

DRAINAGE PLAN
**KANSAS TRUCK EQUIPMENT
ADDITION**
TO
WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY



21 JANUARY 2008



DRAINAGE PLAN KANSAS TRUCK EQUIPMENT ADDITION

FINAL REPORT

Prepared by Baughman Company, P.A.
21 January 2008

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WICHITA

Public Works, Engineering Division Final Drainage Plan Submittal Checklist

Reviewer: _____ Date: _____
 Subdivision Name: KANSAS TRUCK EQUIPMENT Location: 1521 S. Tyler Road
 Total Land Area Of Ownership: 2.4 Acres
 Type: _____ Residential Commercial Industrial _____ Recreation _____ Municipal _____ Other _____
 Applicant: Kansas Truck Equip Contact: Maurice Linnens Phone #: _____
 Engineer: Baughman Company, PA Contact: TREVOR KURTZ Phone #: 262-7271

Please check the appropriate box:

I = Included; NA = Non-Applicable; R= Required prior to development
(If "NA" is checked, an explanation must be entered)

Tab 1. Project Narrative	Applicant		Engr	
	I	NA	I	NA
A. Site Location Map, using USGS Map	<input checked="" type="checkbox"/>			
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	<input checked="" type="checkbox"/>			
C. Discussion of offsite conditions	<input checked="" type="checkbox"/>			
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	<input checked="" type="checkbox"/>			
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design	<input checked="" type="checkbox"/>			
F. Copy of the plat	<input checked="" type="checkbox"/>			
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.)	<input checked="" type="checkbox"/>			
H. Professional Engineer seal, signature and date on cover of report	<input checked="" type="checkbox"/>			
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover		<input checked="" type="checkbox"/>		<i>Provide upon approval</i>

Tab 2. Existing Conditions Runoff Calculations	Applicant		Engr	
	I	NA	I	NA
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)	<input checked="" type="checkbox"/>			
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)	<input checked="" type="checkbox"/>			
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)	<input checked="" type="checkbox"/>			
D. Total Site Area and Total Impervious Area (acres)	<input checked="" type="checkbox"/>			
E. Benchmarks used for site control	<input checked="" type="checkbox"/>			
F. Streams, creeks, and waterway labeled	<input checked="" type="checkbox"/>			
G. Predominant soils from USDA soil surveys, and/or on site soil borings	<input checked="" type="checkbox"/>			
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted	<input checked="" type="checkbox"/>			
I. Location of existing roads, buildings, parking lots and other impervious areas.	<input checked="" type="checkbox"/>			



WICHITA

Final Drainage Plan Submittal Checklist
Adopted: February 23, 2007

J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements	X				
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	X				
L. Flow paths	X				
M. Location and dimensions of existing channels, bridges or culvert crossings	X				
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	X				
O. Assumed pre-developed runoff curve numbers	X				
P. Existing time of concentrations used in calculations	X				
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site	X				
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)	X				
S. Cross-section data for open channels	X				
T. Ground water elevations, if applicable		X	NA		

Tab 3. Post-Development Hydrologic Analysis	Applicant			Engr	
	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)	X				
B. Proposed time of concentrations used in calculations	X				
C. Assumed post-developed runoff curve numbers	X				
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)		X	No detention proposed.		
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration		X	SWS exists on property		
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities		X	No detention provided		
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary	X				
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)	X				
I. Design water surface elevations and normal pool elevation for ponds.		X	No pool proposed.		
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.	X				
K. Proposed limits of clearing and grading	X				
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.	X				
M. Location of existing and proposed utilities (e.g., water, sewer) and easements	X				
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	X				
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings	X				



WICHITA

P. Preliminary selection and location of stormwater controls	X		SWS exists on property currently		
Q. Emergency overflow structure's flow path	X				
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)		X	No detention facility		
S. The 100-year 24-hour HWL delineated on the plan for detention pond		X	" "		
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds		X	" "		
U. Stormwater Management Facilities located within a Reserve		X	" "		
V. Maintenance responsibility of stormwater management facility shall be specified in the plat text. (e.g. HOA, Lot Owners Association, or lot)		X	" "		
W. Off-site drainage easements or agreements required, where necessary	X		None expected		

Tab 4. Floodplain Submittal	Applicant		Explanation / Location in Plan	Engr	
	I	NA		I	NA
A. Provide source of flood profile	X				
B. Nearest base flood elevations	X				
C. Delineation of pre-developed regulatory floodplain/floodway limits		X	No SFHA on property		
D. Delineation of post-developed regulatory floodplain and floodway limits		X	" "		
E. Floodplain boundary determination per elevation (project limits shown)		X	" "		
F. Provide source of floodway data table and discharges		X	" "		
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		X	" "		
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions		X	" "		
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)		X	" "		
J. Flood plains and floodways located within a Reserve, where necessary		X	" "		

Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	Applicant		Explanation / Location in Plan	Engr	
	I/R	NA		I/R	NA
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)		X	No Permitting expected		
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		X	" "		
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.		X	" "		
D. Kansas Department of Transportation		X	" "		
E. Sedgwick County Right-of-way Permit	X		Ditch along north conveys discharge		

PROJECT NARRATIVE

EXISTING CONDITIONS

The site is located on the west side of Tyler Road and adjacent south of the abandoned ATS&F Railroad. This site consists of 2.4 acres of developed property and contains a main sales building and associated parking and utilities. The site generally drains to the west and eventually into the Cowskin Creek via a tributary. There is private stormwater sewer on the property as well as a concrete flume to the south which directs offsite runoff to the west. An 8'x5' RCBC is located under Tyler Road and conveys drainage from the east to the west. The box discharges into the abandoned Railroad ROW channel. The site location is depicted on the USGS Quadrangle Sheet as Exhibit 1.

There is no FEMA Special Flood Hazard Area located on the property as of this report.

PROPOSED CONDITIONS

The proposed Kansas Truck Equipment site is currently developed. The sites drainage patterns are assumed to remain as existing and the existing storm sewer will remain to convey drainage to the north and west. A proposed addition to the main building is expected.

OFFSITE CONDITIONS

The adjacent ditch along the former ATS&F Railroad currently conveys offsite runoff from the east, which is conveyed under Tyler Road via a RCBC. This box will carry, before overtopping Tyler Road, approximately 220 cfs. There is also drainage from the south that flows adjacent to the site via a concrete flume. This flume carries water to the west into then north into the drainage ditch. All of this flow, including the site, is conveyed by the abandoned Railroad ditch and into the Cowskin Creek to the west.

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.

- STORM SERIES
 - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
 - 2-yr Rainfall Depth = 3.5 in
 - 5-yr Rainfall Depth = 4.5 in
 - 10-yr Rainfall Depth = 5.3 in
 - 25-yr Rainfall Depth = 6.1 in
 - 100-yr Rainfall Depth = 7.9 in

- FLOW DATA
 - Existing Conditions runoff calculated using Rational Method
 - Areas per USGS Quadrangle Sheet, Aerial Photos, and Site Visits
 - Rational 'C' factors used for on-site flows
 - Runoff Coefficient: 'C' = .80 (light industrial)
 - Time of Concentration: Lag Method (15 min minimum)

SITE CHARACTERISTICS

The site is currently developed and consists of a main sales building with associated parking and out buildings. The site is partially paved and contains grass cover at the west portion of the site. The soil type on the site is Type B. The NRCS Soil Survey can be viewed in Appendix A.

The site drains to the west via the adjacent (abandoned) Railroad. This channel carries offsite runoff from the east as well this sites runoff. The site discharges to this channel via 3 stormwater sewers.

The aerial photograph with topography can be seen as Exhibit 2.

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for developed conditions using the Rational Method for the 2, 5, 10, 25, and 100 year storm events. A 'C' factor of 0.80 was used for existing conditions assuming light industrial development with Types B soil. The time of concentration used was the City of Wichita minimum of 15 minutes.

The site drains its runoff to the adjacent channel to the north. It appears that this channel has enough capacity to convey the offsite runoff as well as this sites runoff in the 100-year storm event.

Offsite runoff to the south flows adjacent to the south property line in a concrete flume. This runoff then flows north and into the existing channel. No offsite water appears to encroach the proposed site.

DOWNSTREAM DRAINAGE CAPACITY

There are no structures directly downstream of the site. The adjacent channel appears to convey the 100-year rainfall event. This channel drains into a Cowskin Creek tributary about 700 feet to the west of this site. There is no FEMA SFHA located on this property as of this report.

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.

- STORM SERIES
 - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
 - Rational Method for existing flows
 - Rational 'C' Factor; 'C' = 0.80 (Type B Soils, Light Industrial)
 - Time of Concentration; minimum Tc = 15min

- STORM WATER SEWER PIPES & DRAINAGE CHANNELS
 - Leave as existing

- GRADING CONSTRAINTS
 - Match grades along entire property lines

DETENTION FACILITIES

There are no detention facilities on this site. The site is currently developed and contains stormwater sewer as well as a channel along the north which drains runoff to the Cowskin Creek.

DETENTION SUMMARY

No detention is provided on the site. The site is developed and will continue to convey its runoff via SWS and the adjacent channel section.

DISCHARGE POINTS SUMMARY

There is one main discharge point for this site. The site discharges to the north into the existing channel. This channel appears to convey the 100-year storm event.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

No upstream or downstream impacts are expected with this plat. The site is currently developed and contains stormwater sewer. The site will continue to drain via the open channel to the north as it does today.

FLOODPLAIN SUBMITTAL

SOURCE OF FLOODPLAIN INFORMATION

The site lies within FEMA SFHA Zone X.

A copy of the FEMA FIRM Panel is attached as Appendix 5.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

No USACOE permitting is expected at this time.

KANSAS DEPT OF AGRICULTURE - DWR PERMITTING

No Kansas DWR Permit is expected at this time.

FEMA

There is no mapped FEMA SFHA on this property as of this report. Therefore, no permitting is expected at this time.

KANSAS DEPT OF TRANSPORTATION

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

SEDGWICK COUNTY ROW

The abandoned Railroad ROW contains a ditch section which conveys this sites runoff to the west. An agreement with Sedgwick County may be required to continue to discharge into this area.

EXHIBITS

- EXHIBIT 1: Site Location Map**
- EXHIBIT 2: Aerial Photo Exhibit with Topography**
- EXHIBIT 3: Plat – Half Scale**
- EXHIBIT 4: Drainage & Grading Plan – Half Scale**
- EXHIBIT 5: Floodplain Location (FIRM)**

SITE LOCATION EXHIBIT

KANSAS TRUCK EQUIPMENT ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS

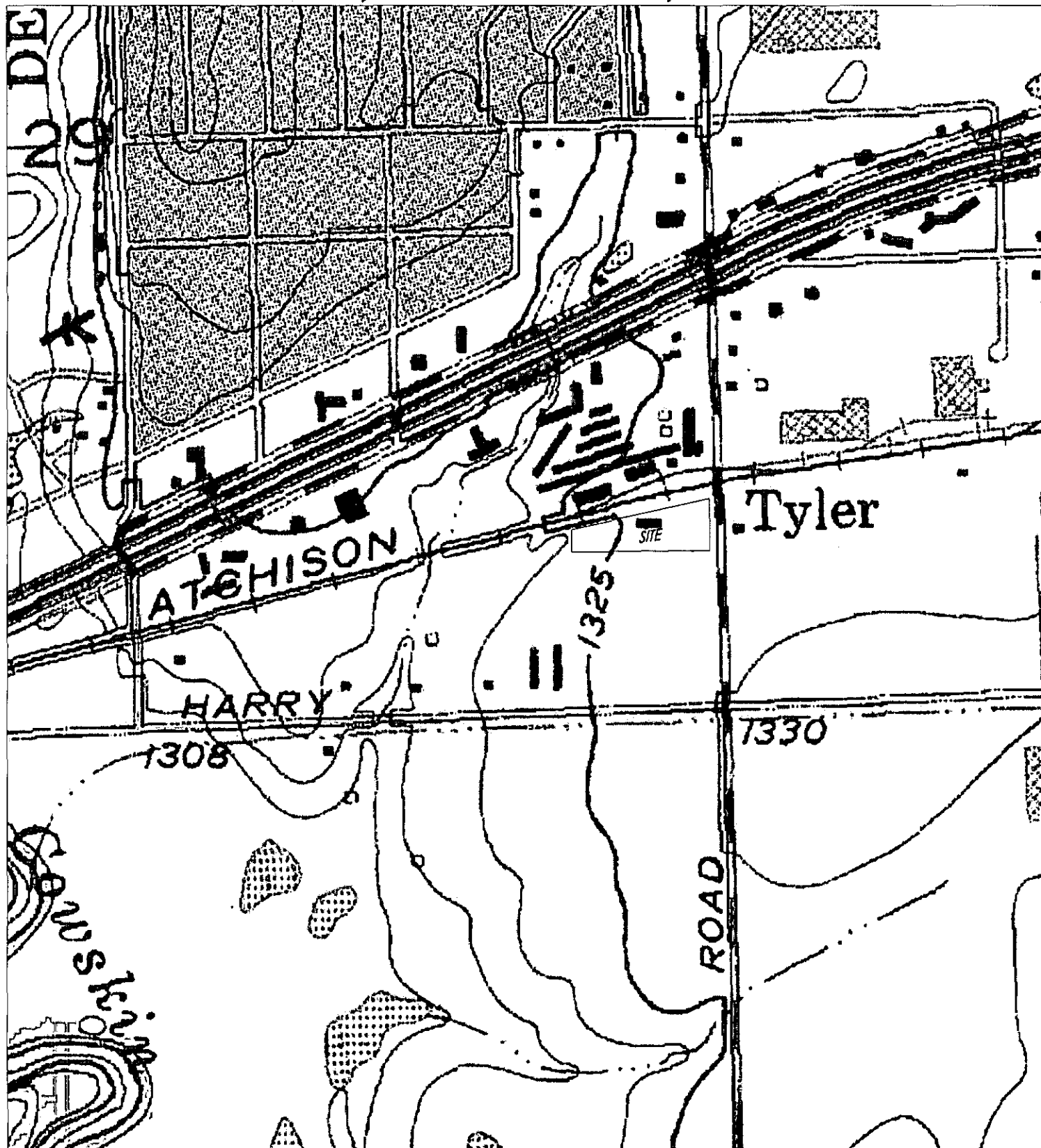

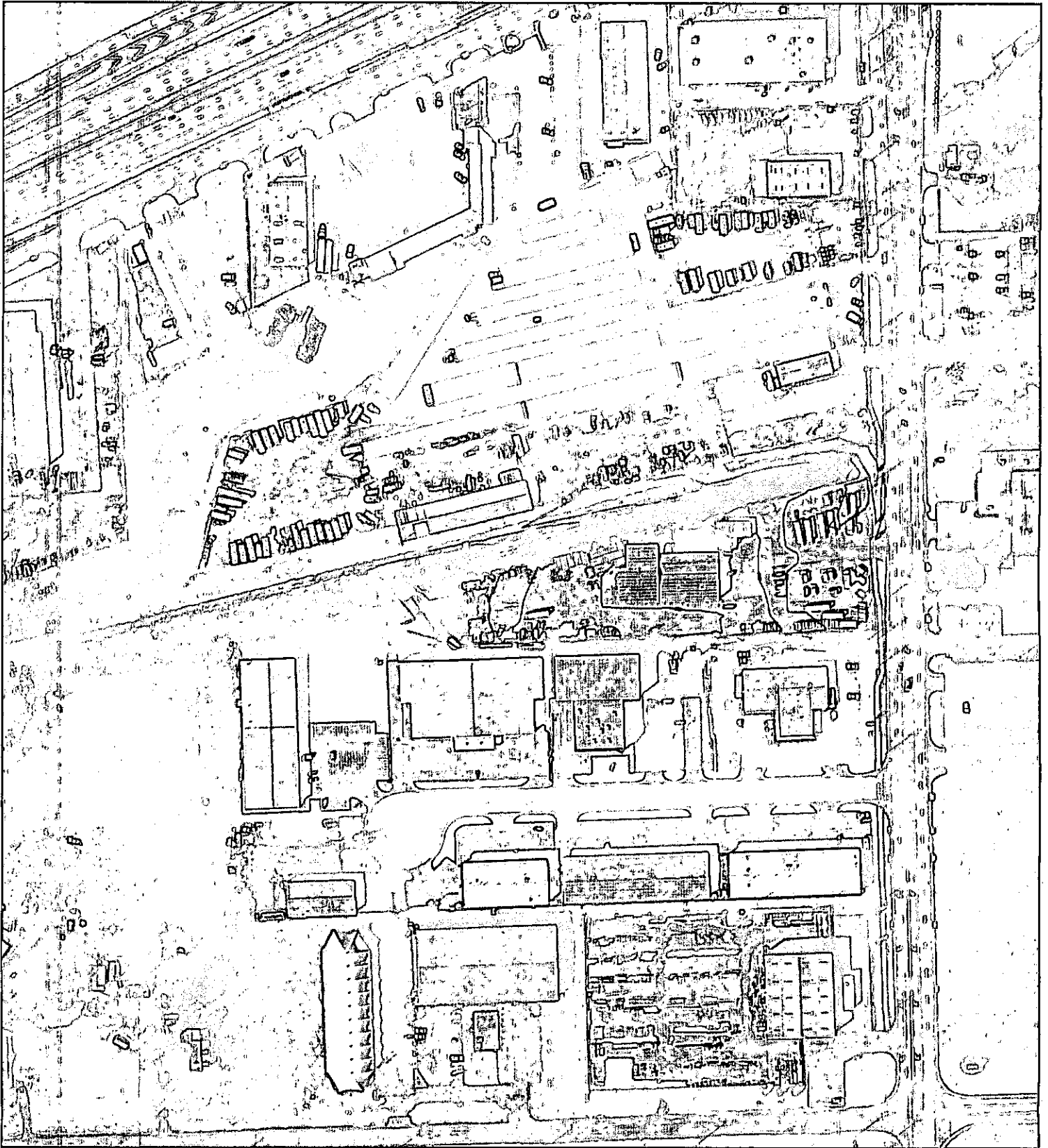


EXHIBIT 1
KANSAS TRUCK EQUIPMENT ADDITION
21 JANUARY 2007

 **Baughman Company, P.A.**
311 8TH ST. WICHITA, KS 67211 P 316-263-2711 F 316-263-1149
SURVEILLING | SURVEYING | PLANNING | LANDMARK ADMINISTRATION
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AERIAL EXHIBIT
KANSAS TRUCK EQUIPMENT ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS



0 100 200
DATE OF PREPARATION: 21 JANUARY 2001



EXHIBIT 1
KANSAS TRUCK EQUIPMENT ADDITION
21 JANUARY 2001

 Baughman Company, P.A.
311326 N. WYOMING, KS 67211 7316243-1771 7316243-0149
Baughman
ARCHITECTURE | INTERIORS | PLUMBING | MECHANICAL | ELECTRICAL

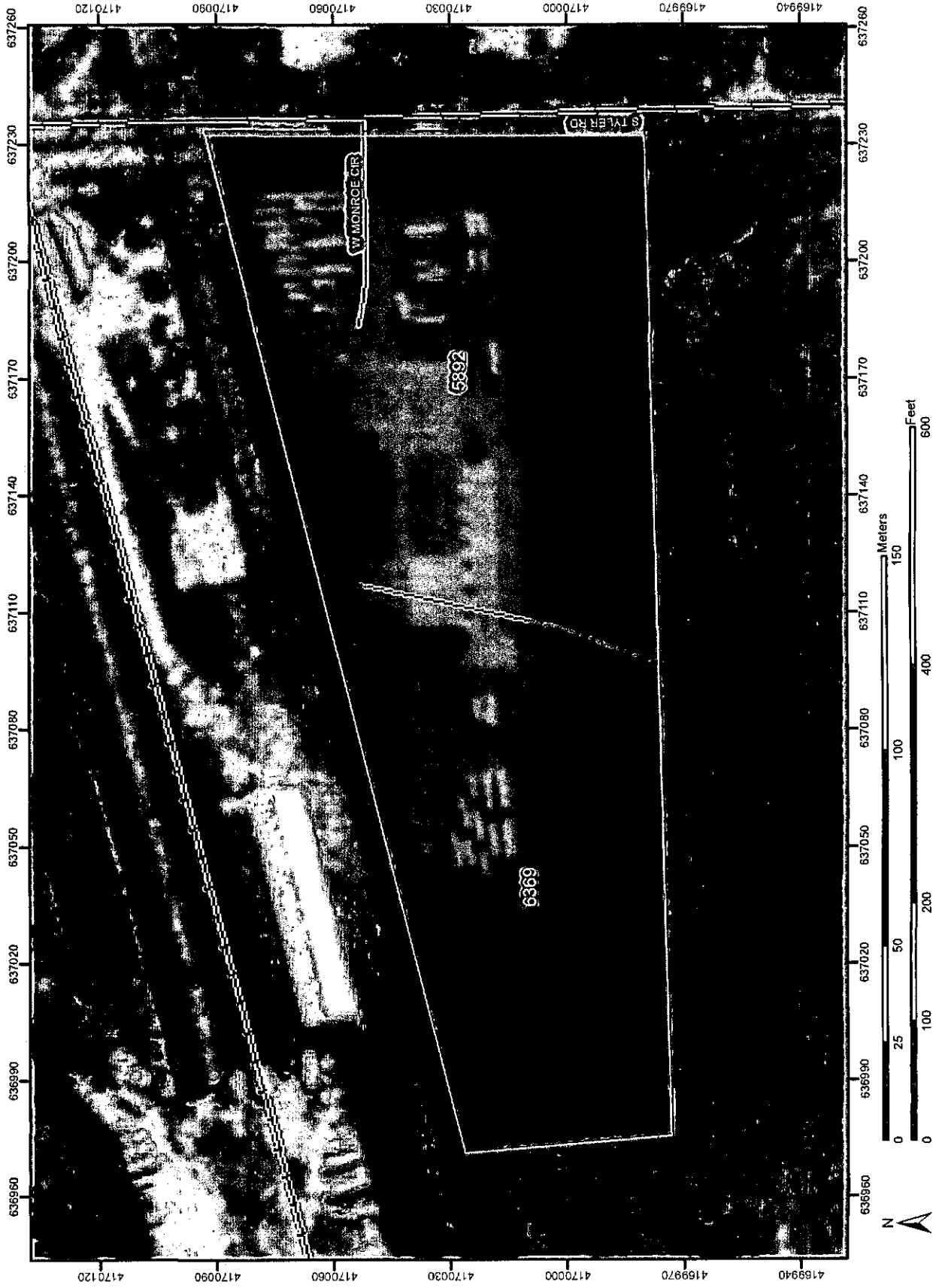
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SUPPORTING CALCULATIONS

APPENDIX A: USGS Soils Survey

USGS Soils Survey

Hydrologic Soil Group--Sedgwick County, Kansas



MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 14N





















This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sedgwick County, Kansas
 Survey Area Data: Version 4, Dec 29, 2007

Date(s) aerial images were photographed: 3/20/1996; 3/31/1996

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

MAP LEGEND

- Area of Interest (AOI)
 -  Area of Interest (AOI)
- Soils
 -  Soil Map Units
- Soil Ratings
 -  A
 -  A/D
 -  B
 -  B/D
 -  C
 -  C/D
 -  D
 -  Not rated or not available
- Political Features
 - Municipalities
 -  Cities
 -  Urban Areas
- Water Features
 -  Oceans
 -  Streams and Canals
- Transportation
 - Rails
 - 
 - Roads
 -  Interstate Highways
 -  US Routes
 -  State Highways
- Local Roads
 - 
- Other Roads
 - 

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Sedgwick County, Kansas				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5892	Farnum loam, 0 to 1 percent slopes	B	3.0	56.6%
6369	Milan loam, 1 to 3 percent slopes	B	2.3	43.4%
Totals for Area of Interest (AOI)			5.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

