Draft – January 25, 2008

Transportation 2030

Lawrence/Douglas County • Long Range Transportation Plan

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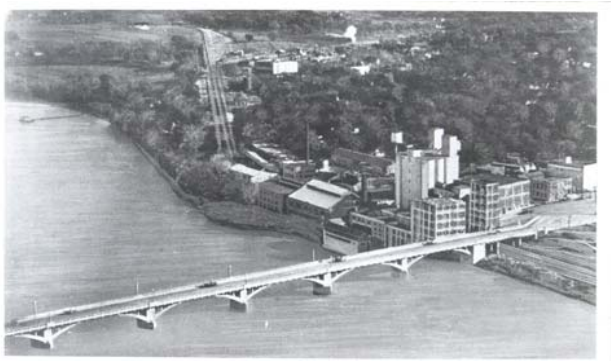

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Glossary

ADA	Americans with Disabilities Act (ADA) of 1990
AVL	Automated Vehicle Locator System
BAC	Bicycle Advisory Committee
BNSF	Burlington Northern-Santa Fe Railroad
CIP	Capital Improvement Program
CTD	Coordinated Transit District
CTP	Comprehensive Transportation Program
E+C	Existing Plus Committed
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HOV	High-Occupancy Vehicle Lanes
ITS	Intelligent Transportation Systems
KDOT	Kansas Department of Transportation
KLINK	Kansas Connecting Link Program
KRT	Kaw Regional Transit
KTA	Kansas Turnpike Authority
KU	University of Kansas, Lawrence
KUoW	KU on Wheels Transit Service
LOS	Level of Service

LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization, such as the Lawrence/Douglas County Metropolitan Planning Organization
NHS	National Highway System
O & M	Operation and Maintenance
PPP	Public Participation Plan
PTAC	Public Transportation Advisory Committee
ROW	Right-of-Way
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, 2005
SCCHF	Special City and County Highway Fund
SLT	South Lawrence Trafficway
SOV	Single Occupant Vehicle
STIP	State Transportation Improvement Program
STP	Surface Transportation Program
T2030	Transportation 2030, the Long Range Transportation Plan for the Lawrence-Douglas County region
TAZ	Traffic Analysis Zone
TDM	Travel Demand Management
TE	Transportation Enhancements
TEA-21	Transportation Equity Act for the 21st Century
The "T"	Lawrence Transit System
TIP	Transportation Improvement Program
TSM	Transportation System Management
UGA	Urban Growth Area
UP	Union Pacific

Chapter 1: Context and Issues

Introduction

Transportation 2030 (T2030) is the long range transportation plan for the urbanized region that includes the City of Lawrence and surrounding area of Douglas County. *T2030* identifies future transportation investments for all modes of transportation. Although the region's mobility continues to be dominated by the automobile, other modes such as public transit, pedestrian, and bicycle transportation are becoming increasingly important means of travel and are addressed by *T2030*. Aviation travel and freight movement are also addressed in the planning process. *T2030* updates and replaces the *T2025* Long Range Transportation Plan.

T2030 identifies specific services and projects for each mode of travel that will be necessary to meet the transportation needs of the region through 2030. Financial resources available to implement *T2030* have also been identified. Similar to virtually every community across the nation, anticipated revenues are not sufficient to fund all of the transportation needs. Therefore, projects have been prioritized for implementation to meet the federal requirement that *T2030* be financially constrained.

The area has seen steady population and employment expansion for several decades and is expected to continue this trend for years to come. To accommodate this future growth, transportation services and infrastructure are developed and implemented though the regional transportation planning process carried out by the Lawrence/Douglas County Metropolitan Planning Commission. This document is a product of that process.

WHY DO WE NEED A PLAN?

For several reasons:

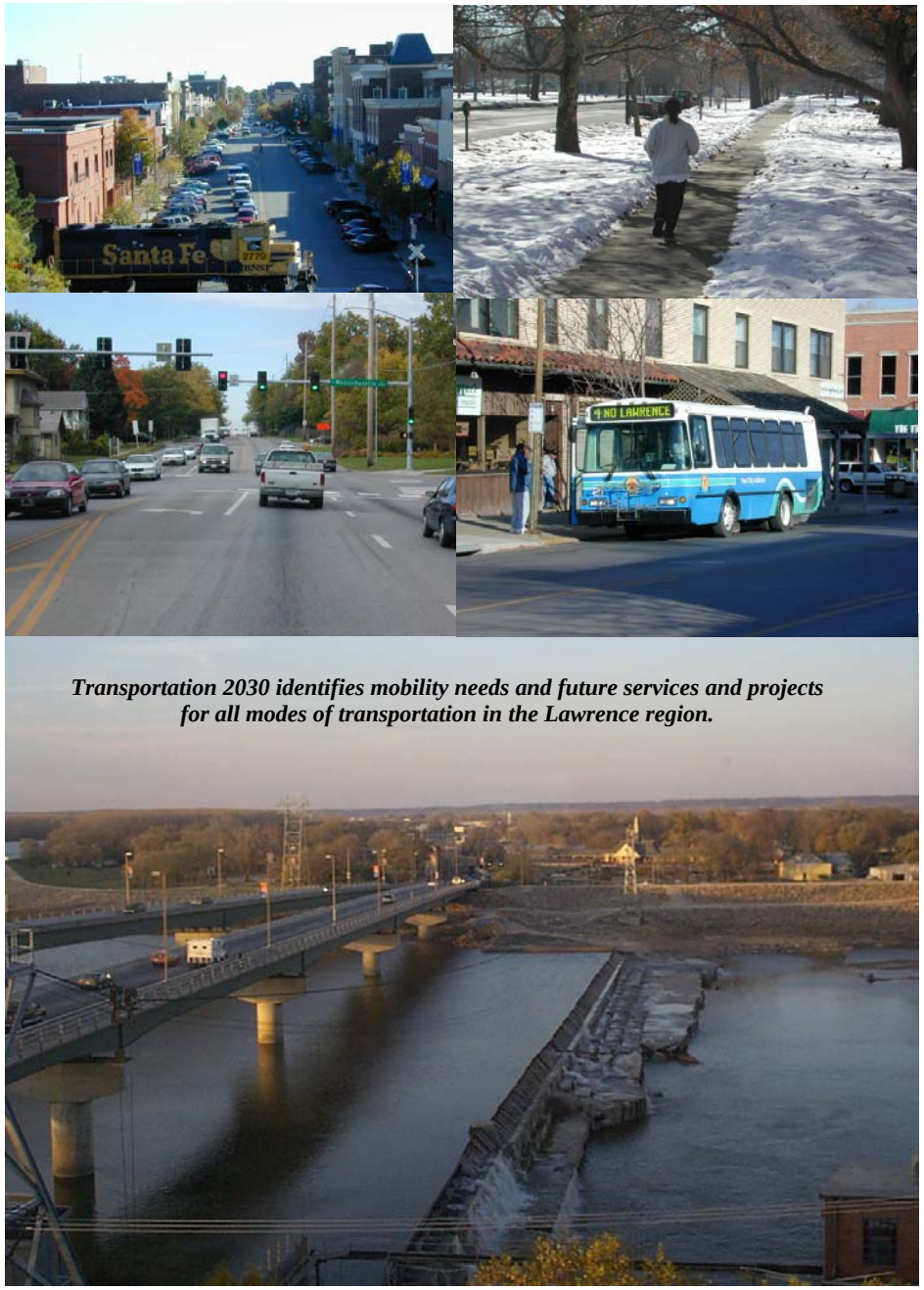
- As congestion increases on roads due to growth, development, and more travel through the region, it is clear that the current roadway system will not be sufficient to accommodate future needs.
- Citizens of the region are asking for increased alternative mode options, consistent with recent federal legislation promoting their use.
- Federal funds make up a significant portion of the region's transportation dollars, and these funds come with a requirement for a long-range transportation plan to ensure proper expenditure of revenues.

Beyond any of these reasons, a long range transportation plan makes sense. Good planning involves citizens, increases efficiency and effectiveness of the investment, and promotes transportation services and infrastructure that are consistent with the community's desires. The planning process enhances the community's character and quality of life by considering the interaction between land use and transportation and their cumulative effect on the built and natural environments.

WHAT ARE THE IMPORTANT TRANSPORTATION ISSUES?

As a growing community, the Lawrence/Douglas County region faces numerous land use, transportation, and environmental issues. Through *T2030's* community involvement process, many concerns, desires, ideas, and issues were brought forth for consideration in the planning process. Among these are:

- ***enhancing transit options*** through system coordination with existing university and other systems in northeast Kansas; optimizing bus routes, frequency and service hours to reflect the needs of a mature city; improving pedestrian connections; keeping pace with fleet modernization; and, transit facility and other infrastructure needs;
- ***serving the needs of regional travelers*** by providing better roadway connections around Lawrence;
- ***constructing sensible and effective roadway improvements*** that maintain the character of the City, stay ahead of the congestion problem, provide for multimodal travel, and are environmentally sensitive;
- ***managing congestion*** through lower-cost solutions, including travel demand management, transportation system management, technology, and intelligent transportation systems;
- ***addressing the growing volume of truck traffic*** through identifying future trends in freight movement and planning for appropriate improvements to the transportation system;
- ***increasing bicycle travel opportunities*** by constructing more bike trails, paths, and lane facilities, as well as providing missing connections in the bicycle system;
- ***providing a pedestrian-friendly community*** by constructing missing segments in the sidewalk network, increasing pedestrian safety at crosswalks and intersections, and implementing amenities and facilities in activity areas consistent with walkable community objectives; and,
- ***balancing land use, transportation, and environmental needs*** to enhance quality of life, minimize the effects of sprawl, and promote the economic competitiveness of the region.



Transportation 2030 identifies mobility needs and future services and projects for all modes of transportation in the Lawrence region.

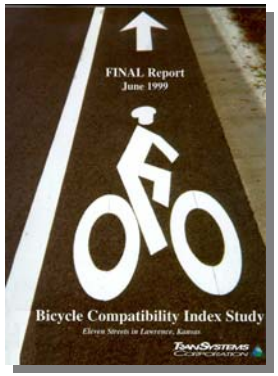
Planning Process and Context

Related Plans and Studies

T2030 is the most recent transportation plan for the Lawrence/Douglas County region. Like many planning documents, it incorporates and builds upon the concepts and recommendations from previous efforts. Comprehensive land use plans address all aspects of a community's future, from land use patterns to sewer and water infrastructure, from parks to open space. Transportation issues typically make up an element of the comprehensive plan, such as *Horizon 2020*. However, due to federal requirements, a separate transportation plan is developed for MPO regions and is often incorporated by reference into comprehensive plans. Corridor studies and modal plans include a greater level of detail and specificity than does the transportation plan. Plans and studies related to the development and implementation of *T2030* include three types:

Comprehensive and Transportation Plans

- *Transportation 2025 – The Long-Range Transportation Plan*
- *City of Lawrence Coordinated Public Transportation Development Plan (2006)*
- *Horizon 2020 – The Comprehensive Land Use Plan for Lawrence and Unincorporated Douglas County* (1996)
- *Kansas Long-Range Transportation Plan* (2002 and 2007)



Modal Plans

- *Regional Commuter Rail Study* (2002)
- *City of Lawrence Airport Feasibility Study* (2001)
- *Kansas Rail Feasibility Study* (2000)
- *Public Transit Implementation Plan* (1999)
- *Bicycle Work Program* (2001)
- *A Plan to Facilitate Public Transportation Alternatives in Lawrence, Kansas* (1998)
- *Bicycle Compatibility Index Study* (1998)

WHAT IS THE MPO?

A Metropolitan Planning Organization (MPO) is a federally designated agency responsible for coordinating transportation planning and programming in urbanized areas with populations of 50,000 or more. Long range transportation plans, capital improvement programs and other studies done under the guidance of and adopted by the MPO describe how federal transportation funds will be spent within the planning area under the jurisdiction of the MPO.

The Lawrence/Douglas County Metropolitan Planning Organization serves as the MPO for the region. The Lawrence/Douglas County metropolitan planning office provides staff support for the MPO.

The Lawrence/Douglas County Metropolitan Planning Organization is responsible for shaping and spearheading the transportation planning process for all of Douglas County.

Transportation 2030 was developed through the planning process conducted by the MPO. In addition to the long-range transportation plan, the MPO is responsible for producing the region's four-year transportation improvement program (currently 2008-2001) and annual work program.

Corridor Studies

- *K-10 Corridor Study (2007)*
- *Burroughs Creek Corridor Plan (2006)*
- *6th Street Corridor Plan (2003)*
- *23rd Street Corridor Study* (2002)
- *31st Street Corridor Study* (2002)
- *South Lawrence Trafficway Corridor Study* (2002)
- *U.S. 59 Corridor Study* (2000)
- *KAW Connects Study* (2000)
- *Louisiana Street Traffic Calming Study* (1999)
- *Access Management Plan for 6th Street* (1998)

Study Area

The federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requires that MPOs develop transportation plans for the urban area and unincorporated areas under their jurisdiction which are expected to become urbanized during the planning period.

The MPO has jurisdiction for transportation planning efforts over an area designated as the Metropolitan Planning Area Boundary (MPAB). This boundary includes the Urban Growth Area (UGA) as defined by the Lawrence/Douglas County MPO. The MPO has previously defined this area through the land use planning efforts embodied in *Horizon 2020*. As with any plan, the UGA is subject to change as conditions warrant. In addition, the MPAB takes into account other statutory boundaries as defined by the U.S. Census.

The Lawrence/Douglas County Metropolitan Planning Organization last designated the current Metropolitan Planning Area Boundary in December of 2001. This boundary includes all of Douglas County, including the cities of Baldwin City, Eudora, Lawrence, and Lecompton.

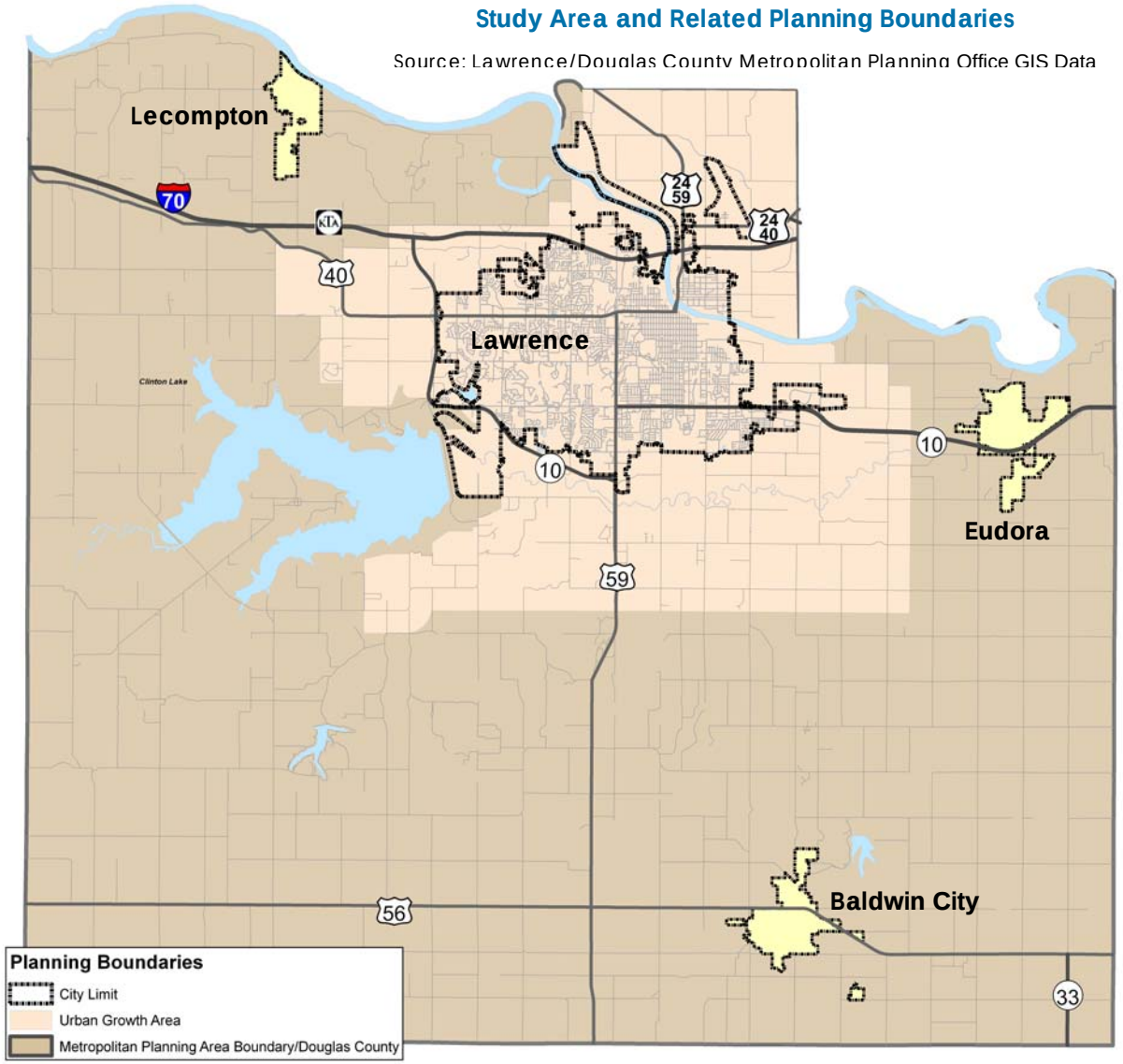
Figure 1.1 identifies the various planning areas and boundaries affecting the development of *T2030*.

Transportation 2030 addresses transportation issues and needs throughout Douglas County. However, the primary emphasis is on the urbanized area including and immediately surrounding the City of Lawrence. The travel forecasting model developed for the MPO generally encompasses the urbanized area and the immediate environs. Ultimately, the model's coverage may be extended countywide.

Figure 1.1

Study Area and Related Planning Boundaries

Source: Lawrence/Douglas County Metropolitan Planning Office GIS Data



T2030 identifies transportation facilities and services throughout Douglas County, including the Cities of Lawrence, Baldwin City, Eudora, and Lecompton.

Plan Approval Process

T2030 was developed through an open and deliberative planning process, complying with all appropriate government regulations and closely following the MPO's approved *Public Involvement for Transportation Planning* procedures.

The development of *T2030* included four components. The first component included the development of a new travel-demand computer model of the area and a diagnostic review of the previous transportation plan. The second component involved the development of transportation alternatives and a review of the region's various modal systems. The third component included the identification of roadway alternatives, testing of alternatives, and the development of the draft *T2030* document. A fourth component includes the adoption of *T2030*.

The approval process for the document included a review by the T2030 Committee and state and federal agencies followed by a 30-day public review period. Upon completion of that effort, the document was presented to the Lawrence/Douglas County Metropolitan Planning Organization. The MPO provided the opportunity for a formal public hearing. The Plan was presented to the governing bodies of the Lawrence City Commission and the Douglas County Board of County Commissioners. Simultaneously, it was received by the Kansas Department of Transportation, the Federal Highway Administration and the Federal Transit Administration.

Plan Elements: Required and Desired

Several laws, regulations, statutes, codes and other documents at the local, state, and federal levels affected the development of *T2030* by specifying requirements to be considered in the planning process or to be contained in *T2030*. These included the federal transportation legislation SAFETEA-LU, existing metropolitan planning regulations, management and monitoring system regulations, Executive Order 12898 on Environmental Justice, the Americans with Disabilities Act, and others.

SAFETEA-LU represents the largest surface transportation investment in US history. It builds on the two landmark bills that brought surface transportation into the 21st century: the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21).

SAFETEA-LU provides the primary authoritative direction on the development of *T2030*. It addresses several challenges prevalent in the current US transportation system. These challenges include improving safety and security, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, public participation and environmental protection. It also lays the groundwork for addressing future challenges.

SAFETEA-LU encourages more "efficient and effective federal surface transportation programs," as well as giving more flexibility to State and local decision makers to focus on transportation issues in their communities. This includes new schedules to update transportation improvement programs and long-range transportation plans; an improved public and agency participation plan; and a Strategic Highway Safety Plan (SHSP) that considers the results of State, regional or local transportation and highway safety planning processes.

SAFETEA-LU includes important transit and environmental elements such as: increased funding for rural transit, funding for non-motorized programs like "Safe Routes to School", establishes a new Small Starts program as part of the New Starts Program for smaller transit capital projects, streamlines the Section 4(f) environmental requirements, and establishes a new Environmental Review Process for federal EIS projects. SAFETEA-LU also makes some changes to provisions for air quality and the protection of historic and natural resources.

SAFETEA-LU Planning Factors

SAFETEA-LU federal legislation recognizes that transportation investments impact a community's economy, environment, and quality of life. As such, it states that the planning process shall provide for consideration of projects and strategies that will:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
2. Increase the safety of the transportation system for all motorized and non-motorized users.
3. Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users.
4. Increase accessibility and mobility of people and freight.

5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
7. Promote efficient system management and operation.
8. Emphasize the preservation of the existing transportation system.

These SAFETEA-LU planning factors were considered and incorporated into the planning process to the extent practical and were used to set priorities for *T2030*.

Project Listings

SAFETEA-LU identifies several categories of projects that are to be included for implementation over the life of a transportation plan. They are:

- adopted congestion management strategies;
- bicycle and pedestrian facilities;
- transportation enhancement activities;
- strategies for managing the transportation system; and
- capital investments and other measures to preserve and improve the existing transportation system.

A description of all proposed improvements in sufficient detail to develop cost estimates is included with the project listing contained within this Plan.

Financial Plan

SAFETEA-LU specifies that an estimate of available revenues for implementation of transportation improvements over the life of *T2030* must be developed through a cooperative effort between the MPO, State, and transit operators. The cost estimates for the projects, strategies, and other transportation improvements contained in *T2030* have therefore been constrained to the forecasts of reasonably available revenues.

When this requirement was enacted over 16 years ago, many communities around the country readily embraced the financial constraint philosophy. In this manner, transportation plans transformed from a wish list of projects with no clear path toward implementation to a documents that included specific and implementable transportation improvements. The financial plan for *T2030* is discussed in Chapter 14.

Public Involvement Process

Public involvement is a high priority in the transportation planning process and in the development of *T2030*. The Lawrence/Douglas County MPO's *Public Involvement for Transportation Planning* procedures reflect the region's rigorous approach to public involvement. It outlines a process that provides complete information, timely public notice, and full public access. These procedures are included in the Technical Appendix. The stakeholder and public participation process for the development of *T2030* is discussed in Chapter 3: Community Participation.

Environmental Justice

Environmental Justice provisions (Executive Order 12898) require agencies to take steps to identify and address disproportionately high and adverse impacts on minority and low-income populations through the development and implementation of *T2030*. Title VI of the 1964 Civil Rights Act requires that no person be excluded from participation in, denied benefits of, or be subjected to discrimination by any federal aid activity. These requirements are addressed in the Chapter 15: Impacts of the Plan.

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Chapter 2: Existing Conditions

In order to properly develop a community-based transportation plan for the cities of Lawrence, Baldwin City, Eudora, Lecompton, and Douglas County, it is necessary to understand their existing economic, land use, social, and transportation conditions. Understanding the trends and changes that made the region what it is today is also useful before embarking on speculations of future conditions.

Land Use and Socioeconomic Characteristics of the Community

The land uses and development patterns that make up a region provide insight into the community's economic health, environmental awareness, and transportation requirements. With regard to planning and providing for transportation facilities and services, activities that occur in each of the various land uses across Lawrence and the County form the basis of travel demand through the trips they generate. The transportation system provides the means through which this demand is met and as such is the mechanism through which commerce flows and personal mobility occurs. Expanded or new transportation facilities and services, accompanied with other types of expanded or new infrastructure, allow a community to expand into new areas as development occurs. As such, land use and transportation are inextricably linked.

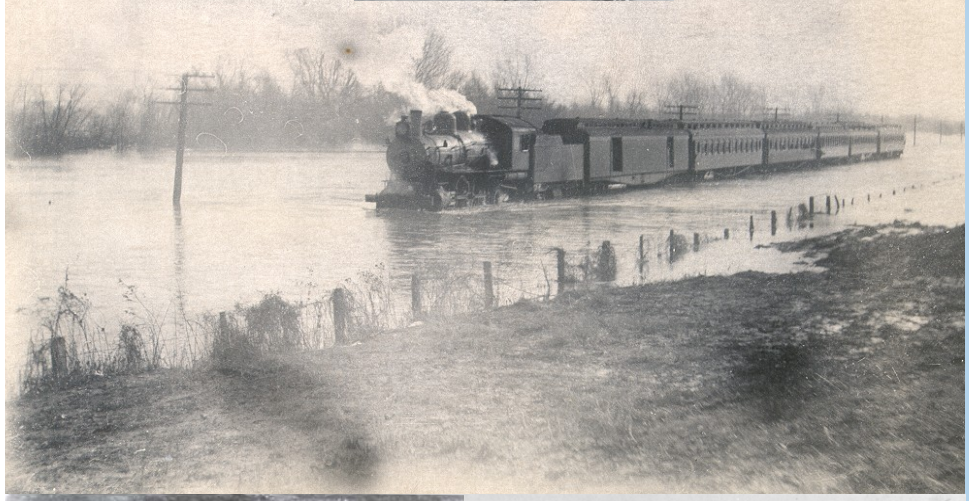
Land Forms and Barriers

Several geographic features have influenced land development and transportation facilities in Lawrence and Douglas County. They include the following:

- Mt. Oread and the University of Kansas campus are located in the middle of the Lawrence urban area and form a physical barrier to continuous street patterns. The area has significant variations in elevation. As a result, 23rd Street/Clinton Parkway is the only east-west street that extends completely from one side of the city to the other;

- The Kansas and Wakarusa Rivers and their floodplains form barriers to development on the north, south, and northeast sides of Lawrence. They also inhibit north-south street extensions;
- The Kansas River, the larger of the two rivers, has a particularly limiting effect on access from east Lawrence to North Lawrence and Grant Township; and Clinton Lake and the area below the dam limit urban development and the extension of east-west streets in the area west of Wakarusa Drive and south of 27th Street.
- Highway K-10, a freeway, divides the City of Eudora. Only Church Street and Winchester Street, each a 2-lane street, provide access from the main part of the City to the developing area south of K-10.
- The Kansas and Wakarusa Rivers also form barriers on the north side of the City of Eudora and in the case of the Wakarusa, on the west side as well. These rivers inhibit the extension of streets in these directions.

In addition to these geographic features, transportation movements are also impeded by large areas and neighborhoods with cul-de-sacs and curvilinear streets.



History 101 – Lawrence in the Early Days

Settlers of Lawrence came primarily from neighboring border and New England states as early as the 1850s. In July of 1857, the citizens of Lawrence petitioned the territorial legislature to establish a city charter, which was approved in 1858. The City of Lawrence continued to grow and prosper until it was punctuated by the destruction of Quantrill's raid in 1863 related to the Civil War.

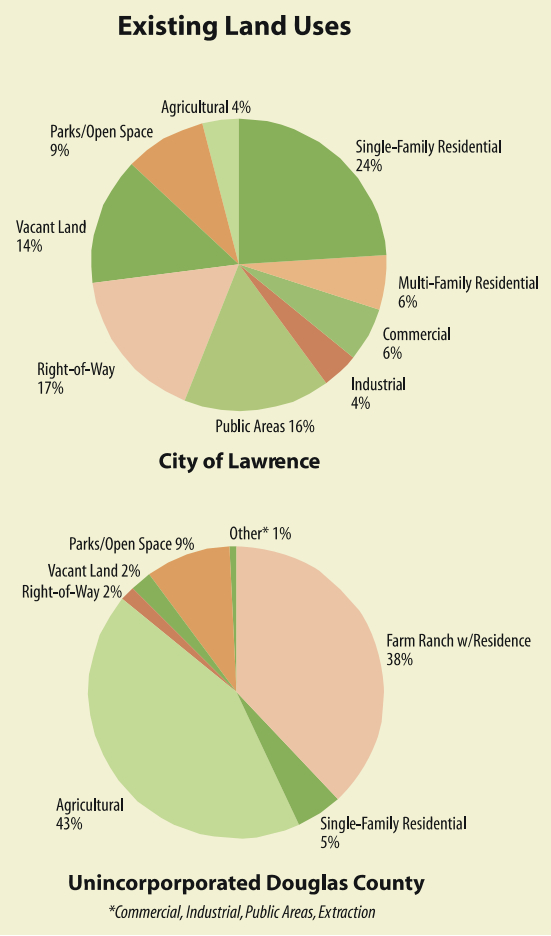
The citizens of Lawrence rallied after Quantrill's raid to rebuild the city. Spurred by the completion of the railroad in 1864, the City's population increased from 1,645 in 1860 to over 8,300 in 1870. With the expansion of Lawrence's transportation network, the city began to grow outward from its historic core. Improvements were made to the public road system through the installation of macadam and gravel paving materials. The introduction of public facilities such as a complete storm water system, a water system, and electricity came by the end of 1890s. Horse-drawn trolleys and electric streetcars were early forms of transit systems operating in the City during this time.

Lawrence's growth stabilized from 1900 to the 1940s. Similar to other communities across the nation, public transportation in Lawrence was challenged by the automobile in the 1920s and the opening of the airport in 1929. Brick became the standard street paving material. Alleyways became a central part of Lawrence's transportation system. A new bridge crossing the Kansas River allowed for easier access to north Lawrence and other northern communities.

The post-1940s saw a drastic change in Lawrence's population and the University of Kansas' role in the community. The population increased from 14,900 to over 40,000 residents in the 1950s. A number of transportation infrastructure improvements changed the face of Lawrence's landscape. The construction of I-70 along Lawrence's northern boundary provided easy access to Topeka, Kansas City, and points beyond. Significant improvements were made to provide greater access to downtown and reduce pass-through traffic in the commercial core. As the City grew, the roadway system and the automobile emerged as the dominant mode of transportation.

Figure 2.2
Existing Land Uses

Source: 2006 Douglas County

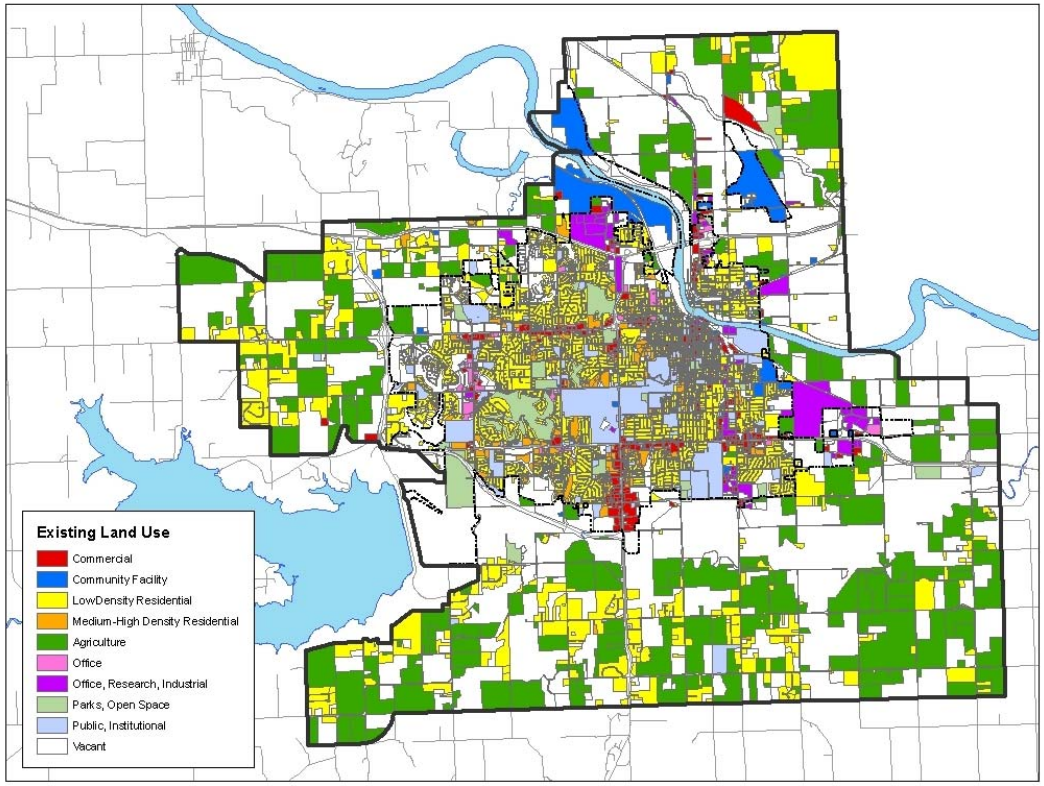


Existing Land Use

Existing land uses in the City of Lawrence are illustrated on Figures 2.1 and 2.2. As the charts in Figure 2.2 suggest, the Lawrence city limits delineate the apparent boundary between the wider variety of land uses found within the city and the lower density residential and agricultural uses found in the unincorporated areas of Douglas County.

Figure 2.1
Existing Land Uses

Source: Lawrence/Douglas County Metropolitan Planning



Land uses provide insight into the community's economic health, environmental awareness, and transportation needs. Land uses form the basis for trip making or travel demand.

Population and Households

Areas of residential land uses generate travel by producing trips through the activities occurring in these locations. Employment areas generate travel by attracting trips. The travel that occurs between trip generators takes place on one of the transportation modes available to the traveler. Accurate estimates of demographic data are imperative to understanding current conditions and forecasting how this travel will occur in the future. Therefore, population and households are key items for the transportation planning process. Historical population and household data from the U.S. Census are shown in Figure 2.3.

U.S. Census estimates of population and households demonstrate steady growth in the region over the past several decades. The graphs tell the story. Since 1950, both Lawrence and Douglas County have seen population increasing at a rate of 2.5 and 2.2 percent per year, respectively.

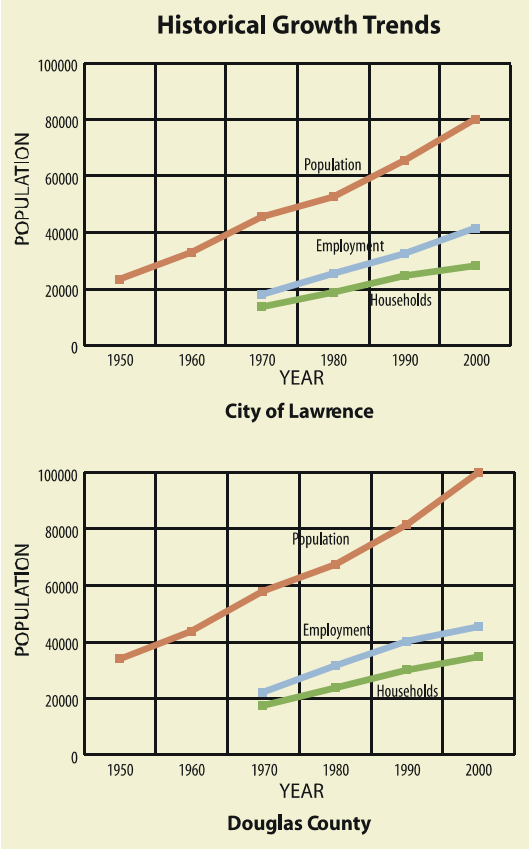
Household growth rates are similar to those of population, but are affected by changes in household size. In 1970, the first year for which data is available, the average household contained more than three persons. Since then, households have decreased in size and appear to have stabilized.

Employment

As stated previously, employment locations tend to generate travel by attracting trips. Employment opportunities in Lawrence and Douglas County are diverse, and different types of businesses generate different types and amounts of travel. Similar to population, employment has increased in the region at an average of 2.4 to 2.8 percent per year over the last three decades. Also similar is the trend that shows employment growth tapering off to some degree during the 1980s and 1990s. Historical employment trends are shown graphically in Figure 2.3.

Figure 2.3
Historical Growth Trends

Source: Lawrence/Douglas County Planning Office; U.S. Census



Transportation System

Many people envision the transportation system as the network of streets and highways that allow for automobile and truck travel within, to, and through the region. In reality, roads make up only one component of the transportation system, albeit an important one. Transit service, bicycle facilities, and pedestrian infrastructure are significant mobility resources as well. Railroad corridors, airports, and intermodal truck terminals are also critical elements. Even traffic signals and stop signs are part of the transportation system.

Gateways to the Cities

Gateways are locations on transportation corridors that define the entrances to cities. These provide visitors with a first impression of the city and often indicate the transition from rural to urban land uses. As such, cities desire to make these locations as attractive and informative as possible. As noted below and shown in Figure 2.4, there are several roadways that represent gateways into the City of Lawrence or into smaller communities within the region that should be reviewed for aesthetic and informational enhancements when they are improved.

There are currently six major gateways to the City of Lawrence:

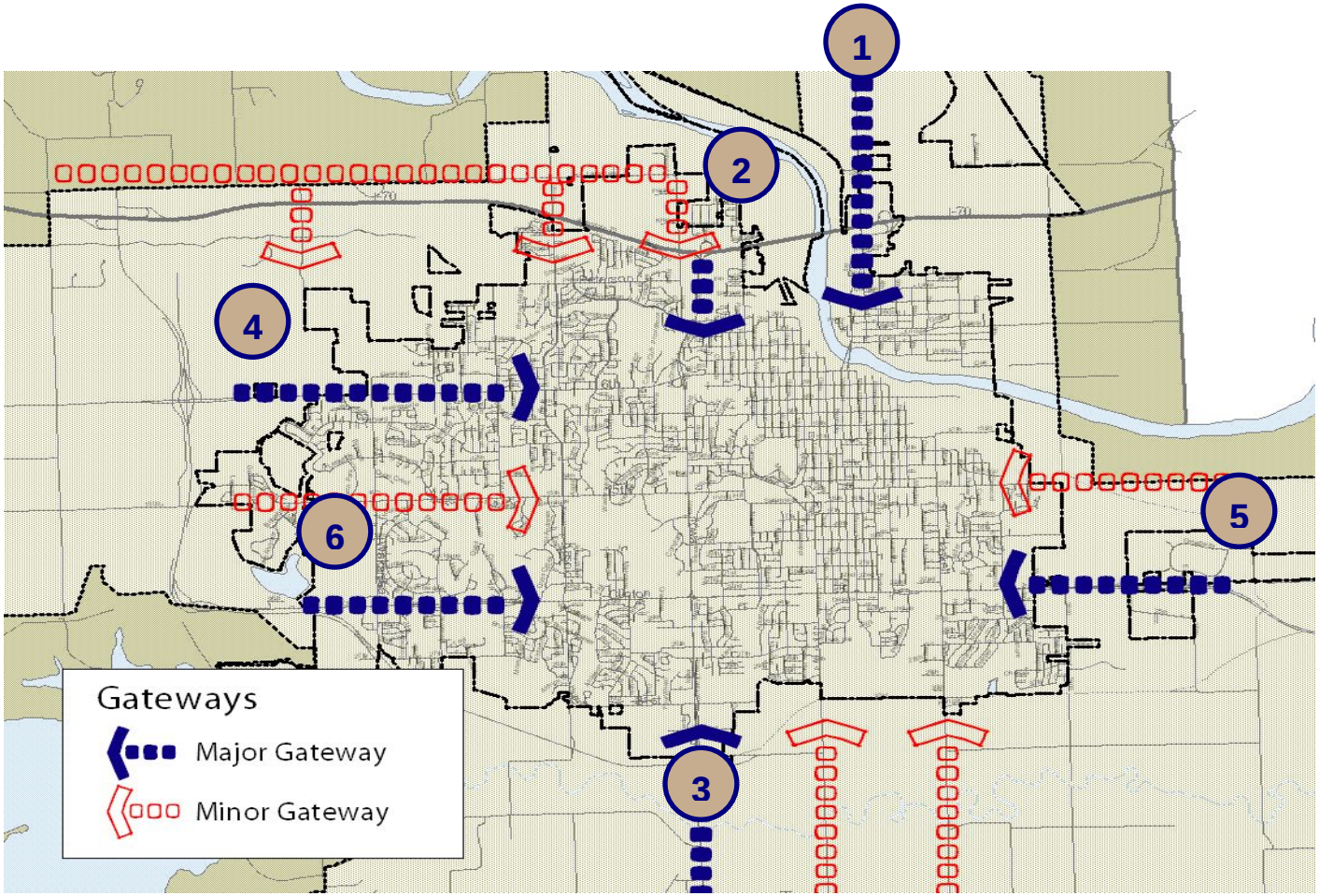
1. US-59/40 via N. 2nd St. at the Kansas Turnpike (I-70) from the north;
2. McDonald Drive via the west toll plaza of the Kansas Turnpike from the north;
3. Iowa Street/US-59 at the intersection of the South Lawrence Trafficway (SLT/K10) from the south;
4. 6th Street/US-40 at the intersection of the SLT/K-10 from the west;
5. 23rd Street/K-10 near the East Hills Business Park from the east; and
6. Clinton Parkway from the west at the intersection of the SLT/K-10.

Gateways into the smaller communities include:

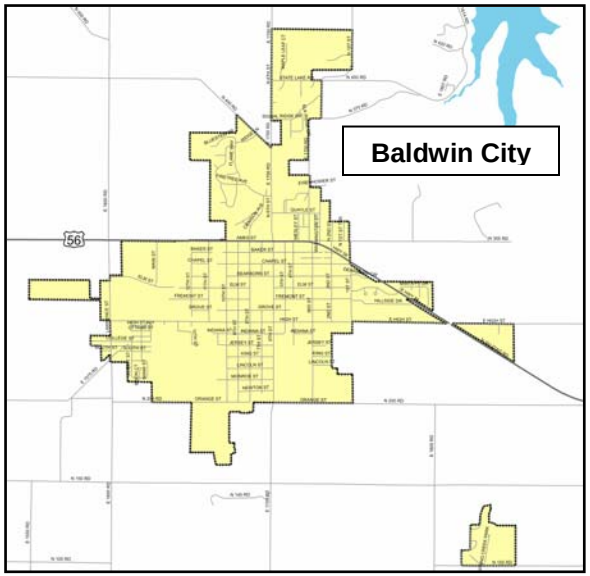
- Baldwin City: Highway US-56 from the east and west
- Eudora: Church St. and N 1400 Road interchanges with K-10 from the south and east, and Main St./E 2200 Road from the north; and
- Lecompton: E 1600 Road from the south and Lecompton Road from the north

Figure 2.4
Lawrence Gateways

Source: Lawrence/Douglas County Metropolitan Planning Office GIS Data

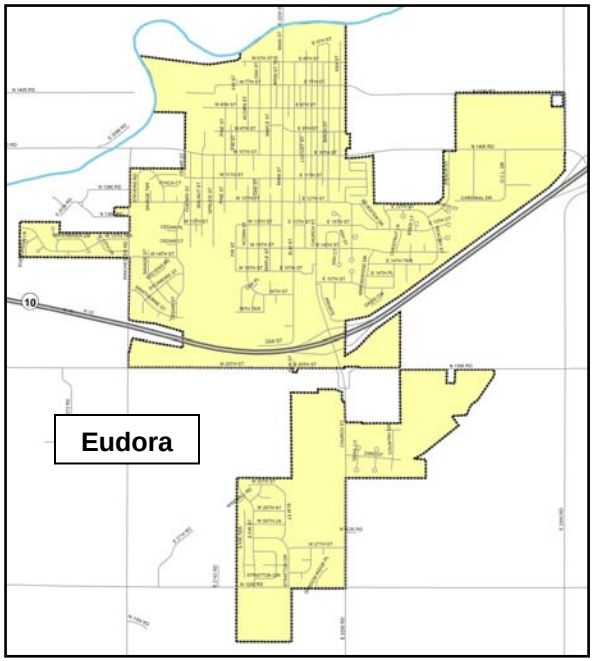


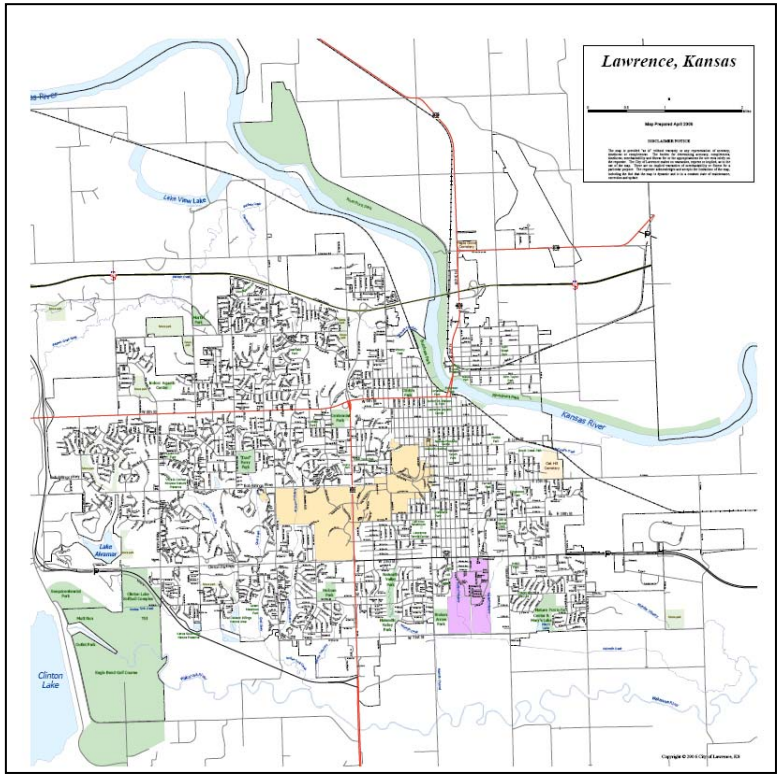
Gateways provide visitors with a first impression of the city.

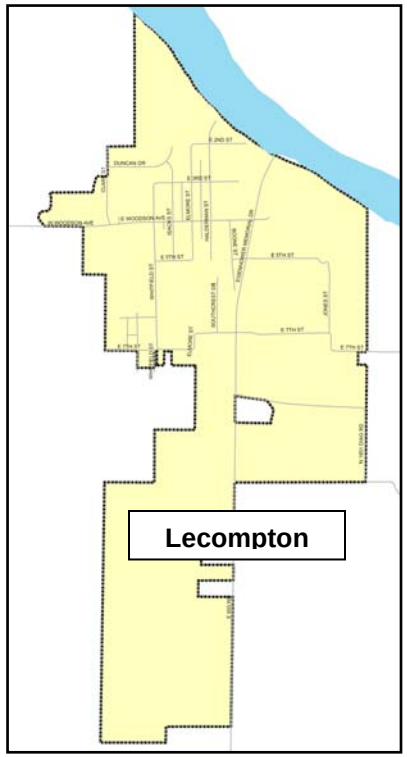


Roadway Network

Roadways make up the backbone of the transportation system. Cars and trucks use the roadway system for mobility. Transit buses utilize roads for their routes. Bicyclists often travel directly on roads, especially in corridors with delineated bike lanes or designated bike routes. Even pedestrians utilize sidewalks that are often constructed in roadway rights-of-way. The most effective roads, called multimodal corridors, often accommodate all of these travel modes.







Functional Classification of Streets and Roads

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the characteristics of the vehicular traffic they are intended to serve. All streets and highways are grouped into one of these classes, depending on the character of the traffic (i.e., local or long distance) and the degree of land access that they allow.

Road classifications are defined as follows:

Freeway: A freeway is a multi-lane, divided arterial roadway with access only at interchanges with major roads. No direct access to adjacent land is permitted. The primary purpose of a freeway is mobility, moving traffic at high speed on long local or regional trips. Examples of a freeway include the Kansas Turnpike (I-70) and highway K-10 east of E 1900 Road.

Expressway: An expressway is a multi-lane, divided arterial roadway with access at some at-grade intersections. The primary purpose of an expressway is mobility, with little or no direct access to adjacent land. Examples of expressways include the current portion of the South Lawrence Trafficway (K-10), K-10 from O'Connell Road to E1750 Road, and US-59 from N 1100 Road to the SLT.

Principal Arterial: Principal arterials are streets and highways that serve major activity centers, carry the highest traffic volumes, and provide for long-length trips. Examples of principle arterials include 6th Street, Iowa Street, and 23rd Street.

Minor Arterial: Minor arterials serve to interconnect with the principal arterial system to provide trips of moderate length and to carry lower traffic volumes.

Collector: Collector streets provide the connection between local roads and the arterial road system.

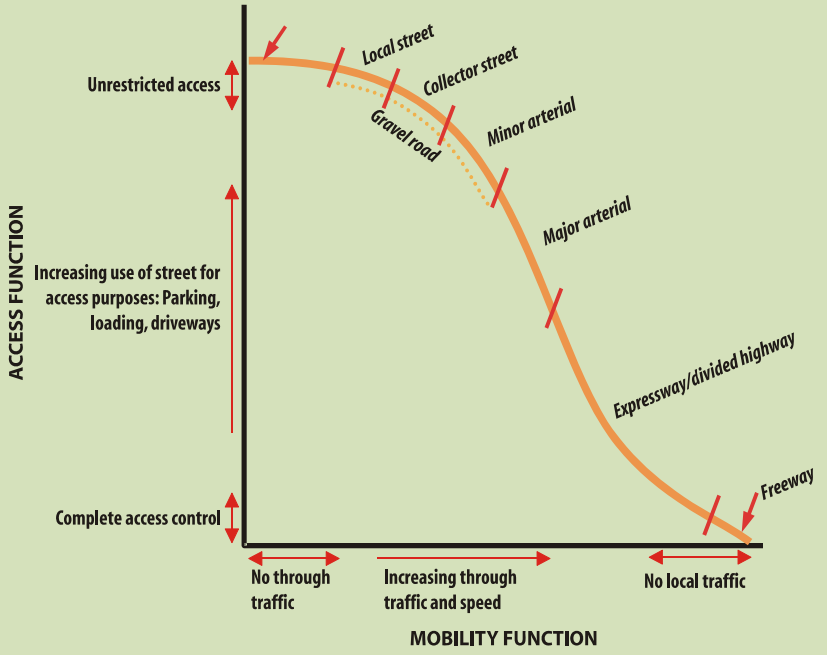
Local Road: Local roads provide direct access to adjacent property. Through traffic is discouraged.

Roadway Function: Mobility and Access

The roadway network is based on a range of different types of facilities with varying characteristics that, when combined, make up the roadway system. These facilities range from freeways, which serve high-speed, longer-distance trips, to local streets that are designed for lower speeds and shorter trip lengths.

Two important variables defining roadway function are mobility and access. Freeways have full access control that allows vehicles to enter and exit only at interchange ramps since mobility is the primary function of a freeway. Local streets on the other hand have numerous driveways and connections because their primary function is to provide local access to businesses and residences.

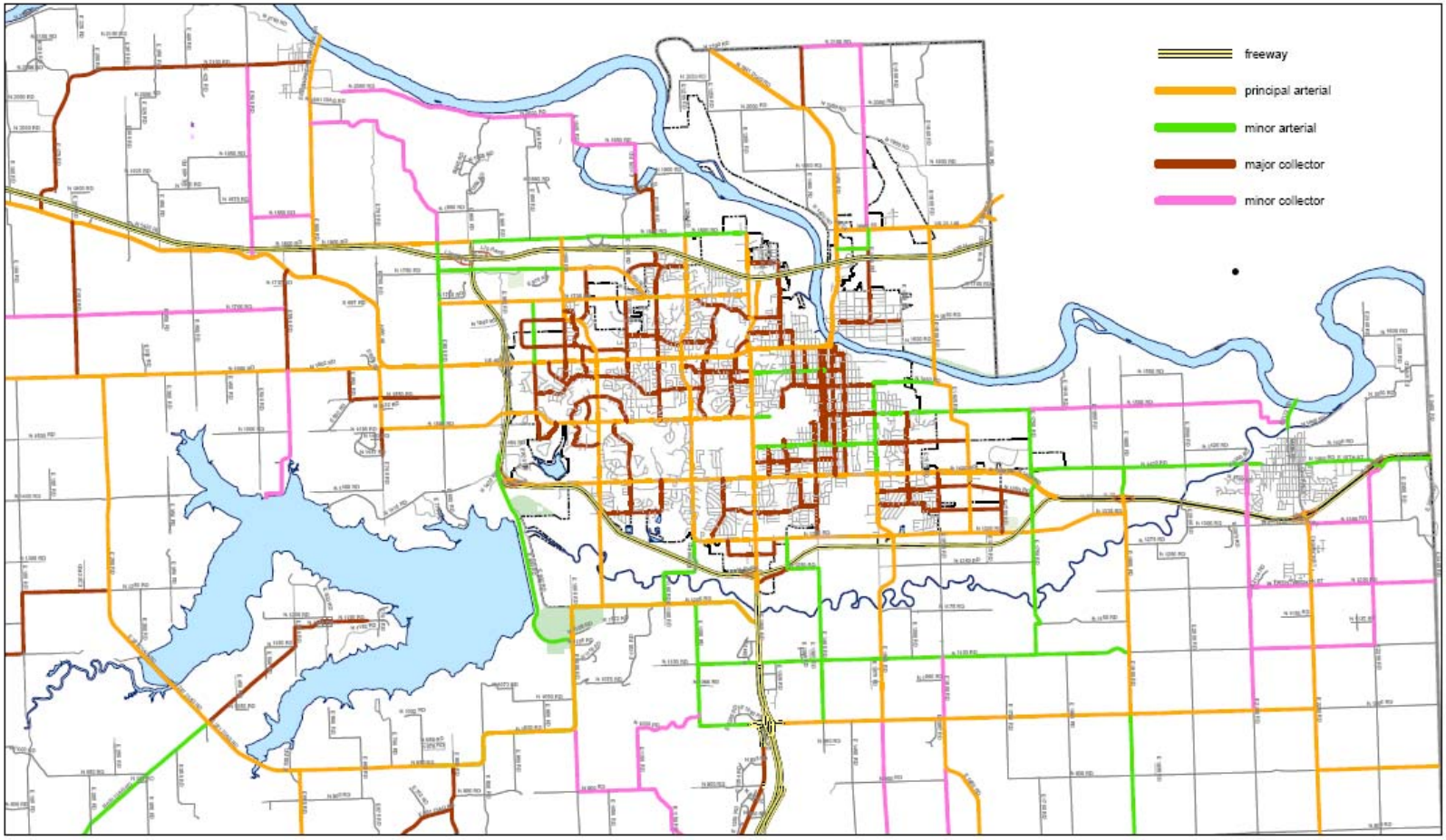
Often, when congestion occurs on an arterial street, it is due to an imbalance between the street's intended function and the amount of access that exists along the corridor. In these cases, access is not well controlled, with the result being numerous opportunities for vehicles to turn in and out of driveways to access local land uses. These movements conflict with and impede the flow of through traffic, creating additional congestion.



Highways, streets and roads are functionally classified to establish their importance to the overall roadway network, qualification for funding, necessary access control measures, corridor preservation needs, and design standards. A map showing the region's roadway functional classification is shown in Figure 2.5.

Figure 2.5
Lawrence Thoroughfares Map

Source: Lawrence/Douglas County Metropolitan Planning Office GIS Data



Roadway Level of Service and Congested Corridors

A common measurement of traffic operational performance or of congestion on a road corridor is "Level of Service" (LOS). In its simplest form, roadway Level of

Roadway Level of Service

Level of Service can be explained in terms of vehicular traffic flow, maneuverability, driver comfort, average speed, and the ratio of traffic volume to a roadway's maximum traffic capacity. It is typically reported for the peak traffic hour (rush hour) of a typical weekday.

Level of Service	A	B	C	D	E	F
Traffic Flow	Free-flow conditions	Reasonably Free-flow	Influence of Traffic Density is Noticeable	Influence of Traffic Density is Severe	Unstable	Forced or Breakdown
Maneuverability	Almost Completely Unimpeded	Slightly Restricted	Noticeably Restricted	Severely Restricted	Extremely Unstable	Almost None
Driver Comfort	High	High	Some Tension	Poor	Extremely Poor	Extremely Poor
Average Speed	Speed Limit	Close to Speed Limit	Close to Speed Limit	Some Slowing	Significantly Slower than Speed Limit	Significantly Slower than Speed Limit
Volume to Capacity Ratio	< 0.40	0.40 – 0.59	0.60 – 0.79	0.80 – 0.89	0.90 – 0.99	≥ 1.00

Figure 2.7
2005 Roadway Congestion
Source: Regional Travel Demand Model

Service can be compared to a grading scale from "A" to "F", where "A" represents excellent performance and "F" indicates failure.

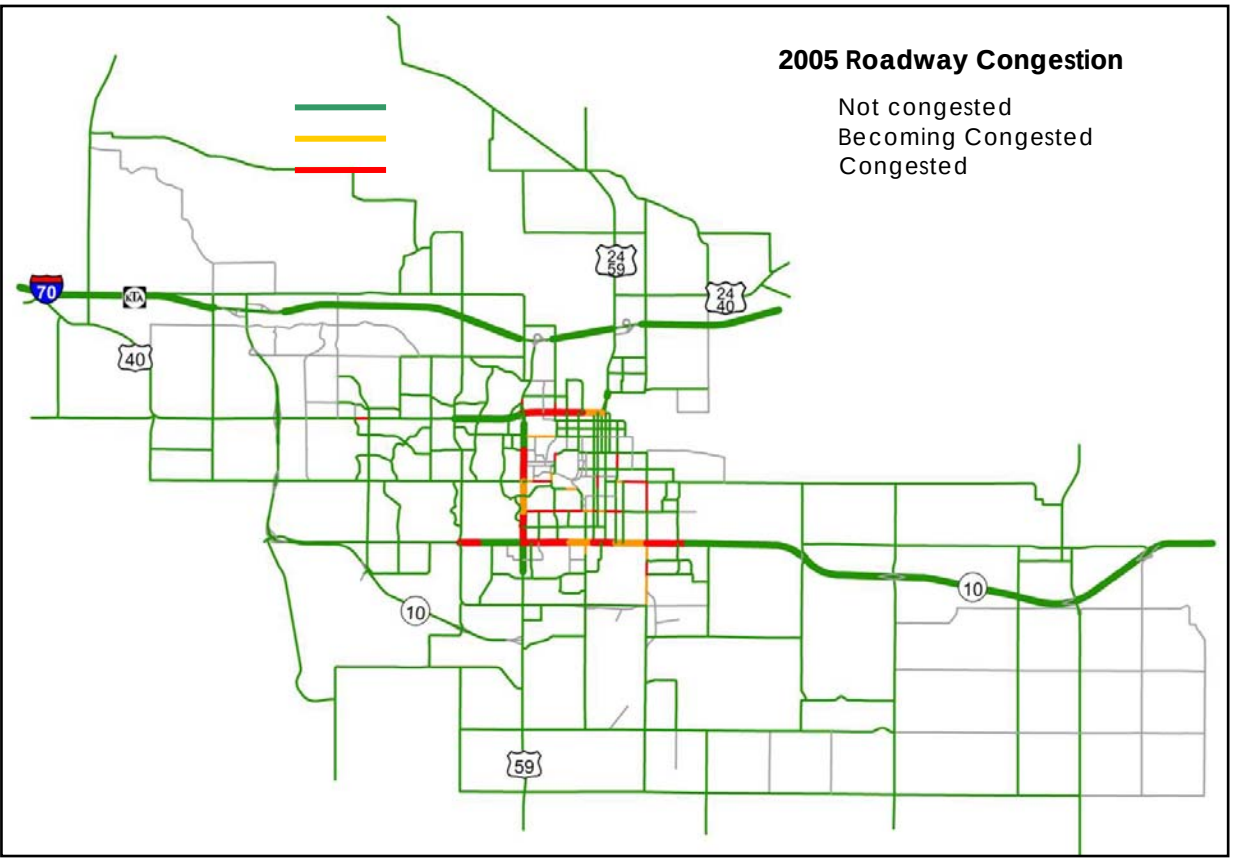
Level of Service can be explained in terms of vehicular traffic flow, maneuverability, driver comfort, average speed, and the ratio of traffic volume to a roadway's maximum traffic capacity. It is typically reported for the peak traffic hour (rush hour) of a typical weekday.

The region's Travel Demand Model provides the Level of Service for major streets, roads, and highways in and near Lawrence.

Many communities around the country try to maintain LOS C or D, or better for their roadway systems, although it is acceptable with some locations, such as a busy downtown area, to operate at an even lower Level of Service. Many communities also use their level of service standard to develop and prioritize projects to improve transportation facilities and services as well as to regulate growth and development. The City of Lawrence and Douglas County currently do not have a LOS standard for roadway corridors.

A number of roadways in the Lawrence region are currently experiencing significant congestion during peak periods. These correspond to LOS E and F, which means the vehicular demand is greater than the carrying capacity for these facilities. They include:

- 6th Street (US-40) from Iowa Street to downtown Lawrence;
- sections of Iowa Street (US-59) from 9th Street to south of 23rd Street;
- portions of 23rd Street (K-10) from Iowa Street to Haskell;
- 19th Street from Iowa Street to Louisiana Street; and
- sections of Haskell Street from 15th to 31st Streets

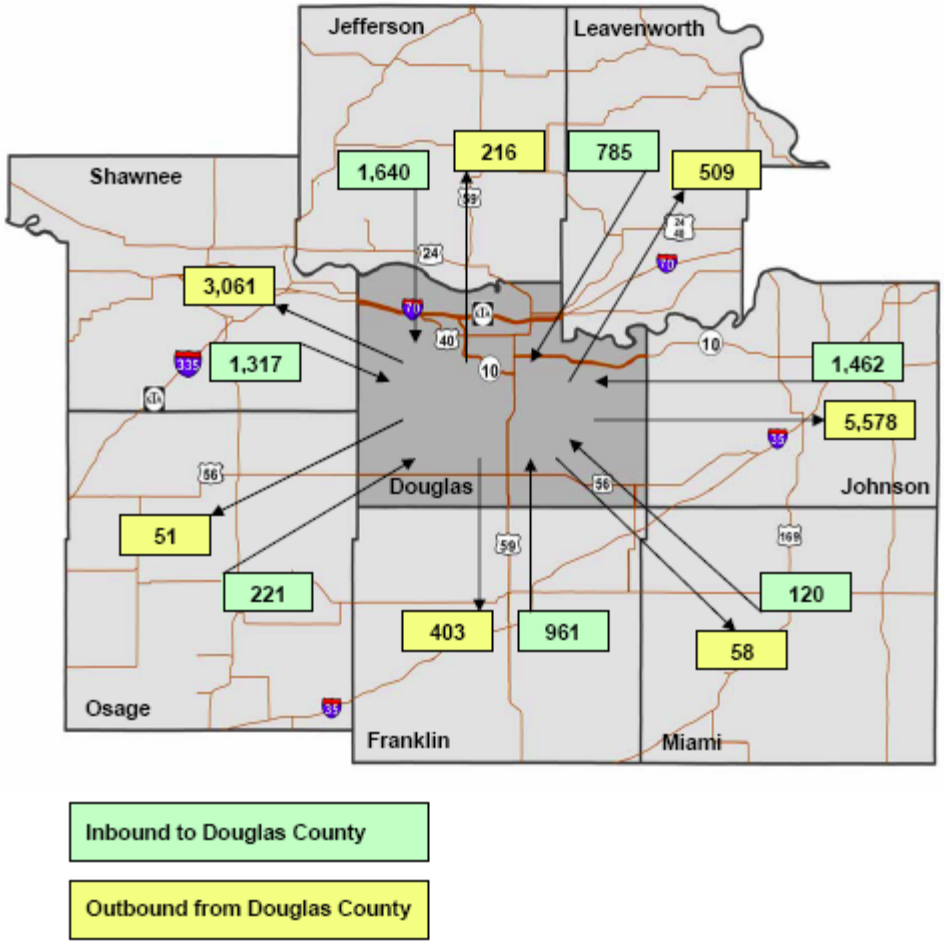


Conditions on these streets have deteriorated to a point in which congestion relief is warranted through operational or capital improvements. Other facilities in the City of Lawrence, many of which are associated with these congested streets, are experiencing peak hour conditions regarded as approaching capacity. The traffic volumes on these streets are approaching the carrying capacity of the roadway. These facilities should be monitored to determine if, when, and what types of improvements may be necessary. As shown in Figure 2.7, roadways in Lawrence had relatively minor congestion problems in 2005.

Commuting Patterns

According to U.S. Census data, in 2000 over 7,000 residents from outside Douglas County commuted to the MTPO planning area each weekday for employment. Over 12,000 Douglas County residents commuted to areas outside the county, with the majority going to Johnson and Shawnee Counties in Kansas and to Jackson County, Missouri. Figure 2.6 illustrates commuter patterns within the area. Future demand is likely to reach such a level that scheduled commuter bus service or high capacity transit service would be an appropriate service addition to consider over the next 10 to 15 years.

Figure 2.6
Commuting Patterns
Source: 2000 U.S. Census

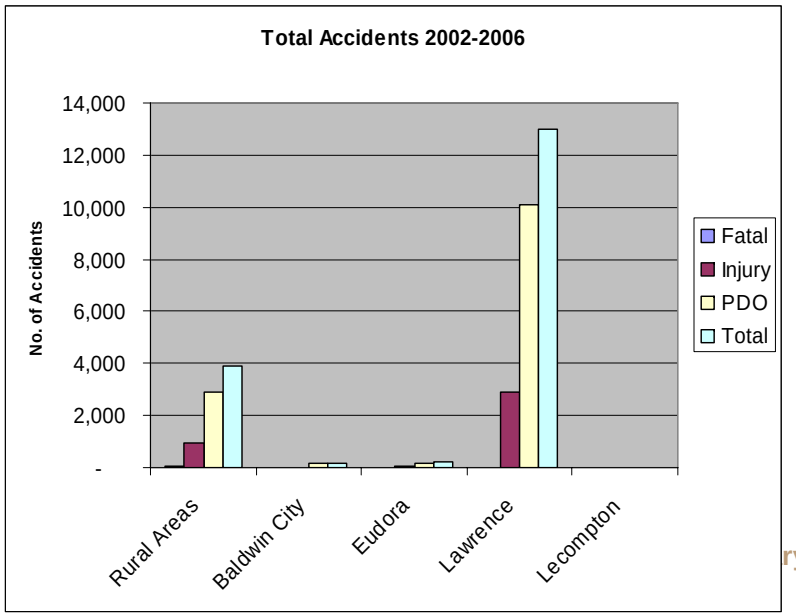


Pass-Through Traffic

One travel pattern, with origins outside Douglas County, has a significant impact on both the City of Lawrence and the City of Eudora. U.S. 2000 Census data and "origin/destination" data collected in 2001 showed a strong pattern of traffic traveling between areas west of Douglas County along I-70 (KTA) and southern Johnson County along K-10.

This traffic uses city streets, passing through Lawrence or Eudora, to make the connection between the two highways. In Lawrence, this pass-through traffic adds to the congestion on 23rd Street, 31st Street, and Haskell Street. In Eudora, it impacts traffic flow on Main Street and Church Street.

Figure 2.8
2002-2006 Total Accidents
Source: Kansas Department of Transportation



Motor Vehicle Crashes

Each year approximately 3,300 motor vehicle crashes occur in Douglas County. Table 2.1 shows the annual number of crashes occuring in the cities of Baldwin City, Eudora, Lawrence, Lecompton, and the rural areas of Douglas County.

During the five-year period 2002-2206, a total of 17,283 accidents occurred, with 48 crashes involving a fatality and 3,924 crashes involving an injury.

Figure 2.8 illustrates that the majority of motor vehicle accidents within Douglas County occur within the City of Lawrence.

Bridges

Bridges are important links in the surface transportation system. They provide continuation of access across natural and manmade impediments such as rivers, creeks, railroads, and other roadways.

Table 2.1
2002-2006 Motor Vehicle Accidents
Source: Kansas Department of Transportation

	Accidents in the Year:					Total 2002-2006 Accidents			
City	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**	**Fatal**	**Injury**	**PDO***
Rural Areas	863	855	813	703	654	**3,888**	32	944	2,912
Baldwin City	35	30	34	37	28	**164**	1	22	141
Eudora	47	35	42	36	37	**197**	1	37	159
Lawrence	2,677	2,713	2,619	2,427	2,586	**13,022**	14	2,920	10,088
Lecompton	4	4	2	-	2	**12**	-	1	11
Total	**3,626**	**3,637**	**3,510**	**3,203**	**3,307**	**17,283**	**48**	**3,924**	**13,311**

Bridge conditions have important implications for the overall transportation system. For example:

- In locations where a road meets a narrow bridge, traffic flow can be restricted or options for widening the road can be complicated by the need for additional lanes on the bridge.
- Bridges that have inadequate or deteriorating decks may, at best, present an inconvenience to farmers, trucking companies, and the traveling public due to load restrictions. At worst, they may require the complete closure of a bridge.
- Bridge construction and rehabilitation are expensive. On average, construction of a span bridge costs about $85 per square foot of surface area.

According to the Kansas Department of Transportation (KDOT), there are almost 26,000 bridges in Kansas; 4987 of those are on the State Highway System throughout the state (source: *2004 Selected Statistics*, KDOT). There are approximately 255 bridges in Douglas County. Bridge sufficiency ratings (a scale from 0 to 100, with 100 being the highest or best condition) from the National Bridge Inventory indicate the following:

- 7% of the bridges in the planning area are rated as deficient;
- 24% have a sufficiency rating of 50-79.9 , indicating fair to good conditions;
- 69% have sufficiency ratings of 80-100, indicating very good conditions (KDOT NBI, 2007)

These sufficiency ratings show a continuing need to improve bridges in the region. When compared to the ratings shown in the *T2025* Long Range Transportation Plan it is seen that the sufficiency rating for a number of bridges has been improved to very good condition (at or above a rating of 80), but a number of bridges have deteriorated to a point where they are rated as deficient (*T2025* show 0% in this category).

Transit Systems

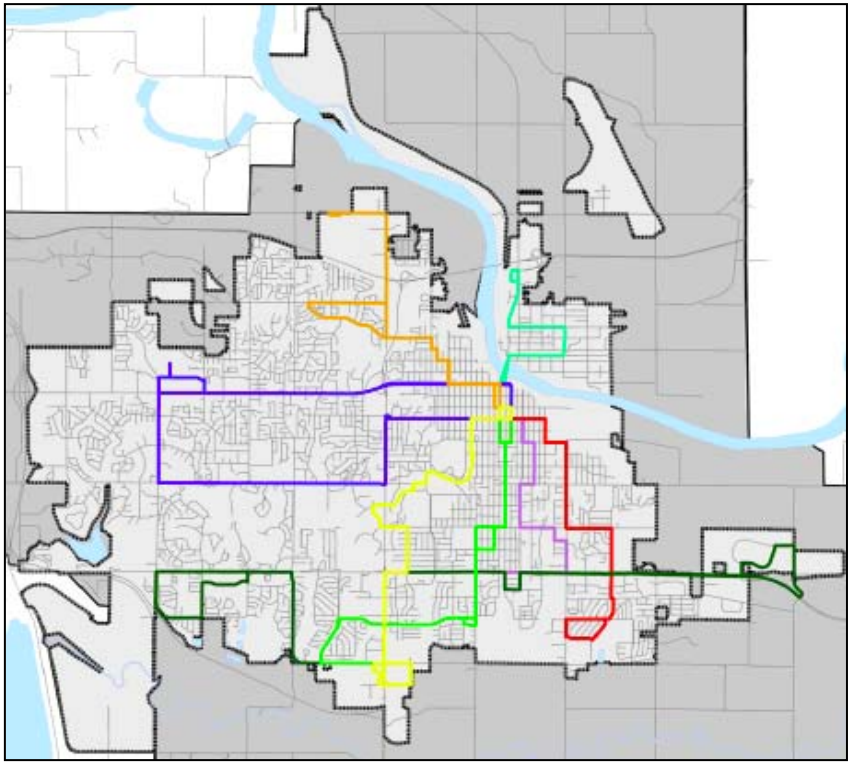


Figure 2.10
Lawrence Transit System Ridership
Source: Lawrence Transit System 2000 Annual Report

The greatest amount of change in the transportation system for Lawrence and Douglas County in the recent past has come in the form of public transportation. Although bus transit serviced has been available in Lawrence in the past, the City of Lawrence started the Lawrence Transit System in December 2000. It is the first public fixed-route transit service in the history of Lawrence. This system complements numerous small paratransit providers, the school bus system for USD #497 Lawrence Public Schools, and the KU on Wheels system.

A brief description of the current transit services follows:

- The Lawrence Transit System (known as the "T") is a municipal transit service operated under contract by a privately owned transit provider. It offers eight fixed routes which, with the exception of one route, converge in the downtown area. A maximum of ten buses are used to operate the fixed route service. Nine paratransit vehicles are used to provide complementary paratransit service, known as the "T" Lift, for those with special transportation needs. Transit services operate from 6:00 a.m. to 8:00 p.m. Monday through Friday. Saturday service operates from 7:00 a.m. to 8:00 p.m. The "T" bus routes are shown in Figure 2.9.

- Ridership on the system has shown steady improvement.

Figure 2.10 shows the increase in ridership from 2001 through 2006. In 2006, the "T" provided 421,864 one-way trips and the T Lift provided 55,176 one-way trips. The trend has continued into 2007 where in September the "T" provided an average 1,227 rides per day on the fixed route service and 183 rides per day on the paratransit service.

- Lawrence Transit partners with the Lawrence/Douglas County MPO and the Mid-America Regional Council, the Kansas City metropolitan area MPO, on the rideshare program, "Carpool Connection". Carpool Connection is a free online matching service for commuters in the Lawrence/KC metropolitan areas interested in ridesharing. Since the service launched in June 2006, almost 1900 people have registered on the site, with approximately 400 people from the Lawrence area.
- Lawrence Transit provides bicycle racks on all fixed-route buses.
- KU on Wheels, a fixed-route bus service for University of Kansas students, operates 11 routes that serve the KU campus, downtown, and off-campus apartment complexes. During the spring and fall semesters, daily ridership is approximately 7,000. KU on Wheels also operates SafeRide, a late-night public safety service for KU students, seven days a week from 10:30 p.m. to 2:30 a.m., and SafeBus, a late-night bus service between 9:00 p.m. and 3:00 a.m. on Friday and Saturday nights.
- Cottonwood, Inc. operates paratransit services from 8:00 a.m. to 5:00 p.m. on weekdays operating during peak periods. Annual ridership is estimated at 52,000 trips.
- Operated by the Douglas County Senior Services (DCSS), a service commonly known as "Bus 62" provides paratransit operations from 8:45 a.m. to 4:45 p.m. on weekdays and Saturdays within the county. From 1998-2000, DCSS carried an average of 20,300 passengers yearly.
- Independence, Inc. provides service for their clients and other qualified individuals in and around Lawrence, Douglas County, and the surrounding region. From 1998-2000, Independence, Inc. provided 12,100 passenger trips annually.

What we've heard…

Continuity in the bicycle system is a problem.

Bicycle and Trail Facilities

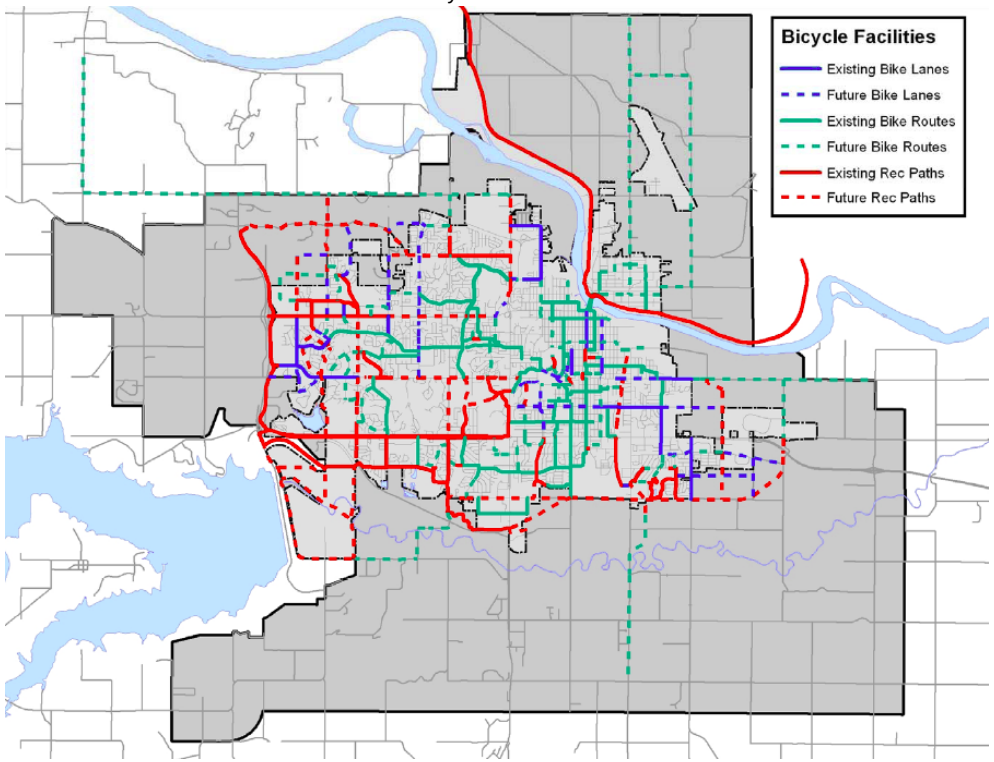
Increased bicycling in a community has positive effects on air quality, physical health, and when used extensively, traffic congestion. According to a national survey, the presence of a university in a city is a major correlating variable in high levels of pedestrian and bicycle commuting, and the City of Lawrence is no exception. According to U.S. 2000 Census, Douglas County has significantly higher levels of non-motorized commuting (9.84% walk or bicycle) compared to the statewide average of 2.89%.

Lawrence has made great strides to improve the quality and safety of cycling in and around the community. The City of Lawrence has created a Bicycle Advisory Committee; designated a Bicycle Coordinator; promoted bicycle safety through a "Share the Road" educational campaign; sponsored the City's Bicycle Safety Month by recognizing and promoting various bicycle-related events; and developed the City's formal long-range plan for bicycles, the Bicycle Work Program. Lawrence has consistently been designated a Bicycle Friendly Community by the League of American Bicyclists.

The existing system of bicycle facilities (Figure 2.11) is comprised of a mixture of off-road trails, on-road designated routes, on-road marked bicycle lanes, and a short "Rails to Trails" section, which is an abandoned railroad right-of-way that has been converted to a bike trail.

Figure 2.11
Existing Bicycle Facilities

Source: City of Lawrence



Lawrence was designated a Bicycle Friendly Community by the League of American Bicyclists in 2006.

The City of Lawrence's inventory of bicycle facilities is as follows:

- 80 miles of on-road designated routes (includes bike lanes and bike routes);
- 63 additional miles of on-road facilities are planned;
- 41 miles of hard surface recreational paths;
- 40 miles of designated off-road paths including 10 miles along the Kansas River levee;
- 0.8 mile of rail-trail (Haskell Trail) with approximately 1.5 miles planned (Burroughs Creek Rail Trail – TE funds are being requested);
- 29 miles of trails at Clinton Lake; and
- Additional off-road trails east of North Lawrence along the Kansas River. These trails are rated by NORBA, the National Off-Road Mountain Biking Association. Off-road trails in this area are considered some of the best trails in the country. Cyclists come from surrounding states to ride these trails, adding to the local tourist economy.

City Staff worked for over a decade to develop the City's bicycle route system. These routes were created with the following assumptions:

- The majority of riders in Lawrence fit the novice category;
- Routes for cyclists should follow lower-volume, lower-speed, local streets and avoid collector or arterial streets; and
- Off-street paths or trails should be utilized when possible.

Although existing designated bicycle routes are generally acceptable for their intended use by novice and recreational cyclists, many deficiencies exist including:

- Lack of traffic control at street crossings;
- Lack of any relationship to popular destinations;
- Inability to cross physical barriers such as rivers and rail corridors;
- Missing connections;
- Undefined trailhead locations;
- User conflicts inherent in multi-use trails; and
- Potential bicycle-car conflicts on certain trail designs, including trails set back from and parallel to major arterials where they intersect cross-streets.

Transportation Enhancements

In 2005, the City of Lawrence applied for federal Transportation Enhancement (TE) funds for the Burroughs Creek Trail project along with two other projects. Unfortunately, this project was not selected for funding. In January of 2007, the Parks and Recreation Department contracted with Bartlett and West Engineers, Inc. to develop a master plan for the Burroughs Creek Trail and Linear Park project. The master plan developed by Bartlett and West was presented to the City Commission on September 04, 2007. The Commission approved the Burroughs Creek Trail and Park Master Plan, directed staff to begin property acquisition, and authorized submission of a TE grant application to the Kansas Department of Transportation. The current scope of the project has been modified from the original scope as was outlined in the TE grant application in 2005. Staff is in the process of preparing the application for a TE grant for this project for the fiscal year 2009/2010 in the Pedestrian and Bicycle category.

What we've heard…

Many neighborhoods in Lawrence are not walkable due to lack of sidewalks and inadequate street lighting.

Pedestrian Facilities

Walking is another form of non-motorized transportation that provides health benefits, can reduce traffic congestion, and help to improve air quality through a reduction in motor vehicle trips. Walking is often a primary form of transportation for children, the elderly, and those who cannot afford other transportation modes. It is also an option for those who choose not to drive.

In *Creating a Healthy Environment: The Impact of the Built Environment on Public Health* (Center for Disease Control and Prevention, 2001), Richard J. Jackson, MD, MPH, and Chris Kochititzky, MSP, explore the relationships between human behavior, the physical and built environments, and public health. They suggest that "two of the main reasons for not exercising are lack of structures or facilities and fears about safety." They argue that "it is dishonest to tell our citizens to walk, jog, or bicycle when there is no safe or welcoming place to pursue these 'life-saving' activities" and "land use decisions are just as much public health decisions as are decisions about food preparation."

Sidewalks provide safe passage for pedestrians by creating a right-of-way that is separate from vehicular traffic. They are particularly important in, to, and from activity areas around the City, such as downtown, shopping districts, schools, recreation centers, government buildings, and university campuses. Good pedestrian connections are imperative for transit service because most transit trips begin and end with a pedestrian trip. Lack of sidewalks discourages pedestrian transportation.

City of Lawrence policies relative to the provision of sidewalks have varied in the past. As a result, some parts of the core area have sidewalks on both sides of most streets, portions of the City have no sidewalks, and some areas have paths located in separate rights-of-way which provide pedestrian access along drainage ways or abandoned railroad lines for recreation.

The City Development Code currently requires the construction of sidewalks on both sides of all local public streets within the city limits. Multi-use recreation paths are required along one side of all arterials. In unincorporated areas of Douglas County, sidewalks may be required for platted subdivisions.

What is Congestion Management?

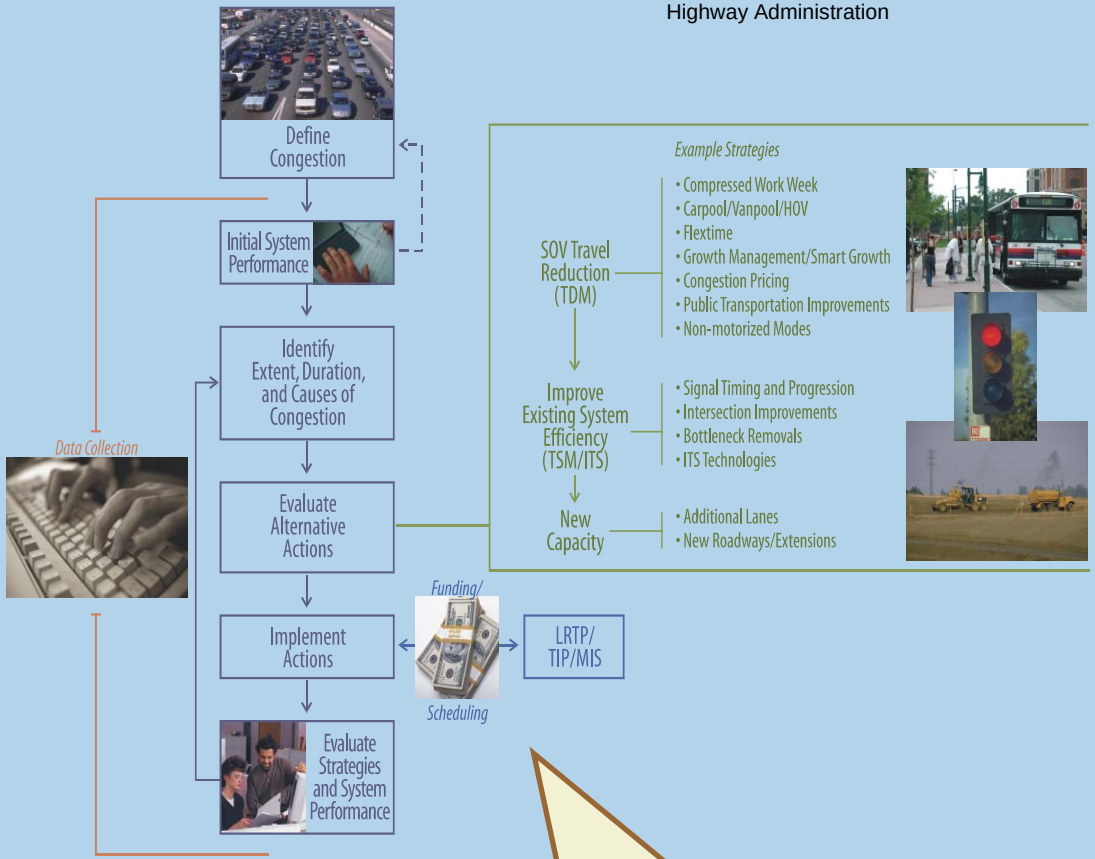
There are provisions in SAFETEA-LU that require congestion management plans for urbanized areas with more than 200,000 persons. Since Lawrence does not fit in that category, the requirements do not apply. However, most communities include congestion management strategies in the planning process because they often provide lower-cost solutions to congestion problems.

Generally, congestion management systems strive to utilize lower cost strategies to solve problems related to congestion in lieu of costlier roadway widenings and extensions. Several techniques are available within the broad categories of Travel Demand Management (TDM), Transportation System Management (TSM), and Intelligent Transportation Systems (ITS). However, congestion management also recognizes that roadway widenings and extensions are often necessary to alleviate traffic congestion.

Defining a framework for managing congestion in the future will provide a solid foundation for identifying lower-cost solutions to some congestion problems.

Congestion Management Framework

Source: Management and Monitoring Systems Rule, Federal Highway Administration



What we've heard…

Congestion is an issue in Lawrence and a combination of operational enhancements and roadway improvements are needed.

Current Congestion Management Strategies

Federal regulations require that metropolitan areas over 200,000 population and all regions designated as air quality non-attainment or maintenance areas develop and adopt a Congestion Management Plan. Although Lawrence does not meet these thresholds and is not required to have a formal Congestion Management Plan, there are proactive congestion management activities already taking place in the urban area.

The City of Lawrence currently has 75 signalized intersections. Three intersections in the downtown area are coordinated with hard-wired interconnected signals, nineteen intersections are isolated, and the rest are coordinated through timing-based signal plans. Lawrence is investigating the possibility of installing fiber optic connections along several principal arterial streets to provide better coordination between traffic signals.

Specific corridors identified as having traffic congestion or safety issues have been studied and recommendations have been made regarding improvements to access, intersection design, signalization, speed, and other transportation system management (TSM) actions. While mostly considered traffic calming measures, roundabouts and traffic circles have been installed on several collector streets as transportation control measures to help alleviate localized traffic and reduce the need for additional traffic signals and signage. Two-way left turn lanes have been recommended where projected volumes and turning movements indicate that such roadway improvements will improve traffic flow.

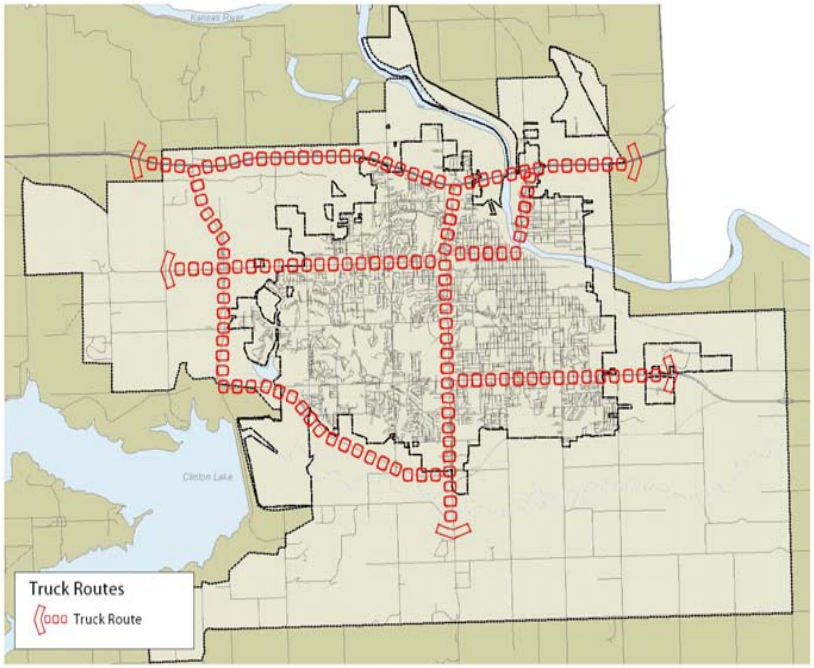
Another technique to improve mobility and alleviate congestion is access management. This is the process of managing access to land development while preserving capacity and improving safety. Access management includes the control and regulation of the location, spacing, and design of driveways, medians, median openings, traffic signals, and freeway interchanges. The goals of access management are to limit the number of conflict points, separate them, and remove turning vehicles and queues from through vehicle movements.

Many communities, including Lawrence, already have mature corridors with numerous driveways and potential conflict points that severely restrict mobility along

the corridor. Two examples in Lawrence are 6th Street and 23rd Street. The City has invested considerable resources in developing access plans for these corridors, but still faces the unenviable task of implementing improvements. Retrofitting existing corridors with access management principles is much more difficult and costly than incorporating good access management techniques into the original planning and development of a corridor. Regardless, access management can have a positive effect on the mobility, congestion, safety, and economic sustainability of a community.

Figure 2.12
Truck Routes

Source: Lawrence/Douglas County Metropolitan Planning Office



Other Transportation Modes

Starting with the landmark legislation of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and continuing through TEA-21 and SAFETEA-LU, the federal government continues to recognize a desire to move people and goods through a seamless transportation system. Seamless transportation depends on efficient connections between modes

Beyond the basic travel needs of Lawrence residents in and around the local community, there are additional travel requirements to move goods on rail and truck and for personal inter-regional travel via bus, rail, and plane.

Freight Movement – Trucking

In the recent past, truck movements have increased dramatically at the major interchanges in the Lawrence area, particularly at the I-70 toll plazas. This has the following implications for land use and traffic management in these areas:

- Heavy truck traffic and light vehicle traffic should be kept separate by maintaining separation of industrial land uses from residential and commercial/retail areas to the extent possible.

- Roadway and access requirements for trucking facilities should be considered in the design of major interchanges and the rehabilitation of existing ones.

- Designated truck routes, as shown in Figure 2.12, can have a positive influence on traffic safety if properly planned, implemented and enforced.

- A properly planned truck route with minimal pauses and delays of traffic should have a positive impact on air quality. Changes in speed and idling create higher levels of emissions than through travel.

Freight Movement – Intermodal Rail

Rail service is an important element in the movement of freight due to its capability to carry large and bulky loads which trucks are unable to carry economically. In the recent past, intermodal rail shipments originating or terminating in Kansas have increased much faster than national averages. Currently, there are three major intermodal rail facilities in the state, all located in Kansas City (KDOT, 2004). A new intermodal rail facility is planned along the BNSF tracks near Gardner, Kansas. Estimated truck traffic in and out of the facility will be between 1000-2000 vehicles per day initially, growing to 10,000 vehicles per day in the future. Some of the trucks carrying freight from this facility will head west, possibly impacting Douglas County, especially the cities of Baldwin City and Lawrence.

The Union Pacific and Burlington, Northern, & Santa Fe Railroads each have mainline tracks that traverse the Lawrence area on the north and south sides of the Kansas River, respectively. A number of Lawrence area industries utilize rail service via rail spurs:

- Santa Fe Industrial Park provides rail service to the K-Mart Distribution Center, Packer Plastics, Western Resources (KP&L), The Lawrence Paper Company, Heinz Pet Products, and others.
- From the Santa Fe switching yard in the area between Eighth and Eleventh Streets and east of Pennsylvania Street, rail spur service is provided to several areas companies, including The World Company (Journal-World), and the grain elevators south of 19th Street.
- Santa Fe lines serve the Farmers CO-OP facility located in the area east of Harper Street and north of K-10 Highway. Rail service can also be extended into the East Hills Business Park.

- Industries served by the Union Pacific line are located in North Lawrence and include Astaris and the grain elevators. Approximately 80–100 trains per day travel through North Lawrence on the Union Pacific line.

Passenger Rail

Passenger rail service plays a very minor role in the overall transportation system in Lawrence. Passenger service is provided daily via Amtrak's Southwest Chief. The depot is located on 7th Street, east of Downtown Lawrence. Eastbound service is available to Kansas City and Chicago; westbound service is available to Albuquerque and Los Angeles. Service in Lawrence is provided daily at 12:32 a.m. for the westbound train and 5:49 a.m. for the eastbound train.

The most recent Kansas Rail Plan notes that 3,347 riders boarded Amtrak's Southwest Chief in Lawrence during Fiscal Year 2005; an increase of 348 riders over the previous year. This represents about 10% of the total ridership in Kansas.

Intercity Bus

Intercity bus service is an important service for individuals with travel needs to and from destinations not served by air or rail transportation. Greyhound Bus Services currently provides daily service to numerous locations in Kansas and Missouri. The depot for these lines is located in a gas station/convenience store near 6th and Rockledge Road. It is open during normal business hours except Sundays and holidays.

K-10 Transit Service

Beginning January 17, 2007 a new transit service was initiated that connects the University of Kansas in Lawrence with Johnson County Community College and the KU - Edwards Campus. The service is open to the general public, students, and commuters.

The new transit route is sponsored by Johnson County Transit in cooperation with the City of Lawrence, the University of Kansas, Johnson County Community College, the Kansas Department of Transportation, and the Mid-America Regional Council.

Airport

The Lawrence Municipal Airport is located approximately three miles northeast of the Lawrence Central Business District. The airport itself is within the Lawrence city limits; however, it is completely surrounded by unincorporated land within Douglas County.

Lawrence Municipal Airport is owned and operated by the City of Lawrence. The Public Works Department is responsible for the operation and management of the airport with the assistance of an aviation advisory board which was formed in 1973 by

the City Commission of Lawrence. The board consists of seven members, six are from the public at large and one represents the University of Kansas. The Fixed Base Operator (FBO), Hetrick Air Services, is contracted by the City for the daily operations of the airport.

Encompassing approximately 445 acres of land, and situated at 832 feet above mean sea level, the Lawrence Municipal Airport serves as a general aviation facility for the business community and recreational users in northeastern Kansas.

Lawrence Municipal Airport is included in the National Plan of Integrated Airport Systems (NPIAS) and the Kansas Aviation Systems Plans. Planning for the development and improvement of Lawrence Municipal Airport is the responsibility of the City of Lawrence and the Airport Advisory Board in cooperation with the Kansas Department of Transportation Aviation Division and the U.S. Department of Transportation-Federal Aviation Administration (FAA). Planning for the ground transportation systems that link the airport to the rest of the regional transportation system is the responsibility of the Lawrence/Douglas County Metropolitan Planning Organization in cooperation with KDOT. Because the region's public use airport is both a major transportation facility and a major land use feature, the MPO is interested in coordinating airport developments with regional comprehensive planning efforts, especially transportation planning and land use planning processes.

Airports are important transportation facilities that form a part of the intermodal transportation system at the local and regional level. The airport is also part of the state aviation system plan, and this facility has the potential to serve Northeast Kansas with both passenger and air freight services. All general aviation, as well as some commercial aircraft can land at Lawrence Municipal Airport. From an operational perspective, the airport can handle much more air traffic than it is currently handling.

The airport is also a potential economic development asset for the region's economy. The land around airports is often used for industrial and/or commercial operations that can add jobs to the local economy. The availability of local airports with relatively uncongested airspace can be used as a tool to attract new businesses that require airport services to an area. The Comprehensive Plan-Growth Management/Land Use Element shows the area around the airport as potential employment zones. Regional planning for Lawrence and Douglas County considers the airport as important to the regional transportation system as well as a valuable economic development tool. According to a survey completed for the Kansas Aviation Systems Plan (KASP) in 1990, to evaluate the economic impact of Kansas

airports, Lawrence Municipal Airport was estimated as having a total annual direct and indirect economic impact of $9,100,000.

The public airport is currently well maintained, however, the airline services offered in the region are minimal. Since Lawrence is only about 50 miles (roadway miles) from the Kansas City International Airport (KCI), many airlines consider the Lawrence Area to be part of the KCI airport market area. The availability of shuttle van services from Lawrence to KCI reinforces this view of Lawrence as a part of the Kansas City air travel market. Since it only takes about one hour to drive from Lawrence to KCI, most people simply choose to drive to KCI and begin their air trip there.

The airport maintains two runways, Runway 15-33 serves as the primary runway, is 5,700 feet long by 100 feet wide, and is served by a full-length, 35-foot-wide parallel taxiway and connecting taxiways. Runway 1-19 is a 3,901-foot-long by 75-foot-wide crosswind runway and is served by a full length, 35-foot-wide parallel taxiway and connecting taxiways. A 32,600-square-foot apron adjacent to the terminal building on the north side is used for based and itinerant aircraft and includes tie down areas. The airport currently has 30 T-Hangars, all occupied. No scheduled commercial service or freight operations are provided or based at the airport.

The Airport Master Plan anticipated that the Kansas Speedway, located in Kansas City, Kansas would generate a large amount of traffic at the airport on race weekends. To date that has not happened, but the airport does see around 30 additional aircraft on race weekends.

The fixed base operator, Hetrick Air Services, provides flight instruction, air taxi and charter, maintenance, fueling, car rental, hangar rental, aircraft sales and rental, aircraft maintenance and repair and itinerant aircraft tie-down services on a daily basis.

According to the current Airport Master Plan, in 1999 there were 53 based aircraft; currently there are 63 based aircraft. The number of operations at the airport (including general aviation, air taxi and military operations) has fluctuated over the years, but for period ending 8/31/2005 there were 31,150 annual takeoffs and landings with a trend towards corporate aviation. The Master Plan forecasts a 66% increase in both aircraft operations and based aircraft during the 20-year planning period. The biggest detriment to the future development at the airport is the lack of sanitary sewers, which are addressed in the Master Plan and the City's current CIP. Access to the terminal/building area is provided via U.S. 24/40, a two-lane highway.

Improvements recommended in the Airport Master Plan include:

- Extension of Runway 15/33 by 400 feet,
- Extension of Taxiway A by 400 feet,
- Construction of additional aircraft hangars,
- Expanded vehicle parking,
- Lighting improvements, and
- Sanitary sewer improvements.

An additional consideration of airport improvements is the protection of the airport's approaches and air space from encroachment through height and land use restrictions. These protections are currently enforced through Article 11, Air Space Control Area District in Chapter 20, Zoning and Planning of the Code of the City of Lawrence. The Lawrence/Douglas County Planning Commission serves the role of Airport Zoning Commission pursuant to K.S.A. 3-707.

Airport Master Plans are used to evaluate the airports' capabilities and roles, to forecast future aviation demand, and to plan for the timely development of new or expanded facilities. In recognition of the importance of air transportation in the region and the associated challenges inherent in providing for their unique operation and improvement needs, these Airport Master Plans must be kept up to date. With the continuous development of sound and realistic plans, the community can maintain the airports link to the national air transportation system and maintain the public and private investments in the facilities.

As the current Airport Master Plan suggests, the airport will be expanding to meet an ever growing demand. With this expansion, efforts must be made to maintain and improve the surrounding roadway systems and promote airport friendly development in the outlying areas.

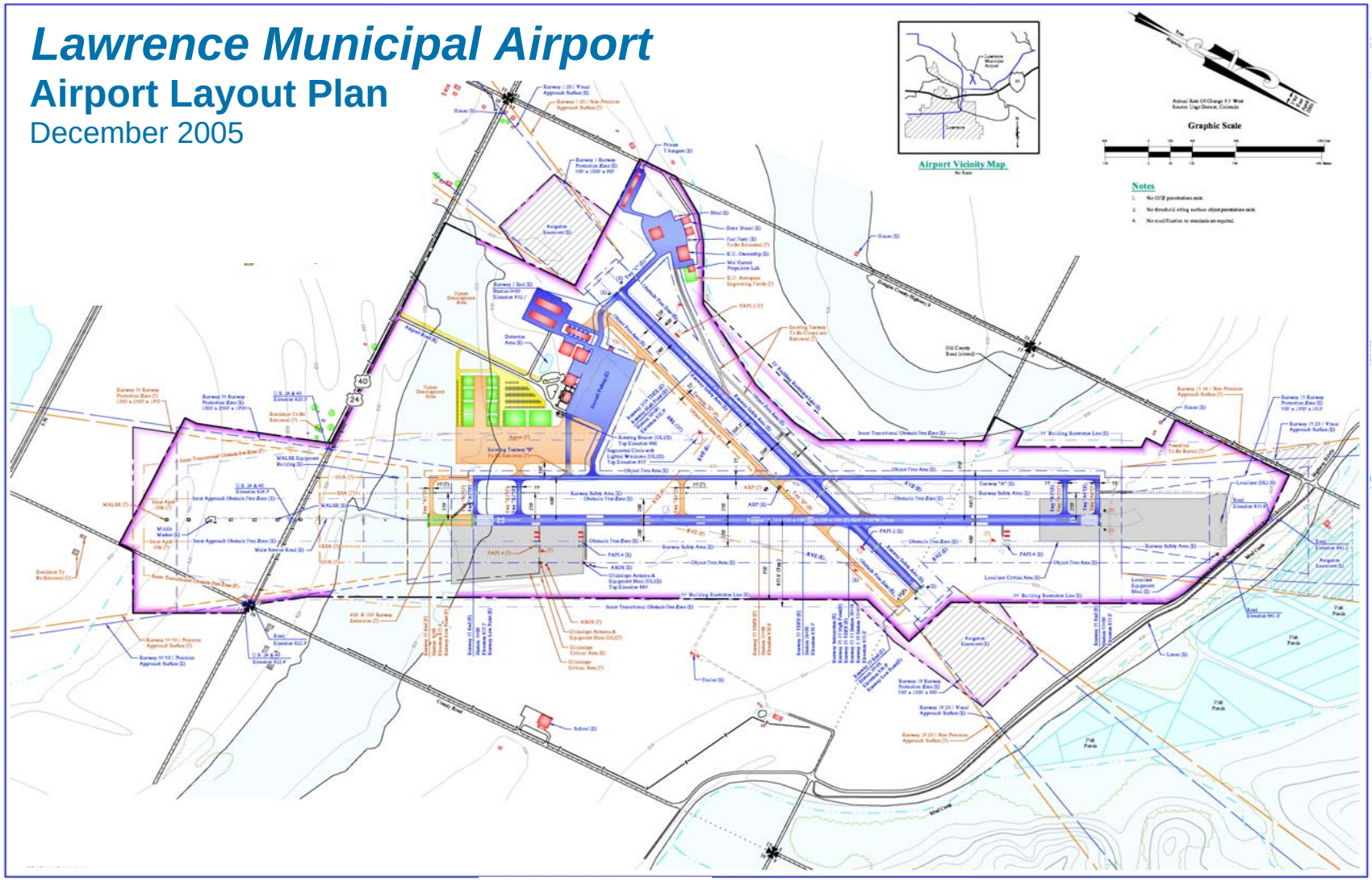
The Airport Master Plan outlines the orderly expansion of existing facilities, and the replacement of older facilities to meet needs over the next 20 years. While the plans are phased through the short (0-5 year), intermediate (6-10 year), and long term (11-20 year) planning horizons, the plans are demand based. Facilities will not be constructed until they are needed for capacity or to replace obsolete facilities. The master plan has identified $16 million in capital needs over the 20-year planning period. To date, about 33% of this work has already been constructed. The current Airport Layout Plan is shown on the following page.

While the Master Plan has identified extensive capital project needs over the next 20 years, a high percentage of the capital costs will be eligible for grants administered by the FAA. The source for these grants is the Aviation Trust Fund, which is funded with taxes on airline tickets, aviation fuel, aircraft registrations, and other aviation-related fees. The FAA distributes these funds through the Airport Improvement Program (AIP). The City of Lawrence will use airport revenue and general obligation bonds to provide the remaining project costs.

Lawrence Municipal Airport

Airport Layout Plan

December 2005



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Chapter 3: Community Participation

Introduction

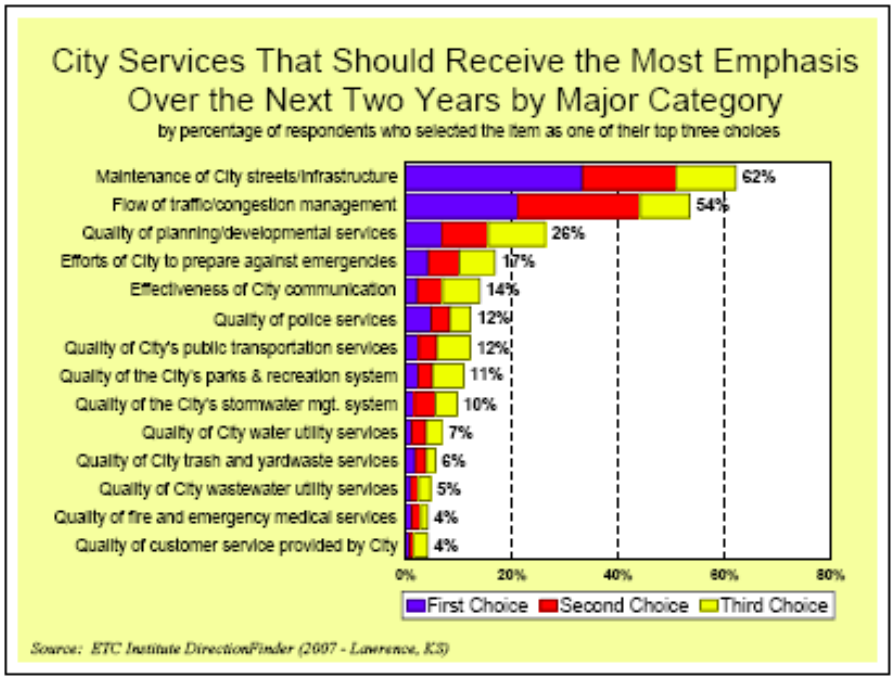
Public and stakeholder participation is the cornerstone of any community-based transportation plan such as *Transportation 2030.* Not only is it required by federal legislation, but good public participation allows planners to identify and understand aspects of the transportation system directly from its users. The Lawrence/Douglas County MPO has adopted aggressive procedures for involving the public in the transportation planning process. These procedures are included in the Technical Appendix. The specific outreach efforts for T2030 are described below.

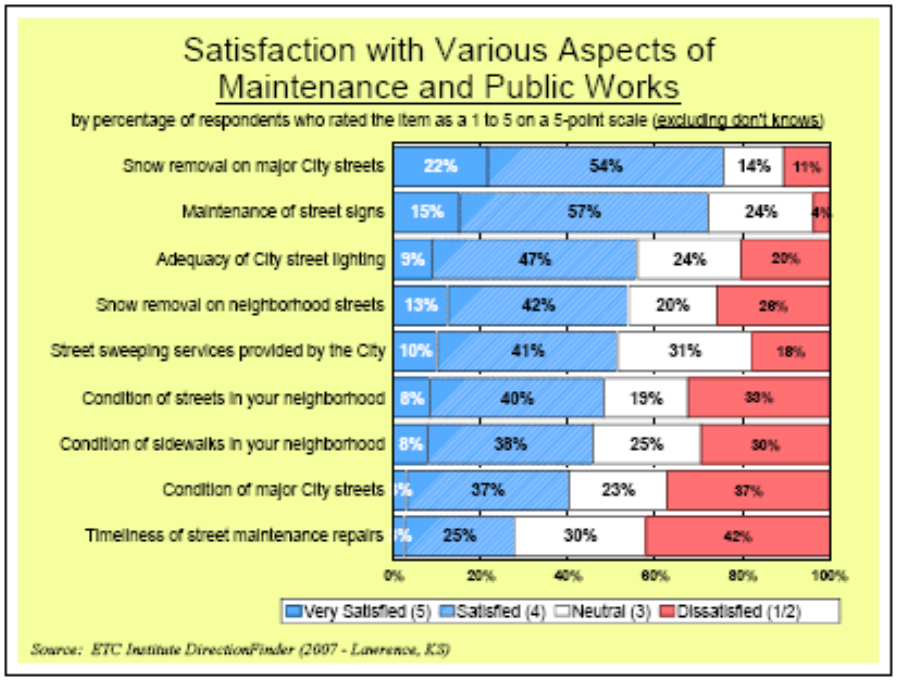
Newsletter

A *T2030* Long Range Transportation Plan newsletter was developed and distributed to provide the public and transportation stakeholders with a basic understanding of the transportation planning process as well as an invitation to be involved, provide comments, and attend a public meeting.

Transportation Related Surveys

Several regional surveys conducted in 2006 and 2007 served as a starting point for the public participation process. These surveys sought the opinions and perceptions of the public and transportation stakeholders on the various transportation issues facing the Lawrence-Douglas County region.





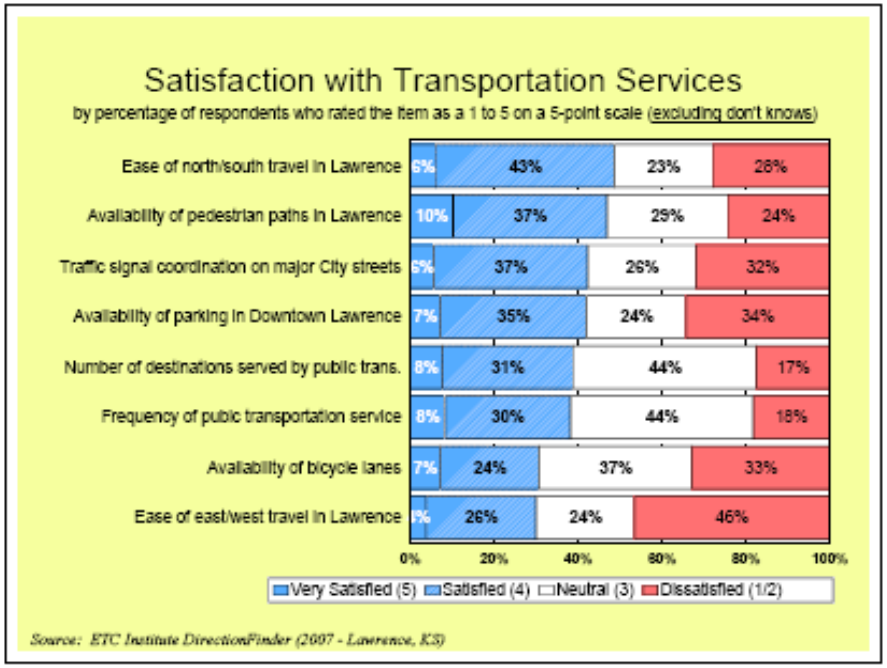
2007 DirectionFinder® Survey: The purpose of the survey was to assess satisfaction with the quality of all services, including transportation, provided by the City of Lawrence and to gather input about priorities for the community. A seven-page survey was mailed to a random sample of 2,500 households in the City. Respondents' gender and race/ethnicity corresponded closely with 2005 census estimates. The results for the random sample of 1168 households that responded have a 95% level of confidence with a precision of at least +/-2.9%.

MAJOR FINDINGS RELATING TO TRANSPORTATION

- **Services that residents thought should receive the most increase in emphasis over the next two years.** Of the all city services included in the survey, the top three that residents thought should receive the most increase in emphasis from the City of Lawrence over the next two years were related to transportation. These were (1) maintenance of City streets/infrastructure, (2) flow of traffic/congestion management, and (3) quality of planning/developmental services.
- **Maintenance and Public Works**. Seventy-six percent (76%) of those surveyed (who had an opinion) were satisfied with snow removal on major City streets; 72% were satisfied with the maintenance of street signs, and 56% were satisfied with the adequacy of City street lighting. Residents were least satisfied with the timeliness of street maintenance repairs (28%). The public works service that residents felt should receive the most increase in emphasis over the next two years was the condition of major city streets.

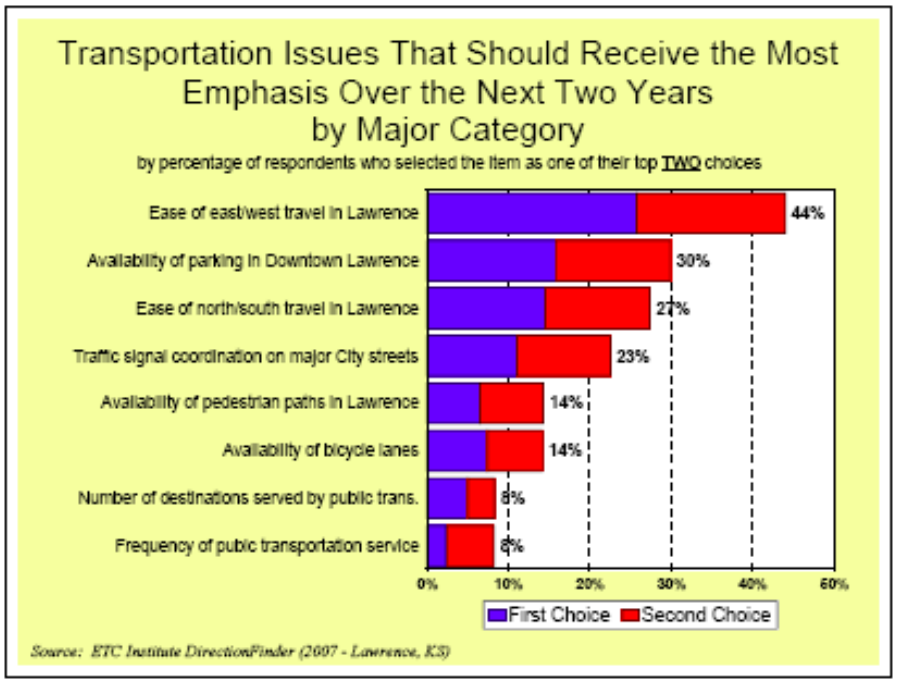
SATISFACTION WITH TRANSPORTATION SERVICES

- **Ease of north-south travel:** Forty-nine percent (49%) of the residents surveyed were satisfied with the ease of north/south travel in Lawrence, while twenty-eight percent (28%) were dissatisfied.
- **Ease of east-west travel:** Thirty percent (30%) of the residents were satisfied with the ease of east-west travel in Lawrence, while forty-six percent (46%) were dissatisfied.
- **Availability of Pedestrian paths:** Forty-seven percent (47%) were satisfied with the availability of pedestrian paths in Lawrence, while twenty-four percent (24%) were dissatisfied.
- **Availability of bicycle lanes:** Thirty-one percent of residents were satisfied with the availability of bicycle lanes, while thirty-three percent (33%) were dissatisfied.
- **Transit services:** Thirty-nine percent (39%) of residents were satisfied with the destinations serviced and 38% were satisfied with the frequency of service. Seventeen to eighteen percent (17-18%) were dissatisfied.



TRANSPORTATION ISSUES THAT SHOULD RECEIVE THE MOST EMPHASIS OVER THE NEXT TWO YEARS

- **East-west travel** in the City of Lawrence was the transportation issue that residents felt should receive the most emphasis over the next two years. Forty-four percent (44%) of respondents selected this issue as one of their top two choices.
- The **availability of parking in Downtown Lawrence** was the second highest ranked issue. Thirty percent (30%) of residents selected this issue as one of their top two choices.
- **North-south travel** in the City of Lawrence was the third highest ranked issue. Twenty-seven percent (27%) of respondents included this issue as one of their top two choices.

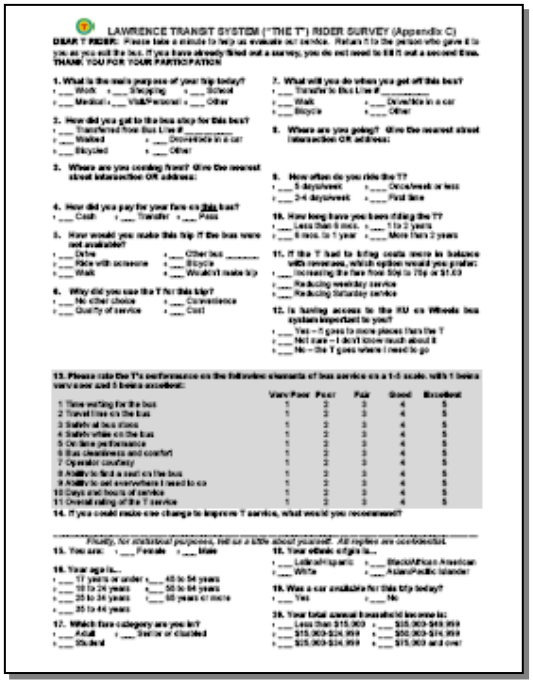


Commuter Survey

The purpose of the Commuter Survey was to gather information from the residents of Lawrence about their travel patterns outside of the City. The survey was distributed with utility bills during October and November of 2006 and of the 31,081 surveys distributed, 724 surveys, or 2.3 percent, were completed and returned. The majority of survey respondents indicated they are commuting outside of Lawrence primarily for employment purposes (66%), followed by shopping (11%), "other" purposes (11%), education (8%), and medical visits (4%).

Survey results suggested that almost as many people are commuting on Kansas Highway 10 as Interstate 70. Among respondents, 40 percent said they primarily travel on K-10, while 43 percent use I-70. The top destination cited was the Kansas City Metro Area (48%), followed by Topeka (31%), Douglas County (12%) and "Other" (9%).

The majority (66%) of people who responded to the survey expressed an interest in ridesharing options. Survey respondents indicated that saving money, concerns over the environment, and reducing roadway congestion were their top reasons for ridesharing or being open to commuting with others.



LAWRENCE TRANSIT SYSTEM ("THE T") RIDER SURVEY (Appendix C)

Transit Rider Surveys

As part of the 2006 *City of Lawrence Coordinated Public Transportation Development Plan*, on-board surveys of transit riders were conducted for both Lawrence Transit and KU on Wheels. The surveys solicited input from riders regarding:

- ♦ Trip origin, destination, purpose, and other information regarding the passenger's trip
- ♦ Extent and history of transit usage, including interest in using the KU on Wheels system
- ♦ Ratings of various service elements
- ♦ Desired changes and improvements to the bus system
- ♦ Rider demographics

Survey Findings for Lawrence Transit "T" Riders

"T" riders are using transit primarily for work and school trips on weekdays. Most riders walk to and from their origin and destination, and transfer activity is relatively low. T riders tend to ride frequently. Convenience and lack of other mode choices are the major reasons that riders choose the T. The majority of riders prefer a fare increase over weekday or weekend service cuts if revenues need to be brought more into line with costs.

T riders are very pleased with the service. On a scale of one (very poor) to five (excellent), respondents rate The T service at an average of 4.22. Sunday service, improved frequency, and later evening service were the most requested improvement among T riders.

Survey Findings for KU on Wheels (KUOW)

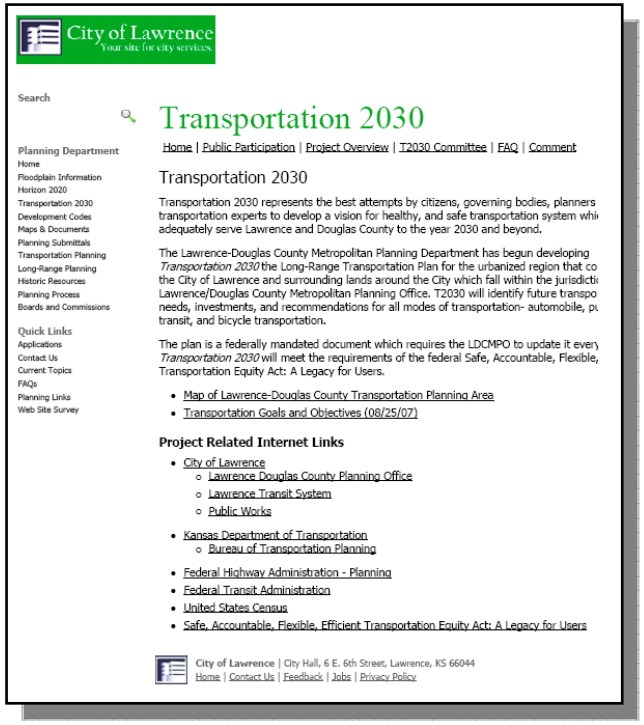
KUOW riders are using transit primarily to get to and from class. KUOW riders tend to ride frequently. At least 95 percent of respondents on both KUOW and the park-and-ride shuttle are KU students. Convenience is by far the major reason that riders choose KUOW. KUOW riders are split on the importance of access to a citywide transit system and are also split on willingness to pay more for evening and weekend service.

KUOW riders are pleased with the service. On a scale of one (very poor) to five (excellent), respondents rate KUOW service at an average of 3.88. Improved frequency, expanded routes, and later evening service were the most requested improvement among KUOW riders.

T2030 Website

To provide Internet based information on T2030, www.lawrenceplanning.org/t2030 was developed as a project website with a direct hyperlink available through the City of Lawrence and Douglas County websites. The site provided a means of submitting input on the development of T2030. The following sections and supporting information were included on the website:

- Project Overview – Background and purpose of a long range transportation plan, project schedule, SAFETEA-LU metropolitan planning requirements and planning factors
- Public Participation – Public/stakeholder/industry participation process, public meeting information, comment forms, and summaries of comments received
- T2030 Committee members, agendas, and meeting minutes
- Frequently Asked Questions
- The site proved a recognizable resource to offer additional information and updates to interested citizens throughout the process.



Stakeholder Interviews

As part of the Long Range Transportation Plan development process, public agencies and interested parties were targeted early in the process to gain their input regarding the transportation needs and issues of the region. A series of stakeholder interviews were held throughout the development of the plan with natural resource agencies, Kansas Department of Transportation (KDOT), Kansas Turnpike Authority (KTA), Lawrence Transit, KU on Wheels, the Lawrence-Douglas County Paratransit Council, the Lawrence Bicycle Advisory Committee, the Pedestrian Advisory Committee and several organizations representing people with disabilities.

The input of these stakeholders, much like the public input, was used to help shape the recommendations, goals, objectives, and policies of this plan. Full reports of the stakeholder interviews and comments are contained in the Technical Appendix and summarized in a following section.

Public Meetings

A series of public meetings was conducted during the development of the 2030 Long Range Transportation Plan, *Transportation 2030.* The locations, dates, and times of the public meetings were as follows:

Location	Date/Time
Eudora City Hall	September 18th, 6:30 – 8:30 PM
Lawrence Union Pacific Railroad Depot	September 20th, 4:30 – 7:00 PM
Baldwin City High School	September 25th, 6:30 – 8:30 PM

Representatives from the Lawrence/Douglas County MPO, Lawrence Transit, KDOT, FTA, and FHWA were in attendance to support the consultant facilitated meetings. Each meeting consisted of a formal presentation followed by a facilitated question-and-answer session, and concluded with an open-ended opportunity for attendees

to interact directly with project representatives. Comments were received verbally at the meetings, through a structured written exercise, and in writing on a citizen comment form. Public interest generated a number of comments on various transportation topics.

Comments were requested and received for the following six subject areas:

- goals and objectives for the 2030 LRTP,
- likes and dislikes of the transportation system,
- ideas for future transportation improvements,
- ideas for increasing public interest in the planning process,
- land use and development issues, and
- other issues and ideas related to transportation in the Cities of Lawrence, Eudora, and Baldwin City as well as Douglas County.

Full reports of the public meetings and comments are contained in the Technical Appendix and they are summarized in the following section.

What Did the Public and Stakeholders Say?

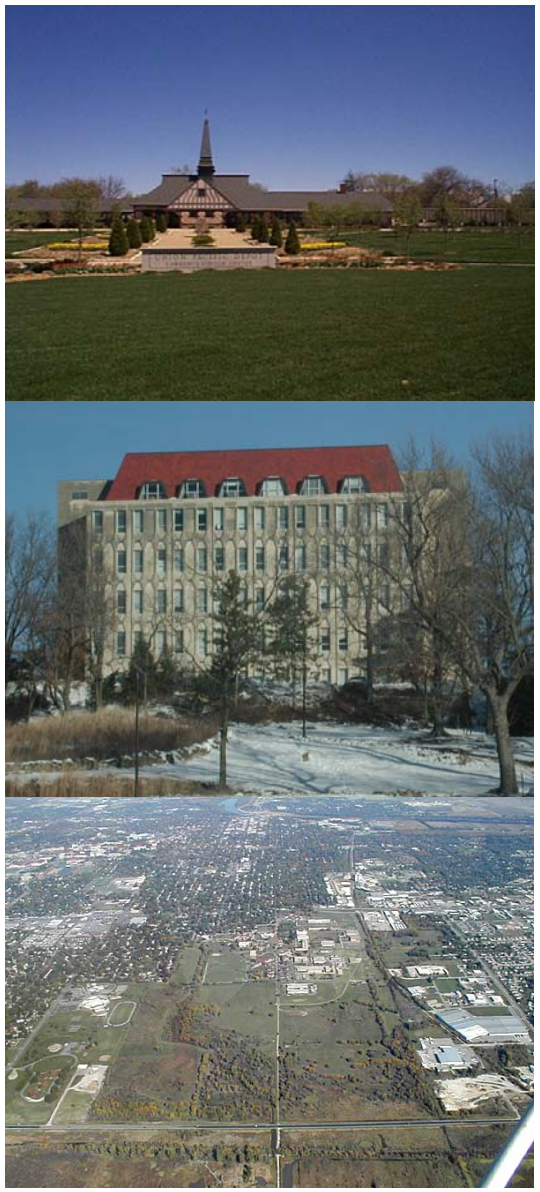
As noted above, public involvement is an important part of the planning process. Although the number of participants and others who submitted comments through the public meeting process and stakeholder interviews is relatively small in comparison to the population of the region, their comments have added value to this planning effort and have helped to shape *Transportation 2030*.

The T2030 Committee

The public involvement process for *Transportation 2030* was guided by the T2030 Committee. Members included representatives from different facets of transportation including the Lawrence/Douglas County MPO, the cities of Lawrence, Eudora, and Baldwin City, Douglas County, Lawrence Transit, the Kansas Department of Transportation, the Federal Highway Administration, and the Federal Transit Administration.

The T2030 Committee met regularly throughout the planning and development process for *Transportation 2030*, helping to build consensus and reach recommendations through informed consent. Staff and the consultant presented information and the T2030 Committee reviewed materials for accuracy, relevancy, and importance in the development of *Transportation 2030*.

The T2030 Committee shaped *Transportation 2030* into a plan that was more comprehensive and sensitive to the design and use of a multi-modal transportation system. Alternative modes, such as pedestrians, bicycles, and public transit, were all given a high priority. In addition, the T2030 Committee stressed the necessity for *Transportation 2030* to incorporate land use and transportation decisions into a unified planning process. This facilitated an emphasis on access management, corridor preservation, and incorporation of development designs that support all modes.



Major Issues/Themes

Several major issues/themes emerged from the numerous public and stakeholder comments regarding the goals and objectives for *Transportation 2030*, including alternative modes and neighborhood planning.

Many of those who commented discussed the need for:

- Roadway improvements to address growing traffic volumes on city streets and county roads, to provide a means to cross natural and man-made barriers such as rivers and freeways, and to provide a route around Lawrence for truck traffic and traffic that is passing through the city from the Kansas Turnpike (I-70) to highway K-10.

- Better alternatives to private automobiles. Provide effective facilities for alternative modes of transportation.

- Better pedestrian amenities, citing missing sidewalk segments, sidewalks in disrepair, crosswalk safety, and access through neighborhoods and to transit stops.

- Additional bicycle facilities, increased connectivity, education, cross-town access, and dedicated funding sources for bicycle improvements.

- Enhanced public transit systems, better pedestrian access to transit, and intercity express transit routes. Funding for transit needs to be increased.

Suggested Future Transportation Improvements

Numerous comments regarding future improvements were received. Many reflected earlier statements regarding both improvements to roadways and the promotion of alternative modes, but some specific ideas were suggested as well.

They include the following items:

- Roadway Improvements – Several expressed desire for the completion of the South Lawrence Trafficway (K-10), others suggested an eastern bypass would be a better alternative.
- Public Transit – Increased frequency of service, expanded service to the county, monthly and unlimited access bus passes for the "T," regional express transit between Topeka and Kansas City (including service to Johnson County and KCI Airport), and consolidation of services with KU on Wheels.
- Intermodal Transportation Center/Hub – Some wanted a hub in downtown that would provide connections between intercity bus transportation, local transit, and potential future passenger/commuter rail service.

Land Use and Development

Discussions on this topic generally included concerns about more recent developments across the City. For example, some expressed concerns about "big box" developments and the need for internal traffic circulation and pedestrian access within them. Others expressed concerns for the location of proposed industrial development. All modes should be considered in the planning of developments. Some expressed a desire for higher density residential developments.

Public Comments regarding the Draft T2030 Long Range Transportation Plan

This section will contain a summary of those comments received during the 30-day public review period and will be prepared following that period.

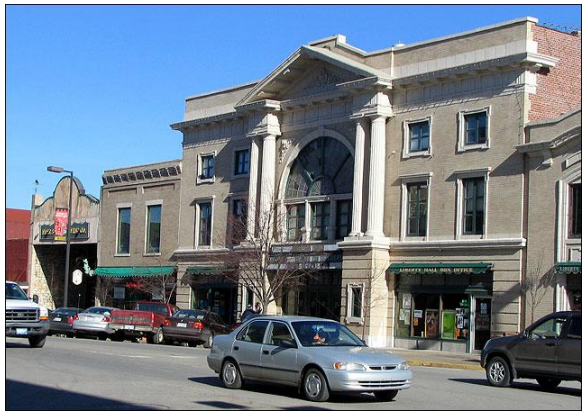
Chapter 4: Transportation Goals and Objectives

The goals and objectives of T2030 are based on those that were developed for *Horizon 2020,* the region's Comprehensive Plan. The goals and objectives of *T2030* were also developed with full consideration of the Planning Factors of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU).

SAFETEA-LU, signed into law in August 2005, is the current national surface transportation act, which authorizes the federal surface transportation program for highways, highway safety, and transit through 2009. SAFETEA-LU builds upon many of the policies and programs established by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Transportation Equity Act for the 21st Century (TEA-21). SAFETEA-LU also makes some significant enhancements and additions to how long range transportation plans for metropolitan areas are to be developed. These include:

- Adding Intermodal connectors as a transportation facility;
- Incorporating a discussion of potential environmental mitigation activities and potential mitigation sites that is to be developed with federal, state, tribal, and wildlife and land management regulatory agencies;
- Including transit operators in the development of the funding estimates for the financial section of the plan;
- Consulting with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation; and,
- Specifically including representatives of agencies representing pedestrians, bicyclists, and persons with disabilities in the planning process.

In addition, SAFETEA-LU expands the number of planning factors to be addressed by the long range transportation plan to eight, with safety and security becoming



separate and distinct factors. Following, is the list of the eight planning factors as described in SAFETEA-LU.

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
2. Increase the safety of the transportation system for all motorized and non-motorized users.
3. Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users.
4. Increase accessibility and mobility of people and freight.
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
7. Promote efficient system management and operation.
8. Emphasize the preservation of the existing transportation system.

The following T2030 goals address the SAFETEA-LU Planning Factors and are intended to guide future transportation decisions in the region. For each of these goals, a corresponding set of objectives has been established to help the region move closer to the intended goal.

Goal 1: Support the Economic Vitality of the Region

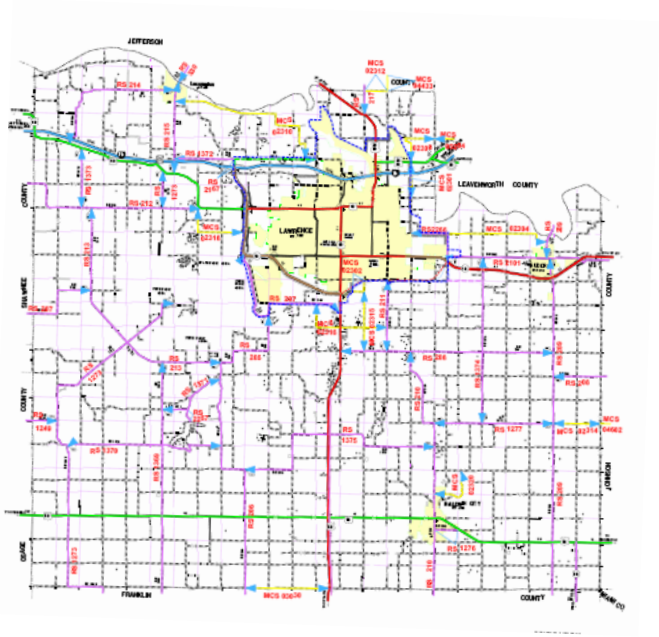
Approve guidelines that enhance economic activity and foster the principles of accessibility, convenience, cooperation, and aesthetic character.

Objective 1.1: Enhance the Efficient Movement of Freight

- Facilitate the movement of freight by air, rail, and truck. Designate specific arterial streets as truck routes. Use this designation to improve the street system to better accommodate industrial traffic movements through adequate turning radii, lane widths, pavement conditions to withstand industrial loads, and access control.
- Protect designated and planned industrial areas from encroachment of commercial and residential use.

Objective 1.2: Enhance All Transportation Facilities

- Continue to develop the Lawrence Municipal Airport for private and commercial aviation and aviation-related business development in accordance with the adopted Airport Master Plan. Protect the airport's approaches and air space from encroachment through height and land use restrictions. Utilize the Airport Master Plan to assist in the projected aviation activity of the airport, allowing effective usage of the facility.
- Plan for a multi-modal transportation center to facilitate rail, bus, transit (inter-city and intra-city), taxi, commuter, and ride-sharing transportation needs, with proper bicycle/pedestrian access for the center. Proper timing and coordination between the various transportation modes for efficient and economical access shall be an objective to encourage use.



Goal 2: Maintain, Expand and Enhance the Existing Street Network

Advance policies that promote roadway connectivity and expand multimodal services.

Objective 2.1: Support an Integrated System

- Encourage location and concentration of land uses and urban design that will promote and facilitate pedestrian access to public transportation.
- Establish an integrated system of bicycle and pedestrian improvements that provide for safe and efficient connections throughout the community and offers viable choices of travel.
- Develop a system that integrates all modes of transportation by providing appropriate links to major transit terminals.
- Support regulations that promote multimodal use.

Objective 2.2: Coordinate with Other Jurisdictions

- Coordinate with other transportation agencies and adjacent communities and counties for the extension of existing and planned arterial, collector, and access/frontage streets.
- Pursue the expansion of, and continue to improve the coordination of public, private and university transit systems.
- Examine the potential of expanding existing commuter services and the implementation of new transportation services between Douglas County, the Kansas City region, and the Topeka region.

Objective 2.3: Develop a Countywide Street/Road System

- Maintain a street/road classification hierarchy for both Lawrence and unincorporated Douglas County that identifies the functions of all streets/roads and intersections within the planning area. The development of this hierarchy should consider Lawrence's emphasis on alternative transportation modes.

- In the incorporated cities, direct access from a local street (public or private) to an arterial street or principal arterial street will be discouraged; permission to do so will require proof of hardship or burden from the applicant. Advanced planning of neighborhood street patterns should be required to avoid local-arterial street connections.
- Develop street improvement and operational standards for street and road classes within the classification hierarchy while addressing the needs specific to Lawrence and unincorporated Douglas County.
- Utilize area planning to plot street expansions to connect neighborhoods.

Objective 2.4: Street, Bridge, Sidewalk Maintenance and Upkeep

- Oversee the public transportation network to confirm continued maintenance of the infrastructure (bridges, public and private streets, sidewalks, and bicycle facilities) with ongoing patching, sealing, overlays, and reconstruction/rehabilitation projects.
- Coordinate with KDOT to develop/maintain a methodology for inspection, maintenance, and replacement of bridges.

Goal 3: Develop and Adopt Acceptable Levels of Service (LOS) Standards for City and County Roads

Promote access management standards to reduce traffic congestion and increase LOS standards for the roadway network.

Objective 3.1: Determine and Attain the Critical LOS for the Street System Network

- An overall level of service D (LOS D) or higher should be maintained at signalized and unsignalized intersections during the a.m. and p.m. peak hours of operation. For intersections on principal arterial streets however, the principal arterial through traffic movements should maintain as close to a level of service C (LOS C) as possible or higher during a.m. and p.m.

peak hours of operation. Within urban areas, issues of transportation performance (LOS) may need to be balanced with issues of urban design, development, or redevelopment, land use functionality and physical and environmental constraints.

- The desired level of service may be achieved by increasing street and intersection capacity and/or reducing vehicular traffic demand.

Objective 3.2: Implement Traffic Impact Standards

- A traffic impact study (TIS) shall be required when a new development or redevelopment produces 100 trips or more during the peak hour. An evaluation of the traffic impacts of a development in the surrounding area should consider existing and projected traffic conditions, plus their impact on the existing transportation system. A TIS should also be based on planned improvements that are identified in the Capital Improvement Plan (CIP), the Comprehensive Plan, and the Long-Range Transportation Plan.
- The Capital Improvement Plan, the Comprehensive Plan, and the Long-Range Transportation Plan shall be updated periodically to recognize changes in priorities and to add new projects with designated priorities.

Objective 3.3: Traffic Signals

- The *Manual on Uniform Traffic Control Devices* (MUTCD) warrants and guidelines will be followed when considering new or upgraded traffic signals.
- To optimize traffic signal coordination, the desirable traffic signal spacing is at ½ mile and preferably at 1 mile intervals. Locations that generate numerous trips may warrant signals at a location other than the 1-mile or ½-mile point, however consideration should be given to the impacts on the coordinated flow of traffic.
- Actuated traffic signals should include push buttons to signal the need for pedestrians to cross. Actuated traffic signals should also include bicycle sensitive loop detectors adjacent to the curb.
- Pedestrian crossings along arterials should be considered between traffic signals that are 660 feet apart where pedestrian traffic warrants them.

Objective 3.4: Roundabouts

- Roundabouts should be considered as an intersection improvement alternative that moves traffic efficiently during peak and non-peak hours.
- The design of roundabouts should be consistent with the Kansas Roundabout Guide prepared by the Kansas Department of Transportation.

Objective 3.5: Medians

- Medians may be used as a method of achieving any of the following objectives: provide access control, separate opposing traffic flows, provide for speed changes, store left-turning vehicles, provide a landscaped area, or provide a pedestrian refuge.
- Continuous raised medians should be considered for principal arterial streets. Arterial and collector streets may have raised medians, in accordance with circulation and land use needs.
- Where a raised median is not possible or is inappropriate on a principal arterial street, an arterial street, or on a collector street, a two-way continuous left-turn lane should be used adjacent to commercial land uses.
- On principal arterial or arterial streets adjacent to residential neighborhoods, the use of a continuous raised median should be considered to discourage cut- through traffic, emphasize through traffic flow on the arterial street, and direct neighborhood traffic to designated intersections.
- Openings in raised medians are desired at 1/4 mile intervals, with 1/8 mile spacing as a minimum distance. Collector streets, local roads (public and private), and driveways to developments should align with these median opening spacing requirements.
- A median crossover or median breaks should not be permitted on existing divided thoroughfares where median openings for crossroads and preplanned median breaks are established or, when spacing is not in the best interest of the traveling public.

Objective 3.6: Traffic Calming

- Develop Traffic Calming guidelines for use on local streets and roads.

Goal 4: Protect the Environment and Promote Energy Conservation

Preserve the environment by adopting criteria that promote smart growth patterns to help sustain healthy air quality levels and minimize land use conflicts.

Objective 4.1: Promote Sensible Growth Patterns

- Provide an efficient and effective network of streets and roads that access all appropriate areas, provide continuity and connections into and beyond the City of Lawrence and Douglas County, and support the arrangements of various land uses within the urbanized area.
- The planning of arterial and other street alignments should consider natural and environmentally sensitive areas to minimize potential impacts.
- Designate roadway and transit corridors for streetscape, noise buffering, and/or landscaped median treatments.

Objective 4.2: Support Measures to Maintain Air Quality and Minimize Use of Fossil Fuels

- Support alternative transportation modes to improve air quality.

Objective 4.3: Use Appropriate Design Criteria to Minimize Negative Impacts

- Arterial and highway alignments should not advance beyond neighborhood boundaries in an effort to minimize traffic intrusion and negative impacts on residential areas.

- Street proposals should consider steep grades and side-slopes as well as the impacts to physical constraints such as drainage ways, existing land use, and topography prior to approval.
- Minimize impacts on environmentally sensitive areas.

Objective 4.4: Improve the Linkage between Transportation Planning and Environmental Planning

- Contact and consult with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation with a focus on policies, programs, and strategies.
- Compare the transportation plan with State conservation plans or maps, if available, and /or compare the transportation plan to inventories of natural or historic resources if available.
- Through discussions with resource agencies, identify potential environmental mitigation activities and potential areas to carry out these activities.

Goal 5: Emphasize Transportation System Safety

Develop criteria that focus on the safety aspect of projects and require that the safety element of projects be addressed properly before approval is considered.

Objective 5.1: Enhance Public Safety

- Enhance public safety through the linking of residential developments to maintain an integrated street system and assure prompt emergency access.
- Identify improvements aimed at enhancing the safety of existing roadways (e.g. adding left-turn lanes at an intersection, traffic signal coordination, adding a right-turn lane at high traffic volume driveways and intersections, etc.).

- Improve pedestrian linkages between residential, commercial, and community facilities and schools.
- Evaluate access to new subdivisions based on public safety.
- Develop guidelines for the use of street lighting along major streets/roads and at other locations that may warrant their use.

Objective 5.2: Coordinate Safety Efforts with the Kansas Strategic Safety Plan

- Develop a regional safety plan, in cooperation with safety partners, which supports the Kansas Strategic Highway Safety Plan. This local plan will implement the appropriate strategies of Engineering, Education, Enforcement, and Emergency Medical Service (4 E's) to reduce crashes.

Goal 6: Increase Transportation System Security

Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized system users.

Objective 6.1: Encourage Transportation Investments and Policies that Result in a Higher Level of Security for Motorists, Transit Users, Pedestrians, and Bicyclists

- Coordinate with local and state agencies responsible for security to develop a plan of action for improving security measures for motorists, transit users, pedestrians, and bicyclists within the Lawrence-Douglas County region.

Goal 7: Coordinate Land Use and Transportation

Ensure that land use planning and transportation planning is coordinated.

Objective 7.1: Land Use and Transportation Coordination

- Coordinate land use and transportation planning for the region. Combine the development cycles of the region's Comprehensive Plan and Long Range Transportation Plan to allow the analysis of land use, transportation, and environmental interactions.

Objective 7.2: On-Street Parking

- Parking on public streets is secondary to the street's primary purpose of providing safe and efficient travel for the public. Therefore, parking should be prohibited on principal arterial and arterial streets.
- Parking is normally permitted on collector streets, but may be restricted to accommodate bus stops, on-street bicycle lanes, added turning lanes at intersections, or other operations requirements.
- Parking is normally permitted on local streets, but may be restricted to one side to facilitate the flow of traffic and reduce congestion.
- In special areas in the city, historic districts, and some activity centers, on-street parking is desired, and should be permitted to contribute to the special character or theme of an area.

Objective 7.3: Street-Land Use Relationship

- The subdivision of property in suburban and rural areas for residential purposes must consider the logical planned extension of local and collector streets to adjacent properties, and property within a section.
- Buildings should be set back a sufficient distance from arterial and section line roads to accommodate future road improvements.
- In the urban growth areas, buildings must be set back from the property/lot line(s) a sufficient distance to accommodate planned extensions of streets along a common property line.

- Along transit routes in urban areas, new buildings should be located within a reasonable walking distance from the right of way line to allow easy access for transit users. In placing buildings along arterial or major collector streets, accommodation of future roadway widening should also be considered.

Objective 7.4: Enhance Streetscape and Gateways

- Streetscapes should be utilized to provide visually attractive and physically comfortable environments that are integrated with similar environments of adjacent private property. Cultural, environmental, and historical considerations should be acknowledged when developing a streetscape.
- The provision of minimum lane widths, allowing brick or other alternative street surfaces, and utilizing minimum turning radii and/or curb extensions are an appropriate traffic calming technique when street character, as defined by land use and street classification, calls for slower speeds and enhanced pedestrian environments. Non-warranted stop signs, speed bumps, or dead-end roads are not desirable traffic calming techniques. Traffic calming measures should:

1. Promote safe and pleasant conditions for motorists, bicyclists, pedestrians, and residents on neighborhood streets;
2. Mitigate the impact of vehicular traffic, including air pollution, accidents, and noise;
3. Provide a visually attractive environment for those who travel through an area by increasing landscaping and gateway opportunities.

- Utilize the streetscape to establish a character or theme for special areas, historic districts, activity centers, universities, neighborhoods, or scenic drives and gateways.
- Use landscaping buffers between automobile traffic lanes and developed sites adjacent to the streets while maintaining safe sight distances.
- Utility (fire hydrants, traffic signal boxes, mailboxes, power poles, transformers, underground cables) design should minimize the visual presence of utilities within the streetscape. Utility corridors should be

established in the greenspace to avoid conflicts between utilities and sidewalks or planting strips.

Goal 8: Preserve Existing Transportation Facilities and Promote Efficient System Management and Operations

Create land use policies that promote transportation system preservation, multimodal transportation, and access management standards.

Objective 8.1: Encourage Land Development Patterns to Promote Transportation Efficiency

- Encourage location and concentration of land uses and urban design, which will promote and facilitate pedestrian access to public transportation.

- Encourage subdivision design that maximizes connectivity.

Objective 8.2: Encourage Access Management Standards

- Access Management Standards for major collector and arterial streets should be implemented to preserve the capability of a roadway to move traffic, delay the need to add lanes, minimize vehicle conflicts, and improve safety. Access Management is not only important for streets in urban areas, but also in rural areas where development is expected.
- Access Management Standards and Access Spacing Guidelines identified in City and County policies should be followed for Low Density Residential, Multi-Family, and Commercial areas.

Objective 8.3: Promote Efficient System Management and Operations

- Mitigate capacity deficiencies on congested roadways and at intersections.

- Support the deployment of appropriate Intelligent Transportation System (ITS) technologies according to the Regional ITS Architecture as a means of achieving better management and operations of the existing transportation system.
- Continue to upgrade traffic signals, improve signal timing, and improve signal coordination.

Goal 9: Pedestrian and Bicycle Transportation System

Establish an integrated system of bicycle and pedestrian improvements that provides for safe and efficient connections throughout the community, and offers viable choices of travel.

Objective 9.1: Sidewalks

- Provide sidewalks as a safe passage for pedestrians by creating a right-of-way that is separate from vehicular traffic. Sidewalks should be provided on both sides of the street in urban areas, or constructed wider than standard widths in areas characterized by a combination of heavy vehicular traffic and a concentration of pedestrian destinations, such as shopping areas, schools, government offices, and activity centers like downtown Lawrence.
- Utilize sidewalks to encourage pedestrian activity, which is a defining criterion for the development of community or neighborhood identity.
- Sidewalks should be set back a sufficient distance from the curb on principal arterial, arterial, and collector streets to create the potential for a safe distance between pedestrians and adjacent automobile traffic.
- Sidewalks should be paved with a hard, all-weather surface that is easy to walk on. Alternative surface types, like bricks or pavers, should be considered when the street character, as defined by land use and street classification, calls for uniquely enhanced pedestrian environments.
- All sidewalks and curbs should accommodate pedestrians with disabilities, and other non-motorized modes of travel. Install ADA accessible

wheelchair landing pads and transit shelters along sidewalks at designated fixed route bus stops.

- Developments should be designed to provide planned non-motorized access to parks and open space.
- Encourage pedestrian activity and neighborhood interaction through the inclusion of pedestrian access to all parts of a neighborhood, subdivision, or development.
- In low-density residential, suburban, or rural areas, pedestrian linkage can be provided with pedestrian easements at the rear of residential developments or along natural drainageways.
- Provide pedestrian connections at the end of cul-de-sacs wherever possible.

Objective 9.2: Bicycles

- Develop a bicycle network that provides improved access to downtown, the KU campus, commercial areas, and activity and recreational centers within the community.
- Bicycle facilities are desired on collector and arterial streets whenever possible. Off-street bicycle facilities should be provided parallel to, or near expressways and arterial streets.
- Where existing and projected traffic volumes are low, collector streets should be designated and signed as a bike route. On higher volume collector streets or where bicycle traffic is anticipated to be heavy, bicycle lanes are desired.
- Older parts of town with established development should be evaluated in terms of bicycle safety and connectivity.
- Continue to provide bicycle racks on all fixed-route transit buses.

Objective 9.3: Multi-Use Trails

- In newer subdivisions with a discontinuous street system, the subdivision should be designed to provide for direct, inter-connected continuous bicycle and pedestrian access to other parts of the community.
- Multi-use trails should be a hard all-weather low-maintenance surface to accommodate walkers, joggers, bicyclists, and other non-motorized

transportation modes. Multi-use trails in park areas, along the river corridors, and adjacent to some drainageways can be of a natural surface to accommodate a variety of users.

- Grade separated crossings for multi-use trails are recommended at the intersection of freeways, expressways, and are desirable when multi-use trails intersect with some principal arterial streets.

Goal 10: Public Transportation System

Implement a coordinated public transportation system that offers a viable choice of travel that addresses the needs of individuals and the community as a whole.

Objective 10.1: Maintain and Enhance a Comprehensive Transit System

- Provide direct and continuous access to transit stops.
- Increase transit productivity by considering the need for sidewalks to transit stops, safe street crossings, lighting for security, bus stop benches and shelters, and turnouts onto roadways.
- A centrally-located hub should be planned and built that coordinates the community and regional multi-modal transportation system and that supports the existing land uses.
- Plan for and construct a bus maintenance facility to serve Lawrence Transit and KU on Wheels.
- Continue to identify/map bus stops.
- Install user-friendly signing at bus stop locations.

Table 4-1 illustrates how the Transportation 2030 goals address each of the eight SAFETEA-LU planning factors.

Table 4.1
Comparison of T2030 Goals and SAFETEA-LU Planning Factors

Federal Planning Factors	Economic & Vitality	Safety	Security	Access & Mobility	Environment	Integration & Connectivity	Management & Operation	System Preservation
Goal 1: Support the Economic Vitality of the Region								
1.1 Enhance the Efficient Movement of Freight	✓	✓		✓	✓	✓	✓	✓
1.2 Enhance All Transportation Facilities	✓	✓		✓	✓	✓	✓	✓
Goal 2: Maintain, Expand and Enhance the Existing Street Network								
2.1 Support an Integrated System	✓	✓		✓		✓		
2.2 Coordinate with Other Jurisdictions				✓		✓	✓	✓
2.3 Develop a Countywide Street System	✓			✓		✓	✓	✓
2.4 Street, Bridge, Sidewalk Maintenance and Upkeep	✓	✓		✓		✓	✓	✓
Goal 3: Develop and Adopt Acceptable Levels of Service (LOS) Standards for City and County Roads								
3.1 Determine and Attain the Critical LOS for the Street System Network	✓	✓		✓	✓		✓	
3.2 Implement Traffic Impact Standards	✓	✓		✓			✓	✓
3.3 Traffic Signals	✓	✓		✓		✓	✓	✓
3.4 Roundabouts		✓		✓	✓		✓	✓
3.5 Medians		✓		✓			✓	✓
3.6 Traffic Calming		✓					✓	✓
Goal 4: Protect the Environment and Promote Energy Conservation								
4.1 Promote Sensible Growth Patterns				✓	✓	✓		
4.2 Support Measures to Maintain Air Quality and Minimize Use of Fossil Fuels				✓	✓	✓		
4.3 Use Appropriate Design Criteria to Minimize Negative Impacts				✓	✓			✓
4.4 Improve the Linkage between Transportation Planning and Environmental Planning					✓			✓

Table 4.1 (continued)
Comparison of T2030 Goals and SAFETEA-LU Planning Factors

Federal Planning Factors	Economic & Vitality	Safety	Security	Access & Mobility	Environment	Integration & Connectivity	Management & Operation	System Preservation
Goal 5: Emphasize Transportation System Safety								
5.1 Enhance Public Safety		✓		✓		✓	✓	
5.2 Coordinate with Statewide Strategic Safety Plan		✓		✓			✓	✓
Goal 6: Increase Transportation System Security								
6.1 Encourage Transportation Investments and Policies that Result in a Higher Level of Security for Motorists, Transit Users, Pedestrians, and Bicyclists			✓					
Goal 7: Coordinate Land Use and Transportation								
7.1 Land Use and Transportation Coordination	✓	✓		✓	✓	✓	✓	✓
7.2 Street-Land Use Relationship				✓			✓	✓
7.3 Enhance Streetscape and Gateways	✓	✓			✓		✓	✓
Goal 8: Preserve Existing Transportation Facilities and Promote Efficient System Management and Operations								
8.1 Encourage Land Development Patterns to Promote Transportation Efficiency		✓		✓	✓	✓	✓	✓
8.2 Encourage Access Management Standards		✓		✓			✓	✓
8.3 Promote Efficient System Management and Operations	✓	✓		✓		✓	✓	✓
Goal 9: Pedestrian and Bicycle Transportation System								
9.1 Sidewalks	✓	✓		✓		✓		
9.2 Bicycles	✓	✓		✓		✓		
9.3 Multi-Use Recreational Trails	✓	✓		✓		✓	✓	✓
Goal 10: Public Transportation System								
10.1 Maintain and Enhance a Comprehensive Transit System	✓	✓		✓		✓		

Chapter 5: Land Use and Transportation

Relationship between Land Use and Transportation Planning

What we've heard…

Transportation and land use planning should go hand-in-hand.

One of the most discussed topics in planning is the relationship between land use and transportation. Often equated to the "chicken or the egg" debate, the discussion most often centers on whether transportation is the driving force behind land use and development patterns or whether land use holds the influence over how transportation facilities and services are developed and used.

Rather than thinking of this relationship in terms of the "chicken *or* the egg," perhaps it makes more sense to view it in terms of the "chicken *and* the egg." Doing so emphasizes the interrelationship between the two instead viewing it in terms of a competition for dominance. It also recognizes that the relationship will vary from case to case and according to context. There are clearly cases or situations when investments in transportation facilities and services take the lead toward implementing a very specific and much focused land use and development plan, supporting economic development efforts, or to support another type of community based program or initiative. There are other situations, however, when evolving land use and development patterns affect how transportation facilities and services grow and are used. Providing transportation facilities and services for low density, widely spread development is much different than for more compact, mixed use development. A low density pattern of development inefficiently uses available land and increases dependency on automobile travel, while a compact, mixed use pattern encourages efficient travel with transit, walking, and bicycling as viable options.

Within the context of the long range transportation plan, effectively integrating land use and transportation helps to define and shape priorities for transportation investments, and the policies and programs needed to make and direct those investments. More importantly though, it helps to ensure that land use and development patterns, and transportation facilities and services support and reinforce each other to the greatest extent possible. Being able to assess project and associated financial needs based on current land use and demographic trends, as well as on desired future development trends, is critical to being able to develop and implement a long range plan as an effective tool for decision making. In this regard, this section describes the future land use and development patterns as well as the expected demographic trends that were used to assess future travel demand and as such for the basis of this plan.

Future Land Use

The region's comprehensive plan, *Horizon 2020, p*rovides a vision for the amount of growth, location of new development, and types of new development and redevelopment expected to occur in the Lawrence/Douglas County planning area.

The Lawrence/Douglas County Planning Commission updated the future land use information and estimates of socioeconomic activity that were made in *Horizon 2020* for the year 2030. This updated information was used in the region's Travel Demand Model to estimate future levels of travel on the region's major roadways. Estimates of future travel demand are based on established travel patterns, travel and demographic trends, and expected future land uses and their associated levels of activity.

One of the considerations in developing a T2030 Future Land Use Scenario is that the City of Lawrence may approve in 2008 an optional development code (Lawrence SmartCode) that will allow the creation of new neighborhoods based on Traditional Neighborhood Design (TND). TND developments built under the Lawrence SmartCode will take on characteristics more similar to the core neighborhoods of the city instead of the suburban areas on the fringe. These characteristics include higher densities, increased connectivity, mixed land uses, and more compact development. The sum total of these characteristics will help contribute to greater walkability and reduced vehicle trips within the neighborhoods.

Based on T2030 Future Land Use Scenario, TND developments are forecasted to be built south of Wakarusa River, east and west of US 59 and west of K-10 along 15th Street instead of traditional suburban development. One effect of TND is to reduce automobile dependency. If one lives in a highly automobile dependent neighborhood, virtually every trip one makes requires driving due to poor pedestrian and bicycle network connectivity and a longer distance to travel. If one lives in a TND development, one can conveniently go shopping and perform other personal trips by walking or cycling, and children can walk or bike to school and parks. Common destinations such as stores, schools, recreation centers and commercial centers are located closer together, so the trip lengths are shorter even if one has to drive. The result is an increase in transportation options and a reduction in total vehicle mileage and usage. Higher land use density would generally encourage a higher transit use.

Travel Demand Model

The region's Travel Demand Model estimates traffic volumes using two socioeconomic variables: households and employment. Employment data is further divided into retail and non-retail categories to account for the differences in the amounts and types of trip making associated with these employment types. Household and employment forecasts were estimated for the year 2030 by applying conversion equations to the 2030 land use map shown in Figure 5.1. For the employment categories, control totals were developed at the county level to restrain future employment estimates to reasonable levels. The current and forecasted socioeconomic data used by the Travel Demand Model is shown in Table 5.1 on page 72. As this data is reviewed, it is important to note that the Travel Demand Model roughly covers the current Urban Growth Area, which is an area smaller than the county but larger than the City of Lawrence; Lawrence figures are estimates based on the model's traffic analysis zones that approximate the city limits. No household data was available at the county level.

More information on the Travel Demand Model can be found in the sidebar in Chapter 6.

Figure 5.1
Future Land Use

Source: Lawrence/Douglas County Metropolitan Planning Office GIS Data

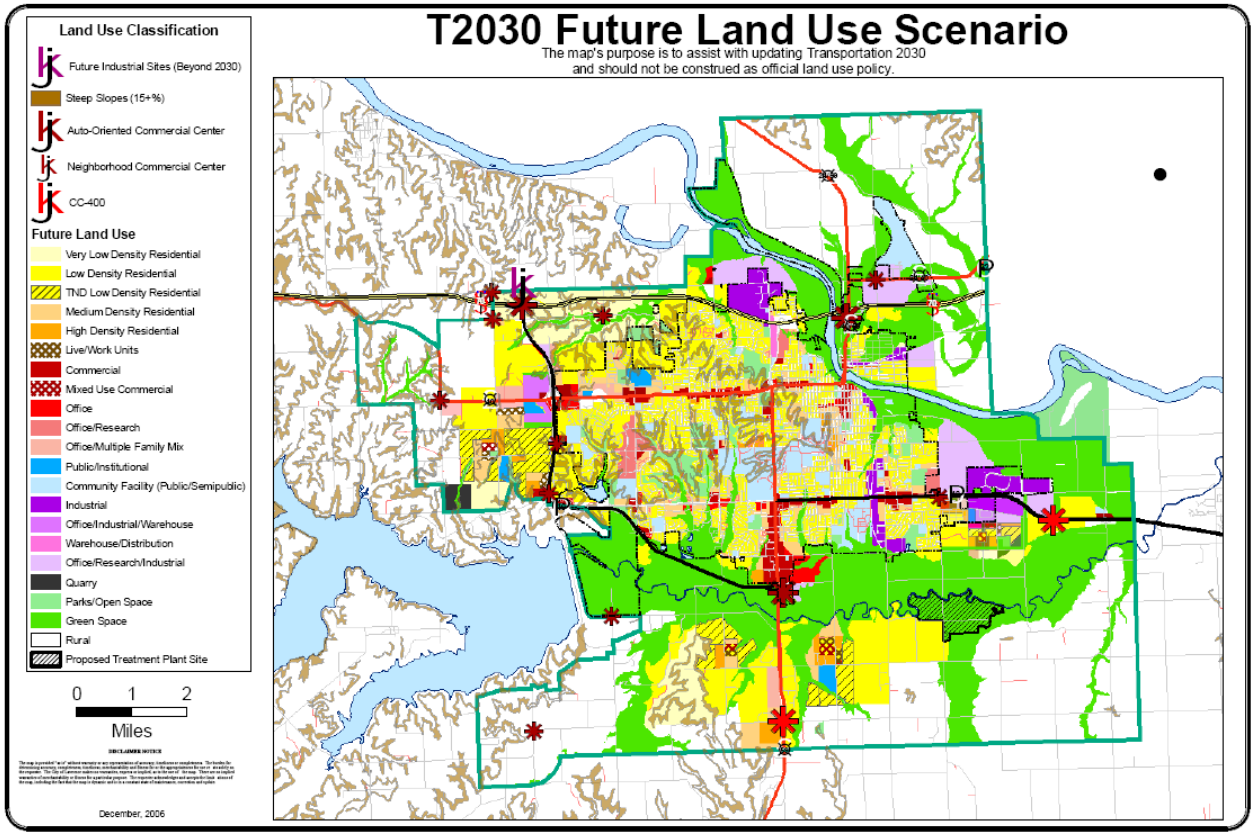


Table 5.1
Current and Forecasted Socioeconomic Data**

		Lawrence	Model Area*
Population	2005	79,409	86,453
	2030	108,242	150,302
	Annual Growth Rate	1.4%	2.8%
Households	2005	36,095	39,297
	2030	49,201	68,319
	Annual Growth Rate	1.4%	2.8%
Retail Employment	2005	12,501	12,762
	2030	18,786	20,017
	Annual Growth Rate	1.9%	2.2%
Non-Retail Employment	2005	32,108	33,187
	2030	46,927	51,204
	Annual Growth Rate	1.8%	2.1%
Total Employment	2005	44,609	45,949
	2030	65,713	71,221
	Annual Growth Rate	1.8%	2.1%

Sources: Lawrence/Douglas County Metropolitan Planning Office; U.S. Census; Lawrence Travel Demand Model

* Model Area is represented by the City of Lawrence and the surrounding areas

** Values in the table above are estimates

Land Use Action 1: *Combine Planning Cycles*

Combine the development cycles of the region's Comprehensive Plan and Long-Range Transportation Plan into a maximum 5-year process that allows for the analysis of land use, transportation, and environmental interactions.

Land Use Action 2: *Encourage Land Development Patterns to Promote Transportation Efficiency*

Encourage location and concentration of land uses through Traditional Neighborhood Design, which will promote and facilitate transportation options such as walking, bicycling, and transit. Encourage subdivision design that maximizes connectivity.

Land Use Action 3: *Encourage Access Management Standards*

Access Management Standards for major collector and arterial streets should be implemented to preserve the capability of a roadway to move traffic, delay the need to add lanes, minimize vehicle conflicts, and improve safety. Access Management is not only important for streets in urban areas, but also in rural areas where development is expected.

Land Use Action 4: *Enhance Streetscapes and Gateways*

Streetscapes should be utilized to provide visually attractive and physically comfortable environments that are integrated with similar environments of adjacent private property. Cultural, environmental, and historical considerations should be acknowledged when developing streetscapes and gateways.

Land Use Action 5: *Consider Street-Land Use Relationship in the Planning of Developments*

Buildings should be set back a sufficient distance from arterial and section line roads to accommodate future road improvements. Along transit routes in urban areas, new buildings should be located within a reasonable walking distance from the right of way line to allow easy access for transit users.

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Chapter 6: Roadway System Plan

The development of *Transportation 2030* sought a careful balance between four critical, interrelated elements: land use, level of service, transportation improvements, and available financial resources. As a result, considerable effort was expended reviewing the needs that would result from projected growth and analyzing the level of service of the current and future roadway system. Based on that review and analysis, three alternative scenarios were developed to test and evaluate. An evaluation process provided the necessary rankings of the alternative scenarios so that projects could be selected based on financial capacity and criteria important to the community.

Future Roadway Deficiencies Analysis

As is the case in many growing communities across the nation, Douglas County, and especially Lawrence, has been adding population and jobs at a faster rate than it has added new or improved roadways. Combined with increased trip-making and longer trip lengths by the traveling public, vehicular traffic is outpacing our ability to improve the roadway system. As a result, congestion has been building on the city's roadway network. This trend is expected to continue through the year 2030.

Analysis of roadway deficiencies begins with a review of the existing street/highway network and those projects already programmed for construction. Using this "existing plus committed" network, the regional travel demand model can be used to analyze the impacts of various roadway improvement scenarios.

Massachusetts Street, circa 1909

Regional Travel Demand Model

The regional travel demand model takes in all of the City of Lawrence plus a portion of surrounding Douglas County. The model may be expanded in the future to cover all of Douglas County.

The model network includes all of the roadways that currently exist except residential or local streets. In addition, this network also includes projects that are far enough along in their development cycle and have funding commitments through the region's transportation improvement program to ensure they will be constructed in the early years of *T2030*. These "committed" projects, when combined with the existing roadway network, make up the "existing and committed" network.

Committed projects, shown in Table 6.1, are programmed and funded for construction in the next few years.

Table 6.1

Committed Projects

Source: MPO Transportation Improvement Program

Route	From	To	# lane	Func. Class	Agency
US-59	FR Co.	K-10	4-lane	freeway	KDOT
31st	Haskell	O'Connell	2 lane	minor arterial	DG/Lawrence
Congressional	6th	Overland	2 lane	collector	Lawrence
George Williams	6th	Overland	4/5 lane	minor arterial	Lawrence
Kasold	Peterson	KTA	3 lane	principal arterial	Lawrence
Kasold	6th	15th	4 lane	principal arterial	Lawrence
Overland Dr.	Wakarusa	GWW	2 lane	collector	Lawrence
Queens	6th	Wakarusa	2 lane	collector	Lawrence

With these projects, the existing and committed network serves as a base from which to test alternative transportation projects and scenarios.

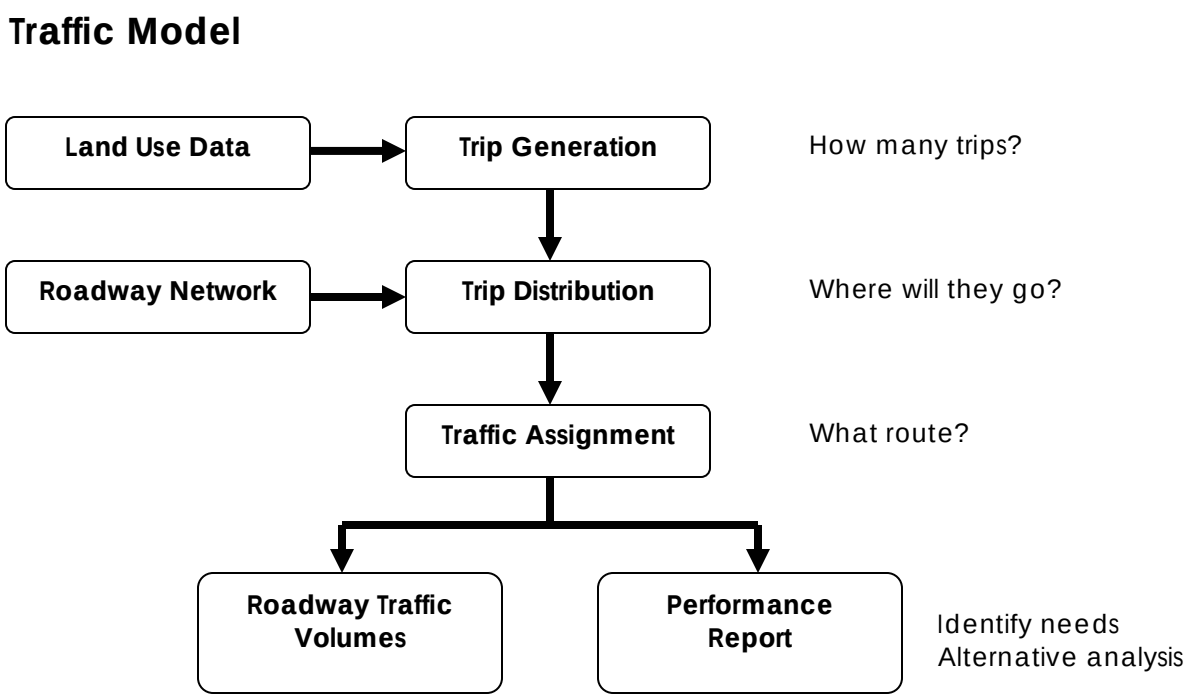
Analysis Tools – Regional Travel Demand Model

As *Transportation 2030* was developed through an analysis of system deficiencies and potential alternative solutions, the process relied on estimates of future travel demand. Travel demand is forecasted using the regional travel demand model.

The model process, shown graphically in Figure 6.1, uses estimates of household and employment data and the existing roadway network as input assumptions. The Trip Generation module calculates the amount of trip-making that takes place based on activities associated with household and employment data. The Trip Distribution module determines the origin and destination of each trip. In the Traffic Assignment module, the specific route is computed through consideration of travel time, distance, and congestion.

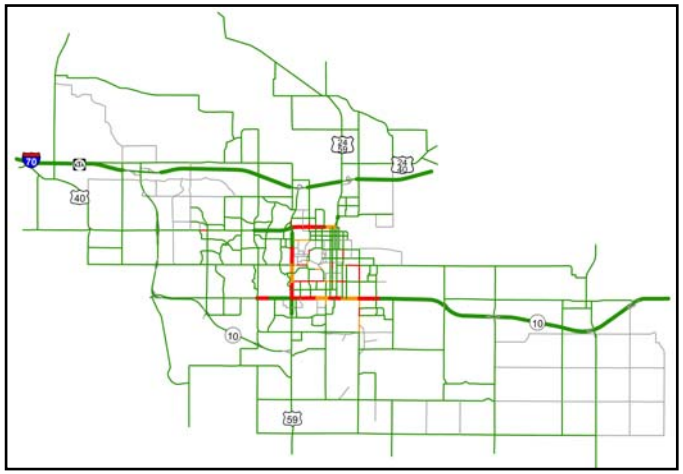
The model can produce reasonable results for several land use and roadway network scenarios. The intent is to produce estimates of average weekday traffic volumes for each roadway segment in the network. These are converted to peak hour traffic volumes for level of service analysis. In this manner, roadway deficiencies can be identified and potential alternative solutions evaluated.

Figure 6.1
Regional Travel Demand Model Process



A word of caution: the model is a tool that can be used to assist with the evaluation of potential roadway improvements. It is not a crystal ball. While the model provides valuable information, it is not sensitive to all aspects of the planning process. Model results should be considered in the context of other information, such as feasibility, environmental concerns, public acceptance, cost, and other criteria.

Figure 6.2
2005 Roadway Level of Service
Source: Lawrence Travel Demand Model



Congestion currently exists on some city streets during rush hour.

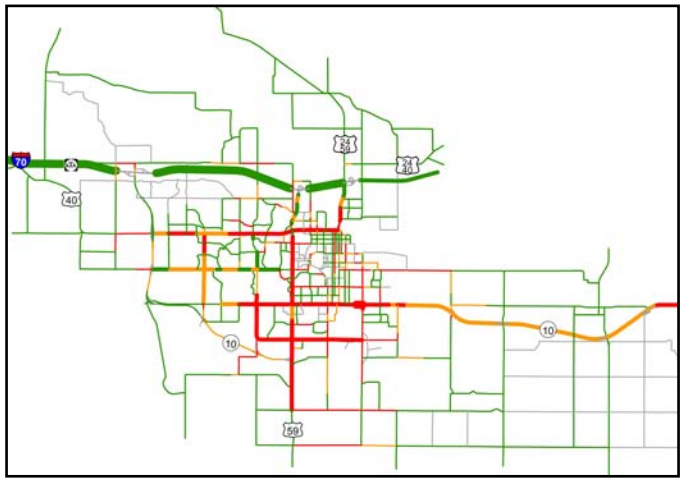
Current and Future Roadway Congestion

Congestion currently exists on some streets in the city as shown in Figure 6.2. An analysis of future traffic conditions indicates that congestion will increase significantly unless strategic projects are implemented in a timely manner to address the growing volume of traffic. Figure 6.3 shows the anticipated levels of service (LOS) on the city's roadways if future growth and development is not balanced with ongoing investment in the roadway infrastructure.

Roadway level of service (LOS) is described more fully in the Existing Conditions chapter. For the purposes of this discussion LOS A, B, or C can be described as "not congested", LOS D is "becoming congested", and LOS E or F is "congested".

Table 6.2 contains level of service information that quantifies the impact of future growth on the existing and committed roadway infrastructure. The number of roadway segments in the congested categories is expected to grow substantially without system improvement.

Figure 6.3
Future Roadway Level of Service (2030 Socioeconomic Data with Existing and Committed Project Road Network)
Source: Lawrence Travel Demand Model



Future growth of people, jobs, and travel will result in the need for new roadway capacity.

Table 6.2
Percent Lane-miles by Level of Service
Source: Lawrence Travel Demand Model

Scenario	Not Congested (LOS A-C)	Becoming Congested (LOS D)	Congested (LOS E-F)
2005	90%	6%	4%
Future: Existing and Committed Road Network with 2030 Socioeconomic Data	28%	15%	57%

Analysis of Roadway Alternatives

Funding resources are not sufficient to add new roadway capacity to solve all of the region's congestion problems. Also, many citizens have expressed their desire for more alternative mode options and less roadway construction. For these reasons, a systematic process for developing, analyzing, and selecting roadway projects was incorporated into the planning process.

Roadway scenarios to test and evaluate for inclusion in *T2030* were developed through several sources. The T2030 Committee, City of Lawrence, City of Eudora, Kansas Department of Transportation (KDOT), Kansas Turnpike Authority (KTA), Douglas County, and the general public provided suggestions for roadway alternatives. MPO staff and consultant staff reviewed the deficiency analysis to further identify roadway improvement options.

Ultimately, three scenarios were identified for detailed evaluation: (1) Roadway capacity improvements including a K-10/SLT on the "32nd Street" alignment; (2) Roadway capacity improvements including a K-10/SLT on the "42nd Street" alignment; and (3) Roadway capacity improvements including an Eastern Connector between I-70/KTA and K-10. Figure 6.4 shows the three roadway scenarios included in the evaluation.

Roadway System Continuity

A well-spaced series of continuous arterial and collector streets provides balance to the roadway system in an urban area. Traditional grid street patterns often place arterial streets every mile and collector streets at half-mile spacing to handle traffic demand from moderate-density land use patterns. Within Lawrence, the street system is discontinuous in places due to natural and man-made obstacles. Some of the more notable routes that are not continuous include the following:

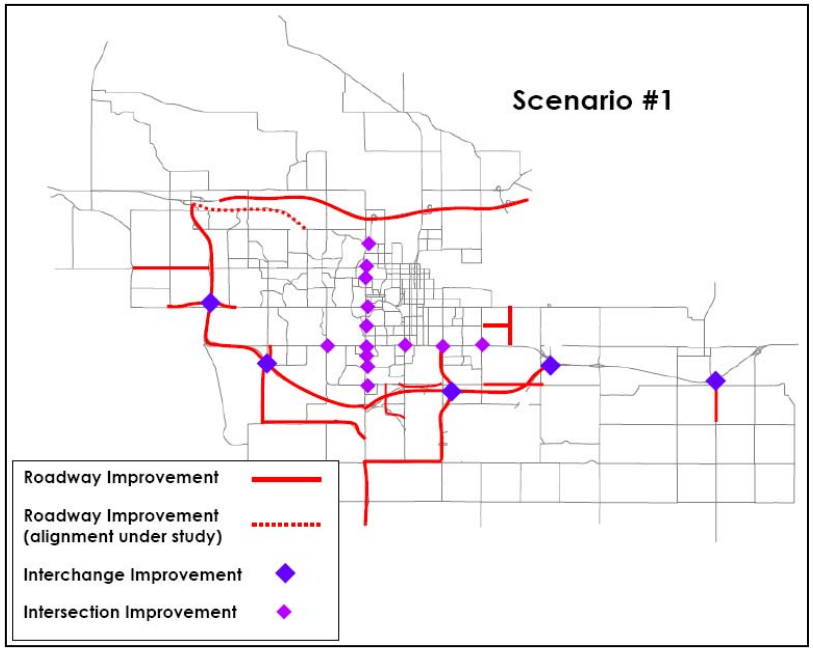
- 9th Street does not extend west of Kasold Drive because the neighborhoods in that area utilize a curvilinear street system;
- 15th Street does not extend through the University of Kansas campus;
- 19th Street does not extend west of Iowa Street;
- 27th Street is discontinuous between Haskell Avenue and Louisiana Street due to the Haskell Indian Nation University campus;
- Kentucky Street and Tennessee Street (one-way pair) are not continuous from 6th Street to 23rd Street/K-10;
- Harvard Drive contains discontinuous sections and has off-setting connections at some intersections; and
- Inverness Drive does not extend south of 27th Street or north to 6th Street.

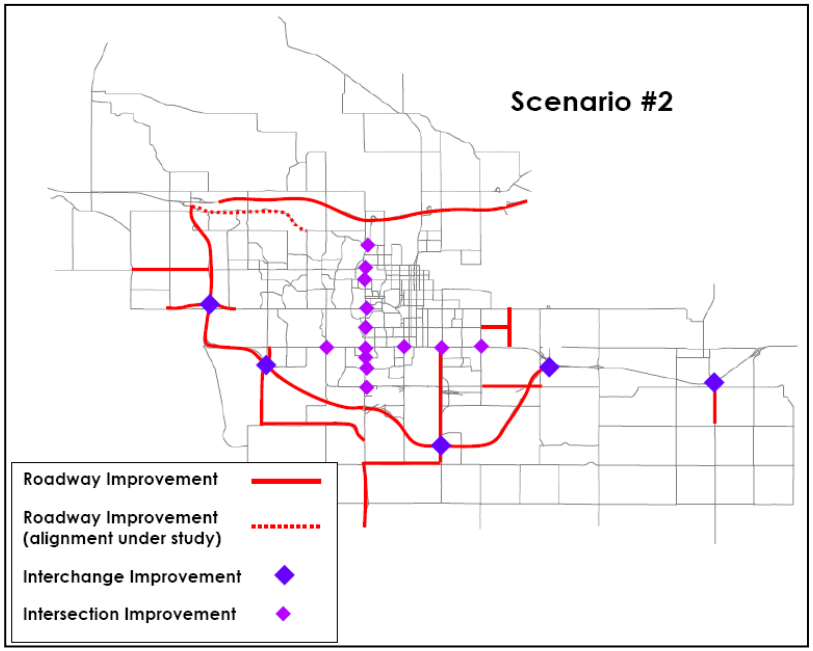
Lack of continuity in the street system tends to place additional traffic burdens on adjacent collector and arterial streets. Unintended travel on local and neighborhood streets often results as well.

Besides the local arterial street system, there are freeway facilities that are missing logical segments within the region. The result is the same; additional through traffic on the arterial street system that should otherwise be on a higher functionally classified highway. Two missing highway sections that would make the freeway system in and around Lawrence continuous are

- The K-10/South Lawrence Trafficway section in the southeast section of the city connecting existing segments of K-10; and
- A connection on the eastern side of the city between K-10 and I-70/KTA.

While these facilities may be difficult and expensive to implement, they nevertheless should be considered in the alternatives analysis to better understand their congestion-related benefits. Continuation of some of the arterial and collector streets with missing segments may not be possible due to physical obstacles along the route.





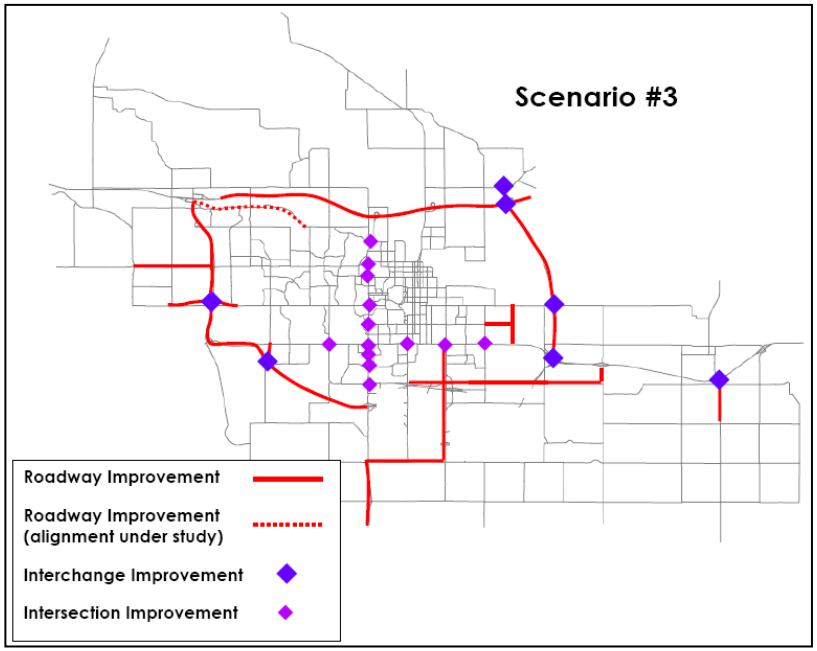


Figure 6.4
Roadway Capacity Scenarios

Source: Regional Travel Demand Model

KTA Projects Included in all Scenarios

The only KTA facility existing in the region is the I-70 corridor. By the year 2030, KTA anticipates widening that facility through the region from four to six lanes at an estimated cost of $170 million. Construction on the portion to replace the Kansas River Bridge and improve the west and east Lawrence interchanges/toll plazas will begin in mid 2008 and be complete in mid 2011.

Since KTA facilities generate revenues through user fees and are financed with bond sales, this project would not require any of the federal, state, or local resources available to fund other projects identified in *T2030*. As a result, selection of this project is included in all roadway improvement scenarios, but the funding remains the responsibility of the KTA.

Information regarding the 1-70 Kansas Turnpike project can be found at www.ksturnpike.org.

Evaluation of Roadway Improvement Scenarios

As noted earlier in this section, three roadway improvement scenarios (combinations of roadway projects) were developed and analyzed using the region's travel demand model. Evaluation criteria were carried forward from the *T2025* Long Range Transportation Plan. The criteria were designed to respond to goals of reduced traffic congestion, cost effectiveness, and safety. Based upon input from the T2030 Steering Committee the weight given to each category was adjusted to better reflect today's issues and to include safety as a true category, not just a bonus.

The evaluation criteria for projects in *T2030* are summarized as follows:

- ***Congestion Relief (weight = 30%)*** – The ability of the scenario to reduce congestion delay is measured with this criterion through application of the regional traffic model.
- ***Cost Effectiveness (weight = 35%)*** – While congestion relief is important, the cost associated with the reduced congestion delay benefit is another notable consideration. Cost effectiveness measures this in terms of daily congestion reduction per $1 million investment in the scenario.
- ***Consistency with T2030 Goals and Objectives (weight = 30%)*** – This category is aimed at examining the scenario's compatibility with *T2030's* objectives, such as supporting the economic vitality of the region, promoting accessibility and mobility options, protecting the environment, and promoting efficient system management.
- ***Safety Benefits (weight = 5%)*** – Statewide average accident rates for various roadway classifications were used, in conjunction with the predicted vehicle-miles traveled on those road classes, to predict the number of accidents likely to occur with each scenario. The estimated numbers of accidents were then compared with the estimated number from the "existing plus committed projects" model to determine the safety benefits.

Based upon the evaluation criteria, Scenario #1 was selected as the roadway improvement system plan for *T2030.* The evaluations and rankings of these projects are included in the Technical Appendix.

Recommended Roadway System Plan

I-70/Kansas Turnpike

The entire stretch of the Kansas Turnpike (I-70) through Douglas County is proposed for widening from four to six lanes by KTA. As part of this project, the Kansas River Bridges will be replaced and the Lawrence toll plazas improved.

K-10/SLT "32nd Street" Alignment B

T2030 includes a new four-lane freeway along the 32nd Street alignment of the SLT as proposed by the recent KDOT study. The 32nd Street location emerged as the best of several potential alignments in the corridor study evaluation process as well as the *T2030* process. Two new interchanges on the eastern section of the SLT are included with this recommendation: one at Haskell Avenue and one in the vicinity of Noria Road.

This circumferential highway will serve both local and regional traffic in the Lawrence area. With the community expanding to the west and with K-10 providing a vital link between Lawrence and Johnson County, the SLT will accommodate those longer trip needs that currently are made on 23rd Street and other arterial streets in the city.

The off-street bicycle and pedestrian facility along the western segment of the SLT should be continued as part of this project. Connections with other trails and north-south bicycle facilities should be pursued consistent with *T2030's* Bicycle Plan.

K-10/SLT Western Section

With the extension of the SLT through southeast Lawrence recommended for implementation as a four-lane freeway, widening of the western section from I-70 to U.S. 59 will be necessary as well to accommodate the new travel demand from the completed loop. Two new interchanges where the SLT intersects 15th Street and Wakarusa Drive are included with these improvements. Care should be taken to maintain the current bicycle and pedestrian path system and enhance its connections to other trails and bicycle facilities accessing Lawrence.

US-59 from the South Douglas County Line to N. 1100 Road

A four-lane freeway will be constructed on an off-set alignment improving US-59 from the south county line to the intersection with N. 1100 Road. This project is included in the state's Comprehensive Transportation Program, but funding issues will likely delay its construction until the early years of *T2030.*

US-40 (6th Street) from Stull Road (County Route 442) to K-10 (SLT)

Traffic count data and traffic projections show a steady increase in traffic volumes along this section of U.S. 40 on the west side of Lawrence. *T2030* calls for widening this facility to four lanes. This arterial street provides an important extension into a developing part of the region. Bicycle and pedestrian activity should be considered to the extent practical.

K-10 and Church Street Interchange

Development south of K-10 along County Road 1061 and increasing traffic on Church Street require improvements to the K-10 and Church Street interchange. The bridge of K-10 will be widened to provide four lanes for through traffic and should accommodate bicycle and pedestrian traffic as well. Due to the number of commuters, consideration should be given to providing "park and ride" facilities near this interchange. Consideration should also be given to a potential transit stop as well.

County Road 1061 from K-10 South for 1.0 Mile

Due to current and planned development, this roadway will be widened to provide four lanes for through traffic. Turning lanes will be needed at key intersections and driveways. Improvements should be coordinated with the interchange improvements at K-10. Bicycle and pedestrian facilities should be included.

15th Street from E 800 Road to Bob Billings Parkway

Linking the western section of the SLT with west Lawrence via continuation of 15th Street, this new four-lane urban arterial should be developed to maximize efficiency with construction of the SLT improvements. This connection will enhance access to the University of Kansas and the Oread West Research Park.

A full interchange at 15th Street and the SLT will be included as development of the western K-10/SLT improvements proceed, with special attention paid during design to issues associated with its proximity to the 6th Street interchange.

Wakarusa Drive from 23rd Street to County Route 458 (N 1200 Road)

T2030 calls for the widening and improvement of Wakarusa Drive to four lanes from 23rd Street south to County Route 458 (N. 1200 Road). Development of this project should be coordinated with KDOT to maximize efficiency with connection to the SLT through the construction of a new interchange at Wakarusa Drive. Since Wakarusa Drive provides the only continuous north-south arterial street service west of Kasold Drive, this corridor should incorporate appropriate amenities to accommodate pedestrian, bicycle, and transit trips safely.

Haskell Avenue from 23rd Street to N 1100 Road

A four- or five-lane section will be needed to serve future traffic on this arterial street that provides a vital extension into the county and an important link between the proposed SLT extension and destinations within Lawrence. A new interchange is proposed as part of the SLT/K-10 extension on the 32nd Street alignment. Multimodal enhancements along this corridor are strongly encouraged given its proximity to Haskell Indian Nations University.

31st Street from O'Connell Road (E 1600 Road) to Noria Road (E1750 Road)

In conjunction with the SLT extension and in response to increased traffic needs in the area, the 31st Street corridor from O'Connell Road to Noria Road is recommended for completion as a two-lane urban street.

N. 1100 Road from Iowa (US-59) to Haskell Avenue

Development anticipated in the area south of the Wakarusa River will generate sufficient traffic to exceed the capacity of the existing roadway. It is recommended that N. 1100 Road be widened to four lanes. Access Management should be incorporated into the design of the improvements.

N. 1200 Road from Wakarusa to Iowa (US-59)

N. 1200 Road will be widened to four lanes to provide some relief to the traffic congestion on Iowa and to provide an east-west arterial street south of the Wakarusa River.

Peterson Road/N 1750 Road from K10/SLT to west of Monterey Way

A new extension of Peterson Road/N 1750 Road from west of Monterey Way to the K-10/SLT is recommended to provide relief of traffic congestion on 6th Street and to provide a new arterial street in a developing area. A 2-lane urban design including consideration for pedestrian and bicycle facilities is recommended. Several possible alignments are under consideration.

Franklin Road from 15th Street to 23rd Street and 19th Street Extension to Franklin Road

New 2-lane urban streets that will be constructed to serve anticipated development.

23rd Street

Future traffic projections indicate volumes will exceed the capacity of the current roadway, especially given the reduced capacity due to numerous driveway locations. Based on recommendations from the 23rd Street Study, the section from Iowa Street to Louisiana Street will benefit from intersection improvements, access management, and median installation at signalized intersections. Specific improvements to the intersection at 23rd Street and Iowa Street are planned as part of this multidimensional project. Intersection improvements are also proposed at Kasold, Haskell, and Harper Streets. Pedestrian accommodations should be incorporated in this corridor project to ensure pedestrian access to, through, and along the facility. As a gateway to the community, aesthetics are important.

Iowa Street (US-59)

Continued growth in traffic volumes will exceed the capacity of the existing roadway. However, like 23rd Street, rather than widening the roadway to six lanes, capacity improvements at major intersections will improve the flow of

traffic along this corridor. Intersection improvements are recommended for 6th, 9th, Harvard, 15th, 23rd, 25th, 27th, and 33rd Streets as well as the K10 ramp intersections.

MacDonald Road at Princeton Boulevard

Intersection improvements are recommended at this location to better accommodate the expected traffic growth from area development and the completion of Peterson Road/N 1750 Road/N 1750 Road to K-10/SLT.

County Road Rehabilitation Projects

These projects are part of Douglas County's ongoing pavement/shoulder rehabilitation program to improve the current system. These projects are more substantial than routine surface overlay projects.

Recommended Roadway Plan

Figure 6.5 shows the recommended roadway improvement plan for *T2030.*

Table 6.3 provides details on the individual projects.

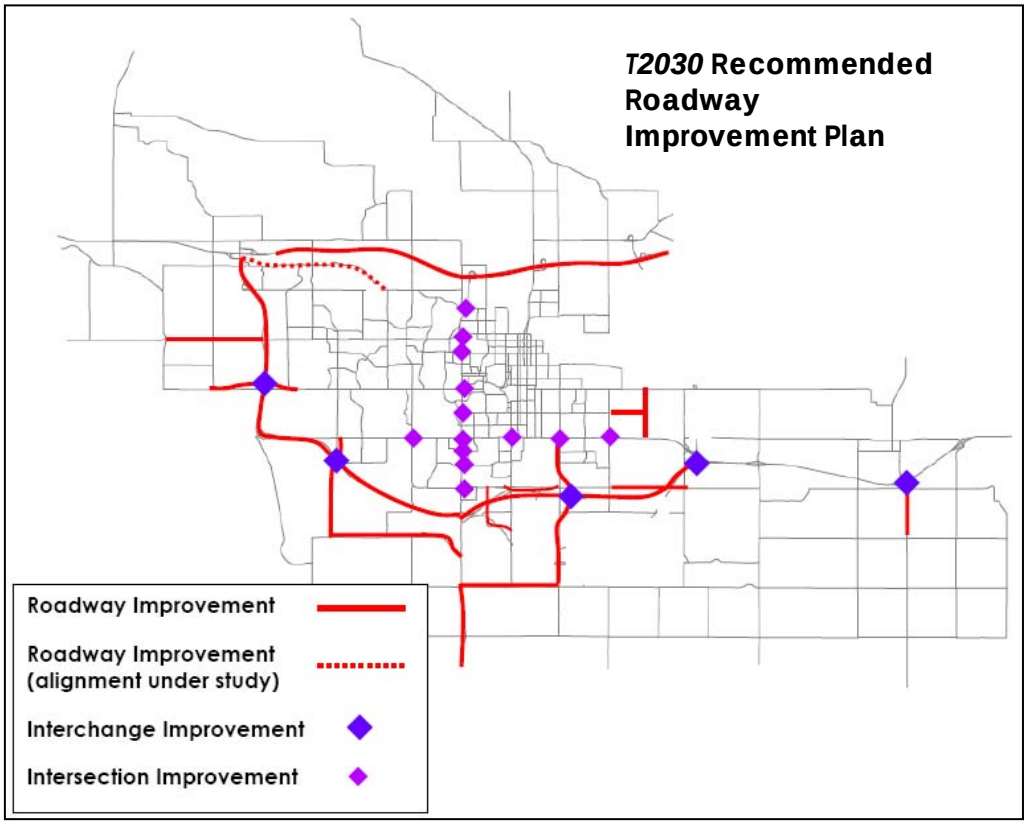


Figure 6.5
Recommended *T2030* Roadway System Plan

Source: *T2030* Roadway Scenario Evaluation and Selection Process

Table 6.3
Recommended *T2030* Roadway System Plan

Source: *T2030* Roadway Scenario Evaluation and Selection Process

Route/Project	Location	Improvement	Estimated Cost
I-70/ Kansas Turnpike	Douglas County	Widen to 6 Lanes	$170,000,000
K-10 (SLT)	32nd Street Alignment	New 4-Lane Freeway, New Interchanges at Haskell and 23rd Street/K-10	$202,760,000
K-10 (SLT)	I-70 to Iowa Street (US-59)	Widen to 4-Lane Freeway, New Interchanges at 15th and Wakarusa, No Connection at Kasold	$38,360,000
US-59	South Douglas County Line to N. 1000 Road	New 4-Lane Freeway	$68,000,000
US-40 (6th Street)	Stull Road to K-10 (SLT)	Widen to 4 Lanes	$24,240,000
Church Street	K-10	Interchange Improvements	$10,960,000
County Road 1061	K-10 South for 1.0 Mile	Widen to 4 Lanes	$8,220,000
15th Street	E. 800 Road to Bob Billings Parkway	New 4-Lane Road	$9,864,000
Wakarusa	23rd Street to County Road 458 (N. 1200 Road)	Widen to 4 Lanes	$18,180,000
Haskell Avenue	23rd Street to N. 1100 Road	Widen to 4 Lanes	$24,660,000
31st Street	E. 1600 Road to E. 1750 Road	Urban 2-Lane Street	$6,165,000
N. 1100 Road	US-59 to Haskell	Widen to 4 Lanes	$16,440,000
N 1200 Road	Wakarusa to US-59	Widen to 4 Lanes	$36,360,000
Peterson Road/N 1750 Road/N 1750 Road	K-10 (SLT) to West of Monterey Way	Urban 2-Lane Street	$18,180,000
Franklin Road/ 19th Street	15th Street to 23rd Street and 19th Street Extension to Franklin Road	Urban 2-Lane Streets	$7,850,000
23rd Street	Kasold, Louisiana, Haskell, Harper	Median, Intersection Improvements, Access Management	$6,780,000
Iowa Street	6th, 9th, Harvard, 15th, 23rd, 25th, 27th, 33rd, K-10	Median, Intersection Improvements	$18,250,000
MacDonald	Princeton Boulevard	Intersection Improvements	$2,020,000
ITS Projects	Various Locations	ITS Deployment	$10,000,000
County Road Projects	Various Roadways in Douglas County	Pavement and/or Shoulder Rehabilitation Improvements	$35,400,000
		Total Estimated Road Project Costs for *T2030*	$732,689,000

System Performance

Several positive impacts are associated with the *T2030* Recommended Roadway System Plan in terms of the amount of vehicular traffic, traffic congestion delay, and other roadway performance characteristics. Performance estimates derived from the region's travel demand model are included in Table 6.4 for vehicle miles of travel (VMT), average congested speeds, and congestion delay.

As expected, the VMT and congestion delay figures for the region increase significantly between the years 2005 and 2030 due to additional growth and development. The average speed on the system's roads can be expected to decrease by approximately seven miles per hour during peak periods. Congestion delay increases to 14 times that experienced during current peak traffic times.

The *T2030* Recommended Roadway System Plan will reduce the amount of congestion that would otherwise occur, but even its improvements cannot hold congestion at today's level.

The roadway level of service that can be expected following the recommended improvements is shown in Figure 6.6. As can be seen, portions of 6th Street, 23rd Street, 31st Street, and Iowa Street will still be congested. Intersection improvements proposed by *T2030* for these streets and potential ITS projects will have a positive impact on traffic flow; however, these are not reflected in the model as the model looks at traffic flow from an overall street level and does not consider the impacts of spot improvements.

Table 6.4
Performance Characteristics for Roadway Scenarios
Source: Lawrence Travel Demand Model

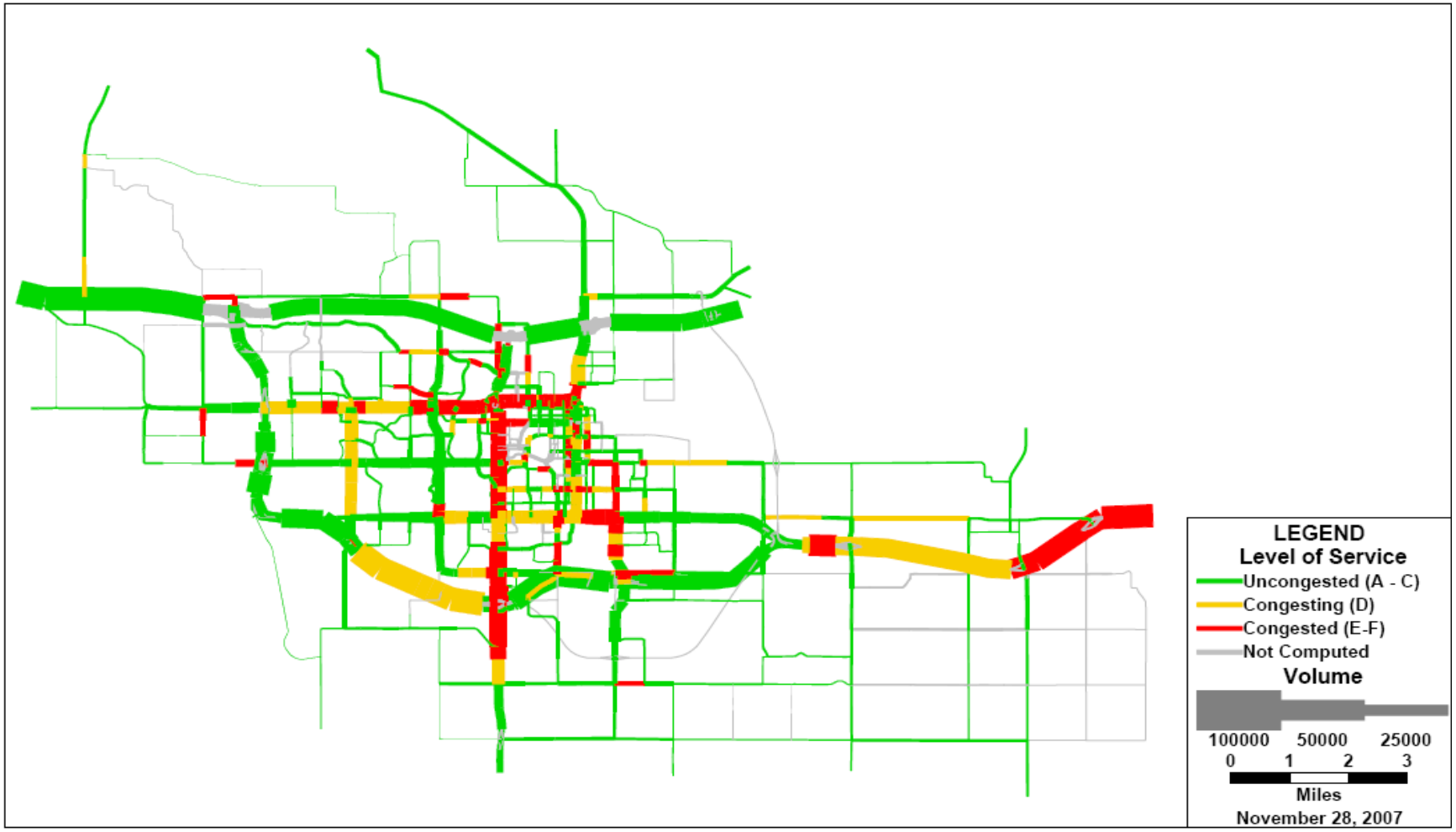
	Vehicle Miles of Travel (miles per weekday)	**Average Congested Speeds** (miles per hour)	**Congestion Delay** (hours per weekday)
2005	1,968,125	47.90	1,993
2030 Existing and Committed Network	3,946,749	41.10	28,561
***T2030* Recommended Roadway System Plan**	4,048,087	46.40	12,790

Figure 6.6

Predicted Level of Service

Recommended *T2030* Roadway System Plan

Source: *T2030* Roadway Scenario Evaluation and Selection Process



Environmental Mitigation Strategies

The current federal transportation legislation, SAFETEA-LU, includes several provisions intended to enhance the consideration of environmental issues and impacts within the transportation planning process. The following strategies address and consider environmental impacts relative to the decisions of the MPO early in the planning process:

- Embrace the principles of Context Sensitive Solutions (CSS) as a means of developing transportation facilities that fit their physical setting and preserve scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility.

- Continue to utilize the region's GIS to identify environmental features (both physical and social) early in the planning process as a means of avoidance and/or to establish early mitigation action plans prior to project construction.

- Partner with local, state, and federal resource agencies early in the planning process to identify potential issues relative to projects under consideration in the MPO's plans and programs.

- Minimize the construction of transportation investments that would impact wetlands. Where impacts are unavoidable, develop appropriate mitigation strategies.

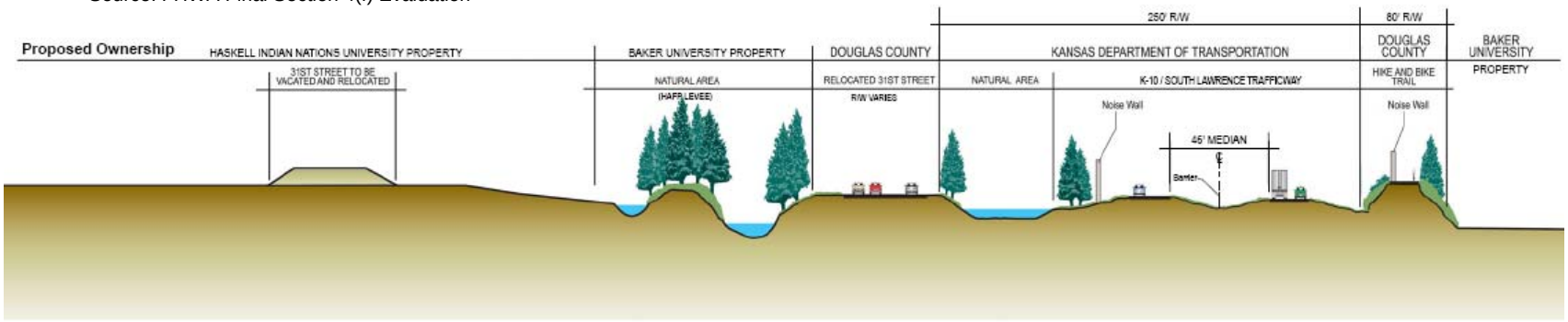
Roadway improvements, especially new roadways, can have an impact on the natural and built environments. In some cases, these impacts are unavoidable. When this occurs environmental mitigation activities are included as part of the project. The proposed K-10 (SLT) alignment is an excellent example of local, state, and federal agencies working with key stakeholders to address environmental issues.

Mitigation Measures for K-10 (SLT) 32nd Street Alignment B

A detailed plan was developed by the Army Corps of Engineers and KDOT to minimize and mitigate impacts from the 32nd Street Alignment B Alternative (Selected Alternative) to the features of the Haskell Agricultural Farm Property. This plan was memorialized in a formal Memorandum of Agreement (MOA) and signed by the Corps of Engineers, the Kansas State Historic Preservation Officer, and the Advisory Council on Historic Preservation. This agreement indicates that there is broad agency support for building the Selected Alternative as long as mitigation measures are carried out.

Figure 6.7
Cross Section of K-10 (SLT) with Mitigation

Source: FHWA Final Section 4(f) Evaluation



There are a number of minimization and mitigation measures included in conceptual designs and plans to address impacts to historic properties. Proposed mitigation concepts are shown on Figures 6.7 and 6.8.

These measures include:

- Minimizing the width of the bypass corridor through the Haskell Agricultural Farm Property (HAFP);
- Bridging historic engineering structures in the HAFP;
- Removal of 31st Street from Haskell Indian Nations University property and conversion of that area to wetlands;

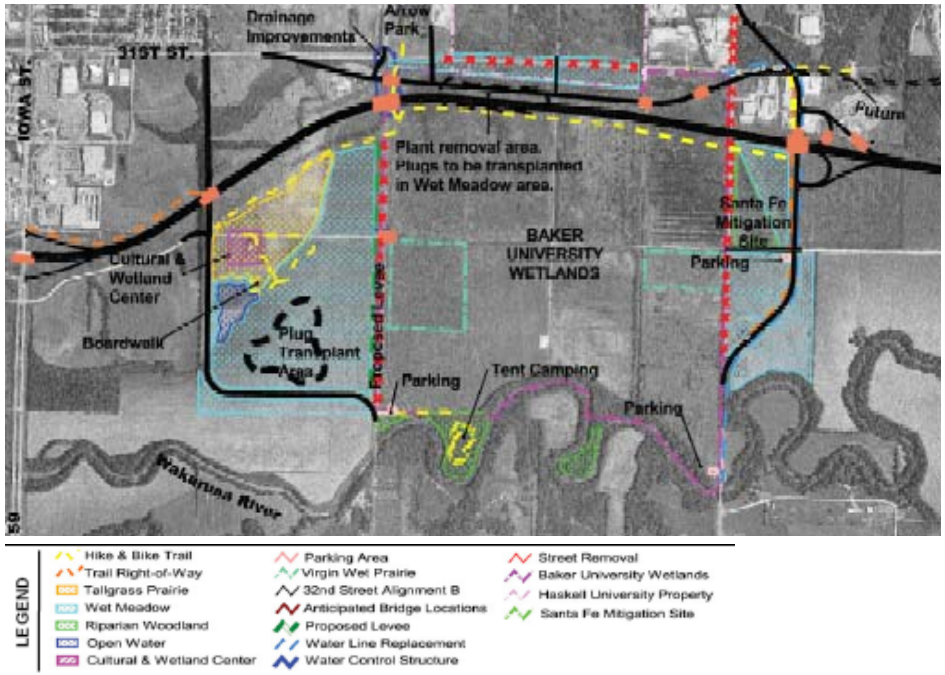
- Ensuring that approximately 304 acres of mitigation wetlands will be developed in the areas created between the relocated and vacated roads; and,
- Acquisition, conservation, and preservation of adjacent lands to reduce foreseeable cumulative future development-related impacts.

Additional measures that are considered include:

- Construction sequencing and methodology to minimize impacts;
- Screening and profile minimization for bypass structures;
- Noise and light mitigation;
- Development of historic and cultural programs;
- Recording of historic structures within the Haskell Agricultural Farm Property; and,
- No clearing and grubbing on Haskell Agricultural Farm Property.

More information can be found on the South Lawrence Trafficway website: www.southlawrencetrafficway.org.

Figure 6.8
Environmental Mitigation Activities
K-10 (SLT) 32nd Street Alignment B
Source: FHWA Final Section 4(f) Evaluation



Recommended Roadway System Plan:

In order for the Lawrence/Douglas County street and highway system to support the multimodal needs of the community and provide acceptable level of service, a number of broad policies and actions are needed. These policies and actions build on the successes and opportunities of the existing system and can help prevent past mistakes from recurring. They are described below.

What we've heard…

New roadways should be designed to accommodate bikes, pedestrians, and buses.

A Balanced, Multimodal Street and Highway System

Developing and maintaining a comprehensive network of streets and highways that support safe automobile, transit, bicycle, and pedestrian traffic is critical to improving mobility within Lawrence. Of particular concern is the development of performance standards for pedestrian and bicycle mobility that can be used in combination with vehicular performance to evaluate and develop Lawrence's transportation infrastructure. These standards should be coupled with an ongoing program of constructing new bicycle lanes and sidewalks in order to create a truly multimodal street and highway system.

Roadway Action 1: *Coordinate Multimodal Enhancements with Roadway Improvements*

Coordinate modal issues among the Public Transportation, Bicycle, Pedestrian, and MPO's Technical Advisory Committees to determine the multimodal enhancements appropriate for each new or reconstructed roadway improvement. Transmit this information to the appropriate implementing agency or jurisdiction. Gaps in bicycle and pedestrian facilities and their condition should be addressed. Transit operation needs should be considered during planning and design of roadway improvements.

Roadway Action 2: *Integrate Multimodal Enhancements into Arterial Street Design Guidelines*

Adopt arterial street design guidelines that provide flexibility for integrating multimodal enhancements into roadway improvements, such as mid-block pedestrian crossings, transit stops, pedestrian refuge islands, pedestrian/sidewalk bulb-outs, bicycle treatments at intersections, and others.

Roadway Action 3: *Consider Environmental Issues Early in the Planning Process*

Partner with local, state, and federal resource agencies early in the transportation planning process to identify potential environmental issues and impacts. Through discussions with resource agencies, identify potential environmental mitigation activities and potential areas to carry out these activities.

Street Design Standards

Historically, highway and arterial street widenings and intersection improvements have been undertaken in the region primarily to improve the roadway capacity and traffic flow for automobiles. Usually, these widenings were uncontested. Land development projects, including highway-oriented commercial centers and office parks, have embraced the automobile and increased the need for roadway improvements through their design, density, and location. Street engineering standards have traditionally emphasized "auto-mobility" to the detriment of other factors, such as pedestrian and bicycle mobility and transit.

In recent years, the ability of roadway improvements to solve Lawrence's growing congestion problem has been questioned. Instead, there is a growing sentiment that roadway improvements should be balanced with other transportation goals and objectives, including the following:

- Streets and highways should incorporate safe bicycle facilities;
- The street system design should be sensitive to the needs of the transit system;
- Intersections should provide acceptable levels of service for pedestrians; and,
- Automobile capacity improvements should not negatively impact transit, bicycle, or pedestrian travel.

It is therefore proposed that street standards used in the region be modified to accommodate all modes of transportation—transit (where appropriate), bicycles, and pedestrians—in addition to the automobile. Where suitable, traffic lanes could be narrowed to accommodate bike lanes as long as the traffic lanes continue to meet safety and mobility standards. It is further recommended that the revised street standards promote pedestrian, bicycle, and transit oriented neighborhoods and development, which will require standards to reduce travel speeds and to minimize non-local traffic on local residential streets. Intersection design standards should also be revised to include pedestrian enhancements such as bulb-outs, median refuge islands, and improved crosswalks.

What we've heard…

Synchronized traffic signals should be considered as a first step to improve traffic flow.

Roadway Action 4: *Update Street and Intersection Design Standards*

Modify current street and intersection design standards to promote a balance for transportation modes.

Roadway Action 5: *Update Subdivision Regulations*

Update subdivision regulations consistent with the guidelines for local and collector streets recommended as part of the Major Thoroughfares Plan section.

Roadway Action 6: *Coordinate Highway Design Standards with KDOT*

Coordinate with the Kansas Department of Transportation to review highway standards for facilities within the city limits.

Access Management

Access management is the process of improving the overall traffic flow of the street system without having to make any major roadway widenings. Arterial and collector streets with good control of access points can accommodate up to 30 or 40 percent more traffic than a roadway that does not have good access control. Access management encompasses a wide range of transportation system elements to minimize vehicle conflicts and improve safety. Potential elements include consolidation and control of access points, medians, turn restrictions, and strategic signal locations.

It is always easier to develop a sound access control plan for an arterial while it is being designed, with strategic locations for access defined prior to development, than it is to retrofit a corridor that has been developed without good access control. The 23rd Street corridor in Lawrence is a good example of poor access control and the difficulty in retrofitting solutions.

The Cities of Baldwin City, Eudora, and Lawrence as well as Douglas County have several responsibilities in this regard. As new facilities are built, locations for future access and the type of access should be determined in order to promote good traffic flow and minimize conflicts. As development occurs in these corridors, the access control plan should be adhered to in order to avoid having more corridors like 23rd Street. Small, incremental changes to the access plan can have large,

cumulative effects over time. In areas where poor access control already exists, systematic block-by-block improvement strategies should be developed and implemented to reduce traffic conflicts and increase capacity to the roadway's potential level.

Roadway Action 7: *Establish Access Standards*

Baldwin City, Eudora, Lawrence, and Douglas County should establish access standards for arterial and collector streets, and major rural roadways.

Roadway Action 8: *Develop Access Control Plans for Individual Corridors*

Develop access control plans for individual corridors that define future points of access for new roadways and provide a mechanism that requires access plans to be followed. Access plans should be prepared prior to development approval for parcels along the corridor.

Roadway Action 9: *Develop Access Management Phasing Plan*

Develop an access management phasing plan to address critical corridors with existing access control problems that are resulting in poor levels of service and safety issues.

Roadway Action 10: *Fund Access Plans*

Since preservation of the existing transportation system is a core element of *Transportation 2030,* funding should be made available to implement solutions to existing corridors with access control problems.

Traffic Signal Timing and Coordination

Very often a corridor may have adequate capacity on the roadway segments between signalized intersections, but the intersections themselves can be the weak link in the street system due to inadequate capacity or uncoordinated signal timings. Traffic signal performance is a top complaint of Lawrence residents related to traffic congestion. These complaints stem from the delay imposed by traffic signals, locations of the signals, traffic volumes, and uncoordinated signal timings.

Whereas past decisions on signal locations cannot easily be changed, developing and implementing a comprehensive signal-timing plan can improve performance. To develop such a plan, current intersection turn movement counts are required at all signalized intersections during the following time periods: a.m. peak period, midday period, p.m. peak period, and Saturday. Collecting these traffic counts and evaluating signal timing is a labor-intensive process. Without an adequate budget for data collection and evaluation, the City's engineering department must rely on spot field review and minor updates when an occasional intersection might be counted as part of a development review.

As one would expect, even after current traffic counts are collected and a signal timing plan is developed, the ongoing change in traffic volumes will eventually require that new counts be collected and the timing plan be updated.

Roadway Action 11: *Fund Intersection Data Collection and Timing Plan Development*

Commit congestion management funds to develop an ongoing program to collect intersection turn movement counts and prepare multiple signal timing plans. Signal timing plans should be updated every five years.

Roadway Action 12: *Study Citywide Signal System*

Explore options to implement a comprehensive, citywide signal system made up of coordinated, interconnected signals for all the signalized intersections in the city. ITS options for improving signal coordination should be pursued.

New Developments/Traffic Impact Analysis Guidelines

Traffic impact studies are sometimes required for new developments in the region. When requested, these studies are prepared by the applicant's consultant to address the proposed development's impacts on a city's transportation infrastructure. Typically, these studies project the expected growth in traffic resulting from the development, define what impacts might result if the

project were to be built, and recommend mitigation actions to offset those impacts.

As is true of most communities, the City of Lawrence's traffic analysis requests focus on automobile travel and do not rigorously address transit, bicycle, and pedestrian mobility, impacts, or on/off-site improvements. Traffic impact guidelines should be developed for new developments and expanded to comprehensively address the following issues:

1. Require sufficient detail to disclose the development's full range of transportation impacts and required mitigation measures.

2. Ensure that alternative mode accommodations meet minimum levels of acceptability. New development proposals should include as part of their required traffic impact studies an assessment of pedestrian and bicycle connections to all schools, parks, activity centers, neighborhoods, and transit services in close proximity to the development.

3. Develop a traffic impact analysis checklist that must be completed before a study can be submitted for review.

4. Retain an independent consultant or in-house capability to review the traffic studies as necessary.

5. Develop an enforcement mechanism that ensures all requirements and mitigation elements of the development review process, including alternative mode accommodations, are actually implemented.

Residential developments in the previous decades have morphed from older areas with a grid pattern of streets to newer subdivisions with curvilinear and disconnected streets. This newer development style limits travel through and within the subdivision, while forcing traffic to arterials on the periphery. This tends to stress the arterial street system by forcing it to accommodate traffic more suitable for collector streets. New developments should consider the impacts of the street network on traffic flow.

What we've heard…

Streets should be designed to accommodate future expected uses.

Roadway Action 13: *Develop Multimodal Traffic Impact Analysis Guidelines*

Develop comprehensive, multimodal traffic impact analysis guidelines for new development consistent with the recommendations above.

Roadway Action 14: *Perform Signal Analysis for New Developments*

For new developments that propose new traffic signals, a signal progression analysis should be performed based on long-range traffic forecasts to demonstrate the impacts of the new signal on traffic flow along the impacted streets.

Roadway Action 15: *Review Subdivision Regulations*

Review subdivision regulations and update as appropriate to provide an acceptable balance of roadway level of service and residential needs.

Roadway Action 16: *Revise Development Standards for Multimodal Requirements*

Revise the current standards to require new developments to construct sidewalks and bicycle lanes, including off-site improvements to provide connections to existing facilities as necessary.

Roadway Capacity Improvements

One of the focuses of *Transportation 2030* is to respond to the desires of the community to implement more alternative mode services and infrastructure in Lawrence and Douglas County. However, even very substantial investments in alternative modes and high usage of these mode options will not eliminate the need for additional roadway capacity improvements in the near future.

For example, roadway levels of service are measured as letter grades between "A" and "F" with a roughly 10 percent difference between each grade. Even a very aggressive mode shift of 10 percent to alternative modes would only improve the level of service on a roadway by one letter grade. Streets and highways operating at LOS E or F would still remain congested and would be candidates for capacity improvement.

Congestion management strategies can offer lower-cost solutions to operational issues and congestion problems. They should be reviewed on a case-by-case basis in lieu of capital-intensive capacity improvements. While congestion management techniques may not eliminate the need for capacity improvements, they can often delay the need for those improvements in a cost-effective manner.

When it comes to new or widened roadway improvements, needs usually exceed available funding. Therefore, a prioritization process for developing and implementing capacity projects should be developed. The process could look at criteria such as public acceptability, environmental considerations, feasibility, cost, and other factors.

The City of Lawrence and Douglas County should also develop level of service standards for urban arterials and intersections and rural roadways. LOS standards allow the communities to stay ahead of the congestion curve by gauging the performance of the roadway system and determining the amount of funding necessary to maintain adequate performance. These can vary by geographic area or facility type. For example, standards might be set at LOS C for roadways and intersections in developing areas and LOS D in the built environment.

Roadway Action 17: *Include Congestion Management in Planning Process*

Develop a process that considers lower-cost congestion management solutions to reduce the need for major capacity improvements.

Roadway Action 18: *Establish Level of Service Standards*

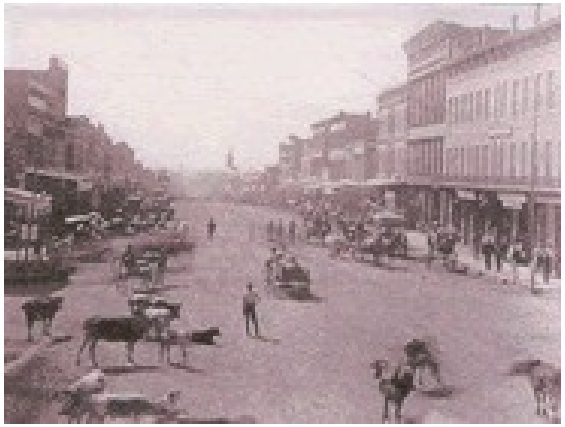
Establish level of service standards for urban arterials and intersections and rural roadways.

Roadway Action 19: *Implement Annual Prioritization Process for Roadway Capacity Improvements*

Refine and adopt a prioritization process for developing and implementing capacity improvement projects. Conduct annual or biannual reviews of the prioritized, funded project improvement list to determine whether development patterns and transportation needs warrant modifications to the roadway prioritization.

Roadway Action 20: *Pursue Additional Funding*

Pursue additional funding sources to maintain the desired level of service on the roadway system in order to stay ahead of the congestion curve.



Planning for the Future: Major Thoroughfares Plan

As stated previously, the roadway system in Lawrence and Douglas County forms the backbone of the transportation system for the region and, as such, performs numerous functions. As alternative modes gain a stronger foothold in the community, the roadway systems' use and importance grows as well, since many of these modes are accommodated in roadway corridors through transit bus service; sidewalk and crosswalk facilities; and bike lanes, routes, and paths.

It is important to identify existing and future streets and highways and define their function so that advanced planning can occur in a proactive, efficient manner. Doing so also provides valuable information to the residents of the region regarding the future vision of the region's street and highway system

Therefore, the Major Thoroughfares Map (MTM) has been established for Lawrence and Douglas County as shown in Figures 6.9 and 6.10 to address several related needs:

- **Kansas Statute No. 12-685:** This statute authorizes a city's governing body to designate existing and proposed streets, boulevards, and avenues as "main traffic ways" whose primary function is the movement of traffic between

activity areas within the city and between the city and outside areas. The MTM was developed in response to this statute.

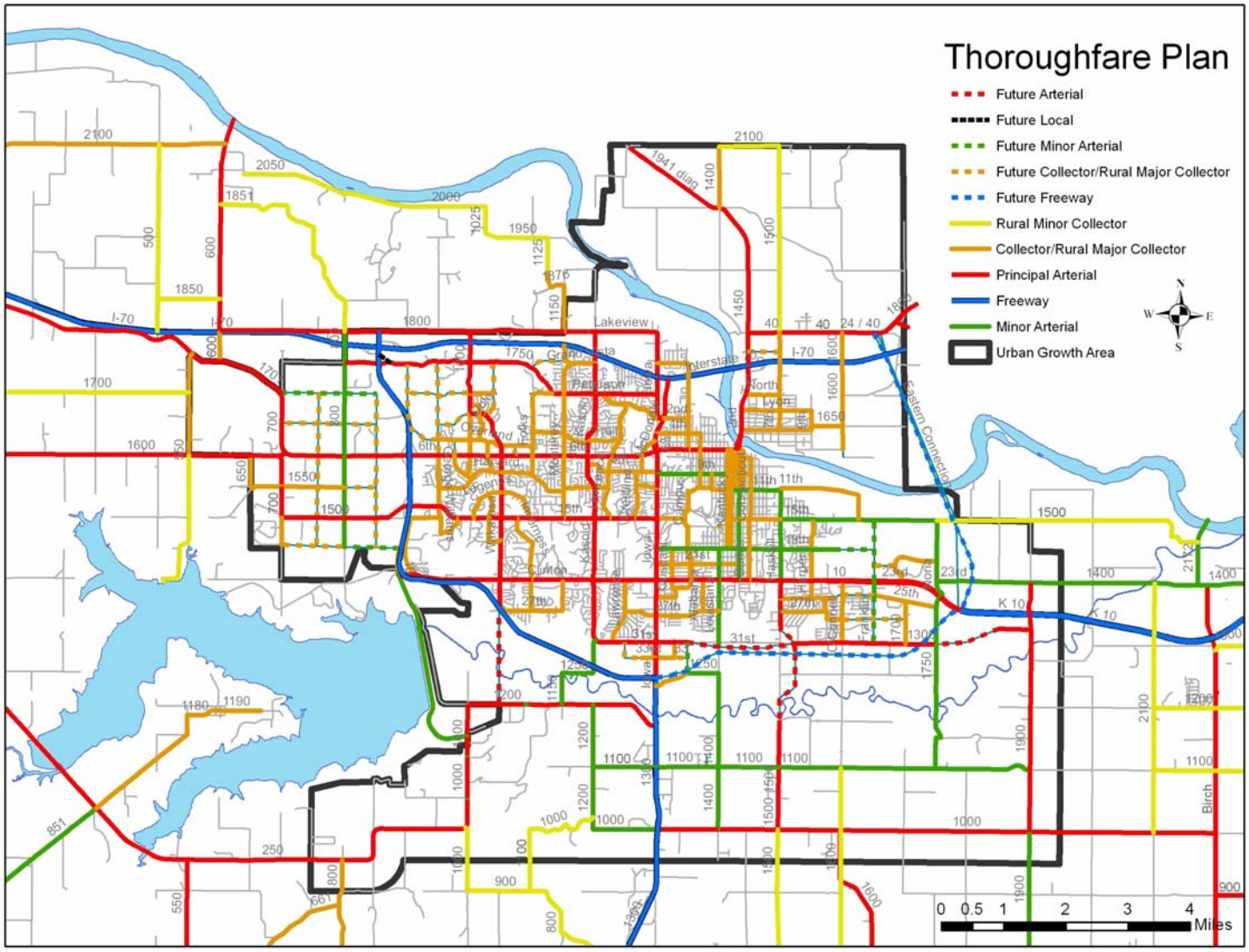
- **Functional Classification:** The functional classification of each roadway reflects its role in the system of streets and highways. While functional classification has specific implications with regard to the administration of federal-aid highway programs, it is used in the MTM as a basis for guiding decisions on corridor preservation, access management, and roadway design. These definitions are reasonably consistent with the MPO's official Functional Classification Map provided in the Technical Appendix and used for federal-aid purposes.
- **Access Management:** Utilizing techniques to minimize vehicle conflicts and improve safety along a corridor, access management guidelines can be used in a proactive manner to maintain the intended function of a roadway as development occurs. They can also be applied after the fact to address existing access and safety problems.
- **Corridor Preservation:** A concept applied to developing areas, corridor preservation guidelines will allow jurisdictions to plan for and acquire right of way in an efficient manner. Doing so will help to preserve the necessary space for future roadway improvements, maintain the desired character of the corridor, and fulfill the functional classification of each roadway.
- **Roadway Design:** Guidelines for the design of streets and highways can serve multiple purposes of accommodating vehicle and alternative modes, increasing safety, and moving people and goods efficiently. In doing so, the intended function of the various roadways can be maintained.

These topics are discussed in further detail in the following sections.

Figure 6.9

2030 Proposed Thoroughfares Map (Urban Growth Area)

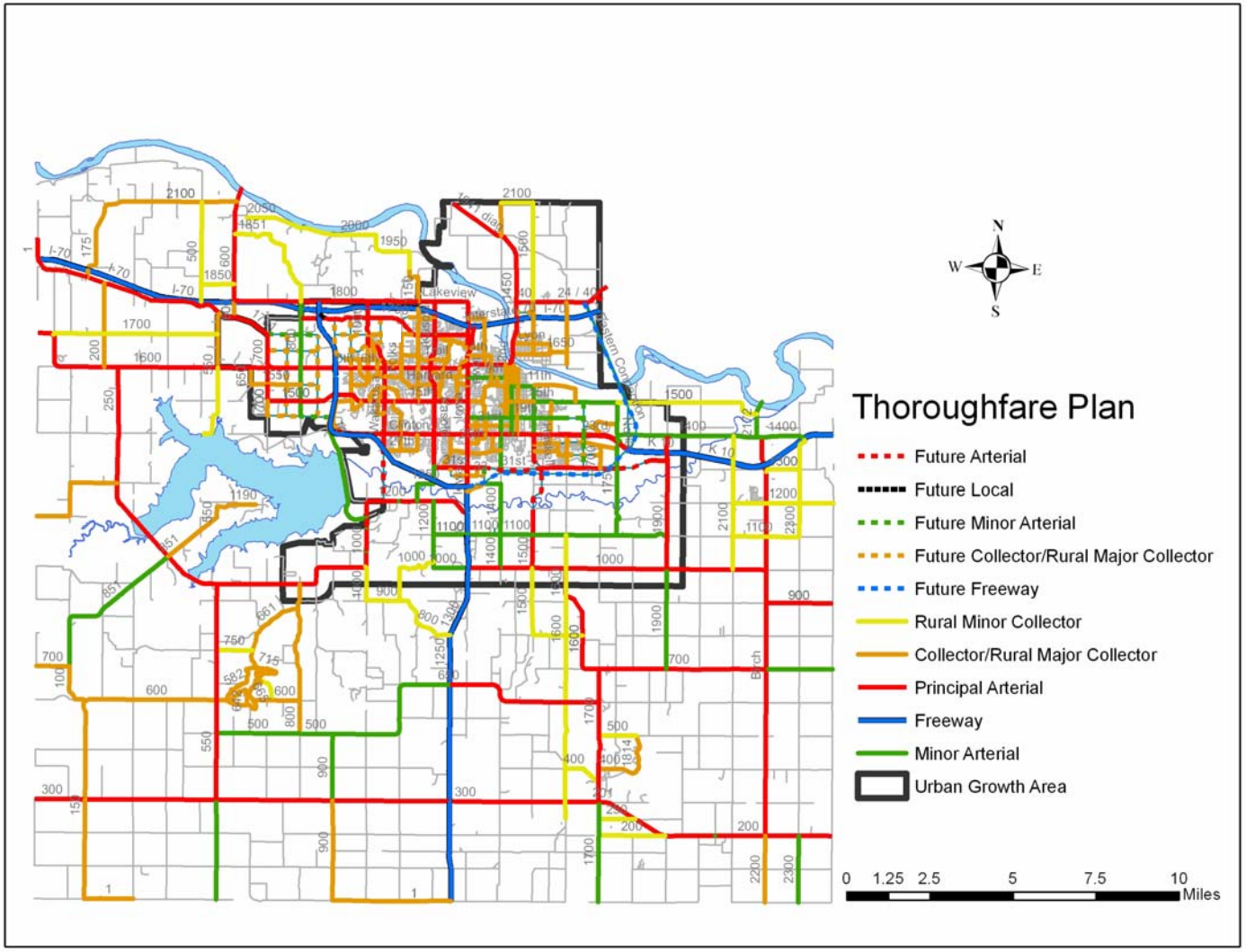
Source: Lawrence/Douglas County MPO



Roadway functional classification guides the access management, corridor preservation, and design needs of each facility.

Figure 6.10
2030 Major Thoroughfares Map
(Douglas County)

Source: Lawrence/Douglas County MPO



Roadway characteristics in the county differ somewhat from streets and highways in urbanized areas.

Functional Classification

The functional classification of a roadway reflects its role in the region's street and highway system and forms the basis for access management, corridor preservation, and street design guidelines and standards. Figure 6.11 summarizes how access, design, and mobility are related among the various functional classes.

Roadway function tends to vary to some degree depending on the amount of urbanization in a particular corridor. The differences in the nature and intensity of development in rural and urban areas warrant corresponding differences in urban system characteristics relative to the rural systems.

Figure 6.11
Roadway Functional Classification

Roadway characteristics vary by function and desired levels of mobility and access.

The roadway functions of the facilities on the Major Thoroughfares Map represent a desired function for the year 2030. Existing roadways may not meet all of the desired characteristics described by their function, but strategic improvements can serve to fulfill the future vision over time. As proposed roadways are planned and developed, the guidelines and standards associated with their function should be considered to the degree practical and appropriate.

Access Management

Access management issues are discussed in depth in the *T2030* Implementation: Policies and Actions section of this chapter.

In rural areas of the county, access management is particularly important for corridors that are likely to experience development or become urbanized through 2030. Often, access management practices are ignored in these areas, so as development and urbanization occur, these corridors become trouble spots in the transportation system.

In December 2006, Douglas County adopted access management standards for rural roads in which minimum frontage requirements increase as the functional classification of the road increases. For new developments Douglas County should require shared entrances or frontage roads to further reduce the number of access points on arterial roads. As arterial roads are reconstructed and where feasible, Douglas County should consider constructing frontage roads to serve existing residences.

Roadway Design

Roadway design is discussed in detail in the *T2030* Implementation: Policies and Actions section of this chapter. Tables 6.5 and 6.6 identify design characteristics appropriate to the various urban and rural functional classifications. The design characteristics are flexible to allow for center turn lane construction in addition to the travel lanes for urban arterials. However, in all cases, arterials should be constructed with appropriate intersection improvements (e.g., left and right turn lanes) incorporated into the design.

Roadway design standards are primarily intended for new roads. To the extent possible, they should be applied to widened or reconstructed roads in the built environment.

Table 6.5 Urban Street Guidelines

Roadway Element	Arterial			Collector	Local
	Principal 6-Lane	Principal and Minor 4-Lane	Minor 2-Lane		
Number of Travel Lanes***	6	4	2	2	2
Median	Yes-Raised	Study	No	No	No
Parking	No	No	No	No	Yes
Designated Bicycle Lanes	Yes	Yes	Yes	Study	No
Minimum Right of Way Width*	150’	120’	100’	80’	60’
Minimum Parkway Width****	10’	10’	10’	8’	6’
Left Turn Lanes Required	Yes	Yes	Yes	Study	No
Traffic Volume Capacity, 1000 veh./day	35-54	15-35	3-15	3-7	< 3
Design Speed, mph	45-50	40-50	35-50	30-40	30
Speed Limit, mph	40-45	35-45	30-45	25-35	25
Minimum Sight Distance at Driveways and Intersections	1,030’	1,030’	1,030’	660’	310’
Minimum Distance between Signalized Intersections*****	2,640’	2,640’	2,640’	NA	NA
Driveway Street Access	Limited**	Limited**	Limited**	1 per Lot	No Limit
Minimum Distance between High Volume Intersections and Driveways	1,320’	1,320’	1,320’	250’	200’
Minimum Distance between Driveway Edges	660’	660’	330’	75’	30’
Minimum Corner Clearance between Driveways and Street Intersection	600’	600’	600’	300’	100’
Driveway Approach Street Configuration	Radial Curb Return			Curb Cut	Curb Cut
Transit Service	Express & Local Bus			Local Bus	Limited Local Bus
Sidewalks	Both Sides			Both Sides	Both Sides

Source: Composite of City of Lawrence and Peer Cities

* An additional 10’-20’ of right-of-way shall be provided at intersections to accommodate second left turn lanes and right turn lanes
** Traffic Study Required
*** Arterial streets may include center turn lanes in addition to the indicated travel lanes
**** Parkway = a green space between the street and sidewalk
***** Subject to traffic impact study and corridor study

Table 6.6 Rural Road Guidelines

Roadway Element	Arterial		Collector		Local
	Principal	Minor	Major	Minor	
Number of Travel Lanes	Study	2	2	2	2
Shoulder for Bicycle Lanes	Yes	Yes	Yes	Yes	No
Minimum Shoulder Width	8’	6’	4’	2’	N/A
Minimum Right of Way Width*	120’	100’	80’	70’	70’
Left Turn Lanes Required	Study	Study	Study	No	No
Design Speed, mph (min.)	55	45	30	30	20
Speed Limit, mph	50	45	30	30	20
Minimum Frontage per Access	1320’	660’	660’	330’	250’
Minimum Corner Clearance between Intersection and Access	820’	600’	600’	250’	200’
Desirable Access Spacing	1320’	660’	660’	330’	250’

Source: Douglas County

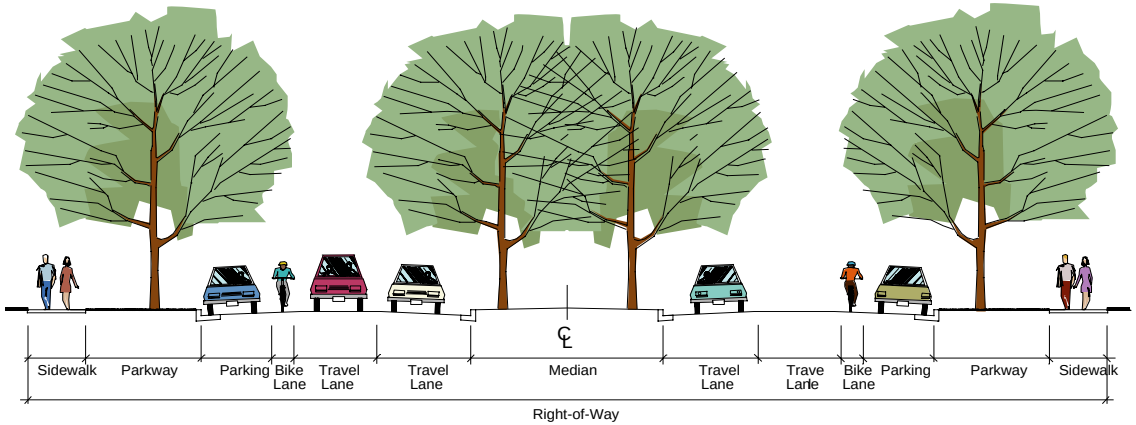
* Right of Way width shall be sufficient to include top of ditch backslopes; may be variable

Corridor Preservation

One of the products in the development of *Transportation 2030* is the identification of major existing and future transportation corridors for each of the roadway functional classifications in the Lawrence/Douglas County region as depicted in the MTM. These corridors should be preserved from negative impacts of development, changing land uses, and encroachments so that future improvements can be made in an efficient manner. This is done through the active process of:

- Identifying major corridors for future roadway improvements;
- Acquiring necessary right-of-way along these corridors as soon as practical or as part of development proposals;
- Adopting access management regulations to allow appropriate access point spacing;

- Identify and secure access management standards for areas beyond the extent of existing urban development; and
- Require building and development setbacks that preserve the relationship between the right-of-way and development so that future roadway improvements can be accommodated on the priority corridors.



The functionally classified corridors identified on the Major Thoroughfares Map are all candidates for corridor preservation. Depending on the type of improvements identified, existing right-of-way, and functional classification, corridors should be prioritized so that the land can be preserved efficiently for future use.

Maintenance

Maintenance is a key component of the transportation system. A clear message received during stakeholder and public involvement was to make the maintenance of existing transportation facilities and services a top priority. The benefits obtained from the initial investment are significantly eroded when the system is not effectively maintained.

All aspects of the transportation system require some maintenance, including pavement, signs, street markings, bridges, buses, bus shelters, recreational paths, sidewalks, crosswalks, and traffic signals. This is reflected in the fact that potholes are often a primary transportation concern with residents across the community. Snow removal on sidewalks, paths, and street is another important maintenance issue. With the numerous rivers and streams in Douglas County, bridge maintenance is a particularly significant item in the community. To facilitate the management of bridges, the County should continue its system of inspection, maintenance, and replacement of bridges and coordinate with KDOT's efforts in this regard.

Chapter 7: Transit System Plan

There are two fixed-route transit services currently operating within the City of Lawrence: the Lawrence Transit System (the "T") and the University of Kansas' "KU on Wheels" system. In addition, there are a number of paratransit shuttle services in Lawrence and Douglas County. The "T," the City's public transportation system, began operation in January 2001 and provides fixed-route service throughout the city. In addition to providing services for transit dependent patrons, the "T" also offers services as an alternative to the automobile for non-transit dependent, or choice, riders.

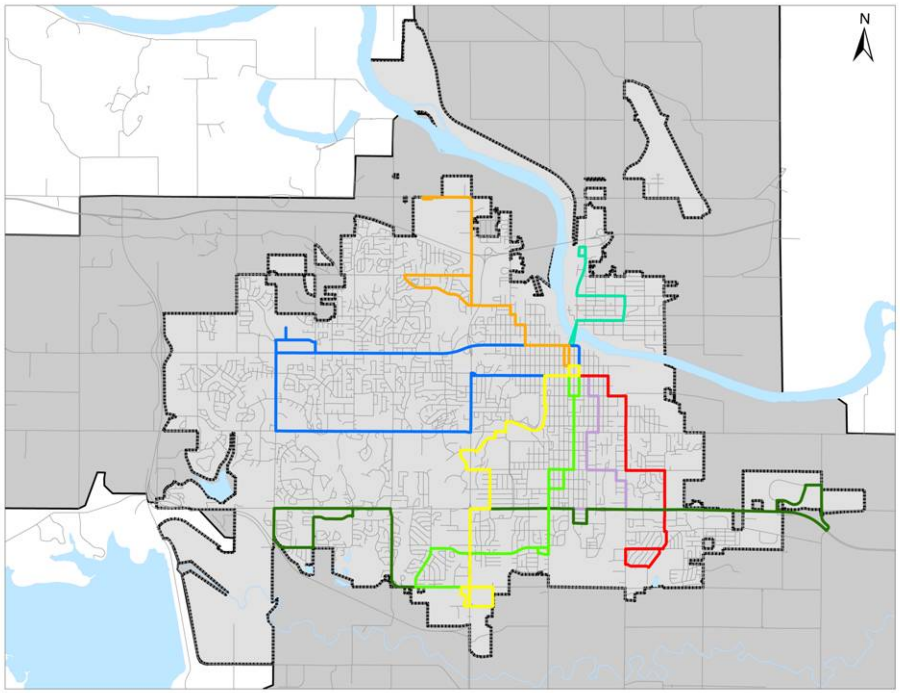
As a public service, the "T" system should be funded and supported similar to other public services. A public transit system of a size and quality commensurate with the future needs of the City of Lawrence and Douglas County residents and businesses is an important element of the region's transportation system. The "T's" existing system of bus routes is shown in Figure 7.1.

Transit service, whether fixed-route or demand-responsive, is intricately linked to many other governmental and planning actions. Lawrence Transit plays a key role in supporting emergency response activities. Transit is an important component in serving those with special needs during man-made or natural disasters.

Providing fixed-route transit service relies upon direct pedestrian connections between bus stops and origins and destinations. Transit service reacts to the density of development within the city, locations of transportation corridors and activity centers, and the design of developments along the corridors and centers it serves. Travel corridors and activity centers with a mix of uses and a large number of travelers provide the demand that can effectively support higher levels of transit service.

Figure 7.1
Lawrence Transit Service Bus Routes

Source: Lawrence/Douglas County MPO, Lawrence



Lawrence's recent citywide bus service offers fixed-route bus service six days a week on eight established routes.

Given the historical emphasis on roadways and automobiles, developing a balanced, multimodal transportation system sometimes requires shifts in public investment. To facilitate a higher level of transit service in the city, new developments and land use patterns should be planned in such a way as to support the non-automobile modes. In turn, the design of the City's infrastructure and roadway system must consider all transportation modes, including transit.

The evolution of Lawrence as an auto-oriented community has occurred over decades. It will similarly take time to restructure land use and development patterns to achieve an environment that can promote productive transit service.

Current and Future Conditions: Access to Transit

With the establishment of citywide, fixed-route bus service, the future of public transportation in Lawrence is much clearer now than in the past. However, several questions and considerations remain.

Future socioeconomic growth will add new people and jobs that will result in increased travel demand. In particular, anticipated development in the southern and western portions of Lawrence will increase demand for transit service and place greater pressure on the Lawrence Transit System. In addition, it is likely that desires for higher service levels (e.g., more routes, longer service hours, increased frequencies) in the existing bus service areas will increase as the system takes hold and ridership grows.

One of the measures used to indicate current service levels and future service needs is the amount of coverage provided by the bus system. Coverage is measured for three intervals: short-walk, medium-walk, and long-walk. Studies and other empirical evidence have indicated that people living within 1/8 mile of transit service have the highest propensity to use the service. The likelihood to walk to the bus falls off rather quickly after about 1/4 mile.

Recommended Transit System Plan

To achieve viable long-range transit service for the City of Lawrence and Douglas County in the year 2030, a number of policies and actions are needed to guide successful implementation and expansion of public transit. These policies and action items are described below.

What we've heard...
Longer service hours and decreased times between buses are needed.

Promote a Balanced Transit System

Finding balance in the transit system between the number of routes, the frequency of service, and the extent of service hours usually requires tradeoffs. As an example, if resources are expended on increasing the frequency of service or extending the service hours, less productive service routes may need to be eliminated and those resources reallocated to the higher-frequency and extended service-hour routes. Similarly, if additional routes are added, frequency of service and/or service hours for existing routes may need to be cut.

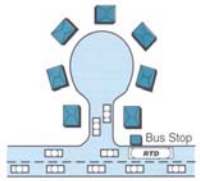
As development occurs and the City adds service to intensified existing development areas and newly developed areas, trade-offs between the number of routes, frequency of service, and service hours should be examined. To the extent possible, frequency of service should be increased on the higher-density transit route corridors to capture trips that might have traditionally used automobiles. As new development occurs, extended or new services should be considered when densities warrant.

Transit Action 1: *Ongoing Monitoring of Transit Performance and Service*

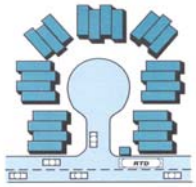
Monitor and modify transit service in response to future growth, changes in development patterns, and user needs. Consider a north-south transit route in the western portion of the City that would connect Bob Billings Parkway and Clinton Parkway.

Transit Action 2: *Establish an off-street location for a regional transit hub.*

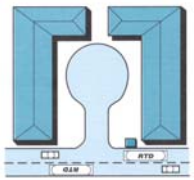
Plan for a regional transit hub that would provide improved facilities for local transit riders and a convenient connection to regional transit service.



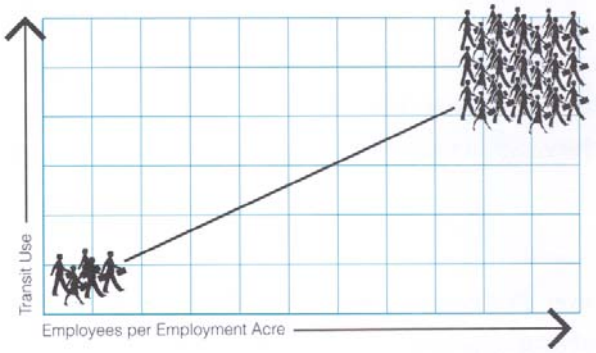
4 du/ac can support transit every 60 minutes
7 du/ac can support transit every 30 minutes



20 to 30 du/ac can support transit every 10 minutes



50 du/ac can support more bus trips than auto trips and light rail



In most areas, local bus service threshold for business is approximately 50 to 60 employees per acre

Transit-Friendly Land Use and Development Standards

Transit service requires pedestrian connections to and from transit stops, a reasonable density of activities, and applicable development design standards. To achieve transit productivity, all three elements must be provided. Pedestrian connections to transit must be direct and the sidewalk system must have continuity. Street crossings to transit stops must be safe. Productive transit service requires high-density land development patterns which link residential areas and employment, retail, and service centers. Design of new developments needs to be transit friendly by providing convenient access to transit services.

Transit use can be increased by site design and zoning actions that complement and encourage public transportation and other alternative modes. Such considerations include

- Site designs which facilitate pedestrian access;
- Higher residential and employment densities;
- Pedestrian improvements connecting new developments to other activity centers and neighborhoods;
- Mixed-use developments;
- Parking price, supply, and design strategies;
- Transit user amenities like bus shelters, benches, and information kiosks; and,
- Subdivision designs that facilitate the connection of residents to bus stops and allow for the efficient circulation within the neighborhood.

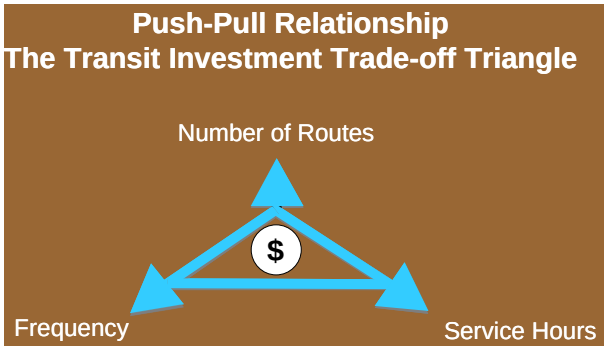
It should be recognized that the typical transit user is also a pedestrian. Conventional commercial site designs often place barriers such as landscaping and parking lots between the buildings and the sidewalk. Residential development patterns tend to be automobile-oriented and make pedestrian access to bus stops difficult. Discontinuous or poorly maintained sidewalks contribute to the problem.

Abundant free parking is sometimes a deterrent to transit usage in large metro areas; however, that is not always an issue in smaller areas. If a joint city-university system is to become a reality, significant changes in current parking policies both on and off campus should be reviewed. Parking policies in the Downtown and other activity centers should be reviewed as well. Parking that supports retail businesses should be studied carefully to maintain a balance of commercial interests and alternative mode opportunities.

Transit Action 3: *Develop Pedestrian and Land Development Standards to Promote Productive Transit Service*

This includes:

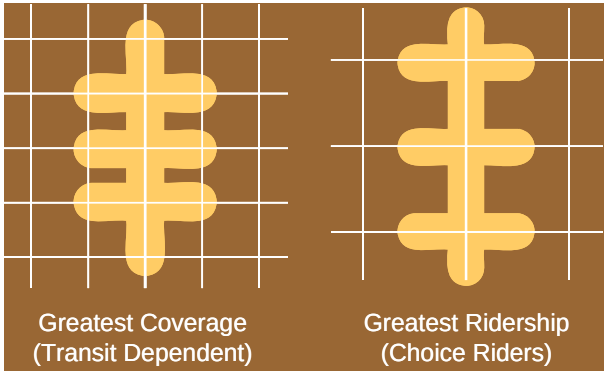
- Developing pedestrian access standards for new development and redevelopment projects that provide direct and continuous access to transit stops;
- Promoting mixed-use, high-density activity centers and corridors integrating transit-oriented standards in project design; and,
- Developing and implementing transit-oriented design standards for new developments.



Multiple Approaches to Providing Transit Access

T2030 addresses both the coverage requirements for serving the transit dependent population as well as productive routes for capturing new riders and reducing congestion. Achieving more productive routes requires strategic planning efforts to direct growth patterns along transit corridors and concentrate activities into higher-density, mixed-use centers.

Maximum transit coverage and maximum transit productivity form the continuum of options for the transit provider. At one end of the continuum is the provision of transit service to as many homes and businesses as possible. This type of service extends coverage but sacrifices higher service standards along more productive routes. Whereas this type of service addresses the needs of the transit dependent, it does not promote competition among modes to capture new riders, especially choice riders. On the other hand, increasing service to high-



demand corridors to capture new riders might mean reducing or eliminating low productivity routes.

Transit Action 4: *Study Transit Productivity and Coverage Issues*

Review transit goals and objectives to determine an appropriate balance between coverage and productivity of transit services.

What we've heard...
There is a desire for bus transit connections to Topeka and the Kansas City metropolitan area.

Integrate Transit When Designing Roadway Improvements

Transit bus service depends on the roadways it travels. Transit productivity is impacted when roadways are congested; increasing transit travel time and requiring additional transit vehicles to provide the same transit level of service. Transit vehicles can also impact other vehicular travel and safety unless transit turnouts allow vehicles to pass. Typically, the turnouts are provided along the far side of an intersection to allow buses more opportunities to re-enter the travel lanes. "Near-side" turnouts can result in transit vehicles being blocked by vehicles queued at the intersection. Roadway design considerations also include the need for sidewalks to transit stops, safe street crossings, lighting for security, and bus stop benches and shelters.

Transit Action 5: *Transit-Friendly Roadway Design Standards*

Develop transit-friendly roadway improvement standards that accommodate and promote far side intersection bus turnouts, efficient transit operations, and transit amenities. Require transit-friendly roadway design in construction of new roadways and reconstruction of existing roadways.

Transit Consolidation

The "T" and "KU on Wheels" transit systems have somewhat redundant services, different fare programs and different funding mechanisms. Consolidation of the

two services would permit the development of an overall plan that could increase coverage, frequency, and service hours by pooling the resources of the two systems.

Consolidation of the transit services should build on the strengths of each system's operating and ridership characteristics. For example, the University's culture of bus transportation should be maintained to greatest extent possible by retaining historical KU on Wheels references, marketing directly to students, and including student leadership in the decision-making process. The consolidated system may wish to employ student drivers, further increasing exposure to students and possibly lowering labor costs. Student managers could assist the professional staff with planning and operations issues. Finally, the important activity centers served by both existing systems should be incorporated into the consolidated system.

What we've heard…
There is a desire for transit connections to the smaller cities in Douglas County.

Transit Action 6: *Pursue Transit Consolidation Opportunities*

Continue to pursue transit service coordination opportunities among the "T," KU on Wheels, and the local school bus system.

Transit Is an Integral Part of the Community's Transportation System

The "T" transit services accounts for a very small percentage of the current Lawrence budget. While this level of funding might be adequate to provide for the basic transit services for the disabled and transit dependent, the funding level is not sufficient to provide the frequency, route coverage, and structure to compete with the level of service offered by the automobile.

Public funds and policies subsidize parking in the downtown area and can make it more difficult for transit to compete. Currently, transit funding is not seriously considered as a way to provide mobility along congested corridors. There are significant fiscal, neighborhood, and environmental impacts when those corridors are widened. The long-term strategy to enhance mobility, though a range of alternative transportation modes, requires long-term funding commitments for the "T."

Independence Inc. provides general paratransit services, and Douglas County Senior Services, and Cottonwood provide paratransit services to elderly citizens and citizens with disabilities in Douglas County. Although separate agencies, they coordinate with Lawrence Transit to provide transit services to the region. Were the services provided by one of these agencies to be scaled back, it would have an impact on all. Each is a member of Coordinated Transit District 1 that covers Douglas, Johnson, Wyandotte, and Leavenworth Counties. CTD 1 has developed a Coordinated Human Services Plan that has been approved by KDOT.

Transit Action 7: *Develop a Long-Term Transit Funding Strategy*

Conduct a funding and subsidy study to determine the trade-off costs and benefits of various transit funding levels. Establish a long-term funding commitment for the "T" to provide for transit service to existing and future developments within the city.

Transit Action 8: *Develop a Long-Range Transit Plan*

Develop a long-range transit plan that addresses future needs and opportunities, reviews the most appropriate fixed-route service types, establishes a framework for consolidation of transit services, and builds on recent transit services. Short-, medium-, and long-term actions should be included in the transit plan's implementation discussion.

Provide Funds for Transit Vehicle Replacement and Facility Needs

Capital needs for the region include replacing buses and paratransit vehicles as they age and providing new transit passenger facilities and vehicle maintenance facilities.

The 12 fixed-route buses in the Lawrence Transit fleet and the 38 buses in the KU on Wheels fleet will need to be replaced twice before the year 2030; Lawrence Transit's 14 paratransit and KU on Wheels 4 paratransit vehicles will need to be replaced four to five times by the year 2030; and there will be a need for new facilities for transit users and vehicle maintenance.

Transit Action 9: *Develop a Long-Term Funding Strategy for Capital Improvements*

Develop a long-term strategy to ensure the replacement of transit vehicles on a regular schedule and to enable the construction of transit facilities.

Regional Commuter Transit Needs and Options

Currently, only one intercity public commuter transit route serves Lawrence and Douglas County. The K-10 Connector bus service provides a route on K-10 between the KU campus and Johnson County. Eastbound and westbound buses provide express service on weekdays fro once an hour. Limited late evening s should be given to providing a stop at Eu

Regional Commuter Rail

As commuter traffic has continued to Topeka and Kansas City Metropolitan Areas, there is an increased need to develop alternative modes of commuter transportation. The K-10 Johnson County Connector is the first step in providing this service. Intercity bus service along the Kansas Turnpike (I-70) to the east and west is a logical next step. The ultimate option would be a commuter rail system that serves the Topeka, Lawrence, and Kansas City areas.

The Mid-America Regional Council (MARC), the MPO for the Kansas City area, has conducted a regional commuter rail study to determine whether existing rail corridors or railroad rights-of-way could effective tion needs of the Kansas City region. Three c idor connecting Kansas City, Lawrence and Topek d to move to the second, more detailed, phase of th

Several private firms, such as Kansas Transportation Services and KCI RoadRunner provide shuttle service on a contractual basis to private corporations or to KCI Airport from Lawrence to Topeka and the Kansas City Metro Area.

Transit Action 10: *Investigate the Potential for Regional Transit Connections along I-70*

The Lawrence/Douglas County MPO should work with the Metropolitan Topeka Planning Organization and the Mid-American Regional Council to explore the potential for intercity transit service.

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Chapter 8: Bicycle System Plan

For many types of trips, bicycling represents a healthy alternative to using an automobile. Bicycling can also play an important role in helping the city to reduce congestion, improve air quality and develop a more balanced transportation system. The recommendations of *Transportation 2030* propose improvements to existing on-street and trail facilities and development of an expanded system of bicycle-friendly roads and trails for the City of Lawrence and Douglas County's future.

As a vital component of the transportation system in Lawrence and Douglas County, bicycles provide both commuter and multiuse transportation. Lawrence and Douglas County offer some of the best cycling opportunities in Kansas. Over the last five years Lawrence has continued to improve conditions for bicycling and to increase education about cycling issues. Accomplishments include:

- An ongoing, active Bicycle Advisory Committee;
- Installation of new multiuse trails and on-street bicycle lanes;
- Designation as the 51st Bicycle Friendly Community in America; and,
- Designation at the Bronze Level from the League of American Bicyclists for being a bicycle friendly community in 2004 and redesignation in 2006.

What we've heard…
There is a need for additional bicycle facilities in Lawrence, Eudora, Baldwin City and Douglas County.

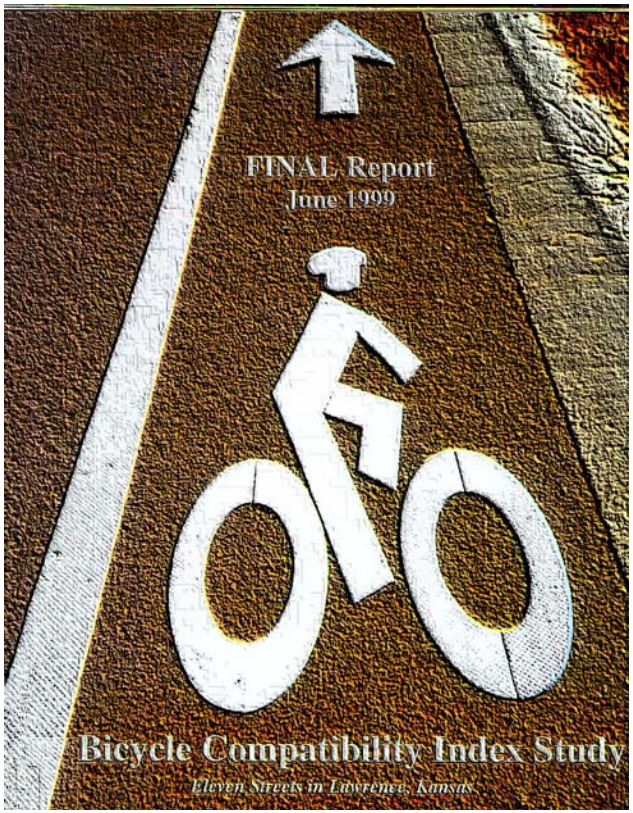
What is the Lawrence/ Douglas County Bicycle Advisory Committee?

The Lawrence/ Douglas County Bicycle Advisory Committee (BAC) was established as a seven-member group of citizens interested in the promotion of bicycle transportation and safety. The BAC makes recommendations on the location and design of bicycle paths, expenditure of City funds, promotion of bicycle use and safety, street design issues related to bicycle use, and other bicycle and transportation issues. The Committee was instrumental in obtaining the City's Bicycle Friendly Community designation.

The Bicycle Work Program was developed by MPO staff with oversight from the BAC. The Work Program identifies:

- Bicycle goals, objectives, and activities,
- The bicycle system and facility needs for the Lawrence/Douglas County region, and
- Bicycle education and safety awareness programs.

The Bicycle Work Program was last updated in 2004 by the MPO. Its Bicycle Facilities Plan is summarized in this chapter and has been adopted as the recommended Bicycle System Plan as a component of T2030.



History

The City of Lawrence has emphasized bicycle planning for over 30 years, starting with the creation of *PedalPlan* in 1976. *PedalPlan* outlined some of the deficiencies in the system, recommended bicycle routes, and proposed a signage scheme for the Lawrence community. These recommendations were implemented between 1976 and 1995. By the mid-1990s, increasing citizen concern about cycling issues prompted the City Commission to form the Bicycle Advisory Committee.

Lawrence was named the 51st Bicycle Friendly Community in 2000 by the League of American Bicyclists, a symbol of Lawrence's commitment to providing the best cycling opportunities in Kansas. The City was also the recipient of the award in 2004 and 2006 receiving recognition at the bronze level. As a recognized Bicycle Friendly Community, the City of Lawrence is working on enhancing existing facilities while planning for the future needs of cyclists in Lawrence. The Lawrence/Douglas County Metropolitan Planning Office takes seriously its role to create, develop, and educate the community about cycling and its facilities.

The City of Lawrence's existing inventory of bicycle facilities includes:

- 80 miles of on-road designated routes, includes bike lanes and bike routes;
- 63 miles of additional on-road facilities are planned;
- 41 miles of hard surface multiuse paths;
- 40 miles of off-road paths, including the 10 miles from the Kansas River levee;
- 0.8 miles of rail trail (Haskell Trail) w/ approximately 1.5 miles planned (Burroughs Creek Rail Trail-TE funds are being requested this year); and,
- 29 miles of trails at Clinton Lake and additional off-road trails east of North Lawrence (along the Kansas River). These trails are rated by NORBA, (National Off-Road Mountain Biking Association). Off-road trails along the Kansas River are considered some of the best trails in the country. Cyclists come from surrounding states to ride these trails adding to the local tourist economy.

Bicycle Facility Needs

Facility needs identified in the Lawrence-Douglas County Bicycle Plan are based on general principles of safe and convenient bicycling, as well as specific location needs for various situations in Lawrence. These are summarized as follows:

Safety and Convenience

Whichever route a bicyclist may choose or need to use, that route should be as safe as possible for bicycling. Issues may include hazards (e.g., drainage grates, overhead obstructions, etc.), lighting, vehicular conflicts, or conflicts with other users. Routes should also provide access to various destinations by a reasonably direct means.

Connections between Destinations

The typical cyclist in Lawrence requires safe and convenient access to connect their residence with school, employment, or entertainment and shopping destinations. These linkages must provide safe access across high volume arterial streets. Some connections specific to Lawrence include:

- Access to the University of Kansas, primarily from residential areas;
- Access to Lawrence's downtown area, a destination for shopping, dining, and entertainment; and,
- Routes well suited for the commuter, multiuse rider, or fitness rider. These routes should provide a medium- to long-range round trip, safe access, and variety.

Bicycle Level of Service Performance Measures

The City of Lawrence has all the makings for a community with high bicycle mobility: a large University population, a relatively compact urban area, and a good climate. Although the City has done a good job of implementing a bicycle network, significant improvements are necessary to complete it to provide safe and direct connections.

Determining how existing traffic operations and geometric conditions impact a bicyclist's decision to use or not use a specific roadway is the first step in defining the bicycle compatibility or performance of the roadway. In December of 1998, the U.S. Department of Transportation in association with the University of North Carolina-Chapel Hill Highway Safety Research Center developed a Bicycle Compatibility Index (BCI) to evaluate existing facilities. This index also assists in determining what geometric improvements may be required for new facilities to achieve the desired level of service performance for bicycles. The BCI Compatibility Index can be applied to the City of Lawrence in the following three ways:

(1) Evaluation of all existing and planned bicycle routes using the BCI index will provide for an accurate assessment of the bicycle network.

(2) The BCI index is the first of its kind to provide a direct correlation of facilities to performance, which allow bicycle facility designers to examine the field variables to improve bicycle lane performance. Weak links in the existing and planned network can be determined, and sites needing improvements can be prioritized on index values.

(3) The BCI index provides for performance measures that can be used in combination with traffic engineering standards to balance a street or corridor's level of service. As an example, one could argue that widening a roadway to improve automobile level of service must be done in balance with the bicycle level of service. Hence new roadways or roadways that are being redesigned or retrofitted can be assessed to determine if they are bicycle compatible. If the roadway does not meet the desired level of performance, the model can be used to evaluate changes that improve performance for bicycles.

What we've heard...
Additional funding is needed for bicycle facilities.

Options

Different levels of bicyclists feel comfortable on different types of facilities. The experience commuting bicyclist may prefer on-street facilities, while a less experienced rider may be more comfortable on a multiuse path. Some bicyclists have different access requirements to various locations at varying times of day. Maximum flexibility is important in accessing all parts of the community.

Signage

Bicyclists require clear and consistent signs to mark bicycle facilities. These signs not only assist the cyclist in choosing the most appropriate route, but also alert the motorist to the presence of cyclists, thereby increasing safety.

Maps

The City's "Planned Bikeways Map (2006)" provides information on existing and future facilities, safety, and related information. The MPO should continue efforts to disseminate these maps to schools, recreation centers, libraries, and other locations.

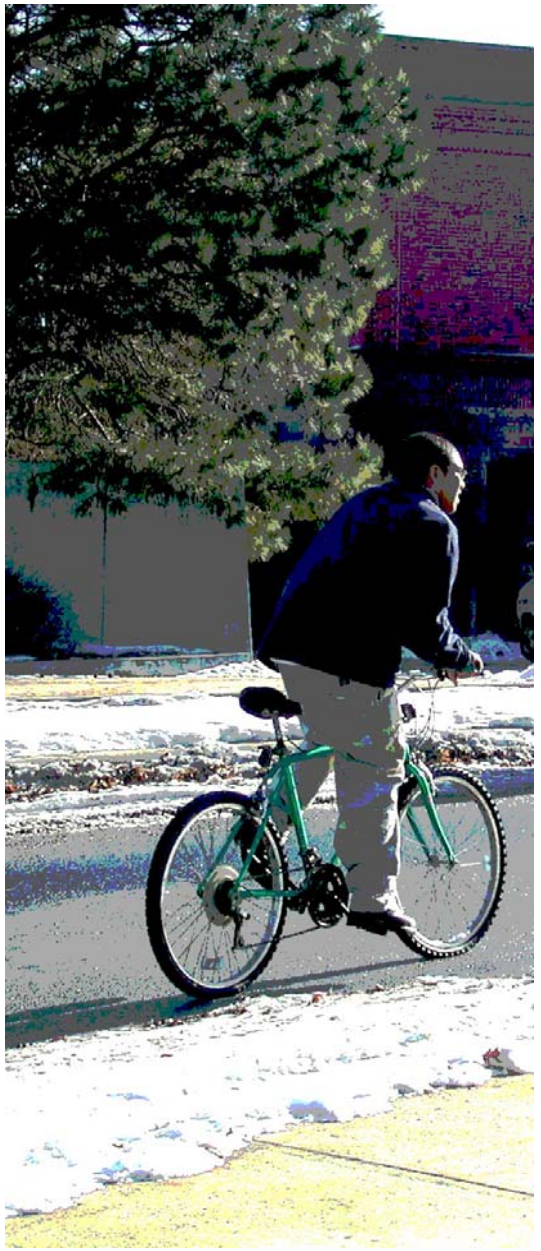
Bicycle Parking

Bicycle parking needs include the following:

- The downtown area should have an adequate amount of dedicated, secure bicycle parking for commuters and business patrons; and,
- Safe and secure bicycle parking should be provided as necessary near schools, universities, libraries, recreational centers, other public buildings, at activity centers, and along activity corridors, as well as in City parks, especially where high use is anticipated (e.g., Holcomb, Lyons, Veterans, etc.).

Ancillary Facilities

To effectively use the bicycle as a transportation mode, the cyclist requires facilities in addition to routes and parking. Bicycle commuters require showers and lockers at their place of employment. Other needed ancillary facilities include access to other public transit modes (buses, carpools, etc.), and rest areas with water at suitable intervals or locations.



Recommended Bicycle System Plan

Lawrence-Douglas County Bicycle Plan Recommendations

The 2004 Lawrence-Douglas County Bicycle Plan includes recommendations for existing and future bike lanes, routes, and trails within the City of Lawrence. Although popular and heavily used, the existing bike system does not yet provide a continuous system that serves the entire city. These paths, lanes, and routes serve both commuter and multiuse bicyclists. Bicycle commuters might use their bicycles daily for work and shopping trips and view their bicycles as vehicles. Multiuse bicyclists tend to ride their bicycles on a more occasional basis, seek attractive and safe routes, and view their bicycles as multiuse and exercise equipment.

The majority of Lawrence's street bike facilities are on-street bike routes. These routes tend to be located along lower volume streets where the routes are shared by automobiles and bicyclists. There are very few separate on-street bike lanes in the city. To the extent possible, bike lanes should be promoted because the separate lane provides a defined physical space for the rider, which improves safety for the bicyclist. This physical lane also helps define the importance of the bicyclist as a means of travel within the community.

Bicycle Action 1: *Implement 2004 Lawrence-Douglas County Bicycle Plan Recommendations*

Implement the Lawrence-Douglas County Bicycle Plan recommendations include the following:

What we've heard...
Bicycle facilities lack continuity at some locations.

- Further develop bicycle facilities that extend into future growth areas as land uses are identified and continue to explore opportunities that provide connections to schools, parks, the downtown, and other activity areas.
- Establish a dedicated funding plan to complete implementation of a bicycle facilities plan and for maintenance of these facilities.
- Prioritize and implement critical segments that provide continuity for the system and provide connections to major activity centers, schools, Kansas University, etc.
- Evaluate existing bicycle routes and other corridors for opportunities to provide bicycle lanes, routes, or trails.
- Maintain existing route maps for all trails, lanes, and routes and provide appropriate signage.
- Implement a public information and education program that encourages this alternative mode of transportation.

Bicycle Action 2: *Update the Lawrence-Douglas County Bicycle Plan and Bicycle Facilities Plan Every Five Years*

The Lawrence-Douglas County Bicycle Plan should be updated every five years to address changing needs and priorities. The next updated should be in 2008.

Public and Private Development Proposals

To create multimodal opportunities, two specific actions are required. The more difficult of the two is repairing and/or retrofitting areas within a City where facilities for bicyclists were not originally considered but are now needed. The easier opportunity is to establish standards and guidelines to accommodate bicycling in future private and public development.

From the standpoint of public development, particularly in construction of new roads and reconstruction of existing roads, considerations related to bike lanes and routes, street crossings, and other design features should be addressed and embraced in all new projects.

In order to assure that new private developments consider the bicyclists, there should be standards and checklists from which the applicant and the City can review the proposed development and be assured that future bicyclists that desire to travel to, from, and within that development can do so.

These standards and guidelines do not need to be onerous, but they do need to be realistic. Requirements should include recognition of on- and off-site destinations and connections between the development and other activity centers. Particularly important destinations would include schools, parks, neighborhoods, citywide trails, libraries, recreation centers, bike lanes and routes, and activity areas.

Bicycle Action 3: *Adopt Bicycle Standards and Guidelines for New Developments*

Standards and guidelines should be adopted that

- Develop minimum bicycle standards and guidelines for all new roadways and reconstruction of existing roadways and
- Incorporate private development standards by providing bicycle facilities connecting to key destinations such as schools, parks, trails, and activity centers.

Bicycle Action 4: *Implement a Bicycle Demonstration Project*

Select a short-term demonstration project that embraces best engineering practices, bicycle design standards, and minimum Federal guidelines for bicycle facilities.

Bicycle Action 5: *Consider Bicycles in Development Review*

The City's development review process should be modified to include requirements for on- and off-site bicycle connections, facilities, and amenities.

Bike Routes, Lanes, and Paths – How Are They Different?

Bikeway – A general term for any street or trail which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Multiuse Paths – This is a bikeway or trail that is physically separated from motor vehicle traffic by open space or a barrier and is either within the road right-of-way or within an independent right-of-way. These are also referred to as a shared-use, multiuse trails, or Class I bikeways.

Bicycle Lane – This is a bikeway on a portion of a street that has been designated by signage, and pavement markings for the preferential or exclusive use of bicycles. Also referred to as a Class II bikeway.

Bicycle Route – A segment of a system of roadways signed for the shared use of automobiles and bicyclists without pavement markings. Sometimes referred to as a Class III bikeway.

What we've heard...
Parking lots are needed at trail heads.

What we've heard...
At some locations there are missing connections between multiuse trails and the rest of the transportation system.

What we've heard...
There should be more bicycle and pedestrian crossings over the Kansas River.

Douglas County Bicycle Recommendations

There is a recognized lack of bikeways between Lawrence and surrounding Douglas County. Currently the only means of connecting these communities is by travel along the country roads and streets. For example, in Eudora bicyclists use Main Street coming from the north as well as 10th Street, neither of which is designed to accommodate bicycles. Many jurisdictions elsewhere in the United States have elected to widen the shoulders of these connecting roads to five or six feet to allow room for the bicyclist, rumble strip, and edge debris. This is typically done at the time of resurfacing or reconstruction but in some cases can only be accomplished during major reconstruction due to existing geometric and physical constraints (e.g., ditches). Additional protection to the bicyclist can be accommodated with edge-line rumble strips that separate the vehicle lane from the shoulder. Where shoulder rumble strips are provided a six-foot wide shoulder is desirable.

Bicycle Action 6: *Implement Douglas County Bicycle Plan Elements*

- Identify potential rural bicycle corridors based upon existing and future demand.
- Identify potential bicycle corridors in the county's smaller cities.
- Identify connecting corridors that integrate with existing and future city bicycle facilities with those in the county and potentially, adjacent counties.
- While addressing safety, explore the opportunity for widening the shoulders of county roads that lead into and out of Lawrence at the time of resurfacing and reconstruction.

Bicycle Amenities

A major element of the overall bicycle plan is the provision for adequate bicycle facilities as part of the manmade environment. A place to park a vehicle at the end of a trip is almost always provided, but rarely is there a place where the bicyclists can lock or store their bicycle. There is a wide range of facility designs available that can be public or part of a private development.

Bicycle Action 7: *Plan and Construct Bicycle Amenities*

- Develop bicycle rack and storage requirements for new developments. Requirements should address design, location, and number. Requirements should also consider covered bicycle parking for major proposed developments.
- Provide functional bicycle racks and storage facilities at activity centers and along activity corridors.
- Explore the opportunity for trailhead restoration, information, and parking facilities for high demand trails.

Bicycle Education, Safety, and Enforcement

A functional bicycle plan needs ongoing education on air quality, laws for bicycles and motor vehilces, the health benefits of bicycle transportation, and its contribution to the reduction of congestion. This should be part of the overall City and MPO communication and education program. In addition, enforcement of the vehicle code for both bicyclists and automobile drivers is necessary to promote a safe environment.

Bicycle Action 8: *Develop a Bicycle Education Program and Enforce Traffic Laws*

- Develop bicycle education program as part of City's overall communication and education program.
- Provide police resources and manpower to enforce bicycle and vehicular traffic laws.
- Use the City's Web site and local access television as information and education tools.

Opportunities and Constraints for Bicycle Use in Lawrence

There are many opportunities to increase the use of alternative modes of transportation, including bicycling:

- ***Demographics*** – The presence of the University of Kansas and its students, faculty and staff, in addition to the general population provide a large base of potential users.
- ***Climate*** – The climate in the Lawrence area is generally conducive to bicycling approximately nine months a year.
- ***Geography*** – The relatively small land area of the immediate Lawrence metropolitan region makes cycling a feasible transportation choice.
- ***Incomplete Existing Bicycle System*** – The City of Lawrence already has a series of trails and existing bicycle routes.

Some constraints to bicycling in the City of Lawrence include the following:

- ***Existing Bicycle System*** – While this system is an opportunity, it is also a constraint to cycling in many areas. Many routes do not provide a safe means across busy streets. Some routes do not have sufficient signage. Other routes have conflicts with multiple users or they may not provide complete linkage to desired destinations.
- ***Topography*** – The steep topography of several areas of the city creates obstacles to bicycling. These include the University of Kansas (especially the eastern edge of campus); 9th Street near Avalon Street; areas of western Lawrence (such as 15th Street west); and the area around the 6th and Iowa Streets intersection.
- ***Barriers*** – Barriers may be manmade or natural. Topographic constraints are considered a barrier. Other barriers include major arterials (e.g., 23rd Street/Clinton Parkway, Iowa Street, and 6th Street), railroad tracks, and the Kansas and Wakarusa rivers.

Lawrence/Douglas County Bicycle System

The establishment of bicycle performance measures will be of little utility unless coupled with concerted action by the City to fund the comprehensive network of bicycle facilities. The Lawrence-Douglas County Bicycle Plan shown in Figure 8.1 is the recommended T2030 Bicycle System Plan. This bicycle network has been designed to provide direct connections between neighborhoods and activity centers. It includes bike lanes along streets and highways and off-street bicycle/pedestrian paths.

Bicycle Action 9: *Implement the Bicycle Plan of the Lawrence-Douglas County Bicycle Plan*

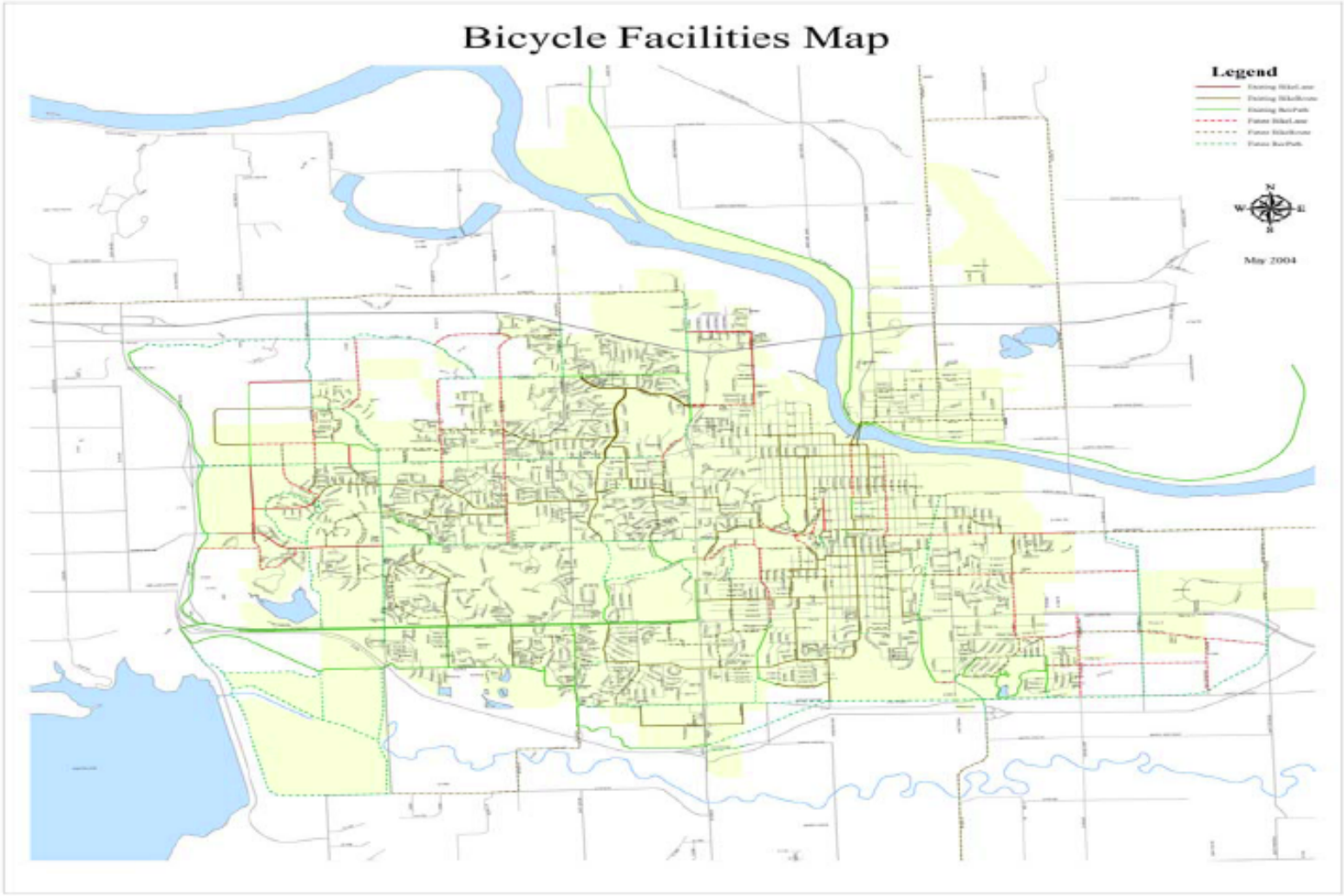
Improvements include new bicycle trail, paths, lanes, and routes. Signage recommendations should also be considered and implemented to increase awareness of the city's bicycle network.

Bicycle Action 10: *Adjust Short-Term Funding Allocations for Bicycle Facilities*

T2030's Financial Plan identifies $7.4 million to fund bicycle and pedestrian improvements. Consideration should be given to providing additional local funding for bicycle facilities. Project priorities in the region's Transportation Improvement Program should be adjusted annually to reflect the funding allocations of T2030. The Bicycle Advisory Committee should prioritize bicycle improvements and expenditures annually.

Figure 8.1
***T2030* Bicycle System Plan**

Source: Lawrence-Douglas County Bike Plan 2004



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Chapter 9: Pedestrian Plan

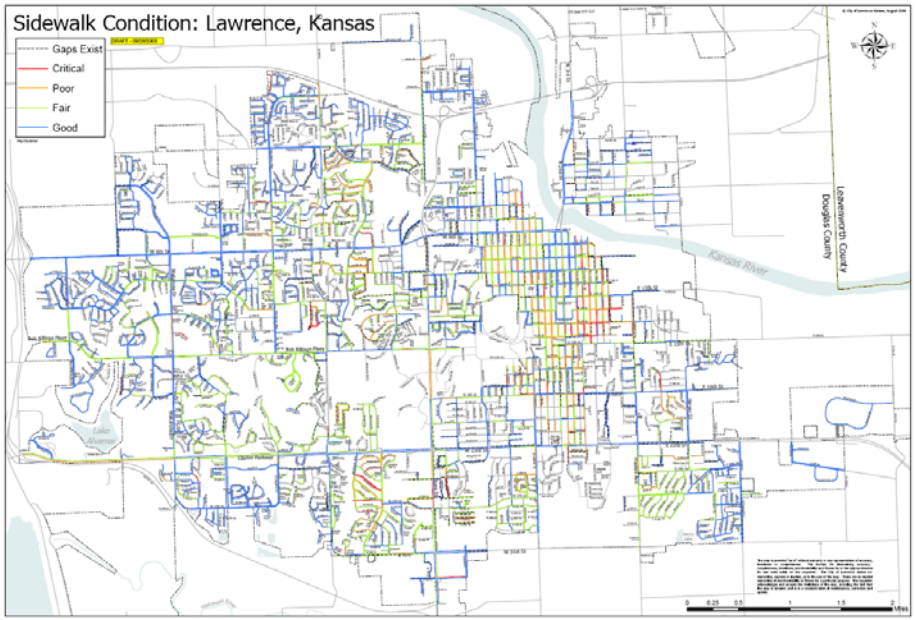
Walking is an essential part of our daily activities, whether it is trips to work, shop, school, or play. Often pedestrian facilities are overlooked or merely added onto street improvement projects with little or no regard to how they fit into the overall transportation system. However, to preserve and enhance the quality of life in the urbanized areas of the region, an overarching pedestrian facility plan for new and improved facilities, as well as consistent maintenance of the existing pedestrian system, is needed.

Development of a continuous, efficient pedestrian system in Lawrence, Eudora, or Baldwin City is dependent on many factors, most notably:

- The location of existing and anticipated activity areas and districts;
- programs to retrofit established sections of town with pedestrian-oriented activities;
- design standards and requirements for new development;
- desired pedestrian levels of service,
- funding for pedestrian improvements; and,
- Americans with Disabilities Act (ADA) requirements.

The first step in developing a plan to improve pedestrian facilities is to conduct an inventory of the existing system to show where sidewalks are in critical, poor, fair, or good condition and where gaps exist in the sidewalk system. In 2006, a Sidewalk Condition Map (Figure 9.1) was developed for the City of Lawrence to document the condition of the sidewalk system.

Figure 9.1
Sidewalk Condition Map

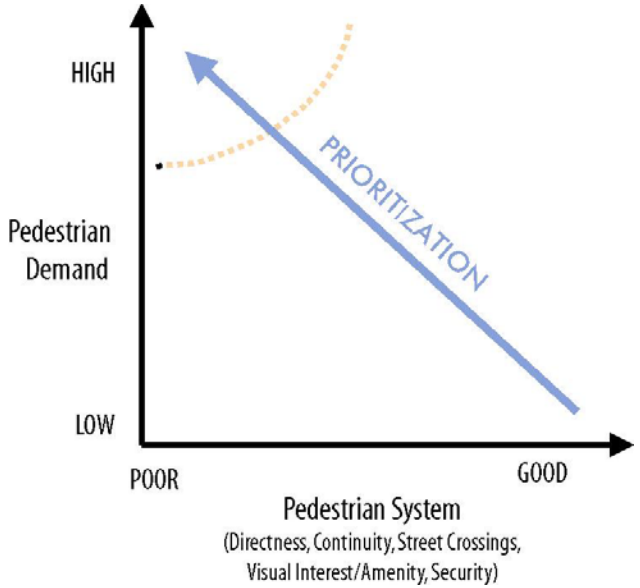


Pedestrian Levels of Service

In order to achieve an effective multimodal transportation system, there needs to be some way to assess capital and land development projects to determine whether these improvements enhance the pedestrian experience or impact pedestrian mobility.

Figure 9.2 shows the relationship between the pedestrian system's level of service and the potential demand for pedestrian travel. Areas with high potential use and low service levels should be regarded as the highest priorities for pedestrian improvements.

Figure 9.2
Pedestrian Priorities



As *Transportation 2030* was developed, it was recognized that a procedure for measuring pedestrian performance did not exist in the region. The procedure recommended for the cities in Douglas County includes the pedestrian system elements of:

- Directness;
- continuity;
- street crossings;
- visual interest and amenity; and,
- security.

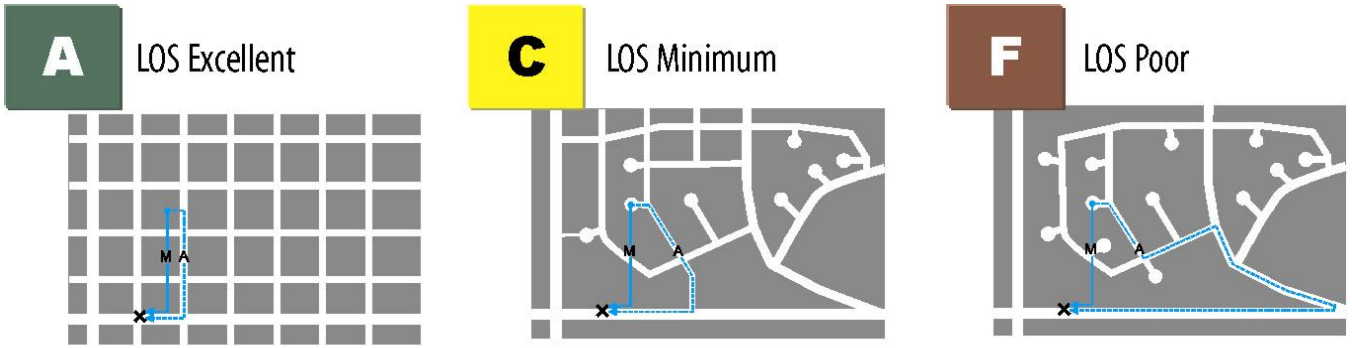
These Level of Service measurements are presented in the following sections.

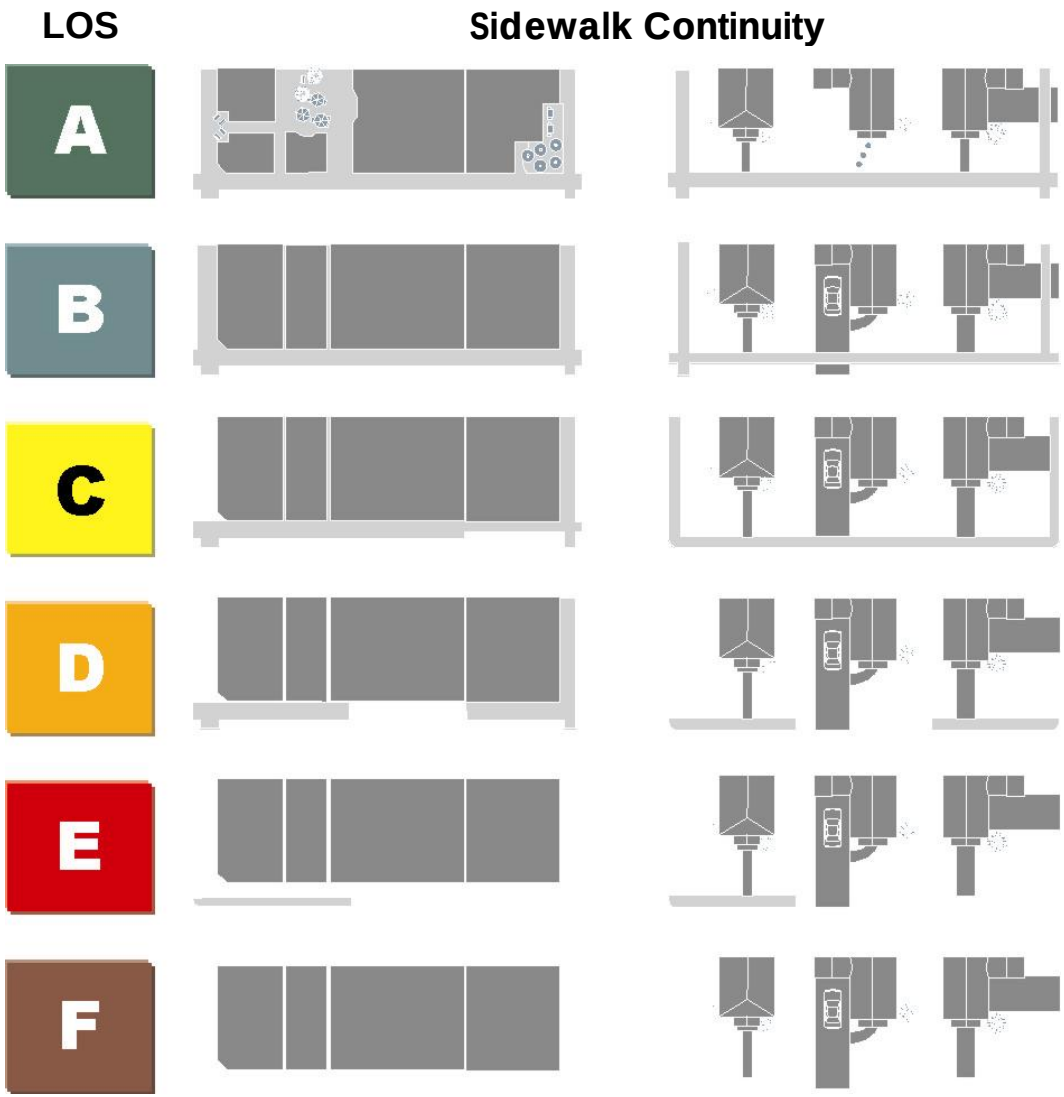
Directness

Distance is critical to the walking trip. As an example, research has closely correlated transit use to distance. No matter how many buses may run up and down an arterial, ridership will be low unless the pedestrian distance to and from activities and bus stops is minimized.

The measure of directness is simply how well a community provides direct pedestrian connections to destinations such as transit stops, schools, parks, commercial centers, or activity areas. The grid street pattern, in which a pedestrian can go north, south, east, or west to easily get to a destination, typifies the ideal system with a high level of service (e.g., LOS A – B). The common curvilinear residential subdivision, which may have cul-de-sacs that back up against a commercial center, transit stop, school, or park but do not have direct connections and instead require a circuitous route, will deter potential pedestrians. These areas have lower service levels (e.g., LOS D – F).

The directness level of service standard is based on a ratio of the actual distance from trip origin to trip destination divided by the minimum distance between those two points. Actual distance is further defined as either existing or proposed.





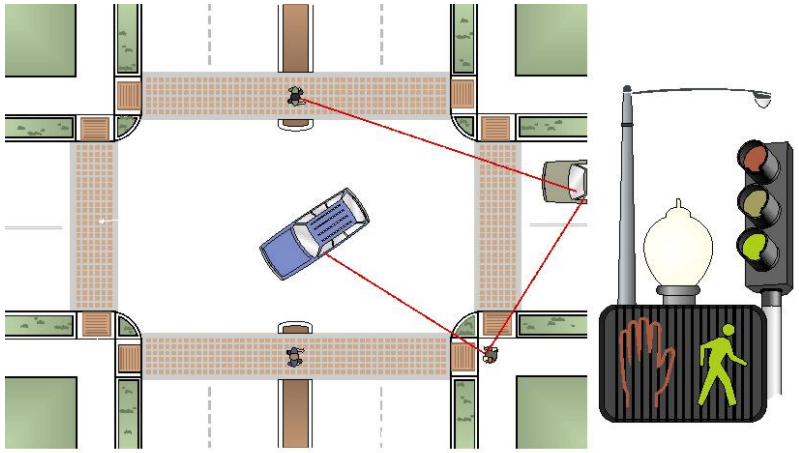
Continuity

Continuity is a measure of the completeness of the sidewalk system and avoidance of missing segments. In the highest Level of Service, LOS A, the pedestrian sidewalk appears as a single entity within a major activity area or public space. LOS B provides a quality, continuous stretch of pedestrian network that is physically separated from other modes. LOS C provides a continuous pedestrian network on both sides of each street, but they may vary in character and design. LOS D reflects areas where there may not be sidewalks on both sides of the street or there are breaches in the system. LOS E reflects areas where there are significant breaks in the pedestrian/sidewalk system. LOS F is a complete breakdown in the pedestrian flow, where each pedestrian selects a different route because no pedestrian network exists.

What we've heard…
In many areas, sidewalks are missing, need repair, or are not continuous.

Street Crossings

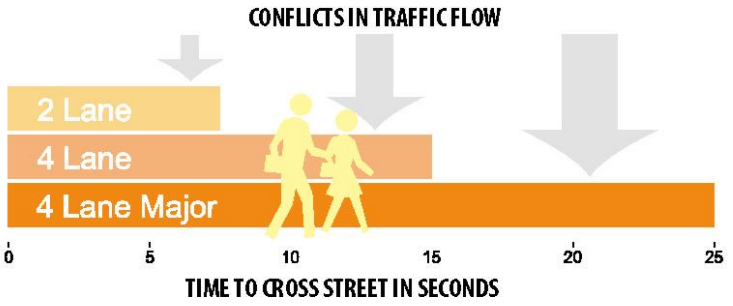
Street crossings may be the "Achilles Heel" of the pedestrian system. Because street crossings place the pedestrian in the middle of the street and exposed to potential conflicts with automobiles, the measurement of pedestrian level of service for a street crossing becomes very complex and the achievement of a high level of service requires significant investment. There are some key elements that need to be examined when measuring a street crossing's level of service:



Number of Lanes/Pedestrian Use and Walking Speed

The greater the number of traffic lanes to be crossed, the greater the exposure of pedestrians to vehicles. In addition, wider streets tend to carry higher volumes of traffic at higher speeds.

For an average pedestrian walking at 3 miles per hour (4.4 feet per second), it takes approximately 3 seconds to cross one 12' traffic lane. If bike lanes are present, an additional 2 seconds is needed. On-street parking on both sides of the street adds another 4 seconds. When determining the total time necessary for a walk signal phase, an additional 3 second factor of safety is recommended. In addition, older adults and mobility impaired pedestrians take longer to cross. Areas with moderate to high amounts of older or mobility impaired pedestrians should allow for increased walk times.



Crosswalks

Pedestrian crosswalks should be adequately marked and signed at non-signalized locations. In some situations, the sidewalks may be raised for added visibility.

What we've heard...
Capital improvement programs should include funding for improvements to the sidewalk system.

Signal Indication

Traffic signal heads should be easily visible to pedestrians and motorists. Is the length of the signal walk phase sufficient to cross the street safely?

Lighting Levels

Are the intersections and crosswalks well lit so that the pedestrian is visible at night on major streets where pedestrian volumes are moderate or high?

Pedestrian Signal Indication

Some traffic signals have a "WALK" phase automatically set for each direction of travel. Some signals have a pedestrian-actuated walk signal which provides a "WALK" phase only when pedestrians are present and have actuated a push-button or other device. The third type of signal installation does not have any pedestrian signal or specific walk phase. Pedestrians may only get a green light to cross the major street when an automobile on the side street activates the signal. Some communities are installing count down signal timing heads to tell the pedestrian how much time is left to complete the crossing before the "DON'T WALK" appears.

Median Refuge Areas

Painted medians offer minimal refuge. Raised medians of significant width and height provide increased safety for the crossing pedestrian.

Amenities

Amenities include such elements as signing and design features that indicate the presence of a pedestrian crossing.

Sight Distance

Sight distance measures the unobstructed view between the motorist and the pedestrian. Good sight distance is important for pedestrian safety.

Corner Ramps

Existing sidewalk ramps may be either ADA standard or non-standard. They are also differentiated as to whether they provide visual directness for the pedestrian and notify the driver which direction the pedestrian will cross. New sidewalk ramps should be ADA compliant.

Bulb-outs

Bulb-outs are extensions of the pedestrian walk network into the street. These bulb-outs generally extend to align with the width of the parking lane. They provide a number of benefits for the pedestrian as follows:

- They reduce the time to cross the street from corner to corner and therefore reduce the pedestrian's exposure to the automobile;
- They provide the pedestrian with a better line of sight to the vehicle stream and also provide improved line of sight from the driver to the pedestrian; and,
- Their physical presence reduces the driver's lateral clearance and helps regulate and slow traffic.

Right Turn on Red

One of the greatest increases in pedestrian accidents has been associated with right turns on red. Research has determined that an extremely high number of drivers do not stop at the crosswalk before making their turn and instead continue after looking to the left for approaching vehicles. Many jurisdictions have installed signs that do not permit right turns on red in high pedestrian use areas.

Visual Interest and Amenity

To promote pedestrian activity in an activity area such as Downtown Lawrence, the pedestrian system needs to be aesthetically appealing. The attractiveness of the pedestrian network can range from visually attractive, with enhancements like street lighting, fountains, and benches, to an experience of discomfort and intimidation associated with the absence of amenities. Areas to examine regarding visual interest and amenity include the following:

Scale

Does the urban environment reflect a pedestrian scale? Are the colors, materials, and form of the pedestrian facilities and features appropriate to the area and do they functionally unite the pedestrian network?

Attractiveness

Does the area include landscaping, vertical treatment, and sidewalk furnishings that improve the character and pedestrian scale of the urban environment?

Design

Does the area include site details, such as public art, that enhance the pedestrian scale of the street and become urban amenities?

Lighting

Does the lighting improve the safety, aesthetics, and character of the area?

Maintenance

Is the area well maintained and clean?

Adjacent Uses

Are the land uses along the pedestrian network attractive and inviting such that they encourage pedestrian activities or are they unappealing, such as non-maintained buildings and parking lots?

Security

Pedestrians require a sense of safety and security, both through visual line of sight with others and separation from vehicles. Street lighting is also important for walking at night.

Pedestrian Districts and Areas

Although these measures can be applied throughout Lawrence, the acceptable performance thresholds will vary by the type of activity area. As an example, a high pedestrian performance level will be of greater importance in the downtown than in outlying, lower density subdivisions with light vehicular and pedestrian traffic.

Figure 9.3 is a map illustrating existing pedestrian activity areas in the region corresponding to the descriptions below.

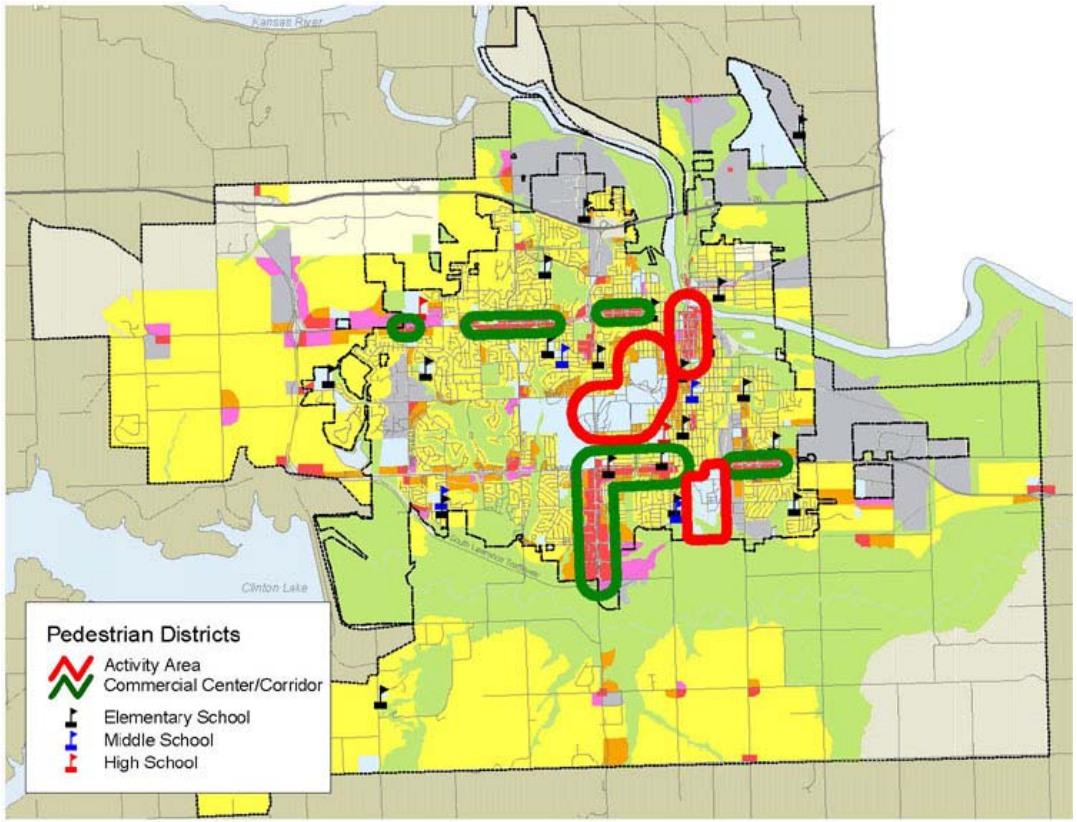
Figure 9.3
Pedestrian Priority Districts in Lawrence

The following activity areas to which differential performance standards would be applied are proposed:

Pedestrian Districts

The primary areas within the City of Lawrence that qualify as pedestrian districts include downtown, the University of Kansas, and Haskell Indian Nations University. These areas include locations that residents of Lawrence consider as places to go to, walk around, shop, eat, study, or conduct business.

Pedestrian standards are high in the downtown pedestrian district. In addition to the need for direct, continuous sidewalks where it is safe to cross the street, this area requires higher levels of visual interest and amenities to attract residents and visitors. Future pedestrian districts could be added to this designation where there are planned future mixed-use activity areas and districts.



Commercial Centers

These areas tend to be located along arterials and aggregated at various locations along the corridor, particularly where major arterials intersect. In the past, these locations have been more of the strip commercial and "L" shaped neighborhood shopping center style developments, which provide relatively poor pedestrian environments. Future goals include improving the directness and safety of the pedestrian network to, from, and within these locations.

Schools

Whereas it is not necessarily critical for routes to schools to be picturesque and visually captivating, there are basic pedestrian needs for the student, including a safe and secure continuous sidewalk with safe street crossings and direct connections to neighborhoods.

Transit Corridors

Both ends of all transit trips are typically pedestrian trips. The most critical elements for pedestrians in transit corridors are direct and safe connections and safe, paved, lighted, and possibly sheltered bus stops.

Other Areas

Although all other areas within the city should have safe, secure, and reasonably direct pedestrian connections, the pedestrian trip-making characteristics of these areas are not as critical as the four areas mentioned above.

Recommended Pedestrian System Plan

The following actions outline the efforts needed to further develop pedestrian facilities for Lawrence, Lecompton, Eudora, and Baldwin City.

Actions by the Region's Cities

Each city in Douglas County should consider formally adopting pedestrian level of service standards for the categories of areas in which pedestrian use is most prevalent or desired. Table 9.1 contains examples of what these standards could be. They were prepared based on input from the public and the MPO's advisory committees, but can be adjusted based on changing conditions and community priorities. The standards are similar to letter grades in which "A" is excellent and "F" represents a failing grade.

The level of service standards can be combined with a pedestrian facility inventory and a list of needs to prioritize improvements for funding through each City's Capital Improvement Program. Currently there are no local dedicated funding programs for pedestrian facilities. The cities should consider setting aside an adequate portion of their transportation funding to address these improvements. Increased emphasis on alternative transportation modes as represented in the *T2030* Financial Plan is a direct result of the public input process and the encouragement of the U.S. Department of Transportation.

Table 9.1
Suggested Level of Service Standards in Pedestrian Use Areas

	Directness	Continuity	Street Crossings	Visual Interest and Amenity	Security
Pedestrian Districts	A	A	A	A	A
Schools	B	B	B	C	A
Commercial Centers	B	B	C	B	B
Transit Corridors	B	C	C	C	B
Other Areas	C	C	C	C	B

What we've heard...
The condition of sidewalks in Lawrence is particularly important for persons in wheelchairs.

Pedestrian Action 1: *Develop Pedestrian Level of Service Standards*

Develop pedestrian level of service standards for each pedestrian use area. In an ongoing process, each of the region's cities should create and periodically update a Pedestrian Priority Areas Map.

Pedestrian Action 2: *Inventory Pedestrian Facilities, Identify Needs, and Prioritize a Plan for Improvements*

Cities should inventory existing pedestrian facilities. This information should be used to identify specific pedestrian improvements and develop a prioritized plan for implementation. The process should seek input from the public on specific locations in need of new or reconstructed pedestrian facilities.

Pedestrian Action 3: *Notify Property Owners of Responsibility to Repair Sidewalks*

Notify property owners of their responsibility to maintain existing sidewalks and provide repairs when their condition deteriorates to a point where pedestrian safety or convenience is negatively impacted.

Pedestrian Action 4: *Fund Pedestrian Improvements*

T2030's Financial Plan earmarks $7.4 million for bicycle and pedestrian improvements. The region's Transportation Improvement Program should be adjusted annually to reflect these allocations. Cities should consider an annual funding set-aside for improvements to the system of pedestrian facilities.

Public and Private Development Proposals

In order to create multi-modal opportunities for Lawrence, Eudora, and Baldwin City, two specific actions are required. The more difficult of the two is retrofitting and fixing the existing environment where pedestrian access was not orignally anticipated but is now needed. The easier opportunity, is to establish standards and guidelines to accommodate the pedestrian in future private and public developments.

From the standpoint of public development, particularly in the construction of new multi-modal corridors and the reconstruction of existing roads, pedestrian amenities and design features should be considered and embraced in all new projects. These may include safe street crossings with pedestrian-actuated walk signals, crosswalk enhancements, median refuge islands, bulb-outs, and other design features. In the built environment, design considerations should be flexible to minimize impacts to adjacent uses.

Pedestrian standards need to be established for new private developments. Both applicants and City staff should review the proposed development against standards and checklists to assure that future pedestrians that desire to travel to, from, through, and within the development can do so.

These standards and guidelines do not need to be onerous, but they do need to be realistic. Requirements should include recognition of on- and off-site destinations, transit stops, and how the plan can accommodate the pedestrian to and from those locations. Particularly important destinations would include schools, libraries, downtown, recreation centers, parks, citywide trails, and activity areas.

Pedestrian Action 5: *Street Design Standards*

Develop minimum pedestrian standards and guidelines for all new roadways and reconstruction of existing roadways. These standards shall include street crossing treatments, sidewalk design, and landscaping.

Pedestrian Action 6: *Pedestrian Standards for New Developments*

Develop public and private development standards for providing pedestrian facilities that connect the development to key destinations and activity centers. Each City's Development Review process should be amended to include requirements for new developments in this regard.

Sidewalk Surveys

One method that each City can use to obtain information regarding the condition of sidewalks and the maintenance and improvement needs of the pedestrian system is through the use of Sidewalk Evaluation Surveys. The City of Lawrence recently inventoried all public sidewalks and evaluated sidewalk connectivity, type, and condition. The surveys discovered that a number of sections of sidewalks required attention throughout Lawrence.

Sidewalk Surveys can be used to generate important information for city planners and public works officials. They could be used to prioritize funding requests for non-motorized improvements. These surveys can also motivate local citizens to have a stake in their neighborhoods and take proactive measures with or without a city's guidance.

Coordination of Pedestrian Planning in Lawrence

Currently, there is not a single-point clearinghouse for pedestrian planning, design, and engineering in the City of Lawrence. Instead, several departments address pedestrian mobility and sidewalks with varying perspectives as part of other job assignments. Often either these conflict with the objectives for pedestrian design or specific job descriptions put pedestrian planning, design, and engineering at a lower priority than other tasks.

The City Traffic Engineer is generally responsible for overseeing pedestrian planning and design in the city. In addition, a pedestrian advisory committee has been formed to provide pedestrian-related input and recommendations. The goal was to establish an organizational responsibility to coordinate all pedestrian planning activities, to oversee all pedestrian activities within the City, to address pedestrian improvement needs, to seek out state and federal grants, and to prioritize pedestrian improvements.

Public education and outreach are key organization principles to complete the pedestrian system planning process. These include ongoing education on air quality and vehicle laws as well as the health benefits of pedestrian transportation and its contribution to the reduction of congestion. This should be part of the overall communication and education program. In addition, enforcement of the vehicle code for both the pedestrian and automobile driver is necessary to promote a safe environment.

Pedestrian Action 7: *Coordinate Pedestrian Planning Issues*

Refine the organizational focus of the pedestrian advisory committee to coordinate pedestrian planning activities and to participate in all pedestrian activities within the city.

Pedestrian Action 8: *Pedestrian Education and Enforcement*

Develop a pedestrian education program as part of City's overall communication and education program. Provide police resources and manpower to enforce pedestrian and vehicular traffic laws.

Chapter 10: Operation and Management Strategies

Introduction

The intent of operation and management strategies is to improve the efficiency and effectiveness of the transportation system through lower cost operational and management improvements and programs. Two such examples are Intelligent Transportation Systems (ITS) and congestion management. ITS make use of technology in the management of the transportation system while congestion management focuses on reducing congestion through strategies aimed at lowering single occupant vehicle use, promoting alternative modes of travel, and better managing existing transportation facilities and services. These two strategies and their application to the Lawrence/Douglas County MPO are discussed in the following sections.

Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) refers to the application of technologies and communications to manage the existing transportation system more effectively, improve its efficiency, and to make the system more user-friendly.

Under an ITS Program, advanced computing, information systems, and communications technology are applied to the control and management of transportation facilities and services to help achieve (1) a safer transportation system, (2) better informed travelers, (3) improved traffic control systems, and (4) increased efficiency of transportation facilities and services, including the transit system.

ITS includes detection systems and cameras for monitoring traffic conditions on roadways, dynamic message signs to provide real time travel information, and vehicle location systems to track transit and emergency services vehicles. The

benefits of ITS include reduced congestion, fewer transportation-related deaths and injuries, and reduced energy consumption and pollution.

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) require the development of a regional ITS architecture for a MPO region to be eligible for federal funding of any ITS projects.

Currently the Lawrence/Douglas County MPO is in the process of developing a regional ITS architecture to ensure that future ITS applications are developed with protocols and standards that allow for complete system integration. A regional architecture ensures that all agencies with an interest in the operation of the transportation system, such as emergency responders, law enforcement, transit agencies, and local and regional transportation agencies, all have the ability to share resources and information to better manage its overall daily operation.

During the development of the draft ITS Architecture, stakeholders in the Lawrence-Douglas County Region identified several high priority needs including:

- Improving traffic signal coordination;
- Having the ability to bring CCTV camera feeds from all agencies back to traffic operations centers and the Douglas County 911 Dispatch Center;
- Having the ability to collect weather-related road condition information;
- Being able to provide system users with automated notification of road closures due to incidents or maintenance to emergency management, public safety, and transit; and
- Being able to track transit vehicles and provide real time bus information to transit users.

As the cost and effort required to expand existing or construct new transportation facilities increases, the use of ITS technologies will become an increasingly important component of the transportation system within Lawrence and Douglas County. ITS provides a means of better managing traffic flows and incidents on heavily traveled roadways today and in the future. ITS improvements, such as signal coordination, traffic monitoring, and message signs, are but a few of the ITS applications that can improve traffic operations within the MPO area by the year

2030. The ITS Regional Architecture Plan for the Lawrence/Douglas County MPO area is scheduled to be completed later in 2008.

Congestion Management

Introduction

The intent of congestion management is to improve the effectiveness of the transportation system through lower cost efficiency-based improvements and programs. Congestion management focuses on reducing single occupant vehicle use, promoting alternative modes of travel, and on making operational improvements to better manage existing resources.

The benefits of congestion management include being able to use the existing transportation system as efficiently as possible, thereby making the most efficient use of limited federal, state and local funds available to expand the system. They also include being able to use each travel mode for its intended purpose and to the greater satisfaction of it users, thereby increasing overall satisfaction with the transportation system.

SAFETEA-LU Elements of a Congestion Management Process

The federal government requires congestion management process (CMP) in urbanized areas with populations over 200,000 persons. Although the Lawrence/Douglas County MPO is not required to develop and implement a full congestion management process, Lawrence and the surrounding area can still benefit from a number of congestion management strategies that can provide logical and sound techniques for managing congestion.

Federal regulations (23 CFR Part 500 Sec.109) state that a congestion management system must include:

1. Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of congestion, identify and

evaluate alternative actions, provide information supporting the implementation of actions, and evaluate the efficiency and effectiveness of implemented actions;

2. Definitions of the parameters for measuring the extent of congestion and for supporting the evaluation of the effectiveness of congestion reduction strategies for the movement of people and goods;

3. Establishment of a program for data collection and system performance monitoring to define the extent and duration of congestion, to help determine the causes of congestion, and to evaluate the efficiency and effectiveness of implemented actions;

4. Identification and evaluation of the anticipated performance and expected benefits of appropriate traditional and nontraditional congestion management strategies;

5. Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy; and

6. Implementation of a process for periodic assessment of the efficiency and effectiveness of implemented strategies, in terms of the area's established performance measures.

Change from System to Process

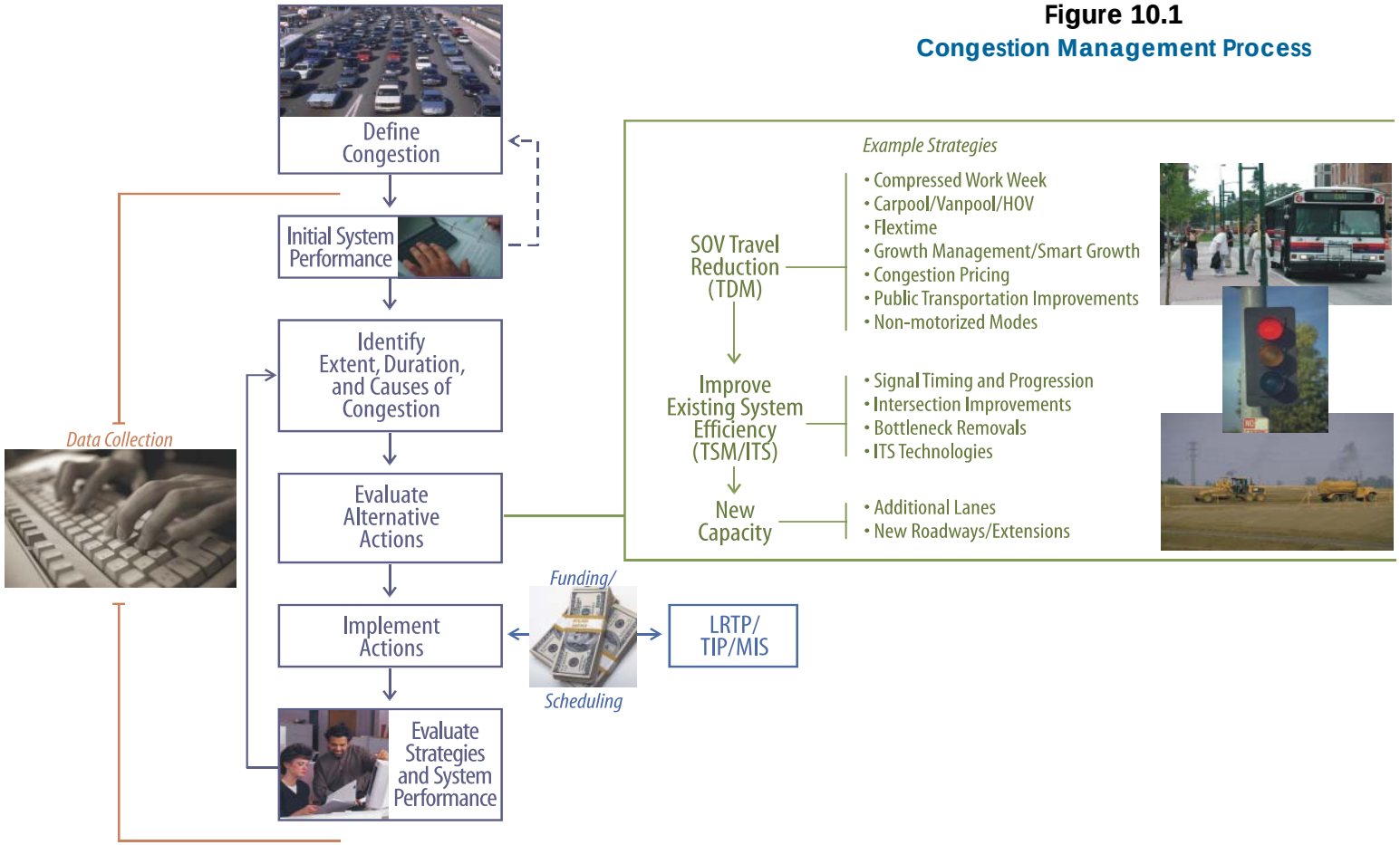
The change from TEA-21 to the SAFETEA-LU transportation funding bill brought with it a name change for the term Congestion Management System. Beginning in 2005, the "umbrella" for congestion management activities is now known as the Congestion Management *Process.* While there will be no real change in the activities that are identified as congestion management, the name change does signify a change in thinking. The goal of the name change is to get local MPOs and other units of government to think about including congestion management techniques while planning and implementing a new transportation project. Instead of congestion management being a stand-alone improvement or an afterthought after completion of the transportation system, it is an integral part of

the planning process. Thus, the idea is for congestion management techniques to be considered from the very start of every transportation improvement.

Congestion Management Process

A process for developing, implementing, and monitoring congestion management strategies is presented in Figure 10.1.

Figure 10.1
Congestion Management Process



Congestion Management Strategies – What's Possible?

There are numerous congestion management strategies being employed in urban areas across the country. These should be considered for implementation in Lawrence, although many may be beyond the City's level of need or interest. Congestion Management strategies fall into two basic categories: Travel Demand Management (TDM) and Transportation System Management (TSM).

Travel Demand Management

TDM promotes programs that are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in vehicles, shifting travel to non-automobile modes, influencing the time of or need to travel, and so forth. TDM programs can be voluntary, incentive-based, or mandatory, depending on the level of community desire and government oversight. At a minimum, all TDM programs should include educational and public outreach components.

Potential TDM strategies include the following:

- ***Telecommuting:*** part-time or full time situation in which employees work at home or another location outside the central office on one or more days a week.
- ***Carpooling:*** an arrangement in which two or more people share the use and cost of privately owned vehicles while traveling together to and from prearranged destinations.
- ***Vanpooling:*** provides transportation to a group of individuals traveling directly between their homes, which tend to be in close proximity, and their regular workplaces, which also tend to be in close proximity.
- ***School pool programs:*** a service that matches students from the same school who live in close proximity to use a single vehicle to commute.
- ***Ridematching software:*** software that archives commuter profiles and matches up those who live and work in similar locations and desiring to share the commute.

- ***Park and Ride Lots:*** parking facilitates that allow the transfer from low occupancy vehicles to carpools, vanpools, or transit services.
- ***Flex Time:*** alternative work schedules in which employees choose their own work schedule within set standards in order to avoid congested traffic conditions.
- ***Staggered Work Hours:*** alternative work schedules in which different groups of employees arrive and depart at different times to offset the congestion impacts of simultaneous trip-making.
- ***Compressed Work Week:*** a program where an employee works a full-time work week in four (or fewer) days, thus reducing the number of weekly trips to work.
- ***Paid Parking and Carpool Incentives:*** preferential parking locations, discounted parking, and other monetary incentives provided by employers to encourage drivers to participate in ridesharing.
- ***Congestion Pricing:*** market-based pricing strategies designed to encourage a shift of peak period trips to off-peak periods or to route traffic away from congested facilities during the peak demand periods. Congestion pricing can also encourage the use of transit or high-occupancy vehicles.
- ***Bicycling:*** a low-cost alternative that results in healthier, more productive employees and reduced vehicular travel, congestion, parking demand, and cost.
- ***Parking Management:*** strategies that utilize a variety of factors to balance the availability of parking with the availability of modal alternatives. Residential and commercial parking permits, parking pricing, shared use parking, time restrictions, and other strategies are included in parking management.
- ***Public Transit Bus Pass Programs:*** community or business-based transit passes that can include promotional and marketing activities oriented toward encouraging commuters to use bus and rail alternatives. Activities include bus route maps, brochures, posters, how-to classes, and free-ride days.

- ***Emergency and guaranteed ride home programs:*** a program where transit users are provided rides home in a daytime emergency or guaranteed at night after regular transit service has ceased.
- ***Electronic and smartcard collection systems***: a fare collection system that uses fare cards with magnetic strips or smartcard technology that allow for electronic payment and the expedited boarding of transit patrons.
- ***Advanced marketing and alternate routes for special events or construction***: using the media to inform travelers of alternate routings for special events or long-term construction projects.
- ***Transportation Management Organization/Coordinator:*** a public or private organization or professional staff that provides information and programs to businesses and individuals to facilitate the increased alternative transportation mode use.

Transportation System Management

TSM is the process of modifying or optimizing the existing transportation system through low-cost means in order to increase system efficiency. These strategies consist of lower cost actions that increase the carrying capacity of existing facilities.

Potential TSM strategies include the following:

- ***Traffic Synchronization:*** the process of coordinating a group of signals to provide efficient vehicle progression along a corridor.
- ***Traffic signal priority systems***: a system of interconnected traffic signals that give priority to certain traffic movements at certain times of day.
- ***Traffic signal priority for buses:*** an interconnected system of traffic signals along a route that allow for buses to receive a green light or longer green time at an intersection. The signal priority contributes to the overall efficiency of the transit system.
- ***Dynamic traffic signal timing systems***: a system of interconnected traffic signals where signal timings are changed based on up to date information on traffic volumes.

- ***Reversible and changeable lanes:*** lanes whose direction can change with electronic signs based on the commuting pattern or a special event.
- ***Dynamic message signs***: message signs that can be updated from a command center based on up to date travel information.
- ***Intersection Improvements:*** strategies that include changes in traffic control, signal phasing, pedestrian crossings, safety improvements, and flatwork that adds left and right turn lanes and other traffic treatments.
- ***Geometric Improvements:*** spot roadway and lane improvements that target specific bottlenecks along a corridor.
- ***Peak Period Parking Restrictions:*** locations along high volume corridors where parking is restricted during peak hours and in the peak travel direction in order to create additional travel lanes.
- ***Access Management:*** programs that manage a proliferation of poorly located and closely spaced driveways, intersections, and traffic signals, which can severely impact a roadway's ability to move traffic and provide convenient access. Access management will protect safety, capacity, and traffic flow on the transportation network while providing access to adjacent property as appropriate and necessary.
- ***Emergency Response:*** systems using global positioning system (GPS) information that allows accidents and incidents to be located and facilitated quickly to minimize travel delay.
- ***Regional Multimodal Traveler Information:*** direct communication that is provided to travelers over the Internet, at kiosks, on message signs, or via radio and television.
- ***Citywide Fiber Optics Network:*** a network of fiber optics that connects signals, hardware, changeable message signs, and other devices to a computerized system to increase real-time information exchange and updates to signal timing patterns.
- ***Dynamic Message Signs:*** a system of interconnected signs that can be updated as information is received in real time to inform drivers of congestion trouble spots in the system.

Operation and Management Strategies – What's Right for Lawrence?

Implementing congestion management and ITS strategies must focus on what's right for Lawrence, how much budget is available, and how these strategies might fit with other plan actions.

Although there are a number of travel demand, transportation system management and intelligent transportation system improvements and strategies that would improve mobility in Lawrence, some are more important than others today, and some might be more appropriate in the future. As an example, periodic retiming of the City's signal system to improve traffic flow and progression would be important today, whereas major upgrades to the signal timing software and hardware, such as fiber optic interconnects, would be more appropriate for future consideration and implementation.

As can be seen in Table 10.1, each of the TDM and TSM strategies noted above have been evaluated as to what might be appropriate for Lawrence today and in the future. The strategies have been ranked low, medium, and high. As the MPO develops and updates the Transportation Improvement Program, ITS and congestion management strategies should be considered along with projects that add to the capacity of a roadway.

Table 10.1
Operation & Management Strategies - What's Right for Lawrence?
Travel Demand Management

Strategy	Now		Future	
	Yes	No	Yes	No
TDM: Travel Demand Management				
Telecommuting	H		H	
Carpooling	H		H	
Vanpooling	M		H	
School Pool	L		M	
Ridematching Software	L		M	
Park and Ride Lots	M		H	
Flex Time/Staggered Work Hours/Compressed Work Week	M		H	
Paid Parking and Carpool Incentives	M		M	
Congestion Pricing		✓		✓
Bicycling	H		H	
Parking Management	M		H	
Public Transit Bus Pass Programs	M		M	
Emergency/Guaranteed Ride Home	L		M	
Electronic Collection System	L		M	
Route Notification for Special Events or Construction	M		M	
Transportation Management Organization/Coordinator	L		L	

Table 10.1 (continued)
Operation & Management Strategies - What's Right for Lawrence?
Transportation System Management

Strategy	Now		Future	
	Yes	No	Yes	No
TSM: Transportation System Management				
Traffic Synchronization	H		H	
Traffic Signal Priority	L		M	
Traffic Signal Priority for Buses	L		M	
Dynamic Traffic Signal Timing	L		L	
Reversible/Changeable Lanes		✓		✓
Dynamic Message Signs		✓	L	
Intersection Improvements	H		H	
Geometric Improvements	H		H	
Peak Period Parking Restrictions		✓	L	
Access Management	H		H	
Emergency Response	L		M	
Regional Multimodal Traveler Information	L		M	
Citywide Fiber Optic Network	L		H	

Recommended Actions

The following actions outline the efforts needed to further employ ITS and congestion management strategies within the Lawrence/Douglas County area.

Operation and Management Action 1: Implement ITS Deployment Plan Recommendations

Work with the Lawrence/Douglas County member agencies and other planning partners to implement the recommendations from the ITS Deployment Plan that is under development as part of the Regional ITS Architecture.

Operation and Management Action 2: Consider Congestion Management Strategies

Work with the Lawrence/Douglas County MPO member agencies and other planning partners to integrate the consideration of demand and systems based management activities into the planning, programming and project development processes.

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Chapter 11: Intermodal, Freight, and Other Transportation

The economic success of a region depends to a large degree on its connections to the rest of the world and its ability to facilitate the movement of people and goods across and within its boundaries. Increased competition in today's global economy rewards those regions that actively plan for and pursue seamless transportation systems, which depend on efficient connections between all modes of travel. Transportation facilities and service levels are important elements that companies consider when locating to a new area because of the cost savings and increased economic competitiveness these regions provide.

Set between the Topeka and Kansas City metropolitan areas, Lawrence and Douglas County fulfill a role as an important link in the regional, statewide, and national transportation system. Beyond the basic travel needs of Lawrence and Douglas County residents, there are additional travel considerations for moving freight on rail and truck and for personal inter-regional travel via bus, rail, and plane. The sections that follow outline the existing elements of the intermodal system, freight transportation, and passenger movement, as well as the actions required to further develop these.

Intermodal Facilities

Intermodal Facilities refer to facilities where people or goods transfer between modes (e.g., combined commuter rail and bus stations, rail/truck freight transfer facilities, etc.). Intermodalism is the concept that binds the modes together so that people and freight movements can be made in the most efficient manner possible.

Although none currently exist in the local area, intermodal freight facilities in Kansas City and Topeka provide Lawrence with connections to the outside world. At the local level, intermodal planning activities and ongoing improvements that

address freight and other needs will help to maintain the region's economy and competitiveness.

Air, rail, truck, and inter-city bus industries are essential components in the local economy and play a fundamental role in the Lawrence/Douglas County transportation system. *T2030's* individual modal system plans represent a comprehensive effort to build a multimodal transportation system. Additional efforts are needed, however, to link these individual modes in one connected and seamless system that further supports the efficient movements of people and goods and helps the region maintain its economic competitiveness and attractiveness of the region. Since many of these planning elements involve private sector entities, it is imperative to involve them in the planning process.

Freight Movement

Coordination with private freight transportation providers, either through a task force or some other means, can provide the MPO with a wealth of information if done properly. Private companies are often hesitant to provide government entities with proprietary information. However, through their involvement they may see the virtue in sharing data, especially if it results in improvements to the transportation system that increases freight movement potential.

Freight providers tend to be very knowledgeable about bottlenecks in the systems that hinder truck and other vehicle movements. In addition, they may be aware of signal timing, signage, or geometric (e.g., turning radii) deficiencies in the system. With their involvement, the MPO can develop a detailed list of improvement needs and incorporate them into the transportation improvement program (TIP) for implementation. While long-range freight planning is necessary, short-term results are also important in engaging and maintaining interest from freight providers.

Freight movements invariably impact land uses, especially along the corridors utilized by truck and rail traffic. The level of impact is often intensified when sensitive receptors, such as neighborhoods, schools, parks, and so forth, occur along these high traffic routes. Proper long range planning and coordination with

appropriate land use planners can serve to alleviate these impacts. This may include periodic designation and update of truck routes, implementation of additional limited-access roadway facilities, and other techniques.

What we've heard…
There is a concern for potential increase in truck traffic with the completion of the Gardner Intermodal Facility.

Gardner Intermodal Facility

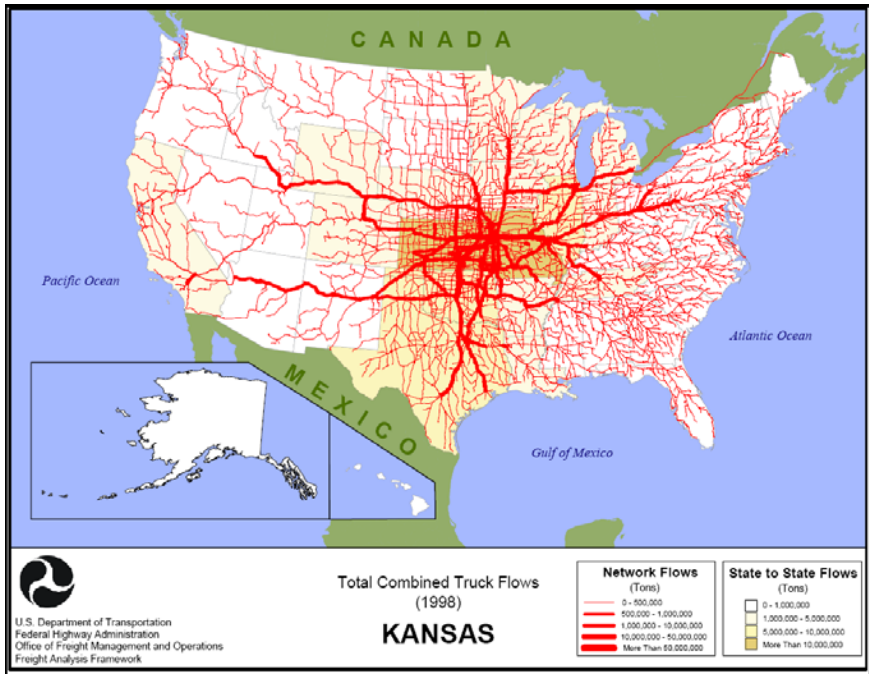
The BNSF Railroad is developing an intermodal facility near the City of Gardner in Johnson County, east of the Lawrence-Douglas County planning area. The facility will provide for the transfer of freight between rail and trucks. The facility is set to open in 2010 and will initially result in 1000-2000 trucks in and out per day. Truck traffic is estimated to grow to 10,000 or more vehicles per day as the facility expands. There is also the potential for growth in warehouse facilities and other freight related development in the Gardner area.

The Gardner Intermodal Facility creates the potential for increased truck traffic traveling through the Lawrence-Douglas County area. Routes that may experience an increase in trucks include US-56 through Baldwin City, US-59 from US-56 through Lawrence, and K-10 through Eudora and Lawrence.

Statewide Freight Plan

The Kansas Department of Transportation (KDOT) is initiating the development of the "Kansas Statewide Freight Plan" to address the impacts of the growth in freight traffic by motor-carriers, rail, air-cargo, and inland waterways.

Kansas is seen as a prime area for the development of freight distribution centers due to its location on the interstate highway and major rail systems and as the northeast part of the state is located within a 24-hour drive of 70% of the continental United States.



Growth in freight traffic will impact the traveling public as more trucks will be using highways, city streets, and county roads adding to congestion as well as more and longer trains leading to greater delays at rail/roadway crossings.

The Lawrence/Douglas County MPO should take an active role in the development of the Statewide Freight Plan; working closely with KDOT to determine the impacts on the region.

People Movement

Passenger Rail

Limited passenger service exists at the Lawrence Santa Fe depot through Amtrak, but this service is not conducive to commuter travel. The long distance Amtrak Train serving Kansas, the Southwest Chief, operates between Los Angeles and Chicago with daily service in each direction.

Boarding/deboarding takes place at six points in the state: Lawrence, Topeka, Newton, Hutchinson, Dodge City, and Garden City. Service in Lawrence is provided daily at 12:32 a.m. for the westbound train and 5:49 a.m. for the eastbound train. The Amtrak station is located at 413 E. 7th Street, near downtown.

The most recent Kansas Rail Plan notes that 3,347 riders boarded Amtrak's Southwest Chief in Lawrence during Fiscal Year 2005; an increase of 348 riders over the previous year. This represents about 10% of the total ridership in Kansas.

Intercity Bus Service

Greyhound bus provides service Monday through Saturday with a stop at the STOP 2 SHOP, 2447 W 6th Street. The Greyhound website notes that the Lawrence hours of operation are subject to change.

Regional Commuter Service

During the stakeholder and public participation process, the community expressed a strong desire for transportation alternatives to serve commuters traveling to and from the Topeka and Kansas City metropolitan areas. The Johnson County Connector bus service that provides a route between the KU campus and Johnson County is the first step in providing this service. Intercity bus service along the Kansas Turnpike (I-70) to the east and west is a logical next step. The ultimate option would be a commuter rail system that serves the Topeka, Lawrence, and Kansas City areas.

Intermodal Passenger/Commuter Hub

There is a desire in the community for the development of a passenger/commuter intermodal hub to provide connections between rail, intercity bus, and local bus services.

Aviation

The Lawrence airport will be expanding to meet an ever growing demand. With this expansion, efforts must be made to maintain and improve the surrounding roadway systems and promote airport friendly development in the outlying areas.

The Airport Master Plan outlines the orderly expansion of existing facilities, and the replacement of older facilities to meet needs over the next 20 years. While the plans are phased through the short (0-5 year), intermediate (6-10 year), and long term (11-20 year) planning horizons, the plans are demand based. Facilities will not be constructed until they are needed for capacity or to replace obsolete facilities. The master plan has identified $16 million in capital needs over the 20-year planning period. To date, about 33% of this work has already been constructed.

Recommended Actions

The following actions outline the efforts needed to further develop the intermodal system for the Lawrence/Douglas County area.

Intermodal Action 1: *Coordinate Freight Issues*

The MPO should work with freight transportation companies operating in the region to identify specific deficiencies in the transportation system that hinder freight movements and to incorporate design elements for large trucks in roadway planning and design. In addition, coordination with KDOT on freight issues could provide increased information regarding freight flows and improvement needs. It may be desirable to establish a freight task force for this purpose.

Intermodal Action 2: *Participate in the Development of the Statewide Freight Plan*

The Lawrence/Douglas County MPO should be an active partner with the Kansas Department of Transportation in the development of the Statewide Freight Plan.

Intermodal Action 3: *Consider Adjacent Land Use*

To the extent possible, heavy truck traffic should be separated from light vehicle traffic and sensitive land uses (e.g., neighborhoods, schools, parks, etc.). Industrial land uses should be isolated from residential and commercial areas. Land use planning activities for areas near the airport should carefully consider noise and other impacts so that only compatible uses occur.

Intermodal Action 4: *Consider Needs of Trucks in Roadway Design and Access Management*

Due to their large size, trucks and buses have special needs for moving through the transportation system. Roadway and access requirements for these vehicles should be considered in the design of intersections and interchanges. Roads in and around industrial areas should be designed specifically for the movement of large trucks.

Intermodal Action 5: *Designate Truck Routes*

Truck routes provide freight haulers with a network of the most efficient and least impacting locations for traveling through Lawrence. Designated truck routes can have a positive influence on traffic safety if properly planned, implemented, and enforced. Hazardous materials traffic should be carefully considered in this analysis and routed accordingly. These should be updated periodically, especially as land use changes and roadway improvements occur.

Intermodal Action 6: *Pursue Commuter Rail*

The Lawrence/Douglas County MPO should establish partnerships with the MPOs in Topeka and Kansas City, KDOT, and other entities and participate in any dialogue concerning commuter rail feasibility and options.

Intermodal Action 7: *Establish a Multimodal Passenger Hub*

The identification of a strategic location where multiple modes can come together is an important step in establishing intermodal passenger connections to other regions. Ideally, this facility will be located in close proximity to downtown Lawrence and the airport. Close coordination with the Lawrence Transit System, Greyhound, Amtrak, other jurisdictions, and freight railroad companies is necessary to make the hub a success.

Intermodal Action: 8: *Implement the Recommendations of the Airport Master Plan*

Implement the improvements recommended in the Airport Master Plan including:

- Extension of Runway 15/33 by 400 feet,
- Extension of Taxiway A by 400 feet,
- Construction of additional aircraft hangars,
- Expanded vehicle parking,
- Lighting improvements, and
- Sanitary sewer improvements.

An additional consideration of airport improvements is the protection of the airport's approaches and air space from encroachment through height and land use restrictions.

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Chapter 12: Safety Plan

Introduction

Roadway safety is a serious, national public health issue. Annually, there are over 40,000 fatalities and almost 3 million injuries on our nation's roads. The Lawrence/Douglas County MPO recognizes the importance of traffic safety and has established safety as a primary goal in the development of *T2030.*

Improving safety for the traveling public depends on the "4-Es": engineering, enforcement, emergency services, and education.

- Engineering involves the built roadway and transportation infrastructure and encapsulates design standards, warrants, materials and construction practices, and signage, striping and signalization policies.
- Enforcement is aimed at modifying (enforcing) human behavior. Enforcement affects drivers in the following way: a law will be enforced, an offender will be detected, the adjudicatory process will be swift and certain, and punishment will follow conviction.
- Emergency services include the assemblage of ambulance companies, fire rescue services, and third party emergency response units and emergency rooms/trauma centers. Obtaining accurate post-crash diagnosis and high quality post-crash care is a critical factor in transportation safety.
- Finally, education encompasses driver licensing programs, driver remediation programs (e.g. traffic school), advanced driving courses, educational campaigns such as "Click It or Ticket" and "Booze It & Lose It," and school education programs aimed at K-12 and college level students.

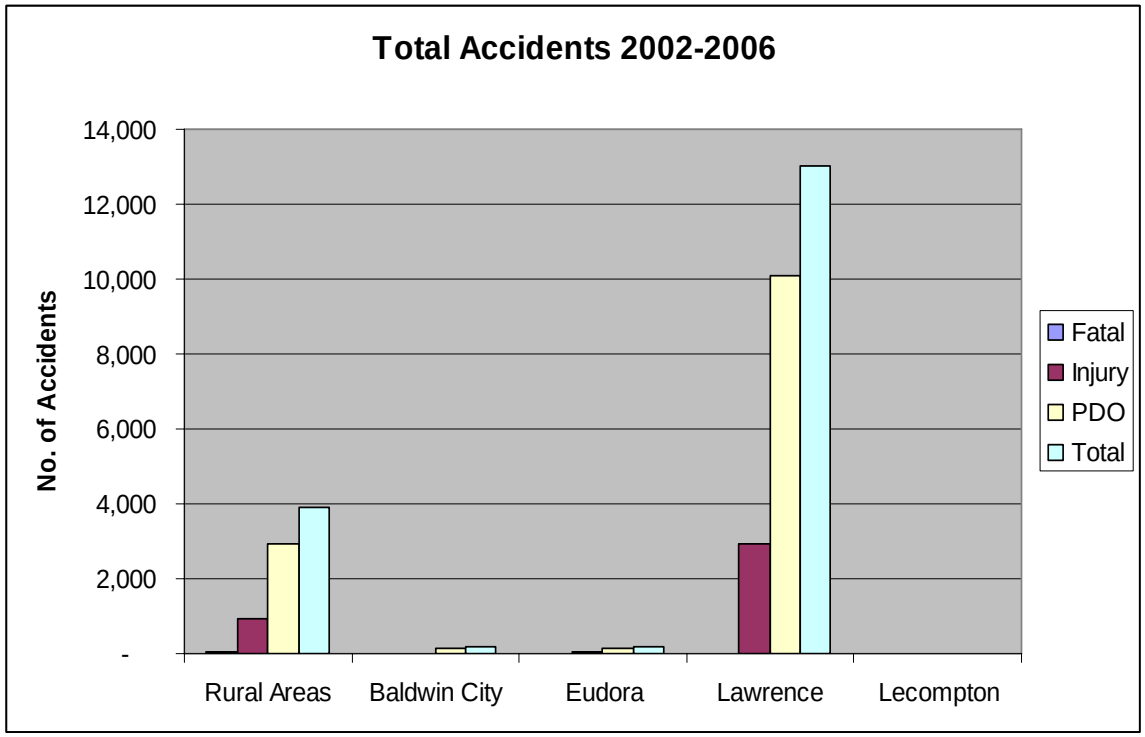
Combined, the 4-Es capture the range of transportation safety related investments that are needed to improve safety within any jurisdiction.

Safety Analysis

The starting point for improving the safety of the traveling public is good data. Kansas Department of Transportation (KDOT) is responsible for compiling the data for traffic accidents that occur on public roadways involving property damage of at least $1000 or an injury or fatality. This data is most useful if it can be tied to a location reference system that can pinpoint accident locations on the road network. Such a system is available for accidents that occur on the state highway system but is not currently available for other roads.

The data is then analyzed by identifying accident locations, types, and appropriate countermeasures. Countermeasures should consider engineering, education, and enforcement efforts that can reduce the identified types of accidents.

Figure 12.1
Traffic Accident Locations
Source: Kansas Department of Transportation



The final step is the development of a safety improvement program that addresses the types of accidents occurring within the planning area.

Motor Vehicle Accident Data

Each year approximately 3,500 motor vehicle accidents occur in the Lawrence/Douglas County MPO Planning Area.

Figure 12.1 shows the total accidents that occurred during a five-year period in rural Douglas County and the cities of Baldwin City, Eudora, Lawrence, and Lecompton.

Accident data for the MPO area has been summarized in this section by:

- Numbers and severity;
- General locations where they occurred;
- Collision type; and,
- Top 20 contributing circumstances.

Accident Numbers and Severity

Table 12.1 shows that during the five-year period from 2002-2006, 48 fatal accidents, 3,924 injury accidents, and 13,311 property damage only (PDO) accidents occurred within the planning area. As expected, the majority of the accidents occur in the city of Lawrence where the highest percentage of travel occurs. While there is some variation, accidents numbers remain fairly consistent over the five-year period within the region's cities. Rural areas in Douglas County have seen a drop in the number of crashes during this period.

Table 12.1
Traffic Accident Numbers and Severity
2002-2006
Source: Kansas Department of Transportation

	Total Accidents in the Year:					2002-2006 Accidents			
City	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**	**Fatal**	**Injury**	**PDO**
Rural Areas	863	855	813	703	654	3,888	32	944	2,912
Baldwin City	35	30	34	37	28	164	1	22	141
Eudora	47	35	42	36	37	197	1	37	159
Lawrence	2,677	2,713	2,619	2,427	2,586	13,022	14	2,920	10,088
Lecompton	4	4	2	-	2	12	-	1	11
Total	**3,626**	**3,637**	**3,510**	**3,203**	**3,307**	**17,283**	**48**	**3,924**	**13,311**

PDO = Property Damage Only

Table 12.2
General Locations of Motor Vehicle Accidents 2002-2006

Source: Kansas Department of Transportation

		Accidents				People	
City	Location	Total	Fatal	Injury	PDO	Deaths	Injuries
RURAL AREAS	Non-Intersection	2,294	16	404	1,874	18	582
	Intersection	343	6	129	208	8	226
	Intersection-Related	228	2	71	155	2	115
	Parking Lot or Driveway Access	77	-	26	51	-	41
	Interchange Area	149	-	29	120	-	42
	On Crossover	5	-	1	4	-	1
	Roadside (including shoulder)	691	7	248	436	7	311
	Median	93	-	32	61	-	42
	Parking Lot or Rest Area Trafficway	1	-	-	1	-	-
	Other	3	-	3	-	-	3
	Unknown	4	1	1	2	1	1
BALDWIN CITY	Non-Intersection	57	-	5	52	-	9
	Intersection	48	-	8	40	-	13
	Intersection-Related	25	1	6	18	1	7
	Parking Lot or Driveway Access	27	-	2	25	-	3
	Roadside (including shoulder)	6	-	1	5	-	1
	Unknown	1	-	-	1	-	-
EUDORA	Non-Intersection	92	-	19	73	-	25
	Intersection	43	-	9	34	-	10
	Intersection-Related	20	-	4	16	-	4
	Parking Lot or Driveway Access	28	-	2	26	-	2
	Interchange Area	11	-	3	8	-	3
	Roadside (including shoulder)	3	1	-	2	1	-
LAWRENCE	Non-Intersection	4,667	6	849	3,812	7	1,103
	Intersection	3,733	4	1,025	2,704	4	1,434
	Intersection-Related	2,877	2	697	2,178	2	943
	Parking Lot or Driveway Access	1,320	2	252	1,066	2	334
	Interchange Area	126	-	34	92	-	37
	On Crossover	1	-	-	1	-	-
	Roadside (including shoulder)	227	-	52	175	-	60
	Median	37	-	8	29	-	10
	Parking Lot or Rest Area Trafficway	16	-	1	15	-	1
	Other	4	-	2	2	-	4
	Unknown	14	-	-	14	-	-
LECOMPTON	Non-Intersection	7	-	1	6	-	1
	Intersection	1	-	-	1	-	-
	Intersection-Related	2	-	-	2	-	-
	Parking Lot or Driveway Access	1	-	-	1	-	-
	Roadside (including shoulder)	1	-	-	1	-	-
Total		**17,283**	**48**	**3,924**	**13,311**	**53**	**5,368**

General Locations of Motor Vehicle Accidents

Table 12.2 shows the general locations on or along the road network where accidents occur. Crash locations vary significantly for rural and urban areas.

- In rural Douglas County, the majority of accidents take place at non-intersection and roadside locations.
- In the City of Lawrence, the majority of accidents occur at intersections or are intersection or driveway-related.
- The three smaller cities show a mix of intersection and non-intersection accidents.

Therefore countermeasures for accident reduction will differ based upon the rural or urban nature of the area.

Collision Types

As shown in Table 12.3, collision types also vary by rural or urban area. In rural Douglas County the leading type of accident is a collision with a fixed object or animal, on or alongside the roadway. Within the cities, the leading accident types are angle and rear end collisions with another vehicle, primarily at intersections or driveways. Collisions with fixed objects or parked vehicles are also significant accident types in cities.

Table 12.3
Motor Vehicle Accidents – Collision Types
2002-2006
Source: Kansas Department of Transportation

	Rural Douglas County Motor Vehicle Accidents						Lawrence Motor Vehicle Accidents					
	Accidents				People		Accidents				People	
Collision Type	Total	Fatal	Injury	PDO	Deaths	Injuries	Total	Fatal	Injury	PDO	Deaths	Injuries
Other Non-Collision	99	-	11	88	-	11	53	-	23	30	-	25
Overturned	310	4	173	133	4	227	56	-	35	21	-	38
Pedestrian	8	1	7	-	1	8	141	3	137	1	3	143
Other Motor Vehicle - Head On	39	10	20	9	11	48	245	2	91	152	3	154
Other Motor Vehicle - Rear End	389	1	126	262	1	212	4,387	1	1,091	3,295	1	1,509
Other Motor Vehicle - Angle, Side Impact	337	8	142	187	11	257	4,328	5	1,053	3,270	5	1,488
Other Motor Vehicle - Sideswipe Opposing	50	1	14	35	1	27	144	-	23	121	-	29
Other Motor Vehicle - Sideswipe Overtaking	117	1	24	92	1	31	673	-	55	618	-	61
Other Motor Vehicle - Backed Into	10	-	1	9	-	1	308	-	7	301	-	8
Other Motor Vehicle - Other	31	-	2	29	-	2	10	-	1	9	-	1
Other Motor Vehicle - Unknown	3	-	1	2	-	2	16	-	5	11	-	6
Parked Motor Vehicle	25	-	7	18	-	9	1,446	-	66	1,380	-	83
Railway Train	5	-	2	3	-	2	3	-	1	2	-	1
Pedalcycle	3	-	2	1	-	2	126	-	116	10	-	119
Animal	1,048	-	27	1,021	-	32	83	-	5	78	-	5
Fixed Object	1,348	6	380	962	6	486	937	3	204	730	3	249
Other Object	62	-	4	58	-	6	50	-	6	44	-	6
Other	1	-	-	1	-	-						
Unknown	3	-	1	2	-	1	16	-	1	15	-	1

Table 12.3 (continued)
Motor Vehicle Accidents – Collision Types
2002-2006

City	Collision Type		Accidents				People	
			Total	Fatal	Injury	PDO	Deaths	Injuries
BALDWIN CITY	Other Non-Collision		4	-	-	4	-	-
	Other Motor Vehicle	Head On	4	-	-	4	-	-
	Other Motor Vehicle	Rear End	16	-	3	13	-	3
	Other Motor Vehicle	Angle - Side Impact	45	1	8	36	1	14
	Other Motor Vehicle	Sideswipe: Opposite Direction	6	-	-	6	-	-
	Other Motor Vehicle	Sideswipe: Same Direction	1	-	-	1	-	-
	Other Motor Vehicle	Backed Into	15	-	-	15	-	-
	Other Motor Vehicle	Unknown	1	-	-	1	-	-
	Parked Motor Vehicle		41	-	1	40	-	1
	Pedalcycle		3	-	3	-	-	3
	Animal		2	-	-	2	-	-
	Fixed Object		25	-	7	18	-	12
	Other Object		1	-	-	1	-	-
EUDORA	Other Non-Collision		4	-	2	2	-	2
	Overturned		10	-	6	4	-	7
	Pedestrian		1	-	1	-	-	1
	Other Motor Vehicle	Head On	2	-	1	1	-	3
	Other Motor Vehicle	Rear End	32	-	5	27	-	5
	Other Motor Vehicle	Angle - Side Impact	42	-	8	34	-	9
	Other Motor Vehicle	Sideswipe: Opposite Direction	3	-	1	2	-	4
	Other Motor Vehicle	Sideswipe: Same Direction	4	-	-	4	-	-
	Other Motor Vehicle	Backed Into	5	-	-	5	-	-
	Parked Motor Vehicle		56	-	1	55	-	1
	Pedalcycle		4	-	4	-	-	4
	Animal		10	-	1	9	-	1
	Fixed Object		22	1	7	14	1	7
	Other Object		2	-	-	2	-	-
LECOMPTON	Other Non-Collision		1	-	-	1	-	-
	Pedestrian		1	-	1	-	-	1
	Other Motor Vehicle	Head On	1	-	-	1	-	-
	Other Motor Vehicle	Rear End	2	-	-	2	-	-
	Other Motor Vehicle	Sideswipe: Opposite Direction	1	-	-	1	-	-
	Animal		1	-	-	1	-	-
	Fixed Object		5	-	-	5	-	-

Contributing Circumstances

Table 12.4 shows the top 20 contributing circumstances for traffic accidents in the planning area are primarily driver-related.

The top five contributing circumstances account for 74 percent of the region's accidents, they are: inattention (37% of accidents), failed to yield right of way (16%), following too closely (10%), too fast for conditions (6%), and disregard traffic signs, signals, and markings (5%).

This indicates that in addition to addressing the safety needs of individual corridors or intersections, a safety improvement plan for the regional should be developed that includes a strong educational component to address the behaviors that increase the risk of being involved in a crash.

Table 12.4
Motor Vehicle Accidents – Contributing Circumstances
2002-2006
Source: Kansas Department of Transportation

Category	Contributing Circumstance (top 20)	Freq.	Percent
DRIVER	Inattention	6,227	37.21%
DRIVER	Failed to yield right of way	2,646	15.81%
DRIVER	Followed too closely	1,652	9.87%
DRIVER	Too fast for conditions	1,050	6.27%
DRIVER	Disregard traffic signs, signals,	904	5.40%
DRIVER	Made improper turn	816	4.88%
DRIVER	Under the influence of alcohol	648	3.87%
DRIVER	Improper backing	643	3.84%
DRIVER	Improper lane change	510	3.05%
ROAD	Wet	223	1.33%
ENVIRONMENT	Rain, mist, or drizzle	204	1.22%
DRIVER	Reckless/Careless driving	180	1.08%
DRIVER	Other Distraction in or on vehicle	165	0.99%
ROAD	Icy or slushy	164	0.98%
DRIVER	Wrong side or wrong way	140	0.84%
DRIVER	Avoidance or evasive action	126	0.75%
DRIVER	Unknown	103	0.62%
DRIVER	Exceeded posted speed limit	101	0.60%
DRIVER	Did not comply - license restrictions	79	0.47%
DRIVER	Improper passing	77	0.46%
ENVIRONMENT	Animal	76	0.45%

Methodology for Developing a Plan to Address Accident Patterns

There are two common methods of addressing accidents that occur on the region's roadways.

1. The first identifies high accident locations where the number of accidents at a spot location (such as an intersection) is higher than would normally be expected.
2. The second is a system-wide approach that focuses on the predominant types of accidents along a longer section of roadway or road network.

High accident locations can be identified through the use of a database, a pin map, a geographic information system (GIS), or in some cases by information received from the public. Locations can be prioritized based upon accident numbers, accident rates, and/or severity. This type of analysis serves as an effective screening tool to identify and prioritize corridor and intersections needing more in-depth analysis and attention. A system-wide approach on the other hand, is a very effective way of identifying issues that are best addressed through education or programmatic efforts.

Kansas Statewide Strategic Highway Safety Plan

On October 18, 2006 the Federal Highway Administration (FHWA) accepted KDOT's Statewide Strategic Highway Safety Plan (SHSP). The SHSP mission is to reduce deaths, injuries, and economic costs resulting from motor vehicle crashes on all Kansas public roads. The Plan's vision is "Safest Drivers, Safest Roads for Kansas" and the goal is to reduce the number of accident related deaths to 365 deaths by 2010. There are six key emphasis areas which have been identified as providing the biggest potential for reducing crashes.

- Impaired Driving
- Occupant Protection
- Lane Departure

- Intersections
- Inexperienced/Novice/Teen Drivers
- Driver Behavior and Awareness

As a stakeholder in the SHSP, the Lawrence/Douglas County MPO is committed to implementing the appropriate strategies and funding for projects that will reduce crashes in the MPO Area. One particular area of focus should be intersections. There are a number of strategies identified in the SHSP to help reduce intersection crashes. A few of these that have been implemented or will be considered are:

- Identify intersections with a disproportionately large number of fatal and serious injury crashes
- Upgrade traffic signals for timing optimization
- Provide better corridor management and access management. Educate local officials about land development and safety
- Upgrade traffic signal equipment and locations
- Verify the continued need for traffic signals at specific locations
- Review signing on major streets and remove unnecessary signs
- Upgrade the size of street name signs
- Provide better bicycle accommodations

The safety of the traveling public is a top priority for the Lawrence/Douglas County MPO, the Lawrence Transit System, KDOT, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), Douglas County, and the cities in the planning area. Incorporating these strategies and other appropriate elements of the SHSP throughout the stages of the Lawrence/Douglas County MPO transportation planning and programming processes will give safety issues higher visibility and greater understanding among stakeholders, elected officials and the public.

Recommended Actions

The following actions outline the efforts needed to improve safety in the Lawrence/Douglas County area.

Safety Plan Action 1: *Improve Accident Data Collection and Analysis*

Efforts should be made to tie the non-state highway system accident locations to a referencing or GIS system to help accident related analyses. Being able to adequately analyze all accidents by location will help to ensure that efforts at improve safety are properly focused across the entire transportation system.

Safety Plan Action 2: *Develop a Regional Highway Safety Plan*

The Lawrence/Douglas County MPO should conduct a regional traffic accident study and develop a regional highway safety plan that should:

- Address high accident locations, predominant accident types, and include a strong driver education component, addressing the application of cost-effective countermeasures and processes for Engineering, Education, Enforcement, and Emergency Medical Service activities.
- Support the goals and objectives of the Kansas Strategic Highway Safety Plan with local analysis and implementation.

Safety Plan Action 3: *Continue to Participate in State & Federally Funded Safety Programs*

The cities and county should continue to participate in programs that provide federal and state funds for safety improvements.

Chapter 13: Security Plan

Introduction

SAFETEA-LU, the current national surface transportation act, separates security as a distinct factor from safety in the transportation planning process. SAFETEA-LU's goal is to: "*Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users".* Elevating the importance of security within the transportation planning process requires providing resources to identify and implement projects that directly improve security needs and mitigate imminent threat.

Some security planning activities have been initiated within the Lawrence-Douglas County area. Lawrence Transit has an ongoing effort to develop a security plan for transit.

Potential Roles for the Lawrence/Douglas County MPO

The role of the MPO is to focus on activities that can be incorporated into the continuing, comprehensive, and cooperative (3C) transportation planning process. These activities must be examined from a regional perspective, since no one agency is solely responsible for the security of an area. Incorporating security considerations into the MPO planning process must go beyond the standard measures often considered such as, emergency preparedness and response planning, and think more towards capital planning.

Considering work elements that allow the MPO to address security, as appropriate is a first step to integrating security into the planning process. These elements may include involving the Technical Advisory Committee (TAC) in determining emergency transportation routes, adding an emergency management position to the TAC, and enhancing communication between all agencies that plan and provide transportation services. These work elements should be in accordance with the following countermeasures: Prevention, Protection, Redundancy, and Recovery.

Prevention includes analyzing the vulnerability of key transportation infrastructure and services, as well as identifying strategies, technologies, and projects that can help prevent events. Protection measures, such as detection systems, fences, and locks, are often enacted to couple with prevention measures for highly vulnerable components of the transportation network such as bridges, tunnels, and transit facilities. Redundancy within the transportation network allows for easy alternative routes for traffic if an incident occurs. This idea of having a "backup plan" should also be considered with communications and information sources as well. Recovery primarily consists of short term or initial response activities during an emergency situation and long term response activities that consist of providing traveler information, re-routing of services, and reconstruction.

Disruption of the transportation system, due to manmade or natural causes, produces consequences ranging from inconvenience to economic loss to injury or death. As a medium for collaboration, and a financial and technical resource for planning and transportation system analysis, the MPO has a critical role to play in ensuring the security of transportation facilities and services.

In the MPO's role as a forum for cooperative decision-making, the actions that seem most appropriate for it in the context of security/disaster planning are to:

- Provide a forum for security/safety agencies to coordinate surveillance and prevention strategies; and,
- Provide a forum for discussions on coordinating emergency responses.

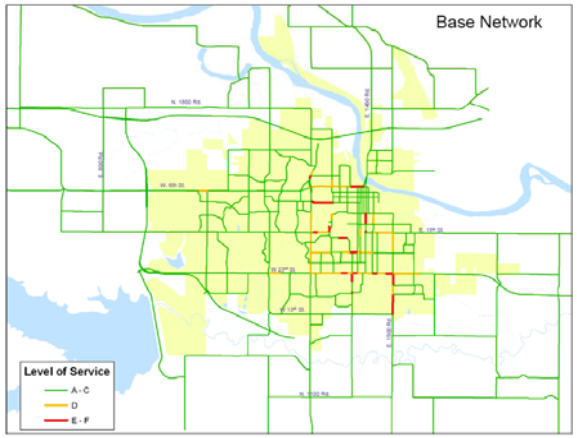
Given the MPO's responsibilities for funding strategies and projects, potential actions could include:

- Funding new strategies/technologies/projects that can help prevent events and/or protect key transportation facilities;

- Funding communications systems and technology to speed response to incidents; and
- Funding recovery activities.

Given the MPO's strengths in technical analysis and transportation planning, potential actions could include:

- Analyzing the transportation network for redundancies in moving large numbers of people (e.g., modeling person and vehicle flows with major links removed or reversed, accommodating street closures, adaptive signal control strategies, impact of traveler information systems), and strategies for dealing with "choke" points such as tollbooths; and,
- Analyzing the transportation network for emergency route planning and identifying strategic gaps in the network.



Recommended Actions

The following actions outline the efforts recommended to address transportation security issues in the Lawrence-Douglas County region.

Security Plan Action 1: *Develop an Action Plan for Transportation Security*

Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized system users.

Coordinate with local and state agencies responsible for transportation and security to develop an action plan for improving security measures for motorists, transit users, pedestrians, and bicyclists within the Lawrence-Douglas County region.

Security Plan Action 2: *Incorporate Security in MPO Activities*

Address security as part of MPO planning, programming and implementation activities.

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Chapter 14: Financial Plan

A major component of *Transportation 2030* is the financial element. The purpose of the financial element is to balance the transportation projects recommended for implementation with the resources of the community available to build and maintain transportation facilities and services. It is based on an analysis of past funding, expected funding, and projected needs.

Federal transportation legislation requires MPOs to include a financial constraint analysis in its long-range transportation plan. The financial component should indicate how *T2030* will be implemented with the resources that could reasonably be expected to be available.

Specific language from the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU) is provided below.

> *"The long-range transportation plan shall include... a financial plan that demonstrates how the adopted long-range transportation plan can be implemented, indicates resources from public and private sources that are reasonably expected to be made available to carry out the plan, and recommends any additional financing strategies for needed projects and programs. The financial plan may include, for illustrative purposes, additional projects that would be included in the adopted long-range transportation plan if reasonable additional resources beyond those identified in the financial plan were available. For the purpose of developing the long-range transportation plan, the metropolitan planning organization and State shall cooperatively develop estimates of funds that will be available to support plan implementation."*

The estimates of revenues available for transportation improvements in the Lawrence-Douglas County area are based on current legislative policy. No change in these policies was assumed. The impacts of inflation in determining revenues and costs were considered.

Revenue Estimation Methodology

Estimating revenues available over the life of *T2030* was done cooperatively between the MPO, the City of Lawrence, Douglas County, Lawrence Transit, and KDOT. Generally, historic expenditures of transportation funds invested on projects in the Lawrence/Douglas County area for approximately the past 5 to 10 years were used to calculate average annual funding amounts that were increased for inflation to estimate the revenues available for the duration of *T2030*.

Estimated average funding amounts for most state and federal programs were developed using each program's revenues over the past years of ISTEA, TEA-21, and SAFETEA-LU implementation. This strategy represents a continuation of current programs at levels similar to recent, historical revenues. These funding figures were then adjusted for inflation and projected over the duration of *T2030* to arrive at total revenue estimates.

T2030 addresses revenues and costs for street and highway projects, bicycle and pedestrian projects, and public, fixed-route transit service. Elderly and disabled public transportation (i.e., paratransit) services are included in the State's long-range transportation plan and therefore are not addressed in *T2030*. University transit services are not explicitly addressed in *T2030* either, although recommendations regarding future coordination needs are discussed in the Transit System Plan chapter.

Funding Assumptions for Roads and Bridges

Federal Funding Assumptions

The current Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) will end with federal fiscal year 2009. It is assumed that a new federal surface transportation program similar to SAFETEA-LU will be passed for federal fiscal year 2010 and beyond, and that federal funding levels to the Lawrence/Douglas County MPO region will continue at current levels adjusted by a 2% rate of inflation.

It is also assumed that the major programs of federal funding available to local governments for roadway and bridge projects (STP, BR and Safety) will continue in their current or similar form. It is assumed that the Surface Transportation Program or similar federal program will continue to be the chief federal funding source for locally sponsored roadway capacity improvements.

It is assumed that Congress will pass new surface transportation legislation with a Transportation Enhancement program and that the region will receive funding from that program at levels similar to what our area received between 2000 and 2006 adjusted for inflation.

Lastly, it is assumed that KDOT will continue to share federal funds with local governments at levels similar to the current levels and that KDOT will not significantly increase the amount of federal funding that they keep for their own projects.

State Funding Assumptions

The current Comprehensive Transportation Program (CTP) ends in 2009. This program is a large multi-year funding program designed to make major improvements to the transportation infrastructure around the state and to provide increased funding for transportation projects and services. In addition to the road improvements funded by the CTP, transit, railroad, and aviation projects are also funded.

It is assumed that a new CTP will not be passed by the State Legislature immediately to replace the current program and that there will be a two-year gap before a new program is in place. For the State fiscal year 2010-2011 period it is assumed that 2009 KDOT funding levels will remain in place. It is assumed that the US-59 reconstruction project will be funded in the region during this two-year interim period.

Starting with State fiscal year 2012, it is assumed that a new CTP will be in place and that the region will obtain sufficient KDOT funding for major roadway capacity projects. The level of funding for KDOT roadway and bridge projects in the MPO area is assumed to be at a level that represents the CTP funding level adjusted for inflation through 2030.

Local Funding Assumptions

Douglas County Funding: The current mix of Douglas County funds used for road and bridge improvements includes general funds and federal aid allocated to the County from KDOT. The assumption is that these funding sources will continue in the future at about current levels adjusted at a 5% rate of inflation. General funds raised from property

taxes are typically used to provide the local match amount for federal aid projects and sometimes used to fully fund smaller road and bridge projects. The assumption included in the funding tables is that an amount of general funds equal to the required twenty percent match for federal aid will be available from the County. These funding practices are assumed to continue through the life of *T2030*.

The County also receives Special City & County Highway Fund revenues from the State which are state gasoline taxes passed onto Douglas County. At present, all of this gas tax revenue is used by the County Public Works Department for maintenance projects, and this practice is assumed to continue. This gas tax revenue along with enhanced general fund revenues is assumed to be adequate to provide necessary maintenance of the County road system in the future.

It is also assumed that the County will occasionally receive some federal funding for Transportation Enhancement (TE) projects and that the local share of those projects will be paid for with general fund revenues.

City Funding: The current mix of City funding for roadway and bridge improvements includes property taxes, federal aid, and Special City & County Highway Fund monies. Like the County this last source from state gas taxes is used by each City for maintenance projects only, and this practice is assumed to continue through 2030.

The level of local funding support for roadway and bridge projects is assumed to remain at current levels adjusted at a 2.5% rate of inflation. The assumption included in the funding tables is that an amount of funds equal to the required twenty percent match for federal aid will be provided by a City for their FHWA funded improvements and that other locally funded projects will be paid for with general fund revenues.

The City of Lawrence, like Douglas County, receives some federal funding passed through KDOT to help fund road and bridge improvements. It is assumed that the current level of federal aid to Lawrence will continue in the future.

It is also assumed that the Cities will continue to be awarded some Transportation Enhancement funds from KDOT for special projects (bikeways, historic preservation, streetscape, etc.). The level of TE funding for the Cities will be assumed to remain at about the level it received during the 2000-2006 period adjusted at a 2% rate of inflation.

Project Cost Assumptions

Projects cost estimates are based upon current construction costs increased by a 4% rate of inflation.

Funding Assumptions for Transit

General Transit Assumptions

The mix of funding for Lawrence Transit (the "T") includes farebox revenue, advertising, local general funds, KDOT operating assistance, federal formula operating assistance, federal formula capital assistance and federal discretionary capital assistance. It is assumed that future farebox revenue will continue at current levels adjusted for inflation. Other operating revenues from advertising fees are a small portion of the revenue mix and are also assumed to remain at current levels.

Federal Transit Funding Assumptions

Federal formula funds for both operating and capital assistance are expected to continue throughout the term of this plan at current levels adjusted at a 2% rate of inflation. There may be delays in reauthorizing the next federal surface transportation program after SAFETEA-LU expires at the end of federal fiscal year 2009. However, it is assumed that funding will continue to flow to the region by the enactment of continuing resolutions similar to those passed by Congress in recent years. The current levels of formula funds from the FTA are assumed to remain the same in the future.

It is also assumed that the transit funding programs used locally (formula operating and capital assistance along with some discretionary capital assistance) will continue at current levels. The paratransit vehicle funding now provided to local agencies for the transportation of elderly persons and persons with disabilities is also assumed to continue at current levels.

Discretionary capital funds from the FTA (Section 5309), are much less predictable and uncertain. It is assumed that some discretionary FTA funds will be available to help pay for bus purchases during the term of this plan, but it is not assumed that major amounts of discretionary funding will be available for new buildings. The assumption used in this Long Range Transportation Plan is that about every four years Lawrence Transit will be successful at securing discretionary capital funds for replacement buses and will be able to purchase four new buses with this funding.

Lawrence Transit is considering application for funding from the Jobs Access- Reverse Commute Program; but, funding from this source has not been assumed in *T2030*.

State Transit Funding Assumptions

The amount of KDOT operating assistance increased substantially after the Comprehensive Transportation Program (CTP) was passed in 2000. It is assumed that this level of state support for transit in the Lawrence Area will continue in the future and that the State will pass an interim program if necessary to maintain this funding while developing a new CTP. It is assumed that no major disruption to state operating assistance for transit will occur even though there is expected to be a two-year period (2010-2011) between the end of the CTP and the start of its successor program. Future state funding is assumed to increase at a 2% rate of inflation.

Local Transit Funding Assumptions

The City of Lawrence provides a local match for formula capital and discretionary capital funds, as well as operating assistance to the "T". These funds are provided through a local property tax levy. It is expected that the City will continue to provide matching funds in the future, at levels similar to the current contributions adjusted for inflation.

Revenue Sources

Several federal, state, and local funding sources provide revenues to fund the transportation system in the Lawrence/Douglas County region. Although the funding process may be very confusing to some and seamless to others, the distinction of funding sources is important in estimating expected revenues and allocation of funds to selected projects within the region.

State and federal funding programs are generally administered by KDOT either through allocation to local jurisdictions or by directly implementing projects on the State Highway System. In some limited cases, the Lawrence/Douglas County MPO selects projects for funding through these state and federal sources. More often than not, however, KDOT programs projects for state and federal funding; but some flexibility exists to change modal allocations of funding or project selection through the cooperative process between the MPO and KDOT.

Federal Highway Programs

National Highway System (NHS) funds are available for use on designated NHS routes. These tend to be high-type freeways, expressways, and principal arterials. KDOT receives an annual formula apportionment of NHS funds. KDOT currently programs NHS projects.

Interstate Maintenance (IM) funds are apportioned annually to the states for use on the interstate highway system. These funds cannot be used for capacity improvements and are intended for substantial maintenance and reconstruction projects. KDOT programs projects in this funding category.

Bridge (BR) funds are annually apportioned by formula to the states for bridge replacement and rehabilitation projects. A portion of these funds are then sub-allocated by KDOT to cities and counties for local bridge projects using a formula that considers the ratio of the square footage of deficient bridges in a county to the total deficient square footage in the state.

Congestion Mitigation/Air Quality (CMAQ) funds are intended for projects that improve air quality through congestion relief and other measures. While the minimum allocation portion of these funds are eligible for use anywhere in the state, KDOT has elected to allocate them to Kansas City and Wichita to help these areas maintain their air quality status.

Surface Transportation Program (STP) funds are apportioned annually to the states. Metropolitan areas with over 200,000 population receive a minimum amount that must be used within the region. In addition, there is a requirement that a certain percentage must be obligated in rural portions of the states. Current KDOT practice is to allocate STP funds to all counties in the state using the allocation formula for the Special City/County Highway Fund. Small urban areas in Kansas (population 5,000–50,000) receive STP allocations on a revolving basis within population groups. KDOT also maintains a statewide flexible category of STP funds that it uses for state system projects. KDOT programs projects for the statewide flexible STP funds; city and county projects are selected by local governments and programmed through KDOT.

The **STP-Safety Program (STP-S)**, formerly known as Hazard Elimination Safety, is a discretionary program available to all jurisdictions regardless of MPO status. The KDOT Bureau of Traffic Engineering manages this program wherein high-accident locations are identified and prioritized across the state. Accident information is solicited from cities every two years to identify the most qualified projects. KDOT programs these funds using this accident information.

The **Rail-Highway Grade Crossing Program (STP-RR)** is a statewide program administered through KDOT. Grade crossings are selected for improvement based on ratings from a grade crossing index.

The **Transportation Enhancement Program (TE)** is administered as a statewide discretionary program in which funding applications are submitted by local jurisdictions on an annual basis. The program includes three main categories: Historic, Scenic and Environmental, and Pedestrian and Bicycle Facilities. Project recipients provide at least 20 percent of the project cost to match the federal funds.

Congressional Priority Program funds are placed in the federal transportation legislation for projects that might not normally receive funding because of the project scope or cost. While Lawrence received Congressional funding in the past for the South Lawrence Trafficway, no assumptions were made in *T2030* concerning future earmarks. However, this could be a potential source of funding for major projects such as the South Lawrence Trafficway, 23rd Street Corridor Access Management Plan, or an Eastern Connector. Congressional Priority projects are administered through KDOT.

State Road Improvement Programs

The **Connecting Link Surfacing Program (KLINK 1R)** provides funds for roadway surfacing on state highway connecting links within local jurisdictions. It is available to all jurisdictions. In Kansas, the state highway system does not extend into a city's corporate limits. Instead, KDOT executes a Connecting Link Agreement that allows a state highway to pass into or through a city, and the city is paid to maintain the route.

Economic Development (ED) is a discretionary program for projects that will provide or enhance economic development opportunities for communities throughout the state. Projects must be on routes that are on or eligible to be added to the State Highway System. It is available to all jurisdictions.

The **Geometric Improvement Program (KLINK Geometric)** provides funds for geometric improvements to city streets that carry state highway designations (City Connecting Links). This is a statewide annual discretionary program available to all jurisdictions.

The **System Enhancement Program** is a statewide discretionary funding program made available to all local governments on a one-time basis. Projects must be on or eligible to be added to the State Highway System. There are separate categories for interchanges/grade separations, bypasses, and corridors.

The Kansas Comprehensive Transportation Program, enacted in 1999, increased funding to the **Special City/County Highway Fund (SCCHF)**, which is distributed annually by formula to all cities and counties in the state. In addition, **City Connecting Link** payments were increased from $2,000 to $3,000 per lane mile for the maintenance of state highways within local jurisdictions.

An additional program available to KDOT is the use of toll credits for project financing. Federal law states that if a state has interstate highways that were constructed and are maintained without the use of federal funds (e.g., the Kansas Turnpike), the state can receive credit for this spending. Since almost all federal transportation programs have matching requirements ranging from 10 to 50 percent, toll credits can be used in lieu of local or state matching funds. KDOT has shared toll credits with local governments on occasion.

Federal Transit Programs

The **Section 5307 Program** provides funding to urban areas for transit capital, operating, and planning assistance. These funds are formula-allocated by FTA to metropolitan area recipients.

The **Section 5309 Program** provides transit capital discretionary grants awarded by FTA, often with Congressional input. They are available to all jurisdictions.

The **Section 5310 Program** supplies capital assistance for elderly and disabled transportation programs. These funds are administered by KDOT as a statewide discretionary program.

The **Section 5311 Program** provides capital and operating assistance for rural public transportation programs. These funds cannot be used in urbanized areas.

The **FTA Job Access & Reverse Commute Grant Program** (also referred to as welfare-to-work) is a federal discretionary grant program. It requires regional job access or reverse-commute plans to be developed through a coordinated transportation/social service planning process.

State Transit Programs

The **State Transit Program** provides funding for urban and rural public transportation at approximately a 60/40 split, respectively. Funding has been increased to $6 million annually beginning in FY2000, up from the previous $1 million annual amount.

Local Transportation Funding Sources

The Operating Budget for the City of Lawrence includes an adopted Capital Improvement Budget (CIB), which contains funding for transportation improvements through the issuance of general obligation bonds. Generally, these funds are used for major thoroughfare improvements, local match obligations for state highway projects within the urban area, and traffic signal improvements.

In addition to general funds, the City of Lawrence has a 3-mil dedicated property tax to fund the Lawrence Transit System (state legislation allows up to 5 mils). There is no local dedicated funding source for bicycle and pedestrian facilities, although some general fund revenues are typically used for projects related to the nonmotorized transportation modes.

Douglas County funds roadway improvements with general fund revenues. In addition, a portion of the county's one mil property tax goes to nonprofit transportation providers for rural transit services.

In summary, local funding sources are typically general fund revenues but also include some bonds.

Some of these funds are dedicated for transit, transportation enhancement, and roadway matching. The remainder is generally available for all modes, although roadway improvements have historically dominated their use.

Other Transportation Funding Sources

The **Kansas Airport Improvement Program** was created in 1999 and funded at $3 million annually to provide assistance to maintain and upgrade local airports.

Anticipated Revenues

Through the cooperative process carried out among the MPO, KDOT, Lawrence Transit, and other agencies, it is anticipated there will be about $1.3 billion dollars available over the life of *T2030* for roadway, bridge, bicycle facility, and pedestrian facility improvements; system maintenance; and transit services. The estimated funding projections are based on current dollars adjusted for inflation.

Federal SAFETEA-LU legislation requires the transportation projects and services recommended in *T2030* to be financially constrained to available revenues. This means that expected financial resources must be sufficient to cover the projected costs of the total transportation system, including both existing and planned facilities and services, through the year 2030.

Table 14.1
Projected Revenues for T2030

Source: Lawrence/Douglas County MPO, KDOT, Lawrence Transit

Funding Programs/Sources	Local	State	Federal	Total
Dedicated Transit Programs	$42,489,000	$12,086,000	$41,652,000	$96,227,000
Transportation Enhancements	$1,485,000	0	$5,938,000	$7,423,000
Special City/County Highway Fund	0	$109,779,000	0	$109,779,000
KLINK – Connecting Links Program	0	$3,404,000	0	$3,404,000
Bridge Programs	$90,243,000	$8,232,000	$11,500,000	$109,975,000
KTA Program				$170,000,000
Road Programs	$156,496,000	$281,005,000	$129,870,000	$567,371,000
Local Operations and Maintenance	$248,026,000	0	0	$248,026,000
Total	**$542,402,000**	**$409,657,000**	**$187,691,000**	**$1,309,750,000**

Reasonably expected revenues include existing local, state, and federal funding sources described in previous sections of this chapter. They also include local revenues for maintaining the system. The *T2030* revenue forecast is shown in Table 14.1. The procedure for determining the anticipated revenues is detailed in the Technical Appendix.

Discretionary programs or new local programs, such as those described on the following pages, could provide significant revenues over and above the formula programs represented in Table 14.1. This may allow one or more of the unfunded projects to be selected for funding.

Funding Sources and Financing Mechanisms

There are a number of financing mechanisms for transportation improvements authorized under Kansas law. A number of state statutes authorize various approaches for funding public projects. Some of these sources and mechanisms are already used by jurisdictions in the region. Others are provided herein for reference to potential funding sources that may be pursued in the future to reduce the gap between transportation needs and revenues.

Development Exactions – Pursuant to approval of subdivisions, rezoning of property, issuance of conditional use permits, or other development approvals, cities have the authority to impose development exactions that reimburse the costs of providing public facilities and services to the new development. The development can be charged its pro rata share of the costs associated with the construction of public facilities or provision of the public service necessary to serve the development. This development exaction can take the shape of a dedication of land to the city, the payment of fees into escrow for future road improvements, the payment of impact fees, or the requirement that the developer construct street improvements.

Excise Tax – An excise tax is a method of raising revenue by levying a tax on a particular activity, as opposed to a property tax, which is a tax on the assessed value of property. There need not be a rational relationship between the tax imposed and the demand for public services created by the activity upon which the tax is imposed. An excise tax's purpose is to raise revenue, not to pay for costs created by the activity upon which the tax is imposed. Unlike an impact fee, the funds collected from an excise tax need not, but can be, earmarked for a particular purpose, such as transportation improvements.

General Obligation Bonds – Although not a source of funds, but rather a financing mechanism, the city has the authority to raise funds for street construction and improvements by the issuance of general obligation bonds. General obligation bonds are long-term obligations backed by the full faith and credit of the city. General obligation bonds may be issued without an election and by a simple approval of the governing body (city or county commission) through passage of an ordinance or resolution.

Impact Fees – An impact fee is a monetary exaction on new development imposed as a part of the development approval process. All impact fees must bear a reasonable relationship between the required fee and the impact of the development that is required to pay the fee. For a program designed to fund streets (the most common use), all impact fees collected by the city must be spent for improvements to streets that benefit those who paid the fee. The amount of the fee collected with respect to each development cannot exceed an amount that reflects the cost of constructing streets or making street improvements, the need for which is generated by the development.

Improvement (Special Benefit) Districts – State statutes authorize the creation of improvement districts to fund infrastructure, including street improvements which confer a special benefit on property within a particular area of the city. Under the statutes, an improvement district may be established by petition from property owners who will benefit from the improvement or by resolution adopted by the city commission creating the district. In order to generate funds for the street improvements, the city levies special assessments on the property in the improvement district and issues general obligation bonds payable from the assessments. The city may also choose to pay a portion of the general obligation bonds from its general revenues

or other sources of funds to the extent the improvement benefits the city-at-large.

Local Sales Tax – Kansas statutes authorize the city to impose a sales tax on all retail sales in the municipality. The sales tax rate may be governed by statute or adjusted by the city pursuant to its home rule authority. The Kansas Court of Appeals ruled in 1996 that the Local Retailers' Sales Tax Act is subject to home rule action by cities but the effect of 1998 amendments to the act has not been judicially determined. If the sales tax is enacted pursuant to statute, the sales tax must be authorized by the city commission or by a petition of 10 percent of the electors. It must also be approved by a simple majority of the voters in an election. If the sales tax is enacted pursuant to home rule authority, the tax is approved by the city commission and also may be subject to a referendum vote. The city may also issue bonds to be retired from revenues derived from the sales tax.

Neighborhood Revitalization Act – This act authorizes a municipality to provide an economic incentive to redevelop areas of a city through a rebate mechanism. The city may designate as a "neighborhood revitalization area" an area of the city that is deteriorating or that has architectural, historic, or other significance. The city is required to adopt a plan to guide redevelopment in the designated area, and this plan may include improvements to transportation facilities. Although no initial financing is provided for improvements in the revitalization area, the city is authorized to subsequently rebate taxpayers in a revitalization area all or a portion of the excess property tax increment that is generated from the area after it was established. The neighborhood revitalization statutes specifically provide that this rebate mechanism may be used in combination with other financing mechanisms that are not in conflict.

Revenue Bonds – State statutes authorize the issuance of revenue bonds for infrastructure improvements, including road improvements. The bonds are obligations that are secured by the revenues received by the city from a particular source, such as the local options sales tax or special assessments imposed as a road improvement district. Revenue bonds are exempt from the city's statutory aggregate debt limitations, and are not a source of funds but rather a financing mechanism.

Property Tax – Kansas statutes authorize cities to impose an ad valorem property tax within the city. This tax applies to real property and to tangible personal property. The Kansas Constitution requires that the application of property taxes must be "uniform and equal." The statutes authorize property tax mill levies to be established for general fund purposes or for a particular purpose in limited amounts, such as for funding operations and improvements associated with road districts.

Redevelopment Districts – State statutes provide the city with several methods to fund infrastructure improvements in order to redevelop or revitalize specific and limited areas of the city. These methods include tax increment financing districts, urban renewal areas, and neighborhood revitalization areas. Each approach shares a common purpose of redeveloping areas to accomplish a specific purpose, such as clearing slums or blighted areas or encouraging major tourism. These methods rely on the additional taxes and revenues generated in the designated areas to fund infrastructure improvements, including street improvements.

Other methods, such as a self-supported municipal improvement district, are limited geographically to a minimum four-block area in the city's central business district.

Self-Supported Municipal Improvement Districts – On its own initiative, or upon a petition by citizens within the area, the city may establish a self-supported municipal improvement district. The city may issue municipal improvement district bonds to fund improvements in the district, including street improvements. The bonds are not general obligations of the city, but rather are repaid with taxes assessed in the district, including the local option sales tax or property taxes.

Costs of the Region's Transportation Needs

While individual project costs are relatively easy to estimate at the system planning level, the list of needed projects is much more difficult to define for each of the modal systems. For example, transit buses, sidewalks, trails, and bicycle lanes are rarely if ever congested, so the concept of need must differ by mode. Roadways in the region are experiencing congestion, especially in the peak period, and are becoming more congested every day. Since reducing traffic congestion is a goal of *T2030*, the concept of congestion-based need generally applies to roadways.

In many communities, the concept of balance has been used to address the discrepancies associated with the definition of need. Again, sidewalks, trails, and buses are not congested, but additional alternative mode facilities and services are clearly needed to help Baldwin City, Eudora, Lawrence, Lecompton, and Douglas County become balanced, multimodal communities.

The approach taken in *T2030* stretches the definition of need beyond that of traffic congestion relief. The region needs a balance of modes to provide travel options for its citizens. The public needs alternative mode options to contribute to their desire for cheap, efficient, healthy, and environmentally friendly transportation solutions. The community needs alternative transportation modes to reduce the land consumption, environmental consequences, and stress associated with automobile travel and roadway construction.

Cost of Roadway and Congestion Management Needs

The Lawrence/Douglas County MPO, in consultation with KDOT, estimated future capital revenues for roadways in the MPO area based on recent funding levels that were increased for inflation. Project costs were estimated in current dollars, and then inflated at 4% per year to the year-of-expenditure.

A summary of planned improvements to roads, which includes roadway widening and new roads, transportation system management, intelligent transportation systems (ITS), and intersection and safety improvements are presented in Table 14.2. The total budget for these planned improvements is $723 million with a surplus of over $4,000,000.

Table 14.2
Recommended *T2030* Roadway System Plan

Source: *T2030* Roadway Scenario Evaluation and Selection Process

Route/Project	Location	Improvement	Estimated Cost
I-70/ Kansas Turnpike	Douglas County	Widen to 6 Lanes	$170,000,000
K-10 (SLT)	32nd Street Alignment	New 4-Lane Freeway, New Interchanges at Haskell and 23rd Street/K-10	$202,760,000
K-10 (SLT)	I-70 to Iowa Street (US-59)	Widen to 4-Lane Freeway, New Interchanges at 15th and Wakarusa, No Connection at Kasold	$38,360,000
US-59	South Douglas County Line to N. 1000 Road	New 4-Lane Freeway	$68,000,000
US-40 (6th Street)	Stull Road to K-10 (SLT)	Widen to 4 Lanes	$24,240,000
Church Street	K-10	Interchange Improvements	$10,960,000
County Road 1061	K-10 South for 1.0 Mile	Widen to 4 Lanes	$8,220,000
15th Street	E. 800 Road to Bob Billings Parkway	New 4-Lane Road	$9,864,000
Wakarusa	23rd Street to County Road 458 (N. 1200 Road)	Widen to 4 Lanes	$18,180,000
Haskell Avenue	23rd Street to N. 1100 Road	Widen to 4 Lanes	$24,660,000
31st Street	E. 1600 Road to E. 1750 Road	Urban 2-Lane Street	$6,165,000
N. 1100 Road	US-59 to Haskell	Widen to 4 Lanes	$16,440,000
N 1200 Road	Wakarusa to US-59	Widen to 4 Lanes	$36,360,000
Peterson Road	K-10 (SLT) to West of Monterey Way	Urban 2-Lane Street	$18,180,000
Franklin Road/ 19th Street	15th Street to 23rd Street and 19th Street Extension to Franklin Road	Urban 2-Lane Streets	$7,850,000
23rd Street	Kasold, Louisiana, Haskell, Harper	Median, Intersection Improvements, Access Management	$6,780,000
Iowa Street	6th, 9th, Harvard, 15th, 23rd, 25th, 27th, 33rd, K-10	Median, Intersection Improvements	$18,250,000
MacDonald	Princeton Boulevard	Intersection Improvements	$2,020,000
ITS Projects	Various Locations	ITS Deployment	$10,000,000
County Road Projects	Various Roadways in Douglas County	Pavement and/or Shoulder Rehabilitation Improvements	$35,400,000
		Estimated Road Project Costs for *T2030*	$732,689,000
		Estimated Revenues Available for *T2030*	$737,371,000
		Balance	$4,682,000

Bridges

Table 14.3 reflects a continued commitment to bridge replacement, rehabilitation, and maintenance. Bridge improvements will be determined based on KDOT, City and County monitoring and normal rehabilitation and replacement schedule.

Table 14.3
Recommended *T2030* Bridge Improvements

Source: *Lawrence/Douglas County MPO, KDOT*

Bridge Programs	Estimated Bridge Project Costs	$109,975,000
	Estimated Revenues Available for *T2030*	$109,975,000
	Balance	$0

Roadway Maintenance

Table 14.4 reflects a continued commitment to maintaining existing city streets and county roads by Douglas County and the cities in the region. The estimated revenues are a summation of the Klink, Local Operations, and Special City County Highway Fund programs in Table 14.1.

Table 14.4
Recommended *T2030* Road Maintenance

Source: *Lawrence/Douglas County MPO, KDOT*

Road Maintenance Programs	Estimated Maintenance Costs	$361,209,000
	Estimated Revenues Available for *T2030*	$361,209,000
	Balance	$0

Cost of Transit Needs

Transit needs are defined in terms of relative ridership and service characteristics. A more robust transit system with higher frequency bus service covering more of the city and serving more activity centers would result in more ridership. Better service would attract choice riders in addition to serving the transit-dependant population. This in turn would reduce vehicular travel, which could be realized in terms of reduced or delayed roadway capacity improvements.

The current bus transit system in Lawrence represents a minimum service for a community of the size and character of Lawrence. As shown in Table 14.5 maintaining this service over the life of *T2030* will consume the estimated available funding.

Additional funding would be necessary to provide a higher level of transit service.

Table 14.5
Recommended *T2030* Transit System Plan

Source: *Lawrence Transit*

	Estimated 2007 Expenses	Projected *T2030* Expenses
Operations Contract	$2,808,649	$81,026,000
Capital Outlay	$309,426	$8,913,000
Personnel	$206,890	$5,971,000
Commodities	$10,954	$317,000
Total Transit Costs	$3,335,918	$96,227,000
Estimated Revenues Available for *T2030*		$96,227,000
Balance		$0

Bicycle and Pedestrian Facility Needs

The Bicycle Work Program prepared by the City of Lawrence's Bicycle Advisory Committee identifies several million dollars worth of improvements to complete the City's bicycle system through a combination of recreational trails, on-street bike lanes, and bike routes along arterial corridors. Other cities in Douglas County and the County itself also have recognized needs for similar bicycle facilities.

In addition, the Cities in the region have a significant amount of missing or deteriorated sidewalks in critical locations along arterial corridors, within neighborhoods, and in and around activity centers. Although not fully documented, the cost of addressing these pedestrian needs is expected to total in the millions of dollars.

Additional funding is needed to provide significantly improved bicycle and pedestrian facilities. Table 14.6 shows the available revenues for bicycle and pedestrian facility improvements. Funding is primarily provided by the federal Transportation Enhancement Program and local match.

Table 14.6
Recommended *T2030* Bicycle & Pedestrian System Plan

Source: *Lawrence/Douglas County MPO, KDOT*

Improvement	Location	Estimated *T2030* Costs
Bicycle & Pedestrian Facilities	Various City & County Locations	$7,423,000
	Estimated Revenues Available for *T2030*	$7,423,000
	Balance	$0

This funding level does not address the needs of the region. A more balanced, fair share target for pedestrian and bicycle improvements would be relative to the percent of share of total trips traveled by bicyclists and pedestrians. According to the most recent U.S. Census data, bicycle and pedestrian trips make up about 11 percent of the commute trips in the region. Based on the region's 2001–2005 Transportation Improvement Program, only 3 percent of the transportation resources are spent on specific bicycle and pedestrian improvements. Since many of the roadway projects also include bicycle and pedestrian components, the target resource allocation for bicycle and pedestrian specific improvements is recommended to be approximately 6 percent.

Illustrative Projects

Given the large amount of needs and limited resources to provide transportation facilities and services through 2030, some of the projects, however necessary, will not be implemented unless additional funding sources are identified and secured. Projects are listed Table 14.7 as illustrative or unfunded projects in order to provide a mechanism for their implementation as new funding sources come on line.

Additional funding may come from discretionary programs, new user or development fees, taxes, special districts, or other sources. As funding becomes available, these projects will need to be amended into the financially constrained portion of the 2034 Long Range Transportation plan in order to be funded.

Table 14.7
Illustrative Projects

Project/Improvement	Location	Improvement
Eastern Connection	US24/40 to K10	new 4 lane freeway, new interchanges at US24/40, I70(KTA), 15th & K10
I-70 to K-10 Connection	South from new KTA Tonganoxie interchange	construct new arterial with Kansas River crossing
31st Street	Louisiana to E 1900 Road	widen to 4 lanes
N 1100 Road	Haskell to E 1900 Road	widen to 4 lanes
N 1000 Road	Iowa to E 1900 Road	improve to arterial road standards
E 1900 Road (Route 1057)	N 1000 Road to K-10	Improve to arterial road standards
Church Street	N. City Limits to 10th Street	street and sidewalk improvements
Church Street	10th Street to K-10	street and sidewalk improvements
Main Street	Through Eudora	street and sidewalk improvements
US-56	Across Douglas County	shoulder improvements, intersection improvements
Transit - Bus Headways	Lawrence	Reduce Time between Successive Buses
Transit Service Hours	Lawrence	Increase Daily and Weekend Service Hours
Transit Facility	Lawrence	Lease or Construct New Transit Depot, Maintenance Facility
Transit – Bus "Cut Outs"	Various	Cut outs along streets to allow buses to pull out of traffic
Bicycle Facilities	MPO Area	Additional Bicycle Facility Improvements
Pedestrian Facilities	MPO Area	Additional Pedestrian Facility Improvements

Recommended Financial Plan

As is the case in virtually every community across the nation, there are not sufficient revenues to meet all of the transportation needs in the Lawrence/Douglas County region. Because financial resources are limited, it was necessary to pare *T2030's* list of transportation projects and services to match the available revenues.

What we've heard...
Funding programs should be established to support all modes of transportation.

The fiscally constrained budget proposed for roadway projects includes:

- $361 million for operation and maintenance activities
- $241 million to complete a K-10 freeway connecting I-70 to K-10 east of Lawrence
- $217 million in major street/road improvements
- $170 million for widening the Kansas Turnpike (I-70) and improving interchanges and toll plazas
- $110 million for bridge improvements
- $68 million to improve US-59 from the south County Line to the south city limits of Lawrence
- $27 million in intersection, access management, and median improvements
- $10 million for ITS projects

The fiscally constrained transit budget is estimated at $96 million, which is consistent with the estimated transit revenues.

The pedestrian/bicycle budget is estimated at $7 million.

The recommended financial plan for *T2030* provides a series of action items for consideration and implementation by the Lawrence/Douglas County MPO and the local jurisdictions in the region.

Financial Action 1: *Increased Long-term Alternative Mode Funding*

Adjust the allocation of transportation funding resources to provide a more equitable share for bicycle and pedestrian modes as well as to increase the current transit share.

Financial Action 2: *Adjust Short-term Funding Allocations in the TIP*

The resource allocations recommended in T2030 should be reflected in the region's Transportation Improvement Program (TIP) to the extent possible. The resource allocation should be reviewed each year as the TIP is prepared. Multi-modal components of roadway projects should be credited to the appropriate modal category - transit, bicycle, or pedestrian.

Financial Action 3: *Transportation Funding Task Force*

Form an ad hoc transportation task force to pursue additional public and private funding for transportation to reduce the number of unfunded projects. Developer impact fees, which are used successfully in many areas across the nation, and possibly a local, dedicated transportation sales tax, may be the most promising new sources of funds.

Financial Action 4: *Pursue Discretionary Funding and Other New Funding Sources*

Vigorously pursue discretionary state and federal funding. There are a number of federal and state funding categories Lawrence might be eligible to receive. These funds typically require a modest local match. The proposed action item would be to continue to seek these discretionary state and federal funding sources.

The Cities and County should explore other new funding sources such as a sales tax dedicated to transportation improvements.

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Chapter 15: Impacts of the Plan

Environmental Review

The community's investment in transportation infrastructure and services can provide significant benefits in terms of mobility, travel choice, and quality of life for the citizens of Baldwin City, Eudora, Lawrence, Lecompton, and Douglas County. In many cases, these investments may contribute to better air quality, energy conservation, and reduced traffic congestion. However, impacts to the natural and physical environments can result as well.

Provisions within SAFETEA-LU call for greater environmental consideration in the development of metropolitan transportation plans. The Lawrence/Douglas County MPO, as part of the *T2030 Long Range Transportation Plan*, has attempted to assess the impacts and/or create an initial understanding of environmental conditions, which can be used to assist in the project development process once a project has moved from the planning stage of this document to the programming stage for ultimate project implementation.

The following sections include a review of the proposed *T2030* projects relative to environmental features such as, communities of concern (e.g. environmental justice populations), wetland and floodplain areas, and historic environs. From this review, the MTPO has developed a series of environmental mitigation strategies to guide future transportation improvements from the planning stage to the project development stage.

Title VI, Environmental Justice, and Socioeconomic Characteristics

Title VI and Environmental Justice

Title VI of the 1964 Civil Rights Act requires that no person, because of race, color, religion, national origin, sex, age, or handicap, be excluded from participation in, denied benefits of, or be subjected to discrimination by any federal aid activity.

Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, issued on February 11, 1994, broadens this requirement to require that disproportionately high and adverse health or environmental impacts to minority and low-income populations be avoided or minimized to the extent feasible. Projects that include actions that are proposed, funded, authorized or permitted by federal agencies are subject to this Executive Order. The federal nexus for the proposed action is FHWA and FTA funding for the development and implementation of *Transportation 2030*.

There are three fundamental environmental justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The U.S. DOT Order (5610.2) on Environmental Justice provides clear definitions of the four (4) minority groups addressed by the Executive Order. These groups are:

- Black (a person having origins in any of the black racial groups of Africa).
- Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).

- Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands).
- American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

The FHWA Order defines "low-income" as "a person whose household income is at or below the Department of Health and Human Services poverty guidelines." The Department of Health and Human Services (HHS) poverty guidelines are used as eligibility criteria for the Community Services Block Grant Program and a number of other Federal programs.

Planning & Environmental Justice

Federal law requires that MPOs ensure that individuals not be excluded from participating in, denied the benefit of, or subject to discrimination under any program or activity receiving federal funding on the basis of race, color, national origin, age, sex, or disability. Environmental Justice Executive Order 12898, Federal Actions to Address Environmental Justice (EJ) in Minority and Low-Income Populations, calls for the identification and addressing of disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low-income populations.

The intent of the Executive Order and the US Department of Transportation's EJ guidance is to ensure that communities of concern, defined as minority populations and low-income populations are included in the transportation planning process, and to ensure that they may benefit equally from the transportation system without shouldering a disproportionate share of its burdens.

In development of the previous long range transportation plan, *T2025*, a community profile for the MPO planning area was developed to better understand the various social and economic characteristics of the planning area. This understanding was carried forward in the development of *T2030.*

The following sections provide an assessment of potential adverse impacts and benefits to the minority population and low income groups within the area based on implementation of the transportation projects within *T2030*.

Douglas County Demographics

An overview of the ethnic and income characteristics of the planning region (the Lawrence standard metropolitan statistical area is the same as Douglas County) is presented in Table 15.1. The table also provides data for the state and nation as a context for comparison to larger geographic areas. The 2000 census indicates that while the population of Douglas County is predominantly White (86 percent), minority populations comprise at least 20 percent of the residents in six census tracts. The 2000 census also indicated that nearly18 percent of Lawrence residents live in poverty.

Table 15.1
Socioeconomic Characteristics

Characteristic	Douglas County	State of Kansas	United States
Racial Composition (Percent of Population)			
White	86.1%	90.0%	75.1%
Black or African American	4.2%	4.6%	12.3%
American Indian and Alaska Native	2.6%	0.7%	0.9%
Asian	3.1%	1.4%	3.6%
Other	1.2%	1.2%	5.5%
Hispanic or Latino[1]	3.3%	4.8%	12.5%
Low Income Statistics (2000)			
Persons in Poverty	17.7%	9.4%	13.8%
Median Household Income	$37,547	$40,272	$34,076

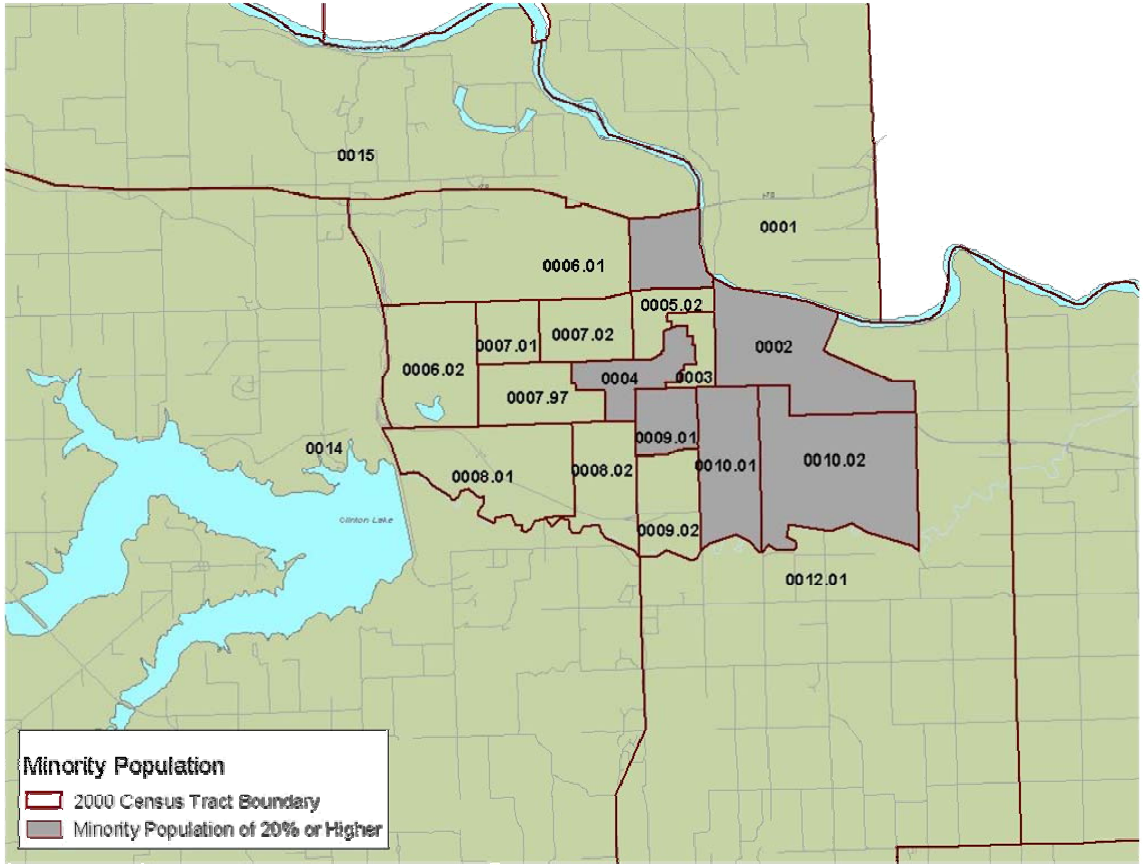
[1] Hispanic/Latino ethnicity is not treated as a separate racial group, so the column total exceeds 100%.

Potential Effects of the Recommended Plan

In general, the Environmental Justice analysis for *T2030* focused on the potentially adverse impacts caused by roadway construction. In this study, the construction of new roadways along new rights-of-way received special attention due to their potential to split or isolate parts of the community. Widening of existing roadways was deemed not as critical, but was still scrutinized for potential impacts. Many of the new and widened roadways will feature enhanced alternative mode facilities, so their impacts may be positive in terms of new transportation services and access.

Figure 15.1
Minority Concentrations

Source: U.S. Census Data (2000); Lawrence/Douglas County MPO GIS Data



Alternative mode investments in transit service and bicycle and pedestrian facilities were considered to provide positive impacts to the minority and low-income populations of Douglas County. For those locations in Lawrence and Douglas County that do not currently have multimodal transportation facilities, alternative mode services and facilities would provide additional, lower-cost transportation options to increase the mobility of these populations and their access to the community.

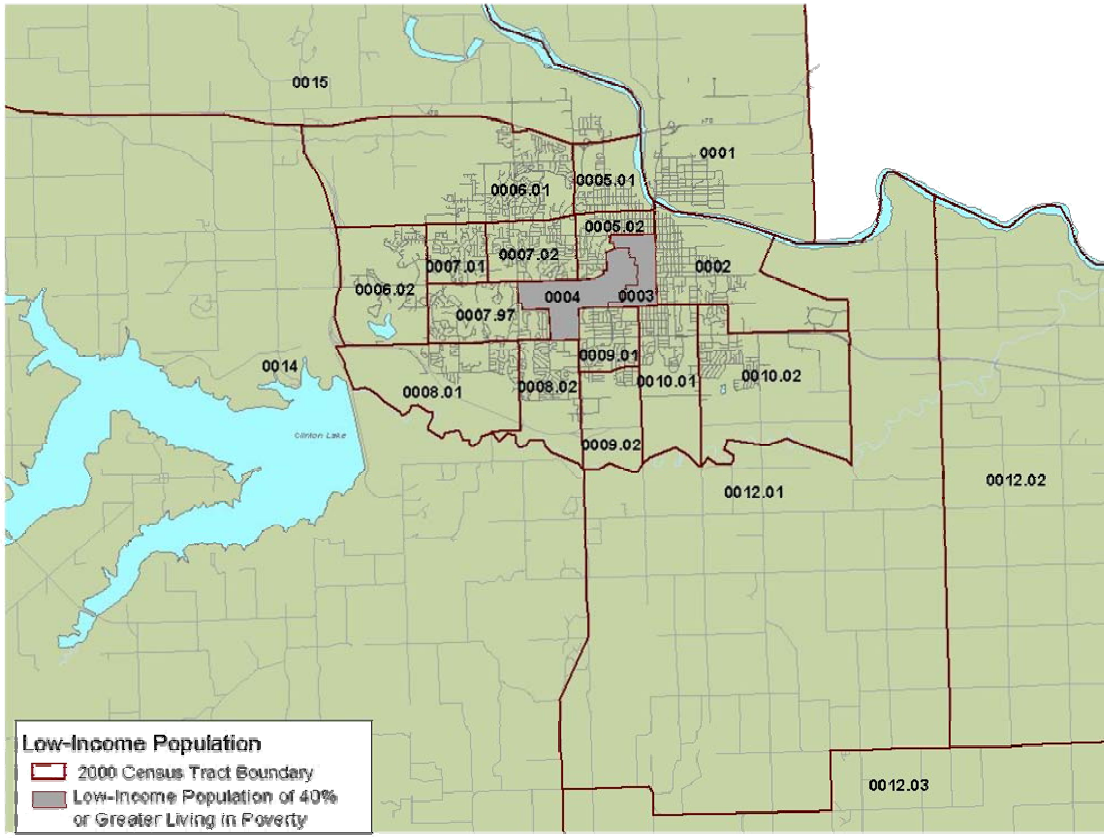
The potential effects of the proposed projects have been identified and evaluated with respect to the impacts that the minority and low-income populations may experience. Several figures are presented to demonstrate graphically where these changes may occur. The concept of environmental justice is to ensure that adverse effects

are not borne unduly by certain groups; this analysis identified the likely impacts from the implementation of *T2030*. These impacts are summarized in Table 15.2, and illustrated in Figures15.3, 15.4, and 15.5.

The criteria used for the minority population impact study was based on Census 2000 tract data with 20 percent or greater minority resident population per tract. Six minority tracts may be affected, as shown in Figure 15.1: 0005.01, 0002, 0004, 0009.01, 0010.01, and 0010.02. Table 15.2 lists the census tracts that are affected, the T2030 improvements that are proposed, and the potential impacts. The affected tracts are located in the east and southeast area of Lawrence.

Figure 15.2
Low-Income Concentrations

Source: U.S. Census Data (2000); Lawrence/Douglas County MPO GIS Data



The criteria used for the low-income population impact study was based on census tract data with 40 percent or greater of the tract population living in poverty. The study area only has two low-income tracts. They are 0004 and 0003. Both of these census tracts are located in the urbanized area of Lawrence as shown in Figure 15.2. Given their proximity to the University of Kansas, many may be college students.

In all, seven census tracts in Douglas County include one or more minority or low-income concentrations that may be affected by the implementation of *T2030.* The transportation categories that have been analyzed are roadways, bicycle and pedestrian facilities, and transit services. These are represented below for the entire Impact Study Area. Figures 15.4, 15.5, and 15.6 represent *T2030's* recommended improvements to each of these modes.

Table 15.2

T2030 Environmental Justice Analysis

Tract	Minority	Low-Income	Roadway	Transit	Bike and Pedestrian
0005.01	✓		The widening of the Kansas Turnpike to 6 lanes will impact the people and environment in this census tract. However, since the turnpike already exists and much of the right-of-way is already owned by the state, impacts to target populations will be minimal.	Implementation of new roadways increases the opportunity for new transit service routes. Transit improvements and changes should be analyzed to insure that all minority and "transit-captive" users are serviced to the extent possible. Increased transit service is considered to have only positive benefits in terms of additional transportation options and increased access to the community for target populations.	Bicycle and pedestrian facilities should be incorporated into new and widened roadways to provide increased service to citizens without cars or drivers licenses. New bicycle facilities and pedestrian improvements are considered to have only positive benefits in terms of additional transportation options and increased access to the community for target populations.
0002	✓		The new Franklin Road and 19th Street Extension will be constructed according to updated urban street design standards and the most recent safety requirements. Their impacts to target populations will be minimal.		
0003		✓	*T2030* does not recommend any roadway improvements in this tract, so no impacts are anticipated.		
0004	✓	✓	*T2030* does not recommend any roadway improvements in this tract, so no impacts are anticipated.		
0009.01	✓		Intersection improvements are recommended to increase the capacity of 23rd Street and Iowa Street. The improvements will consider multimodal facilities and services and the most recent safety standards will be applied. Right-of-way needs should be closely scrutinized, but impacts to minority and low-income should be minimal.		
0010.01	✓		Intersection improvements and the widening of Haskell will increase the capacity of travel lanes. The widening will be constructed to increase multimodal facilities and services and the most recent safety standard will be applied. Right-of-way needs should be closely scrutinized to minimize impacts to minority and low-income areas. The 32nd Street alignment of the South Lawrence Trafficway will be introduced as a new freeway. This area is generally undeveloped so impacts to target populations will be minimal. The new roadway will be constructed according to updated urban street design standards, updated safety requirements, and provision for multimodal transportation.		
0010.02	✓		Intersection improvements are recommended to increase the capacity of 23rd Street. 31st Street will be extended to E 1750 Road. The improvements will consider multimodal facilities and services and the most recent safety standards will be applied. Right-of-way needs should be closely scrutinized to minimize impacts to minority and low-income areas. The 32nd Street alignment of the South Lawrence Trafficway will be introduced as a new freeway. While some environmental effects are possible, this area is generally undeveloped so impacts to target populations will be minimal. The new roadway will be constructed according to updated urban freeway design standards, updated safety requirements, and provision for multimodal transportation.		

Figure 15.3

T2030 New and Widened Roadways

Source: U.S. Census Data (2000); Lawrence/Douglas County MPO GIS Data

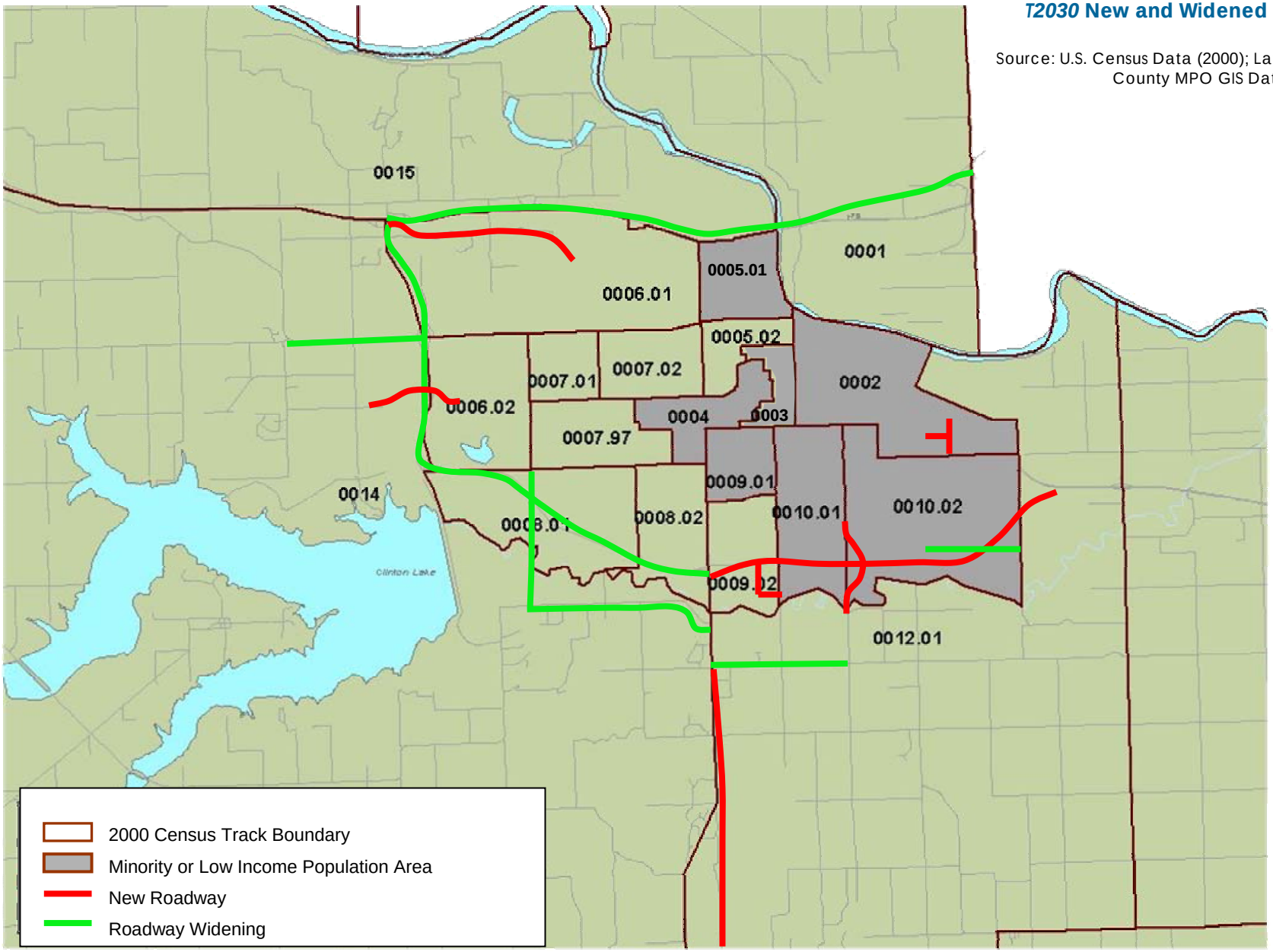


Figure 15.4
T2030 Bicycle Improvements and Pedestrian Districts

Source: U.S. Census Data (2000); Lawrence/Douglas County MPO GIS Data

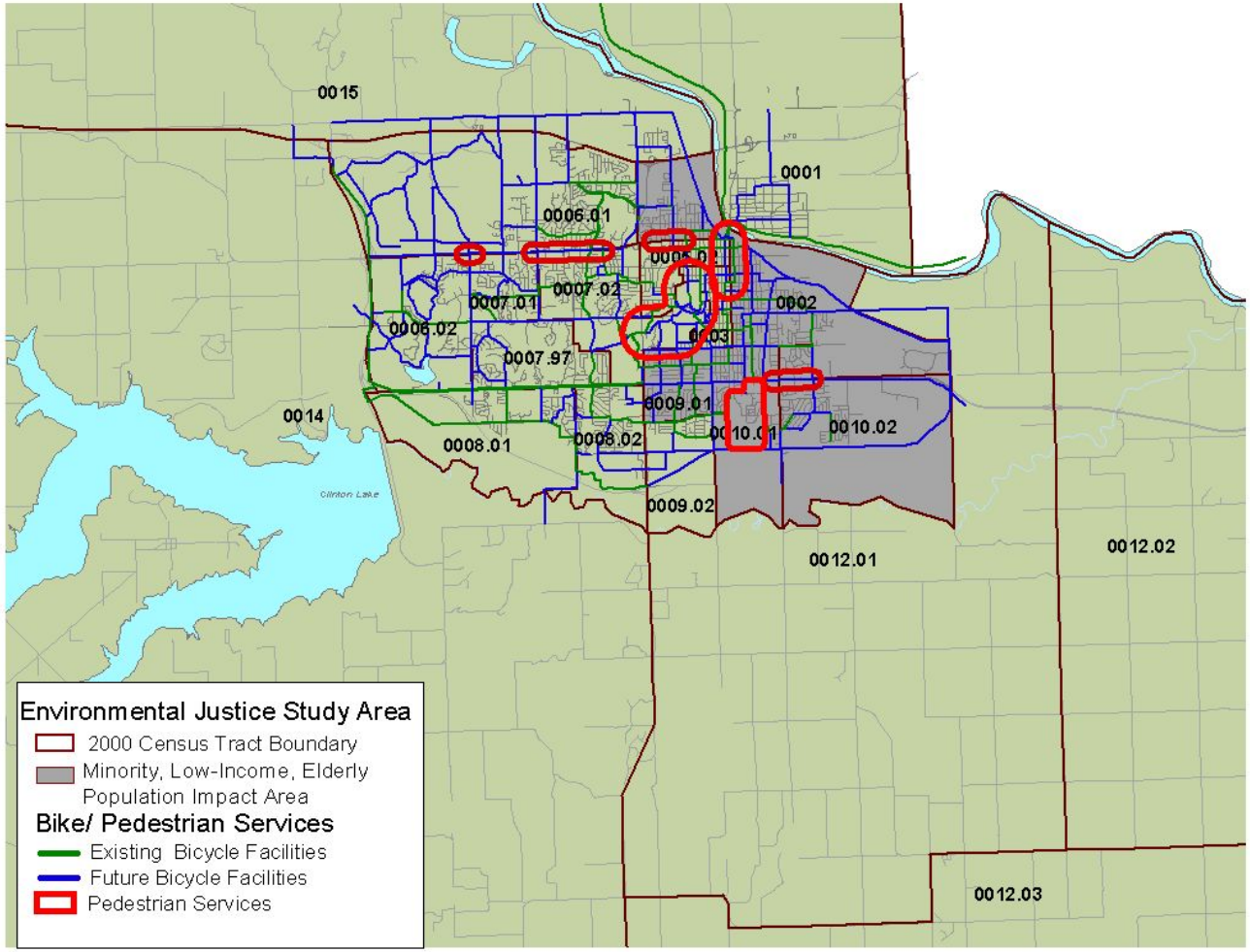
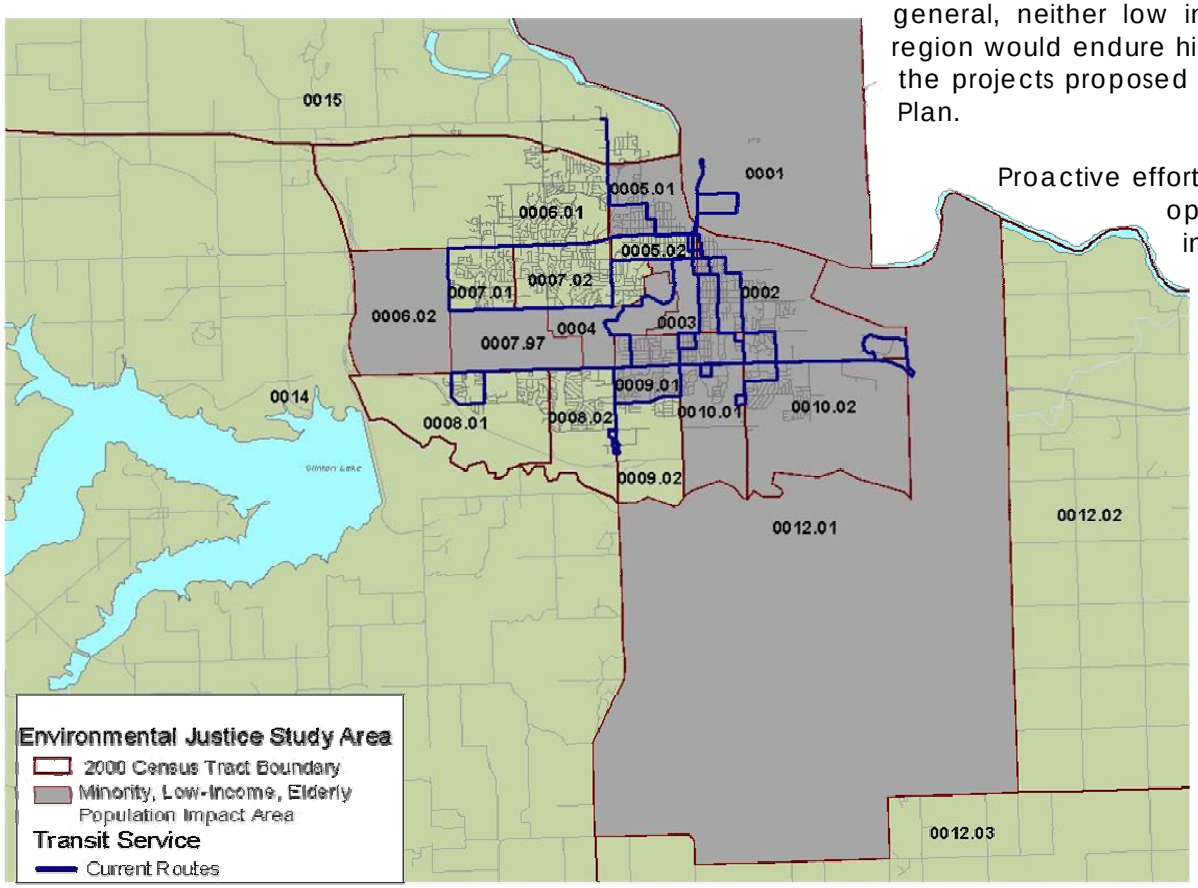


Figure 15.5
T2030 Lawrence Transit System

Source: U.S. Census Data (2000);
Lawrence/Douglas County MPO GIS Data



Summary of EJ Benefits & Burdens

In summary, all population groups would benefit from the planned transportation improvements in the region. In fact, many of the improvements will have positive impacts to these populations in terms of increased access to the community and additional transportation options. Continued transit service would be provided and roadways would include improvements designed to make the roads safer for the traveling public.

Relative to burdens, all segments of the population who live adjacent to roadway construction projects may endure some short-term construction related impacts relative to visual changes, noise and alterations in access. In general, neither low income nor minority populations in the region would endure high and disproportionate impacts due to the projects proposed by the *T2030* Long Range Transportation Plan.

Proactive efforts should be made to ensure meaningful opportunities for public participation including specific activities to increase outreach for low-income and minority participation during the project development process for each of *T2030's* recommendations. This participation will be important to the decision-making process and will help to ensure that transportation needs of the target populations are met to the extent possible.

Floodplains and Wetlands

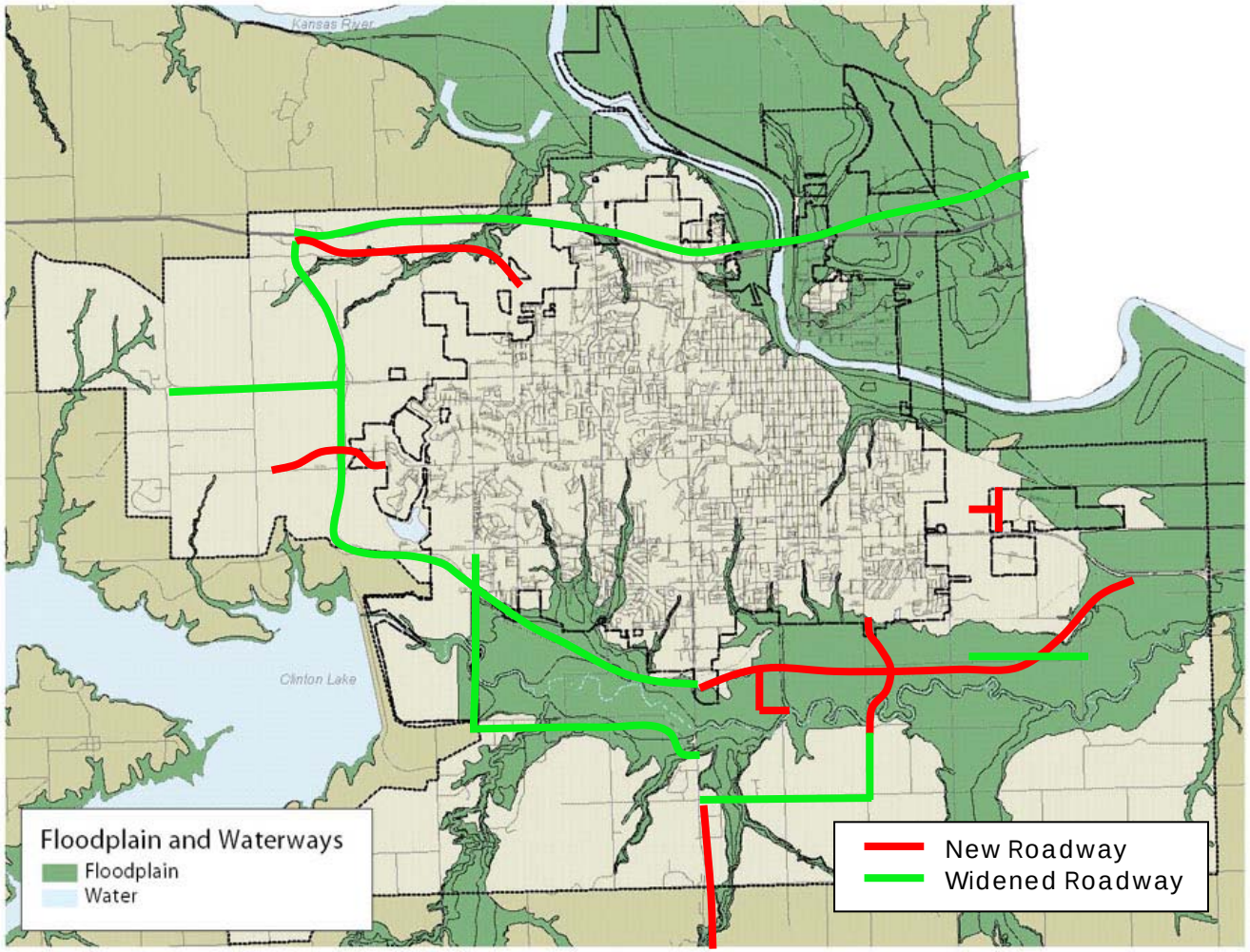
The development of roadways in or through floodplains, wetlands, or other environmentally sensitive areas is discouraged. When it has been determined that no other choice is feasible and a roadway expansion is necessary, the expansion will be undertaken only if it can be demonstrated that the improvement will have no negative impacts upon the environment or that negative impacts that are created will be mitigated. Floodplains and waterways within the Lawrence/Douglas County metropolitan area are shown in Figure 15.6.

Several of the recommended roadway improvements will cross a floodplain. If potential impacts to floodplains are identified, the project sponsor will consult as early as possible with the floodplain administrator or the Federal Emergency Management Agency, as appropriate, to evaluate impacts, and identify avoidance actions or mitigation measures to reduce or eliminate the impacts.

If potential impacts to wetlands are identified, the project sponsor will consult as early as possible with the U.S. Army Corps of Engineers to evaluate potential impacts, and identify avoidance actions or mitigation measures to reduce or eliminate the impacts.

Figure 15.6
Floodplains and Wetlands

Source: Lawrence/Douglas County MPO GIS Data

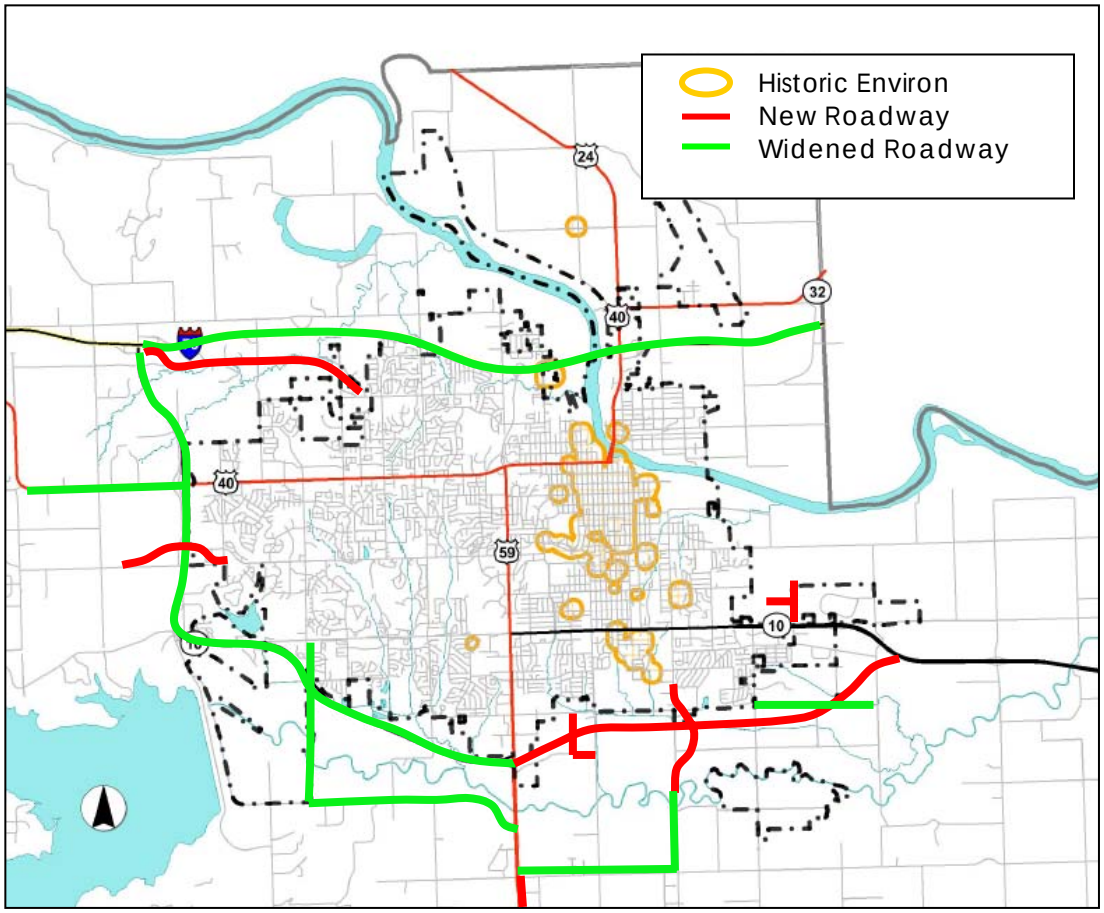


Historic Environs Analysis

The cultural and historic environment of the Lawrence Area is rich - with a long history defined by structures and urban form which are still in place today. Historic environs in the Lawrence area are shown in Figure 15.7.

Figure 15.7
Historic Environs

Source: Lawrence/Douglas County MPO GIS Data



Kansas State Law requires that the State Historic Preservation Officer (SHPO) be notified of any projects that may encroach upon, damage, or destroy any historic property included in the national register of historic places or the state register of historic places or the environs of such property. Whenever rezoning, building, demolition or other permits are required within those environs (i.e., 500 feet within corporate city limits or 1,000 feet in rural areas) the project is reviewed by the SHPO.

A spatial analysis using the Lawrence geographic information system (GIS) indicates that of the planned improvements within the MPO area as part of *T2030,* only the I-70 (KTA) widening, may potentially impact a known historic properties within the City or County.

When a project may impact a historical property, early communication with SHPO should occur to identify potential issues and/or impacts and to develop appropriate mitigation measures, if deemed necessary.

Energy Conservation

Transportation is inextricably linked to energy consumption, but several measures can be planned and implemented to reduce the amount of energy consumed for transportation purposes.

Some energy conservation occurs as older vehicles in the transit and private vehicle fleet are replaced with more fuel-efficient vehicles. Other measures take advantage of incentives or mandates developed through the planning process. For example, travel demand management (TDM) techniques such as carpooling, vanpools, flexible work hours, and alternative mode use can be utilized to reduce vehicular travel and the energy consumption associated with it. Transportation system management (TSM) can also assist with reduced energy consumption using techniques such as intersection improvements (e.g., turning lanes), signal timing and progression, roadway widenings, and others.

Furthermore, additional investments in alternative modes consistent with *T2030's* Financial Plan may reduce vehicle trips and their associated energy needs.

Transportation Planning and Livable Communities

When we think of the components related to transportation that help create or support livable communities, we may think of issues such as traffic calming, street design, scenic road preservation, bicycle parking and facility design, public transit, transportation policies for planning and people, land use planning, parking management, access control, zoning and design, innovative strategies for reducing traffic congestion, and private sector initiatives.

Conventional road widening proposals can threaten and irreversibly damage the scenery, environment, livability, and community character. Conventional road projects are also usually designed to serve the "motoring public," not the public at large with the primary need considered to be speed. Elevating this need above all other needs of real-life people has done considerable harm to the quality of life in communities like Lawrence.

It is important to accommodate motor vehicles in our society because they are the dominant and prevailing mode used by the traveling public. However, this is and should be only one function that streets and roads address. Transportation planners and engineers are reflecting back on the decisions of the last 50 years and are recognizing that it is equally as important to enhance rather than blight areas of the community and neighborhoods that are within or adjacent to the major transportation corridors. Sharing the road or the transportation corridor with other, equally important users (e.g., bicyclists, pedestrians, children at play, and persons with disabilities)

is also an important goal to achieve. Streets exist in conjunction with—not in isolation of—their surroundings. Streets pass through landscapes full of people who *are* somewhere rather than who are *going* somewhere. This is an important distinction.

In 1994, a Boston Globe article posed the question, "Is the front yard obsolete?" According to John Stilgoe, Harvard Social historian, "It's getting so only the elderly can remember the days when people actually spent time sitting on the front porch greeting people or kissing good night after a date. Many homeowners have pretty much kissed off this half of their lot. The main reasons front yards have become so unlivable is *a lot more cars going a lot faster*."

Streets and roads are important public spaces. They determine whether a community looks scenic and inviting, or bleak and unappealing to drivers and others who are passing through. Cities that are attractive and appealing to people have streets that provide a variety of purposes, not just a driving surface. Places along these streets provide space for people to walk or jog, cyclists to ride, pet owners to walk their pets, children to play, and wheeled individuals to find independence in access to and from their neighborhoods to places for work or play.

The reality of a direct and dynamic link between roads and land uses has led to communities adopting policies that put overall community goals ahead of traffic considerations. The 1980 Federal Highway Administration (FHWA) report, *State of the Art: Residential Traffic Management*, states the primary goal of street improvements and traffic management is, "to significantly improve the environmental conditions of as many residents as possible, especially those most vulnerable to traffic impacts." There are several sub-goals listed in this report, six of which are to reduce traffic accidents; provide for safety and convenience of pedestrians and other non-motorists; eliminate noise and pollution; provide a safe place for children's play, improve scenery, and revitalize and stabilize neighborhoods. Achieving these goals in the design of new streets or the redesign of older streets will result in a more livable community for residents of Baldwin City, Eudora, Lawrence, Lecompton, and rural Douglas County.

Improving traffic flow and safety in one neighborhood, when done on a project-by-project basis, can decrease the safety and increase traffic flow on streets in adjoining neighborhoods. Where traffic calming measures and other roadway design techniques are planned for and undertaken on a city or community-wide basis, everyone in the city or community can benefit from these improvements, not just those residents of a select few neighborhoods. Traffic calming, innovative street designs, the establishment of levels of service (LOS) standards, and implementation of access management standards to regulate the number and proximity of access points are all steps that, when taken together, will help build, develop, and maintain a more livable community.

To achieve the above positive impacts, the *T2030* Plan has recommended that goals, policies and strategies be adopted in Baldwin City, Lawrence, Lecompton, and Douglas County to make these steps part of the development process and accepted city and county policy.

Chapter 16: Implementation of the Transportation Plan

T2030 builds upon several significant changes from the *T2025* Lawrence/Douglas County transportation plan in terms of alternative modes, congestion management, and finances. These recommendations can only effect real change in the region's transportation system if they are implemented. This requires the collective will of elected officials, city and county staff, and the general public.

T2030 presents a series of roadway, transit, bicycle, pedestrian, and congestion management projects and/or actions that make up the future vision for transportation in the region through the year 2030. Since the plan is financially constrained to forecasted available resources, it represents not a wish list but rather a literal interpretation of the year 2030 transportation system. In fact, the intent of recent federal legislation is to provide a realistic blueprint for the future so that logical and coordinated land use and transportation planning decisions can be made.

Although *T2030* provides a long-range vision for the year 2030, federal regulations require it to be updated every five years. So while all of the projects, policies, and actions presented herein are necessary to achieve *T2030's* vision, those identified for the first five years of the plan have the highest priority. It is imperative, to show real progress as soon as possible to make the vision a reality.

To realize the spirit and intent of T2030 as well as make the most of the transportation facilities and services it identifies, there are several supporting actions and polices that will need to be implemented. These actions and policies are identified in Table 16.1 and the most pressing are noted in the 0 – 5 Years column. Many of these are considered to be ongoing efforts. The physical improvements and projects constructed in this time period include

committed projects and additional ones identified through the region's annual prioritization process.

Beyond the immediate priorities to implement *T2030*, additional actions and policies should be considered in a longer planning time frame to continue the pursuit of a balanced, multi-modal transportation system. These items are priorities beyond the first five years of *T2030's* implementation and are also identified in Table 16.1.

Many of the actions are related. For example, updating street design standards to accommodate multimodal and freight considerations will address several individual actions. This is also true for those that are associated with funding issues and multimodal opportunities for new developments.

In addition to the actions identified from the individual chapters of T2030, the Lawrence/Douglas County MPO should implement a coordinated data collection and development process, known in other communities as a Mobility Report Card. This would include emphasis on the Lawrence Travel Demand Model, which relies on traffic counts for its calibration. Transit ridership and data, bicycle counts, and possibly a local household travel survey would provide important information to support the MPO's ongoing planning activities and the city and county's engineering efforts.

Table 16.1
Actions and Policies for Implementing T2030

Chapter	Action	Description	0 –5 Years	5 – 10 Years	Beyond 10 Years
Land Use	1	Combine Planning Cycles	■	■	■
	2	Encourage Land Development Patterns to Promote Transportation Efficiency	■	■	■
	3	Encourage Access Management Standards	■	■	■
	4	Enhance Streetscapes and Gateways	■	■	■
	5	Consider Street-Land Use Relationship in Planning Developments	■	■	■
Roadway	1	Coordinate Multimodal Enhancement for Future Roadways	■	■	■
	2	Integrate Multimodal Enhancements into Street Design Guidelines	■		
	3	Consider Environmental Issues Early in the Planning Process	■	■	■
	4	Update Street and Intersection Design Standards	■		
	5	Update Subdivision Regulations	■		
	6	Coordinate Highway Design Standards with KDOT	■	■	■
	7	Establish Access Standards	■		
	8	Develop Access Control Plans for Corridors	■	■	■
	9	Develop Access Management Phasing Plan	■		
	10	Fund Access Plans	■	■	■
	11	Fund Intersection Data Collection and Timing Plan Development	■	■	■
	12	Study Citywide Signal System	■		
	13	Develop Multimodal Traffic Impact Analysis Guidelines	■		
	14	Perform Signal Analysis for New Developments	■	■	■
	15	Review Subdivision Regulations	■		
	16	Revise Development Standards for Multimodal Requirements	■		
	17	Include Congestion Management in Planning Process	■	■	■
	18	Establish Level of Service Standards	■		
	19	Implement Annual Prioritization Process for Roadway Capacity Improvements	■	■	■
	20	Pursue Additional Funding	■	■	■

Chapter	Action	Description	0 –5 Years	5 – 10 Years	Beyond 10 Years
Transit	1	Ongoing Monitoring of Transit Performance and Service	■	■	■
	2	Establish an off-street location for a regional transit hub	■		
	3	Develop Pedestrian and Land Development Standards to Promote Productive Transit Service	■		
	4	Study Transit Productivity and Coverage Issues	■	■	■
	5	Develop Transit-Friendly Roadway Design Standards	■		
	6	Pursue Transit Consolidation Opportunities	■		
	7	Develop a Long-Term Transit Funding Strategy	■		
	8	Develop a Long-Range Transit Plan	■		
	9	Develop a Long-Term Funding Strategy for Capital Improvements	■		
	10	Investigate the Potential for Regional Transit Connections along I-70	■	■	
Bicycle	1	Implement Lawrence-Douglas Co. Bicycle Plan Recommendations	■	■	■
	2	Update the Bicycle Work Program and Bicycle Facilities Plan Every Five Years	■	■	■
	3	Adopt Bicycle Standards and Guidelines for New Developments	■		
	4	Implement a Bicycle Demonstration Project	■	■	
	5	Consider Bicycles in Development Review	■	■	■
	6	Implement Douglas County Bicycle Plan Elements	■	■	
	7	Plan and Construct Bicycle Amenities	■	■	■
	8	Develop a Bicycle Education Program and Enforce Traffic Laws	■	■	■
	9	Implement the Bicycle Plan	■	■	■
	10	Adjust Short-Term Funding Allocations for Bicycle Facilities	■	■	■
Pedestrian	1	Develop Pedestrian Level of Service Standards	■	■	■
	2	Inventory Pedestrian Facilities, Identify Needs, and Prioritize Plan	■	■	■
	3	Notify Property Owners of Responsibility to Repair Sidewalks	■	■	■
	4	Fund Pedestrian Improvements	■	■	■
	5	Develop Street Design Standards	■		
	6	Develop Pedestrian Standards for New Developments	■		
	7	Coordinate Pedestrian Planning Issues	■	■	■
	8	Develop Pedestrian Education Program	■	■	■

Chapter	Action	Description	0 –5 Years	5 – 10 Years	Beyond 10 Years
Operation and Management	1	Implement ITS Deployment Plan Recommendations			
	2	Implement Congestion Management Strategies			
Intermodal	1	Coordinate Freight Issues			
	2	Participate in the Development of the Statewide Freight Plan			
	3	Consider Adjacent Land Use			
	4	Consider Needs of Trucks in Roadway Design/Access Managemt.			
	5	Designate Truck Routes			
	6	Pursue Commuter Rail			
	7	Establish a Multimodal Passenger Hub			
	8	Implement the Recommendations of the Airport Master Plan			
Safety	1	Improve Accident Data Collection and Analysis			
	2	Develop a Regional Roadway Safety Plan			
	3	Continue to Participate in State and Federal Safety Programs			
Security	1	Develop Plan of Action for Transportation Security			
	2	Incorporate Security in MPO Activities			
Financial	1	Increased Long-term Alternative Mode Funding			
	2	Adjust Short-term Funding Allocations in the TIP			
	3	Transportation Funding Task Force			
	4	Pursue Discretionary Funding			

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