1995 EXCEL SERVICE CENTER DRAINAGE REPORT

BURY & PITTMAN-DFW, INC.

Consulting Engineers/Surveyors

Conference Memorandum

Project	Conference Date
18 Acre Excel Site, Addison	08/24/95
Client	**Issue Date**
Wilcox Realty Group	
Conference Location	**Project No.**
City of Addison Service Center	3027-01

Attendance	Routing
John Baumgartner, City of Addison - Public Works Director Ocie Vest, BPI Paul Lee, BPI	

Purpose

Discuss Detention Requirements

Discussion:

The following is our understanding of the subject matter covered in this conference. if this differs with your understanding, please notify us.:

We determined that the downstream restriction to our flow occurs at the 8 X 5 Reinforced Concrete Box (RCB) at Sunbelt Drive as shown on the attached map. We agreed that the adjoining CMP could handle the flows from Sunbelt and Westgrove Drive but would not accept any of the flows from the drainage basin for the project site. This leaves the 8 X 5 RCB for this drainage area. Based on a previous drainage area map this area has a peak discharge of 824.93 CFS, however, the capacity of the RCB is only 593 CFS. This leaves 231.93 CFS or 6.22 Ac-ft of water that must be detained for this drainage basin. We agreed that our project and upstream developed area is 20% of the drainage basin. Therefore we should be required to detain 20% of the total or approximately 1.25 Ac-ft.

c:\PAUL\conmem10.frm\nh

Distribution	Prepared by
John Baumgartner, City of Addison David M. Pearson, BPI Ocie Vest, BPI	Paul Lee

WILCOX

June 29, 1996

Mr. Ron Whitehead
TOWN OF ADDISON
City Manager
P.O. Box 144
Addison, TX 75001

Dear Ron:

I am writing this letter on behalf of Excel Communications, Inc. As you know, Excel is building two facilities of 300,000 square feet valued at more than $18,000,000. These facilities will be completed by September 15 and will employ approximately 2,000 people. The new buildings are located at Addison Road and Bent Tree Plaza Parkway. In the last thirty days, Excel has purchased an additional 18 acres along Bent Tree Plaza Parkway to build an office building of approximately 200,000 square feet which will employ an additional 1,500 employees.

Excel's new home is now in Addison, Texas along Bent Tree Plaza Parkway. Thus, we feel that a name change would be appropriate, and we are requesting that Bent Tree Plaza Parkway be renamed Excel Parkway. Excel Communications, Inc. will incur all cost of street signage change.

I appreciate your consideration and look forward to hearing from you soon.

Sincerely,

WILCOX DEVELOPMENT SERVICES

Jesse K. Pruitt
President

JKP.ew

WILCOX REALTY GROUP
Dallas • San Antonio
Two Lincoln Centre • 5420 LBJ Freeway • Suite 740 • Dallas, Texas 75240
214-770-2100 • Fax 214-770-2199

TOWN OF

ADDISON

PUBLIC WORKS

To: Chris Terry

Company: Town of Addison

FAX #:

Date: 7-18-96

# of pages (including cover): 2

From: John Baumgartner, P.E.
Director
Phone: 214/450-2886
FAX: 214/450-2837

16801 Westgrove
P.O. Box 144
Addison, TX 75001

☐ Original in mail ☒ Per your request ☐ FYI ☐ Call me

Comments:

Bury+Pittman
Consulting Engineers and Surveyors

Bury & Pittman-DFW, Inc.
5310 Harvest Hill Rd.,Suite 100
Dallas, Texas 75230
Tel 214/991-0011
Fax 214/991-0278

LETTER OF TRANSMITTAL

TO	TOWN OF ADDISON	DATE	12/01/95
	16801 WESTGROVE DRIVE	PROJECT NUMBER	3027-01
	ADDISON, TEXAS 75001-0144	DATA CODE	DEL-B.C.
ATTN:	JOHN BAUMGARTNER	ROUTING:	
RE:	EXCEL SERVICE CENTER		

WE ARE SENDING YOU:	THESE ARE TRANSMITTED:
_____ Shop Drawings	_____ As Requested
_____ Original Drawings	_____ For Your Use
___X___ Prints	___X___ For Review and Comment
_____ Specifications	_____
_____ Reports	_____

NUMBER	DESCRIPTION
3 SETS	CIVIL PLANS FOR EXCEL SERVICE CENTER
	PLAN CHECK COMMENTS

REMARKS

PLEASE CALL ME IF THERE IS ANYTHING ELSE THAT NEEDS TO BE DONE TO INSURE THAT THE PLAT IS ON THE DECEMBER 12TH CITY COUNCIL AGENDA.

DISTRIBUTION:	PREPARED BY:
CC: SUBASH GAITONDE, CMC RAY GARRISON, WSI OCIE VEST, BPI	PAUL LEE

If enclosures are not as noted, kindly notify us at once.

TOWN OF ADDISON

PUBLIC WORKS DEPARTMENT (214) 450-2871

Post Office Box 144 Addison, Texas 75001 16801 Westgrove

Excel Telecommunications Center
Construction Plan Review QRB
November 27, 1995

1. All civil plans shall be signed and sealed by a Texas Registered Civil Engineer.

2. General notes:

   A. Revise notes as indicated.

3. Plat:

   A. Provide site visibility easement of 350 feet for western driveway or relocate access point. PROVIDED BY SEPERATE INSTRUMENT

4. Site Plan:

   A. Verify fire lane radius requirements with fire department - Gordon Robbins 450-7201.

   B. Site visibility easement required.

   C. A 5-foot sidewalk is required along Bent Tree Plaza Parkway.

   D. Handicap ramps are required at all driveway/sidewalk intersections.

5. Grading Plan:

   A. Provide recessed curb inlet at the sump in Addison Road.

   B. Provide inlet calculations.

   C. Place a concrete pilot channel in the bottom of the detention ponds or fit them with french drains to facilitate drainage.

6. Utility Plan:

   A. All meter assemblies shall include backflow prevention devices -- see attached.

   B. Fire hydrant assemblies shall include 6" gate valve.

7. Erosion Control Plan:

   A. Show location of stabilized construction entrances.

   B. Provide for perimeter access control to manage random access to the site. Chain link fence

8. Storm Drain Plan and Profile:

   A. Revise detention pond to provide a water surface elevation of less than 639.75.

9. Standard Details:

   A. See attached Addison standards and revise your details as required.

10. See plan for miscellaneous notes.

11. Resubmittal required.

completed

Bury+Pittman

Bury & Pittman-DFW, Inc.
Consulting Engineers/Surveyors
5310 Harvest Hill Road/Suite 100
Dallas, Texas 75230
Tel 214/991-0011
Fax 214/991-0278

April 2, 1996

Mr. John Baumgartner, P.E. 3027-01
Town of Addison
16801 Westgrove Drive
Addison, Texas 75001-0144

RE: Excel Service Center

Dear John:

We need something for our files showing the revised inlet on Addison Road to be approved. I have drawn up the attached sketch showing what you proposed (match inlet at Addison Road and Beltline).

Please call me if you have any questions or problems, or you can fax it back to me if everything is acceptable.

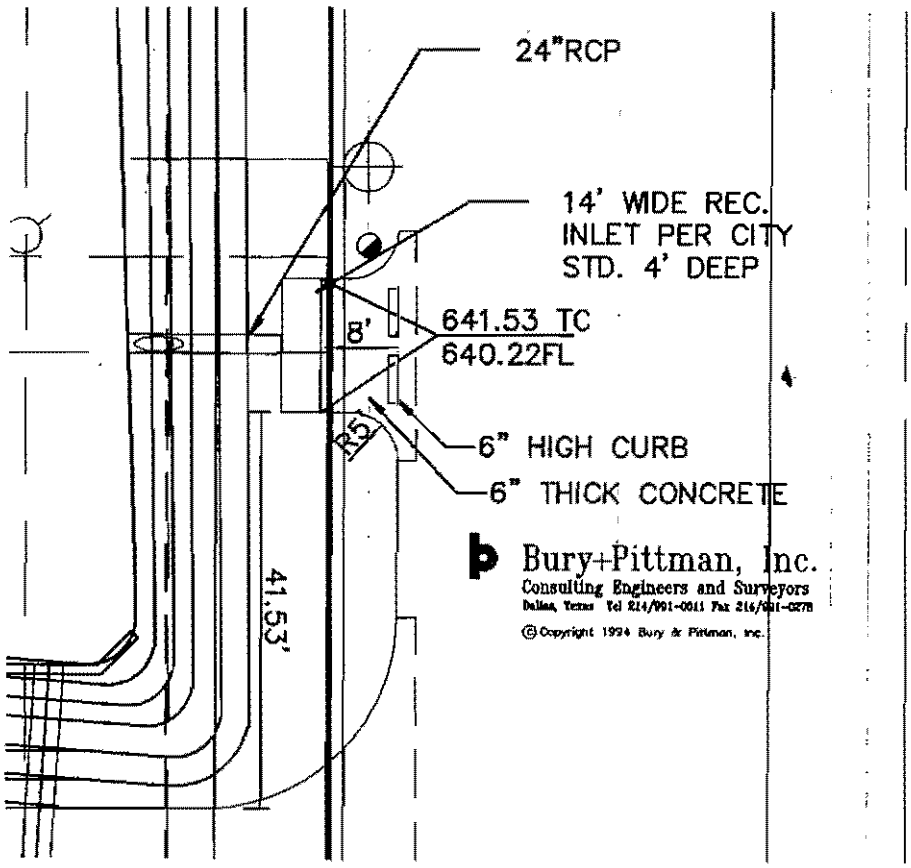
Thank you,

Paul Lee, P.E.

PL\nh

Attachment

c:\PAUL\cityaddi.sn2\nh



INLET DETAIL
ON ADDISON ROAD

N.T.S

DATE:	APPROVED BY:

EXCEL SERVICE CENTER PHASE I

Bury+Pittman
Consulting Engineers and Surveyors

DRAINAGE REPORT

FOR

EXCEL SERVICE CENTER

ADDISON, TEXAS

PREPARED FOR

WILCOX REALTY GROUP
C/O CONSTRUCTION MANAGEMENT CORPORATION
15303 DALLAS PARKWAY, SUITE 640, LB 80
DALLAS, TEXAS

Preliminary
for
Review Only

Bury+Pittman
Consulting Engineers and Surveyors

Bury+Pittman

Bury & Pittman-DFW, Inc.
Consulting Engineers/Surveyors
5510 Harvest Hill Road/Suite 100
Dallas, Texas 75230
Tel 214/991-0011
Fax 214/991-0278

October 23, 1995

John Baumgartner, P.E.
Town of Addison
16801 Westgrove Drive
Addison, Texas 75001-0144

Preliminary for Review Only

Re: Drainage Report for Excel Service Center - Commercial
Addison, Texas

Dear Mr. Baumgartner:

Please accept the following drainage report for the development of the 18 acre office and warehouse facility at the southwest corner of Addison Road and Bent Tree Plaza Drive. The project is going to be constructed by Construction Management Corporation. Your expeditious review of this submittal is greatly appreciated. Please do not hesitate to call Paul Lee at (214) 991-0011 if you have any questions.

Sincerely,

Ocie L. Vest, P.E.

OLV/nh

cc: file

c:\PAUL\exceldr.ain\nh

Drainage Report

Existing Conditions:

The project is a 18 acre tract at the southwest corner of Addison Road and Bent Tree Plaza. The site accepts flows from a 4' wide concrete flume from Addison Road. This is from a drainage area of 11.5 acres. This flows through an open natural channel to a 60" RCP at the southwest corner of the site. This 60"RCP flows to a channel North of Sunbelt Drive where it enters a 8' X 5' box which slows to Addison Airport. This box has a peak capacity of 593 CFS.

Detention Requirement:

Since the drainage area contributing to the box produces a peak flow of 625, (see Appendix 1 HEC-1 Report) and the box is only able to handle 593 CFS. The peak must be reduced by 32 CFS. This project and the upstream contributing area are only 20% of the area contributing to the box. Therefore our site is required to reduce the peak Q by 7 CFS which is 20% of the total reduction required.

Proposed Condition:

A1 acre foot detention pond has been provided at the east end of the site this pond accepts all of the lows from Addison Road through a 14' wide concrete flume (see Appendix 3 for mannings size) a small portion of the site. See Appendix 2 for HEC I study showing the detention routing. The discharge is an 18"rep which joins to the site storm system and discharges to the existing 60" RCP. This pond reduces the peak discharge by 18 CFS. The water surface elevation of the pond will be 640.86 at the peak. This should prevent flooding currently occurring on Addison Road.

APPENDIX I

HEC1 - HYDROGRAPH

FOR

DRAINAGE BASIN CONTRIBUTING TO 8' X 5' REINFORCED CONCRETE BOX

```
1*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)     *
*  MAY  1991                            *
*  VERSION 4.0.1E                       *
*  Lahey F77L-EM/32 version 5.01        *
*  Dodson & Associates, Inc.            *
*  RUN DATE 10/20/95  TIME 09:32:51     *
*****************************************
```

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

```
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     X
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


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

  1       ID   HYDROGRAPH FOR THE ENTIRE DRIANAGE BASIN CONTRIBUTING TO THE BOX
  2       ID   AT
  3       IT    15     0    150
  4       IO     1

  5       KK    DEV
  6       KM   COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED
  7       BA   .1952 -
  8       PH    100          .87   1.88    3.8    5.2    5.5      7    8.5    9.5
  9       LU     .8    .06
          * Lca=.28, Sst = .5,L=.61
 10       US   .24   .719
 11       ZZ
```

```
1*****************************************                    *****************************************
*                                       *                    *                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                    *  U.S. ARMY CORPS OF ENGINEERS         *
*  MAY  1991                            *                    *  HYDROLOGIC ENGINEERING CENTER        *
*  VERSION 4.0.1E                       *                    *  609 SECOND STREET                    *
*  Lahey F77L-EM/32 version 5.01        *                    *  DAVIS, CALIFORNIA 95616              *
*  Dodson & Associates, Inc.            *                    *  (916) 551-1748                       *
*  RUN DATE 10/20/95  TIME 09:32:51     *                    *                                       *
*****************************************                    *****************************************
```

HYDROGRAPH FOR THE ENTIRE DRIANAGE BASIN CONTRIBUTING TO THE BOX
AT

```
 4 IO      OUTPUT CONTROL VARIABLES
             IPRNT        1  PRINT CONTROL
             IPLOT        0  PLOT CONTROL
             QSCAL        0.  HYDROGRAPH PLOT SCALE

  IT       HYDROGRAPH TIME DATA
             NMIN        15  MINUTES IN COMPUTATION INTERVAL
             IDATE     1   0  STARTING DATE
             ITIME      0150  STARTING TIME
               NQ       101  NUMBER OF HYDROGRAPH ORDINATES
            NDDATE      2   0  ENDING DATE
            NDTIME      0250  ENDING TIME
            ICENT       19  CENTURY MARK

           COMPUTATION INTERVAL    0.25 HOURS
             TOTAL TIME BASE   25.00 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

*** ***

****
* *
5 KK * DEV *
* *
****
COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED

SUBBASIN RUNOFF DATA

7 BA SUBBASIN CHARACTERISTICS
TAREA 0.20 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 100-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
0.87 1.88 3.80 5.20 5.50 7.00 8.50 9.50 0.00 0.00 0.00 0.00

STORM AREA = 0.20

9 LU UNIFORM LOSS RATE

STRTL	0.80	INITIAL LOSS
CNSTL	0.06	UNIFORM LOSS RATE
RTIMP	0.00	PERCENT IMPERVIOUS AREA

10 US SNYDER UNITGRAPH

TP	0.24	LAG
CP	0.72	PEAKING COEFFICIENT

SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

***

TC INCREASED TO DELTA T OF 0.25 HR
CLARK DID NOT CONVERGE TO GIVEN SNYDER COEFFICIENTS
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 0.36 AND R= 0.13 INTERVALS

UNIT HYDROGRAPH PARAMETERS
CLARK TC= 0.36 HR, R= 0.13 HR
SNYDER TP= 0.24 HR, CP= 0.58

UNIT HYDROGRAPH
3 END-OF-PERIOD ORDINATES
191. 252. 61.

****

HYDROGRAPH AT STATION DEV

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0150	1	0.00	0.00	0.00	0.	*	1	1435	52	0.40	0.01	0.39	320.		
1	0205	2	0.02	0.02	0.00	0.	*	1	1450	53	0.33	0.01	0.31	190.		
1	0220	3	0.02	0.02	0.00	0.	*	1	1505	54	0.09	0.02	0.07	117.		
1	0235	4	0.02	0.02	0.00	0.	*	1	1520	55	0.07	0.02	0.06	48.		
1	0250	5	0.02	0.02	0.00	0.	*	1	1535	56	0.16	0.02	0.14	45.		
1	0305	6	0.02	0.02	0.00	0.	*	1	1550	57	0.14	0.02	0.13	63.		
1	0320	7	0.02	0.02	0.00	0.	*	1	1605	58	0.13	0.02	0.11	62.		
1	0335	8	0.02	0.02	0.00	0.	*	1	1620	59	0.12	0.02	0.11	57.		
1	0350	9	0.02	0.02	0.00	0.	*	1	1635	60	0.11	0.02	0.10	52.		
1	0405	10	0.02	0.02	0.00	0.	*	1	1650	61	0.11	0.02	0.09	48.		
1	0420	11	0.02	0.02	0.00	0.	*	1	1705	62	0.08	0.02	0.07	41.		
1	0435	12	0.02	0.02	0.00	0.	*	1	1720	63	0.08	0.02	0.06	34.		
1	0450	13	0.02	0.02	0.00	0.	*	1	1735	64	0.07	0.02	0.06	30.		
1	0505	14	0.02	0.02	0.00	0.	*	1	1750	65	0.07	0.02	0.05	28.		
1	0520	15	0.02	0.02	0.00	0.	*	1	1805	66	0.07	0.02	0.05	27.		
1	0535	16	0.02	0.02	0.00	0.	*	1	1820	67	0.06	0.02	0.05	25.		
1	0550	17	0.02	0.02	0.00	0.	*	1	1835	68	0.06	0.02	0.05	24.		
1	0605	18	0.02	0.02	0.00	0.	*	1	1850	69	0.06	0.02	0.04	23.		
1	0620	19	0.02	0.02	0.00	0.	*	1	1905	70	0.06	0.02	0.04	21.		
1	0635	20	0.02	0.02	0.00	0.	*	1	1920	71	0.05	0.02	0.04	20.		
1	0650	21	0.02	0.02	0.00	0.	*	1	1935	72	0.05	0.02	0.04	20.		
1	0705	22	0.03	0.03	0.00	0.	*	1	1950	73	0.05	0.02	0.04	19.		
1	0720	23	0.03	0.03	0.00	0.	*	1	2005	74	0.03	0.01	0.01	14.		
1	0735	24	0.03	0.03	0.00	0.	*	1	2020	75	0.03	0.01	0.01	8.		
1	0750	25	0.03	0.03	0.00	0.	*	1	2035	76	0.03	0.01	0.01	6.		
1	0805	26	0.05	0.05	0.00	0.	*	1	2050	77	0.03	0.01	0.01	6.		
1	0820	27	0.05	0.05	0.00	0.	*	1	2105	78	0.02	0.01	0.01	5.		
1	0835	28	0.05	0.05	0.00	0.	*	1	2120	79	0.02	0.01	0.01	5.		

1	0850	29	0.06	0.06	0.00	0.	*	1	2135	80	0.02	0.01	0.01	4.
1	0905	30	0.06	0.06	0.00	0.	*	1	2150	81	0.02	0.01	0.01	4.
1	0920	31	0.06	0.04	0.02	3.	*	1	2205	82	0.02	0.01	0.01	4.
1	0935	32	0.06	0.02	0.05	13.	*	1	2220	83	0.02	0.01	0.01	4.
1	0950	33	0.06	0.02	0.05	22.	*	1	2235	84	0.02	0.01	0.01	3.
1	1005	34	0.07	0.02	0.05	25.	*	1	2250	85	0.02	0.01	0.01	3.
1	1020	35	0.07	0.02	0.06	27.	*	1	2305	86	0.02	0.01	0.01	3.
1	1035	36	0.07	0.02	0.06	28.	*	1	2320	87	0.02	0.01	0.00	3.
1	1050	37	0.08	0.02	0.06	30.	*	1	2335	88	0.02	0.01	0.00	2.
1	1105	38	0.10	0.02	0.09	36.	*	1	2350	89	0.02	0.01	0.00	2.
1	1120	39	0.11	0.02	0.09	44.	*	2	0005	90	0.02	0.01	0.00	2.
1	1135	40	0.12	0.02	0.10	48.	*	2	0020	91	0.02	0.01	0.00	2.
1	1150	41	0.12	0.02	0.11	52.	*	2	0035	92	0.02	0.01	0.00	1.
1	1205	42	0.13	0.02	0.12	57.	*	2	0050	93	0.02	0.01	0.00	1.
1	1220	43	0.15	0.02	0.13	62.	*	2	0105	94	0.02	0.01	0.00	1.
1	1235	44	0.07	0.02	0.05	50.	*	2	0120	95	0.02	0.01	0.00	1.
1	1250	45	0.08	0.02	0.06	33.	*	2	0135	96	0.02	0.01	0.00	1.
1	1305	46	0.30	0.01	0.29	74.	*	2	0150	97	0.02	0.01	0.00	1.
1	1320	47	0.36	0.01	0.35	143.	*	2	0205	98	0.00	0.00	0.00	0.
1	1335	48	0.44	0.01	0.43	187.	*	2	0220	99	0.00	0.00	0.00	0.
1	1350	49	0.94	0.01	0.92	305.	*	2	0235	100	0.00	0.00	0.00	0.
1	1405	50	1.88	0.01	1.86	614.	*	2	0250	101	0.00	0.00	0.00	0.
1	1420	51	0.54	0.01	0.52	625.	*							
						*								

****

TOTAL RAINFALL = 9.50, TOTAL LOSS = 1.80, TOTAL EXCESS = 7.70

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	25.00-HR
+ (CFS)	(HR)				

		(CFS)					
+	625.	12.50	139.	40.	39.	39.	
		(INCHES)	6.620	7.702	7.702	7.702	
		(AC-FT)	69.	80.	80.	80.	

CUMULATIVE AREA = 0.20 SQ MI

1

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

			PEAK	TIME OF	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN	MAXIMUM	TIME OF
	OPERATION	STATION	FLOW	PEAK				AREA	STAGE	MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
	HYDROGRAPH AT									
+		DEV	625.	12.50	139.	40.	39.	0.20		

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

APPENDIX 2

HEC1 - STUDY

FOR

DETENTION POND ROUTING OF 11.5 ACRE OFFSITE DRAINAGE AREA

```
1*****************************************                    ****************************************
*                                       *                    *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)     *                    *  U.S. ARMY CORPS OF ENGINEERS
*  MAY  1991                            *                    *  HYDROLOGIC ENGINEERING CENTER
*  VERSION 4.0.1E                       *                    *  609 SECOND STREET
*  Lahey F77L-EM/32 version 5.01        *                    *  DAVIS, CALIFORNIA 95616
*  Dodson & Associates, Inc.            *                    *  (916) 551-1748
*  RUN DATE 10/20/95  TIME 09:34:53     *                    *
*****************************************                    ****************************************
```

```
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     X
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


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

  1       ID   Addison pond analysis
  2       ID   PAUL LEE
  3       IT    15     0    150
  4       IO     1

  5       KK    DEV
  6       KM   COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED
  7       BA  0.018
  8       PH   100          .8   1.8   3.6   5.1   5.3     7   8.2   9.2
  9       LU    .8   .06
 10       US   .699  .719
          *

 11       KK    RES
 12       KM   ROUTE DEVELOPED RUNOFF THROUGH RESERVOIR
 13       KO     1     2
 14       RS     1   ELEV  634.43
 15       SA   .015  .028  .089  .188  .228  .358  1.58
 16       SE   634   636   637   638   639   640  644.5
 17       SL 634.59 1.7671   .60   .5
 18       SS   644    25   3.0   1.5
 19       ZZ
```

```
I*****************************************                    ****************************************
*                                       *                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                    *  U.S. ARMY CORPS OF ENGINEERS
*  MAY  1991                            *                    *  HYDROLOGIC ENGINEERING CENTER
*  VERSION 4.0.1E                       *                    *  609 SECOND STREET
*  Lahey F77L-EM/32 version 5.01        *                    *  DAVIS, CALIFORNIA 95616
*  Dodson & Associates, Inc.            *                    *  (916) 551-1748
*  RUN DATE  10/20/95  TIME  09:34:53   *                    *
*****************************************                    ****************************************

                    Addison pond analysis
                    PAUL LEE

  4 IO        OUTPUT CONTROL VARIABLES
                IPRNT        1  PRINT CONTROL
                IPLOT        0  PLOT CONTROL
                QSCAL        0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                NMIN        15  MINUTES IN COMPUTATION INTERVAL
                IDATE     1   0  STARTING DATE
                ITIME      0150  STARTING TIME
                  NQ       101  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE      2   0  ENDING DATE
               NDTIME      0250  ENDING TIME
               ICENT       19  CENTURY MARK

              COMPUTATION INTERVAL    0.25 HOURS
                 TOTAL TIME BASE   25.00 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

*** ***

****
* *
5 KK * DEV *
* *
****
COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED

SUBBASIN RUNOFF DATA

7 BA SUBBASIN CHARACTERISTICS
TAREA 0.02 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 100-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

0.80 1.80 3.60 5.10 5.30 7.00 8.20 9.20 0.00 0.00 0.00 0.00

STORM AREA = 0.02

9 LU UNIFORM LOSS RATE
STRTL 0.80 INITIAL LOSS
CNSTL 0.06 UNIFORM LOSS RATE
RTIMP 0.00 PERCENT IMPERVIOUS AREA

10 US SNYDER UNITGRAPH
TP 0.70 LAG
CP 0.72 PEAKING COEFFICIENT

SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

***

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 0.90 AND R= 0.42 INTERVALS

UNIT HYDROGRAPH PARAMETERS
CLARK TC= 0.90 HR, R= 0.42 HR
SNYDER TP= 0.69 HR, CP= 0.71

UNIT HYDROGRAPH
11 END-OF-PERIOD ORDINATES
2. 7. 11. 11. 7. 4. 2. 1. 1. 0.
0.

****

HYDROGRAPH AT STATION DEV

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0150	1	0.00	0.00	0.00	0.	*	1	1435	52	0.43	0.01	0.41	39.		
1	0205	2	0.02	0.02	0.00	0.	*	1	1450	53	0.36	0.01	0.34	37.		
1	0220	3	0.02	0.02	0.00	0.	*	1	1505	54	0.06	0.02	0.04	29.		
1	0235	4	0.02	0.02	0.00	0.	*	1	1520	55	0.05	0.02	0.03	21.		
1	0250	5	0.02	0.02	0.00	0.	*	1	1535	56	0.17	0.02	0.16	14.		
1	0305	6	0.02	0.02	0.00	0.	*	1	1550	57	0.16	0.02	0.14	10.		
1	0320	7	0.02	0.02	0.00	0.	*	1	1605	58	0.15	0.02	0.13	8.		
1	0335	8	0.02	0.02	0.00	0.	*	1	1620	59	0.14	0.02	0.12	7.		
1	0350	9	0.02	0.02	0.00	0.	*	1	1635	60	0.13	0.02	0.11	7.		
1	0405	10	0.02	0.02	0.00	0.	*	1	1650	61	0.12	0.02	0.11	6.		
1	0420	11	0.02	0.02	0.00	0.	*	1	1705	62	0.07	0.02	0.05	5.		
1	0435	12	0.02	0.02	0.00	0.	*	1	1720	63	0.06	0.02	0.05	5.		
1	0450	13	0.02	0.02	0.00	0.	*	1	1735	64	0.06	0.02	0.04	4.		
1	0505	14	0.02	0.02	0.00	0.	*	1	1750	65	0.06	0.02	0.04	3.		
1	0520	15	0.02	0.02	0.00	0.	*	1	1805	66	0.05	0.02	0.04	3.		
1	0535	16	0.02	0.02	0.00	0.	*	1	1820	67	0.05	0.02	0.04	2.		
1	0550	17	0.02	0.02	0.00	0.	*	1	1835	68	0.05	0.02	0.03	2.		
1	0605	18	0.02	0.02	0.00	0.	*	1	1850	69	0.05	0.02	0.03	2.		
1	0620	19	0.02	0.02	0.00	0.	*	1	1905	70	0.04	0.02	0.03	2.		
1	0635	20	0.02	0.02	0.00	0.	*	1	1920	71	0.04	0.02	0.03	2.		
1	0650	21	0.02	0.02	0.00	0.	*	1	1935	72	0.04	0.02	0.03	1.		
1	0705	22	0.03	0.03	0.00	0.	*	1	1950	73	0.04	0.02	0.02	1.		
1	0720	23	0.03	0.03	0.00	0.	*	1	2005	74	0.03	0.01	0.01	1.		
1	0735	24	0.03	0.03	0.00	0.	*	1	2020	75	0.03	0.01	0.01	1.		
1	0750	25	0.03	0.03	0.00	0.	*	1	2035	76	0.03	0.01	0.01	1.		
1	0805	26	0.04	0.04	0.00	0.	*	1	2050	77	0.03	0.01	0.01	1.		
1	0820	27	0.04	0.04	0.00	0.	*	1	2105	78	0.02	0.01	0.01	1.		
1	0835	28	0.04	0.04	0.00	0.	*	1	2120	79	0.02	0.01	0.01	1.		

1	0850	29	0.04	0.04	0.00	0.	*	1	2135	80	0.02	0.01	0.01	1.
1	0905	30	0.05	0.05	0.00	0.	*	1	2150	81	0.02	0.01	0.01	0.
1	0920	31	0.05	0.05	0.00	0.	*	1	2205	82	0.02	0.01	0.01	0.
1	0935	32	0.05	0.05	0.00	0.	*	1	2220	83	0.02	0.01	0.01	0.
1	0950	33	0.05	0.02	0.04	0.	*	1	2235	84	0.02	0.01	0.01	0.
1	1005	34	0.05	0.02	0.04	0.	*	1	2250	85	0.02	0.01	0.01	0.
1	1020	35	0.06	0.02	0.04	1.	*	1	2305	86	0.02	0.01	0.01	0.
1	1035	36	0.06	0.02	0.04	1.	*	1	2320	87	0.02	0.01	0.00	0.
1	1050	37	0.06	0.02	0.05	2.	*	1	2335	88	0.02	0.01	0.00	0.
1	1105	38	0.12	0.02	0.10	2.	*	1	2350	89	0.02	0.01	0.00	0.
1	1120	39	0.13	0.02	0.11	3.	*	2	0005	90	0.02	0.01	0.00	0.
1	1135	40	0.13	0.02	0.12	3.	*	2	0020	91	0.02	0.01	0.00	0.
1	1150	41	0.14	0.02	0.13	4.	*	2	0035	92	0.02	0.01	0.00	0.
1	1205	42	0.15	0.02	0.14	5.	*	2	0050	93	0.02	0.01	0.00	0.
1	1220	43	0.17	0.02	0.15	5.	*	2	0105	94	0.02	0.01	0.00	0.
1	1235	44	0.04	0.02	0.03	6.	*	2	0120	95	0.02	0.01	0.00	0.
1	1250	45	0.05	0.02	0.04	5.	*	2	0135	96	0.02	0.01	0.00	0.
1	1305	46	0.33	0.01	0.32	5.	*	2	0150	97	0.02	0.01	0.00	0.
1	1320	47	0.39	0.01	0.37	6.	*	2	0205	98	0.00	0.00	0.00	0.
1	1335	48	0.41	0.01	0.40	9.	*	2	0220	99	0.00	0.00	0.00	0.
1	1350	49	0.88	0.01	0.87	13.	*	2	0235	100	0.00	0.00	0.00	0.
1	1405	50	1.80	0.01	1.78	22.	*	2	0250	101	0.00	0.00	0.00	0.
1	1420	51	0.50	0.01	0.49	32.	*							
							*							

****

TOTAL RAINFALL = 9.20, TOTAL LOSS = 1.78, TOTAL EXCESS = 7.42

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	25.00-HR
+ (CFS)	(HR)				
		(CFS)			

```
+     39.   12.75              13.       4.       3.       3.
                (INCHES)     6.519     7.390    7.390    7.390
                (AC-FT)      6.        7.       7.       7.

                CUMULATIVE AREA =    0.02 SQ MI


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


          **********
          *        *
   11 KK  *   RES  *
          *        *
          **********
                ROUTE DEVELOPED RUNOFF THROUGH RESERVOIR

   13 KO        OUTPUT CONTROL VARIABLES
                 IPRNT        1  PRINT CONTROL
                 IPLOT        2  PLOT CONTROL
                 QSCAL        0.  HYDROGRAPH PLOT SCALE

            HYDROGRAPH ROUTING DATA

   14 RS        STORAGE ROUTING
                 NSTPS        1  NUMBER OF SUBREACHES
                 ITYP      ELEV  TYPE OF INITIAL CONDITION
                RSVRIC     634.43  INITIAL CONDITION
                   X       0.00 WORKING R AND D COEFFICIENT
```

15 SA AREA 0.0 0.0 0.1 0.2 0.2 0.4 1.6

16 SE ELEVATION 634.00 636.00 637.00 638.00 639.00 640.00 644.50

17 SL LOW-LEVEL OUTLET
ELEVL 634.59 ELEVATION AT CENTER OF OUTLET
CAREA 1.77 CROSS-SECTIONAL AREA
COQL 0.60 COEFFICIENT
EXPL 0.50 EXPONENT OF HEAD

18 SS SPILLWAY
CREL 644.00 SPILLWAY CREST ELEVATION
SPWID 25.00 SPILLWAY WIDTH
COQW 3.00 WEIR COEFFICIENT
EXPW 1.50 EXPONENT OF HEAD

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	0.00	0.04	0.10	0.23	0.44	0.73	4.77
ELEVATION	634.00	636.00	637.00	638.00	639.00	640.00	644.50

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	0.00	0.00	7.46	8.31	9.37	10.75	12.60	15.23	19.23	26.08
ELEVATION	634.00	634.59	635.36	635.54	635.81	636.19	636.79	637.80	639.70	644.00

OUTFLOW	26.13	26.38	26.96	28.03	29.75	32.27	35.73	40.28	46.08	53.28
ELEVATION	644.01	644.02	644.05	644.08	644.13	644.18	644.25	644.32	644.41	644.50

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.01	0.03	0.03	0.04	0.04	0.05	0.08	0.10	0.20
OUTFLOW	0.00	0.00	7.46	8.31	9.37	10.10	10.75	12.60	13.20	15.23
ELEVATION	634.00	634.59	635.36	635.54	635.81	636.00	636.19	636.79	637.00	637.80
STORAGE	0.23	0.44	0.63	0.73	4.02	4.05	4.09	4.14	4.21	4.29
OUTFLOW	15.70	17.86	19.23	19.78	26.08	26.38	26.96	28.03	29.75	32.27
ELEVATION	638.00	639.00	639.70	640.00	644.00	644.02	644.05	644.08	644.13	644.18
STORAGE	4.38	4.49	4.62	4.77						
OUTFLOW	35.73	40.28	46.08	53.28						
ELEVATION	644.25	644.32	644.41	644.50						

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 11.
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 RES

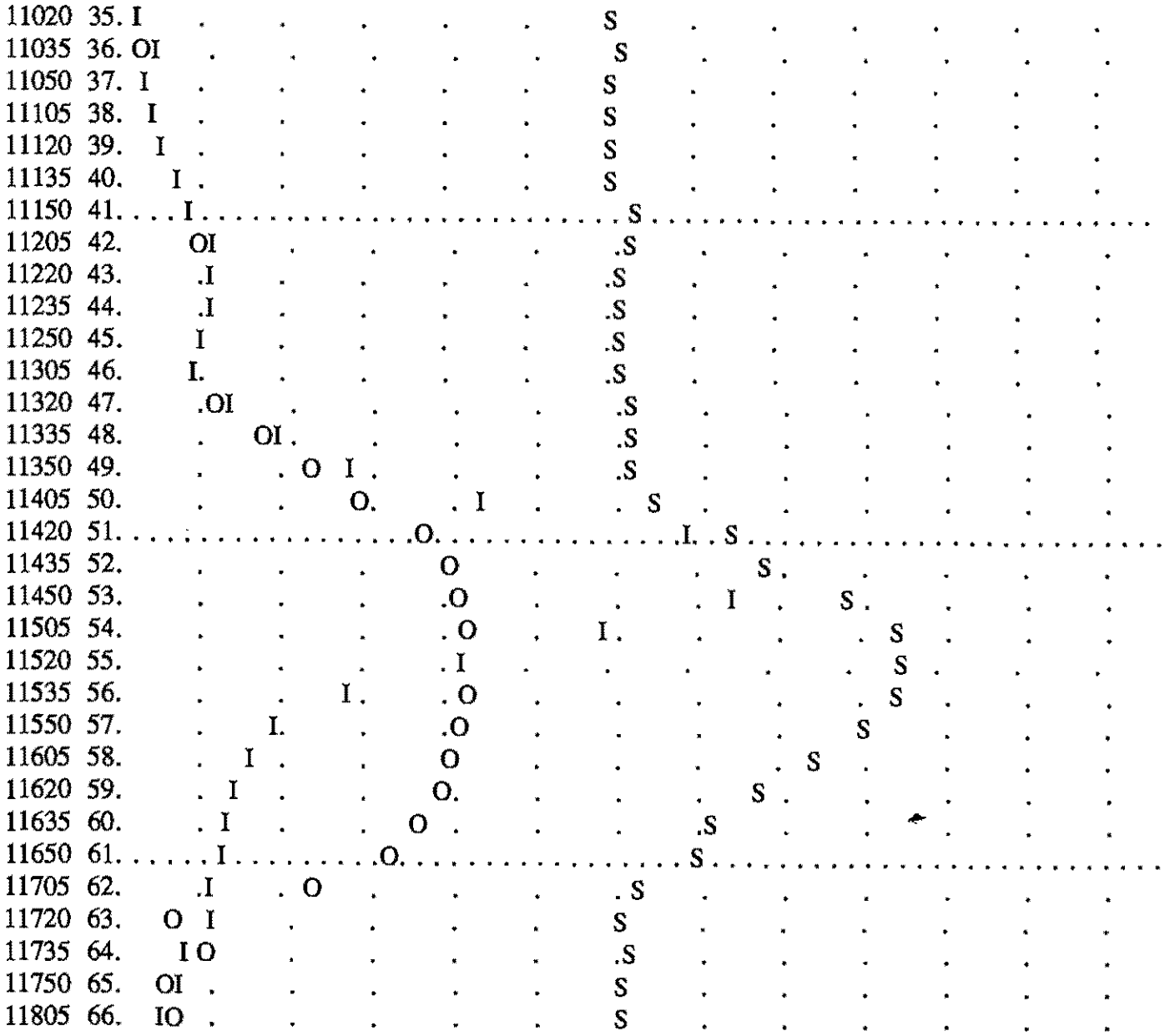
****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0150	1	0.	0.0	634.4		1	1020	35	1.	0.0	634.7		1	1850	69	2.	0.0	634.8	
1	0205	2	0.	0.0	634.4		1	1035	36	1.	0.0	634.7		1	1905	70	2.	0.0	634.8	

1	0220	3	0.	0.0	634.4	*	1	1050	37	2.	0.0	634.8	*	1	1920	71	2.	0.0	634.7
1	0235	4	0.	0.0	634.4	*	1	1105	38	2.	0.0	634.8	*	1	1935	72	2.	0.0	634.7
1	0250	5	0.	0.0	634.4	*	1	1120	39	2.	0.0	634.8	*	1	1950	73	1.	0.0	634.7
1	0305	6	0.	0.0	634.4	*	1	1135	40	3.	0.0	634.9	*	1	2005	74	1.	0.0	634.7
1	0320	7	0.	0.0	634.4	*	1	1150	41	4.	0.0	635.0	*	1	2020	75	1.	0.0	634.7
1	0335	8	0.	0.0	634.4	*	1	1205	42	5.	0.0	635.1	*	1	2035	76	1.	0.0	634.7
1	0350	9	0.	0.0	634.4	*	1	1220	43	5.	0.0	635.1	*	1	2050	77	1.	0.0	634.7
1	0405	10	0.	0.0	634.4	*	1	1235	44	6.	0.0	635.2	*	1	2105	78	1.	0.0	634.7
1	0420	11	0.	0.0	634.4	*	1	1250	45	5.	0.0	635.1	*	1	2120	79	1.	0.0	634.6
1	0435	12	0.	0.0	634.4	*	1	1305	46	5.	0.0	635.1	*	1	2135	80	1.	0.0	634.6
1	0450	13	0.	0.0	634.4	*	1	1320	47	6.	0.0	635.2	*	1	2150	81	0.	0.0	634.6
1	0505	14	0.	0.0	634.4	*	1	1335	48	8.	0.0	635.5	*	1	2205	82	0.	0.0	634.6
1	0520	15	0.	0.0	634.4	*	1	1350	49	11.	0.1	636.4	*	1	2220	83	0.	0.0	634.6
1	0535	16	0.	0.0	634.4	*	1	1405	50	14.	0.2	637.5	*	1	2235	84	0.	0.0	634.6
1	0550	17	0.	0.0	634.4	*	1	1420	51	17.	0.4	638.7	*	1	2250	85	0.	0.0	634.6
1	0605	18	0.	0.0	634.4	*	1	1435	52	20.	0.7	640.0	*	1	2305	86	0.	0.0	634.6
1	0620	19	0.	0.0	634.4	*	1	1450	53	20.	1.1	640.5	*	1	2320	87	0.	0.0	634.6
1	0635	20	0.	0.0	634.4	*	1	1505	54	21.	1.4	640.8	*	1	2335	88	0.	0.0	634.6
1	0650	21	0.	0.0	634.4	*	1	1520	55	21.	1.4	640.9	*	1	2350	89	0.	0.0	634.6
1	0705	22	0.	0.0	634.4	*	1	1535	56	21.	1.4	640.8	*	2	0005	90	0.	0.0	634.6
1	0720	23	0.	0.0	634.4	*	1	1550	57	21.	1.2	640.6	*	2	0020	91	0.	0.0	634.6
1	0735	24	0.	0.0	634.4	*	1	1605	58	20.	0.9	640.3	*	2	0035	92	0.	0.0	634.6
1	0750	25	0.	0.0	634.4	*	1	1620	59	20.	0.7	639.9	*	2	0050	93	0.	0.0	634.6
1	0805	26	0.	0.0	634.4	*	1	1635	60	18.	0.4	639.0	*	2	0105	94	0.	0.0	634.6
1	0820	27	0.	0.0	634.4	*	1	1650	61	16.	0.2	638.0	*	2	0120	95	0.	0.0	634.6
1	0835	28	0.	0.0	634.4	*	1	1705	62	12.	0.1	636.4	*	2	0135	96	0.	0.0	634.6
1	0850	29	0.	0.0	634.4	*	1	1720	63	3.	0.0	634.9	*	2	0150	97	0.	0.0	634.6
1	0905	30	0.	0.0	634.4	*	1	1735	64	5.	0.0	635.1	*	2	0205	98	0.	0.0	634.6
1	0920	31	0.	0.0	634.4	*	1	1750	65	2.	0.0	634.8	*	2	0220	99	0.	0.0	634.6
1	0935	32	0.	0.0	634.4	*	1	1805	66	3.	0.0	634.9	*	2	0235	100	0.	0.0	634.6
1	0950	33	0.	0.0	634.5	*	1	1820	67	2.	0.0	634.8	*	2	0250	101	0.	0.0	634.6
1	1005	34	0.	0.0	634.6	*	1	1835	68	2.	0.0	634.8	*						

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

 PEAK FLOW     TIME                     MAXIMUM AVERAGE FLOW
                          6-HR      24-HR      72-HR     25.00-HR
+   (CFS)       (HR)
                  (CFS)
+      21.     13.50            13.         4.         3.         3.
              (INCHES)    6.517      7.387      7.387      7.387
               (AC-FT)       6.         7.         7.         7.

 PEAK STORAGE   TIME                    MAXIMUM AVERAGE STORAGE
                          6-HR      24-HR      72-HR     25.00-HR
+  (AC-FT)      (HR)
      1.     13.50              0.         0.         0.         0.

 PEAK STAGE    TIME                     MAXIMUM AVERAGE STAGE
                          6-HR      24-HR      72-HR     25.00-HR
+   (FEET)      (HR)
   640.86     13.50           637.53     635.32     635.28     635.28

               CUMULATIVE AREA =     0.02 SQ MI

1                                   STATION     RES

               (I) INFLOW,   (O) OUTFLOW
      0.       5.      10.      15.      20.      25.      30.      35.      40.       0.       0.       0.       0.
                                                              (S) STORAGE
     0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.4      0.8      1.2      1.6      0.0      0.0
 DAHRMN PER
 10150   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10205   2I       .        .        .        .        .        S        .        .        .        .        .        .
```

```
10220  3I      .     .     .     .     .     S     .     .     .     .     .     .
10235  4I      .     .     .     .     .     S     .     .     .     .     .     .
10250  5I      .     .     .     .     .     S     .     .     .     .     .     .
10305  6I      .     .     .     .     .     S     .     .     .     .     .     .
10320  7I      .     .     .     .     .     S     .     .     .     .     .     .
10335  8I      .     .     .     .     .     S     .     .     .     .     .     .
10350  9I      .     .     .     .     .     S     .     .     .     .     .     .
10405  10I     .     .     .     .     .     S     .     .     .     .     .     .
10420  11I.....................................S.....................................
10435  12I     .     .     .     .     .     S     .     .     .     .     .     .
10450  13I     .     .     .     .     .     S     .     .     .     .     .     .
10505  14I     .     .     .     .     .     S     .     .     .     .     .     .
10520  15I     .     .     .     .     .     S     .     .     .     .     .     .
10535  16I     .     .     .     .     .     S     .     .     .     .     .     .
10550  17I     .     .     .     .     .     S     .     .     .     .     .     .
10605  18I     .     .     .     .     .     S     .     .     .     .     .     .
10620  19I     .     .     .     .     .     S     .     .     .     .     .     .
10635  20I     .     .     .     .     .     S     .     .     .     .     .     .
10650  21I.....................................S.....................................
10705  22I     .     .     .     .     .     S     .     .     .     .     .     .
10720  23I     .     .     .     .     .     S     .     .     .     .     .     .
10735  24I     .     .     .     .     .     S     .     .     .     .     .     .
10750  25I     .     .     .     .     .     S     .     .     .     .     .     .
10805  26I     .     .     .     .     .     S     .     .     .     .     .     .
10820  27I     .     .     .     .     .     S     .     .     .     .     .     .
10835  28I     .     .     .     .     .     S     .     .     .     .     .     .
10850  29I     .     .     .     .     .     S     .     .     .     .     .     .
10905  30I     .     .     .     .     .     S     .     .     .     .     .     .
10920  31I.....................................S.....................................
10935  32I     .     .     .     .     .     S     .     .     .     .     .     .
10950  33I     .     .     .     .     .     S     .     .     .     .     .     .
11005  34.I    .     .     .     .     .     S     .     .     .     .     .     .
```


11020 35. I S
11035 36. OI S
11050 37. I S
11105 38. I S
11120 39. I S
11135 40. I S
11150 41. I S
11205 42. OI S
11220 43. I S
11235 44. I S
11250 45. I S
11305 46. I S
11320 47. OI S
11335 48. OI S
11350 49. O I S
11405 50. O. I S
11420 51. O. I S
11435 52. O S
11450 53. O I S
11505 54. O I S
11520 55. I S
11535 56. I O S
11550 57. I O S
11605 58. I O S
11620 59. I O S
11635 60. I O S
11650 61. I O S
11705 62. I O S
11720 63. O I S
11735 64. I O S
11750 65. OI S
11805 66. IO S

11820 67. OI . . . . . S . . . . . .
11835 68. I . . . . . S . . . . . .
11850 69. OI . . . . . S . . . . . .
11905 70. IO . . . . . S . . . . . .
11920 71. .I. . . . . S . . . . . .
11935 72. I . . . . . S . . . . . .
11950 73. I . . . . . S . . . . . .
12005 74. I . . . . . S . . . . . .
12020 75. I . . . . . S . . . . . .
12035 76. I . . . . . S . . . . . .
12050 77. I . . . . . S . . . . . .
12105 78.I . . . . . S . . . . . .
12120 79.I . . . . . S . . . . . .
12135 80.I . . . . . S . . . . . .
12150 81.I. . . . . S . . . . . .
12205 82.I . . . . . S . . . . . .
12220 83.I . . . . . S . . . . . .
12235 84.I . . . . . S . . . . . .
12250 85.I . . . . . S . . . . . .
12305 86.I . . . . . S . . . . . .
12320 87.I . . . . . S . . . . . .
12335 88.I . . . . . S . . . . . .
12350 89I . . . . . S . . . . . .
20005 90I . . . . . S . . . . . .
20020 91I . . . . . S . . . . . .
20035 92I . . . . . S . . . . . .
20050 93I . . . . . S . . . . . .
20105 94I . . . . . S . . . . . .
20120 95I . . . . . S . . . . . .
20135 96I . . . . . S . . . . . .
20150 97I . . . . . S . . . . . .
20205 98I . . . . . S . . . . . .

```
 20220 99I     .     .     .     .     .     S     .     .     .     .     .     .
 20235 100I    .     .     .     .     .     S     .     .     .     .     .     .
 20250 101I----------.----------.----------.----------.----------.----------S----------.----------.----------.----------.----------.----------.
1
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 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		DEV	39.	12.75	13.	4.	3.	0.02		
	ROUTED TO									
+		RES	21.	13.50	13.	4.	3.	0.02		
+								640.86	13.50	

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

APPENDIX 3

MANNINGS SOLUTION

FOR

SIZING CONCRETE FLUME FROM ADDISON ROAD TO DETENTION POND

Rectangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name:

Comment:

Solve For Bottom Width

Given Input Data:

Manning's n.....	0.013
Channel Slope....	0.0050 ft/ft
Depth.....	0.55 ft
Discharge.....	39.00 cfs

Computed Results:

Bottom Width.....	13.76 ft
Velocity.....	5.15 fps
Flow Area.....	7.57 sf
Flow Top Width...	13.76 ft
Wetted Perimeter.	14.86 ft
Critical Depth...	0.63 ft
Critical Slope...	0.0032 ft/ft
Froude Number....	1.22 (flow is Supercritical)

DRAINAGE REPORT

FOR

EXCEL WAREHOUSE PHASE II

ADDISON, TEXAS

PREPARED FOR

WILCOX REALTY GROUP
C/O CONSTRUCTION MANAGEMENT CORPORATION
15303 DALLAS PARKWAY, SUITE 640, LB 80
DALLAS, TEXAS

Bury+Pittman
Consulting Engineers and Surveyors

Bury+Pittman

Bury & Pittman-DFW, Inc.
Consulting Engineers/Surveyors
5510 Harvest Hill Road/Suite 100
Dallas, Texas 75230
Tel 214/991-0011
Fax 214/991-0278

February 5, 1996

John Baumgartner, P.E.
Town of Addison
16801 Westgrove Drive
Addison, Texas 75001-0144

Re: Drainage Report for Excel Warehouse Phase II
Addison, Texas

Dear Mr. Baumgartner:

Please accept the following drainage report for the development of the 11 acre warehouse facility between Addison Road and Westgrove Road on Bent Tree Plaza Parkway. The project is going to be constructed by Construction Management Corporation. Your expeditious review of this submittal is greatly appreciated. Please do not hesitate to call Paul Lee at (214) 991-0011 if you have any questions.

Sincerely,

Ocie L. Vest, P.E.

OLV/nh

cc: file

c:\PAUL\exceldr.ain\nh

Drainage Report

Existing Conditions:

The project is a 11 acre tract at the midway between Addison Road and Westgrove Road on Bent Tree Plaza Parkway. The site drains to the south where it enters an open natural channel which flows to a 8' X 5' box under Sunbelt Drive. This box has a capacity of 593 CFS. The remaining drainage basin that contributes to this Box enter the same open channel through 2-72" and one 60" reinforced concrete pipes.(see appendix 3)

Detention Requirement:

Since the drainage area contributing to the box produces a peak flow of 625, (see Appendix 1 HEC-1 Report) and the box is only able to handle 593 CFS. The peak must be reduced by 32 CFS. This project and the upstream contributing area are only 10% of the area contributing to the box. Therefore our site is required to reduce the peak Q by 2 CFS which is 10% of the total reduction required.

Proposed Condition:

The site is proposed to be split into 4 drainage area's (see Appendix 4). Two of these area's are for the proposed parking lots. These areas will drain into a storm system and be routed to the 60" RCP. One of the inlets for this area will be restricted to act as a detention area in one of the parking areas. This detention area will reduce the peak flow from this drainage area form 9 CFS to 2 CFS. (See Appendix 2 for HEC I study showing the detention routing). The building and area around the building will sheet flow to the open channel.

APPENDIX I

HEC1 - HYDROGRAPH

FOR

DRAINAGE BASIN CONTRIBUTING TO 8' X 5' REINFORCED CONCRETE BOX

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              MAY   1991               *
 *           VERSION 4.0.1E              *
 *     Lahey F77L-EM/32 version 5.01     *
 *       Dodson & Associates, Inc.       *
 *  RUN DATE  10/20/95  TIME  09:32:51   *
 *****************************************
```

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

```
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        X
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


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

            1       ID    HYDROGRAPH FOR THE ENTIRE DRIANAGE BASIN CONTRIBUTING TO THE BOX
            2       ID    AT
            3       IT      15       0     150
            4       IO       1

            5       KK     DEV
            6       KM   COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED
            7       BA   .1952
            8       PH     100              .87    1.88     3.8     5.2     5.5       7     8.5     9.5
            9       LU      .8     .06
                    * Lca=.28, Sst = .5,L=.61
           10       US    .24    .719
           11       ZZ
```


```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
```

```
*              MAY   1991              *
*           VERSION 4.0.1E             *
*     Lahey F77L-EM/32 version 5.01    *
*       Dodson & Associates, Inc.      *
*  RUN DATE  10/20/95  TIME  09:32:51  *
****************************************
```

```
*    HYDROLOGIC ENGINEERING CENTER     *
*         609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

HYDROGRAPH FOR THE ENTIRE DRIANAGE BASIN CONTRIBUTING TO THE BOX
AT

4 IO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN		15	MINUTES IN COMPUTATION INTERVAL
IDATE	1	0	STARTING DATE
ITIME		0150	STARTING TIME
NQ		101	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		0250	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.25 HOURS
TOTAL TIME BASE 25.00 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

*** ***

```
**************
*            *
*       DEV  *
*            *
**************
```

5 KK COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED

SUBBASIN RUNOFF DATA

7 BA SUBBASIN CHARACTERISTICS
TAREA 0.20 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 100-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
0.87	1.88	3.80	5.20	5.50	7.00	8.50	9.50	0.00	0.00	0.00	0.00

STORM AREA = 0.20

9 LU UNIFORM LOSS RATE
STRTL 0.80 INITIAL LOSS
CNSTL 0.06 UNIFORM LOSS RATE
RTIMP 0.00 PERCENT IMPERVIOUS AREA

10 US SNYDER UNITGRAPH
TP 0.24 LAG
CP 0.72 PEAKING COEFFICIENT

SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

***

TC INCREASED TO DELTA T OF 0.25 HR
CLARK DID NOT CONVERGE TO GIVEN SNYDER COEFFICIENTS
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 0.36 AND R= 0.13 INTERVALS

UNIT HYDROGRAPH PARAMETERS
CLARK TC= 0.36 HR, R= 0.13 HR
SNYDER TP= 0.24 HR, CP= 0.58

UNIT HYDROGRAPH
3 END-OF-PERIOD ORDINATES
191. 252. 61.

****

HYDROGRAPH AT STATION DEV

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0150	1	0.00	0.00	0.00	0.	1		1435	52	0.40	0.01	0.39	320.
1		0205	2	0.02	0.02	0.00	0.	1		1450	53	0.33	0.01	0.31	190.
1		0220	3	0.02	0.02	0.00	0.	1		1505	54	0.09	0.02	0.07	117.
1		0235	4	0.02	0.02	0.00	0.	1		1520	55	0.07	0.02	0.06	48.
1		0250	5	0.02	0.02	0.00	0.	1		1535	56	0.16	0.02	0.14	45.
1		0305	6	0.02	0.02	0.00	0.	1		1550	57	0.14	0.02	0.13	63.
1		0320	7	0.02	0.02	0.00	0.	1		1605	58	0.13	0.02	0.11	62.
1		0335	8	0.02	0.02	0.00	0.	1		1620	59	0.12	0.02	0.11	57.
1		0350	9	0.02	0.02	0.00	0.	1		1635	60	0.11	0.02	0.10	52.

1	0405	10	0.02	0.02	0.00	0.	*	1	1650	61	0.11	0.02	0.09	48.
1	0420	11	0.02	0.02	0.00	0.	*	1	1705	62	0.08	0.02	0.07	41.
1	0435	12	0.02	0.02	0.00	0.	*	1	1720	63	0.08	0.02	0.06	34.
1	0450	13	0.02	0.02	0.00	0.	*	1	1735	64	0.07	0.02	0.06	30.
1	0505	14	0.02	0.02	0.00	0.	*	1	1750	65	0.07	0.02	0.05	28.
1	0520	15	0.02	0.02	0.00	0.	*	1	1805	66	0.07	0.02	0.05	27.
1	0535	16	0.02	0.02	0.00	0.	*	1	1820	67	0.06	0.02	0.05	25.
1	0550	17	0.02	0.02	0.00	0.	*	1	1835	68	0.06	0.02	0.05	24.
1	0605	18	0.02	0.02	0.00	0.	*	1	1850	69	0.06	0.02	0.04	23.
1	0620	19	0.02	0.02	0.00	0.	*	1	1905	70	0.06	0.02	0.04	21.
1	0635	20	0.02	0.02	0.00	0.	*	1	1920	71	0.05	0.02	0.04	20.
1	0650	21	0.02	0.02	0.00	0.	*	1	1935	72	0.05	0.02	0.04	20.
1	0705	22	0.03	0.03	0.00	0.	*	1	1950	73	0.05	0.02	0.04	19.
1	0720	23	0.03	0.03	0.00	0.	*	1	2005	74	0.03	0.01	0.01	14.
1	0735	24	0.03	0.03	0.00	0.	*	1	2020	75	0.03	0.01	0.01	8.
1	0750	25	0.03	0.03	0.00	0.	*	1	2035	76	0.03	0.01	0.01	6.
1	0805	26	0.05	0.05	0.00	0.	*	1	2050	77	0.03	0.01	0.01	6.
1	0820	27	0.05	0.05	0.00	0.	*	1	2105	78	0.02	0.01	0.01	5.
1	0835	28	0.05	0.05	0.00	0.	*	1	2120	79	0.02	0.01	0.01	5.
1	0850	29	0.06	0.06	0.00	0.	*	1	2135	80	0.02	0.01	0.01	4.
1	0905	30	0.06	0.06	0.00	0.	*	1	2150	81	0.02	0.01	0.01	4.
1	0920	31	0.06	0.04	0.02	3.	*	1	2205	82	0.02	0.01	0.01	4.
1	0935	32	0.06	0.02	0.05	13.	*	1	2220	83	0.02	0.01	0.01	4.
1	0950	33	0.06	0.02	0.05	22.	*	1	2235	84	0.02	0.01	0.01	3.
1	1005	34	0.07	0.02	0.05	25.	*	1	2250	85	0.02	0.01	0.01	3.
1	1020	35	0.07	0.02	0.06	27.	*	1	2305	86	0.02	0.01	0.01	3.
1	1035	36	0.07	0.02	0.06	28.	*	1	2320	87	0.02	0.01	0.00	3.
1	1050	37	0.08	0.02	0.06	30.	*	1	2335	88	0.02	0.01	0.00	2.
1	1105	38	0.10	0.02	0.09	36.	*	1	2350	89	0.02	0.01	0.00	2.
1	1120	39	0.11	0.02	0.09	44.	*	2	0005	90	0.02	0.01	0.00	2.
1	1135	40	0.12	0.02	0.10	48.	*	2	0020	91	0.02	0.01	0.00	2.
1	1150	41	0.12	0.02	0.11	52.	*	2	0035	92	0.02	0.01	0.00	1.
1	1205	42	0.13	0.02	0.12	57.	*	2	0050	93	0.02	0.01	0.00	1.
1	1220	43	0.15	0.02	0.13	62.	*	2	0105	94	0.02	0.01	0.00	1.
1	1235	44	0.07	0.02	0.05	50.	*	2	0120	95	0.02	0.01	0.00	1.
1	1250	45	0.08	0.02	0.06	33.	*	2	0135	96	0.02	0.01	0.00	1.
1	1305	46	0.30	0.01	0.29	74.	*	2	0150	97	0.02	0.01	0.00	1.
1	1320	47	0.36	0.01	0.35	143.	*	2	0205	98	0.00	0.00	0.00	0.
1	1335	48	0.44	0.01	0.43	187.	*	2	0220	99	0.00	0.00	0.00	0.
1	1350	49	0.94	0.01	0.92	305.	*	2	0235	100	0.00	0.00	0.00	0.
1	1405	50	1.88	0.01	1.86	614.	*	2	0250	101	0.00	0.00	0.00	0.
1	1420	51	0.54	0.01	0.52	625.	*							
							*							

****

TOTAL RAINFALL = 9.50, TOTAL LOSS = 1.80, TOTAL EXCESS = 7.70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	25.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	625.	12.50		139.	40.	39.	39.
			(INCHES)	6.620	7.702	7.702	7.702
			(AC-FT)	69.	80.	80.	80.

CUMULATIVE AREA = 0.20 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 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	DEV	625.	12.50	139.	40.	39.	0.20		

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

APPENDIX 2

HEC1 - STUDY

FOR

DETENTION POND ROUTING OF 11.5 ACRE OFFSITE DRAINAGE AREA

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             MAY   1991                *
 *          VERSION 4.0.1E               *
 *     Lahey F77L-EM/32 version 5.01     *
 *       Dodson & Associates, Inc.       *
 *  RUN DATE  02/01/96  TIME  16:11:11   *
 *****************************************
```

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

```
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        X
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


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

   1          ID   Addison pond analysis for phase 2
   2          ID   PAUL LEE
   3          IT     15       0     150
   4          IO      1

   5          KK    DEV
   6          KM   COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED
   7          BA   .0041
   8          PH    100              .8     1.8     3.6     5.1     5.3       7     8.2     9.2
   9          LU     .8     .06
  10          US   .699    .719
              *

  11          KK    RES
  12          KM   ROUTE DEVELOPED RUNOFF THROUGH RESERVOIR
  13          KO      1       2
```

```
           14          RS       1    ELEV  633.78
           15          SA    .0017    .0561    .1667    .348    .4647
           16          SE     634      635      636      637      638
           17          SL  633.78  0.7853    .6       .5
           18          SS     637.35   25      3.0      1.5
                       *
           19          ZZ
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY   1991                *
*          VERSION 4.0.1E               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  02/01/96  TIME  16:11:11   *
*****************************************

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

                    Addison pond analysis for phase 2
                    PAUL LEE

   4 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT           HYDROGRAPH TIME DATA
                       NMIN         15  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0150  STARTING TIME
                         NQ         101  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     2    0  ENDING DATE
                      NDTIME       0250  ENDING TIME
                      ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL     0.25 HOURS
                        TOTAL TIME BASE     25.00 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

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

```
          **************
          *            *
 5 KK     *     DEV    *
          *            *
          **************
                    COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED

              SUBBASIN RUNOFF DATA

 7 BA           SUBBASIN CHARACTERISTICS
                      TAREA        0.00  SUBBASIN AREA

                PRECIPITATION DATA

 8 PH                                  DEPTHS FOR 100-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
                 0.80    1.80    3.60    5.10    5.30    7.00    8.20    9.20    0.00    0.00    0.00    0.00

                                              STORM AREA =     0.00

 9 LU           UNIFORM LOSS RATE
                      STRTL        0.80  INITIAL LOSS
                      CNSTL        0.06  UNIFORM LOSS RATE
                      RTIMP        0.00  PERCENT IMPERVIOUS AREA

10 US           SNYDER UNITGRAPH
                       TP          0.70  LAG
                       CP          0.72  PEAKING COEFFICIENT

                SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

                                                        ***
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 0.90 AND R= 0.42 INTERVALS

                                              UNIT HYDROGRAPH PARAMETERS
                                        CLARK   TC=  0.90 HR,       R=  0.42 HR
                                      SNYDER    TP=  0.69 HR,      CP=  0.71

                                                   UNIT HYDROGRAPH
                                               11 END-OF-PERIOD ORDINATES
                1.        2.        3.        2.        2.        1.        0.        0.        0.        0.
                0.

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

                                                   HYDROGRAPH AT STATION      DEV

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

      DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q      *      DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q
                                                               *
       1     0150    1    0.00    0.00    0.00         0.      *       1     1435   52    0.43    0.01    0.41         9.
       1     0205    2    0.02    0.02    0.00         0.      *       1     1450   53    0.36    0.01    0.34         8.
```

1	0220	3	0.02	0.02	0.00	0.	*	1	1505	54	0.06	0.02	0.04	7.
1	0235	4	0.02	0.02	0.00	0.	*	1	1520	55	0.05	0.02	0.03	5.
1	0250	5	0.02	0.02	0.00	0.	*	1	1535	56	0.17	0.02	0.16	3.
1	0305	6	0.02	0.02	0.00	0.	*	1	1550	57	0.16	0.02	0.14	2.
1	0320	7	0.02	0.02	0.00	0.	*	1	1605	58	0.15	0.02	0.13	2.
1	0335	8	0.02	0.02	0.00	0.	*	1	1620	59	0.14	0.02	0.12	2.
1	0350	9	0.02	0.02	0.00	0.	*	1	1635	60	0.13	0.02	0.11	1.
1	0405	10	0.02	0.02	0.00	0.	*	1	1650	61	0.12	0.02	0.11	1.
1	0420	11	0.02	0.02	0.00	0.	*	1	1705	62	0.07	0.02	0.05	1.
1	0435	12	0.02	0.02	0.00	0.	*	1	1720	63	0.06	0.02	0.05	1.
1	0450	13	0.02	0.02	0.00	0.	*	1	1735	64	0.06	0.02	0.04	1.
1	0505	14	0.02	0.02	0.00	0.	*	1	1750	65	0.06	0.02	0.04	1.
1	0520	15	0.02	0.02	0.00	0.	*	1	1805	66	0.05	0.02	0.04	1.
1	0535	16	0.02	0.02	0.00	0.	*	1	1820	67	0.05	0.02	0.04	1.
1	0550	17	0.02	0.02	0.00	0.	*	1	1835	68	0.05	0.02	0.03	0.
1	0605	18	0.02	0.02	0.00	0.	*	1	1850	69	0.05	0.02	0.03	0.
1	0620	19	0.02	0.02	0.00	0.	*	1	1905	70	0.04	0.02	0.03	0.
1	0635	20	0.02	0.02	0.00	0.	*	1	1920	71	0.04	0.02	0.03	0.
1	0650	21	0.02	0.02	0.00	0.	*	1	1935	72	0.04	0.02	0.03	0.
1	0705	22	0.03	0.03	0.00	0.	*	1	1950	73	0.04	0.02	0.02	0.
1	0720	23	0.03	0.03	0.00	0.	*	1	2005	74	0.03	0.01	0.01	0.
1	0735	24	0.03	0.03	0.00	0.	*	1	2020	75	0.03	0.01	0.01	0.
1	0750	25	0.03	0.03	0.00	0.	*	1	2035	76	0.03	0.01	0.01	0.
1	0805	26	0.04	0.04	0.00	0.	*	1	2050	77	0.03	0.01	0.01	0.
1	0820	27	0.04	0.04	0.00	0.	*	1	2105	78	0.02	0.01	0.01	0.
1	0835	28	0.04	0.04	0.00	0.	*	1	2120	79	0.02	0.01	0.01	0.
1	0850	29	0.04	0.04	0.00	0.	*	1	2135	80	0.02	0.01	0.01	0.
1	0905	30	0.05	0.05	0.00	0.	*	1	2150	81	0.02	0.01	0.01	0.
1	0920	31	0.05	0.05	0.00	0.	*	1	2205	82	0.02	0.01	0.01	0.
1	0935	32	0.05	0.05	0.00	0.	*	1	2220	83	0.02	0.01	0.01	0.
1	0950	33	0.05	0.02	0.04	0.	*	1	2235	84	0.02	0.01	0.01	0.
1	1005	34	0.05	0.02	0.04	0.	*	1	2250	85	0.02	0.01	0.01	0.
1	1020	35	0.06	0.02	0.04	0.	*	1	2305	86	0.02	0.01	0.01	0.
1	1035	36	0.06	0.02	0.04	0.	*	1	2320	87	0.02	0.01	0.00	0.
1	1050	37	0.06	0.02	0.05	0.	*	1	2335	88	0.02	0.01	0.00	0.
1	1105	38	0.12	0.02	0.10	0.	*	1	2350	89	0.02	0.01	0.00	0.
1	1120	39	0.13	0.02	0.11	1.	*	2	0005	90	0.02	0.01	0.00	0.
1	1135	40	0.13	0.02	0.12	1.	*	2	0020	91	0.02	0.01	0.00	0.
1	1150	41	0.14	0.02	0.13	1.	*	2	0035	92	0.02	0.01	0.00	0.
1	1205	42	0.15	0.02	0.14	1.	*	2	0050	93	0.02	0.01	0.00	0.
1	1220	43	0.17	0.02	0.15	1.	*	2	0105	94	0.02	0.01	0.00	0.
1	1235	44	0.04	0.02	0.03	1.	*	2	0120	95	0.02	0.01	0.00	0.
1	1250	45	0.05	0.02	0.04	1.	*	2	0135	96	0.02	0.01	0.00	0.
1	1305	46	0.33	0.01	0.32	1.	*	2	0150	97	0.02	0.01	0.00	0.
1	1320	47	0.39	0.01	0.37	1.	*	2	0205	98	0.00	0.00	0.00	0.
1	1335	48	0.41	0.01	0.40	2.	*	2	0220	99	0.00	0.00	0.00	0.
1	1350	49	0.88	0.01	0.87	3.	*	2	0235	100	0.00	0.00	0.00	0.
1	1405	50	1.80	0.01	1.78	5.	*	2	0250	101	0.00	0.00	0.00	0.
1	1420	51	0.50	0.01	0.49	7.	*							
							*							

****

TOTAL RAINFALL = 9.20, TOTAL LOSS = 1.78, TOTAL EXCESS = 7.42

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	25.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	9.	12.75		3.	1.	1.	1.
			(INCHES)	6.519	7.391	7.391	7.391
			(AC-FT)	1.	2.	2.	2.

CUMULATIVE AREA = 0.00 SQ MI

*** ***

```
          ***************
          *             *
11 KK     *       RES   *
          *             *
          ***************
```

ROUTE DEVELOPED RUNOFF THROUGH RESERVOIR

13 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	2	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

14 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	633.78	INITIAL CONDITION
X	0.00	WORKING R AND D COEFFICIENT

15 SA	AREA	0.0	7000.1	1000.2	7000.3	0.5
16 SE	ELEVATION	634.00	635.00	636.00	637.00	638.00

17 SL LOW-LEVEL OUTLET

ELEVL	633.78	ELEVATION AT CENTER OF OUTLET
CAREA	0.79	CROSS-SECTIONAL AREA
COQL	0.60	COEFFICIENT
EXPL	0.50	EXPONENT OF HEAD

18 SS SPILLWAY

CREL	637.00	SPILLWAY CREST ELEVATION
SPWID	0.35	SPILLWAY WIDTH
COQW	3.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	0.00	2334.23	5882.97	9431.82	11784.44
ELEVATION	634.00	635.00	636.00	637.00	638.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	0.00	1.93	2.12	2.35	2.64	3.01	3.49	4.17	5.16	6.78
ELEVATION	634.00	634.04	634.09	634.17	634.27	634.41	634.63	634.99	635.64	637.00
OUTFLOW	7.64	7.74	7.85	7.97	8.09	8.22	8.35	8.50	8.65	8.81
ELEVATION	637.49	637.54	637.59	637.64	637.70	637.75	637.81	637.87	637.93	638.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.17	2.01	10.97	44.83	164.37	594.82	2298.95	5280.00	5882.97
OUTFLOW	1.77	1.93	2.12	2.35	2.64	3.01	3.49	4.17	5.16	5.63
ELEVATION	634.00	634.04	634.09	634.17	634.27	634.41	634.63	634.99	635.64	636.00
STORAGE	9431.82	11469.34	11548.78	11616.26	11671.49	11714.56	11746.00	11766.84	11778.61	11783.53
OUTFLOW	6.78	7.64	7.74	7.85	7.97	8.09	8.22	8.35	8.50	8.65
ELEVATION	637.00	637.49	637.54	637.59	637.64	637.70	637.75	637.81	637.87	637.93
STORAGE	11784.44									
OUTFLOW	8.81									
ELEVATION	638.00									

****

HYDROGRAPH AT STATION RES

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0150	1	0.	0.0	634.0	1		1020	35	2.	0.0	634.0	1		1850	69	2.	0.4	634.0
1		0205	2	2.	0.0	634.0	1		1035	36	2.	0.0	634.0	1		1905	70	2.	0.4	634.0
1		0220	3	2.	0.0	634.0	1		1050	37	2.	0.0	634.0	1		1920	71	2.	0.4	634.0
1		0235	4	2.	0.0	634.0	1		1105	38	2.	0.0	634.0	1		1935	72	2.	0.3	634.0
1		0250	5	2.	0.0	634.0	1		1120	39	2.	0.0	634.0	1		1950	73	2.	0.3	634.0
1		0305	6	2.	0.0	634.0	1		1135	40	2.	0.0	634.0	1		2005	74	2.	0.3	634.0
1		0320	7	2.	0.0	634.0	1		1150	41	2.	0.0	634.0	1		2020	75	2.	0.2	634.0
1		0335	8	2.	0.0	634.0	1		1205	42	2.	0.0	634.0	1		2035	76	2.	0.2	634.0
1		0350	9	2.	0.0	634.0	1		1220	43	2.	0.0	634.0	1		2050	77	2.	0.2	634.0
1		0405	10	2.	0.0	634.0	1		1235	44	2.	0.0	634.0	1		2105	78	2.	0.1	634.0
1		0420	11	2.	0.0	634.0	1		1250	45	2.	0.0	634.0	1		2120	79	2.	0.1	634.0
1		0435	12	2.	0.0	634.0	1		1305	46	2.	0.0	634.0	1		2135	80	2.	0.0	634.0
1		0450	13	2.	0.0	634.0	1		1320	47	2.	0.0	634.0	1		2150	81	2.	0.0	634.0
1		0505	14	2.	0.0	634.0	1		1335	48	2.	0.0	634.0	1		2205	82	2.	0.0	634.0
1		0520	15	2.	0.0	634.0	1		1350	49	2.	0.0	634.0	1		2220	83	2.	0.0	634.0
1		0535	16	2.	0.0	634.0	1		1405	50	2.	0.0	634.0	1		2235	84	2.	0.0	634.0
1		0550	17	2.	0.0	634.0	1		1420	51	2.	0.1	634.0	1		2250	85	2.	0.0	634.0
1		0605	18	2.	0.0	634.0	1		1435	52	2.	0.3	634.0	1		2305	86	2.	0.0	634.0

1	0620	19	2.	0.0	634.0	*	1	1450	53	2.	0.4	634.0	*	1	2320	87	2.	0.0	634.0
1	0635	20	2.	0.0	634.0	*	1	1505	54	2.	0.5	634.1	*	1	2335	88	2.	0.0	634.0
1	0650	21	2.	0.0	634.0	*	1	1520	55	2.	0.6	634.1	*	1	2350	89	2.	0.0	634.0
1	0705	22	2.	0.0	634.0	*	1	1535	56	2.	0.6	634.1	*	2	0005	90	2.	0.0	634.0
1	0720	23	2.	0.0	634.0	*	1	1550	57	2.	0.6	634.1	*	2	0020	91	2.	0.0	634.0
1	0735	24	2.	0.0	634.0	*	1	1605	58	2.	0.6	634.1	*	2	0035	92	2.	0.0	634.0
1	0750	25	2.	0.0	634.0	*	1	1620	59	2.	0.6	634.1	*	2	0050	93	2.	0.0	634.0
1	0805	26	2.	0.0	634.0	*	1	1635	60	2.	0.6	634.1	*	2	0105	94	2.	0.0	634.0
1	0820	27	2.	0.0	634.0	*	1	1650	61	2.	0.6	634.1	*	2	0120	95	2.	0.0	634.0
1	0835	28	2.	0.0	634.0	*	1	1705	62	2.	0.6	634.1	*	2	0135	96	2.	0.0	634.0
1	0850	29	2.	0.0	634.0	*	1	1720	63	2.	0.6	634.1	*	2	0150	97	2.	0.0	634.0
1	0905	30	2.	0.0	634.0	*	1	1735	64	2.	0.6	634.1	*	2	0205	98	2.	0.0	634.0
1	0920	31	2.	0.0	634.0	*	1	1750	65	2.	0.5	634.1	*	2	0220	99	2.	0.0	634.0
1	0935	32	2.	0.0	634.0	*	1	1805	66	2.	0.5	634.1	*	2	0235	100	2.	0.0	634.0
1	0950	33	2.	0.0	634.0	*	1	1820	67	2.	0.5	634.1	*	2	0250	101	2.	0.0	634.0
1	1005	34	2.	0.0	634.0	*	1	1835	68	2.	0.5	634.0	*						
						*							*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	25.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 2.	14.00	2.	2.	2.	2.
		(INCHES) 4.452	16.579	17.165	17.165
		(AC-FT) 1.	4.	4.	4.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	25.00-HR
+ (AC-FT)	(HR)				
1.	14.00	0.	0.	0.	0.

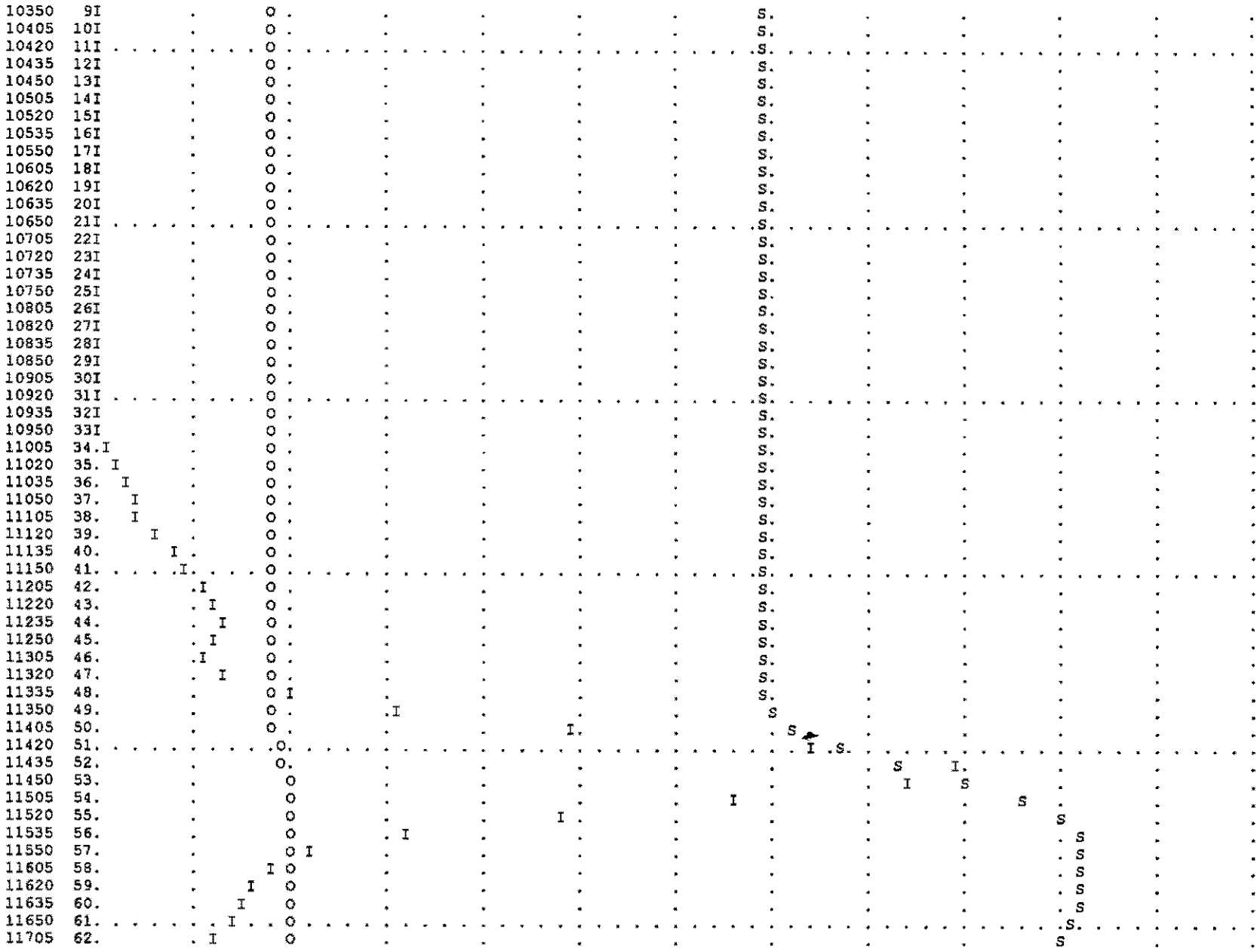
PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	25.00-HR
+ (FEET)	(HR)				
634.06	14.25	634.05	634.01	634.01	634.01

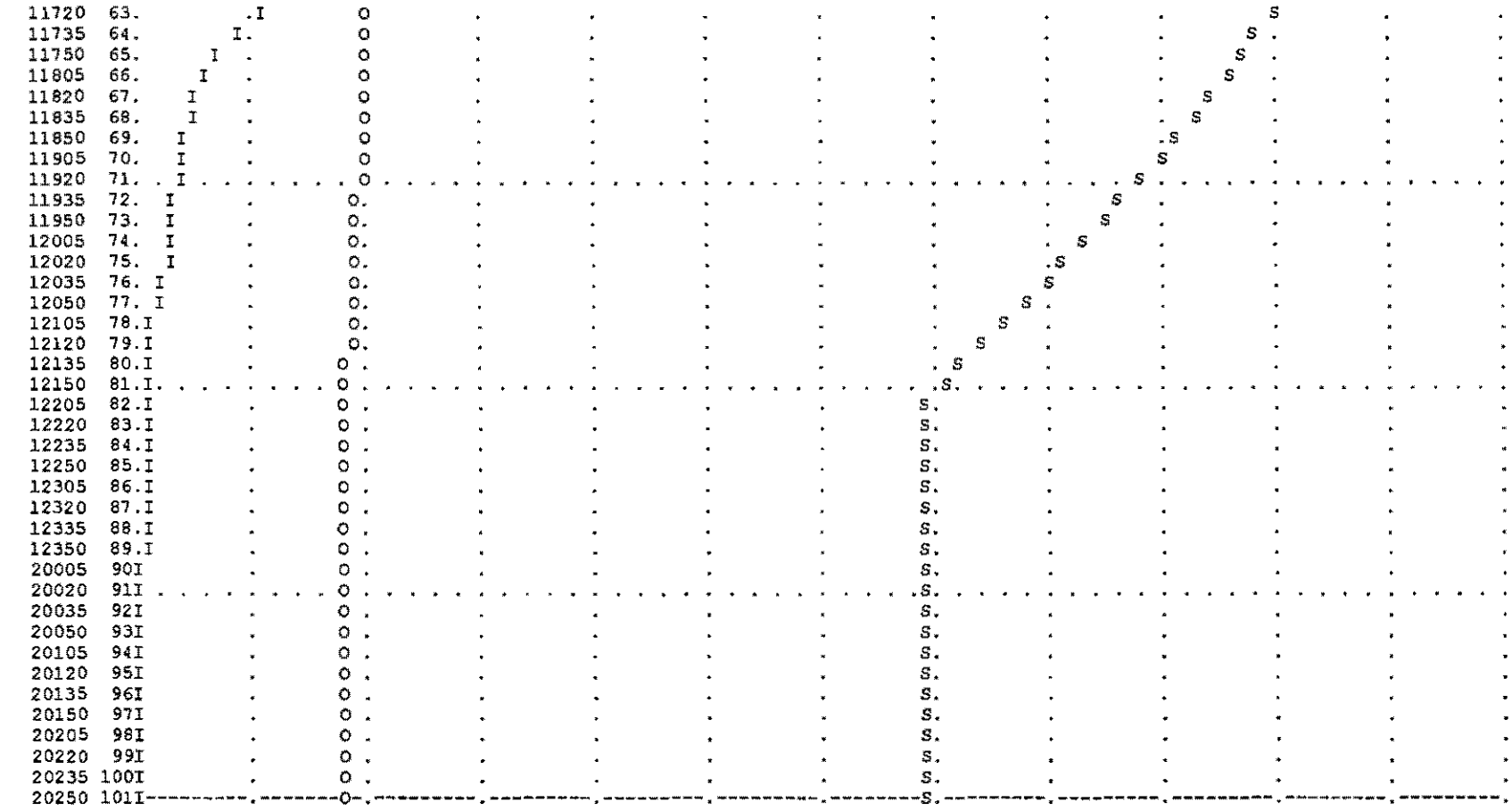
CUMULATIVE AREA = 0.00 SQ MI

1 STATION RES

(I) INFLOW, (O) OUTFLOW

	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.	0.	0.	0.
									(S) STORAGE				
	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.2	0.4	0.6	0.8	0.0
DAHRMN	PER												
10150	1I	----------	----------	----------	----------	----------	----------	----------	S---------	----------	----------	----------	----------
10205	2I	.	O .	.	.	.	.	S	.	.	.	.	.
10220	3I	.	O .	.	.	.	.	S.	.	.	.	.	.
10235	4I	.	O .	.	.	.	.	S.	.	.	.	.	.
10250	5I	.	O .	.	.	.	.	S.	.	.	.	.	.
10305	6I	.	O .	.	.	.	.	S.	.	.	.	.	.
10320	7I	.	O .	.	.	.	.	S.	.	.	.	.	.
10335	8I	.	O .	.	.	.	.	S.	.	.	.	.	.


10350 9I
10405 10I
10420 11I
10435 12I
10450 13I
10505 14I
10520 15I
10535 16I
10550 17I
10605 18I
10620 19I
10635 20I
10650 21I
10705 22I
10720 23I
10735 24I
10750 25I
10805 26I
10820 27I
10835 28I
10850 29I
10905 30I
10920 31I
10935 32I
10950 33I
11005 34.I
11020 35. I
11035 36. I
11050 37. I
11105 38. I
11120 39. I
11135 40. I
11150 41. .I
11205 42. .I
11220 43. . I
11235 44. . I
11250 45. . I
11305 46. .I
11320 47. . I
11335 48. . I
11350 49. .I
11405 50. . I
11420 51. .O
11435 52. O
11450 53. O
11505 54. O
11520 55. O
11535 56. O
11550 57. O I
11605 58. I O
11620 59. I O
11635 60. I O
11650 61. I O
11705 62. I O



1
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 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	DEV	9.	12.75	3.	1.	1.	0.00		
+	ROUTED TO	RES	2.	14.00	2.	2.	2.	0.00		

+ 634.06 14.25

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

APPENDIX 3

Drainage Area Map

OF

DRAINAGE BASIN CONTRIBUTING TO 8' X 5' REINFORCED CONCRETE BOX

APPENDIX 4

Drainage Area Map

OF

Proposed Site

DRAINAGE REPORT

FOR

EXCEL SERVICE CENTER

ADDISON, TEXAS

PREPARED FOR

WILCOX REALTY GROUP
C/O CONSTRUCTION MANAGEMENT CORPORATION
15303 DALLAS PARKWAY, SUITE 640, LB 80
DALLAS, TEXAS

Bury+Pittman
Consulting Engineers and Surveyors

Bury+Pittman

Bury & Pittman-DFW, Inc.
Consulting Engineers/Surveyors
5310 Harvest Hill Road/Suite 100
Dallas, Texas 75230
Tel 214/991-0011
Fax 214/991-0278

December 3, 1995

John Baumgartner, P.E.
Town of Addison
16801 Westgrove Drive
Addison, Texas 75001-0144

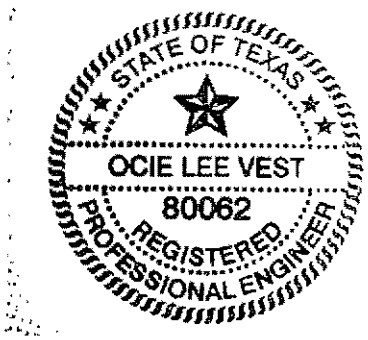
Re: Drainage Report for Excel Service Center - Commercial
Addison, Texas

Dear Mr. Baumgartner:

Please accept the following drainage report for the development of the 18 acre office and warehouse facility at the southwest corner of Addison Road and Bent Tree Plaza Drive. The project is going to be constructed by Construction Management Corporation. Your expeditious review of this submittal is greatly appreciated. Please do not hesitate to call Paul Lee at (214) 991-0011 if you have any questions.

Sincerely,

Ocie L. Vest, P.E.



OLV/nh

cc: file

c:\PAUL\exceldr.ain\nh

Drainage Report

Existing Conditions:

The project is a 18 acre tract at the southwest corner of Addison Road and Bent Tree Plaza. The site accepts flows from a 4' wide concrete flume from Addison Road. This is from a drainage area of 11.5 acres. This flows through an open natural channel to a 60" RCP at the southwest corner of the site. This 60"RCP flows to a channel North of Sunbelt Drive where it enters a 8' X 5' box which slows to Addison Airport. This box has a peak capacity of 593 CFS.

Detention Requirement:

Since the drainage area contributing to the box produces a peak flow of 625, (see Appendix 1 HEC-1 Report) and the box is only able to handle 593 CFS. The peak must be reduced by 32 CFS. This project and the upstream contributing area are only 20% of the area contributing to the box. Therefore our site is required to reduce the peak Q by 7 CFS which is 20% of the total reduction required.

Proposed Condition:

A 1 acre foot detention pond has been provided at the east end of the site this pond accepts all of the flows contributing to this site from off-site. These flows enter through a 14' wide recessed inlet on Addison Road additional flow will be accepted over the top of the curb during large storm flows. The water surface elevation of the pond will be 639.72 at the peak. The pond discharges trough a 18" RCP which discharges from the site through the site Storm drain system to an existing 60" RCP. The peak discharge is reduced by 11 CFS (approximately 30%). (See Appendix 2 for HEC I study showing the detention routing)

APPENDIX I

HEC1 - HYDROGRAPH

FOR

DRAINAGE BASIN CONTRIBUTING TO 8' X 5' REINFORCED CONCRETE BOX

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY   1991                *
*          VERSION 4.0.1E               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  10/20/95  TIME  09:32:51   *
*****************************************
```

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

```
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        X
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


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

            1           ID    HYDROGRAPH FOR THE ENTIRE DRIANAGE BASIN CONTRIBUTING TO THE BOX
            2           ID    AT
            3           IT      15       0     150
            4           IO       1

            5           KK     DEV
            6           KM   COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED
            7           BA   .1952
            8           PH     100              .87    1.88     3.8     5.2     5.5       7     8.5     9.5
            9           LU      .8     .06
                        * Lca=.28, Sst = .5,L=.61
           10           US    .24    .719
           11           ZZ
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
```

```
*          MAY   1991                *          *    HYDROLOGIC ENGINEERING CENTER    *
*        VERSION 4.0.1E              *          *         609 SECOND STREET           *
*   Lahey F77L-EM/32 version 5.01    *          *      DAVIS, CALIFORNIA 95616        *
*     Dodson & Associates, Inc.      *          *          (916) 551-1748             *
* RUN DATE  10/20/95  TIME  09:32:51 *          *                                     *
**************************************          ***************************************


                     HYDROGRAPH FOR THE ENTIRE DRIANAGE BASIN CONTRIBUTING TO THE BOX
                     AT

 4 IO         OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1    0  STARTING DATE
                    ITIME       0150  STARTING TIME
                       NQ        101  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     2    0  ENDING DATE
                   NDTIME       0250  ENDING TIME
                    ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL    0.25 HOURS
                     TOTAL TIME BASE   25.00 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

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

            **************
            *            *
 5 KK       *      DEV   *
            *            *
            **************
                    COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED

           SUBBASIN RUNOFF DATA
```

```
  7 BA          SUBBASIN CHARACTERISTICS
                     TAREA        0.20  SUBBASIN AREA

                PRECIPITATION DATA

  8 PH                                   DEPTHS FOR 100-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
                 0.87    1.88    3.80    5.20    5.50    7.00    8.50    9.50    0.00    0.00    0.00    0.00

                                                  STORM AREA =     0.20

  9 LU          UNIFORM LOSS RATE
                     STRTL        0.80  INITIAL LOSS
                     CNSTL        0.06  UNIFORM LOSS RATE
                     RTIMP        0.00  PERCENT IMPERVIOUS AREA

 10 US          SNYDER UNITGRAPH
                        TP        0.24  LAG
                        CP        0.72  PEAKING COEFFICIENT

                SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

                                                              ***

TC INCREASED TO DELTA T OF  0.25 HR
CLARK DID NOT CONVERGE TO GIVEN SNYDER COEFFICIENTS
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 0.36 AND R= 0.13 INTERVALS

                                                    UNIT HYDROGRAPH PARAMETERS
                                               CLARK   TC=  0.36 HR,       R=  0.13 HR
                                              SNYDER   TP=  0.24 HR,      CP=  0.58

                                                         UNIT HYDROGRAPH
                                                     3 END-OF-PERIOD ORDINATES
              191.      252.       61.

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

                                                   HYDROGRAPH AT STATION      DEV

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

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0150	1	0.00	0.00	0.00	0.	*	1		1435	52	0.40	0.01	0.39	320.
1		0205	2	0.02	0.02	0.00	0.	*	1		1450	53	0.33	0.01	0.31	190.
1		0220	3	0.02	0.02	0.00	0.	*	1		1505	54	0.09	0.02	0.07	117.
1		0235	4	0.02	0.02	0.00	0.	*	1		1520	55	0.07	0.02	0.06	48.
1		0250	5	0.02	0.02	0.00	0.	*	1		1535	56	0.16	0.02	0.14	45.
1		0305	6	0.02	0.02	0.00	0.	*	1		1550	57	0.14	0.02	0.13	63.
1		0320	7	0.02	0.02	0.00	0.	*	1		1605	58	0.13	0.02	0.11	62.
1		0335	8	0.02	0.02	0.00	0.	*	1		1620	59	0.12	0.02	0.11	57.
1		0350	9	0.02	0.02	0.00	0.	*	1		1635	60	0.11	0.02	0.10	52.

1	0405	10	0.02	0.02	0.00	0.	*	1	1650	61	0.11	0.02	0.09	48.
1	0420	11	0.02	0.02	0.00	0.	*	1	1705	62	0.08	0.02	0.07	41.
1	0435	12	0.02	0.02	0.00	0.	*	1	1720	63	0.08	0.02	0.06	34.
1	0450	13	0.02	0.02	0.00	0.	*	1	1735	64	0.07	0.02	0.06	30.
1	0505	14	0.02	0.02	0.00	0.	*	1	1750	65	0.07	0.02	0.05	28.
1	0520	15	0.02	0.02	0.00	0.	*	1	1805	66	0.07	0.02	0.05	27.
1	0535	16	0.02	0.02	0.00	0.	*	1	1820	67	0.06	0.02	0.05	25.
1	0550	17	0.02	0.02	0.00	0.	*	1	1835	68	0.06	0.02	0.05	24.
1	0605	18	0.02	0.02	0.00	0.	*	1	1850	69	0.06	0.02	0.04	23.
1	0620	19	0.02	0.02	0.00	0.	*	1	1905	70	0.06	0.02	0.04	21.
1	0635	20	0.02	0.02	0.00	0.	*	1	1920	71	0.05	0.02	0.04	20.
1	0650	21	0.02	0.02	0.00	0.	*	1	1935	72	0.05	0.02	0.04	20.
1	0705	22	0.03	0.03	0.00	0.	*	1	1950	73	0.05	0.02	0.04	19.
1	0720	23	0.03	0.03	0.00	0.	*	1	2005	74	0.03	0.01	0.01	14.
1	0735	24	0.03	0.03	0.00	0.	*	1	2020	75	0.03	0.01	0.01	8.
1	0750	25	0.03	0.03	0.00	0.	*	1	2035	76	0.03	0.01	0.01	6.
1	0805	26	0.05	0.05	0.00	0.	*	1	2050	77	0.03	0.01	0.01	6.
1	0820	27	0.05	0.05	0.00	0.	*	1	2105	78	0.02	0.01	0.01	5.
1	0835	28	0.05	0.05	0.00	0.	*	1	2120	79	0.02	0.01	0.01	5.
1	0850	29	0.06	0.06	0.00	0.	*	1	2135	80	0.02	0.01	0.01	4.
1	0905	30	0.06	0.06	0.00	0.	*	1	2150	81	0.02	0.01	0.01	4.
1	0920	31	0.06	0.04	0.02	3.	*	1	2205	82	0.02	0.01	0.01	4.
1	0935	32	0.06	0.02	0.05	13.	*	1	2220	83	0.02	0.01	0.01	4.
1	0950	33	0.06	0.02	0.05	22.	*	1	2235	84	0.02	0.01	0.01	3.
1	1005	34	0.07	0.02	0.05	25.	*	1	2250	85	0.02	0.01	0.01	3.
1	1020	35	0.07	0.02	0.06	27.	*	1	2305	86	0.02	0.01	0.01	3.
1	1035	36	0.07	0.02	0.06	28.	*	1	2320	87	0.02	0.01	0.00	3.
1	1050	37	0.08	0.02	0.06	30.	*	1	2335	88	0.02	0.01	0.00	2.
1	1105	38	0.10	0.02	0.09	36.	*	1	2350	89	0.02	0.01	0.00	2.
1	1120	39	0.11	0.02	0.09	44.	*	2	0005	90	0.02	0.01	0.00	2.
1	1135	40	0.12	0.02	0.10	48.	*	2	0020	91	0.02	0.01	0.00	2.
1	1150	41	0.12	0.02	0.11	52.	*	2	0035	92	0.02	0.01	0.00	1.
1	1205	42	0.13	0.02	0.12	57.	*	2	0050	93	0.02	0.01	0.00	1.
1	1220	43	0.15	0.02	0.13	62.	*	2	0105	94	0.02	0.01	0.00	1.
1	1235	44	0.07	0.02	0.05	50.	*	2	0120	95	0.02	0.01	0.00	1.
1	1250	45	0.08	0.02	0.06	33.	*	2	0135	96	0.02	0.01	0.00	1.
1	1305	46	0.30	0.01	0.29	74.	*	2	0150	97	0.02	0.01	0.00	1.
1	1320	47	0.36	0.01	0.35	143.	*	2	0205	98	0.00	0.00	0.00	0.
1	1335	48	0.44	0.01	0.43	187.	*	2	0220	99	0.00	0.00	0.00	0.
1	1350	49	0.94	0.01	0.92	305.	*	2	0235	100	0.00	0.00	0.00	0.
1	1405	50	1.88	0.01	1.86	614.	*	2	0250	101	0.00	0.00	0.00	0.
1	1420	51	0.54	0.01	0.52	625.	*							
							*							

****

TOTAL RAINFALL = 9.50, TOTAL LOSS = 1.80, TOTAL EXCESS = 7.70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	25.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	625.	12.50		139.	40.	39.	39.
			(INCHES)	6.620	7.702	7.702	7.702
			(AC-FT)	69.	80.	80.	80.

CUMULATIVE AREA = 0.20 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	DEV	625.	12.50	139.	40.	39.	0.20		

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

APPENDIX 2

HEC1 - STUDY

FOR

DETENTION POND ROUTING OF 11.5 ACRE OFFSITE DRAINAGE AREA

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             MAY   1991                *
 *          VERSION 4.0.1E               *
 *     Lahey F77L-EM/32 version 5.01     *
 *       Dodson & Associates, Inc.       *
 *  RUN DATE  11/28/95  TIME  00:42:59   *
 *****************************************
```

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

```
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        X
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


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

   1          ID    Addison pond analysis
   2          ID    PAUL LEE
   3          IT      15       0     150
   4          IO       1

   5          KK     DEV
   6          KM   COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED
   7          BA   .0177
   8          PH     100              .8     1.8     3.6     5.1     5.3       7     8.2     9.2
   9          LU      .8     .06
  10          US    .699    .719
              *

  11          KK     RES
  12          KM   ROUTE DEVELOPED RUNOFF THROUGH RESERVOIR
  13          KO       1       2
```

```
          14          RS       1    ELEV  634.43
          15          SA    .039    .106    .184    .238    .283    .375    1.58
          16          SE     634     636     637     638     639     640   644.5
          17          SL  634.25  2.4053      .6      .5
          18          SS     644      25     3.0     1.5
                      *
          19          ZZ
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY   1991                *
*          VERSION 4.0.1E               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  11/28/95  TIME  00:42:59   *
*                                       *
*****************************************

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

                    Addison pond analysis
                    PAUL LEE

  4 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN         15  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0150  STARTING TIME
                        NQ         101  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME        0250  ENDING TIME
                    ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL     0.25 HOURS
                     TOTAL TIME BASE     25.00 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

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

```
          **************
          *            *
 5 KK     *       DEV  *
          *            *
          **************
                    COMPUTE RUNOFF HYDROGRAPH FOR DEVELOPED WATERSHED

              SUBBASIN RUNOFF DATA

 7 BA           SUBBASIN CHARACTERISTICS
                      TAREA         0.02  SUBBASIN AREA

                PRECIPITATION DATA

 8 PH                                  DEPTHS FOR 100-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
                 0.80    1.80    3.60    5.10    5.30    7.00    8.20    9.20    0.00    0.00    0.00    0.00

                                                STORM AREA =     0.02

 9 LU           UNIFORM LOSS RATE
                      STRTL         0.80  INITIAL LOSS
                      CNSTL         0.06  UNIFORM LOSS RATE
                      RTIMP         0.00  PERCENT IMPERVIOUS AREA

10 US           SNYDER UNITGRAPH
                       TP           0.70  LAG
                       CP           0.72  PEAKING COEFFICIENT

                SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

                                                    ***
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 0.90 AND R= 0.42 INTERVALS

                                                UNIT HYDROGRAPH PARAMETERS
                                             CLARK   TC=  0.90 HR,       R=  0.42 HR
                                            SNYDER   TP=  0.69 HR,      CP=  0.71

                                                UNIT HYDROGRAPH
                                            11 END-OF-PERIOD ORDINATES
                2.        7.       11.       10.        7.        4.        2.        1.        1.        0.
                0.

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

                                                HYDROGRAPH AT STATION      DEV

*****************************************************************************************************************************************
                                                                          *
      DA MON HRMN   ORD    RAIN    LOSS  EXCESS      COMP Q              *      DA MON HRMN   ORD    RAIN    LOSS  EXCESS      COMP Q
                                                                          *
       1     0150    1    0.00    0.00    0.00          0.               *       1     1435   52    0.43    0.01    0.41         38.
       1     0205    2    0.02    0.02    0.00          0.               *       1     1450   53    0.36    0.01    0.34         36.
```

1	0220	3	0.02	0.02	0.00	0.	*	1	1505	54	0.06	0.02	0.04	29.
1	0235	4	0.02	0.02	0.00	0.	*	1	1520	55	0.05	0.02	0.03	21.
1	0250	5	0.02	0.02	0.00	0.	*	1	1535	56	0.17	0.02	0.16	14.
1	0305	6	0.02	0.02	0.00	0.	*	1	1550	57	0.16	0.02	0.14	10.
1	0320	7	0.02	0.02	0.00	0.	*	1	1605	58	0.15	0.02	0.13	8.
1	0335	8	0.02	0.02	0.00	0.	*	1	1620	59	0.14	0.02	0.12	7.
1	0350	9	0.02	0.02	0.00	0.	*	1	1635	60	0.13	0.02	0.11	6.
1	0405	10	0.02	0.02	0.00	0.	*	1	1650	61	0.12	0.02	0.11	6.
1	0420	11	0.02	0.02	0.00	0.	*	1	1705	62	0.07	0.02	0.05	5.
1	0435	12	0.02	0.02	0.00	0.	*	1	1720	63	0.06	0.02	0.05	5.
1	0450	13	0.02	0.02	0.00	0.	*	1	1735	64	0.06	0.02	0.04	4.
1	0505	14	0.02	0.02	0.00	0.	*	1	1750	65	0.06	0.02	0.04	3.
1	0520	15	0.02	0.02	0.00	0.	*	1	1805	66	0.05	0.02	0.04	3.
1	0535	16	0.02	0.02	0.00	0.	*	1	1820	67	0.05	0.02	0.04	2.
1	0550	17	0.02	0.02	0.00	0.	*	1	1835	68	0.05	0.02	0.03	2.
1	0605	18	0.02	0.02	0.00	0.	*	1	1850	69	0.05	0.02	0.03	2.
1	0620	19	0.02	0.02	0.00	0.	*	1	1905	70	0.04	0.02	0.03	2.
1	0635	20	0.02	0.02	0.00	0.	*	1	1920	71	0.04	0.02	0.03	2.
1	0650	21	0.02	0.02	0.00	0.	*	1	1935	72	0.04	0.02	0.03	1.
1	0705	22	0.03	0.03	0.00	0.	*	1	1950	73	0.04	0.02	0.02	1.
1	0720	23	0.03	0.03	0.00	0.	*	1	2005	74	0.03	0.01	0.01	1.
1	0735	24	0.03	0.03	0.00	0.	*	1	2020	75	0.03	0.01	0.01	1.
1	0750	25	0.03	0.03	0.00	0.	*	1	2035	76	0.03	0.01	0.01	1.
1	0805	26	0.04	0.04	0.00	0.	*	1	2050	77	0.03	0.01	0.01	1.
1	0820	27	0.04	0.04	0.00	0.	*	1	2105	78	0.02	0.01	0.01	1.
1	0835	28	0.04	0.04	0.00	0.	*	1	2120	79	0.02	0.01	0.01	1.
1	0850	29	0.04	0.04	0.00	0.	*	1	2135	80	0.02	0.01	0.01	1.
1	0905	30	0.05	0.05	0.00	0.	*	1	2150	81	0.02	0.01	0.01	0.
1	0920	31	0.05	0.05	0.00	0.	*	1	2205	82	0.02	0.01	0.01	0.
1	0935	32	0.05	0.05	0.00	0.	*	1	2220	83	0.02	0.01	0.01	0.
1	0950	33	0.05	0.02	0.04	0.	*	1	2235	84	0.02	0.01	0.01	0.
1	1005	34	0.05	0.02	0.04	0.	*	1	2250	85	0.02	0.01	0.01	0.
1	1020	35	0.06	0.02	0.04	1.	*	1	2305	86	0.02	0.01	0.01	0.
1	1035	36	0.06	0.02	0.04	1.	*	1	2320	87	0.02	0.01	0.00	0.
1	1050	37	0.06	0.02	0.05	2.	*	1	2335	88	0.02	0.01	0.00	0.
1	1105	38	0.12	0.02	0.10	2.	*	1	2350	89	0.02	0.01	0.00	0.
1	1120	39	0.13	0.02	0.11	3.	*	2	0005	90	0.02	0.01	0.00	0.
1	1135	40	0.13	0.02	0.12	3.	*	2	0020	91	0.02	0.01	0.00	0.
1	1150	41	0.14	0.02	0.13	4.	*	2	0035	92	0.02	0.01	0.00	0.
1	1205	42	0.15	0.02	0.14	5.	*	2	0050	93	0.02	0.01	0.00	0.
1	1220	43	0.17	0.02	0.15	5.	*	2	0105	94	0.02	0.01	0.00	0.
1	1235	44	0.04	0.02	0.03	5.	*	2	0120	95	0.02	0.01	0.00	0.
1	1250	45	0.05	0.02	0.04	5.	*	2	0135	96	0.02	0.01	0.00	0.
1	1305	46	0.33	0.01	0.32	5.	*	2	0150	97	0.02	0.01	0.00	0.
1	1320	47	0.39	0.01	0.37	6.	*	2	0205	98	0.00	0.00	0.00	0.
1	1335	48	0.41	0.01	0.40	9.	*	2	0220	99	0.00	0.00	0.00	0.
1	1350	49	0.88	0.01	0.87	13.	*	2	0235	100	0.00	0.00	0.00	0.
1	1405	50	1.80	0.01	1.78	21.	*	2	0250	101	0.00	0.00	0.00	0.
1	1420	51	0.50	0.01	0.49	32.	*							
							*							

****

TOTAL RAINFALL = 9.20, TOTAL LOSS = 1.78, TOTAL EXCESS = 7.42

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	25.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	38.	12.75		12.	4.	3.	3.
			(INCHES)	6.519	7.390	7.390	7.390
			(AC-FT)	6.	7.	7.	7.

CUMULATIVE AREA = 0.02 SQ MI

*** ***

```
          **************
          *            *
 11 KK    *       RES  *
          *            *
          **************
                    ROUTE DEVELOPED RUNOFF THROUGH RESERVOIR

 13 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          2  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

                HYDROGRAPH ROUTING DATA

 14 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC     634.43  INITIAL CONDITION
                          X       0.00 WORKING R AND D COEFFICIENT

 15 SA               AREA         0.0       0.1       0.2       0.2       0.3       0.4       1.6

 16 SE          ELEVATION      634.00    636.00    637.00    638.00    639.00    640.00    644.50

 17 SL          LOW-LEVEL OUTLET
                      ELEVL     634.25  ELEVATION AT CENTER OF OUTLET
                      CAREA       2.41  CROSS-SECTIONAL AREA
                       COQL       0.60  COEFFICIENT
                       EXPL       0.50  EXPONENT OF HEAD

 18 SS          SPILLWAY
                       CREL     644.00  SPILLWAY CREST ELEVATION
                      SPWID      25.00  SPILLWAY WIDTH
                       COQW       3.00  WEIR COEFFICIENT
                       EXPW       1.50  EXPONENT OF HEAD

                                                    ***
```

COMPUTED STORAGE-ELEVATION DATA

STORAGE	0.00	0.14	0.28	0.49	0.75	1.08	5.17
ELEVATION	634.00	636.00	637.00	638.00	639.00	640.00	644.50

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	0.00	0.00	10.95	12.16	13.67	15.61	18.19	21.80	27.20	36.14
ELEVATION	634.00	634.25	635.14	635.35	635.64	636.07	636.72	637.80	639.77	644.00
OUTFLOW	36.20	36.46	37.07	38.18	39.93	42.48	45.97	50.55	56.37	63.57
ELEVATION	644.01	644.02	644.05	644.09	644.13	644.19	644.25	644.32	644.41	644.50

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.01	0.06	0.08	0.10	0.14	0.15	0.23	0.28	0.45
OUTFLOW	0.00	0.00	10.95	12.16	13.67	15.31	15.61	18.19	19.19	21.80
ELEVATION	634.00	634.25	635.14	635.35	635.64	636.00	636.07	636.72	637.00	637.80
STORAGE	0.49	0.75	1.00	1.08	4.42	4.46	4.49	4.54	4.61	4.69
OUTFLOW	22.41	25.23	27.20	27.75	36.14	36.46	37.07	38.18	39.94	42.48
ELEVATION	638.00	639.00	639.77	640.00	644.00	644.02	644.05	644.09	644.13	644.19
STORAGE	4.78	4.90	5.02	5.17						
OUTFLOW	45.97	50.55	56.37	63.57						
ELEVATION	644.25	644.32	644.41	644.50						

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 11.
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 RES

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0150	1	5.	0.0	634.4	1		1020	35	1.	0.0	634.3	1		1850	69	2.	0.0	634.4
1		0205	2	0.	0.0	634.0	1		1035	36	1.	0.0	634.3	1		1905	70	2.	0.0	634.4
1		0220	3	0.	0.0	634.0	1		1050	37	1.	0.0	634.4	1		1920	71	2.	0.0	634.4
1		0235	4	0.	0.0	634.0	1		1105	38	2.	0.0	634.4	1		1935	72	1.	0.0	634.4
1		0250	5	0.	0.0	634.0	1		1120	39	2.	0.0	634.4	1		1950	73	1.	0.0	634.4
1		0305	6	0.	0.0	634.0	1		1135	40	3.	0.0	634.5	1		2005	74	1.	0.0	634.4
1		0320	7	0.	0.0	634.0	1		1150	41	4.	0.0	634.6	1		2020	75	1.	0.0	634.3
1		0335	8	0.	0.0	634.0	1		1205	42	5.	0.0	634.6	1		2035	76	1.	0.0	634.3
1		0350	9	0.	0.0	634.0	1		1220	43	5.	0.0	634.7	1		2050	77	1.	0.0	634.3
1		0405	10	0.	0.0	634.0	1		1235	44	5.	0.0	634.7	1		2105	78	1.	0.0	634.3
1		0420	11	0.	0.0	634.0	1		1250	45	5.	0.0	634.7	1		2120	79	1.	0.0	634.3
1		0435	12	0.	0.0	634.0	1		1305	46	5.	0.0	634.6	1		2135	80	1.	0.0	634.3
1		0450	13	0.	0.0	634.0	1		1320	47	5.	0.0	634.7	1		2150	81	0.	0.0	634.3
1		0505	14	0.	0.0	634.0	1		1335	48	8.	0.0	634.9	1		2205	82	0.	0.0	634.3

1	0520	15	0.	0.0	634.0	*	1	1350	49	12.	0.1	635.3	*	1	2220	83	0.	0.0	634.3
1	0535	16	0.	0.0	634.0	*	1	1405	50	16.	0.1	636.1	*	1	2235	84	0.	0.0	634.3
1	0550	17	0.	0.0	634.0	*	1	1420	51	20.	0.3	637.2	*	1	2250	85	0.	0.0	634.3
1	0605	18	0.	0.0	634.0	*	1	1435	52	24.	0.6	638.4	*	1	2305	86	0.	0.0	634.3
1	0620	19	0.	0.0	634.0	*	1	1450	53	26.	0.9	639.3	*	1	2320	87	0.	0.0	634.3
1	0635	20	0.	0.0	634.0	*	1	1505	54	27.	1.0	639.7	*	1	2335	88	0.	0.0	634.3
1	0650	21	0.	0.0	634.0	*	1	1520	55	27.	0.9	639.6	*	1	2350	89	0.	0.0	634.3
1	0705	22	0.	0.0	634.0	*	1	1535	56	25.	0.8	639.0	*	2	0005	90	0.	0.0	634.3
1	0720	23	0.	0.0	634.0	*	1	1550	57	23.	0.5	638.0	*	2	0020	91	0.	0.0	634.3
1	0735	24	0.	0.0	634.0	*	1	1605	58	19.	0.3	636.8	*	2	0035	92	0.	0.0	634.3
1	0750	25	0.	0.0	634.0	*	1	1620	59	13.	0.1	635.4	*	2	0050	93	0.	0.0	634.3
1	0805	26	0.	0.0	634.0	*	1	1635	60	5.	0.0	634.7	*	2	0105	94	0.	0.0	634.3
1	0820	27	0.	0.0	634.0	*	1	1650	61	6.	0.0	634.8	*	2	0120	95	0.	0.0	634.3
1	0835	28	0.	0.0	634.0	*	1	1705	62	5.	0.0	634.7	*	2	0135	96	0.	0.0	634.3
1	0850	29	0.	0.0	634.0	*	1	1720	63	5.	0.0	634.7	*	2	0150	97	0.	0.0	634.3
1	0905	30	0.	0.0	634.0	*	1	1735	64	4.	0.0	634.6	*	2	0205	98	0.	0.0	634.3
1	0920	31	0.	0.0	634.0	*	1	1750	65	3.	0.0	634.5	*	2	0220	99	0.	0.0	634.3
1	0935	32	0.	0.0	634.0	*	1	1805	66	3.	0.0	634.5	*	2	0235	100	0.	0.0	634.3
1	0950	33	0.	0.0	634.0	*	1	1820	67	2.	0.0	634.4	*	2	0250	101	0.	0.0	634.3
1	1005	34	0.	0.0	634.1	*	1	1835	68	2.	0.0	634.4	*						
						*							*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	25.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 27.	13.25		12.	4.	3.	3.
		(INCHES)	6.517	7.428	7.433	7.433
		(AC-FT)	6.	7.	7.	7.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	25.00-HR
+ (AC-FT)	(HR)					
1.	13.25		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	25.00-HR
+ (FEET)	(HR)					
639.72	13.25		636.07	634.66	634.64	634.64

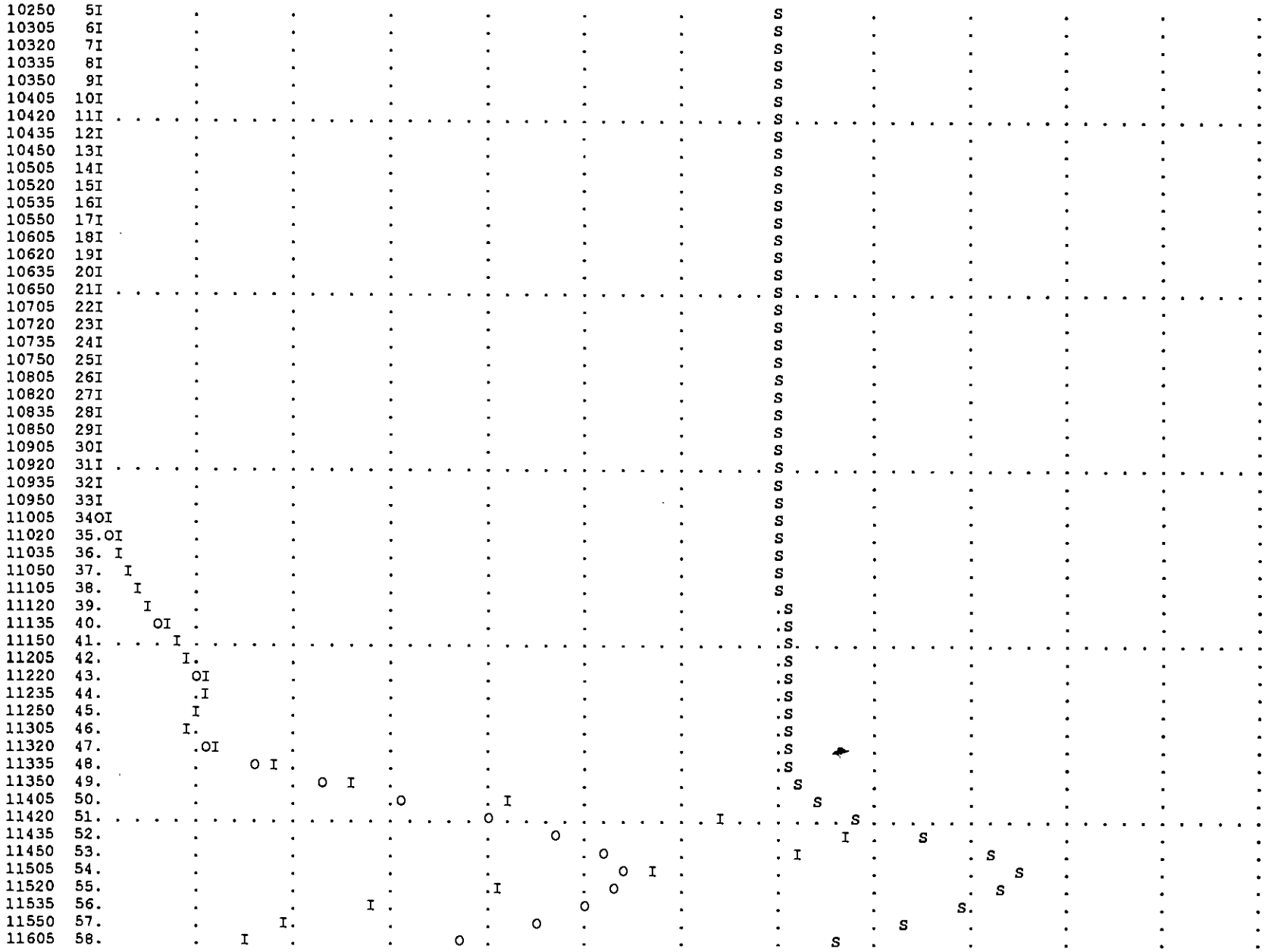
CUMULATIVE AREA = 0.02 SQ MI

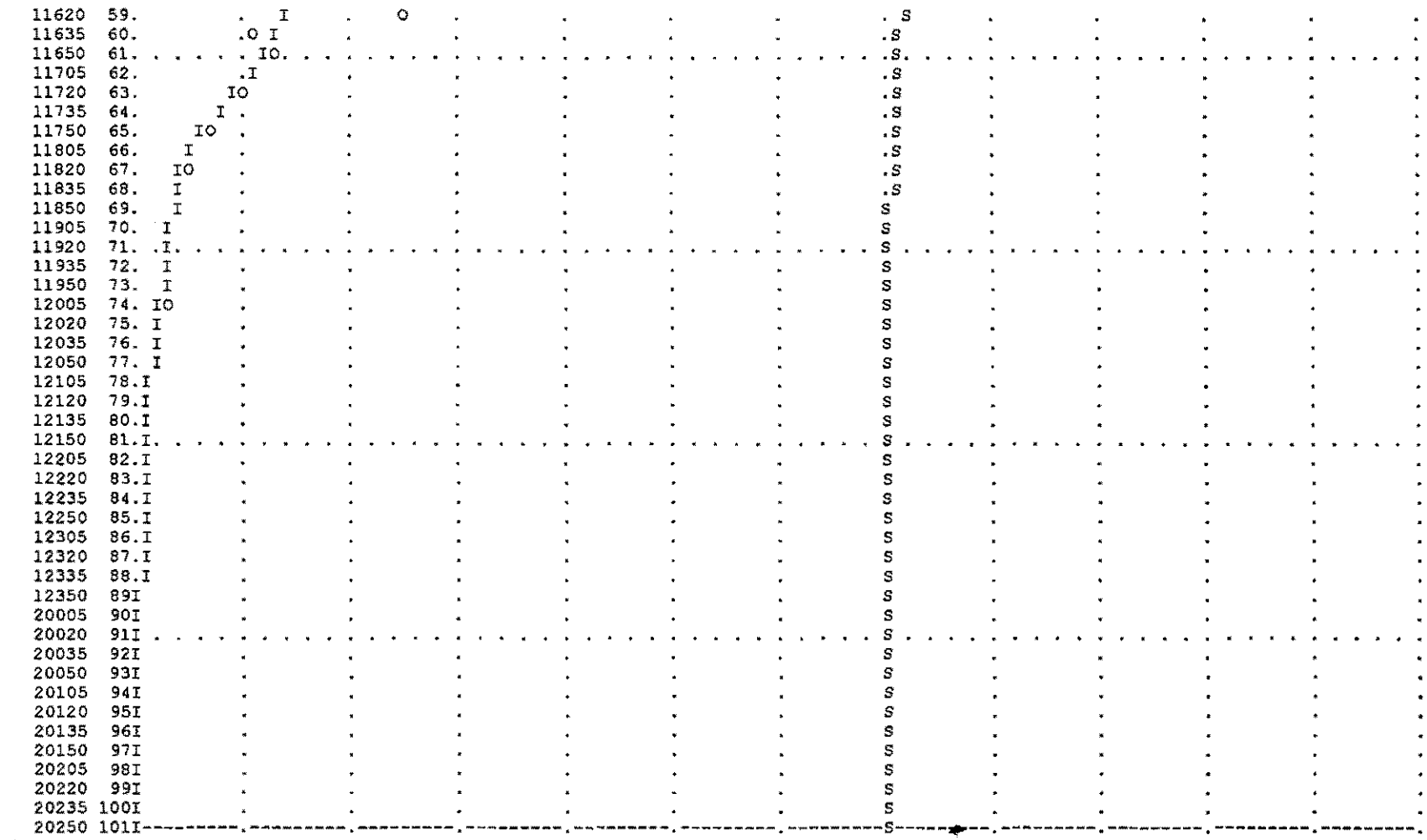
1 STATION RES

(I) INFLOW, (O) OUTFLOW

0.	5.	10.	15.	20.	25.	30.	35.	40.	0.	0.	0.	0.
								(S) STORAGE				
0.0	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	0.4	0.8	1.2	0.0	0.0

```
DAHRMN PER
 10150   1I---------O---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.
 10205   2I         .         .         .         .         .         .         S         .         .         .         .         .
 10220   3I         .         .         .         .         .         .         S         .         .         .         .         .
 10235   4I         .         .         .         .         .         .         S         .         .         .         .         .
```


10250 5I
10305 6I
10320 7I
10335 8I
10350 9I
10405 10I
10420 11I
10435 12I
10450 13I
10505 14I
10520 15I
10535 16I
10550 17I
10605 18I
10620 19I
10635 20I
10650 21I
10705 22I
10720 23I
10735 24I
10750 25I
10805 26I
10820 27I
10835 28I
10850 29I
10905 30I
10920 31I
10935 32I
10950 33I
11005 34OI
11020 35.OI
11035 36. I
11050 37. I
11105 38. I
11120 39. I
11135 40. OI
11150 41. I
11205 42. I.
11220 43. OI
11235 44. .I
11250 45. I
11305 46. I.
11320 47. .OI
11335 48. O I
11350 49. O I
11405 50. .O I
11420 51. O I
11435 52. O I
11450 53. O I
11505 54. O I
11520 55. .I O
11535 56. I O
11550 57. I. O
11605 58. I O



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									

+		DEV	38.	12.75	12.	4.	3.	0.02		
	ROUTED TO								
+		RES	27.	13.25	12.	4.	3.	0.02		
+									639.72	13.25

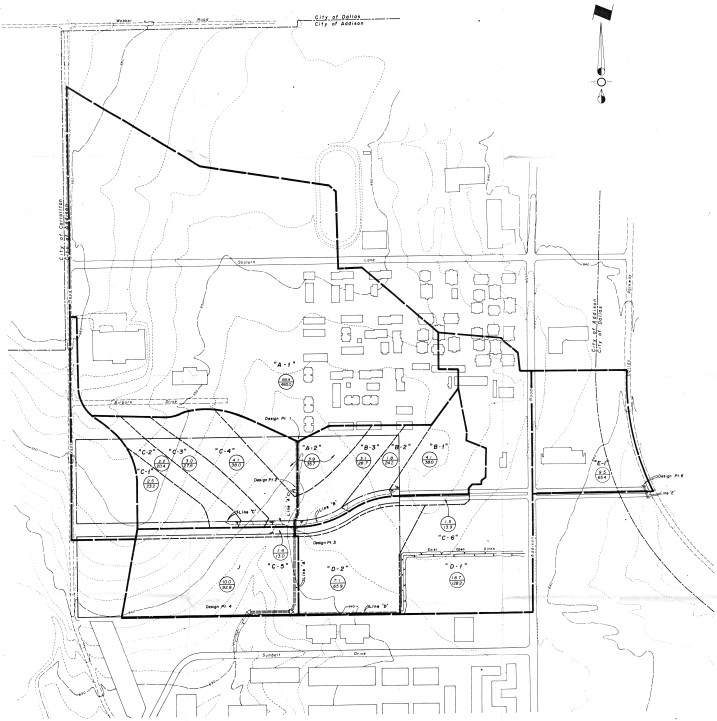
*** NORMAL END OF HEC-1 ***

APPENDIX 3

MANNINGS SOLUTION

FOR

SIZING CONCRETE FLUME FROM ADDISON ROAD TO DETENTION POND



DRAINAGE DESIGN

Design Point	Area (Acres)	"C"	Incr. C.A.	Accum. C.A.	tc	I 100	Q 100
1	64.6	0.781	50.0	50.0	16.2	9.3	465.0
2	8.9	0.795	7.1	56.1	16.8	9.1	483.2
3	20.8	0.797	16.6	69.7	16.9	9.0	627.3
4	35.8	0.800	28.6	98.3	17.9	8.6	845.4
City of Dallas Criteria							
6	9.5	0.9	8.6	8.6	11.1	7.8	80.4

LEGEND:

B - C.I.A.
C = 0.8 Commercial
C = 0.7 Multi - Family
Minimum tc = 10 Min
Imin 11.6 in/hr
Imin 9.28 A

Area (Acres)
Q100 (cfs)

"AS BUILT" 12-15-83

6/11

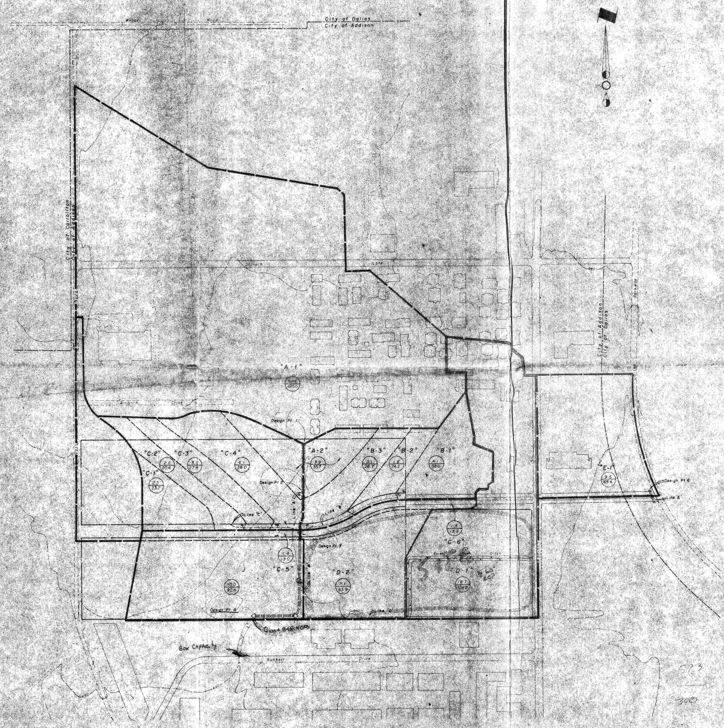
DRAINAGE AREA MAP

BENT TREE PLAZA, PARKWAY

CITY OF ADDISON, TEXAS

ENGINEERS: WORRELL & ASSOCIATES, INC.
13619 INWOOD ROAD, SUITE 300
DALLAS, TEXAS 75234
PLANNERS:

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
WBA	ASD	OCT. 82	1"=200'	8201-01		



DRAINAGE DESIGN								TOTAL AREA		
Design Point	Area (Acres)	"C"	Incr "CA"	Accum "CA"	tc	I_{100}	Q_{100}	Box Capacity	Q Detained	Time x Q = Detention
1	64.4	0.788	50.0	50.0	16.2	9.3	465.0			
2	3.9	0.795	3.1	53.1	16.6	9.1	483.2			
3	20.8	0.797	16.6	69.7	16.9	9.0	627.3			
4	35.8	0.800	28.6	98.3	17.9	8.6	845.4	593 CFS	252.4 CFS	6.22 Ac-Ft
	124.9									
	City of Dallas Criteria									
6	9.5	0.9	8.6	8.6	11.1	7.6	65.4			

20% = 1.25 Ac-Ft

LEGEND:

Q = CIA
C = 0.8 Commercial
C = 0.7 Multi-Family
Minimum tc = 10 Min
I_{100} = 11.6 in./hr.
Q_{100} = 9.28 A

Area (Acres)
Q_{100} (cfs)

TOTAL SUBAREA - SITE + UPSTREAM AREAS FROM ADDISON Rd. = 25.1 ACRES

25.1/124.9 = 20%

6
11

"AS BUILT" 12-15-83

DRAINAGE AREA MAP

BENT TREE PLAZA PARKWAY

CITY OF ADDISON, TEXAS

ENGINEERS — PLANNERS

WORRELL & ASSOCIATES, INC
13619 INWOOD ROAD, SUITE 300
DALLAS, TEXAS 75234

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO
W&A	RGB	OCT '82	1" = 200'	8201-01		