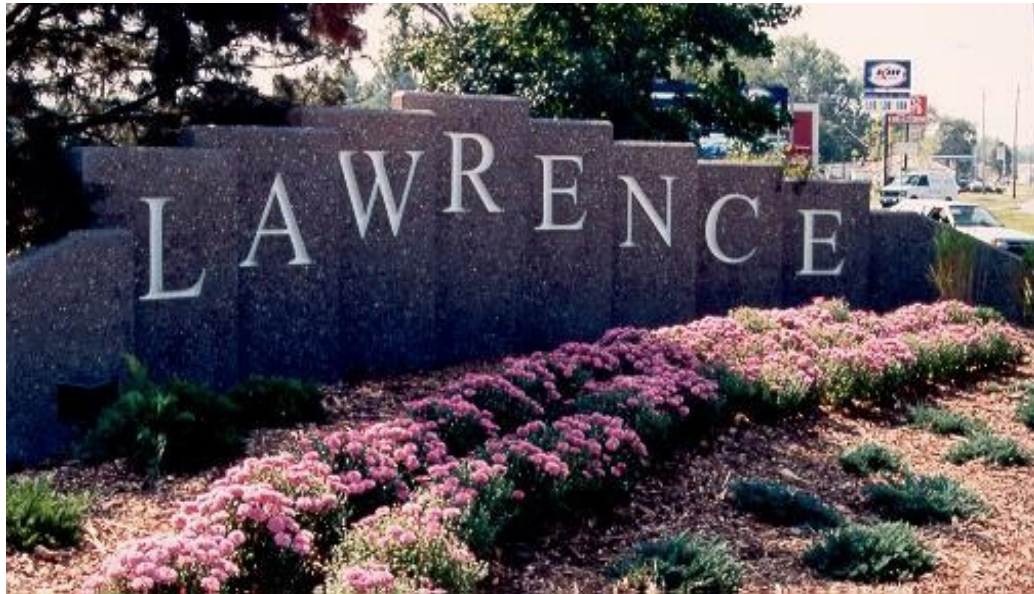


23rd STREET CORRIDOR STUDY

Final Report **September 2002**



**Lawrence-Douglas County
Metropolitan Planning Office**



Table of Contents

Existing Conditions.....	1
Corridor Description.....	1
Assessment.....	1
Enhancements.....	9
Identification of Key Intersections	9
Development and Evaluation of Options	17
Access Management Options.....	17
Corridor Segments	18
Economic Impacts	22
Maximum Economic Impact along 23 rd Street	25
Enhancement Goals and Objectives	26
Enhancement Examples	26
Recommendations	31
Segment Recommendations	31
Suggested Phasing of Potential Projects	41
Initial Phasing	41
Revised Phasing.....	42
Opinion of Probable Costs.....	42
Enhancements.....	43
Redevelopment Options	44
23 rd Street and Louisiana Street	44
23 rd Street and Ousdahl.....	45
Harper Street, O'Connell Road	45
Corridor-wide Improvements	46
Enhancements.....	46
Alternate Modes of Transportation.....	49
Bus Transit.....	50
Pedestrian.....	50
Bicycles.....	51
Potential Funding Sources	51
Possible Capital Improvements Program	54
Public Involvement Approach.....	56
Public Opinion Survey	56
Presentations.....	58
Public Input Meetings	59
PIM No. 1 Comments and Responses.....	60
PIM No. 2 Comments and Responses.....	63
Website	64

List of Figures

<u>Figure</u>	<u>Figure Name</u>	<u>Page</u>
1	Existing: Iowa to Louisiana	3
2	Existing: Louisiana to west of Haskell.....	4
3	Existing: Haskell to west of Harper	5
4	Existing: Franklin to Noria Road	6
5	Access Points and Levels of Service	7
6	Median Treatments.....	17
7	Recommendations: Iowa to Louisiana.....	30
8	Recommendations: Louisiana to west of Haskell	32
9	Recommendations: Haskell to west of Harper.....	35
10	Recommendations: Franklin to Noria Road	38

List of Photos

<u>Photo</u>	<u>Photo Name</u>	<u>Page</u>
1	South side of corridor at Dillons.....	9
2	North side of corridor	10
3	West viewpoint of south side of corridor	11
4	East viewpoint of south side of corridor	11
5	West viewpoint at Massachusetts Street intersection.....	12
6	West viewpoint, west of Silicon Avenue	13
7	North viewpoint from south side of corridor	13
8	East viewpoint, east of Haskell Indian Nations University	17
9	East viewpoint, east of Farmland.....	18
10	West viewpoint at Farmland	18
11	Intersection of 5 th St. and Highway 69, Ankeny Iowa.....	25
12	Center median, Ankeny,Iowa.....	26
13	Commercial Center, Ankeny, Iowa	26
14	Rosehill Road intersection, Lenexa, Kansas	27
15	Sidewalk and Landscaping, Lenexa, Kansas	27
16	Center median, Lenexa, Kansas	28

Overview

A study of the 23rd Street corridor was undertaken to document the existing conditions, analyze traffic operations, and recommend remedies for deficient situations. Although 23rd Street is frequently mentioned as a model “bad example” of a congested urban strip commercial corridor, there was a need to study it in detail to determine the actual level of congestion and needed improvements versus public perception.

Existing Conditions

Corridor Description

The 23rd Street study corridor extends nearly four and one-half miles from the junction of Iowa Street (US 59) on the western end to Noria Road on the eastern end. The corridor is also designated as State Highway K-10 and, as an urban extension of a state highway (known as a Connecting Link), the Kansas Department of Transportation has some limited role in approval of access along the road. The corridor study area lies primarily within the City limits of Lawrence and partially within Douglas County jurisdiction.

In general, corridor land use can be considered primarily commercial, although residential, institutional and industrial uses are also prevalent in some sections. Property frontage along the corridor varies from a few hundred feet to over a thousand feet in length. Along the entire corridor speed limits vary from 30 mph to 65 mph at the eastern end of the study corridor. Traffic volumes also vary from 25,000 to 39,000 vehicles per day. Consequently, there are several distinct and different segments within the corridor. From an access management perspective different tools and techniques are appropriate to address the varying conditions.

Assessment

Aerial photography along the corridor was conducted in December of 1999 to document physical conditions both along and adjacent to the corridor. Through the course of the study, development and redevelopment has continued to occur along the corridor with properties bought and redeveloped. The aerial photography provided the base information upon which to analyze existing conditions and recommend possible improvements. The aerial photography was supplemented with as-built plans from KDOT. The boundary follows the entire parcel. Buildings and parking lots have been illustrated and roadway right-of-way and property lines are also shown. See Figures 1 through 4.

The number and location of existing access points and median openings were recorded. Property sizes vary from ¼ acre to multiple acre sites such as the Haskell Indian Nations University. It is apparent that along the corridor, there is considerable variation in the intensity and scale of development. The western end is dense and compact, while the eastern end is visually and physically more open with larger tracts of land. Visual inspection shows the density of driveways at the western end and the close proximity of driveways to the various intersections along the corridor.

There are nine traffic signals along the corridor. Each signalized intersection has operational boundaries on all of its legs, for both the approach and leaving side. The boundaries are established from queue lengths from intersection capacity analysis as well as guideline distances based upon posted speeds. The desirable situation is to minimize or restrict driveways in the operational boundary in order to maximize the efficiency of the signal operations. It is evident that where the signals are closely spaced (1,000 feet apart) the operational boundaries nearly overlap. It is also obvious that there are numerous driveways within the operational boundary. This also illustrates the effect the small parcel sizes have on the ability to implement access management guidelines.

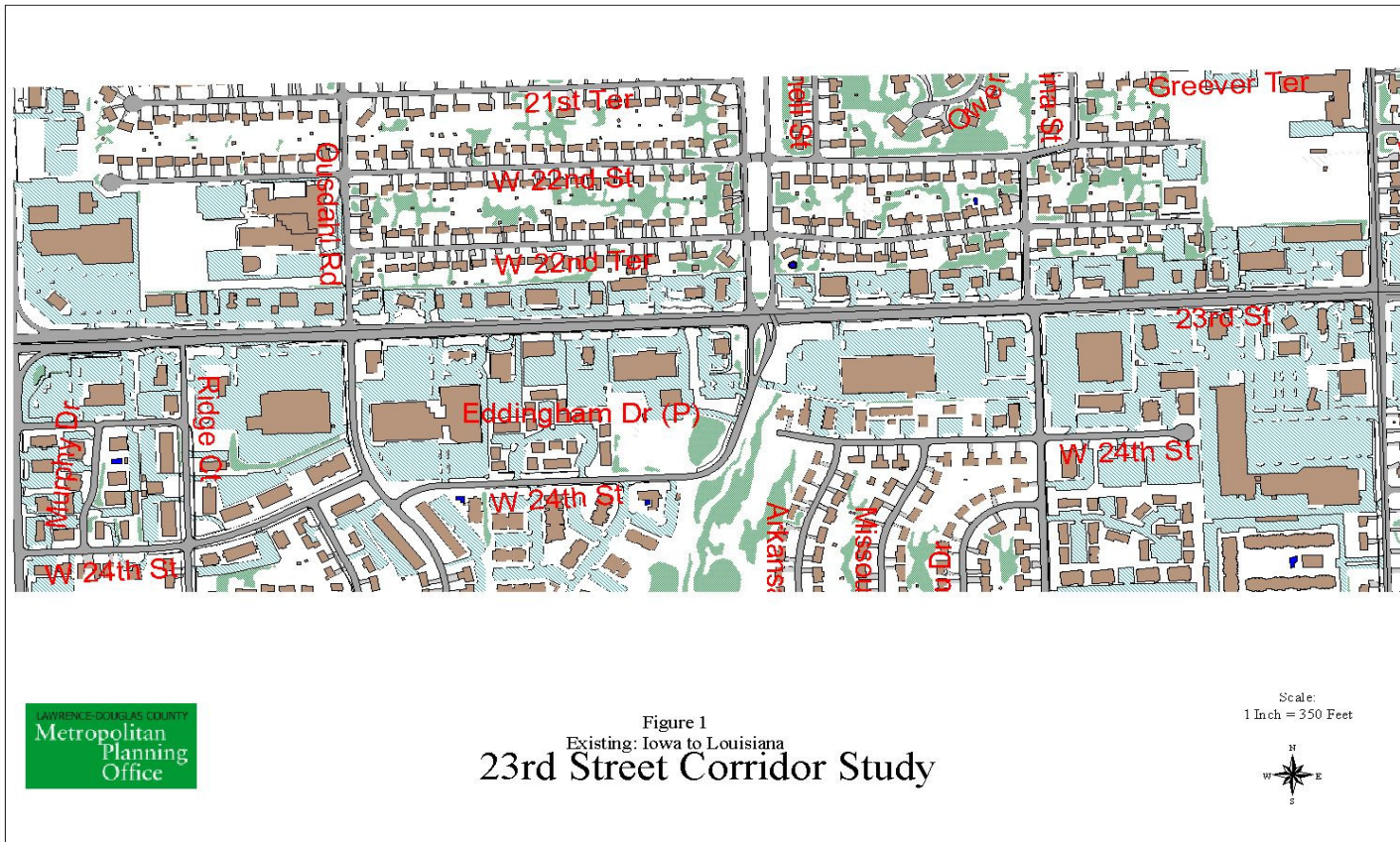
Also analyzed was the number of driveways along the corridor. It is important to note that access points include public street access. Typically the segment and cumulative rate are between 55 and 65 access points per mile, which is considered by many guidelines to be a high rate. Even when the number of driveways diminish (such as in the mainly residential segment), the number of side streets increase to keep the rate at a high level.

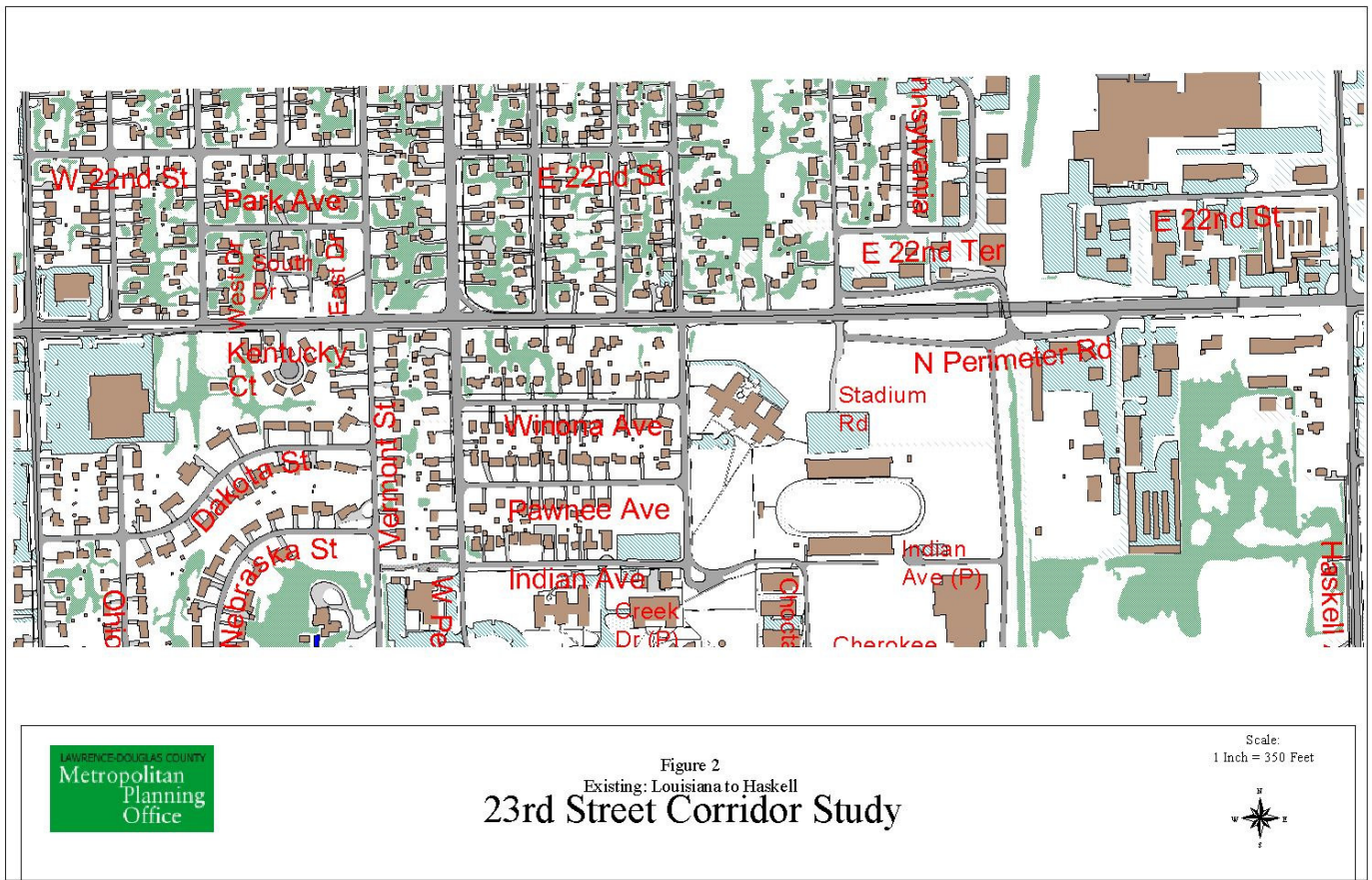
Traffic volumes were recorded at the signalized intersections and along the corridor in November 1999. While the PM peak hour volumes do not vary significantly, daily volumes vary from a low of 26,000 on the west end to 39,000 vehicles per day on the east end. Future year traffic projections forecast by the travel demand model developed for the Lawrence urbanized area indicate that traffic will continue to grow on all major roadways, including 23rd St., as the Lawrence area continues to develop.

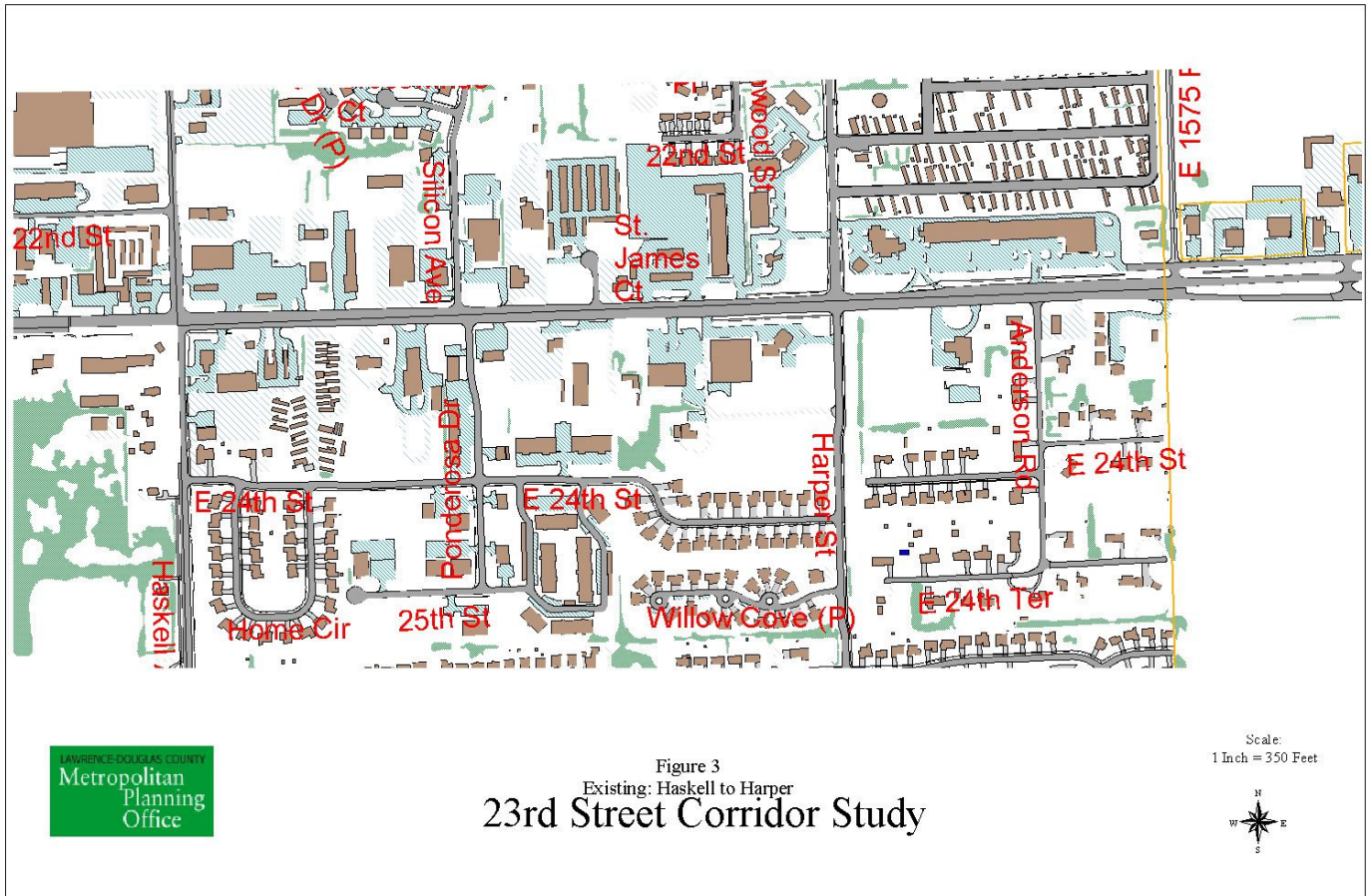
Various operational analyses were prepared for the corridor in addition to reviewing future traffic projections, including intersection and segment capacity, intersection and segment accident experience. Intersection capacity is governed by signalized operations. Level of Service (LOS) is a commonly used measure of a roadway or intersection operation. LOS can be equated to an A through F grading system, with LOS A indicating uncongested operation and free flow and LOS F being very congested conditions of stop-and-go driving and significant intersection delay. The majority of signalized intersections currently operate at Level-of-Service (LOS) C/D during the AM and Noon periods. However, during the PM peak period, the majority operates at LOS D/E and several of the approaches were shown to operate at LOS F. See Figure 5.

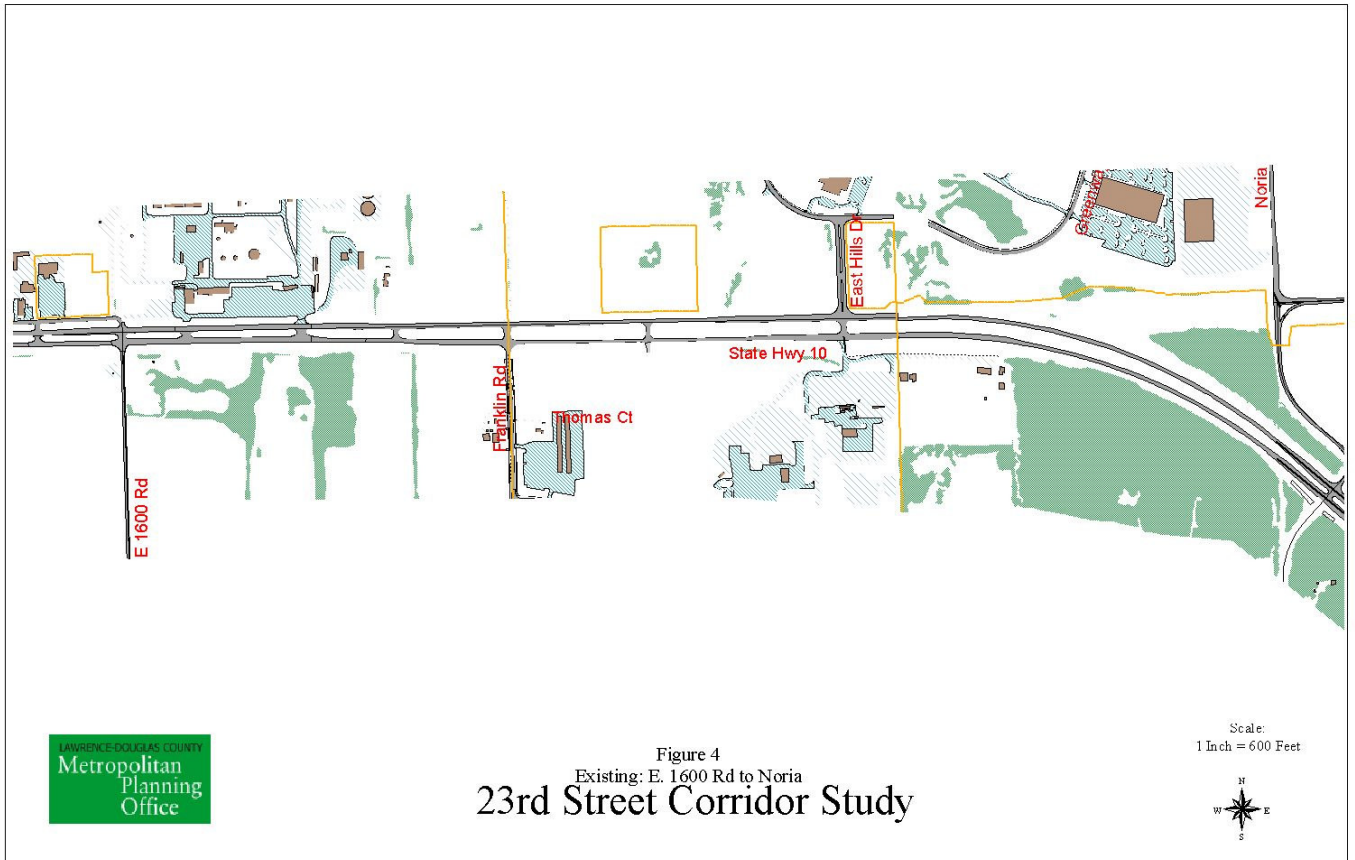
While intersection capacity governs the segment analysis, an additional method of determining segment operations is to conduct travel speed runs. Across the corridor from Iowa to east of Anderson, the travel speed in either direction is approximately 24 mph. This is across segments with posted speeds ranging from 30 to 45 mph. Stopped delays at the intersections are shown as well as the distance associated with the average queues. With the number of travel time runs conducted, a range (minimum and maximum) as well as the average is shown. For example, between Barker and Haskell traveling in the eastbound direction, the average segment speed is approximately 32 mph, with a minimum of 27 mph and a maximum of 42 mph. Average speed through the traffic signal at Haskell is approximately 20 mph. Travel speed runs included travel in both lanes of traffic.

Another operational characteristic is accident experience. Three years of data were reviewed and analyzed to ascertain if patterns or rates were prevalent in certain locations. Out of the total accidents, nearly 60 percent are associated with intersections. The remaining 40 percent occur between intersections. Intersections with a significant number of accidents and a high accident rate include Iowa Street, Alabama, Naismith and Massachusetts.









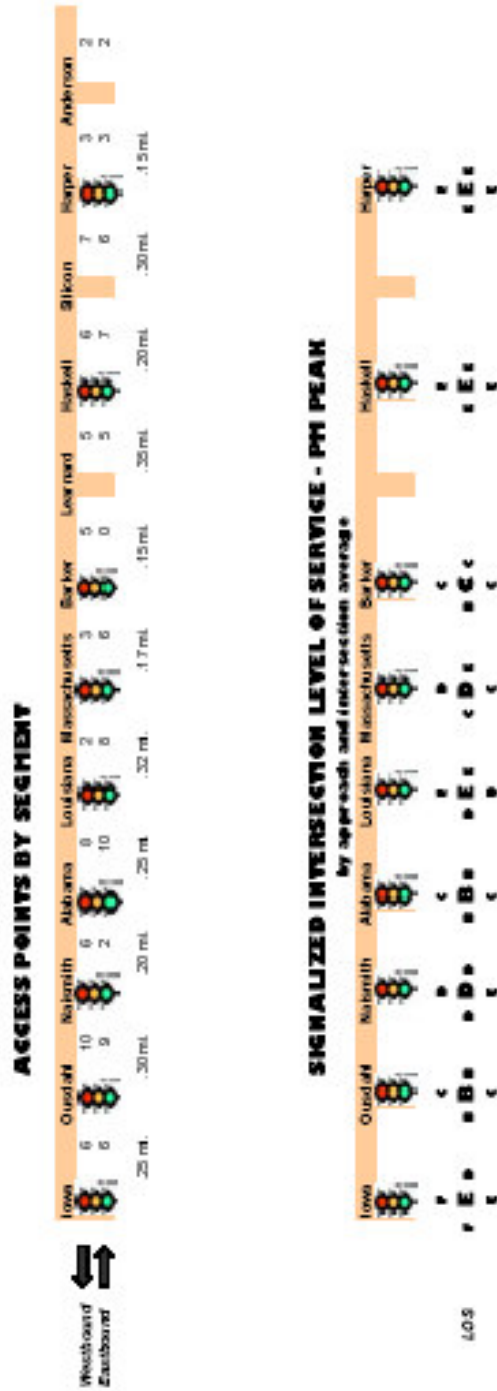


Figure 5
23rd Street Corridor Study

It should be noted that the information includes dates before the Massachusetts intersection was improved.

In terms of segment accident experience, several segments are at or above a critical rate of 6.0 accidents per million vehicle miles traveled. These segment rates have been calculated between public street intersections. It is interesting to note that in comparison to the number of driveways, along the same segments, that as the number of driveways increase so does the segment accident rate. This correlation has been made in numerous national access management studies. The worst segment is between Alabama and Louisiana. Other segments at or above include Ousdahl to Naismith, Naismith to Alabama and Haskell to Ponderosa.

Enhancements

In addition to analyzing the corridor's operational characteristics, it was also assessed in terms of its visual characteristics. 23rd Street is a principal arterial street, a major destination as a commercial corridor, and a primary gateway into Lawrence. The goals and objectives of the visual analysis were:

- to inventory the existing conditions of the corridor,
- to establish Primary and Peripheral Visual Boundaries,
- to identify Key Intersections, and
- to evaluate the existing conditions of the corridor.

The inventory consisted of site observations and documenting conditions with photograph. The primary visual boundary includes the motorist's immediate viewpoint. This generally includes the face of storefronts, signage, landscaping, and amenities that are set close to the corridor.

The peripheral visual boundary includes objects that are set further back from the corridor and from the motorist's primary viewpoint. Generally, this viewpoint includes buildings, parking surfaces, and landscaping set further away from the corridor.

Identification of Key Intersections

- **Gateway Intersection** – Major intersections through their size and location are valued for the capability to be significant gateway entrances into the City or key attractions for the City of Lawrence. Gateways present a high opportunity for enhancements.
- **Primary Intersection** – These intersections based on their location and size, have the capability to be key intersections for the City of Lawrence. Primary intersections present a medium to high opportunity for enhancements.
- **Secondary Intersection** – These intersections based on size and locations have marginal capability to be key intersections for the City of Lawrence. Secondary intersections present a medium opportunity for enhancements.
- **Minor Intersection** – These intersections based on their locations and limitations do not provide enough opportunity to warrant designation as a key intersection. Minor intersections present a low opportunity for enhancements.

Iowa Street to Louisiana Street Segment

Inconsistencies in site design persist along the corridor. The inconsistencies include building

setback, building height, and variations in signage height (signage height ranges from 10' to 25'), as well as type (ground monument, pole) or, in some cases, no signage at all. Seventy-eight percent of the signage between Naismith Drive and Louisiana Street are between 20' to 25' high. Signs along this segment come to a total of 52. The current sign ordinance prohibits new pole signs and restricts commercial/industrial use to ground signs that do not exceed 12' in height from the finished grade of the street. Existing overhead wires, power poles, and large pole signs are prominent throughout this segment. This condition contributes to the visual clutter that exists along the corridor.

Lack of a continuous pedestrian network is evident throughout this segment. Some sidewalk is provided, although neither side of 23rd Street has a continuous sidewalk network.

Iowa Street, Naismith Drive, and Louisiana Street have been identified as Key Intersections. Iowa Street meets the criteria for a Gateway Intersection.

Representative examples of the existing conditions of this segment are presented below.



Photo 1

South side of corridor at Dillons.

Automobiles within parking lot are not screened from the corridor.



Photo 2

North side of corridor.

No continuous pedestrian network provided.

Louisiana Street to Barker Avenue

This segment has the largest portion of continuous residential use throughout the corridor. A continuous pedestrian network does not exist on the North side of the corridor throughout this segment. A continuous sidewalk is provided on the south side of the corridor, but terminates at Barker Avenue.

The existing Breezedale monuments located at the intersection of Massachusetts and 23rd Street have a historical significance with the City of Lawrence and mark the location of a residential subdivision created in 1906 by Lawrence entrepreneur Charles E. Sutton. Possible restoration of these monuments would increase the visual quality of this segment of the corridor and establish the Massachusetts intersection as a Gateway to historic Lawrence and downtown. Mature street trees persist along this segment of the corridor.

Massachusetts Street meets the criteria for a Gateway Intersection.

Representative examples of the existing conditions of this segment are presented below.



Photo 3
West viewpoint of south side of corridor.
Signal pole obstructs the view of the monument.



Photo 4
East Viewpoint of south side of corridor.
Original monuments have been altered to accommodate private sidewalk.



Photo 5

West viewpoint at Massachusetts Street intersection.

No continuous sidewalk provided on the north side of the street.

Barker Avenue to Harper Street

The Haskell University campus is a strong visual element within this segment, combining historic and contemporary architecture. However, inconsistencies with land use are evident within portions of this segment. There is a mix of light industrial, commercial, and residential uses. This is most evident between Haskell Avenue and Ponderosa Drive. Inconsistencies in site design, signage, and architectural materials exist along this segment of the corridor. Twenty-seven percent of the signage ranges from 30' to 40' in height (billboards). Signs along this segment come to a total of 38. The current sign ordinance prohibits the use of new billboards within the City.

Existing overhead wires and power poles are prominent throughout this segment. The combination of billboards and overhead power lines contribute to the visual clutter along the corridor. A continuous pedestrian network does not exist.

Haskell Avenue and Harper Street have been identified as Key Intersections. Harper Street meets the criteria for a Gateway Intersection. Representative examples of the existing conditions of this segment are presented below.



Photo 6

West view, west of Silicon Avenue

Overhead wires and power poles. No continuous sidewalk



Photo 7

Northwest view from south side of corridor.

Overhead wires, power poles, and billboards. No continuous sidewalk.



Photo 8
East Viewpoint, east of Haskell Indian Nations University
Sidewalk abruptly ends.

Harper Street to Noria Road

Much of the land along this segment of the corridor is undeveloped. Tracts that are developed are set back deeply and many are hidden from the view of the motorist. As the speed limit increases within this segment, the cone of vision is greatly decreased and the peripheral boundary disappears.

Inconsistencies with land use are evident within portions of this segment. There is a mix of light industrial, commercial, and residential use, for example: Don's Steakhouse is adjacent to a construction company.

Inconsistencies in site design persist along the corridor. The inconsistencies include building setback and building height. Some buildings are set close to the corridor while others are set far away. The overall scale of the One Marketplace development dominates when compared to other surrounding developments.

A continuous pedestrian network does not exist, although sidewalk does exist along the Marketplace development. Existing signage and inconsistencies in sign design are not as prevalent within this segment as the previous three segments. A total of four pole signs and one ground sign exist within this segment.

Examples of the existing conditions of this segment are presented below.



Photo 9

East viewpoint, east of Farmland.

Development is set back and not readily visible from the corridor (e.g., East Hills Business Park and Franklin Park).



Photo 10

West viewpoint at Farmland.

Development and Evaluation of Options

Access management is an excellent planning and design tool when starting with a new roadway corridor or one that has little or no development along the corridor. However, it is much more difficult to implement access management on existing conditions or “retro-fits”, particularly along a heavily developed mature corridor. Often the access management principles must be compromised somewhat to try to balance improved access management with maintaining the viability of the community, achieving the best possible solution given the circumstances. It is also important to note that not every access management concept is appropriate or feasible in all circumstances or locations. Access management in retrofit applications is extremely site specific and site sensitive.

Access Management Options

For example, a raised median is a typical and effective access management technique. It is intended to control traffic turning movements and is most beneficial near signalized intersection approaches with heavy traffic volumes. Driveway access may be restricted on one side by a raised median, making internal circulation necessary to assist directional mobility. Without fully directional mobility (even if somewhat circuitous), a raised median may not be a practical access management technique.

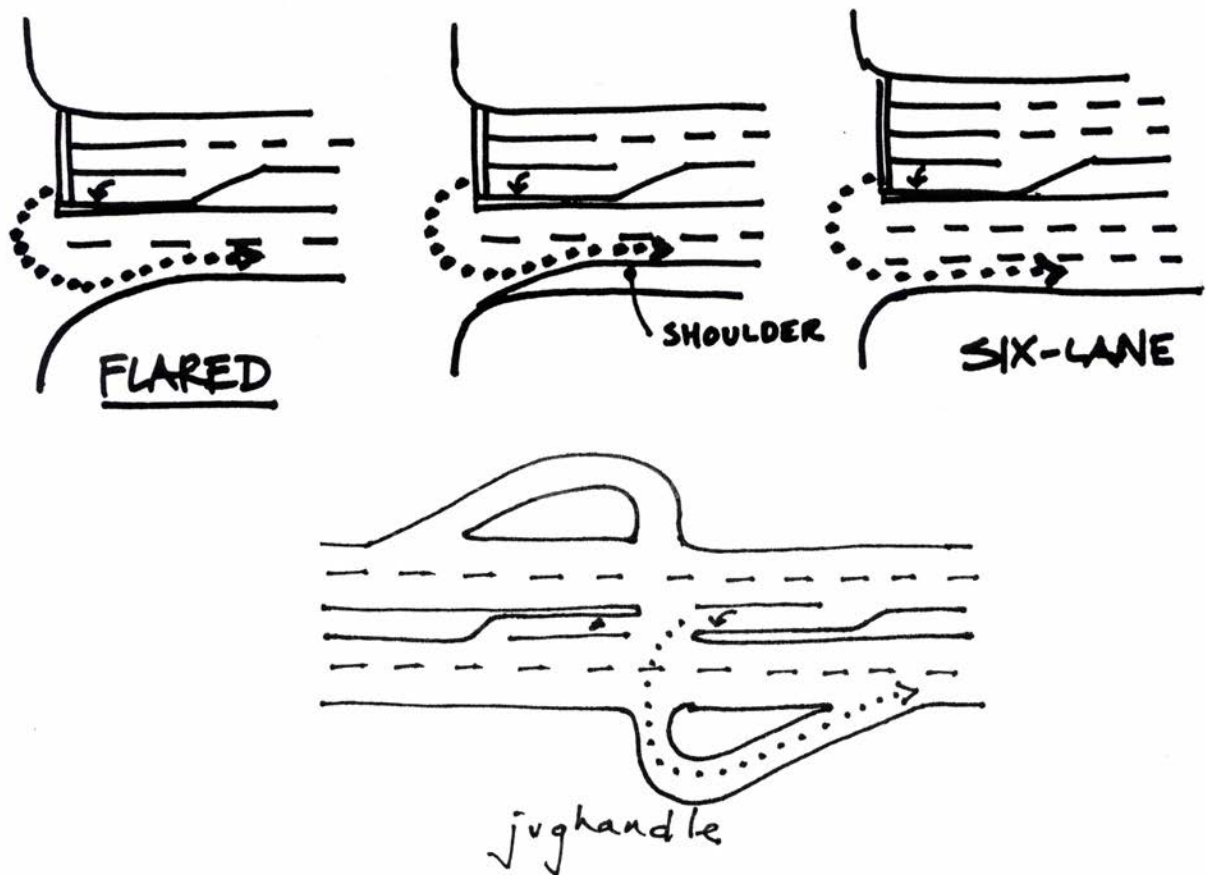
The use of a raised median can be applied in two basic configurations: a continuous median, or only within the functional area of a signalized intersection. For a continuous median to work effectively, certain conditions are necessary. First is that a means be available to access adjacent properties. This could be:

- side street access with or without an internal cross access road,
- a parallel road providing access (such as a frontage or backage road),
- or the ability to change direction (in other words, turning around).

The majority of the corridor does not have parallel access roads and many properties do not have side street access. It may be necessary to improve cross access between properties to improve internal circulation or to consider the potential of U-turning at signalized intersections. This situation may apply under both the continuous median and the intersection median approach.

In order for u-turns to be provided with a continuous median, a wide enough area must be provided to accommodate a U-turn. This can be accomplished via a flared intersection, a wide shoulder, or a minimum three-lane section in each direction. Another option could be a jughandle as provided in several locations along US 24 (State Avenue) between I-435 and US 40 in Kansas City, Kansas.

Figure 6
Median Treatments



Corridor Segments

The Corridor was divided into four segments associated with land use types, traffic volumes and other physical and operational characteristics such as posted speeds. The four segments are:

- Segment 1 – Iowa to Louisiana
- Segment 2 – Louisiana to Barker
- Segment 3 – Barker to Harper
- Segment 4 – Harper to Noria

A brief description of each segment and its potential options follows. Enhancements also have been conceptualized along the entire corridor and are discussed later on.

Segment 1 – Iowa to Louisiana

This segment covers approximately one mile and contains numerous traffic signals and the greatest density of commercial driveways along the corridor. The roadway contains a five-lane section with a center-turn lane. Medians are

provided at the Iowa Street intersection and the east leg of the Louisiana intersection.

Continuous medians were investigated for applicability, but because of highly developed properties and narrow right-of-way, a continuous median may be of questionable value here. Medians at intersection approaches were reviewed to determine if adjacent properties had fully directional mobility. Because of site-specific property configurations, all movements cannot be provided for many of the properties where an intersection median was conceptualized. However, intersection approach medians will improve intersection operations and provide a safety benefit.

Other concepts to consolidate driveways and develop a frontage road system within existing right-of-way would trade one design issue for another. While the total number of driveways could be reduced, the frontage road concept would create a very short “throat” with inadequate room for storage which is an unacceptable design because it can block turning movements and cause vehicles to stack out on the roadway.

The density and proximity of commercial development define this segment. While access management policies may eventually affect and hopefully reduce the number and placement of driveways, the ability to effectively reduce access points is limited because of the small size of properties. Medians to protect the functional area of the intersection somewhat restrict fully directional mobility from some properties.

If one desires a more pro-active approach to achieve the result of reducing the number of driveways, redevelopment or active acquisition of access is necessary. Any redevelopment should encourage relocation within the redeveloped area and financial incentives could be provided as encouragement for landowners. It is also recommended that enhancements be implemented, such as continuous sidewalks.

EVALUATION

- Continuous raised median on a 5-lane section requires either roadway or intersection widening. Major roadway or intersection widening is impractical with its impacts.
- Raised medians at intersections are somewhat constrained by physical restrictions to adjacent properties.

Segment 2 – Louisiana to Barker

This segment covers approximately a half-mile and contains the majority of residential properties abutting the corridor. The roadway transitions from a four-lane undivided section to five lanes with exclusive turn lanes.

This segment has been reviewed primarily in relationship to an enhanced environment that may include sidewalks, ornamental lighting and other treatments. No specific roadway concepts were developed due to potential impacts on adjacent residential areas due to very narrow right of way and because the Massachusetts intersection was recently improved. Access to residential properties would remain unchanged.

This segment's character is essentially controlled by the residential land use. Consequently, no roadway improvements are recommended, although a series of enhancements are strongly suggested and include construction of continuous sidewalks. It should be noted that some right-of-way will be required to install continuous sidewalks on the north side of the corridor.

EVALUATION

- Residential segment – driveway treatments not under review
- Narrow right-of-way
- Different segment from the rest of the corridor
- Enhance and unify character of the corridor
- Transitions are important

Segment 3 – Barker to Harper

This segment covers approximately one mile and is primarily a developed commercial corridor. The roadway is a five-lane section with a center-turn lane. The posted speed is 45-mph. There are three signalized intersections in this segment.

With a wide right-of-way able to accommodate U-turns, continuous medians were reviewed. To provide capacity for this heavily trafficked segment and to allow for U-turns, the roadway would be widened to three lanes in each direction. While the majority of driveways would be restricted to right-in and right-out turns, all abutting properties could be afforded fully directional mobility through U-turns at signalized intersections and at selected median breaks.

Various concepts were developed to replace the bridge over the former railroad tracks (between Barker and Haskell), with an interchange.

The offset alignment of Silicon and Ponderosa Avenue intersections were investigated to determine the possibility of realigning to reduce the number of conflict points.

This segment affords tremendous improvement opportunities and it is recommended that major reconstruction occur to widen the roadway to a six-lane section. Because of ample right-of-way, the principles of access management

can be applied through the concept of a continuous median while addressing driveway consolidation in a comprehensive manner.

EVALUATION

- Wide right-of-way (120 foot minimum) throughout segment affords opportunities to widen roadway with minimal impacts.
- Currently there are few sidewalks along this portion of the corridor.
- Transitions are important

Segment 4 – Harper to Noria

This segment covers approximately two miles and contains the highest posted speeds along the corridor. The roadway is a divided highway with a wide grassed median. The two directions of travel have independent profiles that require the wide (90 feet) median. Several median breaks at public roads and private drives are provided. One of the more active median breaks is at East Hills Business Park. This segment serves as the transition zone from a 45-mph commercial corridor to a 70-mph freeway east of Noria Road.

Along this segment, a review of the spacing of the median breaks was conducted. Approximately every other median break was reviewed for removal, thereby reducing the number of conflict points. As part of a long-range set of improvements, interchange concepts were reviewed for Noria Road coupled with the closure of the median break at East Hills Business Park or alternately at East Hills Rd with a grade separation at Noria road. Right-in and right-out turning movements would remain. Movements restricted by the median break closure would be accommodated at the interchange or at the median break at County Road 1650.

With the extension of a continuous median east of Harper, access to and from Anderson would need to be enhanced through local extensions and access to Harper.

This segment affords tremendous improvement opportunities and it is recommended that major reconstruction occur to revise roadway profiles and construct a phased interchange-concept linking Noria Road with East Hills Business Park. Roadway widening is also recommended to a six-lane section.

EVALUATION

- Wide median section (90 feet), typical is 60 feet. Needed to accommodate different profiles for eastbound and westbound roadways
- Median breaks at 1/8 mile spacing
- Nearly continuous curb cuts along frontage roads
- Narrow throat depth at frontage road and side road junction
- Transitions are important

Economic Impacts

Changes of any sort to an existing roadway impact adjacent properties to varying degrees in terms of gaining or losing access, changes in local travel patterns due to new capacity, signalization, or medians, different speed on the roadway, and many other factors. This section attempts to estimate the potential economic impacts of access management techniques in general as well as the potential economic effects along specific sections of the corridor where the installation of a raised median is considered.

Two recent research papers have been reviewed from the 4th National Access Management Conference entitled:

- *Developing a Methodology to Determine the Economic Impacts of Raised Medians on Adjacent Businesses, and*
- *The Economic Impacts of Medians: An Empirical Approach.*

The first paper presents some case studies and a formula to estimate maximum business loss due to the restriction of left turns. The second paper presents a more general analysis based upon surveys with businesses along corridors that have undergone access management improvements.

Developing a Methodology to Determine the Economic Impacts of Raised Medians on Adjacent Businesses - The research focused upon estimating the economic impacts of raised medians on sales and property values for adjacent businesses and undeveloped landowners. The research has found that installation of a raised median does not equate to economic losses by adjacent businesses. In fact, only two types of businesses (auto repair and gas stations) were found to generally experience losses of gross revenues.

Business owners were asked to rank “accessibility to store” with other factors including distance to travel, hours of operation, customer service, product quality and product price in order of importance that customers use when selecting a business of their type. In all cases, accessibility ranked third or lower. Customers were also asked the same question. Customers ranked accessibility with lower or equal value to the business owners. The most important elements used by customers to determine what businesses they will endorse are factors that may be controlled by the business owners themselves to some extent.

Customers generally indicated they would be less likely to visit the businesses during the construction phase of the project. On another note, business owners prior to a median installation expected a 2.3 percent decline in property values, however after the median installation the perception was that property values actually *increased* 6.7 percent.

The construction phase did seem to impact customers per day and gross sales. Perceptions of expected loss in gross sales during construction were higher (18.6

%) compared to those businesses (11.6%) that were present before, during and after. The construction phase of the project appears to have a negative affect on many of the business types. Business types such as durables retail, specialty retail, fast-food restaurants and sit-down restaurants indicated increasing customers per day, gross sales, and property values. Gas stations, auto repair, and other service businesses indicated somewhat of a decrease in customers per day and gross sales after the raised median was installed. Suggestions to alleviate construction impacts include 1) ensuring adequate and highly visible access, 2) reducing construction time, and 3) performing the construction in smaller roadway segments (phases) to the extent possible.

The Economic Impacts of Medians: An Empirical Approach - Estimating the economic impacts becomes important in helping to decide when and where to install a physical median. It presents a simplified procedure for quantifying the estimated impacts of installing a raised median. The estimates derived represent the maximum likely impacts, since normal traffic growth and overall economic growth are likely to offset some of the potential loss.

Property acquires value because of its location, and the keys to location are accessibility and exposure. Accessibility is measured by the ease that people and vehicles can reach, arrive at and depart from a site; exposure is measured in terms of the number of people and vehicles that pass a site.

In summarizing some previous studies, it is noted that “traffic serving” businesses that were not located at median openings reported a 44% decline in sales volumes after median construction, while non-traffic-serving business reported no change. Comparisons suggest that the raised median did not result in any overall negative impact, although some individual mid-block businesses (i.e. businesses located between median openings) may have suffered some loss of sales. The businesses that were reported to suffer ended up on the “wrong” side of the median, such as a liquor store located on the “going to work” side and a breakfast restaurant located on the “coming home” side. In many cases the changes in business activity reflected the overall economic climate.

In Fort Lauderdale, public opinion surveys found that 63% felt inconvenienced by U-turns, and some 44% reported that U-turns affect the choice of businesses visited. 70% of the merchants reported no adverse effect on truck deliveries. In Orange County, 43% indicated they were unduly inconvenienced by U-turns. U-turns affected driver choice of destination – the range was from 16% for offices to 43% for gas stations. 36% of the businesses indicated that the median changes adversely affected truck deliveries.

NCHRP 25-4 found that perceptions and attitudes were mixed. Some business owners felt that the left turn restrictions limited access to their stores and resulted in lost business, while others reported that the turn restrictions reduced

congestion an improved traffic flow to the point where their market areas actually expanded.

Businesses located at mid-block locations (i.e. away from intersections) perceived the left turn restrictions as more detrimental than businesses located at places where left turns were permitted. In some cases, left turn restrictions appeared to cause some sales to shift from the restricted to the unrestricted business locations. Some businesses reported losses because of left turn restrictions were ready to go out of business before the restrictions were implemented or were planning to go out of business for other reasons.

Perceptions of impacts also varied depending upon the purpose of the project. There was some evidence to suggest that where safety had been publicly perceived to be a serious problem, the left turn restrictions actually enhanced the number of customers coming into the area. However, where projects were intended to improve traffic speeds and flow, perceptions were mixed. Some businesses wanted customers to travel at slower speeds in front of their establishments. While other businesses reported that increased speeds allowed their market areas to be expanded.

In terms of sales impacts, gas stations, food stores and personal service businesses appeared to be the most adversely affected. These businesses showed the largest sales decline and the highest rates of business failure.

Where direct left turns are prohibited, some motorists will change their driving or shopping patterns to continue patronizing specific establishments. Some repetitive pass-by traffic will use well-designed or conveniently located U-turn facilities. Retail sales may increase as overall mobility improves, or as economic conditions change, and as traffic volumes increase. It is also reasonable to expect that destination-oriented trips will find alternate routes to their destinations.

The maximum economic impact will depend on the following factors:

- Size and type of each abutting land use
- Reliance upon pass-by traffic
- Number of vehicles turning left
- Average purchase per vehicle (or person).

The maximum loss would be the number of left turns times the percent pass-by times the dollar per purchase summed for the locations of businesses. Typical proportions of pass-by trips are provided, including 55% for a service station-convenience market and 45% for a fast-food restaurant with a drive-thru. An estimate of left turns as a percentage of total traffic shows a declining proportion of left turn entrants as daily traffic increases. Information is also needed on the purchases per vehicle to estimate maximum daily and annual economic loss.

It should be reiterated that impacts would be less where alternate left-turn access into a property remains open. Over a section of highway, sales at other establishments might increase because of improved accessibility. Finally there may be no overall impact on a community since business would divert to other establishments.

Maximum Economic Impact Along 23rd Street associated with Raised Median

The information from the above research appears inconclusive in many ways, although some generalities may be determined such as:

- One can expect business owner concerns about left-turns restricted by raised medians
- The degree of economic loss, increase or no change due to a raised median is difficult to attribute
- Economic impacts during construction can be expected for many of the business types.

The formula does offer one method of estimating maximum impact that can be applied to the 23rd Street Corridor, in particular between Barker and Anderson. The retail establishments were reviewed by land use type and assigned a probable degree of sensitivity to pass-by traffic. Of the 45 businesses along this stretch, approximately 18 percent could be categorized as high or highest degree of sensitivity. Taking only these eight businesses, consisting of gas stations, convenience stores and restaurants an estimate of maximum economic loss is calculated.

The total traffic for these establishments was reviewed from the ITE Trip Generation Manual. For simplicity purposes each establishment is estimated to generate approximately 2,000 vehicles per day. Using the table for estimated left turns based upon ADT, a value of 22.5% was assumed (being between 20% and 25%). The pass-by percentage varied according to land use. The dollars per purchase was estimated at \$20.00. For the eight businesses under review, the maximum estimated annual loss (based upon 300 days per year) is slightly over \$11.2 million. If adjustments were made to account for those businesses with side street accessibility, the maximum estimated annual loss could reduce to \$9.3 million. It should be noted that these values could be significantly higher or lower depending upon the average value of a purchase. Table 2-1 reflects the above information for each of the eight establishments.

Maximum Annual Estimated Economic Loss

Business	Max. Loss per Year	Adj. Max Loss per Year
Retail/Conoco	\$1,485,0000	\$1,113,750
Food Mart	\$1,485,0000	\$1,113,750
Sonic	\$1,215,0000	\$1,215,000

AmPride (currently vacant)	\$1,485,0000	\$1,113,750
Phillips 66	\$1,485,0000	\$1,485,000
Conoco	\$1,485,0000	\$1,113,750
Texaco	\$1,485,0000	\$1,113,750
Don's Steak House	\$1,080,0000	\$1,080,000
TOTAL	\$11,205,0000	\$9,348,750

Enhancement Goals and Objectives

The goals and objectives for developing enhancements for the corridor were:

- to focus enhancement applications on Gateway and Primary Intersections throughout the corridor,
- to select a segment of the corridor to illustrate opportunities for enhancements,
- to provide site amenities that will visually enhance the corridor, and
- to provide a continuous pedestrian network.

Site amenities are one way to enhance the quality of a corridor. Site amenities that were considered for the 23rd Street Corridor include:

- Landscaping – Plant material consisting of shade and ornamental trees, shrubs, groundcovers, and native grasses.
- Hardscape – Brick/concrete pavers.
- Ornamental street lighting with banners.
- Gateway monuments.
- Vertical elements – Water or sculpture features.

Other factors that can contribute to the visual quality of the 23rd Street Corridor are:

- Removing existing overhead power lines and placing utilities underground.
- Consistent sign design (uniform height and type).
- Continuous sidewalk system.

Enhancement Examples

Examples of these types of applications are illustrated in two separate corridors. One site is located along the Highway 69 Corridor in Ankeny, Iowa, and the second is located along the 87th Street Corridor in Lenexa, Kansas. Refer to the following examples of potential enhancements.



Photo 11
Intersection of 5th Street & Highway, Ankeny, Iowa

The combination of landscaping and appropriate site elevations can effectively screen less desirable views (i.e., automobile headlight glare, parking lot surface, utility boxes, etc.).



Photo 12
Center median along Highway 69, Ankeny, Iowa

Landscape treatment within center medians soften provide contrast with the roadway. Also, the landscape beds provide a common theme that is consistent throughout the corridor. It should be noted that utilities have been placed underground versus overhead. The continuous sidewalk also defines the edge of the street right-of-way.



Photo 13
Commercial Center along Highway 69, Ankeny, Iowa

This site has effective building setback distance combined with a diverse landscaped buffer. This concept serves two functions. First, the landscaping

adequately screens parking from view of the corridor, and second, the landscaping visually enhances this portion of the site within the corridor and accents the business' entrances.



Photo 14
Rosehill Road Intersection, Lenexa, Kansas

The combination of earth berms and landscaping effectively screen out parking areas and drives. The variety of plant materials enhances the visual quality of the corridor.



Photo 15
Sidewalk and Landscaping, Lenexa, Kansas

Signage type is restricted to ground monument signage. The height of the sign shown is 6 feet. This restriction decreases the amount of visual interference that can occur along a corridor when restrictions and standards are not applied.



Photo 16
Center Median, Lenexa, Kansas

The center median is enhanced by selection of materials that are in contrast to the roadway. The combination of cobblestone pavers, concrete curb, and landscape beds with concrete edging provide a unified theme throughout the corridor.

Recommendations

Through the course of this study several factors have influenced the development of the recommendations. First and foremost is understanding and responding to local issues and public input, and secondly is including the potential effects of the South Lawrence Trafficway (SLT), particularly at its potential connection to K-10 on the eastern end of the project. While the SLT is speculative and its construction, if approved, would be a number of years in the future, it is prudent to coordinate to the extent possible the various planning studies underway.

Iowa Street to Louisiana Street

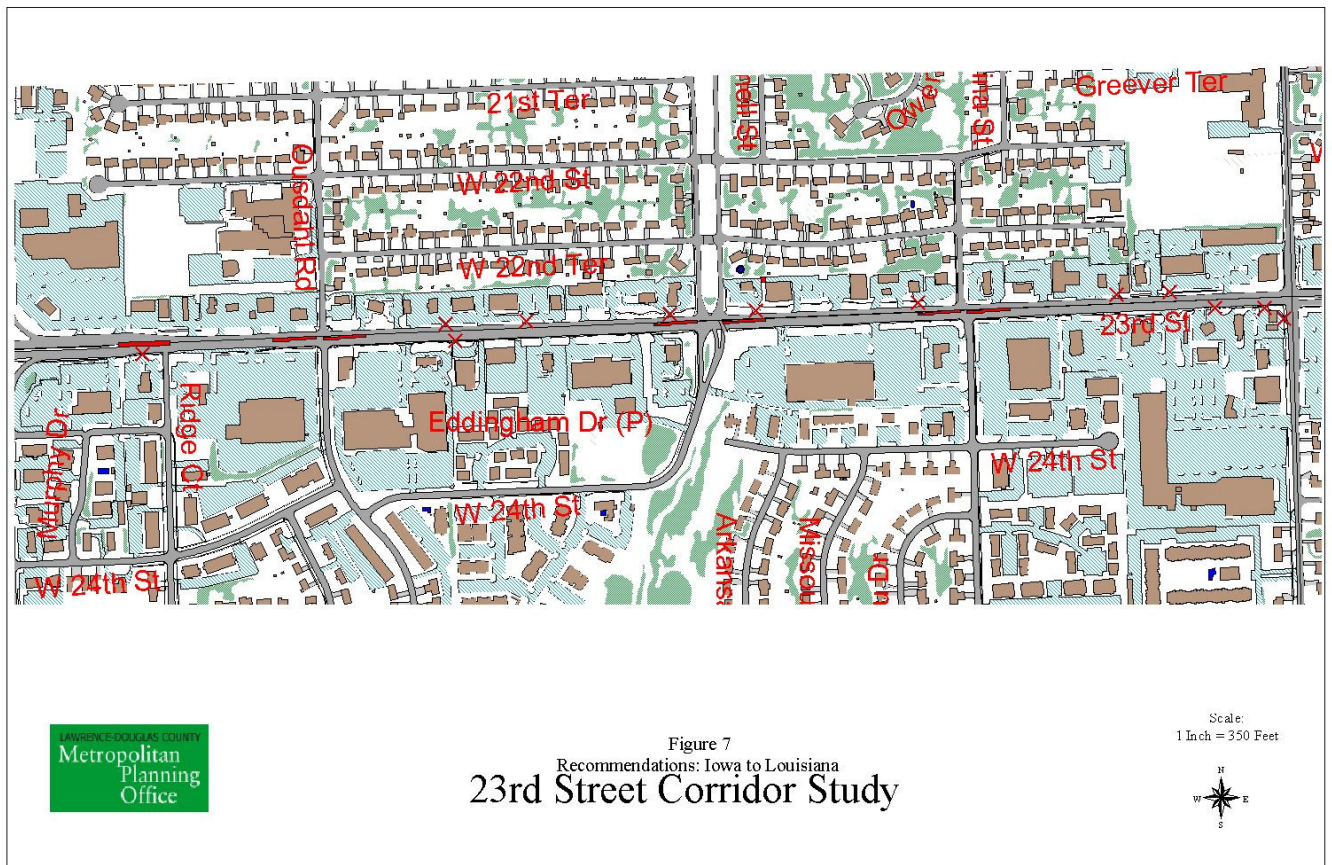
Physical and development constraints determine the practicality and feasibility of improvements in this segment of the corridor. Installation of a continuous center median with turn bays and channelization was studied, but it was determined to be infeasible. Median installation at signalized intersection was also analyzed in terms of the potential effect on intersection operations, potential safety benefit, and property access. Also assessed were opportunities for some driveway consolidation or cross-access easements. The ability to implement in a comprehensive manner would require the City to undertake a policy direction to acquire and close excess points of access; absent that sort of comprehensive approach, opportunities are still present for implementation as properties redevelop.

With regards to enhancements, although several business owners expressed concerns about business impacts during construction of sidewalks, completion of the sidewalk system along arterial streets should be a priority. The opinion of locating utilities underground appeared to be somewhat divided, mainly on the costs of implementation and maintenance. Nonetheless, such an investment would have a positive impact upon this segment's visual quality.

Recommendations: Construct raised medians with turn bays on all approaches at signalized intersections at Ousdahl, Naismith, Alabama, and Louisiana Streets.

- *Identify driveways and curb cuts that are appropriate for closure and/or consolidation. Some combination of city, KDOT, and private resources to be used to acquire access control and reconstruct driveways with shared access.*
- *Institute access management policies, acknowledging that implementation will be incremental and the appropriate application of such policies to be reviewed on a case-by-case basis.*
- *Construct intersection improvements incorporating dual left-turn design on all approaches at the 23rd Street (K-10) and Iowa Street (US 59) intersection.*
- *Provide traffic signal coordination.*
- *Construct continuous sidewalks.*

Refer to Figure 7



Louisiana Street to Haskell Avenue

No major physical changes were recommended in this relatively short stretch. Yet even any physical improvement such as new sidewalk construction did raise several issues such as right-of-way and responsibility for cost. Specifically, if a homeowner is to lose some frontage to provide room to install a sidewalk, will said homeowner also be assessed the cost of installing the new sidewalk?

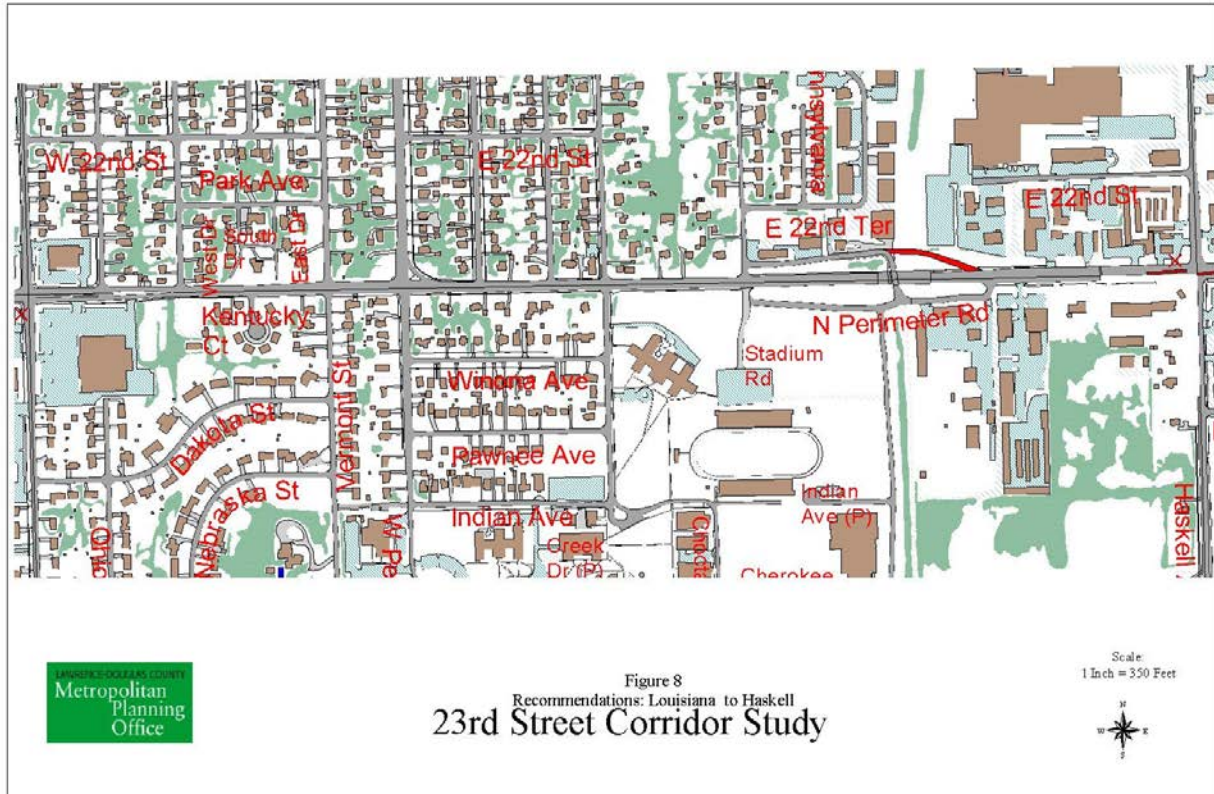
It is suggested that an equitable process be developed that either allows for swapping of the land for the construction of the sidewalk, or one that minimizes or eliminates the homeowners cost in order to achieve the desired result. The opinion on enhancements is generally favorable in this segment, with particular regards to the Breezedale monuments.

After adequately addressing some of the financial issues and the impacts of right-of-way takings, the recommendations for this segment are:

Recommendations:

- *Maintain existing roadway.*
- *Construct sidewalks on north side (requires right-of-way acquisition).*
- *Prohibit eastbound left turns at Tennessee and Vermont Streets during weekday peak period of 4 to 6 PM & investigate possibility of prohibiting left turns at all times.*
- *Investigate enhancements*

Refer to Figure 8



Haskell Avenue to Harper Street

This segment generated the most public interest and negative public comment to the consultant's proposals. While business owners had concerns and issues regarding the impacts to access under a raised median option, the technical evaluation and feasibility from a physical perspective meet the standards of sound engineering judgment. There are however several issues that were raised that require responses.

Concern was expressed that some businesses need two driveways for delivery accessibility and internal circulation. Raised medians can cause delivery inconvenience or changes to delivery access for approximately a third of the businesses along a corridor. No business would lose access, however some may experience a change in access patterns or circuitry of travel.

Although there is a perception that accidents primarily occur at intersections, the fact is that there is an increase in the accident rate as the rate of access points increase. Without improved access management the benefits of traffic signal coordination will not be realized. Those physical aspects are independent of the traffic volumes along the corridor.

In summary, business owners in this segment were generally opposed to the raised median concept and instead favored traffic signal coordination and the hope that improvements to 31st Street and/or the South Lawrence Trafficway would obviate the need for additional capacity on 23rd Street. While the preliminary recommendations are technically sound, public support is a key element for successful implementation. Retrofitting access management has also been identified as a very difficult task to perform.

Several of the questions raised have merit and have caused a re-evaluation of the recommendations. Specifically regarding emergency accessibility, the Fire Department had concerns regarding fire equipment accessibility and its effects upon response times. A raised median could impact emergency response times, although the amount of change is not known. This situation is not true for all raised medians, but it is a valid concern here. If raised medians were constructed, the various emergency services would likely have to evaluate their response patterns and make necessary adjustments to accommodate the changes in accessibility. However, this is true for any changes in land use or roadway project.

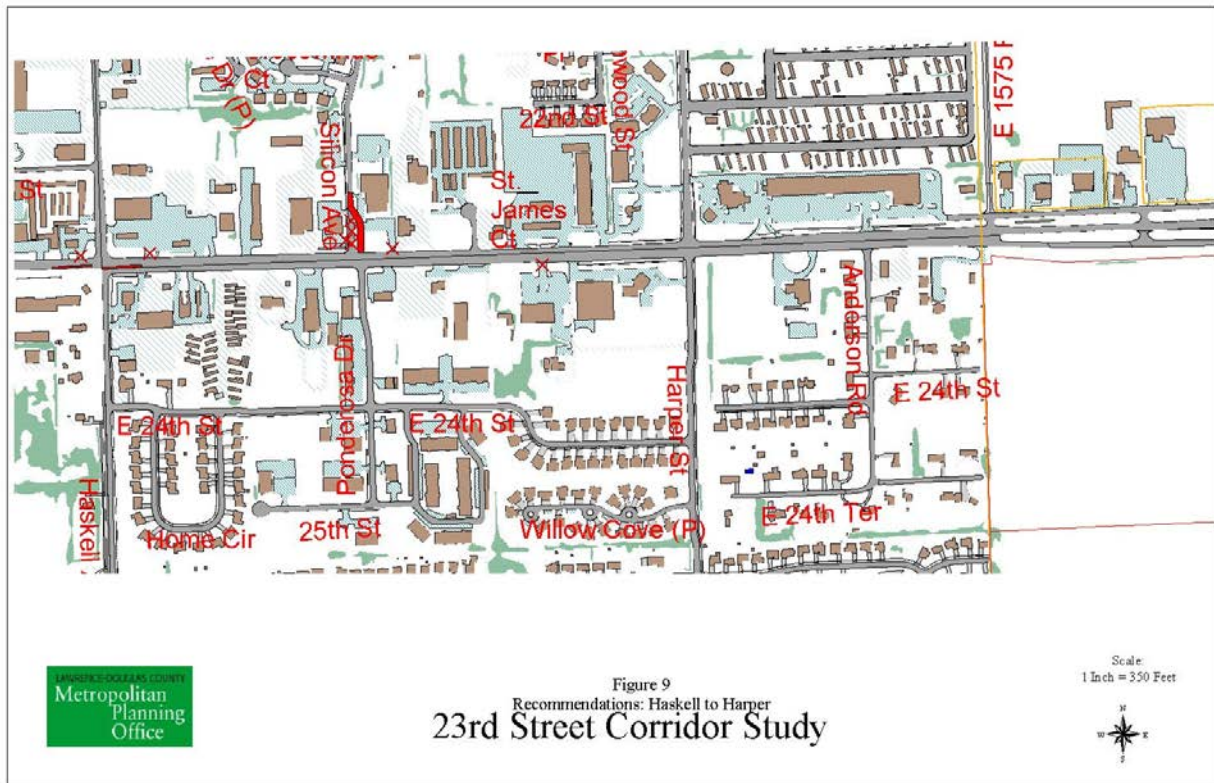
While this study maintains the viability and attractiveness of 23rd Street as a commercial corridor, there is considerable public support for a parallel roadway (such as 31st Street or SLT) in an effort to relieve "through" traffic. Such a parallel facility may provide some operational benefits, although other studies would suggest otherwise, as the problems are related to physical conditions. Travel demand modeling and future year traffic projections indicate that 23rd Street will continue to be a major destination and travel corridor and even if a parallel arterial or freeway were constructed, traffic volumes on 23rd Street will continue to be sufficient to warrant the recommended improvements.

Nevertheless, the parallel roadway may have merit for other reasons and monitoring the situation on 23rd Street (including better reporting of accident locations) should determine the degree of benefit from other minor improvements, such as signal coordination.

Recommendations:

- *Provide traffic signal coordination.*
- *Construct continuous sidewalks on both north and south sides.*
- *Widen the roadway to provide three through lanes in each direction with a wide median (28 foot). Provide dual left turn lanes at signalized intersections.*
- *Realign Silicon and Ponderosa intersections*
- *Modify access in the area of Learnard Avenue at the former railroad bridge. Improve and extend frontage road on the north side of the bridge tying back to 23rd Street east of the bridge. 23rd Street will transition from four to six-lane section.*

Refer to Figure 9



Franklin to Noria Road

This segment presents a series of transitional pieces. Several of the issues raised in segment 3 may also apply in the western portion of segment 4. Some specific comments were related to accessing the residential neighborhood via Anderson Avenue and the closure (dead-ending) of a frontage road at a cross street access point.

Some residents south of 23rd and east of Harper expressed concern regarding the potential for cut-through traffic if the 24th Street extension to Harper was constructed. This alternate access is necessary in order to restrict turn movements via a continuous raised median on 23rd Street. Several options were discussed including making the 24th Street extension one-way westbound and adding a westbound left-turn pocket from 23rd Street to Anderson Avenue. Also traffic calming measures could be considered through neighborhood streets to slow traffic speeds and reduce the potential for cut-through traffic.

The frontage road proximity at the access easement to the Fairgrounds is not a desirable situation. Two options were illustrated. One option provides a cul-de-sac turn around, while the other provides a “hammer head” style. The cul-de-sac option requires acquisition of additional right-of-way. The preferable design would be as proposed at CR 1600 yet this would take one or two existing businesses.

Other options include allowing the inappropriate distance and monitoring the situation, or only closing the median break but still allowing a mid-block right-in right-out. While none of these options are textbook examples of what to do on access management, it does represent the real issues found with retrofit applications.

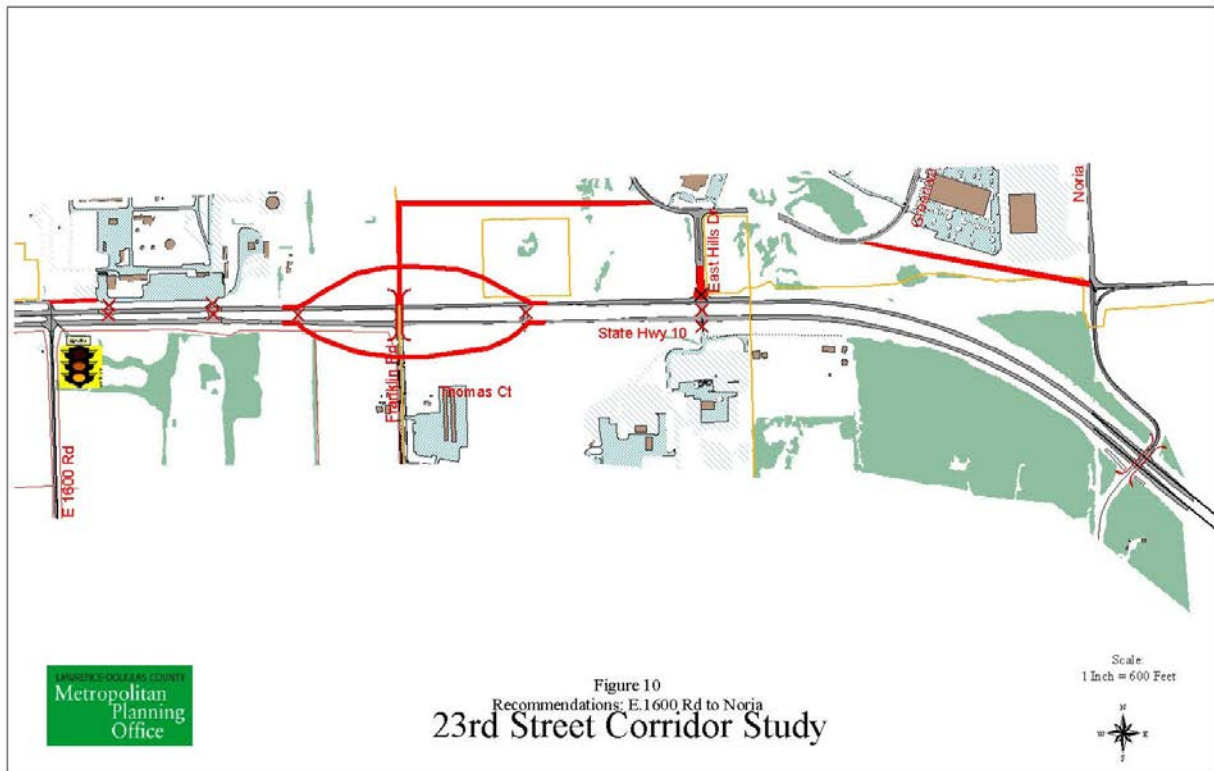
The recommendations for the eastern segment received technical support yet issues were raised regarding timing and implementation of such improvements. The general concern was that improvements were necessary now, as well as in the long range. Issues were also raised about the placing of an East Hills interchange and its construction sequencing. Geometrics and operational analysis indicated that an interchange at East Hills would not be effective and that an interim signalized intersection and ultimate interchange at Franklin Road would provide better land access and improved safe operations. As traffic volumes dictate, an interchange at Franklin Road would be constructed. The construction sequencing would be to utilize the one-way frontage road ramps to handle detour traffic while the K-10 mainline profile is lowered.

In consideration of the on-going discussions regarding the SLT, the eastern terminus of the 23rd Street corridor was revisited. KDOT's SLT design concept proposes Noria Road as a grade separation with no 23rd Street access, thereby restricting access and mobility to this region. A road connection from Noria Road to East Hills is proposed to maintain system connectivity.

Recommendations:

- *Transition from four-lane freeway on K-10 to six-lane expressway entering city limits, with some frontage road sections. Posted speed limits transition from 65 to 45 mph.*
- *Interim: construct signalized intersection at Franklin road.*
- *Ultimate: Construct interchange with Franklin Road, grade separation and frontage roads.*
- *Noria Road grade separation, possibly as part of the KDOT SLT project.*
- *Reduce number of median breaks to ¼ mile spacing.*
- *Delineate two-way frontage road with driveways.*

Refer to Figure 10



Suggested Phasing of Potential Projects

Based upon the initial conclusions carried to the public meetings, a suggested phasing of potential projects was prepared. The phasing was divided into three time periods; a short-range, mid-range and long-range period. Subsequently the dates for these time periods have been revised to reflect the time needed to program and design the various projects to a short-range from 2003 to 2008, a mid-range from 2009 to 2014, and a long-range beyond 2015. This grouping of time periods is not intended to be specific, but to allow decision makers and the public additional information concerning possible implementation time periods. The phasing also included public and private initiatives. Another public initiative involved policy matters including access management guidelines and transit bus pullouts. The private initiatives suggested that if appropriate economic and location conditions exist, to consolidate “small” properties and redevelop commercial establishments. Such efforts would likely result in a reduction in the number of driveways along 23rd Street.

After the 2nd public meeting with its numerous comments concerning the content and scheduling of the projects and the on-going SLT study, a revised phasing plan has been prepared in an attempt to address the issues raised. The difference between the two phasing plans is

- a shifting of priorities
- public-private partnering to implement access management, and
- the inclusion of the effects of the proposed South Lawrence Trafficway.

Initial Phasing

This phasing suggested that work begin at the ends of the corridor, namely at the west end with reconstruction of the Iowa Street intersection and at the east end with the interim phase of the Noria Road interchange. Other projects included signal coordination between Iowa and Louisiana Streets and the removal of five median openings in the divided highway section east of Anderson Avenue.

The mid-range improvements were to concentrate on widening the roadway and constructing a raised median between Barker and a point east of Anderson Avenue. Signal coordination would also occur between Barker and Harper Streets. The improvements also include the construction of sidewalks and filling in sidewalk gaps as well as aesthetic enhancements. This section includes the construction of an interchange at the former railroad bridge.

The long-range improvements were concentrated on the segment between east of Anderson to Noria Road. This includes modifications to the profile of K-10 and the construction of an interchange at the East Hills Business Park entrance

The probable costs of the initial phasing were approximately \$5.8 million for the short-range period, approximately \$8.7 million for the mid-range period and approximately \$13.0 million for the long-range period. This approach put the higher cost projects further out into the future.

Revised Phasing

The revised phasing shifts certain projects around within the various time periods. For example, signal coordination received a fair amount of public support and all traffic signals along the corridor are recommended to be coordinated in the short-range. Support for the immediate implementation of the Franklin Road interchange suggested moving that project from the long-range to the short-range. Filling in sidewalk gaps between Iowa and Barker has also shifted to the short-range. The reconstruction of the Iowa Street intersection remains.

The mid-range period would complete the roadway widening and profile modifications east of Anderson Avenue to a point near CR 1650. Aesthetic enhancements, such as under grounding utilities are proposed between Iowa and Barker Streets. Additional critical aspects occur during this time period. It is recommended that continuous monitoring of the physical and operational characteristics occur to assess the degree of benefits from the above described improvements. With an established set of parameters, an annual report of conditions would be prepared. The need and timing of long-range improvements could then be determined. Without the interchange, the modifications to the roadway profile become unnecessary.

The suggested long-range improvements include the roadway widening and raised median, along with sidewalks and aesthetic enhancements between Barker and Anderson Avenue. This section includes roadway improvements at the former railroad bridge.

The probable costs of the final phasing are approximately \$9.0 million for the short-range period, approximately \$9.0 million for the mid-range period, and approximately \$9.3 million for the long-range period. This approach nearly equally distributes the costs of the projects.

Estimated Project Costs

Probable costs are based upon the proposed transportation improvements. Many of the recommendations can be categorized into two basic types; Policy & Programs and Projects. Although some of the policies and programs may eventually lead to physical infrastructure, only defined transportation projects have been estimated. The policy level recommendations do not have a direct probable cost and are primarily associated with privately initiated changes to properties along the corridor. The program level recommendations, particularly the public-private partnerships, may have some direct costs. This type of incentive may be the best way to implement many of the recommendations associated with driveway placements.

The estimates do not include right-of-way costs, survey, design fees or construction inspection fees. The costs have been estimated based upon four major items and a contingency. The four major items are divided into roadway pavement, including sidewalk and minimal landscaping, earthwork, traffic signals and traffic control, and bridges. In order to develop a range of costs to reflect the potential for varying costs

because of the very preliminary nature of the roadway improvements, the quantities and costs have each been increased by 10 percent to represent an upper limit. The unadjusted quantities and costs represent a lower limit. Each limit is then increased by 25% to adjust for potential contingencies.

Summary of Probable Costs by Segment

Segment	Minimum	Maximum
Iowa Street to Louisiana	\$2,500,000	\$3,500,000
Louisiana to Barker	\$150,000	\$200,000
Barker to Harper (east of Anderson)	\$7,500,000	\$9,000,000
East of Anderson to Noria Road	\$12,000,000	\$14,500,000
TOTAL	\$22,150,000	\$27,200,000

Enhancements

A cost analysis was performed for the enhancements along the Haskell Avenue to Harper Street portion. Three construction cost options were developed along with an associated cost. The estimates include a 20% contingency. The options allow for flexibility in determining the degree of enhancements. The cost analysis does not include sidewalk construction, multi-use recreational path, relocation/replacement of utilities, or relocation/replacement street/highway lighting. Cost Option 1 is the recommended enhancement.

Cost Option 1 includes:

- Concrete paver crosswalk.
- Ornamental lights with banners.
- Landscaping (shade trees, ornamental trees, and landscape beds).
- Flag poles.
- Gateway monuments.
- Grasses with irrigation.

Construction Cost Estimate \$460,000

Cost Option 2 includes everything in Option 1, plus:

- *Brick/concrete pavers within center median.*
- *Water feature.*

Construction Cost Estimate \$720,000

Cost Option 3 includes everything in Option 2, plus:

- *Monuments with waterfall fountain*

Construction Cost Estimate \$770,000

Redevelopment Options

One reason why access management is so difficult to implement through retrofit applications is the integration with existing development, the access and circulation issues of each individual property, as well as property rights. That is why retrofit access management often takes a “get the best you can” attitude and does not attempt to hold fast and true to guidelines that can become impractical to implement on an individual scale, that can create significant impacts or even unusable (not commercially viable) sites.

With these thoughts in mind, the corridor was reviewed to identify such examples of severe physical constraint and areas of “impractical” access management considering the current parcel configurations and multiple ownerships. Two specific areas were found to illustrate the constraints of existing conditions and the potential opportunities of redevelopment. The sites include the southwest quadrant at the intersection of 23rd and Louisiana, and the north mid-block between Ousdahl and Alabama.

23rd Street and Louisiana Street

The overall goals and objectives for the redevelopment of this area are, first, to minimize the number of access points along 23rd Street and Louisiana Street; second, to provide redevelopment options that encourage relocation within the redevelopment area; and finally, for the City to consider financial incentives to provide a smoother transition for redevelopment.

Concept ‘A’ - This scheme proposes reconfiguring access points to be oriented inward, instead of outward, along 23rd Street and Louisiana Street. Also, the concept minimizes the impact to existing businesses by preserving Wendy’s Restaurant, Douglas County Bank, and Pet World. A two-way center drive is located approximately 250’ south of 23rd Street. Direct access will be provided along this drive. This drive is restricted to right-in and right-out access at Louisiana Street. The existing mall entrances located at the north and east side of the redevelopment area shall remain.

Approximately 13,675 square feet of retail use currently exists within the redevelopment area. This concept provides 14,300 square feet, a net gain of 625 square feet for retail use and sufficient parking is also provided. Approval of a variance for the existing Wendy’s site and reconfiguration of the drive-up will need to occur. This concept proposes the removal of six (6) access points from 23rd Street and two (2) access points from Louisiana Street.

Concept ‘B’ - This scheme proposes an expansion of the redevelopment area by extending south to the access drive for Westlake Hardware and General Dollar Store. The concept, like Concept ‘A’, proposes the access to be an inward orientation, instead of outward, along 23rd Street and Louisiana Street. A two-way center drive is located approximately 250’ from 23rd Street and Louisiana Street. This center drive provides access to the north and south sides of the redevelopment area. This drive is restricted to right-in and right-out access at Louisiana Street.

The existing mall entrances located at the north and east sides of the redevelopment area shall remain. The access drive across from the east mall entrance is realigned to match the current entrance. This will affect (1) residential property. This realignment of the drive will provide better traffic circulation. The parking lot for Westlake Hardware will need to be reconfigured to allow for access.

Approximately 25,925 square feet of retail use currently exists within the redevelopment area. The concept provides 26,700 square feet, a net gain of 75 square feet for retail use, and sufficient parking is also provided. This concept proposes the removal of six (6) access points from 23rd and two (2) access points from Louisiana Street.

Concept 'C' - This concept is the same as Concept 'B' with one exception, the southern access drive is realigned to match the southern access drive for Checkers. This alignment preserves the residential property to the south.

23rd Street and Ousdahl

The goals and objectives for this redevelopment area are, first, to minimize the number of access drives that currently exist; second, to provide a redevelopment scheme that encourages relocation within the study area; and finally, to provide a continuous pedestrian network throughout the development area.

Concept 'A' - This concept removes three (3) access points along 23rd Street. Reduction in access points will provide some traffic relief. Buildings and parking areas are set back to provide additional relief along 23rd Street. A continuous pedestrian network is located along the front of the buildings. Approximately 18,900 square feet of retail use currently exists within the redevelopment area. This scenario provides 16,800 square feet, a net loss of 2,100 square feet of retail use. Approval of variances for front and rear yard setbacks will be necessary for redevelopment to occur.

Concept 'B' - This concept also removes three (3) access points along 23rd Street. Reduction in access points will provide some traffic relief. A common access drive is provided at the rear portion of the redevelopment area. This will consolidate the traffic to the rear and lessen congestion at the front. Approval of variances for front and rear yard setbacks will be necessary for redevelopment to occur. This scheme proposes a reduction of the 23rd Street right-of-way from 100' to 95'. Reduction of the right-of-way is essential to the success of the redevelopment.

Harper Street, O'Connell Road

A third example was chosen that focuses upon new development rather than re-development and one that compliments the Horizon 2020 land use plan. The site is on the south side of 23rd Street, west of O'Connell Road. This site also emphasizes the relationship between land use and transportation as access needs require investigation into the transportation network as a "system", not just immediate property access.

The goals and objectives for this area is to, first, reconfigure the street network to be more efficient; second, to minimize access points along K-10 highway; and finally, to provide a buffer for future development.

The existing street network between 23rd Street and 25th Street Terrace is not efficient, and access throughout the existing residential neighborhood is limited. This scheme recommends 24th Street be extended west to Harper Street, and a turn-around (according to City standards) be placed on the west side of East 24th Street Terrace. This will allow better traffic circulation for residents and emergency vehicles. Extension of 25th Street Terrace to O'Connell Road will provide an east-west collector from Harper Street to O'Connell Road. Horizon 2020 has 25th Street connecting to Franklin Road. The location of this street corresponds with the comprehensive plan. Horizon 2020 designates the land between Anderson Road and O'Connell Road as low-density single-family residential, and high density residential at the southeast corner of intersection of O'Connell and K-10.

The plan reflects these uses. Anderson Road has been restricted to right-in and right-out access. This scenario cannot work without the 24th Street west extension. Temporary access from East 24th Street is provided for the small enclave of residences east of Anderson Road. This will be sufficient in the short term until the eastern portion is developed. A 50' greenspace buffer along the corridor is provided for the future residential development. See Figure 3-14 for the representation of this concept.

Corridor-wide Improvements

Several improvement concepts were reviewed along the entire corridor and can be thought of under two basic categories, Enhancements and Alternate Modes of Transportation.

Enhancements

Iowa Street to Louisiana Street

Due to the constraints of the existing developed corridor (small tracts, narrow right-of-way), enhancement opportunities are very limited.

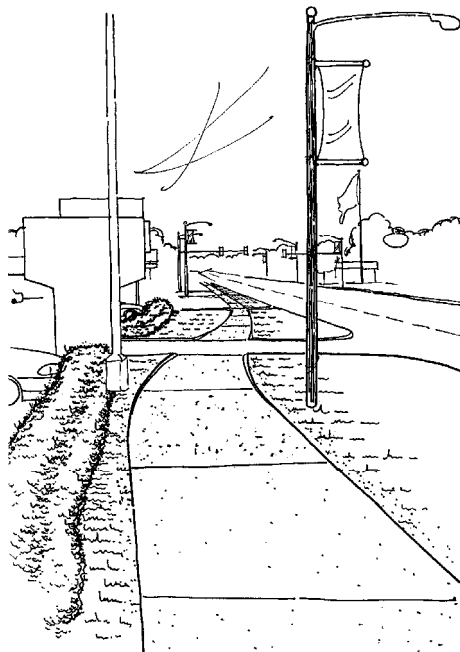
Recommendations

- Provide a continuous sidewalk system throughout this segment on both sides of the corridor.
- Provide consistent sign design throughout this segment. Horizon 2020 recommends that "like the Iowa Street Corridor, emphasis is also placed on improved and coordinated signage in scale with development." This can be achieved by adherence to sign ordinance, enforcement, and development of a public-private funding partnership between the City and businesses. This could encourage business owners to be proactive in conforming to today's standards.
- Develop a special landscape ordinance for the 23rd Street/K-10 Highway Corridor with special regard for businesses that have parking lots facing the

corridor. Special landscaping and berming to screen out automobile headlight glare and the parking surface should be a priority. Horizon 2020 recommends for the 23rd Street Corridor that “in cooperation with property owners, the City should undertake parkway landscaping improvements.” Again, by developing a public-private funding partnership between the City and businesses, this could encourage business owners to be proactive in conforming to today’s standards.

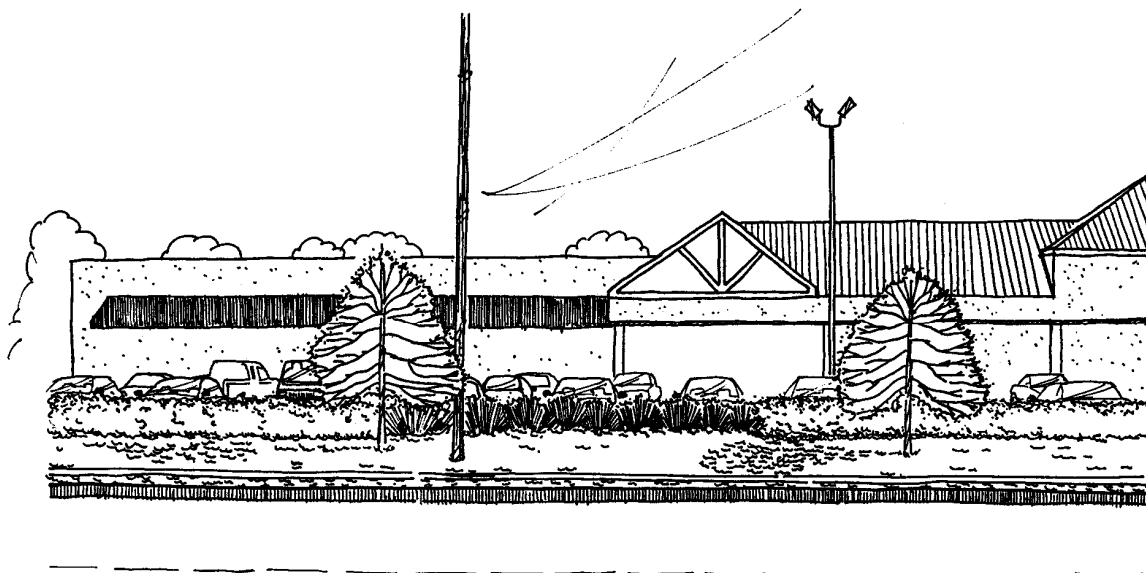
- Remove overhead power lines and place utilities underground.
- Provide uniform street lighting design.

The following illustrations show examples of enhancement recommendations for this segment.



NORTH SIDE OF 23RD STREET

This exhibit is an example of a recommendation that removes overhead power lines, provides continuous sidewalk, and uniform lighting standards. This application can have a positive impact along the corridor.



SOUTH SIDE OF CORRIDOR ALONG DILLON'S

Three-foot high shrubbery can effectively screen out automobiles, parking surface, and headlight glare without detrimentally impacting the view of businesses.

Louisiana Street to Barker Avenue

The Massachusetts intersection has been identified as a Gateway Intersection. Restoration of the historic Breezedale monuments is an important component of enhancing this segment of the corridor. Completing pedestrian access along this residential segment of the corridor is important.

Recommendations

- Provide a continuous pedestrian network by filling the gaps between the sidewalks and providing enhanced crosswalks (contrasting material from roadway) at the intersection of Massachusetts and 23rd Streets.
- Restoration of the Breezedale monuments should be a priority. In December of 2000, the City of Lawrence applied for a grant that would establish the Breezedale monuments as an historic landmark and provide the necessary funding to restore the monuments and additional site amenities to complete the intersection. The grant application was not funded, however, the City is exploring alternate funding opportunities.

Barker Avenue to Harper Street

Most of the right-of-way width along this segment is 120 feet, which can provide room for enhancements. Very few sidewalks are provided along this portion of the corridor. Existing overhead power lines and billboards detract from the visual quality along the corridor.

Recommendation

One of the goals for this segment is to provide site amenities and streetscape elements that enhance the corridor both visually and physically. To minimize impact along business fronts and provide an efficient utility corridor, these amenities will be concentrated primarily within the center medians provided throughout this segment. Specific recommendations include:

- Provide a continuous pedestrian network throughout this segment by providing sidewalks on the north/south sides and enhanced crosswalks (contrasting material from roadway) at the intersections of Haskell Avenue and Harper Street.
- Landscape/Hardscape – The combination of landscaping, pavers, concrete edging will provide a unified theme throughout this segment of the corridor. Crosswalks located at Haskell Avenue, Silicon Avenue, and Harper Street intersections, provide pedestrians with access that is visually identifiable with motorists.
- Ornamental lighting with banners, combined with intermittent highway lighting.
- Vertical elements such as water features, sculpture, and flagpoles can serve as focal points along the corridor.
- Placement of Gateway monuments at the intersection of Harper Street and 23rd Street will provide an east gateway entrance into the City of Lawrence.
- Placement of overhead power lines underground.

Harper Street to Noria Road

The width of the right-of-way in some areas is 275' plus. This expansive right-of-way also affords opportunities for enhancements within this segment. Very few sidewalks are provided along this segment at the western end near the Harper Street intersection. Overhead power lines are less prominent throughout this segment.

Recommendations

- Provide a 50-foot greenspace buffer on both sides of the corridor for land that is not developed.
- Provide landscape treatment (native grasses) in the center median.
- Provide landscape enhancements and amenities, such as terraced retaining walls, ornamental trees, shrubbery, and native grasses, at the Franklin Road interchange and at the East Business Park entrance.

Alternate Modes of Transportation

This study's approach is to be inclusive and incorporate all modes of transportation within policy and project levels. Consequently, bus transit as well as pedestrian and bicycle transportation is considered. Bus transit requires an interface with the bus stops along the corridor, both on 23rd Street and at side streets where the route changes course. Pedestrian facilities typically include the construction of sidewalks, but also involve crossings at major intersections. Bicycle facilities include the consideration of a

off-road trail along 23rd Street as well as critical crossings such as at Naismith. A brief discussion of all three modes is provided.

Bus transit

When this study began, bus service in Lawrence was proposed but not yet in service. Early maps of potential bus routes continue to be revised after service was implemented in early 2001. It is likely that as the transit system and service evolves, further route and bus stop locations will change.

In an effort to provide coordination with potential roadway improvements, the inclusion of bus pull out bays and bus shelters were considered. The typical bus bay design includes a 50 foot long by 10 foot wide bay on the leaving side of the intersection, as well as a 40 to 60 foot long taper to bring the curb line back to the roadway edge. The typical area needed for a bus shelter is 10 foot wide by 12 foot deep, located near the middle of the bus bay.

While initial direction provided was to review bus stops on only the leaving side, site conditions and bus driver experience has taken a different approach where near side bus stops may be appropriate, in particular at route transfer points. The issue with the bus stop location is often associated with the impacts to existing driveways. Several of the bus stop locations are without sidewalks while other locations have ample pedestrian crossing facilities associated with the traffic signals and roadway pavement markings.

In review of the bus routing, seven potential stops were identified along the corridor and potential options to include bus pull out bays identified. In light of the recommendations, review of the bus stops between Iowa and Louisiana become moot as no physical roadway improvements are proposed.

Pedestrian

The pedestrian experience along the majority of 23rd Street does not rank as an enjoyable experience. Heavy traffic volumes and vehicular noise, lack of street trees and a degree of separation from traffic as well as the lack of sidewalks in certain sections all contribute to a poor experience. However, on the positive side, there are many locations where sidewalk is present and the physical condition is acceptable. The issues for the pedestrian experience are many and varied, but a necessary first component is to *have* sidewalks, then the issue can change focus to the quality of the experience. Consequently, this study directs its attention to filling in the sidewalk gaps, constructing sidewalk where there currently is no sidewalk.

While there are several areas of gaps between Iowa and Louisiana Streets, a critical segment lacking sidewalks is between Louisiana and Barker. This segment would also require the acquisition of right-of-way to install sidewalks. The next segment between Barker and Harper has little sidewalk and a couple of large intersection crossings. The recommendations of a raised median would also help to facilitate a pedestrian refuge area when crossing 23rd Street. The segment between Harper and Noria Road has

very little sidewalk. Design aspects would need to consider the high travel speeds and possibly the necessary clear zones along the highway. Where possible, it is recommended that sidewalks be constructed along both sides of 23rd Street and at a minimum width of six feet.

The segment between Barker and Harper, and onto Noria Road for that matter could include a multi-use path or trail, similar to that along Clinton Parkway on the south side of 23rd Street. Even with a multi-use path on one side, sidewalk should be constructed on the opposite side of the multi-use path. Further discussion regarding design issues on the multi-use path are found in the bicycle section of alternate modes of transportation.

Bicycles

By definition bicycle are permitted on all roadways, unless otherwise specifically prohibited. Consequently bicycles can and do use 23rd Street. Observations have noted bicyclists on both the sidewalk and the roadway. Typically only an advanced cyclist would find 23rd Street an acceptable route to travel. The Bicycle Compatibility Index, a measure of stress levels for bicycle travel on various roads dependent upon traffic volumes and speeds, indicates a high level of stress (LOS E). Physical constraints along the right-of-way as well as numerous driveways would even make the inclusion of an off-road facility a potentially stressful experience. Design standards for bicycle separation from traffic is a minimum of five feet. Such standards would require additional right-of-way and potentially shifting of the roadway, particularly in the segment between Iowa and Barker Streets. Other options may exist for parallel routes, yet that is beyond the scope of this study's focus.

Potential Funding Sources

Various types of funding are considered possible, municipal (City only), State and/or Federal (State and/or Federal funds with City match) and public-private partnerships (City and private funds). Note that the following Municipal and State and/or Federal funding assumptions are merely an illustrative example. Often an iterative process to assemble funds, individual projects will likely be funded by a variety of sources. The intent of this exercise is to illustrate a financially constrained plan.

Municipal

Municipal funding sources have been based upon various assumptions. Review of the 2002-2007 CIP shows that 55% of the budget is associated with the top three dollar projects of

Eastern Connection	\$39.95	(beyond 2007)
23 rd Street	\$14.74	(2005)
US Highway 40	<u>\$12.40</u>	(\$11.9 in 2003)
Total	\$66.09	

The remaining 22 projects average approximately \$2.25 million. The City's Public Works budget is estimated at approximately \$20.75 million per year. Included within the budget are street projects, intersection improvements and traffic signals. The street projects typically account for approximately 85% of the Public Works transportation improvement budget.

The original \$14.75 million was a conceptual estimate developed prior to the start of the study, which at that time did not contemplate the potential for a grade separation at Noria Road or an interchange at Franklin Road. Considering that the suggested project phasing might take at least twelve years (from 2003 to 2015 and beyond) and considering the effects of inflation, the projects would appear to be financially constrained.

If the corridor is a high priority for the City, then other funding sources could be applied, assuming voter approval. A half-cent sales tax would generate approximately \$3.5 million per year. If applied directly and solely to this project the phasing time frame could be reduced. This is not to suggest that this or other transportation projects warrant an increase in the City sales tax, but only to offer an alternative funding source.

Other alternative financing mechanisms could include:

- Development Exaction
- Excise Tax
- General Obligation Bonds
- Government Programs
- Impact Fees
- Improvement (Special Benefit) Districts
- Neighborhood Revitalization Act
- Property Tax Levy
- Redevelopment Districts
- Revenue Bonds
- Self-Supported Municipal Improvement Districts

No recommendations are made relative to the means of funding such transportation improvements.

State and Federal Funding Programs

State or Federal funding sources are not guaranteed, yet various assumptions have been made in an effort to illustrate some reasonable possibilities. Specifically, since 23rd Street is also a State Highway K-10 then KDOT categorical aid could be applied at the maximum of 80 percent based upon a minimum City funding level of 20 percent for a project. If SLT is constructed, it would be designated as K-10 and 23rd Street will be removed from the State system, making it ineligible for some funding programs.

Consideration must be made as to the potential eligibility of the various elements of the projects. Sidewalks, landscaping enhancements and other components such as decorative street lighting are often considered non-participatory elements for roadway

improvement funds. However, State aid such as the Transportation Enhancement (TE) program could be applied for. Such applications have been filed previously for restoration of the Breezedale monuments.

Other programs, such as the Transportation and Community and System Preservation Pilot Program (TCSP) have been investigated as well. This program may be an appropriate funding source for the potential enhancements identified along the corridor. Some KDOT discretionary programs are available, however the available pool of funds is relatively small and the competition is statewide. Assuming, the City of Lawrence were accepted for such funding, a likely amount may be on the order of \$500,000.

System Enhancement statewide discretionary funding is made available to all local governments on a one-time basis. Projects must be on or eligible to the State Highway System. Categories are interchanges/separations, bypasses and corridors.

KLINK Geometric program is for geometric improvements to city streets that carry state highway designations (City Connecting Links). This is a statewide annual discretionary program.

KLINK 1R program is for roadway surfacing on connecting links.

Economic Development is a statewide annual discretionary program for projects that will provide or enhance economic development for communities.

Surface Transportation Program (STP) funds are allocated by KDOT to all cities and counties in the state using the allocation formula for the Special City/County Highway Fund. These funds can be used for a wide variety of road and bridge uses.

Federal Bridge funds (BR) are allocated to cities and counties based on square footage of deficient bridges. Lawrence currently does not have any bridges rated as “deficient”, and therefore receives no BR allocation.

Transportation Enhancement (TE) funds are administered as a statewide discretionary program. These funds have three main categories, historic, scenic and environmental, and pedestrian and bicycle facilities.

Safety funding (STP-S) is a discretionary program available to all jurisdictions. KDOT’s Bureau of Traffic Engineering manages this program wherein high-accident locations are identified and prioritized across the state. Accident information is solicited from cities every two years to identify the most qualified projects.

Again, this financial analysis is merely intended to be illustrative of the possibilities for various funding sources and to allow an assessment of a reasonable time frame of implementation. No commitment or guarantee of funding sources or funding amounts is implied or should be inferred.

Public-Private Partnerships

The potential for a public-private partnership is unknown, yet it may be advantageous to pursue other financing methods beyond using only public funds. As a possible scenario, if half the number of commercial properties along the entire corridor were to consider the probability of combining driveways and providing cross access, then approximately 50 “access modifications” could be pursued.

Obviously any of these assumptions may be varied and the dollar amounts change. The appropriate funding mechanism would need to be found, if such a mechanism does not legally exist at this time.

Possible Capital Improvements Program

The recommended phasing plan provides a reasonable assessment of what may be accomplished within certain time periods. Concentrating only upon the public infrastructure and assuming that State formula funding programs will continue at current levels (but not assuming State discretionary funding), the following suggested program is considered to be feasible.

The majority of the projects are eligible for potential KDOT funding participation and assuming that such funds could be allocated (although there is no guarantee that would be the case), based upon a possible \$2.5 million per year, the projects identified could be financially accomplished. The aesthetic enhancements would require an additional funding source to implement at the recommended level of improvements.

The total cost for several of these possible programs, as presented within a five-year period, represent significant dollar amounts (from \$4.5 million to \$7.0 million). In several cases, some of the recommendations might be able to be implemented in increments as smaller projects, however, for some of the major projects this may not be possible. With the roadway widening and profile modifications, it may be possible to implement the construction as a series of smaller consecutive projects, however, it is likely that such a process will increase total construction costs because of the added construction and removal of temporary transitional roadway portions in order to accomplish the construction. While conceptually it may seem financially practical to construct intersection improvements and then tie such improvements together with the roadway in between, construction costs can to be increased by as much as 15 percent.

Possible Roadway Capital Improvements Program

Short-range improvements include:

Traffic signal coordination	\$400,000
Construction of the East Hills interchange.....	\$7,500,000
Reconstruction of the Iowa Street intersection	\$1,200,000
Filling in sidewalk gaps between Iowa Street and Barker Avenue	<u>\$250,000</u>
TOTAL	\$9,350,000

Mid-range improvements include:

Roadway widening and profile modifications.....	\$7,000,000
Aesthetic enhancements (under grounding utilities)	\$2,000,000
TOTAL	\$9,000,000

Long-range improvements include:

Roadway widening and raised median.....	\$4,500,000
Frontage road & modifications at the former railroad bridge	\$4,000,000
Aesthetic enhancements	\$720,000
TOTAL	\$9,220,000

Possible Enhancement/Aesthetic Improvements Program*Short-term improvements (2003-2008)*

Construct continuous sidewalk network Iowa Street to Barker Avenue.
Enhancements at the East Hills interchange

TOTAL **\$540,000**

Mid-range improvements (2009-2014)

Construct enhancements along Iowa to Barker and Anderson Street to CR 1650.
Construct enhancements in the Haskell to Harper segment at key intersections.

TOTAL **\$490,000**

Long-range improvements (2015 and beyond)

Construct enhancements in the Barker to Harper segment.

TOTAL **\$720,000**

Public Involvement Approach

The public involvement component of the study initially focused upon the education aspects of access management by providing information on access management, dealing with typical questions that arise and even the showing of a FHWA Access Management video that attempts to address economic impacts.

Public Opinion Survey

At the beginning of the study process, a telephone survey was conducted of residents within the City of Lawrence to ascertain the degree of problems the community perceived along the 23rd Street corridor as well as their acceptability of various potential solutions. A summary of the findings is provided here along with a few pertinent charts. The complete survey document and instrument is provided in the Appendix.

The purpose of the survey was to gather statistically representative input about a variety of issues including:

- the primary reasons residents travel on 23rd Street
- the frequency of travel on 23rd Street
- concerns about traffic congestion
- safety concerns
- concerns about access to businesses along 23rd Street
- intersections that residents think need the most improvement

The survey was administered by phone to a randomly selected sample of households in the city. Of the 618 households that were contacted, 400 (or 65%) agreed to complete the survey. The sample of 400 households has a 95% level of confidence with a precision of at least +/- 5%. The following presents some of the major findings of the survey.

Frequency that Residents Travel on 23rd Street

More than half (62%) of those surveyed said they travel on 23rd Street at least once a day. More than three-fourths (84%) of those surveyed travel on the street at least a few times a week. Only 1% of those surveyed indicated that they never travel on 23rd Street.

Purpose of Travel on 23rd Street

On average, residents indicated that 49% of their trips on 23rd Street involved travel to/from their home and destinations along 23rd Street; 31% of their trips involved travel to/from their home and other destinations in Lawrence, and 20% of their trips on 23rd Street involved travel to/from their home and destinations outside Lawrence.

Residents Think 23rd Street is Much More Congested Than Other Roadways in Lawrence

Most residents, 67%, said that 23rd Street was much more congested than other major roadways in Lawrence. Twenty-one percent of those surveyed said it was slightly more congested and 12% said that 23rd Street had about the same level of congestion as other major streets in Lawrence.

Residents Think Congestion on 23rd Street Has Increased Significantly

More than half (51%) of those surveyed said they think it takes significantly longer to drive from one side of Lawrence to the other than it did five years ago; 26% thought it takes slightly longer, and 8% thought it takes about the same amount of time. Only one percent (1%) thought the travel time across the City had decreased. Fourteen percent (14%) did not have an opinion.

Intersections Along 23rd Street that Residents Think Cause the Most Difficulty

The two intersections that residents were most concerned about along 23rd Street were the intersections at Iowa (40%) and Louisiana (34%). None of the other intersections along 23rd Street were mentioned by more than 7% of the respondents.

Residents Think Travel on 23rd Street Has Become More Dangerous During the Past 5 Years

Almost half (44%) of those surveyed thought that travel along 23rd Street has become "more dangerous" (32%) or "much more dangerous" (12%) during the past five years. Thirty-six percent (36%) thought the level of safety has stayed the same; only 4% thought travel had become safer. Sixteen percent (16%) did not have an opinion.

Most Important Issues to Consider When Determining Improvements to 23rd Street

Based on the top two choices given by respondents, the two most important issues to consider when determining the types of improvements to make to 23rd Street are: driver safety (71%) and improving traffic flow (67%). Other factors to consider include: access to business and retail areas along 23rd Street (33%), bicycle and pedestrian mobility (20%), and scenic/beautification enhancements (2%).

Residents Are Generally Concerned About Safety on 23rd Street

More than three-fourths (81%) of those surveyed said they were either very or somewhat concerned about safety along 23rd Street; 19% indicated that they were not concerned.

Residents Are Generally Willing to Drive Farther to Get to Destinations Along 23rd Street in Exchange for Safety and Traffic Flow Improvements

Ninety-two percent (92%) of those surveyed said they were either very willing (71%) or somewhat willing (21%) to drive a little farther to get to destinations along 23rd Street if the reason for driving farther was related to safety and traffic flow improvements. Only 7% of those surveyed were not willing to drive a longer distance; 1% did not have an opinion.

Residents Think Safety Improvements Are Enough to Justify Enhancements to 23rd Street

Nearly three-fourths (70%) thought safety improvements alone would be enough to justify improvements along 23rd Street; 23% did not think safety improvements alone would be enough to justify improvements along 23rd Street and 7% did not have an opinion.

Concerns About Traveling on 23rd Street

More than three fourths of those surveyed were either very or somewhat concerned about each of the following items when they travel on 23rd Street: delays at traffic signals (85%), how well traffic signals are coordinated (84%), the number of vehicles in queues at traffic signals (84%), and the number of vehicles turning to/from retail and commercial driveways along 23rd Street (81%). Residents were less concerned about lighting and the visual appearance of the street.

Top Priorities

From a list of three priorities for transportation, residents were asked to identify the one they thought should be the top priority for the City. Forty-four percent (44%) selected “developing alternative routes to relieve congestion on 23rd Street,” 31% selected “making traffic flow and access improvements to 23rd Street,” 22% selected “developing alternative forms of transportation, such as public transit and bicycle and pedestrian facilities,” and 3% did not have an opinion.

Presentations

Several presentations were made throughout the course of the study. A summary list of the presentations, including their dates and major topics are shown below.

May 17, 2000	City Commission & Planning Commission Joint Study Session: Top 3 Questions of Access Management by Chris Huffman 23 rd Street Corridor’s Guiding Principles by TranSystems
July 18, 2000	Leadership Briefing: Development of Access Management Options
April 18, 2001	City Commission & Planning Commission Joint Study Session: Preliminary Recommendations
March 13, 2002	Planning Commission: Draft Report & Recommendations

In general, the study sessions were opportunities to present and discuss material related to the study process, initial findings and preliminary recommendations. In addition to these study sessions, briefings and presentations were given to various groups and committees to inform officials of the study's progress.

Public Input Meetings

Two public meetings were conducted during the study. The first meeting was held on October 4, 2000 and the second meeting on April 30, 2001. The purpose of the first meeting was to inform the public of the study, its assessment of the existing conditions as well as to present some of the initial possibilities of access management tools and techniques being potentially applied along the 23rd Street corridor. Thirty people attended the first meeting and approximately 75 people attended the second meeting and associated briefing sessions. Many of the attendees for the second series of meetings attended more than once. The handouts described a brief summary of material presented. Critical information presented included the phasing summary of the preliminary recommendations.

The following are selected comments raised during the Public Meetings.

Selected Public Comments

- *Improve appearance of Lawrence's gateways. Most impressive thing was the concept of giving Lawrence an identity with lamps and landscaping.*
- *Questions on raised medians. Is it a money pit? Constant upkeep and repair. How affect businesses? Raised medians need to be maintained if used. They are usually not in Lawrence.*
- *This addresses the problems, which will not be solved by a SLT, if that project ever gets done.*
- *Remove pole signs and billboards and replace with monument signs.*
- *Remove median at 23rd and Louisiana.*
- *Please make incremental changes, add sidewalks and lighting and trees. Take care of access as redevelopment occurs.*
- *Require setbacks for buildings to leave room for frontage roads.*
- *Get rid of power lines!*
- *Against raised medians. Strongly suggest that completing the SLT will be a big help in reducing congestion and accidents.*
- *Cyclists have only dangerous options east of Iowa. Consider interface of bike lanes on Naismith and Louisiana.*
- *Any project to "fix" 23rd Street is going to cost a lot of money and still not address the basic problem of too many cars in a limited space. I tend to use 21st and 27th Streets where I can.*
- *Review each situation as being unique.*
- *Capacity of 23rd St. is limited, handling projected traffic volumes will have to be done on other roads. 23rd St. will still be a major commercial and business magnet. Alternative routes are a must.*

- *Iowa crossing is impossible for pedestrians. Raised medians unless wide and grassy and can be seen aren't good. U-turns are not safe.*

At the Public Meeting, attendees were asked to complete a questionnaire. The responses to the questionnaire are summarized below. Approximately 20 persons completed all or a portion of the questionnaire. The responses are shown both numerically and by percentage for the five possible options of strongly agree, agree, don't know, disagree or strongly disagree.

An average of the responses is also provided for review. If one assumes that a corresponding 1 through 5 is associated with strongly agree to strongly disagree, it can be said that an average of 2.5 or less would mean basic agreement while an average of 3.5 or more would mean basic disagreement. There were no responses that indicated basic disagreement, although there were several responses that people indicated they did not know enough about the issue to provide an opinion. The responses are summarized in the two categories of basic agreement and don't know.

Summary Feedback from 1st Public Meeting

Basic Agreement

- 85% agree with filling in sidewalk gaps and 75% agree with constructing a multi-use path on one side.
- 80% agree with corridor-wide traffic signal coordination.
- 75% favor increasing capacity at the intersection of Iowa Street with the addition of dual left turn lanes.
- 75% favor improving intersection operations at Haskell and Harper.
- 75% agree with modifying driveways to improve spacing and clearances.

Don't Know

- 45% don't know about the alignment of Silicon and Ponderosa
- 45% don't know about installing an interchange at Noria and closing the median opening at East Hills Business Park.
- 45% don't know about installing an interchange at Noria and a bridge at East Hills Business Park.

The following are selected comments raised during the course of the Public Meetings. The comments are summarized as well as their responses. Many of these responses were provided at the time of the meeting.

U-turns are unsafe.

Studies have shown that u-turns may actually reduce accident potential. The u-turns proposed at signalized intersections occur with the left-turn phase and are protected from opposing vehicles. One local example of this configuration is at Metcalf Avenue and 105th Street in Overland Park in the northbound direction.

The construction impacts will put the businesses "out of business".

While that is certainly not the intent of the recommendation, various economic studies do indicate that the construction phase represents the most significant period of economic impacts for businesses. Various mitigation measures could be pursued to minimize impacts.

Some businesses need their two driveways for delivery accessibility and internal circulation. Since large trucks can't make the u-turns, how do I get deliveries?

The suggestions for possible driveway removal, relocation or consolidation are for illustrative purposes to indicate potential access management improvements. Because of the varying sizes of property frontage, the lack of a parallel road system and limited side-street access for mid-block properties, not all of the typical access management guidelines for driveway placement can be met. Consequently, the internal circulation of every property has not been reviewed in detail. Certain properties may need two driveways to maintain their delivery accessibility.

Various studies indicate that raised medians can cause delivery inconvenience or changes to delivery access for some businesses along a corridor. Similar impacts could be expected along 23rd Street, yet there does exist safe means of providing access for large vehicles.

Accidents primarily occur at intersections.

Accident data for the most recent three years identified 60% of the accidents occurring at intersections and the remaining 40% occurring at mid-block. Typically, on corridors with fewer access points, the percentage of mid-block accidents to the total number of accidents might be less than 20%. The section between Barker and Harper does exhibit a slightly less mid-block accident rate, yet this is in part due to the former railroad bridge that eliminates access to 23rd Street. Another common factor is the reporting of accidents at the nearest intersection rather than at a driveway. The fact remains that the corridor exhibits an increase in the accident rate as the rate of access points increases, which is also well documented by other national studies.

Build the SLT and the problems will disappear.

This study focuses upon the physical aspects of the corridor, for example the relationship of access points to the number accidents. Those physical aspects are independent of the traffic volumes along the corridor. Prior origin-destination studies indicate the commercial attractions along 23rd Street generate a significant amount of the traffic on the corridor. While the SLT or other parallel may have transportation benefits on their own, the physical aspects of the corridor will not change without physical changes.

The problems aren't that bad, just the fix the signals.

The access issues have been documented along the four and one-half mile long corridor. Those issues vary by segment, and in relative terms this segment between Barker and Harper has fewer issues and constraints than other

segments. Through the prior establishment of a wide right-of-way, this segment also has greater opportunities to implement some access management techniques than possible in other segments. The options evaluated and recommended are intended to address existing and potential future problems, more in a pro-active manner than a reactive manner. Traffic signal coordination is one of the many tools of access management and while often effective it is very much dependent signal spacing, cross street traffic volumes, and the ability to maintain consistent speeds on the mainline. Turning movements to both left-turn lanes and driveways create friction and reduce through travel speeds. Without improved access management the benefits of traffic signal coordination will not be realized.

How will emergency access be provided?

Discussions with the City Fire Department has brought to light concerns about emergency access to properties on the south side of 23rd Street. An emergency response station is located immediately north of 23rd Street off Harper. The next emergency response station serving this area is from Iowa Street. Depending upon the property requiring service, emergency response times may be increased because of the access restrictions of the raised median. This is not always the case with a raised median, yet with the lack of parallel roadways, limited side street access and internal cross circulation among the small properties it is acknowledged that in certain locations emergency response will also be restricted. To date there are no current plans to establish an emergency response station south of 23rd Street which could address the response issue. While additional median breaks could be considered to improve accessibility, the issues of defined above would still remain. If enough median opening could be provided to allow accessibility the purpose of the raised is defeated.

The 10-foot multi-use path would be better suited north of town rather than east of town as there are more destinations north of town.

The primary reason for the east path is to provide future community connections to Eudora, DeSoto, and Lenexa. This is long-term goal of the SmartGrowth K-10 Corridor. As stated earlier, the Bicycle Advisory Committee will determine approval of the path's alignment.

Overall the enhancement recommendations (special landscape screening, placing utilities underground, and filling in sidewalk gaps) were well received at the community briefings. Residents were favorable to the restoration of the Breezedale monuments, the ornamental lighting with banners and other site amenities proposed. Residents also agreed the Massachusetts intersection is not particularly safe for pedestrians and enhanced crosswalks would be helpful.

Although some residents agreed with providing continuous sidewalk on both sides, some were concerned with the loss of property due to additional right-of-way acquisition and who would be responsible for the cost of the new sidewalk. The greatest concern is that they lose property and also pay for the sidewalk improvement. These questions will

need to be addressed by the City of Lawrence in order to gain support for this particular improvement.

With many business owners opposed to the median, the enhancements in the median were also opposed. One business owner commented that they did not want any trees in front of their business, as trees would block the view of their business. It should be noted that placement of trees in the center median rather than placement on the perimeter of the corridor would have less impact on businesses. If the raised median is not developed within this segment, enhancement applications could still be applied at key intersections, reducing the perceived impact on businesses.

The data from the responses has been tabulated and is shown in the attached table. In summary approximately 28 to 30 persons completed all or a portion of the questionnaire. The responses are shown both numerically and by percentage for the five possible options of strongly agree, agree, don't know, disagree or strongly disagree.

Summary Feedback from Public Meeting No. 2

Basic Agreement

- 77% agree with corridor-wide traffic signal coordination.
- 70% agree with filling in sidewalk gaps or constructing a multi-use path on one side.
- 63% favor increasing capacity at the intersection of Iowa Street with the addition of dual left turn lanes.
- 50% agree with under grounding of utilities.
- 50% agree with reducing the number of median openings on the divided roadway between Harper and Noria Road.

Basic Disagreement

- 67% disagree with raised medians (continuous) to control turning movements.
- 63% disagree with widening the roadway to increase capacity and accommodate u-turns.
- 60% disagree with the overall segment recommendations between Barker and Harper.
- 60% disagree with the overall suggested phasing of projects.
- 53% disagree with improving the intersections at Haskell and Harper.
- 53% disagree with constructing an interchange at Noria and closing the median at East Hills Business Park.
- 50% disagree with the projects identified in the Mid-Term period (2005-2010).
- 50% disagree with providing enhancements such as landscaping, gateways, etc in the segment between Louisiana and Barker.
- 50% disagree with providing enhancements such as landscaping, gateways, etc in the segment between Barker and Harper.

In review of the data, it is evident that several responses were "bullet" votes. Ten such responses would fall in this category, one response all for "strongly agree", one

response all for “strongly disagree”, and eight responses with the majority (95%) of the responses being “strongly disagree”. Such bullet voting would have a tendency to skew the data. Only five questions received a “Don’t Know” of 15% or higher.

Website

A website (www.k10corridor.com) was established in October 2000 and was updated several times to include the results of the public opinion survey as well as material presented at the public meetings. The majority of those providing comments say they use the road daily and live in Lawrence. As a trip purpose, work accounts for more than half of the respondents with the remainder either shopping or having a residence along the corridor. The majority are mainly concerned solely with congestion, some solely with speed or safety and other a combination of all three. Their priorities were targeted to alternative transportation, although some identified flow and access their main priority.