

# MKEC ENGINEERING CONSULTANTS, INC.

Kansas City Oklahoma City Wichita



March 16, 2007

Mr. Scott C. Lindebak, P.E.  
City of Wichita  
Department of Public Works  
455 N. Main – 7<sup>th</sup> Floor  
Wichita, Kansas 67202

Reference: Stonebridge Commercial Addition – Drainage Plan  
Wichita, Kansas  
MKEC Project Number 05440

Dear Scott:

We have completed the revisions to the Stonebridge Commercial Addition in response to your email dated June 06, 2006. Each of the comments are restated below and followed with a response.

1. **The CLOMR mentioned in the report states the 100-year water surface elevation is 1351.6, which appears to be above the natural grade of the southeast portion of the plat. Is this area being mapped in the floodplain based on your flood study? This may require a DWR floodplain fill permit.**

The CLOMR ends at the north property line of Fox Ridge Addition. A CLOMR is not required for either the Stonebridge Commercial Addition or the property between Stonebridge Commercial and Fox Ridge.

The Drainage area above Stonebridge Commercial Addition is less than 240 acres therefore a DWR floodplain fill permit will not be required.

2. **The drainage plan should show or provide stormwater sewer to serve lots 1-10, Block 1.**

Stormwater Sewer has been added to the Drainage and Utility Plan to serve lots 1-10, Block 1.

3. **We will request the ponds to be contoured and placed in a Reserve or Reserves. We have been requiring detention pond to be located in reserves for years, including Regency Lakes Commercial 2<sup>nd</sup> Addition, New Market, Chadsworth Plaza, etc....**

The proposed ponds have been contoured on the Drainage & Utility Plan. Reserves will be placed around the proposed ponds on the Final Plat.

4. **The proposed SWS between the ponds shall be located in a public drainage easement.**

The SWS between the ponds will be located in a public Drainage easement on the Final Plat.

*Providing Professional Service Since 1982*

411 NORTH WEBB ROAD WICHITA, KS 67206 T 316.684.9600 F 316.684.5100

5. The plan should include the offsite ditch necessary to drain the ponds into Fox Ridge. Typical Cross sections flowlines, and offsite Drainage easements is required.....

A drawing has been added to Appendix H showing the location and size of the proposed ditch that will drain the Stonebridge Commercial ponds to the Fox Ridge ponds.

6. The post-project TC value is not going to be neighborhood Business at 70% impervious. My experience like developments like Towne East, New Market, the impervious area is 95%. The Water surface area on a pond does not allow for water to soak in. The islands in medians have sub-grades that are compacted to 95% std density. TC of 25 minutes seems high. I would assume the 15 minute minimum. Please revise.

The curve numbers and time of concentrations have been updated in the model for a 95% impervious development.

7. The plan should show the location of the weir, rather than a pipe.

The plan has been updated to show the location of the proposed weir.

8. The plat is not providing adequate detention for all ranges of storm events and should be revised to meet our requirements. Over detain on the lower events and try using a 4' weir. In addition, I want to make sure this development provides the necessary storage volume for the Cadillac Basin. Another development in the basin is proposing 110% of the storage volume required.

The outlet structure has been modified to reduce the runoff offsite to the south for the 2, 5, 10, and 100-yr design storms, from pre-project to post-project conditions.

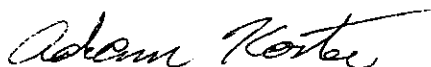
9. Show flow lines for the entrance culverts along 37<sup>th</sup> Street and Maize Road.

Proposed flow line elevations have been added to the entrance culverts along 37<sup>th</sup> Street and Maize Road.

Thank you for your review of this drainage plan. Please let me know if there are any other issues that need to be resolved.

Sincerely,

**MKEC ENGINEERING CONSULTANTS, INC.**



Adam Koster, E.I.T.

# Preliminary Drainage Report for Stonebridge Commercial Addition Wichita, Sedgwick County, Kansas

## Location

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The subject property is located in Wichita, Kansas. The site is located on the southeast corner of the 37<sup>th</sup> Street North and Maize Road. The Wyn-Wood Addition is north of the site and 37<sup>th</sup> Street. Fox Ridge Addition is approximately ¼ mile south of the subject property. U.S.D. #266, Maize School District, owns the land south and east of the site. The site is approximately 36 acres. The property lies in the northwest quarter of the northwest quarter of Section 32, Township 26 South, Range 1 West. The site is shown on the Maize, Kansas Quadrangle, Appendix A.

## Soil

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According to the NRCS (GIS) Sedgwick County Soil Survey (Appendix B), the following soils are found on the site:

- Tabler silty clay loam, 0 to 1 percent slopes, HSG "D"
- Waurika silt loam, 0 to 1 percent slopes, HSG "D"
- Vanoss silt loam, 1 to 3 percent slopes, HSG "B"
- Blanket silt loam, 0 to 1 percent slopes, HSG "C"

The hydrologic soil group (HSG) used to select runoff coefficients and curve numbers for this site is "C".

## Pre-Project Conditions

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### *Development*

The site is currently agricultural land.

### *Landform and Slope*

Slopes across the site range from 0.2-2.0%. The site drains from north to south.

### *Drainage Conditions*

The site is in Zone C, areas of minimal flooding. The nearest Zone A, area within the 100-year floodplain, surrounds Cadillac Lake approximately ½-mile south of the site. (FIRM Panel 125, Sedgwick County, Kansas Unincorporated Areas, June 3, 1986) (Appendix C). CLOMR (Case No. 05-07-0395R) has been approved for the Fox Ridge Addition and a LOMR (Case No. 06-07-BB0P) is pending for Fox Ridge Addition. The flood plain was stopped at the north property line of Fox Ridge.

### *Runoff Characteristics*

Runoff sheet flows from north to south across the site. The stormwater sewer system within the Wyn-Wood Addition and the ditches along 37<sup>th</sup> Street North and Maize Road prevent runoff from

entering the property from offsite. Runoff from the site drains across the adjacent property to the south and flows into Fox Ridge lakes. The site was divided into three basins for modeling purposes. The basins are shown on the Drainage & Utility Plan, Appendix D. The time of concentration for each basin was calculated using the FAA Method, Appendix E. The basins were modeled, under pre-project conditions, using Hydraflow Hydrographs 2004 by Intelisolve, Appendix F.

## Post-Project Conditions

### *Development*

The site will include 10 small commercial lots 1 to 2 acres in size and one large commercial lot approximately 23 acres in size. Three detention ponds will be constructed within the large lot. The shape of the ponds may be modified when the final lot layout is complete; however the storage provided by the ponds will remain.

### *Landform and Slope*

Fill will be added to the lots to raise the building pads above the 100-year water surface elevation of the proposed ponds. Final grades have not been set; however the minimum slope in the streets and parking lots will be 0.5%. A Preliminary Four Corner Lot Grading Plan is in Appendix G.

### *Runoff Characteristics*

Post-project runoff will exit the site through a proposed ditch connecting the proposed Stonebridge Commercial detention ponds to Fox Ridge lakes, see site plan in Appendix H. The ditch will outlet to a Fox Ridge lake approximately 0.5 feet above the normal pool elevation. The ditch will have a 0.1% slope, bottom width of 10.0 ft, side slope of 4 to 1, and a 100-year depth of 2.3 ft. The ditch was sized using Flow Master, Appendix H.

The Drainage & Utility Plan, in Appendix D, shows the three proposed detention ponds that will be constructed to control the post-project flow rates. The ponds share the same normal pool elevations, 1350.4, and provide 10.0 ac-ft of storage in the 100-yr design storm. The CLOMR for Fox Ridge Addition defines the 100-year water surface elevation of 164.2 ft (1351.6 NGVD) and the 10-year water surface elevation of 163.0 ft (1350.4 NGVD) for the Fox Ridge lake.

The post-project times of concentration were calculated using the FAA Method, Appendix E. The post-project basins were modeled in Hydraflow Hydrographs 2004 by Intelisolve, Appendix F. Equalizing structures will connect the proposed ponds; enabling the ponds to function as a single detention pond. A tailwater elevation of 164.2 ft (1351.6 NGVD) was used for the 100-year design storm. A notched weir was designed as the pond outlet to control runoff during design flows. Table 1 compares the pre-project and post-project flow rates exiting the site.

Table 1. Stonebridge Commercial Runoff.

Description	Design Storm Flows (cfs)			
	2-Yr	5-Yr	10-Yr	100-Yr
Pre-Project Total Flow to the South	18.1	30.9	44.3	98.9
Post-Project Total Flow to the South	17.3	26.1	33.4	91.9

Runoff offsite to the south is reduced for the 2, 5, 10, and 100-yr design storms, from pre-project to post-project conditions.

Storm water sewer (SWS) lines are proposed to convey storm water from the commercial lots to the three detention ponds. A preliminary layout of the SWS is shown on the Drainage and Utility

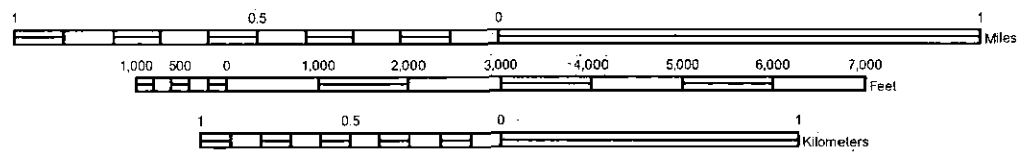
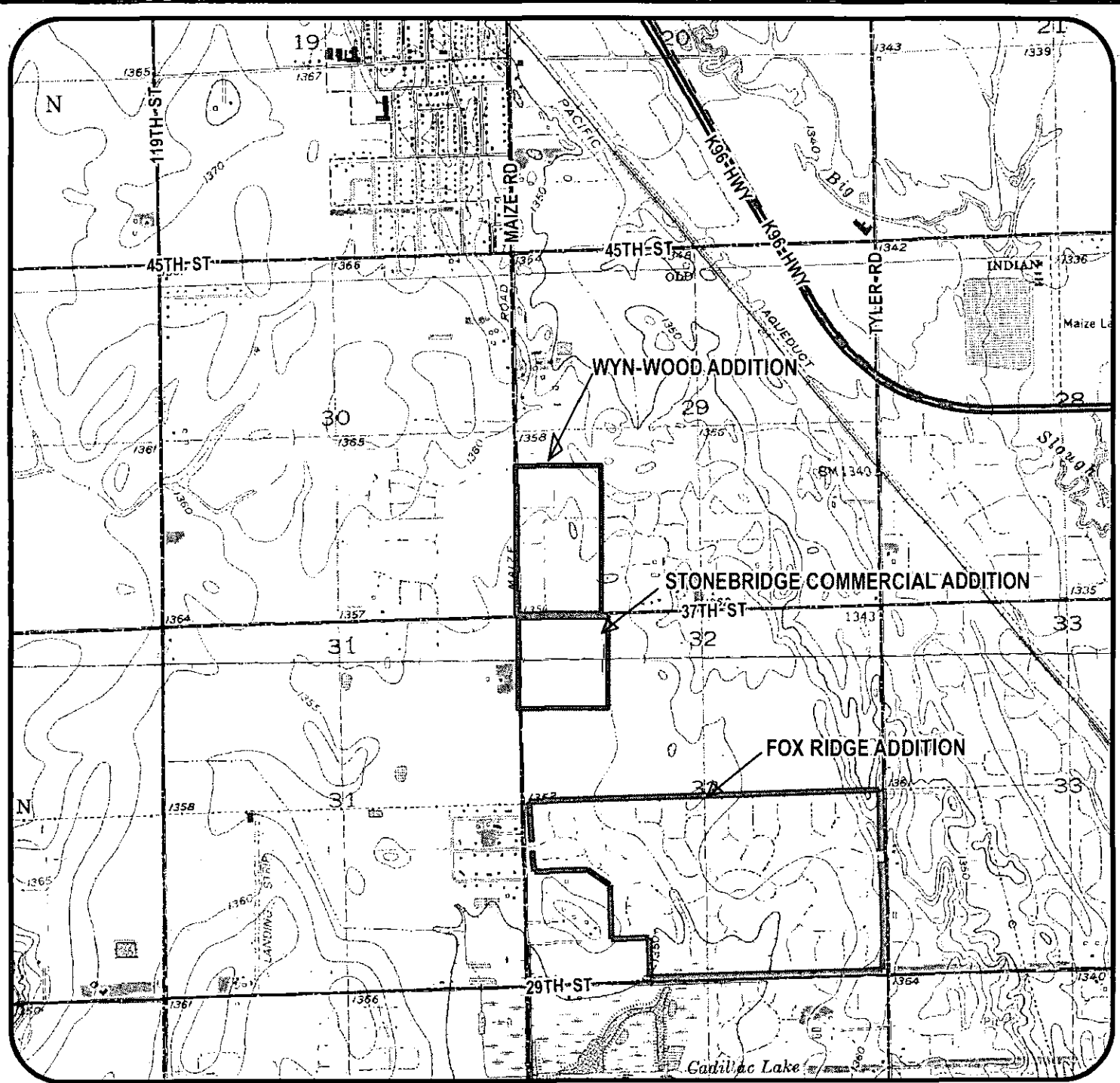
Plan, Appendix.D. HydroFlow Storm Sewers 2005 was used to size the proposed system for the 5-year design storm. The storm sewer calculations are in Appendix I.

## Summary

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Stonebridge Commercial Addition is located on the southeast corner of the intersection of 37<sup>th</sup> Street North and Maize Road. The property is approximately 36 acres and will develop for commercial use. Runoff from the site currently sheet flows across the property to the south into the Fox Ridge lakes. A ditch will be constructed along the east property line of the adjacent property to the south and into a Fox Ridge lake. This ditch will be sized to carry the post-project 100-year flow rate from the subject property. A notched weir was designed to control runoff from the site. Runoff offsite to the south is reduced for the 2, 5, 10, and 100-year design storms, from pre-project to post-project conditions.

Appendix A  
Quadrangle



J:\CIVIL\05440\DWG\DRNG-NRCS-USGS.mxd

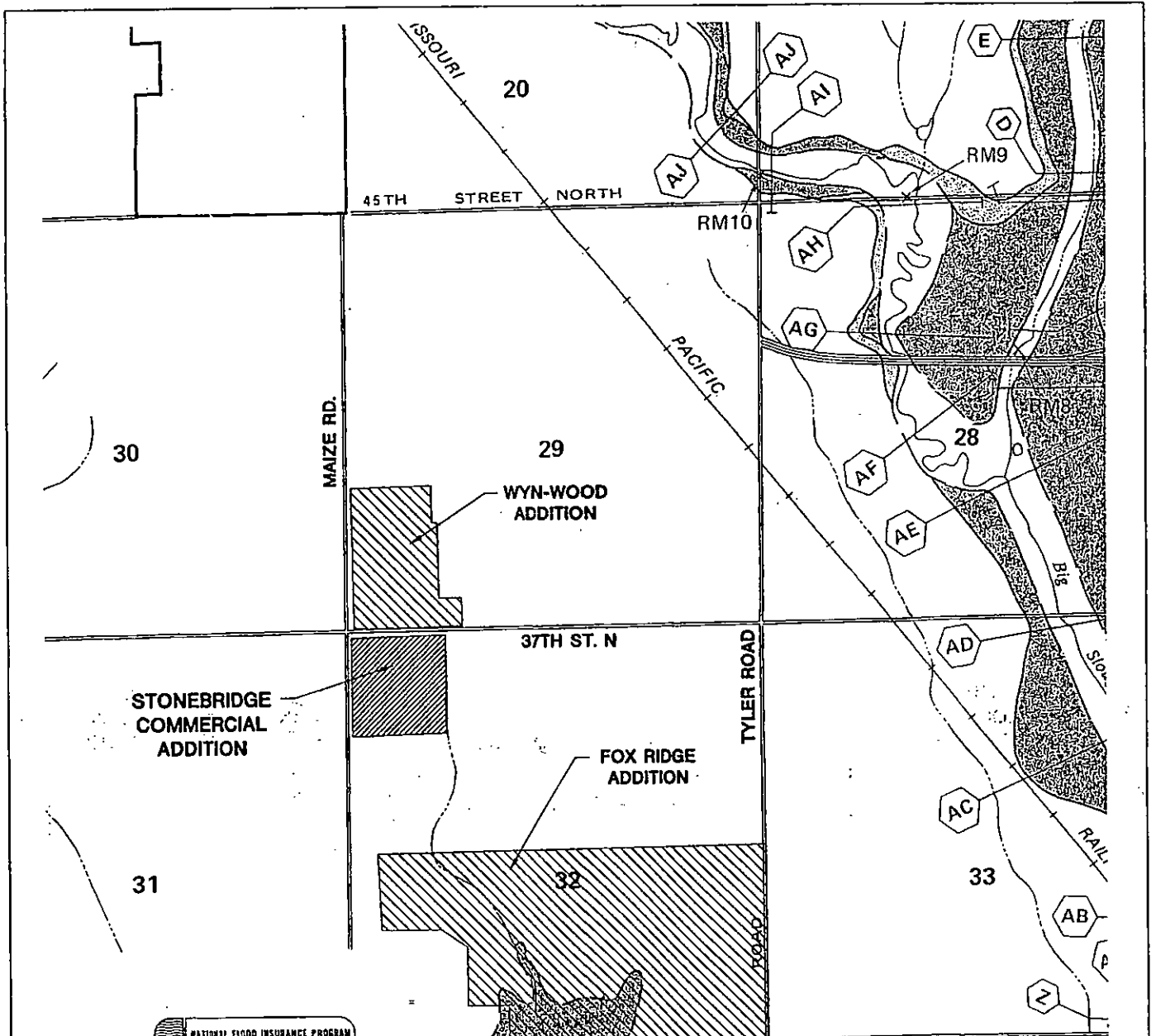
<b>STONEBRIDGE COMMERCIAL ADDITION</b>		
Project Name:		
<b>USGS - Sedgwick County, KS</b>		
Sheet Title:		
	AJK	<b>AUGUST 2006</b>
	Drawn By:	Date:
	AJK / KLA	<b>05440</b>
	Design / Review:	Job No.:

Appendix B  
Soil Survey



Appendix C  
FIRM & FBFM





STONEBRIDGE  
COMMERCIAL  
ADDITION

WYN-WOOD  
ADDITION

FOX RIDGE  
ADDITION

CADILLAC LAKE

NATIONAL FLOOD INSURANCE PROGRAM


**FLOODWAY**  
FLOOD BOUNDARY AND  
FLOODWAY MAP

SEDGWICK,  
COUNTY,  
KANSAS  
(UNINCORPORATED AREAS)

PANEL 125 OF 300  
SEE MAP NUMBER FOR PANELS NOT PRINTED

COMMUNITY-PANEL NUMBER  
200321 0125

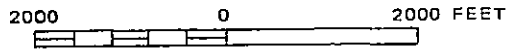
EFFECTIVE DATE:  
JUNE 3, 1986



Federal Emergency Management Agency



APPROXIMATE SCALE



**MKEC**  
ENGINEERING  
CONSULTANTS, INC.

411 N. WEBB ROAD  
WICHITA, KS. 67206  
316-504-9600

**STONEBRIDGE COMMERCIAL ADDITION**  
PROJECT NAME

**FBFM PANEL 125 OF 300**  
**SEDGWICK COUNTY, KANSAS**  
SHEET TITLE

AJK DESIGN BY:	KWS DRAWN BY:	GJA CHECKED BY:
AUGUST 2006 DATE	05440 JOB NO.	1 / 1 SHEET/04

J:\City\101540.dwg\Draw\05440.FRM

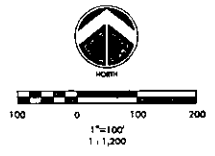
Appendix D  
Preliminary Drainage & Utility Plan

**NOTES**

1. GEOGRAPHY: Located in the Northwest portion of the City of Wichita in an area currently transitioning from agricultural use into urban residential, institutional and commercial uses with access to K-96 via Maize Rd. and/or Ridge Rd. The surrounding land uses include urban residential to the Northwest and South, rural residential to the West, and agriculture production to the immediate South and East, and Institutional uses East of the agriculture production.
2. LOT TOTAL - 11 Commercial parcels
3. ANNEXATION: Lies within the City of Wichita and adjoins the City of Maize to the North and West.
4. EXISTING USE: Agricultural
5. ZONING: Existing / proposed - "C" w/ CUP DP 295 overlay THIS PLAT SHALL CONFORM TO THE RECALLS OF CUP DP 295.
6. PLAT AREA: Gross - 36.3 AC.  
Net - 35.93 AC.
7. SURVEY DATE: January, 2006 (by MKEC)
8. PUBLIC UTILITIES: Shall be extended to site. Municipal sanitary sewer shall be served from the East. Municipal water shall be served from existing mains to the North and West.
9. LEGAL DESCRIPTION: See hereon
10. ACCESS CONTROL: Shall align with developments to the West and North and also conform to access management policies as shown hereon.
11. PROPOSED COMMERCIAL: According to CUP DP 295 the total number of buildings is limited to 10 with the following minimum building setbacks:  
Arterial Street setback = 35'  
Interior side setback = 15'  
Exterior boundary setback = 100' \*\*  
\*\* (if building has a gross floor area greater than 100,000 s.f.)
12. RESERVES: All reserves are planned for irrigation, landscaping, monuments, drainage, and utilities in designated areas. Reserve "C" is also planned for a private swimming pool, pool house, and parking.
13. FLOOD: According to FEMA FEMA Community Unit Panel 200321 0123A, Effective Date June 3rd, 1986, this property lies within flood zone "C", "areas of minimal flooding."
14. DRAINAGE: A drainage report shall accompany this plat. The property lies within a branch of the Sand Creek drainage basin, which drains to the Little Arkansas River located in Sedgewick County and generally draining from northeast to southwest.

**BENCH MARKS**

- 1. Top of "T" post 33' ± N. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 134' ± E. of NW 1/4 corner of said NW 1/4, Elev. = 1383.54 (NGVD 29)
- 2. Top of "T" post 660' ± S. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 1328' ± E. of W. line of said NW 1/4, Elev. = 1351.69 (NGVD 29)
- 3. Top of "T" post 673' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 1307' ± S. of the N. line of said NW 1/4, Elev. = 1351.79 (NGVD 29)
- 4. Square set on N. end, and on top of COP 50' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 660' ± S. of the N. line of said NW 1/4, Elev. = 1352.50 (NGVD 29)



**LEGEND**

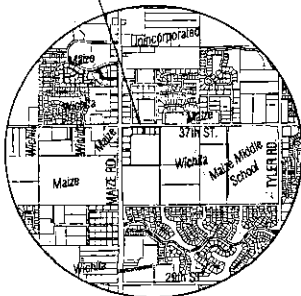
- CONIFEROUS TREE & DIAMETER
- DECIDUOUS TREE & DIAMETER
- SIGN
- POWER POLE AND GUY ANCHOR
- ELECTRIC BOX
- LIGHT POLE
- FIRE APPROACH
- WATER VALVE
- WATER METER
- SECTION CORNER
- BENCHMARK
- EASEMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- GAS PIPELINE
- TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- OVERHEAD ELECTRIC
- FIBER OPTIC CABLE
- DRAINAGE BOUNDARY
- DRAINAGE BOUNDARY LINE
- FLOW ARROW

MINIMUM PAD ELEVATIONS LOWEST OPENINGS		
LOTS (inclusive)	BLOCK	ELEVATION "NGVD"
1-2	1	1355.3
3-11	1	1359.3

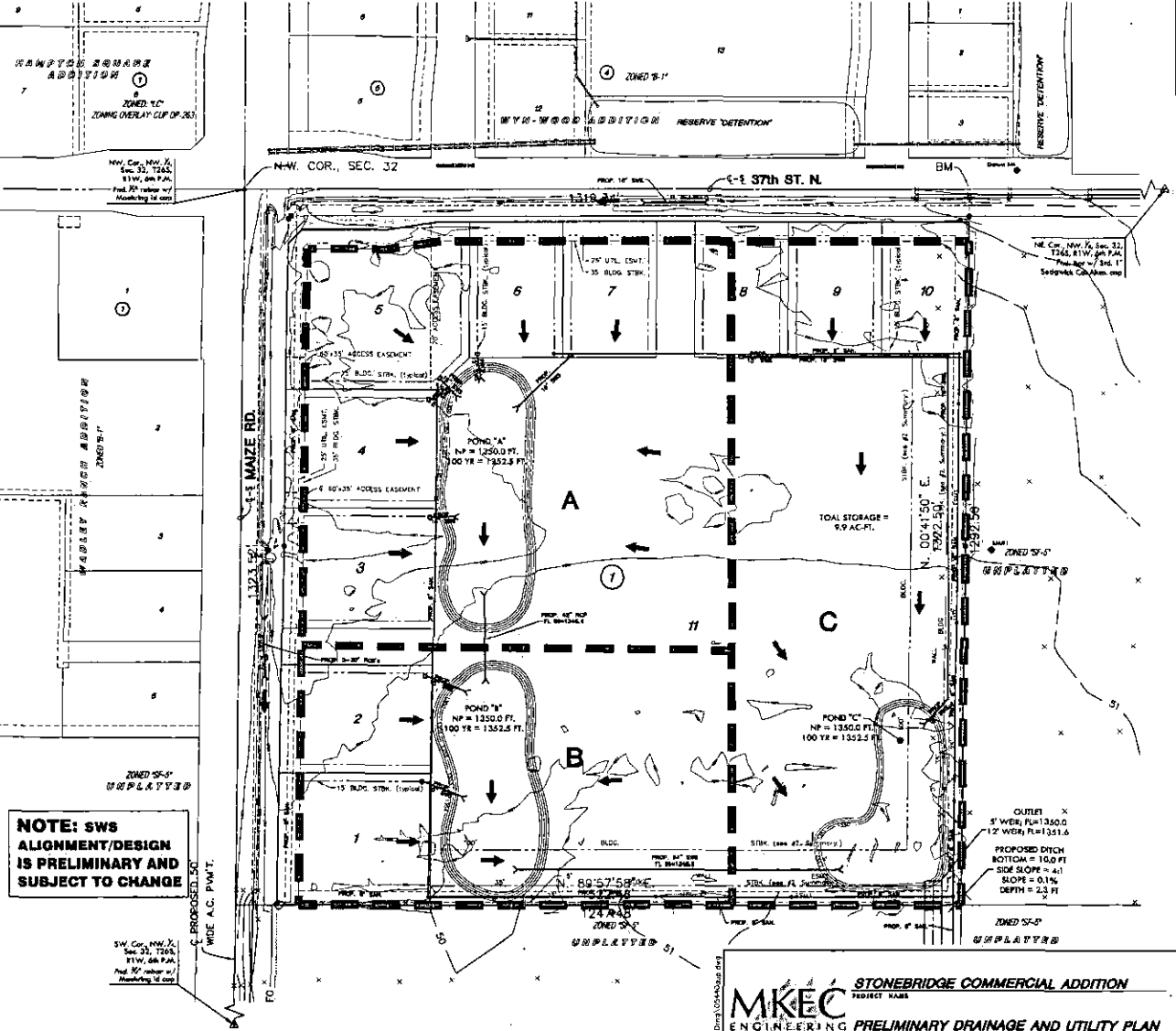
**LEGAL DESCRIPTION**

The North 1/4, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgewick County Kansas, EXCEPT, road right-of-way on the West and North.  
TOGETHER WITH,  
The South 1/4, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgewick County Kansas, EXCEPT, road right-of-way on the West.

**PLAT LOCATION**



**VICINITY MAP**



**NOTE: SWS  
ALIGNMENT/DESIGN  
IS PRELIMINARY AND  
SUBJECT TO CHANGE**

**MKEC** STONEBRIDGE COMMERCIAL ADDITION  
PROJECT NAME  
ENGINEERING PRELIMINARY DRAINAGE AND UTILITY PLAN  
CONSULTANTS, INC. SHEET TITLE

411 N. WEBB ROAD  
WICHITA, KS. 67206  
316-684-9600

AWK  
DESIGN BY

JFL  
CHECKED BY

CJA  
LICENSED BY

AUGUST 2006  
DATE

05440  
JOB NO.

1/1  
REVISION

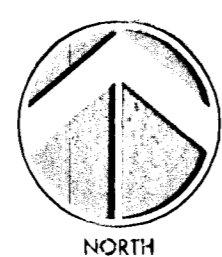
REVISED 11-06: UPDATED DITCH SIZE  
AND DETENTION POND'S 100-YEAR  
WATER SURFACE ELEVATIONS

# NOTES

- GEOGRAPHY:** Located in the Northwest portion of the City of Wichita in an area currently transitioning from agricultural uses into urban residential, institutional and commercial uses with access to K-96 via Maize Rd. and or Ridge Rd. The surrounding land uses include urban residential to the Northwest and South, rural residential to the West, and agriculture production to the immediate South and East, and institutional uses East of the agriculture production.
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- ACCESS CONTROLS:** Shall align with developments to the West and North and also conform to access management policies as shown hereon..
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Interior side setback = 35' \*\*  
Exterior boundary setback = 100' \*\*  
\*\* (if building has a gross floor area greater than 100,000 s.f.)
- RESERVES:** All reserves are platted for irrigation, landscaping, monuments, drainage, and utilities in designated areas. Reserve "C" is also platted for a private swimming pool, pool house, and parking.
- FLOOD:** According to FEMA FIRM Community Unit Panel 200321 0125A, Effective Date June 3rd, 1986; this property lies within flood zone "C", "areas of minimal flooding."
- DRAINAGE:** A drainage report shall accompany this plat. The property lies within a branch of the Sand Creek drainage basin, which drains to the Little Arkansas River located in Sedgwick County and generally draining from northeast to southwest.

## BENCH MARKS

- Datum BM 1 Top of "T" post 35' ± N. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 1384' ± E. of NW corner of said NW 1/4. Elev. = 1353.54 (NGVD 29) 166.14 (City Datum)
- BM#1 Top of "T" post 660' ± S. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 1325' ± E. of W. line of said NW 1/4. Elev. = 1351.69 (NGVD 29) 164.29 (City Datum)
- BM#2 Top of "T" post 675' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 1320' ± S. of the N. line of said NW 1/4. Elev. = 1351.79 (NGVD 29) 164.39 (City Datum)
- BM#3 Square cut on N. end of on top of RCP 30' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 660' ± S. of the N. line of said NW 1/4. Elev. = 1353.59 (NGVD 29) 166.19 (City Datum)



1"=100'  
1:1,200

## LEGEND

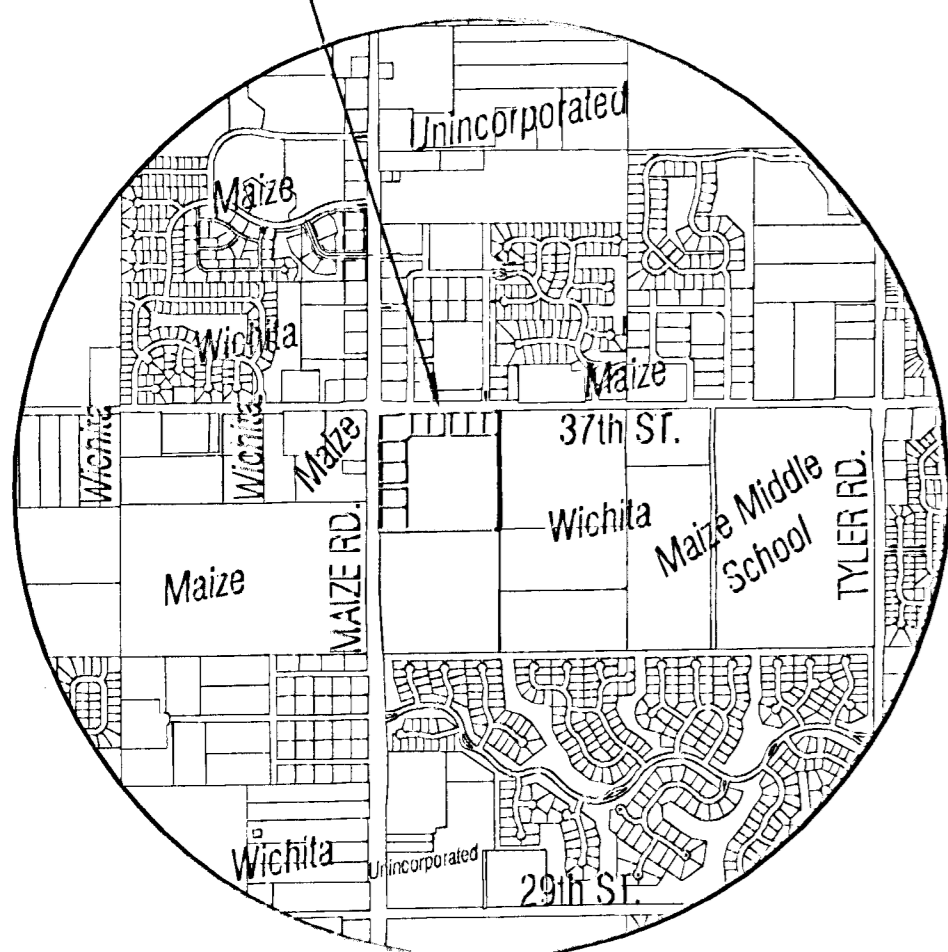
- ✱ BIN - CONIFEROUS TREE & DIAMETER
- BIN - DECIDUOUS TREE & DIAMETER
- SN - SIGN
- PP - POWER POLE AND GUY ANCHOR
- EB - ELECTRIC BOX
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- SC - SECTION CORNER
- BM - BENCHMARK
- EASEMENT
- - - BUILDING SETBACK
- x-x-x FENCE
- - - STORM SEWER PIPE
- - - WATER LINE
- - - SANITARY SEWER LINE
- - - GAS LINE
- - - GAS PIPELINE
- - - TELEPHONE LINE
- - - UNDERGROUND ELECTRIC LINE
- - - OVERHEAD ELECTRIC
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MINIMUM PAD ELEVATIONS LOWEST OPENINGS		
LOTS (inclusive)	BLOCK	ELEVATION NGVD
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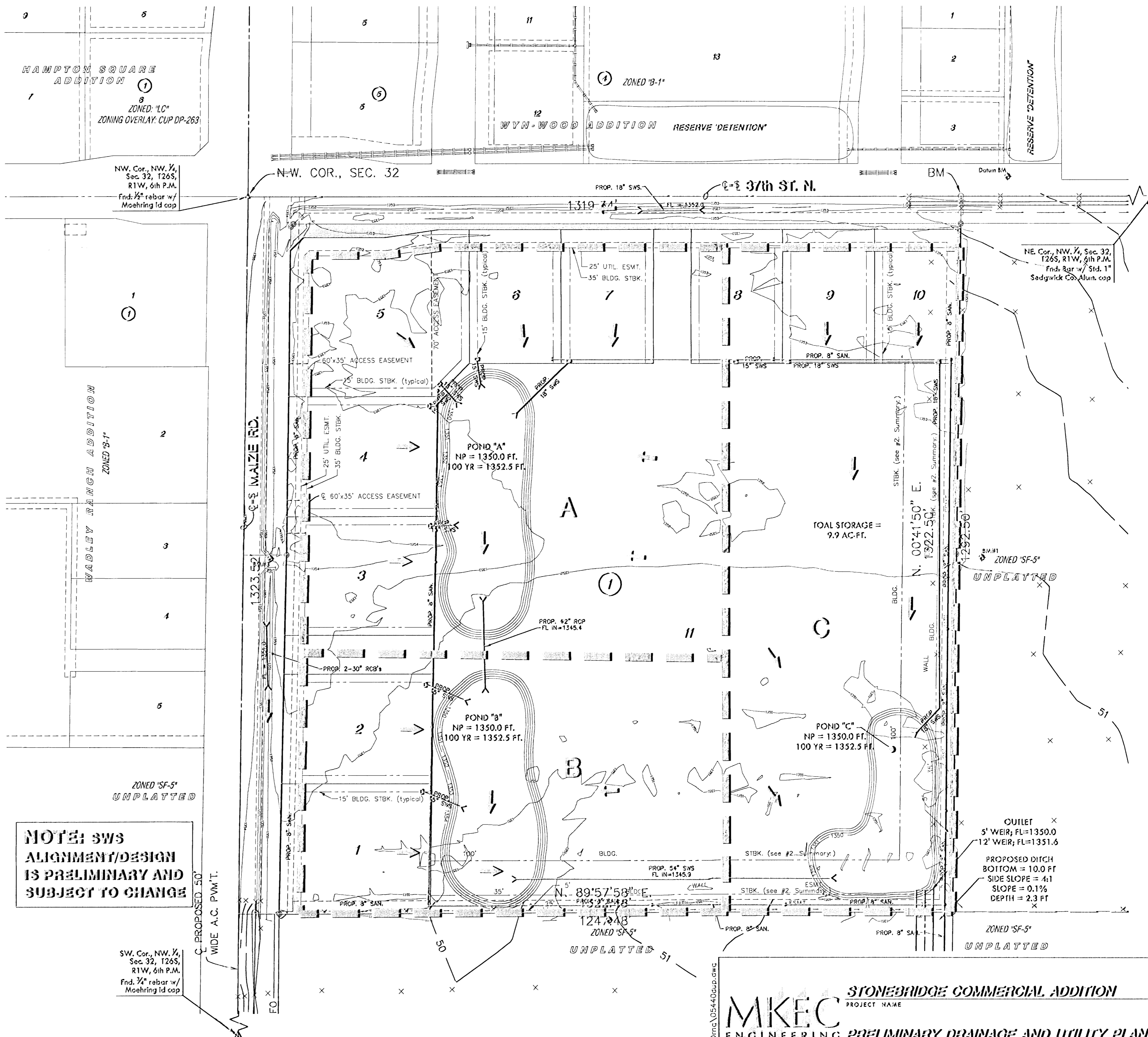
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TOGETHER WITH,  
The South 1/2, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgwick County Kansas, EXCEPT, road right-of-way on the West.

### PLAT LOCATION



### VICINITY MAP



**NOTE: sws ALIGNMENT/DESIGN IS PRELIMINARY AND SUBJECT TO CHANGE**

**STONEBRIDGE COMMERCIAL ADDITION**  
PROJECT NAME

**MKEC**  
ENGINEERING  
CONSULTANTS, INC.  
SHEET TITLE

411 N. WEBB ROAD  
WICHITA, KS. 67206  
316-684-2600

DESIGN BY: AJK  
DRAWN BY: JFL  
CHECKED BY: GJA

DATE: AUGUST 2006  
JOB NO.: 05440  
SHEET/OF: 1/1

REVISED 11-06: UPDATED DITCH SIZE AND DETENTION PONDS 100-YEAR WATER SURFACE ELEVATIONS

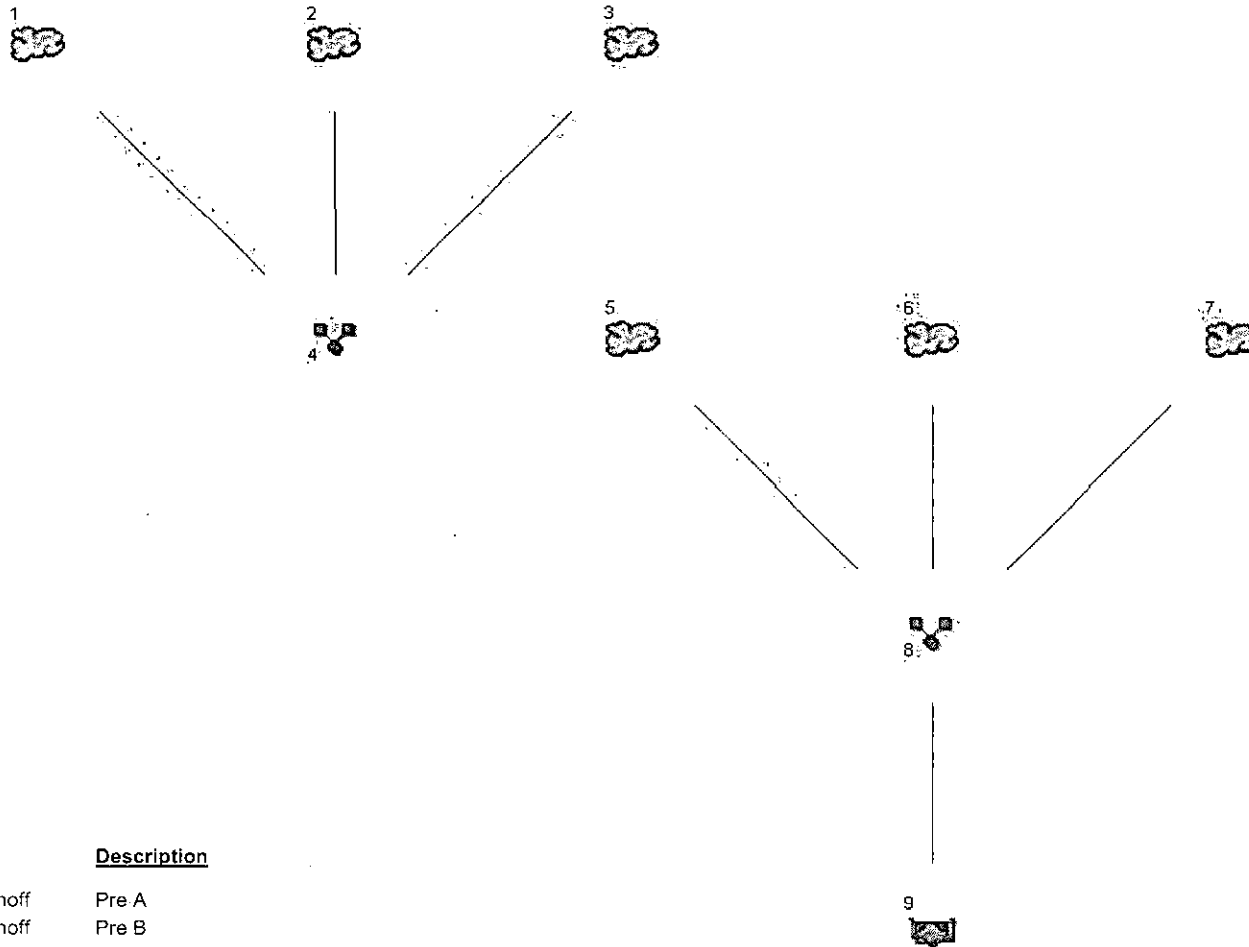
Appendix E  
Time of Concentration Calculations

Time of Concentration Calculations by the FAA method  
 Stonbridge Commercial

$$T_c = \frac{(1.1-C)L^{1/2}}{100 S^{1/3}}$$

Area Name	Land Use	Soil Group	Maximum Elevation	Minimum Elevation	Flow Length (L)	Rational Runoff Coefficient, C				Time of Concentration (min), T <sub>c</sub>			
						2-Year	5-Year	10-Year	100-Year	2-Year	5-Year	10-Year	100-Year
<i>Pre-Developed</i>													
A	Agricultural - Pasture - Slopes <1%	C	166.0	163.6	820	0.26	0.29	0.37	0.53	65.2	62.9	56.7	44.2
B	Agricultural - Pasture - Slopes <1%	C	166.0	163.4	550	0.26	0.29	0.37	0.53	45.5	43.9	39.6	30.9
C	Agricultural - Pasture - Slopes <1%	C	166.0	163.4	1,200	0.26	0.29	0.37	0.53	87.2	84.1	75.8	59.2
<i>Post-Project</i>													
A	Business - Downtown	C	166.0	163.0	800	0.84	0.85	0.87	0.91	18.4	17.6	16.2	15.0
B	Business - Downtown	C	165.0	163.0	420	0.84	0.85	0.87	0.91	15.0	15.0	15.0	15.0
C	Business - Downtown	C	166.0	163.0	1,000	0.84	0.85	0.87	0.91	22.1	21.3	19.6	16.2

Appendix F  
Hydraflow Hydrographs Output



**Legend**

<u>Hyd.</u>	<u>Origin</u>	<u>Description</u>
1	SCS Runoff	Pre A
2	SCS Runoff	Pre B
3	SCS Runoff	Pre C
4	Combine	Pre-Proj South
5	SCS Runoff	Post A
6	SCS Runoff	Post B
7	SCS Runoff	Post C
8	Combine	Post Project A,B,C
9	Reservoir	Combined Detention

# Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	7.688	6	756	1.383	---	-----	-----	Pre A
2	SCS Runoff	6.314	6	744	0.857	---	-----	-----	Pre B
3	SCS Runoff	5.710	6	768	1.226	---	-----	-----	Pre C
4	Combine	18.06	6	756	3.466	1, 2, 3	-----	-----	Pre-Proj South
5	SCS Runoff	40.11	6	720	2.926	---	-----	-----	Post A
6	SCS Runoff	25.93	6	720	1.892	---	-----	-----	Post B
7	SCS Runoff	29.44	6	726	2.816	---	-----	-----	Post C
8	Combine	90.35	6	720	7.634	5, 6, 7	-----	-----	Post Project A,B,C
9	Reservoir	17.31	6	756	7.634	8	1351.03	3.958	Combined Detention

# Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description	
1	SCS Runoff	13.14	6	756	2.269	---	----	-----	Pre A	
2	SCS Runoff	10.71	6	744	1.405	---	----	-----	Pre B	
3	SCS Runoff	9.785	6	768	2.011	---	----	-----	Pre C	
4	Combine	30.85	6	756	5.684	1, 2, 3	----	-----	Pre-Proj South	
5	SCS Runoff	54.17	6	720	4.016	---	----	-----	Post A	
6	SCS Runoff	35.03	6	720	2.596	---	----	-----	Post B	
7	SCS Runoff	39.82	6	726	3.865	---	----	-----	Post C	
8	Combine	122.24	6	720	10.477	5, 6, 7	----	-----	Post Project A,B,C	
9	Reservoir	26.05	6	750	10.476	8	1351.35	5.290	Combined Detention	
Stonebridge 5-yr_R2.gpw					Return Period: 5 Year			Thursday, Nov 9 2006, 2:09 PM		

# Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description	
1	SCS Runoff	18.89	6	750	2.843	---	----	----	Pre A	
2	SCS Runoff	16.34	6	738	1.896	---	----	----	Pre B	
3	SCS Runoff	13.76	6	762	2.525	---	----	----	Pre C	
4	Combine	44.29	6	744	7.264	1, 2, 3	----	----	Pre-Proj South	
5	SCS Runoff	63.30	6	720	4.733	---	----	----	Post A	
6	SCS Runoff	40.93	6	720	3.060	---	----	----	Post B	
7	SCS Runoff	46.57	6	726	4.555	---	----	----	Post C	
8	Combine	142.96	6	720	12.348	5, 6, 7	----	----	Post Project A,B,C	
9	Reservoir	33.42	6	750	11.192	8	1351.62	6.411	Combined Detention	
Stonebridge 10-yr_R2.gpw					Return Period: 10 Year			Thursday, Nov 9 2006, 2:10 PM		

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# Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	39.80	6	738	5.130	---	----	-----	Pre A
2	SCS Runoff	30.39	6	732	3.508	---	----	-----	Pre B
3	SCS Runoff	31.83	6	750	4.747	---	----	-----	Pre C
4	Combine	98.85	6	738	13.386	1, 2, 3	----	-----	Pre-Proj South
5	SCS Runoff	96.28	6	720	7.360	---	----	-----	Post A
6	SCS Runoff	62.25	6	720	4.759	---	----	-----	Post B
7	SCS Runoff	86.87	6	720	6.640	---	----	-----	Post C
8	Combine	245.39	6	720	18.759	5, 6, 7	----	-----	Post Project A,B,C
9	Reservoir	91.93	6	738	13.665	8	1352.53	9.995	Combined Detention

Stonebridge 100-yr\_R2.gpw

Return Period: 100 Year

Thursday, Nov 9 2006, 2:07 PM

# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

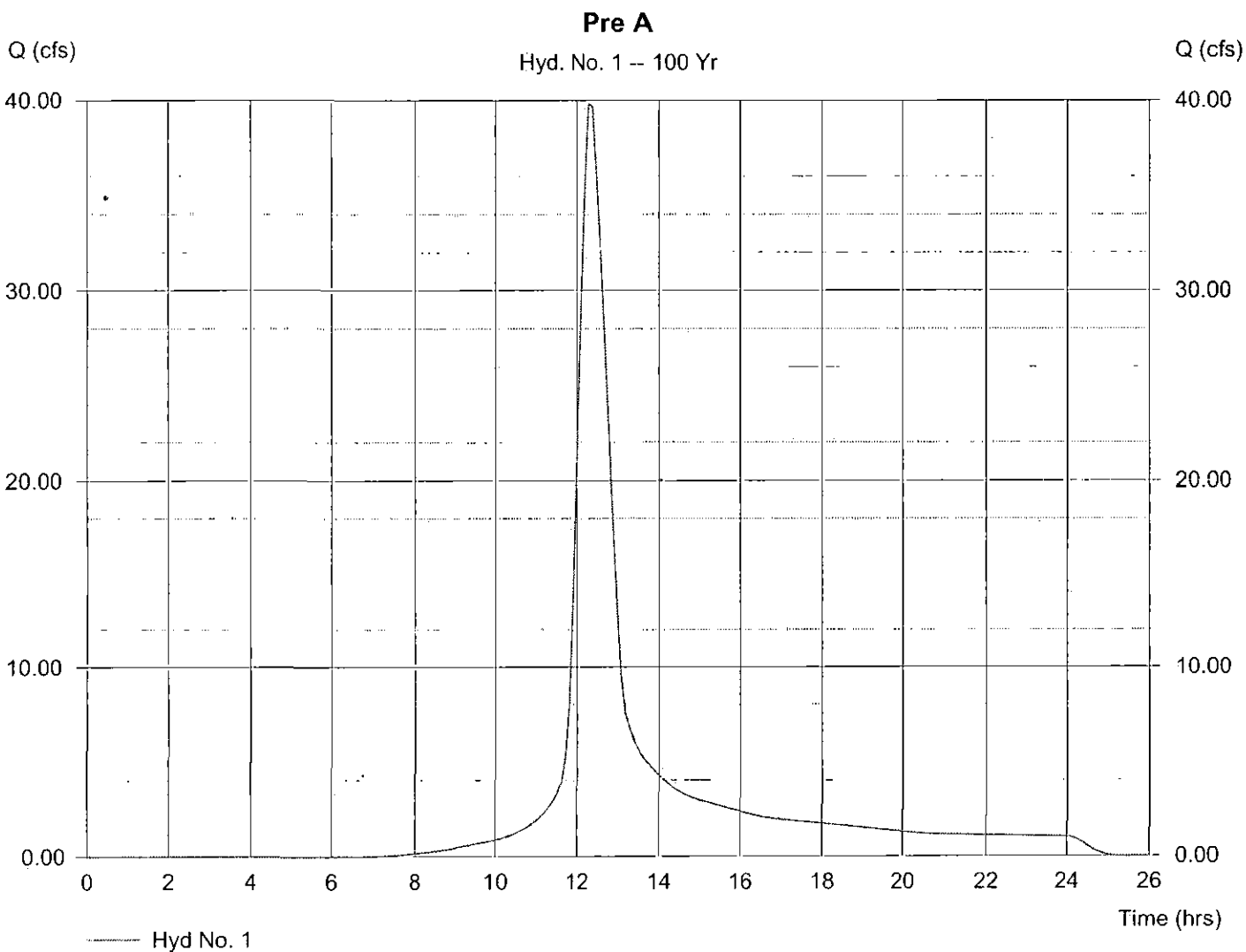
## Hyd. No. 1

Pre A

Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Drainage area = 13.300 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 7.80 in  
 Storm duration = 24 hrs

Peak discharge = 39.80 cfs  
 Time interval = 6 min  
 Curve number = 74  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 44.20 min  
 Distribution = Type II  
 Shape factor = 484

Hydrograph Volume = 5.130 acft



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve.

Thursday, Nov 9 2006, 2:7 PM

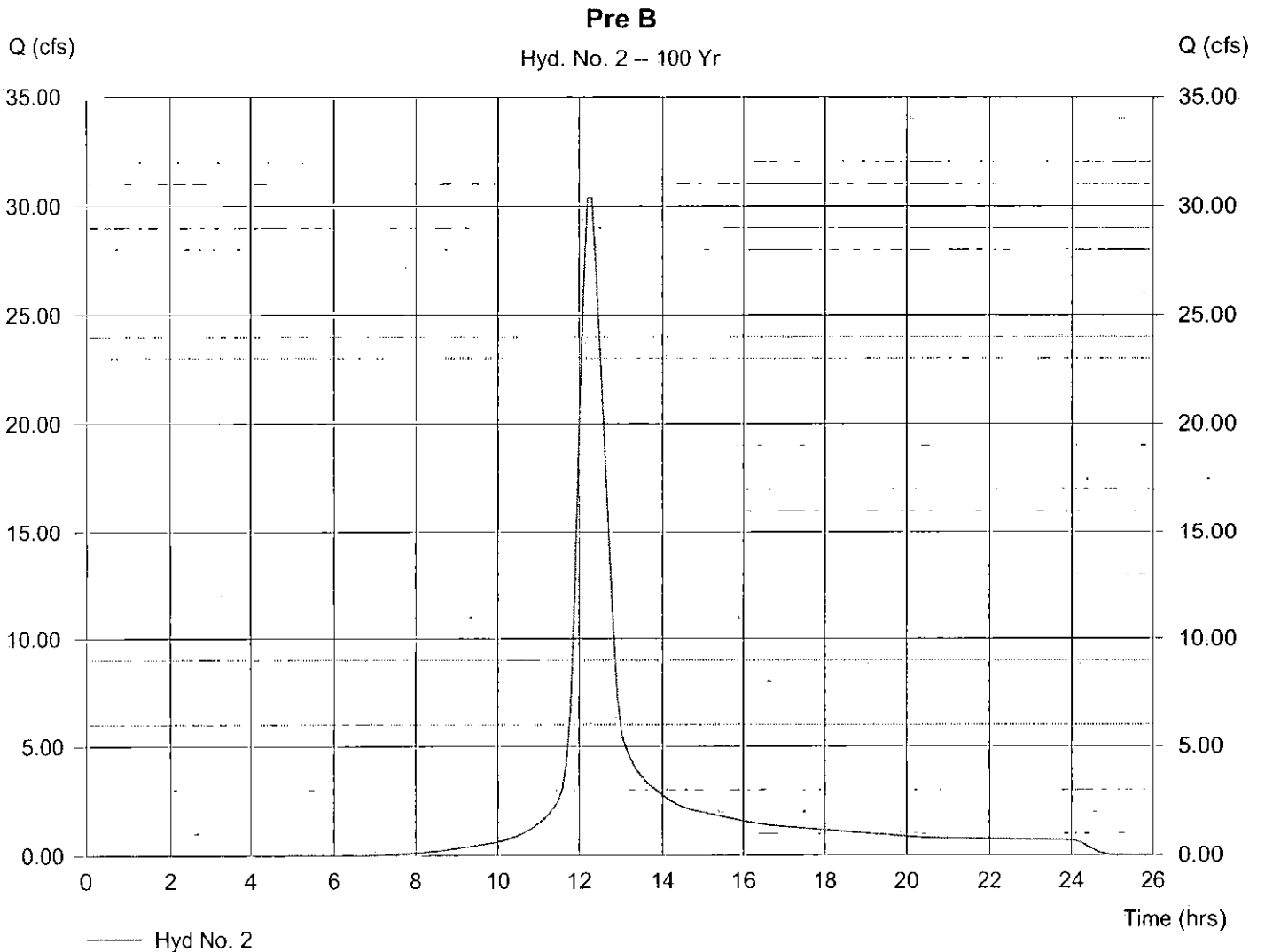
## Hyd. No. 2

Pre B

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Drainage area = 8.600 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 7.80 in  
Storm duration = 24 hrs

Peak discharge = 30.39 cfs  
Time interval = 6 min  
Curve number = 74  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 30.90 min  
Distribution = Type II  
Shape factor = 484

Hydrograph Volume = 3.508 acft



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

## Hyd. No. 3

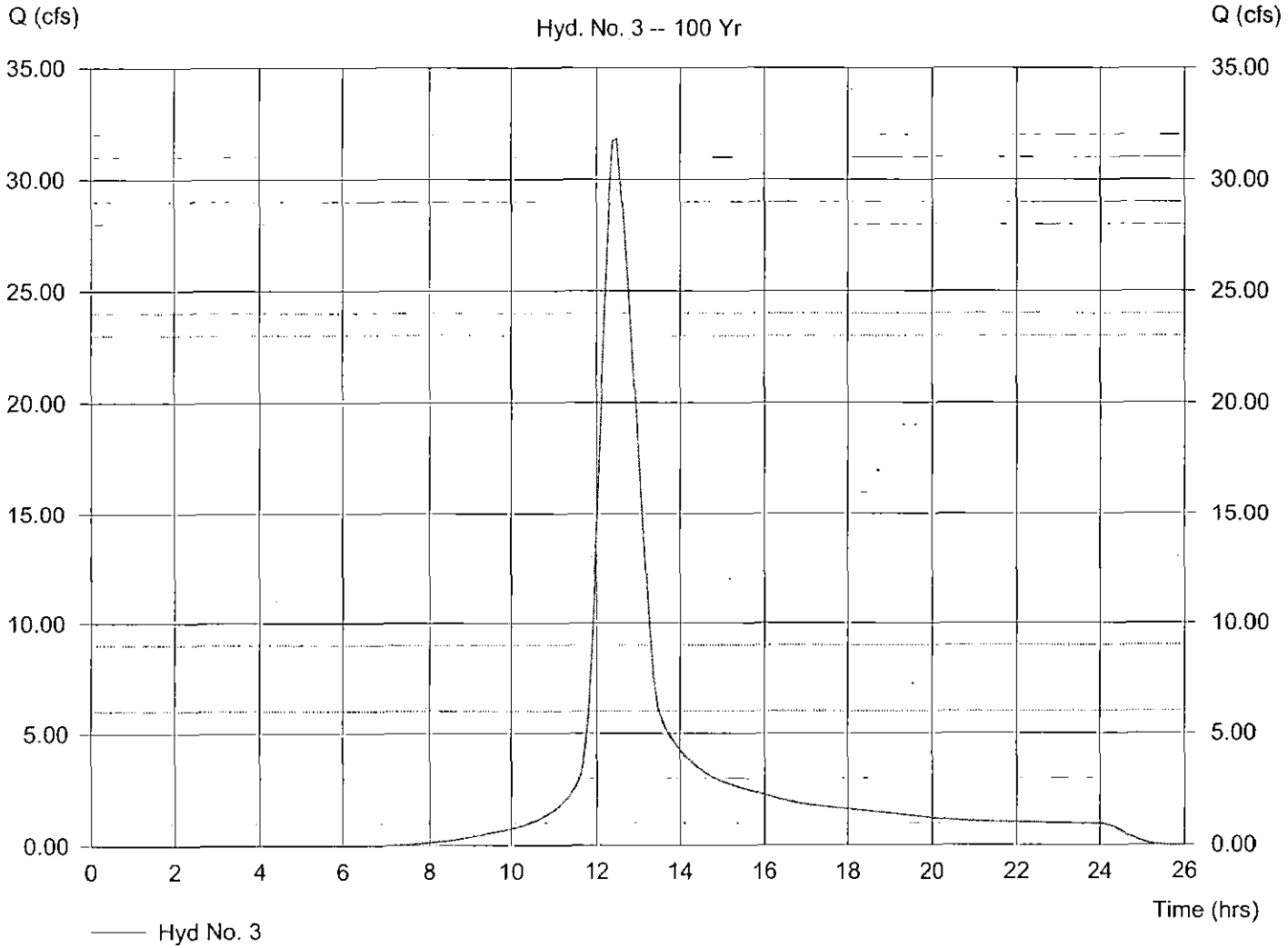
Pre C

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Drainage area = 12.000 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 7.80 in  
Storm duration = 24 hrs

Peak discharge = 31.83 cfs  
Time interval = 6 min  
Curve number = 74  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 59.20 min  
Distribution = Type II  
Shape factor = 484

Hydrograph Volume = 4.747 acft

Pre C  
Hyd. No. 3 -- 100 Yr



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

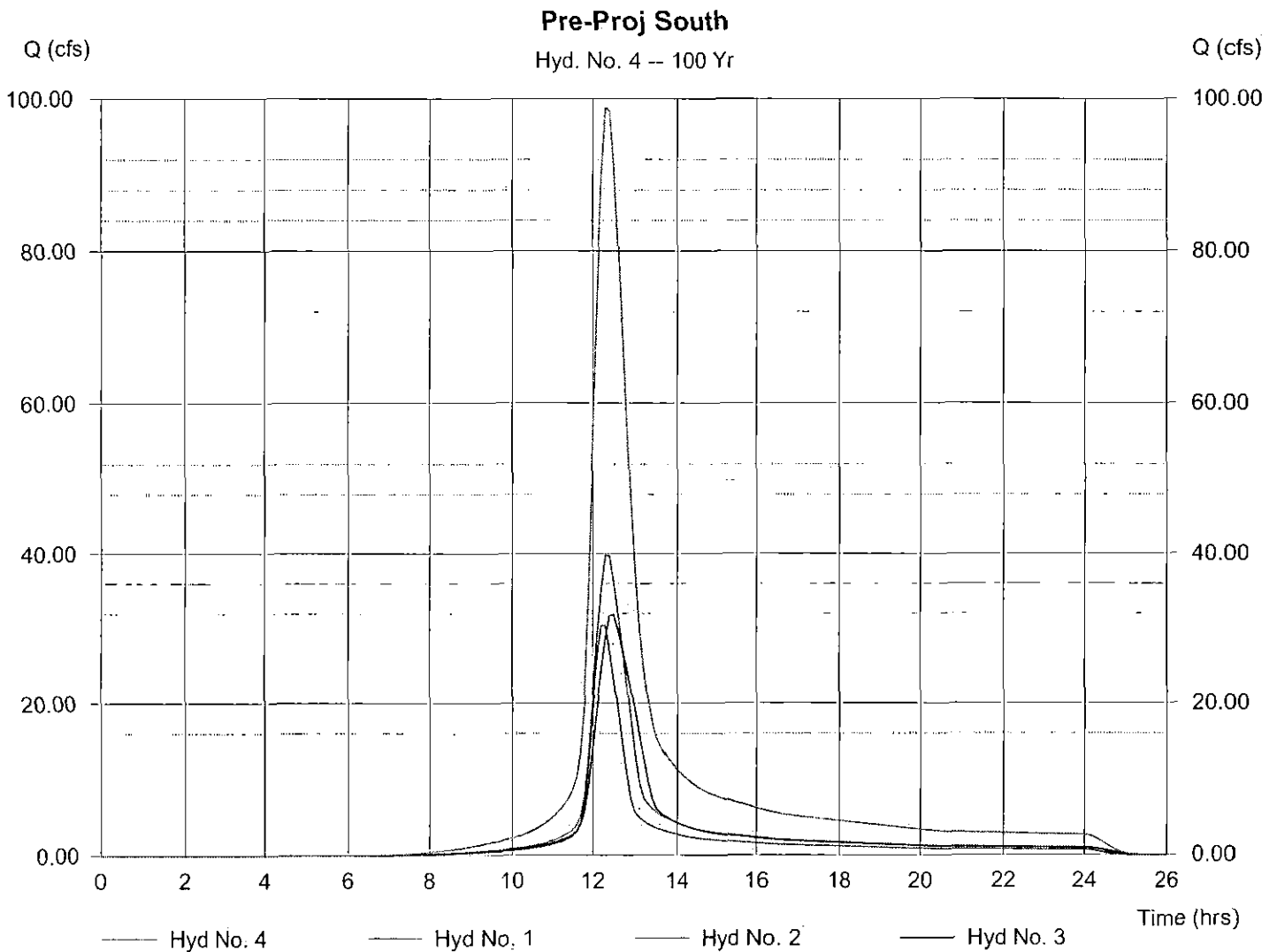
## Hyd. No. 4

Pre-Proj South

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Inflow hyds. = 1, 2, 3

Peak discharge = 98.85 cfs  
Time interval = 6 min

Hydrograph Volume = 13.386 acft



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

## Hyd. No. 5

Post A

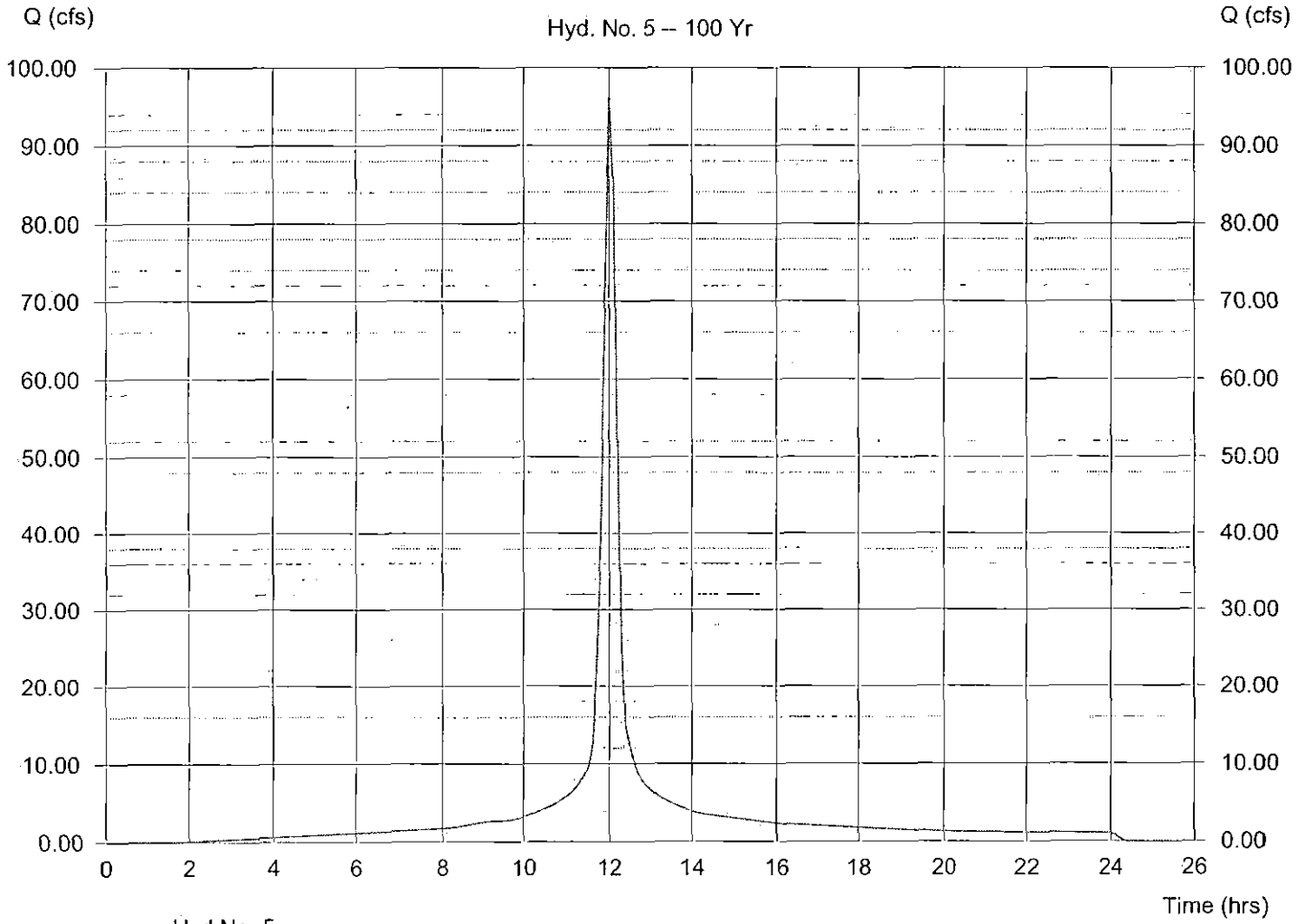
Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Drainage area = 13.300 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 7.80 in  
Storm duration = 24 hrs

Peak discharge = 96.28 cfs  
Time interval = 6 min  
Curve number = 94  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type II  
Shape factor = 484

Hydrograph Volume = 7.360 acft

### Post A

Hyd. No. 5 - 100 Yr



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

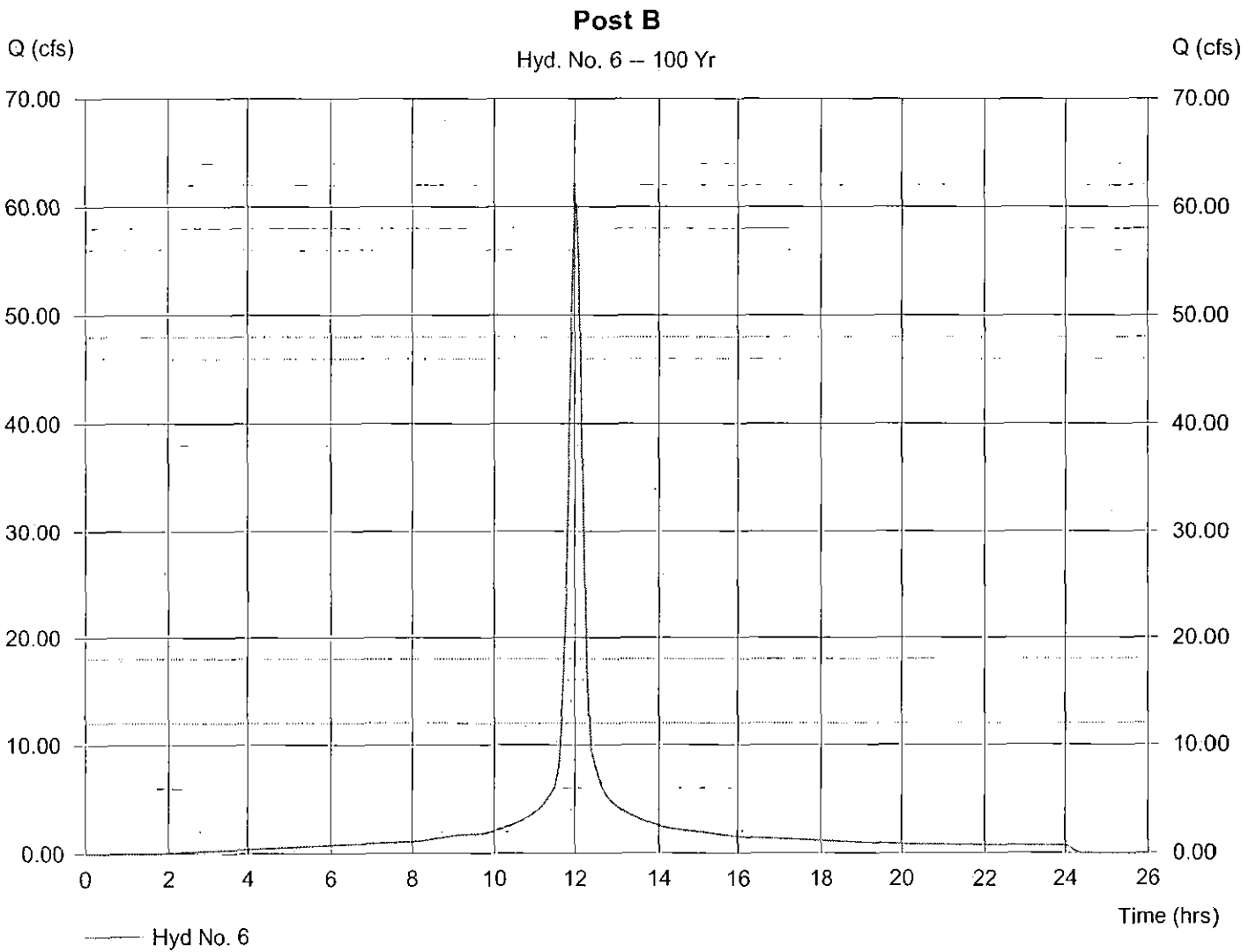
## Hyd. No. 6

Post B

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Drainage area = 8.600 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 7.80 in  
Storm duration = 24 hrs

Peak discharge = 62.25 cfs  
Time interval = 6 min  
Curve number = 94  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type II  
Shape factor = 484

Hydrograph Volume = 4.759 acft



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

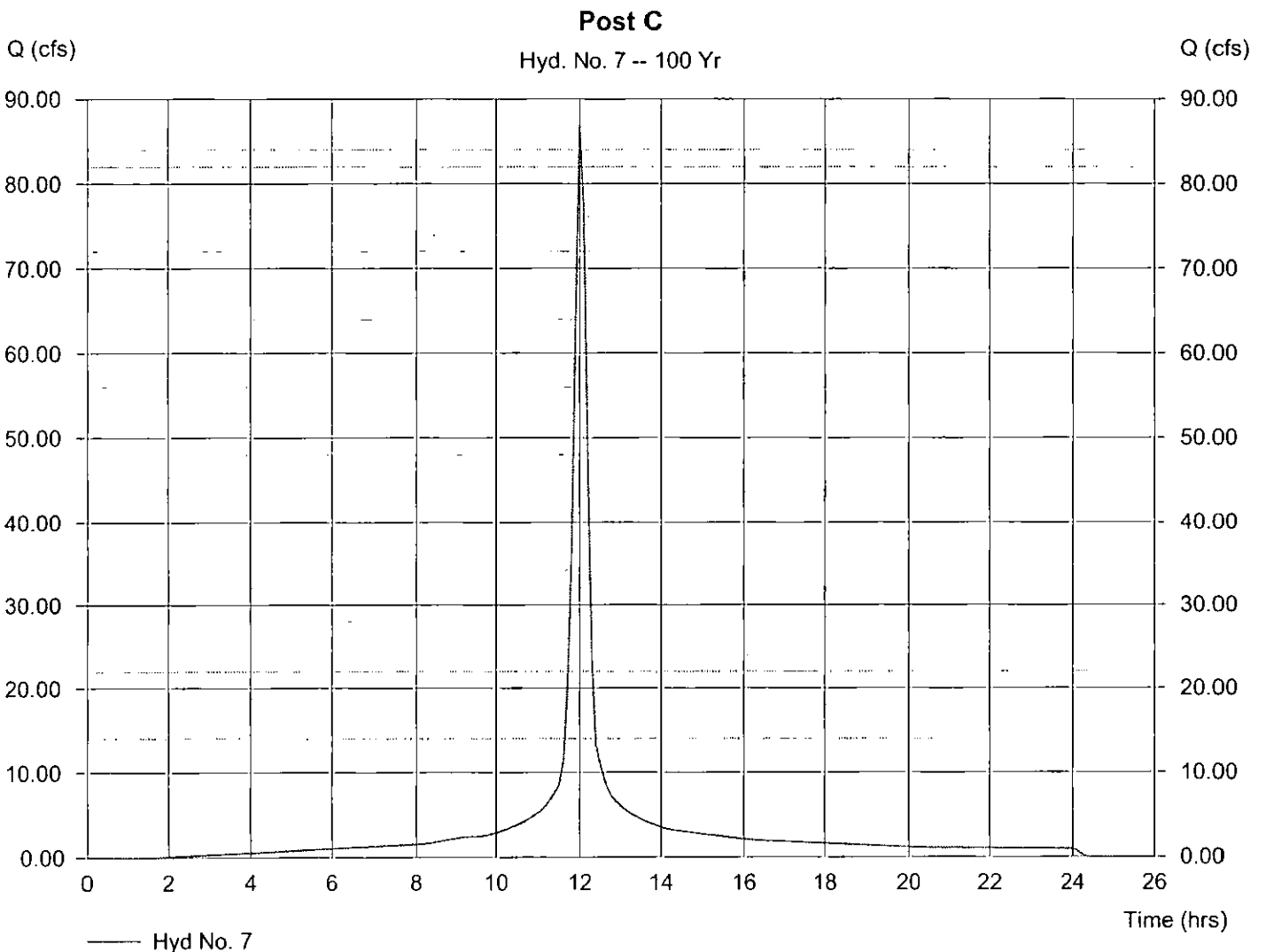
## Hyd. No. 7

Post C

Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Drainage area = 12.000 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 7.80 in  
 Storm duration = 24 hrs

Peak discharge = 86.87 cfs  
 Time interval = 6 min  
 Curve number = 94  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 16.20 min  
 Distribution = Type II  
 Shape factor = 484

Hydrograph Volume = 6.640 acft



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

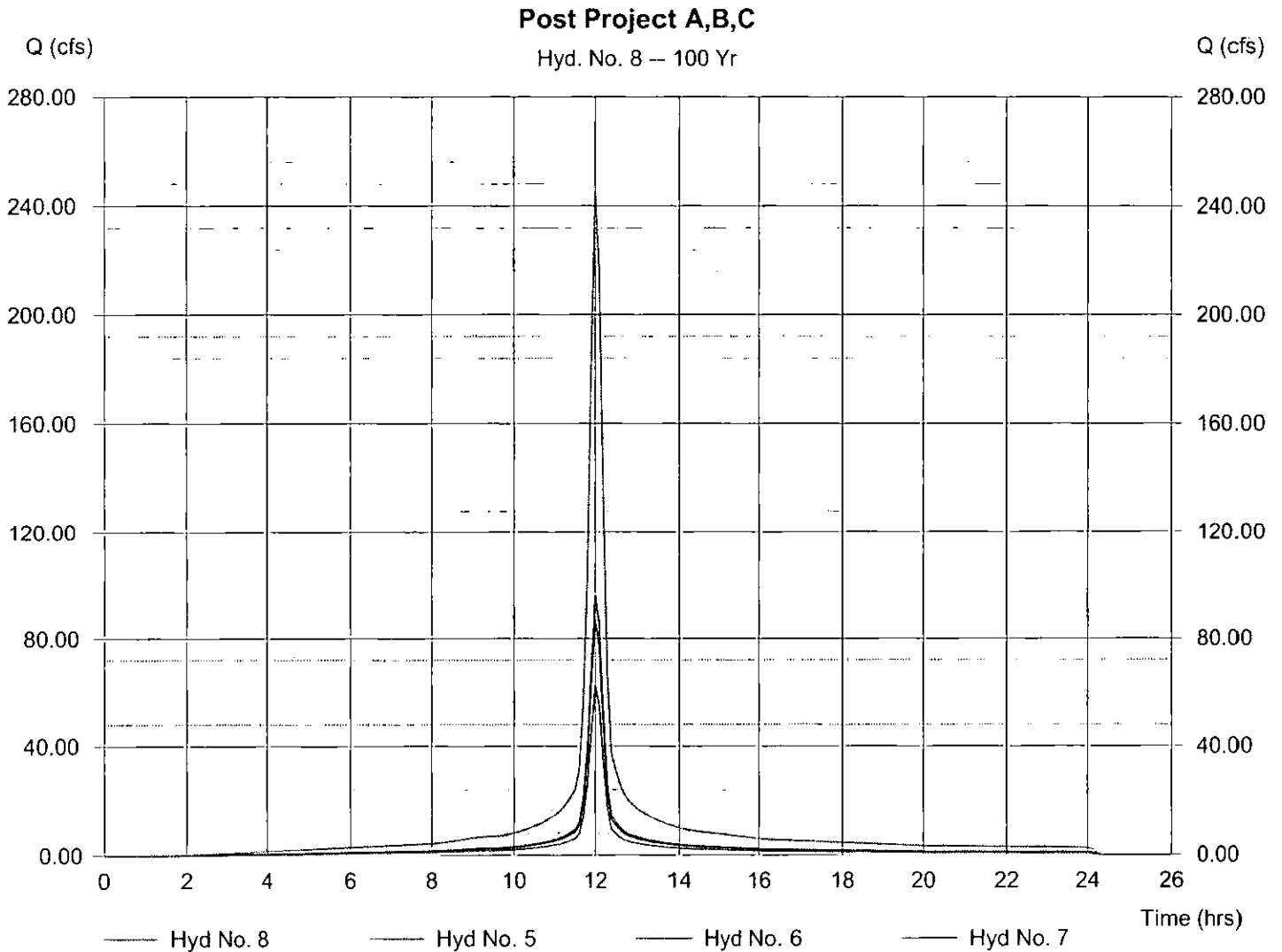
## Hyd. No. 8

Post Project A,B,C

Hydrograph type = Combine  
 Storm frequency = 100 yrs  
 Inflow hyds. = 5, 6, 7

Peak discharge = 245.39 cfs  
 Time interval = 6 min

Hydrograph Volume = 18.759 acft



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

## Hyd. No. 9

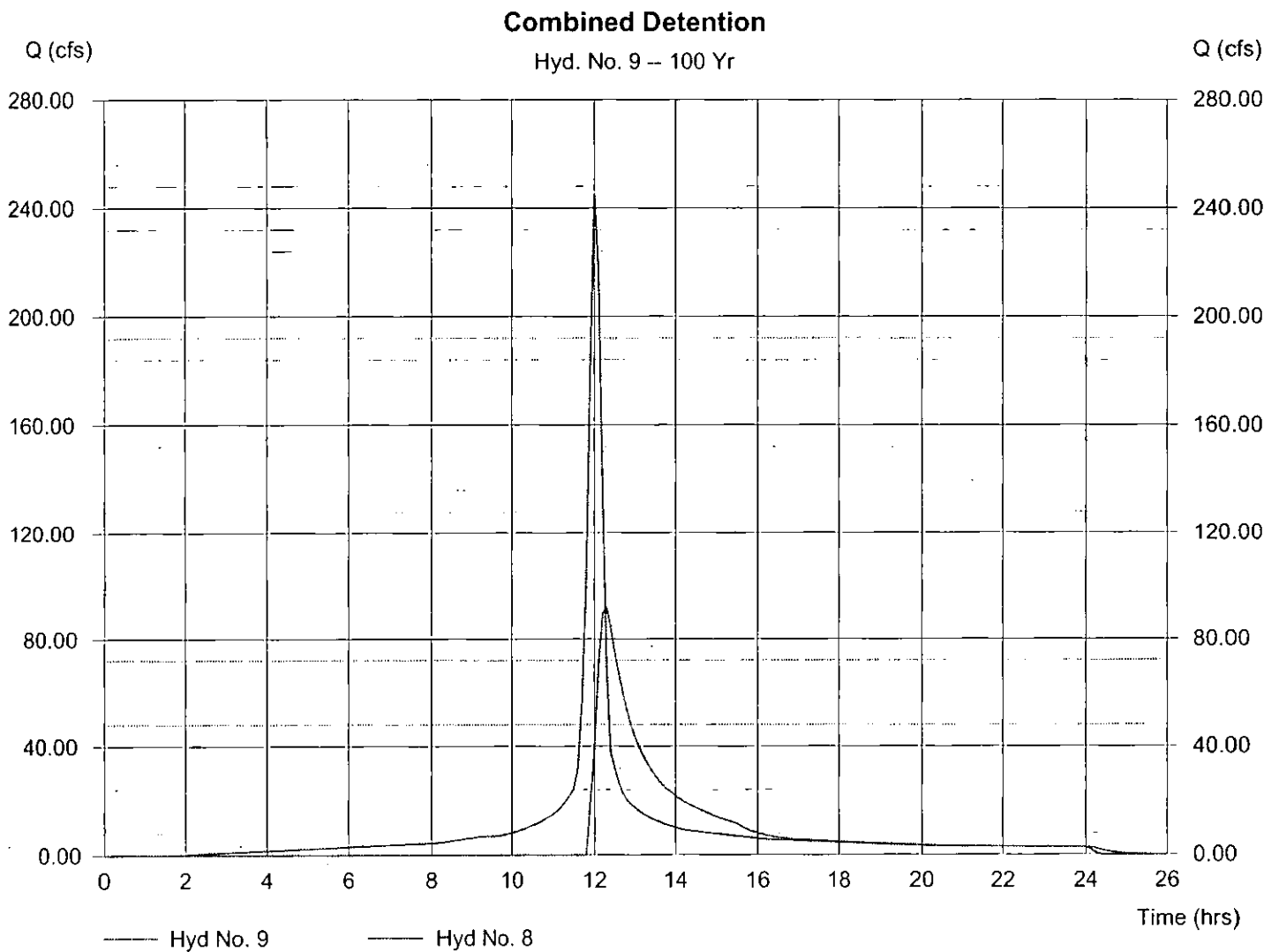
### Combined Detention

Hydrograph type = Reservoir  
 Storm frequency = 100 yrs  
 Inflow hyd. No. = 8  
 Reservoir name = Pond

Peak discharge = 91.93 cfs  
 Time interval = 6 min  
 Max. Elevation = 1352.53 ft  
 Max. Storage = 9.995 acft

Storage Indication method used.

Hydrograph Volume = 13.665 acft



# Pond Report

Hydraflow Hydrographs by Intelisolve

Thursday, Nov 9 2006, 2:7 PM

## Pond No. 1 - Pond

### Pond Data

Pond storage is based on known contour areas. Average end area method used.

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1350.00	161,572	0.000	0.000
1.00	1351.00	174,013	3.852	3.852
2.00	1352.00	186,755	4.141	7.993
3.00	1353.00	142,767	3.782	11.775
4.00	1354.00	162,669	3.506	15.281

### Culvert / Orifice Structures

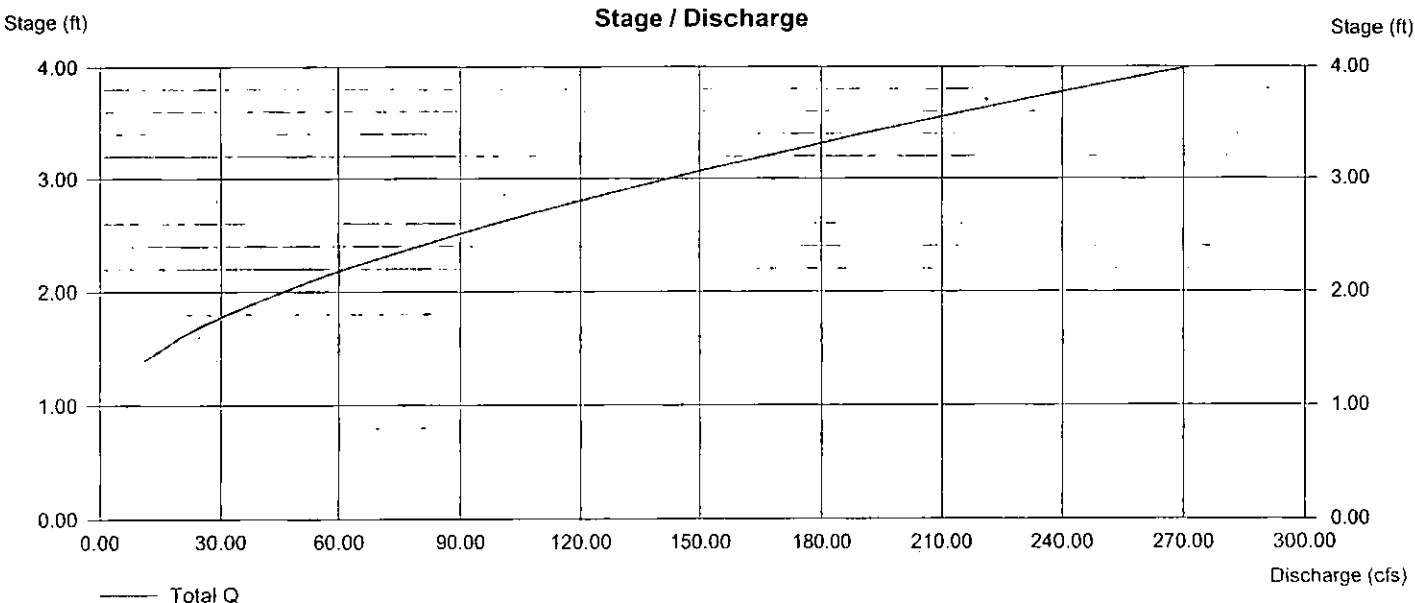
	[A]	[B]	[C]	[D]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	12.00	0.00	0.00
Crest El. (ft)	= 1350.00	1351.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 1351.30 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



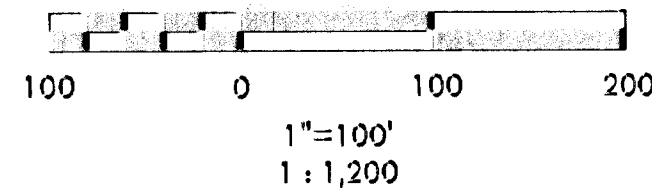
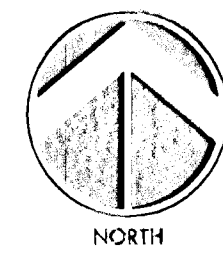
Appendix G  
Preliminary Four Corner Lot Grading Plan

# NOTES

- GEOGRAPHY:** Located in the Northwest portion of the City of Wichita in an area currently transitioning from agricultural uses into urban residential, institutional and commercial uses with access to K-96 via Maize Rd. and or Ridge Rd. The surrounding land uses include urban residential to the Northwest and South, rural residential to the West, and agriculture production to the immediate South and East, and institutional uses East of the agriculture production.
- LOT TOTAL - 11** Commercial parcels
- ANNEXATION:** Lies within the City of Wichita and adjoins the City of Maize to the North and West.
- EXISTING USE:** Agricultural
- ZONING:** Existing / proposed - "LC" w/ CUP DP 295 overlay THIS PLAT SHALL CONFORM TO THE RECITALS OF CUP DP 295.
- PLAT AREA:** Gross - 36.3 Ac.  
Net - 35.93 Ac.
- SURVEY DATE:** January, 2006 (by MKEC)
- PUBLIC UTILITIES:** Shall be extended to site. Municipal sanitary sewer shall be served from the East. Municipal water shall be served from existing mains to the North and West.
- LEGAL DESCRIPTION:** See hereon
- ACCESS CONTROLS:** Shall align with developments to the West and North and also conform to access management policies as shown hereon.
- PROPOSED COMMERCIAL:** According to CUP DP 295 the total number of buildings is limited to 16 with the following minimum building setbacks:  
Arterial Street setback = 35'  
Interior side setback = 15'  
Interior side setback = 35' \*\*  
Exterior boundary setback = 100' \*\*  
\*\* (if building has a gross floor area greater than 100,000 s.f.)
- RESERVES:** All reserves are platted for irrigation, landscaping, monuments, drainage, and utilities in designated areas. Reserve "C" is also platted for a private swimming pool, pool house, and parking.
- FLOOD:** According to FEMA FIRM Community Unit Panel 200321 0125A, Effective Date June 3rd, 1986; this property lies within flood zone "C", "areas of minimal flooding."
- DRAINAGE:** A drainage report shall accompany this plat. The property lies within a branch of the Sand Creek drainage basin, which drains to the Little Arkansas River located in Sedgwick County and generally draining from northeast to southwest.

## BENCH MARKS

- Datum BM#1 Top of "1" post 35' ± N. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 1384' ± E. of NW corner of said NW 1/4.  
Elev. = 1353.54 (NGVD 29)  
166.14 (City Datum)
- BM#1 Top of "1" post 660' ± S. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 1325' ± E. of W. line of said NW 1/4.  
Elev. = 1351.69 (NGVD 29)  
164.29 (City Datum)
- BM#2 Top of "1" post 675' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 1320' ± S. of the N. line of said NW 1/4.  
Elev. = 1351.79 (NGVD 29)  
164.39 (City Datum)
- BM#3 Square cut on N. and on top of RCP 50' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 660' ± S. of the N. line of said NW 1/4.  
Elev. = 1353.59 (NGVD 29)  
166.19 (City Datum)



## LEGEND

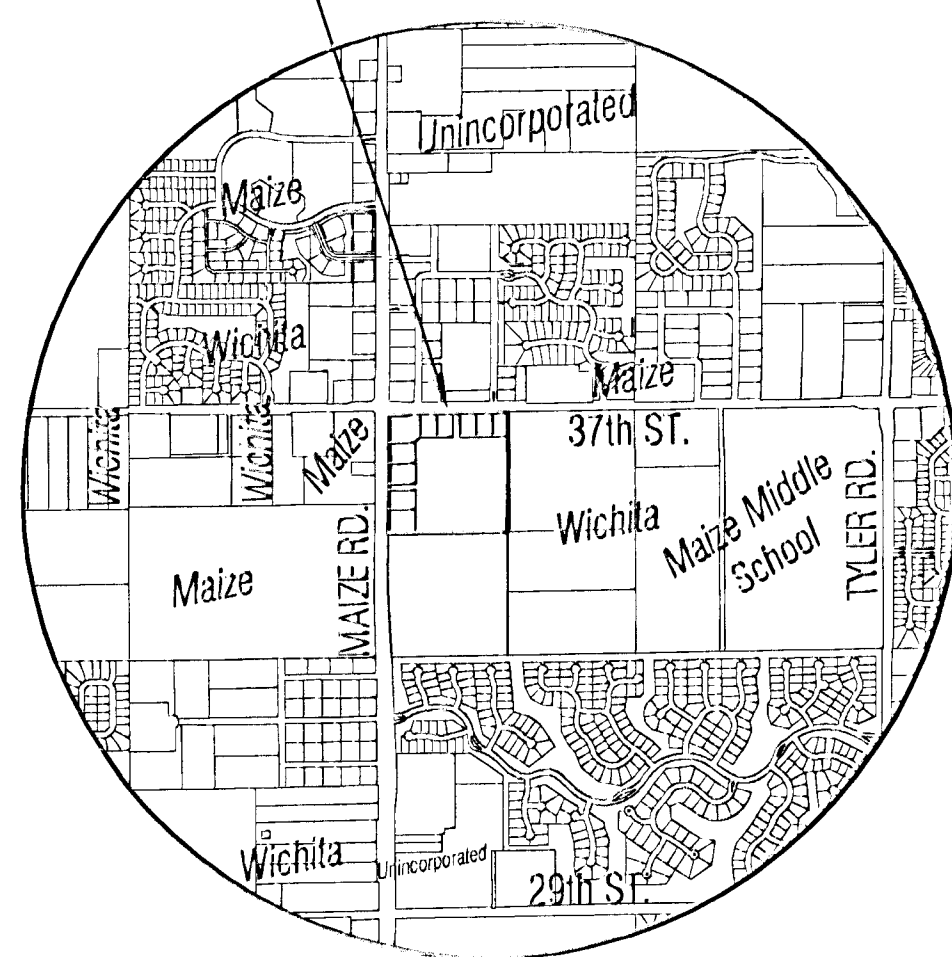
- CONIFEROUS TREE & DIAMETER
- DECIDUOUS TREE & DIAMETER
- SIGN
- POWER POLE AND GUY ANCHOR
- ELECTRIC BOX
- LIGHT POLE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- SECTION CORNER
- BENCHMARK
- EASEMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- GAS PIPELINE
- TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- OVERHEAD ELECTRIC
- FIBER OPTIC CABLE
- SPOT ELEVATIONS
- FLOW ARROW

MINIMUM PAD ELEVATIONS LOWEST OPENINGS		
LOTS (inclusive)	BLOCK	ELEVATION NGVD
1 - 2	1	1355.5
3 - 11	1	1355.5

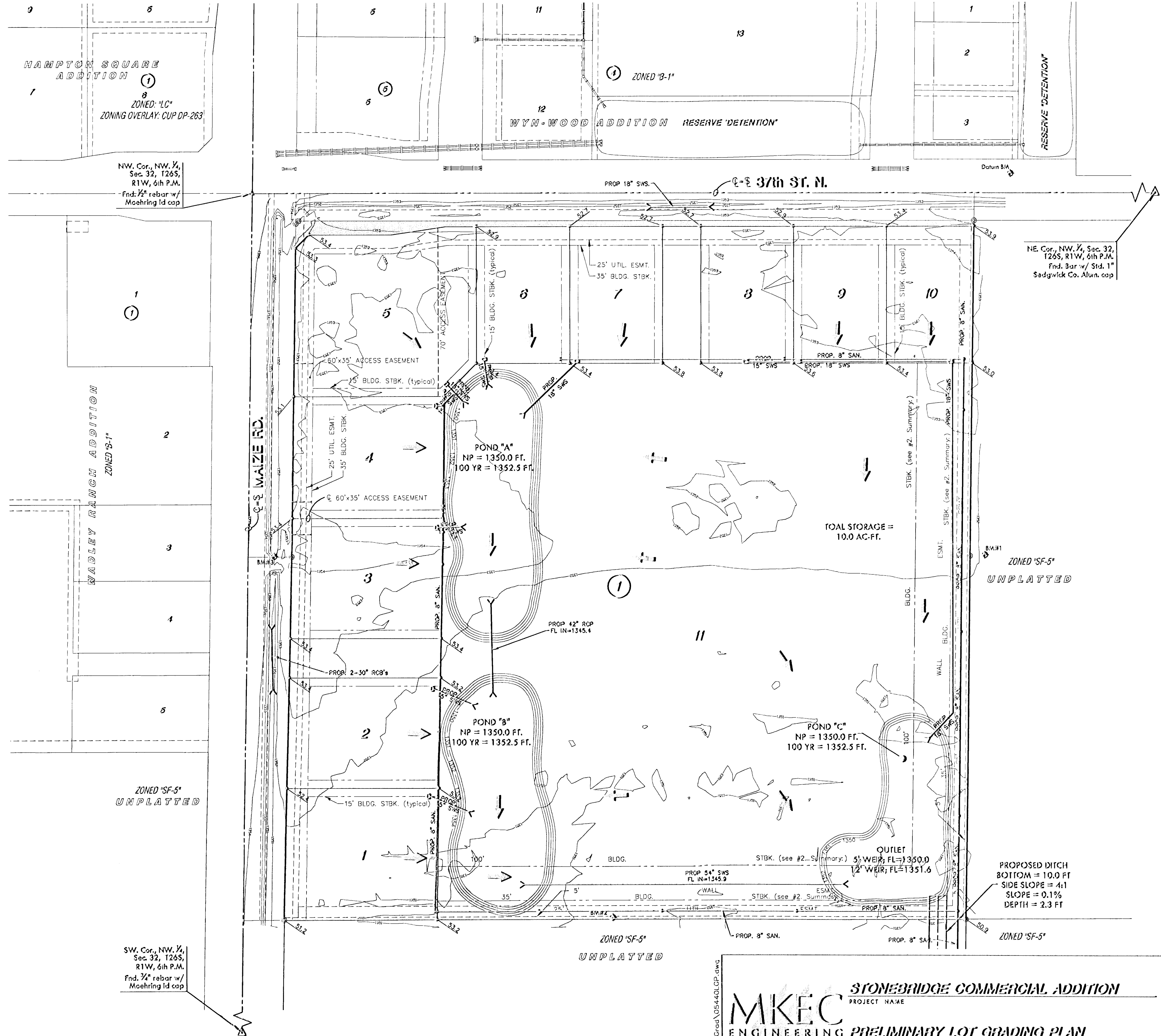
## LEGAL DESCRIPTION

The North 1/2, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgwick County Kansas, EXCEPT, road right-of-way on the West and North.  
TOGETHER WITH,  
The South 1/2, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgwick County Kansas, EXCEPT, road right-of-way on the West.

### PLAT LOCATION



### VICINITY MAP



**MKEC**  
ENGINEERING CONSULTANTS, INC.

**STONEBRIDGE COMMERCIAL ADDITION**  
PROJECT NAME

**PRELIMINARY LOT GRADING PLAN**  
SHEET TITLE

411 N. WEBB ROAD  
WICHITA, K.S. 67206  
316-684-9600

DESIGN BY: **AJK**  
DRAWN BY: **JFL**  
CHECKED BY: **GJA**

DATE: **AUGUST 2006**  
JOB NO.: **05140**  
SHEET OF: **1 / 1**

REVISED 11-06: UPDATED DITCH SIZE AND DETENTION PONDS 100-YEAR WATER SURFACE ELEVATIONS

**NOTES**

- GEOGRAPHY:** Located in the Northwest portion of the City of Wichita in an area currently transitioning from agricultural uses into urban residential, institutional and commercial uses with access to K-96 via Maize Rd. and/or Ridge Rd. The surrounding land uses include urban residential to the Northwest and South, rural residential to the West, and agriculture production to the immediate South and East, and institutional uses East of the agriculture production.
- LOT TOTAL:** 11 Commercial parcels.
- ANNEXATION:** Lies within the City of Wichita and adjoins the City of Maize to the North and West.
- EXISTING USES:** Agricultural.
- ZONING:** Existing / proposed - "C" w/ CUP DP 295 overlay THIS PLAT SHALL CONFORM TO THE REGULARS OF CUP DP 295.
- PLAT AREA:** Gross - 36.3 Ac.  
Net - 35.973 Ac.
- SURVEY DATE:** January, 2006 (by MKEC)
- PUBLIC UTILITIES:** Shall be extended to site. Municipal sanitary sewer shall be served from the east. Municipal water shall be served from existing mains to the North and West.
- LEGAL DESCRIPTION:** See herein.
- ACCESS CONTROLS:** Shall align with developments to the West and North and also conform to access management policies as shown herein.
- PROPOSED COMMERCIAL:** According to CUP DP 295 the total number of buildings is limited to 16 with the following minimum building setbacks:  
 Arterial Street setbacks = 35'  
 Interior side setbacks = 15'  
 Exterior side setbacks = 35'  
 Exterior boundary setbacks = 100' \*\*  
 \*\* (If building has a gross floor area greater than 100,000 s.f.)
- RESERVES:** All reserves are planned for irrigation, landscaping, monuments, drainage, and utilities in designated areas. Reserve "C" is also planned for a private swimming pool, pool house, and parking.
- FLOOD:** According to FEMA FIRMA Community Unit Panel 200331 0125A, Effective Date June 3rd, 1984 this property lies within flood zone "C", "Area of minimal flooding."
- DRAINAGE:** A drainage report shall accompany this plat. The property lies within a branch of the Sand Creek drainage basin, which drains to the Little Arkansas River located in Sedgewick County and generally draining from northeast to southwest.

**BENCH MARKS**

- Top of "T" post 35' ± N. of the N. line of NW 1/4, Sec. 32, T26S, R11W and 1384' ± E. of NW 1/4 corner of said NW 1/4. Elev. = 1353.54 (NGVD 29) 166.14 (City Datum)
- Top of "T" post 660' ± E. of the N. line of NW 1/4, Sec. 32, T26S, R11W and 1325' ± E. of W. line of said NW 1/4. Elev. = 1351.69 (NGVD 29) 164.29 (City Datum)
- Top of "T" post 405' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R11W and 1320' ± S. of the N. line of said NW 1/4. Elev. = 1351.29 (NGVD 29) 164.39 (City Datum)
- Square set on N. and W. of top of RCP 50' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R11W and 640' ± S. of the N. line of said NW 1/4. Elev. = 1353.49 (NGVD 29) 166.19 (City Datum)



1"=100'  
1"=1,200'

**LEGEND**

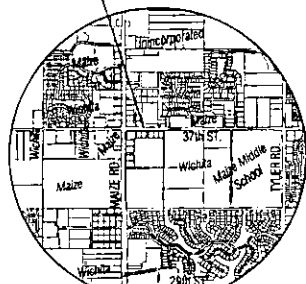
- CONSPICUOUS TREE & DIAMETER
- DISCREET TREE & DIAMETER
- SOIL
- POWER POLE AND GUY ANCHOR
- ELECTRIC BOX
- LIGHT POLE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- SECTION CORNER
- SPRINKLER
- CLASSMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- UNDERGROUND ELECTRIC LINE
- OVERHEAD ELECTRIC
- FIBER OPTIC CABLE
- SPOT ELEVATIONS
- FLOW ARROW

MINIMUM PAD ELEVATIONS LOWEST OPENINGS		
LOTS (inclusive)	BLOCK	ELEVATION NGVD
1 - 2	1	1355.5
3 - 11	1	1355.5

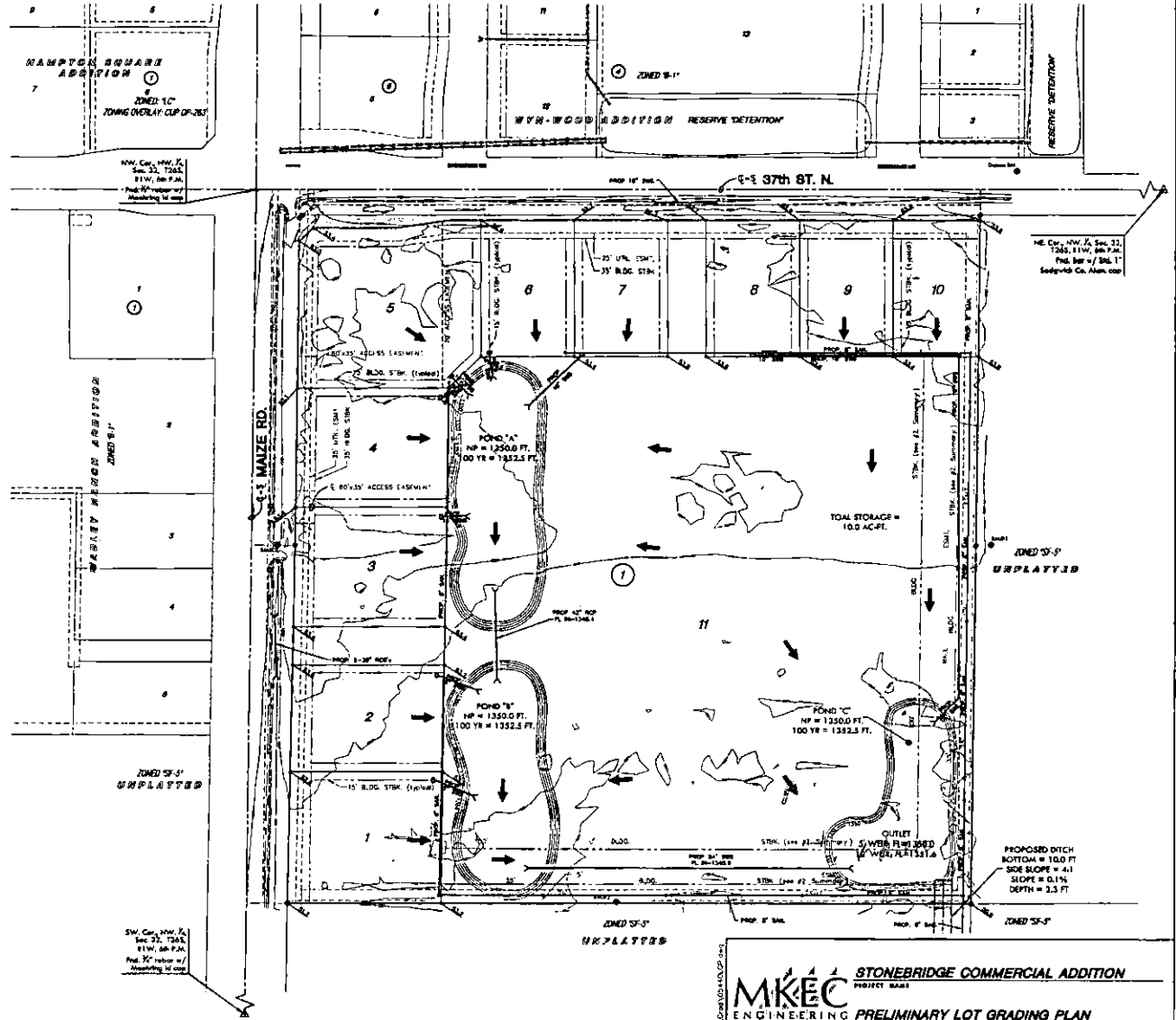
**LEGAL DESCRIPTION**

The North 1/2, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgewick County Kansas, EXCEPT, road right-of-way on the West and North.

**PLAT LOCATION**



**VICINITY MAP**

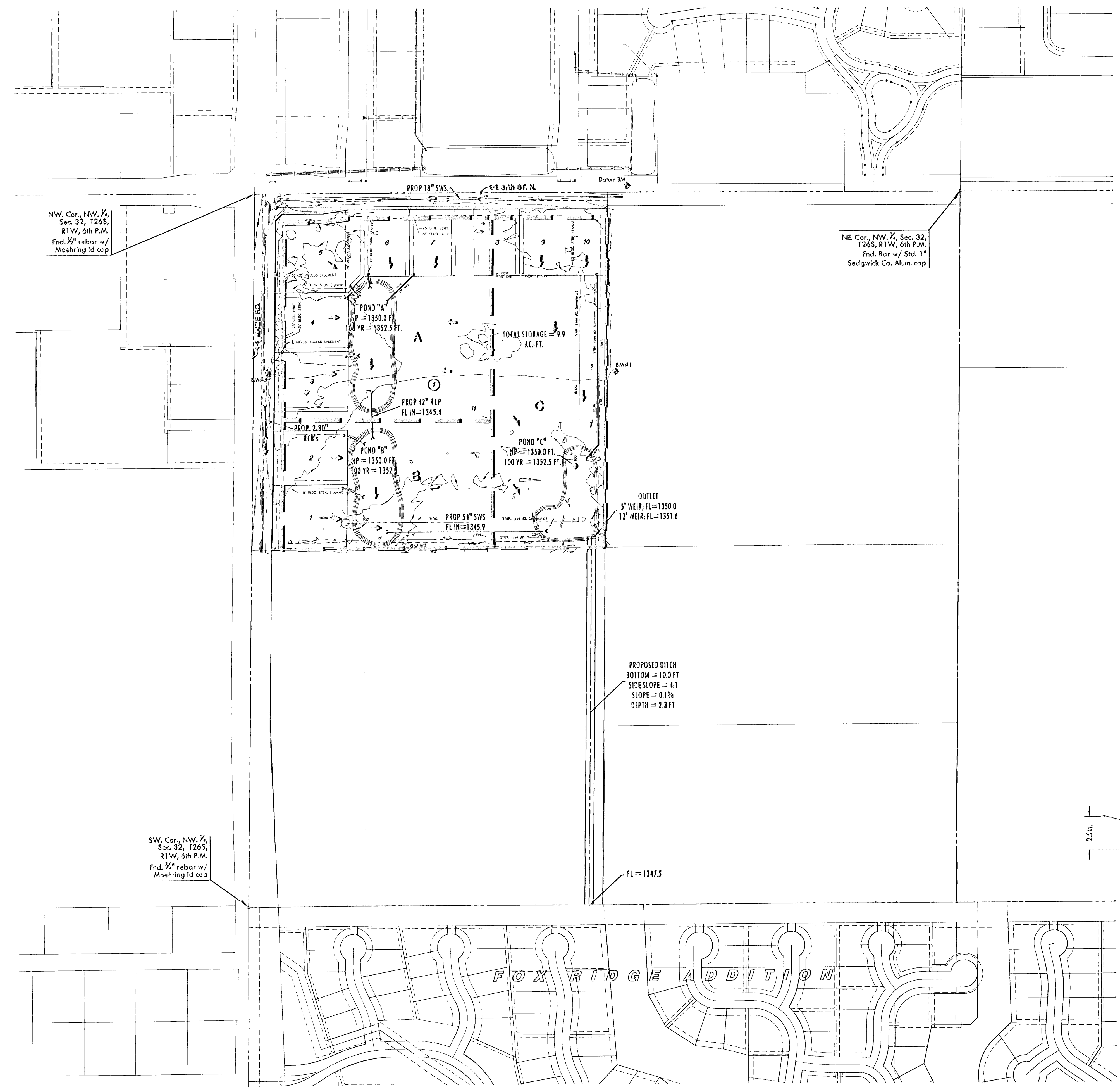


**MKEC ENGINEERING CONSULTANTS, INC.**  
**STONEBRIDGE COMMERCIAL ADDITION**  
**PROJECT NAME**  
**PRELIMINARY LOT GRADING PLAN**  
**CONSULTANTS, INC.**  
 411 N. WEBB ROAD  
 WICHITA, KS. 67206  
 316-640-8400  
 AUGUST 2006  
 DATE

DESIGNED BY: [Signature]  
 CHECKED BY: [Signature]  
 DATE: 8/1/06

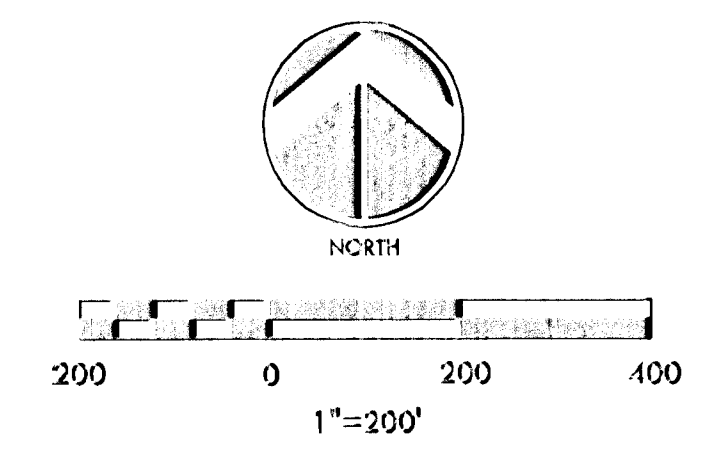
REVISED 11-06: UPDATED DITCH SIZE AND DETENTION POND'S 100-YEAR WATER SURFACE ELEVATIONS

Appendix H  
FlowMaster Output and Drainage Ditch Plan and Section



**LEGEND**

- ⊙ - CONIFEROUS TREE & DIAMETER
- - DECIDUOUS TREE & DIAMETER
- S— - SIGN
- ⊕ - POWER POLE AND GUY ANCHOR
- ⊞ - ELECTRIC BOX
- ⊞ - LIGHT POLE
- ⊞ - FIRE HYDRANT
- ⊞ - WATER VALVE
- ⊞ - WATER METER
- ⊞ - SECTION CORNER
- ⊞ - BENCHMARK
- E— - EASEMENT
- B— - BUILDING SETBACK
- X— - FENCE
- S— - STORM SEWER PIPE
- W— - WATER LINE
- SS— - SANITARY SEWER LINE
- G— - GAS LINE
- P— - GAS PIPELINE
- T— - TELEPHONE LINE
- UE— - UNDERGROUND ELECTRIC LINE
- OE— - OVERHEAD ELECTRIC
- FO— - FIBER OPTIC CABLE I
- DB— - DRAINAGE BOUNDARY
- A - DRAINAGE BOUNDARY LABEL
- - FLOW ARROW



**NOTES**

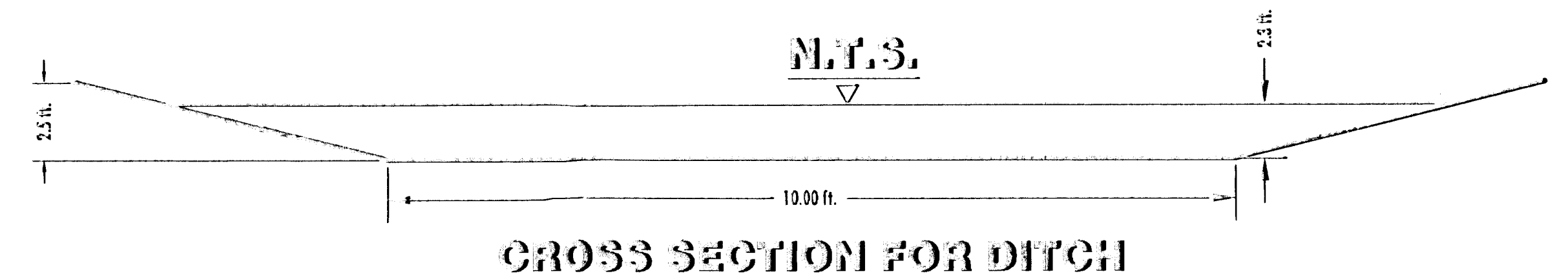
1. GEOGRAPHY: Located in the Northwest portion of the City of Wichita in an area currently transitioning from agricultural uses into urban residential, institutional and commercial uses with access to K-96 via Maize Rd. and or Ridge Rd. The surrounding land uses include urban residential to the Northwest and South, rural residential to the West, and agriculture production to the immediate South and East, and institutional uses East of the agriculture production.
2. LOT TOTAL - 11 Commercial parcels
3. ANNEXATION: Lies within the City of Wichita and adjoins the City of Maize to the North and West.
4. EXISTING USE: Agricultural
5. ZONING: Existing / proposed - "LC" w/ CUP DP 295 overlay THIS PLAT SHALL CONFORM TO THE RECITALS OF CUP DP 295.
6. PLAT AREA: Gross - 36.3 Ac.  
Net - 35.93 Ac.
7. SURVEY DATE: January, 2006 (by MKEC)
8. PUBLIC UTILITIES: Shall be extended to site. Municipal sanitary sewer shall be served from the East. Municipal water shall be served from existing mains to the North and West.
9. LEGAL DESCRIPTION: See hereon
10. ACCESS CONTROLS: Shall align with developments to the West and North and also conform to access management policies as shown hereon.
11. PROPOSED COMMERCIAL: According to CUP DP 295 the total number of buildings is limited to 16 with the following minimum building setbacks:  
Arterial Street setback = 35'  
Interior side setback = 15'  
Interior side setback = 35' \*\*  
Exterior boundary setback = 100' \*\*  
\*\* (if building has a gross floor area greater than 100,000 s.f.)
12. RESERVES: All reserves are platted for irrigation, landscaping, monuments, drainage, and utilities in designated areas. Reserve "C" is also platted for a private swimming pool, pool house, and parking.
13. FLOOD: According to FEMA FIRM Community Unit Panel 200321 0125A, Effective Date June 3rd, 1986; this property lies within flood zone "C", "areas of minimal flooding."
14. DRAINAGE: A drainage report shall accompany this plat. The property lies within a branch of the Sand Creek drainage basin, which drains to the Little Arkansas River located in Sedgwick County and generally draining from northeast to southwest.

**LEGAL DESCRIPTION**

The North 1/2, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgwick County Kansas, EXCEPT, road right-of-way on the West and North.  
TOGETHER WITH,  
The South 1/2, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgwick County Kansas, EXCEPT, road right-of-way on the West.

**BENCH MARKS**

- Datum BM: Top of "I" post 35' ± N. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 1384' ± E. of NW corner of said NW 1/4.  
Elev. = 1353.54 (NGVD 29)  
166.14 (City Datum)
- BM#1: Top of "I" post 660' ± S. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 1325' ± E. of W. line of said NW 1/4.  
Elev. = 1351.69 (NGVD 29)  
164.29 (City Datum)
- BM#2: Top of "I" post 675' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 1320' ± S. of the N. line of said NW 1/4.  
Elev. = 1351.79 (NGVD 29)  
164.39 (City Datum)
- BM#3: Square cut on N. end of on top of RCP 50' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 660' ± S. of the N. line of said NW 1/4.  
Elev. = 1353.59 (NGVD 29)  
166.19 (City Datum)



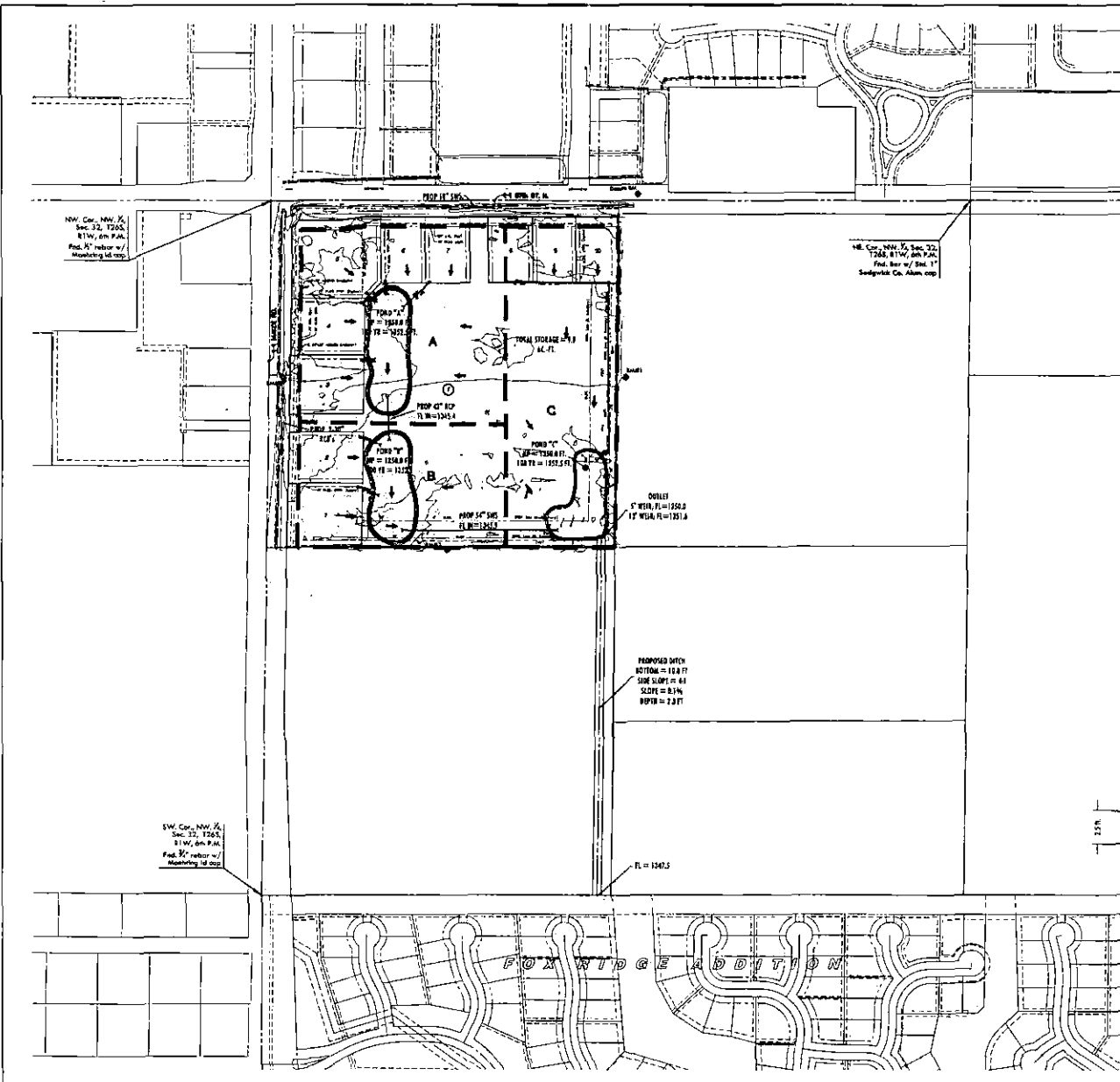
**MKEC**  
ENGINEERING CONSULTANTS, INC.

**STONEBRIDGE COMMERCIAL ADDITION**  
PROJECT NAME

**LOCATION OF DITCH TO FOX RIDGE**  
SHEET TITLE

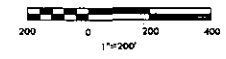
411 N. WEBB ROAD  
WICHITA, KS. 67206  
316-684-9600

AJK DESIGN BY: JFL DRAWN BY: GJA CHECKED BY:  
AUGUST 2006 DATE: 05440 JOB NO. 1/1 SHEET/OF



**LEGEND**

- CONCRETE TREE & DIAMETER
- DECIDUOUS TREE & DIAMETER
- SIGN
- POWER POLE AND GUY ANCHOR
- ELECTRIC BOX
- LIGHT POLE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- SECTION CORNER
- BENCHMARK
- EASEMENT
- BUILDING SETBACK
- WATER LINE
- STORM SEWER PIPE
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- GAS LINE
- GAS PIPELINE
- TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- FIBER OPTIC CABLE
- DRAINAGE BOUNDARY
- DRAINAGE BOUNDARY LABEL
- FLOW ARROW



**NOTES**

1. GEOGRAPHY: Located in the Northwest portion of the City of Wichita in an area currently transitioning from agricultural uses into urban residential, institutional and commercial uses with access to K-96 via Malva Rd. and or Ridge Rd. The surrounding land uses include urban residential to the Northwest and South, rural residential to the West, and agriculture production to the immediate South and East, and institutional uses East of the agriculture production.
2. LOT TOTAL - 11 Commercial parcels
3. ANNEXATION: Lies within the City of Wichita and adjoins the City of Malva to the North and West.
4. EXISTING USE: Agricultural
5. ZONING: Existing / proposed - "LC" w/ CUP DP 295 overlay THIS PLAT SHALL CONFORM TO THE REGULARS OF CUP DP 295.
6. PLAT AREA: Gross - 34.5 Ac.  
Net - 35.93 Ac.
7. SURVEY DATE: January, 2006 (by MKEC)
8. PUBLIC UTILITIES: Shall be extended to site. Municipal sanitary sewer shall be served from the East. Municipal water shall be served from existing mains to the North and West.
9. LEGAL DESCRIPTION: See hereon
10. ACCESS CONTROLS: Shall align with developments to the West and North and also conform to access management policies as shown hereon.
11. PROPOSED COMMERCIAL: According to CUP DP 295 the total number of buildings is limited to 16 with the following minimum building setbacks:  
Arterial Street setback = 35'  
Interior side setback = 15'  
Interior side setback = 35' ↔  
Exterior boundary setback = 100' ↔  
(If building has a gross floor area greater than 100,000 s.f.)
12. RESERVES: All reserves are planned for irrigation, landscaping, monuments, drainage, and utilities in designated areas. Reserve "C" is also planned for a private swimming pool, pool house, and parking.
13. FLOOD: According to FEMA FIRM Community Use Panel 200521 0125A, Effective Date June 3rd, 1984, the property lies within flood zone "C", "areas of minimal flooding."
14. DRAINAGE: A drainage report shall accompany this plat. The property lies within a branch of the Sand Creek drainage basin, which drains to the Little Arkansas River located in Sedgewick County and generally draining from northeast to southwest.

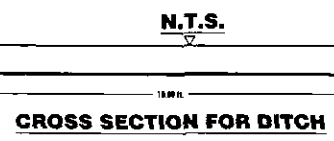
**BENCH MARKS**

- Top of "T" post 35' ± N. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 132S' ± E. of W. line of said NW 1/4.  
Elev. = 1353.54 (NGVD 29)  
164.14 (City Datum)
- Top of "T" post 660' ± S. of the N. line of NW 1/4, Sec. 32, T26S, R1W and 132S' ± E. of W. line of said NW 1/4.  
Elev. = 1381.49 (NGVD 29)  
164.29 (City Datum)
- Top of "T" post 875' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 1320' ± S. of the N. line of said NW 1/4.  
Elev. = 1351.79 (NGVD 29)  
164.39 (City Datum)
- Square set on N. end of on top of RCP 50' ± E. of the W. line of NW 1/4, Sec. 32, T26S, R1W and 660' ± S. of the N. line of said NW 1/4.  
Elev. = 1353.59 (NGVD 29)  
164.19 (City Datum)

**LEGAL DESCRIPTION**

The North 1/4, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgewick County Kansas, EXCEPT, road right-of-way on the West and North.  
TOGETHER WITH:  
The South 1/4, NW 1/4, NW 1/4, Section 32, Township 26 South, Range 1 West, Sedgewick County Kansas, EXCEPT, road right-of-way on the West.

PROPOSED DITCH  
BOTTOM = 10.0 FT  
SIDE SLOPE = 4:1  
SLOPE = 8.1%  
DEPTH = 2.0 FT



**STONEBRIDGE COMMERCIAL ADDITION**

**MKEC ENGINEERING CONSULTANTS, INC.**  
PROJECT NAME: LOCATION OF DITCH TO FOX RIDGE  
SHEET TITLE

411 N. WEBB ROAD WICHITA, KS. 67206 316-684-9900	AUG 2006 DATE	105440 JOB NO.	1/1 SHEET NO.	1/1 TOTAL SHEETS
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Ditch to Fox Ridge 0.1% Slope  
Worksheet for Trapezoidal Channel

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Project Description	
Project File	k:\wp\project\2005\05440 - stonebridge commercial\drainage\flowmaster\ditch to.fm2
Worksheet	Ditch to Fox Ridge 0.001 ft/ft
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

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Input Data	
Mannings Coefficient	0.030
Channel Slope	0.001000 ft/ft
Left Side Slope	4.000000 H : V
Right Side Slope	4.000000 H : V
Bottom Width	10.00 ft
Discharge	92.00 cfs

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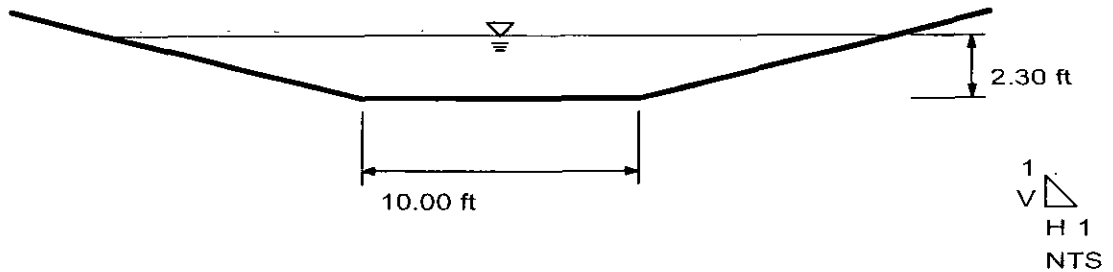
Results	
Depth	2.30 ft
Flow Area	44.29 ft <sup>2</sup>
Wetted Perimeter	29.00 ft
Top Width	28.44 ft
Critical Depth	1.17 ft
Critical Slope	0.013914 ft/ft
Velocity	2.08 ft/s
Velocity Head	0.07 ft
Specific Energy	2.37 ft
Froude Number	0.29
Flow is subcritical.	

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Ditch to Fox Ridge 0.1% Slope  
Cross Section for Trapezoidal Channel

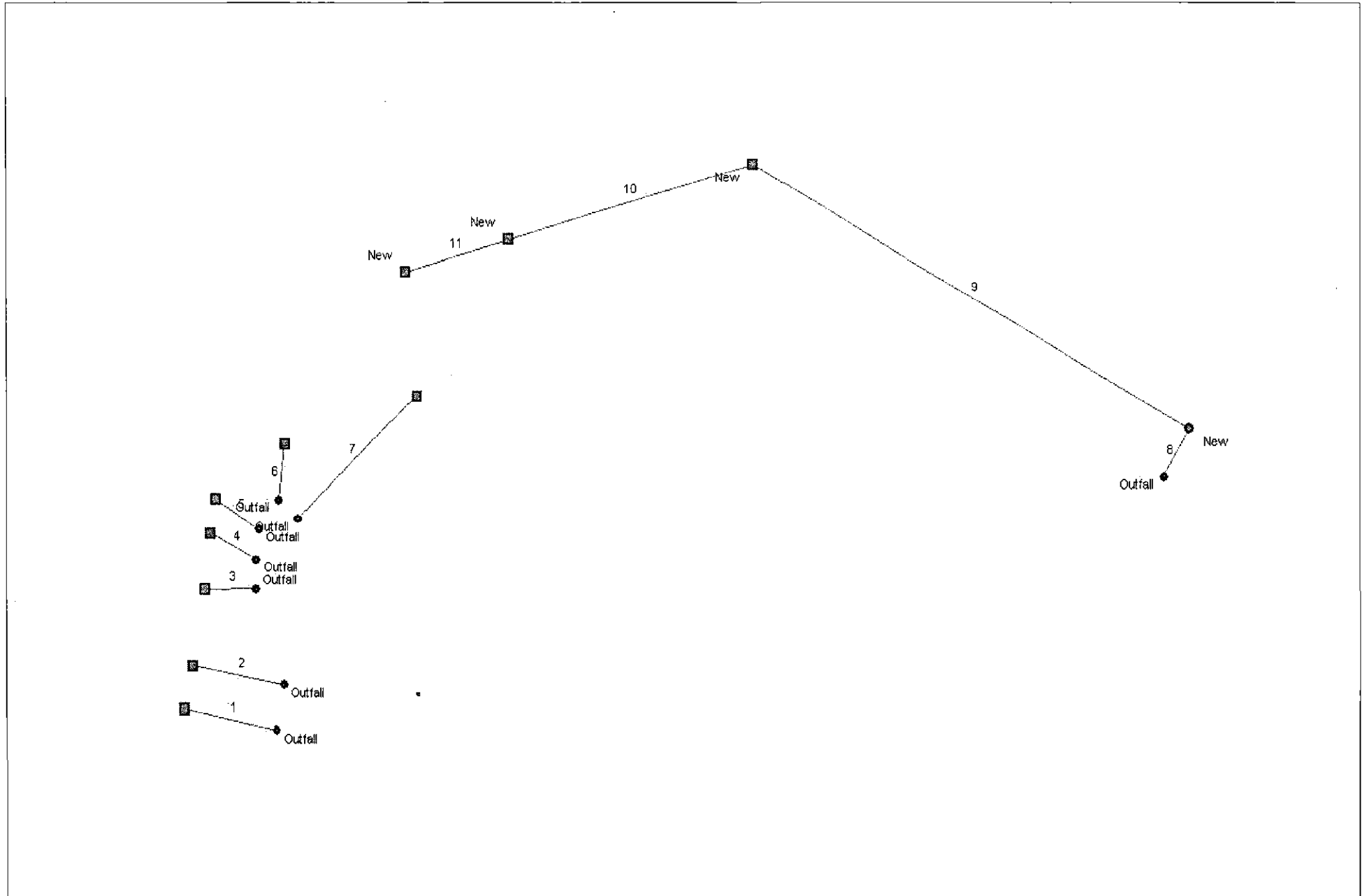
Project Description	
Project File	k:\wp\project\2005\05440 - stonebridge commercial\drainage\flowmaster\ditch to.fm2
Worksheet	Ditch to Fox Ridge 0.001 ft/ft
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.030
Channel Slope	0.001000 ft/ft
Depth	2.30 ft
Left Side Slope	4.000000 H : V
Right Side Slope	4.000000 H : V
Bottom Width	10.00 ft
Discharge	92.00 cfs



Appendix I  
Preliminary Storm Sewer Design for Lots 1-10

# Hydraflow Plan View



Project File: stonebridge\_5yr.stm

No. Lines: 11

08-22-2006

# Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	Lot 1	4.59	15 c	75.0	1353.00	1353.33	0.440	1353.86	1354.47	0.24	1354.71	End
2	Lot 2	4.20	15 c	75.0	1353.00	1353.33	0.440	1353.82	1354.40	0.22	1354.62	End
3	Lot 3	4.23	15 c	41.0	1353.30	1353.48	0.439	1354.12	1354.49	0.24	1354.74	End
4	Lot 4	3.52	15 c	42.0	1353.30	1353.48	0.428	1354.10	1354.36	0.23	1354.59	End
5	Lot 5	5.28	18 c	41.0	1353.30	1353.48	0.439	1354.22	1354.47	0.29	1354.75	End
6	Lot 6	3.17	15 c	41.0	1353.30	1353.48	0.439	1354.06	1354.29	0.22	1354.51	End
7	Lot 7	5.64	18 c	133.0	1353.30	1353.88	0.436	1354.21	1355.00	0.25	1355.25	End
8		3.71	18 c	41.0	1352.30	1352.34	0.097	1353.21	1353.34	0.14	1353.48	End
9	Lot 8, 9, 10	3.93	18 c	400.0	1352.30	1352.80	0.125	1353.64	1354.14	0.10	1354.23	8
10	Lot 9	4.06	18 c	204.0	1352.80	1353.16	0.177	1354.23	1354.49	0.05	1354.54	9
11	Lot 8	1.60	15 c	87.0	1353.30	1353.38	0.092	1354.60	1354.63	0.03	1354.66	10

Project File: stonebridge\_5yr.stm

Number of lines: 11

Run Date: 08-22-2006

NOTES: c = cir; e = ellip; b = box; Return period = 5 Yrs.

# Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID	
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)		Inlet/ Rim El (ft)
1	End	75.0	-168.1	Curb	0.00	1.20	0.84	15.0	1353.00	0.44	1353.33	15	Cir	0.013	1.00	0.00	Lot 1
2	End	75.0	-168.7	Curb	0.00	1.10	0.84	15.0	1353.00	0.44	1353.33	15	Cir	0.013	1.00	0.00	Lot 2
3	End	41.0	179.4	Curb	0.00	1.20	0.84	18.0	1353.30	0.44	1353.48	15	Cir	0.013	1.00	0.00	Lot 3
4	End	42.0	-151.4	Curb	0.00	1.00	0.84	18.0	1353.30	0.43	1353.48	15	Cir	0.013	1.00	0.00	Lot 4
5	End	41.0	-148.1	Curb	0.00	1.50	0.84	18.0	1353.30	0.44	1353.48	18	Cir	0.013	1.00	0.00	Lot 5
6	End	41.0	-83.4	Curb	0.00	0.90	0.84	18.0	1353.30	0.44	1353.48	15	Cir	0.013	1.00	0.00	Lot 6
7	End	133.0	-43.0	Curb	0.00	1.60	0.84	18.0	1353.30	0.44	1353.88	18	Cir	0.013	1.00	0.00	Lot 7
8	End	41.0	-60.0	MH	0.00	0.00	0.84	0.0	1352.30	0.10	1352.34	18	Cir	0.013	1.00	0.00	
9	8	400.0	-90.7	Curb	0.00	0.00	0.84	0.0	1352.30	0.12	1352.80	18	Cir	0.013	1.13	0.00	Lot 8, 9, 10
10	9	204.0	-45.0	Curb	0.00	0.80	0.84	22.0	1352.80	0.18	1353.16	18	Cir	0.013	0.50	0.00	Lot 9
11	10	87.0	0.0	Curb	0.00	0.50	0.84	22.0	1353.30	0.09	1353.38	15	Cir	0.013	1.00	0.00	Lot 8

Project File: stonebridge\_5yr.stm

Number of lines: 11

Date: 08-22-2006