

# Drainage Report

## Davis Moore Fourteenth Addition, To Wichita, Sedgwick County, Kansas



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# Drainage Report

## DAVIS-MOORE 14<sup>TH</sup> ADDITION

### **Introduction**

The subject property is located on the south side of Kellogg (U.S. 54), about one-half mile between Webb Road and Greenwich Road, and extends south to the Turnpike right-of-way. The property is undeveloped and has been for years. The tract of land is approximately 30 acres and is zoned general commercial. It is restricted by Community Unit Plan DP-88. The current proposed use of the land is a car dealership with the replat have a remaining 28 acres more or less after dedication of additional right of way on Kellogg Road. At this time, only the northwest 4 acres of the property are to be developed. The rest of the property will be developed at a later time.

### **Current Conditions**

The site is served by City of Wichita utilities. A car dealership is along the west property line for the length of the property. Most of the property is grassland, except for some of the Kellogg frontage, which has remnants of former parking lots and foundations. The soils are a Type D, mostly clay, with a high runoff coefficient. There are no signs of wetlands and the land is not in a floodplain. The land, except for the northeast corner of the property, drains to the south property line and concentrates at a point in the west third of the site. The site drains at a slope of about 0.3%. The runoff discharges to the turnpike and flows in the existing ditch to the east. Property between Kellogg and the turnpike and approximately 400-500 west of this site also drain to the north ditch of the Turnpike. Where our site drain onto the turnpike and east fro approximately 3/8<sup>th</sup> of a mile downstream, this ditch has a gradual slope of less then 0.4% to the east, a depth in excess of 4ø and width exceeding 50ø After that, the channel has increased vegetation and the scouring from increased slope and cross slope. The North Channel then drains to an existing double concrete box, which drains under the turnpike and to the south.

The attached plat with topography shows existing features including contours and utilities, and proposed easements.

### **Proposed Improvements**

The entire site will be developed for commercial use. This will be accomplished by first developing a 4 acre development at the northwest corner of the site and construction of a retention/detention pond that will accommodate the future development of the entire site. Because of the flat terrain, the 4 acre site will be filled so that there will be enough relief to the south. This will allow the runoff to follow existing drainage patterns. The runoff

will be collected on the 4 acre site in an enclosed system and discharged to a point just south of the four acres, where it will be conveyed south in a V-bottom ditch.

Best management practices for erosion control will include ditch checks in the proposed swale, inlet protection at all inlets, Silt fence where applicable and the detention pond will temporarily act as the sediment basin during construction. The ditch flows to a proposed detention pond of about 2-1/2 acres at the southwest corner of the property, Reserve A. The pond is about 12 feet deep and will have a normal pool elevation of 1343.00 and peak detention elevation of 1353.98. This construction will allow the storm sewer system to drain into the detention pond and minimized the amount of fill to be brought to the site. The site runoff will discharge from the pond through a concrete weir structure to the existing ditch on the Kansas Turnpike. The weir structure is designed to regulate the peak discharge so that it does not increase with development. Appendix C illustrates no increased runoff after development of this site. Appendix A illustrates the pond and weir structure. The attached calculations show the existing and developed peak runoffs, including assumed coefficients and conditions. The attached erosion control plans show how silt will be retained on site. The pond will act as a sediment pond if the erosion control measures fail during and after development is complete.

### **Site Hydrological Analysis**

Existing and proposed site conditions have been modeled using the rational method. The Values for Rainfall Intensity and Runoff Coefficients were established using the *Drainage and Storm Sewer Policy for Design Criteria and Documentation, City of Wichita, Kansas*. Existing time of concentration of 46 minutes was calculated from existing ground conditions, see Appendix C. Proposed time of concentration has been modeled using the proposed site runoff and accounting for the use of storm sewer pipe to route runoff to the detention/retention pond. Detention Pond routing and peak runoff calculations have been developed by storage-Indication Method, with the duration of storm varied to illustrate maximum detention and peak runoff for each storm event.

### **Future Development**

Over time, the entire 28 acres will develop commercially. The detention pond and weir structure are designed for the total development. The remaining site will need fill dirt as the first 4 acres does to allow drainage to the pond. The site will require extensive storm sewer piping to drain the runoff to the pond. The entire site is held under one ownership, so only one party is responsible for maintenance of the pond and protecting the waters from erosion.