

HEC-1 Analyses: Zones I – IV (100-Yr, 24-Hr Event)

HEC-1: 100-Yr (Zone I)

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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 07JUL06 TIME 10:34:10
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*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
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X X X X X
X X X X X
X X XXXXXXX XXXXX XXX

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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HECL (JAN 73), HECLGS, HECLDB, AND HECLKW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS.WRITE STAGE FREQUENCY, DSS.READ TIME SERIES AT DESIRED CALCULATION INTERVAL, LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID Virginia Highlands, LLC (Old TRW Site) - Floodplain Analysis Zone I
2 ID Analyzed June 28, 2006
3 ID 100-YEAR, 24-HR STORM EVENT (TYPE II STORM)
4 IT 30 28JUN06 0800 300
5 IO 3

6 KK SUB 1
7 KM SEE DRAINAGE MAP
8 PB 4.2
9 PC 0.0 0.0051 0.0105 0.0161 0.0220 0.0281 0.0345 0.0411 0.0480 0.0553
10 PC 0.0630 0.0712 0.0800 0.0892 0.0990 0.1093 0.1200 0.1322 0.1470 0.1630
11 PC 0.1810 0.2040 0.2350 0.2830 0.6630 0.7350 0.7720 0.7990 0.8200 0.8376
12 PC 0.8535 0.8676 0.8800 0.8912 0.9018 0.9117 0.9210 0.9297 0.9377 0.9452
13 PC 0.9520 0.9584 0.9647 0.9709 0.9770 0.9829 0.9887 0.9944 1.0000
14 BA 0.85
15 LS 0 87
16 UD 0.20

17 KK PT A
18 KM ROUTE SUB 1 THRU 3A - KINEMATIC WAVE ROUTING FROM A TO C
19 RK 4100 0.049 .04 TRAP 4 2.5

20 KK SUB 3A
21 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
22 BA 0.31
23 LS 0 87
24 UD 0.19

25 KK PT C
26 KM COMBINE SUB AREAS 1 AND 3A
27 HC 2

28 KK SUB 2
29 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
30 BA 1.18
31 LS 0 87
32 UD 0.23

33 KK PT B
34 KM ROUTE SUB 2 THRU 3 - KINEMATIC WAVE ROUTING FROM B TO C
35 RK 4100 0.049 0.04 TRAP 5 11.0

36 KK SUB 3
37 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
38 BA 0.33
39 LS 0 87
40 UD 0.20

41 KK PT C
42 KM COMBINE SUB AREAS 2 AND 3
43 HC 2
44 KK PT C
45 KM ROUTE 1&3A & 2&3 THRU 4 - KINEMATIC WAVE ROUTING FROM C TO D
46 RK 8000 0.032 0.04 TRAP 10 7.5

47 KK SUB 4
48 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
49 BA 1.57
50 LS 0 87
51 UD 0.74

52 KK PT D
53 KM COMBINE SUB AREAS 1, 3A AND 4
54 HC 3
55 ZZ

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Virginia Highlands, LLC (Old TRW Site) - Floodplain Analysis Zone I
Analyzed June 28, 2006
100-YEAR, 24-HR STORM EVENT (TYPE II STORM)

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5 IO      OUTPUT CONTROL VARIABLES
          IPRNT      3      PRINT CONTROL
          IPLOT      0      PLOT CONTROL
          QSCAL      0.     HYDROGRAPH PLOT SCALE

IT        HYDROGRAPH TIME DATA
          NMIN       30     MINUTES IN COMPUTATION INTERVAL
          IDATE      28JUN 6 STARTING DATE
          ITIME      0800   STARTING TIME
          NQ         300    NUMBER OF HYDROGRAPH ORDINATES
          NDDATE     4JUL 6 ENDING DATE
          NDTIME     1330   ENDING TIME
          ICENT      19     CENTURY MARK

          COMPUTATION INTERVAL .50 HOURS
          TOTAL TIME BASE 149.50 HOURS

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ENGLISH UNITS
DRAINAGE AREA      SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW               CUBIC FEET PER SECOND
STORAGE VOLUME    ACRE-FEET
SURFACE AREA      ACRES
TEMPERATURE       DEGREES FAHRENHEIT

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6 KK      *****
          *
          * SUB 1
          *
          *
          *****
          SEE DRAINAGE MAP

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14 BA     SUBBASIN RUNOFF DATA
          SUBBASIN CHARACTERISTICS
          TAREA      .85   SUBBASIN AREA

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          PRECIPITATION DATA
          STORM      4.20  BASIN TOTAL PRECIPITATION

9 PI      INCREMENTAL PRECIPITATION PATTERN
          .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
          .01      .01      .01      .01      .01      .01      .01      .01      .02      .02
          .02      .03      .05      .38      .07      .04      .03      .02      .02      .02
          .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
          .01      .01      .01      .01      .01      .01      .01      .01

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15 LS     SCS LOSS RATE
          STRTTL    .30   INITIAL ABSTRACTION
          CRVNR     87.00 CURVE NUMBER
          RTIMP     .00   PERCENT IMPERVIOUS AREA

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16 UD     SCS DIMENSIONLESS UNITGRAPH
          TLAG      .20   LAG

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UNIT HYDROGRAPH
5 END-OF-PERIOD ORDINATES

815. 228. 45. 9. 0.
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HYDROGRAPH AT STATION

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TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW      TIME      MAXIMUM AVERAGE FLOW
+ (CFS)        (HR)      6-HR      24-HR      72-HR      149.50-HR
+ 1024.        12.00    (CFS)
          (INCHES) 2.247    64.      21.      10.
          (AC-FT) 102.     2.821    2.821    2.821
          CUMULATIVE AREA = .85 SQ MI

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 * * * * *
 17 KK * * * * * PT A
 * * * * *

ROUTE SUB 1 THRU 3A - KINEMATIC WAVE ROUTING FROM A TO C

HYDROGRAPH ROUTING DATA

19 RK KINEMATIC WAVE STREAM ROUTING
 L 4100. CHANNEL LENGTH
 S .0490 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 4.00 BOTTOM WIDTH OR DIAMETER
 Z 2.50 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	3.09	1.37	1.19	1366.67	1019.33	722.53	2.82	20.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1279E+03 EXCESS= .0000E+00 OUTFLOW= .1279E+03 BASIN STORAGE= .5039E-08 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	3.09	1.37	30.00		955.13	720.00	2.84	
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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
955.	12.00	207. (INCHES)	65. 2.266	22. 2.842	10. 2.842
		103. (AC-FT)	129.	129.	129.

CUMULATIVE AREA = .85 SQ MI

 * * * * *
 20 KK * * * * * SUB 3A
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

22 BA SUBBASIN CHARACTERISTICS
 TAREA .31 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

23 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

24 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .19 LAG

 UNIT HYDROGRAPH
 5 END-OF-PERIOD ORDINATES

297.	83.	16.	3.	0.
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HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
374.	12.00	75. (INCHES)	24. 2.247	8. 2.821	4. 2.821
		37. (AC-FT)	47.	47.	47.

CUMULATIVE AREA = .31 SQ MI

 * * * * *
 25 KK * * * * * PT C
 * * * * *

COMBINE SUB AREAS 1 AND 3A

27 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
1329.	12.00	282.	88.	29.	14.
		(INCHES) 2.261	2.837	2.837	2.837
		(AC-FT) 140.	175.	175.	175.

CUMULATIVE AREA = 1.16 SQ MI

 * * * * *
 28 KK * * * * * SUB 2
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

30 BA SUBBASIN CHARACTERISTICS
 TAREA 1.18 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

31 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

32 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .23 LAG

UNIT HYDROGRAPH
 5 END-OF-PERIOD ORDINATES
 1131. 317. 62. 12. 0.

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
1422.	12.00	285.	89.	30.	14.
		(INCHES) 2.247	2.821	2.821	2.821
		(AC-FT) 141.	178.	178.	178.

CUMULATIVE AREA = 1.18 SQ MI

 * * *
 33 KK * * * PT B
 * * *

ROUTE SUB 2 THRU 3 - KINEMATIC WAVE ROUTING FROM B TO C

HYDROGRAPH ROUTING DATA

35 RK KINEMATIC WAVE STREAM ROUTING
 L 4100. CHANNEL LENGTH
 S .0490 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 5.00 BOTTOM WIDTH OR DIAMETER
 Z 11.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	2.22	1.34	1.55	1366.67	1416.74	723.18	2.82	15.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1775E+03 EXCESS= .0000E+00 OUTFLOW= .1776E+03 BASIN STORAGE= .4491E-08 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	2.22	1.34	30.00		1294.99	720.00	2.85	
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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (AC-FT)	149.50-HR (CFS)
1295.	12.00	288.	2.269	143.	14.
		90.	2.846	179.	2.846
		30.	179.	179.	179.
		14.			

CUMULATIVE AREA = 1.18 SQ MI

 * * *
 36 KK * * * SUB 3
 * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

38 BA SUBBASIN CHARACTERISTICS
 TAREA .33 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

39 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

40 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .20 LAG

 UNIT HYDROGRAPH
 5 END-OF-PERIOD ORDINATES
 0.

316. 89. 17. 3.

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (AC-FT)	149.50-HR (CFS)
398.	12.00	80.	2.247	40.	4.
		25.	2.821	50.	2.821
		8.	50.	50.	50.
		4.			

CUMULATIVE AREA = .33 SQ MI

 * * *
 41 KK * * * PT C
 * * *

COMBINE SUB AREAS 2 AND 3

43 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
1693.	12.00	368.	115.	38.	19.
		(INCHES) 2.264	2.841	2.841	2.841
		(AC-FT) 182.	229.	229.	229.

CUMULATIVE AREA = 1.51 SQ MI

 * * *
 44 KK * * * PT C
 * * *

ROUTE 1&3A & 2&3 THRU 4 - KINEMATIC WAVE ROUTING FROM C TO D

HYDROGRAPH ROUTING DATA

46 RK KINEMATIC WAVE STREAM ROUTING
 L 8000. CHANNEL LENGTH
 S .0320 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 10.00 BOTTOM WIDTH OR DIAMETER
 Z 7.50 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.75	1.37	2.93	2666.67	1653.49	725.08	2.84	15.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2288E+03 EXCESS= .0000E+00 OUTFLOW= .2288E+03 BASIN STORAGE= .3870E-06 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.75	1.37	30.00	1381.33	720.00	2.88
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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
1381.	12.00	373.	117.	39.	19.
		(INCHES) 2.297	2.875	2.875	2.875
		(AC-FT) 185.	232.	232.	232.

CUMULATIVE AREA = 1.51 SQ MI

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*
47 KK * SUB 4
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UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

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49 BA SUBBASIN CHARACTERISTICS
TAREA 1.57 SUBBASIN AREA

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PRECIPITATION DATA

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8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

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9 PI INCREMENTAL PRECIPITATION PATTERN
.01 .01 .01 .01 .01 .01 .01 .01 .01 .01
.01 .01 .01 .01 .01 .01 .01 .01 .01 .01
.02 .03 .05 .38 .07 .04 .03 .02 .02 .02
.01 .01 .01 .01 .01 .01 .01 .01 .01 .01
.01 .01 .01 .01 .01 .01 .01 .01 .01 .01

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50 LS SCS LOSS RATE
STRTL .30 INITIAL ABSTRACTION
CRVNR 87.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

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51 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .74 LAG

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UNIT HYDROGRAPH
9 END-OF-PERIOD ORDINATES

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370. 771. 511. 210. 94. 41. 18. 8. 4.

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HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
1116.	12.50	377.	119.	40.	19.
		(INCHES) 2.234	2.821	2.821	2.821
		(AC-FT) 187.	236.	236.	236.

CUMULATIVE AREA = 1.57 SQ MI

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*****
*
52 KK * PT D
*
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COMBINE SUB AREAS 1, 3A AND 4

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54 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
3297.	12.00	1032.	324.	108.	52.
		(INCHES) 2.263	2.845	2.845	2.845
		(AC-FT) 512.	643.	643.	643.

CUMULATIVE AREA = 4.24 SQ MI

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
+	HYDROGRAPH AT	1024.	12.00	205.	64.	21.	.85		
+	ROUTED TO	955.	12.00	207.	65.	22.	.85		
+	HYDROGRAPH AT	374.	12.00	75.	24.	8.	.31		
+	2 COMBINED AT	1329.	12.00	282.	88.	29.	1.16		
+	HYDROGRAPH AT	1422.	12.00	285.	89.	30.	1.18		
+	ROUTED TO	1295.	12.00	288.	90.	30.	1.18		
+	HYDROGRAPH AT	398.	12.00	80.	25.	8.	.33		
+	2 COMBINED AT	1693.	12.00	368.	115.	38.	1.51		
+	ROUTED TO	1381.	12.00	373.	117.	39.	1.51		
+	HYDROGRAPH AT	1116.	12.50	377.	119.	40.	1.57		
+	3 COMBINED AT	3297.	12.00	1032.	324.	108.	4.24		

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	DT (MIN)	INTERPOLATED TO		VOLUME (IN)
							COMPUTATION PEAK (CFS)	INTERVAL TIME TO PEAK (MIN)	
	MANE	1.19	1019.33	722.53	2.82	30.00	955.13	720.00	2.84
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1279E+03 EXCESS= .0000E+00 OUTFLOW= .1279E+03 BASIN STORAGE= .5039E-08 PERCENT ERROR= .0									
	MANE	1.55	1416.74	723.18	2.82	30.00	1294.99	720.00	2.85
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1775E+03 EXCESS= .0000E+00 OUTFLOW= .1776E+03 BASIN STORAGE= .4491E-08 PERCENT ERROR= -.1									
	MANE	2.93	1653.49	725.08	2.84	30.00	1381.33	720.00	2.88
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2288E+03 EXCESS= .0000E+00 OUTFLOW= .2288E+03 BASIN STORAGE= .3870E-06 PERCENT ERROR= .0									

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

HEC-1: 100-Yr (Zone II)

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* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 07JUL06 TIME 10:50:26 *
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
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X X XXXXXXX XXXXX X
X X X X X XX
X X X X X
XXXXXXXX XXXX X XXXXX X
X X X X X
X X X X X
X X XXXXXXX XXXXX XXX

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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HECL (JAN 73), HEC1GS, HECLDB, AND HECLKW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID Virginia Highlands, LLC (Old TRW Site) - Floodplain Analysis Zone II
2 ID Analyzed June 28, 2006
3 ID 100-YEAR, 24-HR STORM EVENT (TYPE II STORM)
4 IT 30 28JUN06 0800 300
5 IO 3

6 KK SUB 6
7 KM SEE DRAINAGE MAP
8 PE 4.2
9 PC 0.0 0.0051 0.0105 0.0161 0.0220 0.0281 0.0345 0.0411 0.0480 0.0553
10 PC 0.0630 0.0712 0.0800 0.0892 0.0990 0.1093 0.1200 0.1322 0.1470 0.1630
11 PC 0.1810 0.2040 0.2350 0.2830 0.6630 0.7350 0.7720 0.7990 0.8200 0.8375
12 PC 0.8535 0.8676 0.8800 0.8912 0.9018 0.9117 0.9210 0.9297 0.9377 0.9452
13 PC 0.9520 0.9584 0.9647 0.9709 0.9770 0.9829 0.9887 0.9944 1.0000
14 BA 2.01
15 LS 0 87
16 UD 0.47

17 KK PT F
18 KM ROUTE SUB 6 THRU 7 - KINEMATIC WAVE ROUTING FROM F TO G
19 RK 4400 0.030 .04 TRAP 10 5.0

20 KK SUB 7
21 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
22 BA 0.57
23 LS 0 87
24 UD 0.79

25 KK PT G
26 KM COMBINE SUB AREAS 6 AND 7
27 HC 2

28 KK SUB 5
29 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
30 BA 0.26
31 LS 0 87
32 UD 0.28

33 KK PT E
34 KM ROUTE SUB 5 THRU 8 - KINEMATIC WAVE ROUTING FROM E TO G
35 RK 3900 0.069 0.04 TRAP 2 8.0

36 KK SUB 8
37 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
38 BA 0.23
39 LS 0 87
40 UD 0.79

41 KK PT G
42 KM COMBINE SUB AREAS 5 AND 8
43 HC 2
44 KK PT G
45 KM ROUTE 6&7 & 5&8 THRU 19 - KINEMATIC WAVE ROUTING FROM G TO O
46 RK 7400 0.025 0.04 TRAP 10 8.0

47 KK SUB 19
48 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
49 BA 1.37
50 LS 0 87
51 UD 0.79

52 KK PT O
53 KM COMBINE SUB AREAS 5-8 AND 19
54 HC 3

55 KK SUB 9
56 KM UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
57 BA 3.41
58 LS 0 87
59 UD 0.53

```

60	KK	PT H						
61	KM	ROUTE SUB 9 THRU 11 - KINEMATIC WAVE ROUTING FROM H TO J						
62	RK	6100	0.041	0.04	TRAP	20	5.0	
63	KK	SUB 11						
64	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
65	BA	0.48						
66	LS	0	87					
67	UD	0.58						
68	KK	PT J						
69	KM	COMBINE SUB AREAS 8 AND 11						
70	HC	2						
71	KK	SUB 10						
72	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
73	BA	0.31						
74	LS	0	87					
75	UD	0.51						
76	KK	PT I						
77	KM	ROUTE SUB 10 THRU 12 - KINEMATIC WAVE ROUTING FROM I TO J						
78	RK	8200	0.070	0.04	TRAP	2	3.0	
79	KK	SUB 12						
80	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
81	BA	0.45						
82	LS	0	87					
83	UD	0.58						
84	KK	PT J						
85	KM	COMBINE SUB AREAS 10 AND 12						
86	HC	2						
87	KK	PT J						
88	KM	ROUTE SUB 8,10,11,12 THRU 13 - KINEMATIC WAVE ROUTING FROM J TO N						
89	RK	4400	0.020	0.04	TRAP	30	5.0	
90	KK	SUB 13						
91	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
92	BA	1.11						
93	LS	0	87					
94	UD	0.58						
95	KK	PT N						
96	KM	COMBINE SUB AREAS 8 & 10-13						
97	HC	3						
98	KK	SUB 14						
99	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
100	BA	0.96						
101	LS	0	85					
102	UD	0.42						
103	KK	PT K						
104	KM	ROUTE SUB 14 - KINEMATIC WAVE ROUTING FROM K TO M						
105	RK	5200	0.058	0.04	TRAP	5	5.0	
106	KK	SUB 16						
107	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
108	BA	0.15						
109	LS	0	85					
110	UD	0.87						
111	KK	PT M						
112	KM	COMBINE SUB AREAS 14 AND 16						
113	HC	2						
114	KK	SUB 15						
115	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
116	BA	0.36						
117	LS	0	82					
118	UD	0.39						
119	KK	PT L						
120	KM	ROUTE SUB 15 - KINEMATIC WAVE ROUTING FROM L TO M						
121	RK	4400	0.061	0.04	TRAP	2	3.0	
122	KK	SUB 17						
123	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
124	BA	0.63						
125	LS	0	85					
126	UD	0.87						
127	KK	PT M						
128	KM	COMBINE SUB AREAS 15 AND 17						
129	HC	2						
130	KK	PT M						
131	KM	ROUTE SUB 14-17 THRU 18 - KINEMATIC WAVE ROUTING FROM M TO N						
132	RK	9300	0.034	0.04	TRAP	15	5.0	
133	KK	SUB 18						
134	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
135	BA	1.28						
136	LS	0	85					
137	UD	0.49						
138	KK	PT N						
139	KM	COMBINE SUB AREAS 14-18						
140	HC	3						
141	KK	PT N						
142	KM	ROUTE SUB 9-13 & 14-18 THRU 20 - KINEMATIC WAVE FROM N TO O						
143	RK	3900	0.027	0.04	TRAP	30	5.0	
144	KK	SUB 20						
145	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH						
146	BA	0.26						
147	LS	0	87					
148	UD	0.49						

149	KK	PT O
150	KM	COMBINE SUB AREAS 9-18 & 20
151	HC	3
152	KK	PT O
153	KM	ROUTE SUB 5-20 THRU 21 - KINEMATIC WAVE FROM O TO P
154	RK	4000 0.024 0.04 TRAP 35 5.0
155	KK	SUB 21
156	KM	UNIFORM LOSS WITH SCS UNIT HYDROGRAPH
157	BA	0.35
158	LS	0 87
159	UD	0.49
160	KK	PT P
161	KM	COMBINE SUB AREAS 5-21
162	HC	3
163	ZZ	

```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 07JUL06 TIME 10:50:26
*
*****

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```

*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****

```

Virginia Highlands, LLC (Old TRW Site) - Floodplain Analysis Zone II
 Analyzed June 28, 2006
 100-YEAR, 24-HR STORM EVENT (TYPE II STORM)

```

5 IO OUTPUT CONTROL VARIABLES
      IPRNT      3 PRINT CONTROL
      IPLOT      0 PLOT CONTROL
      QSCAL      0. HYDROGRAPH PLOT SCALE

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```

IT HYDROGRAPH TIME DATA
      NMIN      30 MINUTES IN COMPUTATION INTERVAL
      IDATE     28JUN 6 STARTING DATE
      ITIME     0800 STARTING TIME
      NQ        300 NUMBER OF HYDROGRAPH ORDINATES
      NDDATE    4JUL 6 ENDING DATE
      NDTIME    1330 ENDING TIME
      ICENT     19 CENTURY MARK

```

```

      COMPUTATION INTERVAL .50 HOURS
      TOTAL TIME BASE 149.50 HOURS

```

```

ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-FEET
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

```

```

*****
6 KK SUB 6
*****
      SEE DRAINAGE MAP

```

SUBBASIN RUNOFF DATA

```

14 BA SUBBASIN CHARACTERISTICS
      TAREA     2.01 SUBBASIN AREA

```

PRECIPITATION DATA

```

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION
9 PI INCREMENTAL PRECIPITATION PATTERN
      .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
      .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
      .02 .03 .05 .38 .07 .04 .03 .02 .02 .02
      .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
      .01 .01 .01 .01 .01 .01 .01 .01 .01 .01

```

```

15 LS SCS LOSS RATE
      STRFL     .30 INITIAL ABSTRACTION
      CRVNR     87.00 CURVE NUMBER
      RTIMP     .00 PERCENT IMPERVIOUS AREA

```

```

16 UD SCS DIMENSIONLESS UNITGRAPH
      TLAG      .47 LAG

```

UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES

```

1070. 1041. 329. 106. 34. 12. 2.

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*** *** *** *** ***

HYDROGRAPH AT STATION

```

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82
PEAK FLOW TIME MAXIMUM AVERAGE FLOW
+ (CFS) (HR) 6-HR 24-HR 72-HR 149.50-HR
+ 1598. 12.50 (CFS) 485. 152. 51. 24.
      (INCHES) 2.241 2.821 2.821 2.821
      (AC-FT) 240. 302. 302. 302.
CUMULATIVE AREA = 2.01 SQ MI

```

17 KK *****
 * * * PT F
 * * *

ROUTE SUB 6 THRU 7 - KINEMATIC WAVE ROUTING FROM F TO G

HYDROGRAPH ROUTING DATA

19 RK KINEMATIC WAVE STREAM ROUTING
 L 4400. CHANNEL LENGTH
 S .0300 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 10.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.76	1.39	1.53	1466.67	1591.95	751.82	2.82	16.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3024E+03 EXCESS= .0000E+00 OUTFLOW= .3025E+03 BASIN STORAGE= .6108E-07 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.76	1.39	30.00		1583.59	750.00	2.84	
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*** **

HYDROGRAPH AT STATION

PEAK FLOW + (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	149.50-HR	
		(CFS)				
+ 1584.	12.50	488.	153.	51.	25.	
		(INCHES)	2.255	2.836	2.836	2.836
		(AC-FT)	242.	304.	304.	304.
CUMULATIVE AREA =		2.01 SQ MI				

*** **

20 KK *****
 * * * SUB 7
 * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

22 BA SUBBASIN CHARACTERISTICS
 TAREA .57 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

23 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

24 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .79 LAG

 UNIT HYDROGRAPH
 10 END-OF-PERIOD ORDINATES

117.	266.	197.	85.	39.	18.	8.	4.	2.	1.
------	------	------	-----	-----	-----	----	----	----	----

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW + (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	149.50-HR	
		(CFS)				
+ 386.	12.50	137.	43.	14.	7.	
		(INCHES)	2.231	2.821	2.821	2.821
		(AC-FT)	68.	86.	86.	86.
CUMULATIVE AREA =		.57 SQ MI				

*** **

 * * * * *
 25 KK * * * * * PT G
 * * * * *

COMBINE SUB AREAS 6 AND 7

27 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

*** **

HYDROGRAPH AT STATION

PEAK FLOW + (CFS)	TIME (HR)	(CFS)	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	149.50-HR
+ 1969.	12.50		624.	197.	66.	32.
		(INCHES)	2.250	2.833	2.833	2.833
		(AC-FT)	310.	390.	390.	390.

CUMULATIVE AREA = 2.58 SQ MI

 * * * * *
 28 KK * * * * * SUB 5
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

30 BA SUBBASIN CHARACTERISTICS
 TAREA .26 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.02	.02
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

31 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

32 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .28 LAG

UNIT HYDROGRAPH
 5 END-OF-PERIOD ORDINATES
 1.

234. 80. 17. 4.

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW + (CFS)	TIME (HR)	(CFS)	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	149.50-HR
+ 296.	12.00		63.	20.	7.	3.
		(INCHES)	2.246	2.821	2.821	2.821
		(AC-FT)	31.	39.	39.	39.

CUMULATIVE AREA = .26 SQ MI

33 KK *****
 * * * * *
 * * * * *
 * * * * *
 * * * * *

PT E

ROUTE SUB 5 THRU 8 - KINEMATIC WAVE ROUTING FROM E TO G

HYDROGRAPH ROUTING DATA

35 RK KINEMATIC WAVE STREAM ROUTING
 L 3900. CHANNEL LENGTH
 S .0690 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 2.00 BOTTOM WIDTH OR DIAMETER
 Z 8.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	3.02	1.34	1.75	1300.00	291.66	722.97	2.82	12.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3911E+02 EXCESS= .0000E+00 OUTFLOW= .3913E+02 BASIN STORAGE= .1155E-08 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	3.02	1.34	30.00		265.98	720.00	2.85	
------	------	------	-------	--	--------	--------	------	--

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (AC-FT)	MAXIMUM AVERAGE FLOW (CFS)	149.50-HR (INCHES)
266.	12.00	63.	2.267	31.	20.	2.846
					7.	39.
					3.	39.

CUMULATIVE AREA = .26 SQ MI

36 KK *****
 * * * * *
 * * * * *
 * * * * *

SUB 8

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

38 BA SUBBASIN CHARACTERISTICS
 TAREA .23 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

39 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

40 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .79 LAG

UNIT HYDROGRAPH
 10 END-OF-PERIOD ORDINATES

47.	107.	79.	34.	16.	7.	3.	2.	1.	0.
-----	------	-----	-----	-----	----	----	----	----	----

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (AC-FT)	MAXIMUM AVERAGE FLOW (CFS)	149.50-HR (INCHES)
156.	12.50	55.	2.231	27.	17.	2.821
					6.	35.
					3.	35.

CUMULATIVE AREA = .23 SQ MI

 * * * * *
 41 KK * * * * * PT G
 * * * * *

COMBINE SUB AREAS 5 AND 8

43 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
343.	12.00	119.	37.	12.	6.
		(INCHES) 2.250	2.834	2.834	2.834
		(AC-FT) 59.	74.	74.	74.

CUMULATIVE AREA = .49 SQ MI

 * * * * *
 44 KK * * * * * PT G
 * * * * *

ROUTE 6&7 & 5&8 THRU 19 - KINEMATIC WAVE ROUTING FROM G TO O

HYDROGRAPH ROUTING DATA

46 RK KINEMATIC WAVE STREAM ROUTING

L	7400.	CHANNEL LENGTH
S	.0250	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	10.00	BOTTOM WIDTH OR DIAMETER
Z	8.00	SIDE SLOPE
NDXMIN	2	MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (PPS)
MAIN	1.54	1.37	4.62	2466.67	342.10	733.27	2.84	8.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7407E+02 EXCESS= .0000E+00 OUTFLOW= .7409E+02 BASIN STORAGE= .3803E-06 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.54	1.37	30.00	336.92	750.00	2.85
------	------	------	-------	--------	--------	------

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
337.	12.50	119.	38.	13.	6.
		(INCHES) 2.257	2.846	2.846	2.846
		(AC-FT) 59.	74.	74.	74.

CUMULATIVE AREA = .49 SQ MI

 *
 47 KK * SUB 19
 *
 *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

49 BA SUBBASIN CHARACTERISTICS
 TAREA 1.37 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

50 LS SCS LOSS RATE
 STRFL .30 INITIAL ABSTRACTION
 CRVNER 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

51 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .79 LAG

UNIT HYDROGRAPH
 10 END-OF-PERIOD ORDINATES

281. 638. 473. 204. 94. 43. 20. 9. 5. 1.

*** *** *** *** ***

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
927.	12.50	329.	104.	35.	17.
		(INCHES) 2.231	2.821	2.821	2.821
		(AC-FT) 163.	206.	206.	206.

CUMULATIVE AREA = 1.37 SQ MI

 *
 52 KK * PT O
 *
 *

COMBINE SUB AREAS 5-8 AND 19

54 HC HYDROGRAPH COMBINATION
 ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

*** *** *** *** ***

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
3233.	12.50	1072.	338.	113.	54.
		(INCHES) 2.245	2.830	2.830	2.830
		(AC-FT) 532.	670.	670.	670.

CUMULATIVE AREA = 4.44 SQ MI

 * * *
 55 KK * * * SUB 9
 * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

57 BA SUBBASIN CHARACTERISTICS
 TAREA 3.41 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.08	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

58 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNER 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

59 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .53 LAG

UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES

1528. 1838. 671. 240. 84. 30. 11.

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HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW		
(CFS)	(HR)	(CFS)	6-HR	24-HR	72-HR
2742.	12.50	822.	822.	259.	86.
		(INCHES)	2.240	2.821	2.821
		(AC-FT)	407.	513.	513.

CUMULATIVE AREA = 3.41 SQ MI

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 60 KK * * * PT H
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ROUTE SUB 9 THRU 11 - KINEMATIC WAVE ROUTING FROM H TO J

HYDROGRAPH ROUTING DATA

62 RK KINEMATIC WAVE STREAM ROUTING
 L 6100. CHANNEL LENGTH
 S .0410 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 20.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT	DX	PEAK	TIME TO PEAK	VOLUME	MAXIMUM CELERITY
			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	1.54	1.44	1.71	2033.33	2718.69	752.30	2.82	21.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5130E+03 EXCESS= .0000E+00 OUTFLOW= .5131E+03 BASIN STORAGE= .1017E-05 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.54	1.44	30.00		2677.24	750.00	2.84	
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HYDROGRAPH AT STATION

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW		
(CFS)	(HR)	(CFS)	6-HR	24-HR	72-HR
2677.	12.50	827.	827.	260.	87.
		(INCHES)	2.254	2.836	2.836
		(AC-FT)	410.	516.	516.

CUMULATIVE AREA = 3.41 SQ MI

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 63 KK * * * SUB 11 * * *
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UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

65 BA SUBBASIN CHARACTERISTICS
 TAREA .48 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

66 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNER 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

67 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .58 LAG

 UNIT HYDROGRAPH
 8 END-OF-PERIOD ORDINATES
 186. 260. 108. 41. 15. 6. 2. 1.

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HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
383.	12.50	116.	36.	12.	6.
		(INCHES) 2.239	2.821	2.821	2.821
		(AC-FT) 57.	72.	72.	72.

CUMULATIVE AREA = .48 SQ MI

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 68 KK * * * PT J * * *
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COMBINE SUB AREAS 8 AND 11

70 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
3060.	12.50	942.	296.	99.	48.
		(INCHES) 2.252	2.834	2.834	2.834
		(AC-FT) 467.	588.	588.	588.

CUMULATIVE AREA = 3.89 SQ MI

71 KK *****
 * * * SUB 10
 * * *

 UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

73 BA SUBBASIN CHARACTERISTICS
 TAREA .31 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

74 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNER 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

75 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .51 LAG

UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES

147. 166. 57. 20. 7. 2. 1.

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HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW					
(CFS)	(HR)	6-HR	24-HR	72-HR	149.50-HR		
+	249.	12.50	75.	24.	8.	4.	
+			(INCHES)	2.241	2.821	2.821	2.821
			(AC-FT)	37.	47.	47.	47.

CUMULATIVE AREA = .31 SQ MI

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76 KK *****
 * * * PT I
 * * *

ROUTE SUB 10 THRU 12 - KINEMATIC WAVE ROUTING FROM I TO J

HYDROGRAPH ROUTING DATA

78 RK KINEMATIC WAVE STREAM ROUTING

L	8200.	CHANNEL LENGTH
S	.0700	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	2.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE
NDXMIN	2	MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT	DX	PEAK	TIME TO PEAK	VOLUME	MAXIMUM CELERITY
			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	3.95	1.34	2.96	2733.33	249.22	755.90	2.82	15.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4664E+02 EXCESS= .0000E+00 OUTFLOW= .4665E+02 BASIN STORAGE= .1202E-07 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	3.95	1.34	30.00		240.04	750.00	2.84	

*** *** *** *** ***

HYDROGRAPH AT STATION

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW					
(CFS)	(HR)	6-HR	24-HR	72-HR	149.50-HR		
+	240.	12.50	75.	24.	8.	4.	
+			(INCHES)	2.257	2.839	2.839	2.839
			(AC-FT)	37.	47.	47.	47.

CUMULATIVE AREA = .31 SQ MI

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 79 KK SUB 12
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UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

81 BA SUBBASIN CHARACTERISTICS
 TAREA .45 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

82 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNER 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

83 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .58 LAG

UNIT HYDROGRAPH
 8 END-OF-PERIOD ORDINATES

175. 244. 102. 38. 14. 5. 2. 0.

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HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
359.	12.50	108.	34.	11.	5.
		(INCHES) 2.239	2.821	2.821	2.821
		(AC-FT) 54.	68.	68.	68.

CUMULATIVE AREA = .45 SQ MI

 * * * * *
 84 KK PT J
 * * * * *

COMBINE SUB AREAS 10 AND 12

86 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
599.	12.50	184.	58.	19.	9.
		(INCHES) 2.247	2.828	2.828	2.828
		(AC-FT) 91.	115.	115.	115.

CUMULATIVE AREA = .76 SQ MI

87 KK *****
 * * * * * PT J
 * * * * *

ROUTE SUB 8,10,11,12 THRU 13 - KINEMATIC WAVE ROUTING FROM J TO N

HYDROGRAPH ROUTING DATA

89 RK KINEMATIC WAVE STREAM ROUTING
 L 4400. CHANNEL LENGTH
 S .0200 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 30.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.85	1.47	2.49	1466.67	597.02	755.07	2.83	10.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1146E+03 EXCESS= .0000E+00 OUTFLOW= .1147E+03 BASIN STORAGE= .2768E-05 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.85	1.47	30.00	569.00	750.00	2.85
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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (INCHES)	149.50-HR (AC-FT)
569.	12.50	185.	2.262	2.847	92.

CUMULATIVE AREA = .76 SQ MI

90 KK *****
 * * * * * SUB 13
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

92 BA SUBBASIN CHARACTERISTICS
 TAREA 1.11 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

INCREMENTAL PRECIPITATION PATTERN	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

93 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

94 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .58 LAG

UNIT HYDROGRAPH
 8 END-OF-PERIOD ORDINATES
 431. 602. 250. 94. 35. 13. 5. 1.

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (INCHES)	149.50-HR (AC-FT)
885.	12.50	267.	2.239	2.821	133.

CUMULATIVE AREA = 1.11 SQ MI

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 95 KK * * * * * PT N
 * * * * *

COMBINE SUB AREAS 8 & 10-13

97 HC HYDROGRAPH COMBINATION
 ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

 HYDROGRAPH AT STATION
 PEAK FLOW TIME MAXIMUM AVERAGE FLOW
 (CFS) (HR) 6-HR 24-HR 72-HR 149.50-HR
 + 4514. 12.50 (CFS) 1394. 439. 146. 70.
 (INCHES) 2.251 2.833 2.833 2.833
 (AC-FT) 691. 870. 870. 870.
 CUMULATIVE AREA = 5.76 SQ MI

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 98 KK * * * * * SUB 14
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UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

100 BA SUBBASIN CHARACTERISTICS
 TAREA .96 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
 .02 .03 .05 .38 .07 .04 .03 .02 .02 .02
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01

101 LS SCS LOSS RATE
 STRIL .35 INITIAL ABSTRACTION
 CRVNR 85.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

102 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .42 LAG

 UNIT HYDROGRAPH
 6 END-OF-PERIOD ORDINATES
 12. 4.

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.56, TOTAL EXCESS = 2.64
 PEAK FLOW TIME MAXIMUM AVERAGE FLOW
 (CFS) (HR) 6-HR 24-HR 72-HR 149.50-HR
 + 728. 12.00 (CFS) 218. 68. 23. 11.
 (INCHES) 2.108 2.637 2.637 2.637
 (AC-FT) 108. 135. 135. 135.
 CUMULATIVE AREA = .96 SQ MI

103 KK *****
 * * * PT K * * *
 * * * *****

ROUTE SUB 14 - KINEMATIC WAVE ROUTING FROM K TO M

HYDROGRAPH ROUTING DATA

105 RK KINEMATIC WAVE STREAM ROUTING
 L 5200. CHANNEL LENGTH
 S .0580 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 5.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	2.89	1.36	1.82	1733.33	726.57	724.30	2.64	16.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1350E+03 EXCESS= .0000E+00 OUTFLOW= .1351E+03 BASIN STORAGE= .1095E-07 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	2.89	1.36	30.00	698.52	750.00	2.65
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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR MAXIMUM AVERAGE FLOW	72-HR	149.50-HR
699.	12.50	219.	69.	23.	11.
		(INCHES)	2.123	2.654	2.654
		(AC-FT)	109.	136.	136.

CUMULATIVE AREA = .96 SQ MI

106 KK *****
 * * * SUB 16 * * *
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UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

108 BA SUBBASIN CHARACTERISTICS
 TAREA .15 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI	INCREMENTAL PRECIPITATION PATTERN								
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

109 LS SCS LOSS RATE
 STRTL .35 INITIAL ABSTRACTION
 CRVNR 85.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

110 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .87 LAG

UNIT HYDROGRAPH
 11 END-OF-PERIOD ORDINATES

25.	64.	54.	26.	13.	6.	3.	1.	1.	0.
0.									

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HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.56, TOTAL EXCESS = 2.64

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR MAXIMUM AVERAGE FLOW	72-HR	149.50-HR
87.	12.50	34.	11.	4.	2.
		(INCHES)	2.094	2.637	2.637
		(AC-FT)	17.	21.	21.

CUMULATIVE AREA = .15 SQ MI

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111 KK      *           *      PT M
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COMBINE SUB AREAS 14 AND 16

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113 HC      HYDROGRAPH COMBINATION
            ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION
PEAK FLOW      TIME      MAXIMUM AVERAGE FLOW
(CFS)          (HR)          6-HR      24-HR      72-HR      149.50-HR
+
+ 786.         12.50      253.      79.       26.       13.
              (INCHES)  2.118    2.652    2.652    2.652
              (AC-FT)  125.     157.     157.     157.
CUMULATIVE AREA = 1.11 SQ MI

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114 KK      *           *      SUB 15
*           *
*****
UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

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SUBBASIN RUNOFF DATA
116 BA      SUBBASIN CHARACTERISTICS
            TAREA          .36  SUBBASIN AREA
PRECIPITATION DATA
8 PB        STORM          4.20  BASIN TOTAL PRECIPITATION
9 PI        INCREMENTAL PRECIPITATION PATTERN
            .01          .01          .01          .01          .01          .01          .01          .01          .01
            .01          .01          .01          .01          .01          .01          .01          .01          .01
            .02          .03          .05          .38          .07          .04          .03          .02          .02
            .01          .01          .01          .01          .01          .01          .01          .01          .01
            .01          .01          .01          .01          .01          .01          .01          .01          .01
117 LS      SCS LOSS RATE
            STR1L          .44  INITIAL ABSTRACTION
            CRVNR          82.00  CURVE NUMBER
            RTIMP          .00  PERCENT IMPERVIOUS AREA
118 UD      SCS DIMENSIONLESS UNITGRAPH
            TLAG          .39  LAG

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UNIT HYDROGRAPH
6 END-OF-PERIOD ORDINATES
243.  162.  44.  12.  3.  1.
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HYDROGRAPH AT STATION
TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.83, TOTAL EXCESS = 2.37
PEAK FLOW      TIME      MAXIMUM AVERAGE FLOW
(CFS)          (HR)          6-HR      24-HR      72-HR      149.50-HR
+
+ 263.         12.00      74.       23.       8.       4.
              (INCHES)  1.909    2.375    2.375    2.375
              (AC-FT)  37.      46.      46.      46.
CUMULATIVE AREA = .36 SQ MI

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119 KK *****
 * * * * * PT L
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ROUTE SUB 15 - KINEMATIC WAVE ROUTING FROM L TO M

HYDROGRAPH ROUTING DATA

121 RK KINEMATIC WAVE STREAM ROUTING
 L 4400. CHANNEL LENGTH
 S .0610 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 2.00 BOTTOM WIDTH OR DIAMETER
 Z 3.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	3.69	1.34	1.81	1466.67	262.38	724.06	2.38	14.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4560E+02 EXCESS= .0000E+00 OUTFLOW= .4560E+02 BASIN STORAGE= .1609E-08 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	3.69	1.34	30.00		236.87	720.00	2.39	
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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (INCHES)	149.50-HR (AC-FT)
237.	12.00	74.	1.921	2.390	2.390
		23.	46.	46.	46.
		8.			
		4.			

CUMULATIVE AREA = .36 SQ MI

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122 KK *****
 * * * * * SUB 17
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

124 BA SUBBASIN CHARACTERISTICS
 TAREA .63 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.08	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

125 LS SCS LOSS RATE
 STRTL .35 INITIAL ABSTRACTION
 CRVNR 85.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

126 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .87 LAG

UNIT HYDROGRAPH
 11 END-OF-PERIOD ORDINATES

105.	269.	226.	109.	54.	26.	12.	6.	3.	1.
0.									

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.56, TOTAL EXCESS = 2.64

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR (INCHES)	72-HR (INCHES)	149.50-HR (AC-FT)
366.	12.50	142.	2.094	2.637	2.637
		45.	89.	89.	89.
		15.			
		7.			

CUMULATIVE AREA = .63 SQ MI

*** **

 * * * * *
 127 KK * * * * * PT M
 * * * * *

COMBINE SUB AREAS 15 AND 17

129 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
596.	12.50	216.	68.	23.	11.
		(INCHES) (AC-FT)	2.030 107.	2.548 135.	2.548 135.

CUMULATIVE AREA = .99 SQ MI

 * * * * *
 130 KK * * * * * PT M
 * * * * *

ROUTE SUB 14-17 THRU 18 - KINEMATIC WAVE ROUTING FROM M TO N

HYDROGRAPH ROUTING DATA

132 RK KINEMATIC WAVE STREAM ROUTING
 L 9300. CHANNEL LENGTH
 S .0340 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 15.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.61	1.41	4.06	3100.00	591.23	757.38	2.55	12.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1345E+03 EXCESS= .0000E+00 OUTFLOW= .1345E+03 BASIN STORAGE= .1820E-05 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.61	1.41	30.00	542.58	750.00	2.56
------	------	------	-------	--------	--------	------

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
543.	12.50	217.	68.	23.	11.
		(INCHES) (AC-FT)	2.037 108.	2.556 135.	2.557 135.

CUMULATIVE AREA = .99 SQ MI

133 KK *****
 * * * SUB 18 * * *
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

135 BA SUBBASIN CHARACTERISTICS
 TAREA 1.28 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.02	.02
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

136 LS SCS LOSS RATE
 STRTL .35 INITIAL ABSTRACTION
 CRVNER 85.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

137 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .49 LAG

 UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES
 644. 675. 223. 75. 25. 9. 2.

*** *** *** *** ***

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.56, TOTAL EXCESS = 2.64

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
960.	12.50	290.	91.	30.	15.
		(INCHES) 2.107	2.637	2.637	2.637
		(AC-FT) 144.	180.	180.	180.

CUMULATIVE AREA = 1.28 SQ MI

138 KK *****
 * * * PT N * * *
 * * * * *

COMBINE SUB AREAS 14-18

140 HC HYDROGRAPH COMBINATION
 ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

*** *** *** *** ***

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
2288.	12.50	758.	238.	79.	38.
		(INCHES) 2.086	2.618	2.618	2.618
		(AC-FT) 376.	472.	472.	472.

CUMULATIVE AREA = 3.38 SQ MI

141 KK *****
 * * * PT N
 * * *

ROUTE SUB 9-13 & 14-18 THRU 20 - KINEMATIC WAVE FROM N TO O

HYDROGRAPH ROUTING DATA

143 RK KINEMATIC WAVE STREAM ROUTING
 L 3900. CHANNEL LENGTH
 S .0270 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 30.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.99	1.47	1.28	1300.00	2286.62	752.53	2.62	17.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4720E+03 EXCESS= .0000E+00 OUTFLOW= .4721E+03 BASIN STORAGE= .5419E-05 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.99	1.47	30.00		2246.55	750.00	2.63	
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*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR MAXIMUM AVERAGE FLOW	72-HR	149.50-HR
2247.	12.50	761.	239.	80.	38.
		(INCHES) 2.093	2.630	2.630	2.630
		(AC-FT) 377.	474.	474.	474.

CUMULATIVE AREA = 3.38 SQ MI

144 KK *****
 * * * SUB 20
 * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

146 BA SUBBASIN CHARACTERISTICS
 TAREA .26 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

147 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

148 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .49 LAG

 UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES
 131. 137. 45. 15. 5. 2. 0.

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	6-HR (CFS)	24-HR MAXIMUM AVERAGE FLOW	72-HR	149.50-HR
208.	12.50	63.	20.	7.	3.
		(INCHES) 2.241	2.821	2.821	2.821
		(AC-FT) 31.	39.	39.	39.

CUMULATIVE AREA = .26 SQ MI

 * * * * *
 149 KK * * * * * PT O
 * * * * *

COMBINE SUB AREAS 9-18 & 20

151 HC HYDROGRAPH COMBINATION
 ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	(CFS)	MAXIMUM AVERAGE FLOW		
			6-HR	24-HR	72-HR
6968.	12.50	2218.	698.	233.	112.
		(INCHES)	2.194	2.760	2.760
		(AC-FT)	1100.	1384.	1384.

CUMULATIVE AREA = 9.40 SQ MI

 * * * * *
 152 KK * * * * * PT O
 * * * * *

ROUTE SUB 5-20 THRU 21 - KINEMATIC WAVE FROM O TO P

HYDROGRAPH ROUTING DATA

154 RK KINEMATIC WAVE STREAM ROUTING
 L 4000. CHANNEL LENGTH
 S .0240 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 35.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.84	1.48	.98	1333.33	6956.10	752.04	2.76	23.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1384E+04 EXCESS= .0000E+00 OUTFLOW= .1384E+04 BASIN STORAGE= .2036E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.84	1.48	30.00	6843.41	750.00	2.77
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HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	(CFS)	MAXIMUM AVERAGE FLOW		
			6-HR	24-HR	72-HR
6843.	12.50	2225.	700.	233.	112.
		(INCHES)	2.201	2.769	2.770
		(AC-FT)	1103.	1388.	1389.

CUMULATIVE AREA = 9.40 SQ MI

 * * * * *
 155 KK * * * * * SUB 21
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

157 BA SUBBASIN CHARACTERISTICS
 TAREA .35 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 4.20 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

158 LS SCS LOSS RATE
 STRTL .30 INITIAL ABSTRACTION
 CRVNR 87.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

159 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .49 LAG

UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES

176.	185.	61.	21.	7.	2.	1.
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*** *** *** *** ***

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.38, TOTAL EXCESS = 2.82

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
280.	12.50	84.	27.	9.	4.
		(INCHES) 2.241	2.821	2.821	2.821
		(AC-FT) 42.	53.	53.	53.

CUMULATIVE AREA = .35 SQ MI

 * * * * *
 160 KK * * * * * PT P
 * * * * *

COMBINE SUB AREAS 5-21

162 HC HYDROGRAPH COMBINATION
 ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

*** *** *** *** ***

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
10356.	12.50	3382.	1064.	355.	171.
		(INCHES) 2.216	2.790	2.790	2.790
		(AC-FT) 1677.	2111.	2111.	2111.

CUMULATIVE AREA = 14.19 SQ MI

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
					6-HOUR	24-HOUR	72-HOUR			
+										
+	HYDROGRAPH AT		1598.	12.50	485.	152.	51.	2.01		
+	ROUTED TO		1584.	12.50	488.	153.	51.	2.01		
+	HYDROGRAPH AT		386.	12.50	137.	43.	14.	.57		
+	2 COMBINED AT		1969.	12.50	624.	197.	66.	2.58		
+	HYDROGRAPH AT		296.	12.00	63.	20.	7.	.26		
+	ROUTED TO		266.	12.00	63.	20.	7.	.26		
+	HYDROGRAPH AT		156.	12.50	55.	17.	6.	.23		
+	2 COMBINED AT		343.	12.00	119.	37.	12.	.49		
+	ROUTED TO		337.	12.50	119.	38.	13.	.49		
+	HYDROGRAPH AT		927.	12.50	329.	104.	35.	1.37		
+	3 COMBINED AT		3233.	12.50	1072.	338.	113.	4.44		
+	HYDROGRAPH AT		2742.	12.50	822.	259.	86.	3.41		
+	ROUTED TO		2677.	12.50	827.	260.	87.	3.41		
+	HYDROGRAPH AT		383.	12.50	116.	36.	12.	.48		
+	2 COMBINED AT		3060.	12.50	942.	296.	99.	3.89		
+	HYDROGRAPH AT		249.	12.50	75.	24.	8.	.31		
+	ROUTED TO		240.	12.50	75.	24.	8.	.31		
+	HYDROGRAPH AT		359.	12.50	108.	34.	11.	.45		
+	2 COMBINED AT		599.	12.50	184.	58.	19.	.76		
+	ROUTED TO		569.	12.50	185.	58.	19.	.76		
+	HYDROGRAPH AT		885.	12.50	267.	84.	28.	1.11		
+	3 COMBINED AT		4514.	12.50	1394.	439.	146.	5.76		
+	HYDROGRAPH AT		728.	12.00	218.	68.	23.	.96		
+	ROUTED TO		699.	12.50	219.	69.	23.	.96		
+	HYDROGRAPH AT		87.	12.50	34.	11.	4.	.15		
+	2 COMBINED AT		786.	12.50	253.	79.	26.	1.11		
+	HYDROGRAPH AT		263.	12.00	74.	23.	8.	.36		
+	ROUTED TO		237.	12.00	74.	23.	8.	.36		
+	HYDROGRAPH AT		366.	12.50	142.	45.	15.	.63		
+	2 COMBINED AT		596.	12.50	216.	68.	23.	.99		
+	ROUTED TO		543.	12.50	217.	68.	23.	.99		
+	HYDROGRAPH AT		960.	12.50	290.	91.	30.	1.28		
+	3 COMBINED AT		2288.	12.50	758.	238.	79.	3.38		

ROUTED TO	2247.	12.50	761.	239.	80.	3.38
+						
HYDROGRAPH AT	208.	12.50	63.	20.	7.	.26
+						
3 COMBINED AT	6968.	12.50	2218.	698.	233.	9.40
+						
ROUTED TO	6843.	12.50	2225.	700.	233.	9.40
+						
HYDROGRAPH AT	280.	12.50	84.	27.	9.	.35
+						
3 COMBINED AT	10356.	12.50	3382.	1064.	355.	14.19

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO		VOLUME (IN)	
						COMPUTATION PEAK (CFS)	INTERVAL TIME TO PEAK (MIN)		
	MANE	1.53	1591.95	751.82	2.82	30.00	1583.59	750.00	2.84
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3024E+03 EXCESS= .0000E+00 OUTFLOW= .3025E+03 BASIN STORAGE= .6108E-07 PERCENT ERROR= .0									
	MANE	1.75	291.66	722.97	2.82	30.00	265.98	720.00	2.85
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3911E+02 EXCESS= .0000E+00 OUTFLOW= .3913E+02 BASIN STORAGE= .1155E-08 PERCENT ERROR= -.1									
	MANE	4.62	342.10	733.27	2.84	30.00	336.92	750.00	2.85
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7407E+02 EXCESS= .0000E+00 OUTFLOW= .7409E+02 BASIN STORAGE= .3803E-06 PERCENT ERROR= .0									
	MANE	1.71	2718.69	752.30	2.82	30.00	2677.24	750.00	2.84
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5130E+03 EXCESS= .0000E+00 OUTFLOW= .5131E+03 BASIN STORAGE= .1017E-05 PERCENT ERROR= .0									
	MANE	2.96	249.22	755.90	2.82	30.00	240.04	750.00	2.84
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4664E+02 EXCESS= .0000E+00 OUTFLOW= .4665E+02 BASIN STORAGE= .1202E-07 PERCENT ERROR= .0									
	MANE	2.49	597.02	755.07	2.83	30.00	569.00	750.00	2.85
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1146E+03 EXCESS= .0000E+00 OUTFLOW= .1147E+03 BASIN STORAGE= .2768E-05 PERCENT ERROR= .0									
	MANE	1.82	726.57	724.30	2.64	30.00	698.52	750.00	2.65
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1350E+03 EXCESS= .0000E+00 OUTFLOW= .1351E+03 BASIN STORAGE= .1095E-07 PERCENT ERROR= .0									
	MANE	1.81	262.38	724.06	2.38	30.00	236.87	720.00	2.39
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4560E+02 EXCESS= .0000E+00 OUTFLOW= .4560E+02 BASIN STORAGE= .1609E-08 PERCENT ERROR= .0									
	MANE	4.06	591.23	757.38	2.55	30.00	542.58	750.00	2.56
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1345E+03 EXCESS= .0000E+00 OUTFLOW= .1345E+03 BASIN STORAGE= .1820E-05 PERCENT ERROR= .0									
	MANE	1.28	2286.62	752.53	2.62	30.00	2246.55	750.00	2.63
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4720E+03 EXCESS= .0000E+00 OUTFLOW= .4721E+03 BASIN STORAGE= .5419E-05 PERCENT ERROR= .0									
	MANE	.98	6956.10	752.04	2.76	30.00	6843.41	750.00	2.77
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1384E+04 EXCESS= .0000E+00 OUTFLOW= .1384E+04 BASIN STORAGE= .2036E-04 PERCENT ERROR= .0									

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

HEC-1: 100-Yr (Zone III)


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*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 07JUL06 TIME 10:57:14 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*****

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Virginia Highlands, LLC (Old TRW Site) - Floodplain Analysis Zone III
 Analyzed June 28, 2006
 100-YEAR, 24-HR STORM EVENT (TYPE II STORM)

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5 IO      OUTPUT CONTROL VARIABLES
          IPRNT      3 PRINT CONTROL
          IPILOT     0 PLOT CONTROL
          QSCAL      0. HYDROGRAPH PLOT SCALE

IT        HYDROGRAPH TIME DATA
          NMIN       30 MINUTES IN COMPUTATION INTERVAL
          IDATE      28JUN 6 STARTING DATE
          ITIME      0800 STARTING TIME
          NQ         300 NUMBER OF HYDROGRAPH ORDINATES
          NDDATE     4JUL 6 ENDING DATE
          NDTIME     1330 ENDING TIME
          ICENT      19 CENTURY MARK

          COMPUTATION INTERVAL .50 HOURS
          TOTAL TIME BASE 149.50 HOURS

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ENGLISH UNITS
DRAINAGE AREA      SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW               CUBIC FEET PER SECOND
STORAGE VOLUME    ACRE-FEET
SURFACE AREA      ACRES
TEMPERATURE       DEGREES FAHRENHEIT

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*** ** ** ** **

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*****
* SUB BASIN 22 - SEE DRAINAGE MAP *
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SUBBASIN RUNOFF DATA

13 BA      SUBBASIN CHARACTERISTICS
          TAREA      2.30 SUBBASIN AREA

          PRECIPITATION DATA

7 PB       STORM      4.20 BASIN TOTAL PRECIPITATION

8 PI       INCREMENTAL PRECIPITATION PATTERN
          .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
          .01 .01 .01 .01 .01 .01 .03 .02 .02 .02
          .02 .03 .05 .38 .07 .04 .01 .01 .01 .01
          .01 .01 .01 .01 .01 .01 .01 .01 .01 .01

14 LS      SCS LOSS RATE
          STRTL      47 INITIAL ABSTRACTION
          CRVNBR     81.00 CURVE NUMBER
          RTIMP      .00 PERCENT IMPERVIOUS AREA

15 UD      SCS DIMENSIONLESS UNITGRAPH
          TLAG       .36 LAG

```

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***
          UNIT HYDROGRAPH
          6 END-OF-PERIOD ORDINATES
          1701.    940.    244.    64.    18.    1.
          ***          ***          ***          ***

```

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          HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.91, TOTAL EXCESS = 2.29

PEAK FLOW      TIME      MAXIMUM AVERAGE FLOW
(CFS)          (HR)          6-HR      24-HR      72-HR      149.50-HR
+ 1751.        12.00          (CFS)
          (INCHES) 456.        142.        47.        23.
          (AC-FT) 1.845      2.291      2.291      2.291
          226.        281.        281.        281.

CUMULATIVE AREA = 2.30 SQ MI

```

*** ** ** ** **

 * * * * *
 16 KK * * * * * POINT Q - ROUTE SUB BASIN 22 THROUGH SUB 24
 * * * * *

KINEMATIC WAVE ROUTING FROM Q TO S

HYDROGRAPH ROUTING DATA

18 RK KINEMATIC WAVE STREAM ROUTING
 L 6000. CHANNEL LENGTH
 S .0500 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 10.00 BOTTOM WIDTH OR DIAMETER
 Z 8.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	2.17	1.37	2.02	2000.00	1737.60	724.71	2.29	17.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2810E+03 EXCESS= .0000E+00 OUTFLOW= .2811E+03 BASIN STORAGE= .5112E-07 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	2.17	1.37	30.00	1548.69	720.00	2.31
------	------	------	-------	---------	--------	------

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	149.50-HR	
1549.	12.00	460.	143.	48.	23.	
		(INCHES)	1.859	2.310	2.310	2.310
		(AC-FT)	228.	283.	283.	283.

CUMULATIVE AREA = 2.30 SQ MI

 * * * * *
 19 KK * * * * * SUB BASIN 24
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

21 BA SUBBASIN CHARACTERISTICS
 TAREA .43 SUBBASIN AREA

PRECIPITATION DATA

7 PB STORM 4.20 BASIN TOTAL PRECIPITATION

INCREMENTAL PRECIPITATION PATTERN	.01	.01	.01	.01	.01	.01	.01	.01	.01
	.01	.01	.01	.01	.01	.01	.01	.01	.01
	.02	.03	.05	.38	.07	.04	.03	.02	.02
	.01	.01	.01	.01	.01	.01	.01	.01	.01
	.01	.01	.01	.01	.01	.01	.01	.01	.01

22 LS SCS LOSS RATE
 STRTL .38 INITIAL ABSTRACTION
 CRVNR 84.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

23 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .52 LAG

 UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES

198.	231.	82.	29.	10.	4.	1.
------	------	-----	-----	-----	----	----

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.65, TOTAL EXCESS = 2.55

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	149.50-HR	
313.	12.50	94.	29.	10.	5.	
		(INCHES)	2.038	2.548	2.548	2.548
		(AC-FT)	47.	58.	58.	58.

CUMULATIVE AREA = .43 SQ MI

 * *
 24 KK * * POINT S
 * *

COMBINE SUB AREAS 22 AND 24

26 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

 HYDROGRAPH AT STATION
 PEAK FLOW TIME MAXIMUM AVERAGE FLOW
 (CFS) (HR) 6-HR 24-HR 72-HR 149.50-HR
 + 1794. 12.00 (CFS) 554. 172. 57. 28.
 (INCHES) 1.887 2.347 2.347 2.347
 (AC-FT) 275. 342. 342. 342.
 CUMULATIVE AREA = 2.73 SQ MI

 * *
 27 KK * * SUB BASIN 23
 * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

29 BA SUBBASIN CHARACTERISTICS
 TAREA .93 SUBBASIN AREA

PRECIPITATION DATA

7 PB STORM 4.20 BASIN TOTAL PRECIPITATION

8 PI INCREMENTAL PRECIPITATION PATTERN
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
 .02 .03 .05 .38 .07 .04 .03 .02 .02 .02
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01

30 LS SCS LOSS RATE
 STRTL .47 INITIAL ABSTRACTION
 CRVNER 81.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

31 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .49 LAG

UNIT HYDROGRAPH
 7 END-OF-PERIOD ORDINATES
 468. 490. 162. 55. 18. 6. 2.

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.91, TOTAL EXCESS = 2.29

PEAK FLOW TIME MAXIMUM AVERAGE FLOW
 (CFS) (HR) 6-HR 24-HR 72-HR 149.50-HR
 + 604. 12.50 (CFS) 184. 57. 19. 9.
 (INCHES) 1.839 2.291 2.291 2.291
 (AC-FT) 91. 114. 114. 114.
 CUMULATIVE AREA = .93 SQ MI

 * * * * *
 32 KK * * * * * POINT R - ROUTE SUB BASIN 23 THROUGH SUB 25
 * * * * *

KINEMATIC WAVE ROUTING FROM R TO S

HYDROGRAPH ROUTING DATA

34 RK KINEMATIC WAVE STREAM ROUTING
 L 3400. CHANNEL LENGTH
 S .0650 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 5.00 BOTTOM WIDTH OR DIAMETER
 Z 6.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	2.95	1.35	1.22	1133.33	602.79	752.30	2.29	15.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1136E+03 EXCESS= .0000E+00 OUTFLOW= .1136E+03 BASIN STORAGE= .1394E-08 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	2.95	1.35	30.00		595.79	750.00	2.30	
------	------	------	-------	--	--------	--------	------	--

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM (CFS)	AVERAGE FLOW 6-HR (CFS)	24-HR (CFS)	72-HR (CFS)	149.50-HR (CFS)
596.	12.50	185.	58.	19.	9.	
		(INCHES) 1.848	2.300	2.300	2.300	2.300
		(AC-FT) 92.	114.	114.	114.	114.

CUMULATIVE AREA = .93 SQ MI

 * * * * *
 35 KK * * * * * SUB BASIN 25
 * * * * *

UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

37 BA SUBBASIN CHARACTERISTICS
 TAREA .39 SUBBASIN AREA

PRECIPITATION DATA

7 PB STORM 4.20 BASIN TOTAL PRECIPITATION

8 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

38 LS SCS LOSS RATE
 STRTL .41 INITIAL ABSTRACTION
 CRVNER 83.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

39 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG .30 LAG

UNIT HYDROGRAPH
 5 END-OF-PERIOD ORDINATES
 2.

336. 129. 30. 7. 2.

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.74, TOTAL EXCESS = 2.46

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM (CFS)	AVERAGE FLOW 6-HR (CFS)	24-HR (CFS)	72-HR (CFS)	149.50-HR (CFS)
370.	12.00	83.	26.	9.	4.	
		(INCHES) 1.978	2.461	2.461	2.461	2.461
		(AC-FT) 41.	51.	51.	51.	51.

CUMULATIVE AREA = .39 SQ MI

 * * *
 40 KK * * * POINT S
 * * *

COMBINE SUB AREAS 23 AND 25

42 HC HYDROGRAPH COMBINATION
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

*** *** *** *** ***

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	(CFS)	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	149.50-HR
836.	12.00	268.	83.	28.	13.	
		(INCHES) 1.884	2.348	2.348	2.348	
		(AC-FT) 133.	165.	165.	165.	

CUMULATIVE AREA = 1.32 SQ MI

 * * *
 43 KK * * * POINT S - ROUTE 22&24 AND 23&25 THROUGH 26
 * * *

KINEMATIC WAVE ROUTING FROM S TO T

HYDROGRAPH ROUTING DATA

45 RK KINEMATIC WAVE STREAM ROUTING
 L 12200. CHANNEL LENGTH
 S .0320 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 15.00 BOTTOM WIDTH OR DIAMETER
 Z 5.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.56	1.41	4.89	4066.67	833.58	730.60	2.35	13.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1653E+03 EXCESS= .0000E+00 OUTFLOW= .1653E+03 BASIN STORAGE= .4555E-05 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.56	1.41	30.00	822.97	750.00	2.36
------	------	------	-------	--------	--------	------

*** *** *** *** ***

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	(CFS)	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	149.50-HR
823.	12.50	269.	84.	28.	13.	
		(INCHES) 1.892	2.356	2.357	2.357	
		(AC-FT) 133.	166.	166.	166.	

CUMULATIVE AREA = 1.32 SQ MI

 * * * * *
 46 KK * * * SUB BASIN 26
 * * * * *

 UNIFORM LOSS WITH SCS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

48 BA SUBBASIN CHARACTERISTICS
 TAREA 1.43 SUBBASIN AREA

PRECIPITATION DATA

7 PB STORM 4.20 BASIN TOTAL PRECIPITATION

8 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.03	.05	.38	.07	.04	.03	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

49 LS SCS LOSS RATE
 STRTL .35 INITIAL ABSTRACTION
 CRVNER 85.00 CURVE NUMBER
 RTIMP .00 PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH
 TLAG 1.11 LAG

 UNIT HYDROGRAPH
 13 END-OF-PERIOD ORDINATES

1.37.	435.	500.	359.	186.	104.	57.	31.	17.	9.
5.	3.	1.							

*** **

HYDROGRAPH AT STATION

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.56, TOTAL EXCESS = 2.64

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
751.	13.00	320.	101.	34.	16.
		(INCHES) 2.082	2.637	2.637	2.637
		(AC-FT) 159.	201.	201.	201.

CUMULATIVE AREA = 1.43 SQ MI

 * * * * *
 51 KK * * * POINT T
 * * * * *

COMBINE SUB AREAS 22-26

53 HC HYDROGRAPH COMBINATION
 ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

*** **

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
3139.	12.50	1142.	357.	119.	57.
		(INCHES) 1.938	2.425	2.425	2.425
		(AC-FT) 566.	709.	709.	709.

CUMULATIVE AREA = 5.48 SQ MI

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT		1751.	12.00	456.	142.	47.	2.30		
ROUTED TO		1549.	12.00	460.	143.	48.	2.30		
HYDROGRAPH AT		313.	12.50	94.	29.	10.	.43		
2 COMBINED AT		1794.	12.00	554.	172.	57.	2.73		
HYDROGRAPH AT		604.	12.50	184.	57.	19.	.93		
ROUTED TO		596.	12.50	185.	58.	19.	.93		
HYDROGRAPH AT		370.	12.00	83.	26.	9.	.39		
2 COMBINED AT		836.	12.00	268.	83.	28.	1.32		
ROUTED TO		823.	12.50	269.	84.	28.	1.32		
HYDROGRAPH AT		751.	13.00	320.	101.	34.	1.43		
3 COMBINED AT		3139.	12.50	1142.	357.	119.	5.48		

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
 (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL		VOLUME	
						PEAK	TIME TO PEAK		
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
	MANE	2.02	1737.60	724.71	2.29	30.00	1548.69	720.00	2.31
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2810E+03 EXCESS= .0000E+00 OUTFLOW= .2811E+03 BASIN STORAGE= .5112E-07 PERCENT ERROR= .0									
	MANE	1.22	602.79	752.30	2.29	30.00	595.79	750.00	2.30
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1136E-03 EXCESS= .0000E+00 OUTFLOW= .1136E+03 BASIN STORAGE= .1394E-08 PERCENT ERROR= .0									
	MANE	4.89	833.58	730.60	2.35	30.00	822.97	750.00	2.36
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1653E+03 EXCESS= .0000E+00 OUTFLOW= .1653E+03 BASIN STORAGE= .4555E-05 PERCENT ERROR= .0									

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

HEC-1: 100-Yr (Zone IV)

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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
*
* RUN DATE 05JUL06 TIME 14:02:21 *
*
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*****
*
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*
*****

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X X XXXXXXX XXXXX X
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,

DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID Virginia Highlands, LLC (Old TRW Site) - Floodplain Analysis Zone IV
2 ID Analyzed June 28, 2006
3 ID 100-YEAR, 24-HR STORM EVENT (TYPE II STORM)
4 IT 30 28JUN06 0800 300
5 IO 3

6 KK SUB BASIN 27 - SEE DRAINAGE MAP
7 PE 4.2
8 PC 0.0 0.0051 0.0105 0.0161 0.0220 0.0281 0.0345 0.0411 0.0480 0.0553
9 PC 0.0630 0.0712 0.0800 0.0892 0.0990 0.1093 0.1200 0.1322 0.1470 0.1630
10 PC 0.1810 0.2040 0.2350 0.2830 0.6630 0.7350 0.7720 0.7990 0.8200 0.8376
11 PC 0.8535 0.8676 0.8800 0.8912 0.9018 0.9117 0.9210 0.9297 0.9377 0.9452
12 PC 0.9520 0.9584 0.9647 0.9709 0.9770 0.9829 0.9887 0.9944 1.0000
13 BA 1.15
14 LS 0 85
15 UD 0.47

16 KK POINT U - ROUTE SUB BASIN 27 TO POINT U
17 KM KINEMATIC WAVE ROUTING TO POINT U
18 RK 7900 0.091 .04 TRAP 2 3.0
19 ZZ

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```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 05JUL06 TIME 14:02:21 *
*****

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*****
*
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*****

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Virginia Highlands, LLC (Old TRW Site) - Floodplain Analysis Zone IV
 Analyzed June 28, 2006
 100-YEAR, 24-HR STORM EVENT (TYPE II STORM)

```

5 IO OUTPUT CONTROL VARIABLES
    IPRNT 3 PRINT CONTROL
    IPLOT 0 PLOT CONTROL
    QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA
    NMIN 30 MINUTES IN COMPUTATION INTERVAL
    IDATE 28JUN 6 STARTING DATE
    ITIME 0800 STARTING TIME
    NQ 300 NUMBER OF HYDROGRAPH ORDINATES
    NDDATE 4JUL 6 ENDING DATE
    NDTIME 1330 ENDING TIME
    ICENT 19 CENTURY MARK

    COMPUTATION INTERVAL .50 HOURS
    TOTAL TIME BASE 149.50 HOURS

```

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ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-Feet
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

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```

*****
*
* SUB BASIN 27 - SEE DRAINAGE MAP
*
*****

```

```

SUBBASIN RUNOFF DATA

13 BA SUBBASIN CHARACTERISTICS
    TAREA 1.15 SUBBASIN AREA

```

```

PRECIPITATION DATA

7 PB STORM 4.20 BASIN TOTAL PRECIPITATION

8 PI INCREMENTAL PRECIPITATION PATTERN
    .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
    .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
    .02 .03 .05 .36 .07 .04 .03 .02 .02 .02
    .01 .01 .01 .01 .01 .01 .01 .01 .01 .01
    .01 .01 .01 .01 .01 .01 .01 .01 .01 .01

```

```

14 LS SCS LOSS RATE
    STRTL .35 INITIAL ABSTRACTION
    CRVNER 85.00 CURVE NUMBER
    RTIMP .00 PERCENT IMPERVIOUS AREA

```

```

15 UD SCS DIMENSIONLESS UNITGRAPH
    TLAG .47 LAG

```

```

UNIT HYDROGRAPH
7 END-OF-PERIOD ORDINATES
612. 595. 188. 61. 20. 7. 1.

```

HYDROGRAPH AT STATION

```

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.56, TOTAL EXCESS = 2.64

PEAK FLOW TIME MAXIMUM AVERAGE FLOW
+ (CFS) (HR) 6-HR 24-HR 72-HR 149.50-HR
+ 857. 12.50 (CFS) 261. 82. 27. 13.
(INCHES) 2.107 2.637 2.637 2.637
(AC-FT) 129. 162. 162. 162.

CUMULATIVE AREA = 1.15 SQ MI

```

16 KK *****
 * * * POINT U - ROUTE SUB BASIN 27 TO POINT U
 * * *

KINEMATIC WAVE ROUTING TO POINT U

HYDROGRAPH ROUTING DATA

18 RK KINEMATIC WAVE STREAM ROUTING
 L 7900. CHANNEL LENGTH
 S .0910 SLOPE
 N .040 CHANNEL ROUGHNESS COEFFICIENT
 CA .00 CONTRIBUTING AREA
 SHAPE TRAP CHANNEL SHAPE
 WD 2.00 BOTTOM WIDTH OR DIAMETER
 Z 3.00 SIDE SLOPE
 NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

 COMPUTED KINEMATIC PARAMETERS
 VARIABLE TIME STEP
 (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	4.50	1.34	1.99	2633.33	852.10	752.21	2.64	23.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1618E+03 EXCESS= .0000E+00 OUTFLOW= .1618E+03 BASIN STORAGE= .1163E-07 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	4.50	1.34	30.00	846.24	750.00	2.65
------	------	------	-------	--------	--------	------

*** *** *** *** ***

HYDROGRAPH AT STATION

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	149.50-HR
846.	12.50	262.	82.	27.	13.
		(INCHES) 2.120	2.653	2.653	2.653
		(AC-FT) 130.	163.	163.	163.

CUMULATIVE AREA = 1.15 SQ MI

1

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT		857.	12.50	261.	82.	27.	1.15		
ROUTED TO		846.	12.50	262.	82.	27.	1.15		

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
 (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL		VOLUME (IN)	
						DT (MIN)	PEAK (CFS)		
	MANE	1.99	852.10	752.21	2.64	30.00	846.24	750.00	2.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1618E+03 EXCESS= .0000E+00 OUTFLOW= .1618E+03 BASIN STORAGE= .1163E-07 PERCENT ERROR= .0

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