

Executive Summary

Background

Economic growth in southern Leavenworth County over the past decade has been strong. As both the number of business and residences has continued to increase, the need for better management of the public infrastructure has also increased. The Kansas Department of Transportation (KDOT) has invested transportation funds in the improvement of US-24/40 through Leavenworth County to upgrade the highway from two lanes to four lanes. Because of the significant public investment in providing this improvement, it is important that the intended function of the highway be preserved as a safe and efficient transportation corridor. The improvement of the highway to four lanes has improved the mobility and safety of motorists in Leavenworth County.

Citizens of Leavenworth County have recognized that US 24/40 is a transportation resource that must be preserved for that purpose. The US 24/40 Corridor Study was initiated by state, regional, county and city officials and staff to preserve the transportation investment made in US 24/40. The project was initiated through the cooperation of the cities of Basehor and Tonganoxie, Leavenworth County, KDOT, and the Mid-America Regional Council (MARC). This consortium selected the firm of Bucher, Willis and Ratliff Corporation (BWR), in cooperation with Jane Mobley Associates, Richard Caplan and Associates, and ETC Institute to assist them in the completion of the US 24/40 Corridor Study.

Purpose

The purpose of the study was to protect and preserve the transportation investment within the corridor by implementing sound corridor land use and transportation planning and management principles. Throughout the 14 month study duration, the public was invited through several different forums to provide meaningful input in developing community values to be embodied in the study. Those values included the desires to maintain a high level of mobility and safety on the highway, to preserve the rural drive experience of US 24/40, and to foster orderly economic growth in southern Leavenworth County.

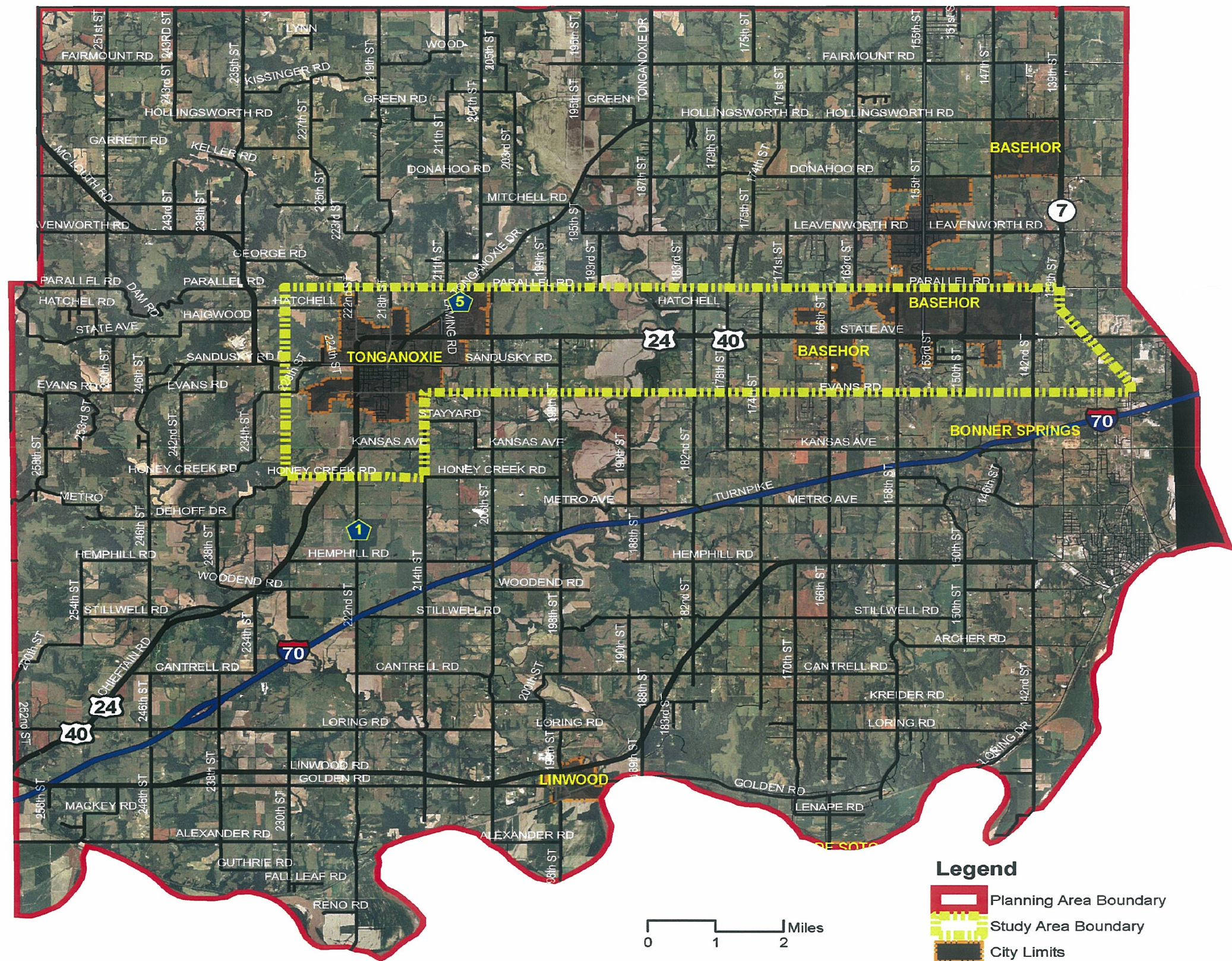
The study defined guidelines for managing traffic, access, land development densities, and design standards and set forth an implementation plan to achieve the study recommendations.

Study Area

The Study Corridor encompassed one mile either side of US 24/40 from Honey Creek Road on the west to K-7 on the east. Figure ES-1 depicts the study corridor. A larger area of Leavenworth County was considered with respect to its influence on the study corridor. This larger planning area included all of Leavenworth County south of Dempsey Road, as depicted in Figure ES-1.

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Figure ES-1 Study & Planning Area



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Recommendations

The recommendations that came out of the public involvement and technical review included development of:

- A plan for development densities by “transects” that help the county and the cities relate their land use plans and zoning policies to the corridor plan,
- Policies for development densities,
- A long range plan for access and traffic management,
- Identification of short range opportunities for access and traffic management,
- Policies for access and traffic management, and
- Design guidance for buildings, landscaping and buffers, lighting, signage, and drive experience.

An implementation plan identifies both short term and ongoing long term activities to achieve the recommendations. An important element of the implementation plan is the continuation of a project management team comprised of the partner jurisdictions that will continue to oversee the plan progress.

Development Plans and Policies

The land density recommendations have been tied to land density zones (or “transects”) that reflect the current long range land use plans of Leavenworth County, the city of Basehor, and the city of Tonganoxie. While it is anticipated that the zone boundaries will change over time, the underlying philosophy is to encourage development to occur contiguous to the two cities where new development can be supported by city services. The transects describe land use patterns (rural-to-urban, and back again urban-to-rural) and complement city and county land use and zoning policies.

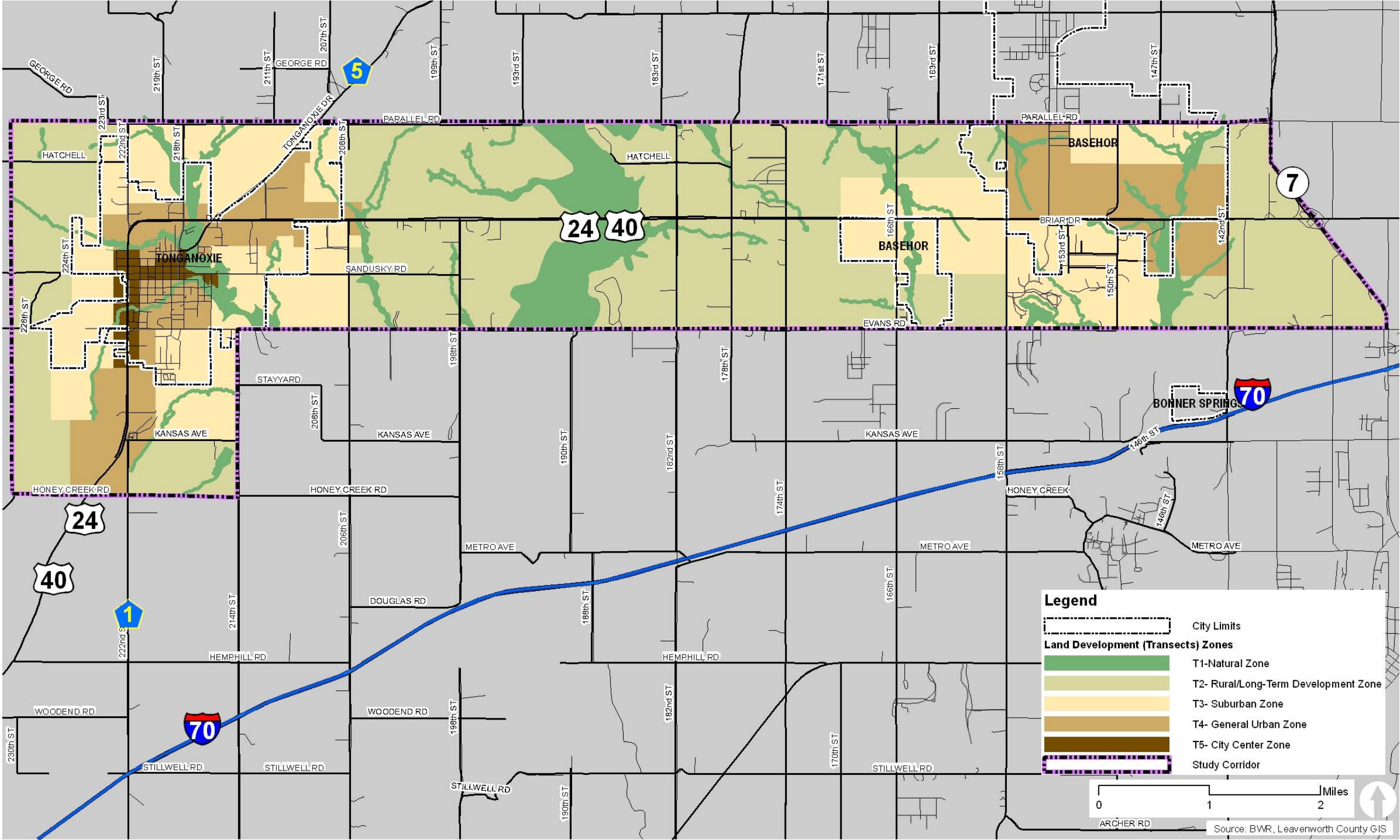
The local land use policies and regulations relate to transects—but, they serve different purposes. Transects are not local regulatory policies, rather, they are planning constructs that help frame the corridor land use analysis. As the land uses along 24/40 “transect” from urban-to-rural and back to urban, the development impacts change. The local land use regulations impose local land use authority. The transects “frame” or describe the land use transitions, but they do not regulate the way local zoning and subdivision ordinances do.

So what is the ultimate goal or “test” of an effective corridor plan? (After all, the plan covers only a 2-mile wide swath through south Leavenworth County.) The plan has engaged the entire regional community and the local jurisdictions. The corridor issues have spill-over effects and implications beyond the 2-mile corridor. Local jurisdictions are asked to adopt the plan recommendations through amendments to their own land plans and zoning and subdivision regulations (such as in overlay districts). Indeed, some of the solutions can be effective only if implemented at the local levels. For example, local street grid systems and parallel collector streets must be planned and platted outside the US 24/40 Highway right-of-way. The corridor study shows how these local street grids can (and must) relate to the highway, and how to adopt these local land use plans and policies.

The transects represent development that continues from T-1 (natural) to T-5 (City center). **Figure ES-2** depicts the transect zones for the corridor.

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Figure ES-2 Transect Plan



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Traffic and Access Management

The recommended long range (2030) traffic and access management plan must envision the transportation system needed to support the future land development. For US 24/40 to retain a high level of mobility and safety, a supporting system of arterial and collector streets will be needed to complement US 24/40. Figure ES-3 depicts the major street system that will be needed in the future. It also depicts the locations where full access to the highway will be permitted. Only right turns will be permitted at those locations where the major streets intersect US 24/40 and where full access has not been designated. It is anticipated that only those locations with full access will be permitted to have a traffic signal, and then only when the intersection meets appropriate warrants and only in consultation between local jurisdictions and KDOT.

Transportation policies governing highway access must be adopted to maintain the integrity of US 24/40 as an effective transportation facility. These traffic and access management policies have been summarized in the following statements:

- New entrance permits onto US 24/40 should be provided for public streets only.
- Streets with entrance permits onto US 24/40 must connect to all adjacent properties.
- Proposed plats of all properties within the two mile corridor must provide street connections to all the adjacent properties.
- The first access onto any street intersecting US 24/40 shall not be less than 400 feet away from the edge of the US 24/40 pavement.
- Traffic signals will be installed only where necessary and permitted by KDOT, and only where full access is allowed.
- All new intersections with US 24/40 should include right and left turning lanes off and onto US 24/40 as applicable.
- A traffic study shall be performed by a licensed traffic engineer for each requested access to US 24/40.

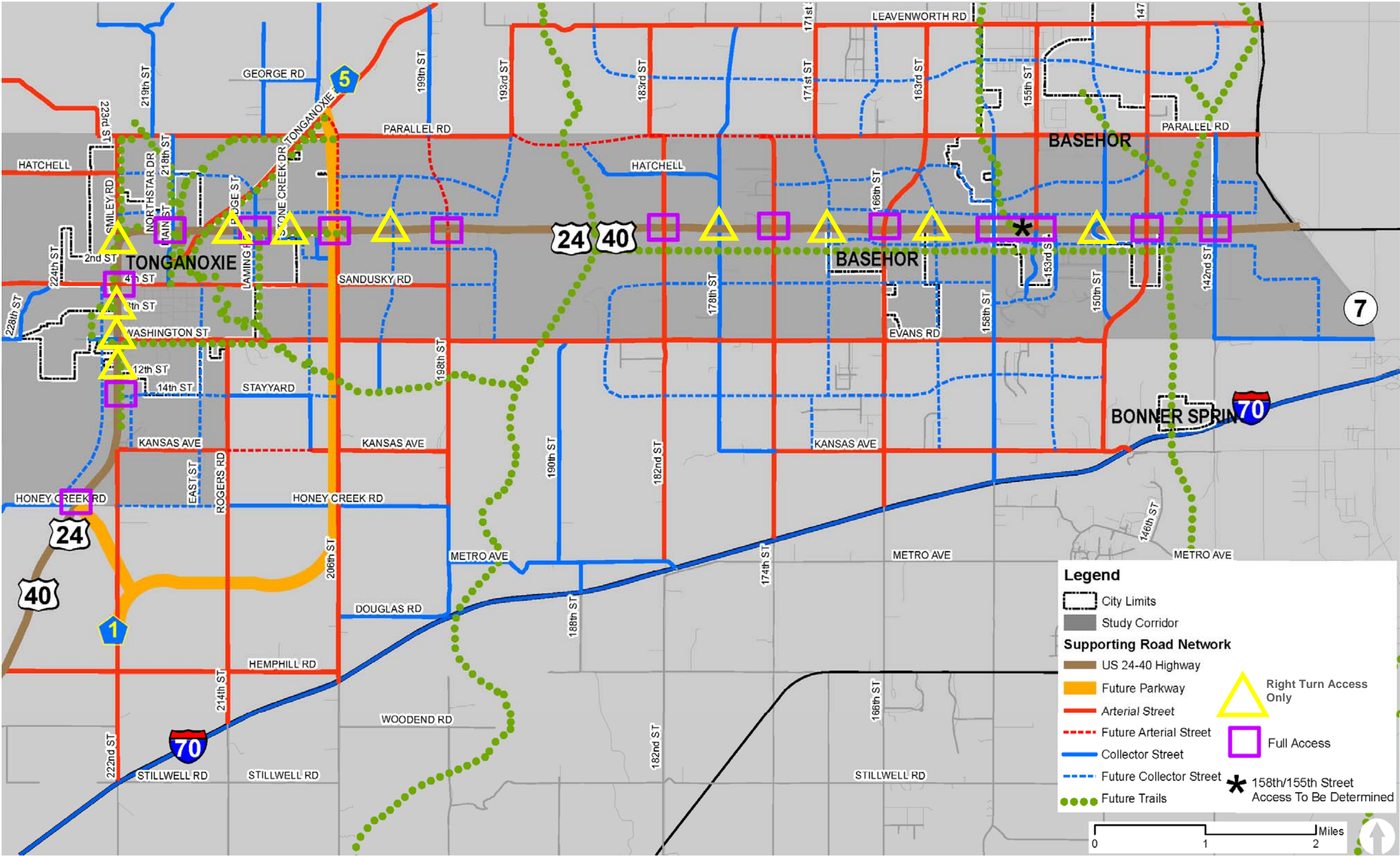
The recommendations of the long range traffic and access management plan are that full access will be limited to only the following intersecting streets in the corridor:

- County Road 1
- 14th Street
- 4th Street
- Main Street
- Laming Road
- 206th Street
- 198th Street
- 182nd Street
- 174th Street
- 166th Street
- 158th Street or 155th Street (still to be determined)
- 147th Street
- 142nd Street

Other recommendations of the long range traffic and access management plan on the corridor include:

- Medians will be constructed the full length of the corridor, with two lanes in each direction by such time that traffic volume thresholds reach the demand for four lanes throughout.
- Existing access in between the full access points will be restricted to right turn only by such time that alternative traffic circulation has been provided for through reverse frontage roads.
- Reverse frontage roads will be constructed to provide alternative traffic circulation and access for properties fronting US 24/40.

Figure ES-3 Long Range (2030) Access and Major Roadway Plan



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Design Policies

The citizens of southern Leavenworth County and the cities of Basehor and Tonganoxie were interested not only in managing the function of their transportation system and development patterns, but also in better directing the future form of transportation and land use in the corridor. One of the outcomes of the study was to identify design guidelines appropriate to the rural and urban development zones. Guidelines were developed for:

- Drive experience
- Pedestrian experience
- Median landscape treatments
- Buffers and screening
- Roadway lighting
- Parking lot lighting
- Building lighting
- Monument signs
- Wall signs
- Pole signs
- Gateway monuments
- Commercial building design
- Industrial building design
- Local and regional commercial building design
- Light industrial building design
- Moderate and high density residential building design

Implementation

An implementation plan was developed to identify the specific responsibilities for activating the plan. It is the intent of the plan that the corridor study report be adopted by reference as part of the Leavenworth County, city of Basehor, and city of Tonganoxie comprehensive plans. Following the adoption of this Corridor Study by the local governments, it is anticipated that the partner agencies will sign an interlocal agreement which will outline the intent of the agencies to support the corridor study recommendations. It is this common commitment of the partner jurisdictions to carry out the Corridor Study which will ensure that the recommendations are completed in accordance with the expectations of the citizens of Leavenworth County, Basehor, and Tonganoxie. It is expected that the partner agencies will continue to meet at regular intervals to review the progress towards implementing the plan.

Existing Conditions: Traffic and Transportation

Introduction

Roadways fulfill two primary functions: mobility and access. Mobility is basically the ability to move quickly from place to place. Access refers to gaining entrance to a property. Generally, these two purposes of a roadway are in competition with each other. One of the challenges for the Corridor Study was for the stakeholders in southern Leavenworth County to reach agreement, or at least give consent, as to the proper balance of the access and mobility functions in the corridor, now, and in the future as the corridor changes.

The corridor is critical to the growth of development in southern Leavenworth County. It serves as a unique transportation resource that serves as the most important thoroughfare for southern Leavenworth County, Basehor, and Tonganoxie. Because of the great cost of constructing the US 24/40 Highway facility, it is important to protect and enhance the highway's primary function of mobility, and to carefully manage its function of access. However, US 24/40 must also provide access to the supporting system of roads that can in turn also provide access to properties, most probably through signalized intersections.

Roads must provide access and mobility, but must also do so in a safe manner. Wherever there are occasions for vehicles to come into contact with other vehicles—as when one vehicle is traveling at a different speed or a different direction from another vehicle—there is a potential for a collision. These possible conflicts most often occur at intersections, where vehicles change both speed and direction. Because collision experience is most often related to intersections, reduction in the number of intersections can also provide reduction in accidents. As traffic volumes increase in the future, the number of accidents may also increase, unless the number of access points is correspondingly decreased.

A review of the corridor's existing mobility, access, and safety also included consideration of occasional on demand transit and bicycle use. No special accommodations to US 24/40 are needed to support the County's existing on demand dial-a-ride service. No specific accommodations have been provided for bicycle use along US 24/40.

Roadway Capacity Analysis

The capacity of a roadway to carry traffic depends not only on the number of lanes, but also on the number of traffic signals and driveways along the road. For example, a freeway can carry more traffic per lane than a city street because freeway access is completely controlled, as opposed to a city street, which has frequent intersections.

The Transportation Research Board has produced methodologies to quantify the quality of roadway operations for multi lane highways, two lane highways, and urban streets in the *Highway Capacity Manual* (HCM). The HCM describes the quality of roadway operation in terms of level of service (LOS) for multi lane highways, two lane highways, and urban streets.

These grades of operation are expressed in terms of LOS A through LOS F, for the best operation through the worst. Because these types of roadways are so different in their characteristics, the equations used to determine the LOS are different. However, in all cases, LOS can be somewhat correlated with traffic volumes, number of lanes, and speeds. Traffic volumes, number of lanes, and speeds vary significantly on US 24/40 Highway throughout the corridor. For example, slower speeds of 30 mph to 55 mph in Tonganoxie result in a LOS B as opposed to the LOS A in the rural section of US 24/40 where the posted speed is 65 mph. Furthermore, it can be expected that the character of US 24/40 will change over time from a highway into an urban highway with traffic signals.

Figure 2-1 depicts the 2006 daily traffic volumes on US 24/40 Highway and the posted speed limit sections in the corridor. Using the methodologies from the HCM for the different sections of the highway, LOS for each section has been identified in **Figure 2-2**. Figure 2-2 also depicts the ratio of the traffic volume to the highway's capacity to carry traffic at LOS C. The capacity of the highway to carry traffic was determined for the number of vehicles that can be accommodated under LOS C conditions. In general, the sections of the highway in west Tonganoxie and south of Tonganoxie where speeds and/or number of lanes are reduced currently operate at LOS C. This section can accommodate an additional 1200 vehicles per day and still remain at level of service C without widening of the highway. It is recommended that traffic volumes in west Tonganoxie and south of Tonganoxie on US 24/40 continue to be monitored with respect to the need to widen the existing two lane highway section. Through the remainder of Tonganoxie and through Basehor the LOS is B. The rural section of the highway between Basehor and Tonganoxie currently operates at LOS A. These four lane sections provide ample capacity to remain at a high level of service.

Roadway Access

One of the challenges for the Corridor Study was for the stakeholders in southern Leavenworth County to reach agreement, or at least consent, as to the proper balance of the access and mobility functions in the corridor now, and in the future as the corridor changes. The existing access patterns along US 24/40 originated in response to the adjacent land developments requesting access in the way most economical for the property development: direct access onto the adjacent highway. Having once obtained the access permits, those properties have thereafter continued to have direct access onto US 24/40. One of the purposes of this study and the resultant plan is to establish the appropriate balance between access and mobility in the corridor. US 24/40 Highway must provide sufficient mobility to move traffic from the regional business and residential centers to the land developments along the corridor, and the supporting roadway system must provide access to those developments.

The Kansas Department of Transportation (KDOT) has developed an access management policy for the highways under its jurisdiction, the *Corridor Management Policy*. This policy contains a matrix of minimum allowable access spacing based on type of highway, land uses being served, traffic volumes, and vehicle speeds. The matrix provides minimum allowable access spacing for US 24/40 Highway that varies from 135 feet in the low speed developed sections to 2640 feet in the high speed undeveloped sections. It must be emphasized that these distances are *minimums* to be applied to accommodate the need for property access under past development patterns. This study provides Leavenworth County and the cities of

Basehor and Tonganoxie an opportunity to establish access management guidelines that will better serve the corridor in terms of appearance, mobility, and safety. US 24/40 is classified as a B Route by the *Corridor Management Policy* in that a corridor study has been completed for the route.

It must be further emphasized, that as development patterns change and traffic volumes increase, application of the KDOT minimum spacing criteria throughout the corridor will result in a deterioration of mobility on US 24/40 Highway. An enhancement of mobility on the highway does not necessarily mean that existing driveways will be closed for the current property owners, or that future developments and redevelopments will not have access. What it means is that as new development or redevelopment occurs, access permits will be more restrictive than the minimums outlined in the *Corridor Management Policy*. New access will be provided as necessary to support the developments in the corridor, but will be shared between multiple parcels, so that new shared public access locations may eventually be spaced one quarter, one half, or even one mile apart. It is recommended that KDOT, the cities, and the county pursue access management opportunities throughout the corridor, as described in Section 7 of this report.

KDOT maintains an inventory of existing access locations along US 24/40 Highway which is summarized in **Table 2-1**. Most of these access points (122 of 153) serve individual properties as the picture below shows. Ideally, an important facility such as US 24/40 Highway should be dedicated to primarily providing mobility to the public, with necessary access provided to public streets, rather than serving as a multi-million dollar facility to serve a few properties. None of the 122 private access points meet the minimum spacing requirements of the *Corridor Management Policy*. Of the public access points, the spacing between Washington and Grace, 4th and 5th, and Village Terrace and Woodfield in Tonganoxie also do not meet the minimum spacing requirements in the *Corridor Management Policy*.



(Example Private Access)

Table 2-1: Driveways by Type and Surface Width

Driveway Surface	Number of Driveways by Surface Width					Sub-Total
	12 ft.	18 ft.	24 ft.	36 ft.	48 ft.	
Private Access Driveways						
Asphalt	61	12	16	1		90
Concrete	8	2	4			14
Gravel	13	2			1	16
Turf	2					2
Total Private						122
Public Access Driveways						
Asphalt		5	22			27
Gravel	3		1			4
Total Public						31
	Total Number of Driveways					153

Source: KDOT

The Institute of Transportation Engineers (ITE) publication *Traffic Engineering Handbook* identifies spacing of access appropriate to maintaining safety. When the speed differentials between vehicles slowing to turn and through vehicles continuing down the road are high, the potential for severe collisions is greater. For posted speeds of 30 mph, ITE recommends all access spacing be no less than 210 feet, and no less than 550 feet for a posted speed of 55 mph. Those spacing standards equate to 25 driveways per mile and 10 driveways per mile, respectively. Sections of US 24/40 Highway through both Basehor and Tonganoxie exceed the number of recommended access points per mile.

Where the density of access points is greater than the ITE density thresholds, collision potential can be somewhat mitigated through a variety of access management strategies, including construction of raised medians, center two way left turn lanes and right turn lanes, consolidation of driveways, and improvement of driveway design standards.

US 24/40 Corridor Study

Figure 2-1

Posted Speed Limit and Annual Average Daily Traffic

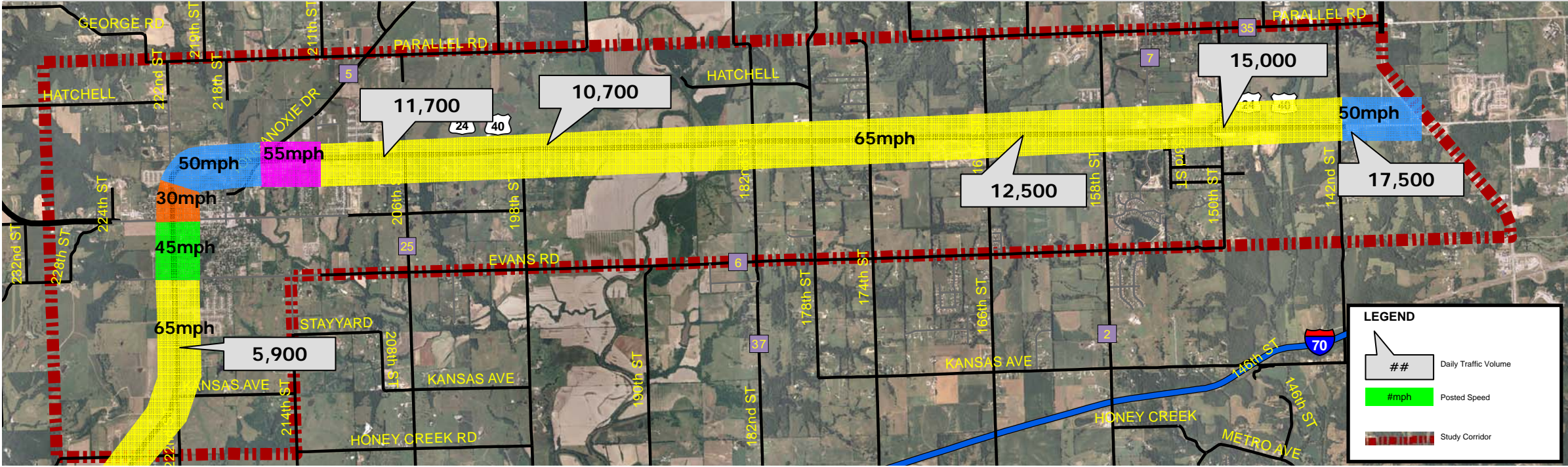


Figure 2-2

Corridor Level of Service



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Traffic Safety Analysis

Roads must not only provide access and mobility, but should do so safely. Wherever there are occasions for vehicles to come into contact with other vehicles, such as when one vehicle is traveling at a different speed or a different direction from another vehicle, there is a potential for a collision. These possible conflicts most often occur at intersections where vehicles change both speed and direction. **Figure 2-3** illustrates the number of ways in which vehicles can potentially conflict. The figure illustrates that a full access intersection provides 36 ways that a collision can occur, while more restrictive access reduces the number of potential conflict points.

KDOT provided a summary of three years of vehicle collision experience for the corridor. Three years is a typical time frame appropriate for reviewing and evaluating collisions history. A review of the collision history on US 24/40, and a review of the corridor, were conducted for the years 2003, 2004, and 2005. The records show 260 collisions. Of the 260 collisions, 3 resulted in fatalities, 56 resulted in injuries, and the remaining 201 resulted in property damage only; 147 involved only one vehicle. Typically, single vehicle collisions are not related to highway access. The contributing causes for the 113 multi-vehicle collisions have been summarized in **Table 2-2**.

Table 2-2: Multi-Vehicle Collision Contributing Factors

Contributing Factors	Number of Collisions
Under influence of alcohol	3
Failed to yield	23
Disregarded signs, signals, or markings	3
Too fast for conditions	1
Improper turn	1
Wrong side or wrong way	5
Following too close	10
Improper lane change	5
Asleep	3
Inattention	29
Ill	1
Mobile phone or electronic distraction	2
Glare	1
Cargo	2
Unspecified	24

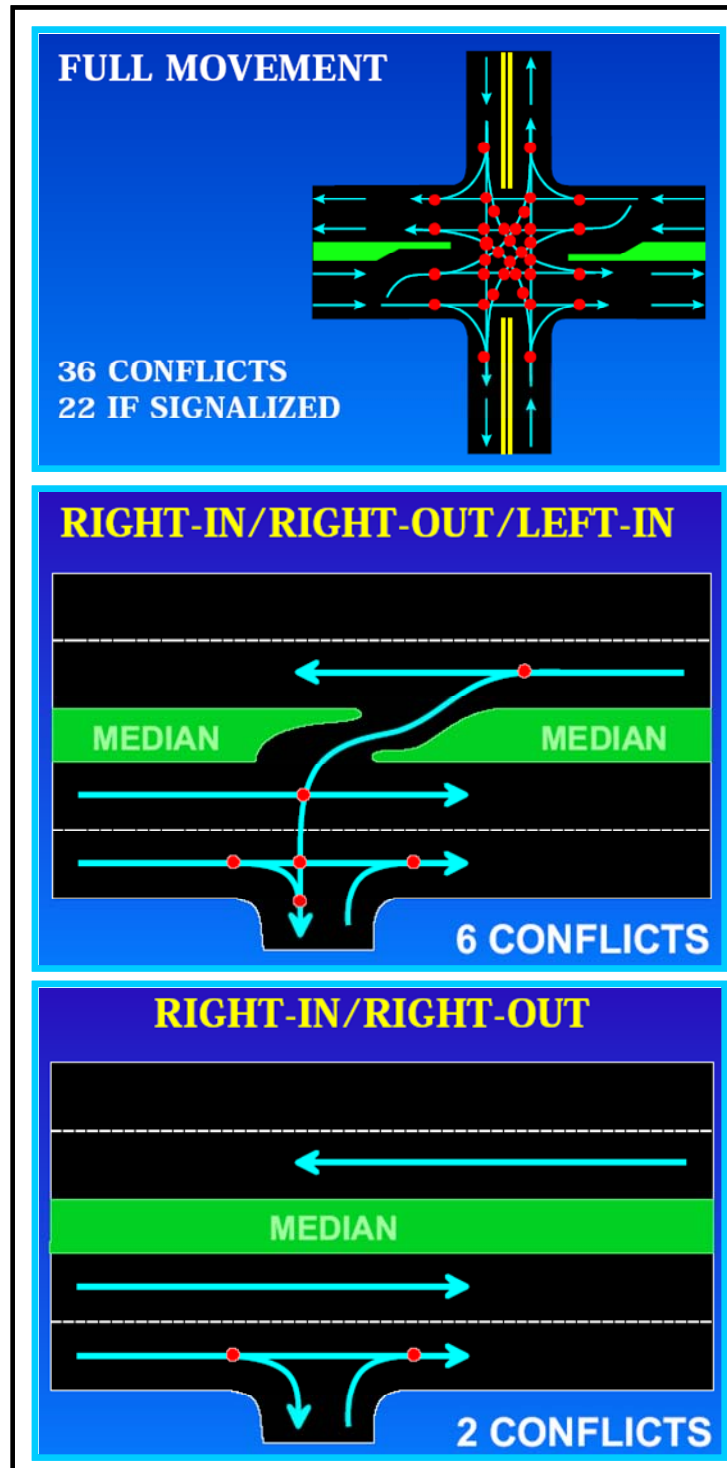
KDOT evaluates collision experience on highways in terms of the number of accidents per million vehicle miles traveled (VMT). Using the statewide collision experience as a basis, they have determined different average collision rates for different types of highways. The study section of US 24/40 contains three types of highways: two lanes, four lanes undivided, and four lanes divided. The number of collisions per million VMT has been determined for each of the three sections of US 24/40 and compared to the statewide average, and to the driveway density on a per mile basis. **Table 2-3** summarizes these comparative rates for the three section of US 24/40.

Table 2-3: Comparison of Collision Rates and Driveway Density

Type of Section	Length of Section (miles)	Collision Rate (per million VMT)	Statewide Average (per million VMT)	Driveway Density (number per mile)
2 Lanes	1.496	2.897	1.641	22.73
4 Lanes Undivided	1.741	2.511	2.378	26.42
4 Lanes Divided	8.609	1.324	.0988	8.48

The comparison of these statistics would seem to indicate that there is a relationship between access management through the provision of medians and reduction in the number of driveways, with a lesser collision rate. In all cases, the US 24/40 collision rates are higher than the state average. Also, fewer driveways per mile, combined with a median (an access management tool), gives the lowest collision rate on the corridor. As traffic volumes increase in the future, it could be expected the number of accidents will also increase. However, implementation of this Corridor Study will provide opportunities to offset rising accident rates through the applications of medians, driveway reductions, and other access management tools. It is recommended that KDOT, the cities, and the county actively pursue opportunities for improved access management, as presented in Section 7 of this report.

Figure 2-3: Potential Conflicts



Applications of full or partial medians reduce the number of potential conflict points.

Transit Service

The US 24/40 Highway Corridor is currently not serviced by any form of public transportation. Countywide, the form of public transportation available is a paratransit (i.e., demand responsive or dial-a-ride type of transportation service) provided by the Leavenworth County Council on Aging. The dial-a-ride service is available for medical, education, personal business, shopping, employment, meals, and recreational trip purposes. Advance reservation is required. Service is available only during weekdays between 8:00 a.m. to 3:00 p.m. It is available for residents in Leavenworth County including the cities of Leavenworth, Lansing, Fort Leavenworth, Tonganoxie, Easton, Basehor, Linwood, and Reno.

Furthermore, the land use patterns indicate a significant portion of the residents in the corridor must work outside the corridor. This commuting pattern provides opportunities for carpooling. It is recommended that KDOT, the cities, and the county promote carpooling as opportunities to do so arise.

Bicycle Level of Service Analysis

US 24/40 Highway varies from a 4-lane divided section west of K-7 Highway to Tonganoxie where it changes to a 5-lane section from Laming Road to just south of 2nd Street. The highway then becomes a 4-lane section with no medians to just south of 5th Street before it transitions to a 2-lane undivided section to the west end of the study area. The highway has paved shoulders on both sides that vary in width from 10 feet along the 4-lane divided section to 4 feet along the 2-lane undivided section. Bicycle operation along the highway is not encouraged.

Currently, there are no marked bicycle lanes and no off-road regional trail accommodations in the corridor. However, there are paved County roads throughout the corridor that would provide some level of accommodation to bicyclists and limited segments of local bicycle trails that can connect into future regional trails. It is recommended that the cities and county promote bicycling outside the venue of US 24/40 as a highway corridor.

Roadway Right-of-Way Inventory

The width of existing right-of-way for US 24/40 Highway is of interest because right-of-way provides a limitation on the number of through and auxiliary lanes which can be added to the existing highway without acquiring private property. In the rural sections of the highway, acquisition of right-of-way, while costing money, generally does not cause a significant devaluing of the remaining property. Within the developed sections of the corridor, right-of-way acquisition could affect building setbacks, parking areas, driveways, sidewalk, utilities, and other infrastructure features. This not only increases the cost of the right-of-way but may also impact the usability of the remaining property. Thus, an awareness of whether additional right-of-way will be required for improvements to US 24/40 Highway is relevant to the feasibility and costs of providing future improvements to the corridor.

Highway right-of-way widths vary throughout the corridor from approximately 100 feet to more than 400 feet wide. Generally, a greater right-of-way width is required where ditches provide surface drainage than where enclosed storm sewers are used with curbs. The rural portions of US 24/40 Highway carry surface drainage in ditches, and thus the highway requires wider right-of-way widths. The four and five lane sections of the highway generally have sufficient right-of-way width to accommodate any additional auxiliary lanes which may be needed in the immediate future. More than 4 through lanes are not anticipated within the 2030 planning horizon of this study.

The existing highway sections of less than four lanes plus a median or center turn lane will require acquisition of additional right-of-way for any widening of the highway. Acquisition of right-of-way in the four lanes without median or center turn lane section or in the two lane section may involve total property takings because of the existing building setbacks in those sections. Consequently, proposals for widening should be considered only as needed to enhance safety or for needed traffic capacity. Right-of-way needs through these sections can be minimized through the construction of a curb and gutter roadway template instead of the shoulder and ditch template used through the rest of the corridor for the highway. It is recommended that as development proposals are submitted to the cities and county for review and approval, additional right of way be dedicated to support the short range and long range traffic and access management recommendations described in Section 7 of this report.

Existing Conditions: Economic Market Assessment

Introduction

The US 24/40 Corridor Study examined existing conditions as they related to economic and commercial market assessments, existing land use, and existing traffic conditions. The traffic analysis included an inventory of existing access to the highway and traffic circulation. To formulate recommendations for land use development, traffic controls, access management, and related public policies, this study assessed economic market trends, both near-term and long-term.

Economic Conditions and Market Assessment

Growth over the past decade in the corridor has been strong. The number of business establishments, employment opportunities, and the size of the local civilian labor force outpaced both Leavenworth County and the Kansas City metropolitan area as a whole.

Existing Economic Conditions

Total Business Establishments

Business growth in the corridor from 1994 to 2004 is summarized in **Table 3-1**. During that period the number of business establishments grew rapidly as evidenced by:

- Leavenworth County doubled the State of Kansas in the rate of growth for new business establishments.
- The number of businesses in the corridor grew at more than double the rate of Leavenworth County – 48% in the area compared to 17% for the county.
- The percentage of the county's business establishments among the corridor's communities has increased from 19% to 24%.
- The Basehor area nearly doubled the number of business establishments while Tonganoxie grew by over 21%.

Table 3-1: Total Business Establishments 1994 – 2004

	1994	1998	2004	1994 – 2004
Basehor (66007; northern portion of 66012)	76	116	143	88%
Tonganoxie (66086)	115	124	140	22%
24 / 40 Corridor Planning Area Total	191	240	283	48%
Leavenworth County	1,001	1,089	1,175	17%
US 24 / 40 Planning Area Share of Leavenworth County	19%	22%	24%	N / A
Kansas	69,802	74,019	75,827	8%

Source: U.S Bureau of Economic Analysis.

Local Civilian Employment

The number of local jobs in the corridor grew more rapidly than the number of businesses from 1994-2004 as demonstrated by **Table 3-2**.

- Employment opportunities in Leavenworth County grew at double the rate of growth of the Kansas City metropolitan area (MSA).
- The number of employment opportunities in the corridor grew at more than three times the rate of Leavenworth County – 75% in the corridor compared to 23% for the County.
- The percentage of Leavenworth County's total employment opportunities found among the corridor's communities increased from 11% to 15%.
- The Basehor area has five times the county's employment growth while Tonganoxie grew by 43% during the same period, almost double the employment growth for Leavenworth County as a whole.

Table 3-2: Local Civilian Employment 1994 – 2004

	1994	1998	2004	1994 – 2004
Basehor (66007; northern portion of 66012)	602	791	1,295	115%
Tonganoxie (66086)	751	856	1,071	43%
24 / 40 Corridor Planning Area Total	1,353	1,647	2,366	75%
Leavenworth County	12,411	14,079	15,210	22%
24 / 40 Planning Area Share of Leavenworth County	11%	12%	15%	N / A
Kansas City MSA	877,600	966,500	1,011,040	15%

Source: U.S. Bureau of Economic Analysis

South Leavenworth County Labor Force Characteristics

Growth of labor force during the 1990's as reported by the US Census is summarized in **Table 3-3**. Noteworthy highlights include:

- The South Leavenworth County labor force grew by 25.6% during the 1990's versus 13.7% in Leavenworth County as a whole and 23.2% in the Kansas City metropolitan area.
- Area residents are most commonly employed in the growing services sector.
- The growth in the percentage of residents in the services sector exceeded regional growth rates.
- The percentage of residents employed in manufacturing and the retail sector declined in comparison to the metropolitan area.

Table 3-3: South Leavenworth County Labor Force Characteristics

Employment Sector	1990	2000	So. LV County Change	1990 – 2000 KC Metro Area Change
Industrial	1,556	1,924	23.7%	26.3%
Manufacturing	133	118	(11.3%)	(7.6%)
Services	958	1,325	38.3%	29.7%
Retail	726	869	19.7%	21.9%
TOTAL South County	3,373	4,236	25.6%	---
Leavenworth County	28,960	32,941	13.7%	---
Total KC Metro Area	946,780	1,166,799	---	23.2%

Source: U.S. Census

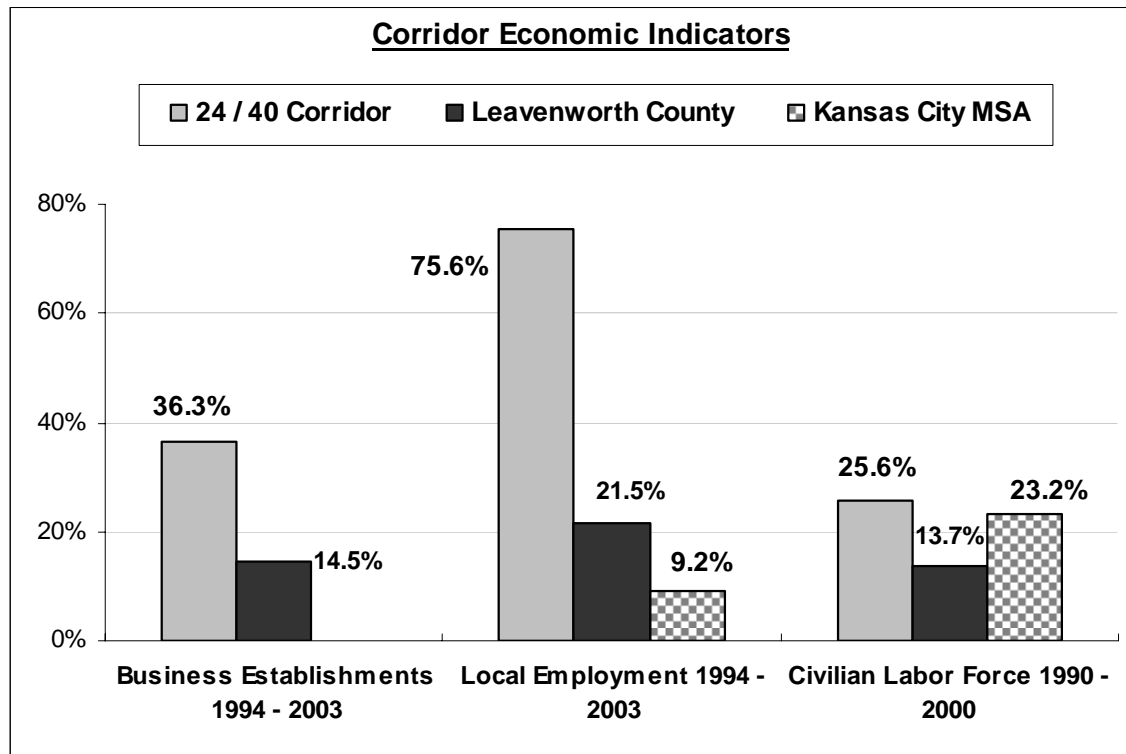
Table 3-4 summarizes 2006 data from the Kansas Department of Revenue (KDOR) which identified a total of 307 business establishments in Basehor and Tonganoxie that report collecting sales tax that year. These figures, along with actual square footage of buildings by use category described later in this study, is the most accurate tally of local business activity. These figures do include home based businesses. These total 136 retail business establishments categorized in the retail, personal services and food and beverage categories according to the Department of Revenue. Currently, approximately 65 percent of these businesses are in Tonganoxie and 35 percent in Basehor.

Table 3-4: US 24/40 Corridor Cities Business Establishments 2006

Business Category	Basehor	Tonganoxie	Total
Retail Trade	16	63	79
Personal Services	17	17	34
Food and Beverage Services	6	17	23
Manufacturing	4	8	12
All Others (includes real estate, banks, light industry, wholesale trade and others)	64	94	159
TOTAL ESTABLISHMENTS	108	199	307

Source: Kansas Department of Revenue 2006

Figure 3-1 summarizes the economic indicators and identifies how the corridor has been outpacing Leavenworth County as a whole and the Kansas City metropolitan area over the past decade. Nevertheless, there is a need to diversify the corridor's economy if the area is to more fully realize its potential.

Figure 3-1: US 24/40 Corridor Economic Indicators**Market Assessment**

The corridor's position in the regional retail, office and industrial markets was assessed to ascertain the appropriate amount of new development and related traffic impacts to plan for through 2030. The analysis evaluated the most relevant local, state and federal published data.

In addition to the prevailing economic conditions, a wide range of demographic and economic factors will influence corridor demand and absorption of new commercial and industrial development including:

- Retail Pull Factor and Household Income
- Educational Attainment of the Labor Force
- Building Leasing Rates
- Local Property Tax Rates
- Competition with Other Highway Corridors

Therefore, the corridor and/or the cities of Basehor and Tonganoxie were compared to other cities and corridors in the Kansas City metropolitan area to help assess the corridor's competitive position in the region.

Retail Pull Factor and Household Income

Household income influences the amount spent in a community for retail purposes. A city's retail "pull factor" indicates how a city retail market is performing. A "pull factor" is a measure of the market share captured in a community by all of the retail businesses and is used to

compare the magnitude of sales activity to the level of business activity on a per capita basis. A pull factor above 1.00 indicates that the community is attracting business while one that is below 1.00 indicates that the community is losing business to other places.

Table 3-5 compares Basehor and Tonganoxie's retail pull factors to seven nearby competing cities, as well as to Leavenworth County and adjoining counties. All of the cities except Bonner Springs and all of the counties except Johnson County experience some level of sales leakage.

- Basehor is in the lower half of the peer cities while Tonganoxie ranks third highest among the nine cities.
- Basehor's median household income is highest among the nine cities while Tonganoxie's median household income ranked fifth.

Table 3-5: Retail Pull Factor and Median Household Income Comparison

City; County	Pull Factor FY 2004	Median Household Income 2000
Edwardsville	0.25	\$42,875
Eudora	0.33	\$41,713
De Soto	0.39	\$46,426
Basehor	0.46	\$52,831
Gardner	0.74	\$50,807
Leavenworth (city)	0.84	\$40,681
Tonganoxie	0.91	\$44,278
Spring Hill	0.95	\$45,052
Bonner Springs	1.79	\$43,234
Leavenworth County	0.60	\$48,114
Wyandotte County	0.83	\$33,748
Douglas County	0.96	\$53,991
Johnson County	1.45	\$72,987

Source: Kansas State Research and Extension Services; U.S. Census.

Although the corridor can realize secondary benefits from its proximity to the Village West area around the Kansas Speedway in western Wyandotte County, the corridor will be challenged to compete with that commercial area to the east and the Lawrence area to the west for major retail development. Nevertheless, as evidenced by Gardner and Spring Hill's comparative pull factor in Johnson County, both Basehor and Tonganoxie have the opportunity to grow their pull factor by as much as 10 percent to 1.00 for Tonganoxie and up to a pull factor of approximately 0.55 for Basehor. This is especially achievable for Tonganoxie because of the future Kansas Turnpike Interchange at County Rt. 1 that will serve Tonganoxie and Leavenworth County. These potential retail growth levels are factored into the retail demand projections presented later in this study.

Education Attainment of the Labor Force

An important characteristic considered by companies is an evaluation of the educational level of the local population. The percentage of high school and college graduates in a community

influences the type and the amount of new business in a developing area, such as the US 24/40 Corridor. The level of education among residents reflects the skills of the local work force and determining the type of new businesses that may be attracted to the corridor.

The commonly considered component used to measure educational levels is the percentage of the population that is high school and college graduates, which is summarized in **Table 3-6**. Based on the 2000 U.S. Census, the corridor's two cities high school graduate rates exceed the average in Leavenworth and Wyandotte Counties. However, the percentage of college graduates of the two cities is lower than the percentages of nearby Johnson and Douglas Counties, while higher than Wyandotte County.

Table 3-6: Education Attainment 2000

City; County	High School Graduates % of Population	College Graduates % of Population
<u>24/40 Corridor:</u>		
Basehor	90.7%	14.5%
Tonganoxie	88.6%	16.0%
Leavenworth County	86.5%	23.1%
Douglas County	92.4%	42.7%
Johnson County	94.9%	47.4%
Wyandotte County	74.0%	12.0%

Source: 2000 U.S. Census

Building Leasing Rates

Located between two larger cities, Lawrence and Kansas City, the US 24/40 Corridor communities will compete with neighboring communities that have existing buildings, business parks with existing infrastructure and aggressive business recruitment efforts. Both Basehor and Tonganoxie have active marketing and professional recruitment efforts through the Leavenworth County Development Corporation and area commercial realtors. Both cities contain large vacant parcels of land suitable for new commercial development.

Table 3-7: Industrial Building Lease Rate Comparisons July 2006

Location	Range of Asking Rate Per Square Foot	Median Asking Rate Per Square Foot
<u>24/40 Corridor:</u>		
Basehor	\$6.75 - \$7.25	\$7.00
Tonganoxie	\$4.00 - \$6.00	\$5.00
Wyandotte County	\$2.85 - \$12.50	\$6.61
Johnson County	\$3.25 - \$12.50	\$8.32
Douglas County	\$1.25 - \$12.00	\$5.00

Source: Kansas City Area Development Council; Block & Company, Inc.; Grubb & Ellis.

Table 3-7 provides a summary of vacant commercial/manufacturing buildings offered for lease in July 2006 and indicates the median asking price per square foot was lower in the corridor cities than in nearby Wyandotte and Johnson Counties. As a result, existing buildings in the corridor offer a price competitive advantage compared to their neighboring cities.

Local Property Taxes Rates

The cost of doing business, especially property taxes, can induce or discourage private investment and is routinely considered by developers in site selection. Property tax rates are more of a factor than income or sales taxes. State and federal income tax rates and business taxes are, of course, uniform among Kansas communities. Retail sales tax rates, though slightly varied among communities, are not a determining factor in where retail businesses choose to locate, although shoppers are not indifferent to varying sales tax rates.

Table 3-8 summarizes total 2006 property tax rates for the nine area cities. Basehor had the lowest local property tax among the nine area small cities. These cities are likely competitors to the corridor communities for new commercial and industrial development.

- Tonganoxie and Basehor's property tax rates are 5 and 13 percent lower than the average of nine similar sized cities in the area with whom the corridor's cities compete.
- These tax rates provide the corridor's communities with a competitive advantage for those businesses whose location decisions are influenced by personal and real estate property tax rates. Of course, all of the communities in Kansas have the potential to offer property tax abatements for manufacturing-related development.

Table 3-8: Area Cities Total Property Tax Rates for 2006

Rank; City	Total Tax Rate	City vs. Average
1. Basehor	117.107	(13%)
2. Eudora	119.815	(10%)
3. Tonganoxie	125.451	(5%)
4. De Soto	127.872	(3%)
5. Leavenworth (city)	136.153	3%
6. Spring Hill	136.242	3%
7. Gardner	138.001	5%
8. Bonner Springs	139.841	6%
9. Edwardsville	148.399	11%
COMBINED AVERAGE	133.098	N / A

Source: League of Kansas Municipalities.

Competition with Other Highway Corridors

For purposes of projecting the future development potential in the corridor, the corridor was measured against five other actively developing highway corridors in the metropolitan area. In addition to retail pull factors, educational attainment levels, lease rates and property tax

rates, transportation and demographic related factors also influence the amount of type of development along highway corridors.

Attracting new commercial development is also influenced by:

- Average daily traffic counts,
- Access and proximity to Interstate highways,
- Availability and access to rail,
- Ease of access to passenger air service,
- Size of labor market, and
- Population growth rates.

The wider availability and more accessibility to transportation options, the better an area's opportunity is to attract new business.

For purposes of evaluating the US 24/40 Corridor, five other highway corridors ranging in length from 8 to 25 miles located in growing, suburban settings were considered. Two of the corridors are shorter in distance than the US 24/40 Corridor, and the remaining three are longer. Several of the highway corridors have more limited access than US 24/40 Highway which can influence some business most dependent on transportation and/or commuter patterns.

Table 3-9 summarizes the five corridors and their characteristics. While no two corridors are the same nor exactly comparable to the US 24/40 Corridor, these comparisons illustrate the competition for attracting new business development and how the US 24/40 Corridor compares today to these growth corridors.

The US 24/40 Corridor compares favorably in the following areas:

- The corridor is closer to KCI than four of the five other corridors, and
- Basehor's population growth in the past decade was higher than that of Spring Hill and Liberty.

The US 24/40 Corridor has the following competitive disadvantages:

- Lower average daily traffic count
- Further from the Interstate Highway system
- No direct rail access and
- A smaller labor pool than the other corridors.

In addition, proposed developments along the US 71 and M-152 highway corridors in Missouri are routinely eligible for a broader range of financial incentives from cities and/or the state than are available in Kansas communities. All of these factors were considered in projecting the amount of commercial and industrial land that can be absorbed in the next two decades in the US 24/40 Corridor.

Table 3-9: Area Highway Corridor Comparison

Corridor	US 24 / 40	K - 7	K - 10	US 71	US 169	MO 152
County(s)	Leavenworth	Leavenworth - Johnson	Douglas - Johnson	Jackson - Cass, MO	Johnson - Miami	Platte -Clay, MO
Connecting Cities	Tonganoxie - Basehor	Lansing - Olathe	Lawrence - Overland Park	Grandview - Raymore	Olathe - Spring Hill	Parkville - Liberty
Transportation Profile						
Closest Point to KCI	11+ miles	25 miles	25 miles	9 miles	8 miles	19 miles
Peak Average Daily Traffic	15,000 vehicles	27,500 vehicles	32,585 vehicles	69,956 vehicles	29,600 vehicles	19,502 vehicles
Closest Point to KCI	26 miles	26 miles	31 miles	35 miles	41 miles	5 miles
Direct Interstate Access	No; 2 miles to I-70 via K-7	Yes; I-70	Yes; I-435	No; 3 miles to I-435	Yes; I-35	Yes; I-29
Rail Access	No	No	Limited	Yes	Yes	No
Demographic Profile						
Largest Corridor City	Tonganoxie	Olathe	Overland Park	Grandview	Olathe	Liberty
Largest City Population	3,317	105,274	160,368	24,549	105,274	29,042
2005 Corridor Labor Pool	33,255	364,117	352,001	393,114	305,217	159,737
Fastest Growing Corridor City	Basehor	Olathe	DeSoto	Raymore	Spring Hill	Liberty
1990 - 2000 City's Population Growth	38.7%	45.2%	99.1%	99.3%	24.5%	22.7%
Other Major Asset(s)	<ul style="list-style-type: none"> Lower taxes Proximity to Village West More affordable housing than Johnson County 	<ul style="list-style-type: none"> Access to K-10 and I-70 <p>Established business parks in Shawnee and Olathe</p>	<ul style="list-style-type: none"> Access to KU and other higher ed. facilities <p>Active inter-governmental association</p>	<ul style="list-style-type: none"> Intermodal Facility under development Missouri incentive programs 	<ul style="list-style-type: none"> Proximity to Johnson County Executive and New Century Airports 	<ul style="list-style-type: none"> Proximity to KCI Missouri incentive programs

Source: U.S. Census; KDOT; MODOT; RICHARD CAPLAN & ASSOCIATES; Bucher, Willis & Ratliff Corporation

Projected Corridor Market Demand

The economic opportunities and ability to diversify the corridor's area economy through new commercial development constructed over the next two decades will be influenced by local public policies, US 24/40 Highway improvements, new interchange access to I-70, and other critical choices made by community leaders. Therefore, two alternative scenarios were prepared to project the amount of new commercial and industrial development. These scenarios incorporate a combination of the Tonganoxie Comprehensive Plan, U.S. Census population growth rates since 2000, and Mid-America Regional Council population projections for census tracts in the US 24/40 Corridor area in Southern Leavenworth County. Together, these assumptions project that the corridor's combined population will grow by approximately 6,000 to 6,750 new residents by the year 2030.

The two alternative growth scenarios are:

- Moderate Growth Scenario – This scenario assumes the corridor will continue to plan for the future by designating new business districts, marketing the corridor's communities, and constructing infrastructure as needed to accommodate growth.
- High Growth Scenario – This scenario further assumes the communities along the corridor and the County will more aggressively promote the US 24/40 Corridor, aggressively targeting financial incentives to attract new development, and invest and construct the necessary infrastructure in advance to accommodate this growth.

The corridor's proximity to Village West in Kansas City, Kansas with its generous development incentive practices means Basehor, Tonganoxie, and the County are in an aggressive environment. Financial incentives for industrial development and major office users have become the norm in the world of economic development. The use of incentives will help determine whether the corridor experiences a moderate or high growth scenario. The use of financial incentives to entice companies is most appropriately tied to:

- waiving or significantly discounting local permit fees,
- property tax abatement, and
- public financing considered with private investments.

Other financial incentives should be targeted to those businesses which best diversify the local economy and generate the most new employment opportunities. Assistance may include participating with employer's relocation expenses. Financial participation to relocating businesses is sometimes based on the amount of new private investment and/or the number and wage levels of new jobs created.

Existing Commercial and Industrial Development

Table 3-10 summarizes the amount of commercial square footage in 2006 according to data supplied by the Leavenworth Appraiser's Office.

- Basehor and Tonganoxie had a combined total of nearly one million square feet of retail, office and industrial development in 2006.
- Tonganoxie had 66 percent of this total non-residential development.

These totals were compared on a per capita basis to several cities in Johnson County where valid square footage data is available, as well as to Wyandotte and Johnson Counties and the Kansas City metropolitan area. They serve as an important factor in projecting the commercial and industrial growth that the corridor can expect to achieve with improvements to the corridor, as well as new access to Interstate 70.

Table 3-10: Corridor Cities Commercial Square Feet by Use 2006

	Retail	Office	Industrial	TOTAL
Basehor	80,525	79,596	155,156	315,277
Tonganoxie	344,490	101,202	173,313	619,005
TOTAL	425,015	180,798	328,469	934,282
Square Feet Per Capita	60 sq. ft.	26 sq. ft.	47 sq. ft.	N / A

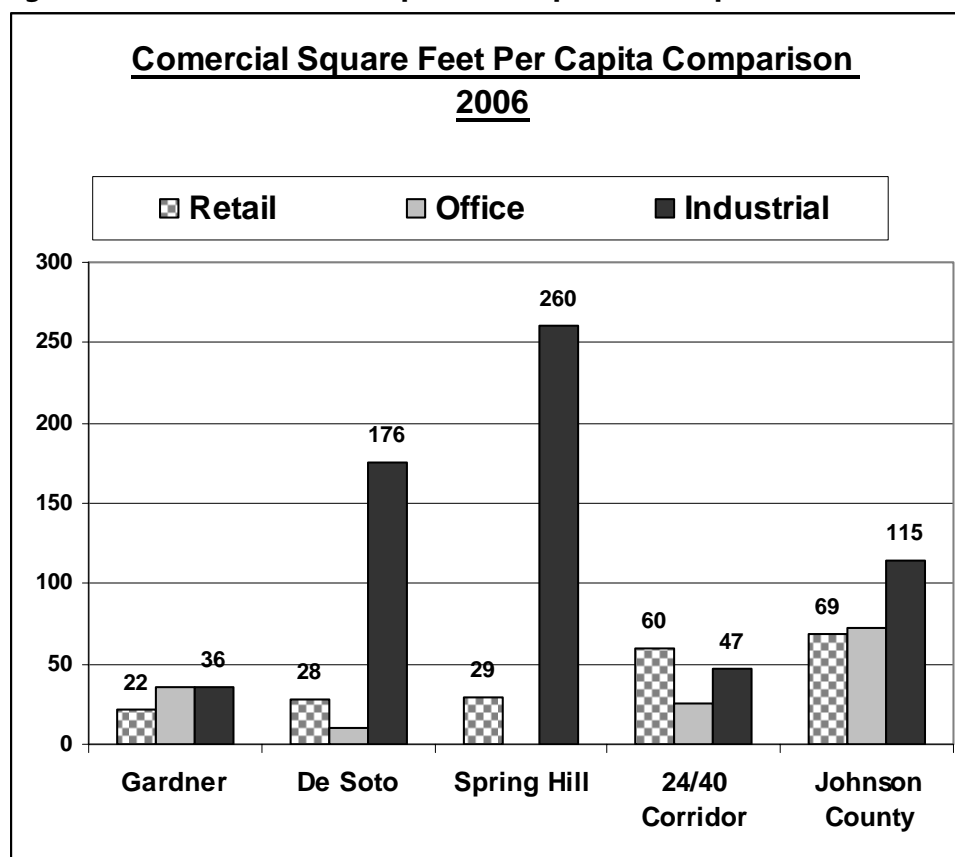
Source: Leavenworth County Appraiser's Office.

Table 3-11 and **Figure 3-2** summarize the amount of retail, office, and industrial square footage in selected areas in 2006. Overall, Basehor lags in the comparison to other cities and the region in retail, office and industrial development per capita while Tonganoxie falls below the norm in the office and industrial comparisons. As the corridor is enhanced with new transportation improvements and new residential subdivisions are completed and occupied, the area will approach the metropolitan area averages per capita.

Table 3-11: Commercial Development Comparison in Square Feet, 2006

Jurisdiction	Retail Space per Capita (s.f.)	Office Space per Capita (s.f.)	Industrial Space per Capita (s.f.)
De Soto	28	10	176
Gardner	22	35	36
Shawnee	57	17	80
Spring Hill	29	N / A	260
Johnson County	69	73	115
Wyandotte County	N / A	N / A	248
Kansas City Metropolitan Area	N / A	43	125
24/40 Corridor:			
Basehor	24	27	47
Tonganoxie	91	24	46
Combined Average Square Feet per Capita	60	26	47

Source: Block & Company, Inc.; Johnson County Appraiser's Office; Colliers International; Leavenworth County Appraiser's Office.

Figure 3-2: Commercial Development Comparison in Square Feet, 2006

Based on an analysis of these comparisons, transportation factors, demographic characteristics and economic conditions, the demand for retail, office and industrial space and acreage for the corridor through 2030 were projected and are provided in **Table 3-12**. The corridor's commercial market is defined as the area encompassing the cities of Basehor and Tonganoxie. A small amount of this projected square footage may occur along unincorporated sections of the US 24/40 Highway. These projections result in the US 24/40 corridor communities absorbing between 975,000 and 1.3 million square feet of new retail, office and industrial development. Based on common site planning criteria, this will absorb a total of approximately 104 to 140 acres. Approximately 84 to 116 these acres are estimated to be located immediately in the corridor.

It should be noted that not all of the retail and office projected demand for Basehor and Tonganoxie will be located along US 24/40 Highway as both cities have other areas of their community suitable for commercial development, such as Downtown Tonganoxie and an area anticipated for Downtown Basehor, as well as a new industrial site identified in the Basehor Comprehensive Plan east of the proposed Downtown.

Table 3-12: Corridor Cities Projected Commercial Demand through 2030

Major Land Use	Moderate Growth Scenario	High Growth Scenario	Estimated Corridor Capture Rate; Acreage
Retail	400,000 sq. feet (40 acres)	425,000 sq. feet (42 acres)	75% – 90% (30 – 40 acres)
Office	190,000 sq. feet (19 acres)	225,000 sq. feet (23 acres)	75% - 90% (16 to 21 acres)
Industrial	385,000 sq. feet (45 acres)	650,000 sq. feet (75 acres)	60% – 75% (38 – 55 acres)
Totals: Square Feet (Acres)	975,000 sq. feet (104 acres)	1,300,000 sq. feet (140 acres)	----- (84 – 116 acres)

Source: RICHARD CAPLAN & ASSOCIATES.

Conclusion

In summary, to be responsive to the market demands of the area's economy through 2030, the County and the communities of Basehor and Tonganoxie should plan for a total of between 975,000 and 1,300,000 square feet of new commercial development. This would consume approximately 104 to 140 acres of land. The corridor's strengths include lower municipal property tax rates and building lease rates, while its comparatively smaller labor pool and educational levels of its labor force will influence the type and amount of commercial development. The projected capture rate for each community will be influenced by availability of infrastructure, maintaining tax rates lower than their competitors, proactive community marketing, improving local transportation systems, and good land use planning, as well as good traffic controls and access management.

Existing Conditions: Land Use and Development

Introduction

This Chapter examines the existing conditions including existing development, infrastructure, and land use pattern for the corridor and the larger Study Area. Land use categories used throughout the corridor are identified and defined. An inventory of existing land uses describes both the amount of land in each land use category and the distribution of uses throughout the Study Area.

Development Patterns and Existing Land Use

The use of land in a community is not a random process. Numerous distinct variables influence the way a given piece of land is used. Some of the variables are influenced by factors beyond the control of the community, including economic factors such as the demand for new development, the cost of property, and the cost of construction. Environmental factors such as soil conditions, topography, and the location of floodplains or other natural limitations are largely pre-determined. Other variables, however, are within the control of the community including traffic patterns, the capacity and location of public utilities, the delivery of municipal services, and the physical appearance of development. Unfortunately, these variables are not constant, but they have an impact on the use of land and on each change in land use.

Viewed as a whole, the use of individual pieces of property forms a pattern of land use that describes the character of the corridor in several ways. It will help to explain where residents live and work, how they obtain goods and services, and where they seek recreation. It will also aid in analyzing the strengths and challenges of the communities in the area and South Leavenworth County as a whole. Finally, and perhaps most importantly, examining the pattern of existing uses is the starting point in the process of formulating policies for the future development within and around the corridor.

Table 4-1 and **Figure 4-1** identify the generalized land use in the Corridor Planning area as well as the entire Study Area. Data was obtained from the Leavenworth County GIS database which incorporates appraisal information and is known to be current as of July 2006. This detailed information was aggregated into the following categories:

1. Single Family Residential
2. Multifamily Residential
3. Hotel
4. Light Industrial/Warehousing
5. Heavy Industrial and Manufacturing
6. Transportation and Utilities
7. Retail Commercial

8. Service Commercial
9. Office
10. Institutional
11. Cultural/Recreational
12. Agriculture-No improvements
13. Agriculture w/Farm Improvements Only
14. Agriculture w/Residential and Farm Improvements
15. Vacant

These categories can generally be defined in the following manner:

Single Family Residential: Land occupied by a single dwelling unit, including accessory buildings, the primary use being for sheltering individuals, families, or groups of persons. Examples: single-family residences, duplexes (single-family attached dwellings).

Multifamily Residential: Land occupied by more than two dwelling units, including accessory buildings, the primary use being for sheltering individuals, families, or groups of persons. Examples: apartments, manufactured housing, and nursing homes.

Hotel: Land that is occupied by a hotel.

Light Industrial/Warehousing: Land occupied by buildings or open space, the primary use being for storage, transportation, or assembly of a product. Examples: material storage, warehousing, wholesale operations and trucking.

Heavy Industrial and Manufacturing: Land occupied by buildings or open space, the primary use being manufacturing of a product. Examples: manufacturers, construction yards, heavy equipment storage.

Transportation and Utilities: Land dedicated for public utilities and land used for railroad purposes.

Retail Commercial: Land or buildings where merchandise is offered for retail sale. Examples: grocery, clothing, hardware and drug stores, restaurants.

Service Commercial: Land or buildings where services are offered. Examples: car and farm equipment sales and service, service stations, banks.

Office: Land occupied by private offices including doctors offices, veterinary offices etc. Does not include public offices such as a City Hall.

Institutional: Land or buildings occupied by agencies of the government or by religious, educational or civic groups, excluding land used for recreational purposes. Examples: schools, churches, cemeteries, city buildings, fire stations, hospitals.

Cultural/Recreational: Land occupied by cultural and recreational uses. Examples: Sports Arenas, Playing Fields, Baseball Diamonds, Museum, Bowling Alley, Library, Auditorium,

Golf Course w/Country Club, Driving Range, Swimming Pool, General Recreation Park - Wildlife Reserve, Leisure - Ornamental Park, Campground.

Agriculture-No improvements: Land which is exclusively being used for farming purposes.

Agriculture w/Farm Improvements Only: Land which is exclusively being used for farming purposes, but may have some agriculture related improvements and structures, such as a barn.

Agriculture w/Residential and Farm Improvements: Land which is primarily being used for farming purposes, but may have residential improvements on site including dwellings, greenhouses, barns, etc.

Vacant: Land which has not been developed or has been cleared of prior development.

Data shows that the corridor is more developed than the surrounding Study Area; the corridor is 65% agriculture and agriculture-related land uses, compared to 85% for the Study area. Single Family Residential land use forms the predominant non-agricultural land use in the corridor. Utilities, Institutional and multifamily residential land uses constitute a small fraction of the available land area.

Table 4-1: Existing Land Use

Detailed Land Use	Planning Area	% of Total	Study Area	% of Total
Single Family Residential	3,629	22%	19,005	10%
Multifamily Residential	221	1%	519	0%
Hotel	2	0%	2	0%
Light Industrial/Warehousing	77	0%	275	0%
Heavy Industrial & Manufacturing	28	0%	390	0%
Transporation/Utilities	444	3%	1,611	1%
Retail-Commercial	35	0%	59	0%
Service Commercial	66	0%	240	0%
Office	7	0%	22	0%
Institutional	430	3%	1,863	1%
Cultural/Recreational	345	2%	1,604	1%
Ag Land - No Improvements	3,927	23%	63,375	34%
Farm w/Residential and Farm Improvements	6,593	39%	76,794	41%
Farm w/Farm Improvements Only	749	4%	18,974	10%
Vacant	234	1%	860	0%
Total area (acres)	16,789		185,591	
Total area (sq. miles)	26		290	

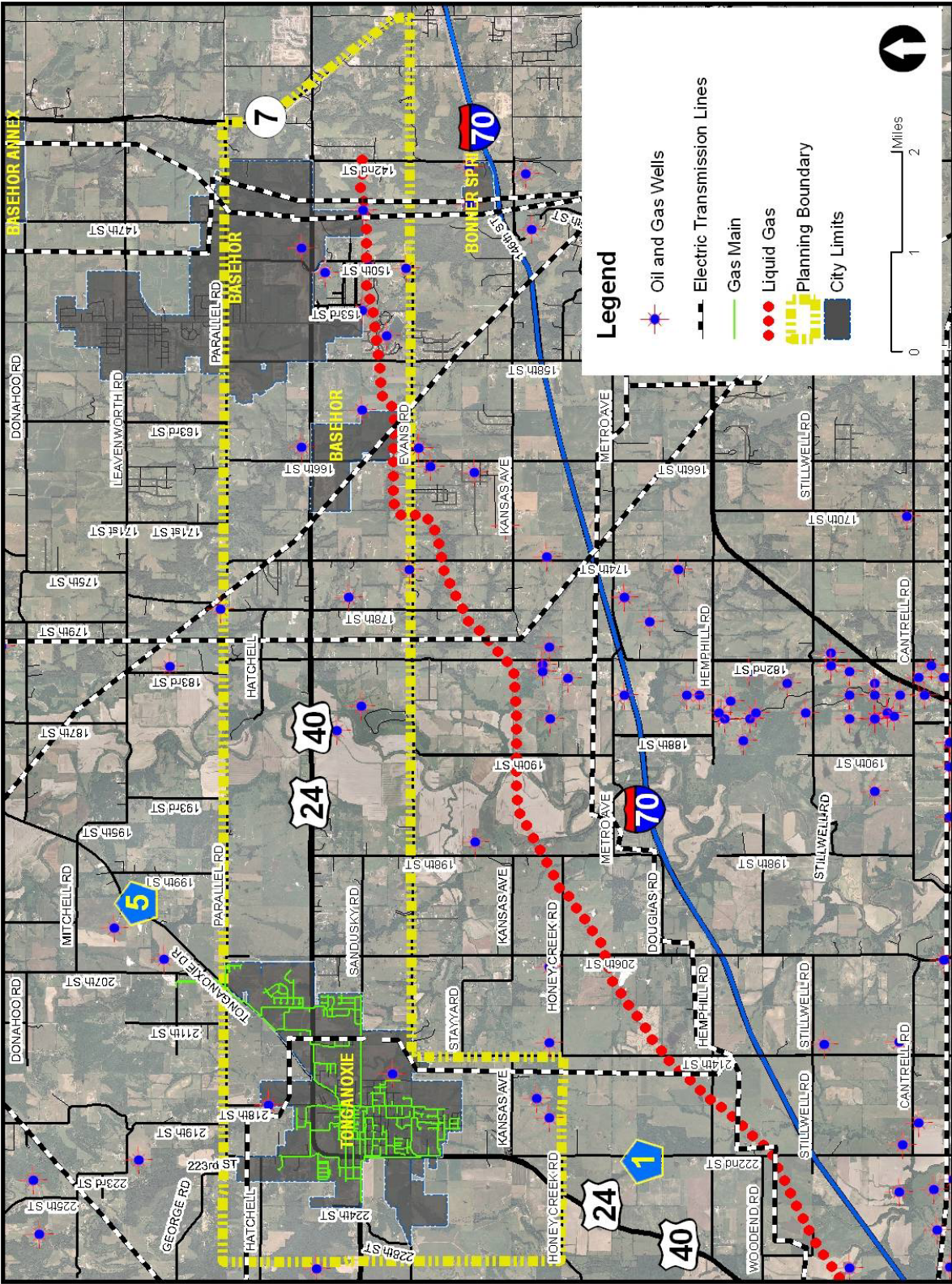
Source: Leavenworth County GIS, BWR

Major Utility Inventory

Figure 4-1 identifies the major existing utilities in the Leavenworth County portion of the Planning area. Several electric transmission lines crisscross the planning area. A high pressure liquid gas line crosses the southeastern part of the corridor (south of Basehor) and about 15 oil and gas wells are located within the corridor.

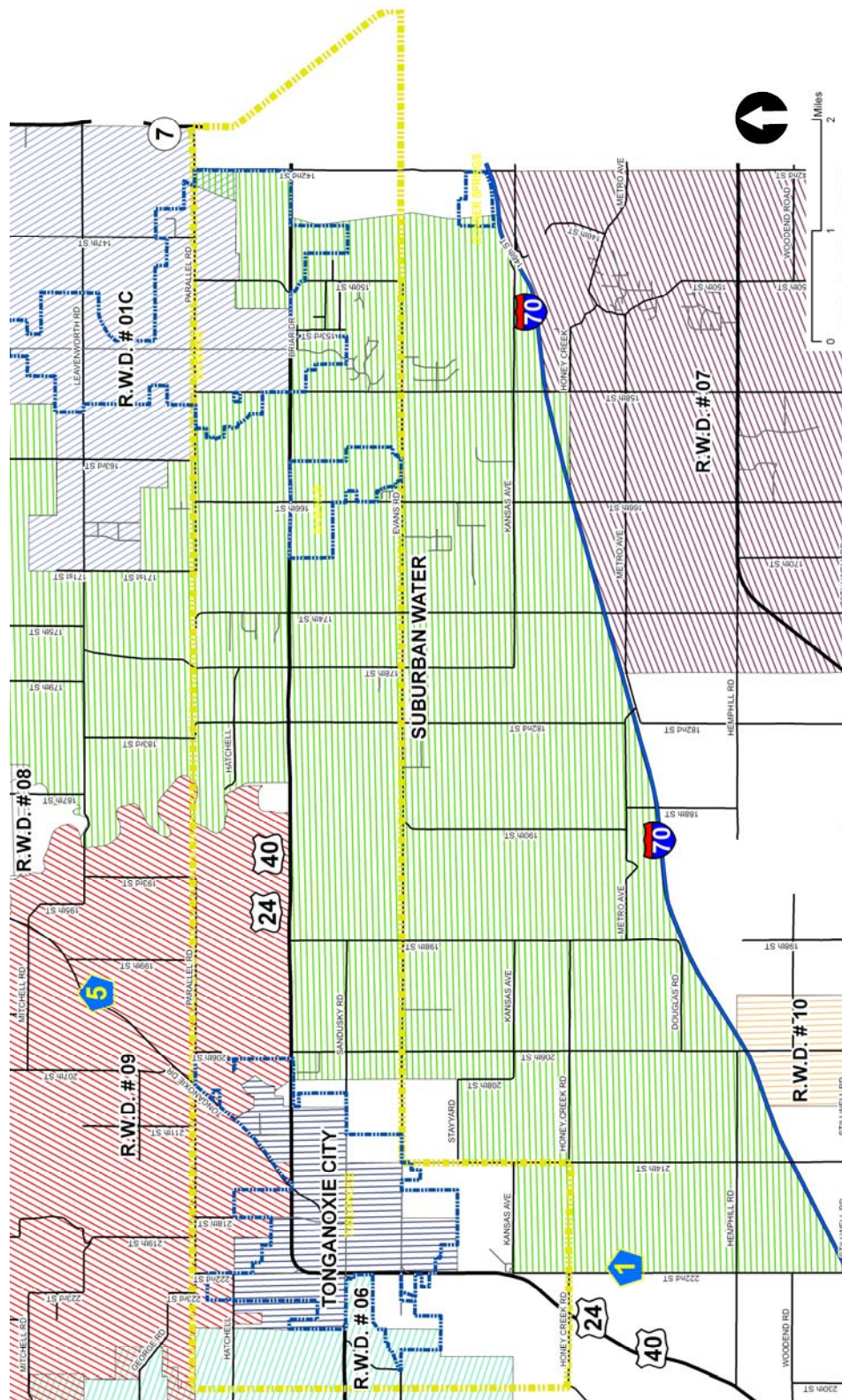
Figure 4-2 identifies the assigned service areas for water providers in the planning area. Currently there is an area south and east of the City of Tonganoxie that does not have an assigned water provider.

Figure 4-1: Major Utilities



Source: Leavenworth County GIS, BWR

Figure 4-2: Water District Boundaries



MetroGreen

MetroGreen is a regional greenway system for the Kansas City metropolitan area. It is principally comprised of linear corridors of land found along streams, roadways, and within abandoned rail corridors. The purpose of MetroGreen is to establish an interconnected system of public and private open spaces, greenways, and trails that will link the seven-county metropolitan region. The plan covers Leavenworth, Johnson, and Wyandotte counties in Kansas, and Cass, Clay, Jackson, and Platte counties in Missouri.

Figure 4-3 identifies the MetroGreen corridors in Leavenworth County. In the US 24/40 Corridor, the MetroGreen corridors include the following:

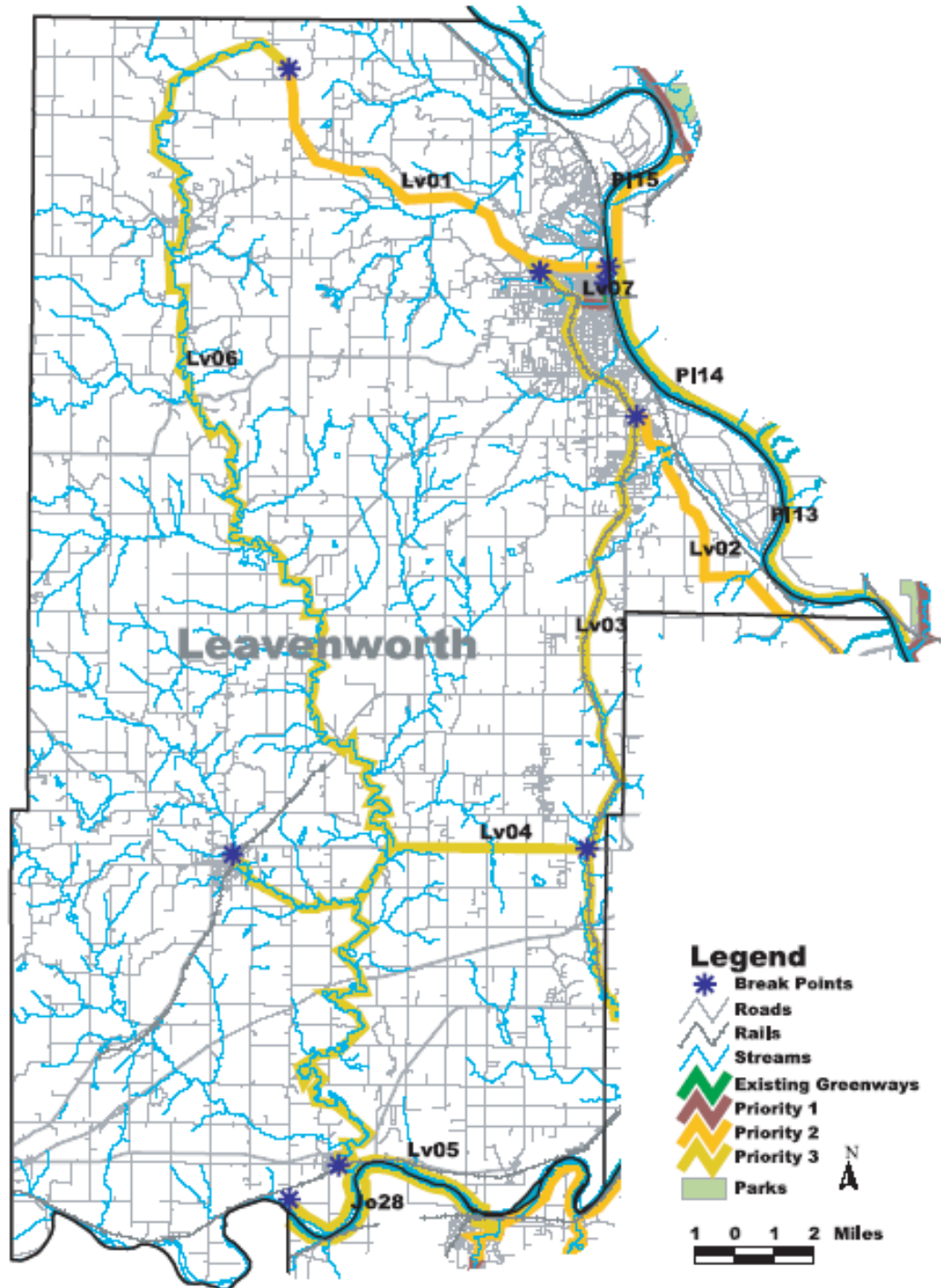
- Trail along US 24/40 Highway from a former rail corridor on the east to Stranger Creek.
- A former rail corridor through eastern Basehor.
- A stream corridor trail along Stranger Creek.
- A stream corridor trail along Tonganoxie Creek from Stranger Creek to connect with VFW Park, Magnatech Park, and Chieftain Park in Tonganoxie.

Figure 7-2: US 24/40 Corridor Supporting Transportation System Network in **Chapter 7** identifies the recommended greenway trail system to implement MetroGreen in the US 24/40 Corridor. Several issues need to be addressed in order to implement the greenway system in the corridor and the larger Leavenworth County planning area:

- Acquisition of land or easements,
- Regulatory updates,
- Design standards,
- Funding, and
- Maintenance.

Options and recommendations to implement the MetroGreen system are provided in **Chapter 8, Future Land Use and Development Regulations** and **Chapter 10, Implementation and Coordination Strategy**.

Figure 4-3: MetroGreen Corridors in Leavenworth County, Kansas



Public Involvement

Introduction

This Section summarizes the public involvement activities throughout the Corridor Planning Process, including the key community meetings that identified the critical issues and policy recommendations for the Study. The essence of the public involvement program was to provide a forum for two-way communication between the Project Management Team and the public stakeholders. The *24/40 Corridor Study* provided an opportunity for Leavenworth County, the two participant cities, and the participant agencies to educate the public as to the relationship between land use and transportation; and for participants to hear ideas and concerns of the general public about transportation and land use choices on the corridor.

The public workshops helped the parties reach informed consent and find practical solutions that will work for all partners in the project. The public involvement process allowed the public to:

- Have an opportunity for providing meaningful input,
- Be kept informed of project findings and recommendations, and
- Be involved in developing the corridor plan recommendations.

The public involvement process provided various forums for public participation at five key project milestones:

- Focus Session Meeting
- Planning Policy Charrette
- Visual Preference Workshop
- Draft Recommendations Open House
- Final Recommendation Presentation

A Citizen Advisory Committee composed of two dozen public representatives from public and private sectors, organized by the Project Management Team, and facilitated by the project consultant team, provided input in preparation for and/or as a part of each public meeting.

In addition, the Project Management Team and consultants, working with ETC Institute - a professional polling firm working as subconsultant to the lead consultant – conducted a *Community Opinion Survey* of corridor issues. The community opinion survey was administered to a randomly selected sample of 1,200 residents in the south half of Leavenworth County, the results of which are summarized in **Appendix A**. The 601 responses—a 50 percent response rate—helped affirm the ideas promulgated during the public workshops.

Summary of Critical Corridor Issues

Throughout the planning process, there were several themes identified during the various public meetings, workshops, and the community survey results related to the future of the US 24/40 Corridor. These issues critical to the corridor are summarized below. The remaining

portion of this section summarizes the public comments and recommendations received throughout the planning process:

- Maintain the rural character and sense of open space along US 24/40 Highway,
- Preserve the mobility and safety of US 24/40 Highway,
- Limit direct access to US 24/40 Highway through the development of an appropriate supporting street network, including “reverse frontage” (or “backage”) roads,
- Establish good planning policies to direct urban growth to desired growth areas adjacent to the cities of Basehor and Tonganoxie and direct large-lot residential development to areas outside the cities’ future growth areas,
- Establish development standards to maintain a quality image for the corridor by addressing issues such as building placement, sign aesthetics, and good development design, and
- Preserve the Stranger Creek corridor and incorporate recreational uses such as multi-use trails.

Focus Group Meeting

In October, 2006 a community meeting was held in Tonganoxie. The meeting included a Focus Session which provided an opportunity for residents, landowners, business and civic leaders, and other community stakeholders to identify and verify issues and opportunities that are critical to the future of the US 24/40 Corridor.

Early in the project, members of the Project Management Team identified key stakeholders who had been involved in the corridor in some public capacity and had demonstrated prior interest and involvement in the future of the corridor. The consultant team conducted informal interviews with these stakeholders, and applied the knowledge obtained as a basis for further exploration of corridor issues through the focus session process. The process of **Issues Identification** used at the Focus Session was a structured idea sharing process. Participants initially introduced themselves and shared each other’s ideas and issues to the entire group. The series of issues were organized and discussed in the context of the following categories:

- Community Identify and Image
- Access Management and Traffic
- Land Use and Development

The opening lists of issues identified in the large group were then refined, clarified and prioritized in smaller “break-out” groups. The following lists summarize the top issues as identified by the meeting participants, with the number of final votes identified behind each issue.

CORRIDOR IDENTITY AND IMAGE

1. Rural and Open Space Preservation (17)
2. Site Development Standards (16)
3. Frontage Roads and Overpasses (9)
4. Lighting for Safety and Beauty (4)

ACCESS MANAGEMENT AND TRAFFIC

1. Geometric Improvements (14)
2. Access Management (limit signals, right locations) (13)
2. Mobility (13)
3. Need to Plan (11)
4. Safety is Key (5)
4. Allowances for Land-Use Access (5)
5. Accommodate Local Traffic (2)

Identified but Not Ranked:

Enjoy no-stress driving (0)

LAND USE AND DEVELOPMENT

1. Local street cross-connection north-south/east-west to serve local development while preserving highway capacity (8)
2. Contiguous development from the cities and the urban services – out to rural areas (7)
3. Recreation opportunities for bikes and pedestrians – (Multimodal) (6)
4. Maintain Sense of Place: What makes Leavenworth County/Tonganoxie/Basehor its own place/(rural) (5)
4. Site development standards to ensure quality development – landscaping (5)
4. Financing – paying for growth (5)
5. Safety at the schools (children) (4)

Identified but Not Ranked:

Control Industrial Growth/Environmentally Friendly (1)

Balance of Development – residential/commercial/industrial (0)

Business Park Development (0)

Planning Policy Charrette

In November, 2006 a community workshop was conducted at the Basehor-Linwood High School. The meeting included a facilitated Planning Policy Charrette to build on the critical issues identified by participants at the October Focus Session. The Charrette was a fast-paced, interactive workshop for solving problems posed to the group of participants using the critical issues.

The Planning Consultant began the workshop by presenting background information related to land use, the market analysis prepared for the corridor, and access management options. Workshop participants were later placed in small work groups and charged with helping identify preferred solutions to the critical issues in the corridor. Supplies included workbooks with questions, an area map, markers, and other tools necessary to record preferences, goals, objectives, actions, and strategies for resolving these issues. The group recommendations addressed issues ranging from future land use and the preferred future development pattern, preferred access management strategies, parks and recreation, and corridor image.

Key access management concepts, as illustrated in the following photos, were presented to the participants to provide them a fuller understanding of access management.

No Access Management



Access Management Issues



Transportation System Concepts



Access Management Concepts

Each group appointed a spokesperson who briefly summarized the group's key findings at the end of the session. The following summarizes the responses by the three groups:

TEAM 1 – SUMMARY

1. No heavy industrial on corridor, but light industrial okay
2. Cluster development districts (rather than allow strip commercial) and apply overlay standards with good planning policies
3. Parks and Open Space: Take advantage of Stranger Creek: Multi-Use Trails
4. Coordinate City/County Standards for: Signage, aesthetics, site plan/landscaping/higher density development
5. Landscaping for Highway-facing Development; street lighting standards, etc.



TEAM 2 – SUMMARY

1. Land Use: Mixed Use – Maintain existing; attract new; emphasis on “*planned development*” (retail, light industrial, etc.)
2. Development Pattern: Discussion focused on land between the two cities:
 - Direct more dense residential closer to the cities
 - Direct large-lot residential farther out away from the cities
 - Industrial should be a part of planned industrial parks
 - Need to attract commercial development – employers
3. Parks & Recreation:
 - Keep floodplain area of Stranger Creek natural
 - Keep parks closer to the cities/population centers
4. Corridor Identity:
 - Setbacks should vary – depends on type of business
 - Limit metal buildings close to road/visuals matter close to road
 - Sign restrictions (size, illumination, height)
 - Similar to K-10 Corridor looks and pattern/keeps a more open feeling
 - Right-of-way for future mass transit
5. Public Realm:
 - Gateway entrances into the cities

6. Traffic/Access Management:
- Stop lights every mile
 - Leavenworth and Parallel improvements



Team 2 Results

TEAM 3 – SUMMARY

1. Shared sewer project by both cities. Trails with trailheads including horse trails with bike friendly roads
2. Passive and active recreation in the Stranger Creek basin. Cities share sports park.
3. Standards for design within corridor visibility. Signage standards on corridor.
4. A street "grid" is good. Support reverse frontage roads with room for separation from highway.
5. Limit left turns/support medians. Reduce access onto 24/40 or reduce speed limit.



Team 3 Results

Visual Preference Workshop Summary

In December, 2006 a Visual Preference Workshop was conducted at a community meeting at the VFW in Tonganoxie to build upon the prioritized issues and recommendations from the Focus Session and the Planning Policy Charrette. The purpose of the Workshop was to:

- Identify visual preferences to link development policy and design standards; and
- Use the visual evaluation as an important bridge between planning and implementation.

The Visual Preference Workshop was conducted by organizing images into the following categories:

Land Use Evaluations

- Moderate Density Residential
- High Density Residential
- Local Commercial
- Regional Commercial
- Light Industrial
- Access Management

Signage Design Evaluations

- Monument Signs
- Pole Signs
- Wall Signs

Streetscape Identity Evaluation

- Gateways
- Rural Streetscape
- Median/Roundabout Landscaping
- Buffers and screening
- Setback and Drive Experience



Roadway Lighting Evaluation

A complete summary of the workshop is presented in **Appendix B**. The following are the top rated images and the desired characteristics for future development identified by planning participants. These characteristics serve as the basis for the US 24/40 Corridor Guiding Principles and Corridor Identity Design Guidelines (**Ref. Section 9, Corridor Identity**).




Land Use Evaluations

Moderate Density Residential	High Density Residential
	
<ul style="list-style-type: none"> • <i>Architectural Detail</i> • <i>Garages vary (do not dominate the front façade)</i> • <i>Sense of depth (recesses and projections)</i> • <i>Larger Appearance</i> • <i>Front Yard Landscaping (rather than concrete)</i> 	<ul style="list-style-type: none"> • <i>“Big House” Residential Appearance</i> • <i>Craftsman style</i> • <i>Has sidewalks, front porch</i> • <i>Detached garages</i> • <i>Landscaped area between building and street</i> • <i>Break up the variety of materials if there are numerous units</i> • <i>On-street parking</i>
Local Commercial	Regional Commercial
	
<ul style="list-style-type: none"> • <i>Pedestrian and Shopper Friendly</i> • <i>Variety of architecture</i> • <i>Visual consistency</i> • <i>Landscaping around buildings</i> • <i>Blends well</i> • <i>Part of a planned district</i> • <i>Control of traffic movements</i> • <i>Provides a sense of community (identity)</i> 	<ul style="list-style-type: none"> • <i>Themed Design</i> • <i>Consistency and variety</i> • <i>Nostalgic</i> • <i>Good scale</i> • <i>Useable second story</i> • <i>Town Square Appearance</i>







Land Use Evaluations

Light Industrial	Access Management
	
<ul style="list-style-type: none"> • Architectural embellishment and details • Trees and Landscaping • Visitor friendly • Clean/Neat appearance • Good setting • Office Appearance • Elevated above street grade 	<ul style="list-style-type: none"> • Limited access allows for higher travel speed • Safe with no vehicular turning conflicts

Signage Design Evaluations

Monument Signs	Pole Signs	Wall Signs
		
<ul style="list-style-type: none"> • All monument signs are acceptable • Better than a pole sign • Context sensitive design 	<ul style="list-style-type: none"> • Clean and modern appearance • Does not look like a sign • Has a monument sign appearance (cannot see the pole) 	<ul style="list-style-type: none"> • Blends in with building design • Not cluttered • Does not appear like an afterthought

Streetscape Identity Evaluations

Gateways	Setbacks and Drive Experience
	
<ul style="list-style-type: none"> • Clean lines • Clearly identifies an "entry" • Creates a park-like appearance • Has an English flair 	<ul style="list-style-type: none"> • Natural appearance • Landscape set-back area • Larger building set-back
Rural Streetscape	Median / Roundabout Landscaping
	
<ul style="list-style-type: none"> • Raised median • Trees in raised median • No overhead power lines 	<ul style="list-style-type: none"> • Landscaping provided • Low maintenance plantings • Flowers • Park like appearance
Buffers and Screening	Roadway Lighting
	
<ul style="list-style-type: none"> • Large variety and quantity of plantings • Natural Appearance • Low maintenance plantings • Variety of color 	<ul style="list-style-type: none"> • Ornamental Appearance • Thematic Design

Community Opinion Survey

ETC Institute, in association with lead consultant BWR, conducted a survey of residents in the south one half of Leavenworth County during the spring 2007. Of the 1,200 county households randomly selected in the south part of the county, more than 600 responded—a strong 50 percent response. The survey asked about transportation and land use along US 24/40. Input included perceptions of safety, preferred configuration of access onto US 24/40, and commercial and residential development within the corridor.

A highlight of the survey results show that a strong majority of the 600 respondents said they were either “somewhat” or “very concerned” about safety along the US 24/40 Corridor. Most respondents agreed that new access onto and from US 24/40, including streets and driveways, should be limited in order to maintain current traffic flow. Respondents were divided on whether to reduce the number of existing driveways along US 24/40; about 30 percent said yes and another 30 percent said no, while 33 percent of respondents were neutral on this issue, and the rest undecided. A majority of respondents said commercial and residential development plans should focus on reserving open areas for rural uses. Most supported keeping such development in or near the cities of Basehor and Tonganoxie.

The survey was a vital step in evaluating communitywide perspectives on corridor development and potential. A complete survey summary was posted on the corridor project Web site in spring 2007 at www.marc.org/transportation/us2440/ and is attached to this report (**Ref. Appendix B, 2007 US 24/40 Corridor Community Opinion Survey**).

Open House Meeting

The consultant team drafted policies for traffic and access management, land development practices, and corridor identity based on the previous public input, feedback from the Project Management Team, and engineering and planning judgment. Exhibits illustrating the study concepts and draft recommendations were presented in an open house setting in March, 2007 at the Basehor-Linwood High School. The meeting provided the public the opportunity to ask questions of the consultant and Project Management Team. Questionnaires were provided to the participants to make it easier for them to comment on each of the exhibits. The comments received were primarily supportive of the draft policies. There was some interest expressed in allowing right turn only access points midway between the full access points onto U.S. 24/40.

Final Recommendations Presentation

A presentation of the final recommendations of the study was made to the public in July, 2007 in the Tonganoxie High School. The recommendations for traffic and access management, land development practices, and corridor identity were presented by the consultant in a power point format. In addition, exhibits summarizing the recommendations were displayed at the front of the auditorium. Following the presentation, the consultant and other members of the Project Management Team answered questions through one-on-one discussions with the interested public.

Environmental Challenges and Opportunities

Introduction

This section evaluates various resources in the US 24/40 Corridor including aesthetic, wetlands, geology and soils, water, ecological, terrestrial, air quality, floodplains and stream corridors, and cultural resources. This analysis serves a significant role in forming policies related to environmental resource preservation and environmental management within the corridor which are addressed in other sections of the Corridor Study. As the Corridor develops, it is important that the natural resources be respected and that the development occurs in a way that does not degrade the natural environment.

The summary and analysis provided in this section are based on information regarding natural, physical, and man-made environmental features that could potentially be affected and/or enhanced by future land uses or the construction of a future roadway network in the corridor. The following agencies were contacted and supplied information for this summary:

- Mid-America Regional Council (MARC)
- Kansas Department of Transportation (KDOT)
- Kansas Department of Wildlife and Parks (KPWP)
- Kansas State Historical Society – Historic Preservation Office
- Kansas Geological Survey (KGS) Data Access and Support Center (DASC)
- National Wetlands Inventory (NWI)
- U.S. Department of Agriculture Natural Resource Conservation Service (NRCS)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (USEPA)
- U.S. Army Corps of Engineers (USACE)

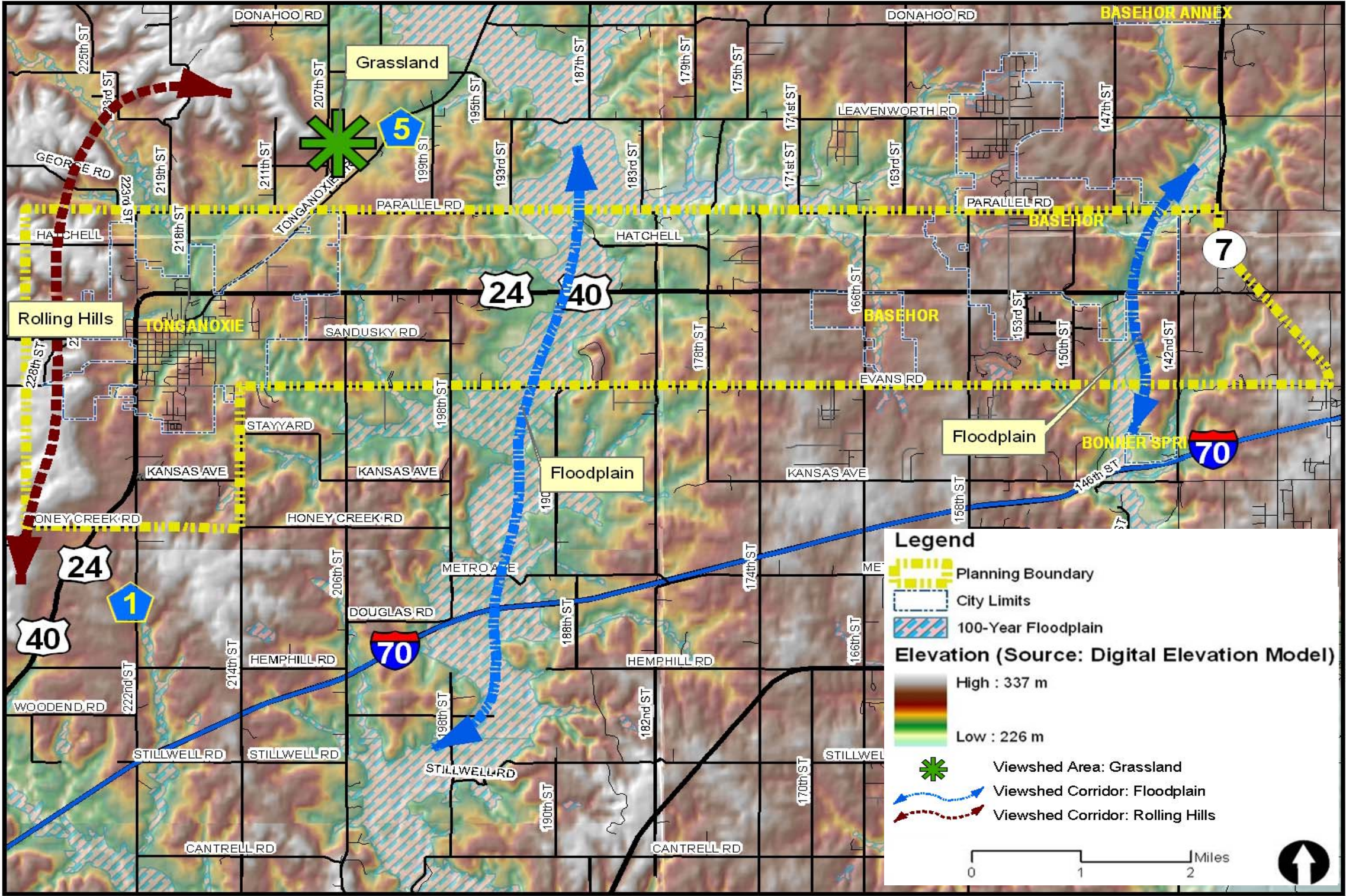
Visual Quality Assessment

Currently the US 24/40 Corridor is a mix of land uses (**Ref. Section 4**) that present a mix of visual images. Much of the undeveloped portion of the corridor has clear “view-sheds” predominantly characterized by agricultural land uses, such as pasture lands that rise above the floodplain of Stranger Creek and its tributaries. The rural character and open space preservation as reflected in the views from the highway were identified through the public involvement process as the top issues in corridor identity and image. **Figure 6-1** identifies view-shed preservation opportunities in the corridor. US 24/40 Highway from K-7 Highway to eastern Tonganoxie is mostly designed with a wide median that preserves and enhances the visual quality of the corridor.

Future updates to the Comprehensive Plans and development regulations for Leavenworth County and the cities of Basehor and Tonganoxie should include policies and standards to preserve these natural resources and view-sheds.

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Figure 6-1: Visual Quality Assessment



Source: BWR, Leavenworth County GIS

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Wetlands

Example Wetland



Wetlands are defined by the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) as ***“those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.”*** Wetlands may provide

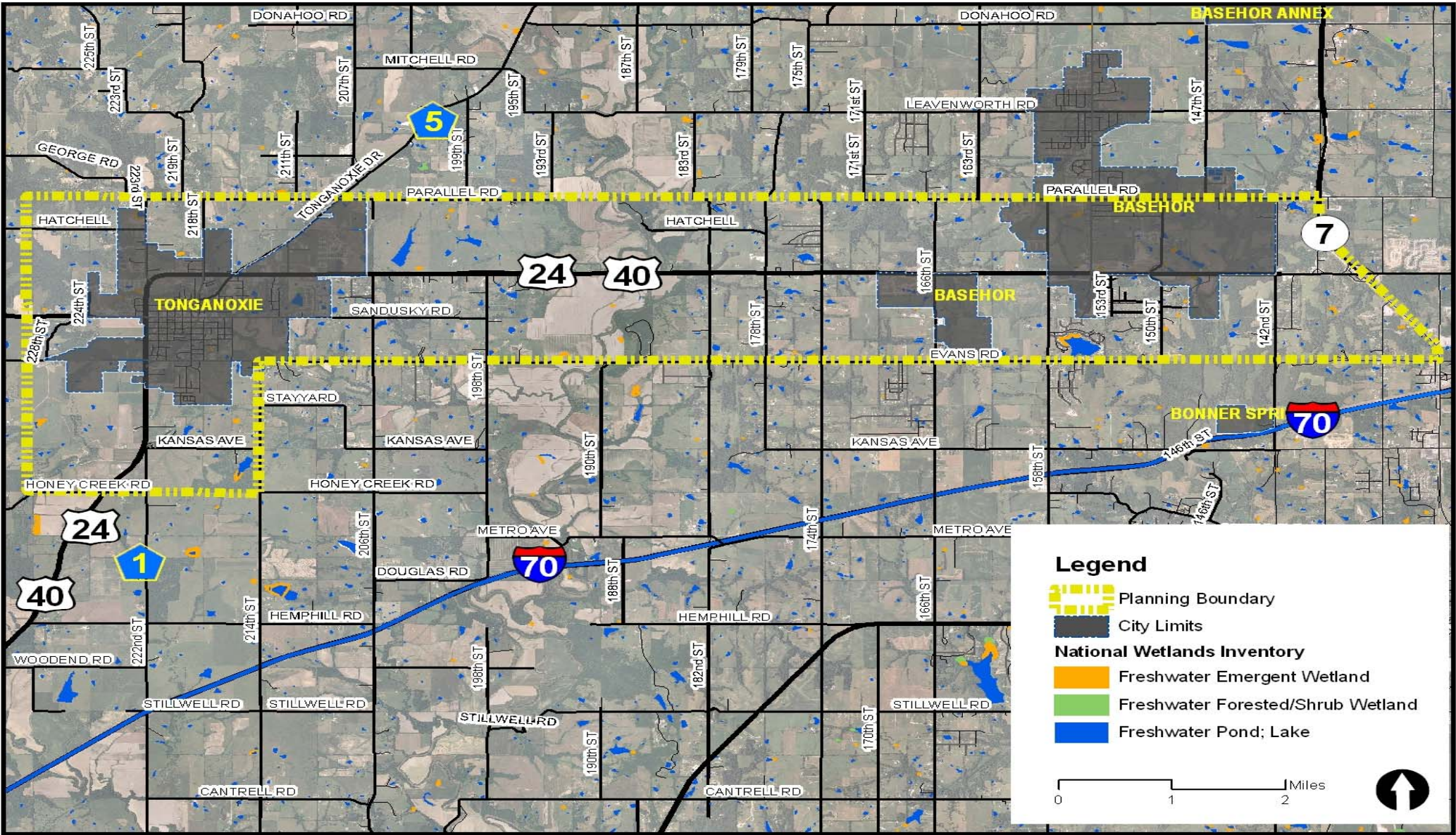
and/or promote a variety of functions including groundwater recharge and discharge, flood flow alternation, nutrient retention and removal, production export, and the promotion of habitat and wildlife diversity and abundance.

The USACE has jurisdiction over all waters of the United States. Discharges of dredged or fill material in waters of the United States, including wetlands, require prior authorization from the USACE under Section 404 of the Clean Water Act (33 USC 1344). Additionally, Executive Order 11990 requires all federal agencies to minimize impacts to wetlands when conducting specific activities.

Potential jurisdictional wetlands have been assessed for the corridor and the designated areas are identified in **Figure 6-2**. The wetland investigation was conducted using information provided from the National Wetland Inventory (NWI) and the Kansas Geological Survey (KGS) Data Access and Support Center (DASC). The US 24/40 Corridor contains a total of 20.5 acres of potential jurisdictional wetlands. These potential wetlands are predominantly located along the central portion of the US 24/40 Corridor (within the Stranger Creek floodplain) and along the eastern portion of the Corridor (near Wolf Creek).

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Figure 6-2: National Wetlands Inventory



Source: National Wetland Inventory (NWI) and the Kansas Geological Survey (KGS) Data Access and Support Center (DASC), BWR.

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The following wetland categories were identified in the corridor:

- PABFh – Palustrine, aquatic bed, semipermanently flooded, diked/impounded (between 142nd and 150th – north of U.S. 24/40, 158th and 166th – north of U.S. 24/40, 166th and 178th – north of U.S. 24/40, 190th and 198th – south of U.S. 24/40, 198th and 206th – north of U.S. 24/40, 206th and Village – south of U.S. 24/40, north of Kansas Ave. and east of U.S. 24/40, and 214th and Delaware – south of U.S. 24/40)
- PEMFh – Palustrine, emergent, semipermanently flooded, diked/impounded (between 142nd and 150th – north of U.S. 24/40 and 224th and U.S. 24/40 – west of U.S. 24/40)
- PUBF – Palustrine, unconsolidated bottom, semipermanently flooded (between 182nd and 198th – south of U.S. 24/40 and 214th and Delaware – south of U.S. 24/40)
- PFOAh – Palustrine, forested, temporarily flooded, diked/impounded (between 206th and Village – south of U.S. 24/40)
- PEMA – Palustrine, emergent, temporarily flooded (between 190th and 198th – south of U.S. 24/40)
- PUBFx – Palustrine, unconsolidated bottom, semipermanently flooded, excavated (between 182nd and 190th – south of U.S. 24/40)
- PEMCh – Palustrine, emergent, seasonally flooded, diked/impounded (between 150th and 158th – south of U.S. 24/40, 174th and 178th – south of U.S. 24/40, 198th and 206th – north of U.S. 24/40, 218th and 222nd – north of U.S. 24/40)
- PABF – Palustrine, aquatic bed, semipermanently flooded (between 158th and 166th – north of U.S. 24/40)
- PABFx – Palustrine, aquatic bed, semipermanently flooded, excavated (between 158th and 166th – north of U.S. 24/40)
- PEMC – Palustrine, emergent, seasonally flooded (between 158th and 166th – south of U.S. 24/40 and U.S. 24/40 and 224th – west of U.S. 24/40)
- PEMCx – Palustrine, emergent, seasonally flooded, excavated (between 150th and 158th – north of U.S. 24/40)

Floodplains

The US 24/40 Corridor contains 1,318 acres of land classified as 100-year floodplain. **Figure 6-3** identifies the floodplain lands in the Corridor, which are primarily located along Stranger Creek and its tributaries. Encroachments into the 100-year floodplain were investigated based on information obtained from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) for Leavenworth County.

Example Floodplain



Executive Order 11988, "Floodplain Management," is the basis for identifying floodplain impacts associated with the construction of improvements located within floodplain boundaries. This order requires federal agencies to avoid actions, to the extent practicable, which will result in the location of facilities in floodplains and/or affect floodplain values. Development associated with this project which lies within floodplains should be planned and located so as not to interfere with stream flow or create a flood hazard.

The FIRM map shows Zone 'A' floodplains along both Wolf Creek and Stranger Creek, as well as along the Stranger Creek tributaries of Hog Creek and Tonganoxie Creek. Zone 'A' areas are susceptible to a 1% chance of being inundated in any given year, i.e. the "100-Year Floodplain". A Zone 'A' designation on the FIRM map is not based upon a detailed flood study and therefore no Base Flood Elevations (BFE's) are provided on the FIRM panel. All areas noted as Zone 'A' are located within the floodplain boundaries, which means development is prohibited under Executive Order 11988.



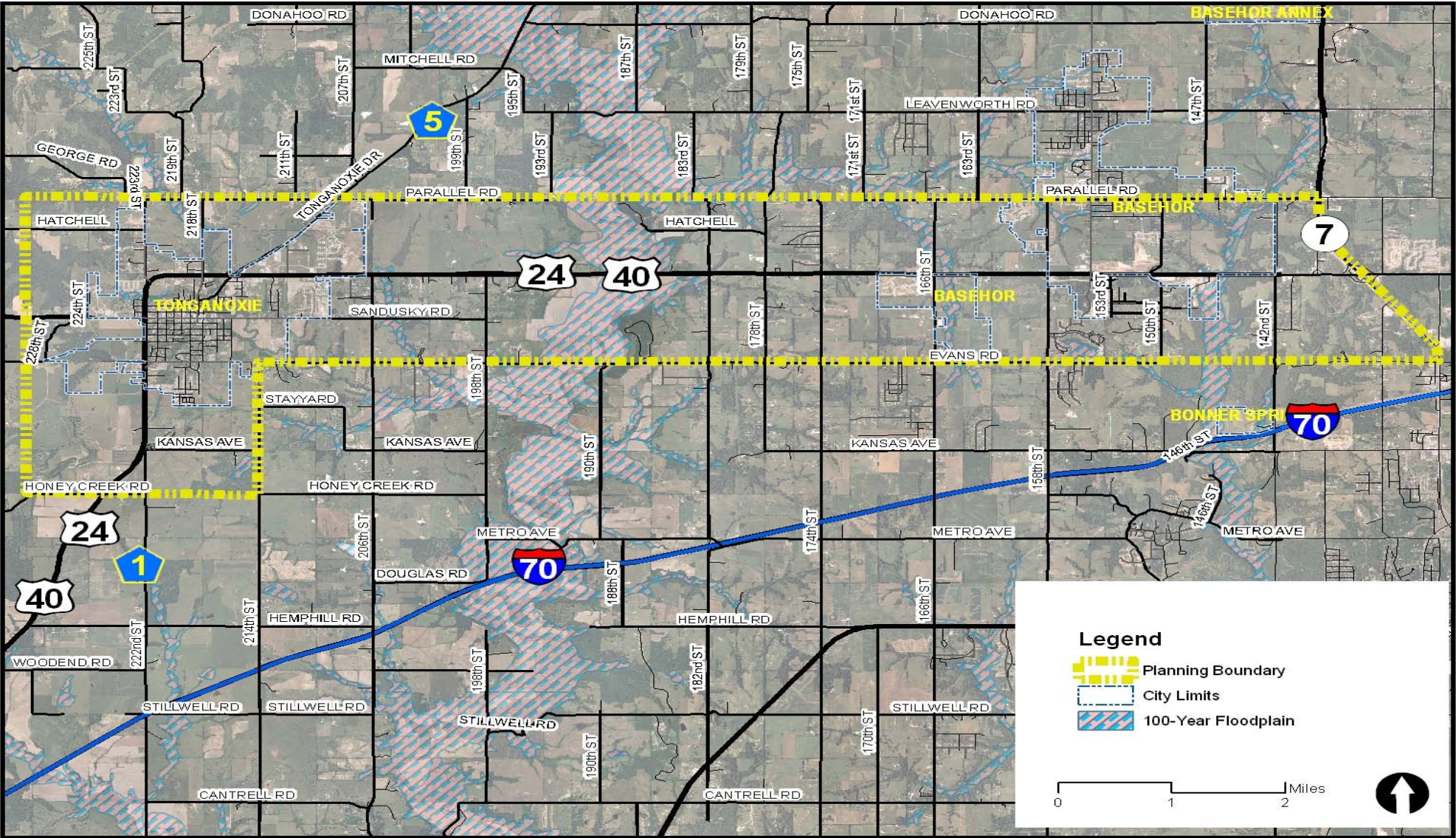
Example Floodplain

Since Zone 'A' floodplains are not based on detailed flood study, a more precise delineation of the floodplain boundary may be established by a detailed hydrologic and hydraulic study of the area. It is possible to expand the developable area through the use of fill within the floodplain (excluding the floodway). Both of these processes would require a formal revision of the FIRM maps through FEMA.

Impacts to the base floodplain should be minimized throughout the development process to insure that any increase of floodwater elevation is less than 0.3048 meter (1.0-foot) and that no rise will occur in the regulatory floodway, in accordance with FEMA standards. Coordination with FEMA and local authorities as appropriate should occur early in the development process to comply with all regulatory and permit requirements.

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Figure 6-3: Floodplain



Source: BWR & Leavenworth County GIS

Water Quality

There are various surface water resources in the corridor that may be affected by development, with a total of 247-acres of open waters located in the corridor. The project corridor has the potential for 22 stream crossings. A total of 295,680 lineal feet (56 miles) of tributary exist within the project corridor.

Storm water and water quality in particular are greatly impacted by development. Implementing an overall storm water management system approach at the countywide level can address the key adverse impacts of storm water runoff by reducing “*quantity*” of storm water runoff and increase the resulting water “*quality*”. Possible storm water management and treatment practices for the corridor are provided in **Section 8, Future Land Use and Development Regulations**.

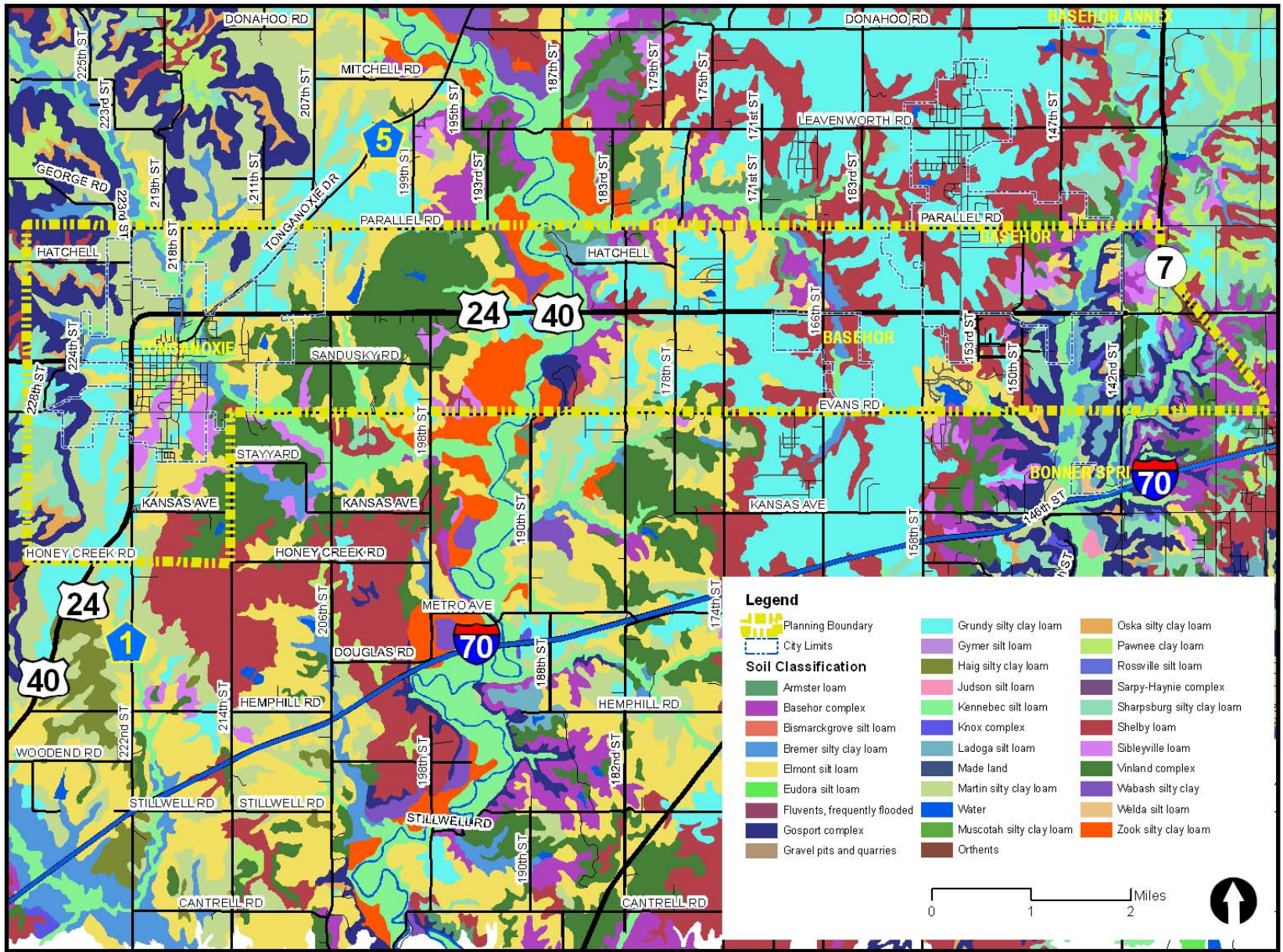
Geology and Soils

Figure 6-4 identifies soil classifications for the corridor using information provided by Leavenworth County, Kansas Soil Survey, and the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) soils maps. The predominant soil units within the corridor include:

- Kennebec silt loam, occasionally flooded
- Basehor complex, 5 to 30 percent slopes
- Elmont silt loam, 3 to 7 percent slopes
- Grundy silty clay loam, 1 to 3 percent slopes
- Grundy silty clay loam, 3 to 7 percent slopes
- Vinland-Sibleyville complex, 5 to 12 percent slopes
- Shelby-Pawnee complex, 3 to 7 percent slopes
- Martin silty clay loam, 3 to 7 percent slopes
- Sibleyville loam, 3 to 7 percent slopes

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Figure 6-4: Soil Classification



Source: Department of Agriculture Natural Resource Conservation Service (NRCS), Data Access and Support Center (DASC), BWR.

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The Leavenworth County soil survey classifies all of the soil types within the corridor as “somewhat” to “very limited” for construction of:

- small commercial buildings
- local road and streets
- dwellings with basements
- dwellings without basements
- septic tank absorption fields

Development and construction limitations exist throughout the corridor due to the low strength, frost action, shrink-swell action, depth to saturated zone, flooding and slope characteristics of the soil. While these limitations can be overcome during development through special design or installation procedures, a higher level of maintenance can generally be expected over the long term.

Threatened and Endangered Species and Critical Habitat

The US Fish and Wildlife Service (USFWS) and the Kansas Department of Wildlife and Parks (KDWP) were contacted regarding threatened and endangered species and critical habitats in the corridor area. Information was collected on a county basis and obtained through phone conversations and website research with both the USFWS and KDWP.

Based on USFWS information there are six federally-listed faunal species (two threatened species and four endangered species) or designated critical habitat within the corridor. **The two federally-listed threatened species include:**

- Bald Eagle (*Haliaeetus leucocephalus*)
- Piping Plover (*Charadrius melodus*)

The four federally-listed endangered species include:

- American Burying Beetle (*Nicrophorus americanus*)
- Eskimo Curlew (*Numenius borealis*)
- Pallid Sturgeon (*Scaphirhynchus albus*)
- Least Tern (*Sterna antillarum*)

The KDWP information indicated that there are eleven threatened species and seven endangered species listed for Leavenworth County, Kansas. **The state-listed threatened species include:**

- Bald Eagle (*Haliaeetus leucocephalus*)
- Chestnut Lamprey (*Ichthyomyzon castaneus*)
- Eastern Spotted Skunk (*Spilogale putorius*)
- Flathead Chub (*Platygobio gracilis*)
- Piping Plover (*Charadrius melodus*)
- Redbelly Snake (*Storeria occipitomaculata*)
- Silverband Shiner (*Notropis shumardi*)

- Smooth Earth Snake (*Virginia valeriae*)
- Snowy Plover (*Charadrius alexandrinus*)
- Sturgeon Chub (*Macrhybopsis gelida*)
- Western Silvery Minnow (*Hybognathus argyritis*)

The state-listed endangered species include:

- American Burying Beetle (*Nicrophorus americanus*)
- Eskimo Curlew (*Numenius borealis*)
- Least Tern (*Sterna antillarum*)
- Pallid Sturgeon (*Scaphirhynchus albus*)
- Peregrine Falcon (*Falco peregrinus*)
- Sicklefin Chub (*Macrhybopsis meeki*)
- Silver Chub (*Macrhybopsis storeriana*)

According to KDWP, the state of Kansas has twelve state-listed critical habitats within Leavenworth County for the threatened and endangered species. **The state-listed critical habitats include the following species:**

- Bald Eagle (*Haliaeetus leucocephalus*)
- Chestnut Lamprey (*Ichthyomyzon castaneus*)
- Flathead Chub (*Platygobio gracilis*)
- Least Tern (*Sterna antillarum*)
- Pallid Sturgeon (*Scaphirhynchus albus*)
- Piping Plover (*Charadrius melodus*)
- Redbelly Snake (*Storeria occipitomaculata*)
- Sicklefin Chub (*Macrhybopsis meeki*)
- Silverband Shiner (*Notropis shumardi*)
- Smooth Earth Snake (*Virginia valeriae*)
- Sturgeon Chub (*Macrhybopsis gelida*)
- Western Silvery Minnow (*Hybognathus argyritis*)

Many of the threatened and endangered species listed have critical habitats within the stream and riparian forest areas in Leavenworth County. Future updates to the Comprehensive Plans and development regulations for Leavenworth County and the cities of Basehor and Tonganoxie should include policies and standards to preserve these stream corridors and natural resources. In addition, future development will require continued coordination with KDWP and the USFWS.

Vegetation

Figure 6-5 identifies the various types of vegetation located in the US 24/40 Corridor based on data provided by the Natural Resources Inventory prepared by the Mid-America Regional Council. Vegetation classifications identified within the inventory included:

- Deciduous forest
- Mixed evergreen deciduous
- Deciduous woodland and immature forest
- Grassland
- Lowland hardwood forest and woodland
- Marsh and wet herbaceous vegetation
- Urban forest

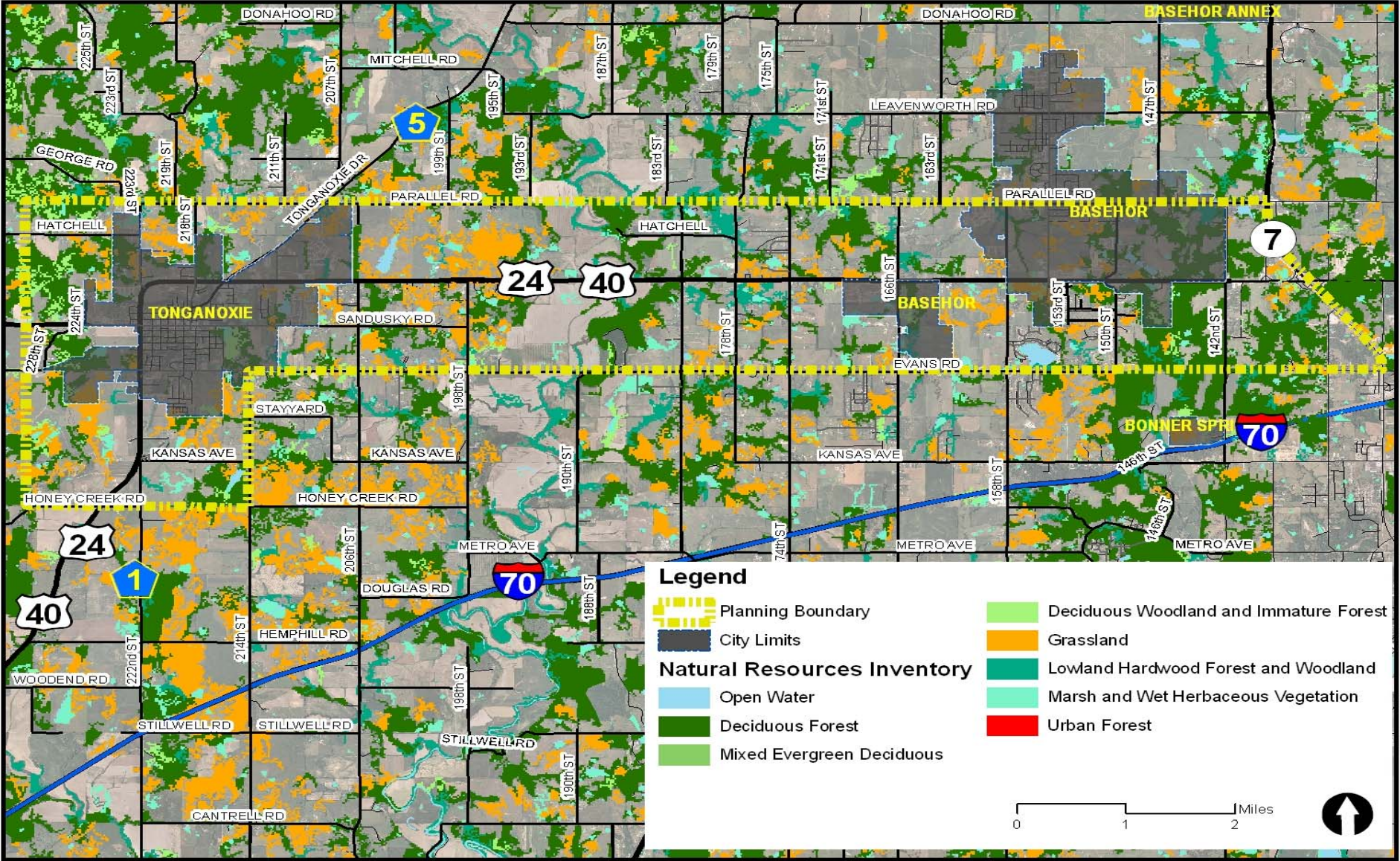


The most predominant vegetation classes in the Corridor are deciduous forest, grasslands and lowland hardwood forest and woodland. The deciduous forest areas are typically located near the riparian corridors of streams. Deciduous forest exists along Stranger Creek, Wolf Creek and the tributaries associated with each stream. The predominant grasslands areas of the project corridor are located between 206th and 193rd Streets east of Tonganoxie and between 163rd and 153rd Streets south and east of Basehor. Lowland hardwood forest and woodland areas are scattered throughout the corridor area. Often areas of lowland hardwood forest and woodland are located near creek tributaries with small pockets of marsh and wet herbaceous vegetation clustered within the forest/woodland areas.

Preservation of these significant resources should be addressed in the various jurisdictions through policies related to future land use, and through development regulations.

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Figure 6-5: Natural Resources Inventory (MARC)



Source: Mid-America Regional Council (MARC), BWR

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Cultural Resources

Historic properties are protected under the National Historic Preservation Act (NHPA), codified under 16 U.S.C 470. The intent of the NHPA is to ensure federal leadership in the preservation of prehistoric and historic resources. Under the NHPA, federal agencies are to integrate historic preservation into all activities that directly or indirectly involve land use decisions.

Information was obtained from both the Kansas State Historical Society and National Register of Historical Places website regarding the identification and evaluation of historic properties within the project corridor. Also, a letter was submitted to the Kansas Historical Preservation Office regarding information about state and national registered historical sites within the corridor area.

There are four national registered historical sites within the “vicinity” of the City of Tonganoxie. For the general protection of these sites, the specific addresses are listed as restricted. These sites include two agricultural fields and two archeological sites. The agricultural fields include:

- Scott Site
- Evans Site (14LV1079)

The archeological sites include:

- Caenen Site (14LV1083)
- Paul Site (14LV1043)

The Tonganoxie Historical Society is located at 201 West Washington Street and owns ten acres of land with a museum consisting of: an old milk house, a renovated barn, the Honey Valley one room school house, and the Reno Methodist Church. None of these structures are listed on the state or national historical registers.

At the time of this study, the Basehor Historical Museum Society has efforts for the construction of a 29,000 square foot facility to be built at the southwest corner of 158th and Parallel.

Due to the existing/known agricultural and archeological sites in the vicinity of Tonganoxie, any future development would require close coordination and regulatory compliance with Section 106 of the NHPA. Unavoidable effects would require mitigation through strict adherence to the laws and regulations protecting NHPA properties and management practices included in standards set forth by the Federal Highway Administration (FHWA), the Advisory Council on Historic Preservation and the Kansas State Historical Society.

Knowledge of the actual site locations are restricted in an effort to protect them from vandalism. However, this also makes it difficult for the cities and the county to protect the historical and archeological resources from development damages. City and county staff should ascertain the locations of these sites from the Kansas State Historical Society to be aware of possible encroachment onto the sites by proposed developments.

Transportation Corridor Management

Introduction

This section describes the recommended transportation management strategies and actions necessary to maintain both the safety and mobility of the corridor. It outlines guiding access management best practices, and how they can be applied to the corridor, both as interim and long-range improvements.

Access and Traffic Management Plan Overview

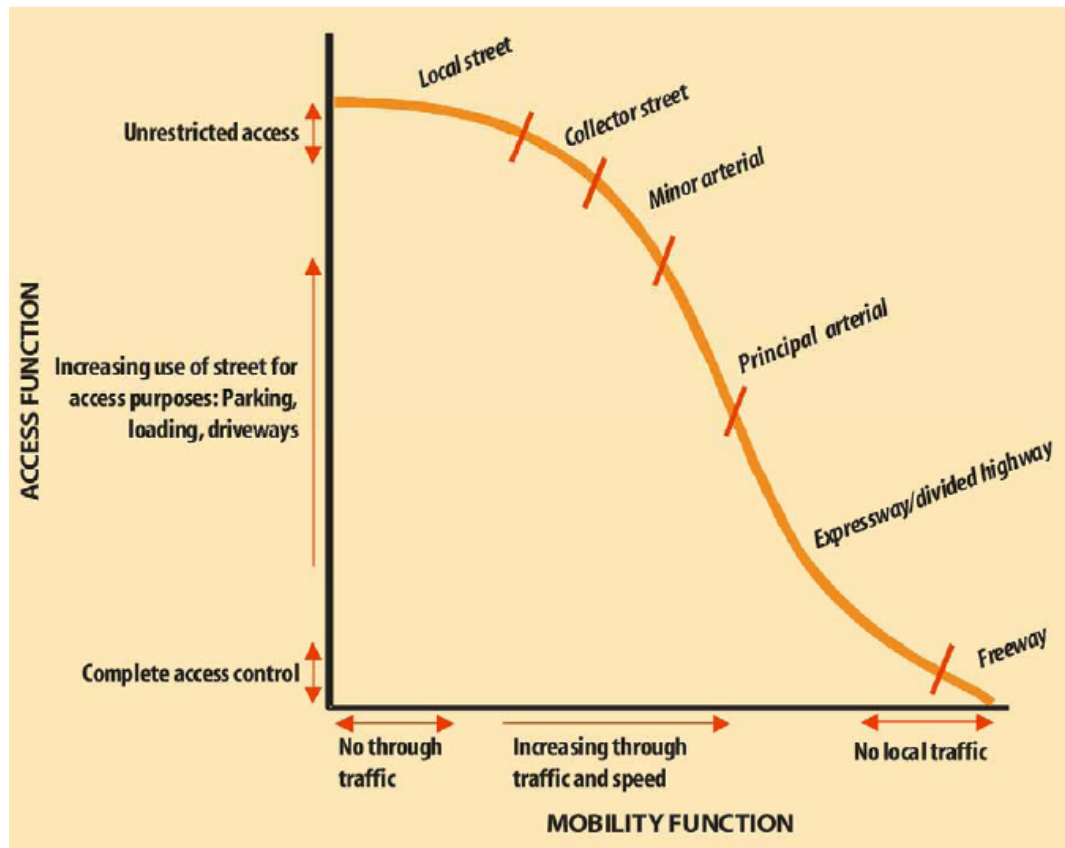
Section 2 described the competition between the two roadway purposes of moving traffic and providing access to adjacent properties. The essence of an access management and traffic management plan is to identify the balance between those purposes. **Figure 7-1** depicts the relationship between mobility and access for various classifications of roads. Combinations of mobility and access that fall to the left of the curve tend to be generally safer than roads that fall to the right of the curve.

Through the public involvement process for this study, the following sentiments were raised constantly:

- Maintain high mobility on US 24/40 Highway
- Provide for safe local access and traffic circulation
- Limit signals and place them at the right locations
- Provide adequate turn lanes and through lanes to maintain safety

These goals, provided by the public, define the guiding principles for the development of the US 24/40 Corridor Access and Traffic Management Plan. The goals will be achieved through the application of best practice strategies in access management, specifically to the US 24/40 Corridor.

Figure 7- 1: Mobility Access Relationship



Access Management Best Practices

The Transportation Research Board's Access Management Manual identifies 10 Principles for Access Management to limit and consolidate access points along major roadways, while promoting a supporting street system and unified access and circulation systems for development (**Table 7-1**). The result is a roadway that functions safely and efficiently for its useful life, and a more attractive corridor. The goals of access management are accomplished by applying these 10 principles.

Table 7-1: Access Management Principles**10 Principles for Access Management****① Provide a Specialized Roadway System**

It is important to design and manage roadways according to the primary function that they are expected to serve.

② Limit Direct Access to Major Roadways

Roadways that serve higher volumes of regional through traffic need more access control to preserve their traffic function.

③ Promote Intersection Hierarchy

An efficient transportation network provides appropriate transitions from one classification of roadway to another.

④ Locate Signals to Favor Through Movements

Long, uniform spacing of intersections and signals on major roadways enhances the ability to coordinate signals and ensure continuous movement of traffic at the desired speed.

⑤ Preserve the Functional Area of Intersections and Interchanges

The functional area is where motorists are responding to the intersection (i.e., decelerating, maneuvering into the appropriate lane to stop or complete a turn).

⑥ Limit the Number of Conflict Points

Drivers make more mistakes and are more likely to have collisions when they are presented with the complex driving situations created by numerous conflicts. Traffic conflicts occur when the paths of vehicles intersect and may involve merging, diverging, stopping, weaving, or crossing movements.

⑦ Separate Conflict Areas

Drivers need sufficient time to address one potential set of conflicts before facing another.

⑧ Remove Turning Vehicles from Through Traffic Lanes

Turning lanes allow drivers to decelerate gradually out of the through lane and wait in a protected area for an opportunity to complete a turn, thereby reducing the severity and duration of a conflict between turning vehicles and through traffic.

⑨ Use Non traversable Medians to Manage Turn Movements

Non traversable medians minimize left turns or reduce driver workload and can be especially effective in improving highway safety.

⑩ Provide a Supporting Street and Circulation System

A supporting network of local and collector streets to accommodate development, and unify property access and circulation systems. Interconnected streets provide alternate routes for bicyclists, pedestrians, and drivers.

Table 7-2 identifies strategies that can be used to apply these best practices to specific locations.

Table 7-2: Strategies to Apply Access Management Principles

Limit Conflicts	
<ul style="list-style-type: none"> 1. Purchase access rights 2. Regulate the location, spacing, & design of driveways 3. Restrict the number of driveways per lot 4. Restrict the number of lots 5. Encourage adjacent properties to share access 6. Coordinate driveway locations on both sides of the roadway 7. Install a nontraversable median 8. Replace a continuous two-way left turn with a nontraversable median 9. Close a median opening 	<ul style="list-style-type: none"> 10. Replace a full median opening with a directional opening 11. Install a separator island to prevent left-turns within the functional intersection area 12. Install a median divider on the cross-road 13. Install a divisional island to prevent entry into left-turn bay 14. Install a physical barrier to eliminate uncontrolled access along property frontage 15. Locate access opposite signalized 3-way intersection 16. Install channelizing island to discourage left-turn maneuver 17. Install narrow median with indirect left-turns
Separate Conflicts	
<ul style="list-style-type: none"> 18. Minimum corner clearance 19. Maximize corner clearance by locating access as far from the intersection as possible 	<ul style="list-style-type: none"> 20. Designate the access for each property 21. Consolidate access drives
Remove Turning Vehicles from the Through Traffic Lanes	
<ul style="list-style-type: none"> 22. Provide separate left-turn entrances and exits at major traffic generators 23. Install a continuous two-way left-turn lane 24. Install a left-turn deceleration bay at existing median opening 25. Install a nontraversable median with left-turn bays 	<ul style="list-style-type: none"> 26. Increase the length of existing turn bay 27. Install a right-turn deceleration bay 28. Install a continuous right-turn lane 29. Install a right-turn lane serving multiple access connections
Reduce the Number of Turning Movements	
<ul style="list-style-type: none"> 30. Provide connection between adjacent parcels 31. Require adequate internal circulation 	<ul style="list-style-type: none"> 33. Provide a supporting circulation system
Improve Roadway Operations	
<ul style="list-style-type: none"> 35. Long, uniform signal spacing 36. Install access on the cross-road 37. Provide adequate sight distances 38. Shared access/joint access 	<ul style="list-style-type: none"> 39. Internal access to outparcels 40. Indirect u-turn 41. Provide a frontage road
Improve Driveway Operations	
<ul style="list-style-type: none"> 42. Smooth vertical geometrics 43. Adequate driveway throat width and curb return radii 44. Provide adequate sight distance 	<ul style="list-style-type: none"> 45. Additional egress lane 46. Define the ingress and egress sides of the access drive

Plan Development Methodology

The process followed to develop the Access and Traffic Management Plan for the US 24/40 Highway Corridor was to:

- Establish the relationship between land use and traffic in the corridor;
- Identify the roadway network necessary to support the projected land use;
- Identify access and the roadway network from US 24/40 Highway necessary to support the projected land use, while maintaining an acceptable level of mobility and safety on the highway; and
- Identify specific short, intermediate, and long range access management and operation improvement strategies and projects.

To maintain the current high mobility function of US 24/40 Highway, a complete system of supporting roadways must be developed in the corridor to provide access to properties and to channel traffic onto the highway at predetermined locations. The prerequisite to any determination of the street network is the establishment of the likely future land use in the study area. This identification of projected land uses within the corridor was completed as part of this study. Once the land uses were identified, a travel demand model was used to relate future land use to traffic forecasts.

A travel demand model is based on establishing the relationship between existing land development and the traffic volume on the roadway system. A computer model is developed that recreates the actual land use/traffic relationship that can be validated through a land use inventory and traffic counts. That relationship is then used to relate future land development in specific locations to future traffic forecasts on specific roads. By comparing the forecast traffic volumes to the capacity of the road system to handle traffic, the need for supporting roadway system improvements can be identified.

Thus, a supporting roadway network can be proposed which will provide adequate access to properties and will collect traffic to interface with US 24/40 Highway at appropriate spacing. The key to determining the access spacing on the highway is finding the balance between maintaining mobility and providing a sufficient number of access points so that no one point becomes over congested, while maintaining safety.

Best practices in access management encourage appropriate access spacing and traffic signal spacing based on desired travel speed for highways such as US 24/40 Highway. The access management plan developed for US 24/40 Highway needs to address the reality of existing access points which are not consistent with best practice guidelines. Consequently, the plan needs to provide short range solutions, as well as a path to achieve the ultimate desired access management.

Many existing roadways – in particular, older commercial strip developments – tend to be dotted with undesirable access design features. A project that applies access management design principles to existing, already built-up street corridors is sometimes called a “retrofit” project.

Retrofit projects can be complex and challenging. Along roadways where the property lines, buildings, and driveways have already been established, the benefits from any access management modifications have to be weighed against the costs and any disruptions that would be caused by modifying, moving, or eliminating driveways and median openings. Bringing such roadways into compliance may not always be a sufficiently high priority to pass the threshold for effort and funding. However, access management policies and standards can be applied when land along existing roadways redevelops. This practice can keep the situation from further deteriorating.

The existing conditions assessment in Section 2 described the relationship between access density and crash potential. It follows then, that reducing the number of full access points for locations that exceed the recommended access densities based on speed should be the first priority. These sections of US 24/40 Highway have been examined for reasonable opportunities for reducing the number of cuts and/or the full accessibility of cuts (median placement), in the context of a sensitivity for existing property access rights. The development of a practical interim plan involves providing alternative access, median placements, auxiliary lanes, and other strategies. The only point in the crash/access analysis sample that does not fit the regression line well is the 2-lane segment of US 24/40 Highway in the western end of the Corridor. This segment reflects a high crash rate compared to the number of access points. Providing widening for a median/center turn lane is an appropriate strategy for this section.

Likewise, the interim traffic management plan addresses roadway capacity issues, assessment of near term demand for signal installation and/or relocation, need for auxiliary turn lanes and other traffic management strategies to improve safety and operations. Although the overall levels of service for the corridor are adequate, key locations for evaluation that have been identified through the public meetings have been examined as part of this study.

The recommendations for long term strategies are based on future land use. The land development absorption rates provided by the economic study were used as the basis to identify the anticipated magnitude and areas for growth within the corridor. Land use development rates were estimated for the year 2030 as input into the travel demand model. These land development estimates were supplied to the planning staff at Leavenworth County, the cities of Basehor and Tonganoxie, and MARC for concurrency. The resulting 2030 traffic forecasts provided the basis for the development of the long-term roadway network in the corridor necessary to practically support the anticipated land use.

Supporting Roadway Network

In order for US 24/40 Highway to continue providing a high level of east-west mobility, it must be supplemented with a system of other roadways to provide varying combinations of mobility and access. This system of streets must include arterial streets, collector streets to feed traffic from multiple local streets to arterial streets, and local streets to provide direct access to properties.

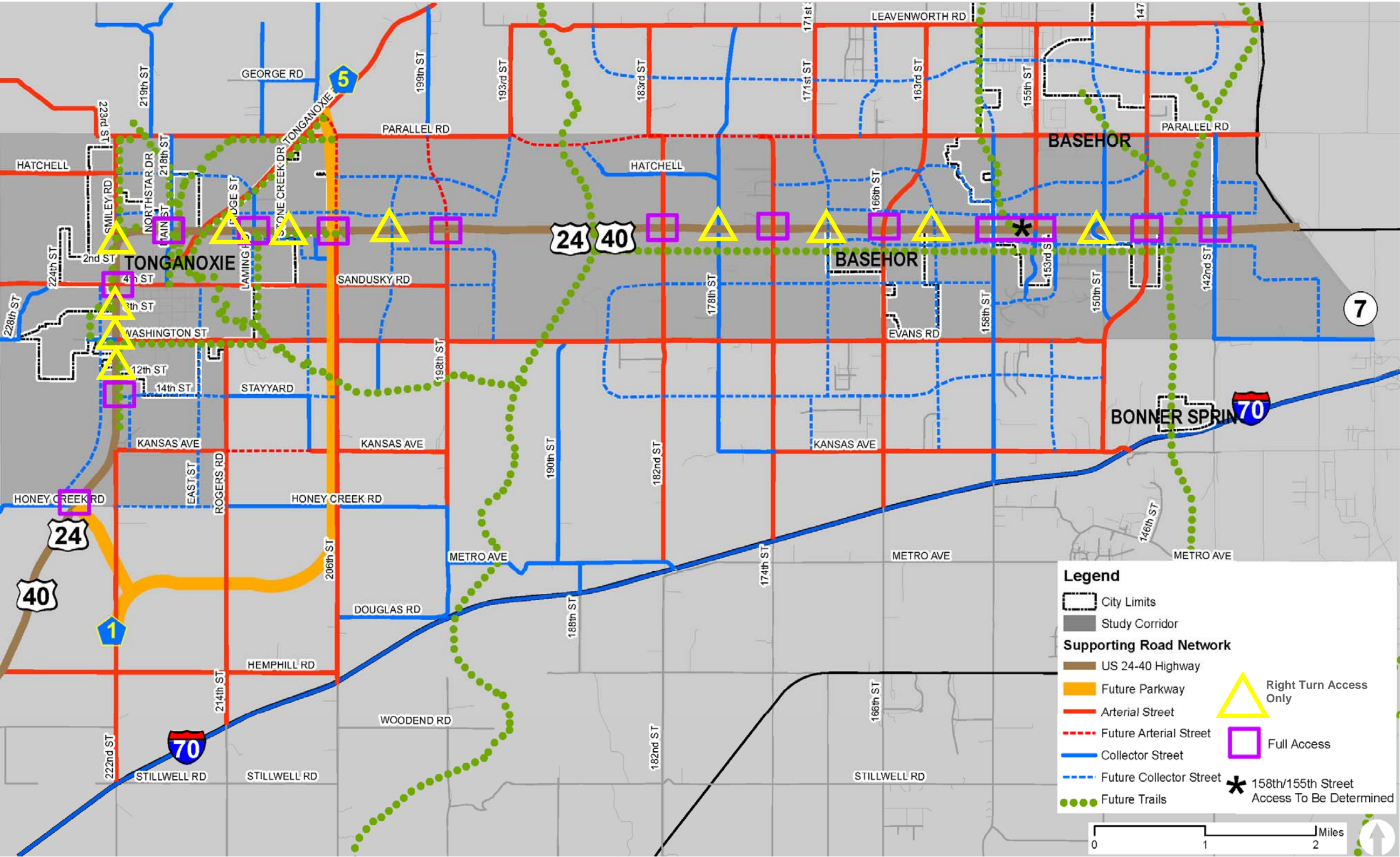
The supporting roadway network for US 24/40 Highway should consist of:

- parallel arterial streets serving east-west traffic along Parallel Parkway and along Evans Road
- arterial streets intersecting US 24/40 Highway at generally one (1) mile spacing.
- collector streets typically situated at half mile points between arterials and/or running parallel to US 24/40 ranging between 400 feet and one-half mile off US 24/40

Figure 7- 2 depicts the basic major street plan for the corridor. This plan should be supplemented with local streets to provide access to individual properties. The collector street network shown in the figure represents the minimum collector system. Additional collector streets may be proposed as needed to support the proposed developments, and alignments of collectors may be adjusted to better serve the adjacent developments.

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Figure 7-2: US 24/40 Corridor Supporting Transportation System Network Map



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Access Management Standards

The primary focus of the Corridor Study is to prepare a community based vision for the future of the corridor. This vision includes adopting standards for access management applicable to the desired character of new development or redevelopment in the corridor.

No single transportation planning publication is authoritative with respect to access management standards. Counties and cities adopt modified access management standards appropriate to their community and their desired future growth pattern. In most jurisdictions the demand for direct access to a roadway will increase as the adjoining area becomes more developed. Therefore, the standards adopted for the US 24/40 Corridor should be appropriate to support future urban development at an acceptable level of service.

It should be emphasized that the US 24/40 Corridor Access Management Standards are intended for new development or redevelopment projects and not for existing developed properties. For example, if a large lot residential acreage fronting US 24-40 Highway with an existing driveway to the highway remains with no change in land use, such driveway access could remain for the foreseeable future. However, if the property owner proposes to change the land use to put a commercial building on the site, the access management policy would apply.

- **A change in land use for property along US 24-40 Highway triggers the application of the Access Management Standards.**
- **When a change occurs from a rural use to a more intensive land use, existing access to the highway or an existing access to a connecting street may no longer be permitted.**

Table 7-3 outlines the US 24/40 Corridor Access Management Standards for future development and redevelopment, including standards for street intersection spacing, traffic signal spacing, number of full access points and right-turn only access points, turn lanes, and traffic studies.

The locations of permitted full and partial access as depicted in **Figure 7-2** have been correlated to future land use density zones called transects. Transects are described in greater detail in Section 8. **Figure 8-2** depicts the transects for the corridor.

Table 7.3: US 24 / 40 Corridor Access Management Standards

Standard	Description
All Areas: A traffic impact analysis shall be performed by a qualified traffic engineer for each requested access to US 24-40 Highway.*	The purpose of the traffic impact analysis is to identify potential safety and mobility impacts resulting from the new access.
All Areas: Allow new access onto US 24/40 Highway only for public streets.	Public streets can provide access for multiple property owners, whereas private access benefits only one property owner.
All Areas: Allow only those streets designated as collector streets or minor collector streets with connections to all adjacent properties to access US 24/40 Highway.	This standard insures that streets with access to the highway will provide access to multiple developments.
All Areas: Proposed plats of all properties within the 2-mile wide corridor shall provide street connections to all adjacent properties, and provide collector streets as designated by the US 24/40 Corridor Supporting Transportation System Network Map .	This ensures collector and minor collector streets are able to provide access to properties that would otherwise be deprived of access onto US 24/40 Highway.
All Areas: The first access onto any street intersecting US 24/40 Highway shall be setback a distance no less than 400 feet from the edge of the highway pavement. A greater setback distance may be required by a traffic impact analysis.	This distance is sufficient in most cases for traffic entering the intersecting street from an adjacent development to be outside the functional area of the intersection. The functional area is the area near an intersection that includes the space needed for decelerating, accelerating, and queuing.
All Areas: Provide right-turn and left-turn auxiliary lanes off the highway, and right-turn and left-turn auxiliary lanes onto the highway for all new intersections with US 24-40 Highway. Auxiliary lanes shall not be less than 150 feet in length, plus tapers. A greater turn bay length may be required by a traffic impact analysis.	The auxiliary lanes will provide a refuge for turning vehicles out of the path of through traffic on the highway, and will allow right turn traffic to enter the highway unimpeded by queued left turn and through vehicles waiting to cross or turn onto the highway.
Transect T1 Area: No new access is permitted onto US 24/40 Highway.	T1 transect areas are primarily floodplain lands in which development is not permitted.
Transect T2 and T3 Areas: Where new access is permitted onto US 24/40 Highway, the public street intersection density shall not be greater than 2 per mile (½-mile spacing). Full access allowed at not greater than 1 per mile, with right in/right out only access provided at ½-mile spacing.	Half-mile access spacing is sufficient to provide access to most tracts fronting the highway in transect areas T2 and T3. It should be emphasized that this is minimum access spacing standard.
Transect T2 and T3 Areas: Limit spacing of traffic signals on US 24/40 Highway to be no closer than one mile.	Optimal spacing for future traffic signals is 1-mile intervals to minimize travel delay on the highway.
Transect T4 Area: Where new access is permitted onto US 24/40 Highway, the public street intersection density shall not be greater than 2 per mile (½-mile spacing). Full access and traffic signal spacing allowed at not greater than 1 per mile with right in/right out only access provided at ½ mile spacing.	Optimal spacing for future traffic signals is 1-mile intervals to minimize travel delay on the highway.
Transect T5 Area: Where new access is permitted onto US 24/40 Highway, the public street intersection density shall not be greater than 4 per mile (¼-mile spacing). Full access and traffic signal spacing allowed at not greater than 1 per mile with right in/right out only provided at ¼ -mile spacing.	Optimal spacing for future traffic signals is 1-mile intervals to minimize travel delay on the highway.

*A traffic impact analysis shall include:

- Intersection sight distance.
- Estimated future traffic volumes using the connection upon full tributary land development, based on trips generated by future land development.
- Intersection capacity and queuing analysis for existing conditions and forecast traffic volumes.
- Lengths and numbers of auxiliary lanes needed to accommodate the estimated future traffic, but not less than the minimums specified in these standards.
- Queuing distances from the intersection for all traffic movements based on the estimated traffic volumes. These queue lengths will be used to establish the distance back from the intersection where the first access onto the street will be permitted, but not less than 400 feet.
- Evaluation of a signal warrant based on the forecast traffic volume for the highway intersection.

Interim Access & Traffic Management Plan

Given the current lack of funding to build the permanent improvements, interim improvements should be implemented as needed to address safety issues that arise and to accommodate the growing traffic demands. Typical interim improvements include:

- **the relocation of existing traffic signals, and the addition of new traffic signals (only where legal warrants for signal installation are met),**
- **targeted widening of US 24/40 Highway to install a center turn lane or a median,**
- **removal of median breaks, and**
- **the addition of turn lanes at intersections.**

The interim (short range) Access and Traffic Management Plan is intended to provide mitigation for existing access and traffic management deficiencies. It is not the intent to deprive existing properties access, but is intended to improve the safety for the motoring public. Interim improvements are enhancements that can be implemented in less than a year's time, and can continue to be implemented until the ultimate plan is realized. The time line for implementation is dependent on local priorities and availability of funding. The appropriate jurisdictions should pursue these opportunities as funding allows, recognizing that implementation of the projects will result in enhancement of safety and mobility in the corridor.

The ***Highway Capacity Manual*** states that the travel speed on a multilane highway decreases by 2.5 mph for every 10 access points in one direction. Thus, the greater the number of driveways and street cuts onto US 24/40 Highway, the slower the resulting travel speed will be. Because a number of properties with access directly onto the highway possess multiple drives and access to adjacent roadways, the number of driveways accessing the highway could be reduced significantly without damaging the property owners' abilities to access their property. It should be noted that acquisition of access rights for superfluous driveways can be a time consuming and costly endeavor, and can sometimes leave property owners dissatisfied. Implementation of an interim access management plan will require individual discussions and negotiations with property owners to identify and address their concerns.

The Short-Range Traffic and Access Management Opportunities are summarized in **Table 7-4** and presented graphically in **Figures 7-3 to 7-7**.

Table 7.4: Interim Improvement Opportunities

Project	Description	Location	Jurisdiction
Consolidate Private Driveways	Owners may voluntarily cooperate with KDOT and local governments to consolidate multiple drives on their own property, share drives with adjacent property owners, or relocate drives to other roads to reduce the number of driveways onto US 24/40 Highway.	Multiple Locations	KDOT / Local
Relocate Traffic Signal	Remove existing signal that does not meet legal warrants at Tonganoxie High School entrance and relocate to the intersection at US 24/40 Highway / Main Street.	Tonganoxie High School Entrance and Main Street	KDOT / Tonganoxie
Intersection Study	Possible consolidation of 155 th Street signal with 158 th Street and construct parallel collector street on north side of US 24/40 between 158 th Street and 155 th Street. Accident history at 158 th Street should be addressed.	155 th /158 th	KDOT / Basehor
Alter On-site Traffic Circulation	Alter the on-site school traffic circulation to direct exiting traffic to Main Street where vehicles would make use of the Main Street traffic controlled intersection to access the highway.	Tonganoxie High School	KDOT / Local
New Traffic Signals	Install traffic signals at intersections along US 24/40 Highway locations warranted based on existing traffic counts and consistent with Figure 7-2 .	Laming Road	KDOT / Tonganoxie
Auxiliary Left Turn Lanes	Install auxiliary left turn lanes at intersections along US 24/40 Highway	174 th Street	KDOT / Leavenworth Co.
		142 nd Street	KDOT / Basehor / Leavenworth Co.
Widening for Center Turn Lane	Widen existing highway to install a center turn lane to remove turning vehicles from through lanes for existing full access driveways and street intersections. Acquire adjacent right-of-way through site plan approval process.	US 24/40 Hwy from Smiley Road to E 14 th Street	KDOT / Tonganoxie
Auxiliary Right Turn Lanes	Install auxiliary right turn lanes at intersections along US 24/40 Highway.	198 th Street 182 nd Street 174 th Street 166 th Street 150 th Street 142 nd Street	KDOT / Leavenworth Co. / Basehor
Supporting Local and Collector Streets	Construct supporting local and collector streets to provide property access.	As noted in Figures 7-3, 7-4, 7-6, and 7-7	Tonganoxie/ Basehor

Project	Description	Location	Jurisdiction
Median Closures	Median closures may be implemented by KDOT based on accident experience or in the implementation of the Corridor Plan.	Corridor-wide	KDOT
Acquire Right-of-Way on Intersecting Arterial Streets	Acquire 120' of right-of-way for designated intersecting arterial streets through site plan approval process.	Honey Creek Road 14 th Street 21 st Street Main Street Laming Road 206 th Street 198 th Street 182 nd Street 174 th Street 166 th Street 150 th Street 147 th Street 142 nd Street	Leavenworth Co. / Tonganoxie / Basehor

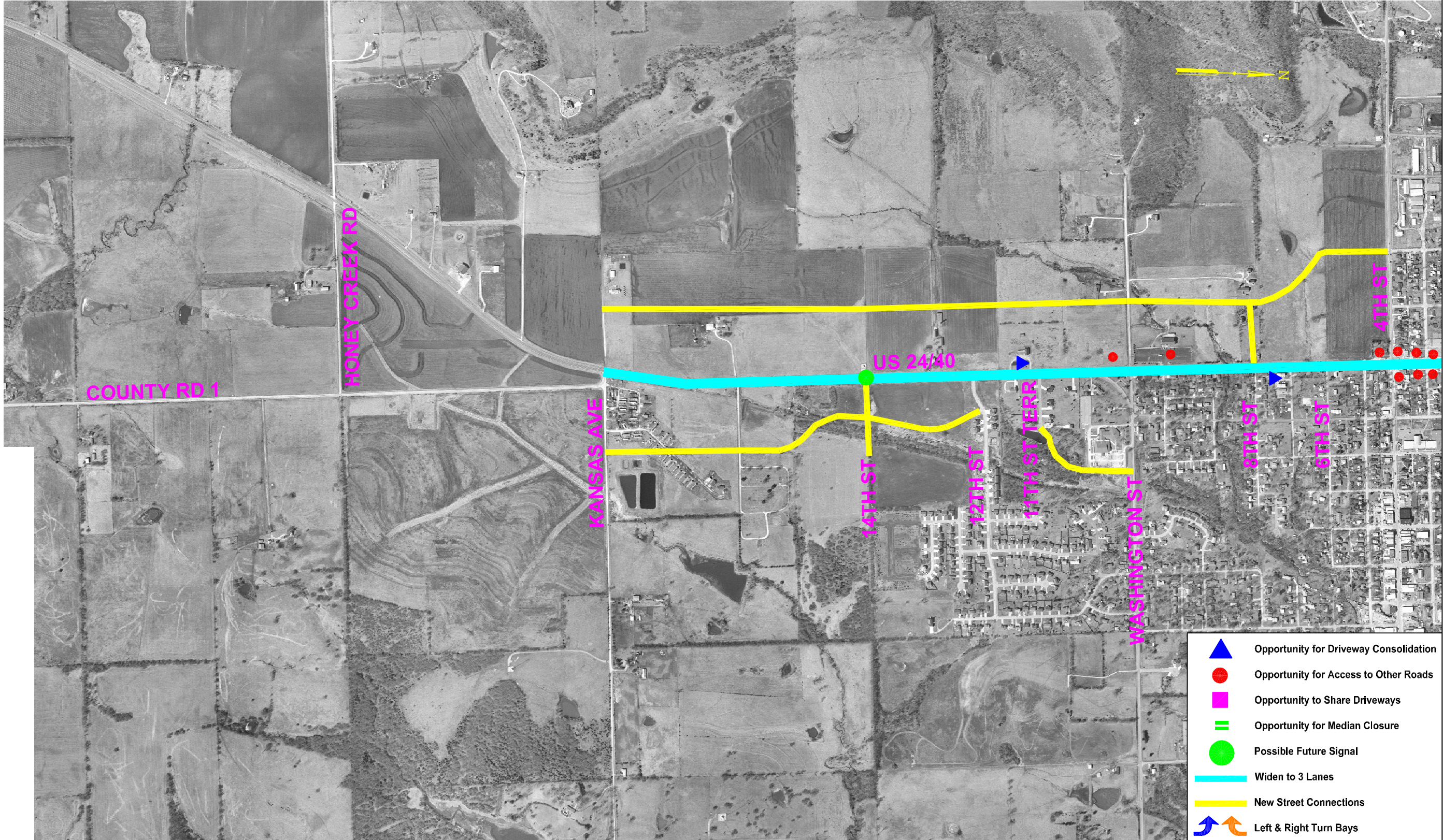
The western portion of the corridor through the original town area of Tonganoxie has the highest density of access to US 24/40 Highway in the corridor. The highway segment south of Smiley Road to E 12th Street should be widened in the short term to provide a center turn lane as depicted in Figures 7-3 and 7-4. The construction of a center turn lane may provide some traffic operation and safety benefits. A center turn lane would provide refuge for left turning traffic out of the path of through traffic. Potential consolidation of access has also been identified within this section.

Once traffic volumes increase sufficiently to justify two through lanes in each direction, the center turn lane should be replaced with a raised median from Stone Creek Drive to E 14th Street to provide the access spacing as indicated by Figure 7-2.

The construction of the median throughout the corridor could provide greater traffic operation and safety benefits than would a center turn lane in that it would reduce the number of conflict points for each full access driveway or intersection from 36 to 2 for a right turn only driveway or intersection. This would significantly reduce the opportunity for accidents and traffic conflicts.

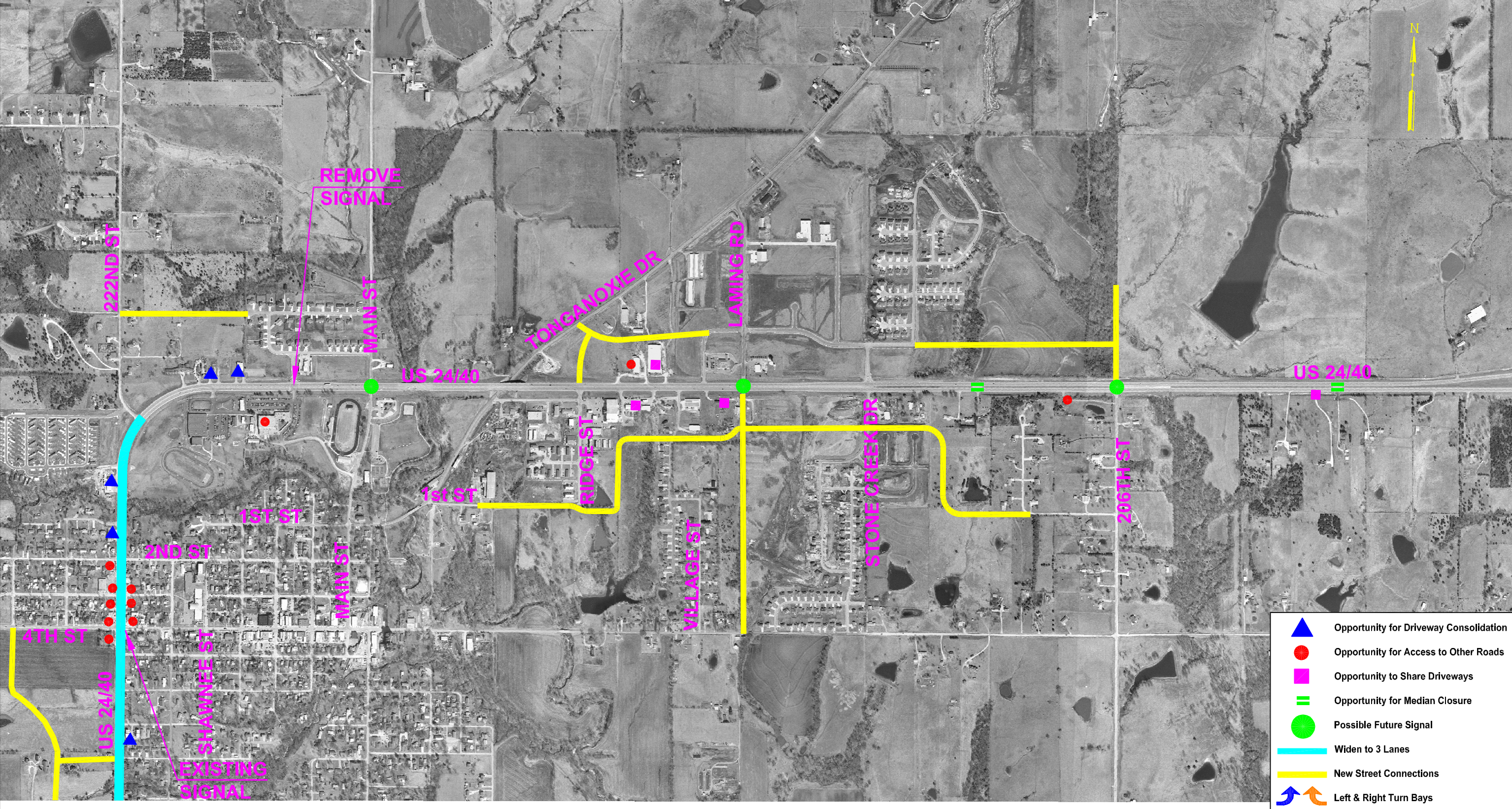
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Figure 7-3: Short-Range Traffic & Access Management Opportunitites



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Figure 7-4: Short-Range Traffic & Access Management Opportunitites



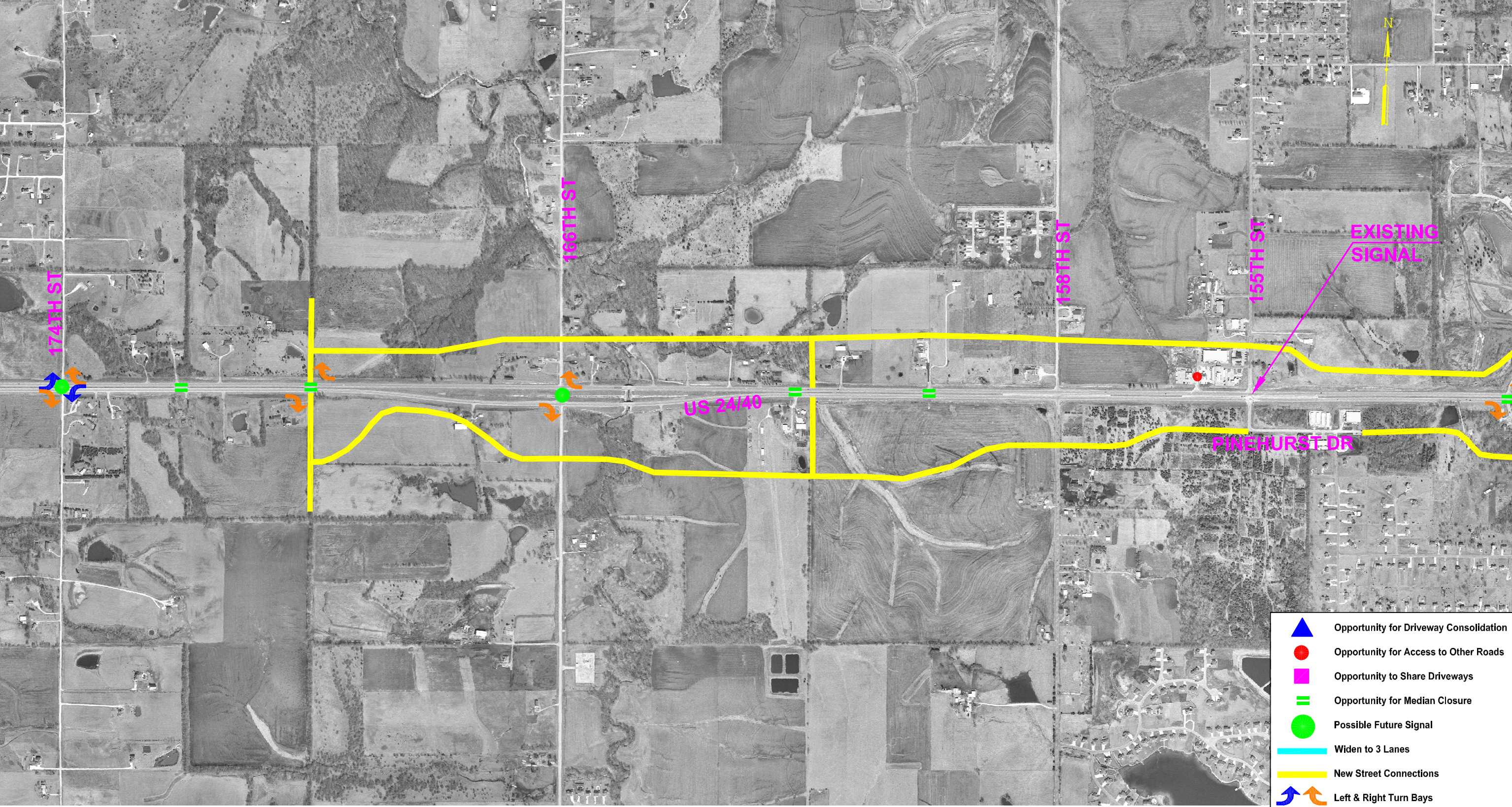
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Figure 7-5: Short-Range Traffic & Access Management Opportunities



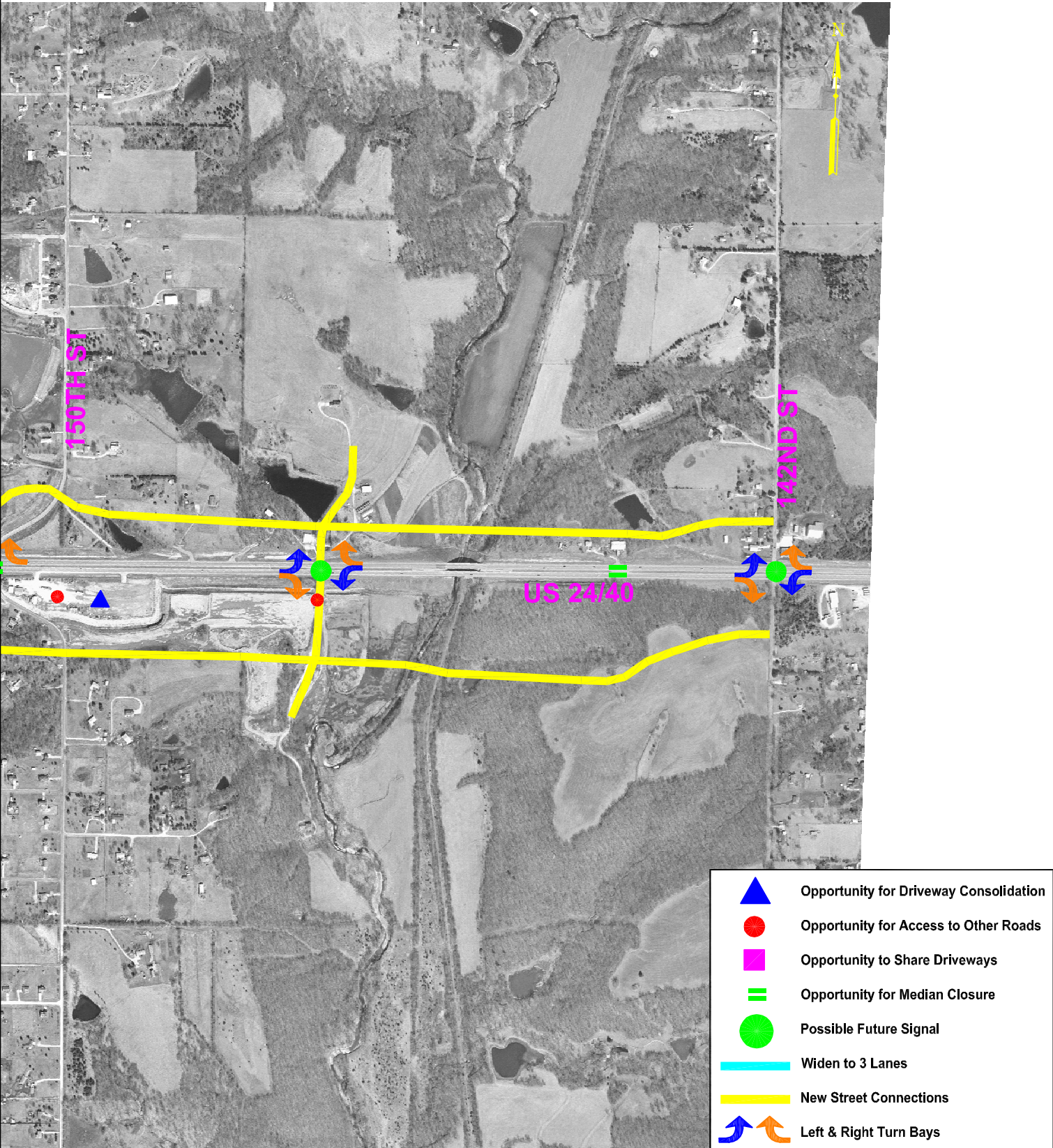
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Figure 7-6: Short-Range Traffic & Access Management Opportunities



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Figure 7-7: Short-Range Traffic & Access Management Opportunities



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Travel Demand Model

The US 24/40 Corridor is located at the fringe of the Mid-America Regional Council (MARC) regional travel demand model. The level of aggregation is quite coarse at the fringe, i.e., the traffic analysis zones (TAZ) cover a much larger geographic area. Larger zones result in most local streets not being modeled. To determine the impacts of future traffic growth in the US 24/40 Corridor, a refined travel demand model was developed for this study. The model area encompassed the entire southern portion of Leavenworth County (and a small portion of western Wyandotte County) and is bounded by Dempsey Road (north), K-7 Highway (east), Leavenworth County boundary (west), and I-70 (south). The model study area shown in **Figure 1-1** was divided into 89 traffic analysis zones as depicted in **Figure 7-8**.

The computerized travel demand model for this study was developed using the planning software VISUM to predict daily traffic volumes. VISUM is a state-of-the-art planning tool that offers a comprehensive, flexible software system for transportation planning, travel demand modeling and network data management. The VISUM model follows the standard four-step process as outlined in **Figure 7-9**. The steps are trip generation, trip distribution, mode choice, and traffic assignment. The trip generation step determines how many trips are generated in each TAZ. The trip distribution step determines where trips are going. The mode choice step identifies which modes are used while the trip assignment step determines which routes are taken.

Input to the model includes population and land use data for current and future planning years, as well as roadway infrastructure for current and planned roadway improvements. Output of the model includes current and future predicted traffic volumes on roadway segments and intersections, as well as various performance measures of the existing and future transportation system. Observed trip length distributions by different trip purposes and traffic counts are used to calibrate the model to ensure the model prediction reasonably replicates current travel patterns. The calibrated base year model is then used to forecast future travel demand in the study corridor.

Figure 7-8: Model Area Traffic Analysis Zones

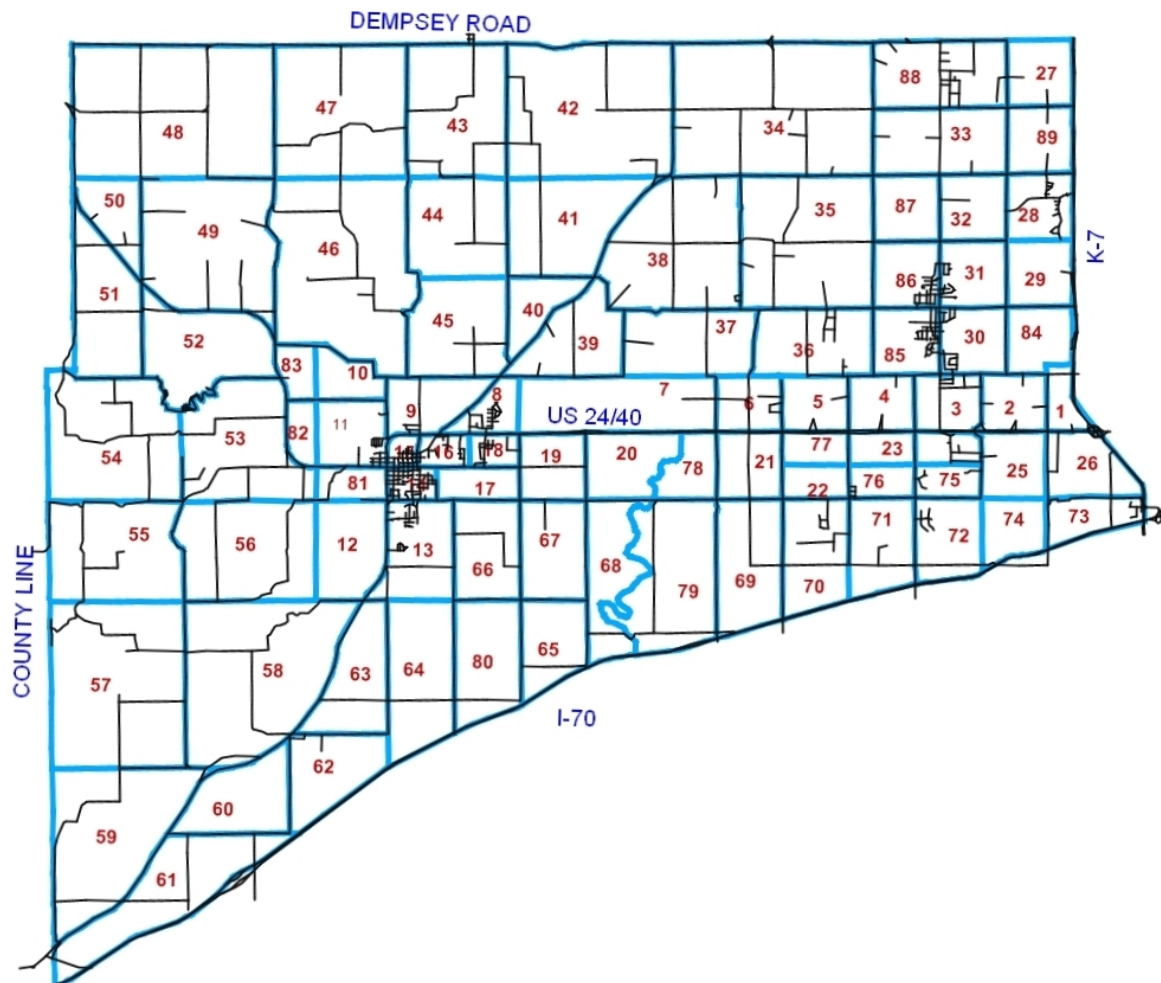
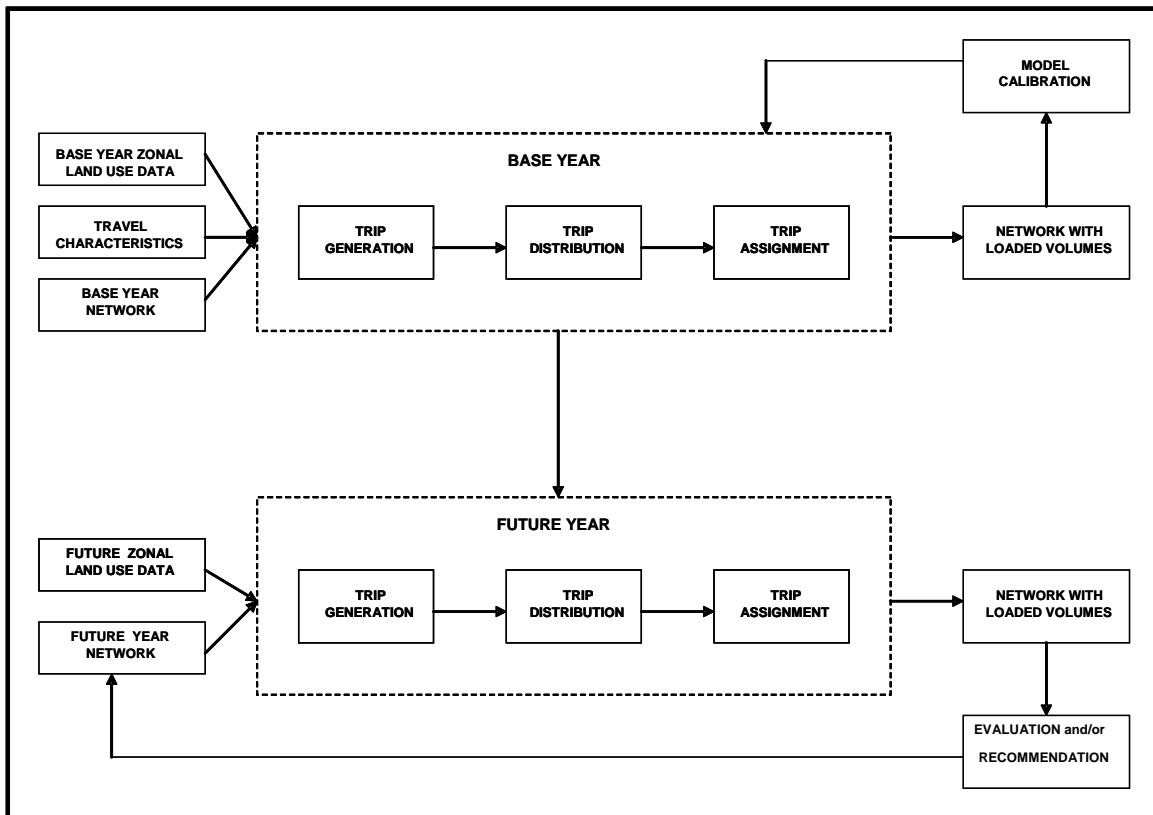


Figure 7-9: Development and Application of Travel Forecasting Models



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Traffic Forecasts

Traffic forecasts were developed for the Corridor for the year 2030. These forecasts were products of a travel demand model prepared for the Corridor Study. A travel demand model is based upon an inventory of the location and intensity of various existing land uses, and a compilation of existing traffic counts on specific roads. The model establishes a relationship between the specific existing land uses and traffic volumes on specific roads. That relationship is then applied to projected specific land development for a future planning horizon, such as 2030, to arrive at corresponding traffic forecasts on specific roads. The forecast land development was based on historic growth patterns, the capacity of the corridor to absorb additional employment as derived from the economic study performed as part of this project, and the comprehensive plans for Basehor, Tonganoxie, and Leavenworth County.

Figure 7-10 depicts existing daily traffic volumes along the corridor.

Figure 7-11 depicts the Year 2030 forecast daily traffic volumes. It can be determined from **Figures 7-10 and 7-11** that traffic on US 24/40 Highway is projected to increase only incrementally by 2030. The results of this increase will mean some greater difficulty for side road traffic to enter US 24/40 Highway under the current stop sign intersection controls. It can be expected that the number of intersections warranted for traffic signal installation may increase, unless rural development is carefully managed, and the new developments remain clustered within the existing city limits of Basehor and Tonganoxie, utilizing those intersections already warranted for signals as their access to US 24/40 Highway.

The construction of an interchange at County Road 1 and I-70, while not significantly affecting the overall volume of traffic generated by the corridor, could affect the traffic flow patterns within the corridor. The opening of the interchange will induce heavier daily traffic flows to the west end of the corridor, as exhibited in **Figure 7-12**. This could accelerate the need for widening of US 24/40 Highway from Tonganoxie south to County Road 1 to four lanes plus a median.

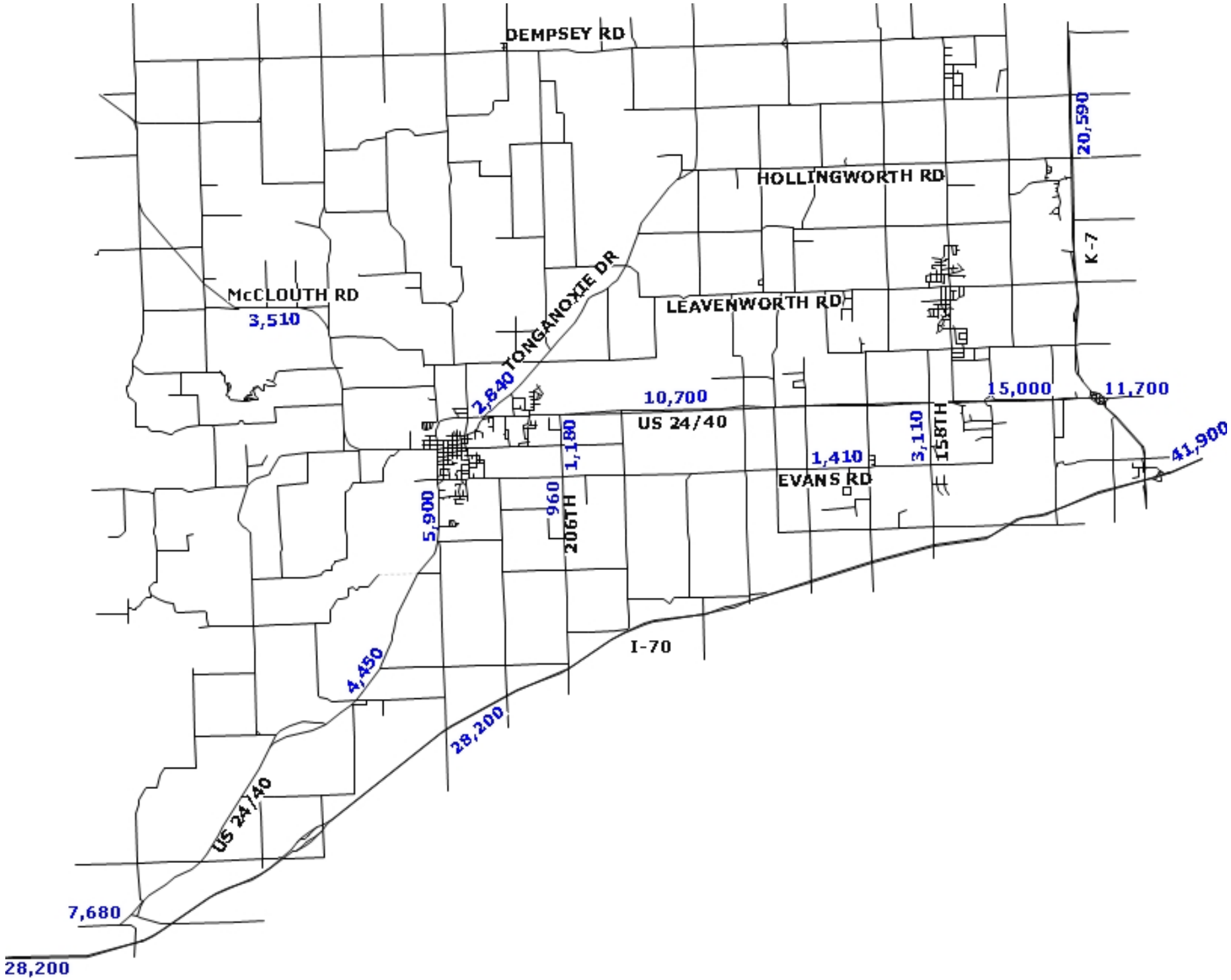
Right-of-way sufficient for four lanes plus a median should be secured from properties abutting the highway as they submit plats and development plans. The necessary width of right-of-way to construct an urban four-lane plus median section should not be less than 120 feet wide.

As further development and redevelopment occurs, the center turn lane of US 24/40 Highway between 4th Street and Stone Creek Drive in Tonganoxie should be converted to a raised median in accord with the access depicted in **Figure 7-2**.

The right-of-way for designated arterial roadways intersecting US 24/40 Highway with full access should be planned at 120 feet wide.

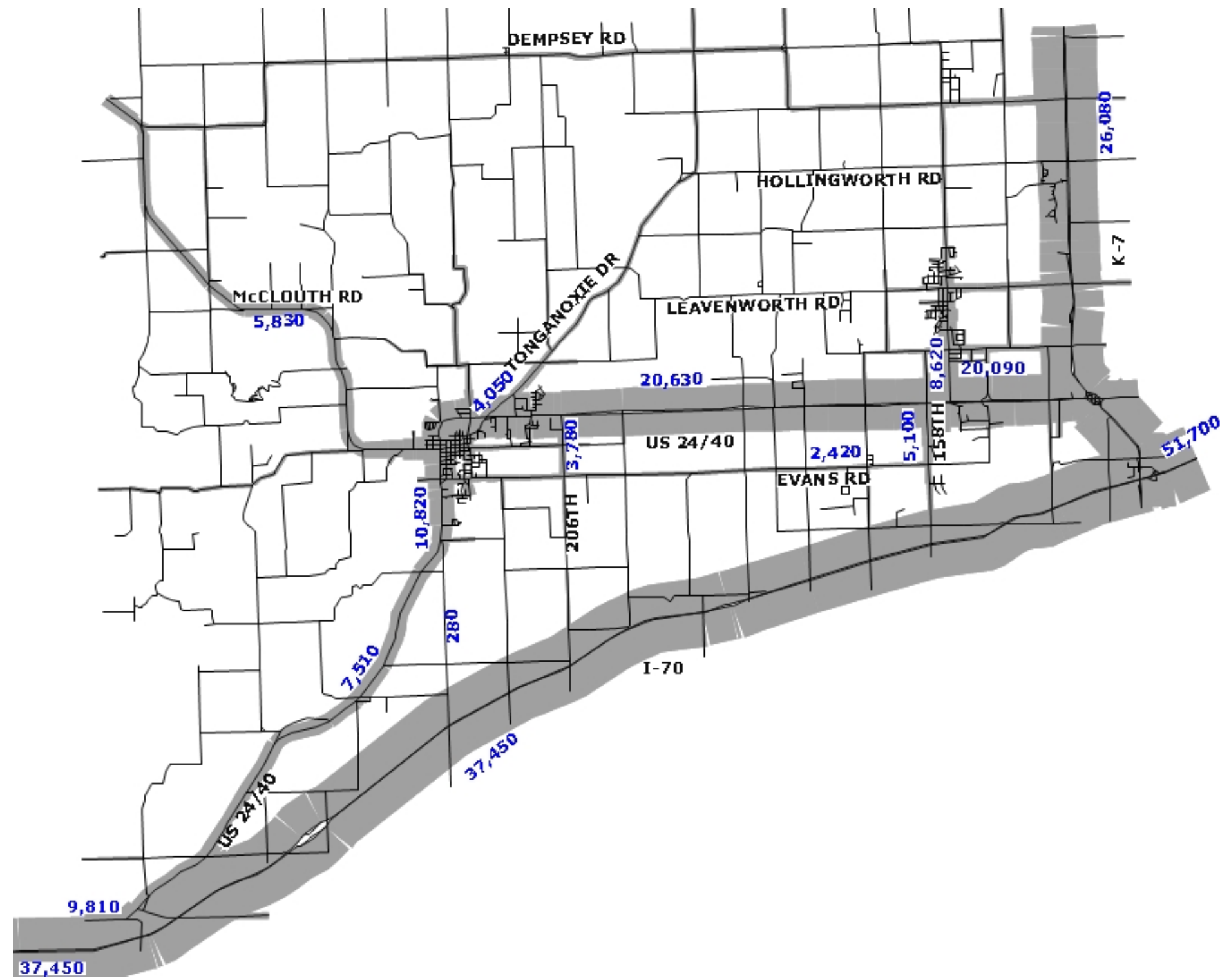
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Figure 7-10: Existing Traffic Volumes



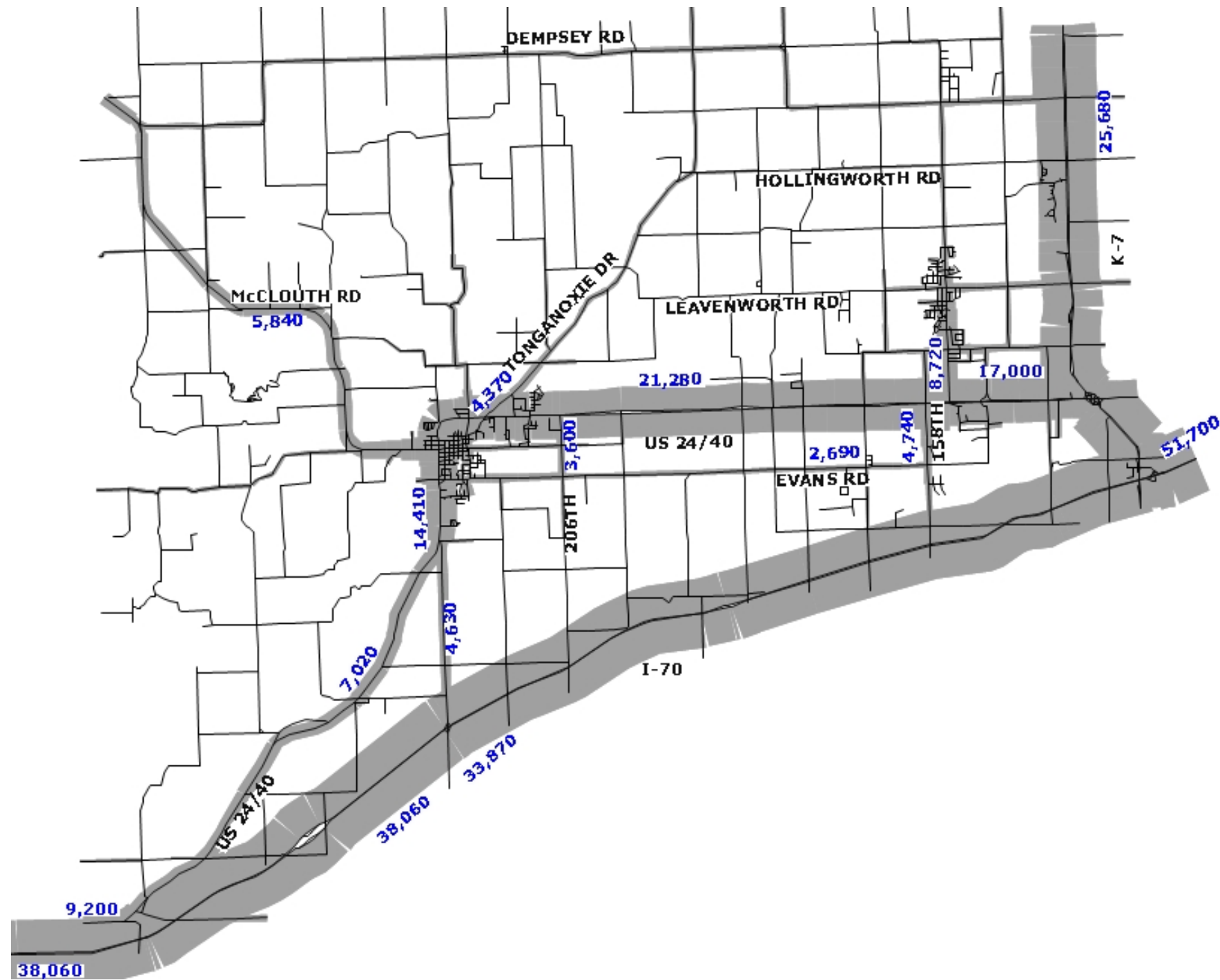
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Figure 7-11: 2030 Forecast Traffic Volumes



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Figure 7-12: 2030 Forecast Traffic Volumes (with Co. Rd. 1 interchange with I-70)



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Future Land Use and Development Policies

Introduction

This section presents policies for future development and land use, given the consensus identified through the extensive public participation process. The development and land use recommendations are based on data, issues, and public consensus, and are intended to be used by the respective planning commissions and governing bodies to adopt as amendments to their comprehensive plans and development regulations.

Included in this section are:

- The US 24/40 Corridor Transect Map which identifies areas where future development is anticipated to occur by 2030, as well as areas designated to remain rural;
- Transect descriptions for the series of zones which transition from sparse rural areas to suburban areas, to the denser core area of a community. The zone descriptions include typical land uses, residential density, infrastructure, and highway access management standards;
- Recommendations for environmental management, including stream buffers, slope preservation, woodlands preservation, and storm water management;
- Description of the Corridor Greenway Trail System; and
- A model overlay district to implement the recommendations of the Corridor Study.

TRANSECT Planning

The Corridor Study uses “Transect Planning” to convey future development areas, access management standards, and urban design guidelines for the corridor. The **TRANSECT** is an urban planning system, not a “zoning system.” Just as Leavenworth County and the two participant cities adopt both land use plans and zoning—as separate instruments—so too, the corridor study presents transects as a planning construct. The study defines a series of transect zones that transition from one land use type to another (**Ref. Figure 8-1**). The land density zones (or “transects”) generally reflect the current long range land use plans of Leavenworth County, the city of Basehor, and the city of Tonganoxie.

While it is anticipated that the transect zone boundaries will change over time—through local plan amendments—the underlying philosophy is to encourage development to occur contiguous to the two cities where new development can be supported by city services. The transects describe this preferred land use pattern (contiguous growth along the corridor, rural-to-urban, and back again urban-to-rural) and support the city and county land use policies in their plans. They provide another “planning tool” to use when updating local zoning and subdivision regulations. The local land use policies and regulations relate to transects—but,

they serve different purposes. Transects are not local land use regulations; rather, they are planning constructs that help frame the corridor land use analysis. As the land uses along 24/40 “transect” from urban-to-rural and back to urban, the local land use regulations change: urban has more commercial, rural more low-density and agricultural. The transects of the 24/40 corridor study “frame” or describe these land use transitions, but they do not regulate land uses. That’s for the local zoning and subdivision ordinances to do.

So what is the use of transects in corridor planning? Local jurisdictions are asked to adopt the plan recommendations through amendments to their own land plans and zoning and subdivision regulations (such as in overlay districts). Indeed, some of the solutions can be effective only if implemented at the local levels. For example, local street grid systems and parallel collector streets must be planned and platted outside the US 24/40 Highway right-of-way. Wide roads and open swales find a place on the Transect in more rural areas, while narrow streets and raised curbs are appropriate for urban areas. The corridor study shows how these local street grids can (and must) relate to the highway, and how to adopt these local land use plans and policies.

HOW THE TRANSECTS WORK

What: A Transect-based planning system organizes the natural, rural, suburban, and urban landscape into categories of density, complexity, and intensity in the same way the countryside relates to traditional towns and villages.

Why: Transect planning is used for several purposes.

- The Transect is a framework that identifies a continuous range of habitats from the most natural to the most urban.
- The continuum of the Transect, when subdivided, lends itself to the creation of logical development and preservation areas.
- The Transect integrates environmental and zoning methodologies, enabling environmentalists to assess the design of social habitats and urbanists to support the viability of natural ones.

In summary, the transects show how “one size does not fit all.” A street grid in an urban T-5 transect should be planned differently at the local level than a street grid in a suburban T-3 transect zone. Each environment, or Transect Zone (T-Zone), is comprised of design elements that define and support its locational character. Through the Transect, planners can specify different rural-to-urban contexts with intensity and function appropriate to their locations. Based on location, the streetscape elements, land uses, building disposition, and parking standards can be calibrated to preserve and enhance the regional character of a given place.

The Transect Plan as presented herein will become effective in its purpose as the entire Corridor Study is adopted by resolution as a part of the comprehensive plans for Leavenworth County, Tonganoxie, and Basehor, and an overlay district is established for the corridor.

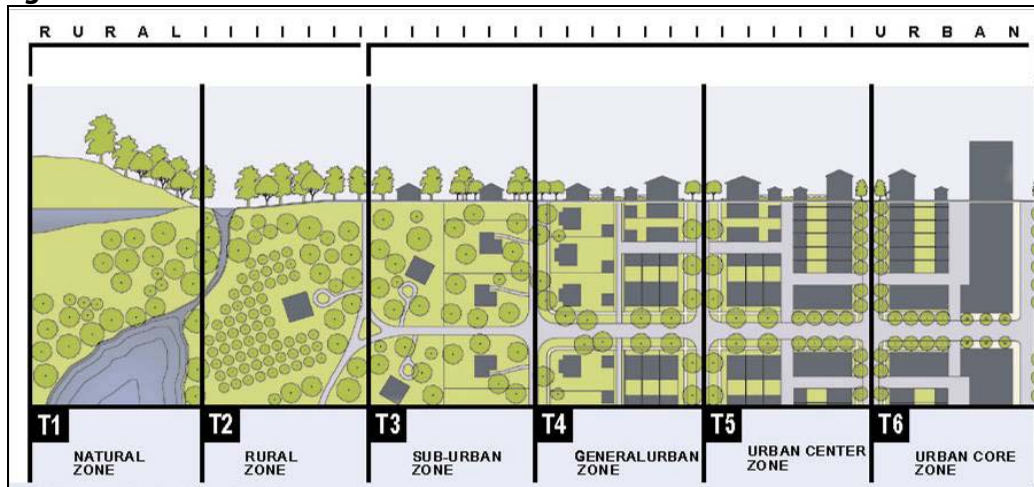
Figure 8-1: Transect Zones

Diagram Credit: Duany Plater-Zyber & Co.

The US 24/40 Corridor includes five of the six Transect Zones illustrated in **Figure 8-1**. Much of the corridor today consists of T1 (Natural Zone), T2 (Rural Zone) and T3 (Sub-Urban Zone). Generally, the existing Tonganoxie downtown area functions as a T5 (Urban Center). However, the Corridor does not include any areas considered T6 (Urban Core) since such areas are considered the most dense development such as downtown Kansas City, Kansas or downtown Kansas City, Missouri.

US 24/40 Corridor Transect Plan

Figure 8-2 identifies the US 24/40 Corridor Transect Plan. Using the transect zones descriptions, the Transect Plan represents areas where development should be encouraged by 2030, as well as areas that should be preserved as natural or for rural uses.

US 24/40 Corridor Transect Plan was prepared using:

- The significant public input provided throughout the planning process, including recommendations from the Focus Session Community Meeting and the Planning Policy Charrette to specifically identify targeted areas for future development and areas of preservation;
- The future land use plans and Comprehensive Plan future growth recommendations for Leavenworth County, Basehor, and Tonganoxie;
- Areas anticipated by the cities of Basehor and Tonganoxie for future extension of municipal water and sanitary sewer services;
- The Economic Conditions and Market Assessment for the US 24/40 Corridor Study; and
- The expertise of the cities' and county's planning officials, as well as the expertise of the Corridor Citizens Advisory Committee.

Purpose of the Corridor Transect Plan

The Corridor Transect Plan is intended to be used by the cities and the county to guide urban growth to appropriate development areas that can be supported by municipal services. The

Transect Plan should be used in tandem with the **US 24/40 Corridor Supporting Transportation System Network Map (Ref. Figure 7-2)** and the US 24/40 Corridor Access Management Standards (**Ref Table 7-3**). The *Long Range Access and Major Roadway Plan* correlates with the *Transect Plan*. While the transects are used primarily for land development and corridor planning purposes, they also correspond to the access management policies defined in this plan.

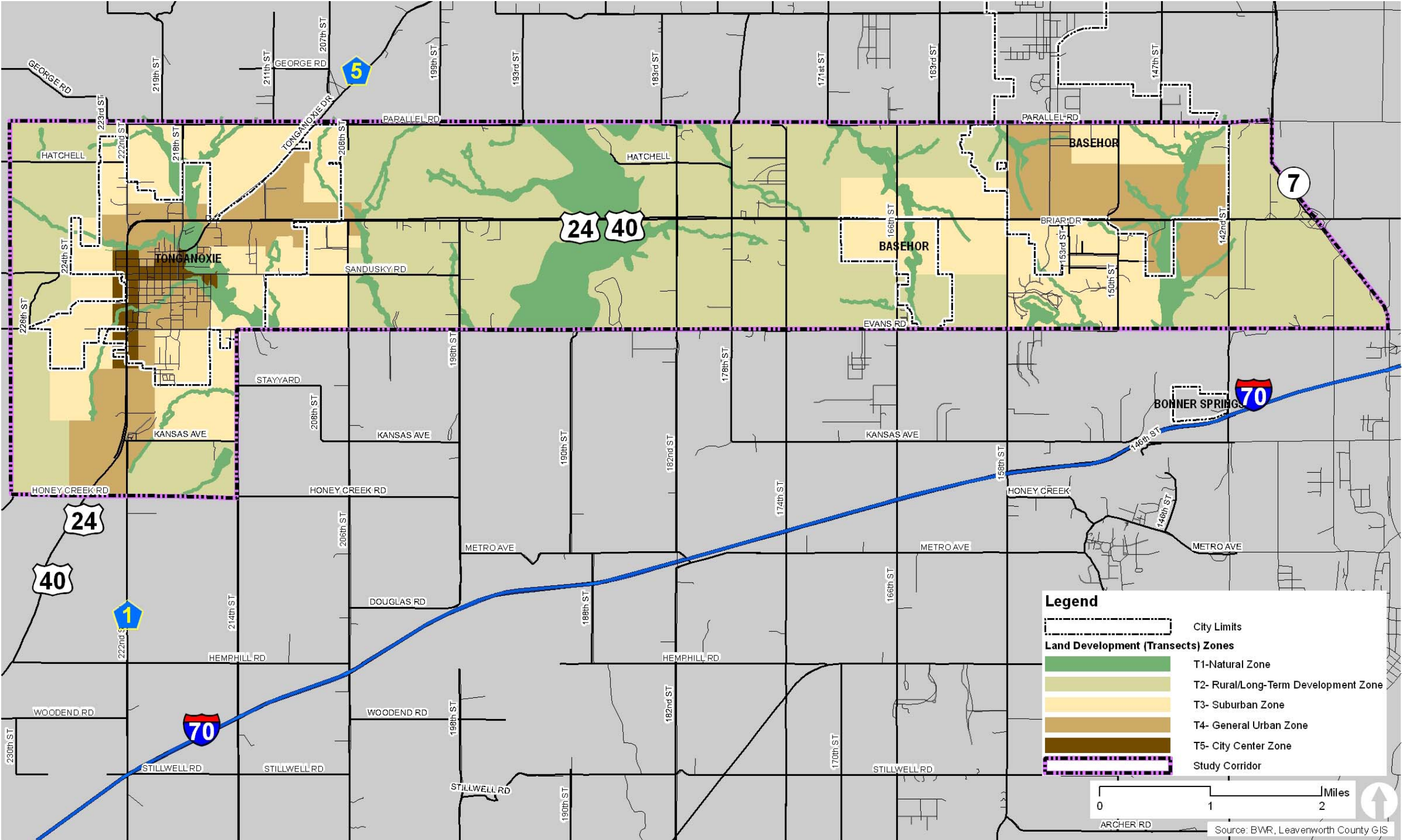
The Transect Plan is not a future land use map. While the transect zone descriptions outline uses considered appropriate for each zone, the intent of the Transect Plan and the Corridor Study are to:

- Direct future urban growth to defined areas in the corridor that can be served by the cities of Basehor and Tonganoxie, and to preserve the rural areas from inappropriate or premature growth;
- Allow each local jurisdiction to define the mix of land uses and development regulations within their planning area under the policy framework established by the Corridor Study; and
- Serve as the framework for the application of the Corridor Access Management Standards which are based on intensity of development.

With the adoption of the corridor study and creation of the overlay district, applications for site plans must comply with the transect definitions.

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Figure 8-2: US 24/40 Corridor Transect Plan



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Transect Zone Descriptions

The Transect Zones in the US 24/40 Corridor and recommended access policies for each zone with frontage along US 24/40 Highway are described as follows:

T1 - Natural Zone

This Zone consists of lands approximating or reverting to a wilderness condition, including lands unsuitable for settlement due to topography, hydrology or vegetation. It also consists of lands in an open or cultivated state, or sparsely settled. These include woodland, agricultural land, grassland, park lands, and low impact recreation uses.

The T1 Zone includes all lands in the 100-year floodplain, or 150 ft Stream Buffer Area on either side of a stream (whichever is greater). Any park and recreation development shall follow overlay district regulations that address stream setbacks, slope, and woodlands preservation.



Land Uses:	<i>Natural preserve, agriculture, low-impact recreation</i>
Residential Density:	<i>N/A</i>
Public Street Frontages:	<i>N/A</i>
Public Infrastructure:	<i>Municipal water and sanitary sewer should not be provided to this Zone.</i>
US 24/40 Hwy Access *:	<i>No highway access permitted</i>

*See Section 7 for complete listing of access management standards.

T2 - Rural (Long-Term Development) Zone

The Rural (Long-Term Development) Zone consists of lands in an open or cultivated state, or sparsely settled. This Zone is characterized by agricultural lands, grasslands, and woodlands and is intended to remain undeveloped until logical expansion of the urban area occurs. The Rural (Long-term Development) Zone is limited to agricultural uses and residential estates until such time that urban services are available and the area is reclassified to a more intense urban zone.



Land Uses:	<i>Natural preserve, agriculture, recreation, and residential estates</i>
Residential Density:	<i>Maximum 1 dwelling unit per 20 acres</i>
Public Street Frontages:	<i>Swales and naturalistic plantings</i>
Public Infrastructure:	<i>Currently without access to municipal water and sanitary sewer services, but may be provided in the future in support of urban development. No development should occur in this zone except for agricultural related uses and residential estates.</i>
US 24/40 Hwy Access *:	<i>Full access not greater than 1 per mile</i>
	<i>One right turn only access allowed between full access intersections, subject to design considerations</i>
	<i>Traffic signal spacing no closer than 1 mile, as warranted</i>
	<i>New intersections with the highway provide right-turn and left-turn lanes off the highway, and right-turn auxiliary lanes onto the highway</i>

*See Section 7 for complete listing of access management standards.

T3 - Sub-Urban Zone

This Zone is characterized by low density residential subdivisions, and may include a limited amount of well-designed low density attached housing products. Residential blocks and lots vary in size, and the roads are aligned on a modified grid to accommodate natural conditions. This zone allows very limited commercial and other non-residential uses.



Land Uses:	<i>Low density residential, civic and institutional uses, and limited neighborhood serving office and retail uses, not including highway and auto-oriented uses</i>
Residential Density:	<i>2-6 dwelling units / acre</i>
Public Street Frontages:	<i>Raised curbs, sidewalks, bike lanes</i>
Public Infrastructure:	<i>Requires access to municipal water and sanitary sewer prior to development</i>
US 24/40 Hwy Access *:	<i>Full access not greater than 1 per mile</i>
	<i>One right turn only access allowed between full access intersections, subject to design considerations</i>
	<i>Traffic signal spacing no closer than 1 mile, , as warranted</i>
	<i>New intersections with the highway provide right-turn and left-turn lanes off the highway, and right-turn auxiliary lanes onto the highway</i>

*See Section 7 for complete listing of access management standards.

T4 - General Urban Zone

This Zone consists of a mix of medium density and high density residential, office and retail uses, institutional, and light industrial. This zone has a range of residential building types: single, town homes/row houses, and other medium density well-designed attached housing products. Streets typically define medium-sized blocks. Rear alley/rear garage access encouraged for attached residential structures.

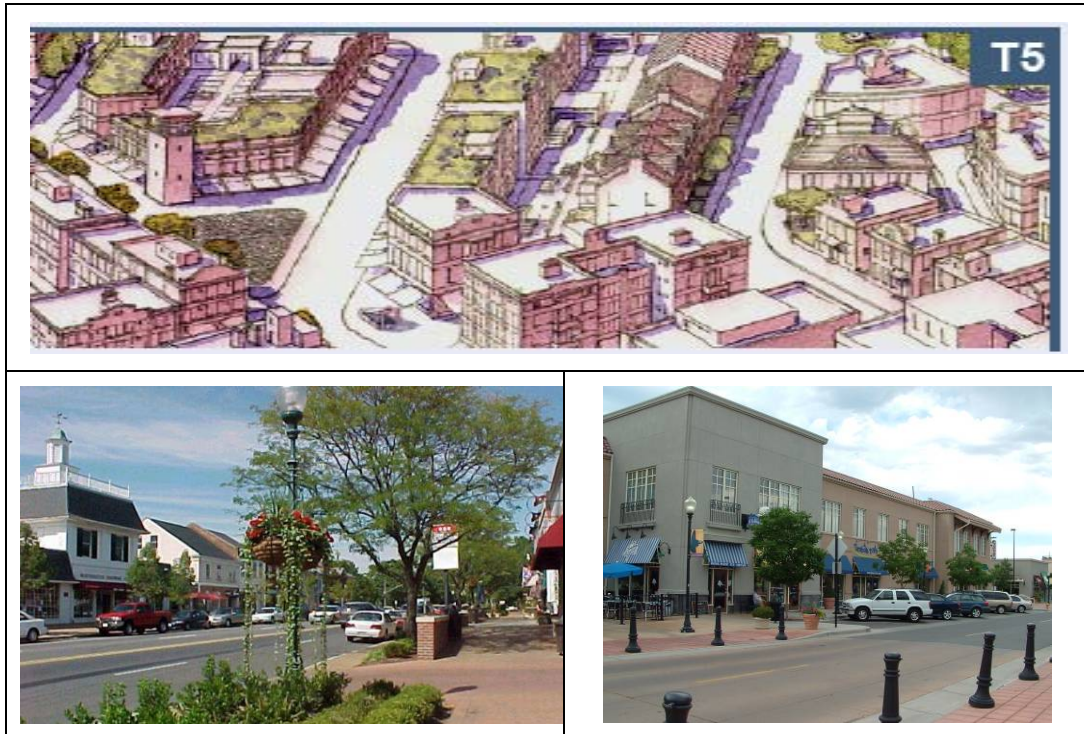


Land Uses:	<i>Medium and high density residential (i.e. single-family, attached single-family, townhomes, apartments), civic and institutional uses, office and retail uses, and light industrial.</i>
Residential Density:	<i>4-12 dwelling units / acre</i>
Public Frontages:	<i>Raised curbs, sidewalks, bike lanes</i>
Public Infrastructure:	<i>Requires access to municipal water and sanitary sewer prior to development</i>
US 24/40 Hwy Access *:	<i>One right turn only access allowed between full access intersections, subject to design considerations</i>
	<i>Traffic signal spacing no closer than 1 mile, as warranted</i>
	<i>New intersections with the highway provide right-turn and left-turn lanes off the highway, and right-turn auxiliary lanes onto the highway</i>

*See Section 7 for complete listing of access management standards.

T5 - City Center Zone

This Zone is the equivalent of a downtown main street, including building types that accommodate a mix of retail, offices, attached town homes/row houses, and apartments. It is usually a tight network of streets, with on-street parking or off-street parking located where not visible from the street, wide sidewalks, street tree planting and buildings set close to the frontages. Rear garage access is required for attached residential structures.



Land Uses:	<i>Medium and high density residential, office, and retail uses, not including highway and auto-oriented uses.</i>
Residential Density:	<i>12+ dwelling units / acre</i>
Public Frontages:	<i>Raised curbs, wide sidewalks, on-street parking, bike lanes</i>
Public Infrastructure:	<i>Requires access to municipal water and sanitary sewer prior to development</i>
US 24/40 Hwy Access *:	<i>Full access not to exceed 1 per mile</i>
	<i>Three right turn only accesses allowed between full access intersections, subject to design considerations</i>
	<i>Traffic signal spacing no closer than 1 mile, as warranted</i>
	<i>New intersections with the highway provide right-turn and left-turn lanes off the highway, and right-turn auxiliary lanes onto the highway</i>

*See Section 7 for complete listing of access management standards.

Environmental Planning

The public input ranked preservation of the natural setting of the corridor as a high priority. The communitywide opinion survey consistently ranked “environmental sustainability” as key value. Future development in the US 24/40 Corridor should be designed to respect the natural environment and coexist in harmony with existing natural features. Development planning should avoid engineering techniques, such as significant cut and fill to force-fit development into the environment. Instead, natural physical features should be incorporated into the overall development design, with drainage areas and other natural features left in their natural state. These principles are applicable throughout the corridor, but more significant results can be experienced in proper management of the still undeveloped areas.

A comprehensive approach for environmental and storm water management should be implemented in the US 24/40 Corridor to increase water “**quality**” and to reduce storm runoff “**quantity**.” This approach will:

- Protect environmentally sensitive areas
- Protect streams through buffer setbacks
- Provide areas of slope protection adjacent to streamway buffers
- Provide localized storm water infiltration and detention in new development areas to protect Stranger Creek, streamways, and storm water management facilities

Environmental Approach

Future development in the Corridor should retain its natural infrastructure and visual character derived from topography, woodlands, streams, and riparian corridors. Natural resources and environmentally sensitive areas such as those represented by the **Natural Resources Inventory (Ref. Figure 6-3)** should be protected by cluster development, or by establishing no-build conservation areas with permanent public or private parks and common open space. In most instances, waterways should be protected in accordance with the provisions of **Section 5600 KCAPWA – Storm Drainage Systems and Facilities**, and protected within slope preservation zones adjacent to stream buffers.

Storm Water Management Approach

An overall storm water management system design approach should address the key adverse impacts of storm water runoff by:

- Reducing pollutant loading from new developments
- Reducing downstream stream bank and channel erosion
- Reducing downstream overbank flooding
- Safely passing or reducing the runoff from extreme storm events

This approach should consider the implementation of regional storm water facilities combined with localized detention and Best Management Practices (BMP’s) to route storm events.

Natural Storm Water Treatment Practices

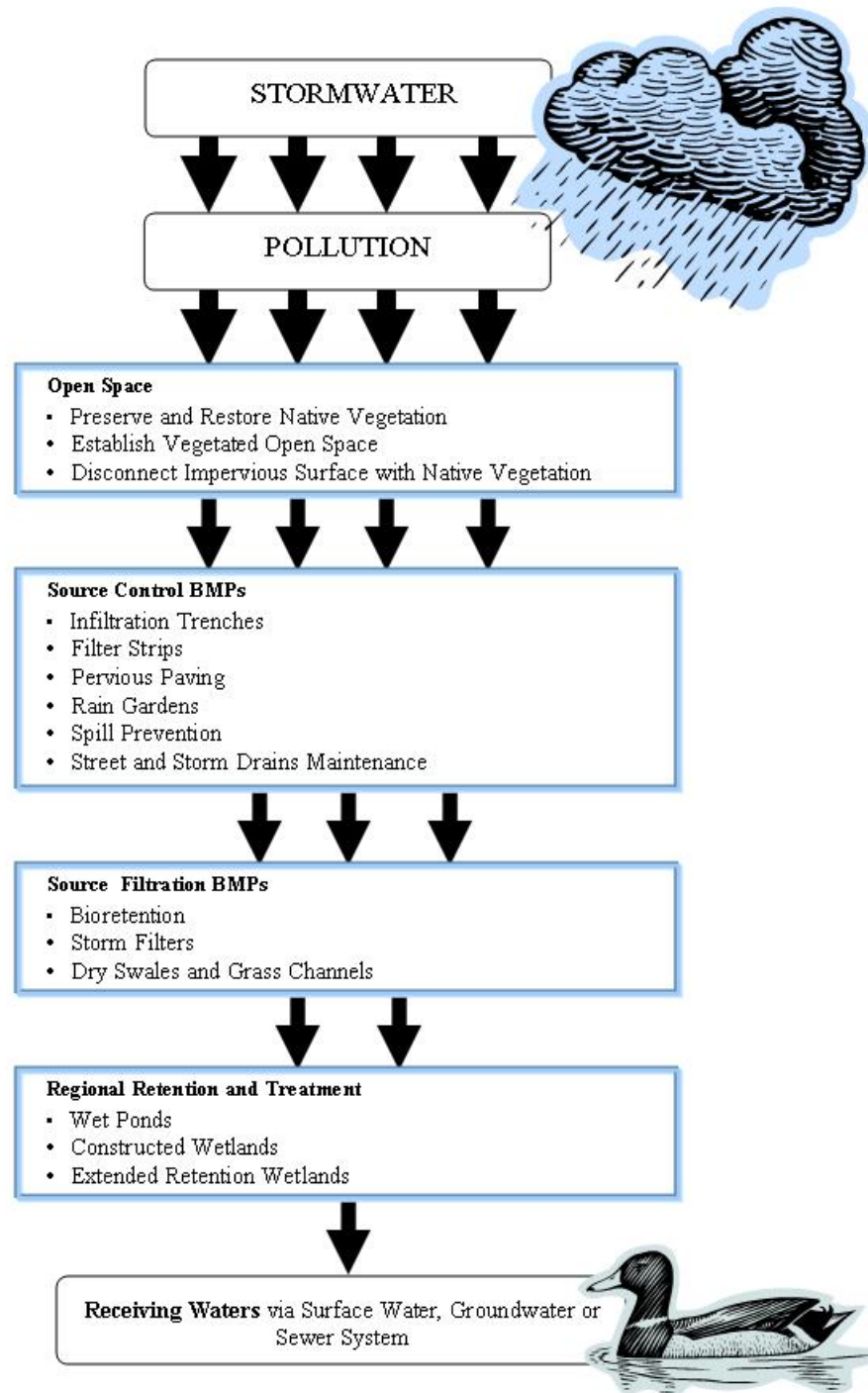
Storm water management should be enhanced by implementing a series of Best Management Practices (BMP's) through the development process that achieve the following goals:

- Increase infiltration (water absorbed by the soil) of storm water runoff while in the basin
- Increase the amount of time for storm water runoff to reach it's receiving stream
- Reduce the potential amount of sediment/pollutants that can be carried off by storm water runoff from rainfall
- Treat storm water runoff before it reaches the receiving stream

To improve water quality, BMP's should be designed and located in such a manner that runoff is routed though a chain of successive treatments that remove pollutants and increase water quality as much as possible before entering the creeks and streams of a watershed (**Ref. Figure 8-2**). The use of BMP's should meet the minimum requirements set forth in the ***Manual of Best Management Practices for Storm Water Quality***, September 2003 prepared by the Mid-America Regional Council and the American Public Works Association. Developers should submit storm water studies that demonstrate the effectiveness of proposed BMP's in lieu of localized detention facilities.

Careful consideration of the placement of BMP's throughout a watershed must be given to ensure water quality. Most BMP's implemented to improve storm water "**quality**" will also reduce the storm water "**quantity**." This reduction in water "quantity" will also reduce the amount of detention storage required for the development, which in turn will reduce development costs. Potential reductions in development costs are true for many of BMP's that can be implemented. The use of natural buffers and native vegetation will reduce the need for grading and the need for larger enclosed pipe systems which reduces up front development costs as well as long-term maintenance needs.

Figure 8-2: Storm Water Treatment Train



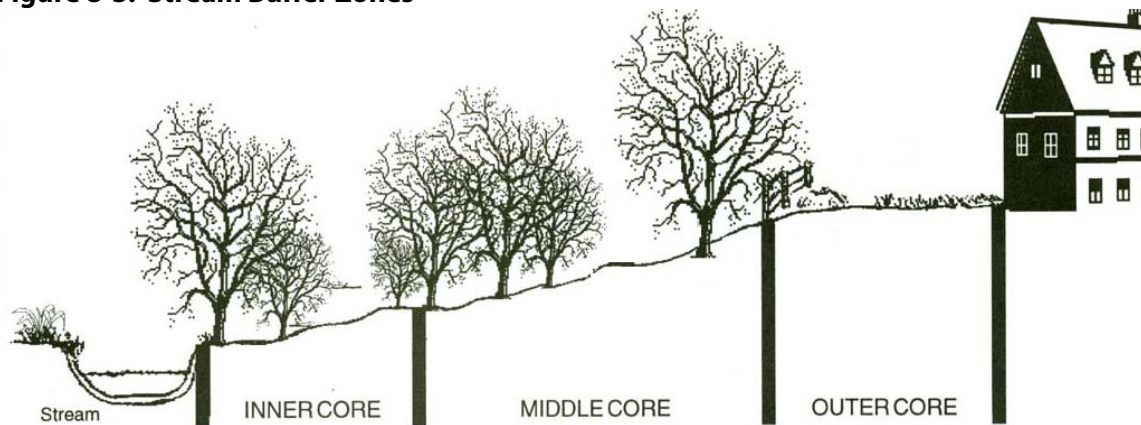
Stream Buffer Zones

Stream buffers – including any floodplains, wetlands, slopes over 15 percent, or wildlife habitat areas – must be managed to enhance and maximize their natural resource value. Management of these areas includes limitations on alteration of the natural conditions of these resources. Effective stream buffers divide the total buffer width into three zones with each buffer zone performing a different function and has a different width, vegetative target and management scheme (**Ref. Figure 8-3**).

- The **inner core** protects the physical and ecological integrity of the stream ecosystem. The vegetative target is mature riparian forest that can provide shade, leaf litter, woody debris, and erosion protection to the stream. The minimum width is 25 feet from each stream bank—about the distance of one or two mature trees. Land use is highly restricted, limited to storm water channels, stream bank stabilization, footpaths, and limited utility or roadway crossings.
- The **middle core** extends from the outward boundary of the streamside zone and varies in width depending on stream order, the extent of the 100-year (or one percent) floodplain, any adjacent steep slopes, and protected wetland areas. Its functions are to protect key stream components and provide further distance between upland development and the stream. The vegetative target for this zone is also mature forest, but some clearing may be allowed for storm water management, access and recreational uses. A wider range of activities and uses are allowed within this zone, such as recreational corridors for hiking and biking, and storm water best management practices (BMPs). The minimum width of the middle core is about 50 feet, but it is often expanded based on stream order, slope, or the presence of critical habitats.
- The **outer core** extends landward an additional 25-foot from the outer edge of the middle zone to the nearest permanent structure. In many instances, this zone may include a residential backyard. However, when slopes over 15 percent or wildlife habitat areas are present within the outer zone, the width of the zone must be increased to encompass such resource areas.

Streamside buffers should be observed along Stranger Creek and stream tributaries with this zone generally measuring 150 feet in width from each side of the stream. This zone varies and is wider in areas with wider floodplains or in areas with the presence of slopes greater than 15 percent.

Much of the recommended streamside buffer zone along Stranger Creek is located in the 100-year floodplain. Activities in this zone should be limited to vegetation management and stream bank stabilization, where required. These areas should consist of native vegetation and may also be used for parklands, trails, and storm water facilities.

Figure 8-3: Stream Buffer Zones**Slope Preservation Zone**

Slope preservation zones have variable width, determined by the presence of slopes greater than 15 percent, and are primarily located along stream buffer zones. Areas designated as slope preservation zones will retain their existing woodlands and native vegetation. Development encroachment should be limited in such areas through the use of cluster development and by establishing no-build lines on future platted property.

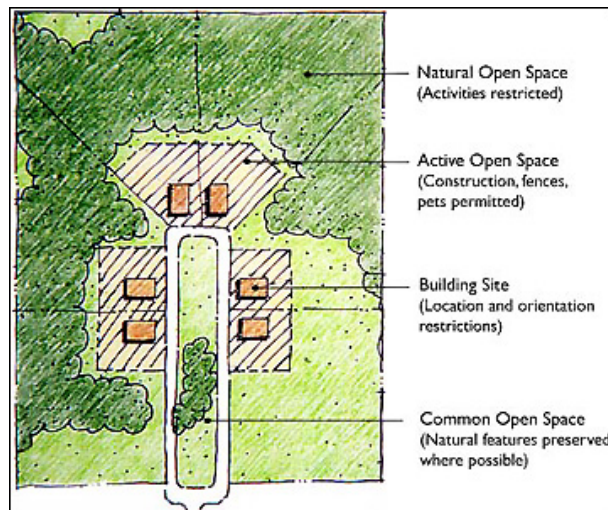
Woodland Preservation

Portions of the US 24/40 Corridor located outside of the recommended stream buffer zones are heavily wooded. A sensible balance should be employed with future development in these areas when providing for preservation of existing noteworthy environmental features. Areas designated for woodland protection will use enhanced measures in development design to preserve significant trees or tree masses where possible. These measures include:

- Cluster development design (**Ref. Figure 8-4**) with flexible development standards such as reduced lot sizes and setbacks and alternative street designs to concentrate buildings on a part of the site (the cluster area) and allow the remaining land to be preserved as open space. Cluster development is encouraged for residential development in areas with environmentally sensitive characteristics to reduce development impacts.
- Tree surveys provided with development applications to determine significant tree clusters to be preserved, as well as mitigation measures for those areas that will be impacted by new development.

Figure 8-4: Cluster Development

A form of planned residential development that concentrates buildings on a part of the site (the cluster area) to allow the remaining land (the open space) to be used for recreation, common open space, or preservation of environmentally sensitive areas. The open space may be owned by either a private or public entity.



Clustering is particularly appropriate in rural areas that wish to remain rural while accommodating additional growth.

Source: -Rural By Design by Randall Arendt

US 24/40 Corridor Greenway Trail System

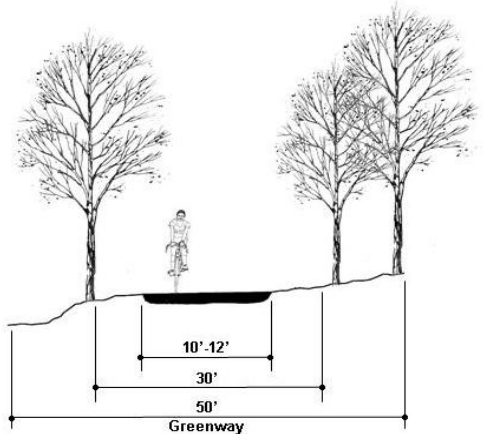
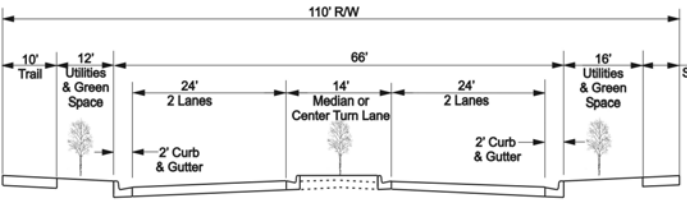


The recommended greenway trail system to implement the ***MetroGreen Plan*** in the US 24/40 Corridor is identified in **Figure 7-2: US 24/40 Corridor Supporting Transportation System Network Map**. The trail system includes future facilities that connect in the vicinity of the US 24/40 Highway and along creeks and streams in the corridor; across unincorporated southern Leavenworth County; and into the cities of Basehor and Tonganoxie. The corridor study proposes linkages with locally planned community trails in the cities of Basehor and Tonganoxie, now and in the future. To implement regional and local trail systems it will be necessary to secure land or easements to allow the construction. The following is recommended when securing land or easements to implement the greenway trail system:

- Minimum 10-foot wide trail separated from or improved along major arterial roads; and
- Minimum 30 to 50-foot wide corridor for greenways along creeks and streamways.

Specific greenway and trail evaluation criteria should be prepared and adopted by the various jurisdictions in the corridor when securing appropriate land and easements when implementing the greenway trail system. **Figure 8- 5** provides the recommended trail standards for regional trails to be used as a model for adoption by each jurisdiction. Local community trails may include variations on these standards.

Implementation options for the acquisition, financing and administration of trails and linear parks are provided in Section 10, Implementation and Coordination Strategy.

Figure 8-5: Trail Concepts

Greenways *	Local Arterial Street Systems **
 <p>The diagram shows a cross-section of a greenway. It features a central paved area for a trail, labeled '10'-12\"</p>	 <p>The diagram shows a cross-section of a local arterial street system with a total right-of-way (R/W) of 110 feet. From left to right, the components are: a 10-foot trail, a 12-foot utility and green space area, a 24-foot two-lane section with a 2-foot curb and gutter, a 14-foot median or center turn lane, another 24-foot two-lane section with a 2-foot curb and gutter, a 16-foot utility and green space area, and a 6-foot sidewalk.</p>
 <p>A photograph showing a greenway in a park-like setting. It features a paved trail for walking and biking, surrounded by grass, trees, and landscaping.</p>	 <p>A photograph of a local arterial street system. It shows a paved road with a median, trees, and a car driving on the road.</p>
<p>A greenway is a linear open space area set aside for public use that is wide enough to accommodate a paved bike / pedestrian trail, landscape area, fencing, or other screening measure.</p> <p><u>These types of linkages:</u></p> <ul style="list-style-type: none"> • Typically follow creeks and streamways and may be located within the floodplain, and are often segregated from street rights-of-way to form a separate alignment. • Typically require that land or easement be secured from the landowner or developer. • Typically cross street or highway rights-of-way by means of an overpass, underpass, or at-grade crossing at controlled or marked intersections. • Typically have fewer amenities, aside from those required for bike / pedestrian comfort and safety. 	<p>The local street and off-street trail systems will run parallel to local thoroughfare streets, typically 10 feet in width.</p> <p><u>This linkage:</u></p> <ul style="list-style-type: none"> • Is located inside the major street right-of-way on one side of the street. • Typically required that land or easement be secured from the landowner or developer. • Typically cross other major street rights-of-way by means of at-grade crossing at controlled or marked intersections. • Typically provide multiple connections into adjoining land uses and to other trail systems. • Typically provides more amenities in urban segments of the corridor.

* Future railways would be improved off of the highway right-of-way.

** Typical street section, subject to local subdivision regulations and access management standards.

Model Overlay District

In order to implement the **US 24/40 Corridor Study** it is recommended the Comprehensive Plans of Leavenworth County and cities of Basehor and Tonganoxie be amended to formally adopt (by resolution) the Corridor Study as part of those Comprehensive Plans, thereby creating more legal force in support of the Study's recommendations. These adoptions should occur as first steps in implementing the Corridor Study. In addition, an overlay district should be established to implement the recommendations of the Corridor Study. This section provides model Overlay District regulations for Leavenworth County and the cities of Basehor and Tonganoxie to amend Zoning Ordinances, and subsequently amend the respective Zoning Maps to reflect the District boundary in each jurisdiction.

Statement of Intent

The purpose of the US 24/40 Corridor Overlay District designation is to encourage development that will be a major asset to Leavenworth County. This area represents a major gateway into the cities of Basehor and Tonganoxie and, as such, gives a "first impression" for visitors and residents. Therefore, it is important that development of this area be highly attractive and functional, while maintaining the environmental character of the area. The Overlay District intends to foster compatible design and community appearance along the highway. The District seeks to ensure that new development is compatible with highway access and best management practices. Further, the purpose of this Overlay District is to promote a level of quality that can serve as the basis for high quality development desired by the cities of Basehor and Tonganoxie. Individual developers are encouraged to expand upon these guidelines to attain a level of development quality that will ultimately generate an economically enhanced and pedestrian friendly area for Leavenworth County.

Corridor Overlay District Designation

The US 24/40 Corridor Overlay District includes the land bounded by ____ [local jurisdiction to establish and designate the boundary description].

Permitted Uses

No building, structure, land or premises shall be used, and no building or structure shall hereafter be erected, constructed, reconstructed, moved or altered, except for one (1) or more of the uses set forth herein, or similar uses, subject to all applicable development and performance standards.

A. Uses permitted by right:

1. In T-1 Natural Zone Districts, agricultural and compatible park and recreation uses shall be permitted. No Special Use Permits for nonagricultural uses except public parkland and environmentally friendly temporary uses are permitted.
2. In T-2 Rural/Long-term Development Zone Districts, the same uses as the T-1 Natural Zone District are permitted, as well as single-family residential estates with a minimum area of 20-acres in size.

3. In T-3 Sub-Urban Zone Districts, single-family detached dwellings and moderate density attached residential dwellings including two-family, three-family, townhouse, and condominium residential, and public and semi-public uses shall be permitted. Development in this District shall be limited to 1- residential unit per 20-acres until such time a full range of municipal water, sanitary sewers, and other services are available for urban residential development ranging from 2 to 6 dwelling units per acre.
 4. In T-4 General Urban Zone Districts, medium density residential uses consisting of attached residential dwellings including two-family, three-family, townhouse, and condominium residential, and apartment buildings shall be permitted. This district also permits office and retail commercial uses, public and semi-public uses, and park and recreation uses. Residential development in this District shall be limited to 1 residential unit per 20-acres until such time a full range of municipal water, sanitary sewers, and other services are available for urban residential development ranging from 4 to 12 dwelling units per acre.
 5. In T-5 City Center Zone Districts, medium to high density attached residential dwellings consisting of townhouse, condominium, and apartment buildings shall be permitted. This district also permits office, retail commercial, public and semi-public, and park and recreation uses.
- B. The following uses shall be prohibited in all districts:
1. Vehicle repair services with overhead doors and repair bays facing an arterial roadway or U.S. 24/40 Highway.
 2. Off-premise advertising signs.
 3. Correctional institutions or facilities (public or private).
 4. Freestanding telecommunications towers.
 5. Truck stops.

Land Use Restrictions and Development Performance Standards

- A. To promote compliance with the study, the plan recommends the following policies and procedures:
1. Proposals for non-residential rezoning shall submit a Planned Development (PD) application.
 2. Site Plan review and approval by the (jurisdiction name here) Planning Commission shall be required for any developments in the unincorporated area of the Overlay District. Project proposals shall demonstrate compliance with specific standards in each district. The overlay district regulations apply in addition to underlying zoning regulations; and in case of conflict, the most restrictive shall guide site plan review and approval.
 3. Site plans shall identify the extent to which structures, walkways, streets, signage, driveways, open space (if any), parking lots, and related on-site and off-site improvements are proposed and planned to achieve the objectives as stated in

each of district, as well as the Design Guidelines for the US 24/40 Corridor Overlay District area adopted pursuant to Resolution (Ordinance) No. _____ or amendments thereto:

4. Development approval will be subject to KDOT Highway access management rules and the Access Management Standards and the **US 24/40 Corridor Supporting Transportation System Network Map** of the US 24/40 Corridor Study.
 5. Areas designated as forest or woodland by the Mid-America Regional Council (MARC) Natural Resources Inventory shall be subject to cluster development regulations or shall be reserved as permanent open space.
 6. Areas designed as greenway or parkway on the US 24/40 Corridor Transportation Plan shall provide a land or grant easement for the bike / pedestrian trail facility.
- B. T-1 Natural Zone Districts shall be subject to the following:
1. Park facilities and recreational uses shall be limited to those that will have minimal impact upon floodplain and environmentally sensitive lands.
- C. T-2 Rural/Long-term Development Zone Districts and T-3 Sub-Urban Zone Districts shall be subject to the following:
1. Any non-agricultural change in land use shall require a Special Use Permit.
 2. Single-family residences shall be exempt from Site Plan Review, but shall require a subdivision plat for density greater than 20-acre lots on more than two contiguous parcels under single ownership.
 3. Cluster development on lots less than 20-acres in size may be permitted, provided the overall density shall not exceed 1 dwelling unit per 20-acres and the resulting land area shall be permanently reserved as common open space and/or so located and configured to allow re-subdivision and development and urban densities of 2 to 6 dwelling units per acre when municipal water and sanitary sewer services are available.
- D. T-4 General Urban Zone Districts shall be subject to the following:
1. Single-family and other low density residential uses should be targeted to low density subareas, and not be permitted in urban areas of the districts.
 2. All non-residential buildings shall be placed at a build-to line along U.S. 24/40 Highway right-of-way and no parking or paving shall be permitted between the build-to line and the highway right-of-way. (The build-to line is different from a set back line.)
 3. All parking and paved areas, and residential and nonresidential structures shall maintain a minimum setback from the nearest U.S. 24/40 Highway right-of-way line, to be determined by local land use regulation in compliance with the plan's objective of maintaining a sense of openness along the highway.
- E. T-5 City Center Zone Districts shall be subject to the following:
1. Single-family and other low density residential uses shall not be permitted in this district.

2. All non-residential buildings shall be placed at a build-to line along street right-of-way and no parking or paving shall be permitted between the build-to line and the highway right-of-way.

Design Guidelines

Development within the US 24/40 Corridor Overlay District shall be subject to the design guideline standards for the US 24/40 Corridor Overlay District area adopted pursuant to Resolution (Ordinance) No. _____ or amendments thereto.

Corridor Identity

An attractive and healthy community is a critical element of a quality place, and the design of quality places is a balance between environmental, economic, and social considerations. The vision for the US 24/40 Corridor provides a broad view of where southern Leavenworth County sees itself in the future. This Section provides further detail through Corridor Identity design elements to shape the physical form of the community.

Introduction

This section provides a framework of development guidelines intended to guide public and private investments made throughout the US 24/40 Corridor, including the unincorporated rural area of Leavenworth County as well as the urbanizing portions of the Corridor in Basehor and Tonganoxie. The Corridor Identity recommendations include:

- **Corridor Planning Principles**
- **Corridor Identity Design Guidelines**

The Corridor Study planning process provided an opportunity for the public participants and community stakeholders to present their issues and concerns, and then formulate ideas and recommendations for the preferred future development pattern. The recommended Design Guidelines are based a great deal on this public input. The planning process included a visual preference evaluation in which planning participants identified desired development characteristics for a variety of residential, commercial, and industrial land uses. This resulted in corridor enhancement strategies for streetscaping elements along US 24/40 Highway, as well as urban design strategies for the variety of future land uses that will be developed throughout the Corridor.

Implementation of the Corridor Identity Design Guidelines will not be a simple task. As development continues in Basehor, Tonganoxie, and unincorporated Leavenworth County, the proper integration of land use and resultant architectural themes for each type of development will be critical. This Section is intended to serve as the framework for amendments to the Comprehensive Plans and development regulations of the Cities of Basehor and Tonganoxie and Leavenworth County to achieve the desired development form recommended by planning participants.

Corridor Guiding Principles

Building on the meaningful public input during the planning process, the Corridor Guiding Principles were prepared to set forth the goals and basic framework to achieve the objectives of the US 24/40 Corridor Study. The overall goal of the Corridor Study, as emphasized through the public participation process, is to preserve the rural character and environmental features of the corridor, while providing a well designed realm of vibrant neighborhoods, parks and recreation, and businesses in future urban development areas of the corridor.

CORRIDOR IDENTITY

- Create a unique and lasting identity for the area.
- Promote economic development through good design, landscaping, public investment, and sustainable design.
- Integrate conservation areas, floodplains, green spaces, woodlands, and parks into urban developments.
- Use linear parks and trails to bind developments and communities together.
- Design residential neighborhoods in the corridor to establish a “sense of place” and provide pedestrian-friendly connections to local and regional sidewalks and trail systems.
- Promote development that complements the natural environment and historical architecture of the corridor.
- Maintain a wide landscape setback along US 24/40 Highway to preserve the rural character of the corridor.

ENVIRONMENTAL STEWARDSHIP

- Respect the natural environment and retain its natural and visual character derived from topography, woodlands, and riparian corridors. Do not use engineering techniques that require significant amounts of cut and fill to force-fit development into the environment.
- Preserve greenway corridors, natural drainage areas, floodplains, and wooded areas in urbanizing areas.
- Use a comprehensive strategy to manage storm water generated by development.
- Plan and construct infrastructure projects with context sensitive design to harmonize with natural systems.

LAND USE

- Promote quality development in the urban areas of the corridor that respects the natural environment and is visually pleasing, while preserving the character of the rural areas.
- In urban areas, provide a well designed realm of vibrant neighborhoods, parks and environmental conservation open spaces, and civic institutions within walking distance of shops, services, jobs, and transportation.
- Provide a broad range of housing types and price levels in neighborhoods to allow for a mix of people with diverse ages, races, and incomes.

TRANSPORTATION CORRIDOR MANAGEMENT

- Plan and reserve future transportation corridors that will support US 24/40 Highway and provide for economic development opportunities.
- Provide an interconnected network of streets, sidewalks, and trails that serves existing and future development.
- Support the physical organization of the corridor with a framework of multimodal transportation alternatives, including pedestrian and bicycle systems that maximize access and mobility while reducing dependence on the automobile.
- Alleviate congestion caused by current facilities and provide timely improvements to the transportation network that minimize congestion before it becomes extreme.

- Diligently use access management standards to manage traffic flow and facilitate optimum travel conditions.
- Provide an interconnected transportation network that encourages walking, reduces the number and length of automobile trips, and conserves energy by reducing the length of automobile trips.
- Provide a street network that is designed with pedestrian and bicycle accommodations with equal emphasis as the automobile.

Corridor Identity Design Guidelines

The Corridor Identity Design Guidelines provide direction on how to achieve the goals set forth by the Corridor Guiding Principles. These guidelines are intended to act as the guide for public and private investments made in the various transects recommended by the US 24/40 Corridor Study.

Due to the varying character envisioned in the corridor by 2030, the Guidelines are grouped by the Transect zones described in **Section 8, Future Land Use and Development Regulations**. The areas designated as natural, rural, or suburban (consisting of low-density residential) are considered “low intensity transects” while the areas with higher density residential, office, commercial, and light industrial are consider “urban” transect zones.

While these guidelines are not absolute or codified development requirements, their application should be considered as a “target” in meeting the objectives of quality development within the corridor. These guidelines are to be used as a tool in conjunction with other County and City requirements and project review procedures. Updated zoning and subdivision regulations for Leavenworth County and the cities of Basehor and Tonganoxie will help ensure development that meets the planning objectives and promotes high quality environments to live, work, shop, and play.

Guidelines for Low Intensity Transects

The following guidelines apply to future development in the low intensity areas of the US 24/40 Corridor including the T1 Natural Zone, T2 Rural Zone, and T3 Suburban Transects.

Streetscape Identity (Low Intensity Transects)

Setback and Drive Experience (Low Intensity Transects)

The placement of buildings, parking lots, and paved areas along US 24/40 Highway are expected to maintain the sense of openness with a wide landscape area.

- Establish setbacks from highway rights-of-way for buildings, parking lots and paved areas, or residential subdivision fencing, to be determined by local land use regulation in compliance with the plan’s objective of maintaining a sense of openness along the highway.

- Establish low maximum building heights for non-residential development to reduce its visual impact on the corridor landscape.
- Require landscape buffers to screen building utility meters, loading docks, or other back-of-building features that face a public right-of-way.
- Cluster all site development to concentrate and limit vehicular access to and from US 24/40 Highway to a few planned major intersections.
- Establish large lot requirements for residential development such that housing developments with higher densities are channeled from low intensity transects into the urban areas of the corridor.
- Use berms and/or landscape buffers to reduce views of “big box” or clustered retail development allowed in low intensity transects through the establishment of special districts.

Median Landscape Treatments (Low Intensity Transects)

Landscaping in the US 24/40 Highway median or local street medians is expected to vary based on the level of adjoining development intensity and will generally be limited in low intensity areas.

- Landscaping in medians should consist mainly of low maintenance native plants and grasses that do not exceed 24-inches in height.
- Use median landscape areas as storm water detention areas, when possible, to aid in drainage from the roadway and to increase the quality of storm water runoff.
- Install landscape trees in natural groupings. When trees are planted, they should be located a minimum of 80-feet from the pavement edge to maintain KDOT safety distances and retain the corridor openness.

Sidewalks and Pedestrian Systems (Low Intensity Transects)

Pedestrian systems in low intensity areas generally consist of sidewalks and trails in residential subdivisions and regional trails to implement the **MetroGreen** Plan.

- Dedicate land or provide a public access easement in developments along designated regional trail corridors.
- Provide neighborhood trail connections in residential developments along a designated regional trail corridor.
- Extend sidewalks from developments to the boundaries of the development and the sidewalk system along perimeter streets.
- Extend sidewalks from developments to any adjacent or future parks, greenways, schools, or civic spaces.
- Establish a large setback for sidewalks and trails along public rights-of-way.

Buffers and Screening (Low Intensity Transects)

- Perimeter landscaping should consist of a wide variety of plantings. Open green space plantings should be used in more rural areas of the corridor.
- Open space perimeter landscaping should consist of native grass and wildflowers and should not exceed 24-inches in height.
- All perimeter landscaping should be low maintenance, unless installed as part of a residential subdivision.
- Perimeter landscape buffers for residential subdivisions should include berming and consist of a large quantity and variety of plants to provide screening and a buffer from highway noise and located in a manner to allow access for regional trails where designated.
- Any permitted outdoor storage areas should be entirely screened from public view along the highway and all public streets by the use of dense landscaping. Any solid walls or fencing should be softened with extensive landscaping plantings between the wall / fence and the right-of-way.

Lighting (Low Intensity Transects)

Lighting in low intensity transects of the Corridor will generally be limited to the highway and local roadways. However, for uses requiring site illumination, such lighting should be provided in a manner that meets functional and security needs without adversely impacting adjacent properties or creating glare. Dark sky compliant fixtures (focuses light onto roadway) should be used whenever possible for each category to reduce light pollution and to maintain the rural character of the corridor at night.

Roadway Lighting (Low Intensity Transects)

- Street lighting should not be located in the median of the highway or other streets unless absolutely necessary.
- Existing cobra head lighting, where provided, should be maintained.

Parking Lot Lighting (Low Intensity Transects)

- Provide parking lot illumination with individual poles and fixtures, rather than building mounted fixtures.
- Illumination of parking lots for nonresidential uses near residential should be limited to individual poles and fixtures not to exceed fifteen (15) feet in height as measured from grade.
- Where possible, parking lot lighting should have an ornamental look and should be dark sky compliant. Thematic lighting should be used where appropriate.

Building Lighting (Low Intensity Transects)

- Building mounted light fixtures should be ornamental in appearance and complement the architectural theme or style.
- Building lighting should be focused upward or downward to highlight architectural features and create visual interest. This should be accomplished with lighting that contains shields or reflectors that do not permit light to escape to the sides toward adjacent buildings, parking areas or roadways.

Utilities (Low Intensity Transects)

As development of the US 24/40 Highway corridor continues, all utilities that are currently above ground (i.e. power lines, phone lines, etc.) should be placed underground. This will create a cleaner look to the corridor and will prevent outages created by weather which often occur with utilities that are pole mounted.

All utility boxes that are required to be above ground should be located adjacent to the highway right-of-way and should be grouped whenever possible. Utility boxes should also be screened from view with landscaping.

Signage Design (Low Intensity Transects)

Signage should be consistently provided throughout the Corridor as dictated by the type of signage desired for each individual situation, with text that is easily read. In low intensity areas of the Corridor, signage will be limited due to its rural character.

Monument Signs (Low Intensity Transects)

- Monument signs are the preferred sign type for all low intensity uses and residential subdivisions. Such signs should be crafted of similar materials and style to the surrounding architecture.

Pole Signs (Low Intensity Transects)

Due to the rural and residential character of the low intensity transects, pole signs should not be permitted. However, such signs may be acceptable for limited nonresidential uses allowed in low intensity transects subject to the following standards:

- The sign provides a clean and modern appearance.
- The sign pole is wrapped in a manner that provides the appearance similar to a monument sign.
- The sign is limited to a maximum height of 15-feet above the average grade and a maximum size of 85 square feet.

Gateway Monuments:

Gateway monuments should be used to signify an entry into a special place, like a scenic overlook or historic landmark, or change of location, like the city limits. Gateway monuments should be primarily used on major thoroughfares.

- Gateway monuments should have clean lines, be crafted of high quality materials like stone or brick, and should match or complement the architectural context of their surrounding area.
- Gateway monuments should be incorporated into the planned landscape or streetscape and should not be placed as an after thought. The monuments should have a prominent position with high visibility.

Building Design (Low Intensity Transects)

Commercial and Industrial development should generally be limited in low intensity transects and should be encouraged in areas designated as urban transects by the US 24/40 Corridor Study. However, for non-residential uses allowed in low intensity transects, they could maintain a well landscaped appearance and be compatible in design and appearance with a rural area by achieving the following guidelines:

Commercial:

- Limit individual building height to one story and define a maximum height.
- Incorporate design themes for clustered development which fit the historic architecture of the area and complement the natural environment.
- Design building facades using a combination of exterior materials (in addition to glazing), preferably common to the surrounding area, to create visual interest.
- Incorporate glazing on sides of buildings which face a public right-of-way.
- Screen rooftop equipment and building utilities from public view.
- Provide landscaping between buildings and public rights-of-way.

Industrial:

- Provide an “office” appearance along public right-of-way for industrial uses.
- Provide architectural embellishment and details.
- Present a clean/neat appearance.
- Design and locate the building to screen parking areas, storage areas, loading areas, and other similar uses from view along public right-of-way.
- Provide landscaping between the building and the rights-of-way.

Guidelines for Urban Transect Zones

The following guidelines apply to future development within urban transect zones of the US 24/40 Corridor including the T4 General Neighborhood Zone and the T5 City Center Zone.

Streetscape Identity (Urban Transects)

Setback and Drive Experience (Urban Transects)

The placement of buildings, parking lots, and paved areas along US 24/40 Highway are expected to maintain the sense of openness with a wide landscape area.

- Establish setbacks from highway rights-of-way for buildings, parking lots and paved areas, or residential subdivision fencing, to be determined by local land use regulation in compliance with the plan's objective of maintaining a sense of openness along the highway. Setbacks should become increasingly smaller where transects become increasingly more urban.
- Establish "build to" lines in the most urban transects to ensure a consistent streetscape and provide a sense of place (e.g. town center).
- Establish increasingly higher maximum building heights for non-residential development where transects become increasingly more urban. Maximum building heights should still be relatively low to reduce the visual impact of development on the corridor landscape.
- Provide landscaping between development and public rights-of-way. The amount of landscaping should be commensurate with the size of setback for each transect.
- Require landscape buffers to screen all building utility meters, loading docks or other back-of-building features that face a public right-of-way.
- Cluster site development to concentrate and limit vehicular access to and from US 24/40 Highway to a few planned major intersections.
- Use berms and/or landscape buffers to reduce views of "big box" or clustered retail development allowed in urban transects through the establishment of special districts.

Street and Highway Median Landscape Treatments (Urban Transects)

Median landscape treatments for US 24/40 Highway and local streets in the Corridor will vary based on the level of adjoining development intensity, with more dense and formal landscape treatments expected in urban areas.

- Landscaping in medians should consist mainly of groundcovers, street trees, low shrubs, an ornamental flower beds. If shrubs or flower beds are provided, the plantings should be limited to a maximum height of 24-inches at maturity, or kept trimmed to that height.

- Median landscape areas should be bermed and drainage toward the median should be avoided wherever possible.
- Street trees should be planted at regular intervals of approximately 50-feet on-center and be a consistent matched variety throughout. Street trees should be planted only when the median is at least 10-foot wide and where permissible by KDOT safety standards for street trees.
- Manicured landscaping with areas of concentrated color should be implemented at points of interest or significance.

Sidewalks and Pedestrian Systems (Urban Transects)

Urban areas are expected to include an extensive pedestrian systems and trail network, including sidewalks for all land use types, regional trails to implement the MetroGreen Plan, and trail connections from developments to the regional trail system.

- Sidewalk and trail street crossings should be made of special materials or colored differently than the main roadway surface to draw attention to it and provide the driver a sense of pedestrian interaction. Special materials used for crosswalks include brick or concrete pavers, stamped and colored concrete or asphalt, or special striping on the roadway surface. Warning signage should also be used in conjunction with special surface treatments at crossings.
- Provide a system of pedestrian walkways to link residential and non-residential buildings to parking areas and to sidewalks along internal and perimeter streets and drives.
- Provide pedestrian walkways and sidewalks on both sides of all public and private streets and drives in denser developments (i.e. multifamily and commercial).
- Dedicate land or provide a public access easement in developments along designated regional trail corridors.
- Provide neighborhood trail connections in all residential developments along a designated regional trail corridor.
- Extend sidewalks to the boundaries of all developments to connect with the existing or future sidewalk system along perimeter streets.
- Extend sidewalks from developments to any adjacent or future parks, greenways, schools, or civic spaces.
- Establish minimum setbacks for sidewalks and trails along public rights-of-way in all but the City Center Transect (T5).

Site Furniture (Urban Transects)

- Where appropriate, use benches and other site furnishings constructed of durable materials and anchor them into place.
- Benches and site furniture should be located in areas that are easily accessed for maintenance and where visible from adjacent streets for safety reasons.

- Site furniture should be concentrated near ingress and egress of trail systems, primarily at trail heads. Grouping site furniture will help promote use.
- In areas of highest use, expanded trail heads could include parking, picnic shelters, off-leash dog parks, etc.

Buffers and Screening (Urban Transects)

Perimeter landscaping should consist of a wide variety of plantings and generally have a more formal and manicured appearance.

- Perimeter landscape buffers should consist of a large quantity and variety of plants to provide screening.
- Dense perimeter landscaping used for buffers in urban areas should be kept a minimum of 40 feet away from the pavement edge to observe KDOT safety distances and to allow access for regional trails where designated. Open space perimeter landscaping consisting of native grass and wildflowers in the public right-of-way should not exceed 24-inches in height.
- Any permitted outdoor storage areas should be entirely screened from public view along the highway and all public streets by the use of dense landscaping. Any solid walls or fencing should be softened with extensive landscaping plantings between the wall / fence and the right-of-way.

Lighting and Banners (Urban Transects)

Lighting systems in the urban transects of the Corridor will be located for most development areas in addition to local roadways and US 24/40 Highway. Lighting should be provided in a manner that meets functional and security needs without adversely impacting adjacent properties or creating glare. Dark sky compliant fixtures (focuses light onto roadway) should be used whenever possible for each category to reduce light pollution and to maintain the rural character of this corridor at night. Banners shall be public or quasi-public owned.

Roadway Lighting (Urban Transects):

- Street lighting should not be located in the median of the highway or other streets unless absolutely necessary.
- Existing roadway lighting should be maintained.
- Maximum Height: 25-feet or 35-feet

Parking Lot Lighting (Urban Transects):

- Provide parking lot illumination in parking lots with individual poles and fixtures, rather than building mounted fixtures.
- Illumination of parking lots for non-residential uses near residential should be limited to individual poles and fixtures not to exceed 15 feet in height as measured from grade.

- Where possible, parking lot lighting should have an ornamental look and should be dark sky compliant. Thematic lighting should be used where appropriate.

Building Lighting (Urban Transects):

- Building mounted light fixtures should be ornamental in appearance and complement the architectural theme or style.
- Building lighting should be focused upward or downward to highlight architectural features and create visual interest. This should be accomplished with lighting that contains shields or reflectors that do not permit light to escape to the sides toward adjacent buildings, parking areas, or roadways.

Pedestrian Lighting (Urban Transects):

- Pedestrian lighting should be provided along all paths and trails in the urban transects for safety purposes.
- Pedestrian lighting should not exceed 15' in height as measured from grade.
- Overlapping ambient light from street lighting can be considered adequate for sidewalks and trails that are immediately adjacent to secondary streets (not the main highway). However, consideration should still be given to adding pedestrian lighting to provide consistency throughout the corridor.

Banners (Urban Transects):

- Pole mounted banners should be made of aluminum, plastic or fabric with a life of 10 years or greater.
- Banners should be mounted on street light poles and the lower edge of the banner should be at least 15 feet from the ground below.
- Banners should be located where easily accessed for replacement of seasonal banners and for routine maintenance.
- Banners should primarily be used in areas of significance, such as the downtown areas or primary business districts.

Signage Design (Urban Transects)

Signage should be consistently provided throughout the Corridor as dictated by the type of signage desired for each individual situation. The transect will dictate the height and size of the signage, but all styles should be consistent with text that is easily read.

Monument Signs (Urban Transects):

- Monument signs are the preferred sign type. Such signs should be crafted of similar materials and style to the surrounding architecture.
- Monument signs are preferred over pole signs whenever possible.

Pole Signs (Urban Transects):

Pole signs should only be allowed along US 24/40 Highway on a limited basis, and not permitted along other local roadways in the Corridor. Any pole signs should be subject to the following standards:

- Provide a clean and modern appearance.
- Wrap the sign pole in a manner that provides the appearance similar to a monument sign.
- Limit the sign to a maximum height of 15-feet above the average grade and a maximum size of 85 square feet.

Wall Signs (Urban Transects):

- Wall signs should be incorporated into the architecture of the building and should be made of materials to complement the architecture of the building. Wall signs should not be applied as an after thought.
- Wall signs should be of modern design and can include back-lit box signs.
- Wall signs should be located above the door frame elevation to be visible from the street or adjacent parking area.

Gateway Monuments (Urban Transects):

- Gateway monuments should be used to signify an entry into a special place, like a scenic overlook or historic place, or change of location, like the city limits. Gateway monuments should be primarily used on major thoroughfares.
- Gateway monuments should have clean lines and be crafted of high quality materials like stone or brick and should match or complement the architectural context of their surrounding area.
- Gateway monuments should be incorporated into the planned landscape or streetscape and should not be placed as an after thought. The monuments should have a prominent position with high visibility.

Utilities (Urban Transects)

As development of the US 24/40 Highway corridor continues, utilities that are currently above ground (i.e. power lines, phone lines, etc.) should be placed underground. This will create a cleaner look to the corridor and will prevent outages created by weather that happen when utilities are pole mounted.

All utility boxes that are required to be above ground should be located adjacent to the highway right-of-way and should be grouped whenever possible. Utility boxes should also be screened from view with landscaping.

Building Design (Urban Transects)

Moderate and High Density Residential (Urban Transects):

- Provide multifamily dwelling designs that limit the appearance of garages along public or private streets. Garages should typically not project in front of the residential structure and should not dominate the front facade.
- Provide large landscaped yard areas between the building and the street.
- Building facades along a public or private street should provide variations in depth (recesses and projections) and incorporate porches and distinctive architectural detailing.
- Multi-unit residential buildings should maintain a “big house” residential appearance as much as possible.
- Provide front entrances facing a roadway rather than the rear or sides of a building.
- Use a variety of building materials (in addition to glazing) to break up the appearance of multi-unit buildings.

Local and Regional Commercial (Urban Transects):

- Provide building designs with variations in building façade treatments and combinations of materials (in addition to glazing), yet maintain a “sense of community” and a unified appearance.
- Design buildings to relate directly to the street and reinforce the pedestrian scale and quality of street, civic, and open spaces using the following techniques:
 - Shifts in building massing, variations in height, profile, and roof form that provide human scale while maintaining a consistent relationship of overall building form to the street edge;
 - Minimize long expanses of wall at a single height or in a single plane;
 - Vary floor elevations to follow natural grade contours if significant variation is present.
- Design buildings to provide human scale, interest, and variety using the following techniques:
 - Building form variation with recessed or projecting bays;
 - Expression of architectural or structural modules and detail;
 - Diversity of window size, shape, or patterns that relate to interior functions;
 - Emphasize building entries through projecting or recessed forms, detail, color, or materials;
 - Variations of material, material modules, expressed joints and details, surface relief, color, and texture to break up large building forms and wall surfaces. Such detailing could include sills, headers, belt courses, reveals, pilasters, window bays, and similar features.

- Locate and design large non-residential buildings to minimize the impact of windowless walls and service areas on public streets.
- Limit the use of outside commercial sales, storage, or display areas. However, when permitted, such areas shall be screened with landscaping or enclosed with materials integral to the building architecture.

Light Industrial (Urban Transects):

- Provide an “office” appearance along public right-of-way for industrial uses.
- Provide architectural embellishment and details.
- Present a clean/neat appearance.
- Design and locate the building to screen parking areas, storage areas, loading areas, and other similar uses from view along public right-of-way
- Provide landscaping between the building and the public right-of-way.

Implementation and Coordination Strategy

Introduction

This section summarizes and presents the recommended approach to implement the recommendations of the US 24/40 Corridor Study. The overall strategy is outlined and includes the following:

- **Inter-local Agreement**
- **Implementation Action Plan**
- **Greenway Trail System Acquisition and Implementation Options**
- **Funding Resources**

Inter-local Agreement

An Inter-local Agreement formalizes the continued partnership between KDOT, MARC, Leavenworth County, Basehor and Tonganoxie to create a framework to implement the provisions for the implementation of the Corridor Study. While each Inter-local Agreement is tailored to the individual needs of each jurisdiction, every agreement includes the same general information:

- Purpose – purpose of the corridor plan,
- Parameters – minimum requirements (access, transportation, land use, etc.),
- Establishment of Corridor Oversight Committee – representatives of KDOT and the various jurisdictions to review the progress of plan implementation and to evaluate any necessary changes to the study's recommendations,
- Roles and Responsibilities of KDOT,
- Roles and Responsibilities of the various jurisdictions, and
- Miscellaneous Provisions – term, termination, etc.

Within the roles and responsibilities sections of the Inter-local Agreements are provisions identifying responsibilities of the participant jurisdictions. These provisions essentially outline the “next steps” to implementing the US 24/40 Corridor Study.

The implementation and coordination strategy presents the recommended approach to implement the recommendations of the US 24/40 Corridor Study. The overall strategy includes the following:

- Inter-local Agreement,
- Implementation Action Plan,
- Greenway Trail System Acquisition and Implementation Options, and
- Funding Resources.

Inter-local Agreements formalize the continued partnership between KDOT, MARC, Leavenworth County, Basehor and Tonganoxie to create a framework to implement the provisions for the implementation of the Corridor Study.

Corridor Oversight Committee

The purpose of the recommended Corridor Oversight Committee will be to serve as an advisory body to regularly review, evaluate, facilitate discussions of and provide input on events and developments that may have an impact on the US 24/40 Corridor and the Corridor Study, and to assist in the Corridor implementation strategy. The Committee will be composed of representatives from Leavenworth County, the City of Basehor, the City of Tonganoxie, KDOT, and the Mid-America Regional Council. It is recommended that the KDOT representative serve as a co-chair of the Committee, with the other co-chair elected each year from the members of the Committee.

Committee meetings should occur whenever the Committee Co-Chairs jointly determine a meeting is appropriate, but at a minimum they should meet twice a year. Because the planning statutes of the state of Kansas require all local planning jurisdictions to annually review an adopted Comprehensive Plan—with public hearing—it is recommended that the participant county and city jurisdictions annually review the Corridor Study at that time. If listed in the published notice for hearing, the Corridor Study could be amended and updated in concert with the locally adopted land use plans, helping meet the intent of close collaboration and coordination between the two documents.

Implementation Action Plan

The work plan for implementation is summarized in the following matrix elements which provide generalized actions steps, responsibilities, and time frame to achieve the vision of the **US 24/40 Corridor Study**. The implementation matrix includes:

- Action Steps – First steps in implementing **Corridor Study** recommendations.
- Implementation Responsibilities – Key groups and partnerships needed to work on the project. These may include:
 - **City and County:** various Departments, Boards, and Commissions of the cities of Tonganoxie and Basehor and Leavenworth County—primarily the planning commissions and governing bodies;
 - **Agencies:** Federal and State agencies and planning organizations such as KDOT and MARC;
 - **Private Sector:** developers and land owners; and
 - **Neighborhoods:** homes associations, neighborhood groups, and homeowners.
- Time Frame – A general phasing of actions over which the action is to occur, expressed in the following terms:
 - Near-term, 1 to 5 years;
 - Mid-Term, 5-10 years;
 - Long-Term, over 10 years; and
 - Ongoing.

Table 10-1: Corridor Oversight Implementation Actions

ACTION STEPS	IMPLEMENTATION RESPONSIBILITY			TIME FRAME			
	City - County	Agencies	Private Developers	Near Term (1-5 Years)	Mid Term (5-10 Years)	Long Term (10+ Years)	Ongoing
Corridor Oversight							
Adopt an Inter-local Agreement for the continued partnership between KDOT, MARC, Leavenworth County, and the cities of Basehor and Tonganoxie.	★	★		★			
Continue the Community Advisory Committee to guide and coordinate US 24/40 Corridor implementation efforts.	★	★					★
Coordinate the formal adoption of the US 24/40 Corridor Study (by resolution) into the Comprehensive Plans for Leavenworth County and cities of Basehor and Tonganoxie.	★	★		★			
Coordinate the adoption of uniform Corridor Overlay District regulations, Zoning Ordinance and Subdivision Regulations updates, Access Management Standards, and trail corridor standards between the various jurisdictions to implement the recommendations of the Corridor Study.	★	★		★			
Incorporate the US 24/40 Corridor Management Plan into MARC's Long Range Transportation Plan.		★		★			
KDOT to adopt the plan into Section D of the Corridor Management Policy		★		★			
Continue the local partnerships with KDOT, and evaluate and pursue funding sources to implement the interim transportation actions.	★	★		★	★		★
Evaluate and implement a strategy to build public awareness about the guidelines and standards of the Corridor Study, including education of public officials, landowners, developers, real estate agents, and local development consultants.	★			★			★
Evaluate and establish the most appropriate entity to coordinate the development of regional trails in Leavenworth County (i.e. a new county parks and recreation department).	★			★			
Evaluate and pursue funding sources to implement the bicycle and greenway trail corridor funding sources.	★	★	★	★			
Determine how and by whom each segment of the trails corridor will be operated and maintained.	★	★		★			
Encourage the cities of Basehor and Tonganoxie to establish or update their local community trails plans to provide local linkages to the regional trails designated by the US 24/40 Corridor Study.	★			★			
Build public awareness and support for greenways and trails, and promote system use.	★	★					★

Table 10-2: Land Use and Development Regulations Implementation Actions

ACTION STEPS	IMPLEMENTATION RESPONSIBILITY			TIME FRAME			
	City – County	Agencies	Private Developers	Near Term (1-5 Years)	Mid Term (5-10 Years)	Long Term (10+ Years)	Ongoing
Formally adopt a US 24/40 Corridor Overlay District into the Zoning Codes for Leavenworth County and the cities of Basehor and Tonganoxie, and subsequently amend the respective Zoning Maps to reflect the District boundary in each jurisdiction.	★			★			
Amend the respective Zoning Codes and Subdivision Regulations to implement the recommended setbacks from US 24/40 Highway right-of-way for all parking and paved areas and residential and nonresidential structures.	★			★			
Amend the respective Zoning Codes and Subdivision Regulations as necessary to provide “cluster development” standards, such as flexible development design standards allowing for reduced lot sizes and setbacks and alternative street designs that concentrate buildings on a part of the site (the cluster area) and allow the remaining land to be preserved as open space.	★			★			
Amend the respective Zoning Codes and Subdivision Regulations with stream buffer regulations that protect stream corridors.	★			★			
Amend the respective Zoning Codes and Subdivision Regulations to require special standards for wetlands or areas designated as forests, or woodlands by the Mid-America Regional Council Natural Resources Inventory (i.e. open space preservation, tree survey, cluster development, etc.).	★			★			
Issue access permits in accordance with the Corridor Study Access and Traffic Management Plan		★		★	★	★	★

Table 10-3 Interim Transportation Implementation Actions (1-5 years)

ACTION STEPS	IMPLEMENTATION RESPONSIBILITY			TIME FRAME	
	City – County	Agencies	Private Developers	Near Term (1-5 Years)	Ongoing
Interim Transportation					
Amend the respective Subdivision Regulations for Leavenworth County and the cities of Basehor and Tonganoxie to implement the Access Management Standards for US 24/40 Highway.	★			★	
Relocate the traffic signal at Tonganoxie High School to the Main Street intersection as warranted.	★	★		★	
Alter the on-site traffic circulation pattern at the Tonganoxie High School to direct exiting traffic to Main Street.	★	★		★	
Install a traffic signal at the US 24/40 Highway intersection with Laming Road as warranted.	★	★		★	
Install auxiliary left-turn lanes at the US 24/40 Highway intersection with 142 nd Street.	★	★		★	
Install auxiliary left-turn lanes at the US 24/40 Highway intersection with 174 th Street.	★	★		★	
Widen US 24/40 Highway in Tonganoxie from Smiley Road to County Road / install a center turn lane.	★	★		★	
Implement the US 24/40 Corridor supporting collector street network with the construction of new developments or with the redevelopment of existing properties.	★	★	★	★	★
Consolidate and relocate driveways to US 24/40 Highway.	★	★	★		★
Provide a collector street system between 155 th Street and 158 th Street on both sides of US 24/40.	★	★	★	★	
Install auxiliary right turn lanes at the US 24/40 Highway intersection with 198 th Street.	★	★		★	
Install auxiliary right turn lanes at the US 24/40 Highway intersection with 182 nd Street.	★	★		★	
Install auxiliary right turn lanes at the US 24/40 Highway intersection with 174 th Street.	★	★		★	
Install auxiliary right turn lanes at the US 24/40 Highway intersection with 166 th Street.	★	★		★	
Install auxiliary right turn lanes at the US 24/40 Highway intersection with 150 th Street.	★	★		★	
Install auxiliary right turn lanes at the US 24/40 Highway intersection with 142 nd Street.	★	★		★	
Close median openings in the interest of safety and/or in implementation of the Corridor Plan.		★		★	★
Acquire 120 feet of right-of-way on intersecting arterial streets through the site plan approval process.	★			★	★

Table 10-4: Long-Term Transportation Implementation Actions (5 to 20 years)

ACTION STEPS	IMPLEMENTATION RESPONSIBILITY			TIME FRAME	
	City - County	Agencies	Private Developers	Long Term (5+ Years)	Ongoing
Long Term Transportation					
Widen US 24/40 Highway in Tonganoxie from 4 th Street to County Rt. 1 to four lanes plus a center median.	★	★		★	
Replace the center turn lane with a median on US 24/40 Highway in Tonganoxie from 4 th Street to Stone Creek Drive.	★	★		★	
Construct the supporting roadway network.	★	★		★	★
Install additional traffic signals as warranted.	★	★		★	★
Close existing nonconforming median breaks on US 24/40 Highway.	★	★		★	★

Table 10-5: Bicycle and Trails Plan Implementation Actions

ACTION STEPS	IMPLEMENTATION RESPONSIBILITY			TIME FRAME		
	City - County	Agencies	Private Developers	Near Term (1-5 Years)	Long Term (5+ Years)	Ongoing
Bicycle and Trail Facilities						
Amend the Comprehensive Plans of Leavenworth County and cities of Basehor and Tonganoxie to formally adopt the US 24/40 Corridor Supporting Transportation System Network Map as part of those comprehensive plans, thereby creating more legal force in support of the Corridor Study.	★			★		
Adopt formal park / trail / greenway standards, or amend the Subdivision Regulations for Leavenworth County, Basehor, and Tonganoxie as necessary to secure land or easements for trail facilities.	★			★		
Amend Zoning and Subdivision Regulations as necessary to allow for density bonuses, subdivision modifications to lot size, and dimensional requirements for preservation of open space, or dedication/ acquisition of land for trails and the construction of trails.	★			★		
Enact a mechanism for a dedicated tax to support trail acquisition, development, and maintenance.	★			★		
Amend the Zoning and Subdivision Regulations to provide that dedication of land (or dedication of land and constructed trails) shall count in calculating lot size, setbacks, or other dimensional requirements.	★			★		
Amend the respective Subdivision Regulations to incorporate express reference to the US 24/40 Corridor Supporting Transportation System Network Map to place developers on notice of development exaction requirements. The US 24/40 Corridor Supporting Transportation System Network Map should also be incorporated into each code by reference.	★			★		
Add provision to planned development zoning sections, incorporating the US 24/40 Corridor Supporting Transportation System Network Map by reference and creating as a condition of any planned development the dedication and/or construction of trails.	★			★		
Establish dedication provisions in the respective zoning/subdivision regulations allowing easement, right-of-way or fee simple dedications, subject to approval (or option of) by the County or Cities on a case-by-case basis.	★			★		
Create an administrative appeal process to provide the local government with the opportunity to provide relief without court intervention.	★			★		
Establish specific submittal and evaluation criteria for the dedication and acceptance of trails (i.e. greenway and trail standards).	★			★		
Develop maintenance standards for the regional and local trails.	★			★		
Educate the public on the tax benefits of donation and assist owners by facilitating donations, possibly through use of a nonprofit "friends" of the Trail System or a trust.	★					★
Tonganoxie, Basehor and Leavenworth County are preparing a regional trail plan, portions of which will be adopted by each city.	★			★		

Greenway Trail System Acquisition and Implementation Options

This section of the *Corridor Study* addresses issues associated with the acquisition, financing and administration of trails and linear parks (hereinafter collectively referred to as “trails”). Land acquisition techniques range in levels of required initiative and commitment from a simple request for a land gift to the required dedication as a condition of development. At the middle ground are zoning and subdivision regulations that can, with some strategic amendments, be used to require granting of easements or dedications of land, setbacks, and other desired elements to implement the trail system in the US 24/40 Corridor, off of the highway right-of-way, and primarily on local major streets and in streamway corridors.

Numerous taxing methods authorized by state statute can be used to generate revenue to support the trail system, ranging from a basic capital improvement sales tax to a more complex benefit district mechanism. Finally, the designated governmental agencies may accomplish the ongoing operation and maintenance of the trails, benefit districts, nonprofit organizations, or trusts. The goal of this section is to provide a set of “tools” which can assist the implementation of the regional trail system in the US 24/40 Corridor. While all of these options are discussed herein, the respective jurisdiction based on their unique attributes, needs, and objectives must determine the ultimate combination of options.

Donations and Incentives

There are many voluntary mechanisms to acquire land and build trail infrastructure that can be implemented in areas where development is occurring, or likely to occur. Such mechanisms generally involve exceptions or modifications to zoning or subdivision requirements to reduce the cost of development or increase the return on the developer investment. This approach requires:

- the existence of development in or near the area of the trail;
- requirements that can be waived without harming the public safety or interest; and
- a willingness of the public to allow the waivers to acquire desired trail sections.

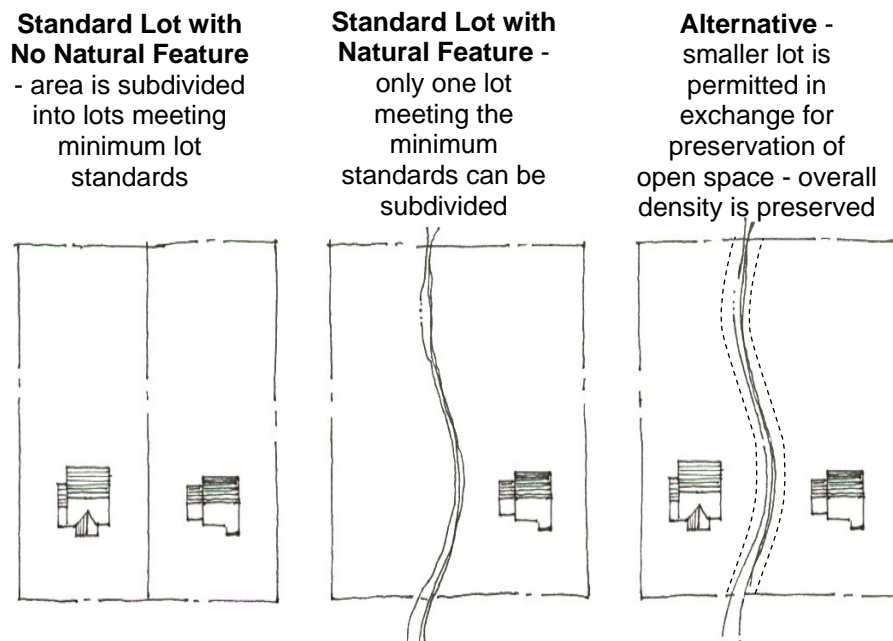
The exceptions or code waivers can be used as an incentive to obtain dedication and construction of trail segments on the site of the development, or in some circumstances even at locations offsite or unassociated with the development. The goal is to minimize the impact upon the landowner so any loss in otherwise developable land may be offset by incentives. Examples of developer incentives include:

1. **Density bonus** – This mechanism grants the developer greater density than permitted by a Master Plan or zoning district in exchange for the developer’s dedication of the land for a trail and/or trail construction. Incentive or bonus zoning is a land use technique that allows a jurisdiction to obtain various public amenities from a builder or developer without having to pay for them directly. Normally, an incentive zoning system will allow a developer to exceed an existing height or density regulation in return for providing one or more public amenities, such as public plazas, parks, and pedestrian space. Incentive zoning typically benefits the landowner or developer,

since the value of the bonus can be designed to equal or exceed the cost to the developer of supplying the public benefit. The most common examples of incentive zoning are an increase in density in the form of bonus floor area, or an increase in the number of dwelling units or the number of square feet of commercial space on a site. A density bonus may also take the form of reduced requirements for off-street parking and loading, mixed uses, and other modifications commonly allowed within a planned development such as a PUD.

2. **Subdivision/lot size modifications** – A reduction in lot size (as opposed to increasing overall density of the entire developed tract), and lot dimension adjustments are also potential incentives. For example, if a property has a creek running through it in such a manner as to leave too little land on one or both sides to develop lots of the size required by the subdivision code or the applicable zoning district, a modification could be made in exchange for dedication of the creek and adjoining area for the trail. Although the lot would be substandard in size, the actual green space for the lot would remain intact as public space. Accordingly, the same number of houses may still exist, although the lot sizes on paper may be smaller.

Figure 10-1: Subdivision/Lot Size Modifications

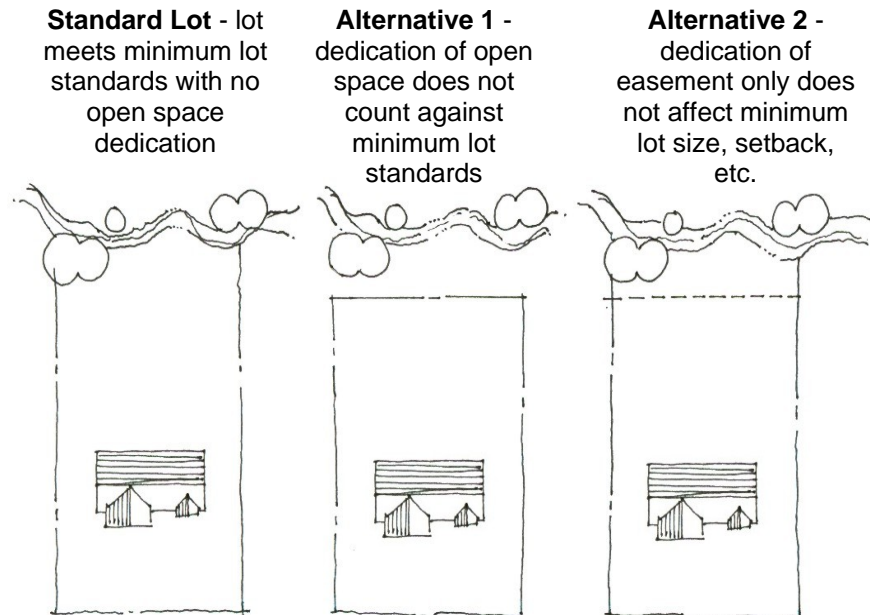


3. **Neutral dedication provisions** – Ensure that the dedication of land is "neutral" to the developer and does not cause a reduction in lot size or developable land by allowing dedication of trails (with limitations) to have no effect on the remaining density, setbacks, etc. after the dedication. For example, if a trail is sought at the back of a lot where there is a 30-foot building setback, the zoning code would be modified to allow any dedicated space to count as part of the lot setback, even though it no longer is part of the lot.

In other words, ensure that the developer is not "punished" by loss of useable ground as a result of the dedication. Another available option is to allow easements to be

dedicated as opposed to the conveyance of a fee simple interest. This ensures that density, setbacks, lot dimensions are wholly unaffected by the dedication of the trail, thereby obtaining the same result as the first option.

Figure 10-2: Neutral Dedication Provisions



4. Planned Development and Conditional Use / Special Use Permit Conditions

Planned development provisions generally allow for an area of land, controlled by a landowner, to be developed as a single entity with a designated number of dwelling units and square footage of commercial and industrial uses. The plan allows modifications of lot size, bulk, type of use, density, lot coverage and open space, to allow developers to achieve a more flexible design, especially in exchange for a development exaction. The ***US 24/40 Corridor Supporting Transportation System Network Map (Ref Figure 7-2)*** and/or other greenspace requirements can be incorporated as an integral part of the approval procedures so that a condition or factor in granting the approval is whether the developer has provided the trails or green space applicable to the site sufficient to warrant the approval. Generally, only trails or greenspace onsite or adjacent can be made a condition of granting the planned development approval. The use of conditions in a planned zoning is technically a "voluntary" incentive because the developer is not required to seek the planned zoning but may opt to use the more restrictive "as of right" zoning district under which the property is currently zoned. The jurisdictions should ensure that they have the appropriate degree of discretion to control the design and use modification requested by the developers and the authority to deny an application if not in the public interest.

The county and cities may also consider the additional requirement of compliance with the ***US 24/40 Corridor Supporting Transportation System Network Map (Figure 7-2)***

and the dedication and construction of trails as conditions for approval of conditional use / special use permits.

Dedication Requirements / Impact Fees

The authority to utilize both of these techniques arises from the police power of the county and the cities of Basehor and Tonganoxie. Each is imposed through the exercise of this power as a condition of development approval. A dedication exaction is a condition or stipulation of approval that requires the applicant to convey an interest in land as a condition of the subject approval. An impact fee is, as it states, a fee, which is legislatively adopted (though it can be imposed on an ad hoc basis). The fee amount is calculated to cover the applicant's fair share of the public infrastructure for which the fee is calculated. Generally, the fee amount is set based upon an established equivalent unit to offset the capacity of the infrastructure system being funded and consumed by the development proposed by the applicant. Exactions may be imposed at different points in the approval process. Traditionally, a dedication exaction is imposed as a condition of rezoning, award of a special/conditional use permit, or upon plat approval. More generally, an impact fee is assessed at one of the aforementioned points, but not collected until a building permit is issued.

The application of dedication exaction's (e.g., dedication requirements and impact fees) must be done consistent with the legally protected property rights of affected property owners, and in a reasonable, non-discriminatory and non-arbitrary manner. While cities and counties clearly have the legal authority to condition development permits to mitigate the impacts of a project on identifiable public resources and interests, such development exactions must have a "close fit" to the development's impact. In Supreme Court parlance, land use regulations must "substantially advance" a legitimate state interest, and there must be an "essential nexus" between the asserted public purpose of a land use action and any conditions attached to approval of a development permit. In the case of a dedication exaction, the amount of land to be dedicated must be roughly proportionate in nature and extent to the development impact. The Supreme Court has yet to clearly decide whether this "rough proportionality" test applies to impact fees. Dedication exactions and the impact fee amount for trails must be reasonably related to the development's impact on the availability of open spaces and recreational areas such as trails.

1. **Subdivision Code Dedication Requirement.** Amend the subdivision codes as necessary to allow dedication requirements where the property, with respect to which development approval is sought, is included in or adjacent to the proposed Trail System. A formal dedication ordinance/resolution can be adopted. The same result, however, can be achieved by the insertion of language such as "the Commission (or Council) may require dedication" into the Codes at the appropriate point where the different development approvals are set forth. Appropriate references to the trail plan and how it relates to the increased populations caused by the subdivisions, and the corresponding increased demand for public recreational facilities such as trails, should also be added. For example, "any development within 50 feet of the greenway trail system, as specified in the **US 24/40 Corridor Supporting Transportation System Network Map (Figure 7-2)**, shall be required, as a condition of plat approval, to dedicate an interest in land for the purpose of establishing a trail, unless otherwise waived." This approach will result in substantial compliance, although in any given case, a refusal of the developer to comply and/or the commitment of the County or

Cities to enforce the provisions may result in less than full compliance. Waiver criteria may be established, based on the developers' ability to demonstrate through an individualized determination that the dedication is not justified or roughly proportional to the impact of the development either because of a lack of requisite reasonable relationship, unique site circumstances, undue hardship, or other circumstances warranting a waiver.

2. **Formal dedication ordinance/resolution.** A formal dedication/impact fee ordinance/resolution may be adopted that establishes requirements for new development. Dedication and impact fee ordinances/resolutions are legally defensible to the extent that they are related to new development and the dedications and/or impact fees are reasonably related to the impact created by the development. Requiring dedication without an individualized determination that the required dedication is roughly proportional to the proposed development's impact on the trail system (i.e., use of the system) may not be legally defensible or enforceable.
3. **Zoning Code – “Trail Corridor” Requirements.** Amend the zoning codes to introduce and establish the “trail corridor” concept by including language similar to the following: “Any development within 50 feet of the Trail System, as specified in the ***US 24/40 Corridor Supporting Transportation System Network Map (Figure 7-2)***, shall have a setback from the trails or open space of at least 20 feet.” For situations involving the development of a single parcel of land (not subject to the subdivision or platting process), the county and cities should also consider an amendment that would make the issuance of a building permit contingent upon the dedication of land and/or construction of a trail.
4. **Administrative Appeal Process.** Amend the zoning and subdivision codes, or establish a stand-alone requirement, to create an administrative appeals process to provide the local governments with the opportunity to correct alleged improper application of trail or green space requirements without immediate court action. For example, where a specific design standard or condition is imposed or a dedication exaction is required, the developer should have an appeals process available prior to judicial intervention. The Board of Adjustment could serve as the entity for these appeals, and could be established as either a final decision-maker or as a recommending body that would hold the formal adjudicative hearing but not make a final decision.

Evaluation Criteria for Trail Dedication and Construction

In evaluating the dedication of land and easements, and the design and construction of trails, criteria should be developed by the county and the respective cities indicating design appropriate to the site's natural, historic, and cultural features, and otherwise meeting the requirements of the respective development codes. Each affected parcel of property will present a unique set of facts and circumstances that requires individual consideration by the local jurisdiction.

Each city and the county should contemplate an evaluation that may involve not only the Planning Commission, but the local staff and Parks Board. This evaluative process will usually

take place during the review of applications for preliminary plat approval, rezoning, special/conditional use permit, or preliminary development plan approval.

Diversity and originality in lot layout and property dedication should be encouraged to achieve the best possible relationship between development and conservation/recreation areas. In addition, these criteria may help ensure that the dedicated land is not merely low-quality land poorly suited for trail use. The evaluation criteria should be established to determine whether the proposed dedication/acquisition satisfies some of the following elements:

- protects and serves floodplains, wetlands, and steep slopes;
- preserves and maintains mature woodlands, existing fields, pastures, meadows, and creates sufficient buffer areas;
- maintains or creates an upland buffer;
- designs around existing tree lines and hedgerows, between fields or meadows, and minimizes impacts on large woodlands;
- leaves scenic views and vistas unblocked or uninterrupted;
- protects wildlife habitat areas;
- designs around and preserves sites of historic, archaeological, or cultural value;
- protects rural roadside character;
- improves public safety;
- provides active recreational areas;
- offers adequate screening from nearby commercial or residential development;
- makes connections to commercial or residential development;
- facilitates pedestrian and bicycle access;
- provides open space that is reasonably contiguous and whose configuration is in accordance with the respective zoning ordinances as well as the **US 24/40 Corridor Supporting Transportation System Network Map (Figure 7-2)**.

Funding Resources

Capital improvements for the permanent addition to the physical infrastructure assets and other public facilities in the US 24/40 Corridor will likely require funding from a variety of sources. As new private development occurs in the corridor, developers should be required to:

- dedicate right-of-way for any necessary US 24/40 Highway improvements, as well as for the local street network; and
- construct improvements needed as a result of the developments (i.e., turn lanes, local streets, reverse frontage (backage) roads, etc.).
- post a bond for future improvements (traffic signals, turn lanes, etc.)

Federal dollars are available through the Mid-America Regional Council (MARC) for necessary interim improvements. Such projects must qualify for the various federal funding sources and be included in the Transportation Improvement Projects (TIP) list maintained by MARC. KDOT currently has no funding identified to implement the Corridor Study recommendations and funding for significant projects will have to wait until another federal highway bill is passed. However, there are some KDOT programs that could be applied for smaller interim improvements. Such potential funding sources may include:

State Corridor Management Funds

These funds help purchase right-of-way or fund other related activities that will improve corridor / access management along the state / federal highway system. As a result of developing and implementing this plan, the parties of the US 24/40 Inter-local Agreement will be eligible for Corridor Management funds. The funds are available through an annual application process for transportation improvements projects on the State and US Highway Systems as well as on the local street system. Project examples include improvements to intersections on the highway, construction of reverse access roads, and advanced acquisition of right-of-way for future projects.

KDOT Economic Development Funds

Such funds may apply to improvements to roads and bridges that will have a benefit to economic development in the area. A 75/25 split is required, with funds solicited in June and forms due in September of each year. Projects are selected by the Highway Advisory Commission the following spring (three years in advance of construction) and are managed by the Bureau of Local Projects.

City Connecting Link (KLINK) Resurfacing Projects

The KLINK program includes resurfacing “curb-to-curb” projects intended to improve roadway surfacing on city streets connecting two rural portions of state highway and are maintained by the city. These projects are limited to resurfacing of the roadway only. (Project scopes may vary from surface replacement to minor patching, joint repair or overlay, but does not include bridge decks or curb and gutter). The maximum state participation in the cost of construction and construction engineering is \$200,000. KLINK funds are solicited in June and forms due in September of each year. Projects are selected by the Highway Advisory Commission the following spring (programmed two years in advance of construction) and are managed by the Bureau of Local Projects.

Geometric Improvement Projects

The Geometric Improvement program is intended to help cities widen pavements, add or widen shoulders, eliminate steep hills or sharp curves and add needed turning lanes, acceleration lanes and deceleration lanes on City Connecting Links. These projects provide improvements to City Connecting Links that extend beyond the back of curb (widening, grades, flatten curves, etc.), with 75% to 100% state participation based on the size of the city (currently up to \$700,000 for Basehor and \$750,000 for Tonganoxie). Funds are solicited in June and forms due in September of each year. Projects are selected by the Highway Advisory Commission the following spring (three years in advance of construction), and are managed by the Bureau of Local Projects.

Transportation Revolving Fund (“TRF”)

The Kansas TRF is a statewide revolving loan fund designed to promote innovative transportation funding solutions. The purpose of the TRF is to provide financial assistance to local governmental units for transportation projects. Eligible projects must be a bridge, culvert, road, street, or highway. However, trail projects are not eligible for financing. Projects must be consistent with the state highway system, as it

exists now or in the future. Local communities identify their transportation needs and submit a project application. Applicants may combine several projects on one application as a highway improvement program; however, each project must be listed separately with supporting information on the application.

The TRF offers a wide range of loan and credit enhancement opportunities for eligible projects. Local governmental units can repay loans with various revenues including Special City & County Highway Fund allocations or locally raised revenues such as sales taxes. A transfer of monies from the state highway fund capitalized the TRF. Proceeds from the issuance of bonds will also be used for project financing. An application for the local share of a state or federal project does not change the financing source. If a project is part of another KDOT program, such as KLINK, Geometric Improvement, or Economic Development, it is subject to all the rules of that program. Borrowing from the TRF does not count against a local government unit's maximum bonding authority. All cities, counties, and other governmental units of the State of Kansas are eligible to borrow from the TRF. In addition, private enterprises are eligible if they have a governmental unit as a partner.

STP Transportation Enhancement Funds

These funds are divided into three main categories of purpose for project selection: Historic; Scenic and Environmental; and, Pedestrian and Bicycle Facilities. To be eligible for Transportation Enhancement funds, an application must:

- relate to surface transportation;
- include one of the 12 federally designated transportation enhancement activities; and
- must be submitted by a local governing entity (city, county, school district, etc.).

Project applications are accepted only from state agencies, city and county governments, and other political subdivisions. Applications within urbanized areas (populations greater than 50,000) must be submitted through Metropolitan Planning Organizations (MPO's), which for Leavenworth County is the Mid-America Regional Council.

The applicant is responsible for at least 20 percent of the total project costs. Applications offering a greater portion of local funding and support receive additional consideration. In-kind (donated) labor and materials are not allowed as part of the applicant's match. Donated rights-of-way may be allowed as part of local match if the applicant provides documentation that acquisition was in accordance with the federal requirements.

STP Hazard Elimination Safety (HES) Funds

HES funds are federal dollars to improve safety on and off the state highway system. Examples include traffic signal installation, left-turn lanes, right-turn lanes, traffic signal modifications, roundabouts, and other projects that improve safety. These funds have a 90 (federal) / 10 (local) split. Selected projects are based on Annual

Average Net Return of the proposed improvement. The program is conducted on a two year cycle.

State-Aid Safety Funds

These funds are for projects to improve safety on the state highway system. Examples include traffic signal installation, left-turn lanes, right-turn lanes, traffic signal modifications, and other projects that improve safety. These funds range from 100 percent to a 50 (federal) / 50 (local) split. Selected projects are prioritized on an as-needed basis.

State Lighting Funds

Funds are available to install lighting at interchanges / intersections based on criteria met in the KDOT Lighting Handbook. Locations must be on the state / federal highway system.

Additional funding for improvements in the US 24/40 Corridor, including local connecting arterial streets, will need to come from Leavenworth County and the communities of Basehor and Tonganoxie. Since the local jurisdictions have tight CIP budgets, other alternative funding sources should be considered to finance major corridor improvements. The following summarizes potential local funding sources:

Capital Improvements (and Special Projects) Sales Tax

Cities and counties may impose a sales tax on all retail sales in the jurisdiction for the purpose of funding capital improvements, including operation and maintenance. The sales tax must be authorized by the governing body and approved by a simple majority of the voters in an election. Funds collected from this tax must be deposited in the general fund and may be transferred to a fund--such as a road improvement fund--to be used solely for the purpose designated in the vote which is approved by the citizens of the jurisdiction.

General Obligation Bonds. Subject to certain constitutional and statutory limitations, primary of which is a constitutional limit on the total amount of debt the county and cities can incur based upon a set percentage of its assessed valuation, funds for street improvements may be raised by the issuance of general obligation (GO) bonds. GO bonds are long-term obligations backed by the full faith and credit of the county or cities. Kansas statutes authorize the governing body to issue bonds for the construction, reconstruction, improvement, maintenance and repair of any and all public roads, highways, bridges and culverts, including the acquisition of property through eminent domain powers. The proceeds from such bonds must be kept as a separate fund. These funds may also be used in the construction, reconstruction, improvement, maintenance and repair of any street, avenue, road or alley in any incorporated city, town or village if that construction or improvement forms part of a continuous road, highway, bridge or culvert of the County.

Transportation Development District ("TDD")

A TDD is a form of special assessment district for transportation needs and has authority to raise funds either through special assessment or sales tax in district. TDDs

are authorized by K.S.A. 12-17,141 et seq. and may be used to pay for improvements for which the development area creates the demand. Such property assessments or sales taxes require approval of all property owners within the district. The funds generated in the TDD are paid by property owners in the case of an assessment, or by the users in the case of a sales tax.

Tax Increment Financing (“TIF”)

A TIF allows future real property taxes and other taxes generated by new development to pay for the costs of construction of public infrastructure and other improvements to make the project feasible. The program allows for the increment in sales taxes and property taxes (taxes after development - taxes before development) to go towards paying off costs incurred for the project. The tax increment can be used for site acquisition, relocation, site preparation, parking facilities, and public improvements. The process is divided into two steps. The first step is establishing a Redevelopment District and the second is adopting a Redevelopment Plan for the Redevelopment District.

Community Improvement District (“CID”)

A Community Improvement District or CID provides another class of special purpose, self-taxing district. Once established, CIDs enjoy broad authority to levy and collect special assessments and/or sales taxes to fix and collect fees for use of CID properties, to construct and maintain a variety of public improvements, to support business activity and economic development within district boundaries, and to issue tax exempt revenue and general obligations.

Transportation Utility Fee

A transportation utility fee is a fee collected on residences and businesses within the local jurisdiction’s corporate limits and tied to the use and consumption of transportation services in the community. Such a fee is similar to a storm water, water, or sanitary sewer utility fee. The premise is that local government is responsible for making roadways available to anybody who desires to use them, and therefore all potential users should pay for upkeep of the roadway network. Typically such a fee is applied communitywide, but could be limited to a corridor or district. There is currently no enabling authority in Kansas for such a fee, but could be applied under home rule authority.

Impact Fee

An impact fee is a one time payment assessed against new development to cover the expenses for essential capital improvements proportionate to the demand generated by the development. Such improvements typically apply to roads, sanitary sewer, storm water systems, or may also include emergency services (e.g. police, fire, and EMS services) and public buildings. The fee may be collected at the time of platting, issuance of building permit, or the issuance of a certificate of occupancy permit. Typically such a fee is applied communitywide, or may limited to specific corridors, but collected funds must be used to provide substantial benefit to the new development. There is no specific authority in Kansas for such a fee, but could be applied under home rule authority.

Excise Tax

The tax is typically applied communitywide to new development and may either be paid by the developer at the time of platting or by a property owner at the time of purchase. The use of the funds may be applied to any budgeted item if placed in the jurisdiction's general fund. The City of Tonganoxie currently has excise tax dedicated to transportation improvements. Leavenworth County does not currently have an excise tax and can no longer enact them, due to a change in the state legislation.

Special Assessment Districts

State statutes authorize the creation of a Special Assessment Districts (SA) by cities and counties for areas designated to benefit from a particular public improvement. Landowners within the district must authorize the formation of the District either by a vote of approval or by execution of a petition to the governing body. A landowner petition to create a District must be signed by the owners of record of at least two-thirds by area of all real property located within the proposed District. If approved, the governing body may authorize the issuance of general obligation bonds to finance construction of an improvement, such as road improvements. To secure the bonds, a portion of the total cost is assessed against each landowner within the District and the special assessment becomes a tax lien against the property. The method of apportioning assessments among the property owners within the District is established prior to the creation of the District. A Special Assessment District allows cities and counties to construct improvements sooner than other financing methods such as road user or impact fees.