

RIVERSIDE AIRPORT ADDITION DRAINAGE PLAN

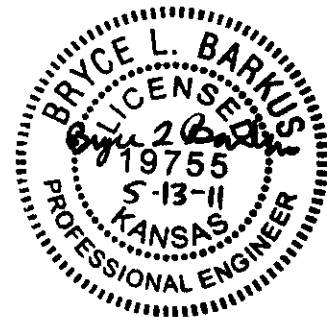
Prepared by:

Bryce L. Barkus, P.E.

ASM Engineering Consultants, LLC

Date:

May 13, 2011





CITY OF
WICHITA

Drainage Plan Submittal Checklist



Reviewer: _____ Date: _____
 Project Name: Riverside Airport Addition Location: North Haven Road between 29th & 37th
 Total Land Area of Ownership: _____ Acres
 Type: Residential _____ Commercial Industrial _____ Recreation _____ Municipal _____ Other _____
 Applicant: _____ Contact: _____ Phone #: _____
 Applicant email: _____
 Surveyor: _____ Contact: _____ Phone#: _____
 Surveyor email: _____
 Engineer: ASM Engineering Consultants Contact: Bryce Barkus, P.E. Phone # (316) 778-2215
 Engineer email: bbarkus@asm4.com

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

| Report Format and Content | Applicant | | | Engr | |
|--|-------------------------------------|----|--------------------------------|------|----|
| | I | NA | Explanation / Location in Plan | I | NA |
| Tab 1. General Information | | | | | |
| 1.1 CD of drainage plan, including preliminary Master Grading Plan, preliminary plat, and proposed plat, in PDF format and one half-size paper copy bound with this checklist included behind the cover to Storm Water Management by Thursday at 4 PM two weeks prior to the subdivision committee hearing on the final plat | <input checked="" type="checkbox"/> | | | | |
| 1.2 Professional Engineer seal, signature and date on cover of report | <input checked="" type="checkbox"/> | | | | |
| 1.3 Site location map, using color ortho photo with project boundaries | <input checked="" type="checkbox"/> | | | | |
| 1.4 North arrow and scale on site location map | <input checked="" type="checkbox"/> | | | | |
| 1.5 Discussion of development, existing conditions, and proposed impacts on storm water, wetlands, riparian zones, and floodplain | <input checked="" type="checkbox"/> | | | | |
| 1.6 Discussion of offsite conditions | <input checked="" type="checkbox"/> | | | | |
| 1.7 Summary table of runoff calculations (pre/post development); no increase in peak discharge for all storm series | <input checked="" type="checkbox"/> | | | | |
| 1.8 Narrative description of the type and function of the permanent structural storm water management facilities | <input checked="" type="checkbox"/> | | | | |

| Report Format and Content | Applicant | | | Engr | |
|--|-------------------------------------|-------------------------------------|--------------------------------|------|----|
| | I | NA | Explanation / Location in Plan | I | NA |
| Tab 2. Existing Conditions Hydrologic Analysis | | | | | |
| 2.1 Existing Conditions Drainage Map | | | | | |
| 2.1.1 Drainage map shows existing onsite and offsite topography; one foot contours required with spot elevations (NAVD 88 datum); onsite and offsite drainage delineated by modifying the Wichita/Sedgwick County LIDAR/hydrogeodatabase | <input checked="" type="checkbox"/> | | | | |
| 2.1.2 Map shows existing streams, creeks, and waterways (perennial and intermittent), with names labeled and flow directions indicated by arrows | | <input checked="" type="checkbox"/> | None on site | | |
| 2.1.3 Map shows location and boundaries of natural features such as wetlands, lakes and ponds with the normal water elevation noted, rock outcroppings, wooded areas and tree rows | <input checked="" type="checkbox"/> | | | | |

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|---|---|---|---------------------------------|--|--|
| 2.1.4 Map shows location of existing conveyance systems such as storm drains, inlets, catch basins, open channels, swales, and areas of overland flow, with flow directions indicated by arrows | X | | | | |
| 2.1.5 Map shows existing structural elevations (e.g., pipes, manholes, etc.), and pipe materials and sizes | X | | | | |
| 2.1.6 Map shows location, dimensions and elevations of existing bridges or culvert crossings | X | | | | |
| 2.1.7 Map shows location of existing utilities (e.g., water, sewer, gas, electric, etc.) with labels and easements | | X | All public utilities are in ROW | | |
| 2.1.8 Map shows ground water elevations, if applicable | X | | | | |
| 2.1.9 Map shows delineation of predominant soils based on USDA soil surveys and/or onsite soil borings; indicate NRCS soil name and Hydrologic Soil Group (HSG) for undisturbed surface soils | X | | | | |
| 2.1.10 Map shows existing land-use and cover per NRCS nomenclature | X | | | | |
| 2.1.11 Map shows delineation of subareas (subbasins) for drainage calculations (subarea boundaries, subarea areas, impervious areas) | X | | | | |
| 2.1.12 Map notes existing site footprint area and existing total impervious area (acres) | X | | | | |
| 2.1.13 Map shows existing conditions time of concentration flow paths (segments; segment lengths, slopes, roughness parameters, and geometric properties if applicable) for each subarea | X | | | | |
| 2.2 Existing Conditions Hydrology and Hydraulics Analysis and Results | | | | | |
| 2.2.1 Discuss hydrologic analysis methodology used (e.g., unit hydrograph or other approved methods) | X | | | | |
| 2.2.2 Provide table of existing subarea areas | X | | | | |
| 2.2.3 Provide table of pre-developed runoff curve numbers with supporting calculations | X | | | | |
| 2.2.4 Provide table of existing times of concentration with supporting calculations | X | | | | |
| 2.2.5 Provide reference to source rainfall data used in the analysis, and a summary table of rainfall data | X | | | | |
| 2.2.6 Provide cross-sections and other diagrams of existing open channels and other hydraulic features as required to illustrate basis for analysis | | X | No channels exist on site | | |
| 2.2.7 Provide existing conditions hydrologic and hydraulic analysis for runoff rates, volumes and velocities, showing assumptions and other support information not already cited in this checklist, including detailed calculations (2, 5, 10, 25 & 100 year, 24-hour storm events); present results in table form; provide copies of any computer files and models used on CD | X | | | | |

| Report Format and Content | Applicant | | | Engr | |
|---|-----------|----|--------------------------------|------|----|
| Tab 3. Post-Development Hydrologic Analysis | I | NA | Explanation / Location in Plan | | NA |
| 3.1 Post-Development Drainage Map (portion of existing conditions drainage map covering project site area revised to show items indicated below) | | | | | |
| 3.1.1 General Features on Map | | | | | |
| 3.1.1.1 Map shows preliminary onsite post-development contours (NAVD 88 datum) and project boundary | X | | | | |

Drainage Plan Submittal Checklist



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|--|---|---|--|--|--|
| 3.1.1.2 Map shows any existing onsite features (e.g., structures and channels) noted in Tab 2 that are to remain after development | X | | | | |
| 3.1.1.3 Map shows location of proposed roads, buildings, parking lots and other impervious areas | X | | | | |
| 3.1.1.4 Map shows location of proposed utilities (e.g., water and sewer) and easements | | X | Will be determined during Final Design | | |
| 3.1.1.5 Map shows offsite through-drainage confined to an easement, dedication, and/or reserve | | X | No offsite drainage | | |
| 3.1.1.6 Map shows delineation of predominant soil HSGs based on anticipated soil textures and NRCS guidelines if post-development soil characteristics will be different from existing soil characteristics | | X | No change in soils | | |
| 3.1.1.7 Map shows post-development land-use and cover per NRCS nomenclature | X | | | | |
| 3.1.1.8 Map shows delineation of subareas (subbasins) for onsite drainage calculations (subarea boundaries, subarea areas, impervious areas and curve numbers) | X | | | | |
| 3.1.1.9 Map shows proposed limits of clearing and grading | X | | | | |
| 3.1.1.10 Map shows post-development time of concentration flow paths (segments, Tc, segment lengths, slopes, roughness parameters, and geometric properties if applicable) for each project site subarea | X | | | | |
| 3.1.2 Locations of Proposed Conveyances and BMPs | | | | | |
| 3.1.2.1 Map shows location of proposed conveyance systems (including backyard drainage) such as storm drains, inlets, catch basins, open channels, swales, and areas of overland flow, with flow directions indicated by arrows | X | | | | |
| 3.1.2.2 Map shows proposed structural elevations (e.g., pipes, manholes, etc.), and pipe materials and sizes | X | | | | |
| 3.1.2.3 For any drainage area of 40 acres or more (either onsite or offsite through drainage), map shows the flow confined to an open channel with required side benches and freeboard, or if partially enclosed conforms to applicable policy and design criteria | | X | None over 40 acres | | |
| 3.1.2.4 Map shows locations of storm water management facilities and 20' wide maintenance access easements | X | | Access from Taxway | | |
| 3.1.2.5 Map shows proposed energy dissipator and channel protection locations | X | | | | |
| 3.1.2.6 Map shows location and dimensions of proposed channel, bridge or culvert crossing modifications | X | | | | |
| 3.1.2.7 Map shows 100-year pool elevation and normal pool elevation for ponds (see section 3.2) | | X | No Pond Proposed | | |
| 3.1.2.8 Map shows permanent concrete outfall control structure for ponds | | X | " | | |
| 3.1.2.9 Map shows emergency overflow and top of berm elevation for ponds | | X | " | | |
| 3.1.2.10 Map shows all floodplains, ponds and storm water management facilities in reserves | | X | " | | |
| 3.2 Post-Development Conditions Hydrology and Hydraulics Analysis and Results | | | | | |
| 3.2.1 Discuss hydrologic analysis methodology used (e.g., unit hydrograph or other approved methods) | X | | | | |
| 3.2.2 Provide table of existing onsite subarea areas | X | | | | |

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|--|---|---|----------------------|--|--|
| 3.2.3 Provide table of post-development runoff curve numbers with supporting calculations | X | | | | |
| 3.2.4 Provide table of onsite post-development time of concentrations with supporting calculations | X | | | | |
| 3.2.5 Provide cross-sections and other diagrams of proposed open channels and other hydraulic features as required to illustrate basis for analysis | X | | | | |
| 3.2.6 Provide post-development conditions hydrologic and hydraulic analysis for runoff rates, volumes and velocities, showing assumptions and other support information not already cited in this checklist, including detailed calculations (2, 5, 10, 25 & 100 year, 24-hour storm events). For off-line projects, or on-line projects where project drainage area exceeds 10% of total on-line drainage area, calculations cover the site and extend downstream to a point where the proposed project site drainage area is equal to or less than 10% of the total drainage area at that point. In addition, for on-line projects analysis is extended downstream far enough to ensure no increase in peak flow rates. Present results in table form for all conveyances and structures; provide copies of any computer models used on CD | X | | | | |
| 3.2.7 For ponds, provide stage-storage-discharge or outlet rating curves and inflow-outflow hydrographs | | X | No Pond proposed | | |
| 3.2.8 For ponds, demonstrate that the pond contours on the master grading plan and the stage-storage data are consistent | | X | " | | |
| 3.2.9 For ponds, provide one foot of freeboard above the 100-year, 24-hour HWL | | X | " | | |
| 3.2.11 Demonstrate that flows discharged from the project site are discharged in the same manner as before development, using level spreaders, other devices, or grading as required, or identify an appropriate flowage easement | X | | | | |
| 3.3 Storm Water Control Sizing | | | | | |
| 3.3.1 Based on flows determined from the hydrology and hydraulics analysis, provide hydraulic sizing calculations for storm water controls | X | | | | |
| 3.3.2 Present, in table form, sizes, elevations, flows, velocities, and depths for each control, as applicable; verify that velocities are self-cleaning and non-erosive | X | | | | |
| 3.3.3 Provide typical details (including cross-sections where applicable) for outlet structures, embankments, spillways, grade control structures, conveyance channels, inlets, etc. | X | | | | |
| 3.4 Storm Water Management Facilities | | | | | |
| 3.4.1 For each storm water management facility, in table form, describe facility, its TSS removal efficiency, total contributing drainage area, total contributing impervious area | X | | | | |
| 3.4.2 Provide 20' wide maintenance access for each facility | X | | Access from Trailway | | |
| 3.4.3 Maintenance responsibility of facilities specified in the plat text. (i.e., Home Owners Association, Lot Owners Association, or lot owner) | | X | Not shown on Plat | | |
| 3.4.4 Water quality protection volume calculations | X | | | | |
| 3.4.5 Channel protection volume calculations | X | | | | |
| 3.4.6 Water quality TSS removal calculations showing TSS removal for the site equals or exceeds 80%. | X | | | | |

Drainage Plan Submittal Checklist



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|---|---|--|--|--|--|
| 3.4.8 Water quality and channel protection volume orifice size calculations | X | | | | |
| 3.4.9 Other calculations required for each facility as specified in the Storm Water Technical Guidance Manual | X | | | | |
| 3.4.10 Plans and typical details for each facility | X | | | | |

| Report Format and Content | Applicant | | | Engr | |
|--|-----------|----|--------------------------------|------|----|
| Tab 4. Floodplain Submittal | I | NA | Explanation / Location in Plan | I | NA |
| 4.1 Provide source of flood profile, floodplain, floodway, and discharges information | X | | | | |
| 4.2 Delineation of nearest base flood elevations | | X | | | |
| 4.3 Delineation of pre-developed regulatory floodplain/floodway limits using FEMA's current GIS database; limits to be per elevation and scaled location | | X | | | |
| 4.4 Delineation of post-developed regulatory floodplain and floodway limits; limits to be per elevation and scaled location, with project limits shown | | X | | | |
| 4.5 Provide floodway data table and discharges | | X | | | |
| 4.6 Provide all hydrologic and hydraulic study information for local floodplain studies, unnumbered Zone A elevation determinations and floodplain map revisions or required permits | | X | | | |
| 4.7 Provide regulatory floodway and four natural profile models (10, 50, 100, and 500-yr) for existing and future watershed conditions | | X | | | |
| 4.8 Floodplains and floodways located within a reserve, where necessary | | X | | | |
| 4.9 Floodplain cut and fill calculations for storage sensitive basins | | X | | | |
| 4.10 Demonstrate that floodway elevations and velocities do not increase due to construction in a floodway ("No Rise Certification") | | X | | | |

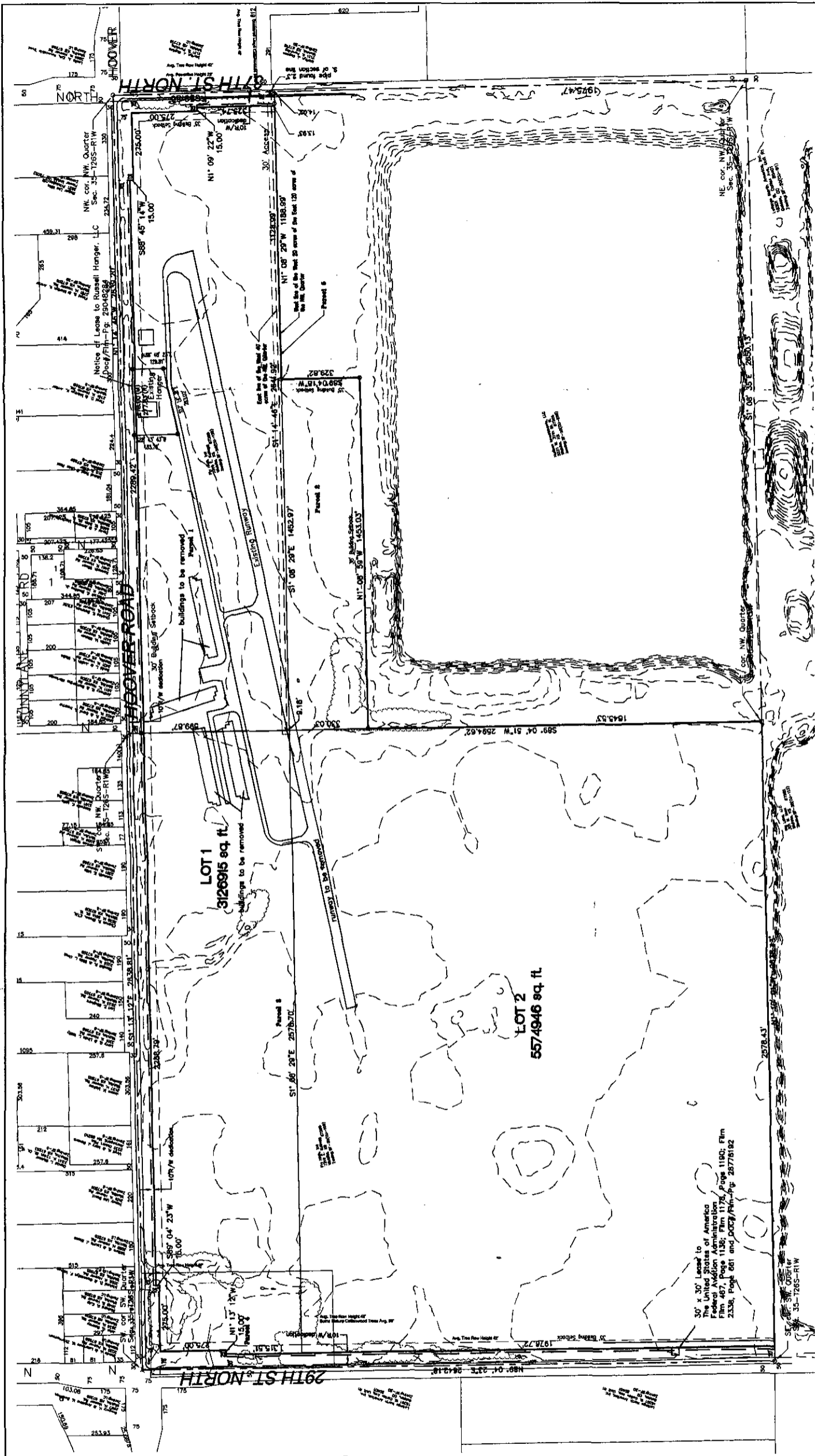
| Report Format and Content | Applicant | | | Engr | |
|---|-----------|----|--------------------------------|------|----|
| Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified) | I/R | NA | Explanation / Location in Plan | I/R | NA |
| 5.1 US Army Corps of Engineers – regulatory program permits (Section 404 permit) | R | | | | |
| 5.2 Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam Safety permit, etc.) | | X | | | |
| 5.3 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 | | | |

| Report Format and Content | Applicant | | | Engr | |
|--|-----------|----|--------------------------------|------|----|
| Tab 6. Half-Scale Preliminary Master Grading Plan | I | NA | Explanation / Location in Plan | I | NA |
| One set of plans and a PDF shall be submitted to Storm Water Management. The final approved plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans.) | X | | | | |
| 6.1 Signed and sealed by Professional Engineer | | X | | | |
| 6.2 Title block, includes subdivision name and phase | X | | | | |
| 6.3 Cross hatch out future phases as information only | | X | | | |
| 6.4 Dated revision documentation above title block | X | | | | |
| 6.5 Scale not greater than 1 inch = 60 feet | | X | | | |
| 6.6 North arrow | X | | | | |

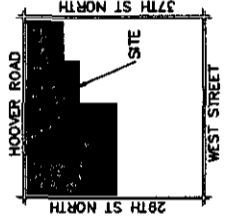
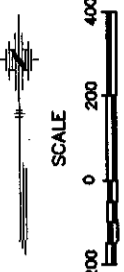
Drainage Plan Submittal Checklist



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|--|---|---|------------------------------|--|
| 6.7 Index or legend key | x | | | |
| 6.8 Benchmarks (minimum of two) used for site control (NAVD 88 vertical datum) | x | | | |
| 6.9 Existing contours of entire site, with contour interval of one foot | x | | | |
| 6.10 Proposed contours for channels, ponds, and other permanent storm water management facilities (including ponds), with contour interval of one foot | x | | | |
| 6.11 Spot elevations shown to nearest tenth of a foot for critical locations | x | / | | |
| 6.12 Proposed street and lot layout | | x | | |
| 6.13 Underground storm drain locations | | x | | |
| 6.14 Overflow locations for storms exceeding storm drain capacity | | x | | |
| 6.15 Top elevations of storm drains at all inlets, manholes, and flow line elevations for all outfalls | | x | | |
| 6.16 Locations of open ditches and lakes | x | | | |
| 6.17 Flow direction arrows | | x | | |
| 6.18 Proposed flow line elevations of all open ditches at maximum 100 feet intervals, and 100 year flood elevations thereon | x | | | |
| 6.19 Ponds: pond bottom elevation | | x | | |
| 6.20 Ponds: normal pool elevation | | x | | |
| 6.21 Ponds: 100 year flood elevation | | x | | |
| 6.22 Ponds: emergency overflow elevation | | x | | |
| 6.23 Proposed top-of-curb elevations at points where drainage will be required to flow over the curb | | x | | |
| 6.24 Platted minimum building opening elevation for each lot, in table form for all lots (excluding basement floor elevations) | | x | | |
| 6.25 Standard foundation and elevation detail for slab on grade, full basement, view-out, partial view-out and/or walk-out construction | | x | | |
| 6.26 Each lot: Top of foundation elevation | | x | | |
| 6.27 Each lot: Notation for builders as to the type of structure that may be constructed and the view-out, walk-out or pad elevation as applicable | | x | | |
| 6.28 All lots above 100-year flood elevation | | x | Zone x - Protected by levee. | |
| 6.29 Grading around structures conforms to perimeter drainage requirements | | x | | |
| 6.30 Backyard drainage conforms to backyard drainage requirements | | x | | |
| 6.31 Adjacent subdivision lot lines, with lot labels and subdivision names | | x | | |
| 6.32 All easements, right-of-ways and reserves shown | x | | | |
| 6.33 Statement on proposed final plat: "A drainage plan has been developed for the subdivision and all drainage easements, right-of-ways, or reserves shall remain at the established grades and unobstructed to allow for the conveyance of storm water." Note that the final Master Grading Plan must have a statement that certifies the plan complies with the approved Final Drainage Plan, or if not, an addendum to the Drainage Plan is included with the final Master Grading Plan. | | x | | |



- LEGEND**
- Bar & Baughman cap found
 - 3/4" Iron pipe cap found
 - △ Bar & Garber cap found
 - × not used
 - 1/2" bar found
 - Stone found
 - (M) Measured dimension
 - (R) Record or Deed dimension



PRELIMINARY PLAT OF RIVERSIDE AIRPORT ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

95671071

DATE OF PREPARATION 02/24/2011

Legal description of tract surveyed. Title Commitment No. 2011990 provided by First American Title Insurance Company dated August 16, 2010, at 7:30 a.m.

Parcel 1:
The West 40 acres of the Northwest Quarter of Section 35, Township 26 South, Range 1 West of the Sixth Principal Meridian, Sedgwick County, Kansas, EXCEPT, beginning at the Northwest corner of Section 35, Township 26 South, Range 1 West, thence East 75 feet, thence South 350 feet, thence West 25 feet, thence South to a point 350 feet North and 50 feet East of the Southwest corner of said Section 35, thence East 25 feet, thence South to the South line of said Section 35, thence West to the West line of said Section 35, thence North along said West line to the point of beginning. AND EXCEPT, beginning at the Northwest corner of Section 35, Township 26 South, Range 1 West, thence South 75 feet, thence East 350 feet, thence North 30 feet, thence West to the point of beginning. Parcel 1 as described contains 35,940 acres, more or less.

Parcel 2:
The South 11 acres of the West 20 acres of the East 120 acres of the Northwest Quarter of Section 35, Township 26 South, Range 1 West of the Sixth Principal Meridian, Sedgwick County, Kansas. Parcel 2 as described contains 11,005 acres, more or less.

Parcel 3:
The Southwest Quarter of Section 35, Township 26 South, Range 1 West of the Sixth Principal Meridian, Sedgwick County, Kansas EXCEPT, the South 400.00 feet of the West 800.00 feet thereof, AND EXCEPT, beginning at the Southwest corner of Section 35, Township 26 South, Range 1 West, thence North 75 feet, thence East 350 feet, thence South 25 feet, thence East to the East line of the West Half of said Section 35, thence South 50 feet, thence West to the point of beginning, AND EXCEPT, that part lying within the following, beginning at the Northwest corner of Section 35, thence East 75 feet, thence South 350 feet, thence West 25 feet, thence South to a point 350 feet North and 30 feet East of the Southwest corner of said Section 35, thence South to the South line of said Section 35, thence East to the East line of said Section 35, thence West to the West line of said Section 35, thence North along said West line to the point of beginning. Parcel 3 as described contains 148,090 acres, more or less.

Parcel 4:
The South 400.00 feet of the West 800.00 feet of the Southwest Quarter of Section 35, Township 26 South, Range 1 West of the Sixth Principal Meridian, Sedgwick County, Kansas, EXCEPT, beginning at the Southwest corner of Section 35, Township 26 South, Range 1 West, thence North 75 feet, thence East 350 feet, thence South 25 feet, thence East to the East line of the West Half of said Section 35, thence South 50 feet, thence West to the point of beginning, AND EXCEPT, that part lying within the following, beginning at the Northwest corner of Section 35, Township 26 South, Range 1 West, thence East 75 feet, thence South 350 feet, thence West 25 feet, thence South to a point 350 feet North and 30 feet East of the Southwest corner of said Section 35, thence South to the South line of said Section 35, thence East to the East line of said Section 35, thence West to the West line of said Section 35, thence North along said West line to the point of beginning. Parcel 4 as described contains 5,686 acres, more or less.

Parcel 5:
All that land lying between the West 40 acres and the East 100 acres of the Northwest Quarter of Section 35, Township 26 South, Range 1 West of the 6th P.M., Sedgwick County, Kansas, EXCEPT, the West 20 acres of the East 120 acres of said Northwest Quarter. Parcel 5 as described contains 0,703 acres, more or less.

OWNER
SARVEYOR
William P. Fox
Poe & Associates, Inc.
5940 E. Central Suite 200
Wichita, Kansas 67208
316-685-4114

PROPERTY OWNER/DEVELOPER
Fly High, Inc.
7310 E. Kellogg
Wichita, Kansas 67205

NOTES:
The basis of bearings for this survey are Grid Bearings based on the Kansas State Plane Coordinate system, NAD 83, Kansas South Zone.

Bench Mark #1 Southwest corner of concrete slab at South side of metal building at 3396 North Hoover, 1333.18 NAVD08.
Bench Mark #2 City of Wichita Bench Mark disk at Southwest corner of 28th North & Hoover Road, 27. South of centerline 28th North and 48.5' West of centerline Hoover Road. 1330.60 NAVD08.

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
960 E. Central Suite 200
Wichita, Kansas 67208
Phone 316-685-4114 Fax 316-685-4114



STATE OF KANSAS)
COUNTY OF SEDGWICK)

William P. Fox, being a duly licensed Land Surveyor in said County and State, do hereby certify that I have been in responsible charge of surveying and platting "RIVERSIDE AIRPORT ADDITION" to Wichita, Sedgwick County, Kansas, being described as follows:

A Tract of land in the West Half of Section 35, Township 26 South, Range 1 West of the Sixth Principal Meridian, Sedgwick County, Kansas, described as follows:
Commencing at the Southwest Corner of the Southwest Quarter of said Section; Thence along the West line of said section on an assumed bearing of N07°31'21" W for a distance of 75 feet; Thence N89°04'23" E for a distance of 75 feet to a point of Beginning, said point being 75 feet North and 75 feet East of the Southwest Corner of the Southwest Quarter of said Section; Thence N07°31'21" W for a distance of 275 feet; Thence S89°04'23" W for a distance of 25 feet to a point, said point being 50 feet East and 350 feet North of the Southwest Corner of the Southwest Quarter of said Section; Thence N07°31'21" W for a distance of 2,288.80 feet to a point, 50 feet East of the Northwest Corner of the Southwest Quarter; Thence N07°44'46" W for a distance of 2,280.85 feet to a point, said point being 50 feet East and 350 feet South of the Northwest Corner of the Southwest Quarter of said Section; Thence N89°04'23" E for a distance of 25 feet to a point, said point being 75 feet East and 350 feet South of the Northwest Corner of the Southwest Quarter of said Section; Thence N07°44'46" W for a distance of 275 feet to a point, said point being 75 feet West and 75 feet South of the Northwest Corner of the Southwest Quarter of said Section; Thence N89°04'23" E for a distance of 275 feet; Thence N07°31'21" W for a distance of 275 feet to a point, said point being 150 feet East and 50 feet South of the Northwest Corner of the Southwest Quarter of said Section; Thence N89°04'23" E for a distance of 323.75 feet to a point on the West line of the West 50 Acres of the East 120 Acres of said Northwest Quarter; Thence S07°00'29" E for a distance of 1,128.89 feet; Thence N89°04'23" E for a distance of 328.82 feet; Thence S07°00'29" E for a distance of 1,453.03 feet; Thence N89°04'23" E for a distance of 2,645.53 feet to the Southwest Corner of said Northwest Quarter; Thence S07°00'29" E for a distance of 2,388.43 feet to a point, said point being 50 feet North of the Southwest corner of the Southwest Quarter of said Section; Thence S89°04'23" W for a distance of 2,292.27 feet; Thence N07°31'21" W for a distance of 25 feet to a point, said point being 75 feet North and 350 feet East of the Southwest Corner of the Southwest Quarter of said Section; Thence S89°04'23" W for a distance of 275 feet to the Point of Beginning. Existing public easements are hereby recorded to conform to this plat by virtue of L.S.A. 12-1121(a). The accompanying plat is a true and correct exhibit of property surveyed and platted by me on this day of March, 2011.



William P. Fox, L.S. 790
Fox and Associates, Inc.



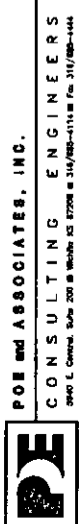
POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
2000 W. 11th St., Suite 100
Wichita, Kansas 67203
Phone: 316-261-1111

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned, have caused the land described in the Surveyor's Certificate to be platted into a Lot and a Block. Easements are hereby granted as indicated for the construction and maintenance of drainage & utilities. A drainage plan has been developed for this addition. All drainage easements shall remain or established grades or as modified with the approval of the applicable City or County Engineer, and remain undisturbed to allow for the convenience of stormwater. All egress rights of access to or from 37th Street North, Hoover Road and 29th Street North as indicated on the plat map are hereby granted to the appropriate governing body.

Fly High, Inc.

Print Name: _____
Title: _____



POE and ASSOCIATES, INC.
CONSULTING ENGINEERS
2000 W. 11th St., Suite 100
Wichita, Kansas 67203
Phone: 316-261-1111

State of Kansas) ss
Sedgwick County)

This report of "SOUTHFOK ADDITION", Wichita, Sedgwick County, Kansas has been submitted to and approved by the Wichita/Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this _____ day of _____, 2011.
Wichita/Sedgwick County Metropolitan Area Planning Commission.

Debra Miller-Stevens, Chair

John L. Schlegel, Secretary

State of Kansas) ss
City of Wichita) ss

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas this _____ day of _____, 2011. At the Direction of the City Council.

Carl Brewer, Mayor

Karen Sublett, City Clerk

Entered on transfer record this _____ day of _____, 2011.

Kathy B. Arnold, County Clerk

State of Kansas) ss
Sedgwick County)

This is to certify that this instrument was filed for record in the Register of Deeds office of _____, _____, Mo., on the _____ day of _____, 2011, and is duly recorded.

Bill Meek, Register of Deeds

Tanya Buckingham, Deputy

State of Kansas) ss
Sedgwick County)

Reviewed in accordance with K.S.A. 58-2005 on this _____ day of _____, 2011.

Traci L. Roberts, L.S. # 1246
Deputy County Surveyor
Sedgwick County, Kansas

FINAL PLAT OF RIVERSIDE AIRPORT ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

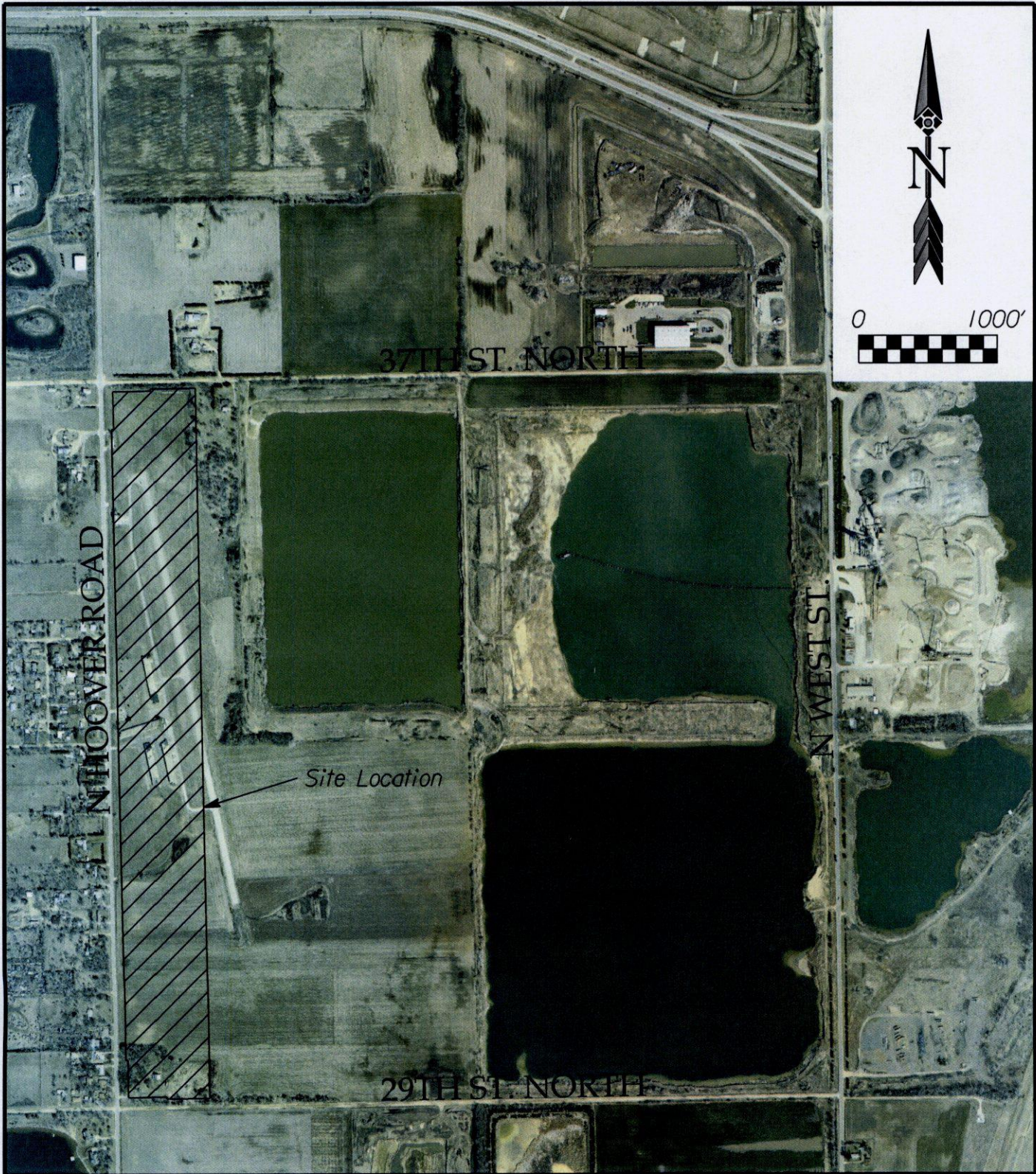
DATE OF PREPARATION 03/04/2011

SHEET 2 OF 2



General Information

Y:\2011\563_Poe_Riverside Airport\Drainage\Sheets\563_Site Location Map.dgn



12469 SW 15th Street Benton, KS 67017
 Ph: (316) 778-2215 Fax: (316) 778-1204

RIVERSIDE AIRPORT
 SITE LOCATION MAP
 PHASE I RUNWAY EXPANSION

SEDGWICK COUNTY, KANSAS

Client:



POE & ASSOCIATES OF KANSAS, INC.
 CONSULTING ENGINEERS
 5940 E. Central, Suite 200 Wichita, KS 67208-4242
 Phone 316/685-4114 FAX 316/685-4444

Drawing No.

1

Project No.

563-11

RIVERSIDE AIRPORT ADDITION DRAINAGE PLAN

GENERAL

The Riverside Airport Addition is a 72 acre commercial subdivision located along the east side of N Hoover Road between W 29th Street N and W 37th Street N within Sedgwick County, Ks. The site lies on the west half of Section 35, Township 26, Range 1 West of the Sixth Principal Meridian. The development of this property will have no impact on storm water runoff, as all post-development storm water runoff will be less than existing storm water runoff.

The Rational Method was used to calculate runoff for both pre and post development conditions. The runoff coefficients and rainfall intensities used were obtained from the City of Wichita Storm Water Manual (COWSWM) Volume 2. All flow paths for existing and proposed conditions were assumed to be shallow concentrated flow. The velocity of these flow paths was calculated using equation 4-6 found in the COWSWM Volume 2. See the "Existing and Proposed Conditions" sections for more detailed information on the basin runoff calculations.

The Total Suspended Solids (TSS) treatment facilities that will be utilized on this site are a Vegetative Filter Strip, a Grassed Channel, and an Enhanced Dry Swale. A Vegetative Filter Strip is a uniformly graded and well vegetated section of land which removes pollutants through vegetative filtering and infiltration. A Grassed Channel is a vegetated open channel that treats storm water runoff through means of infiltration. The last facility, an Enhanced Dry Swale is a vegetated open channel that treats storm water runoff through means of infiltration through a filter bed with an underdrain system. Check dams were added within the Grass Lined Channel to insure that the detention of the Water Quality Protection Volume was sufficient and that flow velocities were non-erosive.

The Riverside Airport Addition is being platted into one commercial lot. Due to the nature of this type of development, determining the locations of site features such as buildings, paving, landscaping, and storm sewer, is difficult at this point in the development process. Therefore, we have only made assumptions as to the percent of impervious area and proposed slopes. Final design will address these items in detail.

Any time grading work is to be performed on this property, Best Management Practices (BMPs) shall be used to help protect from erosion. Silt fence, ditch checks, inlet protections, construction entrances and back of curb protection are among the BMPs to be used.

EXISTING CONDITIONS

The southern half of the property is farmland with a wooded area along the southern edge bordering 29th Street N. The northern half is primarily short grass with an existing runway, hangars, and taxiway. There is also a wooded area on the northern edge of the property bordering 37th Street N and along the eastern portion of the site adjacent to the sand pit. The site contains primarily Pratt loamy fine sand type soil, which is a Hydrologic Soil Group (HSG) A soil. The south eastern portion of the property contains Carwile fine sandy loam type soil, HSG D, and Canadian fine sandy loam, HSG B. The NRCS Soil Survey indicates that the groundwater table for the majority of the site is at a depth > 6.5' and the Saturated Hydraulic Conductivity is 26.1 ft/day. The location of the soils on the site can be seen on the Existing Conditions Drainage Map found in Tab 2 - "Existing Conditions" section of this report and information on the groundwater level can be found in the same section.

Much of this part of the county has slightly rolling terrain with no definable drainage pattern. The soil conditions and rolling terrain allows for shallow ponding where storm water infiltrates and evaporates rather than flows overland. With this in mind, we separated the site into four existing basins.

The southern basin, Basin A, drains eastward, where it ponds just off of the proposed property. It contains 1.5 acres of commercial developed land and 28.7 acres of vacant agricultural land.

Basin B drains to the west, entering the existing ditch along the east side of N Hoover Road. Basin B consists of 4.1 acres of commercial developed area and 9.5 acres of vacant agricultural land or short grass.

Basin C, drains to the east and is collected in an existing sand pit, which is located roughly 400' from the eastern property line of the site. It contains 1.1 acres of commercial developed area and 16.6 acres of vacant agricultural land or short grass.

Basin D lies between the existing runway and taxiway which has no outfall. Water in this area evaporates or infiltrates. Included in this basin are 2.2 acres of commercial developed area and 8.2 acres of short grass.

It was found that no storm water runoff enters the site from off of the property. The Existing Conditions Drainage Map in Tab 2 - "Existing Conditions" section of this report has additional information about the existing conditions.

The entirety of the property lies within a FEMA defined Zone X according to the February 2, 2007 flood map, this is because the site is protected by a levee. A copy of the FIRMette is attached in Tab 5 - "Permits" section of this report.

PROPOSED CONDITIONS

The proposed site contains four basins; Basin 1, Basin 2, Basin 3, and Basin 4. Basin 1 compares to Existing Basin A because both drain toward the eastern property line and after leaving the property, storm water ponds in both cases. Basin 2 compares to Existing Basin B because in both cases storm water is collected in the ditch along N. Hoover Road. Basin 3 and Existing Basin C can be compared because both drain to the existing sand pit east of the property. The final basin, Basin 4, compares to Existing Basin D because in both existing and proposed conditions storm water remains on site.

Basin 1 consists of three sub-basins; 1A, 1B, and 1C. Basin 1 drains to the east where storm water ponds just outside of the property line. Basin 1A is located at the intersection of 29th Street N. and N. Hoover Road. The flow path of storm water runoff from Basin 1A begins on the western side of the basin and travels east where it leaves the site. Basin 1A contains approximately 4.0 acres of undisturbed agricultural land or short grass. Basin 1B is located on the southern portion of the property and east of the proposed runway. Storm water drains south across the basin and leaves to the east. Basin 1B contains approximately 10.2 acres of undisturbed agricultural land or short grass. Basin 1C is located directly north of Basin 1B. Storm water drains south along the proposed runway and leaves the basin on the east. Basin 1C contains approximately 5.7 acres of undisturbed agricultural land or short grass.

Basin 2 consists of five sub-basins; 2A, 2B, 2C, 2D, and 2E. All five sub-basins drain to the west where storm water is collected in an existing ditch along N. Hoover Road. Basin 2A is the proposed entrance off of N. Hoover Road. Storm water drains south along the west curb and gutter and leaves the basin through the southern entrance. Basin 2A consists of approximately 0.2 acres of developed commercial area. Basin 2B is located north of the N. Hoover Road entrance. Water drains west across the basin from the proposed taxiway. It contains 1.1 acres of undisturbed agricultural land or short grass. Basin 2C is located north of Basin 2B. Water drains from the southwest portion of the basin toward the north and then leaves on the west. Basin 2C contains 3.2 acres of undisturbed agricultural land or short grass. Basin 2D is located north of Basin 2C. Storm water drains southwest from the proposed hangar entrance at the northern portion of Basin 2D. Basin 2D consists of 0.1 acres of developed commercial land and 2.3 acres of undisturbed agricultural land or short grass. The final basin, Basin 2E, is located north of Basin 2D. It drains south along the proposed taxiway and then west just north of the existing hangar. Basin 2E consists of 0.1 acres of developed commercial land and 2.2 acres of undisturbed agricultural land or short grass.

Basin 3 contains two sub-basins; 3A and 3B. Both sub-basins drain eastward and after leaving the property, drain into the existing sand pit located approximately 400' from the east property line. The flow path of Basin 3A begins at the northern portion of the proposed taxiway, flows north, and then southeast. Basin 3A consists of 6.2 acres of undisturbed agricultural land or short grass. Basin 3B drains northeast from the proposed runway. It consists of 6.6 acres of undisturbed agricultural land or short grass.

The final basin, Basin 4, is located between the proposed taxiway and proposed runway and includes the disturbed area south west of the taxiway. Runoff from both the taxiway and the runway are collected in this basin. Basin 4 consists of 8.4 acres of developed commercial area and 20.2 acres of enhanced swale and disturbed soil.

The Proposed Conditions Drainage Map in Tab 3 - "Proposed Conditions" section of this report has additional information about the proposed conditions.

To adequately treat storm water runoff, the three TSS removal facilities previously discussed were placed in series within the area between the proposed taxiway and runway. Storm water first passes through a Vegetative Filter Strip which has a TSS removal efficiency of 50%. Water then travels through a Grassed Channel which also has a TSS removal efficiency of 50%. Along the Grassed Channel are check dams which slow flow velocity. The Grassed Channel leads to an Enhanced Dry Swale which removes 90% of the TSS. At the end of the series is a pre-cast manhole with a grate which extends down to a pervious sand layer. The manhole will be backfilled with river gravel. Perforated underdrain runs the entire length of the Enhanced Swale and enters the manhole 30 inches from its top. The total TSS removal for the series was calculated to be 97.5%. The TSS removal calculation can be found in Tab 3 - "Post Development" section of this report. The NRCS Soil Survey indicates that the groundwater table for the area below the inlet is at a depth > 6.5'. Groundwater will not be contaminated because 97.5% TSS removal will occur before storm water enters the manhole.

SUMMARY

It has been determined that pre-development runoff for the site is greater than post-development runoff in every basin except Basin 4. All runoff for Basin 4 will be treated and escapes the site through infiltration. A comparison of pre-development vs. post-development runoff can be found in the table on the next page.

The Water Quality Protection Volume (WQv) for the entire site was calculated to be 1.51 acre-feet and the Channel Protection Volume (CPv) was calculated to be 0.25 acre-ft. To determine that the proposed Vegetative Filter Strip, Grassed Channel, and Enhanced Dry Swale would be sufficient for treating the WQv, the capacity of these structures was calculated. Calculations show their capacity is 5.05 acre-ft which is more than enough to treat the WQv. Because the TSS Facilities capacity is greater than the CPv, there is also sufficient channel protection. For more details on the WQv, CPv, TSS removal facilities sizing, and the TSS removal percentage, see the Tab 3 - "Post Development" section of this report.

Project: **Riverside Airport, Wichita, Ks**
 Date: 5/13/2011
 Prep. By: KLH

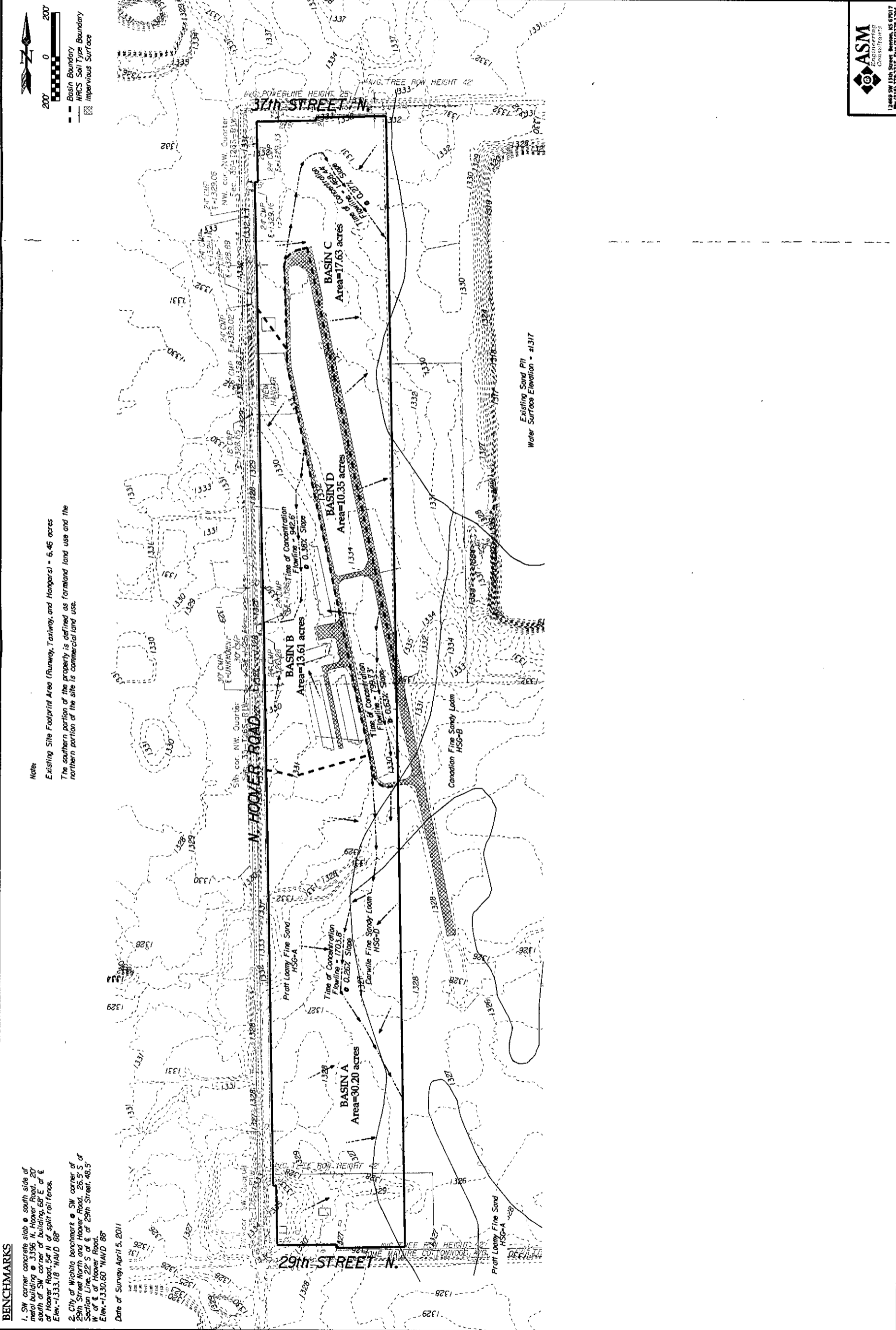
**PRE-DEVELOPMENT AND POST-DEVELOPMENT
 RUNOFF COMPARISON**

| BASIN | AREA (Acre) | Q₂ | Q₅ | Q₁₀ | Q₂₅ | Q₅₀ | Q₁₀₀ |
|--------------|--------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| A (E) | 30.20 | 4.49 | 6.50 | 10.31 | 14.23 | 19.65 | 24.76 |
| 1 (P) | 15.94 | 3.91 | 5.46 | 7.92 | 10.51 | 13.75 | 16.84 |
| Difference | | 0.58 | 1.04 | 2.39 | 3.72 | 5.90 | 7.92 |
| | | | | | | | |
| B (E) | 13.61 | 8.03 | 10.47 | 14.04 | 17.70 | 22.01 | 25.93 |
| 2 (P) | 9.15 | 3.27 | 4.30 | 6.60 | 9.04 | 12.24 | 15.10 |
| Difference | | 4.76 | 6.16 | 7.44 | 8.66 | 9.76 | 10.83 |
| | | | | | | | |
| C (E) | 17.63 | 3.14 | 4.44 | 6.91 | 9.55 | 12.98 | 16.24 |
| 3 (P) | 12.73 | 3.12 | 4.23 | 6.52 | 8.95 | 12.12 | 15.00 |
| Difference | | 0.02 | 0.21 | 0.39 | 0.60 | 0.86 | 1.24 |
| | | | | | | | |
| D (E) | 10.35 | 6.26 | 8.08 | 11.09 | 14.21 | 18.02 | 21.35 |
| 4 (P) | 30.59 | 7.00 | 10.01 | 13.43 | 16.93 | 21.38 | 25.54 |
| Difference | | N/A | N/A | N/A | N/A | N/A | N/A |

E=Existing Basin
 P=Proposed Basin

NOTE: All flowrates are in cubic feet per second (cfs)

Existing Conditions



Notes:
 Existing Site Footprint Area (Runway, Taxiway, and Hangars) = 6.46 acres
 The southern portion of the property is defined as farmland land use and the northern portion of the site is commercial land use.

BENCHMARKS
 1. SW corner concrete slab @ south side of metal building @ 3396 N. Hoover Road, 20' south of SW corner of building, 687' E. of E. of Hoover Road, 54' N. of split rail fence. Elev. -1333.18 "NAVD 88"
 2. City of Wichita benchmark @ SW corner of 29th Street North and Hoover Road, 26.5' S. of section line, 22.5' E. of E. of 29th Street, 40.5' W. of E. of Hoover Road. Elev. -1330.60 "NAVD 88"
 Date of Survey: April 5, 2011

Project: **Riverside Airport, Wichita, Ks**
Date: 5/13/2011
Prep. By: KLH

PRE-DEVELOPMENT RUNOFF SUMMARY

| PRE-DEVELOPMENT RUNOFF | | | | | | | |
|-------------------------------|--------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| BASIN | AREA (Acre) | Q₂ | Q₅ | Q₁₀ | Q₂₅ | Q₅₀ | Q₁₀₀ |
| A | 30.20 | 4.49 | 6.50 | 10.31 | 14.23 | 19.65 | 24.76 |
| B | 13.61 | 8.03 | 10.47 | 14.04 | 17.70 | 22.01 | 25.93 |
| C | 17.63 | 3.14 | 4.44 | 6.91 | 9.55 | 12.98 | 16.24 |
| D | 10.35 | 6.26 | 8.08 | 11.09 | 14.21 | 18.02 | 21.35 |
| Total | 71.79 | N/A | N/A | N/A | N/A | N/A | N/A |

NOTE: All flowrates are in cubic feet per second (cfs)

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN A

Total Area 30.20 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total |
|------------|------------------------|------------------------|------------------------|------------------------|-------|
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 30.20 | 0.00 | 0.00 | 0.00 | 30.20 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Existing | 5% | 0% | 0% | 0% | 0% | 95% |
| Acres | 1.51 | 0.00 | 0.00 | 0.00 | 0.00 | 28.69 |

Length of Flow
 Slope
 Waterflow Desc
 Avg Velocity
 Tc

Existing
 1703.8 ft
 0.26 %
 bare / short grass
 0.36 ft/sec
 1.31 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Existing Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (In/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.11 | 1.37 | 30.20 | 4.49 |
| 5 | 0.12 | 1.80 | 30.20 | 6.50 |
| 10 | 0.16 | 2.14 | 30.20 | 10.31 |
| 25 | 0.19 | 2.50 | 30.20 | 14.23 |
| 50 | 0.23 | 2.86 | 30.20 | 19.65 |
| 100 | 0.26 | 3.19 | 30.20 | 24.76 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: K LH

Manual Input

BASIN B

Total Area 13.61 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total |
|------------|------------------------|------------------------|------------------------|------------------------|-------|
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 13.61 | 0.00 | 0.00 | 0.00 | 13.61 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Existing | 30% | 0% | 0% | 0% | 0% | 70% |
| Acres | 4.08 | 0.00 | 0.00 | 0.00 | 0.00 | 9.53 |

Length of Flow Existing 942.63 ft
 Slope 0.38 %
 Waterflow Desc bare / short grass
 Avg Velocity 0.43 ft/sec
 Tc 0.61 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Existing Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.25 | 2.35 | 13.61 | 8.03 |
| 5 | 0.27 | 2.88 | 13.61 | 10.47 |
| 10 | 0.31 | 3.36 | 13.61 | 14.04 |
| 25 | 0.33 | 3.93 | 13.61 | 17.70 |
| 50 | 0.37 | 4.43 | 13.61 | 22.01 |
| 100 | 0.39 | 4.86 | 13.61 | 25.93 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN C

Total Area 17.63 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total |
|------------|------------------------|------------------------|------------------------|------------------------|-------|
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 17.63 | 0.00 | 0.00 | 0.00 | 17.63 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Existing | 6% | 0% | 0% | 0% | 0% | 94% |
| Acres | 1.06 | 0.00 | 0.00 | 0.00 | 0.00 | 16.57 |

Existing
 Length of Flow 1468.44 ft
 Slope 0.27 %
 Waterflow Desc bare / short grass
 Avg Velocity 0.36 ft/sec
 Tc 1.13 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Existing Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.11 | 1.56 | 17.63 | 3.14 |
| 5 | 0.13 | 2.01 | 17.63 | 4.44 |
| 10 | 0.17 | 2.37 | 17.63 | 6.91 |
| 25 | 0.19 | 2.79 | 17.63 | 9.55 |
| 50 | 0.23 | 3.16 | 17.63 | 12.98 |
| 100 | 0.26 | 3.51 | 17.63 | 16.24 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN D

Total Area 10.35 Acres

| Soil Group | A | B | C | D | Total |
|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 10.35 | 0.00 | 0.00 | 0.00 | 10.35 |

| Land Use | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|----------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| Existing | 21% | 0% | 0% | 0% | 0% | 79% |
| Acres | 2.17 | 0.00 | 0.00 | 0.00 | 0.00 | 8.17 |

| Length of Flow | Existing |
|----------------|--------------------|
| Slope | 799.73 ft |
| Waterflow Desc | 0.63% |
| Avg Velocity | bare / short grass |
| Tc | 0.55 ft/sec |
| | 0.40 hours |

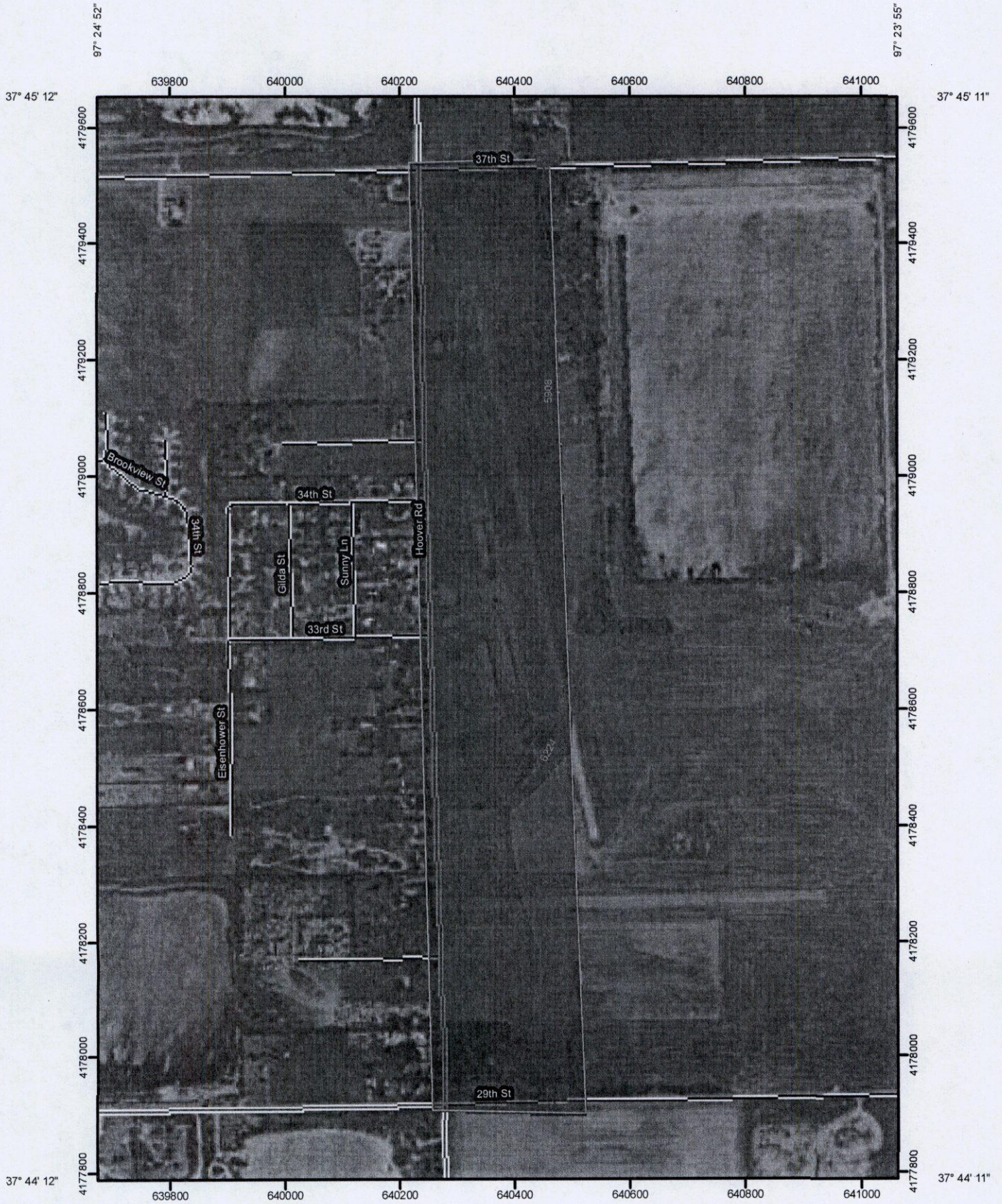
Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

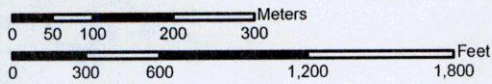
Existing Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.20 | 3.03 | 10.35 | 6.26 |
| 5 | 0.21 | 3.65 | 10.35 | 8.08 |
| 10 | 0.25 | 4.22 | 10.35 | 11.09 |
| 25 | 0.28 | 4.91 | 10.35 | 14.21 |
| 50 | 0.32 | 5.52 | 10.35 | 18.02 |
| 100 | 0.34 | 6.01 | 10.35 | 21.35 |

Depth to Water Table—Sedgwick County, Kansas
(POE - Riverside Airport)



Map Scale: 1:8,900 if printed on A size (8.5" x 11") sheet.



MAP LEGEND

- Area of Interest (AOI)
 - Area of Interest (AOI)
- Soils
 - Soil Map Units
- Soil Ratings
 - 0 - 25
 - 25 - 50
 - 50 - 100
 - 100 - 150
 - 150 - 200
 - > 200
- Political Features
 - Cities
- Water Features
 - Oceans
 - Streams and Canals
- Transportation
 - Rails
 - Interstate Highways
 - US Routes
 - Major Roads
 - Local Roads

MAP INFORMATION

Map Scale: 1:8,900 if printed on A size (8.5" x 11") sheet.
 The soil surveys that comprise your AOI were mapped at 1:24,000.
 Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 14N NAD83

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 7, Nov 30, 2010

Date(s) aerial images were photographed: 6/20/2006

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.

Depth to Water Table

| Depth to Water Table— Summary by Map Unit — Sedgwick County, Kansas | | | | |
|---|--|----------------------|--------------|----------------|
| Map unit symbol | Map unit name | Rating (centimeters) | Acres in AOI | Percent of AOI |
| 5908 | Nalim loam, 0 to 1 percent slopes | >200 | 3.0 | 2.9% |
| 5928 | Pratt loamy fine sand, 1 to 5 percent slopes | >200 | 85.3 | 82.4% |
| 6224 | Canadian fine sandy loam, rarely flooded | >200 | 2.3 | 2.2% |
| 6330 | Carwile fine sandy loam, 0 to 1 percent slopes | 0 | 12.8 | 12.4% |
| Totals for Area of Interest | | | 103.5 | 100.0% |

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

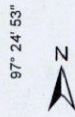
Tie-break Rule: Lower

Interpret Nulls as Zero: No

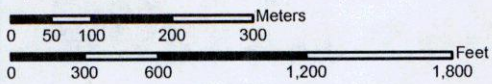
Beginning Month: January

Ending Month: December















Saturated Hydraulic Conductivity (Ksat)—Sedgwick County, Kansas
(POE - Riverside Airport)



Map Scale: 1:8,900 if printed on A size (8.5" x 11") sheet.



MAP LEGEND

| | |
|---|----------------------------|
| Area of Interest (AOI) | |
|  | Area of Interest (AOI) |
| Soils | |
|  | Soil Map Units |
| Soil Ratings | |
|  | <= 9 |
|  | > 9 AND <= 28 |
|  | > 28 AND <= 92 |
|  | Not rated or not available |
| Political Features | |
|  | Cities |
| Water Features | |
|  | Oceans |
|  | Streams and Canals |
| Transportation | |
|  | Rails |
|  | Interstate Highways |
|  | US Routes |
|  | Major Roads |
|  | Local Roads |

MAP INFORMATION

Map Scale: 1:8,900 if printed on A size (8.5" x 11") sheet.
 The soil surveys that comprise your AOI were mapped at 1:24,000.
 Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 14N NAD83

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 Date: Version 7, Nov 30, 2010

Date(s) aerial images were photographed: 6/20/2006

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.

Saturated Hydraulic Conductivity (Ksat)

| Saturated Hydraulic Conductivity (Ksat)— Summary by Map Unit — Sedgwick County, Kansas | | | | |
|--|--|---------------------------------|--------------|----------------|
| Map unit symbol | Map unit name | Rating (micrometers per second) | Acres in AOI | Percent of AOI |
| 5908 | Nalim loam, 0 to 1 percent slopes | 9.0000 | 3.0 | 2.9% |
| 5928 | Pratt loamy fine sand, 1 to 5 percent slopes | 92.0000 | 85.3 | 82.4% |
| 6224 | Canadian fine sandy loam, rarely flooded | 28.0000 | 2.3 | 2.2% |
| 6330 | Carwile fine sandy loam, 0 to 1 percent slopes | 9.0000 | 12.8 | 12.4% |
| Totals for Area of Interest | | | 103.5 | 100.0% |

Description

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Rating Options

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options: Surface Layer

Proposed Conditions

BENCHMARKS

- SW corner concrete slab @ south side of metal building @ 3,396 N. Hoover Road, 20' south of SW corner of building, 68' E. of E. of Hoover Road, 54' N. of split rail fence. Elev. = 1,333.18 "NAVD 88"
- City of Wichita benchmark @ SW corner of 29th Street North and Hoover Road, 26.5' S of Section Line, 22' S of E. of 29th Street, 48.5' W. of E. of Hoover Road. Elev. = 1,330.60 "NAVD 88"

Date of Survey: April 5, 2011

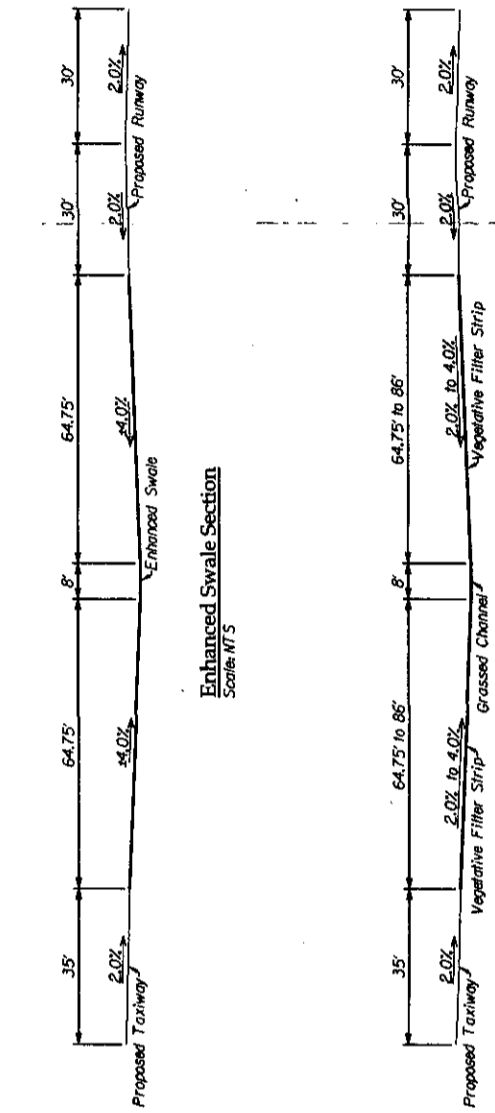
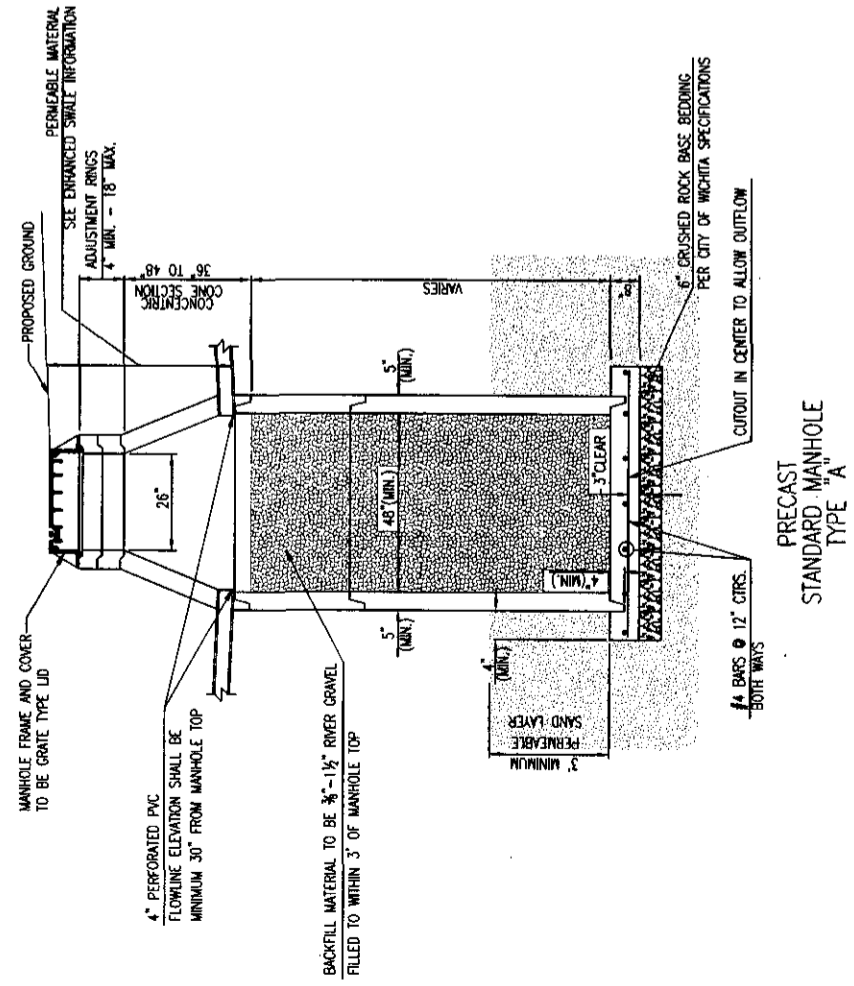
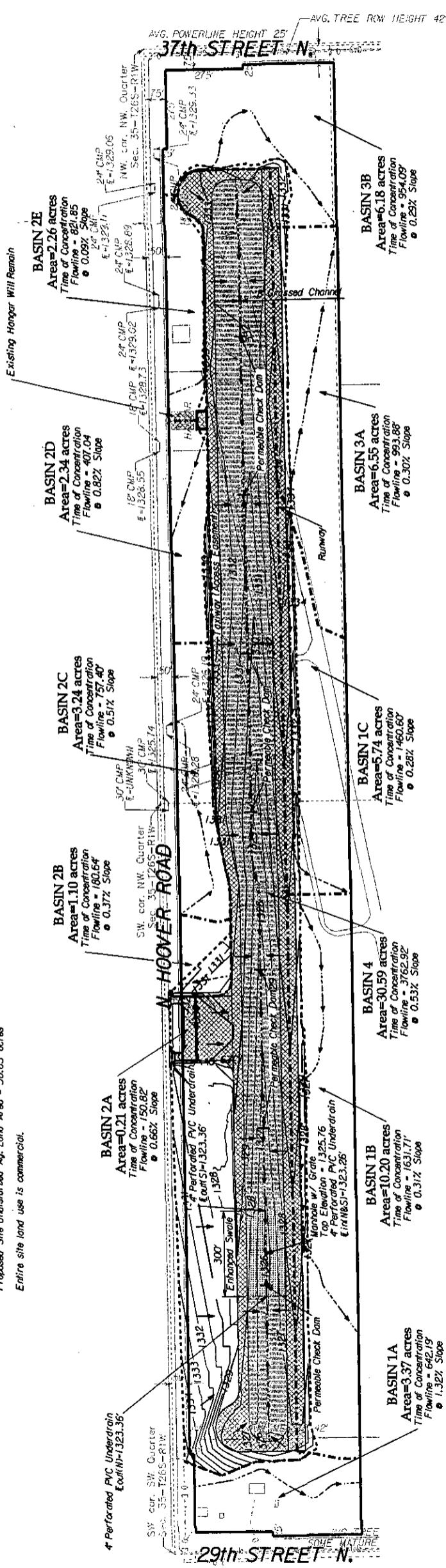
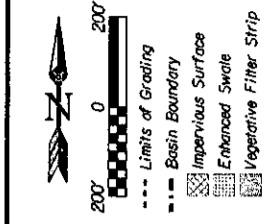
Note:

Permeable Check Dams shown every 450 ft. Final Design will address actual locations needed based on maintaining allowable velocities, as well as, the height at each dam.

Manhole with grate will extend to permeable sand layer and be backfilled with river gravel. NRCS Soil Survey indicates that the groundwater table for the area below the manhole is at a depth > 6.5'. Manhole sizing and depth will be addressed in Final Design.

Proposed Site Impervious Area (Runway, Taxiway, Entrances, and Hangar) = 11.74 acres
Proposed Site Disturbed Soil Area (Area bounded by Runway and Taxiway) = 21.41 acres
Proposed Site Undisturbed Ag. Land Area = 36.63 acres

Entire site land use is commercial.



Project: **Riverside Airport, Wichita, Ks**
 Date: 5/13/2011
 Prep. By: KLH

POST-DEVELOPMENT RUNOFF SUMMARY

| POST-DEVELOPMENT RUNOFF | | | | | | | |
|--------------------------------|--------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| BASIN | AREA (Acre) | Q₂ | Q₅ | Q₁₀ | Q₂₅ | Q₅₀ | Q₁₀₀ |
| 1A | 3.37 | 1.10 | 1.47 | 2.42 | 3.46 | 4.83 | 6.04 |
| 1B | 10.20 | 2.34 | 3.28 | 4.81 | 6.42 | 8.45 | 10.38 |
| 1C | 5.74 | 1.56 | 2.18 | 3.11 | 4.08 | 5.31 | 6.46 |
| Total | 19.31 | 5.01 | 6.93 | 10.34 | 13.96 | 18.58 | 22.88 |

| | | | | | | | |
|--------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| 2A | 0.21 | 0.76 | 0.93 | 1.12 | 1.31 | 1.49 | 1.67 |
| 2B | 1.10 | 0.45 | 0.59 | 0.97 | 1.38 | 1.92 | 2.40 |
| 2C | 3.24 | 0.77 | 1.04 | 1.74 | 2.49 | 3.51 | 4.40 |
| 2D | 2.34 | 0.96 | 1.26 | 1.99 | 2.76 | 3.79 | 4.69 |
| 2E | 2.26 | 0.33 | 0.48 | 0.78 | 1.10 | 1.53 | 1.94 |
| Total | 9.15 | 3.27 | 4.30 | 6.60 | 9.04 | 12.24 | 15.10 |

| | | | | | | | |
|--------------|--------------|-------------|-------------|-------------|-------------|--------------|--------------|
| 3A | 6.55 | 1.89 | 2.55 | 3.78 | 5.07 | 6.73 | 8.24 |
| 3B | 6.18 | 1.23 | 1.69 | 2.74 | 3.88 | 5.39 | 6.76 |
| Total | 12.73 | 3.12 | 4.23 | 6.52 | 8.95 | 12.12 | 15.00 |

| | | | | | | | |
|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|
| 4 | 30.59 | 7.00 | 10.01 | 13.43 | 16.93 | 21.38 | 25.54 |
| Total | 30.59 | 7.00 | 10.01 | 13.43 | 16.93 | 21.38 | 25.54 |

NOTE: All flowrates are in cubic feet per second (cfs)

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 1A

Total Area: 3.37 Acres

| Soil Group | A | B | C | D | Total |
|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 3.37 | 0.00 | 0.00 | 0.00 | 3.37 |

| Land Use | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|----------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| Future | 0% | 0% | 0% | 0% | 0% | 100% |
| Acres | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.37 |

Length of Flow: 642.19 ft
 Slope: 1.32 %
 Waterflow Desc: grass
 Avg Velocity: 0.80 ft/sec
 Tc: 0.22 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.08 | 4.08 | 3.37 | 1.10 |
| 5 | 0.09 | 4.84 | 3.37 | 1.47 |
| 10 | 0.13 | 5.53 | 3.37 | 2.42 |
| 25 | 0.16 | 6.41 | 3.37 | 3.46 |
| 50 | 0.20 | 7.17 | 3.37 | 4.83 |
| 100 | 0.23 | 7.79 | 3.37 | 6.04 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 1B

Total Area 10.20 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total |
|------------|------------------------|------------------------|------------------------|------------------------|-------|
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 10.20 | 0.00 | 0.00 | 0.00 | 10.20 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Future | 13% | 0% | 0% | 0% | 0% | 87% |
| Acres | 1.33 | 0.00 | 0.00 | 0.00 | 0.00 | 8.87 |

Future

| | |
|----------------|----------------|
| Length of Flow | 1631.71 ft |
| Slope | 0.31 % |
| Waterflow Desc | pavement/grass |
| Avg Velocity | 0.39 ft/sec |
| Tc | 1.17 hours |

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.15 | 1.49 | 10.20 | 2.34 |
| 5 | 0.17 | 1.93 | 10.20 | 3.28 |
| 10 | 0.21 | 2.28 | 10.20 | 4.81 |
| 25 | 0.23 | 2.69 | 10.20 | 6.42 |
| 50 | 0.27 | 3.05 | 10.20 | 8.45 |
| 100 | 0.30 | 3.39 | 10.20 | 10.38 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 1C

Total Area 5.74 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total |
|------------|------------------------|------------------------|------------------------|------------------------|-------|
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 5.74 | 0.00 | 0.00 | 0.00 | 5.74 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Future | 17% | 0% | 0% | 0% | 0% | 83% |
| Acres | 0.95 | 0.00 | 0.00 | 0.00 | 0.00 | 4.76 |

Length of Flow
 Slope
 Waterflow Desc
 Avg Velocity
 Tc

Future
 1460.6 ft
 0.28 %
 grass
 0.37 ft/sec
 1.09 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.17 | 1.57 | 5.74 | 1.56 |
| 5 | 0.19 | 2.03 | 5.74 | 2.18 |
| 10 | 0.23 | 2.39 | 5.74 | 3.11 |
| 25 | 0.25 | 2.81 | 5.74 | 4.08 |
| 50 | 0.29 | 3.19 | 5.74 | 5.31 |
| 100 | 0.32 | 3.54 | 5.74 | 6.46 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 2A

Total Area 0.21 Acres

| Soil Group | A | B | C | D | Total |
|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 0.21 | 0.00 | 0.00 | 0.00 | 0.21 |

| Land Use | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|----------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| Future | 100% | 0% | 0% | 0% | 0% | 0% |
| Acres | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Length of Flow 150.82 ft
 Slope 0.66%
 Waterflow Desc grass
 Avg Velocity 1.65 ft/sec
 Tc 0.03 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|-----------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|-----------------------|----------------------|----------------------------|--------------|--------------|
| 2 | 0.65 | 5.57 | 0.21 | 0.76 |
| 5 | 0.68 | 6.53 | 0.21 | 0.93 |
| 10 | 0.72 | 7.41 | 0.21 | 1.12 |
| 25 | 0.73 | 8.52 | 0.21 | 1.31 |
| 50 | 0.75 | 9.48 | 0.21 | 1.49 |
| 100 | 0.77 | 10.32 | 0.21 | 1.67 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 2B

Total Area 1.10 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total |
|------------|------------------------|------------------------|------------------------|------------------------|-------|
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 1.10 | 0.00 | 0.00 | 0.00 | 1.10 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Future | 0% | 0% | 0% | 0% | 0% | 100% |
| Acres | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.10 |

Future
 Length of Flow 180.64 ft
 Slope 0.37%
 Waterflow Desc grass
 Avg Velocity 0.43 ft/sec
 Tc 0.12 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|-----------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|-----------------------|----------------------|----------------------------|--------------|--------------|
| 2 | 0.08 | 5.09 | 1.10 | 0.45 |
| 5 | 0.09 | 5.99 | 1.10 | 0.59 |
| 10 | 0.13 | 6.81 | 1.10 | 0.97 |
| 25 | 0.16 | 7.84 | 1.10 | 1.38 |
| 50 | 0.20 | 8.74 | 1.10 | 1.92 |
| 100 | 0.23 | 9.50 | 1.10 | 2.40 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 2C

Total Area 3.24 Acres

| Soil Group | A | B | C | D | Total |
|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 3.24 | 0.00 | 0.00 | 0.00 | 3.24 |

| Land Use | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|----------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| Future | 0% | 0% | 0% | 0% | 0% | 100% |
| Acres | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.24 |

Length of Flow
 Slope 757.40 ft
 Waterflow Desc 0.51 %
 Avg Velocity grass 0.50 ft/sec
 Tc 0.42 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|-----------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|-----------------------|----------------------|----------------------------|--------------|--------------|
| 2 | 0.08 | 2.96 | 3.24 | 0.77 |
| 5 | 0.09 | 3.57 | 3.24 | 1.04 |
| 10 | 0.13 | 4.13 | 3.24 | 1.74 |
| 25 | 0.16 | 4.81 | 3.24 | 2.49 |
| 50 | 0.20 | 5.41 | 3.24 | 3.51 |
| 100 | 0.23 | 5.90 | 3.24 | 4.40 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 2D

Total Area 2.34 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total |
|------------|------------------------|------------------------|------------------------|------------------------|-------|
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 2.34 | 0.00 | 0.00 | 0.00 | 2.34 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Future | 3% | 0% | 0% | 0% | 0% | 97% |
| Acres | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 2.27 |

Length of Flow 407.04 ft
 Slope 0.82 %
 Waterflow Desc grass
 Avg Velocity 0.63 ft/sec
 Tc 0.18 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.09 | 4.36 | 2.34 | 0.96 |
| 5 | 0.10 | 5.16 | 2.34 | 1.26 |
| 10 | 0.14 | 5.89 | 2.34 | 1.99 |
| 25 | 0.17 | 6.81 | 2.34 | 2.76 |
| 50 | 0.21 | 7.61 | 2.34 | 3.79 |
| 100 | 0.24 | 8.27 | 2.34 | 4.69 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 2E

Total Area 2.26 Acres

| Soil Group | A | B | C | D | Total |
|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| | 100% | 0% | 0% | 0% | 100% |
| Acres | 2.26 | 0.00 | 0.00 | 0.00 | 2.26 |

| Land Use | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|----------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) | (% of Total Area) |
| Future | 3% | 0% | 0% | 0% | 0% | 97% |
| Acres | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 2.19 |

Future
 Length of Flow 821.85 ft
 Slope 0.09 %
 Waterflow Desc grass
 Avg Velocity 0.21 ft/sec
 Tc 1.07 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.09 | 1.57 | 2.26 | 0.33 |
| 5 | 0.10 | 2.03 | 2.26 | 0.48 |
| 10 | 0.14 | 2.39 | 2.26 | 0.78 |
| 25 | 0.17 | 2.81 | 2.26 | 1.10 |
| 50 | 0.21 | 3.19 | 2.26 | 1.53 |
| 100 | 0.24 | 3.54 | 2.26 | 1.94 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 3A

Total Area 6.55 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|------------|------------------------|------------------------|------------------------|------------------------|-------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| | 100% | 0% | 0% | 0% | 100% | 10% | 0% | 0% | 0% | 0% | 90% |
| Acres | 6.55 | 0.00 | 0.00 | 0.00 | 6.55 | 0.66 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 |

Future
 Length of Flow 993.88 ft
 Slope 0.30%
 Waterflow Desc pavement/grass
 Avg Velocity 0.38 ft/sec
 Tc 0.73 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.14 | 2.11 | 6.55 | 1.89 |
| 5 | 0.15 | 2.61 | 6.55 | 2.55 |
| 10 | 0.19 | 3.05 | 6.55 | 3.78 |
| 25 | 0.22 | 3.57 | 6.55 | 5.07 |
| 50 | 0.26 | 4.03 | 6.55 | 6.73 |
| 100 | 0.28 | 4.43 | 6.55 | 8.24 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 3B

Total Area 6.18 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total Acres |
|------------|------------------------|------------------------|------------------------|------------------------|----------------|
| | 100% | 0% | 0% | 0% | 6.18 |

| Land Use | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|----------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| Future | 2% | 0% | 0% | 0% | 0% | 98% |
| Acres | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 6.06 |

Length of Flow 947.09 ft
 Slope 0.29 %
 Waterflow Desc pavement/grass
 Avg Velocity 0.38 ft/sec
 Tc 0.70 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|-----------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|-----------------------|----------------------|----------------------------|--------------|--------------|
| 2 | 0.09 | 2.18 | 6.18 | 1.23 |
| 5 | 0.10 | 2.68 | 6.18 | 1.69 |
| 10 | 0.14 | 3.13 | 6.18 | 2.74 |
| 25 | 0.17 | 3.66 | 6.18 | 3.88 |
| 50 | 0.21 | 4.13 | 6.18 | 5.39 |
| 100 | 0.24 | 4.54 | 6.18 | 6.76 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Manual Input

BASIN 4

Total Area 30.59 Acres

| Soil Group | A (% of Total Area) | B (% of Total Area) | C (% of Total Area) | D (% of Total Area) | Total | Commercial (% of Total Area) | Industrial (% of Total Area) | Multi-Family (% of Total Area) | Public (% of Total Area) | Single Family (% of Total Area) | Vacant/Agriculture (% of Total Area) |
|------------|------------------------|------------------------|------------------------|------------------------|-------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------|------------------------------------|---|
| | 100% | 0% | 0% | 0% | 100% | 27% | 0% | 0% | 0% | 0% | 66% |
| Acres | 30.59 | 0.00 | 0.00 | 0.00 | 30.59 | 8.40 | 0.00 | 0.00 | 0.00 | 0.00 | 20.15 |

Land Use
 Future
 Length of Flow 3762.92 ft
 Slope 0.20 %
 Waterflow Desc pavement/grass
 Avg Velocity 0.31 ft/sec
 Tc 3.34 hours

Runoff Coefficients * Used Soil Group A

| Return Period (Years) | Commercial | Industrial | Multi-Family | Public | Single Family | Vacant/Agriculture |
|--------------------------|------------|------------|--------------|--------|---------------|--------------------|
| 2 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| 5 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 10 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| 25 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 50 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| 100 | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |

Future Conditions

| Return Period (Years) | Runoff Coefficient * | Rainfall Intensity (in/hr) | Area (Acres) | Runoff (cfs) |
|--------------------------|----------------------|-------------------------------|-----------------|-----------------|
| 2 | 0.23 | 0.99 | 30.59 | 7.00 |
| 5 | 0.25 | 1.33 | 30.59 | 10.01 |
| 10 | 0.28 | 1.55 | 30.59 | 13.43 |
| 25 | 0.31 | 1.81 | 30.59 | 16.93 |
| 50 | 0.34 | 2.07 | 30.59 | 21.38 |
| 100 | 0.36 | 2.30 | 30.59 | 25.54 |

Project: Riverside Airport, Wichita, Ks
 Date: 5/13/2011
 Prep. By: KLH

Storm Water Management Facility

| Vegetative Filter Strip - uniformly graded and well vegetated section of land which removes pollutants through vegetative filtering and infiltration | | | | | | |
|--|--------|-------------|-----------------|------------------------|--|--|
| Side | | Length (ft) | Velocity (ft/s) | TSS Removal Efficiency | Total Contributing Drainage Area (acres) | Total Contributing Impervious Area (acres) |
| Width (ft) | Slope | | | | | |
| 64.75 | ±4.00% | ±4000 | 0.15 | 50% | 8.4 | 8.40 |

| Grassed Channel - vegetated open channel that treats storm water runoff through means of infiltration | | | | | | |
|---|-------|-------------|-----------------|------------------------|--|--|
| Bottom Width (ft) | Slope | Length (ft) | Velocity (ft/s) | TSS Removal Efficiency | Total Contributing Drainage Area (acres) | Total Contributing Impervious Area (acres) |
| 8.00 | 0.20% | ±4000 | 0.31 | 50% | 24.61 | 8.40 |

| Enhanced Dry Swale - vegetated open channel that treats storm water runoff through means of infiltration | | | | | | | | |
|--|------------|--------|-------------|-------|-----------------|------------------------|--|--|
| Bottom Width (ft) | Side | | Length (ft) | Slope | Velocity (ft/s) | TSS Removal Efficiency | Total Contributing Drainage Area (acres) | Total Contributing Impervious Area (acres) |
| | Width (ft) | Slope | | | | | | |
| 8.00 | 64.75 | ±4.00% | 300.00 | 0.20% | 0.31 | 90% | 24.61 | 8.40 |

NOTE: Permissible velocity for grass lined channel with sandy soil = 5 ft/s > 0.31 ft/s and 0.15 ft/s ✓ ok, Table 5-12 COWSWM Vol. 2

$V = KS^{0.5}$ Equation 4-6 COWSWM for Shallow Concentrated Flow

$K=7$ (short grass)

S =slope of hydraulic grade line approximated by the watercourse slope (ft/ft)

$T_{T(\text{sheet})} = \frac{0.42(nL)^{1.48}}{(P_2)^{0.5}(S)^{0.4}}$ Equation 4-5 COWSWM Travel Time for Sheet Flow
 Used for vegetative filter strip velocity

$n=0.24$

$P_2=3.5$ in.



PROJECT: POE - Riverside Airport

BY: KLH

DATE: 5-10-11

PROJECT NO: 563

PROJECT ITEM: Water Quality Protection Volume + Peak Flow

PAGE 1 OF 5

$$WQ_v = P R_v A \quad (\text{COWSWM Eqn. 4-25})$$

WQ_v = Water Quality Protection Volume (acre-feet)

P = Water Quality Rainfall Depth (1.2" for Sedgwick County)

R_v = Volumetric Runoff Coefficient

A = Drainage Area (acres) adjusted for WQ_v Reductions, Ch. 2 COWSWM

No Area Reduction can be used due to the fact that no reserves can be placed on the site.

$$R_v = R_{vU} U + R_{vD} D + R_{vI} I \quad (\text{COWSWM Eqn. 4-24})$$

$$R_v = (0.02) \left(\frac{3643}{71.78} \right) + (0.15) \left(\frac{2141}{71.78} \right) + (0.95) \left(\frac{11.74}{71.78} \right) = 0.21$$

$$WQ_v = P R_v A = \frac{1.2(0.21)(71.78)}{12} = \underline{1.507 \text{ acre-ft}}$$

Peak Flow → Follows Example in Sec. 4.13.3 COWSWM

$$Q_{wq} = q_u * A * Q_{wv} \quad (\text{COWSWM Eqn. 4-26})$$

$$Q_{wv} = P R_v \quad (\text{COWSWM Eqn. 4-26})$$

$$Q_{wv} = 1.2(0.2015) = 0.2418 \text{ in.}$$

$$CN = \frac{1000}{[10 + 5P + 10Q_{wv} - 10(Q_{wv}^2 + 1.75 Q_{wv} P)^{1/2}]}$$

$$= \frac{1000}{[10 + 5(1.2) + 10(0.2418) - 10(.2418^2 + 1.75(0.2418)(1.2))^{1/2}]} = \frac{1000}{11.9383} = 83.8345$$



PROJECT: POE - Riverside Airport

BY: KLH

DATE: 5-11-11

PROJECT NO: 563

PROJECT ITEM: Water Quality Peak Flow + TSS Removal

PAGE 2 OF 5

$$S = \frac{1000}{CN} - 10 = \frac{1000}{93.9395} - 10 = 1.928 \text{ in.}$$

$$I_r = 0.2S = 0.2(1.928) = 0.3856 \text{ in.}$$

$$\frac{I_r}{P} = \frac{0.3856}{1.2} = 0.321$$

q_u from figure 4-6 w/ $t_c = 0.68 \text{ hr.}$

$$q_u = 350 \frac{\text{cfs}}{\frac{\text{ft}^2}{\text{in.}}}$$

$$Q_{wg} = q_u \cdot A \cdot Q_{wv} = 350 \left(\frac{71.78}{640} \right) 0.2419 = 9.49 \text{ cfs}$$

TSS % Removal

Table 3-2 (COWSWM) → Enhanced Dry Swale TSS % = 90%

Vegetative Filter Strip TSS % = 50%

Grassed Channel TSS % = 50%

Series:
Vegetative Filter Strip → Grassed Channel → Enhanced Dry Swale → Outfall

COWSWM Egn 3-2 $TSS_{\text{train}} = TSS_A + TSS_B - \frac{(TSS_A \times TSS_B)}{100}$

$$\text{Grassed Channel + V Filter} = 50 + 50 - \frac{(50 \times 50)}{100} = 75$$

$$= 75 + 90 - \frac{(75 \times 90)}{100} = \underline{\underline{97.5\%}}$$



PROJECT: POE - Riverside Airport BY: KLH DATE: 5-11-11
PROJECT NO: 563 PROJECT ITEM: Grassed Channel/Enhanced Swale Design PAGE 3 OF 5

The Vegetative Filter Strip and Grassed Channel will have same dim. as the Enhanced Swale.
Grassed Channel & Swale bottom width = 8'

8' is chosen to ensure braiding does not occur and to maximize side slope

Channel slope of 0.2%

Side slopes = \pm 25:1 Side slope length = 64.75

Check to determine sufficient L for treat WQV

$$WQV = 1.446 \text{ acre-ft} = 62,987.8 \text{ ft}^3$$

Grassed Channel & Swale Cross-Sectional Area = 188.42 ft² (Drawn w/ Microstation)

$$L_{req} = \frac{62,987.8 \text{ ft}^3}{188.42 \text{ ft}^2} = 334.295 \text{ ft}$$

Provided L before taxiway overtopping = 1,167.5 ft

$$1,167.5 \text{ ft} > 334.3 \text{ ft} \quad \checkmark \text{ OK}$$

$$\text{Channel + Swale capacity} = \frac{188.42 \text{ ft}^2 (1,167.5 \text{ ft})}{43,560} = 5.05 \text{ acre-ft}$$

5.05 ac ft provided > 1.50 ac ft needed \checkmark OK



PROJECT: POE - Riverside Airport

BY: KLH DATE: 5-11-11

PROJECT NO: 563 PROJECT ITEM: Channel Protection Volume

PAGE 4 OF 5

$$V_s = \frac{(V_s/V_r) QA}{12} \quad \text{eqn. sect. 4.H pg. 4-50 COWSWM}$$

$$Q = \frac{(P - I_a)^2}{[(P - I_a) + S]}$$

$P = 2.8 \text{ in (1-yr 24 hr rainfall)}$

$$Q_{wv} = PR_v \quad (\text{Egn. 4-26 COWSWM})$$

$$= 2.8 (0.287) = .588$$

↑
WQ_v Calculation

$$CN = \frac{1000}{[10 + 5P + 10Q_{wv} - 10(Q_{wv}^2 + 1.25 Q_{wv} P)^{1/2}]} \quad \text{eqn. 4-3}$$

$$= \frac{1000}{[10 + 5(2.8) + 10(.588) - 10(.588^2 + 1.25(.588)(2.8))^{1/2}]}$$

$$= 51.22$$

$$S = \frac{1000}{CN} - 10 = \frac{1000}{51.22} - 10 = 9.525 \text{ in.}$$

$$I_a = 0.25 = 0.2(9.525) = 1.905$$

$$Q = \frac{(2.8 - 1.905)^2}{(2.8 - 1.905) + 9.525} = 0.077 \text{ in.}$$



PROJECT: POE-Riverside Airport

BY: KLH

DATE: 5-11-11

PROJECT NO: 563

PROJECT ITEM: Channel Protection Volume

PAGE 5 OF 5

$$\frac{I_a}{P} = \frac{1.905}{2.8} = 0.68$$

Fig. 4-6 $T_c = 0.68$ hr outside of range of 4-6 to be conservative
 $q_u = 190$ cfs/m²-in used $\frac{I_a}{P} = 0.5$

$$\frac{q_o}{q_i} = 0.085 \quad \text{Fig. 4-17}$$

$$\frac{V_s}{V_r} = 0.682 - 1.93(0.085) + 1.64(0.085)^3 - 0.804(0.085)^3 \quad \text{eqn. 4-27}$$
$$= 0.549$$

$$V_s = \frac{(0.549)(0.077)(71.78)}{12} = \underline{0.25} \text{ acre-ft} < WQV \quad \checkmark \text{ok}$$

Note: It was determined that the Enhanced Swale has the capacity for the WQV

FINAL



POE & ASSOCIATES OF KANSAS, INC.
CONSULTING ENGINEERS
590 E. Central Blvd. 200 West Wichita, KS 67202-4242
Phone: 316-855-1114 FAX: 316-855-4444

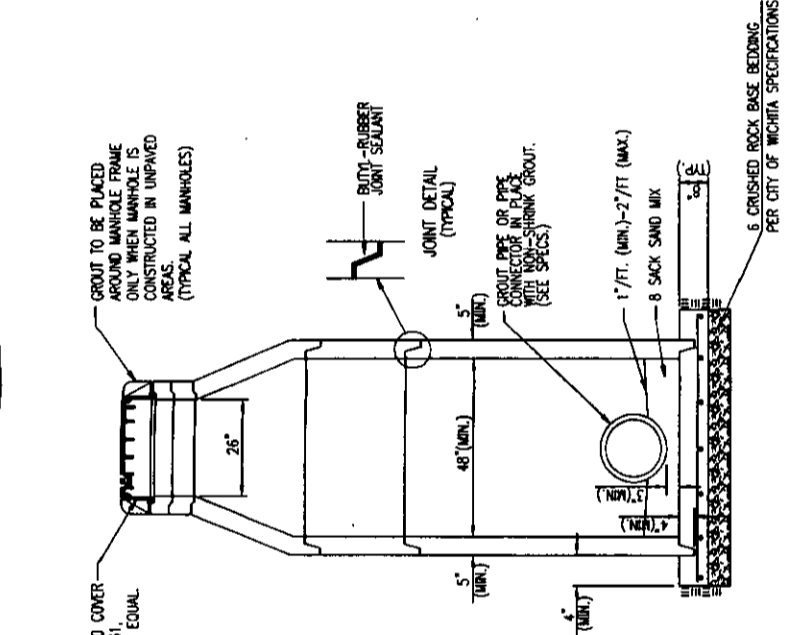
RIVERSIDE AIRPORT
POST DEVELOPMENT DRAINAGE MAP
PHASE 1 RUNWAY EXPANSION
SEDGWICK COUNTY, KANSAS



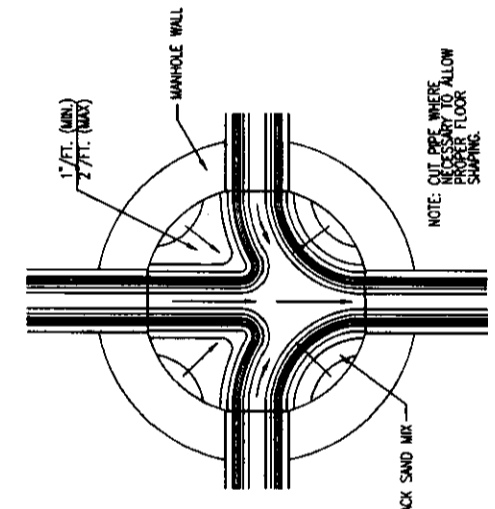
Adapted from City of Wichita Standard Specifications

GENERAL NOTES

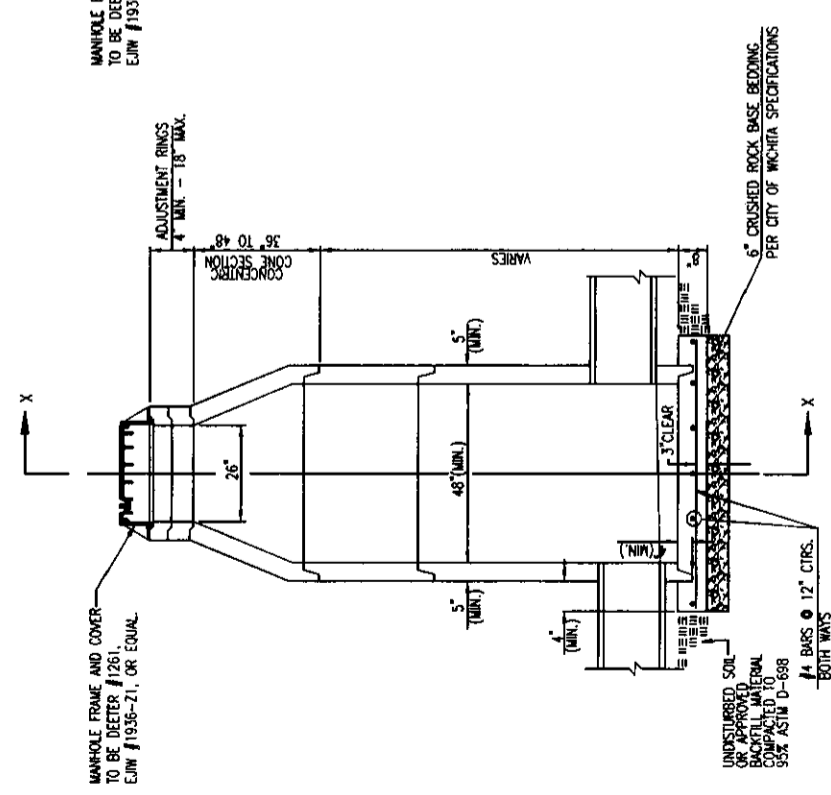
- IF, IN THE OPINION OF THE ENGINEER, THE MANHOLE SUBGRADE APPEARS UNSTABLE, THE CONTRACTOR WILL HAVE THE OPTION TO COMPACT SUBGRADE AS SHOWN OR INCREASE THE THICKNESS OF THE MANHOLE BASE AS DIRECTED BY THE ENGINEER.
- STEEL REINFORCING WILL BE REQUIRED IN ALL MANHOLE BASES.
- ALL MANHOLE CONSTRUCTION SHALL BE WATER TIGHT.
- TOP OF MANHOLE FLOOR SLAB SHALL BE AT LEAST 3 INCHES BELOW THE FLOW LINE OF THE OUTLET PIPE TO INSURE SUFFICIENT MINIMUM THICKNESS OF SHAPED INVERT.
- ALL PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO THE LATEST REVISION OF ASTM C-478 AS MODIFIED BY THE SPECIFICATIONS.
- CONCRETE USED FOR MANHOLE CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
- PRECAST MANHOLES SHALL BE SET AT LEAST 4 INCHES INTO MANHOLE BASE.
- MANHOLES WITH PIPE SIZES 24" AND LARGER SHALL HAVE 5 FOOT INSIDE DIAMETER (MIN).
- MANHOLES WITH PRECAST BASES MAY BE USED AT THE CONTRACTOR'S OPTION. THESE MANHOLES SHALL HAVE AN 8" MINIMUM BASE THICKNESS AND SHALL BE PLACED ON AN 8" MIN. CRUSHED ROCK BASE. PIPES SHALL BE ENCASED WITH CRUSHED ROCK TO AT LEAST 3 FEET FROM THE MANHOLE WALL.
- CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN MANHOLE WALL SHALL BE GROUTED FLUSH TO THE MANHOLE WALL WITH HYDRAULIC CEMENT AFTER THE MANHOLE IS IN PLACE. LIFTING HOLES THRU THE MANHOLE WALL WILL NOT BE ACCEPTED.
- THE ENDS OF ALL PIPES IN MANHOLES SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE MANHOLE WALL.
- MANHOLE INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE MANHOLE WILL BE SELF-CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
- MANHOLE FRAME AND COVER TO BE DEETER #1261, E.I.W. #1935-21, OR APPROVED EQUAL. SEE SW-303.
- FOR FLAT GRADED INLET APPLICATION, GRATE TO BE DEETER #1933, E.I.W. #1205 MD, OR APPROVED EQUAL.
- FOR BEHNE GRATE APPLICATION, GRATE TO BE DEETER #4495, E.I.W. #1205AS, OR APPROVED EQUAL.



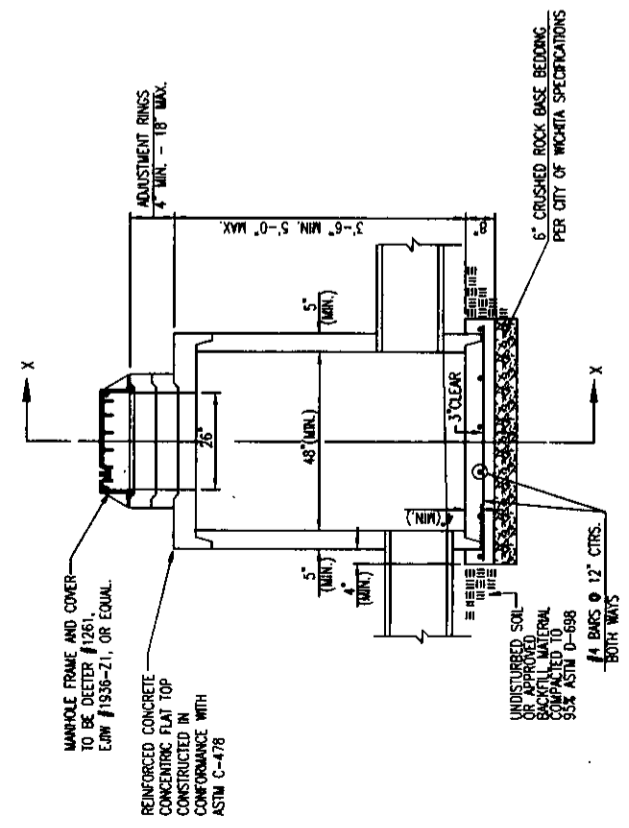
SECTION X-X
(TYPICAL)



TYPICAL MANHOLE
FLOOR SHAPING



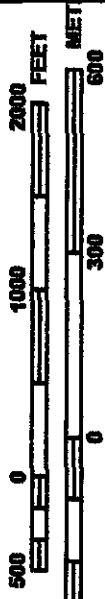
PRECAST
STANDARD MANHOLE
TYPE "A"



PRECAST
SHALLOW MANHOLE
TYPE "B"

Permits

MAP SCALE 1" = 1000'



**Sedgwick County
Unincorporated Areas
200321**

ZONE X

WARNING! THIS AREA IS SHOWN AS BEING PROTECTED FROM THE 1-PERCENT ANNUAL CHANCE FLOOD HAZARD BY LEVEE, DIKE, OR OTHER STRUCTURE. OVERTOPPING OR FAILURE OF THIS STRUCTURE IS POSSIBLE WHICH COULD RESULT IN DESTRUCTIVE FLOOD ELEVATIONS AND WATER VELOCITIES. PROPER PROTECTION, FLOOD INSURANCE, AND ADHERENCE TO EVACUATION PROCEDURES ARE STRONGLY RECOMMENDED. FOR ADDITIONAL INFORMATION, SEE THE NOTES TO USERS.

35

**Sedgwick County
Unincorporated Areas
200321**

ZONE

**City of Wichita
200328**

**CITY OF WICHITA
SEDGWICK COUNTY**

PANEL 0335E

**FIRM
FLOOD INSURANCE RATE MAP
SEDGWICK COUNTY,
KANSAS
AND INCORPORATED AREAS**

PANEL 335 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
 COMMUNITY NUMBER PANEL SUFFIX
 SEDGWICK COUNTY 200321 0335 E
 WICHITA, CITY OF 200328 0335 E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



**MAP NUMBER
20173C0335E**

**EFFECTIVE DATE
FEBRUARY 2, 2007**
 Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Preliminary Grading
Plan

