DRAINAGE REPORT
FOR
CAMBRIA ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS

November 16, 2007

CAMBRIA ADDITION
DRAINAGE ANALYSIS
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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	94.2	143.9	175.2	227.9	319.0

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	38.7	NA	3.0	1305.4
5-yr	71.0	58.8	NA	3.4	1305.9
10-yr	84.9	71.3	NA	3.6	1306.2
25-yr	108.5	92.5	NA	4.0	1306.6
100-yr	148.9	128.6	NA	4.6	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	0.70
1305.0	0.79
1306.0	0.88
1307.0	0.97
1307.5	1.13

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	44.0	32.9	52.6	1.6	1302.4
5-yr	67.1	52.2	79.2	2.2	1302.9
10-yr	81.1	64.3	95.7	2.6	1303.2
25-yr	105.2	85.2	123.6	3.2	1303.6
100-yr	146.8	121.3	171.2	4.2	1304.3

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

Stage	Area (ac-ft)
1301.00	1.10
1302.00	1.20
1303.00	1.31
1304.00	1.42
1304.5	1.50

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

PROPOSED CONDITIONS

DETENTION POND

USGS MAP
PRELIMINARY PLAT
FEMA FIRM
ORTHOPHOTO OF SITE

DRAINAGE MAP

GRADING PLAN

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