PONDING AREA F

UPDATE STUDY

FOR

HIDDEN CREEK ADDN

THE CITY OF WICHITA

OFFICE OF CENTRAL INSPECTION
CITY HALL — SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
FAX (316) 268-4663

April 18, 2000

Mr. Kenny E. Hill, P.E.
POE & ASSOCIATES OF KANSAS, INC.
5940 East Central, Suite 200
Wichita, Kansas 67208-4242

RE: Proposed Welcome Home Manufactured Home Park (Southborough Estates)
Proposed Hidden Lakes Manufactured Home Park

Dear Mr. Hill:

This is in response to your April 4, 2000 letter regarding development requirements for the above-referenced manufactured home parks. These proposed parks, while not mapped are designated by FEMA as being within a floodplain of floodway, are located within an area designated as a "ponding area" or "pool elevation area", as indicated to you by the City's Stormwater Utility Engineer, Chris Carrier, in previous meetings and correspondence with him.

Per our April 4th meeting and your follow-up letter, design of these parks will incorporate the following:

- The minimum floor elevation for both parks shall be at or above the calculated 100-year pool or ponding area elevation of 1274.8.
- Any fill which is below the elevation of 1273.8 must be compensated for by excavation of an area within the drainage basin of equal volume.
- Street elevations shall be no more than 1.25 feet below the 100-year storm elevation to provide for emergency vehicle access.
- OCI must be provided a copy of the street plans to be used to check minimum floor elevations of the mobile homes located within these parks.
- Street width and parking spaces are to be as shown on the site plan approved by the Planning Department which are 25 feet back to back of curb for the streets, and a 20' by 30' foot concrete parking pad for each lot.
- Provided the above items are completed, there will be no special City requirements for anchoring of manufactured homes within this area above or beyond anchoring requirements outlined in Title 26 of the City Code.
- Consideration should be given to designs that will maintain utility service when flooding occurs, but there are no City regulations that suggest improvements or enforce this type of construction.

Thank you for your letter and your attention to this matter. Please don't hesitate to contact me at 268-4460 should you have additional questions or concerns.

Sincerely,

Kurt A. Schroeder
Superintendent of Central
Inspection

CC: Paul Hays
Randy Sparkman
Chris Carrier

ATTACHMENTS

POE & ASSOCIATES OF KANSAS, INC.
CONSULTING ENGINEERS
5940 E. Central, Suite 200 ■ Wichita, KS 67208-4242
Phone 316/685-4114 ■ FAX 316/685-4444

April 4, 2000

Kurt Schroeder

Superintendent of O.C.I.
455 N. Main 7th Floor
Wichita, KS 67202

Re: Welcome Home Mobile Home Park (Southborough)
Hidden Lakes Mobile Home Park

Dear Kurt:

This letter is to outline our discussion about the Southborough Estates and Hidden Lakes mobile home park requirements. The items discussed are as follows:

1. The minimum floor elevation for both parks shall be at or above the calculated 100 year pool elevation of 1274.8.

2. That any fill which is below the elevation of 1273.8 must be compensated for by excavation of an area within the drainage basin of equal volume.

3. Street elevations shall be no more than 1.25 feet below the 100 year storm to provide emergency vehicle access.

4. Consideration should be given to maintaining utility service when flooding occurs but there are no city regulations which suggest improvements or enforce this type of construction.

5. There are no city requirements for special anchoring of mobile homes in areas subject to flooding.

6. OCI should have a copy of the street plans to be used to check minimum floor elevations of the mobile homes located within this area.

7. Street width and parking spaces are to be as shown on the site plan approved by the Planning Department which are 25 feet back to back of curb for the streets and a 20 by 30

foot concrete parking pad for each lot.

If we have missed any items or you have any suggested changes , please let us know.

Sincerely,

POE & ASSOCIATES of KANSAS, INC.

Kenny E. Hill, P.E.
Vice President

cc: Paul Treadwell
Jeff Lange

CITY OF
WICHITA

Department of Public Works

March 9, 2000

Kenny E. Hill, P.E.
Vice President
Poe & Associates of Kansas Inc.
5940 E. Central, Suite 200
Wichita, KS 67208-4242

RE: Welcome Home Mobile Home Park
47th Street South and Meridian

Dear Kenny:

This is written in response to your March 6, 2000 letter, concerning our discussion during our recent meeting on the above referenced subject. All of the items in your letter are correct with the exception of #2. Upon further investigation, I learned that the minimum requirement for the lowest floor is that it be at or above the base flood elevation, not at or above one foot above the base flood elevation.

If you have any questions, please let me know.

Sincerely,

Christopher M. Carrier, P.E.
Storm Water Engineer

Storm Water Management Division

City Hall • 8th Floor • 455 N. Main • Wichita, Kansas 67202

T 316.268.4498

POE & ASSOCIATES OF KANSAS, INC.
CONSULTING ENGINEERS
5940 E. Central, Suite 200 ■ Wichita, KS 67208-4242
Phone 316/685-4114 ■ FAX 316/685-4444

March 6, 2000

FILE COPY

Mr. Chris Carrier

City Hall
455 N. Main, 8th Floor
Wichita, Ks 67202

Re: Welcome Home Mobile Home Park
47th Street South and Meridian

Dear Chris:

I prepared this letter to outline the information that we discussed at our meeting today.

1. That any fill on the subject property which is below the elevation of 1273.8 must be compensated for by excavating an area in this drainage basin of equal volume.

2. The floor elevation of the mobile homes in this park must be at or above 1275.8 which is one foot above the calculated 100yr flood elevation.

3. The design should provide for emergency vehicle access during the 100yr storm event.

4. Consideration should be given to maintaining utility service when flooding occurs.

5. That we should check with OCI for special anchoring or other special requirements.

Please let us know if there is anything that we need to add or revise in this memo.
Thanks for your help.

Sincerely,

POE & ASSOCIATES of KANSAS, INC.

Kenny E. Hill, P.E.
Vice President

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

  1       ID   PONDING AREA F CALCULATION OF RUNOFF HIDDEN CREEK ADDITION
  2       ID   15 MINUTE DISTRIBUTION OF 6 HOUR STORM W/GBA DISTRIBUTION
  3       ID   100-YEAR STORM RAINFALL                          FILE HDNCRK1.IH1
  4       IT     15       0       0     150
  5       IO      4       1

  6       KK  CNTYYD
  7       KM   RUNOFF HYDROGRAPH FROM COUNTY YARD TRIB
  8       PB    5.9
  9       PC      0       2       4       6       9      12      15      19      27      46
 10       PC     62      68      72      76      79      82      85      87      90      92
 11       PC     94      96      98      99     100
 12       BA   0.14
 13       LS      0      85
 14       UD   2.08

 15       KK   CHTWD
 16       KM   RUNOFF HYDROGRAPH FROM CHITWOOD TRIB
 17       BA   0.91
 18       LS      0      83
 19       UD   4.72

 20       KK   JUCT1
 21       KM   COMBINE RUNOFF HYDROGRAPHS FOM COUNTY YARD & CHITWOOD TRIBS @ JUNCTION J1
 22       HC      2

 23       KK   DULNG
 24       KM   RUNOFF HYDROGRAPH FROM DULING TRIB
 25       BA   0.89
 26       LS      0      76
 27       UD   6.32

 28       KK   JUNC2
 29       KM   COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J1 WITH RUNOFF HYDROGRAPH FROM
 30       KM   DULING TRIB AT JUNCTION J2
 31       HC      2

 32       KK   NREST
 33       KM   RUNOFF HYDROGRAPH FROM NORTHEAST TRIB
 34       BA   0.55
 35       LS      0      73
 36       UD   6.98

 37       KK   JUNC3
 38       KM   COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J2 WITH RUNOFF HYDROGRAPH FROM
 39       KM   NORTHEAST TRIB @ JUNCTION J3
 40       HC      2

 41       KK  STHBRG
 42       KM   RUNOFF HYDROGRAPH FROM SOUTHBOROUGH TRIB
 43       BA   0.06
 44       LS      0      86
 45       UD   0.94
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1       ID   PONDING AREA F CALCULATION OF RUNOFF HIDDEN CREEK ADDITION
  2       ID   15 MINUTE DISTRIBUTION OF 6 HOUR STORM W/GBA DISTRIBUTION
  3       ID   100-YEAR STORM RAINFALL                          FILE HDNCRK1.IH1
  4       IT     15      0      0    150
  5       IO      4      1

  6       KK  CNTYYD
  7       KM   RUNOFF HYDROGRAPH FROM COUNTY YARD TRIB
  8       PB    5.9
  9       PC      0      2      4      6      9     12     15     19     27     46
 10       PC     62     68     72     76     79     82     85     87     90     92
 11       PC     94     96     98     99    100
 12       BA   0.14
 13       LS      0     85
 14       UD   2.08

 15       KK   CHTWD
 16       KM   RUNOFF HYDROGRAPH FROM CHITWOOD TRIB
 17       BA   0.91
 18       LS      0     83
 19       UD   4.72

 20       KK   JUCT1
 21       KM   COMBINE RUNOFF HYDROGRAPHS FOM COUNTY YARD & CHITWOOD TRIBS @ JUNCTION J1
 22       HC      2

 23       KK   DULNG
 24       KM   RUNOFF HYDROGRAPH FROM DULING TRIB
 25       BA   0.89
 26       LS      0     76
 27       UD   6.32

 28       KK   JUNC2
 29       KM   COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J1 WITH RUNOFF HYDROGRAPH FROM
 30       KM   DULING TRIB AT JUNCTION J2
 31       HC      2

 32       KK   NREST
 33       KM   RUNOFF HYDROGRAPH FROM NORTHEAST TRIB
 34       BA   0.55
 35       LS      0     73
 36       UD   6.98

 37       KK   JUNC3
 38       KM   COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J2 WITH RUNOFF HYDROGRAPH FROM
 39       KM   NORTHEAST TRIB @ JUNCTION J3
 40       HC      2

 41       KK  STHBRG
 42       KM   RUNOFF HYDROGRAPH FROM SOUTHBOROUGH TRIB
 43       BA   0.06
 44       LS      0     86
 45       UD   0.94
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  46      KK  JUNC4
  47      KM   COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J3 WITH RUNOFF HYDROGRAPH
  48      KM   FROM SOUTHBOROUGH TRIB @ JUNCTION J4
  49      HC      2

  50      KK  CMPSBN
  51      KM   RUNOFF HYDROGRAPH FROM CAMPUS/BARN TRIB
  52      BA   0.12
  53      LS      0      80
  54      UD   2.16

  55      KK  OLDCRK
  56      KM   RUNOFF HYDROGRAPH FROM OLD CREEK TRIB
  57      BA   0.37
  58      LS      0      69
  59      UD  14.25

  60      KK  JUNC5
  61      KM   COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J4 WITH RUNOFF HYDROGRAPHS FROM
  62      KM   CAMPUS/BARN AND OLD CREEK TRIBS AT DRAINAGE STRUCTURE
  63      HC      3
  64      ZZ
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**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)  *
*            MAY  1991               *
*         VERSION 4.0.1E             *
*    Lahey F77L-EM/32 version 5.01   *
*      Dodson & Associates, Inc.     *
* RUN DATE 01/31/00  TIME 19:26:08   *
**************************************
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**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*          (916) 551-1748            *
*                                    *
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PONDING AREA F CALCULATION OF RUNOFF HIDDEN CREEK ADDITION
15 MINUTE DISTRIBUTION OF 6 HOUR STORM W/GBA DISTRIBUTION
100-YEAR STORM RAINFALL FILE HDNCRK1.IH1

5 IO OUTPUT CONTROL VARIABLES

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

IT HYDROGRAPH TIME DATA

NMIN	15	MINUTES IN COMPUTATION INTERVAL
IDATE 1	0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	150	NUMBER OF HYDROGRAPH ORDINATES
NDDATE 2	0	ENDING DATE
NDTIME	1315	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.25 HOURS
TOTAL TIME BASE 37.25 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

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**************
*            *
*   CNTYYD   *
*            *
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6 KK

RUNOFF HYDROGRAPH FROM COUNTY YARD TRIB

SUBBASIN RUNOFF DATA

12 BA SUBBASIN CHARACTERISTICS

TAREA	0.14	SUBBASIN AREA

PRECIPITATION DATA

8 PB

STORM	5.90	BASIN TOTAL PRECIPITATION

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 9 PI          INCREMENTAL PRECIPITATION PATTERN
                 2.00     2.00     2.00     3.00     3.00     3.00     4.00     8.00    19.00    16.00
                 6.00     4.00     4.00     3.00     3.00     3.00     2.00     3.00     2.00     2.00
                 2.00     2.00     1.00     1.00

13 LS          SCS LOSS RATE
                   STRTL      0.35  INITIAL ABSTRACTION
                  CRVNBR     85.00  CURVE NUMBER
                   RTIMP      0.00  PERCENT IMPERVIOUS AREA

14 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG      2.08  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            44 END-OF-PERIOD ORDINATES
                1.       4.       7.      12.      18.      24.      28.      30.      31.      30.
               28.      25.      22.      18.      14.      12.      10.       8.       7.       6.
                5.       4.       3.       3.       2.       2.       2.       1.       1.       1.
                1.       1.       1.       0.       0.       0.       0.       0.       0.       0.
                0.       0.       0.       0.

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

          **************
          *            *
15 KK     *     CHTWD  *
          *            *
          **************
                        RUNOFF HYDROGRAPH FROM CHITWOOD TRIB

             SUBBASIN RUNOFF DATA

17 BA          SUBBASIN CHARACTERISTICS
                  TAREA      0.91  SUBBASIN AREA

               PRECIPITATION DATA

 8 PB                STORM      5.90  BASIN TOTAL PRECIPITATION

 9 PI          INCREMENTAL PRECIPITATION PATTERN
                 2.00     2.00     2.00     3.00     3.00     3.00     4.00     8.00    19.00    16.00
                 6.00     4.00     4.00     3.00     3.00     3.00     2.00     3.00     2.00     2.00
                 2.00     2.00     1.00     1.00

18 LS          SCS LOSS RATE
                   STRTL      0.41  INITIAL ABSTRACTION
                  CRVNBR     83.00  CURVE NUMBER
                   RTIMP      0.00  PERCENT IMPERVIOUS AREA

19 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG      4.72  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            96 END-OF-PERIOD ORDINATES
                1.       3.       6.      10.      14.      18.      24.      30.      37.      45.
               54.      63.      70.      77.      82.      86.      89.      90.      91.      90.
               90.      88.      85.      82.      79.      75.      71.      67.      62.      56.
               51.      46.      42.      38.      35.      32.      30.      27.      25.      23.
```

22.	20.	18.	17.	15.	14.	13.	12.	11.	10.
9.	9.	8.	7.	7.	6.	6.	5.	5.	4.
4.	4.	3.	3.	3.	3.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.				

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          **************
          *            *
20 KK     *   JUCT1    *
          *            *
          **************
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COMBINE RUNOFF HYDROGRAPHS FOM COUNTY YARD & CHITWOOD TRIBS @ JUNCTION J1

22 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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          **************
          *            *
23 KK     *   DULNG    *
          *            *
          **************
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RUNOFF HYDROGRAPH FROM DULING TRIB

SUBBASIN RUNOFF DATA

25 BA SUBBASIN CHARACTERISTICS

TAREA 0.89 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 5.90 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	2.00	2.00	3.00	3.00	3.00	4.00	8.00	19.00	16.00
6.00	4.00	4.00	3.00	3.00	3.00	2.00	3.00	2.00	2.00
2.00	2.00	1.00	1.00						

26 LS SCS LOSS RATE

STRTL 0.63 INITIAL ABSTRACTION

CRVNBR 76.00 CURVE NUMBER

RTIMP 0.00 PERCENT IMPERVIOUS AREA

27 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 6.32 LAG

***

UNIT HYDROGRAPH

128 END-OF-PERIOD ORDINATES

1.	2.	3.	5.	6.	9.	11.	14.	17.	20.
24.	28.	32.	37.	42.	46.	50.	55.	57.	60.
63.	64.	66.	66.	67.	67.	66.	66.	65.	63.
62.	60.	58.	56.	54.	52.	50.	47.	44.	41.

38.	35.	33.	30.	29.	27.	25.	24.	22.	21.
19.	18.	17.	16.	15.	14.	14.	13.	12.	11.
10.	10.	9.	9.	8.	8.	7.	7.	6.	6.
6.	5.	5.	5.	4.	4.	4.	4.	3.	3.
3.	3.	3.	2.	2.	2.	2.	2.	2.	2.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.		

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          **************
          *            *
28 KK     *    JUNC2   *
          *            *
          **************
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COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J1 WITH RUNOFF HYDROGRAPH FROM DULING TRIB AT JUNCTION J2

31 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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          **************
          *            *
32 KK     *    NREST   *
          *            *
          **************
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RUNOFF HYDROGRAPH FROM NORTHEAST TRIB

SUBBASIN RUNOFF DATA

34 BA SUBBASIN CHARACTERISTICS

TAREA	0.55	SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM	5.90	BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	2.00	2.00	3.00	3.00	3.00	4.00	8.00	19.00	16.00
6.00	4.00	4.00	3.00	3.00	3.00	2.00	3.00	2.00	2.00
2.00	2.00	1.00	1.00						

35 LS SCS LOSS RATE

STRTL	0.74	INITIAL ABSTRACTION
CRVNBR	73.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

36 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	6.98	LAG

***

UNIT HYDROGRAPH
142 END-OF-PERIOD ORDINATES

```
    0.    1.    1.    2.    3.    4.    5.    6.    8.    9.
   11.   13.   15.   17.   20.   22.   25.   27.   29.   31.
   32.   34.   35.   36.   37.   37.   37.   37.   37.   37.
   37.   36.   36.   35.   34.   33.   32.   31.   30.   29.
   28.   26.   25.   23.   22.   20.   19.   18.   17.   16.
   15.   14.   13.   12.   12.   11.   10.   10.    9.    9.
    8.    8.    8.    7.    7.    6.    6.    6.    5.    5.
    5.    4.    4.    4.    4.    4.    3.    3.    3.    3.
    3.    3.    2.    2.    2.    2.    2.    2.    2.    2.
    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.
    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.
    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
    0.    0.

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

          **************
          *            *
 37 KK    *    JUNC3   *
          *            *
          **************
                       COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J2 WITH RUNOFF HYDROGRAPH FROM
                       NORTHEAST TRIB @ JUNCTION J3

 40 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

          **************
          *            *
 41 KK    *   STHBRG   *
          *            *
          **************
                       RUNOFF HYDROGRAPH FROM SOUTHBOROUGH TRIB

            SUBBASIN RUNOFF DATA

 43 BA          SUBBASIN CHARACTERISTICS
                     TAREA       0.06  SUBBASIN AREA

                PRECIPITATION DATA

  8 PB               STORM       5.90  BASIN TOTAL PRECIPITATION

  9 PI            INCREMENTAL PRECIPITATION PATTERN
                    2.00     2.00     2.00     3.00     3.00     3.00     4.00     8.00    19.00    16.00
                    6.00     4.00     4.00     3.00     3.00     3.00     2.00     3.00     2.00     2.00
                    2.00     2.00     1.00     1.00

 44 LS          SCS LOSS RATE
                     STRTL       0.33  INITIAL ABSTRACTION
                     CRVNBR     86.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

 45 UD          SCS DIMENSIONLESS UNITGRAPH
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TLAG 0.94 LAG

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UNIT HYDROGRAPH
21 END-OF-PERIOD ORDINATES

4. 11. 22. 27. 26. 21. 14. 9. 7. 4.
3. 2. 1. 1. 1. 0. 0. 0. 0. 0.
0.

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****
* *
46 KK * JUNC4 *
* *
****

COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J3 WITH RUNOFF HYDROGRAPH
FROM SOUTHBOROUGH TRIB @ JUNCTION J4

49 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

*** ***

****
* *
50 KK * CMPSBN *
* *
****

RUNOFF HYDROGRAPH FROM CAMPUS/BARN TRIB

SUBBASIN RUNOFF DATA

52 BA SUBBASIN CHARACTERISTICS
TAREA 0.12 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 5.90 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN
2.00 2.00 2.00 3.00 3.00 3.00 4.00 8.00 19.00 16.00
6.00 4.00 4.00 3.00 3.00 3.00 2.00 3.00 2.00 2.00
2.00 2.00 1.00 1.00

53 LS SCS LOSS RATE
STRTL 0.50 INITIAL ABSTRACTION
CRVNBR 80.00 CURVE NUMBER
RTIMP 0.00 PERCENT IMPERVIOUS AREA

54 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 2.16 LAG

***

UNIT HYDROGRAPH
45 END-OF-PERIOD ORDINATES

1.	3.	6.	9.	14.	19.	23.	25.	25.	25.
24.	22.	19.	16.	13.	11.	9.	7.	6.	5.
5.	4.	3.	3.	2.	2.	2.	1.	1.	1.
1.	1.	1.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.					

*** ***

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          **************
          *            *
55 KK     *   OLDCRK   *
          *            *
          **************
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RUNOFF HYDROGRAPH FROM OLD CREEK TRIB

SUBBASIN RUNOFF DATA

57 BA SUBBASIN CHARACTERISTICS

TAREA 0.37 *SUBBASIN AREA*

PRECIPITATION DATA

8 PB STORM 5.90 BASIN TOTAL PRECIPITATION

9 PI *INCREMENTAL PRECIPITATION PATTERN*

2.00	2.00	2.00	3.00	3.00	3.00	4.00	8.00	19.00	16.00
6.00	4.00	4.00	3.00	3.00	3.00	2.00	3.00	2.00	2.00
2.00	2.00	1.00	1.00						

58 LS SCS LOSS RATE

STRTL	0.90	INITIAL ABSTRACTION
CRVNBR	69.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

59 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 14.25 LAG

***

UNIT HYDROGRAPH
287 END-OF-PERIOD ORDINATES

0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	2.	2.	2.	2.	2.	3.	3.	3.
3.	4.	4.	4.	5.	5.	5.	6.	6.	6.
7.	7.	8.	8.	8.	9.	9.	9.	10.	10.
10.	11.	11.	11.	11.	12.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	11.
11.	11.	11.	11.	11.	10.	10.	10.	10.	10.
10.	9.	9.	9.	9.	9.	8.	8.	8.	7.
7.	7.	7.	7.	6.	6.	6.	6.	6.	5.
5.	5.	5.	5.	5.	5.	4.	4.	4.	4.
4.	4.	4.	4.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

```
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.


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

         **************
         *            *
60 KK    *    JUNC5   *
         *            *
         **************
                       COMBINE RESULTANT HYDROGRAPH FROM JUNCTION J4 WITH RUNOFF HYDROGRAPHS FROM
                       CAMPUS/BARN AND OLD CREEK TRIBS AT DRAINAGE STRUCTURE

63 HC          HYDROGRAPH COMBINATION
                     ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                            ***
```

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	CNTYYD	91.	4.75	58.	16.	10.	0.14		
HYDROGRAPH AT	CHTWD	326.	7.75	270.	98.	63.	0.91		
2 COMBINED AT	JUCT1	365.	7.25	309.	114.	73.	1.05		
HYDROGRAPH AT	DULNG	207.	9.50	184.	78.	51.	0.89		
2 COMBINED AT	JUNC2	541.	8.00	471.	192.	124.	1.94		
HYDROGRAPH AT	NREST	107.	10.25	97.	44.	29.	0.55		
2 COMBINED AT	JUNC3	631.	8.25	556.	235.	153.	2.49		
HYDROGRAPH AT	STHBRG	64.	3.25	27.	7.	4.	0.06		
2 COMBINED AT	JUNC4	633.	8.25	561.	242.	157.	2.55		
HYDROGRAPH AT	CMPSBN	66.	5.00	43.	12.	8.	0.12		
HYDROGRAPH AT	OLDCRK	32.	17.75	32.	22.	16.	0.37		
3 COMBINED AT	JUNC5	664.	8.00	595.	274.	181.	3.04		

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

PONDING AREA F

UPDATE STUDY

FOR

HIDDEN CREEK ADDN

PONDING AREA F UPDATE STUDY

Purpose of the Study is to update the Corps of Engineers calculation for the 25-year ponding elevation for Ponding Area F to meet the FEMA standard for the 100-year storm rainfall. Results of the Study are to be used to recommend minimum floor elevations for new residential buildings in the area adjacent to Cowskin Creek in the area east of the Big Ditch and west of Meridian Avenue.

Drainage basin boundaries were mapped on prints of USGS quadrangle maps enlarged to a scale of 1 inch to 1000 feet using County drainage maps, aerial photographs and field observation. Those boundaries were transferred to prints of the Sedgwick County Soils Survey maps, again enlarged to a scale of 1 inch to 1000 feet. SubBasin areas layed out on the enlarged Soils Map were measured and summed to obtain the total area draining to Ponding Area F.

The soil group information was then used to calculate a composite SCS Curve Number to be used to calculate the runoff from a 100-year frequency 6-hour storm rainfall. That runoff was then multiplied by the total drainage basin area to calculate a volume of runoff which will need to be temporarily stored outside the Big Ditch levee.

Using the Area-Capacity Curve for Ponding Area F which was prepared by the Corps of Engineers, the elevation which would be reached by storing the total volume of runoff from the drainage basin was determined.

Excerpts from the 1949 Corps of Engineers Analysis of Design document which outline the process used to determine the 25-year ponding elevation, Corps of Engineers Drainage Area Map on which the area contributing to Ponding Area F is highlighted, an excerpt from the Corps of Engineers Ponding Area F map, Table 9-1 from the Corps of Engineers Operation and Maintenance Manual, an excerpt from FEMA FIRM panel 200, an excerpt from the City of Wichita Flood Damage Prevention Code pertaining to Manufactured Homes, prints of the enlarged USGS quadrangle map and Soils map, detailed measurements of subbasin drainage areas, calculations leading to a composite SCS Curve Number, calculation of runoff from the 100-year 6-hour rainfall and the total runoff from the drainage basin, and a print of the Area-Capacity Curve showing the extrapolated Capacity curve intersecting the calculated total runoff at elevation 1274.8 are provided.

M.S. Mitchell
January, 2000

Table of Contents

CORPS OF ENGINEERS, U. S. ARMY
TULSA DISTRICT
TULSA, OKLAHOMA

ANALYSIS OF DESIGN
FOR
CONSTRUCTION OF

BIG SLOUGH-COWSKIN FLOODWAY
PARCEL "A"

WICHITA AND VALLEY CENTER
ARKANSAS RIVER, KANSAS

To accompany letter to Chief of Engineers, Department of the Army,
dated September 2, 1949

3-10. Rational method of determination of peak flows. - The peak discharges for designing interconnecting ditches and road culverts where volume of flow is not pertinent were obtained by the use of the equation $Q = CIA$ where Q = run-off in c.f.s.; C = run-off coefficient, I = intensity of rainfall in inches per hour for the time of concentration, and A = contributing area in acres. The value of C varied from 0.3 to 0.4 depending on characteristics of drainage area. Intensities were obtained from curves on plate XI.

3-11. Design floods, Arkansas River in flood. - Ponding would be required for the design rainfall, less infiltration for the condition of the Arkansas River in flood. The volume of storage, area inundated, and ponding elevation for the condition of the Arkansas River in flood for each of the six areas are shown in table 5.

TABLE 5

PONDING WITH THE ARKANSAS RIVER IN FLOOD

Area	Elevation	Volume (acre-feet)	Area (acres)
A	1243.3	5	9
B	1248.5	25	32
C	1253.9	25	27
D	1262.2	42	42
E	1264.1	124	111
F	1267.2	87	27

3-12. Design floods, Arkansas River not in flood. - The design storm, as shown in table 1, less the infiltration, see paragraph 3-07, was applied to the unit-hydrograph shown in table 4 for each of the internal areas. The resulting flood hydrographs are shown on plates XXII through XXVII. The peak inflow and total volume of run-off for each of the internal areas are shown in table 6.

TABLE 6

DESIGN FLOWS AND RUN-OFF VOLUMES, ARKANSAS RIVER NOT IN FLOOD

Area	Drainage Area (acres)	Peak Inflow (c.f.s.)	Total Run-off (acre-feet)
A	114	51	26
B	564	162	127
C	584	268	134
D	995	290	229
E	2,850	710	656
F	2,004	540	461

3-18. Method of routing design floods. - Floodway flows at the confluence of Cowskin Creek for the condition of Arkansas River not in flood were determined by adding the flood hydrographs of Cowskin Creek and Big Slough, from its interception at the upper end of Arkansas Levees to the head of Parcel "A", as shown on plate XXI. This in effect, allows for maximum contribution from interior drainage areas of Parcel "B". A rating curve of the floodway channel at the outlet of each interior area of Parcel "A" was computed. The inflow hydrograph from the uppermost area in Parcel "A" was routed through the ponding area and pipe. The resultant hydrograph was moved, considering time of travel, to the next culvert downstream where the process was repeated, each time adding the time of travel and the outflow from the internal area. The discharge from control structure V was subtracted from the floodway hydrograph at the outlet of Cowskin Creek.

3-19. Design floods, Arkansas River not in flood. - The results of the above-described routings, consisting of inflow, outflow, ponding elevation and floodway hydrographs, and design rainfall are shown on plates XXII through XXVII. The ponding elevation, volume of storage and area inundated for each of the internal areas is shown in table 9.

TABLE 9

PONDING WITH ARKANSAS RIVER NOT IN FLOOD

Area	Elevation	Volume (acre-feet)	Area (acres)
A	1244.5	21.6	20
B	1248.5	25.0	32
C	1254.5	44.0	38
D	1262.6	68.0	71
E	1265.7	400.0	222
F	1273.8	461.0	137

3-20. Description of ponding areas. - The delineation of ponding areas is shown on plates VI through VIII. Small differences in elevation between ponding areas and channel bottom along with backwater from local run-off in floodway nullify any advantages to be gained in a greater number of pipes. A brief description of the ponding areas follows:

a. Area A. - A storm of 25-year frequency, not related to stages on the Arkansas River, will cause ponding to elevation 1244.5 and will inundate 20 acres. A design storm of 25-year frequency for the Arkansas River in flood will cause ponding to elevation 1243.3 and will inundate nine acres. The area to be utilized for the storage of flood flows from area A is wooded land subject to overflow from major floods on the Arkansas River.

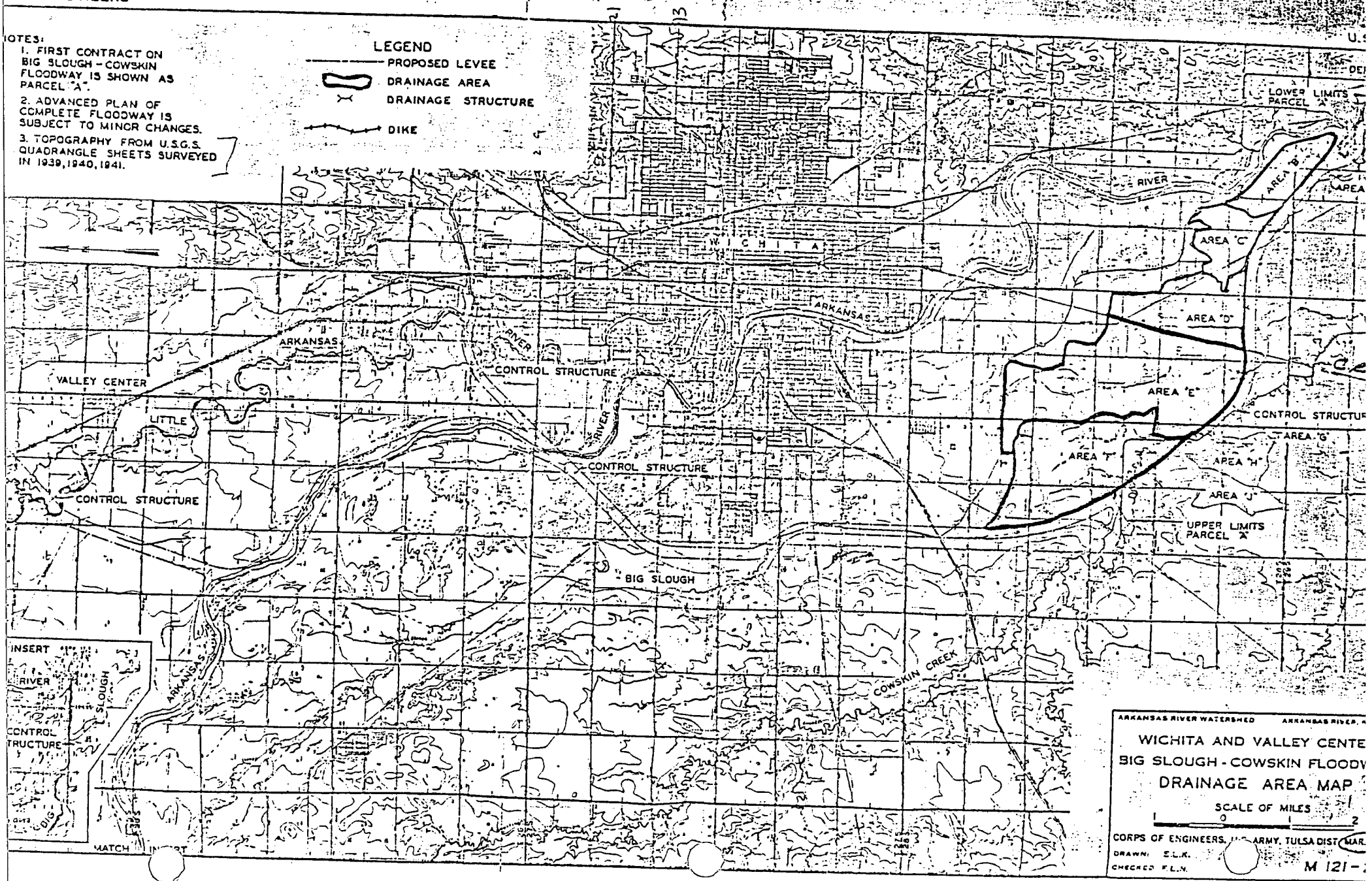
b. Area B. - A storm of 25-year frequency, not related to stages on the Arkansas River, will cause ponding to elevation 1248.5 and will inundate 32 acres. The design storm for the Arkansas River in flood will cause ponding to the same elevation. The area to be utilized for the storage of flood flows is farm land subject to overflow from major floods on the Arkansas River.

c. Area C. - The design storm, not related to stages on the Arkansas River, will pond to elevation 1254.5 and will inundate 38 acres. The design storm, with the Arkansas River above flood stage, will pond to elevation 1253.9 and will inundate 27 acres. The area to be utilized for the storage of flood flows is about one-half grazing and one-half farming land, some of which is subject to overflow from the Arkansas River.

d. Area D. - The design storm, not related to stages on the Arkansas River, will pond to elevation 1262.6 and inundate 71 acres. The area is so flat that the average depth of ponding will be less than one foot, consequently covering a large area to obtain the required storage. The design storm with the Arkansas River above flood stage will pond to elevation 1262.2 and will inundate 42 acres. The area to be utilized for the storage of flood flows consists of about one-third pasture land and two-thirds cultivated land. Some buildings of two farm units will be affected. No definite drainage lines exist within this area.

e. Area E. - The design storm, not related to stage on the Arkansas River, will pond to elevation 1265.7 and will inundate 222 acres. The average depth of ponding will be only 1.8 feet. The design storm, with the Arkansas River above flood stage, will cause ponding to elevation 1264.1 and will inundate 111 acres. The area to be utilized for the storage of flood flows consists of cultivated land. Seven well developed farm units will be affected. An existing culvert under the Chicago, Rock Island and Pacific Railroad is to be closed to retain the ponding west of the railroad inasmuch as the farm units would be affected if the waters were allowed to spread on either side of the railroad and a saving of several acres of farm land will be effected by ponding to a higher elevation upstream.

f. Area F. - It is proposed to maintain and extend the spoil bank, Levee "E", along the left bank of Cowskin Creek at its entrance to the floodway at Station 356+20E to utilize the existing channels of Cowskin Creek for ponding to a greater depth, thereby preventing the floodwaters from spreading over large agricultural areas to a lesser depth downstream. The design storm, not related to stages on the Arkansas River, will pond to elevation 1273.8 and will inundate 137 acres. The design storm, with the Arkansas River above flood stage, will cause ponding to elevation 1267.2 and will inundate 27 acres. The area to be utilized for the storage of flood flows includes the excavated channel of Cowskin Creek, the original channel of Cowskin Creek and the low land adjacent thereto, most of which is in cultivation.


NOTES:
1. FIRST CONTRACT ON BIG SLOUGH - COWSKIN FLOODWAY IS SHOWN AS PARCEL "A".
2. ADVANCED PLAN OF COMPLETE FLOODWAY IS SUBJECT TO MINOR CHANGES.
3. TOPOGRAPHY FROM U.S.G.S. QUADRANGLE SHEETS SURVEYED IN 1939, 1940, 1941.
LEGEND
PROPOSED LEVEE
DRAINAGE AREA
DRAINAGE STRUCTURE
DIKE
WICHITA
ARKANSAS RIVER
VALLEY CENTER
LITTLE ARKANSAS RIVER
CONTROL STRUCTURE
CONTROL STRUCTURE
CONTROL STRUCTURE
CONTROL STRUCTURE
LOWER LIMITS PARCEL "A"
UPPER LIMITS PARCEL "A"
AREA "B"
AREA "C"
AREA "D"
AREA "E"
AREA "F"
AREA "G"
AREA "H"
AREA "J"
BIG SLOUGH
COWSKIN CREEK
INSERT
MATCH LINE
ARKANSAS RIVER WATERSHED
WICHITA AND VALLEY CENTER
BIG SLOUGH - COWSKIN FLOODWAY
DRAINAGE AREA MAP
SCALE OF MILES
0 1 2
CORPS OF ENGINEERS, U.S. ARMY, TULSA DIST.
DRAWN: S.L.K.
CHECKED: F.L.N.
M 121 -

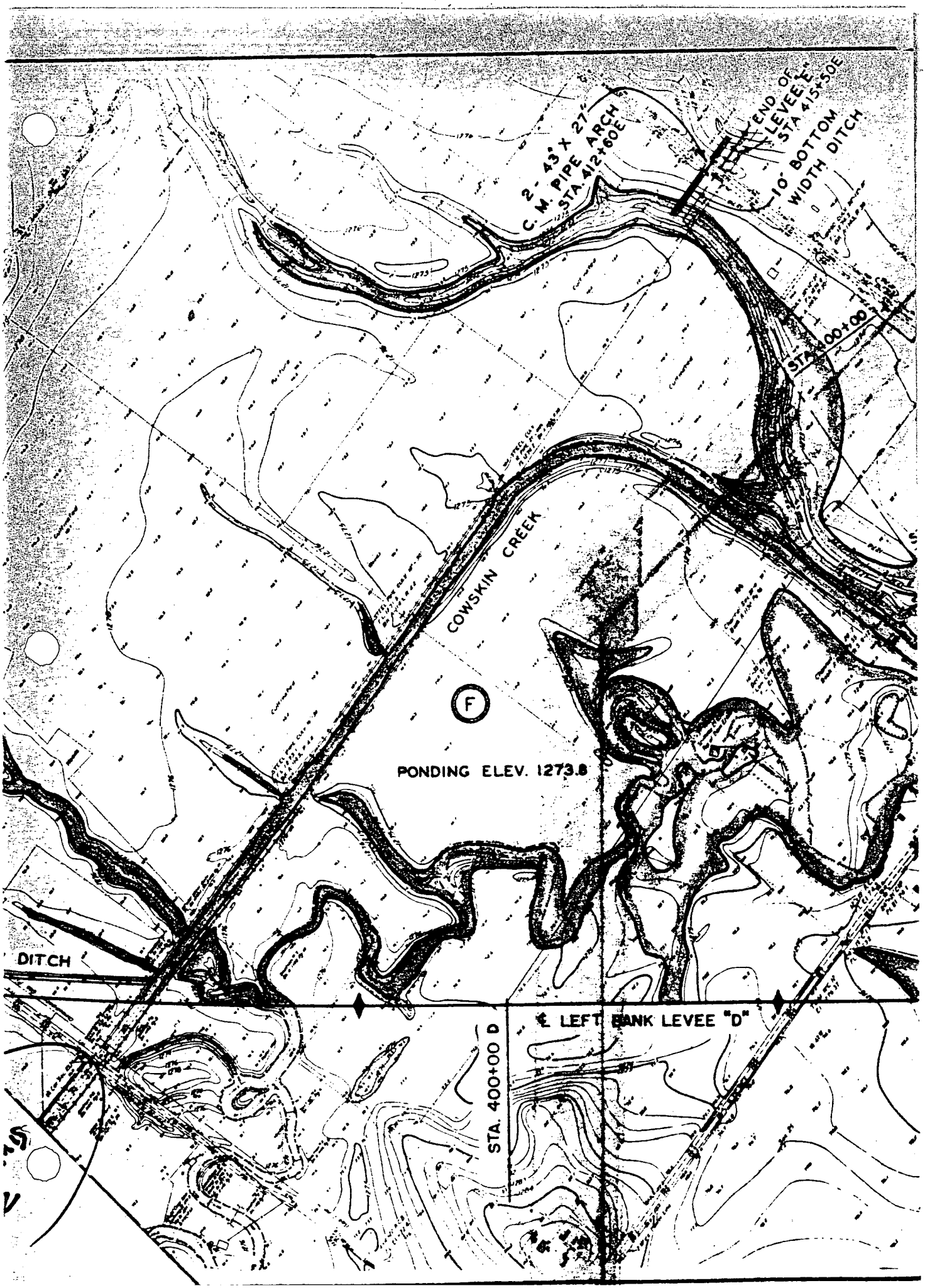
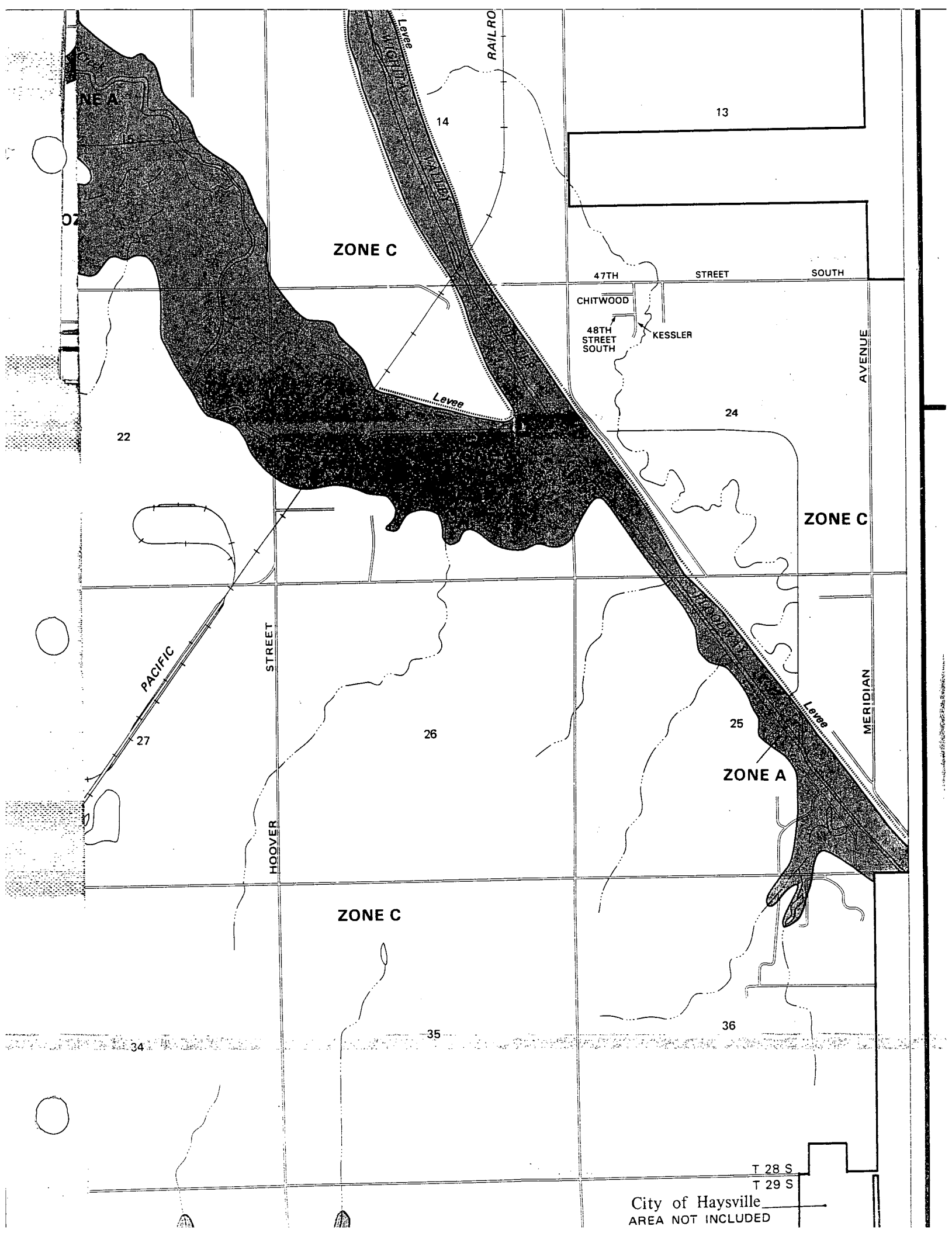

2- 43" X 27" C.M. PIPE ARCH STA. 412+60E
END OF LEVEE "E" STA 415+50E
10' BOTTOM WIDTH DITCH
STA. 400+00
COWSKIN CREEK
F
PONDING ELEV. 1273.8
DITCH
℄ LEFT BANK LEVEE "D"
STA. 400+00 D

TABLE 9-1

DRAINAGE STRUCTURE DATA AND INTERIOR PONDING REQUIREMENTS

Levee	Structure Station	Size	Type of Gate: Manual	Type of Gate: Automatic	Drainage Area (Acres)	Area No.	25-Year Pondage Elevation	Area Covered (Acres)	Remarks
C	64+90	1-24"		x	114	A	1244.5	20	
	430+50	1-36"		x	66	K	78.3	13	
	528+00	4-36"	x	x	527	M	90.0	18	
	602+45	4-60"	x	x	2,955	N	95.1	105	
	691+50	1-48"	x	x	280	O	1302.0	11	
	976+40	3-48"		x	2,220	U	18.0	31	
	1085+40	2-36"		x	525	V	Minor	-	Areas V,
	1116+17	3-36"		x	755	X	Minor	-	X and J
	1237+00	1-36"		x	140	J	Minor	-	Overflows
									40
									976+40
	1374+50	1-36"		x	226	I	Minor	-	
D	82+00	1-72"x44"	x	x	564	B	1248.5	32	
	152+60	1-60"	x	x	584	C	54.7	41	
	208+50	1-36"	x	x	65	D_1	63.0	6	
	225+00	3-60"	x	x	930	D	63.8	125	
	278+20	2-60"	x	x	2,850	E	63.8	90	
	359+85	1-72"x44"	x	x	2,004	F	73.8	137	
	624+50	3-36"	x	x	271	Q	95.5	9	
	690+40	2-36"	x	x	180	R	1301.3	10	
	727+50	2-48"	x	x	442	S	04.5	21	
	1082+70	1-18"		x	Minor	-	-	-	
	1135+89	1-30"		x	30	12	20.4	5	
E	381+30	1-43"x27"		x	80				E-Minor,
									Levee
									outside
									Floodway
									Levee
F	1091+50	2-36"		x	142	W	28.6	6	
	1162+00	3-48"	x	x	757	Y	34.2	31	
	1223+50	2-48"	x	x	888	Z	41.7	26	
J	1295+80	3-48"		x	1,536	1	51.8	218	
	1355+00	2-48"		x	598	2	Minor		Areas 2,
	1391+60	2-48"		x	748	3	Minor		3 and 4
	1442+00	3-48"		x	901	4	Minor		Overflows
									to
									1295+80


ZONE A
ZONE C
ZONE C
ZONE C
Levee
RAILRO
Levee
47TH
STREET
SOUTH
CHITWOOD
48TH
STREET
SOUTH
KESSLER
AVENUE
Levee
Levee
PACIFIC
STREET
HOOVER
MERIDIAN
13
14
22
24
25
26
27
34
35
36
T 28 S
T 29 S
City of Haysville
AREA NOT INCLUDED

tered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the official as set forth in Section 27.04.090(c) of this chapter.

(c) Require for all new construction and substantial improvements that fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

(d) Manufactured Homes.

(1) All manufactured homes shall be anchored to resist flotation, collapse, or lateral movement. Manufactured homes must be anchored in accordance with state and local building codes and FEMA guidelines. In the event that over-the-top frame ties to ground anchors are used, the following specific requirements (or their equivalent) shall be met:

(i) Over-the-top ties be provided at each of the four corners of the manufactured home, with two additional ties per side at intermediate locations and manufactured homes less than fifty feet long requiring one additional tie per side;

(ii) Frame ties be provided at each corner of the home, with five additional ties per side at intermediate points and manufactured homes less than fifty feet long requiring four additional ties per side;

(iii) All components of the anchoring system be capable of carrying a force of four thousand eight hundred pounds;

(iv) Any additions to manufactured homes be similarly anchored.

(2) Require that all manufactured homes to be placed within Zones A1-30, AH and AE on the community's FIRM be elevated on a permanent foundation such that the lowest floor of the manufactured home is at or above the base flood elevation; and be securely anchored to an adequately anchored foundation system in accordance with the provisions of Section 27.04.140(d)(1).

(3) Nothing herein shall be construed to limit or supersede the requirements of Chapter 26.04 of the city code relating to mobile and manufactured homes. (Ord. No. 40-973 § 5)

27.04.150 Floodways.

Located within areas of special flood hazard established in Section 27.04.040 of this chapter, are areas designated as floodways. Since the floodway may be an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles and erosion potential, the following provisions shall apply:

(a) Prohibit encroachments, including fill, new construction, substantial improvements and other developments unless certification by a professional registered engineer or architect is provided demonstrating that encroachments shall not result in any increase in the base flood elevation anywhere on the subject flooding source during occurrence of the base flood discharge.

(b) In Zone A unnumbered, obtain, review and reasonably utilize any floodway data available through federal, state or other sources or Section 27.04.130(d) of this chapter in meeting the standards of this section.

(c) If Section 27.04.150(a) of this chapter is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Section 27.04.120; 27.04.130; and 27.04.140 of this chapter. (Ord. No. 40-973 § 6)

27.04.160 Areas of shallow flooding.

Located within the areas of special flood hazard established in Section 27.04.040 of this code, are areas designated as shallow flooding. These areas have special flood hazards associated with base flood depths of one to three feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and indeterminate; therefore, the following provisions apply:

(a) Within AO Zones:

(1) All new construction and substantial improvement of residential structures shall have the lowest floor elevated above the highest adjacent grade at least one foot above the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified);

(2) All new construction and substantial improvements of nonresidential structures shall:

(i) Have the lowest floor elevated above the highest adjacent grade at least as high as one foot above the depth number specified in feet on the City of Wichita's FIRM (at least two feet if no depth is specified), or

(ii) Together with attendant utility and sanitary facilities, be completely floodproofed to or above one foot above the level specified in subsection (i) hereinabove so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

HIDDEN CREEK

BASIN CHARACTERISTICS

SUBAREA	BASIN AREA		OVERLAND FLOW	CHANNELIZED FLOW
	2906	5107		
CHITWOOD	0710	2906	N.1	L = 11,000'
TRIB	21.96	22.01 > 21.99		
D SOILS	Less 0.67 (B Soils Part 2)			Fall = 1288 - 1269 = 19'
	21.99 - 0.67 = 21.32			Slope = 19/110 = 0.173%
	21.32 x 22.96 = 490 Acres			
CHITWOOD	4900	5062		
TRIB	4746	4900		
C SOILS	1.54	1.62 > 1.58		
	1.58 x 22.96 = 36 Acres			
CHITWOOD	5727	5900		
TRIB	5550	5727		
B SOILS PART 1	1.77	1.73 > 1.75		
CHITWOOD	6467	6532		
TRIB	6399	6467		
B SOILS PART 2	0.68	0.65 > 0.67		
	Part 1 + Part 2 =			
	1.75 + 0.67 = 2.42			
	Σ 2.42 x 22.96 = 56 Acres			
DULING	1975	3095		
TRIB	0867	1975	N.1	L = 13,500'
D SOILS PART 1	11.08	11.20 > 11.14		
	3323	3496		Fall = 1293 - 1265 = 28'
PART 2	3150	3323		Slope = 28/135 = 0.207%
	1.73	1.73 > 1.73		
	Σ 11.14 + 1.73 = 12.87			
	12.87 x 22.96 = 295 Acres			
DULING	3130	3146		
TRIB	3118	3130		
C SOILS	0.12	0.16 > 0.14		
	0.14 x 22.96 = 3 Acres			

HIDDEN CREEK

BASIN CHARACTERISTICS

SUBAREA	BASIN AREA	OVERLAND FLOW	CHANNELIZED FLOW
DULING TRIB B SOILS	2899 4250 1536 2899 13.63 13.51 > 13.57 Less Group D Soils Part 2 (1.73 IN) 13.57 - 1.73 = 11.84 11.84 x 22.96 = 272 Acres		
NORTHEAST TRIB D SOILS	6005 6076 5932 6005 0.73 0.71 > 0.72 0.72 x 22.96 = 17 Acres	Nil	L_c = 11,000' Fall = 1286 - 1270 = 16' Slope = 16/110 = 0.145%
B SOILS Part 1	7055 7848 6248 7055 8.07 7.93 > 8.00 8.00 x 22.96 = 184 Acres	226	
B SOILS Part 2	2080 2263 1900 2080 1.80 1.83 > 1.82 1.82 x 22.96 = 42 Acres		
SOUTH BOROUGH TRIB D SOILS	4528 4596 4460 4528 0.68 0.68 > 0.68 0.68 x 22.96 = 16 Acres	Nil	L_c = 2200' Fall = 1270 - 1264 = 6' Slope = 6/22 = 0.273 %
B SOILS	4704 4814 4596 4704 1.08 1.10 > 1.09 1.09 x 22.96 = 25 Acres		
CAMPUS/ BARN TRIB D SOILS	7032 7199 6864 7032 1.68 1.67 > 1.68 1.68 x 22.96 = 39 Acres	Nil	L_c = 3590' Fall = 1275 - 1269 = 6' Slope = 6/35.9 = 0.167%
B SOILS	7378 7541 7223 7378 1.55 1.63 > 1.59 1.59 x 22.96 = 37 Acres		

HIDDEN CREEK

BASIN CHARACTERISTICS

SUBAREA	BASIN AREA	OVERLAND FLOW	CHANNELIZED FLOW
OLD CREEK TRIB D SOILS	8973 9199 8747 8973 2.26 2.26>2.26 2.26 x 22.96 = 52 ACRES		L = 10300' Fall = 1267 - 1263 = 4' Slope = 4/103 = .039%
B SOILS	2392 3197 1589 2392 8.03 8.05>8.04 8.04 x 22.96 = 185 ACRES		
COUNTY YARD TRIB D SOILS	4116 4494 3730 4116 3.86 3.81>3.84 3.84 x 22.96 = 88 ACRES	N=1	L = 5000' Fall = 1286 - 1275 = 11' Slope = 11/50 = 0.22%
	88/640 = 0.14 Sq. Miles		
NORTHEAST TRIB ADDENDUM (North of MacArthur West of Meridian) D Soils Part 1	6390 6416 6360 6390 0.30 0.26>0.28		
Part 2	5874 5918 5828 5874 0.46 0.44>0.45 0.73 x 22.96 = 17 ACRES		
B Soils	6729 7212 6265 6729 4.64 4.83>4.74		
less D Soils	4.74 - 0.73 = 4.01		
	4.01 x 22.96 = 92 ACRES		

HIDDEN CREEK

BASIN AREA

SUBAREA	GROUP B	GROUP C	GROUP D	Total
CHITWOOD	56 A	36A	490 A	582 A
DULING	272	3	295	570
NORTHEAST	318		34	352
SOUTHBOROUGH	25		16	41
HEIGHTS/BARN	37		39	76
OLD CREEK	185		52	237
COUNTY YARD	—	—	88	88
	893	39	1014	1946

Composite SCS CURVE NUMBER

CHITWOOD

Group C Soils

15% Impervious Surfaces w/CN 98	=	15
30% Small Grain SR+CR w/CN 80	=	24
55% Materials Storage w/CN 85	=	47
Comp CN	=	86

Group B Soils

10% Creekside, Trees & Brush w/CN 60	=	6
30% Farmstead w/CN 74	=	22
60% Large lot industrial w/30% impervious w/CN 84	=	50
Comp CN	=	78

Hidden Creek
Composite SCS Curve Number

SUBAREA

CHITWOOD

GROUP D SOILS

9% Manf Housing w/CN 90 =	8
16% Large lot residential w/CN 84 =	13
4% Creekside w/CN 78 =	3
61% Small Grain SR+CR = w/CN 84 =	51
10% Pasture/Meadow w/CN 79 =	8
Comp CN =	83

All Chitwood Trib

Group B Soils 10% @ CN 78 =	8
Group C Soils 6% @ CN 86 =	5
Group D Soils 84% @ CN 83 =	70
Composite CN for Chitwood =	83

DUING

Group B Soils

7% Large lot residential w/CN 68 =	5
13% Manufactured Homes w/CN 77 =	10
3% Farmsteads w/CN 74 =	2
16% Creekside w/CN 57 =	9
25% Pasture/Meadow w/CN 58 =	14
36% Small Grain SR+CR w/CN 72 =	26
Composite for Group B =	66

Group C Soils

100% Large Lot Residential w/CN 68 =	68

HIDDEN CREEK
COMPOSITE SCS CURVE NUMBER

SUBAREA

DULING

Group D Soils

7% Manufactured Homes w/CN 92 =	6
14% Small lot residential w/CN 92 =	13
25% Pasture/Meadow w/CN 79 =	20
54% Small Grain SR+CR w/CN 86 =	46
Composite CN =	85

All Duling Trib

Group B Soils 48% @ CN 66 =	32
Group C Soils 1% @ CN 68 =	1
Group D Soils 51% @ CN 85 =	43
Composite CN for Duling Trib =	76

Northeast

Group B Soils

5% Large lot residential w/CN 84 =	4
10% Farmsteads w/CN 74 =	7
85% Small Grain SR+CR w/CN 72 =	61
Composite for Group B =	72

Group D Soils

22% Farmstead w/CN 86 =	19
78% Small Grain SR+CR w/CN 84 =	66
Composite for Group D	85

All Northeast Trib

Group B Soils 93% @ CN 73 =	67
Group D Soils 7% @ CN 85 =	6
Composite for Northeast Trib =	73

HIDDEN CREEK

COMPOSITE SCS CURVE NUMBER

Sub Area: Southborough Trib

Group B Soils

95% Manufactured Home Zoning w/CN 85 =	81	
5% Creekside w/CN 57 =	3	
Composite CN for Group B =		84

No Group C Soils

Group D Soils

95% Manufactured Home Zoning w/CN 92 =	87	
5% Creekside w/CN 77 =	4	
Composite CN for Group D =		91

All Southborough Trib

Group B Soils 61% @ CN 84 =	51
Group C Soils –	—
Group D Soils 39% @ CN 91 =	35
Composite CN for Southborough Trib =	86

Heights/Beam Trib

Group B Soils

5% Large lot residential w/CN 84 =	4
13% Creekside/levee w/CN 60 =	8
82% Small Grain, SR+CR w/CN 72 =	59
Composite for Group B =	71

HIDDEN CREEK
COMPOSITE SCS CURVE NUMBER

SUBAREA

Heights/ Barn

Group D Soils

6% Farmstead w/CN 86 =	5
2% Commercial w/CN 90 =	2
29% School Buildings w/CN 95 =	28
33% School Campus Grounds w/CN 89 =	29
30% Small Grain, SR+CR w/CN 84 =	25
Composite CN for Group D =	89

All Heights/Barn Trib

Group B Soils 49% @ CN 71 =	35
Group D Soils 51% @ CN 89 =	45
Composite CN for Heights/Barn Trib =	80

Old Creek Trib

Group B Soils

8% Large lot residential w/CN 84 =	7
2% Surfaced lots/lake w/CN 95 =	2
3% Drives/Trails w/CN 82 =	2
36% Creekside w/Trees & Brush w/CN 48 =	17
51% Small Grain, SR+CR w/CN 72 =	37
Composite for B Soils	65

Group D Soils

100% Small Grain, SR+CR w/CN 84 =	84

All Old Creek Trib

Group B Soils 78% @ CN 65 =	51
Group D Soils 22% @ CN 84 =	18
Composite CN for Old Creek Trib =	69

HIDDEN CREEK
COMPOSITE SCS CURVE NUMBER

NORTEAST TRIB ADDENDUM

B Soils

Large lot residential = 8 Acres

Farmstead = 4 Acres

Large Lot 8+7 = 15 Acres

15/318 = 5%

Farmsteads 27+4 = 31 Acres

31/318 = 10%

Small Grain 192+80 = 272 Acres

272/318 = 86%

D Soils

Small Grain 10+17 = 27

27/34 = 79%

HIDDEN CREEK
COMPOSITE SCS CURVE NUMBER

SubArea: County Yard Trib

Group D Soils (100%)

3% Large lot residential w/CN 84 =	3
39% Materials/Equipment Storage Yard w/CN 92 =	36
1% Commercial w/CN 95 =	1
57% Pasture/Meadow w/CN 79 =	45
Composite CN for County Yard Trib =	85

Combined SCS Curve Number

SubArea	Basin Area	CN	Product
Chitwood	582	83	48306
Duling	570	76	43320
Northeast	352	73	25696
Southborough	41	86	3526
Heights/Barn	76	80	6080
Old Creek	237	69	16353
County Yard	88	85	7480
	1946		150761

Composite CN for all Basins = 150761 / 1946 = 77

HIDDEN CREEK

CALCULATION OF 100-YEAR 6-HOUR STORM RUNOFF & RELATED PONDING AREA F ELEVATION

Composite SCS Curve Number for total drainage basin is 77

SCS Runoff Volume is

$$\text{Runoff Volume } Q = \frac{(P-0.2S)^2}{P+0.8S}$$

where P is precipitation in inches = 5.9

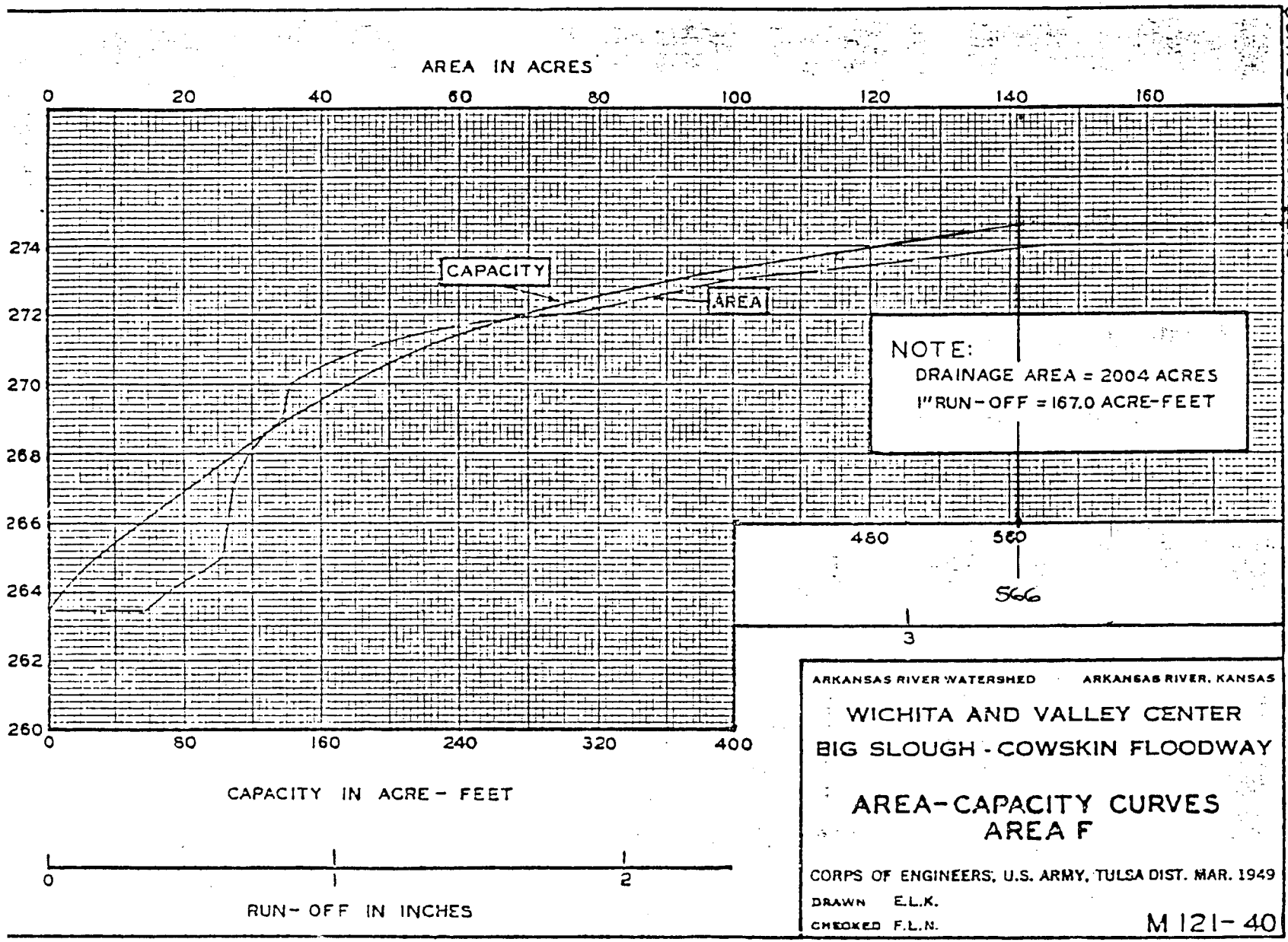
$$S = \frac{1000}{CN} - 10 = \frac{1000}{77} - 10 = 2.99$$

$$Q = \frac{[5.9 - (0.2 \times 2.99)]^2}{5.9 + 0.8(2.99)} = \frac{(5.9 - .598)^2}{5.9 + 2.39} = \frac{(5.302)^2}{8.29} = 3.39 \text{ inches}$$

Total runoff volume from basin area $= \frac{3.39}{12} \times 1946 = 550$ Acre Feet

When Corps of Engineers basin area of 2004 Acres is used

total volume $= \frac{3.39}{12} \times 2004 = 566$ Acre Feet use this



CORPS OF ENGINEERS

1214.8

ARKANSAS RIVER WATERSHED — ARKANSAS RIVER, KANSAS

WICHITA AND VALLEY CENTER
BIG SLOUGH - COWSKIN FLOODWAY

AREA-CAPACITY CURVES
AREA F

CORPS OF ENGINEERS, U.S. ARMY, TULSA DIST. MAR. 1949

DRAWN E.L.K.

CHECKED F.L.N.

M 121-40

PLATE XX

U.S. ARMY

DEPARTMENT OF ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

SEP 14 2000

Programs and Project Management Division
Readiness Team

Ms. Cheryl Holloway
Current Plans Division
Wichita-Sedgwick County Metropolitan
Area Planning Department
City Hall, Tenth Floor
455 North Main
Wichita, KS 67202-1688

RECEIVED
SEP 19 2000
CITY - ENGINEERING

Dear Ms. Holloway:

This is in response to your letter of July 31, 2000, requesting our review and approval of any encroachments to the ponding area by the proposed subdivision adjacent to the Wichita/Valley Center Flood Protection Project (WVCFPP) near South Meridian Road.

According to the as-built drawings, the elevation of the top of Ponding Area "F" is 1273.8 National Geodetic Vertical Datum (NGVD). All lots shown on the enclosed Hidden Creek Subdivision Plat with topographic information are above the ponding area elevation. However, there is a ponding area deficiency that must be addressed and the proposed remedy submitted for approval. The ponding area deficiency is described as follows: A portion of the original ponding area in the southwest portion of the subdivision has been filled in since the flood protection project was built in 1959. The filled-in area is shown in yellow on the enclosed subdivision plat. The filled-in volume below elevation 1273.8 must be estimated and an equal amount of material removed from the ponding area to replace the lost storage capacity.

Other conditions that must be met during the access road construction and when homes are built are described below:

a. The fill material necessary to construct the access roads across the old ponding area channels at three locations must be excavated from the ponding area below elevation 1273.8. This will replace the ponding storage lost due to filling in the old channels for road crossings.

b. The building floor slabs in the subdivision must be above the top of the ponding area elevation of 1273.8. This is estimated to be the Base Flood Elevation for local flood plain development regulations.

Our recommendation to the Federal Emergency Management Agency (FEMA) was that the Ponding Areas denoted on the as-built plans for the WVCFPP be designated "Zone A" for the Wichita and Sedgwick County Flood Insurance Rate Maps. All other flood plain regulations must be followed.

A permit under Section 404 of the Clean Water Act will be required for the old channel crossings and for any construction planned in wetlands that may exist on the property. For the permit or for a wetland determination, please contact Mr. Dan Hayes of the Kansas State Regulatory Office, Kansas City District, Corps of Engineers, 2710 NE Shady Lane Access Road, El Dorado, KS 67042, or by telephone at 316-322-8247. Other Federal, State, and local permits may be required.

If you have questions, please contact Mr. Jack Ball of our Readiness Branch at 918-669-7382.

Sincerely,

John H. Roberts, P.E.
Deputy for Programs and Project Management

Enclosures

Copies Furnished:

Mr. Christopher M. Carrier, P.E.
Storm Water Management Division
City Hall, Eighth Floor
455 North Main Street
Wichita, KS 67202

Mr. Bob Jennings
Flood Control Supervisor
Department of Public Works
1801 South McLean Boulevard
Wichita, KS 67213

Mr. Dan Hayes
Kansas State Regulatory Office
2710 NE Shady Lane Access Road
El Dorado, KS 67042

CITY OF WICHITA

Wichita-Sedgwick County Metropolitan Area Planning Department

CESWT-PE-P
RECEIVED
AUG 07 2000
PLANNING BRANCH

July 31, 2000

Gene Lilly
U.S. Army Corps of Engineers, Tulsa District
1645 S. 101 E. Avenue
Tulsa, OK 74128-4609

RE: Final Plat of HIDDEN CREEK ADDITION

It has been our policy to obtain the Corps of Engineer's review and approval on any encroachments to the ponding areas associated with the Wichita-Valley Center Flood Control Project.

Enclosed is the above referenced plat, along with the drainage plan, for your review in regards to the ponding areas. This plat will be presented to the Subdivision Committee on August 24, 2000.

If you have any comments, please call Neil Strahl at (316) 268-4459, on or before August 14, 2000.

Thanks for your cooperation.

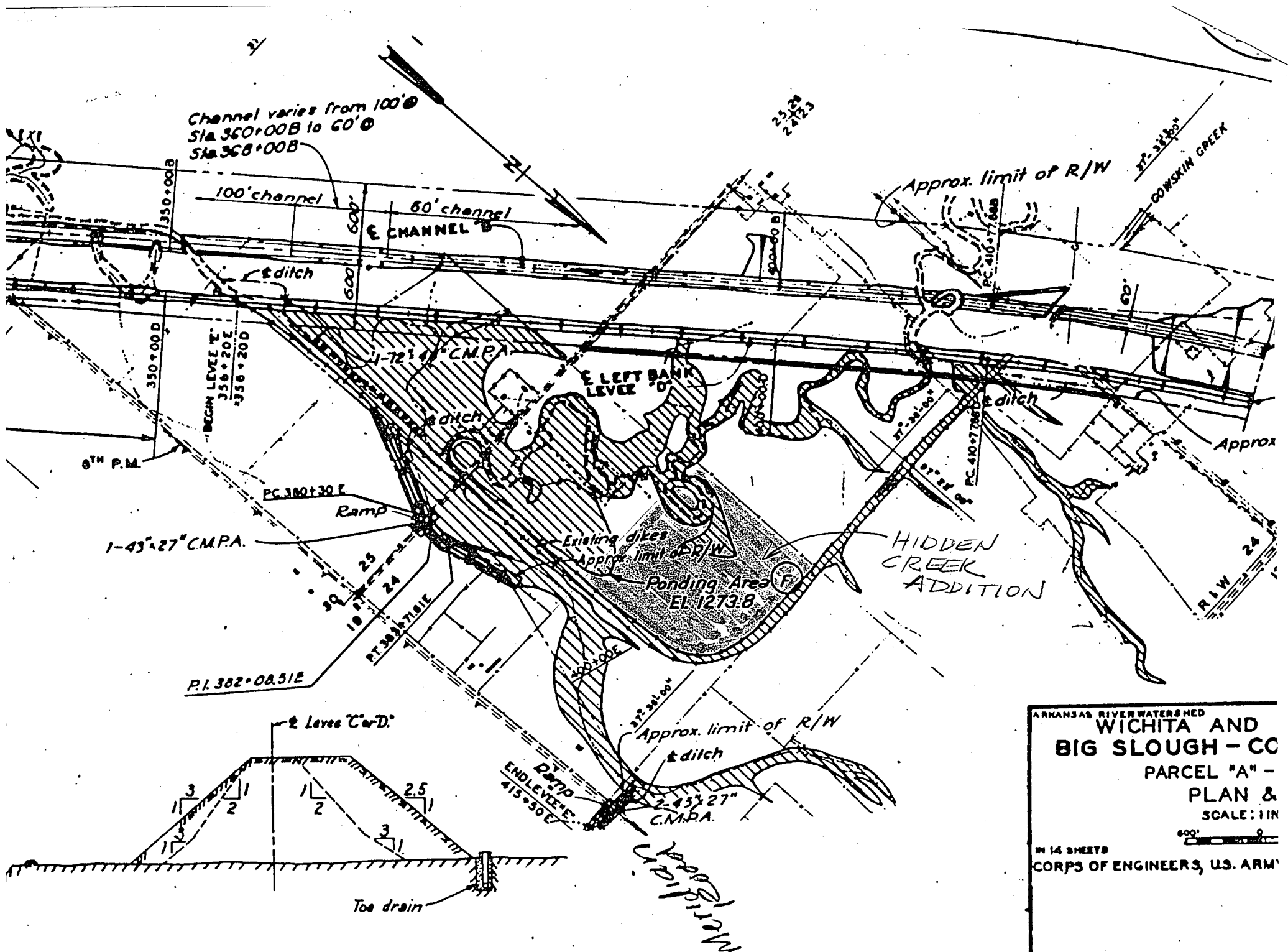
Cheryl Holloway, Secretary
Current Plans Division

Enclosures

City Hall • 10th Floor • 455 North Main • Wichita, Kansas 67202-1688

T 316.268.4421 **F** 316.268.4390

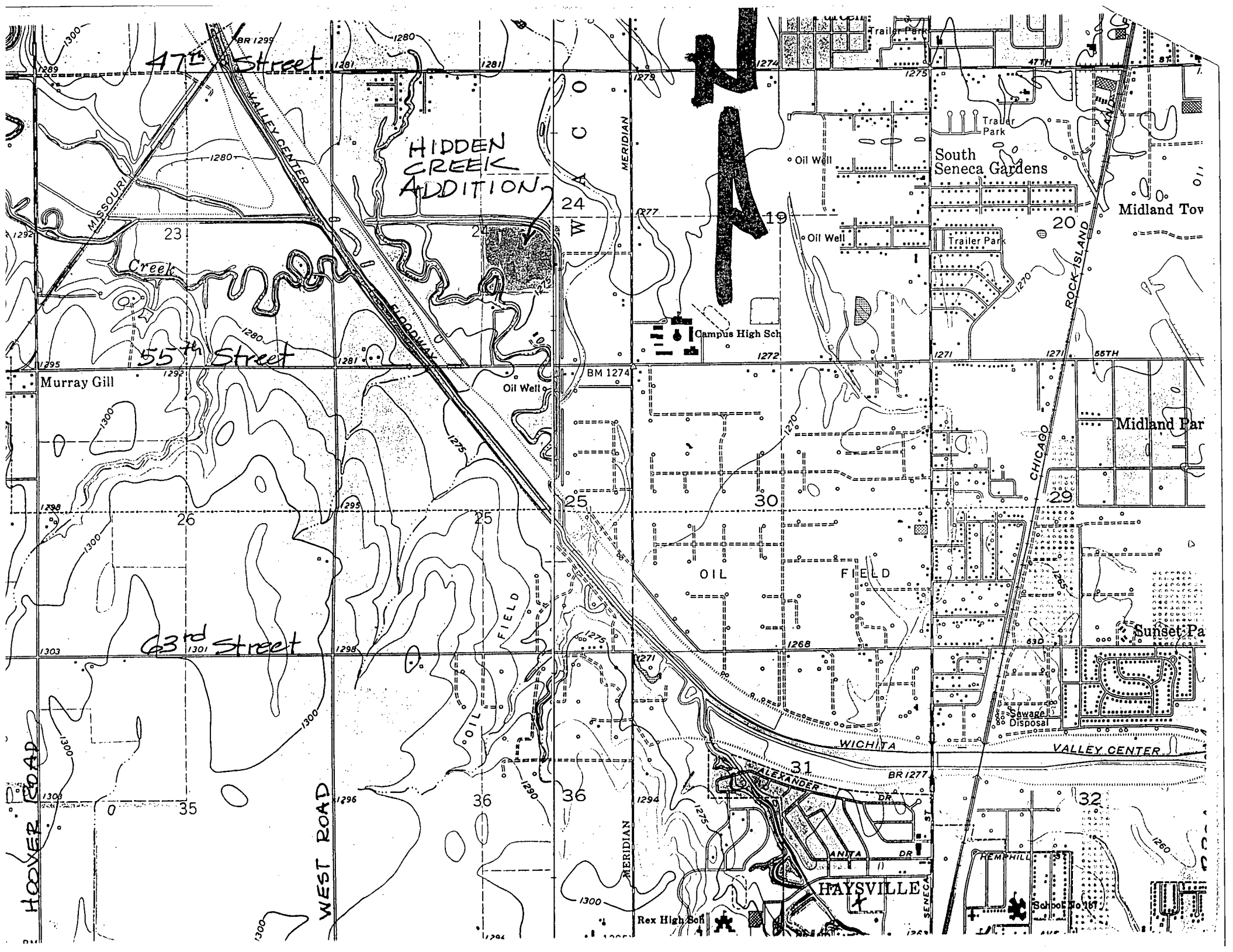
www.wichitagov.org



ARKANSAS RIVER WATERSHED
WICHITA AND
BIG SLOUGH – CC
PARCEL "A" –
PLAN &
SCALE: 1 IN

IN 14 SHEETS
CORPS OF ENGINEERS, U.S. ARM

DATE	DESCRIPTION	CHKD	REC	APPR
	REVISIONS			


47th Street
HIDDEN CREEK ADDITION
MISSOURI
Creek
VALLEY CENTER
FLOODWAY
55th Street
63rd Street
HOOVER ROAD
WEST ROAD
MERIDIAN
COWA
Murray Gill
Oil Well
BM 1274
Campus High Sch
Trailer Park
South Seneca Gardens
Midland Tov
Midland Par
Sunset Pa
ROCK ISLAND
CHICAGO
OIL FIELD
Sewage Disposal
WICHITA
VALLEY CENTER
ALEXANDER DR
ANITA DR
HEMPHILL ST
SENECA ST
HAYSVILLE
Rex High Sch
School No 161
BR 1299
BR 1277
47TH ST
55TH
AVE
23
24
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29
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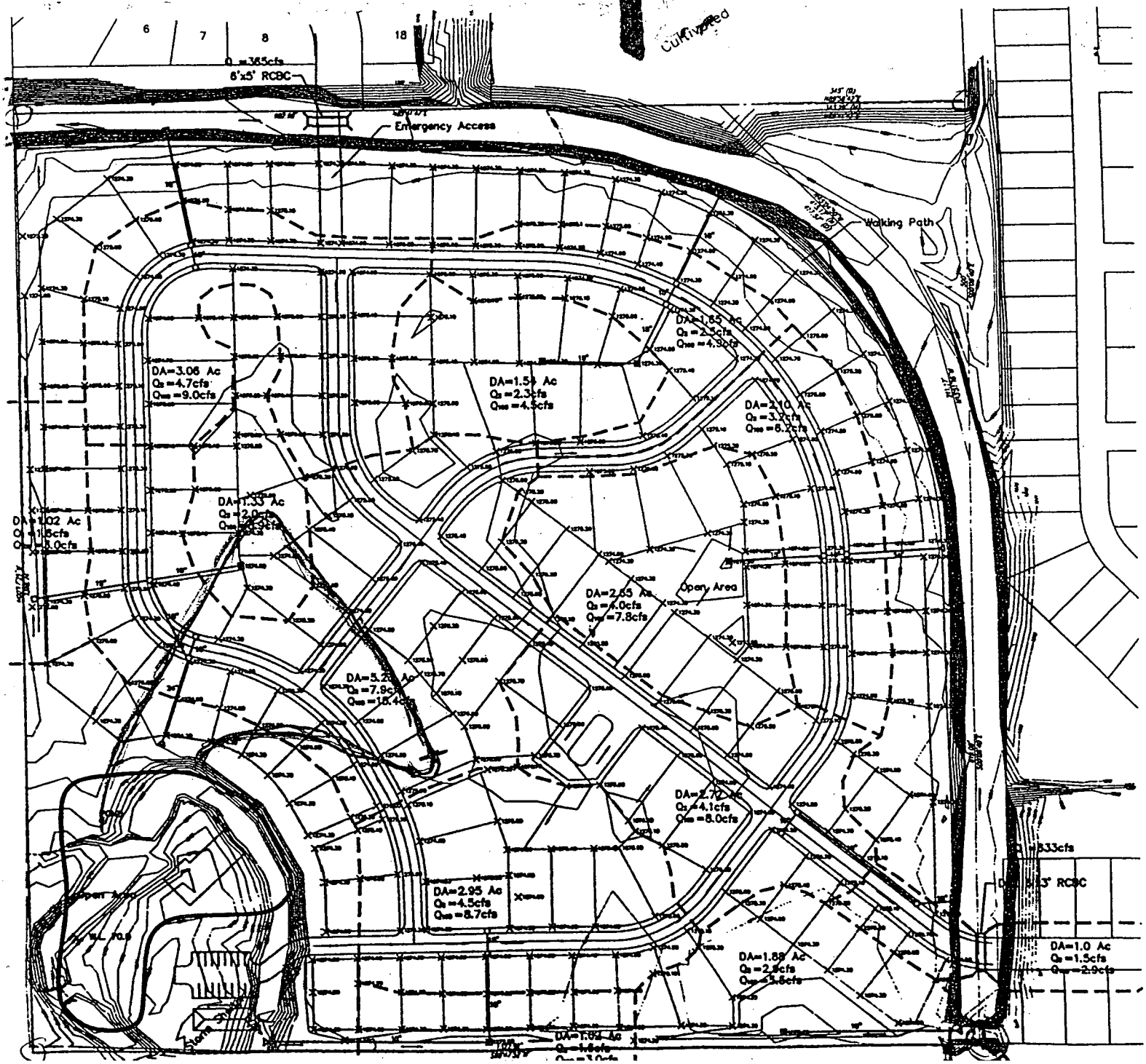
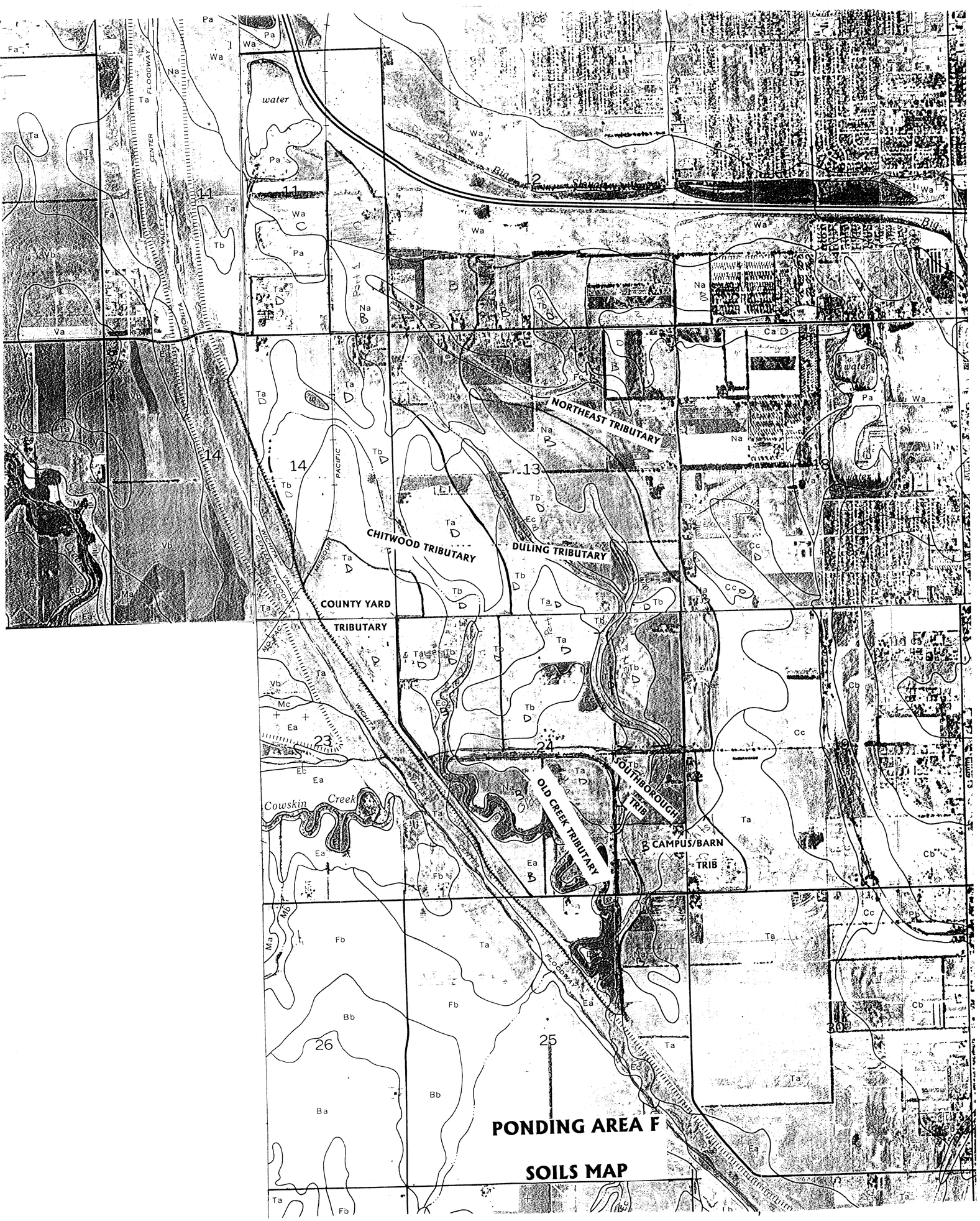
31
32
35
36

HIDDEN CREEK ADDITION



PONDING AREA F

DRAINAGE MAP


NORTHEAST TRIBUTARY
CHITWOOD TRIBUTARY
DULING TRIBUTARY
COUNTY YARD
TRIBUTARY
OLD CREEK TRIBUTARY
SOUTHBOROUGH
TRIB
CAMPUS/BARN
TRIB
PONDING AREA F
SOILS MAP
Cowskin Creek
Big
water
PACIFIC
MISSOURI
CENTER
WICHITA
FLOODWAY
11
12
13
14
18
23
24
25
26
30