

DRAINAGE PLAN  
AUBURN HILLS 11TH  
ADDITION  
TO  
WICHITA, SEDGWICK COUNTY, KANSAS

*Baughman Company, P.A.*

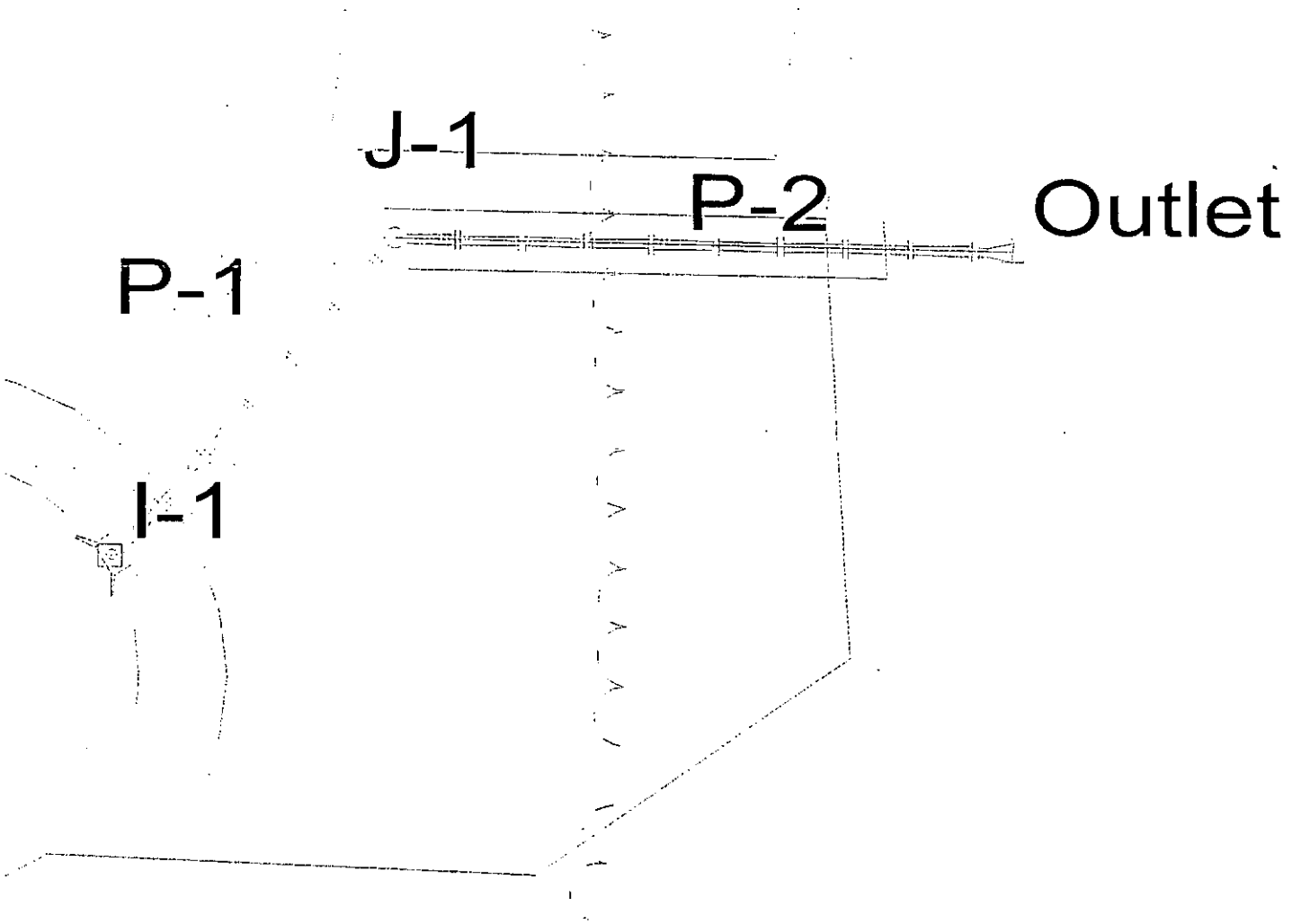


DRAINAGE PLAN  
AUBURN HILLS 11TH  
ADDITION  
TO  
WICHITA, SEDGWICK COUNTY, KANSAS

Prepared By

 **BAUGHMAN COMPANY, P.A.**  
ENGINEERING, SURVEYING & PLANNING  
316/262-7271 FAX 316/262-0149 WICHITA, KANSAS 67211

May 22, 2000



System #1

Node Report									
Node	Area (acres)	Total Area (acres)	Tc (min)	Rainfall Intensity (in/hr)	Additional Flow (cfs)	Discharge (cfs)	Ground Elevation (ft)	HGL In (ft)	HGL Out (ft)
2-yr	I-1	1.3	ERR	3.83	2.4	2.4	197.5	194.74	194.62
	J-1	N/A	ERR	N/A	N/A	2.4	196	191.84	191.72
	Outlet	N/A	ERR	N/A	N/A	N/A	191	188.62	188.62
5-yr	I-1	1.3	ERR	4.56	3	3	197.5	194.84	194.7
	J-1	N/A	ERR	N/A	N/A	3	196	191.94	191.8
	Outlet	N/A	ERR	N/A	N/A	N/A	191	188.7	188.7
10-yr	I-1	1.3	ERR	5.22	3.9	3.9	197.5	194.97	194.8
	J-1	N/A	ERR	N/A	N/A	3.9	196	192.07	191.9
	Outlet	N/A	ERR	N/A	N/A	N/A	191	188.8	188.8
100-yr	J-1	1.3	ERR	7.37	6.5	6.5	197.5	195.31	195.03
	J-1	N/A	ERR	N/A	N/A	6.5	196	192.41	192.13
	Outlet	N/A	ERR	N/A	N/A	N/A	191	189.03	189.03

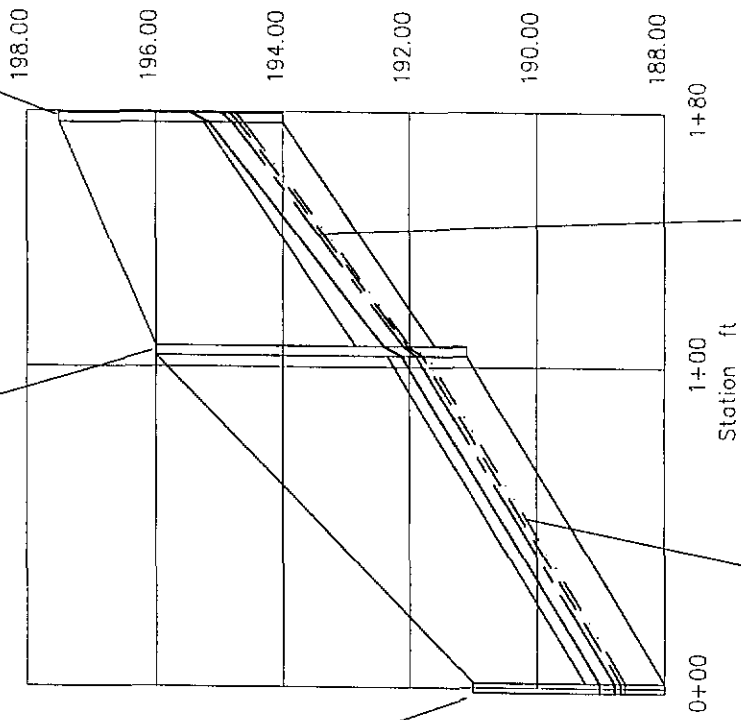
Pipe Report

Pipe Section	Upstream Node	Downstre Node	Area (acres)	Discharge (cfs)	Slope ft/ft	Pipe Size	Mannings	Length (ft)	Upstream Invert (ft)	Downstre Invert (ft)	Upstream Ground (ft)	Downstre Ground (ft)	Upstream HGL (ft)	Downstre HGL (ft)
2-yr	P-1	I-1	1.3	2.4	0.032877	15 inch	0.013	73	194	191.6	197.5	196	194.62	191.98
	P-2	J-1	N/A	2.4	0.029524	15 inch	0.013	105	191.1	188	196	191	191.72	188.62
5-yr	P-1	I-1	1.3	3	0.032877	15 inch	0.013	73	194	191.6	197.5	196	194.7	192.03
	P-2	J-1	N/A	3	0.029524	15 inch	0.013	105	191.1	188	196	191	191.8	188.7
10-yr	P-1	I-1	1.3	3.9	0.032877	15 inch	0.013	73	194	191.6	197.5	196	194.8	192.1
	P-2	J-1	N/A	3.9	0.029524	15 inch	0.013	105	191.1	188	196	191	191.9	188.8
100-yr	P-1	I-1	1.3	6.5	0.032877	15 inch	0.013	73	194	191.6	197.5	196	195.03	192.27
	P-2	J-1	N/A	6.5	0.029524	15 inch	0.013	105	191.1	188	196	191	192.13	189.03

Inlet: J-1  
Rim: 197.50 ft  
Sump: 194.00 ft

Junction: J-1  
Rim: 196.00 ft  
Sump: 191.10 ft

Outlet: Outlet  
Rim: 191.00 ft  
Sump: 188.00 ft



Elevation ft

Station ft

— = 100-yr HGL  
- - - = 10-yr HGL  
- - - - = 5-yr HGL  
... = 2-yr HGL

Pipe: P-1  
Up Invert: 194.00 ft  
Dn Invert: 191.60 ft  
Length: 73.00 ft  
Size: 15 inch

Pipe: P-2  
Up Invert: 191.10 ft  
Dn Invert: 188.00 ft  
Length: 105.00 ft  
Size: 15 inch

```
*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   MAY 1991 *
*   VERSION 4.0.1E *
*   Lahey F77L-EM/32 version 5.01 *
*   Dodson & Associates, Inc. *
*   RUN DATE 05/22/00 TIME 16:26:21 *
*****
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 551-1748 *
*****
```

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X   X  XXXXXXXX  XXXXX      X
X   X  X        X   X      XX
X   X  X        X           X
XXXXXXX XXXX   X   XXXXX   X
X   X  X        X           X
X   X  X        X   X      X
X   X  XXXXXXXX  XXXXX      XXX

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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

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
1	ID	AUBURN HILLS 11TH ADDITION									
2	IT	5	22MAY00	0000	300					20	
3	IO	3	0								
	*DIAGRAM										
	*										
4	KK	OFFSIT									
	* BASIN										
5	BA	.0094									
6	PH	0	0	0.86	1.8425	3.73	4.60	5.04	5.94	6.96	8.16
	*	10	0	0.6175	1.305	2.53	3.10	3.39	4.02	4.68	5.52
	*	50	0	0.4616	0.9575	1.69	1.98	2.16	2.52	3.00	3.60
7	UD	.15									
8	LS	0	88								
	*										
9	KK	LAKE									
10	RS	1	ELEV	188.5							
11	SA	0	.02	.08	0.3	0.6					
12	SE	188.5	189	190	192	194					
13	SL	188.5	1.23	.67	0.5						
14	SS	193.5	40	2.86	1.5						
	*										
15	ZZ										

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

ND. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

4 OFFSIT  
V  
V

9 LAKE

(\*\*\*) RUNOFF ALSO COMPUTED AT THIS LOCATION

\*\*\*\*\*  
 \* FLOOD HYDROGRAPH PACKAGE (HEC-1) \*  
 \* MAY 1991 \*  
 \* VERSION 4.0.1E \*  
 \* Lahey F77L-EM/32 version 5.01 \*  
 \* Dodson & Associates, Inc. \*  
 \* RUN DATE 05/22/00 TIME 16:26:21 \*  
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 \* U.S. ARMY CORPS OF ENGINEERS \*  
 \* HYDROLOGIC ENGINEERING CENTER \*  
 \* 609 SECOND STREET \*  
 \* DAVIS, CALIFORNIA 95616 \*  
 \* (916) 551-1748 \*  
 \*\*\*\*\*

AUBURN HILLS 11TH ADDITION

3 IO OUTPUT CONTROL VARIABLES

IPRNT 3 PRINT CONTROL  
 IPLOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN 5 MINUTES IN COMPUTATION INTERVAL  
 IDATE 22MAY 0 STARTING DATE  
 ITIME 0000 STARTING TIME  
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES  
 NDDATE 23MAY 0 ENDING DATE  
 NDTIME 0055 ENDING TIME  
 ICENT 0 CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS  
 TOTAL TIME BASE 24.92 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

\*\*\* \*\*

\*\*\*\*\*  
 \* OFFSIT \*  
 \*\*\*\*\*

SUBBASIN RUNOFF DATA

5 BA SUBBASIN CHARACTERISTICS

TAREA 0.01 SUBBASIN AREA

PRECIPITATION DATA

6 PH

DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40				TP-49				
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.86	1.84	3.73	4.60	5.04	5.94	6.96	8.16	0.00	0.00	0.00	0.00

STORM AREA = 0.01

8 LS SCS LOSS RATE

STRTL 0.27 INITIAL ABSTRACTION  
 CRVNBR 88.00 CURVE NUMBER  
 RTIMP 0.00 PERCENT IMPERVIOUS AREA

7 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 0.15 LAG

\*\*\*

UNIT HYDROGRAPH  
 11 END-OF-PERIOD ORDINATES

9.	23.	20.	10.	5.	3.	1.	1.	0.	0.
0.									

\*\*\* \*\*

HYDROGRAPH AT STATION OFFSIT

TOTAL RAINFALL = 8.16, TOTAL LOSS = 1.44, TOTAL EXCESS = 6.72

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
38.	12.17	5.	2.	2.	2.
		(INCHES) 5.348	6.725	6.725	6.725
		(AC-FT) 3.	3.	3.	3.

CUMULATIVE AREA = 0.01 SQ MI

\*\*\*\*\*

9 KK  
 \* LAKE \*  
 \*\*\*\*\*

HYDROGRAPH ROUTING DATA

10 RS	STORAGE ROUTING					
	NSTPS	1	NUMBER OF SUBREACHES			
	ITYP		ELEV TYPE OF INITIAL CONDITION			
	RSVRIC	188.50	INITIAL CONDITION			
	X	0.00	WORKING R AND D COEFFICIENT			
11 SA	AREA	0.0	0.0	0.1	0.3	0.6
12 SE	ELEVATION	188.50	189.00	190.00	192.00	194.00
13 SL	LOW-LEVEL OUTLET					
	ELEVL	188.50	ELEVATION AT CENTER OF OUTLET			
	CAREA	1.23	CROSS-SECTIONAL AREA			
	COOL	0.67	COEFFICIENT			
	EXPL	0.50	EXPONENT OF HEAD			
14 SS	SPILLWAY					
	CREL	193.50	SPILLWAY CREST ELEVATION			
	SPWID	40.00	SPILLWAY WIDTH			
	COQW	2.86	WEIR COEFFICIENT			
	EXPW	1.50	EXPONENT OF HEAD			

\*\*\*

COMPUTED STORAGE-ELEVATION DATA

STORAGE	0.00	0.00	0.05	0.41	1.29
ELEVATION	188.50	189.00	190.00	192.00	194.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	0.00	5.20	5.66	6.20	6.87	7.69	8.74	10.12	12.01	14.78
ELEVATION	188.50	189.12	189.23	189.38	189.58	189.85	190.25	190.84	191.80	193.50
OUTFLOW	14.84	15.18	16.04	17.63	20.21	24.00	29.23	36.15	44.97	55.95
ELEVATION	193.51	193.52	193.55	193.58	193.63	193.68	193.75	193.82	193.91	194.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.07	0.15
OUTFLOW	0.00	4.67	5.20	5.66	6.20	6.87	7.69	8.09	8.74	10.12
ELEVATION	188.50	189.00	189.12	189.23	189.38	189.58	189.85	190.00	190.25	190.84
STORAGE	0.35	0.41	1.01	1.02	1.04	1.05	1.08	1.11	1.14	1.19
OUTFLOW	12.01	12.36	14.78	15.18	16.04	17.63	20.21	24.00	29.23	36.14
ELEVATION	191.80	192.00	193.50	193.52	193.55	193.58	193.63	193.68	193.75	193.82
STORAGE	1.23	1.29								
OUTFLOW	44.97	55.95								
ELEVATION	193.91	194.00								

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 5.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.

THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

***		***	***	***	***	
		HYDROGRAPH AT STATION	LAKE			
PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
+ (CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
	12.58	(CFS)	5.	2.	2.	2.
		(INCHES)	5.348	6.725	6.725	6.725
		(AC-FT)	3.	3.	3.	3.
PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
+ (AC-FT)	(HR)		6-HR	24-HR	72-HR	24.92-HR
	12.58		0.	0.	0.	0.
PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
+ (FEET)	(HR)		6-HR	24-HR	72-HR	24.92-HR
	12.58		189.77	188.86	188.84	188.84
		CUMULATIVE AREA =	0.01 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	OFFSIT	38.	12.17	5.	2.	2.	0.01		
	ROUTED TO	LAKE	14.	12.58	5.	2.	2.	0.01	192.94	12.58

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

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* MAY 1991 *
* VERSION 4.0.1E *
* Lahey F77L-EM/32 version 5.01 *
* Dodson & Associates, Inc. *
* RUN DATE 05/22/00 TIME 16:26:42 *
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*****
*
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 551-1748 *
*****
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X X XXXXXXX XXXXX X
X X X X X XX
X X X X X X
XXXXXXX XXXX X XXXXX X
X X X X X X
X X X X X X
X X XXXXXXX XXXXX XXXX

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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 -AMSKK- 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

HEC-1 INPUT

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID AUBURN HILLS 11TH ADDITION
2 IT 5 22MAY00 0000 300 20
3 IO 3 0
  *DIAGRAM
  *
4 KK OFFSIT
  * BASIN
5 BA .0094
  * 0 0 0.86 1.8425 3.73 4.60 5.04 5.94 6.96 8.16
6 PH 10 0 0.6175 1.305 2.53 3.10 3.39 4.02 4.68 5.52
  * 50 0 0.4616 0.9575 1.69 1.98 2.16 2.52 3.00 3.60
7 UD .15
8 LS 0 88
  *
9 KK LAKE
10 RS 1 ELEV 188.5
11, SA 0 .02 .08 0.3 0.6
12 SE 188.5 189 190 192 194
13 SL 188.5 1.23 .67 0.5
14 SS 193.5 40 2.86 1.5
  *
15 ZZ

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SCHEMATIC DIAGRAM OF STREAM NETWORK

```

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

```

(\*\*\*) RUNOFF ALSO COMPUTED AT THIS LOCATION



HYDROGRAPH AT STATION OFFSIT

TOTAL RAINFALL = 5.46, TOTAL LOSS = 1.35, TOTAL EXCESS = 4.11

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
25.	12.17	3.	1.	1.	1.
		3.314	4.112	4.112	4.112
		2.	2.	2.	2.

CUMULATIVE AREA = 0.01 SQ MI

\*\*\*\*\*

\*\*\*\*\*  
 \* \*  
 9 KK \* LAKE \*  
 \* \*  
 \*\*\*\*\*

HYDROGRAPH ROUTING DATA

10 RS	STORAGE ROUTING					
	NSTPS	1	NUMBER OF SUBREACHES			
	ITYP		ELEV TYPE OF INITIAL CONDITION			
	RSVRIC	188.50	INITIAL CONDITION			
	X	0.00	WORKING R AND D COEFFICIENT			
11 SA	AREA	0.0	0.0	0.1	0.3	0.6
12 SE	ELEVATION	188.50	189.00	190.00	192.00	194.00
13 SL	LOW-LEVEL OUTLET					
	ELEVL	188.50	ELEVATION AT CENTER OF OUTLET			
	CAREA	1.23	CROSS-SECTIONAL AREA			
	COQL	0.67	COEFFICIENT			
	EXPL	0.50	EXPONENT OF HEAD			
14 SS	SPILLWAY					
	CREL	193.50	SPILLWAY CREST ELEVATION			
	SPWID	40.00	SPILLWAY WIDTH			
	COGW	2.86	WEIR COEFFICIENT			
	EXPW	1.50	EXPONENT OF HEAD			

\*\*\*

COMPUTED STORAGE-ELEVATION DATA

STORAGE	0.00	0.00	0.05	0.41	1.29
ELEVATION	188.50	189.00	190.00	192.00	194.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	0.00	5.20	5.66	6.20	6.87	7.69	8.74	10.12	12.01	14.78
ELEVATION	188.50	189.12	189.23	189.38	189.58	189.85	190.25	190.84	191.80	193.50
OUTFLOW	14.84	15.18	16.04	17.63	20.21	24.00	29.23	36.15	44.97	55.95
ELEVATION	193.51	193.52	193.55	193.58	193.63	193.68	193.75	193.82	193.91	194.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.07	0.15
OUTFLOW	0.00	4.67	5.20	5.66	6.20	6.87	7.69	8.09	8.74	10.12
ELEVATION	188.50	189.00	189.12	189.23	189.38	189.58	189.85	190.00	190.25	190.84
STORAGE	0.35	0.41	1.01	1.02	1.04	1.05	1.08	1.11	1.14	1.19
OUTFLOW	12.01	12.36	14.78	15.18	16.04	17.63	20.21	24.00	29.23	36.14
ELEVATION	191.80	192.00	193.50	193.52	193.55	193.58	193.63	193.68	193.75	193.82
STORAGE	1.23	1.29								
OUTFLOW	44.97	55.95								
ELEVATION	193.91	194.00								

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 5.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.

THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

***		***	***	***	***	
		HYDROGRAPH AT STATION	LAKE			
PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
+ (CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
	12.50	(CFS)	3.	1.	1.	1.
		(INCHES)	3.314	4.112	4.112	4.112
		(AC-FT)	2.	2.	2.	2.
PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
+ (AC-FT)	(HR)		6-HR	24-HR	72-HR	24.92-HR
	12.42		0.	0.	0.	0.
PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
+ (FEET)	(HR)		6-HR	24-HR	72-HR	24.92-HR
	12.50		189.16	188.69	188.68	188.68
		CUMULATIVE AREA =	0.01 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									
		OFFSIT	25.	12.17	3.	1.	1.	0.01		
	ROUTED TO									
		LAKE	12.	12.50	3.	1.	1.	0.01	191.79	12.50

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

\*\*\*\*\*  
 \* FLOOD HYDROGRAPH PACKAGE (HEC-1) \*  
 \* MAY 1991 \*  
 \* VERSION 4.0.1E \*  
 \* Lahey F77L-EM/32 version 5.01 \*  
 \* Dodson & Associates, Inc. \*  
 \* RUN DATE 05/22/00 TIME 16:27:01 \*  
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 \* U.S. ARMY CORPS OF ENGINEERS \*  
 \* HYDROLOGIC ENGINEERING CENTER \*  
 \* 609 SECOND STREET \*  
 \* DAVIS, CALIFORNIA 95616 \*  
 \* (916) 551-1748 \*  
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X   X XXXXXXX XXXXX      X
X   X X      X   X      XX
X   X X      X           X
XXXXXXX XXXX      X      XXXXX X
X   X X      X           X
X   X X      X   X      XX
X   X XXXXXXX XXXXX      XXX
    
```

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 -AMSKK- 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

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
1	ID	AUBURN HILLS 11TH ADDITION									
2	IT	5	22MAY00	0000	300						
3	IO	3	0								
		*DIAGRAM									
		*									
4	KK	OFFSIT									
		* BASIN									
5	BA	.0094									
	*	0	0	0.86	1.8425	3.73	4.60	5.04	5.94	6.96	8.16
	*	10	0	0.6175	1.305	2.53	3.10	3.39	4.02	4.68	5.52
6	PH	50	0	0.4616	0.9575	1.69	1.98	2.16	2.52	3.00	3.60
7	UD	.15									
8	LS	0	88								
	*										
9	KK	LAKE									
10	RS	1	ELEV	188.5							
11	SA	0	.02	.08	0.3	0.6					
12	SE	188.5	189	190	192	194					
13	SL	188.5	1.23	.67	0.5						
14	SS	193.5	40	2.86	1.5						
	*										
15	ZZ										

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

4 OFFSIT  
 V  
 V  
 9 LAKE

(\*\*\*) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* MAY 1991
* VERSION 4.0.1E
* Lahey F77L-EM/32 version 5.01
* Dodson & Associates, Inc.
* RUN DATE 05/22/00 TIME 16:27:01
*****

```

```

*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 551-1748
*
*****

```

AUBURN HILLS 11TH ADDITION

```

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

```

```

IT HYDROGRAPH TIME DATA
    NMIN      5 MINUTES IN COMPUTATION INTERVAL
    IDATE     22MAY 0 STARTING DATE
    ITIME     0000 STARTING TIME
    NQ        300 NUMBER OF HYDROGRAPH ORDINATES
    NDDATE    23MAY 0 ENDING DATE
    NDTIME    0055 ENDING TIME
    ICENT     0 CENTURY MARK

    COMPUTATION INTERVAL 0.08 HOURS
    TOTAL TIME BASE     24.92 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

```

\*\*\* \*\*

```

*****
*
* 4 KK OFFSIT *
*
*****

```

SUBBASIN RUNOFF DATA

```

5 BA SUBBASIN CHARACTERISTICS
    TAREA      0.01 SUBBASIN AREA

```

PRECIPITATION DATA

```

6 PH DEPTHS FOR 50-PERCENT HYPOTHETICAL STORM
..... HYDRO-35 ..... TP-40 ..... TP-49 .....
5-MIN 15-MIN 60-MIN 2-HR 3-HR 6-HR 12-HR 24-HR 2-DAY 4-DAY 7-DAY 10-DAY
0.46 0.96 1.69 1.98 2.16 2.52 3.00 3.60 0.00 0.00 0.00 0.00

```

STORM AREA = 0.01

```

8 LS SCS LOSS RATE
    STRL      0.27 INITIAL ABSTRACTION
    CRVNB      88.00 CURVE NUMBER
    RTIMP      0.00 PERCENT IMPERVIOUS AREA

```

```

7 UD SCS DIMENSIONLESS UNITGRAPH
    TLAG      0.15 LAG

```

\*\*\*

UNIT HYDROGRAPH  
11 END-OF-PERIOD ORDINATES

```

9. 23. 20. 10. 5. 3. 1. 1. 0. 0.
0.

```

\*\*\* \*\*

HYDROGRAPH AT STATION OFFSIT

TOTAL RAINFALL = 3.17, TOTAL LOSS = 1.20, TOTAL EXCESS = 1.97

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
13.	12.17	2.	0.	0.	0.
	(INCHES)	1.577	1.968	1.968	1.968
	(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA = 0.01 SQ MI

\*\*\* \*\*

\*\*\*\*\*  
 \* \*  
 9 KK \* LAKE \*  
 \* \*  
 \*\*\*\*\*

HYDROGRAPH ROUTING DATA

10 RS	STORAGE ROUTING					
	NSTPS	1	NUMBER OF SUBREACHES			
	ITYP	ELEV	TYPE OF INITIAL CONDITION			
	RSVRIC	188.50	INITIAL CONDITION			
	X	0.00	WORKING R AND D COEFFICIENT			
11 SA	AREA	0.0	0.0	0.1	0.3	0.6
12 SE	ELEVATION	188.50	189.00	190.00	192.00	194.00
13 SL	LOW-LEVEL OUTLET					
	ELEVEL	188.50	ELEVATION AT CENTER OF OUTLET			
	CAREA	1.23	CROSS-SECTIONAL AREA			
	COQL	0.67	COEFFICIENT			
	EXPL	0.50	EXPONENT OF HEAD			
14 SS	SPILLWAY					
	CREL	193.50	SPILLWAY CREST ELEVATION			
	SPWID	40.00	SPILLWAY WIDTH			
	COQW	2.86	WEIR COEFFICIENT			
	EXPW	1.50	EXPONENT OF HEAD			

\*\*\*

COMPUTED STORAGE-ELEVATION DATA

STORAGE	0.00	0.00	0.05	0.41	1.29
ELEVATION	188.50	189.00	190.00	192.00	194.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	0.00	5.20	5.66	6.20	6.87	7.69	8.74	10.12	12.01	14.78
ELEVATION	188.50	189.12	189.23	189.38	189.58	189.85	190.25	190.84	191.80	193.50
OUTFLOW	14.84	15.18	16.04	17.63	20.21	24.00	29.23	36.15	44.97	55.95
ELEVATION	193.51	193.52	193.55	193.58	193.63	193.68	193.75	193.82	193.91	194.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.07	0.15
OUTFLOW	0.00	4.67	5.20	5.66	6.20	6.87	7.69	8.09	8.74	10.12
ELEVATION	188.50	189.00	189.12	189.23	189.38	189.58	189.85	190.00	190.25	190.84
STORAGE	0.35	0.41	1.01	1.02	1.04	1.05	1.08	1.11	1.14	1.19
OUTFLOW	12.01	12.36	14.78	15.18	16.04	17.63	20.21	24.00	29.23	36.14
ELEVATION	191.80	192.00	193.50	193.52	193.55	193.58	193.63	193.68	193.75	193.82
STORAGE	1.23	1.29								
OUTFLOW	44.97	55.95								
ELEVATION	193.91	194.00								

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 5.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.

THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

***		***	***	***	***	
		HYDROGRAPH AT STATION	LAKE			
PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
+ (CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
		(INCHES)				
		(AC-FT)				
9.	12.33	2.	0.	0.	0.	0.
		1.577	1.968	1.968	1.968	1.968
		1.	1.	1.	1.	1.
PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
+ (AC-FT)	(HR)		6-HR	24-HR	72-HR	24.92-HR
0.	12.33	0.	0.	0.	0.	0.
PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
+ (FEET)	(HR)		6-HR	24-HR	72-HR	24.92-HR
190.39	12.33	188.74	188.57	188.57	188.57	188.57
		CUMULATIVE AREA =	0.01 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	OFFSIT	13.	12.17	2.	0.	0.	0.01		
	ROUTED TO	LAKE	9.	12.33	2.	0.	0.	0.01	190.39	12.33

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

