Adopted: February 23, 2007

CITY OF WICHITA

# Public Works, Engineering Division
# Final Drainage Plan Submittal Checklist

Reviewer:______________________ Date: January 21, 2009

Subdivision Name: Stonebridge Commercial Addition Location: 37th and Maize

Total Land Area Of Ownership: 36 Acres

Type: ☐ Residential ☑ Commercial ☐ Industrial ☐ Recreation ☐ Municipal ☐ Other

Applicant:______________________ Contact:______________________ Phone #:______________

Engineer: MKEC Engineering Consultants, Inc. Contact: Kara Anderson Phone # (316) 684-9600

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 | ☑ | ☐ | Appendix A, Stonebridge Comm. 12/06 | ☐ | ☐ |
| B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain | ☑ | ☐ | Pg. 1-2, Stonebridge Comm. 12/06 | ☐ | ☐ |
| C. Discussion of offsite conditions | ☑ | ☐ | Pg. 1-2, Stonebridge Comm. 12/06 | ☐ | ☐ |
| D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series | ☐ | ☑ | The report calculated the volume of storage that is required for the development. The storage is provided below an observed 100 yr. HWL. Pg. 1, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| 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.) | ☑ | ☐ | Appendix D, Supplemental Stonebridge 12/08 | ☐ | ☐ |
| 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) | ☐ | ☑ | Runoff from the Cadillac Lake Basin backs up onto the site. The site provides approximately 0.5 ac. ft. of storage for the basin under existing conditions. Runoff flowrate from the site is controlled by down stream constraints. | ☐ | ☐ |
| C. Existing topography (no greater than 2-foot contours, 1-foot recommend) | ☑ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| D. Total Site Area and Total Impervious Area (acres) | ☑ | ☐ | | ☐ | ☐ |
| E. Benchmarks used for site control | ☑ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| F. Streams, creeks, and waterway labeled | ☐ | ☑ | | ☐ | ☐ |
| G. Predominant soils from USDA soil surveys, and/or on site soil borings | ☑ | ☐ | Appendix B, Stonebridge Comm. 12/08 | ☐ | ☐ |
| 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 | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow | ☐ | ✔ | | ☐ | ☐ |
| L. Flow paths | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| 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 | ✔ | ☐ | Runoff from the Cadillac Lake Basin backs up onto the site. The site provides approximately 0.5 ac. ft. of storage for the basin under existing conditions. Runoff flowrate from the site is controlled by down stream constraints. | ☐ | ☐ |
| O. Assumed pre-developed runoff curve numbers | ✔ | ☐ | Appendix B, Supplemental Stonebridge 12/08 | ☐ | ☐ |
| P. Existing time of concentrations used in calculations | ✔ | ☐ | Appendix B, Supplemental Stonebridge 12/08 | ☐ | ☐ |
| Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site | ☐ | ✔ | Used tailwater from Fox Ridge | ☐ | ☐ |
| R. Existing structural elevations (e.g., invert of pipes, manholes, etc.) | ☐ | ✔ | | ☐ | ☐ |
| S. Cross-section data for open channels | ☐ | ✔ | | ☐ | ☐ |
| T. Ground water elevations, if applicable | ☐ | ✔ | | ☐ | ☐ |

| | **Applicant** | | | **Engr** | |
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| **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) | ☐ | ✔ | The required storage volume for this site has been calculated and will be provided under the observed 100-yr HWL. Runoff flow rate is controlled by down stream constraints. Pg. 1, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| B. Proposed time of concentrations used in calculations | ✔ | ☐ | Appendix B, Supplemental Stonebridge 12/08 | ☐ | ☐ |
| C. Assumed post-developed runoff curve numbers | ✔ | ☐ | Appendix B, Supplemental Stonebridge 12/08 | ☐ | ☐ |
| D. Proposed contours for detention facilities (to equal area used in outlet rating curves) | ✔ | ☐ | Pg. 1, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration | ✔ | ☐ | Appendix C, Supplemental Stonebridge 12/08 | ☐ | ☐ |
| F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities | ☐ | ✔ | The required storage volume for this site has been calculated and will be provided under the observed 100-yr HWL. Runoff flow rate is controlled by down stream constraints. Pg. 1, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| 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.) | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| I. Design water surface elevations and normal pool elevation for ponds. | ✔ | ☐ | Pg 1, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter. | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| K. Proposed limits of clearing and grading | ☐ | ✔ | Entire Site | ☐ | ☐ |
| L. Location of existing and proposed roads, buildings, parking lots and other impervious areas. | ✔ | ☐ | Building & pavement is shown where known | ☐ | ☐ |
| M. Location of existing and proposed utilities (e.g., water, sewer) and easements | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings | ☐ | ✔ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |

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|---|---|---|---|---|---|
| P. Preliminary selection and location of stormwater controls | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| Q. Emergency overflow structure's flow path | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown) | ✔ | ☐ | Appendix A, Supplemental Stonebridge 1/09. Tail water from Cadillac Lake controls the runoff from Development | ☐ | ☐ |
| S. The 100-year 24-hour HWL delineated on the plan for detention pond | ✔ | ☐ | The 100-yr ELEVATION shown on the plan was observed during the September 12, 2008 rain event. Appendix A, Supplemental Stonebridge 1/09 | ☐ | ☐ |
| 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 | ☐ | ✔ | | ☐ | ☐ |

| | **Applicant** | | | **Engr** | |
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| **Tab 4. Floodplain Submittal** | **I** | **NA** | **Explanation / Location in Plan** | **I** | **NA** |
| A. Provide source of flood profile | ☐ | ✔ | | ☐ | ☐ |
| 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** | |
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| **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 | ☐ | ✔ | | ☐ | ☐ |

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# Supplemental Drainage Report for Stonebridge Commercial Addition

## Wichita, Sedgwick County, Kansas

## Post-Project Conditions

### *Runoff Characteristics*

Post-project runoff will flow into a detention pond, then to the south and exit the site into a Maize South School Campus drainage reserve. This drainage reserve will flow south into the lakes in Fox Ridge Addition and into Cadillac Lake. The drainage and utility plan shows the proposed pond layout, Appendix A.

The December 2006 drainage report for this addition required 10.0 acre-feet of storage for the 100-year design storm. The City of Wichita has requested that the development provide 10% more storage volume than what is normally required to help with existing problems within the Cadillac Lake basin. It has also been calculated that the property currently provides the basin with 0.5 acre-feet of storage during a 100-year storm event. Because of the slow draining nature of the basin; the city will not recognize any storage provided above an elevation of 1351.1 (NGVD 29). This elevation was observed during a 100-year rain event on September 12, 2008. Therefore; 11.5 acre-feet of storage must be provided between the normal pool of the detention pond and the 100-year elevation of the Cadillac Lake basin to accommodate the compensatory storage and the required detention storage.

The following changes have been made to the Stonebridge detention pond since the December 2008 Supplemental Drainage Report. The berm elevation along the east side and a portion of the south side of the reserve has been lowered to an elevation of 1349. Lowering the berm allows the expansion of the detention pond within Reserve A. A small controlled discharge area will be cut into the berm to an elevation of 1348 to lower the normal pool of the pond and provide a point discharge location from the detention pond for small design events.

These changes to the detention pond will provide 11.5 acre feet of storage between the normal pool and the observed 100-year elevation of the basin. Table 1 shows the stage storage values within Reserve A.

Table 1. Stonebridge Detention Pond Storage.

| Stage (ft) | Elevation (ft) | Contour Area (sqft) | Incr. Storage (acft) | Total Storage (acft) |
|---|---|---|---|---|
| 0.0 | 1348.0 | 148,400 | 0.0 | 0.0 |
| 1.0 | 1349.0 | 156,800 | 3.5 | 3.5 |
| 2.0 | 1350.0 | 166,600 | 3.7 | 7.2 |
| 3.0 | 1351.0 | 173,200 | 3.9 | 11.1 |
| 3.1 | 1351.1 | 173,200 | 0.4 | 11.5 |

The berm, with a top elevation of 1349 and discharge location at 1348, will allow runoff to back into the Stonebridge detention pond from the Maize South Campus detention ponds during all storm events. Therefore the ponds will work together as one pond to provide detention for the basin.

## Summary

Stonebridge Commercial Addition is located on the southeast corner of the intersection of 37th 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 onto Maize School property and into the Fox Ridge lakes. A drainage reserve has been constructed through the adjacent property to the south and into a Fox Ridge lake. A detention pond will be constructed within the Stonebridge Commercial Addition. The detention pond will work with the drainage reserve to the south to provide detention for the Cadillac Lake basin. The December 2006 drainage report for this addition stated that 10.0 acre-feet of storage would be required for this development. The City of Wichita has requested that the development provide 10% more storage volume than what is normally required to help with existing problems within the Cadillac Lake basin. The property will also provide 0.5 acre-feet of compensatory storage for a total volume of 11.5 acre-feet.

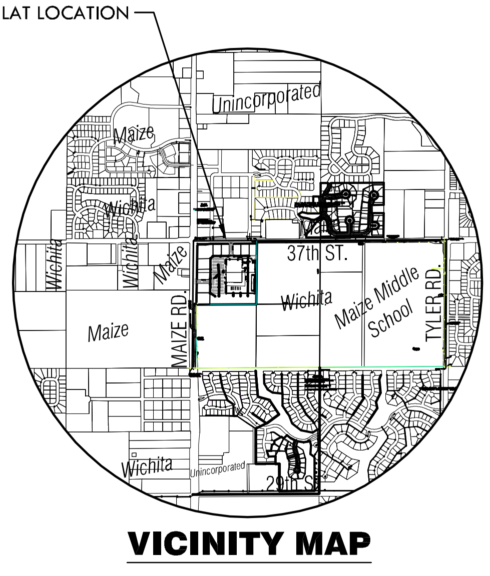
# Appendix A

## Drainage and Utility Plan

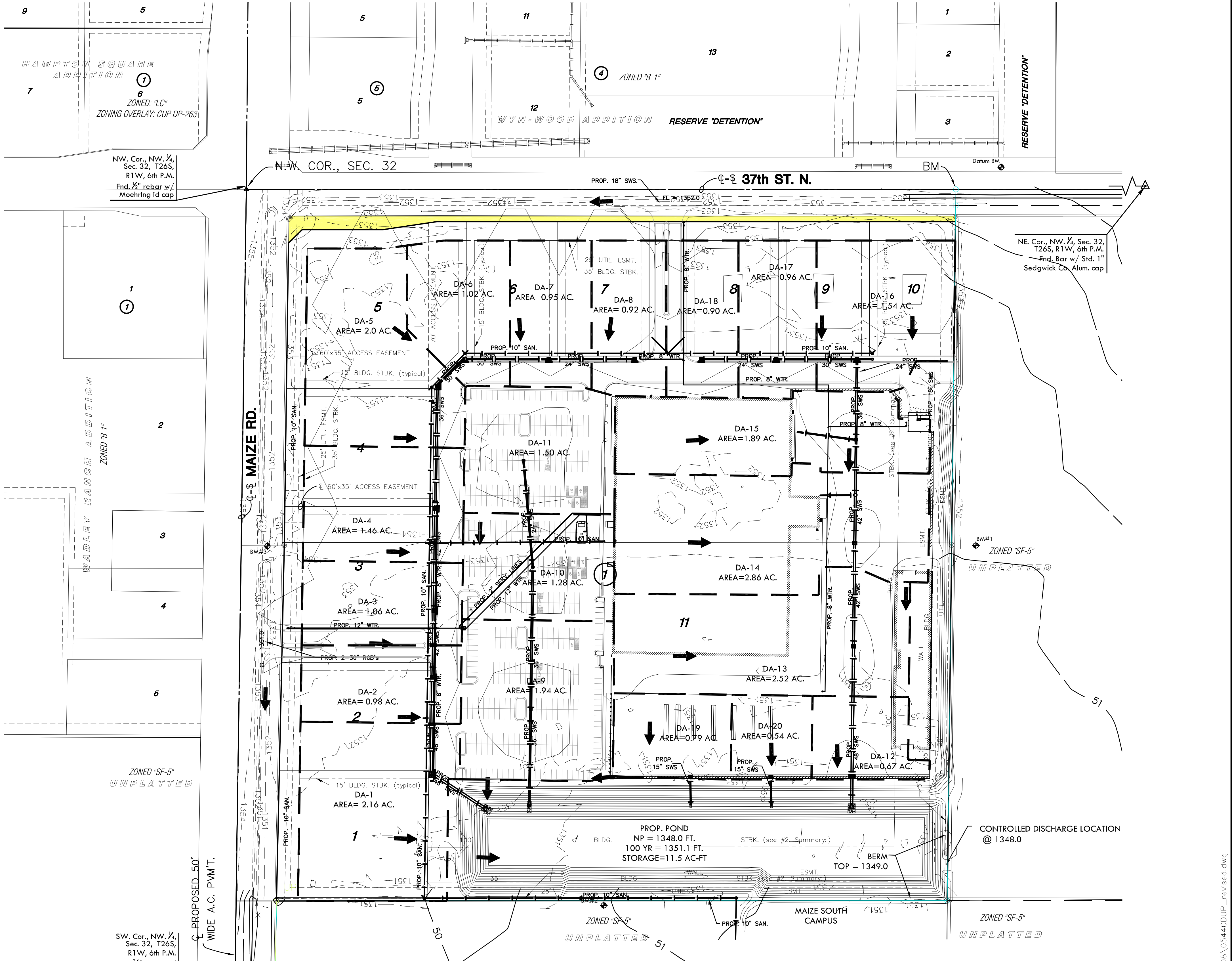
## NOTES

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.



### VICINITY MAP



## 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
- DRAINAGE BOUNDARY
- A - DRAINAGE BOUNDARY LABEL
- → - FLOW ARROW

NORTH

MINIMUM PAD ELEVATIONS
*LOWEST OPENINGS*

| LOTS (inclusive) | BLOCK | ELEVATION *NGVD* |
|---|---|---|
| 1 - 2 | 1 | 1355.5 |
| 3 - 11 | 1 | 1355.5 |

100 0 100 200
1"=100'
1 : 1,200

## LEGAL DESCRIPTION

The North ½, NW. ¼, NW. ¼, 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 ½, NW. ¼, NW. ¼, 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 "T" post 35' ± N. of the N. line of NW¼, Sec. 32, T26S, R1W and 1384' ± E. of NW. corner of said NW¼.
Elev. = 1353.54 (NGVD 29)
166.14 (City Datum)

BM#1 Top of "T" post 660' ± S. of the N. line of NW ¼, Sec. 32, T26S, R1W and 1325' ± E. of W. line of said NW¼.
Elev.= 1351.69(NGVD 29)
164.29 (City Datum)

BM#2 Top of "T" post 675' ± E. of the W. line of NW¼, Sec. 32, T26S, R1W and 1320' ± S. of the N. line of said NW. ¼.
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 NW¼, Sec. 32, T26S, R1W and 660' ± S. of the N. line of said NW. ¼.
Elev.=1353.59 (NGVD 29)
166.19 (City Datum)

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**MKEC**
ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316-684-9600

# STONEBRIDGE COMMERCIAL
STONEBRIDGE COMMERCIAL ADDITION
WICHITA, KANSAS

## DRAINAGE AND UTILITY PLAN

DATE
*SEPTEMBER 2008*
REVISED
*JANUARY 2009*

DESIGN BY
*KLA*
DRAWN BY
*CMJ*
CHECKED BY
*GJA*
SHEET NUMBER
1