

RILEY COUNTY STANDARDS

FOR

ROADWAY DESIGN IN PLATTED SUBDIVISIONS

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INTRODUCTION

These design standards were created to provide a uniform policy and program of minimum engineering standards for the construction of roads and drainage in the unincorporated platted areas of Riley County. These standards shall apply only to the construction of new roads.

NOTE: The County Engineer reserves the right to adjust these standards if terrain features, safety considerations or other circumstances so warrant.

SECTION I - GENERAL ITEMS

All interior roads along with their related drainage improvements shall be constructed at the expense of the owners or developers of such areas or financed through the formation of an approved benefit district.

Prior to the development of a preliminary plat, a pre-development meeting shall be held for every project, to discuss the project and to inform the developer of requirements and potential issues.

Following the approval of the preliminary plat, construction plans for all projects shall be prepared by an engineer licensed in the State of Kansas. (See details under the Street Plans Section II page # 10) The current addition of the Kansas Department of Transportation (KDOT) Standard Specifications for Road and Bridge Construction shall apply unless otherwise noted in this document.

Notification shall be given to the Riley County Public Works Department at least two days prior to the start of construction. Prior to any construction, all necessary staking shall be completed (i.e. right-of-way hubs, alignment control points, preservation of section corners and other survey markers and the establishment of benchmarks).

Additional staking (i.e. blue topping, pavement grade and offsets, etc.) may be requested at the discretion of Riley County and shall be provided by the developer.

The Developer and/or Contractor shall be responsible for the replacement of property pins, boundary markers and legal monuments should they be obliterated during construction. Re-establishment of the above shall be done by a licensed land surveyor.

Traffic and drainage impact studies shall be submitted for all proposed subdivisions unless such study is waived by the County Engineer.

Except for a single lot or two lot subdivision, all subdivision entrances shall access onto a continuous paved public road. In order to be excluded a two lot subdivision shall utilize a shared entrance. A shared entrance shall consist of a single entrance which provides access for two separate parcels.

Depending upon the location, traffic generation or changes in drainage patterns, offsite road improvements may be required at the developer's expense.

The developer shall be informed of all necessary offsite improvements during the plat review process.

All road widths do not allow for on road parking.

Internal roads within a subdivision shall be paved in accordance with the standards listed in this document.

SECTION II – SUBDIVISION STREET GENERAL STANDARDS

Minimum Design Standards for all new subdivision roads:

Design speed:	35 mph
Posted speed:	30 mph
Clear zone:	Conform to AASHTO guidelines
Ditch depth:	2.5 feet
Fore slope:	4:1
Maximum vertical road grade:	10%
Bridge Loading:	HS-20
Back Slope:	
Soil	3:1
Rock	Vertical
Erosion Protection:	
Ditch Lining required:	
Highly erodible soils:	slopes greater than 4.5%
All other soils:	slopes greater than 6.0%
Cul-de-sac:	
0 – 500 ft. in length	Outside radius: 60 feet Surfacing radius: 50 feet Road surface width: 24 feet
501 – 750 ft. in length	Outside radius: 60 feet Surfacing radius: 50 feet Road surface width: 26 feet
Over 750 ft. in length	Special approval required
Intersection with public road:	90 degrees
Radius:	40 feet
Perpendicular:	50 feet
Flat:	30 feet

Sidewalk (where utilized)	
Material:	Concrete
Width:	5 feet
Thickness:	4 inches

Rock Roads with open ditch:

Base width:	28 feet
Surface width:	24 feet
Shoulder width:	2 feet
Shoulder slope:	3 % or match road slope
Shoulder material:	Dirt or AS-1 rock
Bridge width:	32 feet
Box Culvert width:	Shall match 4:1 fore slope
Ditch bottom width:	2 feet
Right-of-way:	80 feet minimum (except cul-de-sac)
Crown:	3%
Base Rock:	Minimum depth of 4 inches of AB-3 rock *
Surface Rock:	Minimum depth of 4 inches of 1-1/4" road rock
Rock Compaction:	Type B MR-90
Stabilized Subgrade:	See Stabilized Subgrade page 8

*As specified in the KDOT Standard Specifications for State Road & Bridge Construction

Paved Roads with open ditch:

Base width:	28 feet
Surface width:	24 feet
Shoulder width:	2 feet
Shoulder slope:	3 %
Shoulder Material:	Asphalt, dirt or AS-1
Bridge width:	32 feet
Box Culvert width:	Shall match 4:1 fore slope
Ditch bottom width:	2 feet
Right-of-way:	80 feet minimum (except cul-de-sac)
Crown:	1.6 %
Paving Thickness:	See Appendix A
Concrete	4000 psi, 2.5 inch slump
Asphalt Base	HMAC Commercial Grade (Class A); maximum 25% RAP with 3% air voids
Asphalt Surface	HMAC Commercial Grade (Class A); maximum 2" thickness & 15% RAP with 3% air voids
Stabilized Subgrade:	See Stabilized Subgrade page 8
Modified Base:	See Modified Base page 8

Paved Roads w/ curb & gutter:

Base width:	33 feet
Back of Curb:	31 feet
Bridge width:	32 feet
Box Culvert width:	Shall match 4:1 fore slope
Right-of-way:	60 feet minimum (except cul-de-sac)
Crown:	1.6 %
Storm drains and inlets:	Provided as necessary
Paving Thickness:	See Appendix A
Concrete	4000 psi, 2.5 inch slump
Asphalt Base	HMAC Commercial Grade (Class A); maximum 25% RAP with 3% air voids
Asphalt Surface	HMAC Commercial Grade (Class A); maximum 2" thickness & 15% RAP with 3% air voids
Stabilized Subgrade:	See Stabilized Subgrade, page 8
Modified Base:	See Modified Base page 8

Internal Subdivision Roads

An internal subdivision road shall be paved when any of the following apply:

- If a subdivision utilizes a centralized public sewer system.
- The ADT generated on a road within a platted subdivision as determined by the Traffic Impact Study, exceeds 200 vehicles per day.

Note: If an internal subdivision road is required to be paved all adjoining roads shall also be paved

Traffic Impact Study:

A Traffic Impact Study (TIS) shall be prepared under the supervision of a qualified and experienced transportation professional who has specific training in traffic and transportation engineering and planning and preferably with several years of experience with TIS. The TIS report shall be sealed and signed by a registered Professional Engineer (PE) licensed in the State of Kansas.

A traffic study for the proposed development shall include at a minimum but not be limited to the following items:

- Identify number, location and type of proposed access drive(s) to the development site.
- Identify the study area to include at a minimum the roads adjacent to the development site.
- Provide a detailed summary of data collection efforts and results
- Evaluate existing operating conditions of traffic within the study area and identify any existing deficiencies (if any) from both capacity and safety point of views. (width, surfacing, drainage, etc.)

- Estimate the number of trips generated by the development site using the most current traffic rates in the ITE Generation Manual.
- The study shall be based on the total build out of the development site.
- Identify the most critical analysis period
- Determine anticipated directional distribution of site-generated traffic
- Intersection assignment of site traffic including through and turning movements.
- Evaluate “existing + site” traffic operating conditions within the study area to assess the impact of the site traffic from both a capacity and a safety point of views.
- Internal circulation of site traffic and parking
- Need for turning lanes at proposed driveway location(s)
- Traffic control needs and warrants
- Determine anticipated future non-site (background) traffic volumes.
- Identify other “nearby approved” developments within the study area.
- Evaluate “existing + site + nearby approved developments” traffic operating conditions to assess cumulative impact of traffic for pre-specified target year
- Recommend on-site and/or off-site road improvements for each traffic condition separately (i.e. existing; existing + site; existing + site + nearby approved developments and future long-term

Hydraulic Criteria:

All structures shall be designed to the following storm frequencies:

When a structure is located in a designated 100 year floodway, the structure shall be designed for a 100 year storm event.

All other structures shall be designed to accommodate a 25 year storm event.

All roadway and drainage improvements shall comply with the Riley County Flood Plain Regulations and any State and Federal Regulations.

All structures shall be designed to minimize obstructions and the collection of debris in the channel (ie. Clear span boxes vs multiple barrel boxes). The consultant shall meet with the County Engineer to discuss the type of structure proposed prior to design.

Drainage Impact Study:

A Drainage Impact Study (DIS) shall be prepared under the supervision of a qualified and experienced transportation professional who has specific training in hydraulics and drainage engineering and preferably with several years of experience with DIS. The DIS report shall be sealed and signed by a registered Professional Engineer (PE) licensed in the State of Kansas.

A drainage study for the proposed development shall include at a minimum but not be limited to the following items:

Runoff, by drainage area, from the entire site prior to the development
Runoff, by drainage area, from the entire site after the development
Provide map showing (existing and proposed drainage patterns)
 General direction of runoff
 The flow associated with each
Verify existing ditches will accommodate the increased flow
Verify existing culverts will accommodate the increased flow
Provide sizing for all culverts
Justify the methodology utilized

Offsite Road Improvements:

All entrances to a platted property shall access onto a continuous paved public road, except for one or two lot subdivisions. In order to be excluded a two lot subdivision shall utilize a shared entrance. A shared entrance shall consist of a single entrance which provides access for two separate parcels. When the adjacent road is not paved, the developer shall be responsible for the paving of such road to the nearest paved roadway. The County Engineer may require multiple roads to receive offsite improvements as determined by the traffic study. The following standards shall apply.

- 24 foot wide, 6 inch thick BM-2 asphalt mat
- Subgrade Stabilization:
- AS-1 rock shoulder wedge
- Ditches sized in accordance with the drainage study

When the traffic or drainage study indicates the geometrics of the adjacent road or the vehicle turning movements will not safely accommodate the increased traffic generated from the proposed development, it shall be the developer's responsibility to provide additional offsite road improvements including but not limited to:

- Turn lanes
- Shoulders
- Multiple lanes
- Larger ditches
- Larger/wider entrance culverts
- Signing
- Site distance improvements

Any additional right-of-way necessary to meet these requirements shall be acquired at the developer's expense.

All off site and subdivision road improvements shall be completed, a paving benefit district formed, a letter of credit submitted, or a bond issued prior to any building permits being issued within the subdivision.

Drainage Culverts:

- Steel culverts may be used on rock or asphalt roads. Concrete, polymer coated or aluminized culverts shall be used on concrete roads. All crossroad culverts shall be new with a minimum diameter of 18" or its pipe-arch equivalent. Minimum gauges shall correspond to current Kansas Department of Transportation Specifications. End sections shall be used. The culvert shall be of sufficient length to match the shoulder slope for a minimum road base of 28 feet or road top of 31 feet with curb and gutter. All culvert sizes shall be approved by the County Engineer.
- Steel culverts may be used on rock or asphalt driveways. Concrete, polymer coated or aluminized culverts shall be used on concrete driveways. All entrance culverts shall be new with a minimum diameter of 15" or its pipe-arch equivalent. Minimum gauges shall correspond to current Kansas Department of Transportation Specifications. Entrance culverts shall be of sufficient length to maintain a minimum 20 foot wide entrance top and match the side slopes. End sections shall be used and all culvert sizes shall be approved by the County Engineer.
- A minimum of 12" depth of cover, including surfacing, shall be maintained over all metal culverts. Minimum cover for concrete culverts shall be per manufacturer specifications.
- No headwalls on entrance culverts shall be permitted.
- Maximum allowable size of metal pipe shall be 8 feet diameter.
- Smooth wall steel pipe may only be used with prior permission from the County Engineer.
 - Smooth Wall Steel Pipe – Steel pipe may be new or used. Wall thickness shall be ¼" or greater and the pipe shall be free of pinholes and scaled rust. In the event smooth wall steel pipe is joined together, it must be continuously welded around the seam. End sections shall be constructed by cutting the pipe to match the side slope.
- No plastic pipe will be allowed

Stabilized Subgrade:

Remove all existing vegetation. Compaction shall be Type B, MR-90 to a depth of 6 inches the entire width of the roadbed.

Modified Base:

For all hard surfaced roads, the modified base shall include the entire width of the roadbed including shoulders. The type of stabilizing agent (cement, cement kiln dust, lime, rock, fly ash, ect.) shall be determined from appropriate soil testing and approved by the County Engineer. The strength of the modified base shall be equal to or

exceed the strength of 8 inches of crushed rock. Modified base shall be compacted to a minimum of 95% of standard density with a range of optimum moisture of plus or minus 3%. The depth of the modified base shall be determined by the design engineer.

Curbing & Sidewalks:

Curbing and sidewalks are not generally a requirement in rural developments but in some instances curbing and sidewalks may be required such as: (1) poor drainage sites, (2) when the development lies within an area of potential annexation by an incorporated city, (3) certain conditions of topography and soils and (4) at the discretion of the County Engineer.

The County Engineer may consider either full depth curbs or laid back curbs and will determine such on a case by case basis.

General Provisions:

1. Cul-de-sacs shall only be used when a through road is determined to be unacceptable due to topography, drainage constraints or economic reasons.
2. Temporary cul-de-sacs may be required when a subdivision is constructed in phases.
3. All defined drainage ways outside of the right-of-way will be designated a drainage easement. All maintenance within a publicly dedicated drainage easement will be the right, duty and responsibility of the owner of the property on which the easement is located. If maintenance is neglected or subject to other unusual circumstances and is determined to be a hazard or threat to public safety by the Director of Public Works, the County may perform corrective maintenance and charge the expenses to the property owner. Public Works officials will have the right to enter upon the easement for purposes of periodic inspection or corrective maintenance or both. No property owner may construct, maintain or allow any natural or non-natural structures or vegetative barriers (including but not limited to trees, shrubbery, berms, fences and walls) within a publicly dedicated drainage easement that the Director of Public Works finds impedes, detains, retains or otherwise interferes with the drainage of storm water regardless of the source of the storm water. The property owner's duty to maintain publicly dedicated drainage easements will be noted on the plat.
4. Entrances shall have a minimum sight triangle distance based on the roadway design speed as per the current edition of AASHTO's Policy on Geometric Design of Highways and Streets.
5. All subdivision entrances shall connect to an interior subdivision road, excluding one or two lot subdivisions. In order to be excluded a two lot subdivision shall utilize a shared entrance. A shared entrance shall consist of a single entrance which provides access for two separate parcels.
6. Alignment of the roadways should fit closely to the existing topography to minimize the need for cuts and fills without sacrificing safety. Caution should be taken to assure the safety of the road is not reduced and the vertical and horizontal alignments are appropriate for the selected design speed.
7. Centerline profile grades shall not be less than .5% if curb & gutter are utilized.

8. Vertical curves shall be designed to assure a minimum stopping sight distance based on the design speed per the current edition of AASHTO's Policy on Geometric Design of Highways and Streets.
9. Any applicant who encroaches on the legal right-of-way of a State highway is required to obtain prior approval from KDOT.
10. Any applicant who encroaches on the legal right-of-way of a County or Township road is required to obtain prior approval from Riley County.
11. All entrances on corner lots shall be placed a minimum of 50 feet from the edge of the driving surface of the intersecting street.
12. All roads shall be warranted by the developer/contractor for a period of one year effective upon the County/Township acceptance of the construction. The Developer/Contractor shall provide the County with a written copy of a warranty and a one year maintenance bond valued at 10% of the construction cost. During the one year warranty, the County/Township shall assume the maintenance of these roads but all labor and material costs associated with any repairs shall be the responsibility of the Developer/Contractor.

Street Plans:

1. Preliminary street plans shall be submitted with the preliminary plat to the Riley County Public Works Department for review and recommendations. At a minimum, these preliminary plans should include the right-of-way required, general drainage requirements, typical cross-section and a plan and profile. A complete set of construction plans shall be submitted to the Riley County Public Works Department for approval prior to any construction. Plans shall be developed by a Professional Engineer licensed to practice in the State of Kansas and bear the stamp of that engineer. Upon final approval, two hard copies and an electronic copy of such plans shall be submitted.
2. The plans shall include but not be limited to the following elements:
 - a. A topographic map of the area with a scale of not less than one inch to 100 feet. Contour intervals shall not exceed 5 feet.
 - b. Plans, profiles and typical cross-sections, including approximate excavation quantities. Ditch profiles with grade percentages shall be shown when varying from a standard ditch. The scale for plan and profiles shall not be more than one inch to 100 feet and the scale for the cross-sections shall not be more than one inch per 10 feet.
 - c. Show specific drainage areas
 - d. Show location, type, size and lengths of all drainage structures with hydrologic and hydraulic data to be shown for each crossroad structure (drainage area, coefficient of runoff, design intensity, design runoff and flow line elevations).
 - e. Denote entrance culvert size and length for each lot being subdivided.
 - f. Sizes and map locations of all easements on or bordering the property to be subdivided; (this shall include all travel and temporary construction easements).
 - g. Road surfacing material quantities shall be shown in tons or square yards
 - h. Seeding plan shall show types and quantities of seed, fertilizer and mulch to be used on all disturbed areas within the right-of-way.
 - i. Plan showing erosion control measures during construction.

3. The developer shall also be responsible for obtaining any additional permits required by state or federal agencies (i.e. Division of Water Resources, Corps of Engineers). Copies of all permits shall be provided to Riley County.

Testing and Inspection:

1. It shall be the responsibility of the Developer to provide for and pay all costs associated with the testing of materials and construction inspections.
 - a. Materials, which are utilized in the project, shall be tested in accordance with current KDOT standards.
 - b. All required material certifications shall meet KDOT standards and are to be submitted to the Department of Public Works and approved prior to being incorporated in the project.
2. The Construction Inspector shall be certified to perform inspections under KDOT guidelines or provide documentation they have the necessary experience and skills. All Construction Inspectors shall be approved by the Riley County Public Works Department prior to any work commencing.
 - a. The Construction Inspector shall be present on the job site during but not limited to the following operations:
 - i. When compaction operations are being performed
 - ii. When drainage structures are being installed
 - iii. During all surfacing operations including the placement of concrete, asphalt, curing compound and the sawing of any joints
 - iv. During the trenching, placement and backfill of all water, sewer and storm water lines
 - v. During backfilling operations
 - vi. During subgrade stabilization modification operations
 - vii. Frequency and documentation of on-site testing and inspection shall be performed in accordance with KDOT guidelines unless noted otherwise in these specifications or directed by the County Engineer

APPENDIX A

Riley County Pavement Design Standard

All pavement design (flexible and rigid) shall be based on AASHTO design methodologies given the following parameters.

All Pavement Design Should Be Based on the Following Parameters:

- 25-Year Design Life
- In situ soil characteristics as determined by an approved laboratory (determined by the County Engineer) using the AASHTO T274 test procedure or predicted from correlations with non destructive deflection measurements
 - Testing frequency shall be two tests per lane mile with a minimum of two tests per roadway project
 - Testing locations shall be selected to provide the most representative results of the site's soil characteristics
 - Additional testing may be required as directed by the County Engineer
- 2.3 Change in Serviceability
- Equivalent Single Axle Loads Determined by Traffic Study
- Reliability Factors of 85, 80, 75 for Arterial, Collector, and Local Roadways Respectively
- Special under pavement drainage may be required as directed by the County Engineer

Asphaltic Pavement Design Should Be Based on the Following Parameters:

- Minimum overall thickness of six inches
 - Minimum of four inches HMA Commercial Grade (Class A); maximum 25% RAP with 3% air voids; base material
 - Minimum of one inch or maximum of two inches of HMA Commercial Grade (Class A); maximum 2" thickness & 15% RAP with 3% air voids; surface material
- Overall Standard Deviation of 0.45 inches

Concrete Pavement Design Should Be Based on the Following Parameters:

- Minimum overall thickness of 6 inches
- Overall standard deviation of 0.35 inches
- Concrete compressive strength of 4,000 psi
- Drainage coefficient of 1.0
- Coefficient of load transfer of 3.8 for pavements without dowels and 2.8 for pavements with dowels
- Dowels required for pavements greater than eight inches in thickness