DRAINAGE PLAN AND SUPPORTING CALCULATIONS FOR NEWMARKET OFFICE TO WICHITA, SEDGWICK COUNTY, KANSAS PEC PROJECT NO. 36-06136-5707

LETTER OF TRANSMITTAL

Professional Engineering Consultants, P.A.
303 S. TOPEKA ▪ WICHITA, KANSAS 67202 ▪ 316-262-2691 ▪ FAX 316-262-3003
www.pec1.com ▪ designers@pec1.com

TO: City of Wichita
Storm Water Management
7Th Floor - City Hall
455 N. Main
Wichita, KS 67202

ATTENTION: Scott Lindebak

FROM: Shawn Bryan

DATE: December 6, 2006
PROJECT NO.: 35-06136
PROJECT: New Market Office

REFERENCE: Drainage Plan Comments

WE ARE SENDING YOU: ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	12/06/2006	1	Response Drainage Plan Comments

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☐ As requested ☐ Returned for corrections ☐ Return _ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS: Scott here is a copy of the revised drainage plan and supporting documentation in response to your comments for New Market Office. If you have any questions please feel free to contact me.

Thanks.

COPIES TO: File **By:** Shawn R. Bryan

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

December 5, 2006

City of Wichita
Attn: Scott Lindebak
Storm Water Management
7th Floor, City Hall
Wichita, KS 67202

Subject: New Market Office Comments

Mr. Lindebak:

Here are the replies to your comments that are in your email letter dated 4/17/06 for New Market Office. I have included this letter with the revision package for your use.

1 The plan, report and models should be submitted in electronic format, including the HEC-1 input files.

The drainage plan will be submitted in PDF format once it has been approved.

2. The flow path used for the TC calculations is not included in the plan, for both pre-developed conditions and post-developed conditions.

Included in the drainage report is the Tc flow path for the pre-development condition. It is standard engineering practice to assume a Tc for the post-development conditions of 15 to 20 minutes depending on size of the site. The drainage report has been updated with the revised post-development HEC-1 model. Once the design has started for the project PEC can submit the StormCAD or pipe sizing calculations to your office with the revised Tc if necessary.

3. An exhibit should be included in the plan that delineates the location of the sub-basins used in the HEC-1 modeling. For example: BSN5, POND7, BSN4, POND 5, BSN6, OFFST, BSN8, POND4, BSN10, POND3, BSN3 BSN2, POND1, POND2, NORTH, & NM-UND.

In the HEC-1 model all the basins and pond nodes that you referenced above are located in the Fontana Addition which was previously approved by all of the committee's and City Council. I have enclosed the drainage plan for Fontana Addition. The north basin is the 10 acre tract directly north of the site location and NM-UND is the undeveloped New Market site, 40 acres.

4. The north offsite 10 ac basin is using a UD of 0.40, The TC for the 40 acres site is shown as 40 min. and the 50 acres is 50.4 minutes. A UD of .4 would translate to a TC of 36 minutes. Please clarify. Thanks.

   The 40 acres site has a Tc of 40 minutes for the pre-development condition and 20 minutes for the post-development condition. The 10 acre site north of the property is accounted for in the post-development conditions with a Tc of 40 minutes. Since the pre vs. post development policy is for the developed property this 10 acres passes through New Market Office detention ponds. The ponds have been sized to pass this extra flow but there is no need to detain any of this runoff since it is off site flow. Using the HEC-1 model a Tc of 40 minutes translates into a UD of 0.4. Tc = 40 minutes (1 Hr. /60 minutes)* (0.6 Lag) = 0.40*

5. The developed conditions HEC-1 run is identical to the existing conditions run. Please revise.

   The two models are very similar with only the last page or two being different. There is a section with a basin "North & Dev – 1" that is the difference in the models. I have included another copy of the post-development HEC-1 model for your use.

6. The HEC-1 calculations for Fontana should be revised with the RS card elevations set to the starting water surface elevation of the pond. Example: Pond 2 elevation is set at elevation 158.0, however the static pool is 166.0.

   This change can be made in the HEC-1 RS card. It is unnecessary, if you look at the SE card the elevation is set to start at 166.0 and not 158.0 this is also the case for the SQ card that shows an elevation if 166.0, the flow over the weir would be 0.00. Therefore it has no effect on the model outcome if the static elevation is set lower than 166.0.

7. The stage, storage, and discharge calculations for each detention pond should be included to support the HEC-1 SA/SE/SQ routing cards.

   The rating curve has been included in the revision package.

8. The detention ponds should be platted in within a drainage reserve.

   The drainage plan has been revised to show the detention ponds located within the "Drainage Reserve."

9. The site should be located on a copy of the FIRM.

   This is included in the revision package.

10. The subdivision should be submitted using an approved datum.

    The drainage plan is in City Datum which is an approved datum unless the City of Wichita, Engineering Dept., has changed their policy. All elevations on the drainage plan will need to have 1187.4 added to them to convert to NAVD 29 datum.

11. The existing conditions model should take into account existing storage that may be occurring due to the road elevation and 30-inch cross culvert. It appears the stormwater runoff is leaving the site at both the southeast corner of the plat and the east line of the plat near the FEMA Zone A designation. The landowner to the east will need to accommodate some of the runoff, if the Baughman design can not handle the entire 321 cfs. Please contact Baughman Company and get a copy of the design flow rates used to size the future RCB. What is the capacity of the 30" culvert (your plan states 24") when the road is overtopped and what is that elevation? What is the split flow rate from the east to the southeast? My site visit last fall found a sizable head cutting into an empty pond south of the cell tower. Photos and last August rain ponded water up to or near the 164 contour.

    PEC has contacted Jeff Bradley with Baughman about the design of the new RCB that will be constructed within the 29th Street North right of way. Mr. Bradley has had conversations with the City of Wichita stating the size of the RCB is not adequate to handle the 100 year storm event and 29th Street will back water up on the New Market Office Addition. This box culvert needs to be enlarged to handle the additional flow. The capacity of the 30" culvert underneath 29th Street will flood during a 100 year storm event and probably can't even handle the 2 year storm event. 29th Street North is in the process of being designed for improvements in this area.

12. What are the match elevations along the east property line? Can you turn on the spot elevations?

    The spot elevations at the property lines and on the adjacent properties have been included on the revised drainage plan.

13. The drainage plan should demonstrate in a summary table that post-developed conditions do not exceed existing conditions for all ranges of storm events up to the 100-year 24 hour event. Include the minimum 2, 5, 10, 100-year 24 hour events for comparison.

    A table including the pre vs. post development discharge rates for the 2, 5 & 100 year has been included in this package.

14. A detail of the ponds and their outfall structures should be included on the plan with necessary elevations, side slopes and dimensions.

    These are design issues and will be address in the construction plans.

15. The plan should include contours for the proposed detention facility to verify storage volumes to be included in the developed conditions model.

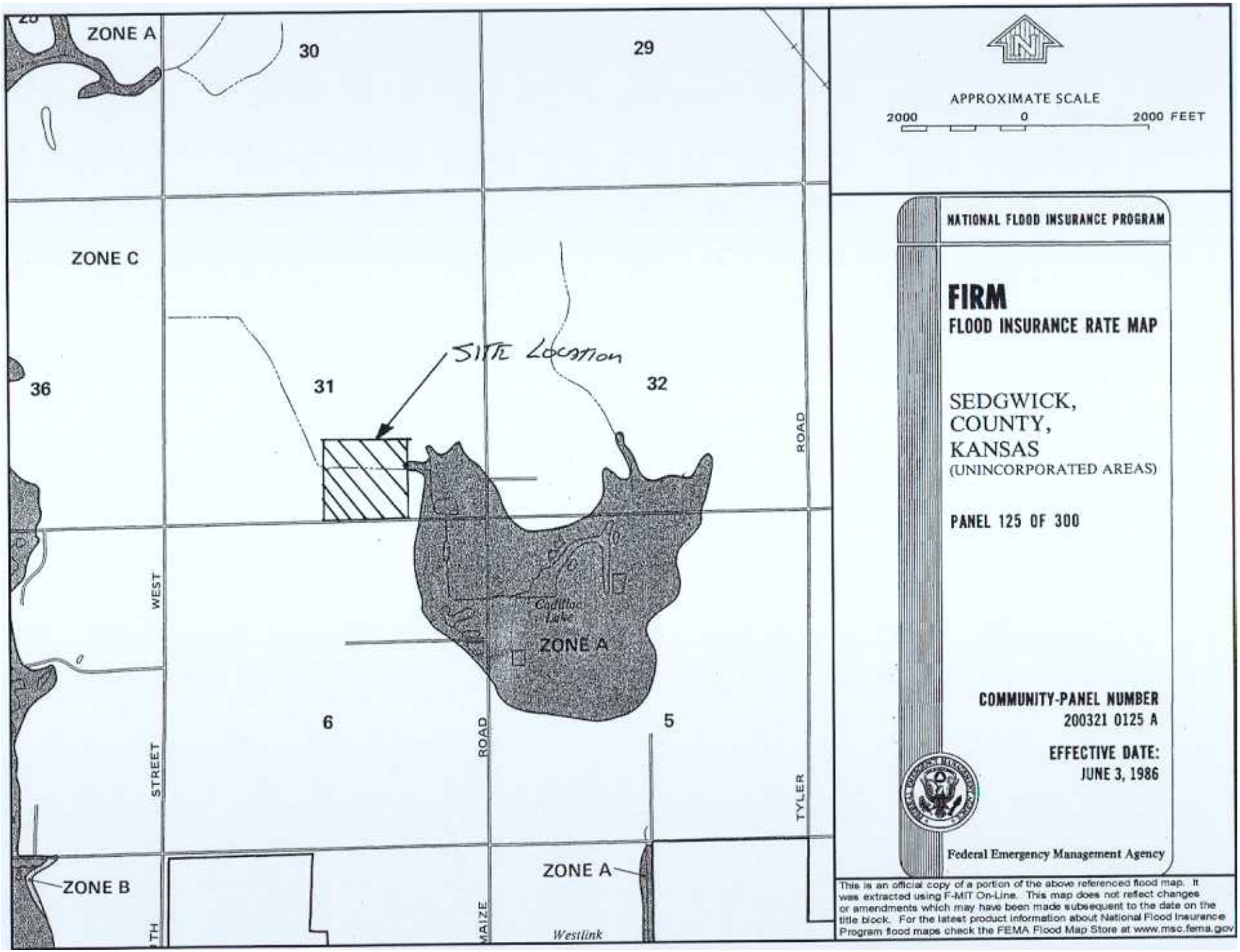
    This is another design issue and will be addressed in the construction plans.

If you have any questions feel free to contact me at (316) 206-1316.

Sincerely,

Shawn R. Bryan, P.E.
PEC
303 S. Topeka
Wichita, KS 67202

cc: File


ZONE A
30
29
ZONE C
SITE Location
36
31
32
ROAD
WEST
Cadillac Lake
ZONE A
6
5
STREET
ROAD
TYLER
ZONE B
ZONE A
MAIZE
Westlink
APPROXIMATE SCALE
2000 0 2000 FEET
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SEDGWICK, COUNTY, KANSAS
(UNINCORPORATED AREAS)
PANEL 125 OF 300
COMMUNITY-PANEL NUMBER
200321 0125 A
EFFECTIVE DATE:
JUNE 3, 1986
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

This assumes a Weir Coefficient of 3.09

Water Surface Elevation	Top of Lower Weir Elevation	Lower Weir Length (feet)	H1 (feet)	q1 (cfs/foot)	Top of Upper Weir Elevation	Upper Weir Length (feet)	H2 (feet)	q2 (cfs/foot)	Total Q (cfs)
159.00	159.00	4.00	0.00	0.00	165.00	8.00	0.00	0.00	0.0
160.00	159.00	4.00	1.00	3.09	165.00	8.00	0.00	0.00	12.4
161.00	159.00	4.00	2.00	8.74	165.00	8.00	0.00	0.00	34.9
162.00	159.00	4.00	3.00	16.05	165.00	8.00	0.00	0.00	64.2
163.00	159.00	4.00	4.00	24.71	165.00	8.00	0.00	0.00	98.8
164.00	159.00	4.00	5.00	34.53	165.00	8.00	0.00	0.00	138.1
167.00	159.00	4.00	8.00	69.89	165.00	8.00	2.00	8.74	349.5

NEW MARKET OFFICE ADDITION

PRE VS. POST DISCHARGE RATE TABLE

Pre-Development				Post-Development	
Storm Event		Q, cfs		Q, cfs	
2 yr.		226		226	
5 yr.		245		239	
100 yr.		321		288	

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1*****************************************
*****************************************
 *                                       *
      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
ENGINEERS      *
 *                JUN   1998             *
CENTER     *
 *              VERSION 4.1              *
      *
 *                                       *
      *
 *  RUN DATE   06DEC06  TIME  11:36:32   *
      *
 *                                       *
      *
 *****************************************
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*
*    U.S. ARMY CORPS OF
*    HYDROLOGIC ENGINEERING
*          609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*          (916) 756-1104
*
```

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

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

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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

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*** LIST ***
*** FREE ***
ID      MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
ID      DEVELOPED CONDITIONS
ID      BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06

*DIAGRAM
IT      15 01JAN04    1200       0 02JAN04    2000
IN      15 01JAN04    1200
IO       0       5
JR    PREC     3.5     4.5     7.8
*
*

KK    BSN5
KO       5
BA   0.023
PB    1.00
PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
LS       0      68      10
UD   0.600
*
*

KK   POND7
KO       5
RS       1    ELEV   162.0
SA    2.55    2.71    2.88    3.06
SE   171.0   172.0   173.0   174.0
SQ       0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
SQ    32.0
SE   171.0  171.35  171.56  171.73  171.88  172.02  172.16  172.28  172.40  172.52
SE   172.6
*
*

KK    BSN4
KO       5
BA   0.020
PB    1.00
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0.000 0.003 006 0.008 0.011 0.014 017 019 0.022 0 025
0.029 0.032 0.035 0.038 0.042 0.045 0.048 0.052 0.056 0.060
0.064 0.068 0.072 0.076 0.080 0.085 0.090 0.095 .100 105
110 0.115 120 0.127 134 0.140 147 155 0.163 172
41 0 181 .193 0.204 220 0.235 0.259 283 0.387 0.663 0.699
0.735 754 0.772 786 799 0.810 0.820 0.828 0.835 0.843
PC 0.850 0.858 0.865 0.873 0.880 0.885 0.889 0.894 0.898 0.903

INE 3. .6. .9

907 0.912 916 0.921 925 0.929 .934 938 0.943 947
0.952 0.955 0.958 0.961 0.964 0.967 0.970 0.973 0.976 0.979
0.982 0.985 0.988 0.991 0.994 0.997 000

850

PD7&4

51

PONDG

162

170.0 171 172 173.0
57 2.2 4. 6.6 11 13
22
SE 170.0 170 171 171 171 172. 172 173 174 174
SE 175

BSN7

055
1.00
PC 0.000 0.003 006 0.008 011 0.014 017 019 022 .025
0.029 0.032 0.035 0.038 0.042 0.045 0.048 0.052 0.056 0.060
0.064 0.068 0.072 0.076 0.080 0.085 0.090 0.095 .100 105
.110 0.115 120 0.127 134 0.140 147 155 0.163 172
0.181 193 0.204 .220 0.235 0.259 283 0.387 0.663 0.699
0 735 754 772 786 0.799 0.810 0.820 0.828 0.835 0.843
0.850 0.858 0.865 0.873 0.880 0.885 0.889 0.894 0.898 0.903

txt

0.907 912 916 921 0.925 0.929 934 938 943 947
PC 0.952 0.955 0.958 0.961 0.964 0.967 0.970 0.973 0.976 0.979
0.982 0.985 0.988 0.991 0.994 0.997 000
LS
840

7PD6

INPUT PAGE

INE .5

POND5

159
3.01
SE 167 168.0 169.0 170.0
0 12 25.2

167 167 167 168 168 168 168 169 169 169.38
169.6

BSN6

0.008

0.000 003 006 008 0.011 014 0.017 019 022 0.025
0.029 0.032 0.035 0.038 0.042 0.045 0.048 0.052 0.056 0.060
PC 0.064 0.068 0.072 0.076 0.080 0.085 0.090 0.095 0.100 105
0.110 115 0.120 127 134 140 147 0.155 163 0.172
PC 181 0.193 204 0.220 235 0.259 283 387 0.663 0.699
PC 0.735 754 0.772 786 799 0.810 0.820 0.828 0.835 0.843
0.850 0.858 0.865 0.873 0.880 0.885 0.889 0.894 0.898 0.903
100 0.907 0.912 0.916 0.921 0.925 0.929 0.934 0.938 0.943 0.947
101 0.952 0.955 0.958 0.961 0.964 0.967 0.970 0.973 0.976 0.979
102 PC 982 0.985 0.988 0.991 0.994 0.997 000
103 LS
104 530

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105                RTE6
106
107
108                OFFST
109
110                  359
111                  1.
112           PC   0.000   0.003     006   0.008   0.011     014   0.017   0.019     022     025
113                0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
114                0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095     100     105
115                  110     115   0.120     127     134   0.140     147     155   0.163     172
116                  181   0.193     204   0.220     235     259   0.283     387   0.663   0.699
117                  735     754   0.772     786     799   0.810   0.820   0.828   0.835   0.843
118                0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
119                0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
120                0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
121                0.982   0.985   0.988   0.991   0.994   0.997   1.000
122           LS
123                  575
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INE
124                BSN8
125
126                  027
127                1.00
128                0.000   0.003     006   0.008     011     014   0.017     019     022   0.025
129                0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
130                0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100     105
131                  110     115   0.120     127   0.134     140   0.147   0.155     163     172
132                0.181     193     204     220   0.235   0.259     283     387   0.663   0.699
133           PC     735   0.754     772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
134                0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
135           PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
136                0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
137                0.982   0.985   0.988   0.991   0.994   0.997     000
138           LS
139                  490
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140                 6O8P5
141
142                           0


143                 POND4
144
145                                     158
146               SA                   3.42
147               SE    166.0    167.0   168.0    169.0
148                     158.0             0.6
149                     167       0.00    3.0      1.


150                 BSN1C
151
152                 0.021
153
154                 0.000      003      006    0.008      011      014    0.017    0.019      022      025
155               PC 0.029    0.032    0.035    0.038    0.042    0.045    0.048    0.052    0.056    0.060
156               PC 0.064    0.068    0.072    0.076    0.080    0.085    0.090    0.095      100    0.105
157                   110    0.115      120      127      134      140      147    0.155      163      172
158                   181      193    0.204      220      235    0.259    0.283      387    0.663    0.699
159                   735      754      772    0.786      799    0.810    0.820    0.828    0.835    0.843
160                 0.850    0.858    0.865    0.873    0.880    0.885    0.889    0.894    0.898    0.903
161                 0.907    0.912    0.916    0.921    0.925    0.929    0.934    0.938    0.943    0.947
162                 0.952    0.955    0.958    0.961    0.964    0.967    0.970    0.973    0.976    0.979
163                 0.982    0.985    0.988    0.991    0.994    0.997      000
164
165                 0.670
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INE


166                 10PD4
167
168


169                 POND3
170
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txt

			162							
				12						
	166.0	167.0	168.0	169.0						
	158		0.6							
	168.0	0.00	3.0							
	BSN3									
	0.024									
PC	0.000	003	0.006	008	0.011	.014	0.017	.019	022	0.025
	0.029	0.032	0.035	0.038	0.042	0.045	0.048	0.052	0.056	0.060
	0.064	0.068	0.072	0.076	0.080	0.085	0.090	0.095	100	105
	110	115	120	127	134	0.140	147	155	163	172
	181	193	204	220	235	259	283	387	0.663	0.699
	735	754	0.772	786	0.799	0.810	0.820	0.828	0.835	0.843
	0.850	0.858	0.865	0.873	0.880	0.885	0.889	0.894	0.898	0.903
	0.907	0.912	0.916	0.921	0.925	0.929	0.934	0.938	0.943	0.947
	0.952	0.955	0.958	0.961	0.964	0.967	0.970	0.973	0.976	0.979
	0.982	0.985	0.988	0.991	0.994	0.997	000			
	580									
	BSN2									
	025									
	0.000	003	0.006	008	011	014	017	0.019	022	0.025
	0.029	0.032	0.035	0.038	0.042	0.045	0.048	0.052	0.056	0.060
	0.064	0.068	0.072	0.076	0.080	0.085	0.090	0.095	100	0.105
	0.110	115	120	127	134	140	147	0.155	163	0.172
PC	181	0.193	204	0.220	235	0.259	283	387	0.663	0.699
	0.735	754	772	786	799	0.810	0.820	0.828	0.835	0.843
PC	0.850	0.858	0.865	0.873	0.880	0.885	0.889	0.894	0.898	0.903
PC	0.907	0.912	0.916	0.921	0.925	0.929	0.934	0.938	0.943	0.947
	0.952	0.955	0.958	0.961	0.964	0.967	0.970	0.973	0.976	0.979
	0.982	0.985	0.988	0.991	0.994	0.997	1.000			
LS										
	0.670									

```
208          KK   POND1
209          KO        5
210          RS        1    ELEV   162.0
211          SA     0.36    0.43    0.49    0.57
212          SE    170.0   171.0   172.0   173.0
213          SQ        0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
214          SQ     32.0
215          SE    170.0  170.17  170.27  170.35  170.42  170.49  170.56  170.62  170.67  170.73
216          SE    170.8
             *
             *

217          KK   3PD1&3
218          KO        5
219          HC        3       0
             *
             *

220          KK   POND2
221          KO        5
222          RS        1    ELEV   158.0
223          SA     2.08    2.23    2.38    2.54
224          SE    166.0   167.0   168.0   169.0
225          SQ        0    26.9    53.8    80.7   107.6   134.5   161.4   188.3   215.2   242.1
226          SQ    269.0
227          SE    166.0  166.50  166.79  167.03  167.25  167.45  167.63  167.81  167.98  168.14
228          SE    168.3
             *
             *
             *

229          KK   PONDA
230          KO        5
             *
             *    ASSUMED OUTLET - 6.5' WEIR AT ELEV. 161.0
             *
231          RS        1    ELEV   161.0
232          SA     1.75    1.75
233          SE    161.0   170.0
234          SQ        0    15.4    45.9    91.6   148.0   213.1   286.0
235          SE    161.0   162.0  163.00  164.00  165.00  166.00  167.00
             *
             *    10 ACRES NORTH OF PROPOSED DEVELOPMENT
             *

236          KK   NORTH
```

```
237          KO       5
238          BA  0.0156
239          PB    1.00
240          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
241          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
242          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
243          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
244          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
1                                          HEC-1 INPUT                                    PAGE  7

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

245          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
246          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
247          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
248          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
249          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
250          LS       0      70       0
251          UD    0.40
             *
             *
             *

252          KK  OFFSTE
253          KO       5
254          HC       2       0
             *
             *
             *
             *  ADDED 40 ACRES DEVELOPED OFFICE PARK - Tc=20 MINUTED, 50% IMPERVIOUS
             *
             *

255          KK   DEV-1
256          KO       5
257          BA  0.0625
258          PB    1.00
259          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
260          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
261          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
262          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
263          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
264          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
265          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
266          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
267          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
268          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
269          LS       0      70      50
```

```
270            UD     0.20
                *
                *
                *

271            KK     29TH
272            KO        5
273            HC        2        0
                *
                *
                *

274            KK     PONDB
275            KO        5
                *
                *     ASSUMED OUTLET   4 & 8' WEIR AT ELEV. 159.0
                *
276            RS        1     ELEV   159.0
277            SA     8.00     8.00
```



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

278            SE    159.0    170.0
279            SQ        0     12.4     34.9     64.2     98.8    138.1    349.5
280            SE    159.0   160.00   161.00   162.00   163.00   164.00   167.00
                *
                *
                *
281            ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

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

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

```
 8        BSN5
             V
             V
24        POND7
             .
             .
33           .        BSN4
             .
             .
49        PD7&4.....
             V
```

52 POND6

BSN7

7PD6

POND5

BSN6

105 RTE6

108 OFFST

124 BSN8

140 6O8P5

143 POND4

150 BSN10

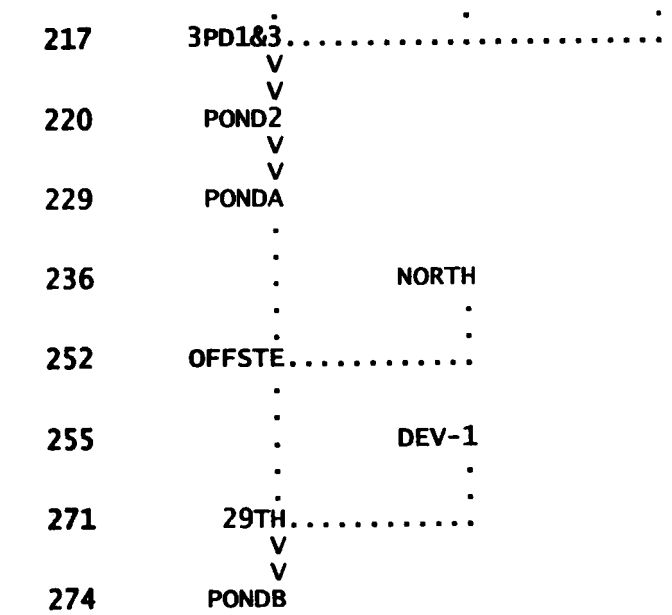
166 10PD4

169 POND3

176 BSN3

192 BSN2

208 POND1



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1**********

****

* *

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *

ENGINEERS *

* JUN 1998 *

CENTER *

* VERSION 4.1 *

* *

* *

* RUN DATE 06DEC06 TIME 11:36:32 *

* *

* *

****

****

* U.S ARMY CORPS OF *

* HYDROLOGIC ENGINEERING *

* 609 SECOND STREET *

* DAVIS, CALIFORNIA 95616 *

* (916) 756-1104 *

*

```
                         MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
                         DEVELOPED CONDITIONS
                         BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06

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

   IT        HYDROGRAPH TIME DATA
                    NMIN           15  MINUTES IN COMPUTATION INTERVAL
                   IDATE       1JAN 4  STARTING DATE
                   ITIME         1200  STARTING TIME
                      NQ          129  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE       2JAN 4  ENDING DATE
                  NDTIME         2000  ENDING TIME
                  ICENT            19  CENTURY MARK

              COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE   32.00 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

   JP        MULTI-PLAN OPTION
                   NPLAN            1  NUMBER OF PLANS

   JR        MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
                3.50      4.50      7.80


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


            **************
            *            *
  8 KK      *     BSN5   *
            *            *
            **************
```

```
   9 KO          OUTPUT CONTROL VARIABLES
                       IPRNT             5  PRINT CONTROL
                       IPLOT             5  PLOT CONTROL
                       QSCAL            0.  HYDROGRAPH PLOT SCALE

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

            **************
            *            *
  24 KK     *    POND7   *
            *            *
            **************

  25 KO          OUTPUT CONTROL VARIABLES
                       IPRNT             5  PRINT CONTROL
                       IPLOT             5  PLOT CONTROL
                       QSCAL            0.  HYDROGRAPH PLOT SCALE

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

            **************
            *            *
  33 KK     *     BSN4   *
            *            *
            **************

  34 KO          OUTPUT CONTROL VARIABLES
                       IPRNT             5  PRINT CONTROL
                       IPLOT             5  PLOT CONTROL
                       QSCAL            0.  HYDROGRAPH PLOT SCALE

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

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

```
 49 KK      *     PD7&4  *
            *            *
            **************

 50 KO           OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE


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

            **************
            *            *
 52 KK      *     POND6  *
            *            *
            **************

 53 KO           OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE


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

            **************
            *            *
 61 KK      *      BSN7  *
            *            *
            **************

 62 KO           OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE


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

```
               **************
               *            *
 77 KK         *    7PD6    *
               *            *
               **************

 78 KO              OUTPUT CONTROL VARIABLES
                          IPRNT              5  PRINT CONTROL
                          IPLOT              5  PLOT CONTROL
                          QSCAL             0.  HYDROGRAPH PLOT SCALE


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

               **************
               *            *
 80 KK         *   POND5    *
               *            *
               **************

 81 KO              OUTPUT CONTROL VARIABLES
                          IPRNT              5  PRINT CONTROL
                          IPLOT              5  PLOT CONTROL
                          QSCAL             0.  HYDROGRAPH PLOT SCALE


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

               **************
               *            *
 89 KK         *    BSN6    *
               *            *
               **************

 90 KO              OUTPUT CONTROL VARIABLES
                          IPRNT              5  PRINT CONTROL
                          IPLOT              5  PLOT CONTROL
                          QSCAL             0.  HYDROGRAPH PLOT SCALE
```

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

            **************
            *            *
 105 KK     *     RTE6   *
            *            *
            **************

 106 KO         OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            5  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE

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

            **************
            *            *
 108 KK     *    OFFST   *
            *            *
            **************

 109 KO         OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            5  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE

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

            **************
            *            *
 124 KK     *     BSN8   *
            *            *
            **************

 125 KO         OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            5  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
```

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

                **************
                *            *
 140 KK         *    608P5   *
                *            *
                **************

 141 KO              OUTPUT CONTROL VARIABLES
                           IPRNT              5  PRINT CONTROL
                           IPLOT              5  PLOT CONTROL
                           QSCAL             0.  HYDROGRAPH PLOT SCALE

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

                **************
                *            *
 143 KK         *    POND4   *
                *            *
                **************

 144 KO              OUTPUT CONTROL VARIABLES
                           IPRNT              5  PRINT CONTROL
                           IPLOT              5  PLOT CONTROL
                           QSCAL             0.  HYDROGRAPH PLOT SCALE

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

                **************
                *            *
 150 KK         *    BSN10   *
                *            *
                **************

 151 KO              OUTPUT CONTROL VARIABLES
```

```
                IPRNT              5  PRINT CONTROL
                IPLOT              5  PLOT CONTROL
                QSCAL             0.  HYDROGRAPH PLOT SCALE


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

           **************
           *            *
 166 KK    *    10PD4   *
           *            *
           **************

 167 KO        OUTPUT CONTROL VARIABLES
                IPRNT              5  PRINT CONTROL
                IPLOT              5  PLOT CONTROL
                QSCAL             0.  HYDROGRAPH PLOT SCALE


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

           **************
           *            *
 169 KK    *    POND3   *
           *            *
           **************

 170 KO        OUTPUT CONTROL VARIABLES
                IPRNT              5  PRINT CONTROL
                IPLOT              5  PLOT CONTROL
                QSCAL             0.  HYDROGRAPH PLOT SCALE


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

           **************
           *            *
 176 KK    *    BSN3    *
           *            *
```

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

 177 KO         OUTPUT CONTROL VARIABLES
                      IPRNT              5   PRINT CONTROL
                      IPLOT              5   PLOT CONTROL
                      QSCAL             0.   HYDROGRAPH PLOT SCALE


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

          **************
          *            *
 192 KK   *     BSN2   *
          *            *
          **************

 193 KO         OUTPUT CONTROL VARIABLES
                      IPRNT              5   PRINT CONTROL
                      IPLOT              5   PLOT CONTROL
                      QSCAL             0.   HYDROGRAPH PLOT SCALE


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

          **************
          *            *
 208 KK   *    POND1   *
          *            *
          **************

 209 KO         OUTPUT CONTROL VARIABLES
                      IPRNT              5   PRINT CONTROL
                      IPLOT              5   PLOT CONTROL
                      QSCAL             0.   HYDROGRAPH PLOT SCALE


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

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

```
             *            *
217 KK       *   3PD1&3   *
             *            *
             **************

218 KO            OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE

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

             **************
             *            *
220 KK       *    POND2   *
             *            *
             **************

221 KO            OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE

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

             **************
             *            *
229 KK       *    PONDA   *
             *            *
             **************

230 KO            OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE

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

```
              **************
              *            *
 236 KK       *    NORTH   *
              *            *
              **************

 237 KO            OUTPUT CONTROL VARIABLES
                         IPRNT              5  PRINT CONTROL
                         IPLOT              5  PLOT CONTROL
                         QSCAL             0.  HYDROGRAPH PLOT SCALE


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

              **************
              *            *
 252 KK       *   OFFSTE   *
              *            *
              **************

 253 KO            OUTPUT CONTROL VARIABLES
                         IPRNT              5  PRINT CONTROL
                         IPLOT              5  PLOT CONTROL
                         QSCAL             0.  HYDROGRAPH PLOT SCALE


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

              **************
              *            *
 255 KK       *    DEV-1   *
              *            *
              **************

 256 KO            OUTPUT CONTROL VARIABLES
                         IPRNT              5  PRINT CONTROL
                         IPLOT              5  PLOT CONTROL
                         QSCAL             0.  HYDROGRAPH PLOT SCALE
```

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

              **************
              *            *
 271 KK       *     29TH   *
              *            *
              **************

 272 KO           OUTPUT CONTROL VARIABLES
                        IPRNT               5  PRINT CONTROL
                        IPLOT               5  PLOT CONTROL
                        QSCAL              0.  HYDROGRAPH PLOT SCALE


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

              **************
              *            *
 274 KK       *    PONDB   *
              *            *
              **************

 275 KO           OUTPUT CONTROL VARIABLES
                        IPRNT               5  PRINT CONTROL
                        IPLOT               5  PLOT CONTROL
                        QSCAL              0.  HYDROGRAPH PLOT SCALE
1

                 PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                  FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                TIME TO PEAK IN HOURS


                                                              RATIOS APPLIED TO PRECIPITATION
 OPERATION        STATION      AREA     PLAN            RATIO 1  RATIO 2  RATIO 3
                                                           3.50     4.50     7.80

 HYDROGRAPH AT
+                  BSN5         .02       1   FLOW          7.      12.      32.
                                              TIME       12.50    12.50    12.50

 ROUTED TO
```

+	POND7	.02	1	FLOW	2.	3.	12.
				TIME	14.00	13.75	13.50
			**	PEAK STAGES IN FEET **			
			1	STAGE	171.22	171.36	171.83
				TIME	14.00	13.75	13.50
HYDROGRAPH AT							
+	BSN4	.02	1	FLOW	5.	8.	22.
				TIME	12.75	12.75	12.75
2 COMBINED AT							
+	PD7&4	.04	1	FLOW	7.	11.	31.
				TIME	13.00	13.00	13.00
ROUTED TO							
+	POND6	.04	1	FLOW	2.	3.	10.
				TIME	17.50	17.00	15.50
			**	PEAK STAGES IN FEET **			
			1	STAGE	170.59	170.90	172.05
				TIME	17.75	17.00	15.50
HYDROGRAPH AT							
+	BSN7	.05	1	FLOW	14.	23.	61.
				TIME	12.75	12.75	12.75
2 COMBINED AT							
+	7PD6	.10	1	FLOW	14.	24.	64.
				TIME	12.75	12.75	12.75
ROUTED TO							
+	POND5	.10	1	FLOW	6.	11.	35.
				TIME	14.50	14.25	13.75
			**	PEAK STAGES IN FEET **			
			1	STAGE	167.50	167.77	168.73
				TIME	14.50	14.25	13.75
HYDROGRAPH AT							
+	BSN6	.01	1	FLOW	3.	4.	12.
				TIME	12.50	12.50	12.50
ROUTED TO							
+	RTE6	.01	1	FLOW	3.	4.	12.
				TIME	13.25	13.25	13.25
HYDROGRAPH AT							

+	OFFST	.36	1	FLOW	66.	109.	273.
				TIME	13.75	13.50	13.50
HYDROGRAPH AT							
+	BSN8	.03	1	FLOW	9.	15.	40.
				TIME	12.50	12.50	12.25
4 COMBINED AT							
+	608P5	.49	1	FLOW	76.	126.	326.
				TIME	13.50	13.50	13.50
ROUTED TO							
+	POND4	.49	1	FLOW	200.	200.	232.
				TIME	.25	.25	14.50
			** PEAK STAGES IN FEET **				
			1	STAGE	166.00	166.00	168.71
				TIME	.25	.25	14.50
HYDROGRAPH AT							
+	BSN10	.02	1	FLOW	6.	10.	27.
				TIME	12.50	12.50	12.50
2 COMBINED AT							
+	10PD4	.51	1	FLOW	206.	211.	236.
				TIME	12.50	12.50	14.50
ROUTED TO							
+	POND3	.51	1	FLOW	203.	205.	224.
				TIME	13.50	13.50	15.50
			** PEAK STAGES IN FEET **				
			1	STAGE	166.72	166.86	168.52
				TIME	13.50	13.50	15.50
HYDROGRAPH AT							
+	BSN3	.02	1	FLOW	8.	13.	33.
				TIME	12.50	12.50	12.50
HYDROGRAPH AT							
+	BSN2	.03	1	FLOW	7.	12.	32.
				TIME	12.50	12.50	12.50
ROUTED TO							
+	POND1	.03	1	FLOW	7.	12.	31.
				TIME	12.75	12.75	12.75
			** PEAK STAGES IN FEET **				

			1	STAGE	170.29	170.40	170.78
				TIME	12.75	12.75	12.75
3 COMBINED AT							
+	3PD1&3	.56	1	FLOW	216.	227.	270.
				TIME	12.75	12.75	12.50
ROUTED TO							
+	POND2	.56	1	FLOW	215.	226.	267.
				TIME	13.00	12.75	12.75
			** PEAK STAGES IN FEET **				
			1	STAGE	167.98	168.04	168.29
				TIME	13.00	12.75	12.75
ROUTED TO							
+	PONDA	.56	1	FLOW	214.	223.	260.
				TIME	13.25	13.25	13.00
			** PEAK STAGES IN FEET **				
			1	STAGE	166.01	166.14	166.64
				TIME	13.25	13.25	13.00
HYDROGRAPH AT							
+	NORTH	.02	1	FLOW	6.	10.	27.
				TIME	12.25	12.25	12.25
2 COMBINED AT							
+	OFFSTE	.58	1	FLOW	216.	227.	269.
				TIME	13.25	13.00	13.00
HYDROGRAPH AT							
+	DEV-1	.06	1	FLOW	65.	91.	184.
				TIME	12.00	12.00	12.00
2 COMBINED AT							
+	29TH	.64	1	FLOW	270.	299.	409.
				TIME	12.00	12.00	12.00
ROUTED TO							
+	PONDB	.64	1	FLOW	226.	239.	288.
				TIME	13.00	13.00	13.25
			** PEAK STAGES IN FEET **				
			1	STAGE	165.25	165.43	166.12
				TIME	13.00	13.00	13.25

xt

NORMAL. END

NEWMARKET SQUARE
Wichita, Sedgwick County, Kansas
04/10/06

NewMarket Square is a 40.0 acre, commercial office development located in the northwest part of Wichita in Sedgwick County, Kansas. The future 40 acre development will consist of parking lots, buildings, storm sewer and detention ponds. This report contains a drawing of the drainage plan, supporting calculations and data for the NewMarket Square Drainage Plan.

Hydrology

The proposed plat lies in the SE 1/4, Section 31, T26S, R1W. The soil on-site is comprised of Shellabarger sandy loam (Sa), Vanoss silt loam (Va) and Waurika silt loam (Wb), which are classified in hydrologic groups B, B and D, respectively. The land is currently used for agricultural purposes and has short grass and bare ground throughout. The site is bordered to the north and east by residential properties, to the south by 29th Street North, and to the west currently by agriculture land. The area to the west of the proposed NewMarket Development will be a developed 137.5 acre residential development consisting of 233 lots, streets, and detention ponds. A natural drainage channel cuts through this site from the west property line (Fontana Development) to the east property line and then flowing to the south to 29th street were it passes through a 24" culvert. Existing site drains to the channel that runs through the property with an additional 267 cfs being contributed from the Fontana property. The proposed Basin A drains to the same outfall as the pre-developed flow. This post-development flow will flow through the series of ponds, with structures, and eventually to the natural drainage channel on the south side of 29th street. It was assumed in the design of this drainage plan that the culvert underneath 29th street would be improved along with the 29th street in the future and the flowline elevation set at 159.00.
The Rational Method was used to calculate runoff quantities. Runoff coefficients were estimated based on tables presented in the Design Aids section of this report using fully

developed conditions. Time of concentration was based on slope, flow velocity and length of flow through each basin and was not allowed to be less than 20 minutes. It was assumed in the post-development calculations that the proposed office park would be 50% impervious. The HEC-1 computer program was used to route the runoff through the ponds and determine the post-development conditions leaving the site.

The analysis was made based on the available site data which includes the following: 1" = 100' topographic map with 1' contours of the site, a Sedgwick County Soil Survey Map and noted references.

Design Aids

This section includes material used to assist in designing the drainage system. A 1" = 100' scale Drainage Plan map (Attachment A) and a 1" = 100' scale Four-Corner Plan map (Attachment B) are enclosed in the pockets.

References

Design of Urban Highway Drainage – The State of the Art, by Reitz & Jens, Inc., April 1980.

Drainage of Highway Pavements, Hydraulic Engineering Circular #12, by Tye Engineering, Inc., March 1984.

Interim Drainage and Storm Sewer Policy for Design Criteria and Documentation, City of Wichita, Kansas, 1985.

Soil Survey of Sedgwick County, Kansas, US Department of Agriculture, Soil Conservation Service, 1979.

EXISTING CONDITIONS

Time of concentration (Tc) or travel time (Tt)

Project : NEWMARKET OFFICE **By:** SB **Date:** 4/10/2006
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: Present / Developed

Circle One: Tc / Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet. Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID		
		AB		
1. Surface description (Table 3-1)		Grass		
2. Mannings roughness coeff., n (Table 3-1)		0.08		
3. Flow length, L (total L < 300 ft.)	ft	300		
4. Two-yr 24-hr rainfall, P2	in	3.60		
5. Calculated Land slope, s	ft/ft	0.022		
5a. Land Elevation For Upper End Of Flow Path		171.5		
5b. Land Elevation For Lower End Of Flow Path		165.0		
6. Compute Tt	hr	0.22	=	0.22

Shallow concentrated flow

		Segment ID		
		BC		
7. Surface description (Paved or Unpaved)		Unpaved		
8. Flow length, L	ft	900		
9. Calculated Watercourse slope, s	ft/ft	0.001		
9a. Land Elevation For Upper End Of Flow Path		165.0		
9b. Land Elevation For Lower End Of Flow Path		163.7		
10. Average velocity, V (Figure 3-1)	ft/s	0.61		
11. Tt = L/3600V Compute Tt	hr	0.41	=	0.41

Channel Flow

		Segment ID		
		CD		
12. Cross sectional flow area, a	sf	100.00		
13. Wetted perimeter, Pw	ft	60		
14. Hydraulic radius, r = a/Pw Compute r	ft	1.667		
15. Channel slope, s	ft/ft	0.001		
16. Manning's roughness coeff., n		0.011		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	6.3		
18. Flow length, L	ft	1050		
19. Tt = L/3600V Compute Tt	hr	0.046	=	0.05
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			hr	0.67

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 40 Minutes

Project: **NEWMARKET OFFICE**
Date: 4/10/2006
Prep. By: SRB

Manual Input

EXISTING

Total Area 50.00 Acres

Soil Group	**A** (% of Total Area)	**B** (% of Total Area)	**C** (% of Total Area)	**D** (% of Total Area)	**Total**
	0%	**60%**	**0%**	**40%**	100%
Acres	0.00	24.00	0.00	16.00	40.00

Land Use	**Commercial** (% of Total Area)	**Industrial** (% of Total Area)	**Multi-Family** (% of Total Area)	**Public** (% of Total Area)	**Single Family** (% of Total Area)	**Vacant/Agriculture** (% of Total Area)
Existing	**0%**	**0%**	**0%**	**0%**	**20%**	**80%**
Acres	0.00	0.00	0.00	0.00	10.00	40.00

	Existing	
Length of Flow	1900	ft
Slope	0.01	%
Waterflow Desc	Bare Ground/Ag.	
Avg Velocity	0.63	ft/sec
Tc	**0.84**	hours

15 min <= Tc <= 24 hrs

Runoff Coefficients * Used Soil Group C

Return Period (Years)	Commercial	ndustrial	Multi-Family	Public	Single Family	Vacant/Agriculture
2	0.68	0.68	0.63	0.49	0.48	0.24
5	0.69	0.69	0.66	0.51	0.51	0.27
10	0.73	0.73	0.71	0.56	0.57	0.35
25	0.75	0.75	0.73	0.59	0.60	0.40
50	0.77	0.77	0.76	0.62	0.64	0.45
100	0.80	0.80	0.79	0.66	0.68	0.51

Existing Conditions

Return Period (Years)	Runoff Coefficient *	Rainfall Intensity (in/hr)	Area (Acres)	Runoff (cfs)
2	0.29	2.24	50.00	32.26
5	0.32	2.76	50.00	43.88
10	0.39	3.22	50.00	63.43
25	0.44	3.76	50.00	82.72
50	0.49	4.25	50.00	103.70
100	0.54	4.66	50.00	126.75

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*           FEBRUARY 1981               *
*         REVISED 02 AUG 88             *
*                                       *
* RUN DATE  04/10/2006  TIME  13:51:39  *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
* THE 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
XXXXXX 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     MODIFIED FONTANA DRAINAGE PLAN (40-AC UNDEVELOPED TRACT D/S ADDED)
           2           ID     40- ACRE NEW MARKET OFFICE TRACT (PRE-PROJECT CONDITIONS)
           3           ID     BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06
*** LIST ***
*** FREE ***
                       *DIAGRAM
           4           IT      15 01JAN04    1200       0 02JAN04    2000
           5           IN      15 01JAN04    1200
           6           IO       0       5
           7           JR    PREC     7.8
                       *
                       *
                       *

           8           KK    BSN5
           9           KO       5
          10           BA   0.023
          11           PB    1.00
          12           PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
          13           PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
          14           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
          15           PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
          16           PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
          17           PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
          18           PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
          19           PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
          20           PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
          21           PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
          22           LS       0      68      10
          23           UD   0.600
                       *
                       *

          24           KK   POND7
          25           KO       5
          26           RS       1    ELEV   162.0
          27           SA    2.55    2.71    2.88    3.06
          28           SE   171.0   172.0   173.0   174.0
          29           SQ       0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
          30           SQ    32.0
          31           SE   171.0  171.35  171.56  171.73  171.88  172.02  172.16  172.28  172.40  172.52
          32           SE   172.6
                       *
                       *

          33           KK    BSN4
          34           KO       5
          35           BA   0.020
          36           PB    1.00
          37           PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
          38           PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
          39           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
          40           PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
          41           PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
          42           PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
```

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

  43      PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  44      PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  45      PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  46      PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  47      LS       0      68      10
  48      UD   0.850
          *
          *

  49      KK   PD7&4
  50      KO       5
  51      HC       2       0
          *
          *

  52      KK   POND6
  53      KO       5
  54      RS       1    ELEV   162.0
  55      SA    1.85    1.99    2.14    2.29
  56      SE   170.0   171.0   172.0   173.0
  57      SQ       0     2.2     4.4     6.6     8.8    11.0    13.2    15.4    17.6    19.8
  58      SQ    22.0
  59      SE   170.0  170.72  171.11  171.42  171.77  172.21  172.75  173.40  174.14  174.98
  60      SE   175.9
          *
          *

  61      KK    BSN7
  62      KO       5
  63      BA   0.055
  64      PB    1.00
  65      PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  66      PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  67      PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  68      PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  69      PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  70      PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  71      PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  72      PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  73      PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  74      PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  75      LS       0      68      10
  76      UD   0.840
          *
          *

  77      KK    7PD6
  78      KO       5
  79      HC       2       0
          *
          *
```

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

  80          KK   POND5
  81          KO      5
  82          RS      1    ELEV   159.0
  83          SA   2.67    2.84    3.01    3.19
  84          SE  167.0   168.0   169.0   170.0
  85          SQ      0     6.3    12.6    18.9    25.2    31.5    37.8    44.1    50.4    56.7
  86          SQ   63.0
  87          SE  167.0  167.55  167.87  168.14  168.39  168.61  168.82  169.01  169.20  169.38
  88          SE  169.6
              *
              *

  89          KK    BSN6
  90          KO      5
  91          BA  0.008
  92          PB   1.00
  93          PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  94          PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  95          PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  96          PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  97          PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  98          PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  99          PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 100          PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 101          PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 102          PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 103          LS      0      68      10
 104          UD  0.530
              *
              *

 105          KK    RTE6
 106          KO      5       5
 107          RT      0       0       3
              *
              *

 108          KK   OFFST
 109          BA  0.359
 110          PB   1.00
 111          PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
 112          PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
 113          PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
 114          PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
 115          PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
 116          PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
 117          PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 118          PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 119          PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 120          PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 121          LS      0      70      10
 122          UD  1.575
              *
              *
```

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

  123         KK   BSN8
  124         KO      5
  125         BA  0.027
  126         PB   1.00
  127         PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  128         PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  129         PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  130         PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  131         PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  132         PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  133         PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  134         PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  135         PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  136         PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  137         LS      0     68     10
  138         UD  0.490
              *
              *

  139         KK   6O8P5
  140         KO      5
  141         HC      4      0
              *
              *

  142         KK   POND4
  143         KO      5
  144         RS      1   ELEV  158.0
  145         SA   3.06   3.24   3.42   3.61
  146         SE  166.0  167.0  168.0  169.0
  147         SL  158.0  14.73    0.6    0.5
  148         SS  167.0   0.00    3.0    1.5
              *
              *

  149         KK   BSN10
  150         KO      5
  151         BA  0.021
  152         PB   1.00
  153         PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  154         PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  155         PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  156         PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  157         PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  158         PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  159         PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  160         PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  161         PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  162         PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  163         LS      0     68     10
  164         UD  0.670
              *
              *
```

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

  165         KK   10PD4
  166         KO       5
  167         HC       2       0
              *
              *

  168         KK   POND3
  169         KO       5
  170         RS       1    ELEV   162.0
  171         SA    1.70    1.83    1.98    2.12
  172         SE   166.0   167.0   168.0   169.0
  173         SL   158.5   14.73     0.6     0.5
  174         SS   168.0    0.00     3.0     1.5
              *
              *

  175         KK    BSN3
  176         KO       5
  177         BA   0.024
  178         PB    1.00
  179         PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  180         PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  181         PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  182         PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  183         PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  184         PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  185         PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  186         PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  187         PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  188         PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  189         LS       0      68      10
  190         UD   0.580
              *
              *

  191         KK    BSN2
  192         KO       5
  193         BA   0.025
  194         PB    1.00
  195         PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  196         PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  197         PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  198         PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  199         PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  200         PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  201         PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  202         PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  203         PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  204         PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  205         LS       0      68      10
  206         UD   0.670
              *
              *
```

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

  207         KK   POND1
  208         KO      5
  209         RS      1    ELEV   162.0
  210         SA   0.36    0.43    0.49    0.57
  211         SE  170.0   171.0   172.0   173.0
  212         SQ      0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
  213         SQ   32.0
  214         SE  170.0  170.17  170.27  170.35  170.42  170.49  170.56  170.62  170.67  170.73
  215         SE  170.8
              *
              *

  216         KK  3PD1&3
  217         KO      5
  218         HC      3       0
              *
              *

  219         KK   POND2
  220         KO      5
  221         RS      1    ELEV   158.0
  222         SA   2.08    2.23    2.38    2.54
  223         SE  166.0   167.0   168.0   169.0
  224         SQ      0    26.9    53.8    80.7   107.6   134.5   161.4   188.3   215.2   242.1
  225         SQ  269.0
  226         SE  166.0  166.50  166.79  167.03  167.25  167.45  167.63  167.81  167.98  168.14
  227         SE  168.3
              *
              *
              *   ROUTE 267 CFS FROM FONTANA TO 29TH STREET
              *

  228         KK    RTE6
  229         KO      5
  230         RT      0       0     2.0
              *
              *
              *

  231         KK  NM-UND
  232         KO      5
  233         BA 0.0625
  234         PB   1.00
  235         PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  236         PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  237         PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  238         PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  239         PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  240         PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  241         PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  242         PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  243         PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  244         PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
  245         LS      0      70       0
```

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

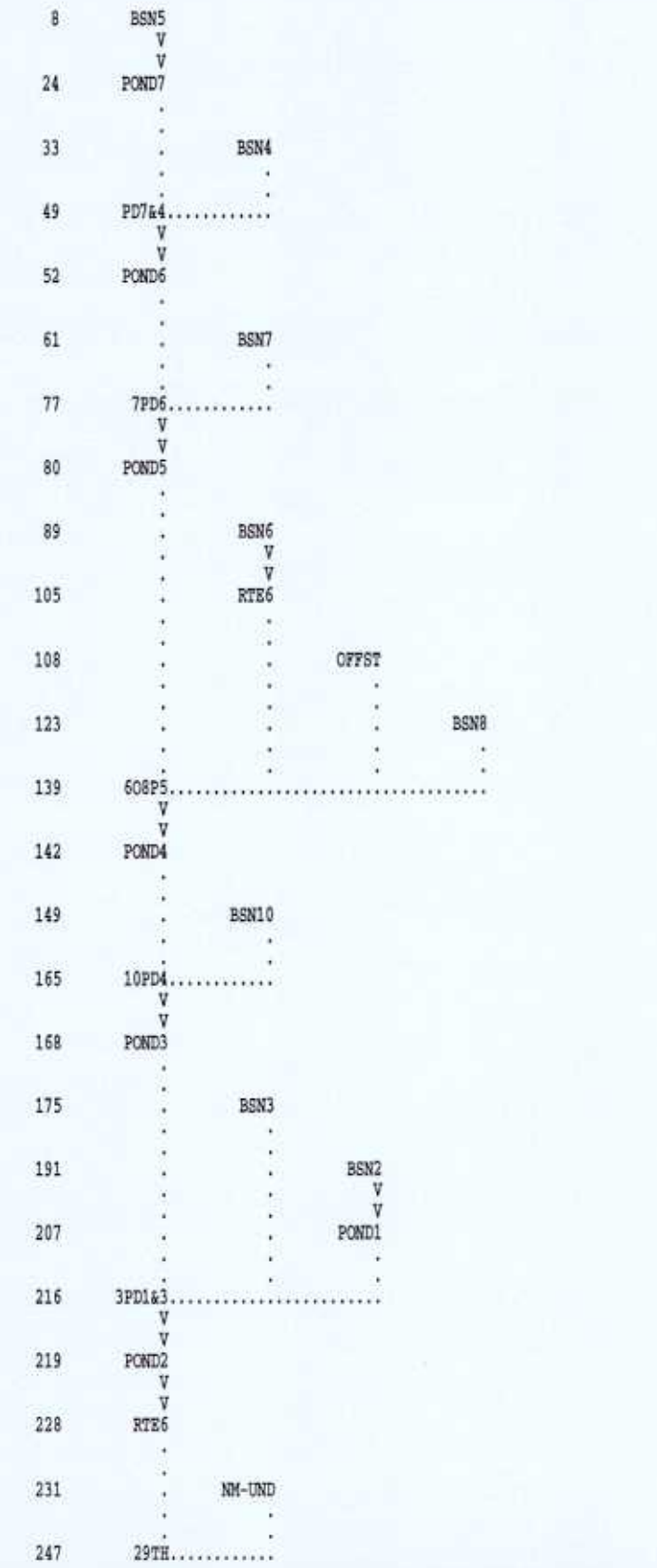
 246      UD    0.40
          *
          *
          *

 247      KK    29TH
 248      KO      5
 249      HC      2       0
          *
          *
          *
          *
 250      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING
(.) CONNECTOR
(---->) DIVERSION OR PUMP FLOW
(<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*             FEBRUARY 1981                  *
*           REVISED 02 AUG 88                *
*                                            *
*  RUN DATE  04/10/2006  TIME  13:51:39      *
*                                            *
**********************************************
```

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

MODIFIED FONTANA DRAINAGE PLAN (40-AC UNDEVELOPED TRACT D/S ADDED)
40- ACRE NEW MARKET OFFICE TRACT (PRE-PROJECT CONDITIONS)
BY BLB DATE 03-13-04, MODIFIED BY PDF 4/10/06

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

    IT        HYDROGRAPH TIME DATA
                    NMIN         15  MINUTES IN COMPUTATION INTERVAL
                   IDATE     1JAN 4  STARTING DATE
                   ITIME       1200  STARTING TIME
                      NQ        129  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE     2JAN 4  ENDING DATE
                  NDTIME       2000  ENDING TIME
                  ICENT          19  CENTURY MARK

                COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE   32.00 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

    JP        MULTI-PLAN OPTION
                   NPLAN          1  NUMBER OF PLANS

    JR        MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
               7.80


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


          **************
          *            *
  8 KK    *     BSN5   *
          *            *
          **************

  9 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          5  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 24 KK    *     POND7  *
          *            *
          **************

 25 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 33 KK    *      BSN4  *
          *            *
          **************

 34 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 49 KK    *     PD7&4  *
          *            *
          **************

 50 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 52 KK    *     POND6  *
          *            *
          **************

 53 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 61 KK    *      BSN7  *
          *            *
          **************

 62 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 77 KK    *      7PD6  *
          *            *
          **************

 78 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 80 KK    *    POND5   *
          *            *
          **************

 81 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 89 KK    *     BSN6   *
          *            *
          **************

 90 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
105 KK    *     RTE6   *
          *            *
          **************

106 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
108 KK    *    OFFST   *
          *            *
          **************

  5 IN         TIME DATA FOR INPUT TIME SERIES
                    JXMIN         15  TIME INTERVAL IN MINUTES
                   JXDATE     1JAN 4  STARTING DATE
                   JXTIME       1200  STARTING TIME

              SUBBASIN RUNOFF DATA

109 BA         SUBBASIN CHARACTERISTICS
                    TAREA        .36  SUBBASIN AREA

               PRECIPITATION DATA

110 PB              STORM       1.00  BASIN TOTAL PRECIPITATION

111 PI           INCREMENTAL PRECIPITATION PATTERN
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .01      .01      .00      .01      .00      .01
```

.01	.00	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.02	.02	.02	.02	.10	.28	.04	.04
.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00				

121 LS SCS LOSS RATE

STRTL	.86	INITIAL ABSTRACTION
CRVNBR	70.00	CURVE NUMBER
RTIMP	10.00	PERCENT IMPERVIOUS AREA

122 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	1.58	LAG

***

UNIT HYDROGRAPH
34 END-OF-PERIOD ORDINATES

6.	19.	38.	65.	88.	100.	102.	96.	86.	72.
55.	42.	33.	26.	21.	16.	13.	10.	8.	6.
5.	4.	3.	2.	2.	1.	1.	1.	1.	1.
0.	0.	0.	0.						

HYDROGRAPH AT STATION OFFST

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 JAN 1200	1	.00	.00	.00	0.	2 JAN 0415	66	.00	.00	.00	1.
1 JAN 1215	2	.00	.00	.00	0.	2 JAN 0430	67	.00	.00	.00	1.
1 JAN 1230	3	.00	.00	.00	0.	2 JAN 0445	68	.00	.00	.00	1.
1 JAN 1245	4	.00	.00	.00	0.	2 JAN 0500	69	.00	.00	.00	1.
1 JAN 1300	5	.00	.00	.00	0.	2 JAN 0515	70	.00	.00	.00	1.
1 JAN 1315	6	.00	.00	.00	0.	2 JAN 0530	71	.00	.00	.00	1.
1 JAN 1330	7	.00	.00	.00	0.	2 JAN 0545	72	.00	.00	.00	1.
1 JAN 1345	8	.00	.00	.00	0.	2 JAN 0600	73	.00	.00	.00	1.
1 JAN 1400	9	.00	.00	.00	0.	2 JAN 0615	74	.00	.00	.00	1.
1 JAN 1415	10	.00	.00	.00	0.	2 JAN 0630	75	.00	.00	.00	1.
1 JAN 1430	11	.00	.00	.00	0.	2 JAN 0645	76	.00	.00	.00	1.
1 JAN 1445	12	.00	.00	.00	0.	2 JAN 0700	77	.00	.00	.00	1.
1 JAN 1500	13	.00	.00	.00	0.	2 JAN 0715	78	.00	.00	.00	1.
1 JAN 1515	14	.00	.00	.00	0.	2 JAN 0730	79	.00	.00	.00	1.
1 JAN 1530	15	.00	.00	.00	0.	2 JAN 0745	80	.00	.00	.00	1.
1 JAN 1545	16	.00	.00	.00	0.	2 JAN 0800	81	.00	.00	.00	1.
1 JAN 1600	17	.00	.00	.00	0.	2 JAN 0815	82	.00	.00	.00	1.
1 JAN 1615	18	.00	.00	.00	0.	2 JAN 0830	83	.00	.00	.00	1.
1 JAN 1630	19	.00	.00	.00	0.	2 JAN 0845	84	.00	.00	.00	1.
1 JAN 1645	20	.00	.00	.00	0.	2 JAN 0900	85	.00	.00	.00	1.
1 JAN 1700	21	.00	.00	.00	0.	2 JAN 0915	86	.00	.00	.00	1.
1 JAN 1715	22	.00	.00	.00	0.	2 JAN 0930	87	.00	.00	.00	0.
1 JAN 1730	23	.00	.00	.00	0.	2 JAN 0945	88	.00	.00	.00	0.
1 JAN 1745	24	.00	.00	.00	0.	2 JAN 1000	89	.00	.00	.00	0.
1 JAN 1800	25	.00	.00	.00	0.	2 JAN 1015	90	.00	.00	.00	0.
1 JAN 1815	26	.01	.00	.00	0.	2 JAN 1030	91	.00	.00	.00	0.
1 JAN 1830	27	.01	.00	.00	0.	2 JAN 1045	92	.00	.00	.00	0.
1 JAN 1845	28	.00	.00	.00	0.	2 JAN 1100	93	.00	.00	.00	0.
1 JAN 1900	29	.01	.00	.00	0.	2 JAN 1115	94	.00	.00	.00	0.
1 JAN 1915	30	.00	.00	.00	0.	2 JAN 1130	95	.00	.00	.00	0.
1 JAN 1930	31	.01	.00	.00	0.	2 JAN 1145	96	.00	.00	.00	0.
1 JAN 1945	32	.01	.00	.00	0.	2 JAN 1200	97	.00	.00	.00	0.
1 JAN 2000	33	.00	.00	.00	0.	2 JAN 1215	98	.00	.00	.00	0.
1 JAN 2015	34	.01	.01	.00	0.	2 JAN 1230	99	.00	.00	.00	0.
1 JAN 2030	35	.01	.01	.00	0.	2 JAN 1245	100	.00	.00	.00	0.
1 JAN 2045	36	.01	.01	.00	0.	2 JAN 1300	101	.00	.00	.00	0.
1 JAN 2100	37	.01	.01	.00	0.	2 JAN 1315	102	.00	.00	.00	0.
1 JAN 2115	38	.01	.01	.00	0.	2 JAN 1330	103	.00	.00	.00	0.
1 JAN 2130	39	.01	.01	.00	1.	2 JAN 1345	104	.00	.00	.00	0.
1 JAN 2145	40	.01	.01	.00	1.	2 JAN 1400	105	.00	.00	.00	0.
1 JAN 2200	41	.01	.01	.00	1.	2 JAN 1415	106	.00	.00	.00	0.
1 JAN 2215	42	.01	.01	.00	1.	2 JAN 1430	107	.00	.00	.00	0.
1 JAN 2230	43	.01	.01	.00	1.	2 JAN 1445	108	.00	.00	.00	0.
1 JAN 2245	44	.02	.01	.00	1.	2 JAN 1500	109	.00	.00	.00	0.
1 JAN 2300	45	.02	.01	.00	1.	2 JAN 1515	110	.00	.00	.00	0.
1 JAN 2315	46	.02	.02	.00	1.	2 JAN 1530	111	.00	.00	.00	0.
1 JAN 2330	47	.02	.02	.00	1.	2 JAN 1545	112	.00	.00	.00	0.

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	2345	48	.10	.09	.01	1.	2	JAN	1600	113	.00	.00	.00	0.
2	JAN	0000	49	.28	.25	.03	1.	2	JAN	1615	114	.00	.00	.00	0.
2	JAN	0015	50	.04	.03	.00	2.	2	JAN	1630	115	.00	.00	.00	0.
2	JAN	0030	51	.04	.03	.00	3.	2	JAN	1645	116	.00	.00	.00	0.
2	JAN	0045	52	.02	.02	.00	4.	2	JAN	1700	117	.00	.00	.00	0.
2	JAN	0100	53	.02	.02	.00	5.	2	JAN	1715	118	.00	.00	.00	0.
2	JAN	0115	54	.01	.01	.00	5.	2	JAN	1730	119	.00	.00	.00	0.
2	JAN	0130	55	.01	.01	.00	5.	2	JAN	1745	120	.00	.00	.00	0.
2	JAN	0145	56	.01	.01	.00	5.	2	JAN	1800	121	.00	.00	.00	0.
2	JAN	0200	57	.01	.01	.00	5.	2	JAN	1815	122	.00	.00	.00	0.
2	JAN	0215	58	.01	.01	.00	4.	2	JAN	1830	123	.00	.00	.00	0.
2	JAN	0230	59	.01	.01	.00	4.	2	JAN	1845	124	.00	.00	.00	0.
2	JAN	0245	60	.01	.01	.00	3.	2	JAN	1900	125	.00	.00	.00	0.
2	JAN	0300	61	.01	.01	.00	3.	2	JAN	1915	126	.00	.00	.00	0.
2	JAN	0315	62	.01	.01	.00	2.	2	JAN	1930	127	.00	.00	.00	0.
2	JAN	0330	63	.01	.01	.00	2.	2	JAN	1945	128	.00	.00	.00	0.
2	JAN	0345	64	.01	.01	.00	2.	2	JAN	2000	129	.00	.00	.00	0.
2	JAN	0400	65	.01	.01	.00	1.								

TOTAL RAINFALL = 1.00, TOTAL LOSS = .90, TOTAL EXCESS = .10

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	32.00-HR
5.	13.50	(CFS)	3.	1.	1.	1.
		(INCHES)	.069	.103	.104	.104
		(AC-FT)	1.	2.	2.	2.

CUMULATIVE AREA = .36 SQ MI

HYDROGRAPH AT STATION OFFST
PLAN 1, RATIO = 7.80

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	.00	.00	.00	0.	2	JAN	0415	66	.04	.01	.03	77.
1	JAN	1215	2	.02	.02	.00	0.	2	JAN	0430	67	.03	.00	.03	70.
1	JAN	1230	3	.02	.02	.00	0.	2	JAN	0445	68	.04	.01	.03	64.
1	JAN	1245	4	.02	.01	.00	0.	2	JAN	0500	69	.03	.00	.03	58.
1	JAN	1300	5	.02	.02	.00	0.	2	JAN	0515	70	.04	.01	.03	53.
1	JAN	1315	6	.02	.02	.00	0.	2	JAN	0530	71	.03	.00	.03	49.
1	JAN	1330	7	.02	.02	.00	1.	2	JAN	0545	72	.04	.01	.03	45.
1	JAN	1345	8	.02	.01	.00	1.	2	JAN	0600	73	.03	.00	.03	41.
1	JAN	1400	9	.02	.02	.00	1.	2	JAN	0615	74	.04	.01	.03	39.
1	JAN	1415	10	.02	.02	.00	1.	2	JAN	0630	75	.03	.00	.03	36.
1	JAN	1430	11	.03	.03	.00	1.	2	JAN	0645	76	.03	.00	.03	34.
1	JAN	1445	12	.02	.02	.00	2.	2	JAN	0700	77	.04	.01	.03	33.
1	JAN	1500	13	.02	.02	.00	2.	2	JAN	0715	78	.03	.00	.03	32.
1	JAN	1515	14	.02	.02	.00	2.	2	JAN	0730	79	.04	.01	.03	31.
1	JAN	1530	15	.03	.03	.00	2.	2	JAN	0745	80	.03	.00	.03	30.
1	JAN	1545	16	.02	.02	.00	2.	2	JAN	0800	81	.04	.01	.03	29.
1	JAN	1600	17	.02	.02	.00	2.	2	JAN	0815	82	.02	.00	.02	29.
1	JAN	1615	18	.03	.03	.00	2.	2	JAN	0830	83	.02	.00	.02	28.
1	JAN	1630	19	.03	.03	.00	2.	2	JAN	0845	84	.02	.00	.02	28.
1	JAN	1645	20	.03	.03	.00	2.	2	JAN	0900	85	.02	.00	.02	27.
1	JAN	1700	21	.03	.03	.00	2.	2	JAN	0915	86	.02	.00	.02	26.
1	JAN	1715	22	.03	.03	.00	2.	2	JAN	0930	87	.02	.00	.02	25.
1	JAN	1730	23	.03	.03	.00	2.	2	JAN	0945	88	.02	.00	.02	24.
1	JAN	1745	24	.03	.03	.00	3.	2	JAN	1000	89	.02	.00	.02	23.
1	JAN	1800	25	.03	.03	.00	3.	2	JAN	1015	90	.02	.00	.02	22.
1	JAN	1815	26	.04	.04	.00	3.	2	JAN	1030	91	.02	.00	.02	21.
1	JAN	1830	27	.04	.04	.00	3.	2	JAN	1045	92	.02	.00	.02	21.
1	JAN	1845	28	.04	.04	.00	3.	2	JAN	1100	93	.02	.00	.02	20.
1	JAN	1900	29	.04	.04	.00	3.	2	JAN	1115	94	.02	.00	.02	20.
1	JAN	1915	30	.04	.04	.00	3.	2	JAN	1130	95	.02	.00	.02	20.
1	JAN	1930	31	.04	.04	.00	3.	2	JAN	1145	96	.02	.00	.02	20.
1	JAN	1945	32	.04	.03	.00	3.	2	JAN	1200	97	.02	.00	.02	19.
1	JAN	2000	33	.04	.03	.00	3.	2	JAN	1215	98	.00	.00	.00	19.
1	JAN	2015	34	.05	.05	.01	3.	2	JAN	1230	99	.00	.00	.00	19.
1	JAN	2030	35	.05	.05	.01	4.	2	JAN	1245	100	.00	.00	.00	18.
1	JAN	2045	36	.05	.04	.01	4.	2	JAN	1300	101	.00	.00	.00	16.
1	JAN	2100	37	.05	.04	.01	4.	2	JAN	1315	102	.00	.00	.00	15.

1 JAN 2115	38	.06	.05	.01	5.	*	2 JAN 1330	103	.00	.00	.00	13.
1 JAN 2130	39	.06	.05	.02	5.	*	2 JAN 1345	104	.00	.00	.00	10.
1 JAN 2145	40	.07	.05	.02	6.	*	2 JAN 1400	105	.00	.00	.00	8.
1 JAN 2200	41	.07	.05	.02	7.	*	2 JAN 1415	106	.00	.00	.00	7.
1 JAN 2215	42	.09	.06	.03	8.	*	2 JAN 1430	107	.00	.00	.00	5.
1 JAN 2230	43	.09	.06	.03	10.	*	2 JAN 1445	108	.00	.00	.00	4.
1 JAN 2245	44	.12	.08	.04	11.	*	2 JAN 1500	109	.00	.00	.00	3.
1 JAN 2300	45	.12	.07	.05	14.	*	2 JAN 1515	110	.00	.00	.00	3.
1 JAN 2315	46	.19	.11	.08	16.	*	2 JAN 1530	111	.00	.00	.00	2.
1 JAN 2330	47	.19	.10	.09	20.	*	2 JAN 1545	112	.00	.00	.00	2.
1 JAN 2345	48	.81	.37	.44	27.	*	2 JAN 1600	113	.00	.00	.00	1.
2 JAN 0000	49	2.15	.64	1.51	46.	*	2 JAN 1615	114	.00	.00	.00	1.
2 JAN 0015	50	.28	.06	.22	78.	*	2 JAN 1630	115	.00	.00	.00	1.
2 JAN 0030	51	.28	.06	.22	125.	*	2 JAN 1645	116	.00	.00	.00	1.
2 JAN 0045	52	.15	.03	.12	182.	*	2 JAN 1700	117	.00	.00	.00	0.
2 JAN 0100	53	.14	.03	.11	231.	*	2 JAN 1715	118	.00	.00	.00	0.
2 JAN 0115	54	.11	.02	.09	262.	*	2 JAN 1730	119	.00	.00	.00	0.
2 JAN 0130	55	.10	.02	.08	273.	*	2 JAN 1745	120	.00	.00	.00	0.
2 JAN 0145	56	.09	.02	.07	268.	*	2 JAN 1800	121	.00	.00	.00	0.
2 JAN 0200	57	.08	.01	.06	251.	*	2 JAN 1815	122	.00	.00	.00	0.
2 JAN 0215	58	.06	.01	.05	225.	*	2 JAN 1830	123	.00	.00	.00	0.
2 JAN 0230	59	.05	.01	.05	193.	*	2 JAN 1845	124	.00	.00	.00	0.
2 JAN 0245	60	.06	.01	.05	165.	*	2 JAN 1900	125	.00	.00	.00	0.
2 JAN 0300	61	.05	.01	.05	143.	*	2 JAN 1915	126	.00	.00	.00	0.
2 JAN 0315	62	.06	.01	.05	125.	*	2 JAN 1930	127	.00	.00	.00	0.
2 JAN 0330	63	.05	.01	.05	109.	*	2 JAN 1945	128	.00	.00	.00	0.
2 JAN 0345	64	.06	.01	.05	96.	*	2 JAN 2000	129	.00	.00	.00	0.
2 JAN 0400	65	.05	.01	.05	85.	*						
						*						

****

TOTAL RAINFALL = 7.80, TOTAL LOSS = 3.16, TOTAL EXCESS = 4.64

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	32.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 273.	13.50		136.	45.	34.	34.
		(INCHES)	3.529	4.622	4.644	4.644
		(AC-FT)	68.	88.	89.	89.

CUMULATIVE AREA = .36 SQ MI

*** ***

```
          **************
          *            *
123 KK    *     BSN8   *
          *            *
          **************
```

124 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	5	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

*** ***

```
          **************
          *            *
139 KK    *    6O8P5   *
          *            *
          **************
```

140 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	5	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

*** ***

```
          **************
          *            *
142 KK    *    POND4   *
          *            *
          **************

143 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
149 KK    *    BSN10   *
          *            *
          **************

150 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
165 KK    *    10PD4   *
          *            *
          **************

166 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
168 KK    *    POND3   *
          *            *
          **************

169 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
175 KK    *     BSN3   *
          *            *
          **************

176 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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

```
          **************
          *            *
191 KK    *      BSN2  *
          *            *
          **************

192 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
207 KK    *     POND1  *
          *            *
          **************

208 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
216 KK    *    3PD1&3  *
          *            *
          **************

217 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
219 KK    *     POND2  *
          *            *
          **************

220 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
228 KK    *      RTE6  *
          *            *
          **************

229 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


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

```
          **************
          *            *
231 KK    *   NM-UND   *
          *            *
          **************

232 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
247 KK    *     29TH   *
          *            *
          **************

248 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 7.80
HYDROGRAPH AT					
+	BSN5	.02	1	FLOW	32.
				TIME	12.50
ROUTED TO					
+	POND7	.02	1	FLOW	12.
				TIME	13.50
			** PEAK STAGES IN FEET **		
			1	STAGE	171.83
				TIME	13.50
HYDROGRAPH AT					
+	BSN4	.02	1	FLOW	22.
				TIME	12.75
2 COMBINED AT					
+	PD7&4	.04	1	FLOW	31.
				TIME	13.00
ROUTED TO					
+	POND6	.04	1	FLOW	10.
				TIME	15.50
			** PEAK STAGES IN FEET **		
			1	STAGE	172.05
				TIME	15.50
HYDROGRAPH AT					
+	BSN7	.05	1	FLOW	61.
				TIME	12.75
2 COMBINED AT					
+	7PD6	.10	1	FLOW	64.
				TIME	12.75
ROUTED TO					
+	POND5	.10	1	FLOW	35.
				TIME	13.75
			** PEAK STAGES IN FEET **		
			1	STAGE	168.73
				TIME	13.75
HYDROGRAPH AT					
+	BSN6	.01	1	FLOW	12.
				TIME	12.50
ROUTED TO					
+	RTE6	.01	1	FLOW	12.
				TIME	13.25
HYDROGRAPH AT					
+	OFFST	.36	1	FLOW	273.
				TIME	13.50
HYDROGRAPH AT					
+	BSN8	.03	1	FLOW	40.
				TIME	12.25
4 COMBINED AT					
+	6O8P5	.49	1	FLOW	326.
				TIME	13.50
ROUTED TO					
+	POND4	.49	1	FLOW	232.
				TIME	14.50
			** PEAK STAGES IN FEET **		

```
                                    1  STAGE      168.71
                                       TIME        14.50

 HYDROGRAPH AT
+                BSN10       .02    1  FLOW         27.
                                       TIME        12.50

  2 COMBINED AT
+                10PD4       .51    1  FLOW        236.
                                       TIME        14.50

 ROUTED TO
+                POND3       .51    1  FLOW        224.
                                       TIME        15.50

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE      168.52
                                       TIME        15.50

 HYDROGRAPH AT
+                 BSN3       .02    1  FLOW         33.
                                       TIME        12.50

 HYDROGRAPH AT
+                 BSN2       .03    1  FLOW         32.
                                       TIME        12.50

 ROUTED TO
+                POND1       .03    1  FLOW         31.
                                       TIME        12.75

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE      170.78
                                       TIME        12.75

  3 COMBINED AT
+               3PD1&3       .56    1  FLOW        270.
                                       TIME        12.50

 ROUTED TO
+                POND2       .56    1  FLOW        267.
                                       TIME        12.75

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE      168.29
                                       TIME        12.75

 ROUTED TO
+                 RTE6       .56    1  FLOW        267.
                                       TIME        13.25

 HYDROGRAPH AT
+               NM-UND       .06    1  FLOW        108.
                                       TIME        12.25

  2 COMBINED AT
+                 29TH       .62    1  FLOW        316.
                                       TIME        12.25


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

350.0 Maximum Q (cfs)
10.000 Weir Width (feet)
162.50 Weir Elevation
2.900 Weir Flow Coeffecient (Never > 3.089)

Q (cfs)	Weir Width (feet)	Weir Elevation	g	Weir Flow Coeff.	Energy Head (feet)	**Water Surface Elevation**
0.0	10.000	162.50	0.0	2.900	0.00	**162.50**
35.0	10.000	162.50	3.5	2.900	1.13	**163.63**
70.0	10.000	162.50	7.0	2.900	1.80	**164.30**
105.0	10.000	162.50	10.5	2.900	2.36	**164.86**
140.0	10.000	162.50	14.0	2.900	2.86	**165.36**
175.0	10.000	162.50	17.5	2.900	3.31	**165.81**
210.0	10.000	162.50	21.0	2.900	3.74	**166.24**
245.0	10.000	162.50	24.5	2.900	4.15	**166.65**
280.0	10.000	162.50	28.0	2.900	4.53	**167.03**
315.0	10.000	162.50	31.5	2.900	4.90	**167.40**
350.0	10.000	162.50	35.0	2.900	5.26	**167.76**

350.0 Maximum Q (cfs)
10.000 Weir Width (feet)
159.00 Weir Elevation
2.900 Weir Flow Coeffecient (Never > 3.089)

Q (cfs)	Weir Width (feet)	Weir Elevation	q	Weir Flow Coeff.	Energy Head (feet)	**Water Surface Elevation**
0.0	10.000	159.00	0.0	2.900	0.00	**159.00**
35.0	10.000	159.00	3.5	2.900	1.13	**160.13**
70.0	10.000	159.00	7.0	2.900	1.80	**160.80**
105.0	10.000	159.00	10.5	2.900	2.36	**161.36**
140.0	10.000	159.00	14.0	2.900	2.86	**161.86**
175.0	10.000	159.00	17.5	2.900	3.31	**162.31**
210.0	10.000	159.00	21.0	2.900	3.74	**162.74**
245.0	10.000	159.00	24.5	2.900	4.15	**163.15**
280.0	10.000	159.00	28.0	2.900	4.53	**163.53**
315.0	10.000	159.00	31.5	2.900	4.90	**163.90**
350.0	10.000	159.00	35.0	2.900	5.26	**164.26**

DEVELOPED CONDITIONS

Project: **NEWMARKET OFFICE**
Date: 4/10/2006
Prep. By: SRB

Manual Input

POST-DEVELOPMENT

Total Area 50.00 Acres

Soil Group	**A** (% of Total Area)	**B** (% of Total Area)	**C** (% of Total Area)	**D** (% of Total Area)	**Total**
	0%	75%	0%	25%	100%
Acres	0.00	30.00		10.00	50.00

Land Use	**Commercial** (% of Total Area)	**Industrial** (% of Total Area)	**Multi-Family** (% of Total Area)	**Public** (% of Total Area)	**Single Family** (% of Total Area)	**Vacant/Agriculture** (% of Total Area)
Existing	40%	0%	0%	0%	20%	40%
Acres	20.00	0.00	0.00	0.00	10.00	20.00

	Developed		
Length of Flow	1300	ft	
Slope	1.00	%	
Waterflow Desc	IMP. AREA		
Avg Velocity	1.08	ft/sec	
Tc	0.33	hours	15 min <= Tc <= 24 hrs

Runoff Coefficients * Used Soil Group B/D

Return Period (Years)	Commercial	Industrial	Multi-Family	Public	Single Family	Vacant/Agriculture
2	0.68	0.68	0.70	0.49	0.50	0.54
5	0.69	0.69	0.73	0.51	0.54	0.56
10	0.73	0.73	0.79	0.56	0.62	0.61
25	0.75	0.75	0.81	0.59	0.66	0.64
50	0.77	0.77	0.83	0.62	0.70	0.67
100	0.80	0.80	0.86	0.66	0.76	0.70

Existing Conditions

Return Period (Years)	Runoff Coefficient *	Rainfall Intensity (in/hr)	Area (Acres)	Runoff (cfs)
2	0.68	3.33	50.00	113.22
5	0.69	4.00	50.00	138.00
10	0.73	4.60	50.00	167.90
25	0.75	5.35	50.00	200.63
50	0.77	6.00	50.00	231.00
100	0.80	6.53	50.00	261.20

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            FEBRUARY 1981              *
*          REVISED 02 AUG 88            *
*                                       *
* RUN DATE  04/10/2006  TIME  15:29:00  *
*                                       *
*****************************************
```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*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
* THE 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     MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
           2       ID     DEVELOPED CONDITIONS
           3       ID     BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06
*** LIST ***
*** FREE ***
                   *DIAGRAM
           4       IT     15 01JAN04   1200       0 02JAN04   2000
           5       IN     15 01JAN04   1200
           6       IO      0       5
           7       JR   PREC     7.8
                   *
                   *
                   *

           8       KK    BSN5
           9       KO       5
          10       BA   0.023
          11       PB    1.00
          12       PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
          13       PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
          14       PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
          15       PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
          16       PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
          17       PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
          18       PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
          19       PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
          20       PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
          21       PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
          22       LS       0      68      10
          23       UD   0.600
                   *
                   *

          24       KK   POND7
          25       KO       5
          26       RS       1    ELEV   162.0
          27       SA    2.55    2.71    2.88    3.06
          28       SE   171.0   172.0   173.0   174.0
          29       SQ       0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
          30       SQ    32.0
          31       SE   171.0  171.35  171.56  171.73  171.88  172.02  172.16  172.28  172.40  172.52
          32       SE   172.6
                   *
                   *

          33       KK    BSN4
          34       KO       5
          35       BA   0.020
          36       PB    1.00
          37       PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
          38       PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
          39       PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
          40       PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
          41       PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
          42       PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
```

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

  43          PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  44          PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  45          PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  46          PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  47          LS      0     68     10
  48          UD  0.850
              *
              *

  49          KK  PD7&4
  50          KO      5
  51          HC      2      0
              *
              *

  52          KK  POND6
  53          KO      5
  54          RS      1   ELEV  162.0
  55          SA   1.85   1.99   2.14   2.29
  56          SE  170.0  171.0  172.0  173.0
  57          SQ      0    2.2    4.4    6.6    8.8   11.0   13.2   15.4   17.6   19.8
  58          SQ   22.0
  59          SE  170.0 170.72 171.11 171.42 171.77 172.21 172.75 173.40 174.14 174.98
  60          SE  175.9
              *
              *

  61          KK   BSN7
  62          KO      5
  63          BA  0.055
  64          PB   1.00
  65          PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  66          PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  67          PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  68          PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  69          PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  70          PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  71          PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  72          PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  73          PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  74          PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  75          LS      0     68     10
  76          UD  0.840
              *
              *

  77          KK   7PD6
  78          KO      5
  79          HC      2      0
              *
              *
```

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

  80      KK   POND5
  81      KO      5
  82      RS      1    ELEV   159.0
  83      SA   2.67    2.84    3.01    3.19
  84      SE  167.0   168.0   169.0   170.0
  85      SQ      0     6.3    12.6    18.9    25.2    31.5    37.8    44.1    50.4    56.7
  86      SQ   63.0
  87      SE  167.0  167.55  167.87  168.14  168.39  168.61  168.82  169.01  169.20  169.38
  88      SE  169.6
          *
          *

  89      KK    BSN5
  90      KO      5
  91      BA  0.008
  92      PB   1.00
  93      PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  94      PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  95      PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  96      PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  97      PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  98      PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  99      PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 100      PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 101      PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 102      PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 103      LS      0      68      10
 104      UD  0.530
          *
          *

 105      KK    RTE6
 106      KO      5
 107      RT      0       0       3
          *
          *

 108      KK   OFFST
 109      KO      5
 110      BA  0.359
 111      PB   1.00
 112      PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
 113      PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
 114      PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
 115      PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
 116      PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
 117      PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
 118      PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 119      PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 120      PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 121      PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 122      LS      0      70      10
 123      UD  1.575
          *
          *
```

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

  124 KK   BSN8
  125 KO      5
  126 BA  0.027
  127 PB   1.00
  128 PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  129 PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  130 PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  131 PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  132 PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  133 PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  134 PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  135 PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  136 PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  137 PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  138 LS      0     68     10
  139 UD  0.490
      *
      *

  140 KK   6O8P5
  141 KO      5
  142 HC      4      0
      *
      *

  143 KK   POND4
  144 KO      5
  145 RS      1   ELEV  158.0
  146 SA   3.06   3.24   3.42   3.61
  147 SE  166.0  167.0  168.0  169.0
  148 SL  158.0  14.73    0.6    0.5
  149 SS  167.0   0.00    3.0    1.5
      *
      *

  150 KK   BSN10
  151 KO      5
  152 BA  0.021
  153 PB   1.00
  154 PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  155 PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  156 PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  157 PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  158 PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  159 PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  160 PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  161 PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  162 PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  163 PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  164 LS      0     68     10
  165 UD  0.670
      *
      *
```

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

  166     KK   10PD4
  167     KO       5
  168     BC       2       0
          *
          *

  169     KK   POND3
  170     KO       5
  171     RS       1     ELEV   162.0
  172     SA    1.70     1.83    1.98    2.12
  173     SE   166.0    167.0   168.0   169.0
  174     SL   158.5    14.73     0.6     0.5
  175     SS   168.0     0.00     3.0     1.5
          *
          *

  176     KK    BSN3
  177     KO       5
  178     BA   0.024
  179     PB    1.00
  180     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  181     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  182     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  183     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  184     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  185     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  186     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  187     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  188     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  189     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  190     LS       0      68      10
  191     UD   0.580
          *
          *

  192     KK    BSN2
  193     KO       5
  194     BA   0.025
  195     PB    1.00
  196     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  197     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  198     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  199     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  200     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  201     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  202     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  203     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  204     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  205     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  206     LS       0      68      10
  207     UD   0.670
          *
          *
```

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

  208     KK  POND1
  209     KO      5
  210     RS      1   ELEV  162.0
  211     SA   0.36   0.43   0.49   0.57
  212     SE  170.0  171.0  172.0  173.0
  213     SQ      0    3.2    6.4    9.6   12.8   16.0   19.2   22.4   25.6   28.8
  214     SQ   32.0
  215     SE  170.0 170.17 170.27 170.35 170.42 170.49 170.56 170.62 170.67 170.73
  216     SE  170.8
          *
          *

  217     KK  3PD1&3
  218     KO      5
  219     HC      3      0
          *
          *

  220     KK  POND2
  221     KO      5
  222     RS      1   ELEV  158.0
  223     SA   2.08   2.23   2.38   2.54
  224     SE  166.0  167.0  168.0  169.0
  225     SQ      0   26.9   53.8   80.7  107.6  134.5  161.4  188.3  215.2  242.1
  226     SQ  269.0
  227     SE  166.0 166.50 166.79 167.03 167.25 167.45 167.63 167.81 167.98 168.14
  228     SE  168.3
          *
          *
          *

  229     KK  PONDA
  230     KO      5
          *
          *   ASSUMED OUTLET   10  WEIR AT ELEV. 162.5
          *
  231     RS      1   ELEV  162.5
  232     SA   1.30   1.30
  233     SE  162.5  170.0
  234     SQ      0     35     70    105    140    175    210    245    280    315
  235     SQ  350.0
  236     SE  162.5 163.63 164.30 164.86 165.36 165.81 166.24 166.65 167.03 167.40
  237     SE  167.8
          *
          *   10 ACRES NORTH OF PROPOSED DEVELOPMENT
          *

  238     KK  NORTH
  239     KO      5
  240     BA 0.0156
  241     PB   1.00
  242     PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  243     PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  244     PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
```

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

  245     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  246     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  247     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  248     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  249     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  250     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  251     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  252     LS      0      70       0
  253     UD    0.40
              *
              *
              *

  254     KK  OFFSTE
  255     KO       5
  256     HC       2       0
              *
              *
              *
              *  ADDED 40 ACRES DEVELOPED OFFICE PARK   Tc=20 MINUTED, 50% IMPERVIOUS
              *
              *

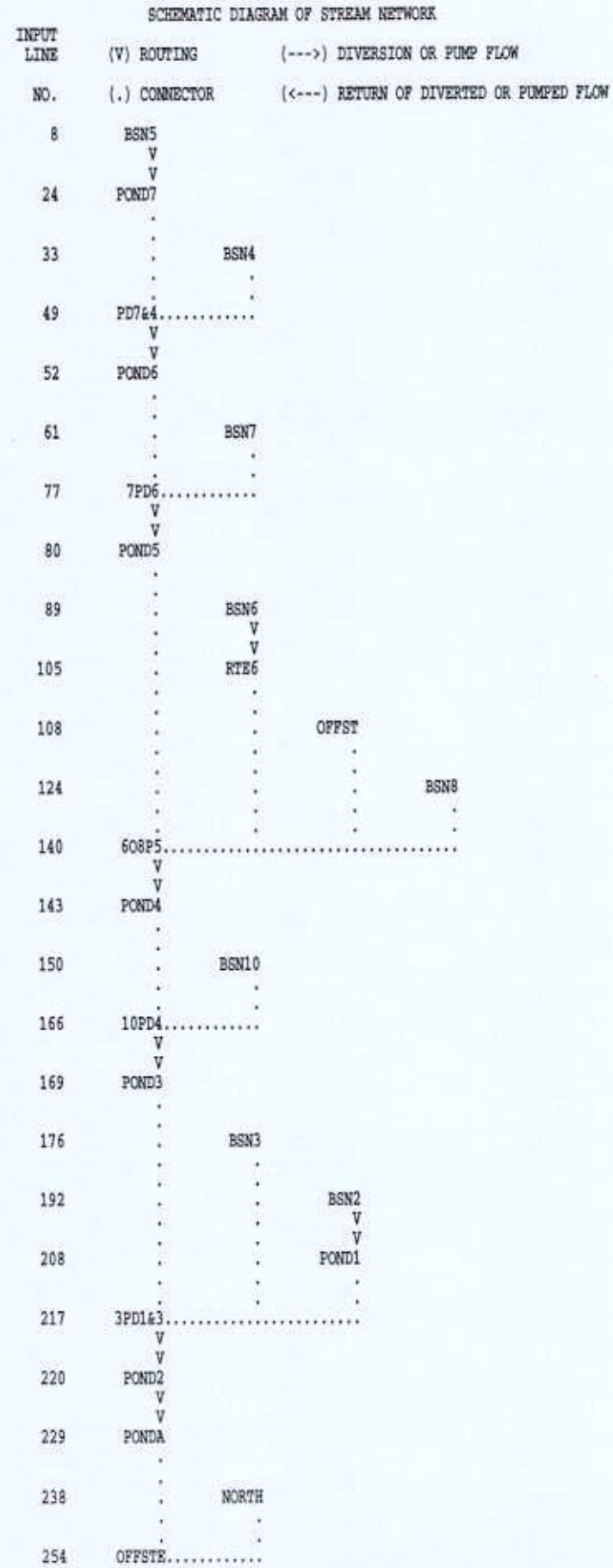
  257     KK   DEV-1
  258     KO       5
  259     BA  0.0625
  260     PB    1.00
  261     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  262     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  263     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  264     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  265     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  266     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  267     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  268     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  269     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  270     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  271     LS      0      70      50
  272     UD    0.20
              *
              *
              *

  273     KK   29TH
  274     KO       5
  275     HC       2       0
              *
              *
              *
```

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

  276     KK  PONDB
  277     KO      5
          *
          *   ASSUMED OUTLET   10  WEIR AT ELEV. 159.0
          *
  278     RS      1    ELEV   159.0
  279     SA   5.10    5.10
  280     SE  159.0   170.0
  281     SQ      0      35      70     105     140     175     210     245     280     315
  282     SQ  350.0
  283     SE  159.0  160.13  160.80  161.36  161.86  162.31  162.74  163.15  163.53  163.90
  284     SE  164.3
          *
          *
          *
  285     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



```
                .
                .
  257           .       DEV-1
                .         .
                .         .
  273         29TH.........
                V
                V
  276         POND8

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

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 02 AUG 88           *
*                                       *
*  RUN DATE  04/10/2006  TIME  15:29:00 *
*                                       *
*****************************************
```

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

MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
DEVELOPED CONDITIONS
BY BLB DATE 03-13-04, MODIFIED BY PDF 4/10/06

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

   IT         HYDROGRAPH TIME DATA
                    NMIN         15  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1JAN 4  STARTING DATE
                   ITIME        1200  STARTING TIME
                      NQ         129  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      2JAN 4  ENDING DATE
                  NDTIME        2000  ENDING TIME
                  ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     .25 HOURS
                    TOTAL TIME BASE   32.00 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

   JP         MULTI-PLAN OPTION
                   NPLAN          1  NUMBER OF PLANS

   JR         MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
               7.80
```

*** ***

```
            **************
            *            *
  8 KK      *     BSN5   *
            *            *
            **************

  9 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          5  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE
```

*** ***

```
            **************
            *            *
 24 KK      *    POND7   *
            *            *
            **************

 25 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 33 KK     *      BSN4  *
           *            *
           **************

 34 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 49 KK     *     PD7&4  *
           *            *
           **************

 50 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 52 KK     *     POND6  *
           *            *
           **************

 53 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 61 KK     *      BSN7  *
           *            *
           **************

 62 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 77 KK     *      7PD6  *
           *            *
           **************

 78 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 80 KK     *     POND5  *
           *            *
           **************

 81 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 89 KK     *      BSN6  *
           *            *
           **************

 90 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
105 KK     *      RTE6  *
           *            *
           **************

106 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
108 KK     *     OFFST  *
           *            *
           **************

109 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
124 KK     *      BSN8  *
           *            *
           **************

125 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 80 KK     *     POND5  *
           *            *
           **************

 81 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
 89 KK     *      BSN6  *
           *            *
           **************

 90 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
105 KK     *      RTE6  *
           *            *
           **************

106 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
108 KK     *     OFFST  *
           *            *
           **************

109 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
124 KK     *      BSN8  *
           *            *
           **************

125 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
140 KK    *    6O8P5   *
          *            *
          **************

141 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
143 KK    *    POND4   *
          *            *
          **************

144 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
150 KK    *    BSN10   *
          *            *
          **************

151 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
166 KK    *    10PD4   *
          *            *
          **************

167 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
169 KK    *    POND3   *
          *            *
          **************

170 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
176 KK     *      BSN3  *
           *            *
           **************

177 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
192 KK     *      BSN2  *
           *            *
           **************

193 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
208 KK     *     POND1  *
           *            *
           **************

209 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
217 KK     *    3PD1&3  *
           *            *
           **************

218 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
220 KK     *     POND2  *
           *            *
           **************

221 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
229 KK     *     PONDA  *
           *            *
           **************

230 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
238 KK     *     NORTH  *
           *            *
           **************

239 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
254 KK     *    OFFSTE  *
           *            *
           **************

255 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
257 KK     *     DEV-1  *
           *            *
           **************

258 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


           **************
           *            *
273 KK     *      29TH  *
           *            *
           **************

274 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


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


            **************
            *            *
 276 KK     *    POND8   *
            *            *
            **************

 277 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 7.80
HYDROGRAPH AT					
+	BSN5	.02	1	FLOW	32.
				TIME	12.50
ROUTED TO					
+	POND7	.02	1	FLOW	12.
				TIME	13.50
			** PEAK STAGES IN FEET **		
			1	STAGE	171.83
				TIME	13.50
HYDROGRAPH AT					
+	BSN4	.02	1	FLOW	22.
				TIME	12.75
2 COMBINED AT					
+	PD7&4	.04	1	FLOW	31.
				TIME	13.00
ROUTED TO					
+	POND6	.04	1	FLOW	10.
				TIME	15.50
			** PEAK STAGES IN FEET **		
			1	STAGE	172.05
				TIME	15.50
HYDROGRAPH AT					
+	BSN7	.05	1	FLOW	61.
				TIME	12.75
2 COMBINED AT					
+	7PD6	.10	1	FLOW	64.
				TIME	12.75
ROUTED TO					
+	POND5	.10	1	FLOW	35.
				TIME	13.75
			** PEAK STAGES IN FEET **		
			1	STAGE	168.73
				TIME	13.75
HYDROGRAPH AT					
+	BSN6	.01	1	FLOW	12.
				TIME	12.50
ROUTED TO					
+	RTE5	.01	1	FLOW	12.
				TIME	13.25
HYDROGRAPH AT					
+	OFFST	.36	1	FLOW	273.
				TIME	13.50
HYDROGRAPH AT					
+	BSN8	.03	1	FLOW	40.
				TIME	12.25
4 COMBINED AT					
+	608P5	.49	1	FLOW	326.
				TIME	13.50
ROUTED TO					
+	POND4	.49	1	FLOW	232.
				TIME	14.50
			** PEAK STAGES IN FEET **		

```
                                    1  STAGE     168.71
                                       TIME       14.50

 HYDROGRAPH AT
+                  BSN10      .02    1  FLOW        27.
                                       TIME       12.50

  2 COMBINED AT
+                  10PD4      .51    1  FLOW       236.
                                       TIME       14.50

 ROUTED TO
+                  POND3      .51    1  FLOW       224.
                                       TIME       15.50

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE     168.52
                                       TIME       15.50

 HYDROGRAPH AT
+                   BSN3      .02    1  FLOW        33.
                                       TIME       12.50

 HYDROGRAPH AT
+                   BSN2      .03    1  FLOW        32.
                                       TIME       12.50

 ROUTED TO
+                  POND1      .03    1  FLOW        31.
                                       TIME       12.75

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE     170.78
                                       TIME       12.75

  3 COMBINED AT
+                 3PD1&3      .56    1  FLOW       270.
                                       TIME       12.50

 ROUTED TO
+                  POND2      .56    1  FLOW       267.
                                       TIME       12.75

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE     168.29
                                       TIME       12.75

 ROUTED TO
+                  PONDA      .56    1  FLOW       264.
                                       TIME       13.00

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE     166.86
                                       TIME       13.00

 HYDROGRAPH AT
+                  NORTH      .02    1  FLOW        27.
                                       TIME       12.25

  2 COMBINED AT
+                  OFFSTE     .58    1  FLOW       274.
                                       TIME       13.00

 HYDROGRAPH AT
+                  DEV-1      .06    1  FLOW       184.
                                       TIME       12.00

  2 COMBINED AT
+                   29TH      .64    1  FLOW       411.
                                       TIME       12.00

 ROUTED TO
+                  POND8      .64    1  FLOW       321.
                                       TIME       12.50

                                    ** PEAK STAGES IN FEET **
                                    1  STAGE     163.97
                                       TIME       12.50
```

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

DESIGN AIDS

County	Expected 24-hour Storm Rainfall in Inches						Normal Annual Precipitation
	Storm Frequency in Years						
	100	50	25	10	5	2	Inches
Pawnee	6.6	6.0	5.2	4.5	3.7	2.8	23.3
Phillips	6.0	5.5	4.8	4.1	3.4	2.5	23.6
Pottawatomie	7.5	6.6	5.9	5.1	4.3	3.4	33.6
Pratt	7.2	6.4	5.6	4.8	4.1	3.0	24.6
Rawlins	5.5	5.0	4.3	3.6	3.1	2.3	21.0
Reno	7.4	6.6	5.8	5.0	4.2	3.2	27.7
Republic	6.8	6.0	5.4	4.6	3.9	2.9	28.6
Rice	7.3	6.4	5.6	4.8	4.1	3.0	26.6
Riley	7.4	6.5	5.8	5.1	4.3	3.3	33.5
Rooks	6.1	5.7	4.9	4.1	3.4	2.5	23.9
Rush	6.5	5.9	5.0	4.3	3.6	2.7	23.3
Russell	6.7	5.9	5.2	4.4	3.7	2.8	26.8
Saline	7.3	6.4	5.7	4.9	4.1	3.1	28.4
Scott	5.7	5.3	4.5	3.8	3.2	2.4	20.2
Sedgwick	7.8	7.0	6.1	5.3	4.5	3.5	30.6
Seward	6.0	5.7	4.8	4.2	3.5	2.6	19.8
Shawnee	7.8	6.8	6.1	5.3	4.5	3.5	34.7
Sheridan	5.7	5.3	4.5	3.8	3.2	2.4	21.3
Sherman	5.3	4.8	4.2	3.5	3.0	2.2	16.7
Smith	6.3	5.7	5.0	4.2	3.5	2.6	24.4
Stafford	7.1	6.2	5.5	4.7	4.0	2.9	25.1
Stanton	5.6	5.2	4.5	3.8	3.2	2.4	15.8
Stevens	5.9	5.5	4.7	4.1	3.4	2.5	19.7
Sumner	8.0	7.1	6.2	5.4	4.6	3.6	34.0

x-slope = 3/8"/ft = 0.03125%

z = 1/x-slope = 1/0.03125 = 32

n = 0.016

z/n = 32/0.016 = 2000 always

EQUATION: $Q = 0.56\left(\frac{z}{n}\right) s^{\frac{1}{2}} d^{\frac{8}{3}}$

n IS ROUGHNESS COEFFICIENT IN MANNING FORMULA APPROPRIATE TO MATERIAL IN BOTTOM OF CHANNEL

z IS RECIPROCAL OF CROSS SLOPE

REFERENCE: H. R. B. PROCEEDINGS 1946, PAGE 150, EQUATION (14)

EXAMPLE (SEE INSTRUCTION 1)

GIVEN: S = 0.03

z = 24

n = .02

z/n = 1200

Q = 2.0 CFS

FIND: d = 0.22 BY FOLLOWING DASHED LINES

RATIO z/n: 10000, 9000, 8000, 7000, 6000, 5000, 4000, 3000, 2000, 1000, 900, 800, 700, 600, 500, 400, 300, 200, 100, 90, 80, 70, 60, 50, 40, 30, 20, 10

TURNING LINE

DISCHARGE (Q) IN CFS: 100, 70, 50, 30, 20, 10, 7, 5, 3, 2, 1, .7, .5, .3, .2, .1, .07, .05, .03, .02, .01

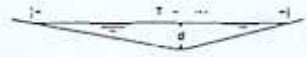
SLOPE OF CHANNEL (S) IN FT./FT.: .10, .08, .07, .06, .05, .04, .03, .02, .01, .008, .007, .006, .005, .004, .003, .002, .001

DEPTH AT CURB OR DEEPEST POINT (d) IN FT.: 2.0, 1.0, .90, .70, .60, .50, .40, .30, .20, .10, .08, .07, .06, .05, .04, .03, .02, .01

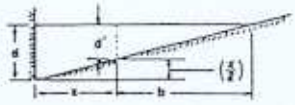
INSTRUCTIONS

1. CONNECT z/n RATIO WITH SLOPE (S) AND CONNECT DISCHARGE (Q) WITH POINT WHERE LINE CROSSES TURNING LINE READ DEPTH AT CURB (d). Q CAN BE FOUND FROM d BY CONNECTING d WITH CROSSING OF TURNING LINE

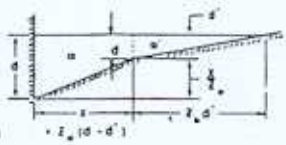
2. FOR SHALLOW V-SHAPED CHANNEL AS SHOWN USE NOMOGRAPH AS EXPLAINED IN INSTRUCTION 1 BUT WITH $z = \frac{T}{d}$.



3. TO DETERMINE DISCHARGE Q_s IN PORTION OF CHANNEL HAVING WIDTH x: DETERMINE DEPTH d FOR TOTAL DISCHARGE IN ENTIRE SECTION AS EXPLAINED IN 1. THEN USE NOMOGRAPH TO DETERMINE Q_b IN SECTION OF WIDTH b FOR DEPTH $d' = d - \left(\frac{x}{z}\right)$. THEN $Q_s = Q - Q_b$.



4. TO DETERMINE DISCHARGE (Q_s) IN COMPOSITE SECTION:- FOLLOW INSTRUCTION 3 TO OBTAIN DISCHARGE (Q_b) IN SECTION a AT ASSUMED DEPTH d BASED ON AN EXTENSION OF SLOPE RATIO z_a TO INTERSECT WATER SURFACE; OBTAIN Q_b FOR SLOPE RATIO z_b AND DEPTH d'; $d' = d - \frac{x}{z_a}$ THEN $Q_s = Q_a + Q_b$.



BUREAU OF PUBLIC ROADS
REV. JAN. 1968

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

April 15, 1986

ATTACHMENT A
DRAINAGE CRITERIA MANUAL

RAINFALL INTENSITY TABLE FOR SEDGWICK COUNTY, KANSAS

The following tabulation contains rainfall intensity in inches per hour as derived from ESSA Weather Bureau Technical Paper 40 Modified to NWS Hydro-35, 1977 During First Hour

(t_c) DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	i = 4.18	5.57	6.53	7.41	8.52	9.48	10.32
6	3.99	5.32	6.25	7.09	8.16	9.09	9.89
7	3.81	5.09	5.99	6.81	7.84	8.74	9.50
8	3.66	4.89	5.75	6.55	7.55	8.42	9.15
9	3.52	4.70	5.54	6.31	7.28	8.13	8.83
10	3.39	4.52	5.34	6.09	7.04	7.86	8.54
11	3.27	4.36	5.16	5.89	6.81	7.61	8.27
12	3.18	4.21	4.99	5.71	6.60	7.38	8.02
13	3.05	4.08	4.84	5.53	6.41	7.17	7.79
14	2.96	3.95	4.69	5.37	6.23	6.97	7.57
15	2.87	3.83	4.56	5.22	6.06	6.78	7.37
16	2.78	3.72	4.43	5.08	5.90	6.60	7.18
17	2.71	3.61	4.31	4.95	5.75	6.44	7.00
18	2.63	3.51	4.20	4.83	5.61	6.29	6.84
19	2.56	3.42	4.10	4.71	5.47	6.14	6.68
20	2.50	3.33	4.00	4.60	5.35	6.00	6.53
21	2.44	3.25	3.90	4.50	5.23	5.87	6.39
22	2.38	3.17	3.81	4.40	5.12	5.75	6.26
23	2.32	3.10	3.73	4.31	5.01	5.63	6.13
24	2.27	3.03	3.65	4.22	4.91	5.52	6.01
25	2.22	2.96	3.57	4.13	4.81	5.41	5.90
26	2.20	2.90	3.50	4.05	4.72	5.31	5.79
27	2.16	2.84	3.43	3.98	4.63	5.21	5.69
28	2.14	2.78	3.37	3.90	4.55	5.12	5.59
29	2.11	2.72	3.30	3.83	4.47	5.03	5.49
30	2.08	2.67	3.24	3.76	4.39	4.94	5.40
31	2.05	2.62	3.19	3.70	4.32	4.86	5.32
32	2.02	2.57	3.10	3.63	4.25	4.79	5.22
33	1.99	2.52	3.05	3.57	4.18	4.71	5.14
34	1.96	2.48	3.01	3.51	4.11	4.63	5.07
35	1.93	2.44	2.98	3.46	4.05	4.56	5.00
36	1.91	2.39	2.93	3.41	3.99	4.50	4.93
37	1.89	2.35	2.88	3.36	3.93	4.43	4.86
38	1.87	2.32	2.84	3.31	3.87	4.37	4.79
39	1.85	2.28	2.80	3.26	3.82	4.31	4.73
40	1.83	2.24	2.76	3.22	3.76	4.25	4.66
41	1.81	2.21	2.72	3.17	3.71	4.19	4.60
42	1.79	2.18	2.68	3.13	3.66	4.13	4.54
43	1.77	2.14	2.64	3.09	3.61	4.08	4.49
44	1.75	2.11	2.61	3.05	3.57	4.03	4.43
45	1.73	2.08	2.57	3.01	3.52	3.98	4.38

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	.5-YR	10-YR	25-YR	50-YR	100-YR
46	1.70	2.05	2.54	2.97	3.48	3.93	4.33
47	1.67	2.02	2.50	2.93	3.44	3.88	4.28
48	1.66	2.00	2.47	2.90	3.39	3.84	4.23
49	1.64	1.97	2.44	2.86	3.35	3.79	4.18
50	1.61	1.95	2.41	2.83	3.32	3.75	4.13
51	1.59	1.92	2.38	2.79	3.28	3.71	4.09
52	1.56	1.89	2.35	2.76	3.24	3.67	4.05
53	1.54	1.86	2.33	2.73	3.20	3.63	4.00
54	1.52	1.84	2.30	2.70	3.17	3.59	3.96
55	1.50	1.81	2.27	2.67	3.14	3.55	3.92
56	1.47	1.79	2.25	2.64	3.10	3.51	3.88
57	1.45	1.76	2.22	2.61	3.07	3.48	3.84
58	1.43	1.74	2.20	2.59	3.04	3.44	3.81
59	1.42	1.72	2.18	2.56	3.01	3.41	3.77
60	1.40	1.69	2.15	2.53	2.98	3.37	3.73
61	1.38	1.67	2.13	2.51	2.95	3.34	3.70
62	1.36	1.65	2.11	2.48	2.92	3.31	3.67
63	1.34	1.63	2.09	2.46	2.89	3.28	3.63
64	1.33	1.61	2.07	2.44	2.86	3.25	3.60
65	1.31	1.59	2.05	2.41	2.84	3.22	3.57
66	1.30	1.57	2.03	2.39	2.81	3.19	3.54
67	1.28	1.56	2.01	2.37	2.79	3.16	3.51
68	1.26	1.54	1.99	2.35	2.76	3.13	3.48
69	1.25	1.52	1.97	2.33	2.74	3.10	3.45
70	1.24	1.50	1.95	2.31	2.71	3.08	3.42
71	1.22	1.49	1.93	2.28	2.69	3.05	3.39
72	1.21	1.47	1.92	2.26	2.67	3.02	3.36
73	1.20	1.46	1.90	2.25	2.64	3.00	3.34
74	1.18	1.44	1.88	2.23	2.63	2.98	3.31
75	1.17	1.43	1.86	2.21	2.61	2.95	3.29
76	1.16	1.41	1.85	2.19	2.58	2.93	3.26
77	1.15	1.40	1.83	2.17	2.55	2.90	3.24
78	1.13	1.38	1.82	2.15	2.53	2.88	3.22
79	1.12	1.37	1.80	2.14	2.50	2.86	3.19
80	1.11	1.36	1.79	2.12	2.48	2.84	3.16
81	1.10	1.34	1.77	2.10	2.46	2.82	3.13
82	1.09	1.33	1.76	2.08	2.43	2.79	3.10
83	1.08	1.32	1.74	2.06	2.41	2.76	3.07
84	1.07	1.31	1.73	2.04	2.39	2.74	3.04
85	1.06	1.30	1.72	2.02	2.37	2.71	3.01
86	1.05	1.28	1.70	2.00	2.34	2.69	2.99
87	1.04	1.27	1.69	1.99	2.32	2.66	2.96
88	1.03	1.26	1.68	1.97	2.30	2.64	2.93
89	1.02	1.25	1.68	1.95	2.28	2.62	2.91
90	1.01	1.24	1.66	1.93	2.26	2.59	2.88

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
91	1.00	1.23	1.65	1.92	2.24	2.57	2.86
92	1.00	1.22	1.63	1.90	2.22	2.55	2.83
93	0.99	1.21	1.62	1.89	2.20	2.53	2.81
94	0.98	1.20	1.61	1.87	2.19	2.51	2.79
95	0.97	1.19	1.59	1.85	2.17	2.49	2.76
96	0.96	1.18	1.58	1.84	2.15	2.46	2.74
97	0.96	1.17	1.57	1.82	2.13	2.44	2.72
98	0.95	1.16	1.56	1.81	2.12	2.42	2.70
99	0.94	1.15	1.54	1.80	2.10	2.41	2.67
100	0.93	1.14	1.53	1.78	2.08	2.39	2.65
101	0.93	1.13	1.52	1.77	2.07	2.39	2.65
102	0.92	1.13	1.51	1.75	2.05	2.35	2.61
103	0.91	1.12	1.50	1.74	2.04	2.33	2.59
104	0.90	1.11	1.49	1.73	2.02	2.31	2.57
105	0.90	1.10	1.47	1.72	2.01	2.30	2.55
106	0.89	1.09	1.46	1.70	1.99	2.28	2.54
107	0.88	1.09	1.45	1.69	1.98	2.26	2.52
108	0.88	1.08	1.44	1.68	1.96	2.25	2.50
109	0.87	1.07	1.43	1.67	1.95	2.23	2.48
110	0.87	1.06	1.42	1.65	1.93	2.21	2.46
111	0.86	1.06	1.41	1.64	1.92	2.20	2.45
112	0.85	1.05	1.40	1.63	1.91	2.18	2.43
113	0.85	1.04	1.39	1.62	1.89	2.17	2.41
114	0.84	1.03	1.38	1.61	1.88	2.15	2.40
115	0.84	1.03	1.37	1.60	1.87	2.14	2.38
116	0.83	1.02	1.36	1.59	1.86	2.12	2.36
117	0.82	1.01	1.36	1.58	1.84	2.11	2.35
118	0.82	1.01	1.35	1.57	1.83	2.09	2.33
119	0.81	1.00	1.34	1.56	1.82	2.08	2.32
120	0.81	0.99	1.33	1.55	1.81	2.07	2.30

DURATION IN HOURS	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
2	0.81	0.99	1.33	1.55	1.81	2.07	2.30
3	0.59	0.72	0.97	1.13	1.32	1.51	1.68
4	0.47	0.58	0.78	0.91	1.06	1.21	1.35
5	0.40	0.49	0.66	0.77	0.89	1.02	1.14
6	0.35	0.42	0.57	0.67	0.78	0.89	0.99
8	0.28	0.34	0.46	0.53	0.62	0.71	0.79
10	0.23	0.29	0.39	0.45	0.52	0.60	0.67
12	0.20	0.25	0.33	0.39	0.45	0.52	0.58
18	0.15	0.18	0.24	0.28	0.33	0.38	0.42
24	0.12	0.15	0.20	0.23	0.27	0.31	0.34

ATTACHMENT B

DRAINAGE CRITERIA MANUAL

INCREMENTAL INFILTRATION VALUES IN INCHES

Time Minutes**	SCS Hydrologic Soil Group			
	A	B	C	D
5	.33	.26	.19	.12
10	.25	.17	.09	.04
15	.18	.11	.05	.02
20	.13	.07	.03	.02
25	.10	.05	.03	.02
30	.08	.05	.03	.02
35	.08	.05	.03	.02
40	.08	.05	.03	.02
45	.08	.05	.03	.02
50	.08	.05	.03	.02
55	.08	.05	.03	.02
60	.08	.05	.03	.02
65	.08	.05	.03	.02
70	.08	.05	.03	.02
75	.08	.05	.03	.02
80	.08	.05	.03	.02
85	.08	.05	.03	.02
90	.08	.05	.03	.02
95	.08	.05	.03	.02
100	.08	.05	.03	.02
105	.08	.05	.03	.02
110	.08	.05	.03	.02
115	.08	.05	.03	.02
120	.08	.05	.03	.02

**Time at end of the time increment

NOTE: Values for 125 minutes and additional 5 minute increments shall be the same as those shown for 120 minutes.

ATTACHMENT C

DRAINAGE CITERIA MANUAL

DEPRESSION STORAGE LOSSES

Surface Type	Total Loss (Inches)
Impervious:	
Paved Areas	0.1
Flat Roofs	0.1
Sloped Roofs	0.05
Pervious:	
Lawns and Grass	0.3
Wooded Areas and Open Fields	0.4

ATTACHMENT

DETERMINATION OF DIMENSIONLESS WATERSHED CONVEYANCE FACTOR (Ø)

$$\emptyset = \emptyset_1 + \emptyset_2$$

$\emptyset_1$	Classification
0.6	Extensive channel improvement and storm sewer system, closed conduit channel system
0.7	Moderate channel improvement and storm sewer system.
0.8	Some channel improvement and storm sewers, mainly cleaning and enlargement of existing channel.
0.9	Little channel improvement and storm sewers.
1.0	Natural channel conditions.

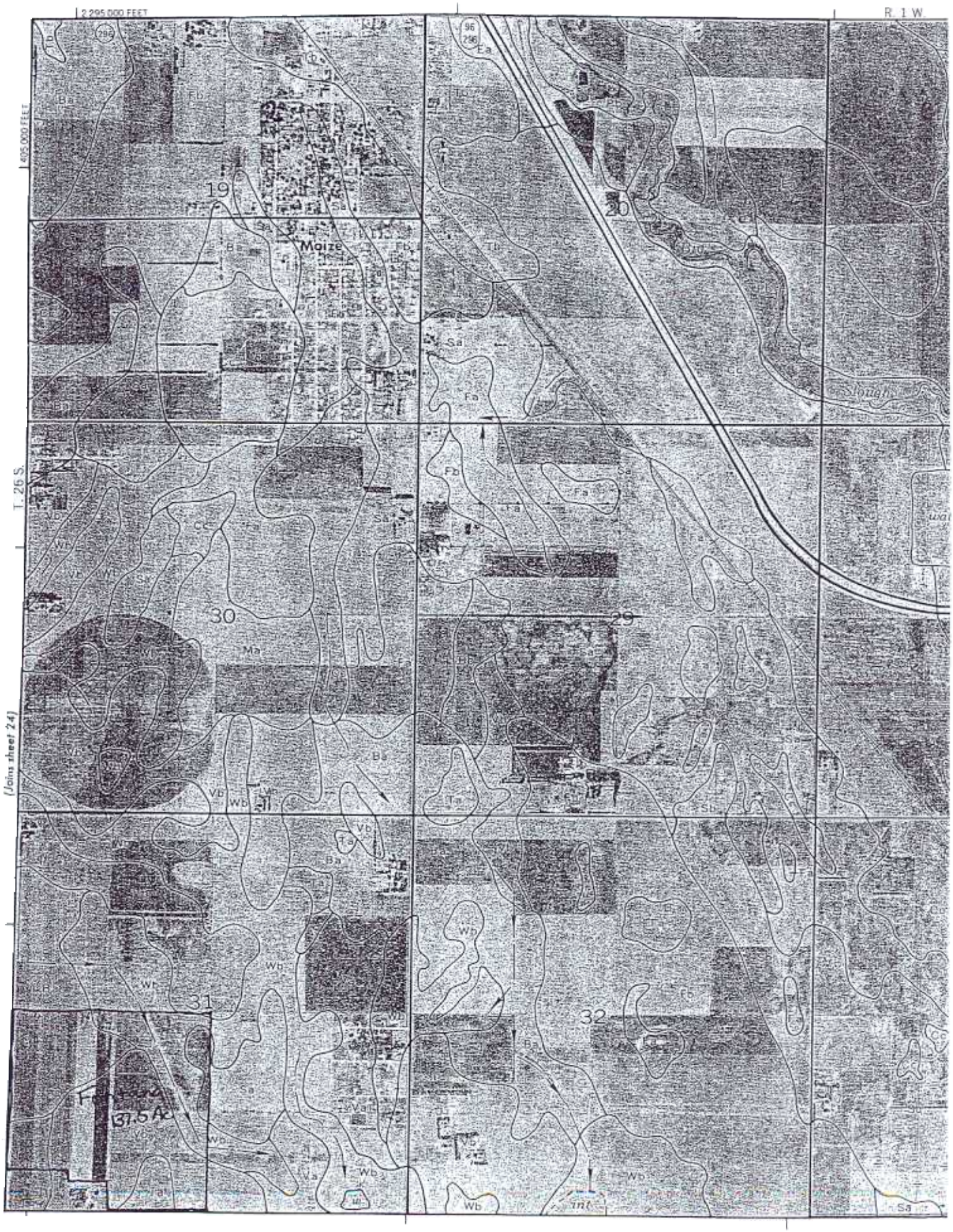
$\emptyset_2$	Classification
0.0	No channel vegetation.
0.1	Light channel vegetation.
0.2	Moderate channel vegetation.
0.3	Heavy channel vegetation.

EXHIBIT NO. 1

SOIL LEGEND

SYMBOL	HYDROLOGIC GROUP	NAME
Aa	B	Albion-Shellabarger sandy loams, 1 to 4 percent slopes
Ab	B	Albion and Shellabarger sandy loans, 7 to 15 percent slopes
Ba	C	Blanket silt loam, 0 to 1 percent slopes
Bb	C	Blanket silt loan, 1 to 3 percent slopes
Ca	B	Canadian fine sandy loan
Cb	B	Canadian-Waldeck fine sandy loams
Cc	D	Carwile fine sandy loam
Cd	B	Clark-Ost clay loams, 1 to 4 percent slopes
Ce	C	Clime silty clay, 3 to 6 percent slopes
Ea	B	Elandco silt loam
Eb	B	Elandco silt loam, occasionally flooded
Ec	B	Elandco silt loam, frequently flooded
Fa	B	Farnum loam, 0 to 1 percent slopes
Fb	B	Farnum loam, 1 to 3 percent slopes
Fc	B	Farnum loam, sandy substratum, 0 to 1 percent slopes
Ga	D	Goessel silty clay, 0 to 1 percent slopes
Gb	D	Goessel silty clay, 1 to 2 percent slopes
Ia	D	Irwin silty clay loam, 1 to 3 percent slopes
Ib	D	Irwin silty clay loam, 3 to 6 percent slopes
Ic	D	Irwin silty clay loam, 2 to 6 percent slopes, eroded
La	C	Lesho loam
Lb	A	Lincoln soils
Ma	B	Milan loam, 1 to 3 percent slopes
Mb	B	Milan form, 3 to 6 percent slopes
Mc	B	Milan clay loam, 2 to 6 percent slopes, eroded
Na	B	Naron fine sandy loam
Oc	D	Owens clay loam, 1 to 3 percent slopes
Od	D	Owens-Rock outcrop complex, 3 to 10 percent slopes
Pa		Pits
Pb	D	Plevna fine sandy loam
Pc	A	Pratt loamy fine sand, undulating
Pd	A	Pratt-Tivoli complex, rolling
Ra	D	Renfrow silty clay loam, 1 to 3 percent slopes
Rb	D	Renfrow silty clay loam, 3 to 6 percent slopes
Rc	D	Renfrow-Owens clay loams, 1 to 4 percent slopes
Rd	D	Rosehill silty clay, 1 to 3 percent slopes
Sa	B	Shellabarger sandy loam, 1 to 3 percent slopes
Sb	B	Shellabarger sandy loam, 3 to 6 percent slopes
Sc	B	Shellabarger sandy loam, 3 to 6 percent slopes, eroded
Ta	D	Tabler silty clay loam
Tb	D	Tabler-Drummond complex
Ua	B	Urban land-Canadian complex
Ub	B	Urban land-Elandco complex
Uc	B	Urban land-Farnum complex, 0 to 3 percent slopes
Ud	D	Urban land-Irwin complex, 1 to 3 percent slopes
Ue	D	Urban land-Tabler complex
Va	B	Vanoss silt loam, 0 to 1 percent slopes
Vb	B	Vanoss silt loam, 1 to 3 percent slopes
Vc	B	Vanoss silt loam, 3 to 6 percent slopes
Vd	B	Vanoss silt loam, 3 to 6 percent slopes, eroded
Ve	D	Vernon sandy loam, 1 to 3 percent slopes
Vf	D	Vernon sandy loam, 3 to 6 percent lopes
Wa	C	Waldeck sandy loam
Wb	D	Waurika silt loam

SEDGWICK COUNTY, KANSAS



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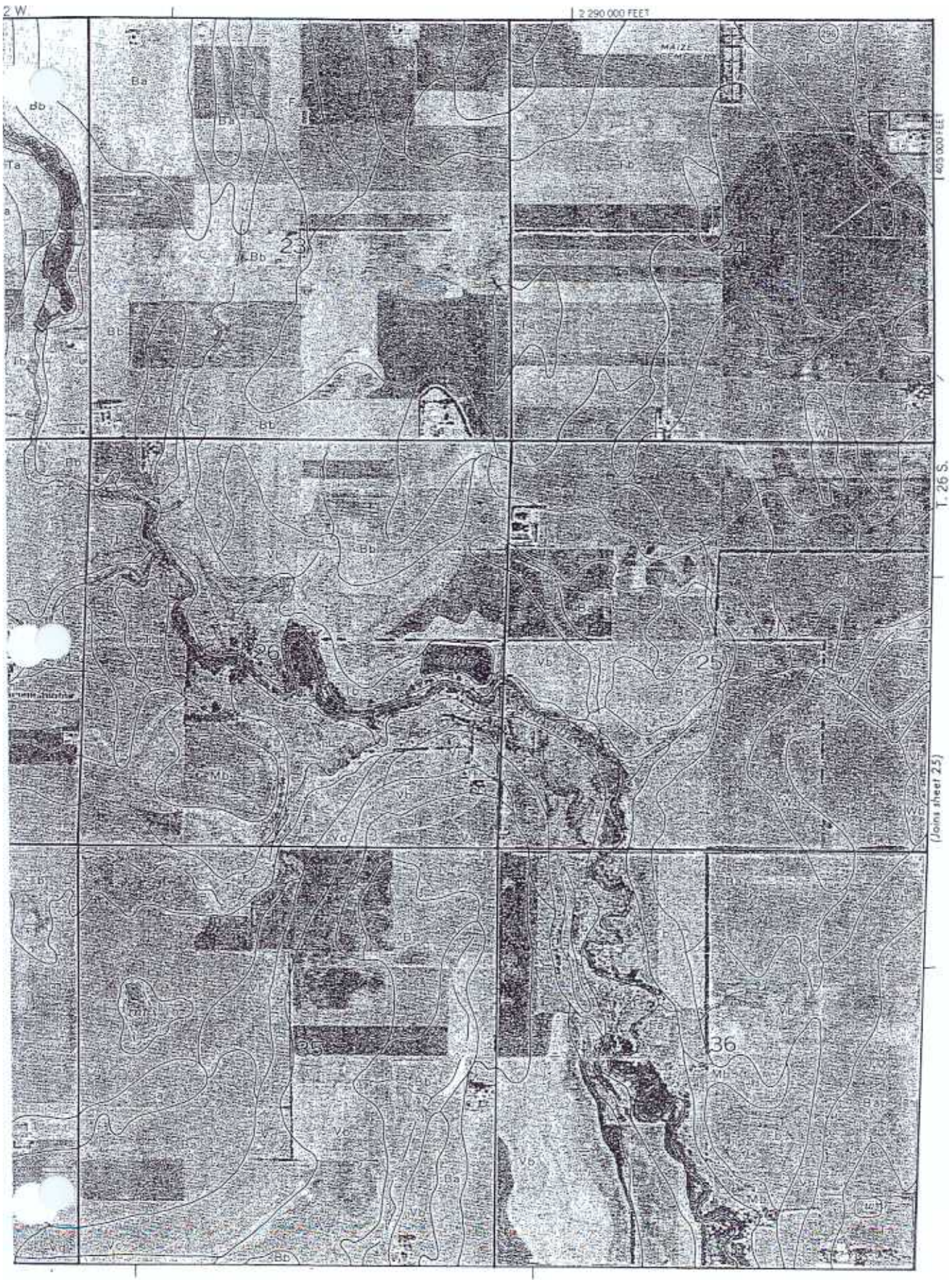

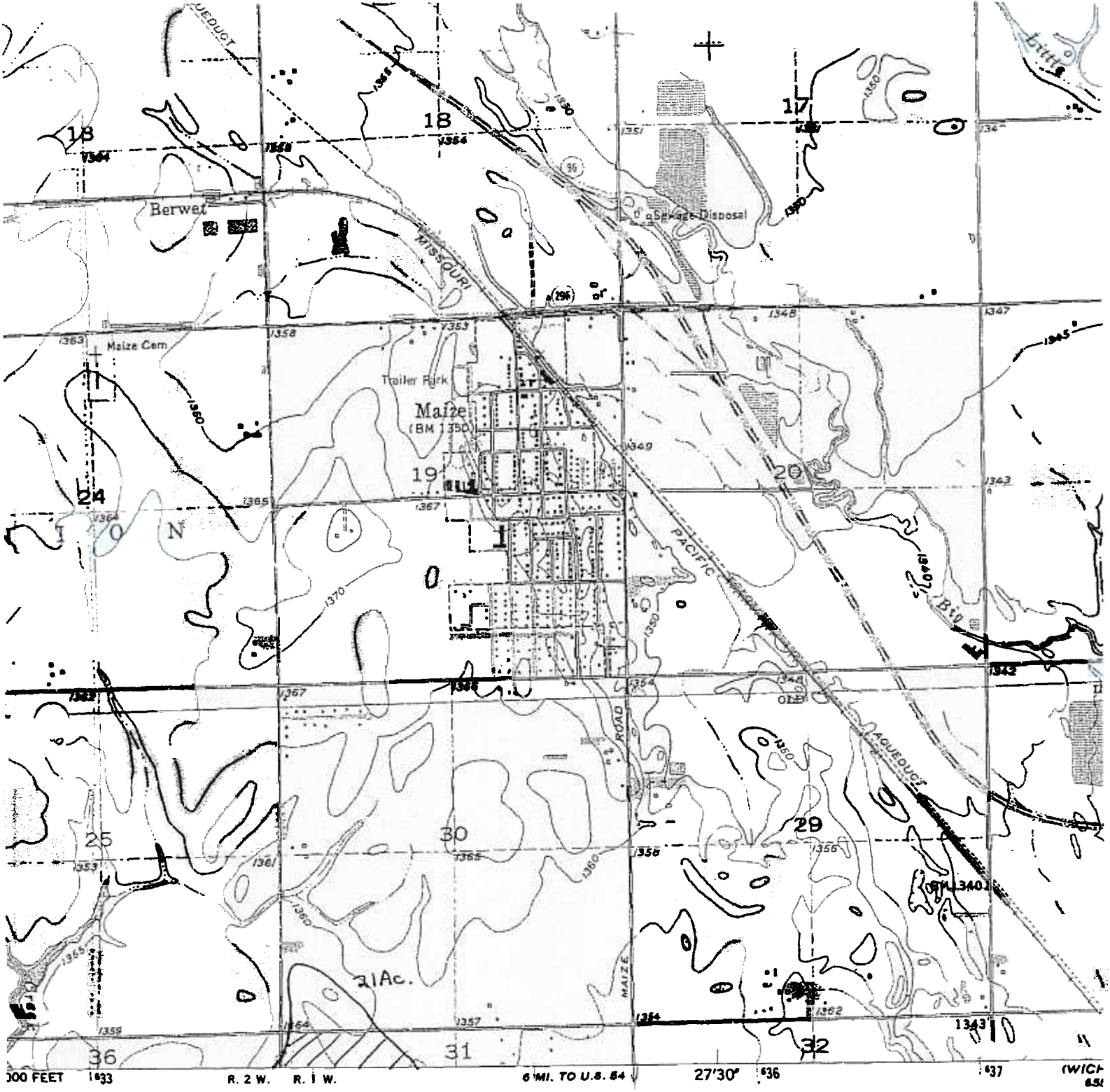

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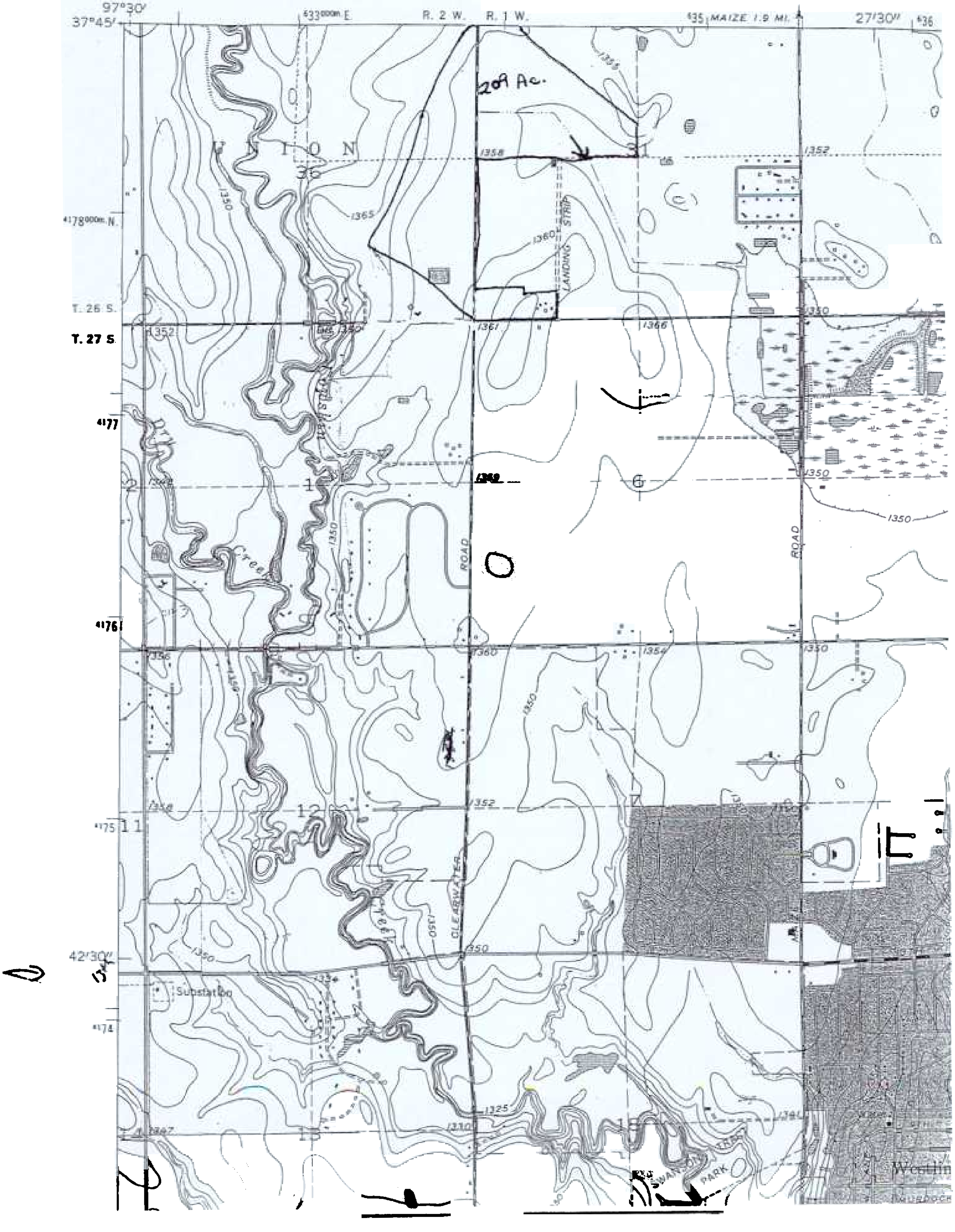
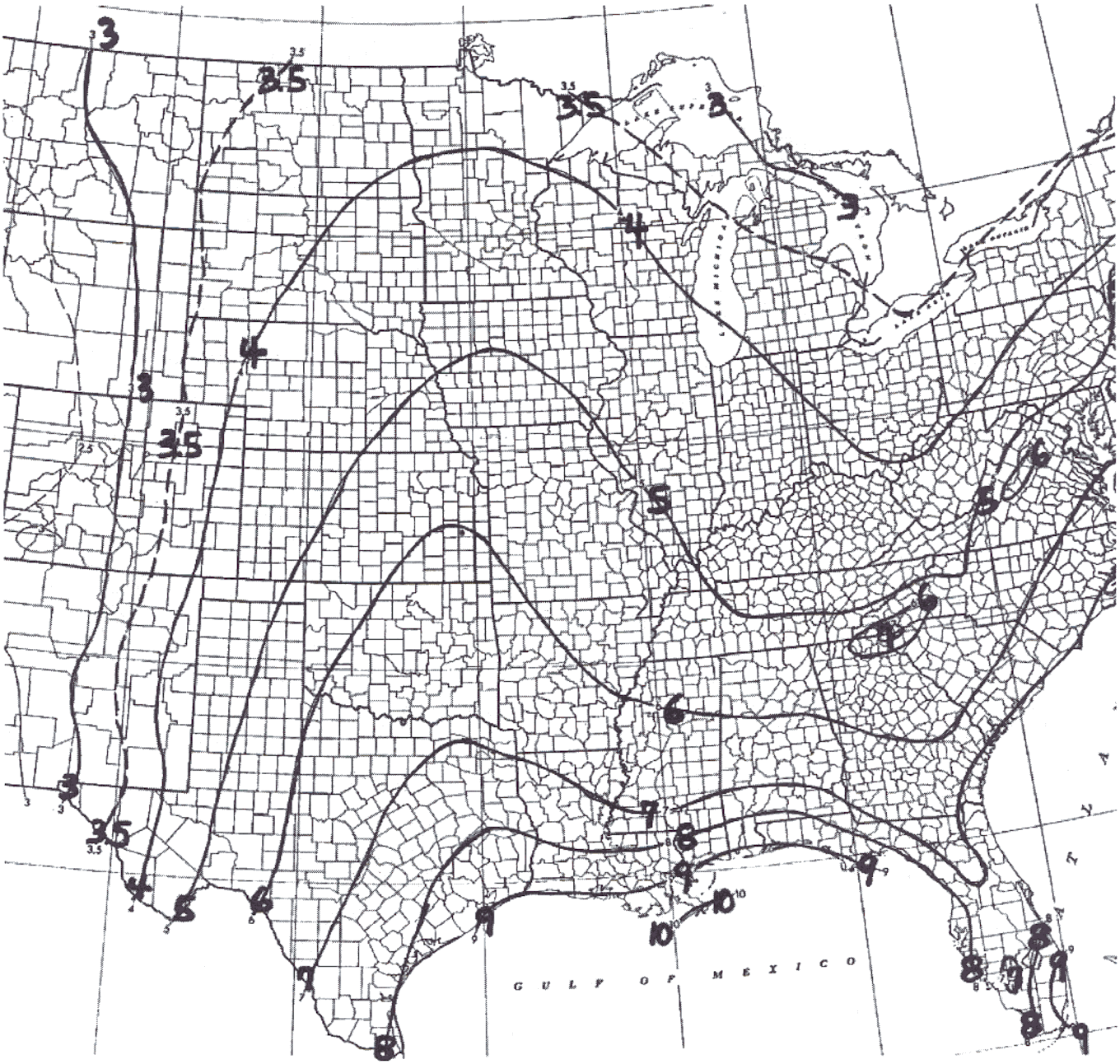
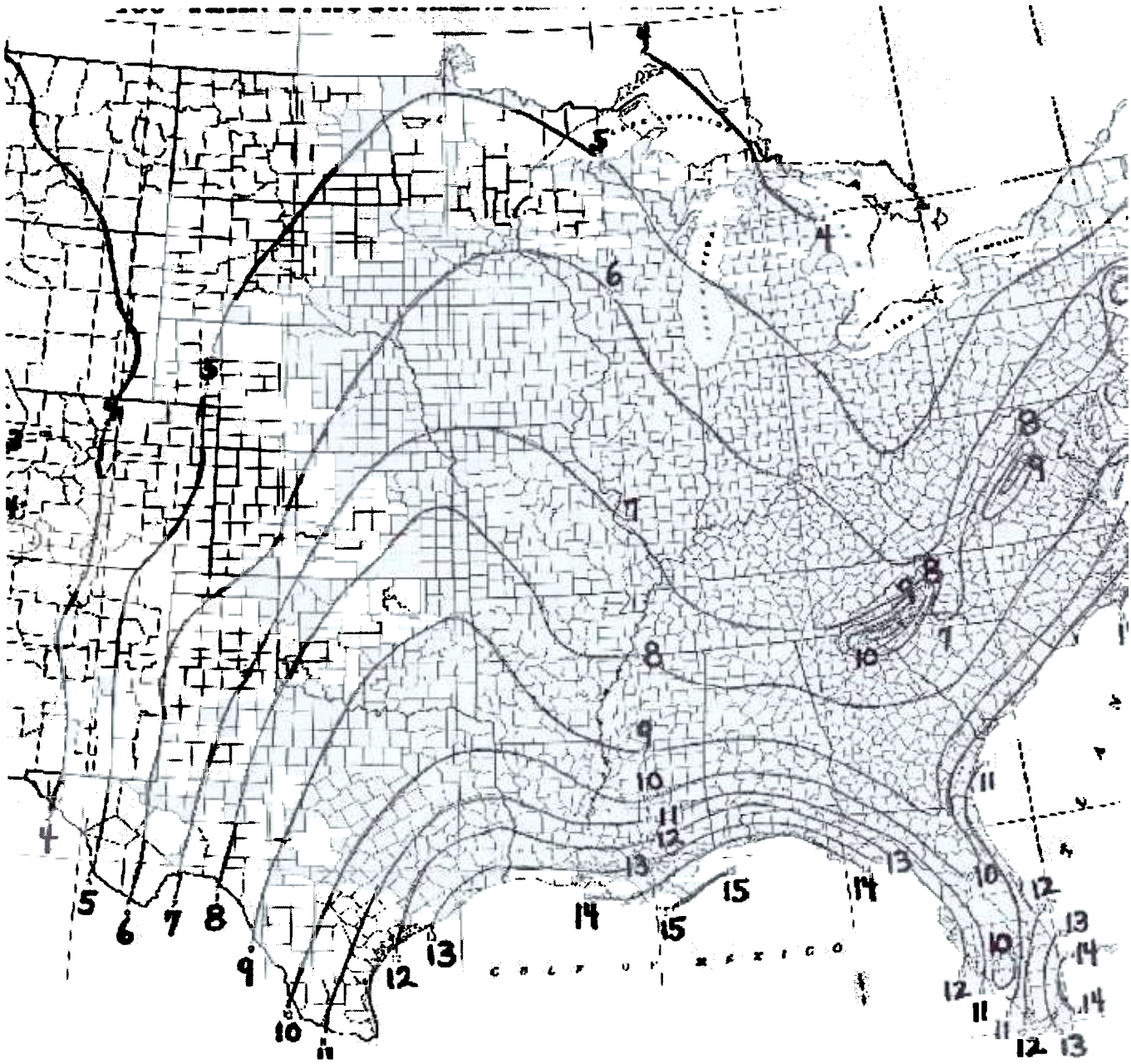
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



100 Year 6 Hour Rainfall (Inches)



100 Year 24 Hour Rainfall (Inches)



ATTACHMENT D

DRAINAGE CRITERIA

RECOMMENDED RUNOFF COEFFICIENTS FOR RATIONAL METHOD
AND PERCENT IMPERVIOUS FOR UNIT HYDROGRAPH METHOD

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
1 Business:					
Downtown Areas	95	0.84	0.85	0.87	0.91
Neighborhood Areas	70	0.68	0.69	0.73	0.80
2. Residential:					
Single Family (Soil Group D)					
1/8 Acre	50	0.57	0.61	0.66	0.79
1/4 Acre	38	0.50	0.54	0.62	0.76
1/3 Acre	30	0.46	0.50	0.59	0.73
1/2 Acre	25	0.42	0.48	0.56	0.72
3/4 Acre	22	0.42	0.46	0.55	0.71
1 Acre	20	0.41	0.45	0.54	0.71
Multi-Family (Soil Group D)					
Multi-Unit (detached)	60	0.62	0.66	0.72	0.82
Multi-Unit (attached)	65	0.64	0.68	0.73	0.83
Apartments	75	0.70	0.73	0.79	0.86
Single Family (Soil Group C)					
1/8 Acre	50	0.55	0.58	0.64	0.73
1/4 Acre	38	0.48	0.51	0.57	0.68
1/3 Acre	30	0.43	0.46	0.53	0.65
1/2 Acre	25	0.40	0.43	0.50	0.63
3/4 Acre	22	0.39	0.42	0.49	0.62
1 Acre	20	0.37	0.40	0.48	0.61
Multi-Family (Soil Group C)					
Multi-Unit (detached)	60	0.60	0.63	0.69	0.77
Multi-Unit (attached)	65	0.63	0.66	0.71	0.79
Apartments	75	0.68	0.72	0.77	0.83
Single-Family (Soil Group B)					
1/8 Acre	50	0.52	0.54	0.59	0.67
1/4 Acre	38	0.44	0.46	0.52	0.61
1/3 Acre	30	0.39	0.41	0.47	0.57
1/2 Acre	25	0.36	0.38	0.44	0.54
3/4 Acre	22	0.34	0.36	0.42	0.52
1 Acre	20	0.33	0.35	0.40	0.51
Multi-Family (Soil Group B)					
Multi-Unit (detached)	60	0.58	0.60	0.65	0.72
Multi-Unit (attached)	65	0.61	0.64	0.68	0.75
Apartments	75	0.67	0.70	0.74	0.80

Land Use or Place Characteristics	Percent Impervious	Frequency 2	5	10	100
Single Family (Soil Group A)					
1/8 Acre	50	0.47	0.50	0.54	0.60
1/4 Acre	38	0.39	0.41	0.45	0.52
1/3 Acre	30	0.33	0.35	0.39	0.47
1/2 Acre	25	0.30	0.31	0.35	0.44
3/4 Acre	22	0.28	0.29	0.33	0.42
1 Acre	20	0.26	0.28	0.32	0.40
Multi-Family (Soil Group A)					
Multi-Unit (detached)	60	0.55	0.57	0.61	0.67
Multi-Unit (attached)	65	0.58	0.60	0.64	0.70
Apartments	75	0.65	0.68	0.72	0.77
3. Industrial:					
Light Areas	70	0.68	0.69	0.73	0.80
Heavy Areas	80	0.74	0.76	0.79	0.84
4 Playgrounds:	15	0.33	0.35	0.42	0.55
5. Schools:	40	0.49	0.51	0.56	0.66
6. Railroad Yard Areas:	30	0.43	0.45	0.50	0.62
Undeveloped Urban Areas: Offsite Flow Analysis (when land use not defined)	45	0.52	0.54	0.59	0.68
8. Streets:					
Paved	99	0.87	0.88	0.90	0.93
Gravel	00	0.24	0.26	0.33	0.48
9. Drive, Parking Lots and Walks:	96	0.87	0.87	0.88	0.89
10. Roofs:	90	0.80	0.85	0.90	0.93
11. Urban Lawn Areas (See Note No. 1 below):					
Soil Group A					
Slope less than 1%	00	0.08	0.09	0.13	0.23
Slope 1% to 4%	00	0.12	0.13	0.17	0.27
Slope more than 4%	00	0.16	0.17	0.21	0.31
Soil Group B					
Slope less than 1%	00	0.16	0.18	0.24	0.37
Slope 1% to 4%	00	0.20	0.22	0.28	0.41
Slope more than 4%	00	0.24	0.26	0.32	0.45
Soil Group C					
Slope less than 1%	00	0.24	0.27	0.35	0.51
Slope 1% to 4%	00	0.26	0.29	0.37	0.53
Slope more than 4%	00	0.28	0.31	0.39	0.55

Land Use or ace Characteristics	Percent Impervious	Frequency 2	5	10	100
Soil Group D					
Slope less than 1%	00	0.28	0.33	0.43	0.63
Slope 1% to 4%	00	0.30	0.35	0.45	0.65
Slope more than 4%	00	0.32	0.37	0.47	0.67

Note No. 1: Coefficients shown in the above table are for pervious open space areas with thick turf which includes pervious areas in parks and cemeteries. Coefficients shown above must be increased 0.02 for use with agricultural pasture areas. Coefficients shown above must be reduced by 0.04 for use with agricultural cultivated areas. Group A soils are well-drained, coarse textured sands with high infiltration rates. Group B soils are moderately well-drained, moderately coarse textured soils with moderate infiltration rates. Group C soils are moderately poor-drained, moderately fine textured soils with slow infiltration rates. Group D soils are poor-drained, fine textured soils with very slow infiltration rates.

GENERAL NOTE: These Rational Formula Coefficients may not be valid for basins 320 acres or larger.

ATTACHMENT E

DRAINAGE CRITERIA

AVERAGE OVERLAND FLOW VELOCITY FOR USE WITH URBANIZED AREAS

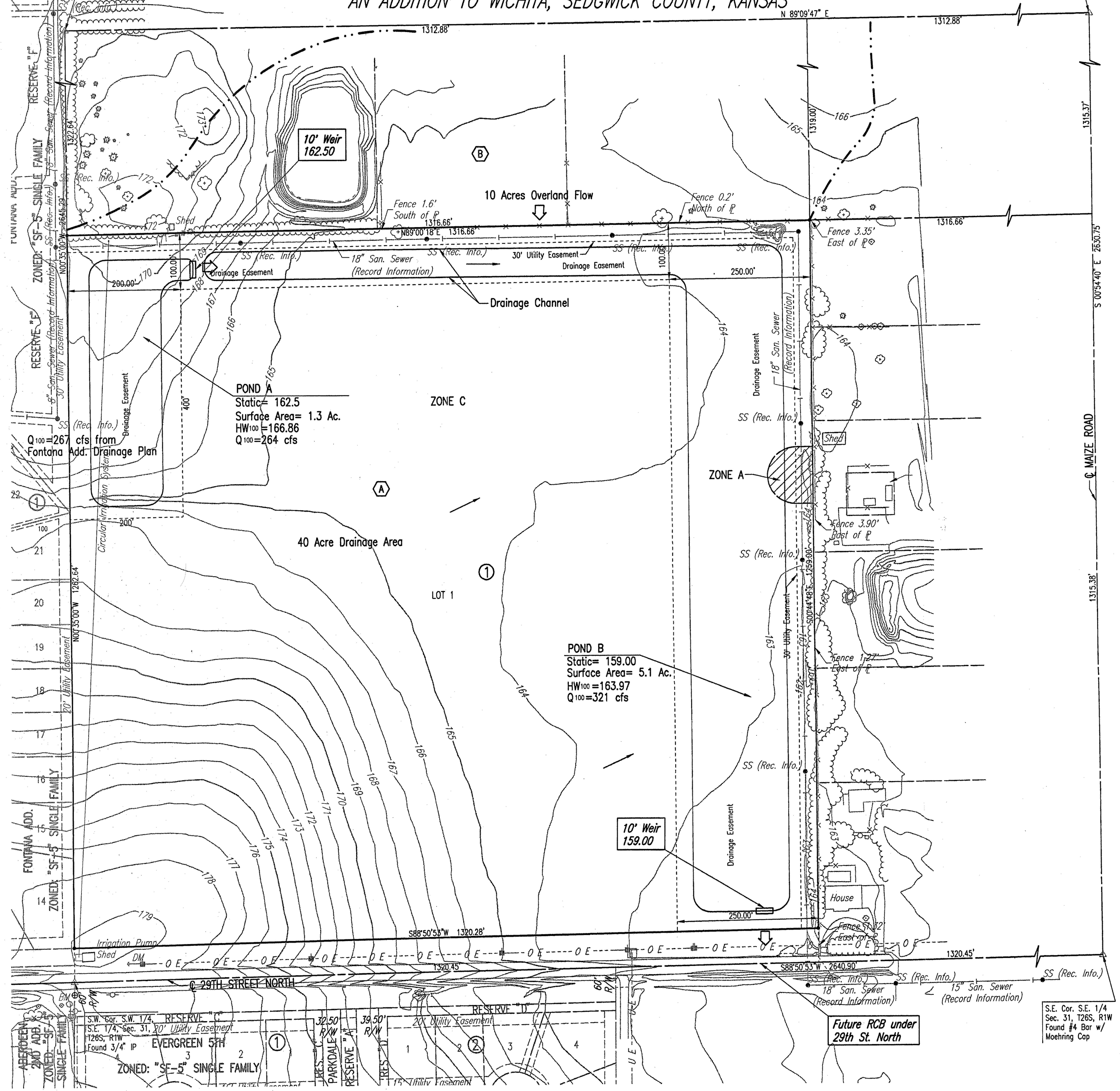
Surface Type	VELOCITY IN FEET/SECOND FOR SLOPES IN PERCENT SHOWN																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	20.0
Forest with Heavy Ground Litter or Meadow	0.03	0.04	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.16	0.21	0.28	0.33	0.39	0.46	0.53	0.60	0.72	1.10
Fallow or Minimum Tillage Cultivation	0.06	0.08	0.10	0.12	0.13	0.14	0.16	0.17	0.18	0.19	0.29	0.40	0.51	0.66	0.78	0.91	1.05	1.20	1.44	2.10
Short Grass Pasture or Lawns	0.09	0.13	0.15	0.18	0.20	0.21	0.23	0.25	0.26	0.28	0.45	0.60	0.77	0.96	1.17	1.33	1.50	1.68	1.98	3.20
Almost Bare Ground	0.16	0.22	0.28	0.31	0.35	0.38	0.41	0.44	0.46	0.49	0.70	0.85	1.05	1.26	1.50	1.75	2.03	2.32	2.79	4.40
Grassed Waterway	0.35	0.48	0.58	0.67	0.77	0.84	0.91	0.98	1.05	1.12	1.54	1.82	2.10	2.38	2.78	3.20	3.66	4.14	4.56	7.00
Paved Areas (Sheet Flow) or Shallow Gutter Flow	0.44	0.62	0.77	0.91	1.05	1.12	1.19	1.26	1.33	1.40	2.00	2.55	3.20	3.83	4.41	5.04	5.70	6.00	6.20	9.00

PLAN MAP

DRAINAGE PLAN

NEWMARKET OFFICE

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS



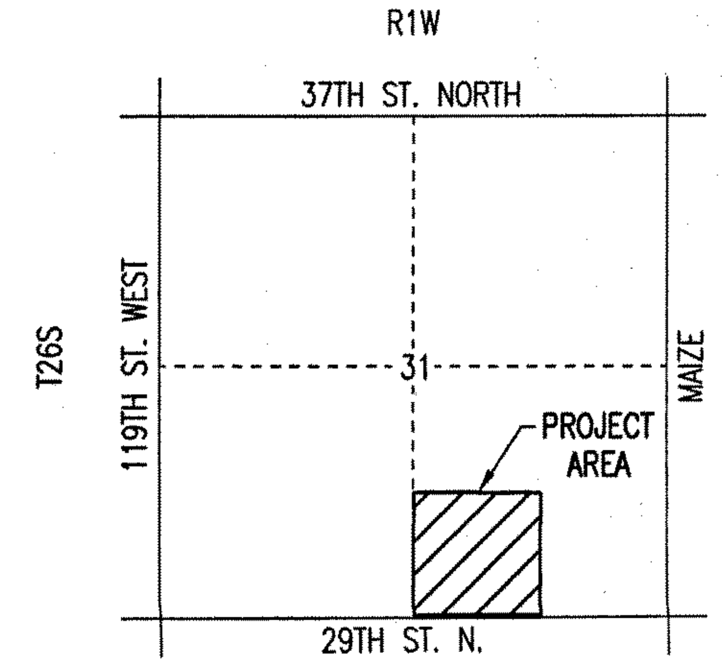
Center of Sec. 31
T26S, R1W
Found 3/4" IP
E. 1/4 Cor. Sec. 31,
T26S, R1W
Found 3/4" IP
Moehring Cap
N 89°09'47" E
1312.88'
1316.66'
1315.37'
S 00°54'40" E 2630.75'
1315.38'
10' Weir
162.50
10 Acres Overland Flow
Fence 1.6' South of ℄
Fence 0.2' North of ℄
Fence 3.35' East of ℄
18" San. Sewer (Record Information)
30' Utility Easement
Drainage Easement
Drainage Channel
POND A
Static= 162.5
Surface Area= 1.3 Ac.
HW100 =166.86
Q100=264 cfs
Q100=267 cfs from
Fontana Add. Drainage Plan
ZONE C
ZONE A
40 Acre Drainage Area
LOT 1
POND B
Static= 159.00
Surface Area= 5.1 Ac.
HW100 =163.97
Q100=321 cfs
10' Weir
159.00
Fence 3.90' East of ℄
Fence 1.27' East of ℄
Circular Irrigation System
Irrigation Pump
Shed
House
SS (Rec. Info.)
℄ MAIZE ROAD
℄ 29TH STREET NORTH
S88°50'53"W 1320.28'
1320.45'
S88°50'53"W - 2640.90'
15" San. Sewer (Record Information)
Future RCB under 29th St. North
S.E. Cor. S.E. 1/4
Sec. 31, T26S, R1W
Found #4 Bar w/
Moehring Cap
S.W. Cor. S.W. 1/4, Sec. 31,
T26S, R1W
Found 3/4" IP
RESERVE "C"
RESERVE "D"
EVERGREEN 5TH
ZONED: "SF-5" SINGLE FAMILY
ZONED: "SF-5" SINGLE FAMILY
FONTANA ADD.
RESERVE "F"
RESERVE "E"
20' Utility Easement

SCALE: 1" = 100'

LEGEND

- (3A) BASIN IDENTIFIER
- MAJOR BASIN BOUNDARY
- EMERGENCY STORM WATER FLOW
- STORM WATER FLOW

SEE SUPPORTING CALCULATIONS FOR HYDROLOGY



VICINITY MAP

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003