

CHAPTER 5 – TRANSPORTATION SYSTEM

INTRODUCTION

The present and future characteristics of the transportation system supporting the community in large measure influences that community's long-range patterns of growth and development. Adequate transportation is vital to the movement of raw materials and to the distribution of the commodities and products of agriculture and local industry. Adequate transportation is equally vital in an internal sense as the day-to-day activities of the population are heavily dependent upon direct, efficient and safe access to all portions of the community via the transportation system.

The purpose of the transportation element is to review the current transportation systems serving the community and explore the ways and means by which these systems can continue to serve an enlarging population and expanding economy in the future.

SURFACE TRANSPORTATION SYSTEM

As stated in the previous Comprehensive Plan, the surface transportation system has its own unique characteristics and classifications, which are:

Roadway Classification System

The existing road and highway network is classified by function. Roads and highways are grouped into classes or systems according to the service they provide. The factors that identify roadway classifications include:

- The level of through-traffic movement; and
- Access to adjacent land or individual properties.

Roadways are not classified by the amount of traffic they carry; however, higher traffic volumes are usually consistent with upper level roadway classifications, as discussed below.

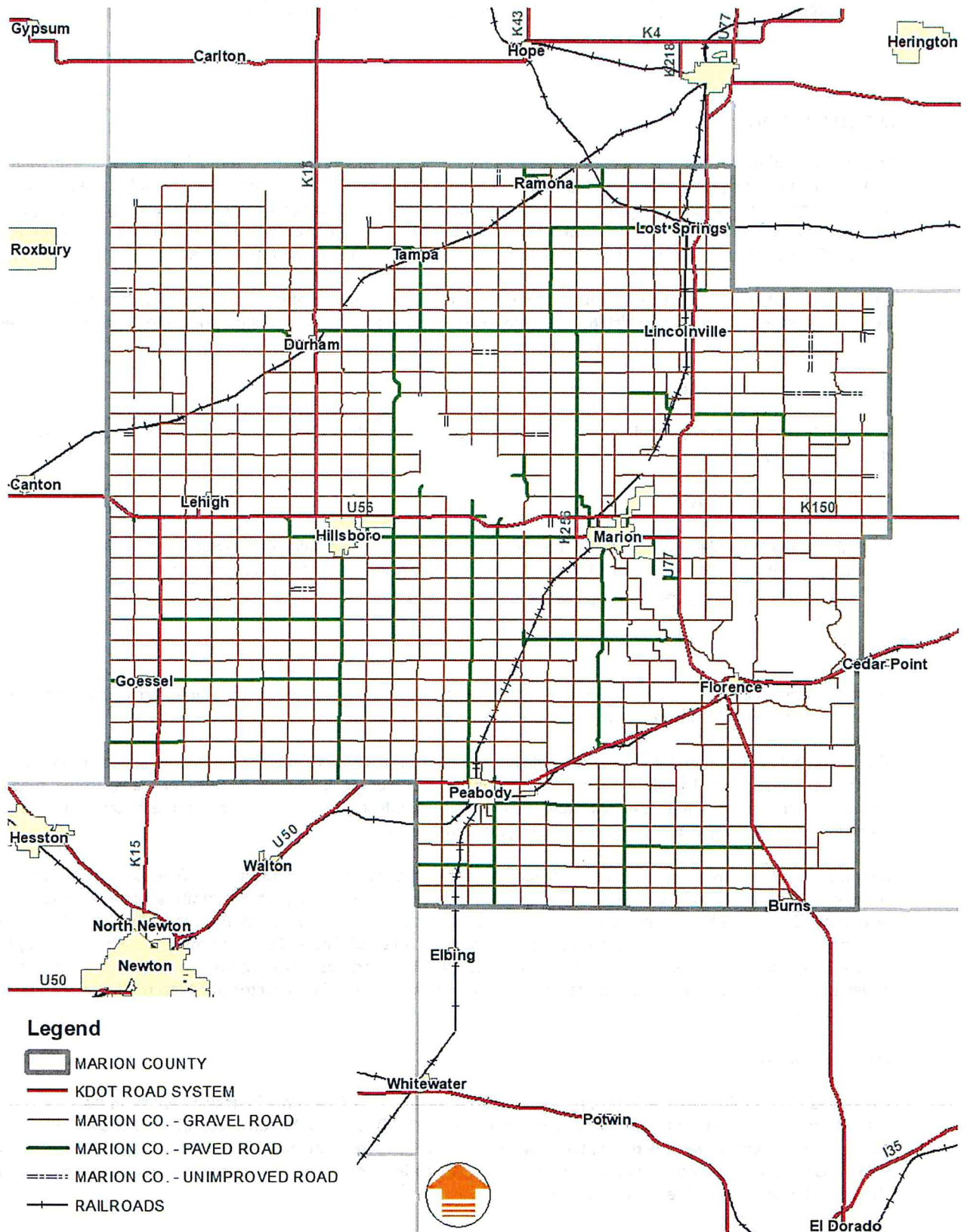
The functional classification for roadways employs a hierarchical structure to identify the operation of all roadways within a transportation system. The hierarchy of road types in ascending order is: local roads, collector roads, arterial roads, and expressways/freeways. Lower level roadways, such as local or collector roads, provide more direct access to property than do higher level roadways, such as arterial roadways or expressways.

Roadway classifications dictate the design standards for the construction of a roadway. The function of a roadway, traffic volume, and adjacent land use determine the type of roadway that should support daily traffic activity. General roadway design standards have been developed by the American Association of State Highway Transportation Officials (AASHTO) as defined in "A Policy of Geometric Design and Highways and Streets." The ability to improve an existing roadway by constructing additional lanes or other improvements to AASHTO standards, however, may be constrained by the existing development in growth areas. The standards summarized below for arterial, collector, and local roadways also reflect locally adopted standards.

LOCAL ROADWAYS

Local roadways provide direct access to private property. The ideal traffic volume for local roadways is less than 1,500 vehicles per day. The recommended width for a local roadway is 28 feet and the recommended minimum right-of-way is 60 feet. Local roadways serving residential areas should be constructed with an enclosed storm water system. On-street parking is usually permitted. However, in order to meet fire codes, which require a 20-foot path for equipment, parking should be limited to one side of the roadway.

FIGURE 9: MARION COUNTY ROADWAY MAP



COLLECTOR ROADWAYS

Collector roadways can be further classified as minor collector roadways (two-lane) and major collector roadways (three-lane). The two-lane collector roadway functions to collect traffic in residential neighborhoods. Because traffic volumes on two-lane collector roadways may range between 1,500 and 5,000 vehicles per day, residential properties abutting the collector road may not be as desirable as those abutting a local road. The road width should accommodate two 16-foot lanes and curb and gutter for a width of 36 feet. To accommodate sidewalks and street lighting, a minimum right-of-way of 60 feet is needed. Depending on local conditions such as traffic volumes, up to an 80' right-of-way may be warranted. Parking and private access to the collector should be discouraged. If needed, parking should be allowed on one side only.

A three-lane collector roadway section is appropriate for collecting traffic in commercial land use areas, such as a business park or shopping center where traffic demand is expected to range between 1,500 and 12,000 vehicles per day. This road section includes two 12-foot through lanes, and can be widened by adding one 12-foot center left turn lane. The recommended road width for a three-lane collector including curb and gutter is 40 feet. Sidewalks should be provided on both sides. The right-of-way width to allow for the roadway, sidewalks and street lighting should be 80 feet. On-street parking should be prohibited.

ARTERIAL ROADWAYS

Arterial roadways can be further classified into minor arterial roadways (four-lane) and major arterial roadways (five-lane). Minor arterial roadways are appropriate for carrying traffic through primarily residential areas without directly accessing any of the properties. A minor arterial road section includes four 12-foot through lanes and should provide additional left-turn bay at all signalized intersections and any major intersections. A minimum travel width of 52 feet and right-of-way width of 100 feet are recommended. Sidewalks should be provided on both sides. Only public roads should be allowed to access a four-lane arterial road and road spacing should be related to design speed as per a five or six-lane roadway. The ideal range for traffic volume on a four-lane arterial roadway is between 12,000 and 25,000 vehicles per day.

Major arterial roadways serve major activity centers and carry a high proportion of traffic on a limited number of roadway miles. A road section includes two 12-foot through lanes in each direction and between a 12-foot and 16-foot center two-way left-turn lane. A minimum road width of 65 feet and right-of-way of 100 feet are recommended. Traffic volumes on this type of roadway range between 25,000 and 35,000 vehicles per day.

HIGHWAYS

Highways are primary arterial roadways that are partially access controlled. These routes are typically the highest traveled corridors, serve major activity centers and carry the major portion of trips entering or leaving the county and the cities of the county.

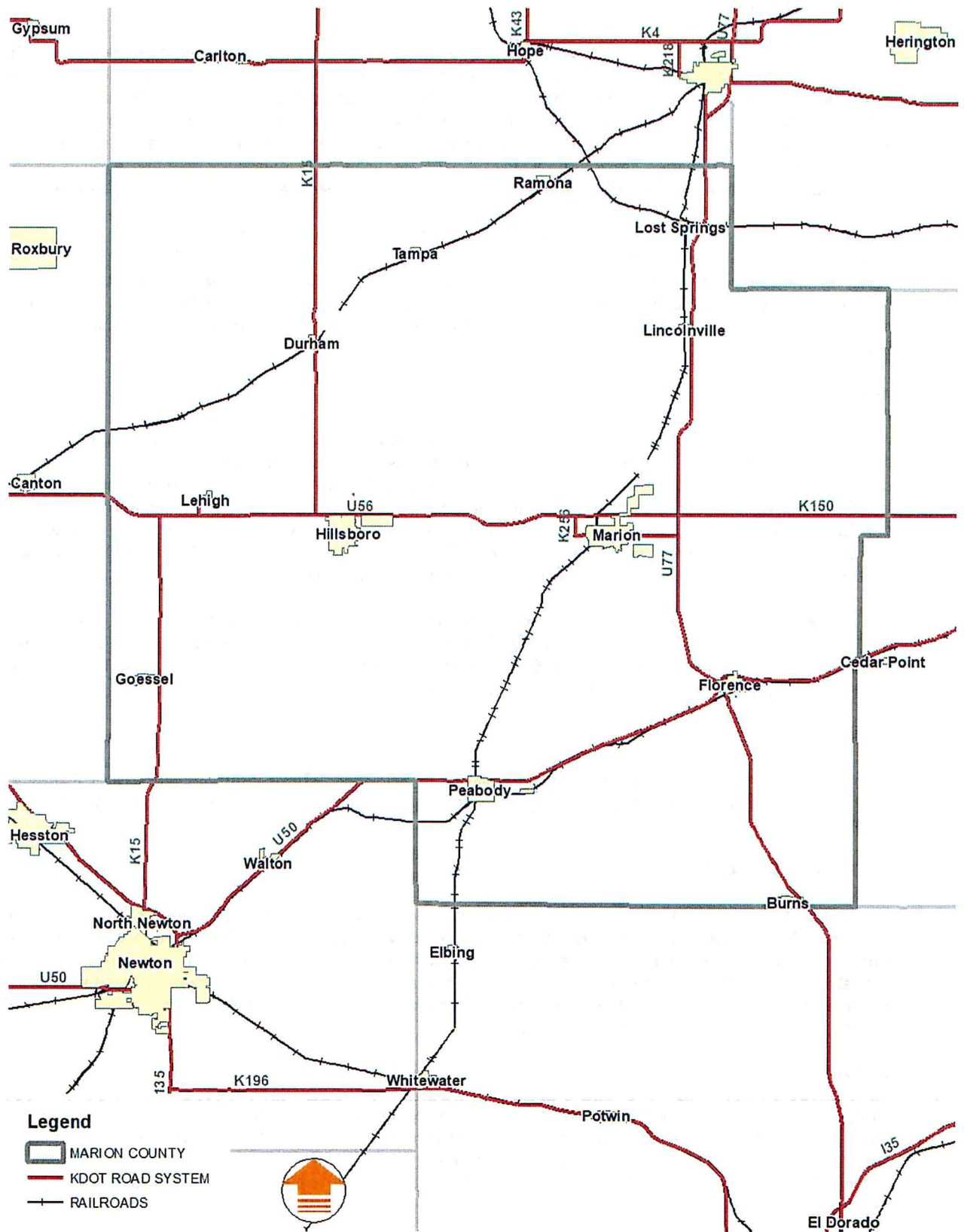
HIGHWAY CORRIDORS

U.S. Highways 50/56/77 and State Routes 150/256 function as major arterial roadways, providing both regional access and local arterial access. Major land uses such as the Marion Reservoir access roads and the Marion Lake are served by these primary roadways. Development along the federal and state highways must be carefully planned in order for efficient funneling of traffic onto local and collector roads. Further, roads and driveways intersecting the local arterials and major collectors that provide links to the highways, must be designed in a manner that will minimize traffic conflicts and maximize access to new development and major land uses.

ACCESS CONTROL

Just as the design of a roadway helps to move traffic efficiently, controlling access to the roadway system can help do the same. The lack of an adequate access control policy or plan increases the probability of having traffic hazards and increased traffic congestion. Traffic hazards and traffic congestion reduce the capacity of the roadway to accommodate the traffic volumes for which it is designed. Traffic congestion and traffic hazards increase the pressure to widen roadways, which requires additional public funds.

FIGURE 10: MARION COUNTY STATE HIGHWAY MAP



Roadway capacity can be increased or decreased in a number of ways. The method utilized most frequently to increase capacity is to widen a road to provide additional travel lanes. In some instances, however, it is not feasible to add additional travel lanes due to land uses on either side of existing roadways. In these instances, other methods of increasing roadway capacity may be more appropriate. Other methods include constructing intersection improvements, turn bays, medians, restricting road and driveway access or providing traffic signal timing improvements. Conversely, road capacity can be decreased by adding cross roads, driveways, traffic signals, or other traffic control devices. By developing an access control policy, road capacity can be maintained to efficiently accommodate future development.

Specific design characteristics associated with each functional classification depend on factors such as projected traffic volumes and local access control policies. Higher traffic volumes such as those exceeding 20,000 vehicles per day warrant construction of a four or five lane arterial road. Traffic volumes of 10,000 or 15,000 vehicles per day can be accommodated by a four-lane arterial road or by a two-lane arterial road that includes turn bays, good signal and intersection spacing, and private driveway access control. In many cases, a well-built two-lane arterial road can function as well as a four-lane road at approximately half the cost.

Acceptable traffic volumes on a major arterial roadway can range between 25,000 and 35,000 vehicles per day. However, excessive curb cuts and mid-block turning movements can reduce capacity. The center turn lane is appropriate because of frequent entrances into higher traffic generation land uses such as business parks and retail centers. A median can be constructed in locations where left-turns should be prohibited and on-street parking should not be allowed. For design speeds greater than 35 mph, or for peak hour right turn-in traffic volumes exceeding 100 vehicles, it is recommended that a right turn lane be constructed along the arterial roadway approaching the curb cut.

U.S. 56/50/77 and State Highway 15/256/150 provide regional access as well as access to abutting properties. Therefore, it is critical that a sound access control policy be followed as development occurs on property directly abutting the highway. Access control for major collector streets parallel to highways and county roads become critical for efficient movement of local traffic as residential and commercial growth occurs.

As future development occurs, minor roadway improvements may be necessary to prevent traffic congestion from increased traffic movements accessing U.S. 56. Such improvements may consist of turn bays, restricting road and driveway access, or providing traffic control devices on local arterial roads and access roads. The need for these improvements must be carefully balanced against the need to allow for the efficient movement of traffic through the County. Therefore, the carrying capacity of the highways must be protected by limiting the number of cross roads, driveways, traffic signals, or other stop controls.

INTERSECTION SPACING

Adequate distance between intersections is essential for the safe and efficient flow of traffic. Appropriately spaced intersections provide through-motorists an opportunity to respond to traffic entering the street from a side street. Table 4.1 shows the recommended minimum standards for spacing intersections, determined by through-traffic speed.

TABLE 6: MINIMUM INTERSECTION SPACING STANDARDS

Through-Traffic Speed	Minimum Intersection Spacing
30 mph	210 feet
35 mph	300 feet
40 mph	420 feet
45+ mph	550 feet

Source: Institute of Transportation Engineers

DRIVEWAY SPACING

Like a street, private driveways create an intersection with a public street. Conflicts and potential congestion occur at all intersections - public and private. Methods to reduce conflict include:

- Separating the conflicts by reducing the number of driveways and intersections;
- Limiting certain maneuvers such as left turns; and
- Separating conflicts by providing turn lanes.

No access drives should be located within the operations area of an intersection. Driveway conflicts need to be spaced in order to eliminate overlaps between through traffic and right turns.

It is recommended that new driveway locations should comply with the minimum corner clearance criteria indicated in Figure 4.1. Proper spacing of driveways permits adequate storage and stacking of automobiles on the public street. This distance may have to be increased in cases with high volumes to ensure that driveways do not interfere with the operation of turning lanes at intersections.

The number of driveways accessing undivided arterial roadways should be minimized. The following standards in Table 4.2 are based on AASHTO standards and the Institute of Transportation Engineers (ITE) Manual.

TABLE 7: SUGGESTED MAXIMUM DRIVEWAY GUIDELINES

Maximum Number of Driveways	Driveway Spacing	
	Undivided Arterial Roads Length of Lot Frontage	Divided Arterial Roads Length of Lot Frontage
1	0-399 feet	0-529 feet
2	400 - 899 feet	530 - 1199 feet
3	900-1,399 feet	1200 - 1859 feet
4	1,400-1,899 feet ¹	1860 - 2525 feet ²

Source: Institute of Transportation Engineers (ITE) Manual

Notes:

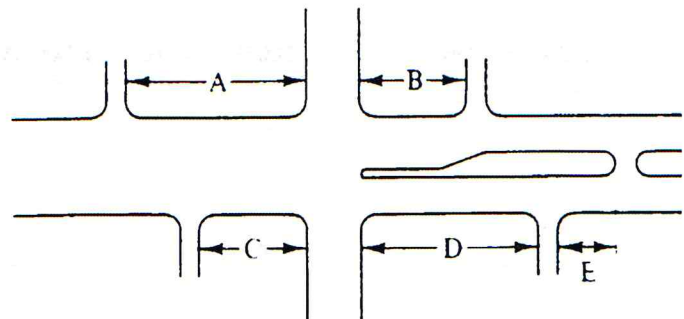
¹ For each 500 feet above 1899 feet, one additional driveway is permitted.

² For each 665 feet above 2525 feet, one additional driveway is permitted.

TABLE 8: CORNER CLEARANCE GUIDELINES

Item	Functional Classification of Road		
	Arterial	Collector	Local
A	230	175	50
B	230	175	50
C	230	175	50
D	75	75	0

Source: Based on Institute of Traffic Engineers Handbook



Specific minimum corner clearance guidelines are listed in Figure 4.1. These guidelines can be used to regulate new commercial developments located along arterial or collector streets.

ROADWAY SURFACE MATERIAL STANDARDS

The major roads of Marion County should conform to one of the following standards:

TABLE 9: ROADWAY MATERIAL OPTIONS

Option	Material Description
A	Must meet specifications of the Kansas Department of Transportation (KDOT).
B	Six (6) inches of Portland cement concrete over a six-inch compacted subgrade 95 percent of standard maximum density.
C	Two (2) inches of Type 3 asphaltic concrete, 10 inches of Type 1 asphaltic concrete base course and a six (6) inch compacted subgrade 95 percent of standard maximum density.
D	Two (2) inches of Type 3 asphaltic concrete with six (6) inches of Type 1 asphaltic concrete base course and a six (6) inch compacted subgrade 95 percent of standard maximum density.
E	Three (3) inches of Type 3 asphaltic concrete with a five (5) inch stabilized aggregate base and a six (6) inch compacted subgrade 95 percent of standard maximum density.
F	Aggregate rock—variable—with a five (5) inch stabilized aggregate base and a six (6) inch compacted subgrade 95 percent of standard maximum density

AIR TRANSPORTATION

The two “air facilities” existing within Marion County are the Marion Municipal Airport southeast of Marion, and the Alfred Schroeder Field on the west side of Hillsboro. These are both owned and operated by the respective cities and are surrounded mostly by lands devoted to agricultural uses. Beyond some minor basic services, such as hangers, nothing more is provided at either airport, such as passenger service. There is not an FBO at either facility; however Alfred Schroeder Field provides fueling facilities. Both airports have paved runways, with Alfred Schroeder Field having radio-activated lighting. Several small, private landing strips also are scattered around the county, but these are for private users.

RAIL TRANSPORTATION

Marion County, as most counties in Kansas, has seen a significant reduction in the number of rail miles serving the county.

The Union Pacific Railroad (UPRR) has two lines crossing Marion County, one on the east side of the County that comes from Herrington, goes through Marion and heads south and west toward Peabody. The other UPRR line generally comes from Herrington and goes south and west across the northern part of the County through Tampa and Durham before exiting the County on the west side.

The Burlington Northern/Santa Fe Railroad (BNSF) also has a couple of lines within the County. The primary one enters on the eastern side of the County coming from Emporia and going on to Newton and points further west. This line goes through Florence and Peabody and also is the main line for the Amtrak service in Kansas, although no stops occur in Marion County. The other BNSF line connects to the UPRR at Ramona and goes north and west before leaving the County.

The rail services within the county will continue to play a vital role in offering support for industrial development. The ability to maintain a connection with the larger rail companies will continue to be a challenge and the county should participate with the local cities and Economic Development agencies in maintaining support for rail services. Failure to do so will reduce the ability to attract additional businesses and will increase the burden placed on the surface transportation system by increasing the amount of heavy truck traffic. The costs associated with supporting rail services for the movement of bulk goods has been shown to be very economical when compared to the costs to maintain the surface transportation system capable of supporting more heavy truck traffic.

OTHER TRANSPORTATION SERVICES

PUBLIC TRANSPORTATION SERVICES

There is a limited public transportation service serving the elderly within the county. However, as is normal in most counties throughout the state, this service is limited in its scope and only a relatively small portion of the county residents gain benefits from it.

This does not mean it is unnecessary. Quite the contrary. But the likelihood of obtaining the necessary funding to expand this service to a larger sector of the citizenry is very remote. However the county should continue to remain vigilant in evaluating all potential transportation services that would enhance the quality of life for a larger sector of the public.

ROAD STANDARDS

Road standards within Marion County fall into four categories, those for which Marion County is directly responsible, those that are the responsibility of the local township governments, those that are the responsibility of the cities, and those that are the responsibility of the State of Kansas. As noted earlier, the rural roads that are not a part of the Kansas Department of Transportation system are the responsibility of the county, except for some private roads within some rural subdivisions.

As noted later in this chapter, the county needs to completely review its policies regarding the standards for its rural road network and the provision of internal roads within new rural subdivisions. The opportunity to do the right thing for the long term is only available during the initial review and approval process that is part of the Subdivision Regulations.

PROPOSED ROAD IMPROVEMENTS

The most significant road improvements within Marion County continue to be the planned projects by the Kansas Department of Transportation. And the most significant change these improvements will have in Marion County will be the upgrades primarily to US Highway 77 and US Highway 50.

The County should remain active and diligent in coordinating with KDOT on all future road projects.

PLANNING IMPLICATIONS

The planning implications for the transportation system are many and varied. The county should continue to support the improvements proposed by the Kansas Department of Transportation for area. The county should also continually pursue funding support for additional public transportation services for its citizens, not only for the elderly programs, but for all citizens with need.

The most important planning implication that directly affects county government, however, deals with articulating the policies and standards outlining the requirements of new development on the rural road network within the Subdivision Regulations. This is an issue that the county should be doing more than it recently has. This is especially important as the County continues to deal with the "rural development" issue of being more generous regarding lot splits and isolated home development.

GOALS AND OBJECTIVES

TR-1 GOAL: PROVIDE AN EFFICIENT AND SAFE TRANSPORTATION SYSTEM DESIGNED TO MOVE PEOPLE AND GOODS WITHIN AND AROUND THE COUNTY.

TRO-A OBJECTIVE: Promote improvement to traffic flows within and through the county by proper use and development of all the road types.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County.

TRO-B OBJECTIVE: Promote the development and use of alternative modes of individual and mass transportation and the infrastructure necessary to support the same within the county.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County, all cities, Kansas Department of Transportation.

TRO-C OBJECTIVE: Ensure that new private development in rural Marion County does not negatively impact the existing transportation system nor place demands for major upgrades to the transportation system in an untimely manner.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County.

TRO-D OBJECTIVE: Discourage unplanned residential development along section-line roads in the unincorporated areas.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County.

TRO-E OBJECTIVE: Promote the enhancement of regional transportation improvements that will benefit the county. Strongly support those major road improvements included in the Kansas Highway Improvement Plan.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County, all cities, Kansas Department of Transportation.

TRO-F OBJECTIVE: Establish construction standards within the Subdivision Regulations outlining appropriate requirements for improvements to roads and streets in new subdivisions.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County.

TRO-G OBJECTIVE: Establish guidelines within the Subdivision Regulations for improvements to existing roads and streets impacted by proposed developments, including an impact fee where appropriate.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County.

TRO-H OBJECTIVE: Support the provision of special transportation needs, especially for an aging population, through programs at the county level or by private means.

TIMEFRAME: On-going.

RESPONSIBLE PARTIES: Marion County, all cities, Kansas Department of Transportation, Department of Aging.

RECOMMENDATIONS

In order to enhance the transportation system within Marion County, the following recommendations are given.

1. The county should establish design and construction standards for all streets, by street classification, being sensitive to natural terrain and drainage networks.
2. The Subdivision Regulations should be modified to prohibit, where possible, direct access to the section-line road system from adjoining rural residential properties. The section-line roads are intended to function as major traffic carriers and access to these roads should be limited as much as possible. In addition, it should be clear within the Subdivision Regulations that additional right-of-way should be provided at the time of platting to accommodate future road improvements.
3. The county should consider the establishment of an impact fee program to provide funds for the future improvement of the road network that would serve the new development. This should be developed to directly relate the fee collected to the level of improvements needed.
4. The county should place a high priority on supporting those projects identified within the Kansas Highway Improvement Plan within Marion County.