DRAINAGE PLAN

RIVER WOOD ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

23 APRIL 2007

ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

DRAINAGE PLAN
RIVER WOOD ADDITION

FINAL REPORT

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23 April 2007

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REPORT CONTENTS

EXISTING CONDITIONS

The site is located near the northwest corner of 63rd Street South and Clifton Avenue. The existing site consists of approximately 54 acres and is currently agricultural farmland and pasture with portions of the site heavily treed. There is a FEMA Special Flood Hazard Area located on the property due to the flooding effects of the Arkansas River. There are two existing ponds on the site which appear to have no outlet. Existing trees will be retained and left at existing grades, where applicable.

PROPOSED CONDITIONS

The site is proposed to be developed into a residential subdivision with approximately 130 lots. The subdivision will consist of residential lots with corresponding streets, utilities, and stormwater management systems (storm sewer, channels, ponds, etc.). Outlets will be added to the two existing ponds and will be utilized for detention. The site will be elevated above the FEMA Base Flood Elevation.

OFFSITE CONDITIONS

This site is very flat but generally drains to the west and into the Arkansas River. There is no substantial introduction of offsite flow onto the site.

EXISTING CONDITIONS RUNOFF CALCULATIONS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in calculating the existing conditions runoff values.

- Ø STORM SERIES
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
  - 2-yr Rainfall Depth = 3.5 in
  - 10-yr Rainfall Depth = 5.3 in
  - 100-yr Rainfall Depth = 7.8 in

SITE CHARACTERISTICS

The proposed site is currently agricultural farmland. There are tree rows encompassing the property as well as two existing ponds. The predominant soils on this site consist of Type A soils. The site is very flat but generally drains to the west and into Arkansas River.

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for pre-development conditions using the rational method for the 2, 10, and 100 year storm events. Runoff coefficients used were from the City of Wichita Drainage Criteria Manual for Urban Lawn Areas, soil type A, slope of 1% to 4%. The total runoff from the site was determined to be 27 cfs, 52 cfs, and 116 cfs for the 2, 10, and 100 year - 24 hour storm events. The runoff appears to sheet flow toward the west into the Arkansas river.

DOWNSTREAM DRAINAGE CAPACITY

Currently there are no structures downstream of the site. The site drains directly into the Arkansas River

POST-DEVELOPMENT HYDROLOGIC ANALYSIS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in developing the drainage and grading plans.

Ø STORM SERIES
- 24-hour; 2-yr, 10-yr, 100-yr Storm Events Modeled
- 2-yr Rainfall Depth = 3.5 in
- 10-yr Rainfall Depth = 5.3 in
- 100-yr Rainfall Depth = 7.8 in

Ø STORM WATER SEWER PIPES
- Rational Method for proposed flows
- Soil Type = B & D
- Developed 'C' = 0.52, Soil Group A, ¼ acre lots
- Minimum Tc = 15 min
- 24-hr, 10-yr Storm Event contained in Pipe
- Emergency Overflows for 24-hr, 100-yr Storm Event

Ø GRADING CONSTRAINTS
- Minimum 1% Cross-lot Rear Yard Grades
- Minimum 0.5% Street Grades
- Double Curb Inlets utilized at all street sump locations
- Backyard inlets assumed to be 2'x4' grated inlet, unless otherwise specified on plan sheet

Ø POND ROUTING / GRADING
- Hydraflow Hydrograph software utilized for modeling (Hydrograph Method)
- Minimum 1' Freeboard from 100-yr Water Surface Elevations to adjacent lot corners
- Ponds were modeled as tailwater controlled using BFE of Arkansas River

DETENTION FACILITIES

There are two (2) ponds proposed in this subdivision. These ponds can be seen on the half-scale drainage plan in Exhibit 5. The pond systems are described below in further detail.

Ø EAST POND SYSTEM

This system is located in the northeast area of the site. An existing pond will be utilized to detain runoff from approximately 31 acres of the site. An outlet will be added to the existing pond consisting of a 15" RCP that will connect to a proposed storm water sewer system and will drain into the Arkansas River. The pond will have a static water surface of 1252.0 and a corresponding 100-yr water surface elevation of 1254.1. The pond system was modeled assuming a tailwater equal to the 100-yr BFE of the Arkansas River. The adjacent structures will have minimum lowest opening of at least 3 feet above the mapped FEMA BFE for the Arkansas River.

Ø WEST POND SYSTEM

This pond system will accommodate offsite runoff from the west and southwest area of the property. The existing pond will be utilized to detain runoff from approximately 21 acres of the site. An outlet will be added to the existing pond consisting of a 15" RCP that will connect to a proposed storm water sewer system and will drain into the Arkansas River. The pond will have a static water surface of 1250.0 and a corresponding 100-yr water surface elevation of 1256.3. The pond system was modeled assuming a tailwater equal to the 100-yr BFE of the Arkansas River. The adjacent structures will have minimum lowest opening equal to at least 3 feet above the mapped FEMA BFE for the Arkansas RIver.

DETENTION SUMMARY

Detention will be provided on the proposed site to limit the developed runoff to less than or equal to the existing conditions. The following tables represent each pond systems inflow and outflow for the 24-hour, 100-yr storm event.

East Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
Pond A	125 cfs	0 cfs *	1252.4	15" RCP

West Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
Pond B	88 cfs	0 cfs *	1256.3	15" RCP

*Both ponds modeled assuming tailwater equal to Arkansas River 100-yr BFE

DISCHARGE POINTS SUMMARY

Currently there are no main discharge points from the site. The site is adjacent to the Arkansas River and the majority of the runoff from the site sheet flows to the west into the river. A small amount of runoff sheet flows into the road ditch along Clifton Avenue. Upon development the majority of the site will discharge through a 24" RCP with a flapgate. This pipe discharges both detention ponds and the storm water sewer system that runs through the development. A small amount of runoff from proposed lots adjacent to the river will continue to sheet flow into the river. Also, some runoff will be allowed to continue to flow into the Clifton Avenue ditch. The discharge points are summarized below. All flows are for the 24-hour, 100-yr storm events.

LOCATION	STRUCTURE	EXIST RUNOFF	PROP RUNOFF
West edge of property	None	116 cfs **	26 cfs
Northwest Corner of Site	24" RCP	NA**	9 cfs
Southeast corner of property	None	17 cfs	4 cfs

**Existing conditions entire site sheet flow along west edge of property

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

No potential upstream impacts are expected with this development.

Due to detention on the proposed site, there are no downstream impacts expected.

SOURCE OF FLOODPLAIN INFORMATION

FEMA Floodplain and Floodway information were obtained from the Sedgwick County, Kansas FIRM Panel 536 of 700 dated February 2, 2007.

The base flood elevations (BFE 's) of the adjacent the Arkansas River varies from elevations 1257 NAVD at 63rd Street South to 1260 NAVD a half mile south of 55th Street South. The floodplain encroaches the property near along the west edge of the property. This area of inundation is expected to be elevated above the BFE before any structures are constructed.

There is no floodway boundary on the proposed property.

The scaled floodplain and floodway locations are shown on the Drainage and Grading Plans.

The actual FEMA FIRM Panel can be viewed as Exhibit 6.

The Floodway data table, as provided by the National Flood Insurance Program, can be seen in Exhibit 7.

The corresponding Flood Profiles are attached as Exhibit 8.

Note: The elevations shown on the plan sheets are in NGVD. The elevations on the FEMA FIRM Panels are in NAVD. To convert NAVD to NGVD, subtract 0.4.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

There does not appear to be intermittent and/or ephemeral streams on the site. An area of wetlands does appear to be present on the west edge of the site. However, there is no development planned for the area containing wetlands. A USACOE jurisdictional determination has been made on this site.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING

A portion of the site is located within the floodplain. Because of this a floodplain fill permit may be required. This permit will need to be obtained before any construction begins in the channel.

FEMA

As stated earlier, a portion of the floodplain lies on the proposed site. This area should be filled (to at least BFE) and removed from the mapped floodplain by a Letter of Map Revision based on Fill (LOMR-F).

KANSAS DEPT OF TRANSPORTATION

There does not appear to be any KDOT permitting needed on the proposed project.

SEDGWICK COUNTY ROW

There is one discharge point in Sedgwick County ROW at the southeast corner of the site. This area of discharge will need to have county approval and may require additional re-grading of the existing ditch section.

DRAINAGE PLAN Scale 1:100

GRADING PLAN Scale 1:100

APPENDIX A: USGS Soils Survey

APPENDIX B: Hydraflow Storm Sewer
- 2-yr Storm Event
- 10-yr Storm Event
  SWS Systems 1-6

APPENDIX C: Hydraflow Hydrograph
- East Pond
- West Pond

USGS Soils Survey

Hydraflow Storm Sewer

SWS Systems 1-6

Hydraflow Hydrograph

East Pond
West Pond