DRAINAGE REPORT
FOR
CAMBRIA ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS

October 17, 2007

Ruggles & Bohm P.A.

Engineering, Surveying, Land Planning

Adopted: February 23, 2007

CITY OF WICHITA

Public Works, Engineering Division
Final Drainage Plan Submittal Checklist

Reviewer: _____ Date: October 17, 2007

Subdivision Name: Cambria Location: SW 1/4 Sect. 36, T27S, R2E

Total Land Area Of Ownership: 46.9 Acres

Type: X Residential _____ Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other

Applicant: LCS Enterprises Contact: Cory M. Shackelford Phone #: 213-8766

Engineer: Ruggles & Bohm P.A. Contact: _____ Phone # 264-8008

Please check the appropriate box: I = Included; NA = Non-Applicable; R= Required prior to development
(If "NA" is checked, an explanation must be entered)

	Applicant			Engr	
Tab 1. Project Narrative	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Site Location Map, using USGS Map	✓				
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	✓				
C. Discussion of offsite conditions	✓				
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	✓				
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design	✓				
F. Copy of the plat	✓				
G. Preliminary grading plan (The final grading plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans. One plan sheet and PDF shall be submitted to the Subdivision Engineer.)	✓				
H. Professional Engineer seal, signature and date on cover of report	✓				
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover	✓				

	Applicant			Engr	
Tab 2. Existing Conditions Runoff Calculations	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)	✓				
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)	✓				
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)	✓				
D. Total Site Area and Total Impervious Area (acres)	✓				
E. Benchmarks used for site control	✓				
F. Streams, creeks, and waterway labeled	✓				
G. Predominant soils from USDA soil surveys, and/or on site soil borings	✓				
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted	✓				
I. Location of existing roads, buildings, parking lots and other impervious areas.	✓				

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J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements	✓				
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✓				
L. Flow paths	✓				
M. Location and dimensions of existing channels, bridges or culvert crossings	✓				
N. Existing conditions hydrologic analysis for runoff rates, volumes and velocities showing methodologies used and supporting calculations (2, 5, 10, 25 & 100 year, 24-hour storm events) or Critical Duration	✓				
O. Assumed pre-developed runoff curve numbers	✓				
P. Existing time of concentrations used in calculations	✓				
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site	✓				
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)	✓				
S. Cross-section data for open channels		✓	no on-site stream		
T. Ground water elevations, if applicable		✓	unknown @ this time		

	Applicant			Engr	
Tab 3. Post-Development Hydrologic Analysis	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Proposed (post-development) conditions hydrologic and hydraulic analysis for runoff rates, volumes, HGL, and velocities showing the methodologies used and supporting calculations for all applicable design storms (2, 5, 10, 25 & 100 year, 24-hour storm events)	✓				
B. Proposed time of concentrations used in calculations	✓				
C. Assumed post-developed runoff curve numbers	✓				
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)	✓				
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration	✓				
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities	✓				
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary	✓				
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)	✓				
I. Design water surface elevations and normal pool elevation for ponds.	✓				
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.	✓				
K. Proposed limits of clearing and grading	✓				
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.	✓				
M. Location of existing and proposed utilities (e.g., water, sewer) and easements	✓				
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✓				
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings	✓				

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P. Preliminary selection and location of stormwater controls	✓				
Q. Emergency overflow structure's flow path	✓				
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)	✓				
S. The 100-year 24-hour HWL delineated on the plan for detention pond	✓				
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds	✓				
U. Stormwater Management Facilities located within a Reserve	✓				
V. Maintenance responsibility of stormwater management facility shall be specified in the platters text. (e.g. HOA, Lot Owners Association, or lot)	✓				
W. Off-site drainage easements or agreements required, where necessary		✓	drains into exist. tributary		

	Applicant			Engr	
Tab 4. Floodplain Submittal	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Provide source of flood profile		✓	site is outside adjacent Floodplain		
B. Nearest base flood elevations		✓			
C. Delineation of pre-developed regulatory floodplain/floodway limits		✓			
D. Delineation of post-developed regulatory floodplain and floodway limits		✓			
E. Floodplain boundary determination per elevation (project limits shown)		✓			
F. Provide source of floodway data table and discharges		✓			
G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies, unnumbered Zone A area elevation determinations and flood plain map revisions or required permits		✓			
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions		✓			
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)		✓			
J. Flood plains and floodways located within a Reserve, where necessary		✓			

	Applicant			Engr	
Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	**I/R**	**NA**	**Explanation / Location in Plan**	**I/R**	**NA**
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)		✓			
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		✓			
C. Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.) Shall be included and approved when project modifies the limits of the floodway.		✓			
D. Kansas Department of Transportation		✓			
E. Sedgwick County Right-of-way Permit		✓			

Consulting Engineer Initials PB

TABLE OF CONTENTS

CAMBRIA ADDITION
DRAINAGE ANALYSIS
October 12, 2007

INTRODUCTION

This report contains supporting documentation and calculations for the proposed plat Cambria Addition. The existing site is a triangle shaped undeveloped 46.9-acre tract of land located approximately ½ mile south of Harry on the east side of 143th Street East. The area is currently pasture land and drains easterly to a Spring Branch Tributary #1. Existing off-site drainage enters the site in two location, on the north and west side of the property. FEMA map 20173C0395E, effective date Feb. 2, 2007 shows the proposed project site is located outside of and on the edge of the Zone AE. Approximately 64.9 acres of offsite area currently flow through the site, 29.9 acres from the north and 35.0 acres from the east. The site will be graded to direct 14.9 acres of the site and 35.0 acres of offsite area to a series of detention ponds while the remaining 32.2 acres and 29.9 acres of offsite drainage will drain directly into the Spring Branch Tributary.

The site will be developed into single family residential lots (approx. ¾ acre) with on-site detention provided at the southern central area of the site with a series of three retention/detention ponds.

HYDROLOGY

Peak flow rates for the tributary areas were determined using HEC-HMS. The hydrological soil group for the site is D. The times of concentration were calculated using the velocity method and overland flow rates from Attachment E of the City of Wichita Drainage Criteria. The parameters and results of the existing and proposed analysis are shown in the tables below.

Existing	Area	CN	TC (min.)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
N. Offsite (A)	29.9 ac.	83	20	35.1	51.7	62.0	78.1	108.9
N. Onsite (C)	24.4 ac.	83	20	28.6	42.3	50.7	64.8	89.0
S. Offsite (B)	35.0 ac.	83	20	41.0	60.6	72.6	92.9	127.6
S. Onsite (D)	22.5 ac.	83	20	26.4	39.0	46.7	59.8	82.1
Entire Site	111.8ac.	83	20	131.0	193.7	232.2	297.1	408.1

Proposed	Area	CN	TC (min.)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
N. Offsite (A)	29.9 ac.	83	20	35.0	51.7	62.0	79.6	108.9
N. Onsite (E&F)	28.1 ac.	85	20	35.9	52.0	61.7	78.1	106.0
S. Offsite (B)	35.0 ac.	83	20	41.0	60.6	72.6	92.9	127.6
S. Onsite 1(G)	6.5 ac.	85	10	11.0	16.1	19.2	24.4	33.5
S. Onsite 2(H)	8.4 ac.	85	10	15.5	22.3	26.4	33.3	45.2
S. Bypass (J)	4.0 ac.	85	10	7.5	10.8	11.4	16.1	21.9
Entire Site	111.8 ac.	83.9	25	88.5	136.1	166.3	216.8	307.9

HEC-HMS computer modeling was used to determine peak flow rates for the series of basins located within the plat. The attached Drainage Plan shows the on site drainage calculations.

Pond Routing Information:

A series of 3 ponds will provide the detention required for this development. The upper pond detention will not be taken into account, since the waterfall feature will be architectural and will not detain runoff in any large amount. The retention ponds will be located at the southern central area of the property and will outlet into Tributary #1 of Spring Branch.

Rainfall Data: The SCS Type II Rainfall Distribution as modeled by the HEC-RAS program is used for analysis, with a total 100 year – 24 hour rainfall event of 7.8 inches (TR-55). This rainfall model is used for all basins.

The schematic hydraulic model indicates the modeling parameters for each of the basins draining to the detention pond area. A summary of the ponds' performance in the various design storms can be found in the tables below.

POND 1(upper pond omitted)

Design Storm	Peak Inflow (cfs)	Peak Outflow (cfs)	Allowable Release (cfs)	Peak Storage (ac-ft.)	Peak Elevation
2-yr	48.2	36.7	NA	2.4	1305.4
5-yr	71.0	56.5	NA	2.8	1305.9
10-yr	84.9	68.5	NA	3.1	1306.1
25-yr	108.5	89.1	NA	3.5	1306.5
100-yr	148.9	125.6	NA	4.2	1307.2

The stage-storage data was calculated by HEC-HMS using the parameters located in the table below.

Stage	Area (ac-ft)
1304.0	0.8500
1305.0	0.9200
1306.0	1.0000
1307.0	1.0700

The outlet of this pond shall be controlled by 3'x 9' Rein. Concrete Box Culvert that will release to Pond 2.

POND 2

Design Storm	Peak Inflow (cfs)	Peak Outflow (cfs)	Allowable Release (cfs)	Peak Storage (ac-ft.)	Peak Elevation
2-yr	41.5	29.1	52.6	1.8	1302.3
5-yr	64.1	47.0	79.2	2.5	1302.8
10-yr	78.0	58.6	95.7	2.9	1303.1
25-yr	101.3	79.2	123.6	3.5	1303.5
100-yr	142.6	114.3	171.2	4.6	1304.2

The stage-storage data was calculated by HEC-HMS using the parameters located in the table below.

Stage	Area (ac-ft)
1301.00	1.3000
1302.00	1.3900
1303.00	1.4800
1304.00	1.5700
1304.20	1.6000

The outlet of this pond shall be controlled by a 6' wide weir structure that will release to the southeast into Spring Branch Tributary #1. The minimum foundation elevation is shown on the mass grading plan and these elevations have been developed to ensure a minimum 2' elevation over the existing adjacent floodway elevation.

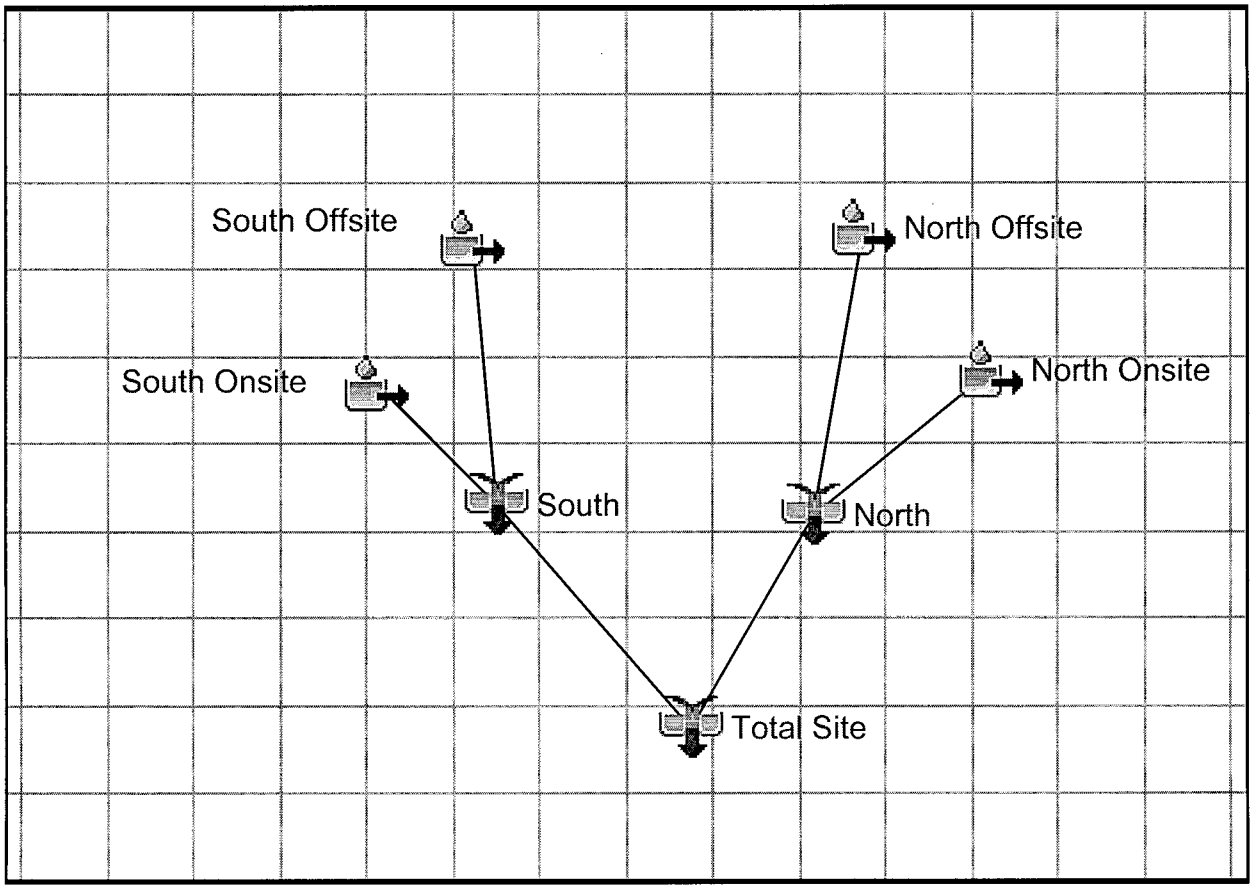
EXISTING CONDITIONS

HEC-HMS

Project : Shackleford

Basin Model : Existing

Oct 17 08:56:41 CDT 2007



Project: Shackleford Simulation Run: 01 Exist 2

Start of Run: 01Jan2007, 12:00 Basin Model: Existing
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 2
Compute Time: 17Oct2007, 08:59:33 Control Specifications: Control 1

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
North	0.08507	63.7	02Jan2007, 00:20	8.3
North Offsite	0.04690	35.1	02Jan2007, 00:20	4.6
North Onsite	0.03817	28.6	02Jan2007, 00:20	3.7
South	0.08988	67.3	02Jan2007, 00:20	8.8
South Offsite	0.05469	41.0	02Jan2007, 00:20	5.4
South Onsite	0.03519	26.4	02Jan2007, 00:20	3.5
Total Site	0.17495	131.0	02Jan2007, 00:20	17.2

Project: Shackleford Simulation Run: 02 Exist 5

Start of Run: 01Jan2007, 12:00 Basin Model: Existing
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 5
Compute Time: 17Oct2007, 09:26:41 Control Specifications: Control 1

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
North	0.08507	94.2	02Jan2007, 00:20	12.3
North Offsite	0.04690	51.9	02Jan2007, 00:20	6.8
North Onsite	0.03817	42.3	02Jan2007, 00:20	5.5
South	0.08988	99.5	02Jan2007, 00:20	12.9
South Offsite	0.05469	60.6	02Jan2007, 00:20	7.9
South Onsite	0.03519	39.0	02Jan2007, 00:20	5.1
Total Site	0.17495	193.7	02Jan2007, 00:20	25.2

Project: Shackleford Simulation Run: 03 Exist 10

Start of Run: 01Jan2007, 12:00 Basin Model: Existing
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 10
Compute Time: 04Oct2007, 17:22:14 Control Specifications: Control 1

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
North	0.08507	112.9	02Jan2007, 00:20	14.7
North Offsite	0.04690	62.2	02Jan2007, 00:20	8.1
North Onsite	0.03817	50.7	02Jan2007, 00:20	6.6
South	0.08988	119.3	02Jan2007, 00:20	15.5
South Offsite	0.05469	72.6	02Jan2007, 00:20	9.4
South Onsite	0.03519	46.7	02Jan2007, 00:20	6.1
Total Site	0.17495	232.2	02Jan2007, 00:20	30.2

Project: Shackleford Simulation Run: 04 Exist 25

Start of Run: 01Jan2007, 12:00 Basin Model: Existing
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 25
Compute Time: 17Oct2007, 09:33:45 Control Specifications: Control 1

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
North	0.08507	144.5	02Jan2007, 00:20	18.8
North Offsite	0.04690	79.6	02Jan2007, 00:20	10.4
North Onsite	0.03817	64.8	02Jan2007, 00:20	8.4
South	0.08988	152.6	02Jan2007, 00:20	19.9
South Offsite	0.05469	92.9	02Jan2007, 00:20	12.1
South Onsite	0.03519	59.8	02Jan2007, 00:20	7.8
Total Site	0.17495	297.1	02Jan2007, 00:20	38.7

Project: Shackleford Simulation Run: 05 Exist 100

Start of Run: 01Jan2007, 12:00 Basin Model: Existing
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita100
Compute Time: 04Oct2007, 17:22:20 Control Specifications: Control 1

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
North	0.08507	198.5	02Jan2007, 00:20	26.0
North Offsite	0.04690	109.4	02Jan2007, 00:20	14.4
North Onsite	0.03817	89.0	02Jan2007, 00:20	11.7
South	0.08988	209.7	02Jan2007, 00:20	27.5
South Offsite	0.05469	127.6	02Jan2007, 00:20	16.7
South Onsite	0.03519	82.1	02Jan2007, 00:20	10.8
Total Site	0.17495	408.1	02Jan2007, 00:20	53.6

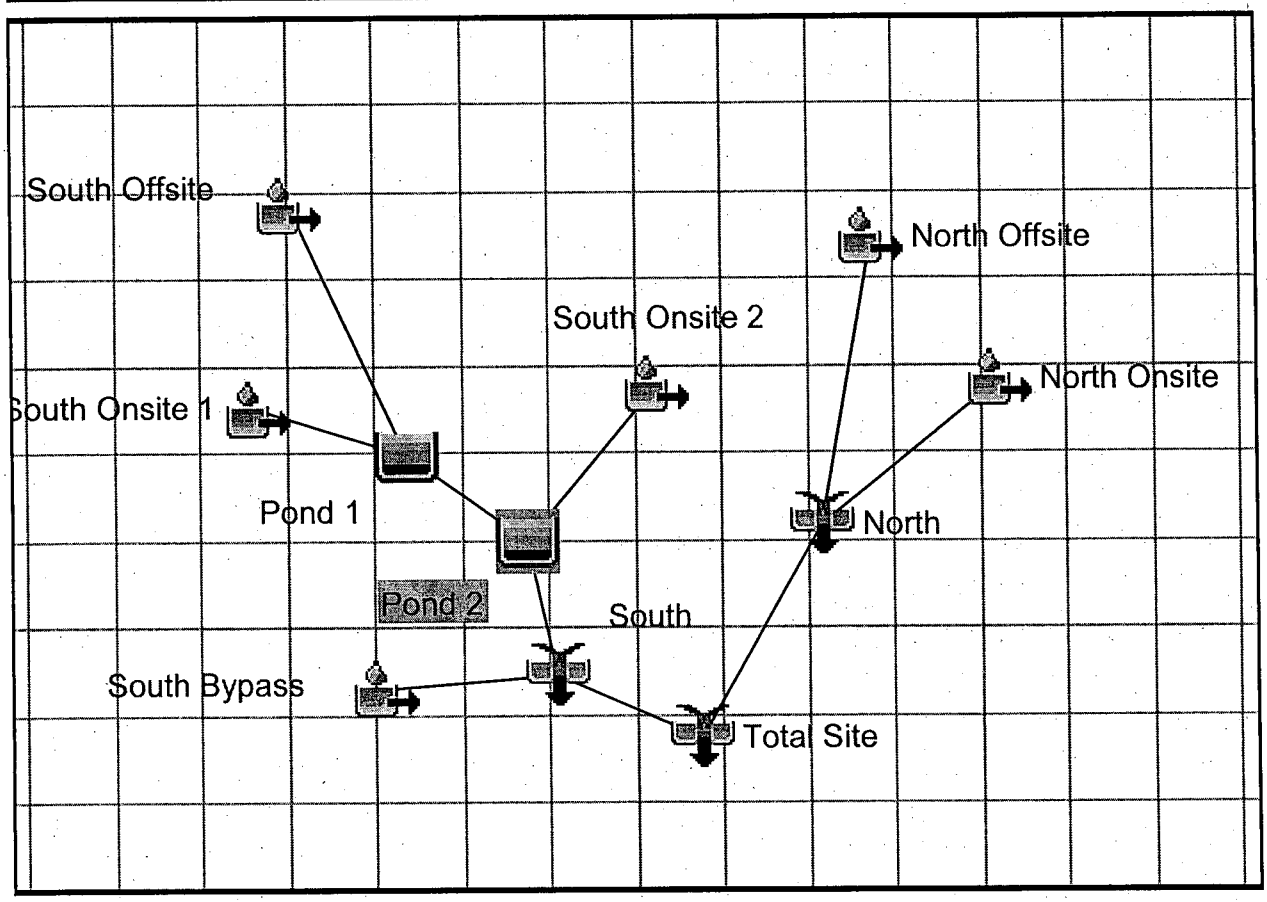
PROPOSED CONDITIONS

HEC-HMS

Project : Shackleford

Basin Model : Proposed

Oct 17 09:49:43 CDT 2007



Project: Shackleford Simulation Run: 06 Prop 2

Start of Run: 01Jan2007, 12:00 Basin Model: Proposed
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 2
Compute Time: 17Oct2007, 10:57:32 Control Specifications: Control 1

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
North	0.090630	70.9	02Jan2007, 00:20	9.3
North Offsite	0.046700	35.0	02Jan2007, 00:20	4.6
North Onsite	0.043930	35.9	02Jan2007, 00:20	4.7
Pond 1	0.064720	36.7	02Jan2007, 00:35	6.2
Pond 2	0.077786	29.1	02Jan2007, 01:00	7.5
South	0.084106	30.1	02Jan2007, 01:00	8.2
South Bypass	0.006320	7.5	02Jan2007, 00:10	0.7
South Offsite	0.054690	41.0	02Jan2007, 00:20	5.4
South Onsite 1	0.010030	11.0	02Jan2007, 00:10	1.0
South Onsite 2	0.013066	15.5	02Jan2007, 00:10	1.4
Total Site	0.174736	88.5	02Jan2007, 00:25	17.4

Project: Shackleford Simulation Run: 07 Prop 5

Start of Run: 01Jan2007, 12:00 Basin Model: Proposed
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 5
Compute Time: 17Oct2007, 10:57:45 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Volume Units:	AC-FT			
North	0.090630	103.7	02Jan2007, 00:20	13.5
North Offsite	0.046700	51.7	02Jan2007, 00:20	6.7
North Onsite	0.043930	52.0	02Jan2007, 00:20	6.8
Pond 1	0.064720	56.5	02Jan2007, 00:35	9.2
Pond 2	0.077786	47.0	02Jan2007, 00:55	11.0
South	0.084106	48.6	02Jan2007, 00:55	12.0
South Bypass	0.006320	10.8	02Jan2007, 00:10	1.0
South Offsite	0.054690	60.6	02Jan2007, 00:20	7.9
South Onsite 1	0.010030	16.1	02Jan2007, 00:10	1.5
South Onsite 2	0.013066	22.3	02Jan2007, 00:10	2.0
Total Site	0.174736	136.1	02Jan2007, 00:25	25.5

Project: Shackleford Simulation Run: 08 Prop 10

Start of Run: 01Jan2007, 12:00 Basin Model: Proposed
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 10
Compute Time: 17Oct2007, 10:57:51 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Volume Units:	AC-FT			
North	0.090630	123.7	02Jan2007, 00:20	16.1
North Offsite	0.046700	62.0	02Jan2007, 00:20	8.1
North Onsite	0.043930	61.7	02Jan2007, 00:20	8.0
Pond 1	0.064720	68.5	02Jan2007, 00:35	11.0
Pond 2	0.077786	58.6	02Jan2007, 00:50	13.2
South	0.084106	60.7	02Jan2007, 00:50	14.3
South Bypass	0.006320	12.8	02Jan2007, 00:10	1.2
South Offsite	0.054690	72.6	02Jan2007, 00:20	9.4
South Onsite 1	0.010030	19.2	02Jan2007, 00:10	1.7
South Onsite 2	0.013066	26.4	02Jan2007, 00:10	2.4
Total Site	0.174736	166.3	02Jan2007, 00:25	30.4

Project: Shackleford Simulation Run: 08 Prop 25

Start of Run: 01Jan2007, 12:00 Basin Model: Proposed
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita 25
Compute Time: 17Oct2007, 10:57:58 Control Specifications: Control 1

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
North	0.090630	157.4	02Jan2007, 00:20	20.6
North Offsite	0.046700	79.3	02Jan2007, 00:20	10.3
North Onsite	0.043930	78.1	02Jan2007, 00:20	10.2
Pond 1	0.064720	89.1	02Jan2007, 00:30	14.1
Pond 2	0.077786	79.2	02Jan2007, 00:50	16.9
South	0.084106	81.9	02Jan2007, 00:50	18.4
South Bypass	0.006320	16.1	02Jan2007, 00:05	1.5
South Offsite	0.054690	92.9	02Jan2007, 00:20	12.1
South Onsite 1	0.010030	24.4	02Jan2007, 00:10	2.2
South Onsite 2	0.013066	33.3	02Jan2007, 00:05	3.1
Total Site	0.174736	216.8	02Jan2007, 00:25	38.9

Project: Shackleford Simulation Run: 10 Prop 100

Start of Run: 01Jan2007, 12:00 Basin Model: Proposed
End of Run: 02Jan2007, 12:05 Meteorologic Model: Wichita100
Compute Time: 17Oct2007, 10:58:12 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Volume Units:	AC-FT			
North	0.090630	215.0	02Jan2007, 00:20	28.3
North Offsite	0.046700	108.9	02Jan2007, 00:20	14.3
North Onsite	0.043930	106.0	02Jan2007, 00:20	14.0
Pond 1	0.064720	125.6	02Jan2007, 00:30	19.6
Pond 2	0.077786	114.3	02Jan2007, 00:45	23.4
South	0.084106	118.4	02Jan2007, 00:45	25.4
South Bypass	0.006320	21.9	02Jan2007, 00:05	2.0
South Offsite	0.054690	127.6	02Jan2007, 00:20	16.7
South Onsite 1	0.010030	33.5	02Jan2007, 00:05	3.1
South Onsite 2	0.013066	45.2	02Jan2007, 00:05	4.2
Total Site	0.174736	307.9	02Jan2007, 00:25	53.7

DETENTION POND

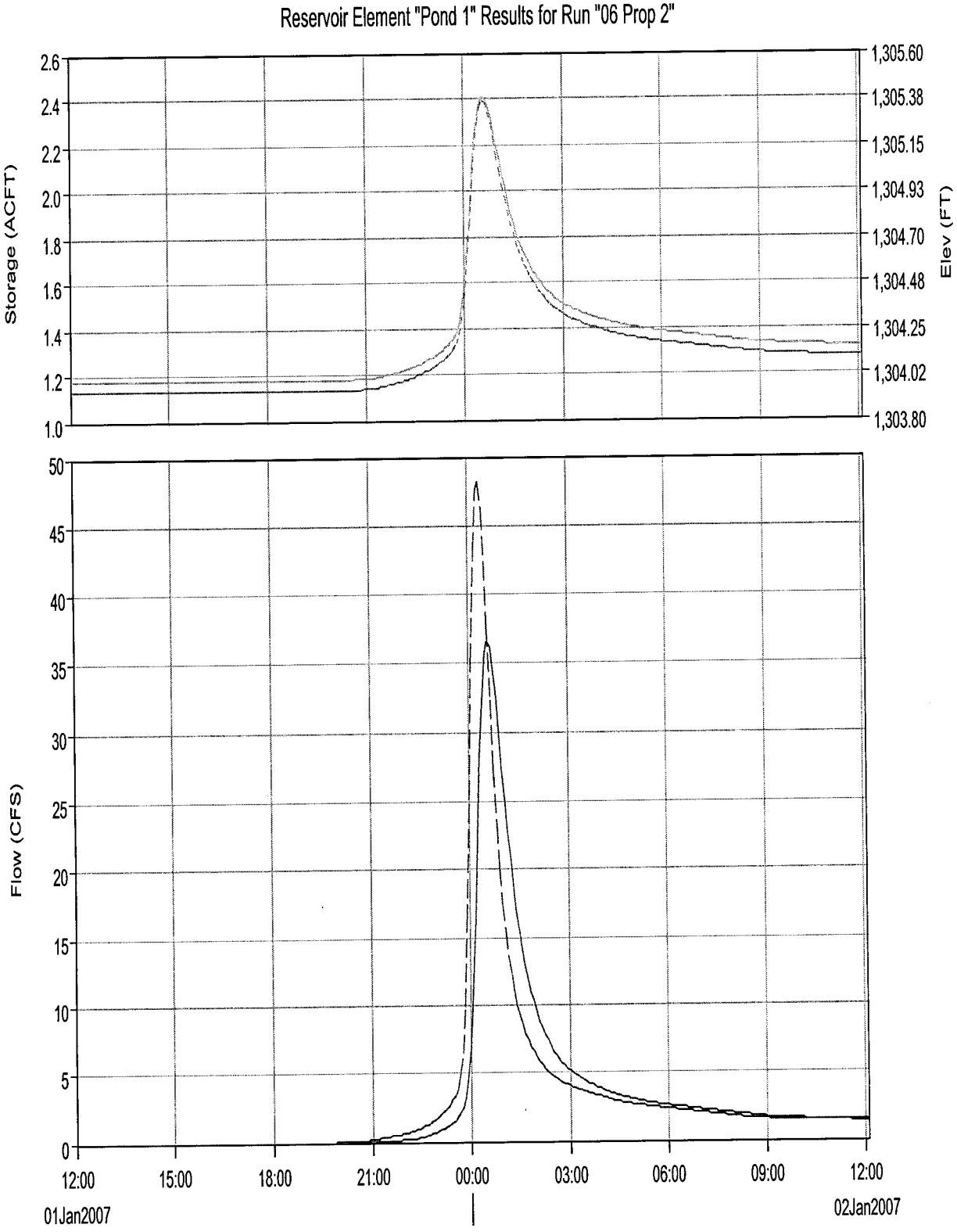
Project : Shackleford Simulation Run : 06 Prop 2 Reservoir: Pond 1

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 2
Compute Time :	17Oct2007, 10:57:32	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	48.2 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:20
Peak Outflow :	36.7 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:35
Total Inflow :	6.4 (AC-FT)	Peak Storage :	2.4 (AC-FT)
Total Outflow :	6.2 (AC-FT)	Peak Elevation :	1305.4 (FT)


Reservoir Element "Pond 1" Results for Run "06 Prop 2"
Storage (ACFT)
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
Elev (FT)
1,305.60
1,305.38
1,305.15
1,304.93
1,304.70
1,304.48
1,304.25
1,304.02
1,303.80
Flow (CFS)
50
45
40
35
30
25
20
15
10
5
0
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:06 PROP 2 Element:POND 1 Result:Storage
Run:06 PROP 2 Element:POND 1 Result:Outflow
Run:06 PROP 2 Element:POND 1 Result:Pool Elevation
Run:06 PROP 2 Element:POND 1 Result:Combined Inflow

Project : Shackleford Simulation Run : 06 Prop 2 Reservoir: Pond 2

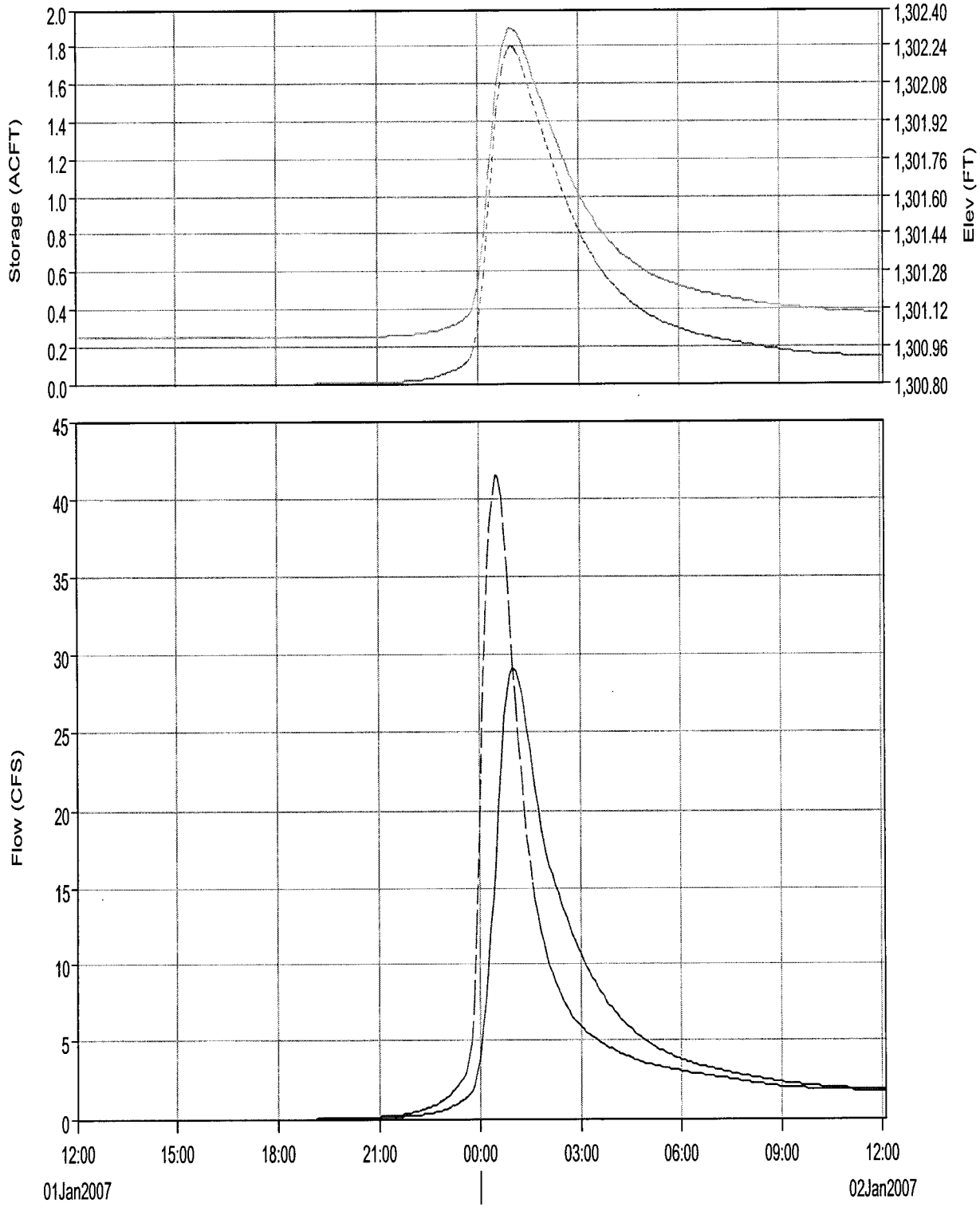
Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 2
Compute Time :	17Oct2007, 10:57:32	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	41.5 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:30
Peak Outflow :	29.1 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 01:00
Total Inflow :	7.6 (AC-FT)	Peak Storage :	1.8 (AC-FT)
Total Outflow :	7.5 (AC-FT)	Peak Elevation :	1302.3 (FT)

Reservoir Element "Pond 2" Results for Run "06 Prop 2"



Run:06 PROP 2 Element:POND 2 Result:Storage

Run:06 PROP 2 Element:POND 2 Result:Outflow

Run:06 PROP 2 Element:POND 2 Result:Pool Elevation

Run:06 PROP 2 Element:POND 2 Result:Combined Inflow

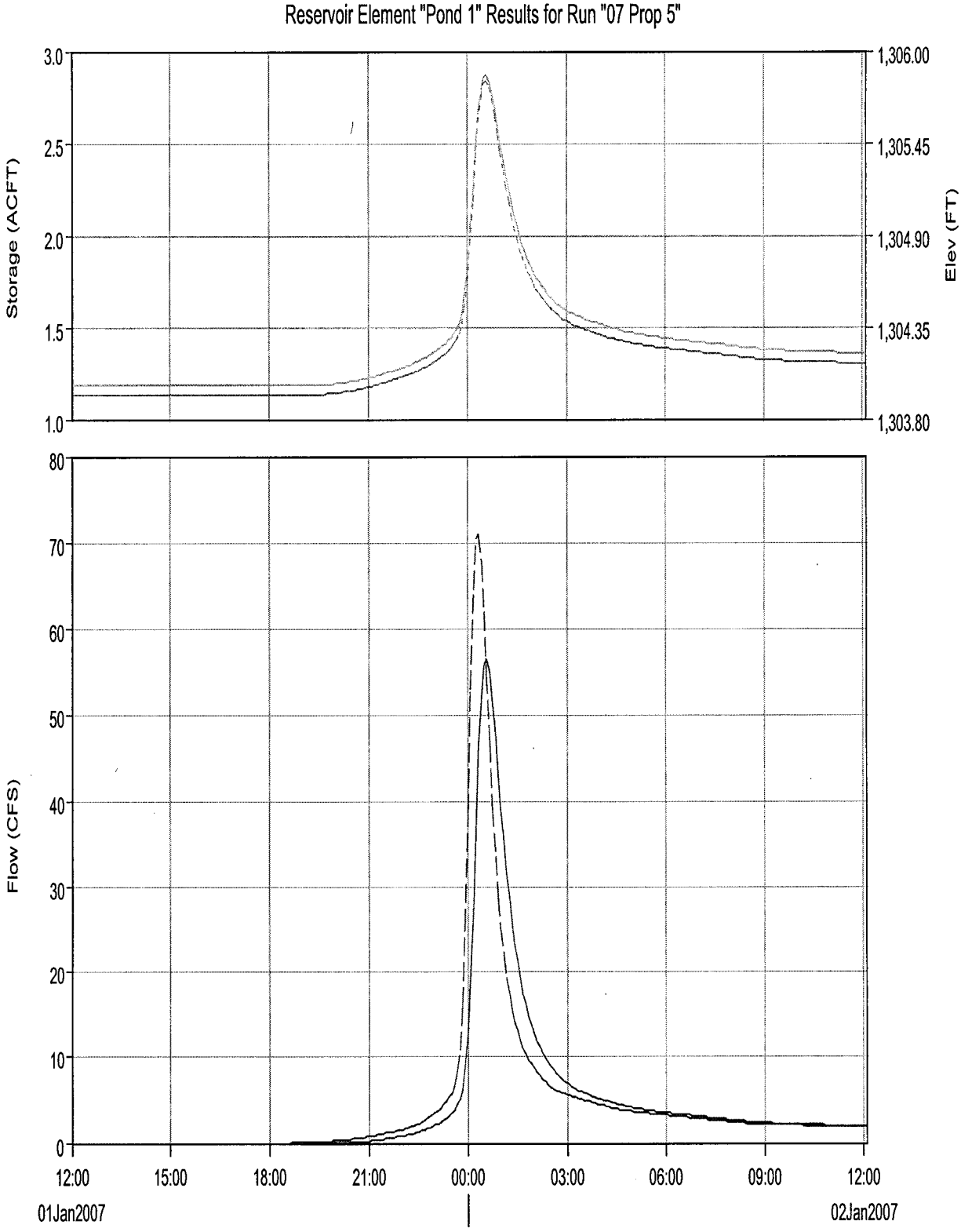
Project : Shackleford Simulation Run : 07 Prop 5 Reservoir: Pond 1

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 5
Compute Time :	17Oct2007, 10:57:45	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	71.0 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:20
Peak Outflow :	56.5 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:35
Total Inflow :	9.3 (AC-FT)	Peak Storage :	2.8 (AC-FT)
Total Outflow :	9.2 (AC-FT)	Peak Elevation :	1305.9 (FT)


Reservoir Element "Pond 1" Results for Run "07 Prop 5"
Storage (ACFT)
Elev (FT)
3.0
2.5
2.0
1.5
1.0
1,306.00
1,305.45
1,304.90
1,304.35
1,303.80
Flow (CFS)
80
70
60
50
40
30
20
10
0
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:07 PROP 5 Element:POND 1 Result:Storage
Run:07 PROP 5 Element:POND 1 Result:Pool Elevation
Run:07 PROP 5 Element:POND 1 Result:Outflow
Run:07 PROP 5 Element:POND 1 Result:Combined Inflow

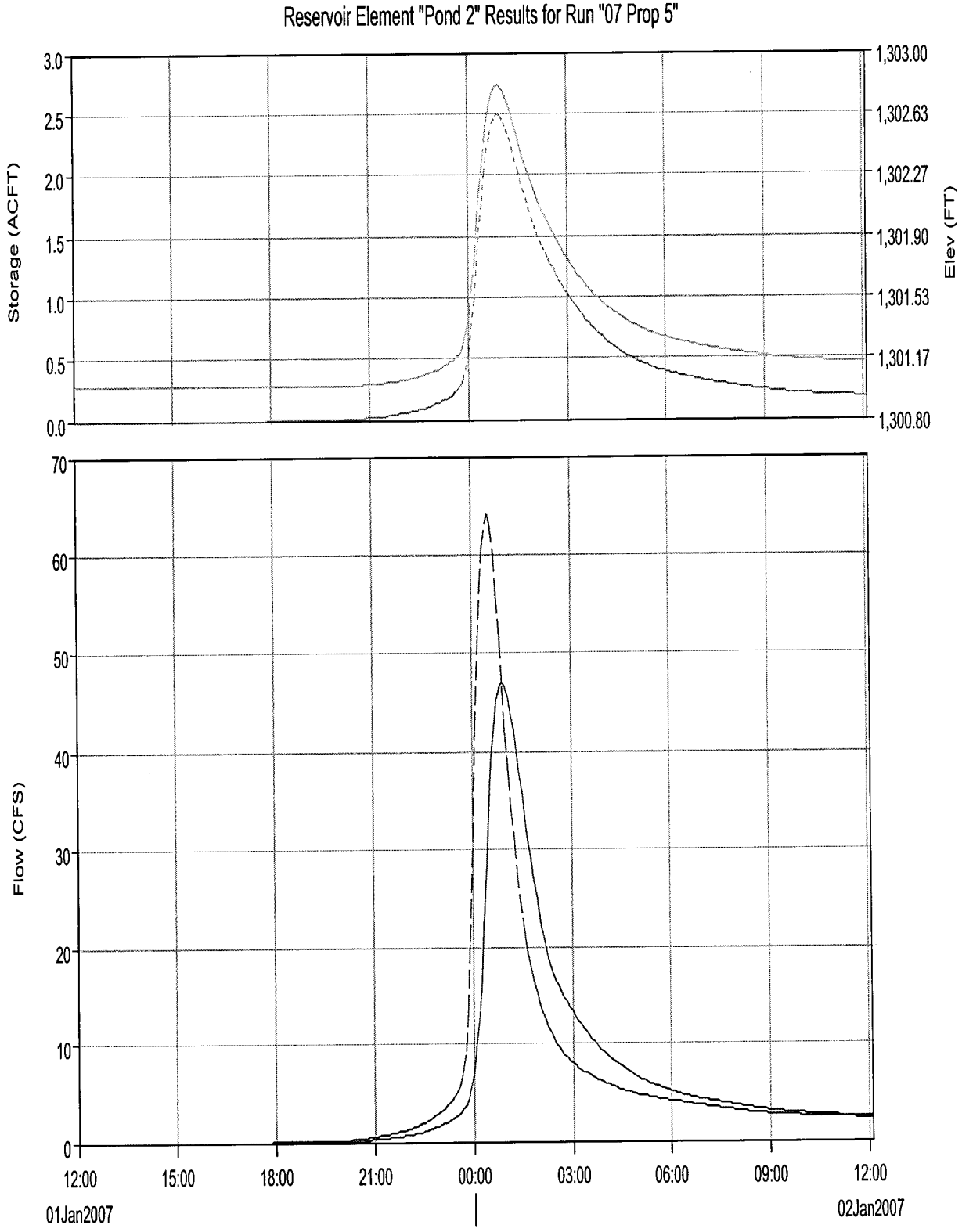
Project : Shackleford Simulation Run : 07 Prop 5 Reservoir: Pond 2

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 5
Compute Time :	17Oct2007, 10:57:45	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	64.1 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:30
Peak Outflow :	47.0 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:55
Total Inflow :	11.2 (AC-FT)	Peak Storage :	2.5 (AC-FT)
Total Outflow :	11.0 (AC-FT)	Peak Elevation :	1302.8 (FT)


Reservoir Element "Pond 2" Results for Run "07 Prop 5"
Storage (ACFT)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Elev (FT)
1,303.00
1,302.63
1,302.27
1,301.90
1,301.53
1,301.17
1,300.80
Flow (CFS)
70
60
50
40
30
20
10
0
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:07 PROP 5 Element:POND 2 Result:Storage
Run:07 PROP 5 Element:POND 2 Result:Outflow
Run:07 PROP 5 Element:POND 2 Result:Pool Elevation
Run:07 PROP 5 Element:POND 2 Result:Combined Inflow

Project : Shackleford Simulation Run : 08 Prop 10 Reservoir: Pond 1

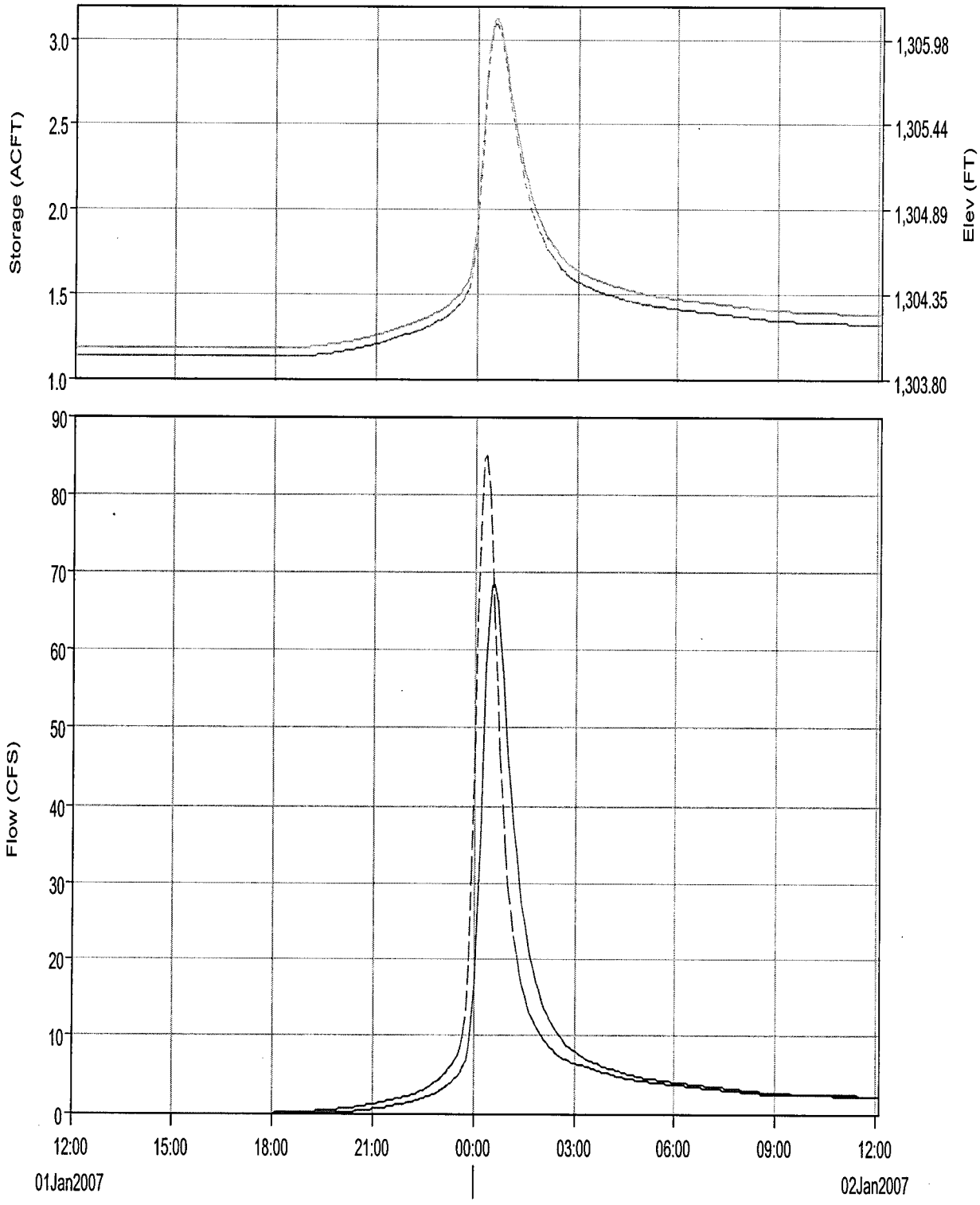
Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 10
Compute Time :	17Oct2007, 10:57:51	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	84.9 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:20
Peak Outflow :	68.5 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:35
Total Inflow :	11.2 (AC-FT)	Peak Storage :	3.1 (AC-FT)
Total Outflow :	11.0 (AC-FT)	Peak Elevation :	1306.1 (FT)

Reservoir Element "Pond 1" Results for Run "08 Prop 10"



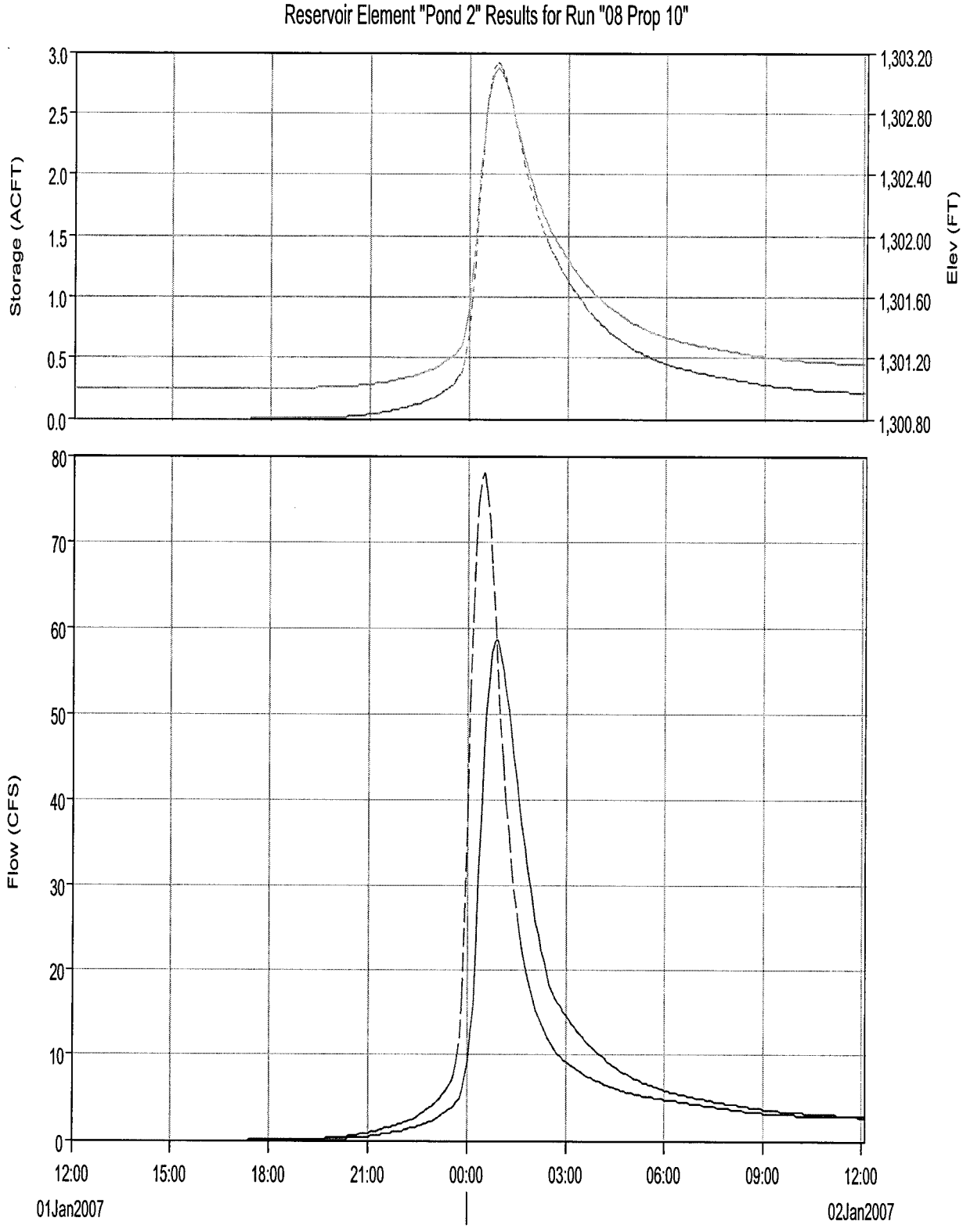
Project : Shackleford Simulation Run : 08 Prop 10 Reservoir: Pond 2

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 10
Compute Time :	17Oct2007, 10:57:51	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	78.0 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:30
Peak Outflow :	58.6 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:50
Total Inflow :	13.4 (AC-FT)	Peak Storage :	2.9 (AC-FT)
Total Outflow :	13.2 (AC-FT)	Peak Elevation :	1303.1 (FT)


Reservoir Element "Pond 2" Results for Run "08 Prop 10"
Storage (ACFT)
Elev (FT)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1,303.20
1,302.80
1,302.40
1,302.00
1,301.60
1,301.20
1,300.80
Flow (CFS)
80
70
60
50
40
30
20
10
0
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:08 PROP 10 Element:POND 2 Result:Storage
Run:08 PROP 10 Element:POND 2 Result:Outflow
Run:08 PROP 10 Element:POND 2 Result:Pool Elevation
Run:08 PROP 10 Element:POND 2 Result:Combined Inflow

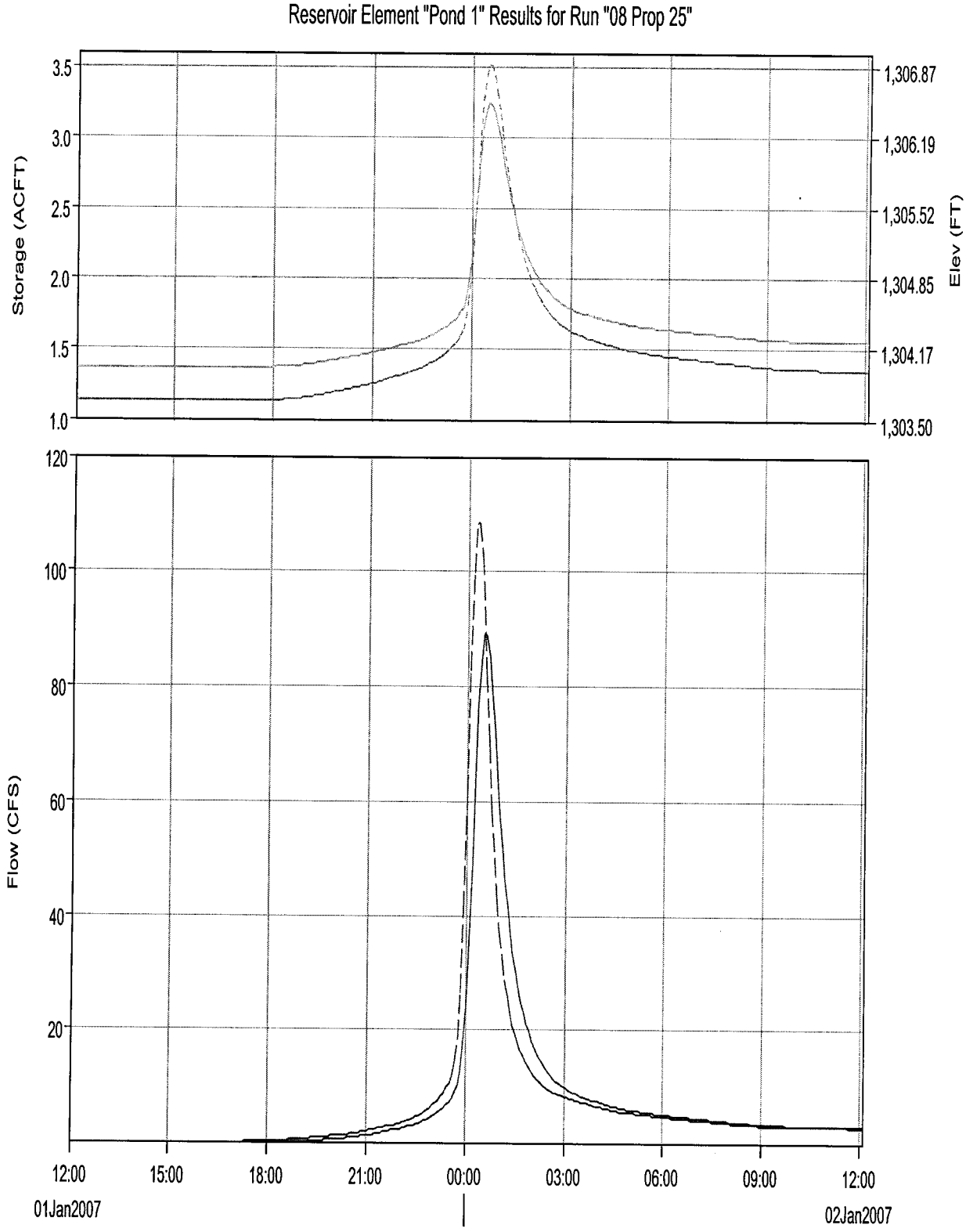
Project : Shackleford Simulation Run : 08 Prop 25 Reservoir: Pond 1

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 25
Compute Time :	17Oct2007, 10:57:58	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	108.5 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:20
Peak Outflow :	89.1 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:30
Total Inflow :	14.3 (AC-FT)	Peak Storage :	3.5 (AC-FT)
Total Outflow :	14.1 (AC-FT)	Peak Elevation :	1306.5 (FT)


Reservoir Element "Pond 1" Results for Run "08 Prop 25"
Storage (ACFT)
3.5
3.0
2.5
2.0
1.5
1.0
Elev (FT)
1,306.87
1,306.19
1,305.52
1,304.85
1,304.17
1,303.50
Flow (CFS)
120
100
80
60
40
20
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:08 PROP 25 Element:POND 1 Result:Storage
Run:08 PROP 25 Element:POND 1 Result:Outflow
Run:08 PROP 25 Element:POND 1 Result:Pool Elevation
Run:08 PROP 25 Element:POND 1 Result:Combined Inflow

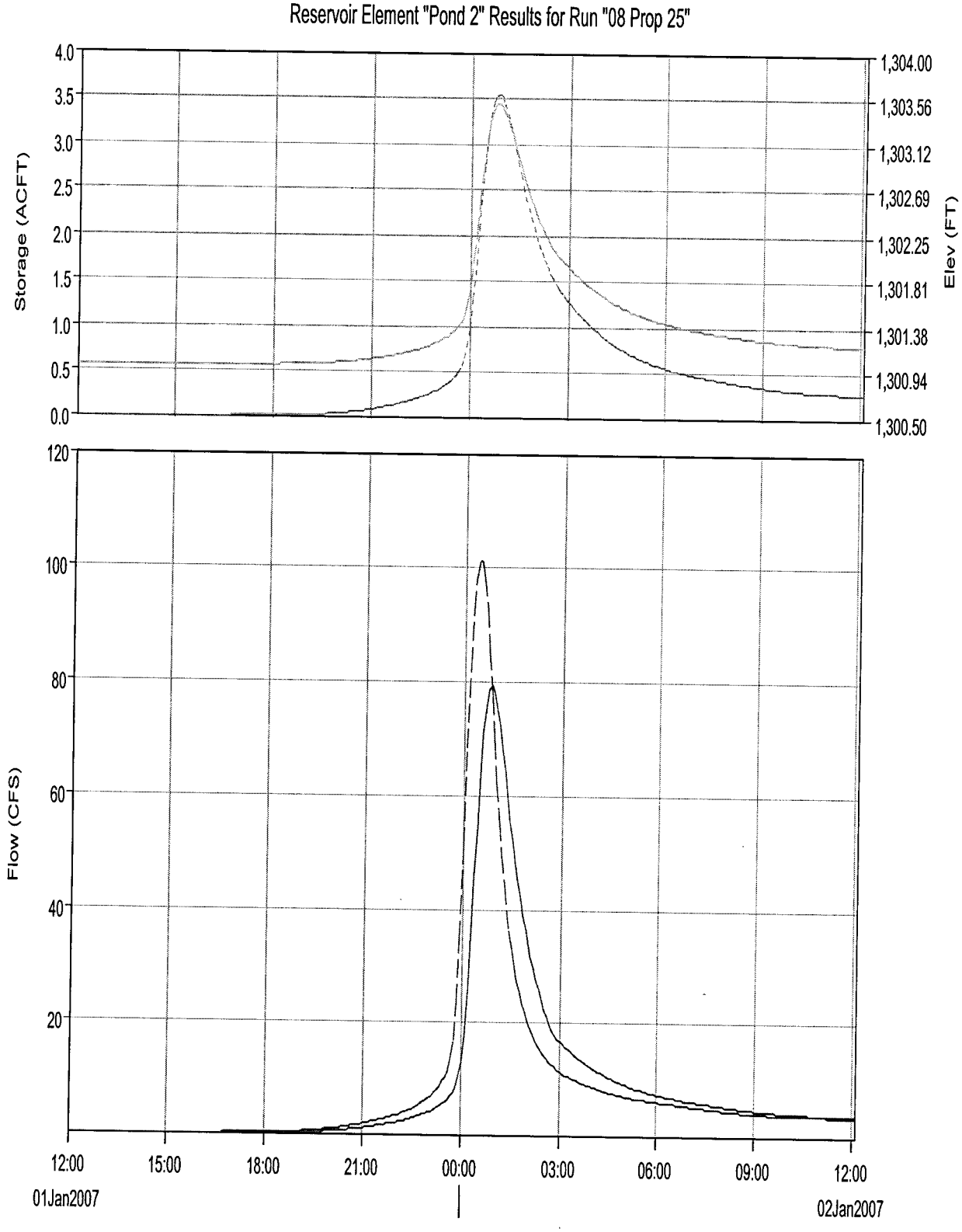
Project : Shackleford Simulation Run : 08 Prop 25 Reservoir: Pond 2

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita 25
Compute Time :	17Oct2007, 10:57:58	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	101.3 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:30
Peak Outflow :	79.2 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:50
Total Inflow :	17.2 (AC-FT)	Peak Storage :	3.5 (AC-FT)
Total Outflow :	16.9 (AC-FT)	Peak Elevation :	1303.5 (FT)


Reservoir Element "Pond 2" Results for Run "08 Prop 25"
Storage (ACFT)
Elev (FT)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1,304.00
1,303.56
1,303.12
1,302.69
1,302.25
1,301.81
1,301.38
1,300.94
1,300.50
Flow (CFS)
120
100
80
60
40
20
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:08 PROP 25 Element:POND 2 Result:Storage
Run:08 PROP 25 Element:POND 2 Result:Outflow
Run:08 PROP 25 Element:POND 2 Result:Pool Elevation
Run:08 PROP 25 Element:POND 2 Result:Combined Inflow

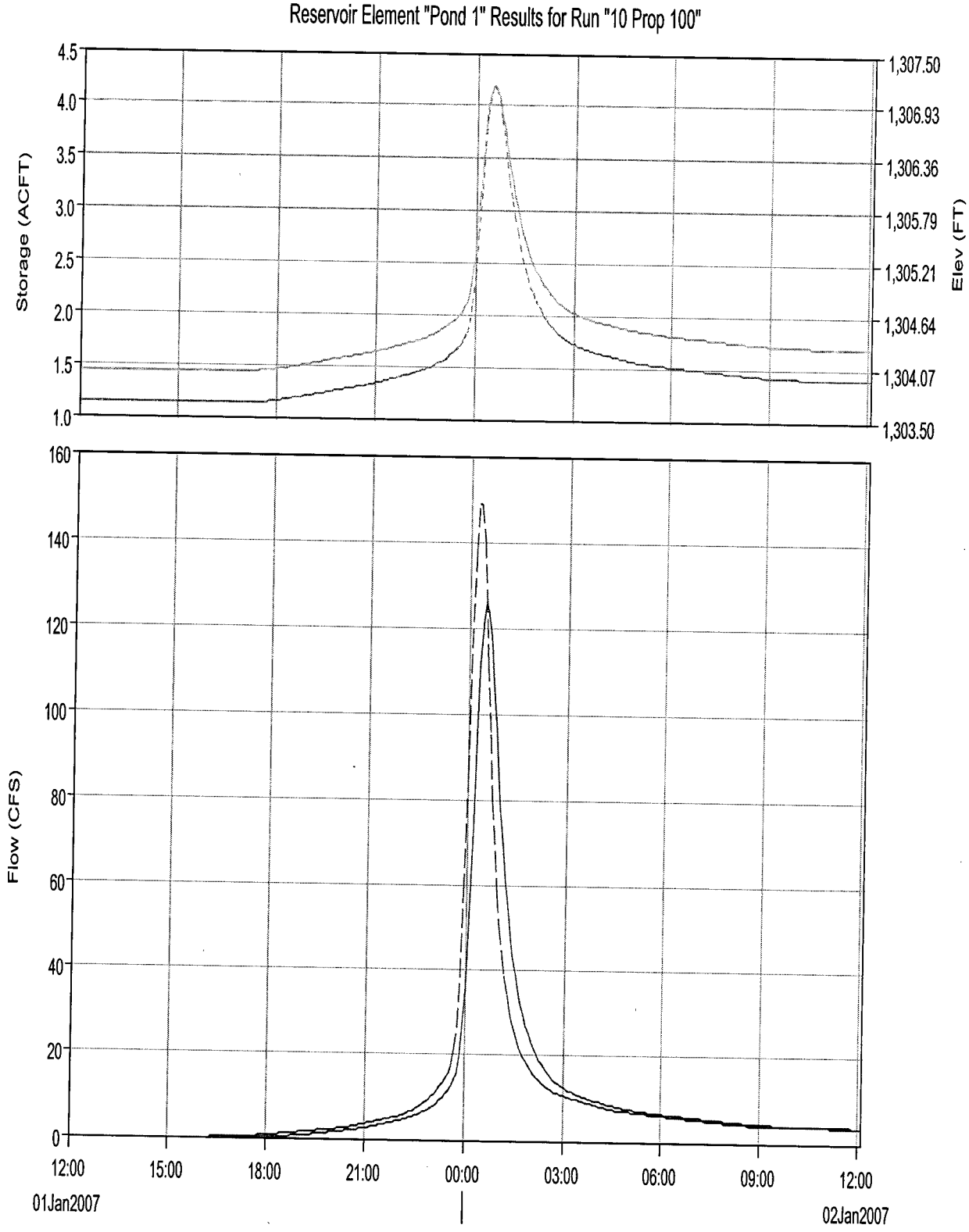
Project : Shackleford Simulation Run : 10 Prop 100 Reservoir: Pond 1

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita100
Compute Time :	17Oct2007, 10:58:12	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	148.9 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:15
Peak Outflow :	125.6 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:30
Total Inflow :	19.8 (AC-FT)	Peak Storage :	4.2 (AC-FT)
Total Outflow :	19.6 (AC-FT)	Peak Elevation :	1307.2 (FT)


Reservoir Element "Pond 1" Results for Run "10 Prop 100"
Storage (ACFT)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
Elev (FT)
1,307.50
1,306.93
1,306.36
1,305.79
1,305.21
1,304.64
1,304.07
1,303.50
Flow (CFS)
160
140
120
100
80
60
40
20
0
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:10 PROP 100 Element:POND 1 Result:Storage
Run:10 PROP 100 Element:POND 1 Result:Outflow
Run:10 PROP 100 Element:POND 1 Result:Pool Elevation
Run:10 PROP 100 Element:POND 1 Result:Combined Inflow

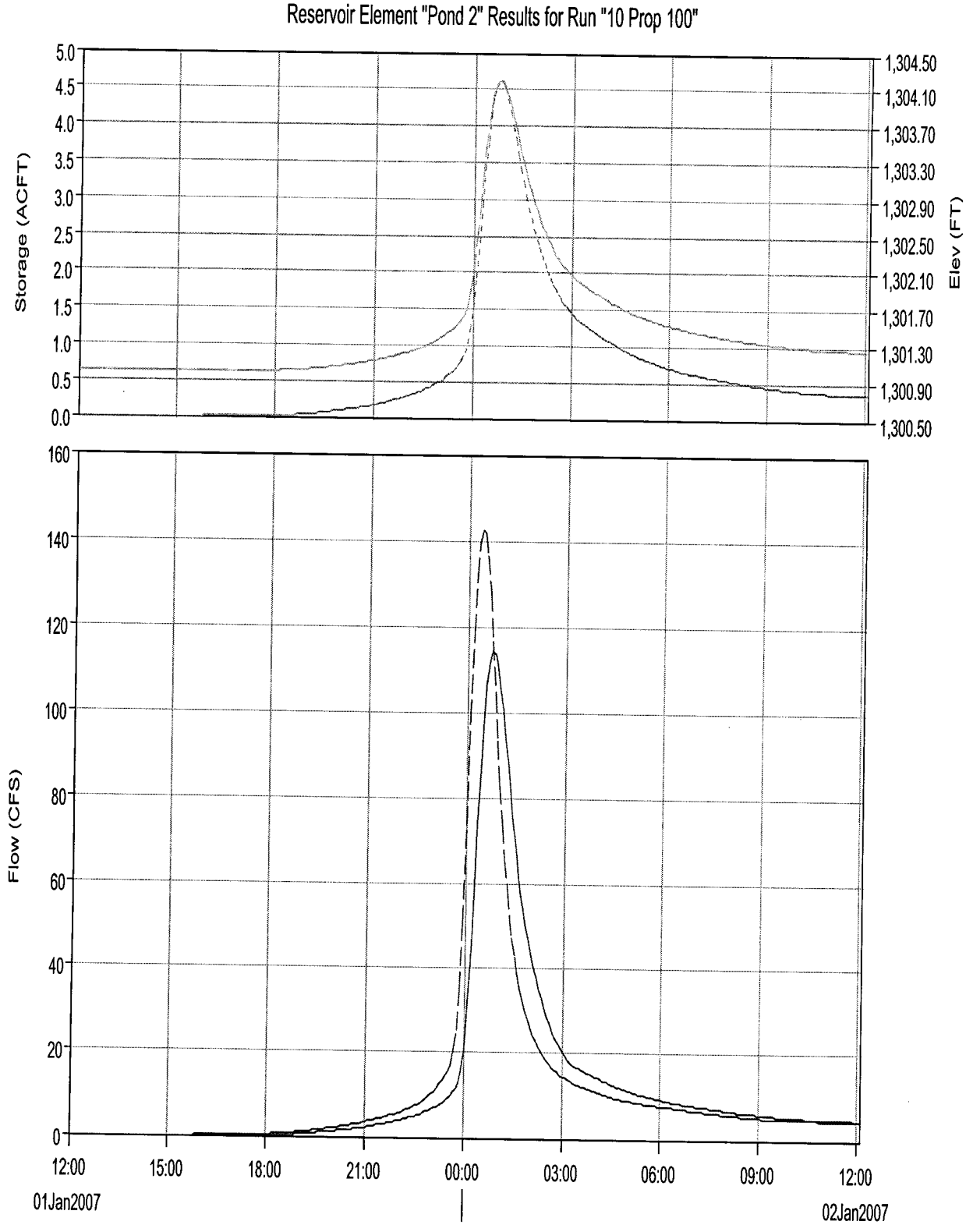
Project : Shackleford Simulation Run : 10 Prop 100 Reservoir: Pond 2

Start of Run :	01Jan2007, 12:00	Basin Model :	Proposed
End of Run :	02Jan2007, 12:05	Meteorologic Model :	Wichita100
Compute Time :	17Oct2007, 10:58:12	Control Specifications :	Control 1

Volume Units : AC-FT

Computed Results

Peak Inflow :	142.6 (CFS)	Date/Time of Peak Inflow :	02Jan2007, 00:25
Peak Outflow :	114.3 (CFS)	Date/Time of Peak Outflow :	02Jan2007, 00:45
Total Inflow :	23.8 (AC-FT)	Peak Storage :	4.6 (AC-FT)
Total Outflow :	23.4 (AC-FT)	Peak Elevation :	1304.2 (FT)


Reservoir Element "Pond 2" Results for Run "10 Prop 100"
Storage (ACFT)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Elev (FT)
1,304.50
1,304.10
1,303.70
1,303.30
1,302.90
1,302.50
1,302.10
1,301.70
1,301.30
1,300.90
1,300.50
Flow (CFS)
160
140
120
100
80
60
40
20
0
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
01Jan2007
02Jan2007
Run:10 PROP 100 Element:POND 2 Result:Storage
Run:10 PROP 100 Element:POND 2 Result:Outflow
Run:10 PROP 100 Element:POND 2 Result:Pool Elevation
Run:10 PROP 100 Element:POND 2 Result:Combined Inflow

USGS MAP
PRELIMINARY PLAT
FEMA FIRM
ORTHOPHOTO OF SITE

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF KANSAS

ANDOVER QUADRANGLE
KANSAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey in cooperation with State of Kansas agencies

Control by USGS and USC&GS

Culture and drainage in part compiled from aerial photographs taken 1954–1955. Topography by planetable surveys 1941–1942
Revised 1961

Polyconic projection. 1927 North American datum
10,000-foot grid based on Kansas coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 14, shown in blue

Red tint indicates area in which only landmark buildings are shown

To place on the predicted North American Datum 1983 move the projection lines 27 meters east as shown by dashed corner ticks

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

There may be private inholdings within the boundaries of the National or State reservations shown on this map

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND STATE GEOLOGICAL SURVEY, LAWRENCE, KANSAS 66044
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

KANSAS
QUADRANGLE LOCATION

Revisions shown in purple compiled from aerial photographs taken 1980 and other sources
This information not field checked. Map edited 1982
Purple tint indicates extension of urban area

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

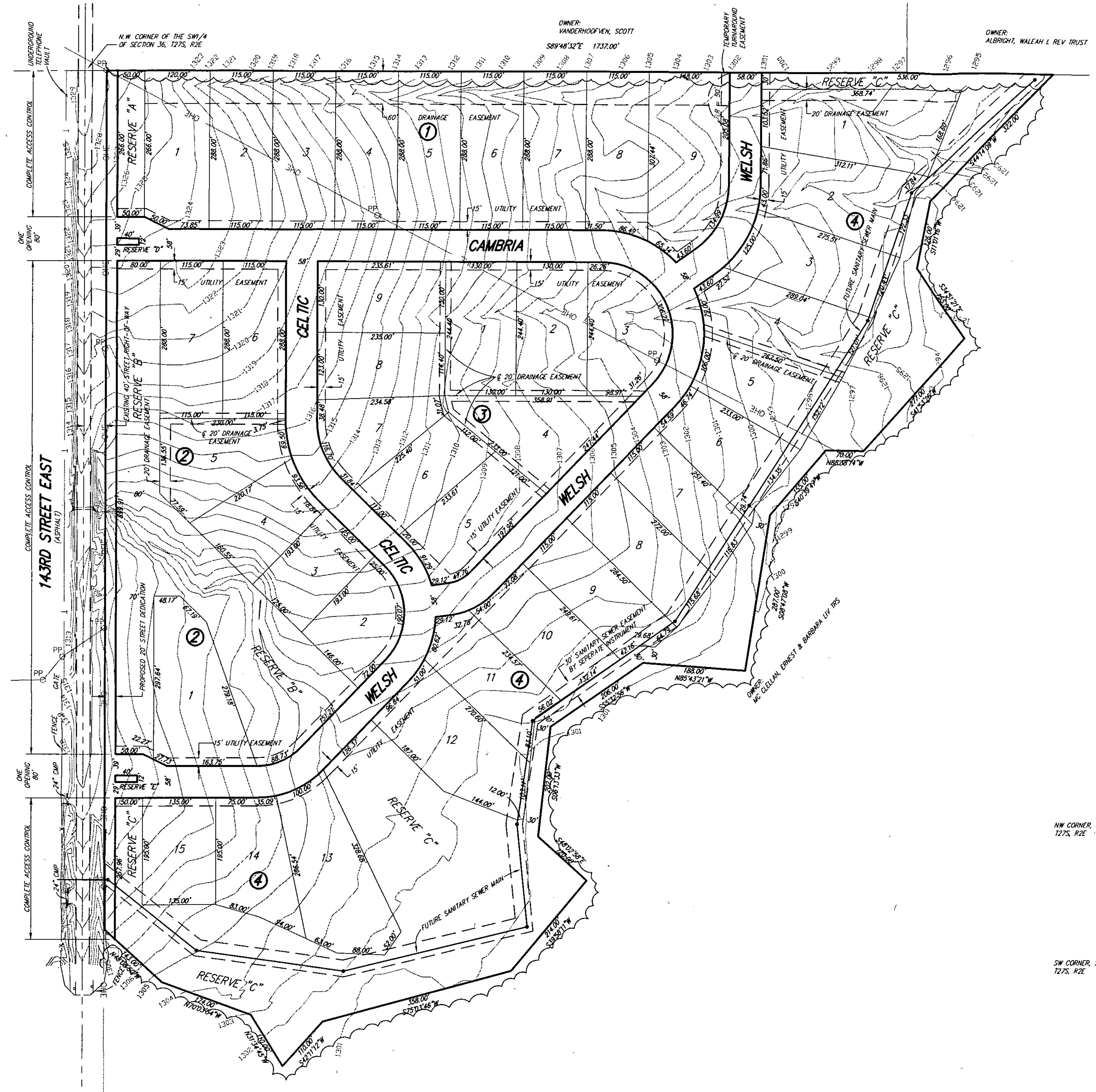
ANDOVER, KANS.
N3737.5—W9707.5/7.5

1961

PHOTOREVISED 1982

DMA 6559 II NW—SERIES V878

Preliminary Plat
CAMBRIA
Wichita, Sedgwick County, Kansas



1" = 100'

LEGEND

OHE . . . . OVERHEAD ELECTRIC

T . . . . UNDERGROUND TELEPHONE (SBC)

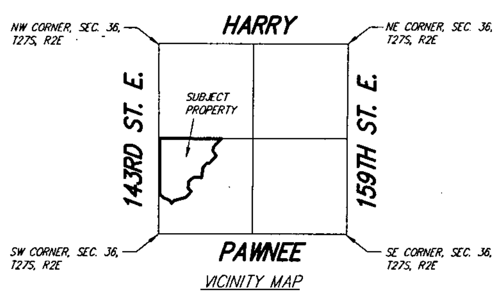
. . . . SIGN

PP . . . . POWER POLE

BUILDING SETBACKS PER ZONING REGULATIONS

BENCH MARK: R.R. SPIKE 32.39' E. & 40.87' N. OF THE CENTERLINE INTERSECTION PAWNEE AVENUE & 127TH STREET EAST ELEV.=1348.62 (NGVD) = 161.22 (CITY DATUM)

BENCH MARK: SRB BRASS DISC 1008.17' E. & 55.63' N. OF THE CENTERLINE INTERSECTION PAWNEE AVENUE & 127TH STREET EAST ELEV.=1336.63 (NGVD) = 149.23 (CITY DATUM)



VICINITY MAP

NOT TO SCALE

LEGAL DESCRIPTION:
That part of the SW1/4 of Section 36, T27S, R2E of the 6th P.M., Sedgwick County, Kansas, described as commencing at the northwest corner of said SW1/4; thence S89°48'32"E, along the north line of said SW1/4, 40.00 feet for a place of beginning; thence continuing S89°48'32"E, along said north line, 1737.00 feet; thence S44°14'09"W, 322.00 feet; thence S11°01'16"W, 126.00 feet; thence S34°51'21"E, 155.00 feet; thence S41°53'26"W, 277.00 feet; thence N88°38'14"W, 70.00 feet; thence S40°39'47"W, 155.00 feet; thence S08°47'08"W, 287.00 feet; thence N85°43'21"W, 188.00 feet; thence S55°32'56"W, 206.00 feet; thence S06°13'33"W, 202.00 feet; thence S48°02'58"E, 120.00 feet; thence S39°58'11"W, 214.00 feet; thence S75°03'46"W, 358.00 feet; thence S42°11'12"W, 110.00 feet; thence N31°34'45"W, 110.00 feet; thence N70°03'54"W, 174.00 feet; thence N48°08'50"W, 143.00 feet to a point 40.00 feet East of the west line of said SW1/4; thence N00°04'42"W, parallel with said west line, 1566.00 feet to the place of beginning.

OWNER:
LCS Enterprises, Inc.
Attn: Cory Shackelford
1418 N. Glen Wood St.
Wichita, KS 67230

Ph. (317) 213-8766

SURVEYOR & ENGINEER:
Ruggles & Bohm P.A.

PROPOSED ZONING:
SF-5

EXISTING ZONING:
Subject property and the surrounding property is zoned SF-20.
Existing use is agricultural

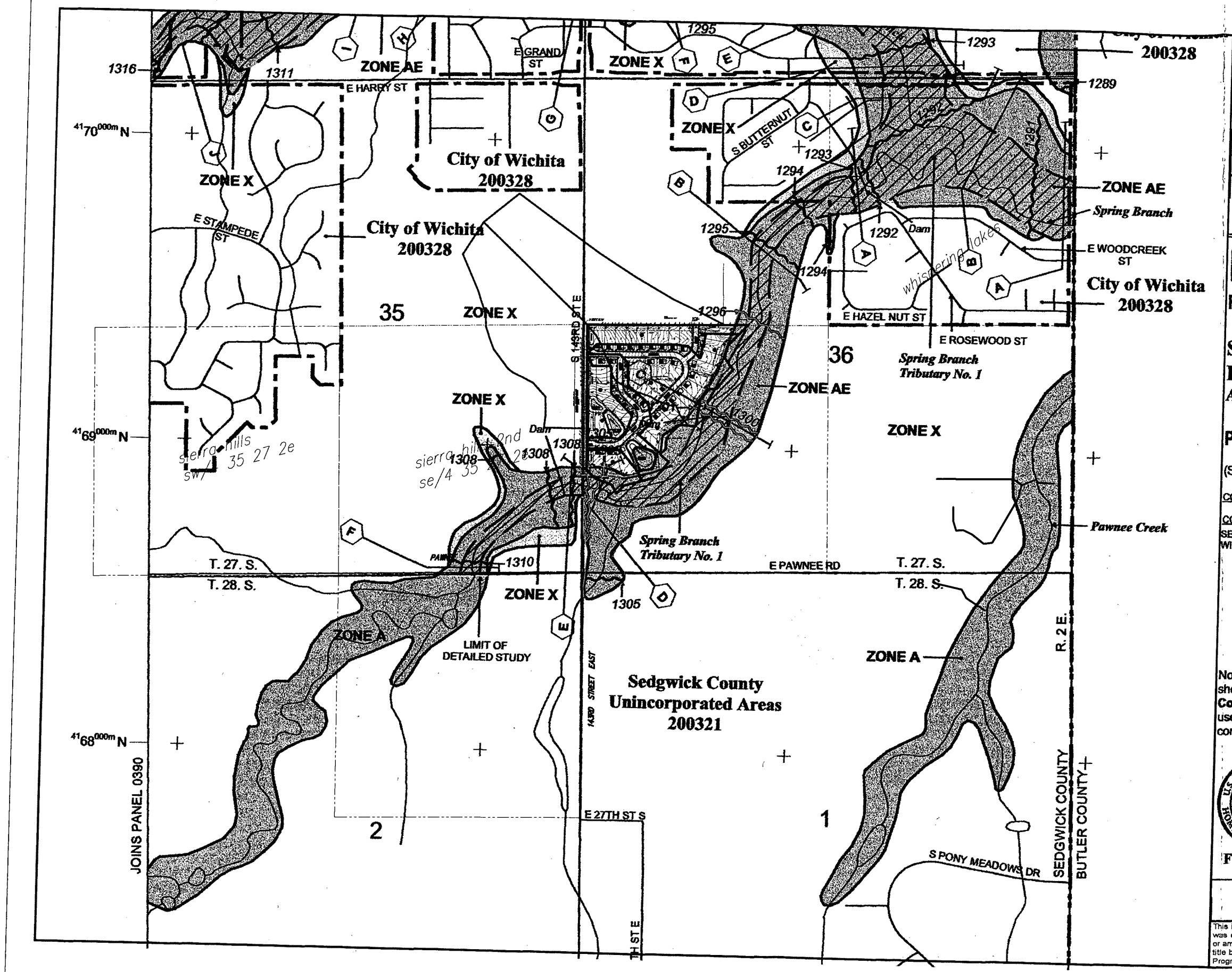
FLOOD ZONE:
According to the FEMA/FIRM Community Panel No. 200321 0395 E, effective February 2, 2007; the property shown hereon is located in Zones AE and X

GROSS AREA:
2,044,802.9 Sq. Ft.±
46.94 Acres±

DATE OF TOPOGRAPHY:
JULY 23, 2007

DWG FILE: SURVEY BASE
PROJECT NO. 3109P
OCTOBER 8, 2007

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main
Wichita, Kansas 67203
www.rbkansas.com
(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com



MAP SCALE 1" = 1000'

1000 2000 FEET

0 300 600 METERS

PANEL 0395E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS AND INCORPORATED AREAS

PANEL 395 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEDGWICK COUNTY	200321	0395	E
WICHITA, CITY OF	200328	0395	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
20173C0395E

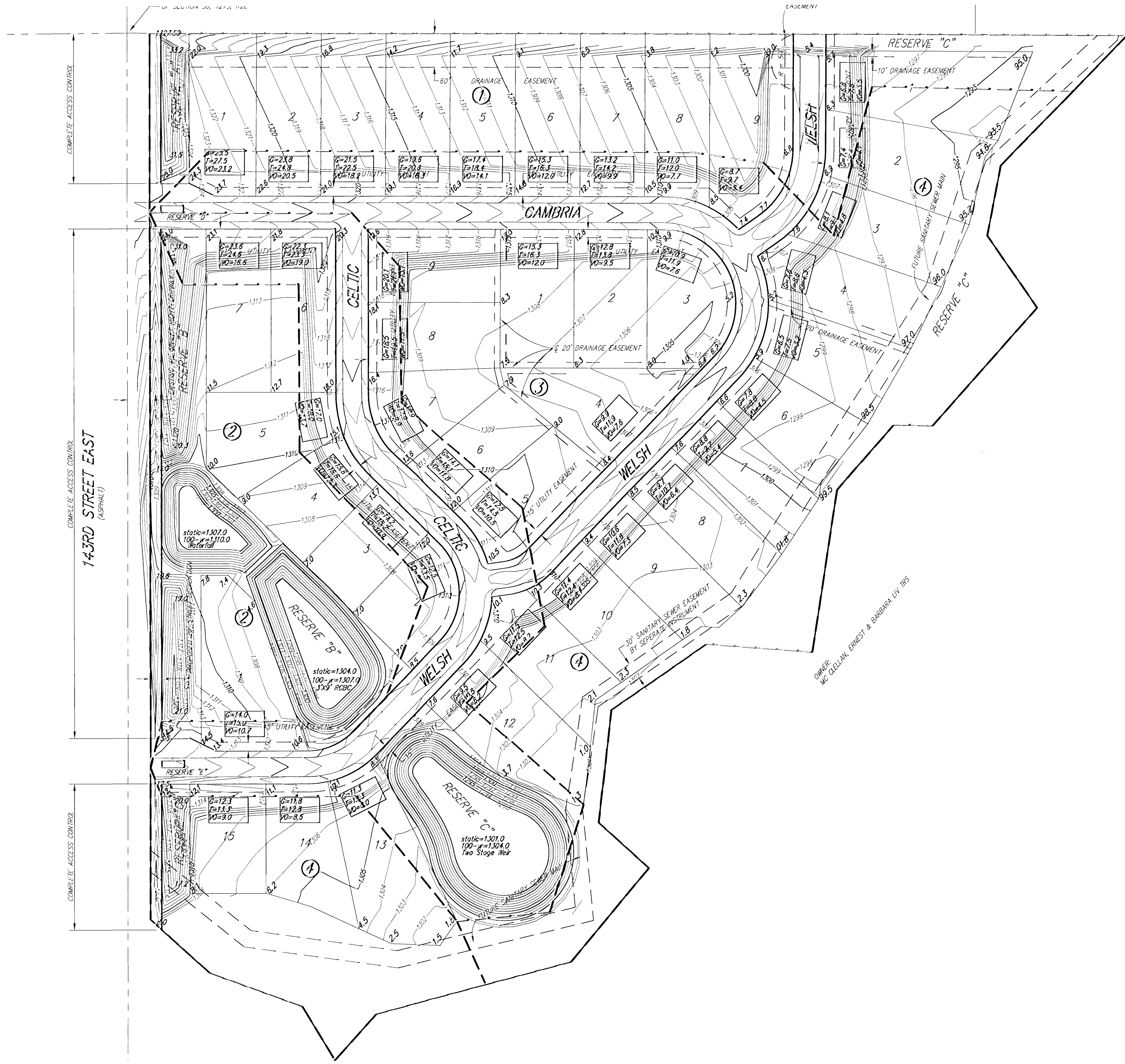
EFFECTIVE DATE
FEBRUARY 2, 2007

Federal Emergency Management Agency

143RD STREET EAST
WELSH
CAMBRIA
CELTIC
ASTON
RESERVE "C"
RESERVE "D"
RESERVE "B"

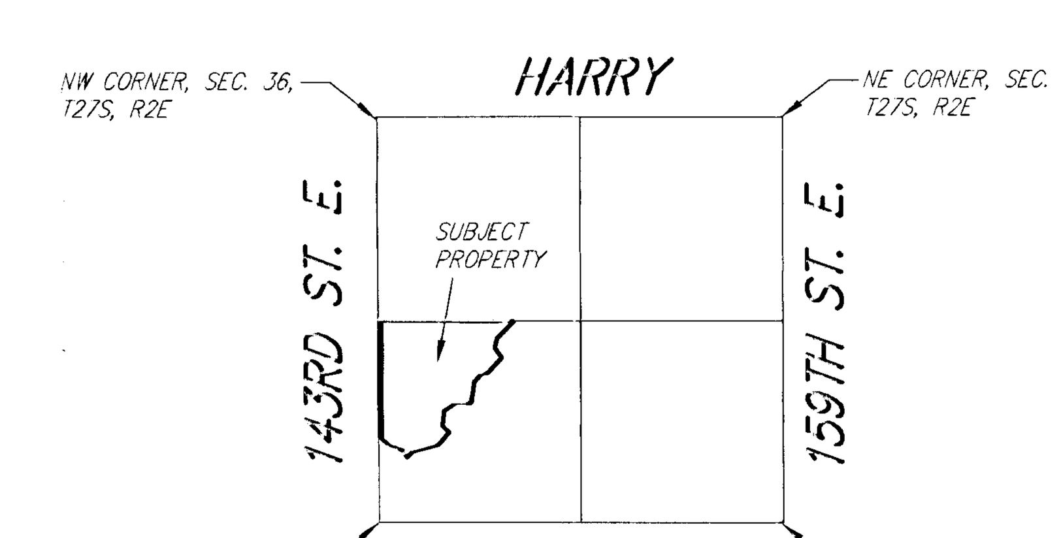
DRAINAGE MAP

DRAINAGE PLAN FOR
CAMBRIA ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS



BENCH MARK: R.R. SPIKE 32.39' E. & 40.87' N. OF THE CENTERLINE INTERSECTION PAWNEE AVENUE & 127TH STREET EAST ELEV.=1348.62 (NGVD) = 161.22 (CITY DATUM)

BENCH MARK: SRB BRASS DISC 1008.17' E. & 55.63' N. OF THE CENTERLINE INTERSECTION PAWNEE AVENUE & 127TH STREET EAST ELEV.=1336.63 (NGVD) = 149.23 (CITY DATUM)



VICINITY MAP

NOT TO SCALE

1" = 100'

PATRICK SHAWN BAER
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10/1/07

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(316) 264-4621 fax
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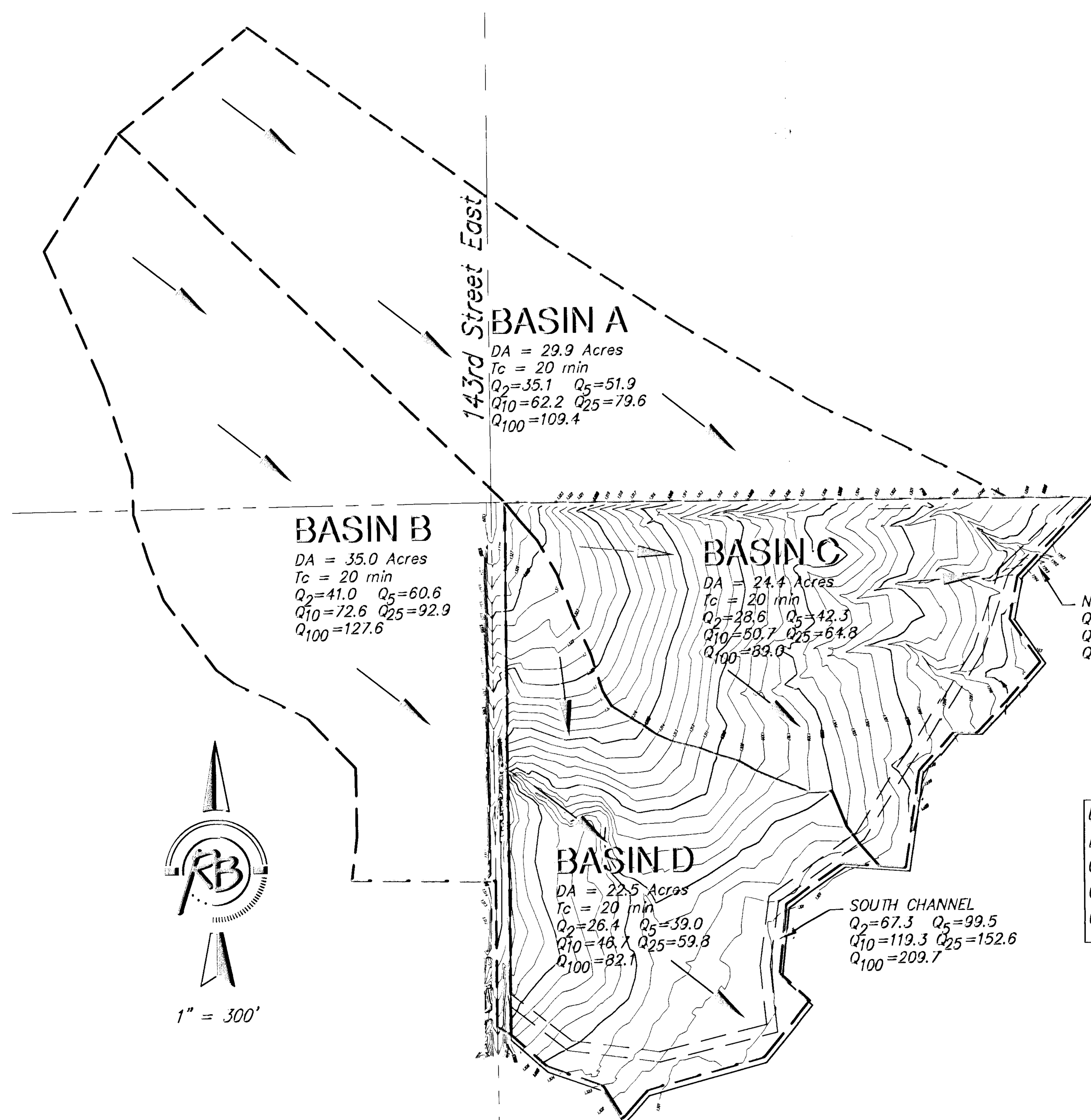
GRADING PLAN

DRAINAGE PLAN FOR
CAMBRIA ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS



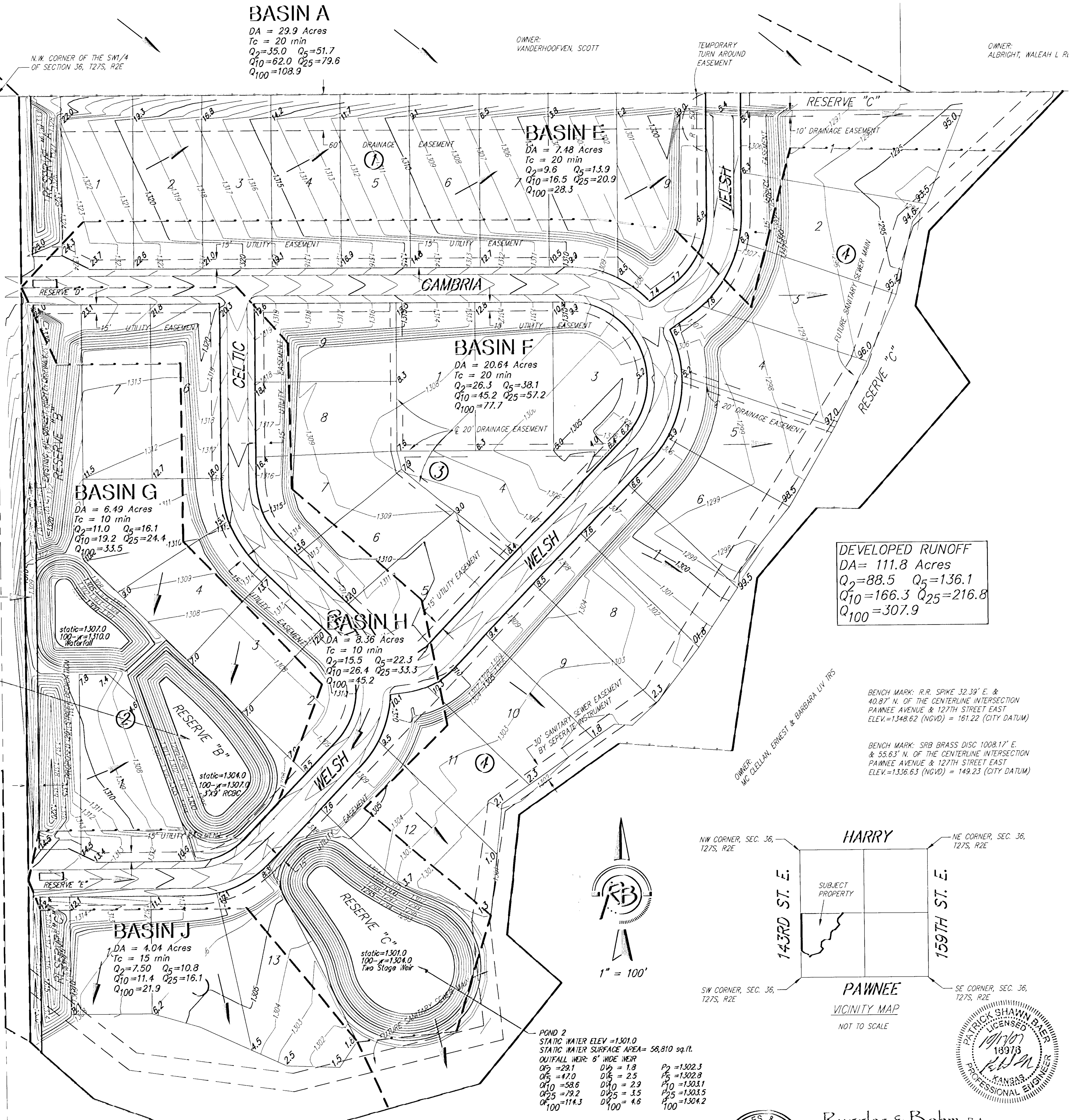
UNDEVELOPED RUNOFF
DA = 112.0 Acres
Q_2=131.0 Q_5=193.7
Q_{10}=232.2 Q_{25}=297.1
Q_{100}=408.1

UNDEVELOPED DRAINAGE CONDITION

DRAINAGE DESIGN CALCULATIONS:
The existing drainage analysis was developed using the SCS Method and Rational Method, using the City of Wichita (COW) Drainage Standards for Intensity and Runoff Coefficients. These coefficients are list below for pre and post development in the table below. Detention/Retention Ponds were developed by using a HEC-HMS computer modeling for storm event runoff modeling. Pond One has been designed for a Outfall structure consisting of a 9'x3' RCB. Pond Two has been designed for a Weir outfall structure with 6' width.

Note: DA= Drainage Area, Q= Peak Runoff (cfs), OF=Outfall Flow(cfs), DV=Detention Volume(acre-ft), P=Peak Volume Elevation(usgs)

Undeveloped Time of Concentration equals 20 minutes. Developed Time of Concentration equals 15 minutes (COW std. minimum). Rain Intesity values per City of Wichita Sewer & Drainage Design Standard. Undeveloped and Developed Soil Coeficents per City of Wichita Sewer & Drainage Design Standards for soil classification group "D" with slope between 1%-4% and soil group "D" Residential Single Family ¼ Acre Lots.



POND 1
STATIC WATER ELEV =1304.0
STATIC WATER SURFACE AREA= 36,870 sq.ft.
OUTFALL RCB: 3'x9'

OF_2 =36.7	DV_2 =2.4	P_2 =1305.4
OF_5 =56.5	DV_5 =2.8	P_5 =1305.9
OF_{10} =68.5	DV_{10} =3.1	P_{10} =1306.1
OF_{25} =89.1	DV_{25} =3.5	P_{25} =1306.5
OF_{100}=125.6	DV_{100}=4.2	P_{100}=1307.2

DEVELOPED RUNOFF
DA= 111.8 Acres
Q_2=88.5 Q_5=136.1
Q_{10}=166.3 Q_{25}=216.8
Q_{100}=307.9

BENCH MARK: R.R. SPIKE 32.39' E. & 40.87' N. OF THE CENTERLINE INTERSECTION PAWNEE AVENUE & 127TH STREET EAST ELEV.=1348.62 (NGVD) = 161.22 (CITY DATUM)

BENCH MARK: SRB BRASS DISC 1008.17' E. & 55.63' N. OF THE CENTERLINE INTERSECTION PAWNEE AVENUE & 127TH STREET EAST ELEV.=1336.63 (NGVD) = 149.23 (CITY DATUM)

HARRY
NW CORNER, SEC. 36, T27S, R2E
NE CORNER, SEC. 36, T27S, R2E
SUBJECT PROPERTY
143RD ST. E.
159TH ST. E.
SW CORNER, SEC. 36, T27S, R2E
SE CORNER, SEC. 36, T27S, R2E
PAWNEE

VICINITY MAP
NOT TO SCALE

POND 2
STATIC WATER ELEV =1301.0
STATIC WATER SURFACE AREA= 56,810 sq.ft.
OUTFALL WEIR: 6' WIDE WEIR

OF_2 =29.1	DV_2 = 1.8	P_2 =1302.3
OF_5 =47.0	DV_5 = 2.5	P_5 =1302.8
OF_{10} =58.6	DV_{10} = 2.9	P_{10} =1303.1
OF_{25} =79.2	DV_{25} = 3.5	P_{25} =1303.5
OF_{100}=114.3	DV_{100}= 4.6	P_{100}=1304.2

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DEVELOPED DRAINAGE CONDITION

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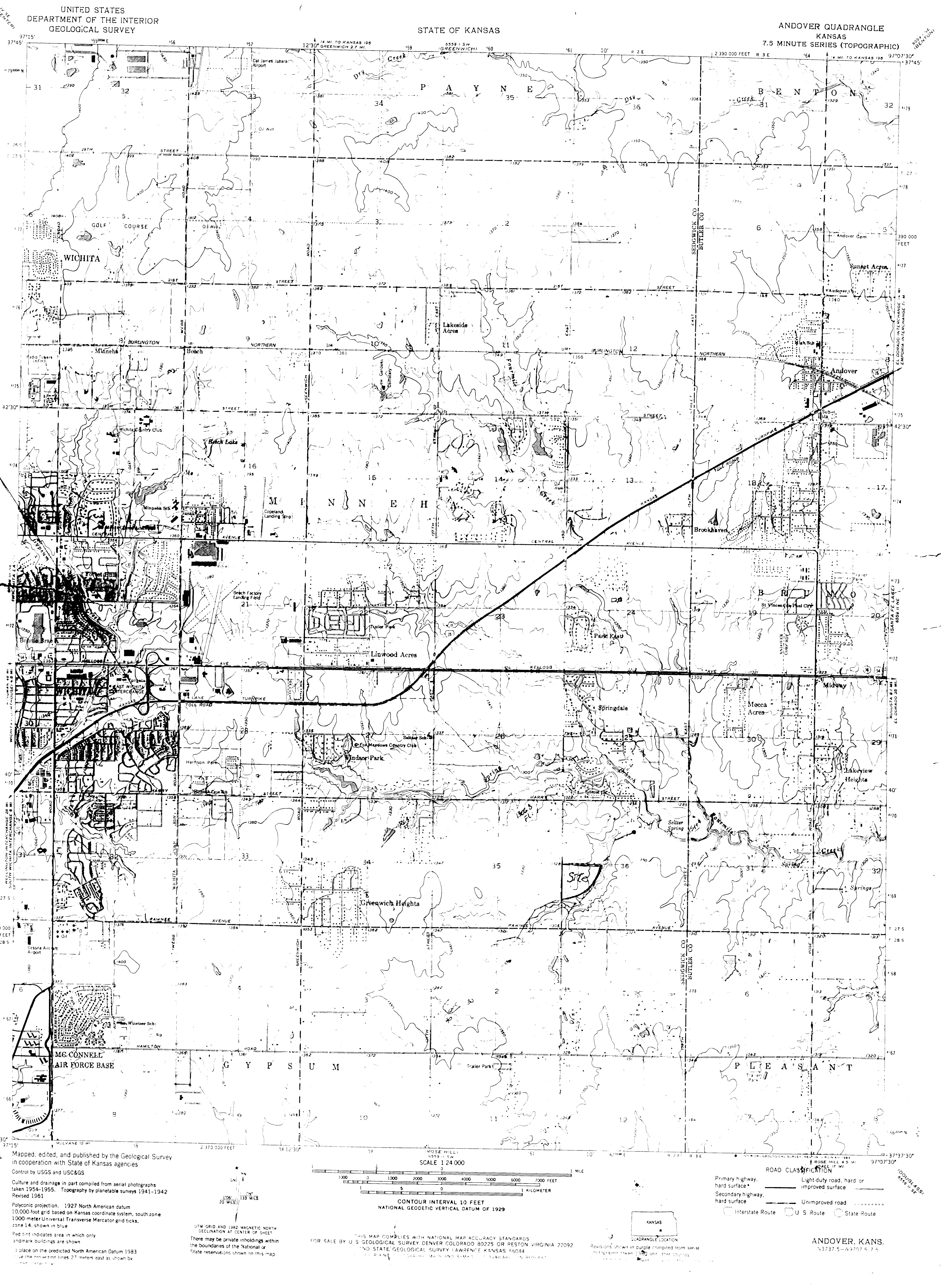
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF KANSAS
ANDOVER QUADRANGLE
KANSAS
7.5 MINUTE SERIES (TOPOGRAPHIC)
P A Y N E
B E N T O N
M I N N E H A
B R O N O
G Y P S U M
P L E A S A N T
WICHITA
GOLF COURSE
Lakeside Acres
Andover
Sunset Acres
Brookhaven
Linwood Acres
Park East
Springdale
Mecca Acres
Midway
Windsor Park
Lakeview Heights
Greenwich Heights
Seltzer Spring
MC CONNELL AIR FORCE BASE
SEDGWICK CO
BUTLER CO
Site
Mapped, edited, and published by the Geological Survey in cooperation with State of Kansas agencies
Control by USGS and USC&GS
Culture and drainage in part compiled from aerial photographs taken 1954-1955. Topography by planetable surveys 1941-1942
Revised 1961
Polyconic projection. 1927 North American datum
10,000-foot grid based on Kansas coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 14, shown in blue
There may be private inholdings within the boundaries of the National or State reservations shown on this map
SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND STATE GEOLOGICAL SURVEY, LAWRENCE, KANSAS 66044
ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U.S. Route
State Route
QUADRANGLE LOCATION
ANDOVER, KANS.