.06	.05	.05
22.00	DISCHG	.07	.05	.05	.05	.05	.05
23.00	DISCHG	.05	.05	.05	.05	.05	.05
24.00	DISCHG	.03	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = .31 WATERSHED INCHES, 1.46 CFS-HRS, .12 ACRE-FEET; BASEFLOW = .00 CFS

24R STORM

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

```
JOB TR-20                FULLPRINT          SUMMARY  NOPLOTS
TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TITLE   TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00
5 RAINFL 9                .25
8      0.0                .0025      .005      .0075      .010
8      .0125              .015      .0175     .020      .0225
8      .026                .0285     .031      .0345     .037
8      .0405              .043      .0465     .050      .0535
8      .057                .0605     .064      .068      .072
8      .076                .080      .0845     .089      .094
8      .100               .1075     .115      .1225     .130
8      .1385              .148      .157      .167      .178
8      .189                .202      .216      .2315     .250
8      .271                .298      .3455     .500      .6555
8      .702                .7295     .751      .769      .785
8      .7985              .811      .823      .834      .8435
8      .853                .862      .870      .8785     .886
8      .8935              .900      .907      .911      .916
8      .920                .9245     .929      .9325     .936
8      .940                .944      .947      .951      .954
8      .957                .9605     .963      .9665     .969
8      .9725              .975      .9775     .981      .9835
8      .986                .9885     .991      .9935     .996
8      .9985              1.0      1.0      1.0      1.0
9 ENDTBL
3 STRUCT      12
8              61.9      0.0      0.0
8              62.      .09      .0001
8              64.      2.26     .0007
8              64.5     2.59     .1426
8              65.      4.51     .669
8              65.2     5.45     .98
8              66.      10.35    2.7
9 ENDTBL
6 ADDHYD 4 001   1 2 3                1 1 1 1
6 RUNOFF 1 002   6 .0043281  77.      .49      1 1 1 1
6 ADDHYD 4 004   6 3 7                1 1 1 1
6 RESVOR 2      12 7 5 61.9          1 1 1 1 1
  ENDATA
7 INCREM 6                0.07
7 READHD 8      1
7 READHD 9 12.3          .2      .010376563 0.0
8      0.0                .01      .01      .01      .01
8      .01                .02      .03      .05      .09
8      .50                1.45     1.79     1.51     1.3
8      1.14              1.01     .91      .82      .73
```

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	.66	.61	.57	.52	.48
8	.45	.43	.40	.38	.37
8	.35	.34	.32	.31	.30
8	.25	.24	.23	.21	.21
8	.20	.19	.18	.17	.17
8	.17	.16	.16	.16	.15
8	.14	.15	.14	.13	.14
8	.13	.14	.13	.12	.12
8	.13	.13	.12	.12	.12
8	.11	.11	.11	.11	.11
8	.09	.07	.05	.04	.03
8	.02	.02	.01	.01	0.0

9 ENDTBL

7 READHD 8 2

7 READHD 9 12.2	.2	.0073125	0.0		
8	.02	.78	.47	.33	.29
8	.25	.22	.21	.19	.18
8	.17	.17	.16	.15	.14
8	.15	.14	.13	.13	.13
8	.12	.12	.11	.12	.12
8	.07	.09	.07	.08	.08
8	.08	.06	.06	.07	.07
8	.07	.05	.07	.06	.06
8	.06	.06	.05	.06	.06
8	.05	.07	.05	.05	.05
8	.07	.05	.05	.05	.05
8	.05	.05	.05	.05	.04
8	.03	0.0	0.0	0.0	0.0

9 ENDTBL

7 COMPUT 7 001 12 0.0 3.1 1.0 9 2 02 01

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 02-09-00 11:10
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

STARTING TIME= 12.30 TIME INCREMENT= .20 DRAINAGE AREA= .01 BASE FLOW= .00

8	.00	.01	.01	.01	.01
8	.01	.02	.03	.05	.09
8	.50	1.45	1.79	1.51	1.30
8	1.14	1.01	.91	.82	.73
8	.66	.61	.57	.52	.48
8	.45	.43	.40	.38	.37
8	.35	.34	.32	.31	.30
8	.25	.24	.23	.21	.21
8	.20	.19	.18	.17	.17
8	.17	.16	.16	.16	.15
8	.14	.15	.14	.13	.14
8	.13	.14	.13	.12	.12
8	.13	.13	.12	.12	.12
8	.11	.11	.11	.11	.11
8	.09	.07	.05	.04	.03
8	.02	.02	.01	.01	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 12.20 TIME INCREMENT= .20 DRAINAGE AREA= .01 BASE FLOW= .00

8	.02	.78	.47	.33	.29
8	.25	.22	.21	.19	.18
8	.17	.17	.16	.15	.14
8	.15	.14	.13	.13	.13
8	.12	.12	.11	.12	.12
8	.07	.09	.07	.08	.08
8	.08	.06	.06	.07	.07
8	.07	.05	.07	.06	.06
8	.06	.06	.05	.06	.06
8	.05	.07	.05	.05	.05
8	.07	.05	.05	.05	.05
8	.05	.05	.05	.05	.04
8	.03	.00	.00	.00	.00

9 ENDTBL

TR20 XEQ 02-09-00 11:10
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 2

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 12 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 3.10 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .07 HOURS

OPERATION ADDHYD CROSS SECTION 1
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
14.71 1.92 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 12.20 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .02 SQ.MI.								
12.20	DISCHG .02 .29 .55 .77 .67 .56 .47 .42 .37 .33										
12.90	DISCHG .32 .31 .29 .28 .26 .25 .24 .24 .23 .23										
13.60	DISCHG .23 .23 .23 .23 .23 .24 .25 .26 .38 .53										
14.30	DISCHG .67 1.00 1.33 1.63 1.75 1.86 1.92 1.81 1.71 1.62										
15.00	DISCHG 1.55 1.48 1.42 1.36 1.30 1.25 1.20 1.15 1.11 1.08										
15.70	DISCHG 1.04 1.01 .98 .95 .91 .88 .85 .82 .79 .77										
16.40	DISCHG .76 .73 .72 .70 .69 .68 .66 .64 .63 .61										
17.10	DISCHG .58 .55 .53 .53 .53 .52 .51 .49 .48 .47										
17.80	DISCHG .47 .46 .46 .45 .45 .45 .44 .42 .41 .40										
18.50	DISCHG .40 .39 .39 .38 .38 .38 .38 .38 .37 .36										
19.20	DISCHG .35 .32 .30 .30 .30 .30 .30 .30 .29 .28										
19.90	DISCHG .27 .27 .27 .27 .27 .26 .26 .26 .25 .24										
20.60	DISCHG .24 .23 .24 .23 .23 .23 .23 .23 .22 .22										
21.30	DISCHG .23 .23 .23 .22 .21 .21 .21 .21 .21 .21										
22.00	DISCHG .21 .21 .21 .21 .20 .20 .20 .20 .20 .19										
22.70	DISCHG .19 .19 .18 .18 .18 .19 .19 .19 .18 .18										
23.40	DISCHG .18 .19 .19 .18 .18 .18 .17 .17 .16 .16										
24.10	DISCHG .16 .15 .15 .14 .13 .13 .13 .13 .12 .12										
24.80	DISCHG .12 .12 .12 .12 .12 .12 .11 .11 .11 .11										
25.50	DISCHG .11 .11 .11 .11 .11 .11 .11 .11 .11 .11										
26.20	DISCHG .10 .09 .09 .08 .07 .07 .06 .05 .05 .04										
26.90	DISCHG .04 .04 .03 .03 .03 .02 .02 .02 .02 .02										
27.60	DISCHG .02 .01 .01 .01 .01 .01 .01 .01 .01 .00										

RUNOFF VOLUME ABOVE BASEFLOW = .54 WATERSHED INCHES, 6.15 CFS-HRS, .51 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2
OUTPUT HYDROGRAPH= 6
AREA= .00 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .49 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0653 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.41 1.99 (RUNOFF)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .07 HOURS DRAINAGE AREA = .00 SQ.MI.

TR20 XEQ 02-09-00 11:10
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 3

10.50	DISCHG	.01	.01	.01	.01	.02	.02	.03	.03	.04	.05
11.20	DISCHG	.05	.06	.07	.08	.10	.11	.13	.16	.20	.27
11.90	DISCHG	.39	.58	.83	1.11	1.40	1.67	1.88	1.99	1.95	1.81
12.60	DISCHG	1.60	1.38	1.18	1.01	.88	.77	.68	.62	.56	.52
13.30	DISCHG	.48	.45	.42	.40	.38	.37	.35	.33	.32	.31
14.00	DISCHG	.30	.29	.29	.28	.28	.27	.27	.26	.26	.25
14.70	DISCHG	.24	.24	.23	.23	.22	.22	.22	.21	.21	.21
15.40	DISCHG	.21	.20	.20	.19	.19	.19	.19	.19	.19	.18
16.10	DISCHG	.18	.18	.18	.17	.17	.17	.17	.16	.16	.16
16.80	DISCHG	.16	.16	.15	.14	.13	.12	.12	.11	.11	.11
17.50	DISCHG	.11	.11	.10	.10	.10	.10	.10	.10	.10	.10
18.20	DISCHG	.10	.10	.09	.09	.09	.09	.09	.09	.09	.09
18.90	DISCHG	.09	.09	.09	.09	.09	.09	.08	.08	.08	.08
19.60	DISCHG	.09	.09	.08	.08	.08	.08	.08	.07	.07	.08
20.30	DISCHG	.08	.08	.08	.07	.07	.07	.07	.07	.07	.07

RUNOFF VOLUME ABOVE BASEFLOW = 1.06 WATERSHED INCHES, 2.96 CFS-HRS, .24 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4
 INPUT HYDROGRAPHS= 6,3 OUTPUT HYDROGRAPH= 7

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.42	2.72	(NULL)
14.70	2.15	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.02 SQ.MI.					
10.50	DISCHG	.01	.01	.01	.02	.02	.03	.03	.04	.05	
11.20	DISCHG	.05	.06	.07	.08	.10	.11	.13	.16	.20	.27
11.90	DISCHG	.39	.58	.83	1.11	1.40	1.88	2.36	2.69	2.65	2.40
12.60	DISCHG	2.10	1.81	1.56	1.36	1.20	1.08	.98	.90	.83	.77
13.30	DISCHG	.72	.69	.66	.64	.62	.60	.58	.57	.55	.55
14.00	DISCHG	.55	.55	.64	.77	.90	1.18	1.51	1.81	1.97	2.08
14.70	DISCHG	2.15	2.08	1.97	1.87	1.79	1.71	1.65	1.59	1.53	1.47
15.40	DISCHG	1.42	1.37	1.32	1.28	1.24	1.21	1.18	1.14	1.11	1.07
16.10	DISCHG	1.04	1.01	.98	.95	.93	.91	.89	.87	.85	.84
16.80	DISCHG	.82	.80	.78	.75	.71	.68	.65	.65	.64	.63
17.50	DISCHG	.62	.60	.58	.58	.57	.57	.56	.56	.56	.55
18.20	DISCHG	.54	.52	.51	.50	.49	.48	.48	.47	.47	.47
18.90	DISCHG	.47	.47	.47	.46	.44	.41	.39	.38	.38	.39
19.60	DISCHG	.39	.38	.37	.36	.35	.35	.35	.34	.34	.34
20.30	DISCHG	.34	.33	.33	.32	.31	.31	.31	.31	.31	.30

RUNOFF VOLUME ABOVE BASEFLOW = .57 WATERSHED INCHES, 8.16 CFS-HRS, .67 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 61.90

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.53	2.27*	64.02 * FIRST POINT OF FLAT PEAK
14.70	2.15	63.90

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.02 SQ.MI.
10.50	DISCHG	.00 .01 .01 .01 .02 .02 .03 .03 .04 .05				
10.50	ELEV	61.90 61.91 61.91 61.92 61.92 61.92 61.93 61.94 61.94 61.95				
11.20	DISCHG	.05 .06 .07 .08 .09 .11 .13 .16 .20 .26				
11.20	ELEV	61.96 61.97 61.98 61.99 62.00 62.02 62.04 62.06 62.10 62.16				
11.90	DISCHG	.38 .57 .82 1.10 1.39 1.85 2.26 2.26 2.27 2.27				
11.90	ELEV	62.27 62.44 62.67 62.93 63.20 63.63 64.00 64.01 64.01 64.02				
12.60	DISCHG	2.27 2.27 2.26 .87 1.62 .75 1.26 .67 1.02 .62				
12.60	ELEV	64.02 64.01 64.00 62.72 63.41 62.61 63.08 62.54 62.86 62.49				
13.30	DISCHG	.85 .58 .75 .56 .68 .55 .62 .53 .58 .53				
13.30	ELEV	62.70 62.45 62.60 62.44 62.54 62.42 62.49 62.41 62.45 62.40				
14.00	DISCHG	.57 .54 .64 .75 .91 1.15 1.50 1.79 1.97 2.07				
14.00	ELEV	62.44 62.41 62.51 62.61 62.75 62.98 63.30 63.57 63.74 63.82				
14.70	DISCHG	2.15 2.08 1.98 1.88 1.79 1.72 1.65 1.59 1.53 1.48				
14.70	ELEV	63.90 63.84 63.74 63.65 63.57 63.50 63.44 63.38 63.33 63.28				
15.40	DISCHG	1.42 1.37 1.32 1.28 1.24 1.21 1.18 1.15 1.11 1.08				
15.40	ELEV	63.23 63.18 63.14 63.10 63.06 63.03 63.00 62.97 62.94 62.91				
16.10	DISCHG	1.04 1.01 .98 .95 .93 .91 .89 .87 .85 .84				
16.10	ELEV	62.88 62.85 62.82 62.80 62.78 62.76 62.74 62.72 62.70 62.69				
16.80	DISCHG	.82 .80 .78 .75 .72 .68 .65 .65 .64 .64				
16.80	ELEV	62.68 62.66 62.64 62.61 62.58 62.54 62.52 62.51 62.51 62.50				
17.50	DISCHG	.62 .60 .59 .58 .57 .57 .56 .56 .56 .55				
17.50	ELEV	62.49 62.47 62.46 62.45 62.45 62.44 62.44 62.43 62.43 62.42				
18.20	DISCHG	.54 .52 .51 .50 .49 .48 .48 .47 .47 .47				
18.20	ELEV	62.41 62.40 62.39 62.38 62.37 62.36 62.36 62.35 62.35 62.35				
18.90	DISCHG	.47 .47 .47 .46 .44 .42 .39 .38 .38 .39				
18.90	ELEV	62.35 62.35 62.35 62.34 62.32 62.30 62.28 62.27 62.27 62.27				
19.60	DISCHG	.39 .38 .37 .36 .35 .35 .35 .34 .34 .34				
19.60	ELEV	62.27 62.27 62.26 62.25 62.24 62.24 62.24 62.23 62.23 62.23				
20.30	DISCHG	.34 .33 .33 .32 .31 .31 .31 .31 .31 .30				
20.30	ELEV	62.23 62.22 62.22 62.21 62.20 62.20 62.20 62.20 62.20 62.20				

RUNOFF VOLUME ABOVE BASEFLOW = .57 WATERSHED INCHES, 8.08 CFS-HRS, .67 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)	
<u>ALTERNATE 2 STORM 1</u>														
XSECTION	1	ADDHYD	.02	9	2	.07	12.2	.00	.00	.54	---	14.71	1.92	108.4
XSECTION	2	RUNOFF	.00	9	2	.07	.0	3.10	24.00	1.06	---	12.41	1.99	459.9
XSECTION	4	ADDHYD	.02	9	2	.07	.0	3.10	24.00	.57	---	12.42	2.72	123.6
STRUCTURE	12	RESVOR	.02	9	2	.07	.0	3.10	24.00	.57	64.02	12.53*	2.27*	103.2

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
<u>STRUCTURE 12</u>	<u>.02</u>	
ALTERNATE 2		2.27
<u>XSECTION 1</u>	<u>.02</u>	
ALTERNATE 2		1.92
<u>XSECTION 2</u>	<u>.00</u>	
ALTERNATE 2		1.99
<u>XSECTION 4</u>	<u>.02</u>	
ALTERNATE 2		2.72

10 YR STORM

OPERATION ADDHYD CROSS SECTION 42
 INPUT HYDROGRAPHS= 5,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.30 PEAK DISCHARGE(CFS) 4.90 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
8.00	.00	.00	.00	.00	.00	.01	.01
9.00	.01	.01	.01	.01	.01	.02	.02
10.00	.03	.03	.03	.04	.04	.05	.05
11.00	.09	.11	.13	.16	.20	.25	.34
12.00	2.45	3.43	4.34	4.90	4.29	3.71	3.40
13.00	2.62	2.50	2.37	2.27	2.12	2.00	1.87
14.00	1.47	1.40	1.33	1.28	1.22	1.16	1.11
15.00	.94	.91	.88	.86	.82	.79	.77
16.00	.70	.69	.68	.66	.64	.62	.61
17.00	.50	.48	.48	.47	.44	.42	.41
18.00	.40	.38	.36	.35	.34	.33	.33
19.00	.33	.32	.31	.30	.31	.31	.31
20.00	.27	.27	.28	.28	.27	.25	.25
21.00	.24	.25	.26	.27	.25	.24	.24
22.00	.26	.25	.24	.23	.23	.23	.22
23.00	.22	.22	.22	.21	.21	.21	.21
24.00	.18	.15	.12	.10	.08	.07	.06
25.00	.04	.03	.03	.03	.02	.02	.02
26.00	.01	.01	.01				

RUNOFF VOLUME ABOVE BASEFLOW = 1.62 WATERSHED INCHES, 10.88 CFS-HRS, .90 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 43
 OUTPUT HYDROGRAPH= 2
 AREA= .01 SQ MI INPUT RUNOFF CURVE= 58. TIME OF CONCENTRATION= .10 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

PEAK TIME(HRS) 12.23 PEAK DISCHARGE(CFS) 3.58 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
11.00	.00	.00	.00	.00	.00	.04	.26
12.00	2.04	2.83	3.55	3.35	1.55	1.41	1.00
13.00	.71	.63	.61	.60	.56	.56	.50
14.00	.46	.44	.44	.44	.41	.41	.37
15.00	.37	.35	.35	.34	.32	.31	.33
16.00	.30	.30	.30	.29	.27	.26	.28
17.00	.16	.20	.21	.20	.17	.17	.18
18.00	.19	.16	.15	.15	.15	.15	.16
19.00	.17	.14	.13	.14	.17	.17	.14
20.00	.13	.15	.15	.14	.11	.11	.14
21.00	.11	.14	.15	.14	.11	.11	.11
22.00	.15	.12	.11	.11	.11	.11	.11
23.00	.11	.11	.11	.11	.11	.11	.11
24.00	.07	.02	.00				

RUNOFF VOLUME ABOVE BASEFLOW = .96 WATERSHED INCHES, 4.54 CFS-HRS, .37 ACRE-FEET; BASEFLOW = .00 CFS

10 YR STORM
 *****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	FULLPRINT	SUMMARY	NOPLOTS
TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.				
TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00				
5	RAINFL 9	.25		
8	0.0	.0025	.005	.0075 .010
8	.0125	.015	.0175	.020 .0225
8	.026	.0285	.031	.0345 .037
8	.0405	.043	.0465	.050 .0535
8	.057	.0605	.064	.068 .072
8	.076	.080	.0845	.089 .094
8	.100	.1075	.115	.1225 .130
8	.1385	.148	.157	.167 .178
8	.189	.202	.216	.2315 .250
8	.271	.298	.3455	.500 .6555
8	.702	.7295	.751	.769 .785
8	.7985	.811	.823	.834 .8435
8	.853	.862	.870	.8785 .886
8	.8935	.900	.907	.911 .916
8	.920	.9245	.929	.9325 .936
8	.940	.944	.947	.951 .954
8	.957	.9605	.963	.9665 .969
8	.9725	.975	.9775	.981 .9835
8	.986	.9885	.991	.9935 .996
8	.9985	1.0	1.0	1.0 1.0
9	ENDTBL			
3	STRUCT 12			
8		61.9	0.0	0.0
8		62.	.09	.0001
8		64.	2.26	.0007
8		64.5	2.59	.1426
8		65.	4.51	.669
8		65.2	5.45	.98
8		66.	10.35	2.7
9	ENDTBL			
6	ADDHYD 4 001 1 2 3			1 1 1 1
6	RUNOFF 1 002 6 .0043281 77.		.49	1 1 1 1
6	ADDHYD 4 004 6 3 7			1 1 1 1
6	RESVOR 2 12 7 5 61.9			1 1 1 1 1
ENDATA				
7	INCREM 6	0.06		
7	READHD 8 1			
7	READHD 9 8.3	.2	.010376563	0.0
8	0.0	0.0	0.0	.01
8	.01	.01	.01	.01 .02
8	.03	.03	.04	.05 .07
8	.09	.13	.20	.34 .69

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	2.45	4.34	4.29	3.4	2.92
8	2.62	2.37	2.12	1.87	1.65
8	1.47	1.33	1.22	1.11	1.01
8	.94	.88	.82	.77	.75
8	.70	.68	.64	.61	.60
8	.50	.48	.44	.41	.41
8	.40	.36	.33	.34	.34
8	.33	.31	.31	.31	.28
8	.27	.28	.27	.25	.27
8	.24	.26	.25	.24	.23
8	.26	.24	.23	.22	.22
8	.22	.22	.21	.21	.21
8	.18	.12	.08	.06	.05
8	.04	.03	.02	.02	.01
8	.01	.01	0.0	0.0	0.0

9 ENDTBL

7 READHD 8 2

7 READHD 9 11.2 .2 .0073125 0.0

8	0.0	0.0	0.0	0.0	.26
8	2.04	3.55	1.55	1.0	.83
8	.71	.61	.56	.50	.48
8	.46	.44	.41	.37	.36
8	.37	.35	.32	.33	.33
8	.30	.30	.27	.28	.25
8	.16	.21	.17	.18	.19
8	.19	.15	.15	.16	.17
8	.17	.13	.17	.14	.13
8	.13	.15	.11	.14	.14
8	.11	.15	.11	.11	.12
8	.15	.11	.11	.11	.11
8	.11	.11	.11	.11	.10
8	.07	0.0	0.0	0.0	0.0

9 ENDTBL

7 COMPUT 7 001 12 0.0 4.6 1.0 9 2 02 02

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 02-09-00 11:49
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .06 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

STARTING TIME= 8.30 TIME INCREMENT= .20 DRAINAGE AREA= .01 BASE FLOW= .00

8	.00	.00	.00	.01	.01
8	.01	.01	.01	.01	.02
8	.03	.03	.04	.05	.07
8	.09	.13	.20	.34	.69
8	2.45	4.34	4.29	3.40	2.92
8	2.62	2.37	2.12	1.87	1.65
8	1.47	1.33	1.22	1.11	1.01
8	.94	.88	.82	.77	.75
8	.70	.68	.64	.61	.60
8	.50	.48	.44	.41	.41
8	.40	.36	.33	.34	.34
8	.33	.31	.31	.31	.28
8	.27	.28	.27	.25	.27
8	.24	.26	.25	.24	.23
8	.26	.24	.23	.22	.22
8	.22	.22	.21	.21	.21
8	.18	.12	.08	.06	.05
8	.04	.03	.02	.02	.01
8	.01	.01	.00	.00	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 11.20 TIME INCREMENT= .20 DRAINAGE AREA= .01 BASE FLOW= .00

8	.00	.00	.00	.00	.26
8	2.04	3.55	1.55	1.00	.83
8	.71	.61	.56	.50	.48
8	.46	.44	.41	.37	.36
8	.37	.35	.32	.33	.33
8	.30	.30	.27	.28	.25
8	.16	.21	.17	.18	.19
8	.19	.15	.15	.16	.17
8	.17	.13	.17	.14	.13
8	.13	.15	.11	.14	.14
8	.11	.15	.11	.11	.12
8	.15	.11	.11	.11	.11
8	.11	.11	.11	.11	.10
8	.07	.00	.00	.00	.00

TR20 XEQ 02-09-00 11:49
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 2

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 12 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 2 MAIN TIME INCREMENT = .06 HOURS

OPERATION ADDHYD CROSS SECTION 1
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.49 7.50 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 8.30 HOURS	TIME INCREMENT = .06 HOURS	DRAINAGE AREA = .02 SQ.MI.								
8.30	DISCHG .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .01										
8.90	DISCHG .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01										
9.50	DISCHG .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .02										
10.10	DISCHG .02 .02 .03 .03 .03 .03 .03 .03 .03 .03 .04										
10.70	DISCHG .04 .04 .05 .05 .05 .06 .07 .07 .07 .08 .08										
11.30	DISCHG .09 .10 .11 .13 .14 .17 .19 .21 .26 .30										
11.90	DISCHG .39 .58 .76 1.09 2.01 3.08 4.14 5.13 6.15 7.17										
12.50	DISCHG 7.49 6.87 6.26 5.79 5.44 5.01 4.58 4.30 4.11 3.91										
13.10	DISCHG 3.73 3.60 3.47 3.35 3.24 3.13 3.03 2.94 2.85 2.76										
13.70	DISCHG 2.67 2.57 2.48 2.39 2.32 2.25 2.17 2.11 2.05 1.99										
14.30	DISCHG 1.93 1.88 1.83 1.78 1.74 1.69 1.65 1.61 1.56 1.52										
14.90	DISCHG 1.48 1.44 1.41 1.38 1.36 1.34 1.32 1.30 1.27 1.25										
15.50	DISCHG 1.22 1.20 1.17 1.15 1.13 1.12 1.11 1.10 1.09 1.09										
16.10	DISCHG 1.07 1.05 1.03 1.00 1.00 .99 .98 .97 .95 .92										
16.70	DISCHG .91 .91 .90 .89 .88 .86 .85 .81 .76 .70										
17.30	DISCHG .67 .68 .69 .69 .67 .64 .62 .61 .60 .60										
17.90	DISCHG .59 .60 .60 .60 .60 .59 .59 .57 .55 .53										
18.50	DISCHG .51 .50 .49 .48 .49 .49 .50 .50 .51 .51										
19.10	DISCHG .51 .51 .50 .50 .48 .46 .44 .45 .46 .48										
19.70	DISCHG .47 .46 .46 .45 .44 .43 .42 .41 .41 .40										
20.30	DISCHG .40 .41 .42 .42 .41 .40 .38 .39 .39 .39										
20.90	DISCHG .39 .40 .40 .41 .39 .37 .36 .36 .38 .40										
21.50	DISCHG .40 .39 .37 .36 .36 .36 .35 .35 .35 .35										
22.10	DISCHG .36 .37 .39 .40 .39 .37 .35 .35 .35 .34										
22.70	DISCHG .34 .34 .33 .33 .33 .33 .33 .33 .33 .33										
23.30	DISCHG .33 .33 .33 .33 .33 .33 .32 .32 .32 .32										
23.90	DISCHG .32 .32 .31 .31 .29 .27 .26 .22 .18 .15										
24.50	DISCHG .12 .11 .10 .08 .08 .07 .06 .06 .06 .05										
25.10	DISCHG .05 .05 .04 .04 .04 .04 .03 .03 .03 .02										
25.70	DISCHG .02 .02 .02 .02 .02 .02 .01 .01 .01 .01										

RUNOFF VOLUME ABOVE BASEFLOW = 1.34 WATERSHED INCHES, 15.29 CFS-HRS, 1.26 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH= 6

AREA= .00 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .49 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0653 HOURS

PEAK TIME(HRS) 12.39 PEAK DISCHARGE(CFS) 4.09 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.06 HOURS	DRAINAGE AREA =	.00 SQ.MI.
8.40	DISCHG	.00	.00	.00	.00	.01
9.00	DISCHG	.01	.01	.02	.03	.03
9.60	DISCHG	.04	.04	.05	.07	.08
10.20	DISCHG	.08	.09	.10	.13	.15
10.80	DISCHG	.16	.17	.19	.25	.28
11.40	DISCHG	.31	.33	.40	.72	1.25
12.00	DISCHG	1.67	2.15	3.12	4.07	3.55
12.60	DISCHG	3.16	2.76	2.09	1.29	1.07
13.20	DISCHG	.99	.92	.82	.68	.63
13.80	DISCHG	.60	.58	.55	.50	.49
14.40	DISCHG	.48	.47	.46	.42	.40
15.00	DISCHG	.39	.39	.38	.36	.35
15.60	DISCHG	.34	.34	.34	.33	.32
16.20	DISCHG	.31	.31	.30	.28	.28
16.80	DISCHG	.28	.27	.25	.21	.20
17.40	DISCHG	.20	.19	.18	.18	.18

RUNOFF VOLUME ABOVE BASEFLOW = 2.00 WATERSHED INCHES, 5.58 CFS-HRS, .46 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

INPUT HYDROGRAPHS= 6,3 OUTPUT HYDROGRAPH= 7

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 3

PEAK TIME(HRS) 12.47 PEAK DISCHARGE(CFS) 11.27 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.06 HOURS	DRAINAGE AREA =	.02 SQ.MI.
8.40	DISCHG	.00	.00	.00	.00	.02
9.00	DISCHG	.02	.02	.03	.04	.04
9.60	DISCHG	.05	.05	.06	.08	.10
10.20	DISCHG	.11	.12	.13	.17	.19
10.80	DISCHG	.20	.21	.25	.33	.38
11.40	DISCHG	.42	.45	.55	1.00	1.77
12.00	DISCHG	2.37	3.13	5.84	10.90	10.63
12.60	DISCHG	9.63	8.71	7.24	5.27	4.72
13.20	DISCHG	4.51	4.31	3.99	3.47	3.23
13.80	DISCHG	3.12	3.01	2.82	2.51	2.38

TR20 XEQ 02-09-00 11:49
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 4

14.40	DISCHG	2.33	2.27	2.22	2.17	2.11	2.06	2.00	1.95	1.90	1.86
15.00	DISCHG	1.82	1.78	1.75	1.73	1.71	1.68	1.65	1.62	1.59	1.56
15.60	DISCHG	1.52	1.49	1.48	1.46	1.45	1.44	1.43	1.42	1.40	1.38
16.20	DISCHG	1.35	1.32	1.31	1.30	1.29	1.27	1.24	1.22	1.20	1.19
16.80	DISCHG	1.18	1.17	1.15	1.12	1.09	1.05	.99	.92	.88	.88
17.40	DISCHG	.88	.88	.86	.83	.81	.79	.78	.78	.77	.77

RUNOFF VOLUME ABOVE BASEFLOW = 1.28 WATERSHED INCHES, 18.17 CFS-HRS, 1.50 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 61.90

PEAK TIME(HRS) 13.54 PEAK DISCHARGE(CFS) 3.62 PEAK ELEVATION(FEET) 64.77

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.06 HOURS	DRAINAGE AREA =	.02 SQ.MI.
8.40	DISCHG	.00	.00	.00	.00	.01
8.40	ELEV	61.90	61.90	61.90	61.90	61.92
9.00	DISCHG	.02	.02	.03	.03	.04
9.00	ELEV	61.92	61.92	61.93	61.93	61.94
9.60	DISCHG	.05	.05	.06	.07	.08
9.60	ELEV	61.95	61.96	61.97	61.98	62.00
10.20	DISCHG	.11	.12	.13	.14	.16
10.20	ELEV	62.01	62.02	62.03	62.04	62.05
10.80	DISCHG	.20	.21	.23	.25	.27
10.80	ELEV	62.10	62.11	62.13	62.14	62.16
11.40	DISCHG	.41	.45	.55	.62	.71
11.40	ELEV	62.30	62.33	62.37	62.42	62.49
12.00	DISCHG	2.26	2.27	2.28	2.32	2.36
12.00	ELEV	64.00	64.01	64.03	64.08	64.16
12.60	DISCHG	3.03	3.14	3.23	3.31	3.38
12.60	ELEV	64.61	64.64	64.67	64.69	64.70
13.20	DISCHG	3.58	3.59	3.60	3.61	3.62
13.20	ELEV	64.76	64.76	64.76	64.77	64.77
13.80	DISCHG	3.60	3.59	3.58	3.57	3.55
13.80	ELEV	64.76	64.76	64.76	64.75	64.75
14.40	DISCHG	3.45	3.43	3.40	3.38	3.36
14.40	ELEV	64.72	64.72	64.71	64.71	64.70
15.00	DISCHG	3.22	3.19	3.16	3.14	3.11
15.00	ELEV	64.66	64.66	64.65	64.64	64.64
15.60	DISCHG	2.96	2.93	2.91	2.88	2.86
15.60	ELEV	64.60	64.59	64.58	64.58	64.57
16.20	DISCHG	2.71	2.68	2.66	2.63	2.61
16.20	ELEV	64.53	64.52	64.52	64.51	64.51
16.80	DISCHG	2.51	2.50	2.48	2.46	2.45
16.80	ELEV	64.38	64.36	64.33	64.31	64.29
17.40	DISCHG	2.35	2.33	2.32	2.30	2.28
17.40	ELEV	64.13	64.11	64.08	64.06	64.03

TR20 XEQ 02-09-00 11:49 PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
REV PC 09/83(.2) TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 5

RUNOFF VOLUME ABOVE BASEFLOW = 1.28 WATERSHED INCHES, 18.20 CFS-HRS, 1.50 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

TR20 XEQ 02-09-00 11:49
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 SUMMARY
 PAGE 6

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 MOIST 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)
<u>ALTERNATE 2 STORM 2</u>													
XSECTION 1	ADDHYD	.02	9	2	.06	8.3	.00	.00	1.34	---	12.49	7.50	424.1
XSECTION 2	RUNOFF	.00	9	2	.06	.0	4.60	24.00	2.00	---	12.39	4.09	944.6
XSECTION 4	ADDHYD	.02	9	2	.06	.0	4.60	24.00	1.28	---	12.47	11.27	511.9
STRUCTURE 12	RESVOR	.02	9	2	.06	.0	4.60	24.00	1.28	64.77	13.54	3.62	164.4

TR20 XEQ 02-09-00 11:49
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 SUMMARY
PAGE 7

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 2
<u>STRUCTURE 12</u>	<u>.02</u>	
ALTERNATE 2		3.62
<u>XSECTION 1</u>	<u>.02</u>	
ALTERNATE 2		7.50
<u>XSECTION 2</u>	<u>.00</u>	
ALTERNATE 2		4.09
<u>XSECTION 4</u>	<u>.02</u>	
ALTERNATE 2		11.27

2542 STORM

OPERATION ADDHYD CROSS SECTION 42

INPUT HYDROGRAPHS= 5,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.29 PEAK DISCHARGE(CFS) 6.61 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
8.00	.01	.01	.01	.01	.01	.01	.01
9.00	.02	.02	.02	.03	.03	.04	.05
10.00	.05	.06	.07	.08	.09	.10	.11
11.00	.22	.26	.30	.35	.42	.50	.64
12.00	3.75	4.94	5.92	6.60	5.70	4.87	4.45
13.00	3.39	3.23	3.06	2.93	2.80	2.68	2.55
14.00	2.06	1.95	1.85	1.76	1.67	1.59	1.51
15.00	1.25	1.21	1.17	1.13	1.08	1.04	1.01
16.00	.91	.89	.87	.86	.82	.80	.78
17.00	.64	.61	.61	.60	.57	.54	.53
18.00	.51	.49	.46	.45	.43	.42	.42
19.00	.42	.41	.39	.38	.39	.40	.39
20.00	.35	.35	.36	.36	.34	.32	.32
21.00	.31	.31	.33	.34	.32	.31	.30
22.00	.33	.32	.30	.29	.29	.28	.28
23.00	.27	.27	.27	.27	.27	.27	.27
24.00	.22	.20	.15	.12	.11	.09	.08
25.00	.05	.04	.04	.03	.03	.03	.02
26.00	.01	.01	.01	.01	.01	.01	.01

RUNOFF VOLUME ABOVE BASEFLOW = 2.19 WATERSHED INCHES, 14.68 CFS-HRS, 1.21 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 43

OUTPUT HYDROGRAPH= 2

AREA= .01 SQ MI INPUT RUNOFF CURVE= 58. TIME OF CONCENTRATION= .10 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

PEAK TIME(HRS) 12.22 PEAK DISCHARGE(CFS) 5.35 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
11.00	.00	.00	.00	.01	.04	.09	.22
12.00	3.53	4.49	5.34	4.89	2.23	2.01	1.41
13.00	1.00	.88	.85	.83	.78	.78	.69
14.00	.63	.61	.61	.60	.57	.56	.51
15.00	.50	.48	.47	.46	.43	.43	.45
16.00	.41	.41	.41	.39	.36	.36	.38
17.00	.22	.26	.28	.26	.23	.22	.24
18.00	.25	.21	.20	.20	.20	.20	.22
19.00	.23	.18	.17	.19	.22	.23	.19
20.00	.17	.19	.20	.19	.15	.14	.19
21.00	.15	.19	.20	.19	.15	.15	.15
22.00	.20	.16	.15	.15	.15	.15	.15
23.00	.15	.15	.15	.15	.15	.15	.15
24.00	.09	.02	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 1.40 WATERSHED INCHES, 6.62 CFS-HRS, .55 ACRE-FEET; BASEFLOW = .00 CFS

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

5 RAINFL	9	.25			
8	0.0	.0025	.005	.0075	.010
8	.0125	.015	.0175	.020	.0225
8	.026	.0285	.031	.0345	.037
8	.0405	.043	.0465	.050	.0535
8	.057	.0605	.064	.068	.072
8	.076	.080	.0845	.089	.094
8	.100	.1075	.115	.1225	.130
8	.1385	.148	.157	.167	.178
8	.189	.202	.216	.2315	.250
8	.271	.298	.3455	.500	.6555
8	.702	.7295	.751	.769	.785
8	.7985	.811	.823	.834	.8435
8	.853	.862	.870	.8785	.886
8	.8935	.900	.907	.911	.916
8	.920	.9245	.929	.9325	.936
8	.940	.944	.947	.951	.954
8	.957	.9605	.963	.9665	.969
8	.9725	.975	.9775	.981	.9835
8	.986	.9885	.991	.9935	.996
8	.9985	1.0	1.0	1.0	1.0

9 ENDTBL

3 STRUCT 12

8	61.9	0.0	0.0
8	62.	.09	.0001
8	64.	2.26	.0007
8	64.5	2.59	.1426
8	65.	4.51	.669
8	65.2	5.45	.98
8	66.	10.35	2.7

9 ENDTBL

6 ADDHYD	4	001	1	2	3			1	1	1	1
6 RUNOFF	1	002	6	.0043281	77.	.49		1	1	1	1
6 ADDHYD	4	004	6	3	7			1	1	1	1
6 RESVOR	2	12	7	5	61.9			1	1	1	1

ENDATA

7 INCREM	6	0.07			
7 READHD	8	1			
7 READHD	9	8.3	.2	.010376563	0.0
8	.01	.01	.01	.01	.01
8	.02	.02	.03	.03	.04
8	.05	.07	.09	.11	.15
8	.22	.30	.42	.64	1.18

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	3.75	5.92	5.70	4.45	3.80
8	3.39	3.06	2.80	2.55	2.32
8	2.06	1.85	1.67	1.51	1.35
8	1.25	1.17	1.08	1.01	.98
8	.91	.87	.82	.78	.76
8	.64	.61	.57	.53	.52
8	.51	.46	.43	.42	.43
8	.42	.39	.39	.39	.36
8	.35	.36	.34	.32	.34
8	.31	.33	.32	.30	.29
8	.33	.30	.29	.28	.28
8	.27	.27	.27	.27	.27
8	.22	.15	.11	.08	.06
8	.05	.04	.03	.02	.02
8	.01	.01	.01	0.0	0.0

9 ENDTBL

7 READHD 8 2

7 READHD 9 11.2	.2	.0073125	0.0		
8	0.0	0.0	.04	.22	.83
8	3.53	5.34	2.23	1.41	1.17
8	1.00	.85	.78	.69	.65
8	.63	.61	.57	.51	.49
8	.50	.47	.43	.45	.44
8	.41	.41	.36	.38	.34
8	.22	.28	.23	.24	.25
8	.25	.20	.20	.22	.23
8	.23	.17	.22	.19	.17
8	.17	.20	.15	.19	.19
8	.15	.20	.15	.15	.16
8	.20	.15	.15	.15	.15
8	.15	.15	.15	.15	.13
8	.09	0.0	0.0	0.0	0.0

9 ENDTBL

7 COMPUT 7 001 12 0.0 5.4 1.0 9 2 02 03

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 02-09-00 11:21
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

	STARTING TIME=	8.30	TIME INCREMENT=	.20	DRAINAGE AREA=	.01	BASE FLOW=	.00
8		.01	.01	.01	.01	.01		
8		.02	.02	.03	.03	.04		
8		.05	.07	.09	.11	.15		
8		.22	.30	.42	.64	1.18		
8		3.75	5.92	5.70	4.45	3.80		
8		3.39	3.06	2.80	2.55	2.32		
8		2.06	1.85	1.67	1.51	1.35		
8		1.25	1.17	1.08	1.01	.98		
8		.91	.87	.82	.78	.76		
8		.64	.61	.57	.53	.52		
8		.51	.46	.43	.42	.43		
8		.42	.39	.39	.39	.36		
8		.35	.36	.34	.32	.34		
8		.31	.33	.32	.30	.29		
8		.33	.30	.29	.28	.28		
8		.27	.27	.27	.27	.27		
8		.22	.15	.11	.08	.06		
8		.05	.04	.03	.02	.02		
8		.01	.01	.01	.00	.00		

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

	STARTING TIME=	11.20	TIME INCREMENT=	.20	DRAINAGE AREA=	.01	BASE FLOW=	.00
8		.00	.00	.04	.22	.83		
8		3.53	5.34	2.23	1.41	1.17		
8		1.00	.85	.78	.69	.65		
8		.63	.61	.57	.51	.49		
8		.50	.47	.43	.45	.44		
8		.41	.41	.36	.38	.34		
8		.22	.28	.23	.24	.25		
8		.25	.20	.20	.22	.23		
8		.23	.17	.22	.19	.17		
8		.17	.20	.15	.19	.19		
8		.15	.20	.15	.15	.16		
8		.20	.15	.15	.15	.15		
8		.15	.15	.15	.15	.13		
8		.09	.00	.00	.00	.00		

TR20 XEQ 02-09-00 11:21
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 2

9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 12 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 3 MAIN TIME INCREMENT = .07 HOURS

OPERATION ADDHYD CROSS SECTION 1
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

	PEAK TIME(HRS)	PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)						
	12.44	10.05				(NULL)						
TIME(HRS)	FIRST HYDROGRAPH POINT = 8.30 HOURS				TIME INCREMENT = .07 HOURS				DRAINAGE AREA = .02 SQ.MI.			
8.30	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
9.00	DISCHG	.01	.01	.01	.02	.02	.02	.02	.02	.02	.03	.03
9.70	DISCHG	.03	.03	.03	.03	.03	.04	.04	.04	.05	.05	.05
10.40	DISCHG	.06	.07	.07	.08	.09	.09	.10	.11	.12	.14	.14
11.10	DISCHG	.15	.17	.20	.22	.25	.29	.34	.39	.49	.61	.61
11.80	DISCHG	.75	1.04	1.39	1.90	3.04	4.68	6.43	7.97	9.38	10.03	10.03
12.50	DISCHG	9.71	8.54	7.83	7.42	6.69	6.11	5.65	5.34	5.05	4.80	4.80
13.20	DISCHG	4.60	4.40	4.22	4.06	3.92	3.79	3.68	3.55	3.43	3.32	3.32
13.90	DISCHG	3.22	3.13	3.04	2.95	2.85	2.75	2.66	2.58	2.49	2.41	2.41
14.60	DISCHG	2.33	2.25	2.17	2.09	2.03	1.97	1.91	1.85	1.82	1.78	1.78
15.30	DISCHG	1.74	1.70	1.66	1.61	1.57	1.54	1.52	1.50	1.47	1.45	1.45
16.00	DISCHG	1.44	1.41	1.39	1.35	1.33	1.31	1.29	1.26	1.23	1.20	1.20
16.70	DISCHG	1.19	1.18	1.16	1.14	1.12	1.08	1.02	.93	.90	.89	.89
17.40	DISCHG	.90	.88	.85	.82	.81	.80	.79	.78	.77	.77	.77
18.10	DISCHG	.77	.77	.75	.73	.70	.67	.66	.65	.64	.64	.64
18.80	DISCHG	.64	.64	.65	.66	.66	.66	.65	.62	.59	.58	.58
19.50	DISCHG	.58	.60	.60	.59	.58	.58	.57	.55	.54	.53	.53
20.20	DISCHG	.53	.53	.54	.55	.54	.52	.50	.51	.52	.52	.52
20.90	DISCHG	.51	.52	.52	.51	.48	.48	.49	.52	.51	.50	.50
21.60	DISCHG	.48	.47	.47	.46	.46	.45	.46	.47	.49	.51	.51
22.30	DISCHG	.51	.48	.46	.45	.45	.44	.44	.44	.43	.43	.43
23.00	DISCHG	.43	.43	.43	.42	.42	.42	.42	.42	.42	.42	.42
23.70	DISCHG	.42	.42	.42	.41	.40	.39	.37	.34	.29	.24	.24
24.40	DISCHG	.19	.16	.14	.13	.11	.10	.09	.08	.07	.07	.07
25.10	DISCHG	.06	.06	.05	.05	.05	.04	.04	.04	.03	.03	.03
25.80	DISCHG	.03	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01
26.50	DISCHG	.01	.01	.01	.01	.01	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 1.85 WATERSHED INCHES, 21.11 CFS-HRS, 1.74 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 2
 OUTPUT HYDROGRAPH= 6
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .49 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0653 HOURS

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.38		5.27				(RUNOFF)					
TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA = .00 SQ.MI.					
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
8.40	DISCHG	.01	.01	.01	.02	.02	.03	.03	.03	.04	.04
9.10	DISCHG	.05	.05	.06	.06	.07	.07	.08	.08	.09	.10
9.80	DISCHG	.10	.11	.12	.12	.13	.14	.15	.16	.17	.18
10.50	DISCHG	.19	.20	.22	.23	.24	.26	.28	.30	.32	.34
11.20	DISCHG	.37	.39	.42	.45	.49	.54	.61	.70	.83	1.05
11.90	DISCHG	1.41	1.97	2.67	3.41	4.12	4.72	5.13	5.26	5.07	4.61
12.60	DISCHG	4.03	3.43	2.90	2.47	2.13	1.85	1.62	1.45	1.31	1.20
13.30	DISCHG	1.11	1.03	.97	.92	.87	.83	.79	.76	.73	.70
14.00	DISCHG	.68	.66	.64	.63	.62	.61	.59	.58	.57	.56
14.70	DISCHG	.54	.53	.51	.50	.49	.48	.48	.47	.47	.46
15.40	DISCHG	.45	.44	.43	.42	.42	.42	.42	.41	.41	.40
16.10	DISCHG	.40	.39	.38	.38	.38	.37	.36	.35	.35	.34
16.80	DISCHG	.34	.34	.32	.30	.28	.26	.25	.25	.25	.24
17.50	DISCHG	.24	.23	.22	.22	.22	.22	.22	.22	.22	.22
18.20	DISCHG	.22	.21	.20	.20	.19	.19	.18	.19	.19	.19
18.90	DISCHG	.19	.20	.20	.20	.19	.19	.18	.18	.18	.18
19.60	DISCHG	.18	.18	.18	.18	.17	.16	.16	.16	.16	.16
20.30	DISCHG	.16	.17	.16	.16	.15	.15	.15	.15	.16	.16

RUNOFF VOLUME ABOVE BASEFLOW = 2.79 WATERSHED INCHES, 7.79 CFS-HRS, .64 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4
 INPUT HYDROGRAPHS= 6,3 OUTPUT HYDROGRAPH= 7

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 3

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.43		15.09				(NULL)					
TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA = .02 SQ.MI.					
7.70	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
8.40	DISCHG	.02	.02	.02	.03	.03	.04	.04	.04	.05	.05
9.10	DISCHG	.06	.07	.08	.08	.09	.09	.10	.11	.12	.13
9.80	DISCHG	.13	.14	.15	.16	.17	.18	.19	.21	.22	.24
10.50	DISCHG	.26	.28	.30	.32	.34	.36	.39	.42	.46	.50
11.20	DISCHG	.55	.60	.66	.72	.80	.90	1.04	1.25	1.50	1.92
11.90	DISCHG	2.60	3.58	5.06	7.15	9.55	11.81	13.70	14.92	14.96	13.82
12.60	DISCHG	12.27	11.09	10.00	8.91	8.04	7.36	6.84	6.39	6.02	5.71
13.30	DISCHG	5.43	5.18	4.96	4.78	4.61	4.45	4.29	4.14	4.00	3.88
14.00	DISCHG	3.76	3.65	3.55	3.43	3.33	3.23	3.13	3.04	2.95	2.85
14.70	DISCHG	2.76	2.66	2.58	2.50	2.43	2.36	2.31	2.27	2.23	2.18
15.40	DISCHG	2.13	2.08	2.03	1.98	1.95	1.92	1.90	1.88	1.85	1.83

TR20 XEQ 02-09-00 11:21
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 4

16.10	DISCHG	1.80	1.76	1.73	1.70	1.68	1.65	1.61	1.57	1.54	1.53
16.80	DISCHG	1.52	1.49	1.45	1.40	1.33	1.24	1.17	1.15	1.14	1.13
17.50	DISCHG	1.10	1.06	1.04	1.02	1.01	1.00	1.00	1.00	1.00	.99
18.20	DISCHG	.98	.95	.92	.88	.86	.84	.83	.83	.83	.84
18.90	DISCHG	.84	.85	.85	.86	.85	.82	.79	.76	.76	.77
19.60	DISCHG	.79	.78	.77	.76	.74	.72	.70	.69	.69	.69
20.30	DISCHG	.70	.71	.71	.69	.66	.65	.66	.67	.67	.67

RUNOFF VOLUME ABOVE BASEFLOW = 1.92 WATERSHED INCHES, 27.26 CFS-HRS, 2.25 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12
 INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 61.90

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.63	4.49	64.99
19.18	1.43	63.24

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.02 SQ.MI.
7.70	DISCHG	.00	.00	.00	.00	.01
7.70	ELEV	61.90	61.90	61.90	61.90	61.91
8.40	DISCHG	.02	.02	.03	.03	.05
8.40	ELEV	61.92	61.92	61.93	61.94	61.96
9.10	DISCHG	.06	.07	.08	.09	.13
9.10	ELEV	61.97	61.97	61.98	62.00	62.03
9.80	DISCHG	.13	.14	.16	.18	.24
9.80	ELEV	62.04	62.05	62.06	62.08	62.14
10.50	DISCHG	.26	.28	.30	.34	.50
10.50	ELEV	62.16	62.17	62.21	62.25	62.38
11.20	DISCHG	.55	.60	.72	.80	1.89
11.20	ELEV	62.42	62.47	62.58	62.74	63.66
11.90	DISCHG	2.26	2.27	2.30	2.43	3.45
11.90	ELEV	64.00	64.02	64.14	64.43	64.72
12.60	DISCHG	3.65	3.82	4.08	4.17	4.42
12.60	ELEV	64.78	64.82	64.86	64.91	64.98
13.30	DISCHG	4.44	4.46	4.47	4.49	4.46
13.30	ELEV	64.98	64.99	64.99	64.99	64.99
14.00	DISCHG	4.45	4.43	4.41	4.37	4.24
14.00	ELEV	64.98	64.98	64.98	64.96	64.93
14.70	DISCHG	4.21	4.18	4.15	4.08	3.90
14.70	ELEV	64.92	64.91	64.91	64.89	64.84
15.40	DISCHG	3.87	3.83	3.79	3.72	3.53
15.40	ELEV	64.83	64.82	64.81	64.79	64.75
16.10	DISCHG	3.50	3.46	3.43	3.36	3.18
16.10	ELEV	64.74	64.73	64.72	64.70	64.65
16.80	DISCHG	3.14	3.11	3.08	3.01	2.82
16.80	ELEV	64.64	64.64	64.63	64.61	64.56
17.50	DISCHG	2.79	2.75	2.72	2.65	2.52
17.50	ELEV	64.55	64.54	64.53	64.51	64.49

TR20 XEQ 02-09-00 11:21
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 5

18.20	DISCHG	2.50	2.48	2.46	2.44	2.42	2.40	2.38	2.35	2.33	2.31
18.20	ELEV	64.36	64.33	64.30	64.27	64.24	64.21	64.17	64.14	64.11	64.08
18.90	DISCHG	2.29	2.27	1.71	.15	1.43	.35	1.19	.44	1.03	.55
18.90	ELEV	64.05	64.02	63.49	62.06	63.23	62.24	63.01	62.32	62.86	62.42
19.60	DISCHG	.97	.63	.90	.65	.83	.65	.76	.64	.73	.66
19.60	ELEV	62.81	62.50	62.74	62.52	62.68	62.52	62.62	62.51	62.59	62.52
20.30	DISCHG	.73	.69	.73	.67	.68	.64	.67	.66	.68	.67
20.30	ELEV	62.59	62.55	62.59	62.54	62.54	62.51	62.53	62.53	62.54	62.53

RUNOFF VOLUME ABOVE BASEFLOW = 1.91 WATERSHED INCHES, 27.16 CFS-HRS, 2.24 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)	
	<u>ALTERNATE</u>	<u>2</u>	<u>STORM</u>	<u>3</u>										
XSECTION	1	ADDHYD	.02	9	2	.07	8.3	.00	.00	1.85	---	12.44	10.05	568.0
XSECTION	2	RUNOFF	.00	9	2	.07	.0	5.40	24.00	2.79	---	12.38	5.27	1216.8
XSECTION	4	ADDHYD	.02	9	2	.07	.0	5.40	24.00	1.92	---	12.43	15.09	685.4
STRUCTURE	12	RESVOR	.02	9	2	.07	.0	5.40	24.00	1.91	64.99	13.63	4.49	203.9

TR20 XEQ 02-09-00 11:21
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 SUMMARY
PAGE 7

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

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 3
<u>STRUCTURE 12</u>	<u>.02</u>	
ALTERNATE 2		4.49
<u>XSECTION 1</u>	<u>.02</u>	
ALTERNATE 2		10.05
<u>XSECTION 2</u>	<u>.00</u>	
ALTERNATE 2		5.27
<u>XSECTION 4</u>	<u>.02</u>	
ALTERNATE 2		15.09

100 YR STORM

OPERATION ADDHYD CROSS SECTION 42
 INPUT HYDROGRAPHS= 5,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.38 PEAK DISCHARGE(CFS) 11.41 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
7.00	.00	.01	.01	.01	.01	.01	.01
8.00	.02	.02	.02	.03	.03	.04	.05
9.00	.06	.06	.07	.08	.09	.11	.17
10.00	.19	.21	.24	.28	.31	.35	.48
11.00	.60	.67	.76	.84	.97	1.11	1.36
12.00	6.46	8.04	9.34	10.42	11.33	8.95	6.98
13.00	4.66	4.50	4.32	4.19	4.01	3.84	3.66
14.00	3.05	2.93	2.82	2.73	2.62	2.52	2.42
15.00	1.97	1.89	1.81	1.74	1.65	1.58	1.53
16.00	1.36	1.32	1.29	1.26	1.21	1.17	1.15
17.00	.92	.89	.88	.87	.82	.78	.76
18.00	.73	.71	.66	.64	.62	.61	.61
19.00	.61	.59	.56	.54	.56	.57	.56
20.00	.50	.50	.51	.51	.48	.46	.46
21.00	.44	.45	.47	.48	.46	.44	.42
22.00	.46	.46	.43	.42	.41	.40	.40
23.00	.39	.39	.39	.39	.39	.38	.38
24.00	.32	.28	.21	.18	.15	.13	.12
25.00	.07	.06	.05	.05	.04	.04	.03
26.00	.02	.02	.01	.01	.01	.01	.01

RUNOFF VOLUME ABOVE BASEFLOW = 3.42 WATERSHED INCHES, 22.90 CFS-HRS, 1.89 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 43
 OUTPUT HYDROGRAPH= 2
 AREA= .01 SQ MI INPUT RUNOFF CURVE= 58. TIME OF CONCENTRATION= .10 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

PEAK TIME(HRS) 12.20 PEAK DISCHARGE(CFS) 9.35 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
10.00	.00	.00	.00	.00	.00	.02	.04
11.00	.17	.22	.26	.33	.44	.51	.92
12.00	7.01	8.27	9.35	8.28	3.72	3.31	2.31
13.00	1.61	1.42	1.37	1.34	1.24	1.24	1.10
14.00	.99	.96	.96	.94	.89	.89	.80
15.00	.78	.75	.74	.72	.67	.66	.70
16.00	.63	.63	.63	.61	.55	.55	.58
17.00	.34	.41	.43	.40	.35	.34	.38
18.00	.39	.32	.30	.30	.30	.30	.34
19.00	.35	.28	.26	.28	.34	.35	.28
20.00	.26	.30	.31	.28	.23	.22	.29
21.00	.22	.29	.31	.29	.23	.22	.22
22.00	.31	.24	.22	.22	.22	.22	.22
23.00	.22	.22	.22	.22	.22	.22	.22
24.00	.13	.03	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 2.42 WATERSHED INCHES, 11.43 CFS-HRS, .94 ACRE-FEET; BASEFLOW = .00 CFS

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

```

JOB TR-20                FULLPRINT        SUMMARY  NOPLOTS
TITLE 001 PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TITLE   TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00
5 RAINFL 9                .25
8      0.0      .0025      .005      .0075      .010
8      .0125     .015      .0175     .020      .0225
8      .026      .0285     .031      .0345     .037
8      .0405     .043      .0465     .050      .0535
8      .057      .0605     .064      .068      .072
8      .076      .080      .0845     .089      .094
8      .100     .1075     .115      .1225     .130
8      .1385     .148      .157      .167      .178
8      .189     .202      .216      .2315     .250
8      .271     .298      .3455     .500      .6555
8      .702     .7295     .751      .769      .785
8      .7985     .811      .823      .834      .8435
8      .853      .862      .870      .8785     .886
8      .8935     .900      .907      .911      .916
8      .920     .9245     .929      .9325     .936
8      .940     .944      .947      .951      .954
8      .957     .9605     .963      .9665     .969
8      .9725     .975      .9775     .981      .9835
8      .986     .9885     .991      .9935     .996
8      .9985     1.0      1.0      1.0      1.0
9 ENDTBL
3 STRUCT      12
8      61.9      0.0      0.0
8      62.      .09      .0001
8      64.      2.26     .0007
8      64.5     2.59     .1426
8      65.      4.51     .669
8      65.2     5.45     .98
8      66.      10.35    2.7
9 ENDTBL
6 ADDHYD 4 001  1 2 3                1 1 1 1
6 RUNOFF 1 002      6 .0043281  77.      .49      1 1 1 1
6 ADDHYD 4 004  6 3 7                1 1 1 1
6 RESVOR 2  12 7  5 61.9            1 1 1 1
  ENDDATA
7 INCREM 6                0.07
7 READHD 8      1
7 READHD 9 7.3      .2      .010376563  0.0
8      0.0      .01      .01      .01      .01
8      .02      .02      .03      .04      .04
8      .06      .07      .09      .11      .15
8      .19      .24      .31      .39      .48

```


*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8	.60	.76	.97	1.36	2.33
8	6.46	9.34	11.33	6.98	5.11
8	4.66	4.32	4.01	3.66	3.32
8	3.05	2.82	2.62	2.42	2.16
8	1.97	1.81	1.65	1.53	1.47
8	1.36	1.29	1.21	1.15	1.12
8	.92	.88	.82	.76	.75
8	.73	.66	.62	.61	.61
8	.61	.56	.56	.56	.51
8	.50	.51	.48	.46	.49
8	.44	.47	.46	.42	.42
8	.46	.43	.41	.40	.40
8	.39	.39	.39	.38	.38
8	.32	.21	.15	.12	.09
8	.07	.05	.04	.03	.02
8	.02	.01	.01	.01	0.0

9 ENDTBL

7 READHD 8 2

7 READHD 9 10.2	.2	.0073125	0.0		
8	0.0	0.0	0.0	.04	.09
8	.17	.26	.44	.92	2.24
8	7.01	9.35	3.72	2.31	1.90
8	1.61	1.37	1.24	1.10	1.04
8	.99	.96	.89	.80	.77
8	.78	.74	.67	.70	.69
8	.63	.63	.55	.58	.53
8	.34	.43	.35	.38	.39
8	.39	.30	.30	.34	.35
8	.35	.26	.34	.28	.26
8	.26	.31	.23	.29	.28
8	.22	.31	.23	.22	.25
8	.31	.22	.22	.22	.22
8	.22	.22	.22	.22	.20
8	.13	0.0	0.0	0.0	0.0

9 ENDTBL

7 COMPUT 7 001 12 0.0 7.0 1.0 9 2 02 04

ENDCMP 1

ENDJOB 2

*****END OF 80-80 LIST*****

TR20 XEQ 02-09-00 11:21
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .07 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 1

RECORD ID

STARTING TIME= 7.30 TIME INCREMENT= .20 DRAINAGE AREA= .01 BASE FLOW= .00

8	.00	.01	.01	.01	.01
8	.02	.02	.03	.04	.04
8	.06	.07	.09	.11	.15
8	.19	.24	.31	.39	.48
8	.60	.76	.97	1.36	2.33
8	6.46	9.34	11.33	6.98	5.11
8	4.66	4.32	4.01	3.66	3.32
8	3.05	2.82	2.62	2.42	2.16
8	1.97	1.81	1.65	1.53	1.47
8	1.36	1.29	1.21	1.15	1.12
8	.92	.88	.82	.76	.75
8	.73	.66	.62	.61	.61
8	.61	.56	.56	.56	.51
8	.50	.51	.48	.46	.49
8	.44	.47	.46	.42	.42
8	.46	.43	.41	.40	.40
8	.39	.39	.39	.38	.38
8	.32	.21	.15	.12	.09
8	.07	.05	.04	.03	.02
8	.02	.01	.01	.01	.00

9 ENDTBL

EXECUTIVE CONTROL OPERATION READHD DISCHARGE HYDROGRAPH, HYDROGRAPH LOCATION 2

RECORD ID

STARTING TIME= 10.20 TIME INCREMENT= .20 DRAINAGE AREA= .01 BASE FLOW= .00

8	.00	.00	.00	.04	.09
8	.17	.26	.44	.92	2.24
8	7.01	9.35	3.72	2.31	1.90
8	1.61	1.37	1.24	1.10	1.04
8	.99	.96	.89	.80	.77
8	.78	.74	.67	.70	.69
8	.63	.63	.55	.58	.53
8	.34	.43	.35	.38	.39
8	.39	.30	.30	.34	.35
8	.35	.26	.34	.28	.26
8	.26	.31	.23	.29	.28
8	.22	.31	.23	.22	.25
8	.31	.22	.22	.22	.22

TR20 XEQ 02-09-00 11:21
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 2

8 .22 .22 .22 .22 .20
8 .13 .00 .00 .00 .00
9 ENDTBL

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 1 TO STRUCTURE 12 RECORD ID
STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 4 MAIN TIME INCREMENT = .07 HOURS

OPERATION ADDHYD CROSS SECTION 1
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.42 17.12 (NULL)
12.66 14.46 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = 7.30 HOURS	TIME INCREMENT = .07 HOURS	DRAINAGE AREA = .02 SQ.MI.
7.30	DISCHG .00 .00 .01 .01 .01 .01 .01 .01 .01 .01 .01		
8.00	DISCHG .01 .01 .01 .02 .02 .02 .02 .02 .02 .02 .03		
8.70	DISCHG .03 .03 .04 .04 .04 .04 .04 .05 .05 .05 .06		
9.40	DISCHG .06 .07 .07 .08 .09 .09 .10 .10 .11 .11 .12		
10.10	DISCHG .15 .16 .18 .19 .21 .21 .23 .23 .25 .25 .31		
10.80	DISCHG .39 .44 .48 .53 .59 .59 .66 .66 .73 .73 .89		
11.50	DISCHG 1.11 1.25 1.44 1.69 2.00 2.51 3.17 3.17 3.97 3.97 5.81		8.29
12.20	DISCHG 11.40 13.67 15.68 17.11 16.15 14.97 14.11 14.32 12.62 12.62 10.75		
12.90	DISCHG 9.09 8.29 7.51 6.83 6.57 6.32 6.09 5.89 5.72 5.72 5.56		
13.60	DISCHG 5.41 5.25 5.08 4.91 4.77 4.63 4.49 4.35 4.24 4.24 4.13		
14.30	DISCHG 4.03 3.93 3.84 3.73 3.64 3.54 3.44 3.33 3.25 3.25 3.16		
15.00	DISCHG 3.06 2.97 2.90 2.83 2.75 2.68 2.61 2.53 2.45 2.45 2.38		
15.70	DISCHG 2.34 2.30 2.26 2.22 2.20 2.16 2.11 2.05 2.01 2.01 1.98		
16.40	DISCHG 1.96 1.90 1.85 1.80 1.78 1.77 1.75 1.71 1.68 1.68 1.63		
17.10	DISCHG 1.56 1.42 1.34 1.31 1.32 1.30 1.26 1.21 1.19 1.19 1.18		
17.80	DISCHG 1.17 1.15 1.14 1.14 1.14 1.14 1.12 1.08 1.03 1.03 .98		
18.50	DISCHG .96 .95 .94 .94 .95 .95 .96 .96 .96 .96 .96		
19.20	DISCHG .96 .93 .89 .85 .86 .88 .89 .87 .85 .85 .84		
19.90	DISCHG .83 .81 .79 .77 .77 .77 .79 .81 .79 .79 .76		
20.60	DISCHG .73 .74 .75 .76 .75 .75 .75 .74 .71 .71 .69		
21.30	DISCHG .70 .75 .76 .74 .70 .69 .68 .66 .66 .66 .66		
22.00	DISCHG .67 .69 .72 .75 .73 .70 .66 .65 .64 .64 .64		
22.70	DISCHG .63 .63 .62 .62 .62 .62 .62 .62 .61 .61 .61		
23.40	DISCHG .61 .61 .61 .61 .61 .61 .60 .59 .58 .58 .57		
24.10	DISCHG .55 .50 .44 .37 .29 .24 .20 .18 .16 .16 .15		
24.80	DISCHG .14 .12 .11 .10 .09 .09 .08 .07 .06 .06 .06		
25.50	DISCHG .05 .05 .04 .04 .04 .04 .03 .03 .03 .03 .02		
26.20	DISCHG .02 .02 .02 .01 .01 .01 .01 .01 .01 .01 .01		
26.90	DISCHG .01 .01 .00 .00 .00 .00 .00 .00 .00 .00 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.00 WATERSHED INCHES, 34.20 CFS-HRS, 2.83 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 02-09-00 11:21
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 3

OPERATION RUNOFF CROSS SECTION 2

OUTPUT HYDROGRAPH= 6

AREA= .00 SQ MI INPUT RUNOFF CURVE= 77. TIME OF CONCENTRATION= .49 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0653 HOURS

PEAK TIME(HRS) 12.37 PEAK DISCHARGE(CFS) 7.72 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.00 SQ.MI.
7.00	.00	.00	.00	.00	.00	.01	.02
7.70	.02	.03	.03	.04	.04	.05	.07
8.40	.07	.08	.08	.09	.09	.10	.13
9.10	.14	.15	.16	.16	.17	.18	.22
9.80	.23	.24	.25	.26	.27	.28	.35
10.50	.37	.39	.41	.43	.45	.47	.60
11.20	.64	.68	.72	.77	.83	.91	1.69
11.90	2.23	3.08	4.12	5.20	6.21	7.04	7.38
12.60	5.82	4.93	4.15	3.52	3.03	2.62	1.85
13.30	1.56	1.45	1.36	1.28	1.22	1.16	1.01
14.00	.94	.91	.89	.87	.86	.84	.79
14.70	.75	.73	.71	.69	.68	.67	.64
15.40	.62	.61	.60	.59	.58	.58	.57
16.10	.55	.54	.53	.53	.52	.51	.48
16.80	.47	.46	.45	.42	.39	.36	.34
17.50	.32	.31	.31	.30	.30	.30	.31
18.20	.30	.29	.28	.27	.26	.26	.25
18.90	.27	.27	.27	.27	.27	.26	.25
19.60	.25	.25	.25	.24	.23	.23	.22
20.30	.22	.23	.22	.22	.21	.20	.21

RUNOFF VOLUME ABOVE BASEFLOW = 4.13 WATERSHED INCHES, 11.54 CFS-HRS, .95 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

INPUT HYDROGRAPHS= 6,3 OUTPUT HYDROGRAPH= 7

*** WARNING - XSECTION 4 RUNOFF VOLUME TRUNCATED WHEN ADDING HYDROGRAPHS STORED IN LOCATIONS 6 AND 3

PEAK TIME(HRS) 12.41 PEAK DISCHARGE(CFS) 24.48 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.02 SQ.MI.
7.00	.00	.00	.00	.00	.00	.01	.03
7.70	.03	.04	.04	.05	.05	.06	.09
8.40	.09	.10	.11	.11	.12	.13	.17
9.10	.18	.20	.21	.22	.23	.25	.31
9.80	.33	.35	.37	.39	.42	.44	.57
10.50	.61	.65	.70	.76	.83	.89	1.24

TR20 XEQ 02-09-00 11:21
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
 PAGE 4

11.20	DISCHG	1.35	1.46	1.59	1.74	1.91	2.12	2.40	2.78	3.27	4.05
11.90	DISCHG	5.22	6.82	9.41	12.78	16.72	20.06	22.68	24.41	23.80	21.98
12.60	DISCHG	20.17	19.19	17.25	14.81	12.59	11.14	10.04	9.08	8.50	8.08
13.30	DISCHG	7.71	7.39	7.12	6.89	6.67	6.45	6.23	6.02	5.82	5.65
14.00	DISCHG	5.47	5.31	5.16	5.03	4.91	4.80	4.69	4.57	4.46	4.34
14.70	DISCHG	4.22	4.09	3.98	3.88	3.77	3.67	3.58	3.50	3.42	3.34
15.40	DISCHG	3.25	3.16	3.07	2.99	2.93	2.89	2.85	2.81	2.77	2.73
16.10	DISCHG	2.67	2.61	2.55	2.51	2.48	2.43	2.36	2.30	2.26	2.25
16.80	DISCHG	2.23	2.18	2.13	2.06	1.97	1.82	1.71	1.66	1.66	1.64
17.50	DISCHG	1.59	1.54	1.50	1.49	1.47	1.46	1.45	1.45	1.45	1.44
18.20	DISCHG	1.42	1.38	1.32	1.27	1.23	1.21	1.20	1.20	1.21	1.22
18.90	DISCHG	1.22	1.23	1.23	1.23	1.23	1.19	1.15	1.10	1.10	1.12
19.60	DISCHG	1.14	1.13	1.11	1.08	1.07	1.04	1.01	.99	.99	.99
20.30	DISCHG	1.01	1.03	1.02	.99	.95	.94	.95	.97	.97	.97

RUNOFF VOLUME ABOVE BASEFLOW = 3.05 WATERSHED INCHES, 43.35 CFS-HRS, 3.58 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 12

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 61.90

PEAK TIME(HRS) 13.73 PEAK DISCHARGE(CFS) 6.19 PEAK ELEVATION(FEET) 65.32

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.07 HOURS	DRAINAGE AREA =	.02 SQ.MI.
7.00	DISCHG	.00	.00	.00	.00	.03
7.00	ELEV	61.90	61.90	61.90	61.90	61.93
7.70	DISCHG	.03	.04	.04	.05	.09
7.70	ELEV	61.94	61.94	61.95	61.96	62.00
8.40	DISCHG	.09	.10	.11	.12	.17
8.40	ELEV	62.00	62.01	62.01	62.03	62.08
9.10	DISCHG	.18	.20	.21	.22	.31
9.10	ELEV	62.09	62.10	62.11	62.13	62.20
9.80	DISCHG	.33	.35	.37	.42	.57
9.80	ELEV	62.22	62.24	62.26	62.30	62.44
10.50	DISCHG	.61	.65	.70	.82	1.24
10.50	ELEV	62.48	62.52	62.56	62.68	63.06
11.20	DISCHG	1.34	1.46	1.58	1.73	2.29
11.20	ELEV	63.16	63.26	63.37	63.67	64.05
11.90	DISCHG	2.33	2.37	2.45	2.81	4.70
11.90	ELEV	64.10	64.17	64.29	64.56	65.04
12.60	DISCHG	4.99	5.24	5.46	5.77	6.09
12.60	ELEV	65.10	65.16	65.20	65.25	65.30
13.30	DISCHG	6.12	6.14	6.16	6.18	6.18
13.30	ELEV	65.31	65.31	65.32	65.32	65.32
14.00	DISCHG	6.17	6.16	6.14	6.10	5.99
14.00	ELEV	65.32	65.32	65.31	65.31	65.29
14.70	DISCHG	5.96	5.93	5.90	5.87	5.65
14.70	ELEV	65.28	65.28	65.27	65.26	65.23

TR20 XEQ 02-09-00 11:21
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 PASS 1
PAGE 5

15.40	DISCHG	5.61	5.57	5.53	5.49	5.45	5.41	5.36	5.32	5.28	5.23
15.40	ELEV	65.23	65.22	65.21	65.21	65.20	65.19	65.18	65.17	65.16	65.15
16.10	DISCHG	5.19	5.14	5.10	5.05	5.01	4.97	4.92	4.88	4.83	4.79
16.10	ELEV	65.14	65.13	65.13	65.12	65.11	65.10	65.09	65.08	65.07	65.06
16.80	DISCHG	4.74	4.70	4.65	4.61	4.57	4.52	4.46	4.41	4.35	4.29
16.80	ELEV	65.05	65.04	65.03	65.02	65.01	65.00	64.99	64.97	64.96	64.94
17.50	DISCHG	4.24	4.18	4.12	4.07	4.02	3.96	3.91	3.86	3.81	3.76
17.50	ELEV	64.93	64.91	64.90	64.89	64.87	64.86	64.84	64.83	64.82	64.80
18.20	DISCHG	3.71	3.66	3.61	3.57	3.52	3.47	3.42	3.38	3.33	3.29
18.20	ELEV	64.79	64.78	64.77	64.75	64.74	64.73	64.72	64.70	64.69	64.68
18.90	DISCHG	3.24	3.20	3.16	3.12	3.08	3.04	3.00	2.96	2.92	2.89
18.90	ELEV	64.67	64.66	64.65	64.64	64.63	64.62	64.61	64.60	64.59	64.58
19.60	DISCHG	2.85	2.81	2.78	2.74	2.71	2.67	2.64	2.60	2.58	2.56
19.60	ELEV	64.57	64.56	64.55	64.54	64.53	64.52	64.51	64.50	64.48	64.45
20.30	DISCHG	2.54	2.52	2.50	2.48	2.46	2.44	2.42	2.40	2.38	2.36
20.30	ELEV	64.42	64.39	64.36	64.33	64.30	64.27	64.24	64.21	64.18	64.15

RUNOFF VOLUME ABOVE BASEFLOW = 3.01 WATERSHED INCHES, 42.83 CFS-HRS, 3.54 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB

RECORD ID

TR20 XEQ 02-09-00 11:21
 REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 SUMMARY
 PAGE 6

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 MOIST 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)
<u>ALTERNATE 2 STORM 4</u>													
XSECTION 1	ADDHYD	.02	9	2	.07	7.3	.00	.00	3.00	---	12.42	17.12	968.1
XSECTION 2	RUNOFF	.00	9	2	.07	.0	7.00	24.00	4.13	---	12.37	7.72	1783.6
XSECTION 4	ADDHYD	.02	9	2	.07	.0	7.00	24.00	3.05	---	12.41	24.48	1111.9
STRUCTURE 12	RESVOR	.02	9	2	.07	.0	7.00	24.00	3.01	65.32	13.73	6.19	281.2

TR20 XEQ 02-09-00 11:21
REV PC 09/83(.2)

PROPOSED CONDITION WATERSHED - TO RES 12 POINT OF COMPAR.
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 02/03/00

JOB 1 SUMMARY
PAGE 7

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

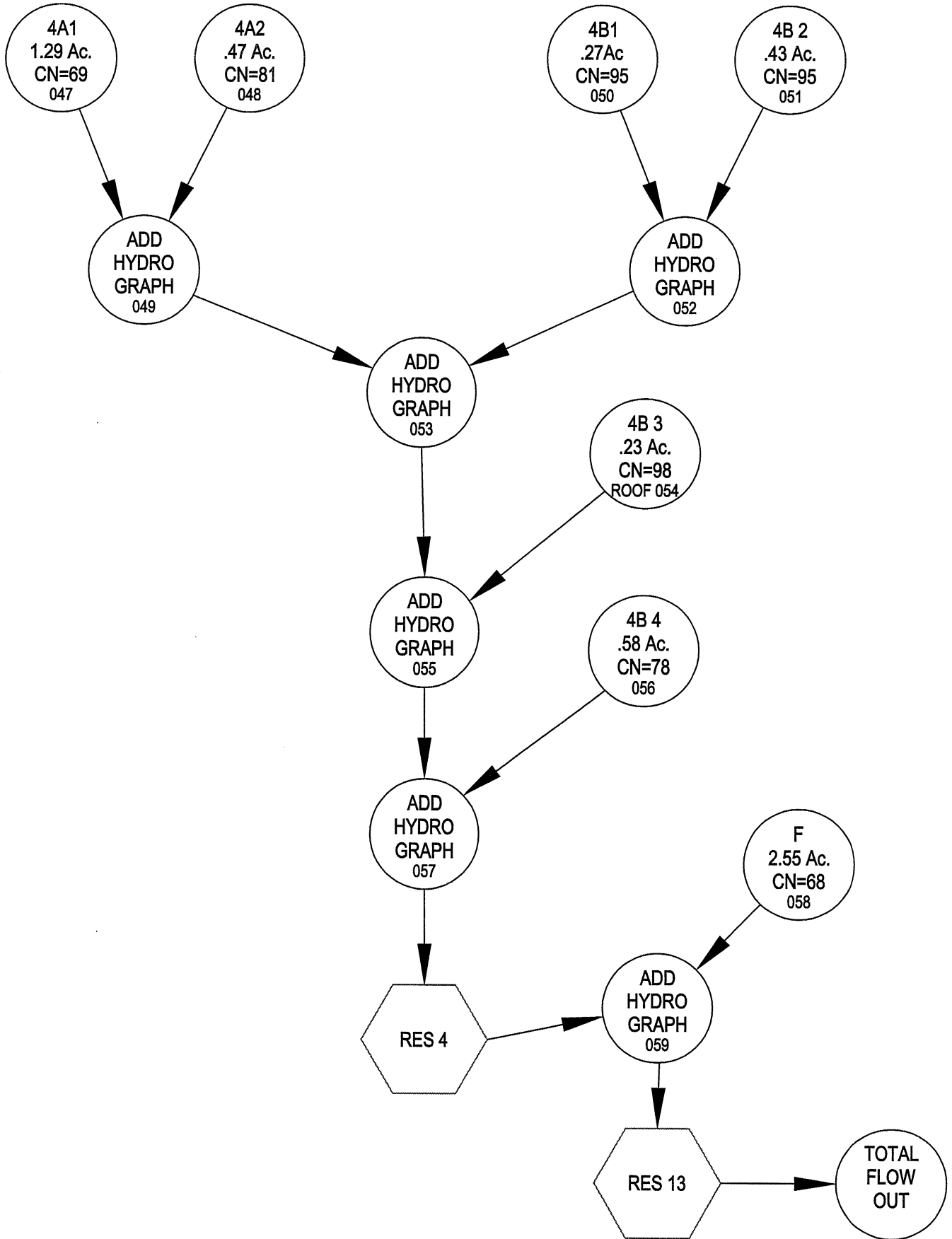
XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....
<u>STRUCTURE 12</u>	<u>.02</u>	4
ALTERNATE 2		6.19
<u>XSECTION 1</u>	<u>.02</u>	
ALTERNATE 2		17.12
<u>XSECTION 2</u>	<u>.00</u>	
ALTERNATE 2		7.72
<u>XSECTION 4</u>	<u>.02</u>	
ALTERNATE 2		24.48

**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

**Proposed Condition Analysis
To RES 13 Design Point**

**Hayes Engineering, Inc.
February 14, 2000**

PROPOSED CONDITION WATERSHED SCHEMATIC TO RES 13 WETLAND OUTLET



TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11

Project : CHERRY HILL SITE PLAN User: cfb Date: 12-20-99
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS
 Subarea : 4A1

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover > 75%	-	.38(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.32(98)	-	-
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	-	.59(58)	-	-
 Total Area (by Hydrologic Soil Group)		1.29		
		====		

SUBAREA: 4A1 TOTAL DRAINAGE AREA: 1.29 Acres WEIGHTED CURVE NUMBER:69

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11

Project : CHERRY HILL SITE PLAN User: cfb Date: 12-20-99
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS
 Subarea : 4A2

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	-	.01(61)	.06(74)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.02(98)	.22(98)	-
OTHER AGRICULTURAL LANDS				
Meadow -cont. grass (non grazed) ----	-	.16(58)	-	-
 Total Area (by Hydrologic Soil Group)		.19	.28	
		====	====	

SUBAREA: 4A2 TOTAL DRAINAGE AREA: .47 Acres WEIGHTED CURVE NUMBER:81

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11

Project : SITE PLAN AT CHERRY HILL User: cfb Date: 11-03-99
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS TO RES 13
 Subarea : 4B1

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
Acres (CN)				

FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover € 75%	-	.02(61)	-	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.24(98)	.01(98)	-

Total Area (by Hydrologic Soil Group)		.26	.01	
		====	====	

 SUBAREA: 4B1 TOTAL DRAINAGE AREA: .27 Acres WEIGHTED CURVE NUMBER:95

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11

Project : SITE PLAN AT CHERRY HILL User: cfb Date: 11-03-99
 County : State: Checked: Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS TO RES 13
 Subarea : 4B2

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	-	.02(61)	.03(74)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.12(98)	.26(98)	-
Total Area (by Hydrologic Soil Group)		.14	.29	
		====	====	

 SUBAREA: 4B2 TOTAL DRAINAGE AREA: .43 Acres WEIGHTED CURVE NUMBER:95

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11

Project : SITE PLAN AT CHERRY HILL User: cfb Date: 11-03-99
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS TO RES 13
 Subarea : 4B3 (ROOF)

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
Acres (CN)				
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	.23(98)	-

Total Area (by Hydrologic Soil Group) .23
 =====

SUBAREA: 4B3 TOTAL DRAINAGE AREA: .23 Acres WEIGHTED CURVE NUMBER:98

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11

Project : SITE PLAN AT CHERRY HILL User: cfb Date: 11-03-99
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS TO RES 13
 Subarea : 4B4

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
Acres (CN)				
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	-	-	.33(74)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	.12(98)	-
OTHER AGRICULTURAL LANDS				
Woods good	-	-	.13(70)	-
Total Area (by Hydrologic Soil Group)			.58	
			====	

SUBAREA: 4B4 TOTAL DRAINAGE AREA: .58 Acres WEIGHTED CURVE NUMBER: 78

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11

Project : SITE PLAN AT CHERRY HILL User: cfb Date: 11-03-99
 County : State: Checked: _____ Date: _____
 Subtitle: PROPOSED CONDITION ANALYSIS TO RES 13
 Subarea : F

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns, parks etc.)				
Good condition; grass cover \geq 75%	-	.4(61)	.13(74)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	.08(98)	.03(98)	-
Residential districts Avg % imperv				
(by average lot size)				
1 acre 20	-	.4(68)	.3(79)	-
OTHER AGRICULTURAL LANDS				
Woods good	-	.41(55)	.8(70)	-
Total Area (by Hydrologic Soil Group)				
		1.29	1.26	
		====	====	

 SUBAREA: F TOTAL DRAINAGE AREA: 2.55 Acres WEIGHTED CURVE NUMBER:68



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT-0015A
NAME _____
DATE 12/20/99

MADE BY _____

MEMO

CALCULATION

RES 04

WQU DETERMINATION - 1" RUNOFF PER SUBD. R&R

4A1: .32 Ac

4A2: .24 Ac

4B1: .25 Ac

4B2: .38

4B3 (Road) TO INFIL

4B4 (BMP)

TOTAL: 1.19 Ac

1" RUNOFF: 4320 FT³

WQU PROVIDED

ELN	Area	Avg	Inc D	Inc Vol	Cum Vol
62.8	3000				0
		3250	.2	650	
63	3500				650
		3980	1.0	3980	
64	4460				4630

4320 FT³ REQ'D 4630 FT³ PROVIDED



HAYES ENGINEERING, INC.
603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT-0015
NAME _____
DATE _____

MADE BY _____

- MEMO
 CALCULATION

PROPOSED CONDITION - UNCHANGED FROM EXISTING CONDITIONS
RES 13 STAGE STORAGE

ELEV	Area FT ²	Avg. FT ²	Inc D. FT	Inc. Vol FT ³	Cum Vol Ac Ft.
60.9	0				0
62	1800	900	1.1	990	.0227
64	10300	6050	2	12100	.300
65.8	27000	18650	1.8	33570	1.071
66	29680	28340	.2	5668	1.201

12" TRANSITE AC DRAIN AT 60.9 - ASSUME INLET CONTROL

ELEV	Q cfs
60.9	0.0
62	2.91
64	6.37
65.8	8.62
66	8.75

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 FULLPRINT SUMMARY NOPLOTS

TITLE 001 PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV

TITLE TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

5 RAINFL 9	.25				
8	0.0	.0025	.005	.0075	.010
8	.0125	.015	.0175	.020	.0225
8	.026	.0285	.031	.0345	.037
8	.0405	.043	.0465	.050	.0535
8	.057	.0605	.064	.068	.072
8	.076	.080	.0845	.089	.094
8	.100	.1075	.115	.1225	.130
8	.1385	.148	.157	.167	.178
8	.189	.202	.216	.2315	.250
8	.271	.298	.3455	.500	.6555
8	.702	.7295	.751	.769	.785
8	.7985	.811	.823	.834	.8435
8	.853	.862	.870	.8785	.886
8	.8935	.900	.907	.911	.916
8	.920	.9245	.929	.9325	.936
8	.940	.944	.947	.951	.954
8	.957	.9605	.963	.9665	.969
8	.9725	.975	.9775	.981	.9835
8	.986	.9885	.991	.9935	.996
8	.9985	1.0	1.0	1.0	1.0

9 ENDTBL

3 STRUCT 04

8	64.	0.0	0.0
8	66.	2.2	.243
8	67.8	3.22	.531
8	68.	5.9	.568

9 ENDTBL

3 STRUCT 13

8	60.9	0.0	0.0
8	62.	2.91	.0227
8	64.	6.37	.300
8	65.8	8.62	1.071
8	66.	8.75	1.201

9 ENDTBL

6 RUNOFF 1 047	1 .00202	69.	.13	1 1 1 1
6 RUNOFF 1 048	2 .00073	81.	.18	1 1 1 1
6 ADDHYD 4 049	2 1 3			1 1 1 1
6 RUNOFF 1 050	1 .00042	95.	.1	1 1 1 1
6 RUNOFF 1 051	2 .00067	95.	.1	1 1 1 1
6 ADDHYD 4 052	2 1 4			1 1 1 1
6 ADDHYD 4 053	4 3 2			1 1 1 1
6 RUNOFF 1 054	1 .00036	98.	.1	1 1 1 1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

6	ADDHYD	4	055	2	1	3				1	1	1	1
6	RUNOFF	1	056		1	.00091	78.	.15		1	1	1	1
6	ADDHYD	4	057	1	3	2				1	1	1	1
6	RESVOR	2	04	2	1	64.				1	1	1	1
6	RUNOFF	1	058		2	.00398	68.	.18		1	1	1	1
6	ADDHYD	4	059	1	2	3				1	1	1	1
6	RESVOR	2	13	3	2	60.9				1	1	1	1
	ENDATA												
7	INCREM	6				.1							
7	COMPUT	7	047	13	0.0		3.1	1.0		9	2	02	01
	ENDCMP	1											
7	COMPUT	7	047	13	0.0		4.6	1.0		9	2	02	02
	ENDCMP	1											
7	COMPUT	7	047	13	0.0		5.4	1.0		9	2	02	03
	ENDCMP	1											
7	COMPUT	7	047	13	0.0		7.0	1.0		9	2	02	04
	ENDCMP	1											
	ENDJOB	2											

*****END OF 80-80 LIST*****

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 1
PAGE 1

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .10 HOURS

RECORD ID

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 47 TO STRUCTURE 13

RECORD ID

STARTING TIME = .00 RAIN DEPTH = 3.10 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
ALTERNATE NO.= 2 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 47

OUTPUT HYDROGRAPH= 1

AREA= .00 SQ MI INPUT RUNOFF CURVE= 69. TIME OF CONCENTRATION= .13 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0173 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .02 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.02	(RUNOFF)
12.30	.75	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
11.00	DISCHG	.00 .00 .00 .00 .00 .00 .01 .03 .07 .26				
12.00	DISCHG	.43 .59 .73 .75 .38 .30 .23 .19 .18 .15				
13.00	DISCHG	.15 .13 .13 .12 .12 .11 .10 .10 .10 .09				
14.00	DISCHG	.09 .09 .09 .09 .08 .08 .08 .07 .07 .07				
15.00	DISCHG	.07 .07 .07 .07 .06 .06 .07 .07 .07 .06				
16.00	DISCHG	.06 .06 .06 .06 .05 .05 .06 .06 .05 .04				
17.00	DISCHG	.03 .04 .04 .04 .03 .03 .04 .04 .04 .04				
18.00	DISCHG	.04 .03 .03 .03 .03 .03 .03 .03 .03 .03				
19.00	DISCHG	.03 .03 .03 .03 .03 .03 .03 .03 .03 .03				
20.00	DISCHG	.03 .03 .03 .03 .02 .02 .03 .03 .03 .02				
21.00	DISCHG	.02 .03 .03 .03 .02 .02 .02 .02 .02 .03				
22.00	DISCHG	.03 .03 .02 .02 .02 .02 .02 .02 .02 .02				
23.00	DISCHG	.02 .02 .02 .02 .02 .02 .02 .02 .02 .01				
24.00	DISCHG	.01 .01 .00				

RUNOFF VOLUME ABOVE BASEFLOW = .73 WATERSHED INCHES, .95 CFS-HRS, .08 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 48

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .18 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.01	(RUNOFF)
12.30	.51	(RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
10.00	.01	.01	.01	.01	.01	.01	.02
11.00	.02	.02	.03	.03	.04	.04	.06
12.00	.38	.45	.50	.51	.32	.21	.16
13.00	.09	.08	.08	.07	.07	.07	.06
14.00	.05	.05	.05	.05	.05	.05	.04
15.00	.04	.04	.04	.04	.04	.03	.04
16.00	.03	.03	.03	.03	.03	.03	.03
17.00	.02	.02	.02	.02	.02	.02	.02
18.00	.02	.02	.02	.02	.02	.02	.02
19.00	.02	.02	.01	.01	.02	.02	.02
20.00	.01	.01	.02	.02	.01	.01	.01
21.00	.01	.01	.01	.02	.01	.01	.01
22.00	.02	.01	.01	.01	.01	.01	.01
23.00	.01	.01	.01	.01	.01	.01	.01
24.00	.01	.00					

RUNOFF VOLUME ABOVE BASEFLOW = 1.39 WATERSHED INCHES, .65 CFS-HRS, .05 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 49
INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.26 PEAK DISCHARGE(CFS) 1.32 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
10.00	.01	.01	.01	.01	.01	.01	.02
11.00	.02	.02	.03	.03	.04	.04	.07
12.00	.81	1.04	1.23	1.26	.70	.51	.39
13.00	.23	.22	.20	.20	.18	.18	.17
14.00	.14	.14	.14	.14	.13	.13	.12
15.00	.11	.11	.11	.11	.10	.10	.10
16.00	.09	.09	.09	.09	.08	.08	.08
17.00	.05	.06	.06	.06	.05	.05	.05
18.00	.06	.05	.05	.05	.04	.04	.05
19.00	.05	.05	.04	.04	.05	.05	.05
20.00	.04	.04	.04	.04	.04	.03	.04
21.00	.03	.04	.04	.04	.04	.03	.03
22.00	.05	.04	.03	.03	.03	.03	.03
23.00	.03	.03	.03	.03	.03	.03	.03
24.00	.02	.01	.00				

RUNOFF VOLUME ABOVE BASEFLOW = .90 WATERSHED INCHES, 1.60 CFS-HRS, .13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 50
OUTPUT HYDROGRAPH= 1
AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.01	(RUNOFF)
12.20	.49	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
6.00	DISCHG	.00	.00	.00	.01	.01
7.00	DISCHG	.01	.01	.01	.01	.01
8.00	DISCHG	.01	.01	.01	.02	.02
9.00	DISCHG	.02	.02	.02	.02	.03
10.00	DISCHG	.03	.03	.03	.04	.04
11.00	DISCHG	.05	.06	.06	.07	.08
12.00	DISCHG	.47	.49	.49	.17	.15
13.00	DISCHG	.07	.06	.06	.05	.05
14.00	DISCHG	.04	.04	.04	.04	.03
15.00	DISCHG	.03	.03	.03	.03	.03
16.00	DISCHG	.02	.02	.02	.02	.02
17.00	DISCHG	.01	.02	.02	.01	.01
18.00	DISCHG	.01	.01	.01	.01	.01
19.00	DISCHG	.01	.01	.01	.01	.01
20.00	DISCHG	.01	.01	.01	.01	.01
21.00	DISCHG	.01	.01	.01	.01	.01
22.00	DISCHG	.01	.01	.01	.01	.01
23.00	DISCHG	.01	.01	.01	.01	.01
24.00	DISCHG	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 2.53 WATERSHED INCHES, .69 CFS-HRS, .06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 51

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.01	(RUNOFF)
12.20	.79	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
5.00	DISCHG	.00	.00	.00	.01	.01
6.00	DISCHG	.01	.01	.01	.01	.01
7.00	DISCHG	.01	.01	.01	.02	.02
8.00	DISCHG	.02	.02	.02	.02	.03
9.00	DISCHG	.03	.03	.03	.04	.04
10.00	DISCHG	.04	.05	.05	.06	.06

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 1
PAGE 4

11.00	DISCHG	.08	.09	.09	.10	.12	.12	.19	.22	.36	.70
12.00	DISCHG	.76	.77	.79	.64	.28	.24	.17	.14	.13	.11
13.00	DISCHG	.11	.10	.09	.09	.08	.08	.07	.07	.07	.07
14.00	DISCHG	.06	.06	.06	.06	.06	.06	.05	.05	.05	.05
15.00	DISCHG	.05	.05	.05	.05	.04	.04	.04	.04	.04	.04
16.00	DISCHG	.04	.04	.04	.04	.03	.03	.04	.04	.03	.02
17.00	DISCHG	.02	.02	.03	.02	.02	.02	.02	.02	.02	.02
18.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
19.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
20.00	DISCHG	.02	.02	.02	.02	.01	.01	.02	.02	.02	.01
21.00	DISCHG	.01	.02	.02	.02	.01	.01	.01	.01	.01	.02
22.00	DISCHG	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01
23.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
24.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 1.10 CFS-HRS, .09 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 52

INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS) 12.16 PEAK DISCHARGE(CFS) 1.30 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.					
5.00	DISCHG	.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
6.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.02	.02	.02
7.00	DISCHG	.02	.02	.02	.02	.02	.02	.03	.03	.03	.03
8.00	DISCHG	.03	.04	.04	.04	.04	.04	.04	.04	.05	.05
9.00	DISCHG	.05	.05	.05	.05	.06	.06	.06	.07	.07	.07
10.00	DISCHG	.07	.08	.08	.09	.09	.09	.10	.10	.11	.13
11.00	DISCHG	.13	.14	.15	.16	.19	.20	.31	.35	.58	1.15
12.00	DISCHG	1.23	1.26	1.28	1.05	.45	.39	.27	.23	.22	.18
13.00	DISCHG	.18	.16	.15	.15	.14	.13	.12	.11	.11	.11
14.00	DISCHG	.11	.10	.10	.10	.09	.09	.08	.08	.08	.08
15.00	DISCHG	.08	.08	.08	.07	.07	.07	.07	.07	.07	.06
16.00	DISCHG	.06	.06	.06	.06	.06	.06	.06	.06	.05	.04
17.00	DISCHG	.03	.04	.04	.04	.03	.03	.04	.04	.04	.04
18.00	DISCHG	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03
19.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
20.00	DISCHG	.03	.03	.03	.03	.02	.02	.03	.03	.03	.02
21.00	DISCHG	.02	.03	.03	.03	.02	.02	.02	.02	.02	.03
22.00	DISCHG	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.01
24.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 2.54 WATERSHED INCHES, 1.79 CFS-HRS, .15 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 1
PAGE 6

9.00	DISCHG	.02	.02	.02	.02	.03	.03	.03	.03	.03	.03
10.00	DISCHG	.03	.03	.03	.04	.04	.04	.04	.04	.04	.05
11.00	DISCHG	.05	.06	.06	.06	.07	.07	.12	.13	.21	.41
12.00	DISCHG	.44	.44	.44	.36	.16	.13	.09	.08	.07	.06
13.00	DISCHG	.06	.05	.05	.05	.05	.05	.04	.04	.04	.04
14.00	DISCHG	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03
15.00	DISCHG	.03	.03	.03	.03	.02	.02	.02	.02	.02	.02
16.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.01
17.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
18.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
19.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
20.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
21.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
22.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
23.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.00

RUNOFF VOLUME ABOVE BASEFLOW = 2.84 WATERSHED INCHES, .66 CFS-HRS, .05 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 55

INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.19 PEAK DISCHARGE(CFS) 2.95 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
4.00	DISCHG	.00	.00	.01	.01	.01
5.00	DISCHG	.01	.01	.01	.01	.01
6.00	DISCHG	.02	.02	.02	.02	.02
7.00	DISCHG	.03	.03	.03	.04	.05
8.00	DISCHG	.05	.05	.05	.06	.06
9.00	DISCHG	.08	.07	.07	.08	.09
10.00	DISCHG	.10	.12	.13	.13	.14
11.00	DISCHG	.20	.22	.23	.25	.30
12.00	DISCHG	2.48	2.74	2.95	2.67	1.31
13.00	DISCHG	.48	.43	.41	.39	.37
14.00	DISCHG	.29	.28	.28	.27	.26
15.00	DISCHG	.22	.21	.21	.21	.19
16.00	DISCHG	.18	.18	.18	.17	.16
17.00	DISCHG	.10	.11	.12	.12	.10
18.00	DISCHG	.11	.09	.09	.08	.08
19.00	DISCHG	.10	.08	.07	.08	.09
20.00	DISCHG	.07	.08	.08	.08	.07
21.00	DISCHG	.06	.08	.08	.08	.07
22.00	DISCHG	.09	.07	.06	.06	.06
23.00	DISCHG	.06	.06	.06	.06	.06
24.00	DISCHG	.03	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 1.49 WATERSHED INCHES, 4.05 CFS-HRS, .33 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 1
PAGE 7

OPERATION RUNOFF CROSS SECTION 56

OUTPUT HYDROGRAPH= 1

AREA= .00 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .15 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0200 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.01	(RUNOFF)
12.30	.56	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .00 SQ.MI.
10.00	DISCHG .00 .00 .00 .00 .00 .01 .01 .01 .01 .01		
11.00	DISCHG .02 .02 .02 .03 .03 .04 .06 .08 .12 .30		
12.00	DISCHG .41 .49 .56 .56 .30 .22 .17 .13 .12 .10		
13.00	DISCHG .10 .09 .08 .08 .08 .07 .07 .06 .06 .06		
14.00	DISCHG .06 .06 .06 .06 .05 .05 .05 .05 .05 .05		
15.00	DISCHG .05 .05 .04 .04 .04 .04 .04 .04 .04 .04		
16.00	DISCHG .04 .04 .04 .04 .03 .03 .03 .03 .03 .02		
17.00	DISCHG .02 .02 .02 .02 .02 .02 .02 .02 .02 .02		
18.00	DISCHG .02 .02 .02 .02 .02 .02 .02 .02 .02 .02		
19.00	DISCHG .02 .02 .02 .02 .02 .02 .02 .02 .02 .02		
20.00	DISCHG .02 .02 .02 .02 .01 .01 .02 .02 .02 .01		
21.00	DISCHG .01 .02 .02 .02 .01 .01 .01 .01 .01 .02		
22.00	DISCHG .02 .02 .01 .01 .01 .01 .01 .01 .01 .01		
23.00	DISCHG .01 .01 .01 .01 .01 .01 .01 .01 .01 .01		
24.00	DISCHG .01 .00		

RUNOFF VOLUME ABOVE BASEFLOW = 1.20 WATERSHED INCHES, .71 CFS-HRS, .06 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 57

INPUT HYDROGRAPHS= 1,3 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.20	3.51	(NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ.MI.
4.00	DISCHG .00 .00 .01 .01 .01 .01 .01 .01 .01 .01		
5.00	DISCHG .01 .01 .01 .01 .01 .01 .01 .01 .01 .01		
6.00	DISCHG .02 .02 .02 .02 .02 .02 .02 .03 .03 .03		
7.00	DISCHG .03 .03 .03 .03 .04 .04 .05 .05 .05 .05		
8.00	DISCHG .05 .05 .05 .06 .06 .06 .06 .07 .07 .08		
9.00	DISCHG .08 .07 .07 .08 .08 .09 .09 .10 .10 .10		
10.00	DISCHG .10 .12 .13 .13 .14 .15 .16 .17 .18 .21		
11.00	DISCHG .22 .24 .26 .28 .34 .35 .56 .67 1.09 2.38		
12.00	DISCHG 2.89 3.23 3.51 3.23 1.61 1.26 .92 .75 .70 .59		
13.00	DISCHG .57 .52 .49 .48 .44 .44 .40 .37 .37 .35		

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 1
 PAGE 8

14.00	DISCHG	.34	.34	.33	.33	.31	.31	.28	.27	.27	.27
15.00	DISCHG	.27	.26	.26	.25	.23	.23	.24	.24	.24	.22
16.00	DISCHG	.22	.22	.22	.21	.19	.19	.20	.20	.19	.13
17.00	DISCHG	.12	.13	.14	.14	.12	.12	.13	.13	.13	.13
18.00	DISCHG	.13	.11	.10	.10	.10	.10	.11	.12	.12	.12
19.00	DISCHG	.12	.10	.09	.09	.11	.12	.10	.09	.09	.09
20.00	DISCHG	.09	.10	.10	.10	.08	.08	.09	.10	.10	.08
21.00	DISCHG	.08	.09	.10	.10	.08	.08	.07	.07	.08	.10
22.00	DISCHG	.10	.09	.08	.08	.07	.07	.07	.07	.07	.07
23.00	DISCHG	.07	.07	.07	.07	.07	.08	.08	.08	.07	.05
24.00	DISCHG	.04	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 1.44 WATERSHED INCHES, 4.76 CFS-HRS, .39 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 1
 SURFACE ELEVATION= 64.00

PEAK TIME(HRS) 12.52 PEAK DISCHARGE(CFS) 1.20 PEAK ELEVATION(FEET) 65.09

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
5.00	DISCHG	.00	.00	.00	.00	.01
5.00	ELEV	64.00	64.00	64.00	64.00	64.01
6.00	DISCHG	.01	.01	.01	.01	.01
6.00	ELEV	64.01	64.01	64.01	64.01	64.01
7.00	DISCHG	.01	.02	.02	.02	.03
7.00	ELEV	64.01	64.01	64.02	64.02	64.02
8.00	DISCHG	.03	.03	.03	.04	.04
8.00	ELEV	64.03	64.03	64.03	64.03	64.04
9.00	DISCHG	.05	.05	.05	.06	.06
9.00	ELEV	64.04	64.04	64.05	64.05	64.06
10.00	DISCHG	.07	.07	.08	.09	.10
10.00	ELEV	64.06	64.07	64.07	64.08	64.08
11.00	DISCHG	.12	.13	.13	.16	.19
11.00	ELEV	64.11	64.11	64.12	64.13	64.14
12.00	DISCHG	.54	.72	.91	1.09	1.18
12.00	ELEV	64.49	64.65	64.83	64.99	65.08
13.00	DISCHG	1.06	1.03	.99	.95	.92
13.00	ELEV	64.97	64.93	64.90	64.87	64.83
14.00	DISCHG	.72	.70	.67	.64	.62
14.00	ELEV	64.66	64.63	64.61	64.59	64.56
15.00	DISCHG	.50	.48	.46	.45	.43
15.00	ELEV	64.45	64.44	64.42	64.41	64.39
16.00	DISCHG	.36	.35	.34	.33	.32
16.00	ELEV	64.33	64.32	64.31	64.30	64.29
17.00	DISCHG	.27	.26	.25	.24	.23
17.00	ELEV	64.24	64.23	64.23	64.22	64.21
18.00	DISCHG	.20	.19	.18	.18	.17

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 1
PAGE 9

18.00	ELEV	64.18	64.17	64.17	64.16	64.16	64.15	64.15	64.15	64.14	64.14
19.00	DISCHG	.15	.15	.14	.14	.14	.14	.13	.13	.13	.13
19.00	ELEV	64.14	64.13	64.13	64.13	64.13	64.12	64.12	64.12	64.12	64.11
20.00	DISCHG	.12	.12	.12	.12	.12	.11	.11	.11	.11	.11
20.00	ELEV	64.11	64.11	64.11	64.11	64.11	64.10	64.10	64.10	64.10	64.10
21.00	DISCHG	.11	.10	.10	.10	.10	.10	.10	.10	.10	.09
21.00	ELEV	64.10	64.09	64.09	64.09	64.09	64.09	64.09	64.09	64.09	64.09
22.00	DISCHG	.10	.10	.09	.09	.09	.09	.09	.09	.09	.09
22.00	ELEV	64.09	64.09	64.09	64.08	64.08	64.08	64.08	64.08	64.08	64.08
23.00	DISCHG	.09	.08	.08	.08	.08	.08	.08	.08	.08	.08
23.00	ELEV	64.08	64.08	64.08	64.08	64.08	64.07	64.07	64.07	64.07	64.07
24.00	DISCHG	.08	.07	.07	.06	.06	.05	.05	.05	.04	.04
24.00	ELEV	64.07	64.07	64.06	64.06	64.05	64.05	64.05	64.04	64.04	64.04
25.00	DISCHG	.04	.03	.03	.03	.03	.03	.02	.02	.02	.02
25.00	ELEV	64.03	64.03	64.03	64.03	64.02	64.02	64.02	64.02	64.02	64.02
26.00	DISCHG	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01
26.00	ELEV	64.02	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01

RUNOFF VOLUME ABOVE BASEFLOW = 1.43 WATERSHED INCHES, 4.72 CFS-HRS, .39 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 58

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= .18 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

PEAK TIME(HRS) 12.27 PEAK DISCHARGE(CFS) 1.39 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .00 SQ.MI.
11.00	DISCHG .00 .00 .00 .00 .00 .00 .00 .02 .07 .30		
12.00	DISCHG .63 .93 1.21 1.37 .90 .62 .49 .38 .34 .30		
13.00	DISCHG .28 .26 .24 .24 .22 .22 .20 .19 .18 .18		
14.00	DISCHG .17 .17 .17 .17 .16 .16 .15 .14 .14 .14		
15.00	DISCHG .14 .14 .13 .13 .12 .12 .12 .13 .13 .12		
16.00	DISCHG .11 .11 .11 .11 .11 .11 .10 .10 .11 .10 .08		
17.00	DISCHG .07 .07 .08 .08 .07 .07 .06 .07 .07 .07 .07		
18.00	DISCHG .07 .07 .06 .06 .06 .06 .06 .06 .06 .06 .06		
19.00	DISCHG .06 .06 .05 .05 .06 .06 .06 .06 .05 .05 .05		
20.00	DISCHG .05 .05 .06 .06 .05 .04 .05 .05 .05 .06 .05		
21.00	DISCHG .04 .05 .05 .06 .05 .04 .04 .04 .04 .04 .05		
22.00	DISCHG .06 .05 .04 .04 .04 .04 .04 .04 .04 .04 .04		
23.00	DISCHG .04 .04 .04 .04 .04 .04 .04 .04 .04 .04 .03		
24.00	DISCHG .03 .02 .00		

RUNOFF VOLUME ABOVE BASEFLOW = .68 WATERSHED INCHES, 1.75 CFS-HRS, .14 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 59

INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.30		2.46				(NULL)					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .01 SQ.MI.		
5.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01
6.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
7.00	DISCHG	.01	.02	.02	.02	.02	.02	.02	.02	.03	.03
8.00	DISCHG	.03	.03	.03	.03	.04	.04	.04	.04	.04	.05
9.00	DISCHG	.05	.05	.05	.05	.05	.06	.06	.06	.06	.07
10.00	DISCHG	.07	.07	.08	.08	.08	.09	.09	.10	.10	.11
11.00	DISCHG	.12	.13	.13	.14	.16	.17	.19	.24	.34	.68
12.00	DISCHG	1.16	1.65	2.12	2.46	2.08	1.83	1.69	1.54	1.48	1.40
13.00	DISCHG	1.34	1.29	1.23	1.19	1.14	1.10	1.05	1.00	.97	.93
14.00	DISCHG	.90	.87	.84	.81	.78	.76	.73	.70	.67	.65
15.00	DISCHG	.64	.62	.60	.58	.56	.54	.53	.52	.51	.49
16.00	DISCHG	.48	.46	.45	.44	.43	.41	.41	.40	.39	.36
17.00	DISCHG	.33	.33	.32	.32	.30	.29	.28	.28	.28	.27
18.00	DISCHG	.27	.26	.24	.23	.23	.22	.22	.22	.22	.22
19.00	DISCHG	.22	.21	.20	.19	.20	.20	.19	.18	.18	.17
20.00	DISCHG	.17	.17	.17	.17	.16	.16	.16	.16	.16	.15
21.00	DISCHG	.15	.15	.16	.16	.15	.14	.14	.14	.14	.15
22.00	DISCHG	.15	.15	.14	.14	.13	.13	.13	.13	.13	.13
23.00	DISCHG	.13	.13	.13	.13	.12	.12	.12	.12	.12	.11
24.00	DISCHG	.10	.09	.07	.06	.06	.05	.05	.05	.04	.04
25.00	DISCHG	.04	.03	.03	.03	.03	.03	.02	.02	.02	.02
26.00	DISCHG	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01

RUNOFF VOLUME ABOVE BASEFLOW = 1.10 WATERSHED INCHES, 6.46 CFS-HRS, .53 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 13
INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 2
SURFACE ELEVATION= 60.90

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)				PEAK ELEVATION(FEET)					
12.39		2.22				61.74					
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .01 SQ.MI.		
5.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
5.00	ELEV	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90
6.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
6.00	ELEV	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90
7.00	DISCHG	.01	.01	.02	.02	.02	.02	.02	.02	.02	.03
7.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91
8.00	DISCHG	.03	.03	.03	.03	.03	.04	.04	.04	.04	.04
8.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.92	60.92
9.00	DISCHG	.05	.05	.05	.05	.05	.06	.06	.06	.06	.06
9.00	ELEV	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92
10.00	DISCHG	.07	.07	.07	.08	.08	.08	.09	.09	.10	.10

10.00	ELEV	60.93	60.93	60.93	60.93	60.93	60.93	60.93	60.94	60.94	60.94
11.00	DISCHG	.11	.12	.13	.14	.15	.16	.17	.20	.26	.43
11.00	ELEV	60.94	60.94	60.95	60.95	60.96	60.96	60.97	60.98	61.00	61.06
12.00	DISCHG	.77	1.21	1.68	2.10	2.22	2.04	1.84	1.69	1.56	1.48
12.00	ELEV	61.19	61.36	61.54	61.69	61.74	61.67	61.60	61.54	61.49	61.46
13.00	DISCHG	1.40	1.34	1.28	1.23	1.18	1.14	1.09	1.05	1.00	.97
13.00	ELEV	61.43	61.41	61.39	61.37	61.35	61.33	61.31	61.30	61.28	61.26
14.00	DISCHG	.93	.90	.87	.84	.81	.78	.75	.72	.70	.67
14.00	ELEV	61.25	61.24	61.23	61.22	61.21	61.20	61.19	61.17	61.16	61.15
15.00	DISCHG	.65	.63	.62	.60	.58	.56	.54	.53	.52	.51
15.00	ELEV	61.15	61.14	61.13	61.13	61.12	61.11	61.10	61.10	61.10	61.09
16.00	DISCHG	.49	.48	.46	.45	.44	.43	.42	.41	.40	.38
16.00	ELEV	61.09	61.08	61.08	61.07	61.07	61.06	61.06	61.05	61.05	61.05
17.00	DISCHG	.36	.34	.33	.32	.31	.30	.29	.28	.28	.28
17.00	ELEV	61.04	61.03	61.02	61.02	61.02	61.01	61.01	61.01	61.01	61.00
18.00	DISCHG	.27	.26	.25	.24	.24	.23	.22	.22	.22	.22
18.00	ELEV	61.00	61.00	61.00	60.99	60.99	60.99	60.98	60.98	60.98	60.98
19.00	DISCHG	.22	.21	.21	.20	.19	.20	.20	.19	.18	.18
19.00	ELEV	60.98	60.98	60.98	60.97	60.97	60.97	60.97	60.97	60.97	60.97
20.00	DISCHG	.17	.17	.17	.17	.17	.16	.16	.16	.16	.16
20.00	ELEV	60.97	60.97	60.97	60.97	60.96	60.96	60.96	60.96	60.96	60.96
21.00	DISCHG	.15	.15	.15	.16	.15	.15	.14	.14	.14	.14
21.00	ELEV	60.96	60.96	60.96	60.96	60.96	60.96	60.95	60.95	60.95	60.95
22.00	DISCHG	.15	.15	.15	.14	.14	.13	.13	.13	.13	.13
22.00	ELEV	60.96	60.96	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.95
23.00	DISCHG	.13	.13	.13	.13	.13	.12	.12	.12	.12	.12
23.00	ELEV	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.95	60.94
24.00	DISCHG	.11	.10	.09	.07	.06	.06	.05	.05	.05	.04
24.00	ELEV	60.94	60.94	60.93	60.93	60.92	60.92	60.92	60.92	60.92	60.92
25.00	DISCHG	.04	.04	.03	.03	.03	.03	.03	.02	.02	.02
25.00	ELEV	60.92	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91
26.00	DISCHG	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01
26.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.90	60.90	60.90	60.90	60.90
27.00	DISCHG	.01									
27.00	ELEV	60.90									

RUNOFF VOLUME ABOVE BASEFLOW = 1.10 WATERSHED INCHES, 6.46 CFS-HRS, .53 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 47 TO STRUCTURE 13 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 2 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 47
 OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 69. TIME OF CONCENTRATION= .13 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0173 HOURS

PEAK TIME(HRS) 12.23 PEAK DISCHARGE(CFS) 1.76 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .00 SQ.MI.
10.00	.00	.00	.01	.02
11.00	.04	.05	.09	.23
12.00	1.30	1.54	1.70	.39
13.00	.31	.28	.26	.20
14.00	.19	.18	.17	.15
15.00	.15	.14	.13	.13
16.00	.12	.12	.11	.11
17.00	.07	.07	.07	.07
18.00	.07	.06	.06	.06
19.00	.07	.06	.06	.05
20.00	.05	.05	.04	.06
21.00	.04	.05	.04	.04
22.00	.06	.05	.04	.04
23.00	.04	.04	.04	.04
24.00	.03	.01	.00	.04

RUNOFF VOLUME ABOVE BASEFLOW = 1.68 WATERSHED INCHES, 2.19 CFS-HRS, .18 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 48
 OUTPUT HYDROGRAPH= 2
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .18 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .02 CFS.

PEAK TIME(HRS) 23.70 PEAK DISCHARGE(CFS) .02 PEAK ELEVATION(FEET) (RUNOFF)
 12.20 .95 (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .00 SQ.MI.
8.00	.00	.00	.00	.01
9.00	.01	.01	.02	.02
10.00	.02	.03	.04	.04
11.00	.06	.07	.09	.19

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
 PAGE 13

12.00	DISCHG	.77	.88	.95	.94	.58	.38	.29	.22	.19	.17
13.00	DISCHG	.15	.14	.13	.13	.12	.11	.11	.10	.10	.09
14.00	DISCHG	.09	.09	.09	.09	.08	.08	.08	.07	.07	.07
15.00	DISCHG	.07	.07	.07	.06	.06	.06	.06	.06	.06	.06
16.00	DISCHG	.06	.06	.05	.05	.05	.05	.05	.05	.05	.04
17.00	DISCHG	.03	.03	.04	.04	.03	.03	.03	.03	.03	.03
18.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
19.00	DISCHG	.03	.03	.02	.02	.03	.03	.03	.02	.02	.02
20.00	DISCHG	.02	.02	.03	.03	.02	.02	.02	.02	.03	.02
21.00	DISCHG	.02	.02	.02	.03	.02	.02	.02	.02	.02	.02
22.00	DISCHG	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.01
24.00	DISCHG	.01	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.64 WATERSHED INCHES, 1.24 CFS-HRS, .10 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 49
 INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.23 PEAK DISCHARGE(CFS) 2.71 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
8.00	DISCHG	.00 .00 .00 .00	.00 .01 .01	.01 .01 .01		
9.00	DISCHG	.01 .01 .01 .01	.02 .02 .02	.02 .02 .02		
10.00	DISCHG	.02 .03 .03 .03	.04 .05 .06	.06 .07 .09		
11.00	DISCHG	.10 .11 .13 .15	.19 .21 .31	.42 .62 1.53		
12.00	DISCHG	2.07 2.42 2.69 2.63	1.42 1.03 .78	.61 .56 .48		
13.00	DISCHG	.46 .42 .39 .38	.36 .35 .32	.30 .29 .28		
14.00	DISCHG	.28 .27 .27 .26	.25 .25 .23	.22 .21 .21		
15.00	DISCHG	.21 .21 .21 .20	.19 .18 .19	.19 .19 .18		
16.00	DISCHG	.17 .17 .17 .17	.16 .15 .16	.16 .15 .11		
17.00	DISCHG	.10 .11 .11 .11	.10 .09 .10	.10 .11 .11		
18.00	DISCHG	.11 .09 .08 .08	.08 .08 .09	.09 .09 .09		
19.00	DISCHG	.09 .08 .07 .07	.09 .09 .08	.07 .07 .07		
20.00	DISCHG	.07 .08 .08 .08	.07 .06 .07	.08 .08 .07		
21.00	DISCHG	.06 .07 .08 .08	.07 .06 .06	.06 .06 .08		
22.00	DISCHG	.08 .07 .06 .06	.06 .06 .06	.06 .06 .06		
23.00	DISCHG	.06 .06 .06 .06	.06 .06 .06	.06 .06 .04		
24.00	DISCHG	.04 .02 .00				

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 3.43 CFS-HRS, .28 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 50
 OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
 PAGE 14

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.01	(RUNOFF)
12.20	.75	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
4.00	DISCHG	.00 .00	.01 .01	.01 .01	.01 .01	.01 .01
5.00	DISCHG	.01 .01	.01 .01	.01 .01	.01 .01	.01 .01
6.00	DISCHG	.01 .01	.01 .01	.01 .01	.01 .01	.01 .01
7.00	DISCHG	.01 .01	.02 .02	.02 .02	.02 .02	.02 .03
8.00	DISCHG	.03 .03	.03 .03	.03 .03	.03 .03	.03 .04
9.00	DISCHG	.04 .04	.04 .04	.04 .04	.04 .04	.04 .05
10.00	DISCHG	.05 .05	.05 .06	.06 .06	.07 .07	.07 .08
11.00	DISCHG	.08 .09	.09 .10	.12 .12	.19 .19	.22 .35
12.00	DISCHG	.73 .75	.75 .61	.26 .23	.16 .16	.14 .13
13.00	DISCHG	.11 .09	.09 .09	.08 .08	.07 .07	.07 .06
14.00	DISCHG	.06 .06	.06 .06	.05 .05	.05 .05	.05 .05
15.00	DISCHG	.05 .04	.04 .04	.04 .04	.04 .04	.04 .04
16.00	DISCHG	.04 .04	.04 .04	.03 .03	.03 .03	.03 .03
17.00	DISCHG	.02 .02	.02 .02	.02 .02	.02 .02	.02 .02
18.00	DISCHG	.02 .02	.02 .02	.02 .02	.02 .02	.02 .02
19.00	DISCHG	.02 .02	.01 .02	.02 .02	.02 .02	.01 .01
20.00	DISCHG	.01 .02	.02 .02	.01 .01	.02 .02	.02 .02
21.00	DISCHG	.01 .02	.02 .02	.01 .01	.01 .01	.01 .01
22.00	DISCHG	.02 .01	.01 .01	.01 .01	.01 .01	.01 .01
23.00	DISCHG	.01 .01	.01 .01	.01 .01	.01 .01	.01 .01
24.00	DISCHG	.01 .00				

RUNOFF VOLUME ABOVE BASEFLOW = 4.02 WATERSHED INCHES, 1.09 CFS-HRS, .09 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 51

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.15	1.22	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
3.00	DISCHG	.00 .00	.00 .00	.00 .00	.01 .01	.01 .01
4.00	DISCHG	.01 .01	.01 .01	.01 .01	.01 .01	.01 .01
5.00	DISCHG	.01 .01	.01 .01	.01 .01	.01 .01	.01 .01
6.00	DISCHG	.02 .02	.02 .02	.02 .02	.02 .02	.02 .02
7.00	DISCHG	.02 .02	.02 .03	.03 .03	.04 .04	.04 .04
8.00	DISCHG	.04 .04	.04 .04	.04 .04	.05 .05	.05 .06
9.00	DISCHG	.06 .06	.06 .06	.06 .06	.07 .07	.07 .07
10.00	DISCHG	.07 .08	.09 .09	.09 .10	.11 .11	.11 .13

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
PAGE 15

11.00	DISCHG	.13	.14	.15	.16	.19	.20	.31	.35	.56	1.10
12.00	DISCHG	1.17	1.19	1.20	.98	.42	.37	.25	.22	.20	.17
13.00	DISCHG	.17	.15	.14	.14	.13	.13	.11	.11	.10	.10
14.00	DISCHG	.10	.09	.09	.09	.09	.09	.08	.07	.07	.07
15.00	DISCHG	.07	.07	.07	.07	.06	.06	.07	.07	.06	.06
16.00	DISCHG	.06	.06	.06	.06	.05	.05	.05	.05	.05	.03
17.00	DISCHG	.03	.04	.04	.04	.03	.03	.03	.04	.04	.04
18.00	DISCHG	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03
19.00	DISCHG	.03	.03	.02	.03	.03	.03	.03	.02	.02	.02
20.00	DISCHG	.02	.03	.03	.03	.02	.02	.03	.03	.03	.02
21.00	DISCHG	.02	.03	.03	.03	.02	.02	.02	.02	.02	.03
22.00	DISCHG	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.01
24.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 4.03 WATERSHED INCHES, 1.74 CFS-HRS, .14 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 52
INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS) 12.15 PEAK DISCHARGE(CFS) 1.99 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
3.00	DISCHG	.00	.00	.00	.00	.01
4.00	DISCHG	.01	.01	.01	.01	.02
5.00	DISCHG	.02	.02	.02	.02	.02
6.00	DISCHG	.03	.03	.03	.03	.03
7.00	DISCHG	.03	.04	.04	.04	.05
8.00	DISCHG	.07	.07	.07	.07	.07
9.00	DISCHG	.09	.09	.09	.09	.10
10.00	DISCHG	.12	.13	.14	.15	.15
11.00	DISCHG	.21	.23	.24	.26	.31
12.00	DISCHG	1.90	1.94	1.95	1.59	.69
13.00	DISCHG	.27	.24	.23	.22	.21
14.00	DISCHG	.16	.15	.15	.15	.14
15.00	DISCHG	.12	.12	.11	.11	.10
16.00	DISCHG	.10	.10	.10	.09	.08
17.00	DISCHG	.05	.06	.06	.06	.05
18.00	DISCHG	.06	.05	.04	.04	.04
19.00	DISCHG	.05	.04	.04	.04	.05
20.00	DISCHG	.04	.04	.04	.04	.03
21.00	DISCHG	.03	.04	.04	.04	.03
22.00	DISCHG	.04	.04	.03	.03	.03
23.00	DISCHG	.03	.03	.03	.03	.03
24.00	DISCHG	.02	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 4.03 WATERSHED INCHES, 2.83 CFS-HRS, .23 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
 PAGE 16

OPERATION ADDHYD CROSS SECTION 53
 INPUT HYDROGRAPHS= 4,3 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS) 12.19 PEAK DISCHARGE(CFS) 4.65 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
3.00	.00	.00	.00	.00	.00	.01	.01
4.00	.01	.01	.01	.01	.01	.02	.02
5.00	.02	.02	.02	.02	.02	.02	.02
6.00	.03	.03	.03	.03	.03	.03	.03
7.00	.03	.04	.04	.04	.05	.05	.06
8.00	.07	.07	.07	.07	.07	.08	.09
9.00	.11	.10	.10	.11	.12	.12	.13
10.00	.14	.16	.17	.18	.20	.20	.22
11.00	.31	.35	.37	.41	.50	.53	.81
12.00	3.98	4.36	4.64	4.23	2.10	1.63	1.19
13.00	.73	.66	.62	.60	.56	.55	.50
14.00	.44	.43	.42	.41	.39	.39	.36
15.00	.34	.33	.32	.31	.29	.29	.30
16.00	.27	.27	.27	.26	.24	.23	.24
17.00	.15	.17	.18	.17	.15	.15	.16
18.00	.16	.14	.13	.13	.13	.13	.14
19.00	.15	.12	.11	.12	.14	.14	.12
20.00	.11	.12	.13	.12	.10	.09	.11
21.00	.09	.11	.13	.12	.10	.09	.09
22.00	.13	.11	.09	.09	.09	.09	.09
23.00	.09	.09	.09	.09	.09	.09	.09
24.00	.06	.02	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 2.53 WATERSHED INCHES, 6.27 CFS-HRS, .52 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 54
 OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 98. TIME OF CONCENTRATION= .10 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS) 23.60 PEAK DISCHARGE(CFS) .01 PEAK ELEVATION(FEET) (RUNOFF)
 12.20 .66 (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
2.00	.00	.00	.00	.00	.01	.01	.01
3.00	.01	.01	.01	.01	.01	.01	.01
4.00	.01	.01	.01	.01	.01	.01	.01

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
 PAGE 17

5.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
6.00	DISCHG	.01	.01	.01	.01	.01	.01	.02	.02	.02	.02
7.00	DISCHG	.02	.02	.02	.02	.02	.02	.03	.03	.03	.03
8.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.04
9.00	DISCHG	.04	.04	.04	.04	.04	.04	.04	.04	.04	.05
10.00	DISCHG	.05	.05	.05	.05	.06	.06	.06	.06	.07	.08
11.00	DISCHG	.08	.08	.09	.09	.11	.11	.18	.20	.32	.62
12.00	DISCHG	.65	.66	.66	.54	.23	.20	.14	.12	.11	.09
13.00	DISCHG	.09	.08	.08	.07	.07	.07	.06	.06	.06	.05
14.00	DISCHG	.05	.05	.05	.05	.05	.05	.04	.04	.04	.04
15.00	DISCHG	.04	.04	.04	.04	.03	.03	.04	.04	.04	.03
16.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.02
17.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
18.00	DISCHG	.02	.02	.02	.01	.01	.01	.02	.02	.02	.02
19.00	DISCHG	.02	.01	.01	.01	.02	.02	.01	.01	.01	.01
20.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
21.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
22.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
23.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
24.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 4.36 WATERSHED INCHES, 1.01 CFS-HRS, .08 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 55
 INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.18 PEAK DISCHARGE(CFS) 5.31 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
2.00	DISCHG	.00	.00	.00	.01	.01
3.00	DISCHG	.01	.01	.01	.01	.01
4.00	DISCHG	.01	.02	.02	.03	.03
5.00	DISCHG	.03	.03	.03	.03	.04
6.00	DISCHG	.04	.04	.04	.04	.05
7.00	DISCHG	.05	.06	.06	.07	.09
8.00	DISCHG	.10	.10	.10	.10	.12
9.00	DISCHG	.14	.14	.14	.15	.17
10.00	DISCHG	.19	.21	.22	.23	.25
11.00	DISCHG	.39	.43	.46	.50	.61
12.00	DISCHG	4.63	5.02	5.30	4.77	2.33
13.00	DISCHG	.82	.74	.70	.68	.63
14.00	DISCHG	.49	.48	.47	.46	.44
15.00	DISCHG	.38	.36	.36	.35	.33
16.00	DISCHG	.30	.30	.30	.29	.27
17.00	DISCHG	.17	.19	.20	.19	.17
18.00	DISCHG	.18	.16	.14	.14	.14
19.00	DISCHG	.16	.14	.13	.13	.16

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
 PAGE 18

20.00	DISCHG	.12	.13	.14	.14	.11	.10	.13	.14	.14	.11
21.00	DISCHG	.10	.13	.14	.14	.11	.10	.10	.10	.11	.14
22.00	DISCHG	.14	.12	.11	.10	.10	.10	.10	.10	.10	.10
23.00	DISCHG	.10	.10	.10	.10	.10	.10	.10	.10	.10	.07
24.00	DISCHG	.06	.02	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.69 WATERSHED INCHES, 7.28 CFS-HRS, .60 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 56

OUTPUT HYDROGRAPH= 1

AREA= .00 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .15 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0200 HOURS

PEAK TIME(HRS) 12.22 PEAK DISCHARGE(CFS) 1.10 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
8.00	DISCHG	.00	.00	.00	.00	.01
9.00	DISCHG	.01	.01	.01	.01	.02
10.00	DISCHG	.02	.02	.03	.04	.05
11.00	DISCHG	.06	.07	.08	.11	.29
12.00	DISCHG	.90	1.01	1.06	.40	.22
13.00	DISCHG	.18	.16	.15	.13	.11
14.00	DISCHG	.11	.10	.10	.09	.08
15.00	DISCHG	.08	.08	.08	.07	.07
16.00	DISCHG	.07	.06	.06	.06	.06
17.00	DISCHG	.04	.04	.04	.04	.04
18.00	DISCHG	.04	.04	.03	.03	.04
19.00	DISCHG	.04	.03	.03	.03	.03
20.00	DISCHG	.03	.03	.03	.02	.03
21.00	DISCHG	.02	.03	.03	.02	.02
22.00	DISCHG	.03	.03	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02
24.00	DISCHG	.01	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.39 WATERSHED INCHES, 1.40 CFS-HRS, .12 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 57

INPUT HYDROGRAPHS= 1,3 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS) 12.19 PEAK DISCHARGE(CFS) 6.40 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
2.00	DISCHG	.00	.00	.00	.01	.01
3.00	DISCHG	.01	.01	.01	.01	.02
4.00	DISCHG	.01	.02	.02	.03	.03
5.00	DISCHG	.03	.03	.03	.03	.04

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
 PAGE 19

6.00	DISCHG	.04	.04	.04	.04	.04	.04	.05	.05	.05	.05
7.00	DISCHG	.05	.06	.06	.06	.07	.07	.09	.09	.09	.09
8.00	DISCHG	.10	.10	.10	.10	.10	.11	.12	.12	.13	.15
9.00	DISCHG	.15	.15	.15	.16	.17	.17	.19	.20	.20	.20
10.00	DISCHG	.21	.24	.25	.26	.29	.30	.33	.34	.37	.43
11.00	DISCHG	.45	.50	.53	.58	.71	.75	1.14	1.38	2.14	4.63
12.00	DISCHG	5.52	6.02	6.40	5.83	2.90	2.23	1.63	1.32	1.22	1.04
13.00	DISCHG	1.00	.90	.85	.82	.77	.75	.69	.64	.63	.60
14.00	DISCHG	.59	.58	.57	.56	.53	.53	.49	.46	.46	.46
15.00	DISCHG	.46	.44	.44	.43	.40	.39	.40	.41	.40	.37
16.00	DISCHG	.37	.37	.37	.36	.33	.32	.33	.34	.32	.22
17.00	DISCHG	.20	.23	.24	.24	.21	.20	.21	.22	.22	.22
18.00	DISCHG	.22	.19	.18	.17	.17	.17	.19	.20	.20	.20
19.00	DISCHG	.20	.17	.15	.16	.19	.20	.17	.15	.15	.15
20.00	DISCHG	.15	.16	.17	.17	.13	.13	.15	.17	.17	.13
21.00	DISCHG	.13	.15	.17	.17	.13	.13	.13	.13	.13	.17
22.00	DISCHG	.17	.15	.13	.13	.13	.13	.13	.13	.13	.13
23.00	DISCHG	.13	.13	.13	.13	.13	.13	.13	.13	.12	.08
24.00	DISCHG	.08	.03	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 2.63 WATERSHED INCHES, 8.68 CFS-HRS, .72 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 1
 SURFACE ELEVATION= 64.00

PEAK TIME(HRS) 12.50 PEAK DISCHARGE(CFS) 2.22 PEAK ELEVATION(FEET) 66.04

TIME(HRS)		FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.				
3.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.01	.01	
3.00	ELEV	64.00	64.00	64.00	64.00	64.00	64.00	64.00	64.01	64.01	
4.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.02	
4.00	ELEV	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01	
5.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.03	
5.00	ELEV	64.02	64.02	64.02	64.02	64.02	64.02	64.02	64.02	64.02	
6.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.04	
6.00	ELEV	64.02	64.02	64.03	64.03	64.03	64.03	64.03	64.03	64.03	
7.00	DISCHG	.04	.04	.04	.04	.04	.04	.05	.05	.06	
7.00	ELEV	64.03	64.03	64.04	64.04	64.04	64.04	64.04	64.05	64.05	
8.00	DISCHG	.06	.06	.06	.07	.07	.07	.07	.08	.09	
8.00	ELEV	64.05	64.06	64.06	64.06	64.06	64.06	64.07	64.07	64.08	
9.00	DISCHG	.09	.09	.10	.10	.11	.11	.12	.12	.13	
9.00	ELEV	64.08	64.09	64.09	64.09	64.10	64.10	64.11	64.11	64.12	
10.00	DISCHG	.14	.14	.15	.16	.17	.18	.19	.20	.21	
10.00	ELEV	64.13	64.13	64.14	64.14	64.15	64.16	64.17	64.18	64.19	
11.00	DISCHG	.24	.25	.27	.29	.32	.35	.39	.45	.55	
11.00	ELEV	64.22	64.23	64.25	64.27	64.29	64.32	64.36	64.41	64.50	
12.00	DISCHG	1.07	1.40	1.75	2.07	2.21	2.22	2.21	2.18	2.12	

12.00	ELEV	64.97	65.28	65.59	65.88	66.02	66.04	66.03	65.98	65.92	65.86
13.00	DISCHG	1.97	1.90	1.82	1.75	1.68	1.62	1.55	1.49	1.43	1.37
13.00	ELEV	65.79	65.73	65.66	65.59	65.53	65.47	65.41	65.35	65.30	65.24
14.00	DISCHG	1.31	1.26	1.21	1.16	1.12	1.08	1.04	1.00	.96	.92
14.00	ELEV	65.19	65.15	65.10	65.06	65.02	64.98	64.94	64.91	64.87	64.84
15.00	DISCHG	.89	.86	.83	.80	.77	.74	.72	.70	.67	.65
15.00	ELEV	64.81	64.78	64.75	64.73	64.70	64.68	64.65	64.63	64.61	64.59
16.00	DISCHG	.63	.61	.60	.58	.56	.54	.53	.52	.50	.49
16.00	ELEV	64.58	64.56	64.54	64.53	64.51	64.50	64.48	64.47	64.46	64.44
17.00	DISCHG	.47	.45	.43	.42	.40	.39	.38	.36	.35	.34
17.00	ELEV	64.42	64.41	64.39	64.38	64.37	64.35	64.34	64.33	64.32	64.31
18.00	DISCHG	.34	.33	.32	.31	.30	.29	.28	.27	.27	.26
18.00	ELEV	64.31	64.30	64.29	64.28	64.27	64.26	64.25	64.25	64.24	64.24
19.00	DISCHG	.26	.25	.25	.24	.23	.23	.23	.22	.22	.21
19.00	ELEV	64.23	64.23	64.22	64.22	64.21	64.21	64.21	64.20	64.20	64.19
20.00	DISCHG	.21	.21	.20	.20	.20	.19	.19	.19	.18	.18
20.00	ELEV	64.19	64.19	64.18	64.18	64.18	64.17	64.17	64.17	64.17	64.17
21.00	DISCHG	.18	.18	.17	.17	.17	.17	.17	.16	.16	.16
21.00	ELEV	64.16	64.16	64.16	64.16	64.16	64.15	64.15	64.15	64.15	64.15
22.00	DISCHG	.16	.16	.16	.16	.15	.15	.15	.15	.15	.15
22.00	ELEV	64.15	64.15	64.14	64.14	64.14	64.14	64.14	64.14	64.13	64.13
23.00	DISCHG	.14	.14	.14	.14	.14	.14	.14	.14	.14	.13
23.00	ELEV	64.13	64.13	64.13	64.13	64.13	64.13	64.12	64.12	64.12	64.12
24.00	DISCHG	.13	.12	.12	.11	.10	.09	.09	.08	.07	.07
24.00	ELEV	64.12	64.11	64.11	64.10	64.09	64.08	64.08	64.07	64.07	64.06
25.00	DISCHG	.06	.06	.05	.05	.05	.04	.04	.04	.03	.03
25.00	ELEV	64.06	64.05	64.05	64.05	64.04	64.04	64.04	64.03	64.03	64.03
26.00	DISCHG	.03	.03	.03	.02	.02	.02	.02	.02	.02	.02
26.00	ELEV	64.03	64.03	64.02	64.02	64.02	64.02	64.02	64.02	64.02	64.01
27.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
27.00	ELEV	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01

RUNOFF VOLUME ABOVE BASEFLOW = 2.62 WATERSHED INCHES, 8.62 CFS-HRS, .71 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 58

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= .18 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

PEAK TIME(HRS) 12.26 PEAK DISCHARGE(CFS) 3.38 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
10.00	DISCHG	.00	.00	.00	.00	.04
11.00	DISCHG	.06	.07	.09	.11	1.40
12.00	DISCHG	2.15	2.69	3.12	3.27	.64
13.00	DISCHG	.59	.55	.51	.49	.37
14.00	DISCHG	.36	.35	.35	.34	.28
15.00	DISCHG	.28	.28	.27	.27	.24

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
 PAGE 21

16.00	DISCHG	.23	.23	.23	.23	.21	.20	.20	.21	.21	.16
17.00	DISCHG	.13	.13	.15	.15	.13	.13	.13	.14	.14	.14
18.00	DISCHG	.14	.13	.11	.11	.11	.11	.11	.12	.12	.12
19.00	DISCHG	.12	.11	.10	.10	.11	.12	.11	.10	.10	.09
20.00	DISCHG	.09	.10	.11	.11	.09	.08	.09	.10	.11	.09
21.00	DISCHG	.08	.09	.11	.11	.09	.08	.08	.08	.08	.10
22.00	DISCHG	.11	.10	.09	.08	.08	.08	.08	.08	.08	.08
23.00	DISCHG	.08	.08	.08	.08	.08	.08	.08	.08	.08	.06
24.00	DISCHG	.05	.03	.01	.00						

RUNOFF VOLUME ABOVE BASEFLOW = 1.60 WATERSHED INCHES, 4.12 CFS-HRS, .34 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 59
 INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.28 PEAK DISCHARGE(CFS) 5.37 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
3.00	DISCHG	.00	.00	.00	.00	.01
4.00	DISCHG	.01	.01	.01	.01	.01
5.00	DISCHG	.02	.02	.02	.02	.02
6.00	DISCHG	.03	.03	.03	.03	.03
7.00	DISCHG	.04	.04	.04	.04	.05
8.00	DISCHG	.06	.06	.06	.07	.07
9.00	DISCHG	.09	.09	.10	.11	.12
10.00	DISCHG	.14	.14	.15	.16	.17
11.00	DISCHG	.29	.33	.36	.40	.46
12.00	DISCHG	3.22	4.09	4.88	5.34	4.29
13.00	DISCHG	2.57	2.45	2.33	2.25	2.15
14.00	DISCHG	1.67	1.61	1.56	1.51	1.45
15.00	DISCHG	1.17	1.13	1.10	1.06	1.02
16.00	DISCHG	.86	.84	.82	.80	.77
17.00	DISCHG	.60	.58	.58	.57	.54
18.00	DISCHG	.48	.46	.43	.42	.41
19.00	DISCHG	.38	.37	.35	.34	.35
20.00	DISCHG	.30	.30	.31	.31	.29
21.00	DISCHG	.26	.27	.28	.28	.26
22.00	DISCHG	.27	.26	.24	.24	.23
23.00	DISCHG	.22	.22	.22	.22	.22
24.00	DISCHG	.18	.16	.12	.11	.10
25.00	DISCHG	.06	.06	.05	.05	.05
26.00	DISCHG	.03	.03	.03	.02	.02
27.00	DISCHG	.01	.01	.01	.01	.01

RUNOFF VOLUME ABOVE BASEFLOW = 2.17 WATERSHED INCHES, 12.74 CFS-HRS, 1.05 ACRE-FEET; BASEFLOW = .00 CFS

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 2
PAGE 23

23.00	DISCHG	.23	.22	.22	.22	.22	.22	.22	.22	.22	.21
23.00	ELEV	60.99	60.98	60.98	60.98	60.98	60.98	60.98	60.98	60.98	60.98
24.00	DISCHG	.19	.18	.15	.13	.11	.10	.09	.09	.08	.07
24.00	ELEV	60.97	60.97	60.96	60.95	60.94	60.94	60.93	60.93	60.93	60.93
25.00	DISCHG	.07	.06	.06	.05	.05	.05	.04	.04	.04	.03
25.00	ELEV	60.93	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.91	60.91
26.00	DISCHG	.03	.03	.03	.03	.02	.02	.02	.02	.02	.02
26.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91
27.00	DISCHG	.02	.01	.01	.01	.01	.01	.01	.01	.01	
27.00	ELEV	60.91	60.91	60.90	60.90	60.90	60.90	60.90	60.90		

RUNOFF VOLUME ABOVE BASEFLOW = 2.17 WATERSHED INCHES, 12.73 CFS-HRS, 1.05 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP

COMPUTATIONS COMPLETED FOR PASS 2

RECORD ID

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 47 TO STRUCTURE 13 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 5.40 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 3 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 47
 OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 69. TIME OF CONCENTRATION= .13 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0173 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.22 2.36 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
9.00	DISCHG	.00 .00	.00 .00	.00 .00	.00 .01	.01
10.00	DISCHG	.01 .02	.02 .03	.03 .04	.05 .06	.07
11.00	DISCHG	.08 .10	.11 .13	.16 .18	.28 .37	1.42
12.00	DISCHG	1.84 2.12	2.35 2.25	1.10 .85	.64 .51	.48 .41
13.00	DISCHG	.40 .36	.34 .33	.31 .30	.28 .26	.25 .24
14.00	DISCHG	.24 .23	.23 .23	.22 .21	.20 .19	.19 .19
15.00	DISCHG	.19 .18	.18 .17	.16 .16	.16 .17	.17 .15
16.00	DISCHG	.15 .15	.15 .15	.13 .13	.14 .14	.13 .09
17.00	DISCHG	.08 .09	.10 .10	.08 .08	.09 .09	.09 .09
18.00	DISCHG	.09 .08	.07 .07	.07 .07	.08 .08	.08 .08
19.00	DISCHG	.08 .07	.06 .06	.08 .08	.07 .06	.06 .06
20.00	DISCHG	.06 .07	.07 .07	.06 .05	.06 .07	.07 .06
21.00	DISCHG	.05 .06	.07 .07	.06 .05	.05 .05	.06 .07
22.00	DISCHG	.07 .06	.05 .05	.05 .05	.05 .05	.05 .05
23.00	DISCHG	.05 .05	.05 .05	.05 .05	.05 .05	.05 .04
24.00	DISCHG	.03 .01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 2.27 WATERSHED INCHES, 2.95 CFS-HRS, .24 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 48
 OUTPUT HYDROGRAPH= 2
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .18 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.23 1.19 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
7.00	DISCHG	.00 .00	.00 .00	.00 .00	.00 .01	.01
8.00	DISCHG	.01 .01	.01 .01	.01 .01	.02 .02	.02
9.00	DISCHG	.02 .02	.02 .02	.03 .03	.03 .03	.04
10.00	DISCHG	.04 .04	.05 .05	.05 .05	.06 .06	.07 .08
11.00	DISCHG	.08 .09	.10 .11	.13 .14	.19 .25	.33 .73
12.00	DISCHG	.99 1.11	1.19 1.17	.72 .47	.36 .27	.24 .20

13.00	DISCHG	.19	.18	.16	.16	.15	.14	.13	.12	.12	.11
14.00	DISCHG	.11	.11	.11	.10	.10	.10	.09	.09	.08	.08
15.00	DISCHG	.08	.08	.08	.08	.07	.07	.07	.07	.07	.07
16.00	DISCHG	.07	.07	.07	.07	.06	.06	.06	.06	.06	.05
17.00	DISCHG	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
18.00	DISCHG	.04	.04	.03	.03	.03	.03	.03	.04	.04	.04
19.00	DISCHG	.04	.03	.03	.03	.03	.04	.03	.03	.03	.03
20.00	DISCHG	.03	.03	.03	.03	.03	.02	.03	.03	.03	.03
21.00	DISCHG	.02	.03	.03	.03	.03	.02	.02	.02	.02	.03
22.00	DISCHG	.03	.03	.02	.02	.02	.02	.02	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
24.00	DISCHG	.01	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 3.35 WATERSHED INCHES, 1.58 CFS-HRS, .13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 49
INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.22 PEAK DISCHARGE(CFS) 3.55 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
7.00	DISCHG	.00	.00	.00	.00	.01
8.00	DISCHG	.01	.01	.01	.01	.02
9.00	DISCHG	.02	.02	.02	.03	.04
10.00	DISCHG	.05	.06	.07	.08	.10
11.00	DISCHG	.17	.19	.21	.23	.29
12.00	DISCHG	2.83	3.24	3.54	3.42	1.82
13.00	DISCHG	.59	.54	.50	.49	.45
14.00	DISCHG	.35	.34	.34	.33	.32
15.00	DISCHG	.27	.26	.26	.25	.24
16.00	DISCHG	.22	.22	.22	.21	.20
17.00	DISCHG	.12	.13	.14	.14	.12
18.00	DISCHG	.13	.12	.11	.10	.10
19.00	DISCHG	.12	.10	.09	.09	.11
20.00	DISCHG	.09	.10	.10	.10	.08
21.00	DISCHG	.08	.09	.10	.10	.08
22.00	DISCHG	.10	.09	.08	.08	.08
23.00	DISCHG	.08	.08	.08	.08	.08
24.00	DISCHG	.05	.02	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 2.55 WATERSHED INCHES, 4.53 CFS-HRS, .37 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 50
OUTPUT HYDROGRAPH= 1
AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
23.70	.01	(RUNOFF)
12.20	.89	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
3.00	DISCHG	.00	.00	.00	.01	.00
4.00	DISCHG	.01	.01	.01	.01	.01
5.00	DISCHG	.01	.01	.01	.01	.01
6.00	DISCHG	.01	.01	.01	.02	.02
7.00	DISCHG	.02	.02	.02	.03	.03
8.00	DISCHG	.03	.03	.03	.04	.04
9.00	DISCHG	.04	.04	.04	.05	.05
10.00	DISCHG	.06	.07	.07	.08	.09
11.00	DISCHG	.10	.11	.12	.15	.23
12.00	DISCHG	.87	.88	.89	.31	.27
13.00	DISCHG	.12	.11	.10	.09	.09
14.00	DISCHG	.07	.07	.07	.06	.06
15.00	DISCHG	.05	.05	.05	.05	.05
16.00	DISCHG	.04	.04	.04	.04	.04
17.00	DISCHG	.02	.03	.03	.02	.02
18.00	DISCHG	.03	.02	.02	.02	.02
19.00	DISCHG	.02	.02	.02	.02	.02
20.00	DISCHG	.02	.02	.02	.01	.01
21.00	DISCHG	.01	.02	.02	.01	.01
22.00	DISCHG	.02	.02	.01	.01	.01
23.00	DISCHG	.01	.01	.01	.01	.01
24.00	DISCHG	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 4.82 WATERSHED INCHES, 1.31 CFS-HRS, .11 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 51

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.15	1.45	(RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
3.00	DISCHG	.00	.01	.01	.01	.01
4.00	DISCHG	.01	.01	.01	.01	.01
5.00	DISCHG	.02	.02	.02	.02	.02
6.00	DISCHG	.02	.02	.02	.03	.03
7.00	DISCHG	.03	.03	.03	.04	.05
8.00	DISCHG	.05	.05	.05	.05	.06
9.00	DISCHG	.07	.07	.07	.08	.08

RUNOFF VOLUME ABOVE BASEFLOW = 4.82 WATERSHED INCHES, 3.39 CFS-HRS, .28 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 53
 INPUT HYDROGRAPHS= 4,3 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS) 12.19 PEAK DISCHARGE(CFS) 5.86 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .00 SQ.MI.
3.00	.00	.01	.01	.01
4.00	.01	.02	.02	.02
5.00	.02	.03	.03	.03
6.00	.03	.04	.04	.04
7.00	.04	.05	.05	.05
8.00	.09	.09	.10	.10
9.00	.14	.13	.14	.15
10.00	.19	.22	.24	.25
11.00	.42	.47	.50	.55
12.00	5.09	5.53	5.85	5.31
13.00	.91	.82	.77	.75
14.00	.54	.52	.52	.51
15.00	.41	.40	.39	.39
16.00	.33	.33	.33	.32
17.00	.18	.20	.22	.21
18.00	.20	.17	.16	.16
19.00	.18	.15	.14	.14
20.00	.13	.15	.16	.15
21.00	.11	.14	.15	.15
22.00	.16	.13	.12	.11
23.00	.11	.11	.11	.11
24.00	.07	.02	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.20 WATERSHED INCHES, 7.92 CFS-HRS, .65 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 54
 OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 98. TIME OF CONCENTRATION= .10 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .01 CFS.

PEAK TIME(HRS) 23.70 PEAK DISCHARGE(CFS) .01 PEAK ELEVATION(FEET) (RUNOFF)
 12.20 .78 (RUNOFF)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .00 SQ.MI.
2.00	.01	.01	.01	.01

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 3
 PAGE 29

3.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
4.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
5.00	DISCHG	.01	.01	.01	.01	.01	.01	.02	.02	.02	.02
6.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
7.00	DISCHG	.02	.02	.02	.02	.03	.03	.03	.03	.03	.03
8.00	DISCHG	.03	.04	.04	.04	.04	.04	.04	.04	.04	.04
9.00	DISCHG	.05	.04	.04	.04	.05	.05	.05	.05	.05	.05
10.00	DISCHG	.05	.06	.06	.06	.07	.07	.07	.08	.08	.09
11.00	DISCHG	.09	.10	.10	.11	.13	.13	.21	.23	.38	.73
12.00	DISCHG	.77	.77	.78	.63	.27	.24	.16	.14	.13	.11
13.00	DISCHG	.11	.09	.09	.09	.08	.08	.07	.07	.07	.06
14.00	DISCHG	.06	.06	.06	.06	.06	.06	.05	.05	.05	.05
15.00	DISCHG	.05	.05	.05	.04	.04	.04	.04	.04	.04	.04
16.00	DISCHG	.04	.04	.04	.04	.03	.03	.03	.03	.03	.02
17.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
18.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
19.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
20.00	DISCHG	.02	.02	.02	.02	.01	.01	.02	.02	.02	.01
21.00	DISCHG	.01	.02	.02	.02	.01	.01	.01	.01	.01	.02
22.00	DISCHG	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01
23.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
24.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 5.17 WATERSHED INCHES, 1.20 CFS-HRS, .10 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 55

INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.18 PEAK DISCHARGE(CFS) 6.64 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
2.00	DISCHG	.01	.01	.01	.01	.01
3.00	DISCHG	.01	.02	.02	.01	.03
4.00	DISCHG	.02	.03	.03	.03	.04
5.00	DISCHG	.04	.04	.04	.04	.05
6.00	DISCHG	.05	.05	.05	.05	.06
7.00	DISCHG	.06	.07	.07	.08	.09
8.00	DISCHG	.13	.13	.13	.13	.14
9.00	DISCHG	.18	.18	.18	.20	.22
10.00	DISCHG	.25	.28	.30	.32	.34
11.00	DISCHG	.51	.57	.61	.66	.79
12.00	DISCHG	5.86	6.30	6.63	5.94	2.91
13.00	DISCHG	1.02	.91	.86	.83	.77
14.00	DISCHG	.60	.59	.58	.57	.54
15.00	DISCHG	.46	.45	.44	.43	.40
16.00	DISCHG	.37	.37	.37	.36	.33
17.00	DISCHG	.20	.23	.24	.24	.21

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 3
 PAGE 30

18.00	DISCHG	.22	.19	.18	.17	.17	.17	.19	.20	.20	.20
19.00	DISCHG	.20	.17	.15	.16	.19	.20	.17	.15	.15	.15
20.00	DISCHG	.15	.16	.17	.16	.13	.13	.15	.17	.16	.13
21.00	DISCHG	.13	.15	.17	.17	.13	.13	.13	.13	.13	.17
22.00	DISCHG	.17	.15	.13	.13	.13	.13	.13	.13	.13	.13
23.00	DISCHG	.13	.13	.13	.13	.13	.13	.13	.13	.12	.08
24.00	DISCHG	.08	.02	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 3.37 WATERSHED INCHES, 9.12 CFS-HRS, .75 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 56

OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .15 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0200 HOURS

PEAK TIME(HRS) 12.21 PEAK DISCHARGE(CFS) 1.39 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.					
8.00	DISCHG	.00 .00 .00	.01 .01 .01	.01 .01 .01	.01 .01 .01	.01 .01 .01					
9.00	DISCHG	.02 .02 .02	.02 .02 .02	.02 .02 .02	.03 .03 .03	.03 .03 .03					
10.00	DISCHG	.03 .04 .04	.05 .05 .05	.05 .05 .05	.06 .06 .06	.07 .07 .07					
11.00	DISCHG	.09 .10 .11	.11 .11 .11	.14 .15 .15	.22 .22 .22	.28 .28 .28					
12.00	DISCHG	1.17 1.30 1.39	1.34 .71 .51	.38 .29 .27	.29 .27 .23	.23 .23 .23					
13.00	DISCHG	.22 .20 .19	.18 .17 .17	.17 .15 .15	.14 .14 .14	.14 .14 .13					
14.00	DISCHG	.13 .13 .13	.12 .12 .12	.12 .11 .11	.10 .10 .10	.10 .10 .10					
15.00	DISCHG	.10 .10 .10	.09 .09 .09	.09 .09 .09	.09 .09 .09	.09 .09 .08					
16.00	DISCHG	.08 .08 .08	.08 .07 .07	.07 .07 .07	.07 .07 .07	.07 .07 .05					
17.00	DISCHG	.04 .05 .05	.05 .05 .05	.05 .04 .05	.05 .05 .05	.05 .05 .05					
18.00	DISCHG	.05 .04 .04	.04 .04 .04	.04 .04 .04	.04 .04 .04	.04 .04 .04					
19.00	DISCHG	.04 .04 .03	.03 .03 .03	.04 .04 .04	.03 .03 .03	.03 .03 .03					
20.00	DISCHG	.03 .03 .04	.04 .03 .03	.03 .03 .03	.04 .04 .04	.04 .04 .03					
21.00	DISCHG	.03 .03 .04	.04 .03 .03	.03 .03 .03	.03 .03 .03	.03 .03 .04					
22.00	DISCHG	.04 .03 .03	.03 .03 .03	.03 .03 .03	.03 .03 .03	.03 .03 .03					
23.00	DISCHG	.03 .03 .03	.03 .03 .03	.03 .03 .03	.03 .03 .03	.03 .03 .02					
24.00	DISCHG	.02 .01 .00									

RUNOFF VOLUME ABOVE BASEFLOW = 3.07 WATERSHED INCHES, 1.80 CFS-HRS, .15 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 57

INPUT HYDROGRAPHS= 1,3 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS) 12.19 PEAK DISCHARGE(CFS) 8.03 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
2.00	DISCHG	.01 .01 .01	.01 .01 .01	.01 .01 .01	.01 .01 .01	.01 .01 .01
3.00	DISCHG	.01 .02 .02	.02 .01 .01	.01 .01 .03	.03 .03 .03	.03 .03 .02

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 3
 PAGE 31

4.00	DISCHG	.02	.03	.03	.03	.03	.04	.04	.04	.04	.04
5.00	DISCHG	.04	.04	.04	.04	.04	.04	.05	.05	.05	.05
6.00	DISCHG	.05	.05	.05	.05	.05	.05	.06	.06	.06	.06
7.00	DISCHG	.06	.07	.07	.08	.09	.09	.11	.12	.12	.12
8.00	DISCHG	.13	.13	.13	.14	.14	.14	.16	.17	.18	.19
9.00	DISCHG	.20	.20	.20	.20	.22	.23	.25	.26	.27	.27
10.00	DISCHG	.28	.32	.35	.36	.39	.40	.44	.47	.50	.57
11.00	DISCHG	.60	.67	.71	.77	.93	.99	1.49	1.81	2.76	5.93
12.00	DISCHG	7.03	7.61	8.02	7.28	3.61	2.77	2.03	1.63	1.51	1.28
13.00	DISCHG	1.24	1.12	1.05	1.02	.94	.93	.84	.79	.78	.74
14.00	DISCHG	.73	.71	.70	.69	.66	.65	.60	.57	.56	.56
15.00	DISCHG	.56	.54	.53	.52	.49	.48	.49	.50	.49	.46
16.00	DISCHG	.45	.45	.45	.44	.40	.39	.41	.42	.39	.27
17.00	DISCHG	.25	.28	.30	.29	.25	.24	.26	.27	.27	.27
18.00	DISCHG	.27	.24	.22	.21	.21	.21	.23	.24	.24	.24
19.00	DISCHG	.24	.21	.19	.19	.23	.24	.21	.19	.18	.18
20.00	DISCHG	.18	.20	.21	.20	.16	.15	.19	.21	.20	.16
21.00	DISCHG	.15	.19	.21	.20	.16	.15	.15	.15	.16	.20
22.00	DISCHG	.21	.18	.16	.15	.15	.15	.15	.15	.15	.15
23.00	DISCHG	.15	.15	.15	.15	.15	.15	.15	.15	.14	.10
24.00	DISCHG	.09	.03	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 3.31 WATERSHED INCHES, 10.92 CFS-HRS, .90 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 1
 SURFACE ELEVATION= 64.00

PEAK TIME(HRS) 12.54 PEAK DISCHARGE(CFS) 2.49 PEAK ELEVATION(FEET) 66.50

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ. MI.								
3.00	DISCHG	.00	.00	.01	.01	.01	.01	.01	.01	.01	.01
3.00	ELEV	64.00	64.00	64.00	64.01	64.01	64.01	64.01	64.01	64.01	64.01
4.00	DISCHG	.01	.01	.01	.02	.02	.02	.02	.02	.02	.02
4.00	ELEV	64.01	64.01	64.01	64.01	64.02	64.02	64.02	64.02	64.02	64.02
5.00	DISCHG	.02	.03	.03	.03	.03	.03	.03	.03	.03	.03
5.00	ELEV	64.02	64.02	64.02	64.03	64.03	64.03	64.03	64.03	64.03	64.03
6.00	DISCHG	.04	.04	.04	.04	.04	.04	.04	.04	.05	.05
6.00	ELEV	64.03	64.03	64.03	64.04	64.04	64.04	64.04	64.04	64.04	64.04
7.00	DISCHG	.05	.05	.05	.05	.05	.06	.06	.06	.07	.07
7.00	ELEV	64.04	64.04	64.05	64.05	64.05	64.05	64.06	64.06	64.06	64.07
8.00	DISCHG	.08	.08	.08	.09	.09	.09	.10	.10	.11	.11
8.00	ELEV	64.07	64.07	64.08	64.08	64.08	64.09	64.09	64.09	64.10	64.10
9.00	DISCHG	.12	.13	.13	.14	.14	.15	.15	.16	.17	.18
9.00	ELEV	64.11	64.11	64.12	64.12	64.13	64.13	64.14	64.15	64.15	64.16
10.00	DISCHG	.18	.19	.20	.21	.22	.24	.25	.27	.28	.30
10.00	ELEV	64.17	64.17	64.18	64.19	64.20	64.22	64.23	64.24	64.26	64.27
11.00	DISCHG	.32	.34	.37	.39	.43	.47	.52	.60	.72	.99

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 3
 PAGE 32

11.00	ELEV	64.29	64.31	64.33	64.36	64.39	64.42	64.47	64.55	64.66	64.90
12.00	DISCHG	1.38	1.81	2.22	2.37	2.46	2.48	2.48	2.46	2.44	2.41
12.00	ELEV	65.26	65.64	66.03	66.31	66.46	66.50	66.50	66.46	66.42	66.36
13.00	DISCHG	2.37	2.34	2.30	2.27	2.23	2.18	2.09	1.99	1.91	1.82
13.00	ELEV	66.31	66.24	66.18	66.12	66.05	65.98	65.90	65.81	65.73	65.66
14.00	DISCHG	1.75	1.67	1.60	1.54	1.47	1.41	1.36	1.30	1.25	1.20
14.00	ELEV	65.59	65.52	65.46	65.40	65.34	65.29	65.23	65.18	65.13	65.09
15.00	DISCHG	1.15	1.11	1.07	1.03	.99	.95	.92	.89	.86	.83
15.00	ELEV	65.05	65.01	64.97	64.94	64.90	64.87	64.84	64.81	64.78	64.76
16.00	DISCHG	.81	.78	.76	.73	.71	.69	.67	.65	.63	.61
16.00	ELEV	64.73	64.71	64.69	64.67	64.65	64.63	64.61	64.59	64.57	64.55
17.00	DISCHG	.58	.56	.54	.52	.50	.49	.47	.45	.44	.43
17.00	ELEV	64.53	64.51	64.49	64.48	64.46	64.44	64.43	64.41	64.40	64.39
18.00	DISCHG	.42	.41	.39	.38	.37	.36	.35	.34	.33	.32
18.00	ELEV	64.38	64.37	64.36	64.35	64.33	64.32	64.32	64.31	64.30	64.30
19.00	DISCHG	.32	.31	.30	.30	.29	.29	.28	.28	.27	.26
19.00	ELEV	64.29	64.28	64.28	64.27	64.26	64.26	64.26	64.25	64.24	64.24
20.00	DISCHG	.26	.25	.25	.25	.24	.23	.23	.23	.23	.22
20.00	ELEV	64.23	64.23	64.23	64.22	64.22	64.21	64.21	64.21	64.21	64.20
21.00	DISCHG	.22	.21	.21	.21	.21	.21	.20	.20	.20	.20
21.00	ELEV	64.20	64.20	64.19	64.19	64.19	64.19	64.18	64.18	64.18	64.18
22.00	DISCHG	.20	.20	.19	.19	.19	.19	.18	.18	.18	.18
22.00	ELEV	64.18	64.18	64.18	64.17	64.17	64.17	64.17	64.16	64.16	64.16
23.00	DISCHG	.18	.17	.17	.17	.17	.17	.17	.17	.17	.16
23.00	ELEV	64.16	64.16	64.16	64.16	64.15	64.15	64.15	64.15	64.15	64.15
24.00	DISCHG	.16	.15	.14	.13	.12	.11	.10	.10	.09	.08
24.00	ELEV	64.14	64.14	64.13	64.12	64.11	64.10	64.09	64.09	64.08	64.08
25.00	DISCHG	.08	.07	.07	.06	.06	.05	.05	.05	.04	.04
25.00	ELEV	64.07	64.07	64.06	64.06	64.05	64.05	64.04	64.04	64.04	64.04
26.00	DISCHG	.04	.03	.03	.03	.03	.03	.02	.02	.02	.02
26.00	ELEV	64.03	64.03	64.03	64.03	64.02	64.02	64.02	64.02	64.02	64.02
27.00	DISCHG	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
27.00	ELEV	64.02	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01	64.01

RUNOFF VOLUME ABOVE BASEFLOW = 3.29 WATERSHED INCHES, 10.85 CFS-HRS, .90 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 58

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= .18 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

PEAK TIME(HRS) 12.26 PEAK DISCHARGE(CFS) 4.57 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
9.00	DISCHG	.00	.00	.00	.00	.01
10.00	DISCHG	.01	.02	.03	.04	.12
11.00	DISCHG	.14	.16	.18	.21	2.10
12.00	DISCHG	3.12	3.77	4.28	4.41	.83

RUNOFF VOLUME ABOVE BASEFLOW = 2.80 WATERSHED INCHES, 16.44 CFS-HRS, 1.36 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 13
 INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 2
 SURFACE ELEVATION= 60.90

PEAK TIME(HRS) 12.57 PEAK DISCHARGE(CFS) 4.07 PEAK ELEVATION(FEET) 62.67

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
3.00	DISCHG	.00	.00	.00	.01	.01
3.00	ELEV	60.90	60.90	60.90	60.90	60.90
4.00	DISCHG	.01	.01	.01	.02	.02
4.00	ELEV	60.90	60.90	60.91	60.91	60.91
5.00	DISCHG	.02	.02	.03	.03	.03
5.00	ELEV	60.91	60.91	60.91	60.91	60.91
6.00	DISCHG	.03	.04	.04	.04	.04
6.00	ELEV	60.91	60.91	60.91	60.91	60.91
7.00	DISCHG	.05	.05	.05	.05	.05
7.00	ELEV	60.92	60.92	60.92	60.92	60.92
8.00	DISCHG	.07	.08	.08	.09	.09
8.00	ELEV	60.93	60.93	60.93	60.93	60.93
9.00	DISCHG	.11	.12	.13	.14	.14
9.00	ELEV	60.94	60.95	60.95	60.95	60.95
10.00	DISCHG	.18	.20	.21	.23	.25
10.00	ELEV	60.97	60.97	60.98	60.99	61.00
11.00	DISCHG	.42	.46	.51	.56	.62
11.00	ELEV	61.06	61.07	61.09	61.11	61.13
12.00	DISCHG	2.96	3.16	3.44	3.76	3.98
12.00	ELEV	62.03	62.15	62.31	62.49	62.62
13.00	DISCHG	3.84	3.77	3.69	3.62	3.55
13.00	ELEV	62.54	62.50	62.45	62.41	62.37
14.00	DISCHG	3.06	2.97	2.72	2.23	2.03
14.00	ELEV	62.09	62.03	61.93	61.74	61.67
15.00	DISCHG	1.56	1.51	1.46	1.41	1.36
15.00	ELEV	61.49	61.47	61.45	61.43	61.42
16.00	DISCHG	1.14	1.10	1.07	1.05	1.01
16.00	ELEV	61.33	61.32	61.31	61.30	61.28
17.00	DISCHG	.81	.76	.74	.73	.71
17.00	ELEV	61.21	61.19	61.18	61.18	61.17
18.00	DISCHG	.61	.59	.57	.54	.52
18.00	ELEV	61.13	61.12	61.11	61.10	61.10
19.00	DISCHG	.48	.47	.45	.43	.43
19.00	ELEV	61.08	61.08	61.07	61.06	61.06
20.00	DISCHG	.38	.38	.38	.38	.37
20.00	ELEV	61.04	61.04	61.04	61.04	61.04
21.00	DISCHG	.34	.33	.34	.34	.34
21.00	ELEV	61.03	61.02	61.03	61.03	61.03

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 3
PAGE 35

22.00	DISCHG	.32	.33	.32	.30	.30	.29	.29	.29	.28	.28
22.00	ELEV	61.02	61.02	61.02	61.02	61.01	61.01	61.01	61.01	61.01	61.01
23.00	DISCHG	.28	.28	.28	.27	.27	.27	.27	.27	.27	.26
23.00	ELEV	61.01	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00
24.00	DISCHG	.24	.22	.19	.16	.14	.12	.11	.10	.10	.09
24.00	ELEV	60.99	60.98	60.97	60.96	60.95	60.95	60.94	60.94	60.94	60.93
25.00	DISCHG	.08	.08	.07	.07	.06	.06	.05	.05	.05	.04
25.00	ELEV	60.93	60.93	60.93	60.93	60.92	60.92	60.92	60.92	60.92	60.92
26.00	DISCHG	.04	.04	.03	.03	.03	.03	.03	.02	.02	.02
26.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91
27.00	DISCHG	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01
27.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.90	60.90	60.90	60.90	60.90
28.00	DISCHG	.01									
28.00	ELEV	60.90									

RUNOFF VOLUME ABOVE BASEFLOW = 2.80 WATERSHED INCHES, 16.41 CFS-HRS, 1.36 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 3

RECORD ID

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 4
 PAGE 36

EXECUTIVE CONTROL OPERATION COMPUT FROM XSECTION 47 TO STRUCTURE 13 RECORD ID
 STARTING TIME = .00 RAIN DEPTH = 7.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 9 ANT. MOIST. COND= 2
 ALTERNATE NO.= 2 STORM NO.= 4 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 47
 OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 69. TIME OF CONCENTRATION= .13 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0173 HOURS

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	TIME INCREMENT =	DRAINAGE AREA =	PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)	(RUNOFF)
		.00 HOURS	.10 HOURS	.00 SQ.MI.	12.21	3.64		
8.00	.00	.00	.00	.00				
9.00	.02	.02	.03	.05				
10.00	.06	.07	.09	.13				
11.00	.19	.21	.26	.68				
12.00	3.01	3.37	3.42	1.01				
13.00	.58	.53	.48	.76				
14.00	.35	.34	.33	.38				
15.00	.27	.26	.25	.24				
16.00	.22	.22	.21	.20				
17.00	.12	.13	.14	.13				
18.00	.13	.12	.10	.12				
19.00	.12	.10	.09	.09				
20.00	.09	.10	.10	.10				
21.00	.07	.09	.10	.07				
22.00	.10	.09	.07	.07				
23.00	.07	.07	.07	.07				
24.00	.05	.02	.00	.07				

RUNOFF VOLUME ABOVE BASEFLOW = 3.53 WATERSHED INCHES, 4.61 CFS-HRS, .38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 48
 OUTPUT HYDROGRAPH= 2
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 81. TIME OF CONCENTRATION= .18 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	TIME INCREMENT =	DRAINAGE AREA =	PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)	(RUNOFF)
		.00 HOURS	.10 HOURS	.00 SQ.MI.	12.22	1.68		
6.00	.00	.00	.00	.00				
7.00	.01	.01	.01	.02				
8.00	.02	.02	.03	.03				
9.00	.04	.04	.05	.06				
10.00	.06	.07	.08	.11				

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 4
 PAGE 37

11.00	DISCHG	.14	.15	.16	.17	.20	.22	.29	.38	.50	1.08
12.00	DISCHG	1.45	1.60	1.68	1.64	1.00	.65	.50	.37	.33	.28
13.00	DISCHG	.26	.24	.22	.21	.20	.19	.18	.17	.16	.15
14.00	DISCHG	.15	.15	.14	.14	.14	.13	.13	.12	.11	.11
15.00	DISCHG	.11	.11	.11	.11	.10	.10	.10	.10	.10	.09
16.00	DISCHG	.09	.09	.09	.09	.08	.08	.08	.08	.08	.06
17.00	DISCHG	.05	.05	.06	.06	.05	.05	.05	.05	.05	.05
18.00	DISCHG	.05	.05	.04	.04	.04	.04	.04	.05	.05	.05
19.00	DISCHG	.05	.04	.04	.04	.04	.05	.04	.04	.04	.04
20.00	DISCHG	.04	.04	.04	.04	.04	.03	.03	.04	.04	.04
21.00	DISCHG	.03	.03	.04	.04	.04	.03	.03	.03	.03	.04
22.00	DISCHG	.04	.04	.03	.03	.03	.03	.03	.03	.03	.03
23.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.02
24.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 4.81 WATERSHED INCHES, 2.27 CFS-HRS, .19 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 49

INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) 12.21 PEAK DISCHARGE(CFS) 5.32 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
6.00	DISCHG	.00	.00	.00	.00	.01
7.00	DISCHG	.01	.01	.01	.01	.02
8.00	DISCHG	.02	.02	.03	.03	.04
9.00	DISCHG	.06	.06	.07	.08	.11
10.00	DISCHG	.13	.14	.16	.19	.24
11.00	DISCHG	.32	.36	.39	.52	1.06
12.00	DISCHG	4.46	4.96	5.32	5.05	1.13
13.00	DISCHG	.84	.77	.72	.65	.54
14.00	DISCHG	.50	.49	.48	.45	.39
15.00	DISCHG	.38	.37	.37	.33	.34
16.00	DISCHG	.31	.31	.31	.28	.29
17.00	DISCHG	.17	.19	.20	.17	.18
18.00	DISCHG	.19	.17	.15	.15	.16
19.00	DISCHG	.17	.15	.13	.16	.13
20.00	DISCHG	.13	.14	.14	.11	.14
21.00	DISCHG	.11	.13	.14	.11	.11
22.00	DISCHG	.14	.13	.11	.11	.11
23.00	DISCHG	.11	.11	.11	.11	.11
24.00	DISCHG	.07	.03	.00		.10

RUNOFF VOLUME ABOVE BASEFLOW = 3.87 WATERSHED INCHES, 6.87 CFS-HRS, .57 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 50

OUTPUT HYDROGRAPH= 1
AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

		PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)					
		12.15		1.19		(RUNOFF)					
TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS		TIME INCREMENT = .10 HOURS		DRAINAGE AREA = .00 SQ.MI.					
2.00	DISCHG	.00	.00	.00	.01	.01	.01	.01	.00	.01	.01
3.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
4.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.02
5.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
6.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.03
7.00	DISCHG	.03	.03	.03	.03	.03	.04	.04	.04	.05	.05
8.00	DISCHG	.05	.05	.05	.05	.05	.05	.05	.05	.06	.06
9.00	DISCHG	.06	.06	.06	.06	.07	.07	.07	.07	.08	.08
10.00	DISCHG	.08	.09	.09	.09	.10	.10	.11	.11	.12	.13
11.00	DISCHG	.13	.15	.15	.16	.19	.20	.31	.34	.56	1.08
12.00	DISCHG	1.14	1.16	1.16	.95	.41	.35	.24	.21	.19	.16
13.00	DISCHG	.16	.14	.14	.13	.12	.12	.11	.10	.10	.09
14.00	DISCHG	.09	.09	.09	.09	.08	.08	.07	.07	.07	.07
15.00	DISCHG	.07	.07	.07	.07	.06	.06	.06	.06	.06	.06
16.00	DISCHG	.06	.06	.06	.05	.05	.05	.05	.05	.05	.03
17.00	DISCHG	.03	.04	.04	.04	.03	.03	.03	.03	.03	.03
18.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
19.00	DISCHG	.03	.02	.02	.02	.03	.03	.02	.02	.02	.02
20.00	DISCHG	.02	.03	.03	.02	.02	.02	.02	.03	.02	.02
21.00	DISCHG	.02	.02	.03	.02	.02	.02	.02	.02	.02	.03
22.00	DISCHG	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.01
24.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 6.42 WATERSHED INCHES, 1.74 CFS-HRS, .14 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 51

OUTPUT HYDROGRAPH= 2
AREA= .00 SQ MI INPUT RUNOFF CURVE= 95. TIME OF CONCENTRATION= .10 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

		PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)					
		12.15		1.89		(RUNOFF)					
TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS		TIME INCREMENT = .10 HOURS		DRAINAGE AREA = .00 SQ.MI.					
2.00	DISCHG	.00	.00	.00	.01	.01	.01	.01	.01	.01	.01
3.00	DISCHG	.01	.01	.01	.01	.01	.01	.02	.02	.02	.01
4.00	DISCHG	.01	.02	.02	.02	.02	.02	.02	.02	.02	.02
5.00	DISCHG	.02	.02	.03	.03	.03	.03	.03	.03	.03	.03
6.00	DISCHG	.03	.03	.03	.03	.03	.03	.04	.04	.04	.04
7.00	DISCHG	.04	.04	.05	.05	.06	.06	.07	.07	.07	.07
8.00	DISCHG	.07	.07	.07	.08	.08	.08	.09	.09	.09	.10

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 4
PAGE 39

9.00	DISCHG	.10	.10	.10	.10	.11	.11	.12	.12	.12	.12
10.00	DISCHG	.12	.14	.14	.15	.16	.16	.17	.17	.18	.21
11.00	DISCHG	.21	.23	.24	.26	.31	.31	.49	.55	.89	1.72
12.00	DISCHG	1.82	1.85	1.85	1.51	.65	.56	.39	.33	.31	.26
13.00	DISCHG	.26	.23	.22	.21	.19	.19	.17	.16	.16	.15
14.00	DISCHG	.15	.15	.14	.14	.13	.13	.12	.11	.11	.11
15.00	DISCHG	.11	.11	.11	.10	.10	.10	.10	.10	.10	.09
16.00	DISCHG	.09	.09	.09	.09	.08	.08	.08	.08	.07	.05
17.00	DISCHG	.05	.06	.06	.06	.05	.05	.05	.05	.05	.05
18.00	DISCHG	.05	.05	.04	.04	.04	.04	.05	.05	.05	.05
19.00	DISCHG	.05	.04	.04	.04	.05	.05	.04	.04	.04	.04
20.00	DISCHG	.04	.04	.04	.04	.03	.03	.04	.04	.04	.03
21.00	DISCHG	.03	.04	.04	.04	.03	.03	.03	.03	.03	.04
22.00	DISCHG	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03
23.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.02
24.00	DISCHG	.02	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 6.43 WATERSHED INCHES, 2.78 CFS-HRS, .23 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 52
INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 4

PEAK TIME(HRS) 12.15 PEAK DISCHARGE(CFS) 3.08 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
2.00	DISCHG	.00	.00	.00	.01	.01
3.00	DISCHG	.02	.02	.02	.02	.02
4.00	DISCHG	.02	.03	.03	.03	.03
5.00	DISCHG	.04	.04	.04	.04	.04
6.00	DISCHG	.05	.05	.05	.05	.05
7.00	DISCHG	.07	.07	.07	.08	.08
8.00	DISCHG	.12	.12	.12	.12	.12
9.00	DISCHG	.16	.16	.16	.16	.16
10.00	DISCHG	.20	.22	.23	.24	.25
11.00	DISCHG	.34	.38	.39	.42	.50
12.00	DISCHG	2.96	3.00	3.02	2.46	1.06
13.00	DISCHG	.42	.37	.35	.34	.32
14.00	DISCHG	.24	.24	.23	.23	.22
15.00	DISCHG	.19	.18	.18	.17	.16
16.00	DISCHG	.15	.15	.15	.14	.13
17.00	DISCHG	.08	.09	.10	.09	.08
18.00	DISCHG	.09	.07	.07	.07	.07
19.00	DISCHG	.08	.06	.06	.06	.08
20.00	DISCHG	.06	.07	.07	.06	.05
21.00	DISCHG	.05	.06	.07	.06	.05
22.00	DISCHG	.07	.05	.05	.05	.05
23.00	DISCHG	.05	.05	.05	.05	.05

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 4
 PAGE 40

24.00 DISCHG .03 .00

RUNOFF VOLUME ABOVE BASEFLOW = 6.42 WATERSHED INCHES, 4.52 CFS-HRS, .37 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 53
 INPUT HYDROGRAPHS= 4,3 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS) 12.18 PEAK DISCHARGE(CFS) 8.36 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
2.00	DISCHG	.00 .00 .00	.01 .01 .01	.01 .01 .01	.01 .01 .01	
3.00	DISCHG	.02 .02 .02	.02 .02 .02	.03 .03 .03	.03 .03 .03	
4.00	DISCHG	.02 .03 .03	.03 .04 .04	.04 .04 .04	.04 .04 .04	
5.00	DISCHG	.04 .04 .04	.04 .04 .04	.05 .05 .05	.05 .05 .05	
6.00	DISCHG	.05 .05 .05	.05 .06 .06	.06 .06 .06	.06 .07 .07	
7.00	DISCHG	.07 .08 .08	.09 .10 .10	.12 .13 .14	.14 .14 .14	
8.00	DISCHG	.14 .14 .15	.15 .15 .15	.17 .17 .19	.19 .21 .21	
9.00	DISCHG	.22 .22 .22	.23 .25 .26	.29 .30 .31	.32 .32 .32	
10.00	DISCHG	.32 .37 .39	.41 .44 .46	.50 .52 .56	.64 .64 .64	
11.00	DISCHG	.66 .74 .78	.85 1.02 1.08	1.61 1.95 2.95	6.31 6.31 6.31	
12.00	DISCHG	7.42 7.96 8.33	7.51 3.72 2.84	2.07 1.67 1.54	1.31 1.31 1.31	
13.00	DISCHG	1.26 1.14 1.07	1.04 .96 .94	.86 .81 .79	.75 .75 .75	
14.00	DISCHG	.74 .73 .72	.70 .67 .66	.61 .57 .57	.57 .57 .57	
15.00	DISCHG	.57 .55 .54	.53 .49 .48	.50 .51 .50	.46 .46 .46	
16.00	DISCHG	.45 .45 .45	.44 .40 .40	.41 .42 .39	.28 .28 .28	
17.00	DISCHG	.25 .28 .30	.29 .25 .25	.26 .27 .27	.27 .27 .27	
18.00	DISCHG	.27 .24 .22	.21 .21 .21	.23 .24 .24	.24 .24 .24	
19.00	DISCHG	.24 .21 .19	.20 .23 .24	.21 .19 .18	.18 .18 .18	
20.00	DISCHG	.18 .20 .21	.20 .16 .16	.19 .21 .20	.16 .16 .16	
21.00	DISCHG	.16 .19 .21	.20 .16 .16	.15 .15 .16	.20 .20 .20	
22.00	DISCHG	.21 .18 .16	.15 .15 .15	.15 .15 .15	.15 .15 .15	
23.00	DISCHG	.15 .15 .15	.15 .15 .15	.15 .15 .15	.15 .15 .15	
24.00	DISCHG	.09 .03 .00				

RUNOFF VOLUME ABOVE BASEFLOW = 4.60 WATERSHED INCHES, 11.39 CFS-HRS, .94 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 54
 OUTPUT HYDROGRAPH= 1
 AREA= .00 SQ MI INPUT RUNOFF CURVE= 98. TIME OF CONCENTRATION= .10 HOURS
 INTERNAL HYDROGRAPH TIME INCREMENT= .0133 HOURS

*** WARNING-NO PEAK FOUND, MAXIMUM DISCHARGE = .02 CFS.

PEAK TIME(HRS) 23.70 PEAK DISCHARGE(CFS) .02 PEAK ELEVATION(FEET) (RUNOFF)
 12.20 1.01 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS			TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .00 SQ.MI.			
1.00	DISCHG	.00	.00	.00	.01	.01	.01	.01	.01	.01	.01
2.00	DISCHG	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
3.00	DISCHG	.01	.02	.02	.02	.01	.01	.02	.02	.02	.01
4.00	DISCHG	.01	.02	.02	.02	.02	.02	.02	.02	.02	.02
5.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
6.00	DISCHG	.02	.02	.02	.02	.02	.02	.03	.03	.03	.03
7.00	DISCHG	.03	.03	.03	.03	.04	.04	.04	.05	.05	.05
8.00	DISCHG	.05	.05	.05	.05	.05	.05	.05	.05	.06	.06
9.00	DISCHG	.06	.06	.06	.06	.06	.06	.07	.07	.07	.07
10.00	DISCHG	.07	.08	.08	.08	.09	.09	.10	.10	.10	.12
11.00	DISCHG	.12	.13	.13	.15	.17	.17	.27	.30	.49	.95
12.00	DISCHG	1.00	1.01	1.01	.82	.35	.31	.21	.18	.17	.14
13.00	DISCHG	.14	.12	.12	.11	.10	.10	.09	.09	.09	.08
14.00	DISCHG	.08	.08	.08	.08	.07	.07	.06	.06	.06	.06
15.00	DISCHG	.06	.06	.06	.06	.05	.05	.05	.06	.05	.05
16.00	DISCHG	.05	.05	.05	.05	.04	.04	.04	.05	.04	.03
17.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
18.00	DISCHG	.03	.02	.02	.02	.02	.02	.03	.03	.03	.03
19.00	DISCHG	.03	.02	.02	.02	.03	.03	.02	.02	.02	.02
20.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
21.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
22.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
23.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.02	.01	.01
24.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 6.78 WATERSHED INCHES, 1.57 CFS-HRS, .13 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 55

INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.18 9.38 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS			TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .00 SQ.MI.			
1.00	DISCHG	.00	.00	.00	.01	.01	.01	.01	.01	.01	.01
2.00	DISCHG	.01	.01	.01	.02	.03	.03	.02	.02	.02	.03
3.00	DISCHG	.03	.04	.04	.04	.03	.03	.04	.05	.04	.04
4.00	DISCHG	.04	.05	.05	.05	.05	.06	.06	.06	.06	.06
5.00	DISCHG	.06	.06	.06	.06	.06	.06	.07	.07	.07	.08
6.00	DISCHG	.08	.08	.08	.08	.08	.08	.09	.09	.10	.10
7.00	DISCHG	.10	.11	.11	.12	.14	.14	.17	.18	.18	.19
8.00	DISCHG	.19	.19	.19	.19	.20	.20	.22	.23	.25	.27
9.00	DISCHG	.28	.28	.28	.29	.32	.33	.35	.37	.38	.39
10.00	DISCHG	.39	.45	.48	.50	.53	.55	.59	.62	.66	.75
11.00	DISCHG	.78	.87	.92	.99	1.19	1.25	1.89	2.25	3.44	7.25
12.00	DISCHG	8.42	8.97	9.34	8.33	4.07	3.15	2.28	1.85	1.71	1.46

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 4
 PAGE 42

13.00	DISCHG	1.40	1.26	1.19	1.15	1.07	1.05	.95	.90	.88	.83
14.00	DISCHG	.82	.80	.79	.78	.74	.73	.67	.64	.63	.63
15.00	DISCHG	.63	.61	.60	.59	.54	.54	.55	.57	.55	.51
16.00	DISCHG	.50	.50	.50	.49	.45	.44	.46	.47	.43	.30
17.00	DISCHG	.28	.31	.33	.32	.28	.27	.29	.30	.30	.30
18.00	DISCHG	.30	.26	.24	.24	.24	.24	.26	.27	.27	.27
19.00	DISCHG	.27	.23	.21	.22	.26	.27	.23	.21	.20	.20
20.00	DISCHG	.20	.22	.23	.22	.18	.17	.21	.23	.22	.18
21.00	DISCHG	.17	.21	.23	.22	.18	.17	.17	.17	.18	.23
22.00	DISCHG	.24	.20	.17	.17	.17	.17	.17	.17	.17	.17
23.00	DISCHG	.17	.17	.17	.17	.17	.17	.17	.17	.16	.11
24.00	DISCHG	.10	.03	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 4.78 WATERSHED INCHES, 12.97 CFS-HRS, 1.07 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 56

OUTPUT HYDROGRAPH= 1

AREA= .00 SQ MI INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .15 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0200 HOURS

PEAK TIME(HRS) 12.20 PEAK DISCHARGE(CFS) 2.00 PEAK ELEVATION(FEET) (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.					
7.00	DISCHG	.00	.00	.00	.01	.01	.01	.01	.01	.02	
8.00	DISCHG	.02	.02	.02	.02	.02	.03	.03	.03	.04	
9.00	DISCHG	.04	.04	.04	.04	.05	.05	.05	.06	.06	
10.00	DISCHG	.07	.07	.08	.09	.09	.10	.11	.11	.14	
11.00	DISCHG	.15	.16	.18	.19	.23	.25	.34	.45	.61	1.40
12.00	DISCHG	1.75	1.90	2.00	1.91	1.00	.71	.54	.41	.38	.32
13.00	DISCHG	.31	.28	.26	.25	.23	.23	.21	.20	.19	.18
14.00	DISCHG	.18	.18	.17	.17	.16	.16	.15	.14	.14	.14
15.00	DISCHG	.14	.13	.13	.13	.12	.12	.12	.12	.12	.11
16.00	DISCHG	.11	.11	.11	.11	.10	.10	.10	.10	.10	.07
17.00	DISCHG	.06	.07	.07	.07	.06	.06	.06	.07	.07	.07
18.00	DISCHG	.07	.06	.05	.05	.05	.05	.05	.06	.06	.06
19.00	DISCHG	.06	.05	.05	.05	.06	.06	.05	.05	.04	.04
20.00	DISCHG	.04	.05	.05	.05	.04	.04	.04	.05	.05	.04
21.00	DISCHG	.04	.04	.05	.05	.04	.04	.04	.04	.04	.05
22.00	DISCHG	.05	.05	.04	.04	.04	.04	.04	.04	.04	.04
23.00	DISCHG	.04	.04	.04	.04	.04	.04	.04	.04	.04	.03
24.00	DISCHG	.02	.01	.00							

RUNOFF VOLUME ABOVE BASEFLOW = 4.49 WATERSHED INCHES, 2.64 CFS-HRS, .22 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 57

INPUT HYDROGRAPHS= 1,3 OUTPUT HYDROGRAPH= 2

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)		
12.18		11.38		(NULL)		
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
1.00	DISCHG	.00	.01	.01	.01	.01
2.00	DISCHG	.01	.01	.02	.02	.03
3.00	DISCHG	.03	.04	.03	.04	.04
4.00	DISCHG	.04	.05	.05	.06	.06
5.00	DISCHG	.06	.06	.06	.07	.08
6.00	DISCHG	.08	.08	.08	.09	.10
7.00	DISCHG	.10	.11	.12	.18	.20
8.00	DISCHG	.20	.21	.22	.25	.31
9.00	DISCHG	.32	.32	.33	.41	.45
10.00	DISCHG	.46	.52	.58	.70	.89
11.00	DISCHG	.93	1.03	1.18	1.42	1.50
12.00	DISCHG	10.16	10.87	11.35	10.24	5.07
13.00	DISCHG	1.71	1.54	1.45	1.40	1.30
14.00	DISCHG	1.00	.98	.97	.95	.90
15.00	DISCHG	.77	.75	.73	.72	.66
16.00	DISCHG	.61	.61	.61	.60	.55
17.00	DISCHG	.34	.38	.40	.39	.34
18.00	DISCHG	.37	.32	.29	.29	.29
19.00	DISCHG	.33	.28	.25	.26	.31
20.00	DISCHG	.25	.27	.29	.27	.22
21.00	DISCHG	.21	.25	.28	.27	.22
22.00	DISCHG	.29	.24	.21	.21	.21
23.00	DISCHG	.21	.21	.21	.21	.21
24.00	DISCHG	.13	.05	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 4.73 WATERSHED INCHES, 15.61 CFS-HRS, 1.29 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 1
 SURFACE ELEVATION= 64.00

PEAK TIME(HRS)		PEAK DISCHARGE(CFS)		PEAK ELEVATION(FEET)		
12.59		3.06		67.52		
TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
2.00	DISCHG	.00	.00	.00	.01	.01
2.00	ELEV	64.00	64.00	64.00	64.01	64.01
3.00	DISCHG	.01	.01	.02	.02	.03
3.00	ELEV	64.01	64.01	64.01	64.02	64.02
4.00	DISCHG	.03	.03	.03	.03	.04
4.00	ELEV	64.02	64.02	64.03	64.03	64.03
5.00	DISCHG	.04	.04	.04	.05	.05
5.00	ELEV	64.04	64.04	64.04	64.04	64.04
6.00	DISCHG	.06	.06	.06	.06	.07

6.00	ELEV	64.05	64.05	64.05	64.05	64.06	64.06	64.06	64.06	64.06	64.06
7.00	DISCHG	.07	.07	.08	.08	.08	.09	.09	.10	.11	.11
7.00	ELEV	64.07	64.07	64.07	64.07	64.08	64.08	64.08	64.09	64.10	64.10
8.00	DISCHG	.12	.13	.13	.14	.14	.15	.16	.16	.17	.18
8.00	ELEV	64.11	64.11	64.12	64.13	64.13	64.14	64.14	64.15	64.15	64.16
9.00	DISCHG	.19	.20	.21	.21	.22	.23	.25	.26	.27	.28
9.00	ELEV	64.17	64.18	64.19	64.20	64.20	64.21	64.22	64.24	64.25	64.26
10.00	DISCHG	.30	.31	.33	.34	.36	.38	.40	.43	.45	.48
10.00	ELEV	64.27	64.28	64.30	64.31	64.33	64.35	64.37	64.39	64.41	64.43
11.00	DISCHG	.51	.54	.58	.62	.67	.73	.81	.93	1.10	1.48
11.00	ELEV	64.46	64.49	64.53	64.56	64.61	64.66	64.74	64.84	65.00	65.35
12.00	DISCHG	2.05	2.39	2.64	2.87	3.01	3.05	3.06	3.05	3.02	2.99
12.00	ELEV	65.87	66.33	66.77	67.19	67.43	67.51	67.52	67.49	67.45	67.39
13.00	DISCHG	2.95	2.92	2.87	2.83	2.79	2.75	2.70	2.66	2.61	2.57
13.00	ELEV	67.33	67.26	67.19	67.12	67.04	66.97	66.89	66.81	66.73	66.65
14.00	DISCHG	2.52	2.48	2.43	2.39	2.35	2.31	2.27	2.22	2.15	2.05
14.00	ELEV	66.57	66.49	66.41	66.34	66.26	66.19	66.12	66.04	65.96	65.87
15.00	DISCHG	1.96	1.87	1.79	1.71	1.64	1.57	1.50	1.45	1.39	1.34
15.00	ELEV	65.78	65.70	65.63	65.56	65.49	65.43	65.37	65.31	65.26	65.22
16.00	DISCHG	1.29	1.24	1.19	1.15	1.11	1.07	1.03	1.00	.96	.93
16.00	ELEV	65.17	65.12	65.08	65.04	65.01	64.97	64.94	64.90	64.88	64.84
17.00	DISCHG	.89	.85	.81	.78	.75	.72	.70	.67	.65	.63
17.00	ELEV	64.80	64.77	64.74	64.71	64.69	64.66	64.63	64.61	64.59	64.57
18.00	DISCHG	.61	.59	.57	.55	.53	.51	.50	.49	.47	.46
18.00	ELEV	64.56	64.54	64.52	64.50	64.48	64.47	64.45	64.44	64.43	64.42
19.00	DISCHG	.45	.44	.43	.42	.41	.40	.40	.39	.38	.37
19.00	ELEV	64.41	64.40	64.39	64.38	64.37	64.37	64.36	64.35	64.34	64.33
20.00	DISCHG	.36	.35	.35	.34	.33	.33	.32	.32	.31	.31
20.00	ELEV	64.33	64.32	64.32	64.31	64.30	64.30	64.29	64.29	64.28	64.28
21.00	DISCHG	.30	.30	.29	.29	.29	.28	.28	.27	.27	.27
21.00	ELEV	64.27	64.27	64.27	64.27	64.26	64.26	64.25	64.25	64.25	64.24
22.00	DISCHG	.27	.27	.27	.26	.26	.25	.25	.25	.25	.24
22.00	ELEV	64.24	64.24	64.24	64.24	64.23	64.23	64.23	64.23	64.22	64.22
23.00	DISCHG	.24	.24	.24	.23	.23	.23	.23	.23	.22	.22
23.00	ELEV	64.22	64.22	64.21	64.21	64.21	64.21	64.21	64.21	64.20	64.20
24.00	DISCHG	.21	.21	.19	.18	.17	.15	.14	.13	.12	.11
24.00	ELEV	64.19	64.19	64.17	64.16	64.15	64.14	64.13	64.12	64.11	64.10
25.00	DISCHG	.11	.10	.09	.08	.08	.07	.07	.06	.06	.05
25.00	ELEV	64.10	64.09	64.08	64.08	64.07	64.07	64.06	64.06	64.05	64.05
26.00	DISCHG	.05	.05	.04	.04	.04	.03	.03	.03	.03	.03
26.00	ELEV	64.05	64.04	64.04	64.04	64.03	64.03	64.03	64.03	64.02	64.02
27.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
27.00	ELEV	64.02	64.02	64.02	64.02	64.02	64.01	64.01	64.01	64.01	64.01
28.00	DISCHG	.01	.01	.01	.01						
28.00	ELEV	64.01	64.01	64.01	64.01						

RUNOFF VOLUME ABOVE BASEFLOW = 4.70 WATERSHED INCHES, 15.51 CFS-HRS, 1.28 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RUNOFF CROSS SECTION 58

OUTPUT HYDROGRAPH= 2

AREA= .00 SQ MI INPUT RUNOFF CURVE= 68. TIME OF CONCENTRATION= .18 HOURS

INTERNAL HYDROGRAPH TIME INCREMENT= .0240 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.25 7.09 (RUNOFF)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
8.00	DISCHG	.00	.00	.00	.00	.00
9.00	DISCHG	.02	.02	.03	.04	.05
10.00	DISCHG	.10	.12	.14	.15	.17
11.00	DISCHG	.33	.37	.41	.45	.55
12.00	DISCHG	5.24	6.11	6.74	6.79	4.23
13.00	DISCHG	1.15	1.07	.98	.95	.89
14.00	DISCHG	.68	.67	.65	.65	.62
15.00	DISCHG	.52	.51	.50	.49	.46
16.00	DISCHG	.42	.42	.42	.42	.39
17.00	DISCHG	.24	.25	.27	.28	.25
18.00	DISCHG	.26	.24	.21	.20	.20
19.00	DISCHG	.23	.21	.18	.18	.21
20.00	DISCHG	.17	.18	.20	.20	.17
21.00	DISCHG	.15	.16	.19	.19	.17
22.00	DISCHG	.20	.18	.16	.15	.15
23.00	DISCHG	.14	.14	.14	.14	.15
24.00	DISCHG	.09	.06	.02	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.42 WATERSHED INCHES, 8.78 CFS-HRS, .73 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 59

INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.26 9.87 (NULL)

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
2.00	DISCHG	.00	.00	.00	.01	.01
3.00	DISCHG	.01	.01	.02	.02	.02
4.00	DISCHG	.03	.03	.03	.03	.04
5.00	DISCHG	.04	.04	.04	.05	.05
6.00	DISCHG	.06	.06	.06	.06	.06
7.00	DISCHG	.07	.07	.08	.08	.09
8.00	DISCHG	.12	.13	.13	.14	.14
9.00	DISCHG	.20	.22	.24	.25	.27
10.00	DISCHG	.40	.43	.46	.50	.53
11.00	DISCHG	.84	.91	.99	1.07	1.22
12.00	DISCHG	7.29	8.49	9.37	9.67	7.24

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 4
PAGE 46

13.00	DISCHG	4.10	3.99	3.85	3.78	3.68	3.61	3.51	3.40	3.34	3.26
14.00	DISCHG	3.20	3.14	3.09	3.04	2.97	2.91	2.84	2.76	2.68	2.58
15.00	DISCHG	2.48	2.39	2.29	2.21	2.10	2.02	1.96	1.91	1.86	1.78
16.00	DISCHG	1.71	1.66	1.61	1.56	1.49	1.44	1.40	1.38	1.34	1.22
17.00	DISCHG	1.13	1.09	1.09	1.06	1.00	.96	.93	.92	.90	.88
18.00	DISCHG	.87	.83	.78	.75	.73	.71	.71	.71	.70	.69
19.00	DISCHG	.68	.65	.61	.60	.62	.63	.60	.57	.55	.54
20.00	DISCHG	.53	.53	.54	.54	.50	.48	.48	.51	.51	.47
21.00	DISCHG	.45	.46	.49	.49	.46	.43	.42	.42	.42	.45
22.00	DISCHG	.47	.45	.42	.41	.40	.40	.40	.39	.39	.39
23.00	DISCHG	.38	.38	.38	.38	.38	.37	.37	.37	.37	.33
24.00	DISCHG	.31	.27	.21	.18	.17	.15	.14	.13	.12	.11
25.00	DISCHG	.11	.10	.09	.08	.08	.07	.07	.06	.06	.05
26.00	DISCHG	.05	.05	.04	.04	.04	.03	.03	.03	.03	.03
27.00	DISCHG	.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
28.00	DISCHG	.01	.01	.01	.01						

RUNOFF VOLUME ABOVE BASEFLOW = 4.14 WATERSHED INCHES, 24.29 CFS-HRS, 2.01 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 13

INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 2
SURFACE ELEVATION= 60.90

PEAK TIME(HRS) 12.59 PEAK DISCHARGE(CFS) 5.30 PEAK ELEVATION(FEET) 63.38

TIME(HRS)	FIRST HYDROGRAPH POINT = .00 HOURS	TIME INCREMENT = .10 HOURS	DRAINAGE AREA = .01 SQ.MI.								
2.00	DISCHG	.00	.00	.00	.00	.00	.01	.01	.01	.01	.01
2.00	ELEV	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90	60.90
3.00	DISCHG	.01	.01	.01	.02	.02	.02	.02	.02	.02	.02
3.00	ELEV	60.90	60.90	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91
4.00	DISCHG	.03	.03	.03	.03	.03	.03	.03	.04	.04	.04
4.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91
5.00	DISCHG	.04	.04	.04	.04	.05	.05	.05	.05	.05	.05
5.00	ELEV	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92
6.00	DISCHG	.05	.06	.06	.06	.06	.06	.06	.06	.07	.07
6.00	ELEV	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.92	60.93
7.00	DISCHG	.07	.07	.07	.08	.08	.08	.09	.09	.10	.11
7.00	ELEV	60.93	60.93	60.93	60.93	60.93	60.93	60.93	60.94	60.94	60.94
8.00	DISCHG	.11	.12	.13	.13	.14	.14	.15	.16	.16	.17
8.00	ELEV	60.94	60.95	60.95	60.95	60.95	60.95	60.96	60.96	60.96	60.97
9.00	DISCHG	.19	.21	.22	.24	.25	.27	.29	.31	.34	.36
9.00	ELEV	60.97	60.98	60.98	60.99	61.00	61.00	61.01	61.02	61.03	61.04
10.00	DISCHG	.38	.40	.43	.47	.50	.54	.57	.62	.66	.72
10.00	ELEV	61.04	61.05	61.06	61.08	61.09	61.10	61.12	61.13	61.15	61.17
11.00	DISCHG	.78	.85	.92	1.00	1.10	1.23	1.42	1.73	2.20	2.98
11.00	ELEV	61.19	61.22	61.25	61.28	61.32	61.37	61.44	61.56	61.73	62.04
12.00	DISCHG	3.30	3.75	4.26	4.77	5.13	5.27	5.30	5.26	5.19	5.11
12.00	ELEV	62.22	62.49	62.78	63.08	63.29	63.37	63.38	63.36	63.32	63.27

TR20 XEQ 02-04-00 13:12
 REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
 TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 PASS 4
 PAGE 47

13.00	DISCHG	5.02	4.92	4.82	4.73	4.63	4.53	4.44	4.34	4.25	4.15
13.00	ELEV	63.22	63.16	63.11	63.05	62.99	62.94	62.88	62.83	62.77	62.72
14.00	DISCHG	4.06	3.97	3.89	3.81	3.73	3.65	3.58	3.50	3.42	3.35
14.00	ELEV	62.67	62.62	62.57	62.52	62.47	62.43	62.39	62.34	62.30	62.25
15.00	DISCHG	3.27	3.18	3.10	3.02	2.93	2.87	2.81	2.75	2.69	2.63
15.00	ELEV	62.21	62.16	62.11	62.06	62.01	61.83	61.71	61.66	61.63	61.60
16.00	DISCHG	1.77	1.71	1.66	1.61	1.55	1.49	1.44	1.41	1.38	1.31
16.00	ELEV	61.57	61.55	61.53	61.51	61.49	61.46	61.45	61.43	61.42	61.40
17.00	DISCHG	1.21	1.14	1.11	1.08	1.05	1.00	.96	.94	.92	.90
17.00	ELEV	61.36	61.33	61.32	61.31	61.30	61.28	61.26	61.25	61.25	61.24
18.00	DISCHG	.88	.86	.82	.78	.76	.73	.72	.71	.71	.70
18.00	ELEV	61.23	61.22	61.21	61.20	61.19	61.18	61.17	61.17	61.17	61.16
19.00	DISCHG	.69	.67	.65	.62	.61	.62	.62	.60	.57	.55
19.00	ELEV	61.16	61.16	61.14	61.13	61.13	61.13	61.13	61.13	61.12	61.11
20.00	DISCHG	.54	.53	.54	.54	.52	.50	.49	.49	.50	.49
20.00	ELEV	61.10	61.10	61.10	61.10	61.10	61.09	61.08	61.09	61.09	61.09
21.00	DISCHG	.47	.46	.47	.48	.47	.45	.44	.43	.42	.43
21.00	ELEV	61.08	61.07	61.08	61.08	61.08	61.07	61.07	61.06	61.06	61.06
22.00	DISCHG	.45	.46	.44	.42	.41	.40	.40	.40	.39	.39
22.00	ELEV	61.07	61.07	61.07	61.06	61.06	61.05	61.05	61.05	61.05	61.05
23.00	DISCHG	.39	.38	.38	.38	.38	.38	.37	.37	.37	.35
23.00	ELEV	61.05	61.05	61.04	61.04	61.04	61.04	61.04	61.04	61.04	61.03
24.00	DISCHG	.33	.30	.26	.21	.18	.17	.15	.14	.13	.12
24.00	ELEV	61.02	61.01	61.00	60.98	60.97	60.96	60.96	60.95	60.95	60.95
25.00	DISCHG	.11	.11	.10	.09	.08	.08	.07	.07	.06	.06
25.00	ELEV	60.94	60.94	60.94	60.93	60.93	60.93	60.93	60.93	60.92	60.92
26.00	DISCHG	.05	.05	.05	.04	.04	.04	.03	.03	.03	.03
26.00	ELEV	60.92	60.92	60.92	60.92	60.92	60.91	60.91	60.91	60.91	60.91
27.00	DISCHG	.03	.02	.02	.02	.02	.02	.02	.02	.01	.01
27.00	ELEV	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.91	60.90
28.00	DISCHG	.01	.01	.01	.01	.01					
28.00	ELEV	60.90	60.90	60.90	60.90	60.90					

RUNOFF VOLUME ABOVE BASEFLOW = 4.14 WATERSHED INCHES, 24.27 CFS-HRS, 2.01 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 4 RECORD ID

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 MOIST 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)
<u>ALTERNATE 2 STORM 1</u>													
XSECTION 47	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.73	---	12.30	.75	369.3
XSECTION 48	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.39	---	12.30	.51	702.8
XSECTION 49	ADDHYD	.00	9	2	.10	.0	3.10	24.00	.90	---	12.26	1.32	479.5
XSECTION 50	RUNOFF	.00	9	2	.10	.0	3.10	24.00	2.53	---	12.20	.49	1171.9
XSECTION 51	RUNOFF	.00	9	2	.10	.0	3.10	24.00	2.55	---	12.20	.79	1171.9
XSECTION 52	ADDHYD	.00	9	2	.10	.0	3.10	24.00	2.54	---	12.16	1.30	1192.8
XSECTION 53	ADDHYD	.00	9	2	.10	.0	3.10	24.00	1.37	---	12.20	2.51	652.8
XSECTION 54	RUNOFF	.00	9	2	.10	.0	3.10	24.00	2.84	---	12.20	.44	1229.4
XSECTION 55	ADDHYD	.00	9	2	.10	.0	3.10	24.00	1.49	---	12.19	2.95	702.5
XSECTION 56	RUNOFF	.00	9	2	.10	.0	3.10	24.00	1.20	---	12.30	.56	612.8
XSECTION 57	ADDHYD	.01	9	2	.10	.0	3.10	24.00	1.44	---	12.20	3.51	685.9
STRUCTURE 4	RESVOR	.01	9	2	.10	.0	3.10	24.00	1.43	65.09	12.52	1.20	235.2
XSECTION 58	RUNOFF	.00	9	2	.10	.0	3.10	24.00	.68	---	12.27	1.39	348.9
XSECTION 59	ADDHYD	.01	9	2	.10	.0	3.10	24.00	1.10	---	12.30	2.46	270.3
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	3.10	24.00	1.10	61.74	12.39	2.22	244.3
<u>ALTERNATE 2 STORM 2</u>													
XSECTION 47	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.68	---	12.23	1.76	870.3
XSECTION 48	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.64	---	12.20	.95	1296.2
XSECTION 49	ADDHYD	.00	9	2	.10	.0	4.60	24.00	1.94	---	12.23	2.71	985.4
XSECTION 50	RUNOFF	.00	9	2	.10	.0	4.60	24.00	4.02	---	12.20	.75	1790.1
XSECTION 51	RUNOFF	.00	9	2	.10	.0	4.60	24.00	4.03	---	12.15	1.22	1825.8
XSECTION 52	ADDHYD	.00	9	2	.10	.0	4.60	24.00	4.03	---	12.15	1.99	1825.8
XSECTION 53	ADDHYD	.00	9	2	.10	.0	4.60	24.00	2.53	---	12.19	4.65	1210.1
XSECTION 54	RUNOFF	.00	9	2	.10	.0	4.60	24.00	4.36	---	12.20	.66	1834.9
XSECTION 55	ADDHYD	.00	9	2	.10	.0	4.60	24.00	2.69	---	12.18	5.31	1265.2
XSECTION 56	RUNOFF	.00	9	2	.10	.0	4.60	24.00	2.39	---	12.22	1.10	1204.0
XSECTION 57	ADDHYD	.01	9	2	.10	.0	4.60	24.00	2.63	---	12.19	6.40	1252.8
STRUCTURE 4	RESVOR	.01	9	2	.10	.0	4.60	24.00	2.62	66.04	12.50	2.22	435.0
XSECTION 58	RUNOFF	.00	9	2	.10	.0	4.60	24.00	1.60	---	12.26	3.38	848.3
XSECTION 59	ADDHYD	.01	9	2	.10	.0	4.60	24.00	2.17	---	12.28	5.37	590.6
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	4.60	24.00	2.17	62.34	12.54	3.51	385.7

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 MOIST 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)
<u>ALTERNATE 2 STORM 3</u>													
XSECTION 47	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.27	---	12.22	2.36	1168.1
XSECTION 48	RUNOFF	.00	9	2	.10	.0	5.40	24.00	3.35	---	12.23	1.19	1635.4
XSECTION 49	ADDHYD	.00	9	2	.10	.0	5.40	24.00	2.55	---	12.22	3.55	1292.0
XSECTION 50	RUNOFF	.00	9	2	.10	.0	5.40	24.00	4.82	---	12.20	.89	2117.0
XSECTION 51	RUNOFF	.00	9	2	.10	.0	5.40	24.00	4.83	---	12.15	1.45	2160.7
XSECTION 52	ADDHYD	.00	9	2	.10	.0	5.40	24.00	4.82	---	12.15	2.36	2160.7
XSECTION 53	ADDHYD	.00	9	2	.10	.0	5.40	24.00	3.20	---	12.19	5.86	1525.4
XSECTION 54	RUNOFF	.00	9	2	.10	.0	5.40	24.00	5.17	---	12.20	.78	2157.0
XSECTION 55	ADDHYD	.00	9	2	.10	.0	5.40	24.00	3.37	---	12.18	6.64	1581.8
XSECTION 56	RUNOFF	.00	9	2	.10	.0	5.40	24.00	3.07	---	12.21	1.39	1532.0
XSECTION 57	ADDHYD	.01	9	2	.10	.0	5.40	24.00	3.31	---	12.19	8.03	1571.6
STRUCTURE 4	RESVOR	.01	9	2	.10	.0	5.40	24.00	3.29	66.50	12.54	2.49	486.4
XSECTION 58	RUNOFF	.00	9	2	.10	.0	5.40	24.00	2.17	---	12.26	4.57	1147.1
XSECTION 59	ADDHYD	.01	9	2	.10	.0	5.40	24.00	2.80	---	12.27	6.89	757.6
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	5.40	24.00	2.80	62.67	12.57	4.07	447.3
<u>ALTERNATE 2 STORM 4</u>													
XSECTION 47	RUNOFF	.00	9	2	.10	.0	7.00	24.00	3.53	---	12.21	3.64	1800.3
XSECTION 48	RUNOFF	.00	9	2	.10	.0	7.00	24.00	4.81	---	12.22	1.68	2305.6
XSECTION 49	ADDHYD	.00	9	2	.10	.0	7.00	24.00	3.87	---	12.21	5.32	1934.3
XSECTION 50	RUNOFF	.00	9	2	.10	.0	7.00	24.00	6.42	---	12.15	1.19	2826.7
XSECTION 51	RUNOFF	.00	9	2	.10	.0	7.00	24.00	6.43	---	12.15	1.89	2826.7
XSECTION 52	ADDHYD	.00	9	2	.10	.0	7.00	24.00	6.42	---	12.15	3.08	2826.7
XSECTION 53	ADDHYD	.00	9	2	.10	.0	7.00	24.00	4.60	---	12.18	8.36	2175.9
XSECTION 54	RUNOFF	.00	9	2	.10	.0	7.00	24.00	6.78	---	12.20	1.01	2800.5
XSECTION 55	ADDHYD	.00	9	2	.10	.0	7.00	24.00	4.78	---	12.18	9.38	2233.0
XSECTION 56	RUNOFF	.00	9	2	.10	.0	7.00	24.00	4.49	---	12.20	2.00	2202.4
XSECTION 57	ADDHYD	.01	9	2	.10	.0	7.00	24.00	4.73	---	12.18	11.38	2226.5
STRUCTURE 4	RESVOR	.01	9	2	.10	.0	7.00	24.00	4.70	67.52	12.59	3.06	599.1
XSECTION 58	RUNOFF	.00	9	2	.10	.0	7.00	24.00	3.42	---	12.25	7.09	1782.0
XSECTION 59	ADDHYD	.01	9	2	.10	.0	7.00	24.00	4.14	---	12.26	9.87	1086.4
STRUCTURE 13	RESVOR	.01	9	2	.10	.0	7.00	24.00	4.14	63.38	12.59	5.30	583.0

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	3	4
<u>STRUCTURE 13</u>	<u>.01</u>				
ALTERNATE 2		2.22	3.51	4.07	5.30
<u>STRUCTURE 4</u>	<u>.01</u>				
ALTERNATE 2		1.20	2.22	2.49	3.06
<u>XSECTION 47</u>	<u>.00</u>				
ALTERNATE 2		.75	1.76	2.36	3.64
<u>XSECTION 48</u>	<u>.00</u>				
ALTERNATE 2		.51	.95	1.19	1.68
<u>XSECTION 49</u>	<u>.00</u>				
ALTERNATE 2		1.32	2.71	3.55	5.32
<u>XSECTION 50</u>	<u>.00</u>				
ALTERNATE 2		.49	.75	.89	1.19
<u>XSECTION 51</u>	<u>.00</u>				
ALTERNATE 2		.79	1.22	1.45	1.89
<u>XSECTION 52</u>	<u>.00</u>				
ALTERNATE 2		1.30	1.99	2.36	3.08
<u>XSECTION 53</u>	<u>.00</u>				
ALTERNATE 2		2.51	4.65	5.86	8.36
<u>XSECTION 54</u>	<u>.00</u>				
ALTERNATE 2		.44	.66	.78	1.01
<u>XSECTION 55</u>	<u>.00</u>				
ALTERNATE 2		2.95	5.31	6.64	9.38
<u>XSECTION 56</u>	<u>.00</u>				
ALTERNATE 2		.56	1.10	1.39	2.00
<u>XSECTION 57</u>	<u>.01</u>				
ALTERNATE 2		3.51	6.40	8.03	11.38
<u>XSECTION 58</u>	<u>.00</u>				
ALTERNATE 2		1.39	3.38	4.57	7.09

TR20 XEQ 02-04-00 13:12
REV PC 09/83(.2)

PROPOSED WATERSHED CONDITION - CHERRY HILL ESTATES SUBDIV
TYPE III STORM DISTRIBUTION 24 HOUR DURATION 2/01/00

JOB 1 SUMMARY
PAGE 51

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	3	4
<u>XSECTION 59</u>	<u>.01</u>				
ALTERNATE 2		2.46	5.37	6.89	9.87

**MITIGATIVE DRAINAGE STUDY
CHERRY HILL ESTATES
NEWBURYPORT, MA**

APPENDIX

**Hayes Engineering, Inc.
February 14, 2000**

RES 01 WATERSHED

Roadway Drainage Calculations

25-Year Storm

25 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS

FEB 7, 2000

CB L 24+75 C.H.D.

Slope= 0.0095 ft/ft Q= 0.93 cfs Velocity= 3.38 fps Depth= 0.38 ft
Sc= 0.0073 ft/ft n= 0.015 Vc= 3.08 fps Dc= 0.41 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 24+75 C.H.D.

Slope= 0.0095 ft/ft Q= 1.32 cfs Velocity= 3.71 fps Depth= 0.46 ft
Sc= 0.0077 ft/ft n= 0.015 Vc= 3.43 fps Dc= 0.49 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 24+50 C.H.D.

Slope= 0.0233 ft/ft Q= 2.92 cfs Velocity= 6.33 fps Depth= 0.57 ft
Sc= 0.0111 ft/ft n= 0.015 Vc= 4.69 fps Dc= 0.74 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 23+00 C.H.D.

Slope= 0.0307 ft/ft Q= 2.92 cfs Velocity= 7.03 fps Depth= 0.52 ft
Sc= 0.0111 ft/ft n= 0.015 Vc= 4.69 fps Dc= 0.74 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB L 21+75 C.H.D.

Slope= 0.0243 ft/ft Q= 0.7 cfs Velocity= 4.38 fps Depth= 0.26 ft
Sc= 0.0072 ft/ft n= 0.015 Vc= 2.83 fps Dc= 0.35 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 21+75 C.H.D.

Slope= 0.0243 ft/ft Q= 1.1 cfs Velocity= 4.98 fps Depth= 0.32 ft
Sc= 0.0075 ft/ft n= 0.015 Vc= 3.24 fps Dc= 0.45 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 21+50 C.H.D.

Slope= 0.0304 ft/ft Q= 4.09 cfs Velocity= 7.56 fps Depth= 0.65 ft
Sc= 0.0161 ft/ft n= 0.015 Vc= 5.68 fps Dc= 0.86 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 20+00 C.H.D.

Slope= 0.0231 ft/ft Q= 4.09 cfs Velocity= 6.75 fps Depth= 0.72 ft
Sc= 0.0161 ft/ft n= 0.015 Vc= 5.68 fps Dc= 0.86 ft
CIRCULAR CHANNEL Diameter= 1 ft

25 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS

FEB 7, 2000

CB L 18+75 C.H.D.

Slope= 0.0177 ft/ft Q= 0.6 cfs Velocity= 3.74 fps Depth= 0.26 ft
Sc= 0.0071 ft/ft n= 0.015 Vc= 2.70 fps Dc= 0.33 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 18+75 C.H.D.

Slope= 0.0177 ft/ft Q= 0.9 cfs Velocity= 4.20 fps Depth= 0.32 ft
Sc= 0.0073 ft/ft n= 0.015 Vc= 3.05 fps Dc= 0.40 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 18+60 C.H.D.

Slope= 0.0225 ft/ft Q= 5.58 cfs Velocity= 7.34 fps Depth= 0.74 ft
Sc= 0.0111 ft/ft n= 0.015 Vc= 5.49 fps Dc= 0.96 ft
CIRCULAR CHANNEL Diameter= 1.25 ft

CB L 2+75 A.W.D.

Slope= 0.0150 ft/ft Q= 1.9 cfs Velocity= 4.83 fps Depth= 0.50 ft
Sc= 0.0086 ft/ft n= 0.015 Vc= 3.90 fps Dc= 0.60 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 2+75 A.W.D.

Slope= 0.0150 ft/ft Q= 1.9 cfs Velocity= 4.83 fps Depth= 0.50 ft
Sc= 0.0086 ft/ft n= 0.015 Vc= 3.90 fps Dc= 0.60 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB LOT ~~54~~ 55- 39/40

Slope= 0.0100 ft/ft Q= 3.9 cfs Velocity= 4.94 fps Depth= 0.77 ft
Sc= 0.0086 ft/ft n= 0.015 Vc= 4.65 fps Dc= 0.81 ft
CIRCULAR CHANNEL Diameter= 1.25 ft

DMH 2+50 A.W.D.

Slope= 0.0100 ft/ft Q= 7.63 cfs Velocity= 5.78 fps Depth= 1.05 ft
Sc= 0.0093 ft/ft n= 0.015 Vc= 5.60 fps Dc= 1.08 ft
CIRCULAR CHANNEL Diameter= 1.5 ft

DMH 0+50 A.W.D.

Slope= 0.0184 ft/ft Q= 7.63 cfs Velocity= 7.37 fps Depth= 0.85 ft
Sc= 0.0093 ft/ft n= 0.015 Vc= 5.60 fps Dc= 1.08 ft
CIRCULAR CHANNEL Diameter= 1.5 ft

25 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS

FEB 7, 2000

CB R 15+47 C.H.D.

Slope= 0.0063 ft/ft Q= 0.98 cfs Velocity= 2.95 fps Depth= 0.44 ft
Sc= 0.0074 ft/ft n= 0.015 Vc= 3.13 fps Dc= 0.42 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB L 15+75 C.H.D.

Slope= 0.0400 ft/ft Q= 1.23 cfs Velocity= 6.14 fps Depth= 0.30 ft
Sc= 0.0076 ft/ft n= 0.015 Vc= 3.36 fps Dc= 0.47 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 15+90 C.H.D.

Slope= 0.0118 ft/ft Q= 5.19 cfs Velocity= 5.58 fps Depth= 0.89 ft
Sc= 0.0104 ft/ft n= 0.015 Vc= 5.29 fps Dc= 0.93 ft
CIRCULAR CHANNEL Diameter= 1.25 ft

DMH 15+75 C.H.D.

Slope= 0.0100 ft/ft Q= 14.97 cfs Velocity= 6.89 fps Depth= 1.31 ft
Sc= 0.0081 ft/ft n= 0.015 Vc= 6.33 fps Dc= 1.41 ft
CIRCULAR CHANNEL Diameter= 2 ft

DMH 16+75 C.H.D.

Slope= 0.0136 ft/ft Q= 20.55 cfs Velocity= 8.25 fps Depth= 1.48 ft
Sc= 0.0109 ft/ft n= 0.015 Vc= 7.45 fps Dc= 1.64 ft
CIRCULAR CHANNEL Diameter= 2 ft

CB L 3+25 W.H.D.

Slope= 0.0250 ft/ft Q= 1.72 cfs Velocity= 5.69 fps Depth= 0.41 ft
Sc= 0.0082 ft/ft n= 0.015 Vc= 3.76 fps Dc= 0.57 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 3+25 W.H.D.

Slope= 0.0250 ft/ft Q= 1.79 cfs Velocity= 5.75 fps Depth= 0.42 ft
Sc= 0.0084 ft/ft n= 0.015 Vc= 3.81 fps Dc= 0.58 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 3+35 W.H.D.

Slope= 0.0188 ft/ft Q= 3.51 cfs Velocity= 6.03 fps Depth= 0.69 ft
Sc= 0.0132 ft/ft n= 0.015 Vc= 5.17 fps Dc= 0.81 ft
CIRCULAR CHANNEL Diameter= 1 ft

OPERATION ADDHYD CROSS SECTION 17

INPUT HYDROGRAPHS= 3,5

OUTPUT HYDROGRAPH= 4

24" PIPE To Res 01

25yr Storm

PEAK TIME(HRS)
12.26

PEAK DISCHARGE(CFS)
20.55

PEAK ELEVATION(FEET)
(NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.02 SQ.MI.
7.00	DISCHG	.00	.00	.01	.01	.01	.03
8.00	DISCHG	.03	.03	.03	.03	.03	.06
9.00	DISCHG	.06	.07	.07	.08	.09	.17
10.00	DISCHG	.19	.22	.25	.28	.32	.56
11.00	DISCHG	.62	.70	.79	.88	1.08	8.45
12.00	DISCHG	12.67	16.09	19.02	20.09	13.86	4.34
13.00	DISCHG	3.98	3.66	3.39	3.25	3.06	2.40
14.00	DISCHG	2.35	2.31	2.27	2.24	2.16	1.83
15.00	DISCHG	1.83	1.80	1.76	1.74	1.64	1.56
16.00	DISCHG	1.51	1.49	1.49	1.47	1.38	1.07
17.00	DISCHG	.91	.91	.96	.97	.89	.91
18.00	DISCHG	.91	.85	.77	.74	.72	.81
19.00	DISCHG	.82	.76	.68	.66	.74	.63
20.00	DISCHG	.62	.65	.69	.70	.61	.69
21.00	DISCHG	.56	.60	.67	.69	.61	.64
22.00	DISCHG	.69	.65	.58	.55	.53	.53
23.00	DISCHG	.53	.53	.53	.53	.53	.51
24.00	DISCHG	.36	.24	.09	.03	.01	.00

RUNOFF VOLUME ABOVE BASEFLOW = 1.77 WATERSHED INCHES, 27.18 CFS-HRS, 2.25 ACRE-FEET; BASEFLOW = .00 CFS

25 YR STORM RES 01

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH= 1 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 63.00

PEAK TIME(HRS) 12.64 PEAK DISCHARGE(CFS) 8.37 PEAK ELEVATION(FEET) 66.37

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.03 SQ.MI.
7.00	DISCHG	.00	.00	.00	.01	.01
7.00	ELEV	64.00	64.00	64.00	64.00	64.00
8.00	DISCHG	.01	.02	.02	.04	.05
8.00	ELEV	64.00	64.00	64.01	64.01	64.01
9.00	DISCHG	.05	.06	.07	.11	.13
9.00	ELEV	64.01	64.02	64.02	64.03	64.03
10.00	DISCHG	.14	.16	.19	.29	.35
10.00	ELEV	64.04	64.04	64.05	64.06	64.07
11.00	DISCHG	.39	.44	.54	.96	1.20
11.00	ELEV	64.11	64.12	64.13	64.19	64.21
12.00	DISCHG	2.81	4.14	5.68	8.35	8.26
12.00	ELEV	64.76	65.12	65.54	66.33	66.37
13.00	DISCHG	7.99	7.84	7.67	6.39	6.11
13.00	ELEV	66.23	66.17	66.10	65.88	65.80
14.00	DISCHG	5.60	5.37	5.15	4.23	4.07
14.00	ELEV	65.51	65.45	65.39	65.24	65.19
15.00	DISCHG	3.77	3.64	3.52	2.98	2.90
15.00	ELEV	65.02	64.98	64.95	64.86	64.83
16.00	DISCHG	2.74	2.66	2.59	2.27	2.22
16.00	ELEV	64.74	64.72	64.70	64.65	64.63
17.00	DISCHG	2.07	1.99	1.92	1.62	1.58
17.00	ELEV	64.56	64.54	64.52	64.47	64.45
18.00	DISCHG	1.50	1.47	1.42	1.24	1.22
18.00	ELEV	64.41	64.40	64.39	64.36	64.34
19.00	DISCHG	1.18	1.16	1.14	1.05	1.03
19.00	ELEV	64.32	64.31	64.31	64.29	64.29
20.00	DISCHG	.98	.97	.95	.89	.88
20.00	ELEV	64.27	64.26	64.26	64.25	64.24
21.00	DISCHG	.86	.85	.84	.80	.79
21.00	ELEV	64.23	64.23	64.23	64.22	64.22
22.00	DISCHG	.78	.79	.78	.74	.73
22.00	ELEV	64.21	64.21	64.21	64.20	64.20
23.00	DISCHG	.71	.71	.70	.68	.68
23.00	ELEV	64.19	64.19	64.19	64.19	64.19
24.00	DISCHG	.65	.62	.59	.58	.57
24.00	ELEV	64.18	64.17	64.16	64.13	64.12
25.00	DISCHG	.29	.27	.25	.21	.20
25.00	ELEV	64.08	64.07	64.07	64.06	64.05
26.00	DISCHG	.12	.11	.10	.09	.08
26.00	ELEV	64.03	64.03	64.03	64.02	64.02
27.00	DISCHG	.05	.05	.04	.04	.03
27.00	ELEV	64.01	64.01	64.01	64.01	64.01
28.00	DISCHG	.02	.02	.02	.01	.01
28.00	ELEV	64.01	64.01	64.00	64.00	64.00
29.00	DISCHG	.01				
29.00	ELEV	64.00				

RUNOFF VOLUME ABOVE BASEFLOW = 1.82 WATERSHED INCHES, 33.70 CFS-HRS, 2.79 ACRE-FEET; BASEFLOW = .00 CFS

RES 01 25 YR PEAK FLOW 14 - 24" DRAIN²

CURRENT DATE: 02-11-2000
CURRENT TIME: 07:59:00

FILE DATE: 02-11-2000
FILE NAME: RES01

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) RCP

DIS-CHARGE FLOW (cfs)	HEAD- ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 = F4c	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	66.90	0.00	0.00	0-NF	0.00	0.00	0.00	0.80	0.00	0.00
2.06	67.53	0.63	-1.08	6-FFt	0.40	0.49	0.80	0.80	1.76	0.00
4.12	67.86	0.96	-1.01	6-FFt	0.57	0.71	0.80	0.80	3.51	0.00
6.18	68.12	1.22	-0.81	6-FFc	0.70	0.87	0.87	0.80	4.67	0.00
8.24	68.34	1.44	-0.51	6-FFc	0.83	1.02	1.02	0.80	5.11	0.00
10.30	68.54	1.64	-0.17	6-FFc	0.94	1.15	1.15	0.80	5.54	0.00
12.36	68.73	1.83	0.20	6-FFc	1.05	1.26	1.26	0.80	5.94	0.00
14.42	68.92	2.02	0.61	6-FFc	1.15	1.37	1.37	0.80	6.31	0.00
16.48	69.13	2.23	1.06	6-FFc	1.26	1.46	1.46	0.80	6.73	0.00
18.54	69.35	2.45	1.77	6-FFc	1.37	1.55	1.55	0.80	7.13	0.00
20.60	69.59	2.69	2.25	6-FFc	1.49	1.62	1.62	0.80	7.54	0.00

El. inlet face invert 66.90 ft El. outlet invert 65.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
INLET ELEVATION 66.90 ft
OUTLET STATION 140.00 ft
OUTLET ELEVATION 65.00 ft
NUMBER OF BARRELS 1
SLOPE (V/H) 0.0136
CULVERT LENGTH ALONG SLOPE 140.01 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
BARREL DIAMETER 2.00 ft
BARREL MATERIAL CONCRETE
BARREL MANNING'S n 0.015
INLET TYPE CONVENTIONAL
INLET EDGE AND WALL GROOVED END IN HEADWALL
INLET DEPRESSION NONE

RES 01 25YR MAX TW EL. 24' DRAIN²

CURRENT DATE: 02-11-2000
CURRENT TIME: 08:00:47

FILE DATE: 02-11-2000
FILE NAME: RES01

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4t (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	66.90	0.00	0.00	0-NF	0.00	0.00	0.00	1.37	0.00	0.00
0.69	67.27	0.37	-0.53	6-FFt	0.23	0.27	1.37	1.37	0.30	0.00
1.38	67.41	0.51	-0.52	6-FFt	0.32	0.40	1.37	1.37	0.60	0.00
2.07	67.54	0.64	-0.51	6-FFt	0.41	0.49	1.37	1.37	0.90	0.00
2.76	67.65	0.75	-0.49	6-FFt	0.46	0.58	1.37	1.37	1.20	0.00
3.45	67.76	0.86	-0.46	6-FFt	0.52	0.64	1.37	1.37	1.51	0.00
4.14	67.86	0.96	-0.44	6-FFt	0.57	0.71	1.37	1.37	1.81	0.00
4.83	67.96	1.06	-0.40	6-FFt	0.62	0.77	1.37	1.37	2.11	0.00
5.52	68.05	1.15	-0.36	6-FFt	0.66	0.83	1.37	1.37	2.41	0.00
6.21	68.13	1.23	-0.32	6-FFt	0.71	0.88	1.37	1.37	2.71	0.00
6.90	68.20	1.30	-0.27	6-FFt	0.75	0.93	1.37	1.37	3.01	0.00

El. inlet face invert 66.90 ft El. outlet invert 65.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
INLET ELEVATION 66.90 ft
OUTLET STATION 140.00 ft
OUTLET ELEVATION 65.00 ft
NUMBER OF BARRELS 1
SLOPE (V/H) 0.0136
CULVERT LENGTH ALONG SLOPE 140.01 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
BARREL DIAMETER 2.00 ft
BARREL MATERIAL CONCRETE
BARREL MANNING'S n 0.015
INLET TYPE CONVENTIONAL
INLET EDGE AND WALL GROOVED END IN HEADWALL
INLET DEPRESSION NONE

RES 01 BASIN AREA DRAIN SEGMENT 15+75 ² → 16+75 24" DRAIN

CURRENT DATE: 02-11-2000
CURRENT TIME: 08:25:26

25 YR PEAK Q
TW = 69.59

FILE DATE: 02-11-2000
FILE NAME: RES02

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4c (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	69.59	0.00	1.69	0-NF	0.00	0.00	0.00	2.69	0.00	0.00
1.50	69.60	0.53	1.70	4-FFt	0.37	0.42	2.00	2.69	0.48	0.00
3.00	69.63	0.80	1.73	4-FFt	0.52	0.60	2.00	2.69	0.95	0.00
4.50	69.68	1.02	1.78	4-FFt	0.65	0.74	2.00	2.69	1.43	0.00
6.00	69.75	1.21	1.85	4-FFt	0.76	0.86	2.00	2.69	1.91	0.00
7.50	69.84	1.37	1.94	4-FFt	0.85	0.97	2.00	2.69	2.39	0.00
9.00	69.95	1.52	2.05	4-FFt	0.95	1.07	2.00	2.69	2.86	0.00
10.50	70.08	1.66	2.18	4-FFt	1.04	1.16	2.00	2.69	3.34	0.00
12.00	70.23	1.80	2.33	4-FFt	1.13	1.24	2.00	2.69	3.82	0.00
13.50	70.41	1.94	2.51	4-FFt	1.22	1.32	2.00	2.69	4.30	0.00
15.00	70.60	2.08	2.70	4-FFt	1.31	1.40	2.00	2.69	4.77	0.00

El. inlet face invert 67.90 ft El. outlet invert 66.90 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
INLET ELEVATION 67.90 ft
OUTLET STATION 100.00 ft
OUTLET ELEVATION 66.90 ft
NUMBER OF BARRELS 1
SLOPE (V/H) 0.0100
CULVERT LENGTH ALONG SLOPE 100.00 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
BARREL DIAMETER 2.00 ft
BARREL MATERIAL CONCRETE
BARREL MANNING'S n 0.015
INLET TYPE CONVENTIONAL
INLET EDGE AND WALL GROOVED END IN HEADWALL
INLET DEPRESSION NONE

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-09-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 24+75 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.018	0.020	0.016	0.93	4.05

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.999	0.16	2.81

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.990	0.92	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB R STATION: 24+75 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.018	0.020	0.016	1.32	5.18

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.991	0.19	3.03

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.990	1.30	0.02

***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000
PROJECT: CHERRY HILL PROJECT NO.: NBT0015
INLET NO.: CB L STATION: 21+75 C.H.D.
DRAINAGE AREA: Acres DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.033	0.020	0.016	0.70	3.24

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	1.000	0.13	2.15

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	1.000	0.70	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB R STATION: 21+75 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.033	0.020	0.016	1.12	3.86

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	1.000	0.16	3.43

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	1.000	1.12	0.00

***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-09-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 18+75 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.018	0.020	0.016	0.58	3.41

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	1.000	0.14	1.83

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	1.000	0.58	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB R STATION: 18+75 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.018	0.020	0.016	0.89	3.96

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	1.000	0.16	2.73

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	1.000	0.89	0.00



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: LOT 39/40 CB INLET 2'x2' (NO CURB)
STORM & Q: 25 YR Q = 3.9 CFS

GRATE

$$Q = C_w P d^{1.485} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 5.0 \text{ FT}$$

(LEBARON LF 246)

$$d = 0.41 \text{ FT}$$

CURB INLET NA

$$Q = C_o h L \sqrt{2g d}$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT}$$

$$L = \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d =$$

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000
 PROJECT: CHERRY HILL PROJECT NO.: NBT0015
 INLET NO.: CB L STATION: 2+75 A.W.D.
 DRAINAGE AREA: Acres DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.010	0.020	0.016	1.90	7.62

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.915	0.24	2.54

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	4.00	2.00	0.940	1.79	0.11

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-09-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 2+75 A.W.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.010	0.020	0.016	1.90	7.62

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.915	0.24	2.54

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	4.00	2.00	0.940	1.79	0.11



HAYES ENGINEERING, INC.
603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-10-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 15+47 RT C.H.D. 2'x2'
STORM & Q: 25 YR Q = 0.98 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 3.75 \text{ FT} \quad (\text{LEBARON LF 246})$$

$$d = 0.20 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.08 \text{ FT}$$



HAYES ENGINEERING, INC.
603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 15+75 LT C.H.D. 2'x2'
STORM & Q: 25YR Q = 1.23 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 3.75 \text{ FT}$$

(LEBARON LF 246)

$$d = 0.23 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = 0.67$$

$$h = 0.33 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.12 \text{ FT}$$



HAYES ENGINEERING, INC.
603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 15+90 RT C.H.D. 2'x4'
STORM & Q: 25 YR Q = 5.19 CFS

GRATE

$$Q = C_w P d^{1.485} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 5.0 \text{ FT}$$

(LEBARON LF 246)

$$d = 0.49 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT}$$

$$L = 4.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.53 \text{ FT}$$



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 3+25 R&L W.H.D. 2'x2'
STORM & Q: 25YR Q = 1.8 CFS

GRATE

$Q = C_w P d^{1.5}$ (FORMULA #17 - HEC 12)

$\therefore d = (Q \div C_w P)^{2/3}$

$C_w = 3.0$

$P = 3.75 \text{ FT}$ (LEBARON LF 246)

$d = 0.29 \text{ FT}$

CURB INLET

$Q = C_o h L \sqrt{2g d}$ (FORMULA #21 - HEC 12)

$\therefore d = [Q \div C_o h L]^2 \div 2g$

$C_o = .67$

$h = .33 \text{ FT}$

$L = 2.0 \text{ FT}$

$2g = 64.4 \text{ FT/SEC}^2$

$d = 0.26 \text{ FT}$

RES 01 WATERSHED

Roadway Drainage Calculations 100-Year Storm

**Note: Alternate flow paths to RES 01 are available
from all low points**

**100 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS**

FEB 7, 2000

CB L 24+75 C.H.D.

Slope= 0.0095 ft/ft Q= 1.29 cfs Velocity= 3.69 fps Depth= 0.46 ft
 Sc= 0.0077 ft/ft n= 0.015 Vc= 3.41 fps Dc= 0.49 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 24+75 C.H.D.

Slope= 0.0095 ft/ft Q= 1.99 cfs Velocity= 4.10 fps Depth= 0.59 ft
 Sc= 0.0087 ft/ft n= 0.015 Vc= 3.97 fps Dc= 0.61 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 24+50 C.H.D.

Slope= 0.0233 ft/ft Q= 3.32 cfs Velocity= 6.52 fps Depth= 0.62 ft
 Sc= 0.0125 ft/ft n= 0.015 Vc= 5.01 fps Dc= 0.79 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 23+00 C.H.D.

Slope= 0.0307 ft/ft Q= 3.32 cfs Velocity= 7.25 fps Depth= 0.57 ft
 Sc= 0.0125 ft/ft n= 0.015 Vc= 5.01 fps Dc= 0.79 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB L 21+75 C.H.D.

Slope= 0.0243 ft/ft Q= 1.3 cfs Velocity= 5.21 fps Depth= 0.35 ft
 Sc= 0.0077 ft/ft n= 0.015 Vc= 3.42 fps Dc= 0.49 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 21+75 C.H.D.

Slope= 0.0243 ft/ft Q= 2 cfs Velocity= 5.86 fps Depth= 0.45 ft
 Sc= 0.0087 ft/ft n= 0.015 Vc= 3.98 fps Dc= 0.61 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 21+50 C.H.D.

Slope= 0.0304 ft/ft Q= 6.65 cfs Velocity= 6.54 fps Depth= 0.66 ft
 Sc= 0.0407 ft/ft n= 0.015 Vc= 8.53 fps Dc= 0.97 ft
 CIRCULAR CHANNEL Diameter= 1 ft NOT ACCURATE FOR DEPTH>1.8R MAX Q = 5.76

DMH 20+00 C.H.D.

Slope= 0.0231 ft/ft Q= 6.65 cfs Velocity= 5.90 fps Depth= 0.55 ft
 Sc= 0.0407 ft/ft n= 0.015 Vc= 8.53 fps Dc= 0.97 ft
 CIRCULAR CHANNEL Diameter= 1 ft NOT ACCURATE FOR DEPTH>1.8R MAX Q = 5.02

**100 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS**

FEB 7, 2000

CB L 18+75 C.H.D.

Slope= 0.0177 ft/ft Q= 1 cfs Velocity= 4.32 fps Depth= 0.34 ft
 Sc= 0.0074 ft/ft n= 0.015 Vc= 3.15 fps Dc= 0.42 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 18+75 C.H.D.

Slope= 0.0177 ft/ft Q= 1.5 cfs Velocity= 4.83 fps Depth= 0.42 ft
 Sc= 0.0079 ft/ft n= 0.015 Vc= 3.58 fps Dc= 0.53 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 18+60 C.H.D.

Slope= 0.0225 ft/ft Q= 9.17 cfs Velocity= 6.35 fps Depth= 0.96 ft
 Sc= 0.0231 ft/ft n= 0.015 Vc= 7.69 fps Dc= 1.17 ft
 CIRCULAR CHANNEL Diameter= 1.25 ft NOT ACCURATE FOR DEPTH>1.8R **MAX Q=8.98**

CB L 2+75 A.W.D.

Slope= 0.0150 ft/ft Q= 2.9 cfs Velocity= 5.32 fps Depth= 0.66 ft
 Sc= 0.0110 ft/ft n= 0.015 Vc= 4.68 fps Dc= 0.74 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 2+75 A.W.D.

Slope= 0.0150 ft/ft Q= 2.9 cfs Velocity= 5.32 fps Depth= 0.66 ft
 Sc= 0.0110 ft/ft n= 0.015 Vc= 4.68 fps Dc= 0.74 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB LOT ~~54-55~~ 39/40

Slope= 0.0100 ft/ft Q= 7.72 cfs Velocity= 4.48 fps Depth= 0.72 ft
 Sc= 0.0169 ft/ft n= 0.015 Vc= 6.71 fps Dc= 1.11 ft
 CIRCULAR CHANNEL Diameter= 1.25 ft NOT ACCURATE FOR DEPTH>1.8R **MAX Q=5.99**

DMH 2+50 A.W.D.

Slope= 0.0100 ft/ft Q= 13.37 cfs Velocity= 5.13 fps Depth= 0.78 ft
 Sc= 0.0187 ft/ft n= 0.015 Vc= 7.89 fps Dc= 1.37 ft
 CIRCULAR CHANNEL Diameter= 1.5 ft NOT ACCURATE FOR DEPTH>1.8R **MAX Q=9.74**

DMH 0+50 A.W.D.

Slope= 0.0184 ft/ft Q= 13.37 cfs Velocity= 6.48 fps Depth= 1.16 ft
 Sc= 0.0187 ft/ft n= 0.015 Vc= 7.89 fps Dc= 1.37 ft
 CIRCULAR CHANNEL Diameter= 1.5 ft NOT ACCURATE FOR DEPTH>1.8R **MAX Q=13.21**

**100 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS**

FEB 7, 2000

CB R 15+47 C.H.D.

Slope= 0.0063 ft/ft Q= 1.43 cfs Velocity= 3.25 fps Depth= 0.55 ft
 Sc= 0.0078 ft/ft n= 0.015 Vc= 3.53 fps Dc= 0.51 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB L 15+75 C.H.D.

Slope= 0.0400 ft/ft Q= 1.7 cfs Velocity= 6.73 fps Depth= 0.36 ft
 Sc= 0.0082 ft/ft n= 0.015 Vc= 3.74 fps Dc= 0.56 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 15+90 C.H.D.

Slope= 0.0118 ft/ft Q= 8.07 cfs Velocity= 4.81 fps Depth= 0.76 ft
 Sc= 0.0182 ft/ft n= 0.015 Vc= 6.93 fps Dc= 1.13 ft
 CIRCULAR CHANNEL Diameter= 1.25 ft NOT ACCURATE FOR DEPTH>1.8R MAX Q= 6.50

DMH 15+75 C.H.D.

Slope= 0.0100 ft/ft Q= 24.49 cfs Velocity= 5.97 fps Depth= 1.31 ft
 Sc= 0.0139 ft/ft n= 0.015 Vc= 8.36 fps Dc= 1.76 ft
 CIRCULAR CHANNEL Diameter= 2 ft NOT ACCURATE FOR DEPTH>1.8R MAX Q= 20.97

DMH 16+75 C.H.D.

Slope= 0.0136 ft/ft Q= 33.66 cfs Velocity= 7.26 fps Depth= 1.04 ft
 Sc= 0.0255 ft/ft n= 0.015 Vc= 10.88 fps Dc= 1.91 ft
 CIRCULAR CHANNEL Diameter= 2 ft NOT ACCURATE FOR DEPTH>1.8R MAX Q= 24.45

CB L 3+25 W.H.D.

Slope= 0.0250 ft/ft Q= 2.42 cfs Velocity= 6.22 fps Depth= 0.50 ft
 Sc= 0.0097 ft/ft n= 0.015 Vc= 4.30 fps Dc= 0.67 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 3+25 W.H.D.

Slope= 0.0250 ft/ft Q= 2.54 cfs Velocity= 6.29 fps Depth= 0.51 ft
 Sc= 0.0100 ft/ft n= 0.015 Vc= 4.39 fps Dc= 0.69 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 3+35 W.H.D.

Slope= 0.0188 ft/ft Q= 4.96 cfs Velocity= 5.08 fps Depth= 0.71 ft
 Sc= 0.0223 ft/ft n= 0.015 Vc= 6.56 fps Dc= 0.92 ft
 CIRCULAR CHANNEL Diameter= 1 ft NOT ACCURATE FOR DEPTH>1.8R MAX Q= 4.52

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-10-2000
 PROJECT: CHERRY HILL PROJECT NO.: NBT0015
 INLET NO.: CB L STATION: 24+75 C.H.D.
 DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.018	0.020	0.016	1.29	5.11

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.992	0.19	3.02

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.990	1.28	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-10-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB R STATION: 24+75 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.018	0.020	0.016	1.99	6.65

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.952	0.22	3.26

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.950	1.90	0.09

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-10-2000
 PROJECT: CHERRY HILL PROJECT NO.: NBT0015
 INLET NO.: CB L STATION: 21+75 C.H.D.
 DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.033	0.020	0.016	1.30	4.15

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.999	0.17	3.84

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.990	1.29	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 21+75 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.033	0.020	0.016	2.08	5.73

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.980	0.20	4.21

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.980	2.05	0.03

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-10-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB L STATION: 18+75 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.018	0.020	0.016	1.00	4.28

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.999	0.17	2.86

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.990	0.99	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-10-2000
 PROJECT: CHERRY HILL PROJECT NO.: NBT0015
 INLET NO.: CB R STATION: 18+75 C.H.D.
 DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.018	0.020	0.016	1.53	5.70

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.981	0.20	3.11

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.980	1.50	0.02



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: LOT 39/40 CB INLET 2x2' (NO CURB)
STORM & Q: 100 YR Q = 7.7 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 5.0 \text{ FT} \quad (\text{LEBARON LF 246})$$

$$d = 0.64 \text{ FT}$$

CURB INLET NA

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT}$$

$$L = \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d =$$

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-10-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB L STATION: 2+75 A.W.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.010	0.020	0.016	2.90	9.42

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.838	0.27	2.74

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	4.00	2.00	0.890	2.59	0.31

***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 2+75 A.W.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.010	0.020	0.016	2.90	9.42

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.838	0.27	2.74

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	4.00	2.00	0.890	2.59	0.31



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 15+47 RT C.H.D. 2'x2'

STORM & Q: 100 YR Q = 1.43 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 3.75 \text{ FT} \quad (\text{LEBARON LF 246})$$

$$d = 0.25 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.16 \text{ FT}$$



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 15+75 LT CH.D. 2x2

STORM & Q: 100 YR Q = 1.70 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 3.75 \text{ FT} \quad (\text{LEBARON LF 246})$$

$$d = 0.28 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = 0.67$$

$$h = 0.33 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.23 \text{ FT}$$



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 15+90 RT C.H.D. 2'x4'

STORM & Q: 100 YR Q = 8.18 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \# 17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 5.0 \text{ FT} \quad (\text{LEBARON LF 246})$$

$$d = 0.67 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \# 21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = 0.67$$

$$h = 1.33 \text{ FT}$$

$$L = 4.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 1.33 \text{ FT}$$



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 3+25 R&L W.H.D. 2'x2'

STORM & Q: 100 YR Q = 2.5 CFS

GRATE

$$Q = C_w P d^{1.485} \quad (\text{FORMULA \# 17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 3.75 \text{ FT} \quad (\text{LEBARON LF 246})$$

$$d = 0.37 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \# 21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.50 \text{ FT}$$

RES 02 WATERSHED

Roadway Drainage Calculations
25-Year Storm

**25 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS**

FEB 7,2000

CB L 9+00 C.H.D.

Slope= 0.0114 ft/ft Q= 0.9 cfs Velocity= 3.58 fps Depth= 0.36 ft
 Sc= 0.0073 ft/ft n= 0.015 Vc= 3.05 fps Dc= 0.40 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 9+00 C.H.D.

Slope= 0.0104 ft/ft Q= 0.9 cfs Velocity= 3.47 fps Depth= 0.37 ft
 Sc= 0.0073 ft/ft n= 0.015 Vc= 3.05 fps Dc= 0.40 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 9+25 C.H.D.

Slope= 0.0148 ft/ft Q= 1.76 cfs Velocity= 4.71 fps Depth= 0.48 ft
 Sc= 0.0083 ft/ft n= 0.015 Vc= 3.79 fps Dc= 0.57 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 11+00 C.H.D.

Slope= 0.0169 ft/ft Q= 1.76 cfs Velocity= 4.95 fps Depth= 0.46 ft
 Sc= 0.0083 ft/ft n= 0.015 Vc= 3.79 fps Dc= 0.57 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB L 12+00 C.H.D.

Slope= 0.0343 ft/ft Q= 1.4 cfs Velocity= 6.03 fps Depth= 0.34 ft
 Sc= 0.0078 ft/ft n= 0.015 Vc= 3.50 fps Dc= 0.51 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 12+00 C.H.D.

Slope= 0.0343 ft/ft Q= 1.4 cfs Velocity= 6.03 fps Depth= 0.34 ft
 Sc= 0.0078 ft/ft n= 0.015 Vc= 3.50 fps Dc= 0.51 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 12+05 C.H.D.

Slope= 0.0140 ft/ft Q= 4.6 cfs Velocity= 5.84 fps Depth= 0.77 ft
 Sc= 0.0095 ft/ft n= 0.015 Vc= 4.99 fps Dc= 0.88 ft
 CIRCULAR CHANNEL Diameter= 1.25 ft

CB L 14+40 C.H.D.

Slope= 0.0050 ft/ft Q= 0.96 cfs Velocity= 2.70 fps Depth= 0.46 ft
 Sc= 0.0074 ft/ft n= 0.015 Vc= 3.11 fps Dc= 0.42 ft
 CIRCULAR CHANNEL Diameter= 1 ft

CB R 14+40 C.H.D.

Slope= 0.0230 ft/ft Q= 0.99 cfs Velocity= 4.74 fps Depth= 0.31 ft
 Sc= 0.0074 ft/ft n= 0.015 Vc= 3.14 fps Dc= 0.42 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 14+25 C.H.D.

Slope= 0.0072 ft/ft Q= 1.95 cfs Velocity= 3.66 fps Depth= 0.64 ft
 Sc= 0.0087 ft/ft n= 0.015 Vc= 3.94 fps Dc= 0.60 ft
 CIRCULAR CHANNEL Diameter= 1 ft

DMH 13+40 C.H.D.

Slope= 0.0100 ft/ft Q= 6.32 cfs Velocity= 5.58 fps Depth= 0.92 ft
 Sc= 0.0082 ft/ft n= 0.015 Vc= 5.15 fps Dc= 0.98 ft
 CIRCULAR CHANNEL Diameter= 1.5 ft

**** ROADWAY DRAINAGE DESIGN ****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 9+00 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.015	0.020	0.016	0.90	4.23

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.999	0.17	2.60

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.990	0.89	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 9+00 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.020	0.016	0.90	4.23

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.999	0.17	2.60

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.990	0.89	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 12+00 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.012	0.020	0.016	1.40	6.10

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.970	0.21	2.59

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	4.00	2.00	0.980	1.37	0.02

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 14+50 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.010	0.020	0.016	0.99	5.21

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.991	0.19	2.26

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	4.00	2.00	0.990	0.98	0.00



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015

NAME CHERRY HILL

DATE 2-10-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 14+40 LT CHD. 2'x2'

STORM & Q: 25YR Q = .96 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17-HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 3.75 \text{ FT}$$

(LEBARON LF 246)

$$d = 0.19 \text{ FT}$$

CURB INLET

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21-HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.07 \text{ FT}$$

RES 02 WATERSHED

Roadway Drainage Calculations

100-Year Storm

**100 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS**

FEB 7, 2000

CB L 9+00 C.H.D.

Slope= 0.0114 ft/ft	Q= 1.3 cfs	Velocity= 3.96 fps	Depth= 0.44 ft
Sc= 0.0077 ft/ft	n= 0.015	Vc= 3.42 fps	Dc= 0.49 ft
CIRCULAR CHANNEL Diameter= 1 ft			

CB R 9+00 C.H.D.

Slope= 0.0104 ft/ft	Q= 1.3 cfs	Velocity= 3.83 fps	Depth= 0.45 ft
Sc= 0.0077 ft/ft	n= 0.015	Vc= 3.42 fps	Dc= 0.49 ft
CIRCULAR CHANNEL Diameter= 1 ft			

DMH 9+25 C.H.D.

Slope= 0.0148 ft/ft	Q= 2.61 cfs	Velocity= 5.18 fps	Depth= 0.61 ft
Sc= 0.0102 ft/ft	n= 0.015	Vc= 4.45 fps	Dc= 0.70 ft
CIRCULAR CHANNEL Diameter= 1 ft			

DMH 11+00 C.H.D.

Slope= 0.0169 ft/ft	Q= 2.61 cfs	Velocity= 5.45 fps	Depth= 0.59 ft
Sc= 0.0102 ft/ft	n= 0.015	Vc= 4.45 fps	Dc= 0.70 ft
CIRCULAR CHANNEL Diameter= 1 ft			

CB L 12+00 C.H.D.

Slope= 0.0343 ft/ft	Q= 2.2 cfs	Velocity= 6.82 fps	Depth= 0.43 ft
Sc= 0.0092 ft/ft	n= 0.015	Vc= 4.13 fps	Dc= 0.64 ft
CIRCULAR CHANNEL Diameter= 1 ft			

CB R 12+00 C.H.D.

Slope= 0.0343 ft/ft	Q= 2.2 cfs	Velocity= 6.82 fps	Depth= 0.43 ft
Sc= 0.0092 ft/ft	n= 0.015	Vc= 4.13 fps	Dc= 0.64 ft
CIRCULAR CHANNEL Diameter= 1 ft			

DMH 12+05 C.H.D.

Slope= 0.0140 ft/ft	Q= 7.02 cfs	Velocity= 6.12 fps	Depth= 1.11 ft
Sc= 0.0146 ft/ft	n= 0.015	Vc= 6.28 fps	Dc= 1.07 ft
CIRCULAR CHANNEL Diameter= 1.25 ft			

CB L 14+40 C.H.D.

Slope= 0.0050 ft/ft	Q= 1.34 cfs	Velocity= 2.93 fps	Depth= 0.57 ft
Sc= 0.0077 ft/ft	n= 0.015	Vc= 3.45 fps	Dc= 0.50 ft
CIRCULAR CHANNEL Diameter= 1 ft			

CB R 14+40 C.H.D.

Slope= 0.0230 ft/ft	Q= 1.44 cfs	Velocity= 5.26 fps	Depth= 0.38 ft
Sc= 0.0078 ft/ft	n= 0.015	Vc= 3.53 fps	Dc= 0.51 ft
CIRCULAR CHANNEL Diameter= 1 ft			

DMH 14+25 C.H.D.

Slope= 0.0072 ft/ft	Q= 2.78 cfs	Velocity= 3.78 fps	Depth= 0.89 ft
Sc= 0.0106 ft/ft	n= 0.015	Vc= 4.58 fps	Dc= 0.72 ft
CIRCULAR CHANNEL Diameter= 1 ft			

DMH 13+40 C.H.D.

Slope= 0.0100 ft/ft	Q= 9.48 cfs	Velocity= 5.87 fps	Depth= 1.29 ft
Sc= 0.0113 ft/ft	n= 0.015	Vc= 6.26 fps	Dc= 1.20 ft
CIRCULAR CHANNEL Diameter= 1.5 ft			

OPERATION ADDHYD CROSS SECTION 38 *18" Pipe in to Res 02 100 y. storm*
 INPUT HYDROGRAPHS= 4,3 OUTPUT HYDROGRAPH= 5

PEAK TIME(HRS) 12.23 PEAK DISCHARGE(CFS) 9.48 PEAK ELEVATION(FEET) (NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
6.00	DISCHG	.00	.00	.01	.01	.01	.01
7.00	DISCHG	.01	.01	.01	.01	.02	.03
8.00	DISCHG	.04	.04	.05	.05	.07	.09
9.00	DISCHG	.11	.11	.12	.13	.18	.22
10.00	DISCHG	.23	.26	.29	.31	.40	.54
11.00	DISCHG	.58	.65	.71	.77	1.41	5.69
12.00	DISCHG	7.64	8.70	9.44	9.24	2.94	1.69
13.00	DISCHG	1.57	1.45	1.33	1.28	1.09	.98
14.00	DISCHG	.91	.90	.88	.87	.77	.70
15.00	DISCHG	.70	.69	.67	.66	.61	.59
16.00	DISCHG	.57	.56	.56	.55	.50	.39
17.00	DISCHG	.33	.33	.36	.36	.32	.34
18.00	DISCHG	.34	.31	.28	.27	.28	.30
19.00	DISCHG	.30	.28	.24	.24	.27	.23
20.00	DISCHG	.23	.24	.26	.26	.22	.25
21.00	DISCHG	.20	.22	.25	.26	.19	.20
22.00	DISCHG	.26	.24	.21	.20	.19	.19
23.00	DISCHG	.19	.19	.19	.19	.19	.18
24.00	DISCHG	.12	.07	.02	.01	.00	

RUNOFF VOLUME ABOVE BASEFLOW = 3.88 WATERSHED INCHES, 12.54 CFS-HRS, 1.04 ACRE-FEET; BASEFLOW = .00 CFS

RES 02 100 yr. storm

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH= 3 OUTPUT HYDROGRAPH= 5
 SURFACE ELEVATION= 67.00

PEAK TIME(HRS) 12.43 PEAK DISCHARGE(CFS) 7.23 PEAK ELEVATION(FEET) 69.67

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS			TIME INCREMENT = .10 HOURS				DRAINAGE AREA = .01 SQ.MI.		
7.00	DISCHG	.00	.01	.01	.01	.01	.01	.01	.01	.01	.01
7.00	ELEV	67.00	67.00	67.00	67.00	67.00	67.00	67.01	67.01	67.01	67.01
8.00	DISCHG	.02	.02	.02	.03	.03	.03	.04	.04	.04	.05
8.00	ELEV	67.01	67.01	67.01	67.01	67.02	67.02	67.02	67.02	67.02	67.03
9.00	DISCHG	.06	.06	.07	.08	.09	.10	.11	.12	.13	.15
9.00	ELEV	67.03	67.03	67.04	67.04	67.05	67.05	67.06	67.07	67.07	67.08
10.00	DISCHG	.16	.18	.19	.21	.23	.25	.28	.30	.33	.36
10.00	ELEV	67.09	67.10	67.11	67.12	67.13	67.14	67.15	67.17	67.18	67.20
11.00	DISCHG	.40	.44	.48	.53	.59	.66	.76	.91	1.14	1.64
11.00	ELEV	67.22	67.24	67.27	67.29	67.32	67.36	67.42	67.50	67.62	67.90
12.00	DISCHG	2.23	2.86	3.43	4.25	7.10	6.18	4.85	3.80	3.73	3.65
12.00	ELEV	68.28	68.72	69.15	69.52	69.67	69.62	69.55	69.50	69.43	69.36
13.00	DISCHG	3.56	3.47	3.38	3.29	3.16	3.02	2.89	2.76	2.63	2.51
13.00	ELEV	69.28	69.19	69.11	69.02	68.92	68.83	68.74	68.65	68.56	68.48
14.00	DISCHG	2.40	2.30	2.20	2.11	2.02	1.94	1.86	1.77	1.66	1.56
14.00	ELEV	68.40	68.33	68.26	68.20	68.14	68.08	68.03	67.97	67.91	67.86
15.00	DISCHG	1.47	1.40	1.33	1.26	1.20	1.15	1.10	1.06	1.02	.98
15.00	ELEV	67.81	67.77	67.73	67.69	67.66	67.63	67.60	67.58	67.56	67.54
16.00	DISCHG	.95	.92	.89	.86	.84	.81	.79	.77	.75	.72
16.00	ELEV	67.52	67.50	67.49	67.47	67.46	67.45	67.43	67.42	67.41	67.40
17.00	DISCHG	.69	.65	.62	.60	.58	.56	.53	.52	.50	.49
17.00	ELEV	67.38	67.36	67.34	67.33	67.32	67.31	67.29	67.28	67.28	67.27
18.00	DISCHG	.48	.47	.46	.44	.43	.42	.41	.40	.40	.39
18.00	ELEV	67.27	67.26	67.25	67.24	67.24	67.23	67.22	67.22	67.22	67.22
19.00	DISCHG	.39	.39	.38	.37	.36	.36	.36	.35	.34	.34
19.00	ELEV	67.21	67.21	67.21	67.20	67.20	67.20	67.20	67.19	67.19	67.19
20.00	DISCHG	.33	.33	.32	.32	.32	.31	.30	.30	.30	.30
20.00	ELEV	67.18	67.18	67.18	67.18	67.17	67.17	67.17	67.17	67.17	67.17
21.00	DISCHG	.30	.29	.29	.29	.29	.29	.28	.28	.27	.27
21.00	ELEV	67.16	67.16	67.16	67.16	67.16	67.16	67.16	67.15	67.15	67.15
22.00	DISCHG	.28	.28	.28	.27	.27	.27	.26	.26	.26	.25
22.00	ELEV	67.15	67.15	67.15	67.15	67.15	67.15	67.14	67.14	67.14	67.14
23.00	DISCHG	.25	.25	.25	.25	.24	.24	.24	.24	.24	.23
23.00	ELEV	67.14	67.14	67.14	67.14	67.13	67.13	67.13	67.13	67.13	67.13
24.00	DISCHG	.23	.21	.19	.17	.15	.13	.12	.10	.09	.08
24.00	ELEV	67.12	67.12	67.11	67.09	67.08	67.07	67.06	67.06	67.05	67.04
25.00	DISCHG	.07	.06	.05	.05	.04	.04	.03	.03	.02	.02
25.00	ELEV	67.04	67.03	67.03	67.03	67.02	67.02	67.02	67.02	67.01	67.01
26.00	DISCHG	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
26.00	ELEV	67.01	67.01	67.01	67.01	67.01	67.01	67.01	67.01	67.01	67.01

RUNOFF VOLUME ABOVE BASEFLOW = 3.77 WATERSHED INCHES, 15.05 CFS-HRS, 1.24 ACRE-FEET; BASEFLOW = .00 CFS

RES 02 100 yr. PEAK FLOW IN - 18" DRAIN ²
 CURRENT DATE: 02-11-2000 FILE DATE: 02-11-2000
 CURRENT TIME: 07:17:46 FILE NAME: RES02

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.50 (ft) BY 1.50 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 = F4 _o (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	69.27	0.00	0.27	0-NF	0.00	0.00	0.00	2.00	0.00	0.00
0.95	69.46	0.46	0.29	4-FFt	0.32	0.36	0.32	2.00	3.44	0.00
1.90	69.70	0.70	0.37	4-FFt	0.46	0.51	0.46	2.00	4.10	0.00
2.85	69.89	0.89	0.49	4-FFt	0.57	0.64	0.57	2.00	4.58	0.00
3.80	70.05	1.05	0.66	4-FFt	0.67	0.74	0.67	2.00	4.94	0.00
4.75	70.20	1.20	0.87	4-FFt	0.77	0.83	0.77	2.00	5.22	0.00
5.70	70.33	1.33	1.14	4-FFt	0.86	0.92	0.86	2.00	5.45	0.00
6.65	70.46	1.46	1.45	4-FFt	0.95	0.99	0.95	2.00	5.63	0.00
7.60	70.81	1.61	1.81	4-FFt	1.05	1.07	1.50	2.00	4.30	0.00
8.55	71.22	1.76	2.22	4-FFt	1.16	1.13	1.50	2.00	4.84	0.00
9.50	71.68	1.92	2.68	4-FFt	1.31	1.19	1.50	2.00	5.38	0.00

El. inlet face invert 69.00 ft El. outlet invert 67.27 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
 INLET ELEVATION 69.00 ft
 OUTLET STATION 173.00 ft
 OUTLET ELEVATION 67.27 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0100
 CULVERT LENGTH ALONG SLOPE 173.01 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.50 ft
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S n 0.015
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL GROOVED END IN HEADWALL
 INLET DEPRESSION NONE

RES02 100yr. MAX.T.W. Elev 18" DRAIN 2

CURRENT DATE: 02-11-2000
CURRENT TIME: 07:28:05

FILE DATE: 02-11-2000
FILE NAME: RES02

PERFORMANCE CURVE FOR CULVERT 1 - (1.50 (ft) BY 1.50 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4@ (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	69.67	0.00	0.67	0-NF	0.00	0.00	0.00	2.40	0.00	0.00
0.52	69.68	0.34	0.68	4-FFt	0.23	0.26	1.50	2.40	0.29	0.00
1.04	69.70	0.49	0.70	4-FFt	0.34	0.37	1.50	2.40	0.59	0.00
1.56	69.73	0.62	0.73	4-FFt	0.42	0.47	1.50	2.40	0.88	0.00
2.08	69.79	0.74	0.79	4-FFt	0.48	0.54	1.50	2.40	1.18	0.00
2.60	69.85	0.84	0.85	4-FFt	0.54	0.61	1.50	2.40	1.47	0.00
3.12	69.94	0.94	0.93	4-FFt	0.60	0.67	0.60	2.40	4.68	0.00
3.64	70.03	1.03	1.02	4-FFt	0.66	0.73	0.66	2.40	4.88	0.00
4.16	70.13	1.11	1.13	4-FFt	0.71	0.78	1.50	2.40	2.35	0.00
4.68	70.26	1.19	1.26	4-FFt	0.76	0.83	1.50	2.40	2.65	0.00
5.20	70.39	1.26	1.39	4-FFt	0.81	0.88	1.50	2.40	2.94	0.00

El. inlet face invert 69.00 ft El. outlet invert 67.27 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
INLET ELEVATION 69.00 ft
OUTLET STATION 173.00 ft
OUTLET ELEVATION 67.27 ft
NUMBER OF BARRELS 1
SLOPE (V/H) 0.0100
CULVERT LENGTH ALONG SLOPE 173.01 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
BARREL DIAMETER 1.50 ft
BARREL MATERIAL CONCRETE
BARREL MANNING'S n 0.015
INLET TYPE CONVENTIONAL
INLET EDGE AND WALL GROOVED END IN HEADWALL
INLET DEPRESSION NONE

RES02 BASIN AREA DRAIN SEGMENT 14+25-13+40 12" DRAIN
 CURRENT DATE: 02-11-2000 100 YR PEAK Q FILE DATE: 02-11-2000
 CURRENT TIME: 07:31:52 CTW=71.68 FILE NAME: RES02

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.00 (ft) BY 1.00 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 = F4e	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	71.68	0.00	1.77	0-NF	0.00	0.00	0.00	2.38	0.00	0.00
0.28	71.69	0.28	1.78	4-FFt	0.22	0.21	1.00	2.38	0.36	0.00
0.56	71.71	0.41	1.80	4-FFt	0.31	0.31	1.00	2.38	0.71	0.00
0.84	71.76	0.53	1.85	4-FFt	0.39	0.38	1.00	2.38	1.07	0.00
1.12	71.82	0.62	1.91	4-FFt	0.45	0.44	1.00	2.38	1.43	0.00
1.40	71.91	0.71	2.00	4-FFt	0.52	0.50	1.00	2.38	1.78	0.00
1.68	72.01	0.79	2.10	4-FFt	0.58	0.55	1.00	2.38	2.14	0.00
1.96	72.13	0.86	2.22	4-FFt	0.64	0.60	1.00	2.38	2.50	0.00
2.24	72.27	0.93	2.36	4-FFt	0.71	0.64	1.00	2.38	2.85	0.00
2.52	72.42	1.01	2.51	4-FFt	0.78	0.68	1.00	2.38	3.21	0.00
2.80	72.60	1.08	2.69	4-FFt	0.89	0.72	1.00	2.38	3.57	0.00

El. inlet face invert 69.91 ft El. outlet invert 69.30 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
 INLET ELEVATION 69.91 ft
 OUTLET STATION 84.00 ft
 OUTLET ELEVATION 69.30 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0073
 CULVERT LENGTH ALONG SLOPE 84.00 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.00 ft
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S n 0.015
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL GROOVED END IN HEADWALL
 INLET DEPRESSION NONE

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000
 PROJECT: CHERRY HILL PROJECT NO.: NBT0015
 INLET NO.: CB L STATION: 9+00 C.H.D.
 DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.015	0.020	0.016	1.30	5.44

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.986	0.19	2.80

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.980	1.28	0.01

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000

 PROJECT: CHERRY HILL PROJECT NO.: NBT0015

 INLET NO.: CB R STATION: 9+00 C.H.D.

 DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.020	0.016	1.30	5.44

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.986	0.19	2.80

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.980	1.28	0.01

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-09-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 12+00 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.012	0.020	0.016	2.20	7.84

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.906	0.24	2.81

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	4.00	2.00	0.930	2.06	0.14

***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB R STATION: 12+00 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.012	0.020	0.016	2.20	7.84

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.906	0.24	2.81

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	4.00	2.00	0.930	2.06	0.14

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-09-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 14+50 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.010	0.020	0.016	1.58	6.89

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.944	0.22	2.46

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	4.00	2.00	0.960	1.52	0.06



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 14+40 LT C.H.D. 2'x2'

STORM & Q: 100YR Q = 1.48 CFS

GRATE

$Q = C_w P d^{1.5}$ (FORMULA #17 - HEC 12)

$\therefore d = (Q \div C_w P)^{2/3}$

$C_w = 3.0$

$P = 3.75 \text{ FT}$

(LEBARON LF 246)

$d = 0.26 \text{ FT}$

CURB INLET

$Q = C_o h L \sqrt{2g d}$ (FORMULA #21 - HEC 12)

$\therefore d = [Q \div C_o h L]^2 \div 2g$

$C_o = .67$

$h = .33 \text{ FT}$

$L = \text{ FT}$

$2g = 64.4 \text{ FT/SEC}^2$

$d = 0.17 \text{ FT}$

RES 04 WATERSHED

Roadway Drainage Calculations 25-Year Storm

25 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS

FEB 7, 2000

CB L 0+02 C.H.D.

Slope= 0.0150 ft/ft Q= 0.6 cfs Velocity= 3.53 fps Depth= 0.27 ft
Sc= 0.0071 ft/ft n= 0.015 Vc= 2.70 fps Dc= 0.33 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 0+10 C.H.D.

Slope= 0.0385 ft/ft Q= 0.6 cfs Velocity= 4.93 fps Depth= 0.21 ft
Sc= 0.0071 ft/ft n= 0.015 Vc= 2.70 fps Dc= 0.33 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 0+25 C.H.D.

Slope= 0.0050 ft/ft Q= 1.19 cfs Velocity= 2.85 fps Depth= 0.53 ft
Sc= 0.0076 ft/ft n= 0.015 Vc= 3.32 fps Dc= 0.47 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB L 3+00 C.H.D.

Slope= 0.0168 ft/ft Q= 1.2 cfs Velocity= 4.46 fps Depth= 0.37 ft
Sc= 0.0076 ft/ft n= 0.015 Vc= 3.33 fps Dc= 0.47 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 3+00 C.H.D.

Slope= 0.0168 ft/ft Q= 1.2 cfs Velocity= 4.46 fps Depth= 0.37 ft
Sc= 0.0076 ft/ft n= 0.015 Vc= 3.33 fps Dc= 0.47 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 2+75 C.H.D.

Slope= 0.0259 ft/ft Q= 2.36 cfs Velocity= 6.26 fps Depth= 0.48 ft
Sc= 0.0095 ft/ft n= 0.015 Vc= 4.26 fps Dc= 0.66 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 1+18 C.H.D.

Slope= 0.0080 ft/ft Q= 3.55 cfs Velocity= 4.44 fps Depth= 0.78 ft
Sc= 0.0082 ft/ft n= 0.015 Vc= 4.47 fps Dc= 0.77 ft
CIRCULAR CHANNEL Diameter= 1.25 ft

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 0+02 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.025	0.020	0.016	0.60	3.21

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	1.000	0.13	1.84

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	1.000	0.60	0.00

**** ROADWAY DRAINAGE DESIGN ****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 0+10 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.025	0.020	0.016	0.60	3.21

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	1.000	0.13	1.84

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	1.000	0.60	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 3+00 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.025	0.020	0.016	1.20	4.34

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.999	0.17	3.39

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.990	1.19	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-10-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 3+00 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 25 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.025	0.020	0.016	1.20	4.34

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	0.999	0.17	3.39

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	0.990	1.19	0.00

RES 04 WATERSHED

Roadway Drainage Calculations 100-Year Storm

100 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS

FEB 7, 2000

CB L 0+02 C.H.D.

Slope= 0.0150 ft/ft Q= 0.9 cfs Velocity= 3.96 fps Depth= 0.33 ft
Sc= 0.0073 ft/ft n= 0.015 Vc= 3.05 fps Dc= 0.40 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 0+10 C.H.D.

Slope= 0.0385 ft/ft Q= 0.9 cfs Velocity= 5.54 fps Depth= 0.26 ft
Sc= 0.0073 ft/ft n= 0.015 Vc= 3.05 fps Dc= 0.40 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 0+25 C.H.D.

Slope= 0.0050 ft/ft Q= 1.68 cfs Velocity= 3.07 fps Depth= 0.66 ft
Sc= 0.0082 ft/ft n= 0.015 Vc= 3.73 fps Dc= 0.56 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB L 3+00 C.H.D.

Slope= 0.0168 ft/ft Q= 1.8 cfs Velocity= 4.97 fps Depth= 0.47 ft
Sc= 0.0084 ft/ft n= 0.015 Vc= 3.82 fps Dc= 0.58 ft
CIRCULAR CHANNEL Diameter= 1 ft

CB R 3+00 C.H.D.

Slope= 0.0168 ft/ft Q= 1.8 cfs Velocity= 4.97 fps Depth= 0.47 ft
Sc= 0.0084 ft/ft n= 0.015 Vc= 3.82 fps Dc= 0.58 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 2+75 C.H.D.

Slope= 0.0259 ft/ft Q= 3.64 cfs Velocity= 6.93 fps Depth= 0.63 ft
Sc= 0.0138 ft/ft n= 0.015 Vc= 5.28 fps Dc= 0.82 ft
CIRCULAR CHANNEL Diameter= 1 ft

DMH 1+18 C.H.D.

Slope= 0.0080 ft/ft Q= 5.32 cfs Velocity= 4.62 fps Depth= 1.11 ft
Sc= 0.0107 ft/ft n= 0.015 Vc= 5.36 fps Dc= 0.94 ft
CIRCULAR CHANNEL Diameter= 1.25 ft

OPERATION ADDHYD CROSS SECTION 49

INPUT HYDROGRAPHS= 2,1 OUTPUT HYDROGRAPH= 3

15" PIPE TO RES 04 100 YR STORM

PEAK TIME(HRS)
12.21

PEAK DISCHARGE(CFS)
5.32

PEAK ELEVATION(FEET)
(NULL)

TIME(HRS)	DISCHG	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.00 SQ.MI.
6.00	.00	.00	.00	.00	.00	.00	.01
7.00	.01	.01	.01	.01	.01	.02	.02
8.00	.02	.02	.02	.03	.03	.03	.04
9.00	.06	.06	.07	.07	.08	.09	.10
10.00	.13	.14	.16	.17	.19	.20	.22
11.00	.32	.36	.39	.43	.52	.57	.82
12.00	4.46	4.96	5.32	5.05	2.66	1.93	1.45
13.00	.84	.77	.72	.70	.65	.63	.58
14.00	.50	.49	.48	.47	.45	.44	.41
15.00	.38	.37	.37	.36	.33	.33	.34
16.00	.31	.31	.31	.30	.28	.27	.28
17.00	.17	.19	.20	.20	.17	.17	.18
18.00	.19	.17	.15	.15	.15	.15	.16
19.00	.17	.15	.13	.13	.16	.16	.15
20.00	.13	.14	.14	.14	.11	.11	.13
21.00	.11	.13	.14	.14	.11	.11	.11
22.00	.14	.13	.11	.11	.11	.11	.11
23.00	.11	.11	.11	.11	.11	.11	.11
24.00	.07	.03	.00				

RUNOFF VOLUME ABOVE BASEFLOW = 3.87 WATERSHED INCHES, 6.87 CFS-HRS, .57 ACRE-FEET; BASEFLOW = .00 CFS

100Y12 Storm Res 04

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 1
 SURFACE ELEVATION= 64.00

PEAK TIME(HRS) 12.59 PEAK DISCHARGE(CFS) 3.06 PEAK ELEVATION(FEET) 67.52

TIME(HRS)	FIRST HYDROGRAPH POINT =	.00 HOURS	TIME INCREMENT =	.10 HOURS	DRAINAGE AREA =	.01 SQ.MI.
2.00	DISCHG	.00	.00	.00	.01	.01
2.00	ELEV	64.00	64.00	64.00	64.01	64.01
3.00	DISCHG	.01	.01	.02	.02	.02
3.00	ELEV	64.01	64.01	64.01	64.02	64.02
4.00	DISCHG	.03	.03	.03	.03	.04
4.00	ELEV	64.02	64.02	64.03	64.03	64.03
5.00	DISCHG	.04	.04	.04	.05	.05
5.00	ELEV	64.04	64.04	64.04	64.04	64.04
6.00	DISCHG	.06	.06	.06	.06	.06
6.00	ELEV	64.05	64.05	64.05	64.06	64.06
7.00	DISCHG	.07	.07	.08	.08	.09
7.00	ELEV	64.07	64.07	64.07	64.08	64.08
8.00	DISCHG	.12	.13	.13	.14	.15
8.00	ELEV	64.11	64.11	64.12	64.13	64.13
9.00	DISCHG	.19	.20	.21	.21	.22
9.00	ELEV	64.17	64.18	64.19	64.20	64.20
10.00	DISCHG	.30	.31	.33	.34	.36
10.00	ELEV	64.27	64.28	64.30	64.31	64.33
11.00	DISCHG	.51	.54	.58	.62	.67
11.00	ELEV	64.46	64.49	64.53	64.56	64.61
12.00	DISCHG	2.05	2.39	2.64	2.87	3.01
12.00	ELEV	65.87	66.33	66.77	67.19	67.43
13.00	DISCHG	2.95	2.92	2.87	2.83	2.79
13.00	ELEV	67.33	67.26	67.19	67.12	67.04
14.00	DISCHG	2.52	2.48	2.43	2.39	2.35
14.00	ELEV	66.57	66.49	66.41	66.34	66.26
15.00	DISCHG	1.96	1.87	1.79	1.71	1.64
15.00	ELEV	65.78	65.70	65.63	65.56	65.49
16.00	DISCHG	1.29	1.24	1.19	1.15	1.11
16.00	ELEV	65.17	65.12	65.08	65.04	65.01
17.00	DISCHG	.89	.85	.81	.78	.75
17.00	ELEV	64.80	64.77	64.74	64.71	64.69
18.00	DISCHG	.61	.59	.57	.55	.53
18.00	ELEV	64.56	64.54	64.52	64.50	64.48
19.00	DISCHG	.45	.44	.43	.42	.41
19.00	ELEV	64.41	64.40	64.39	64.38	64.37
20.00	DISCHG	.36	.35	.35	.34	.33
20.00	ELEV	64.33	64.32	64.32	64.31	64.30
21.00	DISCHG	.30	.30	.29	.29	.29
21.00	ELEV	64.27	64.27	64.27	64.27	64.26
22.00	DISCHG	.27	.27	.27	.26	.26
22.00	ELEV	64.24	64.24	64.24	64.24	64.23
23.00	DISCHG	.24	.24	.24	.23	.23
23.00	ELEV	64.22	64.22	64.21	64.21	64.21
24.00	DISCHG	.21	.21	.19	.18	.17
24.00	ELEV	64.19	64.19	64.17	64.16	64.15
25.00	DISCHG	.11	.10	.09	.08	.08
25.00	ELEV	64.10	64.09	64.08	64.08	64.07
26.00	DISCHG	.05	.05	.04	.04	.04
26.00	ELEV	64.05	64.04	64.04	64.04	64.03
27.00	DISCHG	.02	.02	.02	.02	.02
27.00	ELEV	64.02	64.02	64.02	64.02	64.02

RES 04 10042 PEAK FLOW IN 15"² DRAIN

CURRENT DATE: 02-11-2000
 CURRENT TIME: 08:42:26

FILE DATE: 02-11-2000
 FILE NAME: RES04

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.25 (ft) BY 1.25 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 _F4c (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	67.98	0.00	0.00	0-NF	0.00	0.00	0.00	0.31	0.00	0.00
0.53	68.34	0.36	-1.15	6-FFt	0.27	0.28	0.31	0.31	2.21	0.00
1.06	68.52	0.54	-1.00	6-FFc	0.39	0.40	0.40	0.31	3.13	0.00
1.59	68.67	0.69	-0.80	6-FFc	0.48	0.50	0.50	0.31	3.47	0.00
2.12	68.80	0.82	-0.58	6-FFc	0.57	0.58	0.58	0.31	3.82	0.00
2.65	68.91	0.93	-0.33	6-FFc	0.65	0.65	0.65	0.31	4.10	0.00
3.18	69.01	1.03	-0.05	6-FFc	0.72	0.72	0.72	0.31	4.38	0.00
3.71	69.11	1.13	0.27	6-FFc	0.80	0.78	0.78	0.31	4.63	0.00
4.24	69.21	1.23	0.63	6-FFc	0.88	0.83	0.83	0.31	4.90	0.00
4.77	69.31	1.33	1.02	6-FFc	0.98	0.88	0.88	0.31	5.14	0.00
5.30	69.43	1.44	1.45	6-FFc	1.11	0.93	0.93	0.31	5.43	0.00

El. inlet face invert 67.98 ft El. outlet invert 66.50 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
 INLET ELEVATION 67.98 ft
 OUTLET STATION 185.00 ft
 OUTLET ELEVATION 66.50 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0080
 CULVERT LENGTH ALONG SLOPE 185.01 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.25 ft
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S n 0.015
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL GROOVED END IN HEADWALL
 INLET DEPRESSION NONE

RES04 10042 MAX T.W. ELEV 15" DRAIN²
 CURRENT DATE: 02-11-2000 FILE DATE: 02-11-2000
 CURRENT TIME: 08:44:39 FILE NAME: RES04

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.25 (ft) BY 1.25 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW NORMAL HDS5 =F4C (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	67.98	0.00	0.00	0-NF	0.00	0.00	0.00	1.02	0.00
0.15	68.19	0.21	-0.46	6-FFt	0.14	0.14	1.02	1.02	0.14
0.30	68.25	0.27	-0.45	6-FFt	0.20	0.20	1.02	1.02	0.28
0.45	68.31	0.33	-0.45	6-FFt	0.25	0.26	1.02	1.02	0.42
0.60	68.37	0.39	-0.43	6-FFt	0.29	0.30	1.02	1.02	0.56
0.75	68.42	0.44	-0.42	6-FFt	0.32	0.33	1.02	1.02	0.70
0.90	68.47	0.49	-0.40	6-FFt	0.36	0.37	1.02	1.02	0.84
1.05	68.52	0.54	-0.38	6-FFt	0.39	0.40	1.02	1.02	0.98
1.20	68.56	0.58	-0.36	6-FFt	0.41	0.43	1.02	1.02	1.12
1.35	68.61	0.63	-0.33	6-FFt	0.44	0.46	1.02	1.02	1.26
1.50	68.65	0.67	-0.30	6-FFt	0.47	0.48	1.02	1.02	1.40

El. inlet face invert 67.98 ft El. outlet invert 66.50 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
 INLET ELEVATION 67.98 ft
 OUTLET STATION 185.00 ft
 OUTLET ELEVATION 66.50 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0080
 CULVERT LENGTH ALONG SLOPE 185.01 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.25 ft
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S n 0.015
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL GROOVED END IN HEADWALL
 INLET DEPRESSION NONE

RES 04 BASIN AREA DRAIN SEGMENT² 0+25 → 1+18

CURRENT DATE: 02-11-2000 FILE DATE: 02-11-2000
 CURRENT TIME: 08:58:14 100YR PEAK Q FILE NAME: RES04

TW = 69.43

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.00 (ft) BY 1.00 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FULL FLOW HDS5 = F4# (ft)	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	69.43	0.00	0.83	0-NF	0.00	0.00	0.00	1.29	0.00	0.00
0.17	69.43	0.22	0.83	4-FFt	0.19	0.16	1.00	1.29	0.22	0.00
0.34	69.44	0.31	0.84	4-FFt	0.26	0.24	1.00	1.29	0.43	0.00
0.51	69.46	0.39	0.86	4-FFt	0.33	0.30	1.00	1.29	0.65	0.00
0.68	69.49	0.47	0.89	4-FFt	0.38	0.34	1.00	1.29	0.87	0.00
0.85	69.52	0.53	0.92	4-FFt	0.43	0.38	1.00	1.29	1.08	0.00
1.02	69.56	0.59	0.96	4-FFt	0.48	0.42	1.00	1.29	1.30	0.00
1.19	69.61	0.65	1.01	4-FFt	0.53	0.46	1.00	1.29	1.52	0.00
1.36	69.66	0.70	1.06	4-FFt	0.57	0.49	1.00	1.29	1.73	0.00
1.53	69.73	0.75	1.13	4-FFt	0.62	0.52	1.00	1.29	1.95	0.00
1.70	69.79	0.79	1.19	4-FFt	0.66	0.55	1.00	1.29	2.16	0.00

El. inlet face invert 68.60 ft El. outlet invert 68.14 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT *****

INLET STATION 0.00 ft
 INLET ELEVATION 68.60 ft
 OUTLET STATION 92.00 ft
 OUTLET ELEVATION 68.14 ft
 NUMBER OF BARRELS 1
 SLOPE (V/H) 0.0050
 CULVERT LENGTH ALONG SLOPE 92.00 ft

***** CULVERT DATA SUMMARY *****

BARREL SHAPE CIRCULAR
 BARREL DIAMETER 1.00 ft
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S n 0.015
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL GROOVED END IN HEADWALL
 INLET DEPRESSION NONE

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB L STATION: 0+02 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.025	0.020	0.016	0.90	3.74

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	1.000	0.15	2.76

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	1.000	0.90	0.00

**** ROADWAY DRAINAGE DESIGN ****

DESIGNER: EES

DATE: 02-09-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB R

STATION: 0+10 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
-----	-----	-----	-----	-----	-----
Composite	0.025	0.020	0.016	0.90	3.74

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
-----	-----	-----	-----	-----	-----
2.00	0.040	1.00	1.000	0.15	2.76

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
-----	-----	-----	-----	-----	-----
Curved Vane	2.00	2.00	1.000	0.90	0.00

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES

DATE: 02-09-2000

PROJECT: CHERRY HILL

PROJECT NO.: NBT0015

INLET NO.: CB L

STATION: 3+00 C.H.D.

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.025	0.020	0.016	1.80	5.69

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.981	0.20	3.67

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.980	1.76	0.03

 ***** ROADWAY DRAINAGE DESIGN *****

DESIGNER: EES DATE: 02-09-2000

PROJECT: CHERRY HILL PROJECT NO.: NBT0015

INLET NO.: CB R STATION: 3+00 C.H.D.

DRAINAGE AREA: Acres DESIGN FREQUENCY: 100Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.025	0.020	0.016	1.80	5.69

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.040	1.00	0.981	0.20	3.67

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Curved Vane	2.00	2.00	0.980	1.76	0.03

CROSS-CULVERTS

25-Year & 100-Year Storms

RUNOFF CURVE NUMBER COMPUTATION

Version 2.10

Project : CHERRY HILL

User: EES

Date: 02-14-2000

County :

State:

Checked: _____

Date: _____

Subtitle: WATERSHED TO CULVERT AT ENTRANCE

Subarea : 1

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

OTHER AGRICULTURAL LANDS				
Brush - brush, weed, grass mix good	-	.64(48)	.37(65)	-
Total Area (by Hydrologic Soil Group)		.64	.37	
		====	====	

SUBAREA: 1 TOTAL DRAINAGE AREA: 1.01 Acres WEIGHTED CURVE NUMBER: 54*

* - Generated for use by GRAPHIC method

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : CHERRY HILL User: EES Date: 02-14-2000

County : State: Checked: ____ Date: _____

Subtitle: WATERSHED TO CULVERT AT ENTRANCE

```

-----
Flow Type  2 year  Length  Slope  Surface  n  Area  Wp  Velocity  Time
           rain    (ft)   (ft/ft) code  (sq/ft) (ft) (ft/sec) (hr)
-----
Sheet      3.1     50     .03    F                0.118
Shallow Concent'd  300     .05    U                0.023
    
```

Time of Concentration = 0.14*

=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Bermuda	--- Surface Codes ---
C Cultivated = 20 % Res.	H Woods, Light	P Paved
D Cultivated ≠ 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

* - Generated for use by GRAPHIC method

GRAPHICAL PEAK DISCHARGE METHOD

Version 2.10

Project : CHERRY HILL

User: EES

Date: 02-14-2000

County :

State:

Checked: _____

Date: _____

Subtitle: WATERSHED TO CULVERT AT ENTRANCE

Data: Drainage Area : 1.01 * Acres
 Runoff Curve Number : 54 *
 Time of Concentration: 0.14 * Hours
 Rainfall Type : III
 Pond and Swamp Area : NONE

```

=====
¶ Storm Number      ¶ 1 ¶ 2 ¶
¶-----¶-----¶
¶ Frequency (yrs)   ¶ 25 ¶ 100 ¶
¶                  ¶   ¶   ¶
¶ 24-Hr Rainfall (in) ¶ 5.4 ¶ 7.0 ¶
¶                  ¶   ¶   ¶
¶ Ia/P Ratio        ¶ 0.32 ¶ 0.24 ¶
¶                  ¶   ¶   ¶
¶ Runoff (in)       ¶ 1.12 ¶ 2.03 ¶
¶                  ¶   ¶   ¶
¶ Unit Peak Discharge ¶0.827 ¶0.885 ¶
¶ (cfs/acre/in)    ¶   ¶   ¶
¶                  ¶   ¶   ¶
¶ Pond and Swamp Factor ¶ 1.00 ¶ 1.00 ¶
¶ 0.0% Ponds Used   ¶   ¶   ¶
¶-----¶-----¶
¶ Peak Discharge (cfs) ¶ 1 ¶ 2 ¶
=====
    
```

* - Value(s) provided from TR-55 system routines

25 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS

FEB 7, 2000

15" CULVERT @ 21+00 C.H.D.

Slope= 0.0385 ft/ft Q= 2 cfs Velocity= 6.82 fps Depth= 0.36 ft
Sc= 0.0070 ft/ft n= 0.015 Vc= 3.67 fps Dc= 0.57 ft
CIRCULAR CHANNEL Diameter= 1.25 ft

15" CULVERT @ 21+00 C.H.D.

Slope= 0.0190 ft/ft Q= 2 cfs Velocity= 5.29 fps Depth= 0.43 ft
Sc= 0.0070 ft/ft n= 0.015 Vc= 3.67 fps Dc= 0.57 ft
CIRCULAR CHANNEL Diameter= 1.25 ft

18" CULVERT BETWEEN 12+00 & 13+50 C.H.D.

Slope= 0.0050 ft/ft Q= 3.9 cfs Velocity= 3.82 fps Depth= 0.84 ft
Sc= 0.0068 ft/ft n= 0.015 Vc= 4.30 fps Dc= 0.77 ft
CIRCULAR CHANNEL Diameter= 1.5 ft

12" CULVERT @ 0-34 C.H.D.

Slope= 0.0050 ft/ft Q= 1 cfs Velocity= 2.72 fps Depth= 0.47 ft
Sc= 0.0074 ft/ft n= 0.015 Vc= 3.15 fps Dc= 0.42 ft
CIRCULAR CHANNEL Diameter= 1 ft



HAYES ENGINEERING, INC.

603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 13+50 ± LT 2'x2' W/D.I.
STORM & Q: 25 YR Q = 3.9 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 5.0 \text{ FT}$$

(LEBARON LF 246)

$$d = 0.41 \text{ FT}$$

~~CURB INLET~~ DROP INLET 8'x24"

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = 0.67$$

$$h = ~~1.33~~ \text{ FT } 0.67 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.29 \text{ FT (ABOVE CENTER OF OPENING)}$$

**100 YEAR STORM PIPE FLOW CALCULATIONS
CHERRY HILL ESTATES
NEWBURYPORT, MASSACHUSETTS**

FEB 7, 2000

15" CULVERT @ 21+00 C.H.D.

Slope= 0.0385 ft/ft	Q= 3.9 cfs	Velocity= 8.21 fps	Depth= 0.51 ft
Sc= 0.0086 ft/ft	n= 0.015	Vc= 4.65 fps	Dc= 0.81 ft
CIRCULAR CHANNEL Diameter= 1.25 ft			

15" CULVERT @ 21+00 C.H.D.

Slope= 0.0190 ft/ft	Q= 3.9 cfs	Velocity= 6.32 fps	Depth= 0.63 ft
Sc= 0.0086 ft/ft	n= 0.015	Vc= 4.65 fps	Dc= 0.81 ft
CIRCULAR CHANNEL Diameter= 1.25 ft			

18" CULVERT BETWEEN 12+00 & 13+50 C.H.D.

Slope= 0.0050 ft/ft	Q= 6.3 cfs	Velocity= 4.16 fps	Depth= 1.20 ft
Sc= 0.0082 ft/ft	n= 0.015	Vc= 5.14 fps	Dc= 0.98 ft
CIRCULAR CHANNEL Diameter= 1.5 ft			

12" CULVERT @ 0-34 C.H.D.

Slope= 0.0050 ft/ft	Q= 2 cfs	Velocity= 3.16 fps	Depth= 0.75 ft
Sc= 0.0087 ft/ft	n= 0.015	Vc= 3.98 fps	Dc= 0.61 ft
CIRCULAR CHANNEL Diameter= 1 ft			



HAYES ENGINEERING, INC.
603 SALEM STREET
WAKEFIELD, MA 01880
TEL.: (781) 246-2800
FAX: (781) 246-7596

REFER TO FILE # NBT 0015
NAME CHERRY HILL
DATE 2-16-00

MADE BY ECS

MEMO

CALCULATION

WATER DEPTH @ SAG CATCH BASINS

LOCATION & SIZE: 13+50 ± LT 2'x2' W/D.I.

STORM & Q: 100YR Q = 6.3 CFS

GRATE

$$Q = C_w P d^{1.5} \quad (\text{FORMULA \#17 - HEC 12})$$

$$\therefore d = (Q \div C_w P)^{2/3}$$

$$C_w = 3.0$$

$$P = 5.0$$

(LEBARON LF 246)

$$d = 0.56 \text{ FT}$$

~~CURB INLET~~ DROP INLET - 8" x 24"

$$Q = C_o h L \sqrt{2g d} \quad (\text{FORMULA \#21 - HEC 12})$$

$$\therefore d = [Q \div C_o h L]^2 \div 2g$$

$$C_o = .67$$

$$h = .33 \text{ FT} \quad .67 \text{ FT}$$

$$L = 2.0 \text{ FT}$$

$$2g = 64.4 \text{ FT/SEC}^2$$

$$d = 0.76 \text{ FT (ABOVE CENTER OF OPENING)}$$