Approved: 5/18/09
Date

MINUTES OF THE SENATE TRANSPORTATION COMMITTEE

The joint meeting of House and Senate Transportation Committees was called to order by Chairman Dwayne Umbarger at 12:00 p.m. on January 22, 2009, in Room 143-N of the Capitol.

All members were present except:
Senator Anthony Hensley- excused

Committee staff present:
Mike Corrigan, Office of the Revisor of Statutes
Bruce Kinzie, Office of the Revisor of Statutes
Hank Avila, Kansas Legislative Research Department
Chris Courtwright, Kansas Legislative Research Department
Aaron Klaassen, Kansas Legislative Research Department
Jill Shelley, Kansas Legislative Research Department
Cindy Shepard, Committee Assistant

Conferees appearing before the committee:
Deb Miller, Secretary of Transportation, State of Kansas

Others attending:
See attached list.

Chairman Umbarger opened the meeting asking all members to introduce themselves and their districts. Chairman Hayzlett welcomed everyone attending and introduced Deb Miller, Secretary of Transportation, State of Kansas. She thanked the members for the opportunity to speak before the Joint Committee on Transportation and presented "Transportation 101" (Attachment 1).

- Agency - At a Glance
- Revenues/Expenditures
- Past Programs
- Current Status of the CTP
- Moving Forward
  -T-LINK efforts
- Transportation Infrastructure Investment and the Kansas Economy

Following questions and discussion from the joint committee, the meeting was adjourned at 1:25 p.m. The next meeting of the Senate Transportation Committee is scheduled for January 27, 2009.

SENATE TRANSPORTATION COMMITTEE
GUEST LIST

& House Joint Meeting

DATE: 1-22-09

NAME	REPRESENTING
Jim AuBuchon	Hwy 69 Assoc. of Kansas
Bud Burke	"
Tye Dragoo	United Transportation Union
Dow Lindsey	United Transportation Union
Tuck Duncan	KS Public Transit Assn
Tom Whitaker	KMCA
Pat Kelly	KSRR's
Whitney Damron	City of Topeka
Patrick Hurley	Economic Defelenes
Spencer Duncan	Capitol connection LS
Sara Belfry	Kansas Chamber of Commerce
Wendy Harms	KAPA - KRMCA
Wade Myers	KAPA - KRMCA
Edward De Soignie	Heavy Constructors Assoc. of KC
KEVIN GREGG	KMCA
Dana Peterson	Ks Wheat Growers
Norm Bowas	Kan Assoc. Counties
Ron Gaches	KSPE
Travis Lowe	Pinegar, Smith & Assoc.

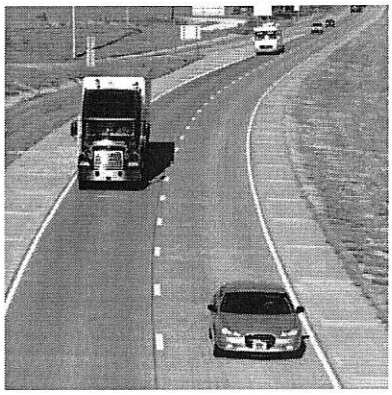
KANSAS
DEPARTMENT OF TRANSPORTATION

Joint Committee on Transportation
January 22, 2009

Overview

- Agency– At a Glance
- Revenues/Expenditures
- Past Programs
- Current Status of the CTP
- Moving Forward
  - –T-LINK efforts

Transportation Moves People and the Kansas Economy



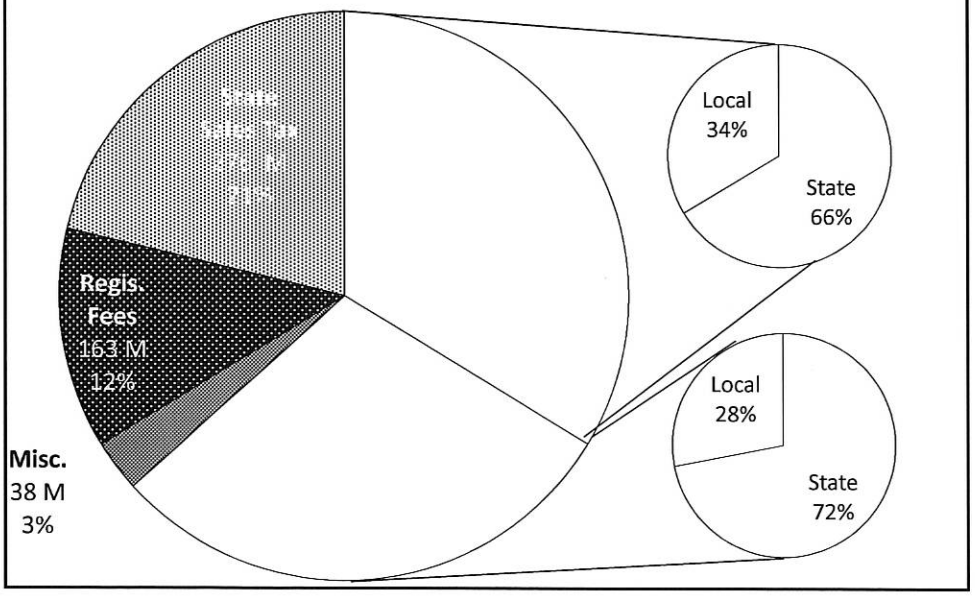
- 10,000 miles of state highways
- More than 2 million registered vehicles
- Nearly 2 million licensed drivers
- More than $900 billion of goods shipped to, from and within Kansas annually

KDOT's Resources Strategically Deployed

- **3,100 employees**
- **2,000 employees in 6 districts / 26 areas**
  - **Road maintenance and construction inspection**
- **1,000 employees at headquarters**
  - **Planning and local projects**
  - **Road and bridge design**
  - **Aviation, rail, and transit services**
  - **Signs, access, and speed limits**

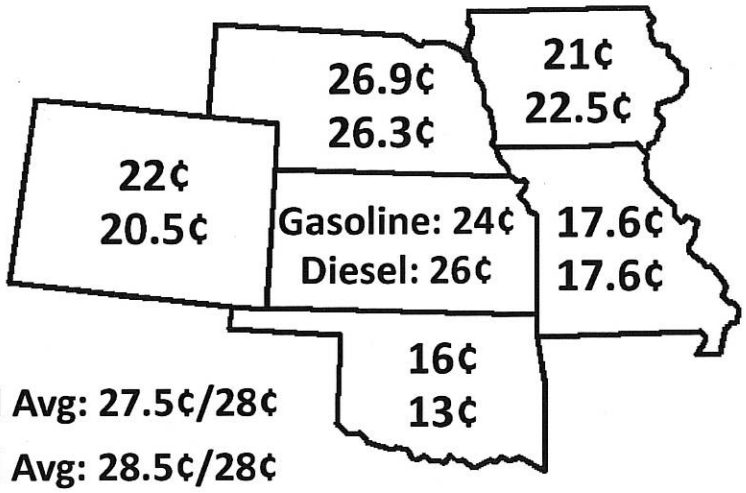
Transportation Funding in Kansas

State Highway Fund Projected 2010 Revenues



State Motor Fuels Tax

1¢/gallon yields $17 million



Regional Avg: 27.5¢/28¢

National Avg: 28.5¢/28¢

State Sales Tax: History

1983: Added 9.2% transfer of all sales tax proceeds. Was to be phased in, never reached higher than 4.9%

1989: Transfer increased to 10%, direct 0.25-cent sales tax added

1999: Passed incremental increases to transfer that maxed at 12% in 2005

2002-2004: Eliminated transfer, phased increase of direct sales tax to 0.65-cents by 2008

Existing Sources:

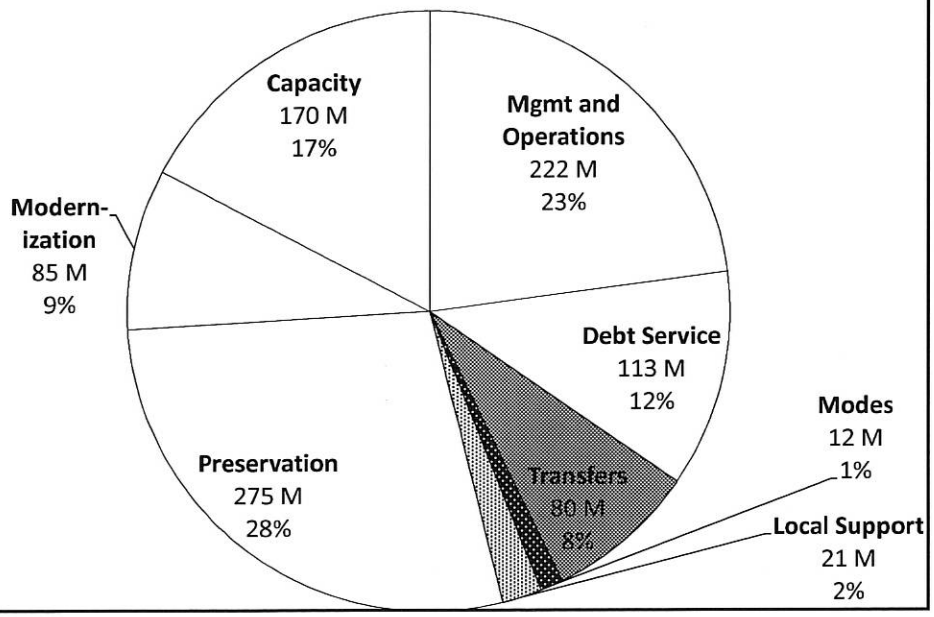
Vehicle Registration Fees

	Car	Truck
Kansas Average	**$39** ($4 for VIPS)	**$1,770**
Regional Average	$55	$2,072
National Average	$50	$1,675
Yield of $1 increase	$2.4 million	$170,000
CTP increase	$5	$2-10

Federal Funding

- Current federal bill expires in 2009
- Much uncertainty about next bill
- KDOT's base assumption
- Federal fuel tax: 18.4 ¢/gallon

KDOT's Avg. CTP Expenditures



Program vs. Cash Flow

For example, in 2008:

Lettings: $430 million

Cash payments: $755 million

CTP payouts will continue through 2014

Debt

	CHP	CTP	TOTAL
Debt Authorized	$890	$995 '99 $277 in '02 $1,272 TOTAL	$2,162
Current Principle	$415	$1,292	$1,707
Principle in 2014	$0	$1,161	$1,161
Principle in 2025	$0	$0	$0

Debt

Minimum debt level: $250 M in 1992

Maximum debt level: $1.9 B in 2005

Weighted Average Interest	
June 1992	6.5%
June 2000	5.5%
June 2008	3.5%
Dec 2008	4.9%

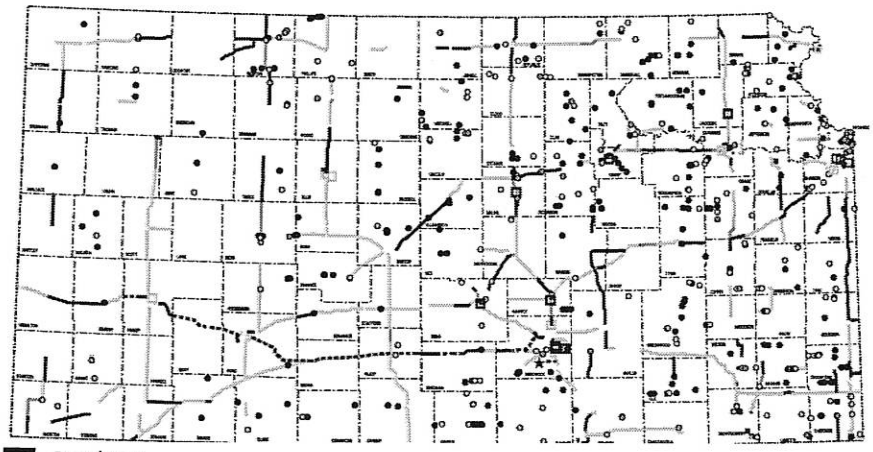
Comparing the two programs

	'89 CHP	'99 CTP
Repair Highways & Expand System	$3.1 B	$5.6 B
Transit	$5.4 M	$52.4 M
Aviation	$0	$30 M
Rail	$0	$30 M

Funding for the CHP & CTP

	CHP	CTP
MFT	7¢ phased	6¢ phased
Sales Tax: -- Direct Deposit -- Transfer	.25 ¢ 10% → 6%	.25 ¢ →.65 ¢ 12% → 0%
Reg. Fees	50% rate ↑ cars 33% rate ↑ trucks	(eventually) $5 cars $2-10 trucks
Bonds	$890 M	$ 995 M +$ 277M $1.272 B

Transportation Projects: 1990-2009

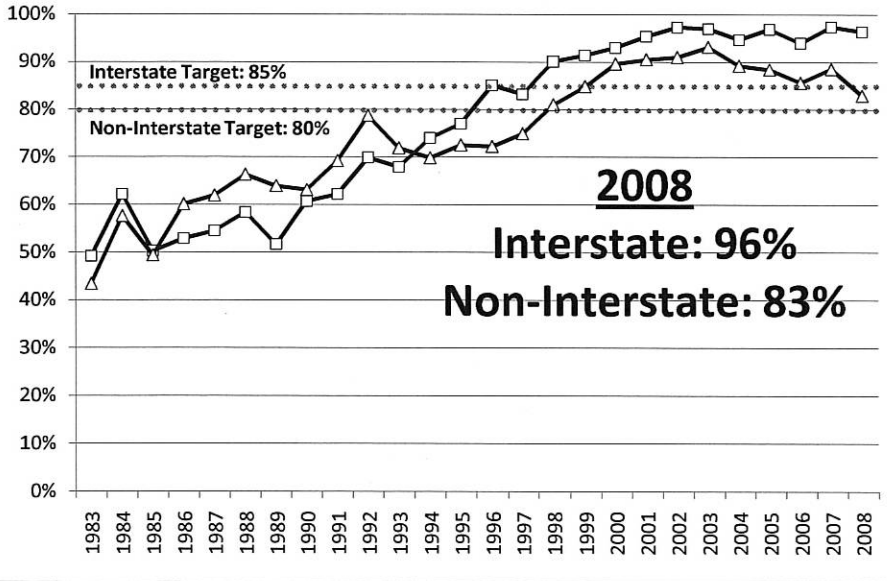


Roadway
Bridge
Interchange

CHP Projects (1990-97)
Interim Projects (1998-99)
CTP Projects (2000-09)

Highway Preservation

Percent of pavement in good condition



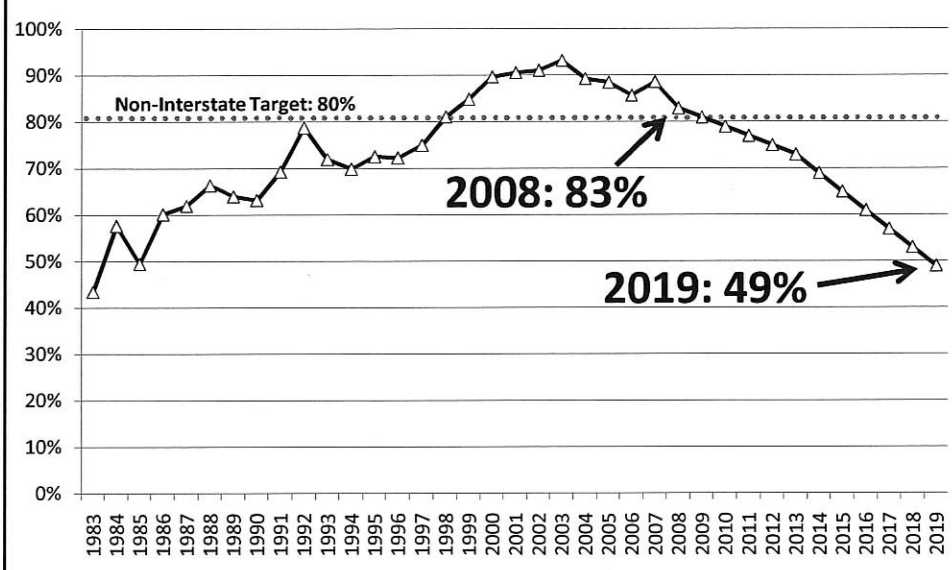
2008

Interstate: 96%

Non-Interstate: 83%

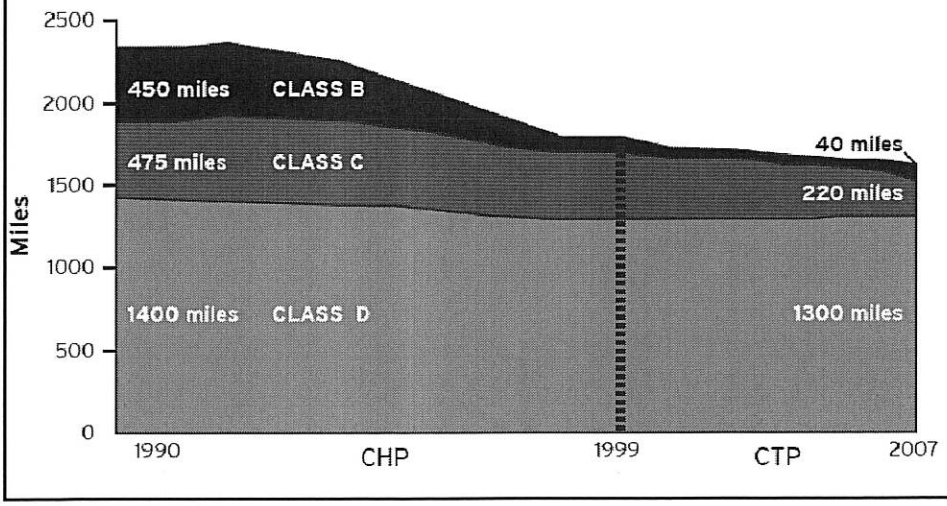
If preservation is not adequately funded...

Percent of Non-Interstates in good condition

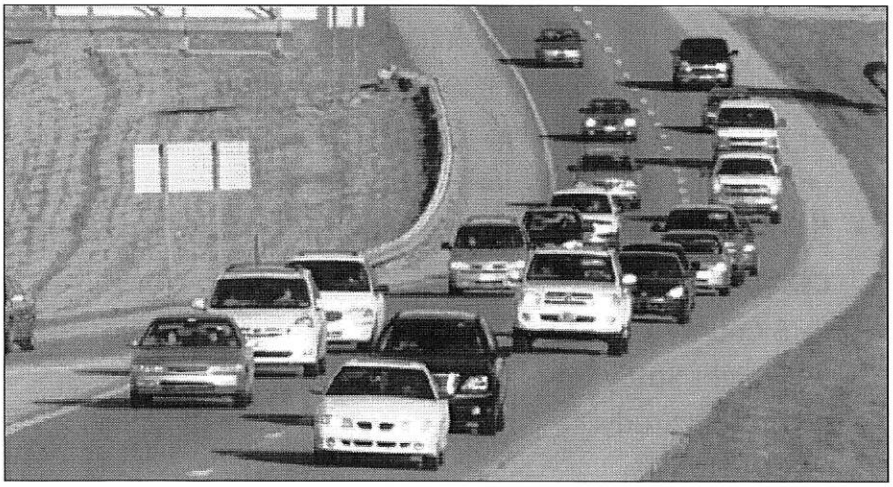


Significant improvement in shoulders

Safety concerns remain, less expensive approaches needed



Capacity is a growing concern



Completing the CTP

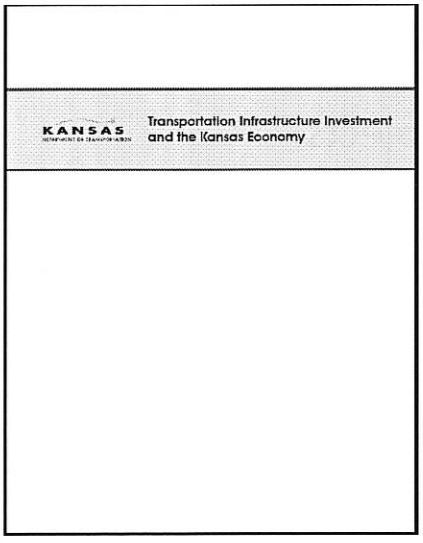
- More than $561 M remains to be let
- Major Projects
  - K-61 in Reno and McPherson County
  - Amelia Earhart Bridge in Atchison
  - US-169 in Montgomery County
  - US-50 in Finney County

Other happenings

- **K-TOC: a transportation online community**

  www.ktoc.net
  - Launched last week, 300+ members already
  - Great low cost way to interact with citizens
  - KDOT is leading the way in this arena
- **Several key studies are underway or nearing completion**
  - 5 County Transportation Study in Kansas City
  - Freight Study
  - Amtrak Study
  - Toll Study
  - Economic Impact Studies

Transportation Investments & the Kansas Economy



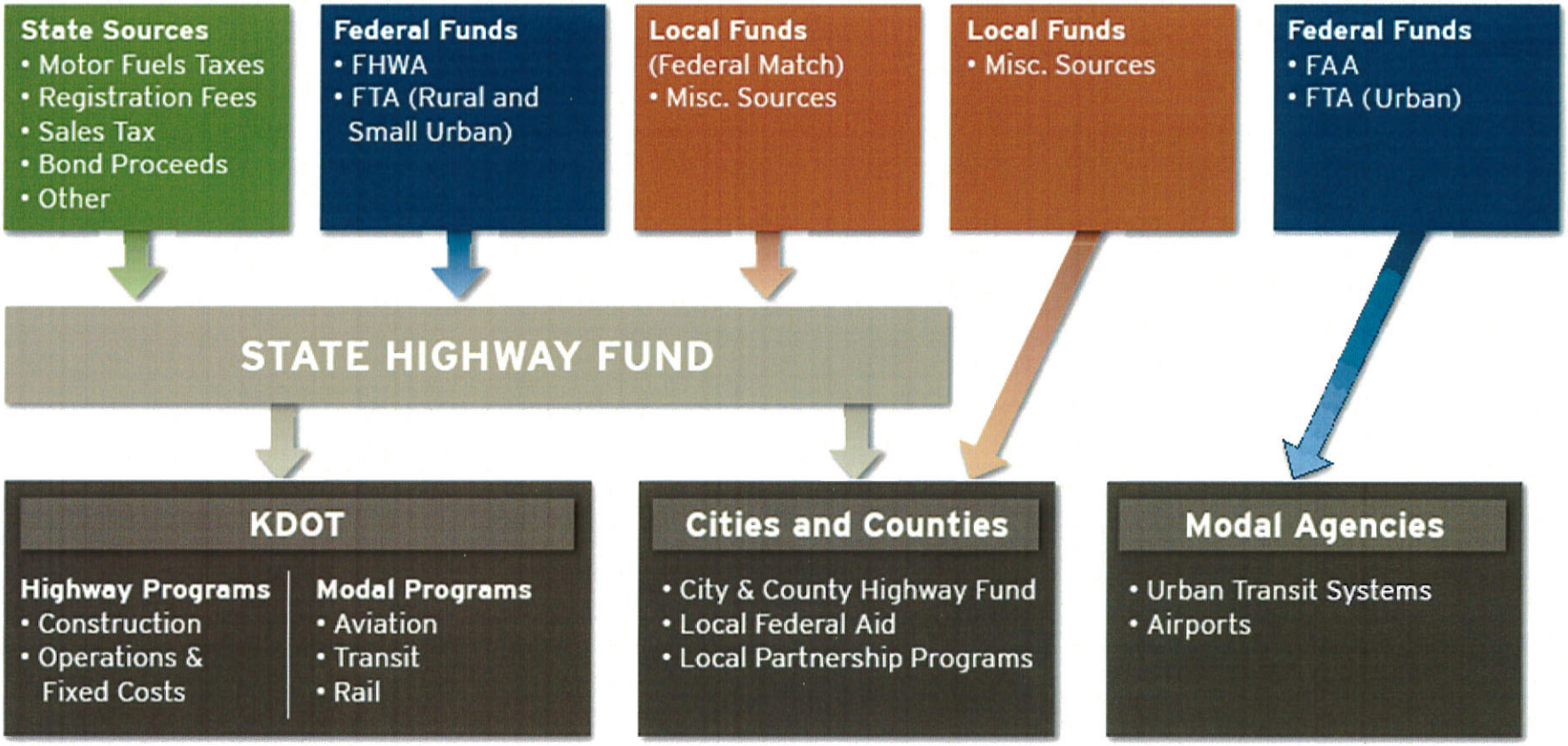
Five Case Studies of Past Transportation Projects

Project	Project Cost	Jobs Added	Economic Value Added
Parsons - US-400 Bypass	$27 M	1,400	$56 M
Wichita - K-96 Bypass	$103 M	24,000	$1.6 B
WY County –110th St Interchange	$50 M	5,700	$186 M
Overland Park – Nall Ave Interchange	$48 M	17,500	$4.1 B
Hays – Commerce Pkwy Interchange	$3.5 M	2,200	$111 M
TOTAL	**$231 M**	**50,800**	**$6.1 B**

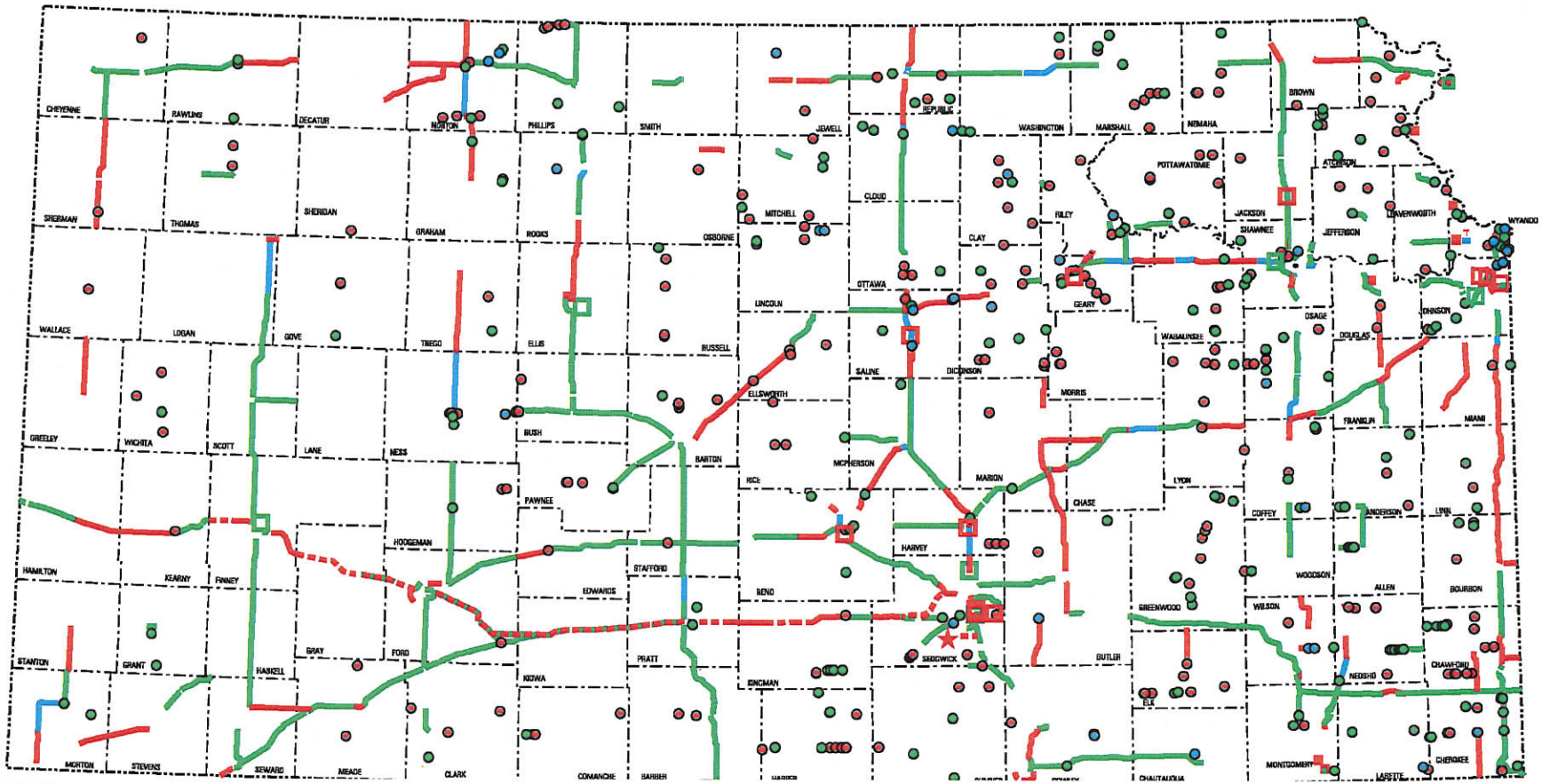
Major issues to come

- T-LINK – Governor's Task Force
  - Final meeting is Monday, Jan 26th
  - Summary is available online, full final report due next week
  - Will go into further detail in subsequent committee meetings
- Funding Uncertainty
  - State
  - Federal
  - Economic Stimulus

Transportation Funding in Kansas



Transportation Projects: 1990-2009



Roadway

Bridge

Interchange

CHP Projects (1990-97)

Interim Projects (1998-99)

CTP Projects (2000-09)

Summary of Debt to Finance Transportation

(amounts in millions)

To be repaid from	SHF			SGF
Debt Authorized for :	**CTP**	**CHP**	**Combined**	
•**CHP**		$ 890		
CTP – initially	$ 995			
CTP – subsequent	$ 277			$ 210
•**Subtotal for CTP**	$1,272			
Total CHP & CTP			**$2,162**	
Principal Outstanding at 1/22/09	$1,292	$ 415	$1,707	
Principal Outstanding at 06/30/14	$1,161	$ 0	$1,161	
Principal Outstanding at 06/30/25	$ 0	$ 0	$ 0	
•**Minimum and Maximum debt outstanding at end of any fiscal year**				
Minimum: June 30, 1992			$ 250	
Maximum: June 30, 2005			$ 1,889	
Weighted Average Interest on SHF debt				
• **June 30,**				
1992			6.50%	
2000			5.47%	
2008			3.38%	
•**December 31,**				
2008			4.90%	

KANSAS
DEPARTMENT OF TRANSPORTATION

Transportation Infrastructure Investment and the Kansas Economy

TABLE OF CONTENTS

Transportation Infrastructure Investment and the Kansas Economy

Executive Summary

Transportation Infrastructure Sustains a Diverse Economy in Kansas

The Kansas economy sustained 1.35 million jobs and $112 billion in gross state product (GSP) in 2006.[1] Transportation – alongside workforce education and training, a business-friendly regulatory climate, and entrepreneurial initiative - is fuel for the engine that drives economic prosperity across Kansas. Transportation's importance in sustaining the Kansas economy is evident in the 30 million miles driven by vehicles on the state's roads in 2006 and goods valued at $892 billion that move across the state's transportation network annually. Every sector of the state's diverse economy – whether services, agriculture and agribusiness, or manufacturing – depends on an extensive and reliable transportation network to stay competitive:

- ***Services:*** The wide-ranging service sector is the fastest growing portion of the Kansas economy. In 2006, the largest service sector areas, including professional and business services; trade, transportation and utilities; government; and financial activities, were responsible for about 58 percent of gross state product and 53 percent of jobs in Kansas. Commuters employed in the service sector depend on transportation to get to and from work, and service sector businesses also make diverse demands on the transportation network. A retailer for example depends on roads and transit to keep goods stocked on its shelves, and to bring in customers; while a freight transport business depends on uncongested highway and rail services to maximize efficient flow of goods in and out of its facilities.
- ***Agriculture, agribusiness, and food processing:*** Kansas is the nation's leading producer of wheat flour and processed beef and according to a 2006 Kansas State University (K-State) study, Kansas farmers and ranchers generate revenues of nearly $10 billion per year from grain production and livestock operations.[2] Agriculture-related production is transportation intensive; large trucks and rail cars need a network that spans local farm roads and rail spurs to state highways and class one railroads to move bulky grains and livestock from dispersed rural Kansas farms and feed yards to markets and processing facilities and to ship finished products onward to market destinations across the United States.
- ***Manufacturing:*** Kansas retains a healthy manufacturing sector that is responsible for about 14 percent of Kansas GSP and which is dominated by the Wichita region's hub for aerospace products and parts manufacturing. Companies with a strong Kansas presence like Boeing, Bombardier, Cessna, and Raytheon depend on transportation for access to specialized suppliers and markets that span the globe as well as to bring employees to and from work.

In short, good transportation keeps the Kansas economy on track and growing. Stakeholders in KDOT's 2007 Long Range Transportation Plan recognized this fact when they made support for economic development one of three guiding principles for the entire Plan.

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[1] 2006 was chosen as the reference year for all annual statistics citations in this article because it is the most recent year for which a complete set of relevant data is available.

[2] Agricultural Commodities Future: Assess Competitive Threats to the Kansas Economy, Kansas, Inc. 2006

Transportation Infrastructure Upgrades Support New Economic Development

Understanding the Link between Transportation and Jobs, Income, and Economic Value Added. Empirical evidence suggests past upgrades to the Kansas transportation network have had a positive impact on the Kansas economy that greatly outweighs their construction costs. Building transportation projects requires millions of dollars in government spending; so how do they help the Kansas economy grow?

The answer is that well-planned transportation investments add jobs, income, and economic value to the economy over a long time span that may last 15 to 30 years or more before structures begin to deteriorate:

- ***Short-term Economic Impacts*** - In the short-term (usually three years or less), project construction quickly supports more jobs, income and economic value added as private contractors use dollars they are paid by KDOT to directly hire construction workers and compensate suppliers for materials such as diesel fuel, steel or asphalt used to build roads and bridges. Indirectly, the contractors' workers and suppliers spend a portion of the money they receive on other goods and services unrelated to the transportation project, which encourages non-construction businesses to increase output. Economists call this the "multiplier effect" of highway construction spending.
- ***Long-term Economic Impacts*** - In the long-term, many more new jobs appear and increases in income and economic value added occur as businesses respond to faster and more reliable drive times and better access to local destinations by locating or expanding in the vicinity of completed projects. A goods distribution center, for example, might expand its logistics facility to take advantage of the wider geographic radius that can now be reached by its trucks. Economists know that the long-term economic impacts of transportation investments are intertwined with other factors such as labor costs, overall economic conditions, and a business-friendly regulatory climate. In many instances, however, transportation is often called out as a catalyst that promotes growth.

All transportation projects generate short-term economic multiplier benefits - in direct proportion to their cost - as new construction dollars flow through the Kansas economy. KDOT has sponsored academic studies of the short-term economic impacts of the Comprehensive Highway Program and the subsequent Comprehensive Transportation Program respectively (see sidebar) that show each program sustained about 115,000 jobs and created over $7 billion in value added over its lifetime.

Not every project, however, offers the same long-term economic potential. For example, investments in preservation that return degraded facilities to their original condition or investments that eliminate safety hazards generally do not create long-lasting opportunities for new or expanded business activity, but they still provide important user benefits. By contrast, projects that reduce travel time and improve travel reliability or create new access - such as new four lane facilities, interchanges or bypasses – can create tremendous economic opportunities when they are built in the right place and at the right time.

Five Case Studies of Transportation Projects that have helped the Kansas Economy. To help understand how transportation projects have helped the Kansas economy grow to where it is today, KDOT has examined the economic impacts of five projects around the state built at a cost of about $231 million during the state's Comprehensive Highway Program and the subsequent Comprehensive Transportation Program. Added economic activity associated with the five case

study projects is estimated to have generated about 51,000 jobs and produced $6.1 billion in additional economic value added in 2006. Each case study gives a different perspective on how transportation investments have helped the Kansas economy grow (the full report on the case studies is included in the briefing book):

- ***K-96 Northeast Wichita Bypass – Maintaining Steady Regional Growth.*** Since it was built in 1993, Wichita's K-96 Northeast Bypass corridor has dramatically influenced the Wichita region's development patterns by contributing about 75 percent of overall regional job growth between 1994 and 2006. Employment growth in the K-96 Northeast Bypass corridor has added up to almost 24,000 new jobs since 1993 and $1.1 billion in income along the corridor in 2006. While employment in Wichita's aviation sector was particularly hard hit following the Sept 11 attacks, jobs, income and value added in the K-96 corridor have grown steadily. Development in the corridor includes Greenwich business park, new businesses like Cox Communications and Sonaca NMF, and upscale office, retail, and residential complexes like the the Waterfront.
- ***Interstate 70 and 110th Street Speedway/Village West Interchange – Bringing National-Scale Development to Kansas.*** The payoff for building a $50 million interchange and arterial improvements among the farm fields of Wyandotte County has been the state's success in spurring Village West – a national-scale sports, retail, and entertainment development, which includes the 85,000 spectator Kansas Speedway facility and the 400-acre Legends retail complex. The new development is estimated to have brought almost 5,700 new jobs to Kansas between 2001 and 2006. Almost half the new jobs are associated with the Kansas Speedway, whose developers were considering sites across the United States prior to settling on Wyandotte County, which provides access to the entire Kansas City region via I-70 and I-435. Furthermore, the Village West has set the stage for future growth, which includes plans for a major water park report, hotel and casino complex.
- ***US-400 Parsons Bypass – Helping Transform a Rural Town's Economy.*** Built in 2004, the Parsons Bypass project is the most recently completed of the case study projects. Parsons' economy has struggled in

Economic Impacts of the Kansas Comprehensive Highway Program

In 1997, K-State economics professor Michael Babcock conducted an analysis of the short-term construction-related economic impacts of the CHP.

Based on regional economic modeling results, Dr. Babcock concluded that $2.86 billion in highway construction spending over the life of the program from 1989 to 1997 sustained 118,000 jobs and $7.4 billion in added output in Kansas.

Economic Impacts of the Kansas Comprehensive Transportation Program

In 2004, K-State economics professor Michael Babcock conducted a similar analysis of the short-term construction-related economic impacts of the CTP.

Dr. Babcock concluded that $2.73 billion in highway construction spending over the life of the program sustained 115,000 jobs and $7.1 billion in added output in Kansas.

Benefits and Costs of the Kansas Comprehensive Highway Program

In 1999, University of Kansas economics professor David Burress conducted a full cost benefit analysis of construction-related spending during the CHP.

Dr. Burress concluded that highway construction spending achieved a benefit cost ratio of at least 3:1, meaning that Kansans got back $3 for every $1 spent in the CHP.

(Copies of these three reports are included in the briefing book)

recent decades, particularly following closure of the Missouri-Kansas-Texas ("Katy") Railroad's diesel engine shop in the 1980s and the recent closure of the Kansas Army Ammunition Plant. In the brief time-span since the US-400 Bypass was finished, however, over 1,400 new jobs have been attracted to Parsons, which has a population of just over 11,000 people. A new cluster of employment has emerged around the US-400 Bypass north of downtown Parsons. Businesses drawn by the improved transportation access include a 300-employee storage tank manufacturer, a 24-hour truck stop and restaurant, and a WalMart Supercenter. Other businesses – including Old Dominion Trucking – have significantly expanded their operations in response to the improved transportation. Downtown Parsons remains vibrant despite the bypass development.

- ***Interstate 435 and Nall Interchange – Retaining a Major Kansas Employer.*** In the mid-1990s, Sprint – the Kansas metro area's largest private employer – seriously considered relocating its headquarters to another state as it embarked on a plan to consolidate a dispersed set of offices scattered across the two-state Kansas City metro area. Instead, Sprint opted to build a 200-acre "greenfield" campus in Overland Park capable of housing 14,000 workers. The State's commitment to build a $48 million interchange helped convince Sprint to stay in Kansas. Total job growth in the vicinity of the Nall Avenue interchange has now reached over 17,500 with other development including the Overland Park convention center and several medical suites.
- ***Interstate 70 and Commerce Parkway Interchange – Supporting New Manufacturing Jobs.*** Slow but steady growth has followed the addition of a second interchange for Hays on Interstate 70 in western Kansas. Following KDOT's investment, the local community has worked hard to attract and retain high quality jobs including developing the Airport Industrial Park, which is accessed from the Commerce Parkway interchange. A-1 Plank and Scaffolding, for example, was attracted to the Airport Industrial Park from California in 1996 and now employs 116 people. A total of 2,233 new jobs have been added in Hays since the Commerce Parkway interchange was finished.

Sound Project Selection Methods Today Assure Economic Growth Potential is Realized Tomorrow

Tough economic times combined with structural shifts in regional, national and global markets and rapid technological innovation together create a challenging environment in which the transportation investment choices Kansas makes today will have a powerful influence on the state's economic competitiveness in the future. Smart investments help keep as many jobs as possible in Kansas and they ensure the state is well equipped to be a leader in emerging sectors like ethanol production, wind power, biotechnology, and freight logistics. So, how can the state determine which transportation investments will provide the best long-term economic benefit for tax payers?

Historically, KDOT's approach for selecting which projects to build has relied on an objective and data intensive formula that uses information about engineering deficiencies on existing road sections to create a list priority projects. The formula does not directly consider economic impacts and it cannot predict needs for new bypasses, interchanges, or roadway alignments. A more comprehensive project selection approach is needed.

KDOT convened a working group of external stakeholders to provide suggestions for a new tool to specifically assess economic impacts as part of the project selection process. (The working group's white paper documenting their work is included in the briefing book.) The group recommends that

KDOT should further develop and incorporate the following principles into future selection of transportation projects for all modes:

- ***Examine Predicted Economic Impacts for a Projects Meeting Prerequisites Only*** - Scrutiny of potential economic impacts is time intensive and should be reserved for projects like new interchanges, bypasses, or new alignments that offer the highest economic impact potential. Potential projects should always demonstrate a clear transportation need that justifies the project, such as congestion relief, improved safety, enhanced access or modernization of facilities to reduce risk of traffic incidents. In addition, all projects evaluated should offer hard evidence of strong local or regional-level support such as local government resolutions of support, preservation of land for project right-of-way, and clear economic development plans to take advantage of the completed project or evidence that substantial new public or private capital investments have or will be made in anticipation of the project.
- ***Avoid Comparing "Apples to Oranges"*** – The scale of economic impacts associated with a mega-project such as a high-cost, complex urban interchange is likely to be on a different order of magnitude from those associated with a modest capacity improvement project. For example, an important, but low-cost project in rural Kansas where economic activity is not as densely concentrated, may have less economic impact than a high-cost project in the Kansas City region which has a large market for labor, goods and services. Project cost should be used as a primary criterion for grouping projects to avoid an unfair focus on high cost projects with large economic impacts.
- ***Model Projected Jobs, Income and Economic Value Added Impacts*** - For projects that are not selected on the basis of traffic flow improvements, there should be an assessment of the potential project's impact on jobs, income and value added. That assessment should be based in part on quantified data generated using an "off the shelf" regional economic model.

KDOT's Multi-Modal Economic Development Set Aside Program

Not every economic development-related transportation project costs millions of dollars to build. In the past, KDOT has set aside $5 to $7 million annually for a diverse set of competitively selected economic development projects that are chosen once a year and usually cost under $1 million. To improve the program's effectiveness, the Department plans to overhaul it in several ways:

- **Go multi-modal** – Make projects from all modes including rail and transit eligible for funds;
- **Focus on immediate opportunities** – Give priority to projects that have already lined up business prospects;
- **Employ a rigorous selection process** – Focus the selection process on economic impact potential;
- **Use a rolling application cycle** – Give applicants quicker turnaround time from submitting their ideas to receiving go ahead approval;
- **Ensure local commitment** – Require evidence of strong commitment from local applicants as a pre-requisite for funding.
- **Consider more funding** – Examine the adequacy of the current funding amount.

- ***Use Qualitative Information to Round Out Analysis of Economic Impacts*** - Modeling techniques are acknowledged to provide an incomplete picture of economic impacts. To ensure that a fuller consideration of economic impacts takes place, each project should be assessed via qualitative criteria, such as consistency with statewide economic goals or the level of local or regional support for the project, and the presence of strong local economic growth plans.

According to the working group, data on predicted economic impacts should be used to inform a broader project selection process that also includes consideration of engineering and community factors. First and foremost, all projects should serve compelling transportation needs.

The Kansas Economy Suffers when Highway Maintenance is Deferred

Across the lifespan of the CHP and the CTP, Kansans have made a significant investment in the state's transportation infrastructure. But over time, roads and bridges wear out and must be repaired or replaced. When traffic is slowed by rough roads and trucks must make detours around weight restricted bridges, businesses bear additional transportation costs that lower their productivity and drive down output. Kansas invests about $385 million a year to keep 10,000 miles of pavement and 5,000 bridges on the state highway system in good condition – and it has achieved a highway network that is ranked among the best in the nation. But what would be the consequences to the Kansas economy if the Department spent less on periodic repaving of roads, and repair and replacement of bridge decks and structural components?

KDOT has calculated the impact of reducing maintenance funding by 60 percent from $385 million per year to $154 million per year (in constant 2008 dollars) over the period from 2009 to 2020. By 2020, this scenario is predicted by KDOT to cause a 30 percent decrease in the share of state highway miles in good condition and an additional 100 bridges that would require weight restrictions or detours.

Economic modeling of the consequences associated with a 60 percent decrease in maintenance funding suggests that by 2020 the Kansas economy would lose 12,000 jobs and $670 million per year in gross state product, including $460 million per year less labor income than would occur if preservation funding were to continue at its current level.

Conclusions

Evidence is plentiful that the multimodal network of transportation in Kansas helps sustain the state's economy. Scrutiny of the economic impacts of past transportation projects – particularly those that improve transportation capacity and access – also shows that transportation investments can help the Kansas economy grow over the long term, while timely investment in pavement and bridge preservation helps avoid job losses. Making the best use of transportation dollars will depend on bringing greater consideration of the economic development impacts associated with investment choices to the forefront alongside other important factors, such as lifecycle costs, safety or mobility benefits. And finally, success will also depend on KDOT and local and regional groups building strong project-level partnerships so that transportation improvements can fulfill their potential for positive economic impacts.

Transportation Infrastructure Investments and Economic Growth

Five Kansas Case Studies

Prepared for Kansas Department of Transportation by:

High Street Consulting Group

November 2008

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Acknowledgements

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1.0 Introduction

Transportation infrastructure is vital to the economic prosperity of Kansas. Sound road, rail, transit and air connections across the state help businesses get goods and services to markets and workers get to jobs. Communities often cite desire for economic growth as a reason for seeking additional transportation improvements and public officials frequently justify transportation spending on its economic merits. Evidence of economic growth caused by improvement of transportation infrastructure in Kansas, however, is mostly anecdotal.

The five case studies of actual Kansas highway improvements in this study offer empirical evidence about regional economic trends that show how past investments in the state's transportation infrastructure have helped create new jobs, add to regional income and boost value added to the economy for Kansas communities across the state.

Results from the case studies show that jobs have grown across Kansas over time. But total jobs in the vicinity of case study projects grew eight percent more each year, on average, than total jobs in similar areas of the state that undertook no transportation infrastructure improvements. By 2006, about 51,000 new jobs were added in the vicinity of the five case study projects, which were built between 1993 and 2004. New economic activity in the vicinity of each project generated an estimated $6.1 billion for the Kansas economy in 2006. This compares to a one time combined investment of $231 million to build the five projects. Conversations with local economic development experts in each of the case study areas suggest that this strong performance is directly linked to the transportation improvements from which the case study areas have benefited, but that growth was only possible because these communities have acted as good stewards of the initial investments in transportation made by KDOT.

1.1. Transportation Infrastructure and Long-Term Economic Growth

At the regional level, "economic growth" is commonly described in terms of change in jobs, income or gross regional product (GRP). The mechanisms by which highway improvements spur regional economic growth are documented extensively in the professional literature.[1] Economists agree that any transportation project's potential to cause growth is mostly correlated with its ability to: 1) reduce business operating costs through travel time savings, 2) expand businesses' labor, supplier or customer markets, and 3) increase the volume, visibility and access of pass-by traffic; all of which encourage businesses to grow by locating or expanding in the vicinity of completed projects. These outcomes may occur, for example, when an interchange is added to an access controlled highway or a freeway-grade bypass is built. The amount of economic growth that follows a new project, however, varies from case to case depending on its location, who it serves, how much it is used, and how it affects local accessibility and broader system-wide connectivity. Perhaps most importantly, it is affected by how well the community in which the improvement is made is able to capitalize on the investment through its own economic development activities.

[1] For example, see Transportation Research Board, *Circular 477 - Assessing the Economic Impacts of Transportation Projects*, 1997

This study uses the yardsticks of jobs, income and value added to gauge economic growth associated with each of five carefully chosen case study projects:

- *Jobs retained and added* – Each case study reports the actual change in jobs in the area surrounding the project between its completion and 2006 (the most recent year for which jobs data is available);
- *2006 Income* – Each case study calculates the estimated 2006 annual income associated with actual job growth reported in the project's vicinity. Income is defined as wages and benefits associated with employment and it is modeled in this study using county-specific data from the IMPLAN input-output model on wage levels for job types similar to those reported; and
- *2006 Value Added* – Each case study calculates the estimated 2006 value added associated with actual job growth in the project's vicinity. Value added is equivalent to Gross Regional Product; it includes income and business output minus the cost of non-labor inputs and it is modeled in this study using county-specific data from the IMPLAN input-output model on value added levels for job types similar to those reported.

Economists sometimes consider other measures of economic growth including property-related impacts, such as new real estate transactions and increased property tax revenues; or private investment impacts, such as new building permits or capital investment growth. Each measure, however, has limitations as an indicator of economic growth; changes in property or private investment impacts, for example, may not translate to income growth if new ventures are unsuccessful.

1.2. Economic Growth Case Studies

This study reports on the economic growth impacts of five Kansas transportation infrastructure improvements built since 1993. Criteria for selecting the five projects included geographic diversity, range in costs, and consideration of different types of infrastructure improvements. Figure 1.1 shows the project locations, which include:

- **US-400 Parsons Bypass –** A $27 million bypass built in 2004 on a new alignment that re-routes US-400 around Parsons' downtown through formerly agricultural land north of Parsons and completes a fully-upgraded "Super Two" route between Parsons and Wichita to the west and Missouri to the east.
- **K-96 Northeast Wichita Bypass –** A $103 million highway in Wichita built in 1993 on a new alignment that added new transportation capacity in the rapidly growing northeast quadrant of Wichita's suburbs and has become a key east-west route for getting around the city.
- **Interstate 70 and 110th Street Interchange –** A $50 million interchange and arterial upgrade built in 2001 on a previously undeveloped area of Wyandotte County that now serves the 400-acre *Speedway/Village West* retail, dining and entertainment development.
- **Interstate 435 and Nall Interchange -** A $48 million interchange and widening of I-435 built in 1997 that serves Overland Park development north and south of Interstate 435 including the 200-acre *Sprint-Nextel* corporate headquarters and Overland Park's College Avenue commercial corridor.

- **Interstate 70 and Commerce Parkway Interchange –** A $3.4 million interchange on the east side of Hays, built in 1995 and serving Hays' only industrial park, which was established after the project was completed.

Each case study illustrates a different way in which transportation investments benefit the Kansas economy.

Figure 1.1. Case Study Project Locations

1.3. Case Study Methodology for Measuring Economic Growth

Each of the case studies in this report was prepared in general accordance with the methodology recommended by the United States Department of Transportation for gauging project-level economic growth impacts, which is described in *Using Empirical Information to Measure the Economic Impact of Highway Investments* (USDOT, Federal Highway Administration, 2001):

A. **Measure Gross Change in Local Jobs –** The starting point for assessing each case study's economic impacts was to find proof of a positive change in jobs over time for the area surrounding the project. This includes new jobs directly created by businesses attracted to or expanding in the project area and added jobs in associated businesses within the area that serve the growing economy. Historic change in total jobs was calculated using annual County Business Patterns (CBP) series data provided by the United States Census Bureau, which reports the yearly number of paid employees by ZIP code from 1994 to 2006.[2] The County

[2] ZIP code level County Business Patterns data is available from the US Census Bureau for 1994 onward. US Census Bureau's definition of "paid employment" includes full- and part-time employees (including employees on paid sick leave, holidays, and vacations) and salaried officers and executives of corporations, who are on the payroll in the pay period including March 12. Employees excluded from the ZIP code-level County Business Patterns series include unpaid employees, self-employed individuals, employees of private households, railroad employees,

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Business Patterns series is considered valid for local-level analysis because it is directly derived from individual employers' mandatory annual payroll reporting records and therefore contains no sampling errors. For each case study, the core parameters considered when measuring gross change in jobs were:

- ***Temporal Scale of Analysis*** – USDOT's guidance counsels that a case study analysis should include a multi-year post-construction time horizon because economic growth naturally unfolds gradually. Signs of growth usually begin immediately before or after a project is built, with rising property prices and building permit applications as businesses acquire land for expansion. Since new and expanded facilities take time to plan, finance and build, however, significant job growth does not always occur for up to several years. Once new and expanded facilities are in place, ancillary businesses - such as suppliers to the directly attracted businesses or others are attracted by the "agglomeration economies" of an emerging business cluster and generate additional local economic activity. Each of the five case studies in this report examines a range of three to 14 years of post-construction jobs data.
- ***Spatial Scale of Analysis*** – The spatial scale of job growth analysis should match the reach of a transportation project's influence on a regional economy. If the analysis zone is too small, for example, it may miss jobs attributable to a project and vice versa if it is too big it may attribute jobs to the project that are unrelated to the transportation improvement. As noted in FHWA's guide, the appropriate spatial scale of analysis should vary with the scope of the project being assessed. The five case studies in this report, generally fit FHWA's definition of a "local community study" category, which calls for a "town or neighborhood" scale of analysis. ZIP code boundaries were used to identify appropriate analysis zones and are assumed to provide a reasonable approximation of "town or neighborhood" scale analysis.[3]

B. **Distinguish Net Change in Jobs from Existing Trends** – Even though job growth was apparent for each case study project, special effort was undertaken to indentify and account for growth that was occurring distinctly from prior growth trends or a reflection of broader trends occurring in the region where the project is located. FHWA's guide encourages scrutiny of pre-project data trends and comparison with otherwise similar "benchmark" areas that did not benefit from a highway improvement in the same period to distinguish net change in jobs from existing trends. Where possible, each of the case studies in this report includes pre- and post-construction jobs data and a comparison between job trends in the project location and those for a "benchmark" region.

C. **Determine Causality between the Highway and Job Growth** – Even when the case study showed a component of measured change that is not explained by prior trends or broader changes also occurring elsewhere, FHWA's guide encourages collection of on-the-ground evidence that helps assess whether the highway is the sole reason for this change, such as via direct interviews with local economic development officials. Each of the case studies includes information provided by local sources about the role of transportation in encouraging economic growth.

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agricultural production employees, most government employees, proprietors and partners of unincorporated businesses, and those employees whose employers are without a fixed location in a state.

[3] A request for more detailed census tract-level data was denied by Kansas Department of Labor.

D. **Translate Job Growth into Change in Income and Value Added** – To provide additional perspective on the economic impacts of each case study project, county-level wage and value added data from the IMPLAN regional economic model was used to translate job gains into estimated changes in regional income and value added. Income includes all wages and benefits, and value added includes income and business output minus the cost of non-labor inputs, which is comparable to Gross Regional Product.

1.4. Summary of Case Study Results

Results from the five case studies are summarized in Table 1.1. Since construction ended, the areas surrounding the projects studied have added about 51,000 new jobs to their respective local economies at a cost of about $231 million in transportation improvements. Added economic activity associated with the five case studies is estimated at $6.1 billion for 2006. Each case study gives a different perspective on how transportation investments have helped the Kansas economy grow:

- **US-400 Parsons Bypass – Helping Transform a Rural Town's Economy.** Built in 2004, the Parsons Bypass project is the most recently completed of the case study projects. Parsons' economy has struggled in recent decades, particularly following closure of the Missouri-Kansas-Texas ("Katy") Railroad's Parsons diesel engine shop in the 1980s and the recent closure of the Kansas Army Ammunition Plant. In the brief time-span since the US-400 Parsons Bypass was finished, however, over 1,400 new jobs have been attracted to Parsons, which has a population of just over 11,000 people. A new cluster of employment has emerged around the US-400 Bypass north of downtown Parsons. Businesses drawn by the improved transportation access include a 300-employee storage tank manufacturer, a 24-hour truck stop and restaurant, and a WalMart Supercenter. Other businesses – including Old Dominion Trucking – have significantly expanded their operations in response to the improved transportation. Downtown Parsons remains vibrant despite the bypass development although some businesses including a GM car dealership have relocated to the bypass area.
- **K-96 Northeast Wichita Bypass – Maintaining Steady Regional Growth.** Since it was built in 1993, the K-96 Northeast Bypass corridor, which is located in the largest city in Kansas, has dramatically influenced the region's development patterns by contributing about 75 percent of Wichita's overall job growth between 1994 and 2006. Employment growth in the K-96 Bypass corridor has added up to almost 24,000 new jobs since 1993, which added $1.1 billion in income along the corridor in 2006. While employment in Wichita's aviation sector was particularly hard hit following the Sept 11 attacks, jobs, income and value added in the K-96 corridor have grown steadily. Development in the corridor includes Greenwich and North Rock business parks, new businesses like Cox Communications and Sonaca NMF, and upscale office, retail, and residential complexes like the Collective and the Waterfront.
- **Interstate 70 and 110th Street Interchange – Bringing National-Scale Development to Kansas.** The payoff for building a $50 million interchange and arterial upgrades among the farm fields of Wyandotte County has been the state's success in spurring Village West – a national-scale sports, retail, and entertainment development, which includes the 85,000 spectator Kansas Speedway facility and the 400-acre Legends retail complex. The new development is estimated to have brought almost 5,700 new jobs to Kansas between 2001 and 2006. Almost half the new jobs are associated with the Kansas Speedway, whose developers were

considering sites across the United States prior to settling on Wyandotte County, which provides access to the entire Kansas City metro region via Interstate 70 and Interstate 435.

- **Interstate 435 and Nall Interchange – Retaining a Major Kansas Employer.** In the mid-1990s, Sprint – the Kansas metro area's largest private employer – seriously considered relocating its headquarters to another state as it embarked on a plan to consolidate a dispersed set of offices scattered across the two-state Kansas City metro area. Instead, Sprint opted to build a 200-acre "greenfield" campus in Overland Park capable of housing 14,000 workers. The State's commitment to build a $48 million interchange helped convince Sprint to stay in Kansas. Total job growth in the vicinity of the Nall Avenue interchange has now reached over 17,500 with other development including the Overland Park convention center and several medical suites.
- **Interstate 70 and Commerce Parkway Interchange – Supporting New Manufacturing Jobs.** Slow but steady growth has followed the addition of a second interchange for Hays on Interstate 70 in western Kansas. Following KDOT's investment, the local community has worked hard to attract and retain high quality jobs including developing the Airport Industrial Park, which is accessed from the Commerce Parkway interchange. A-1 Plank and Scaffolding, for example, was attracted to the Airport Industrial Park from California in 1996 and now employs 116 people. A total of 2,233 new jobs have been added in Hays since the Commerce Parkway interchange was finished.

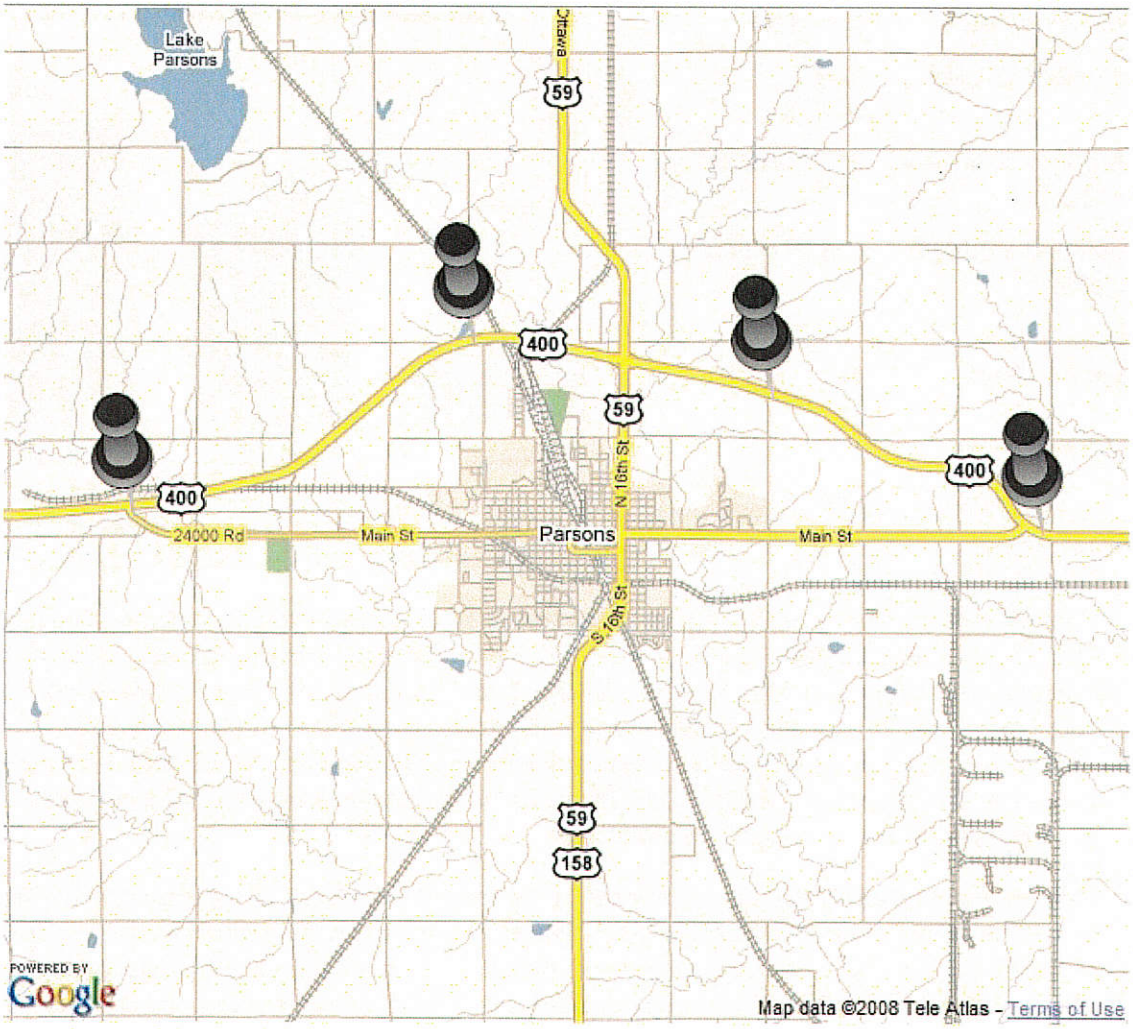
Table 1.1. Summary of Case Study Results

Project	US-400 Parsons Bypass	K-96 Northeast Bypass	I-70 & 110th Street Interchange	I-435 & Nall Avenue Interchange	I-70 & Commerce Parkway Interchange
Location	Parsons	Wichita	Wyandotte County	Overland Park	Hays
Cost (Millions - Year of Construction Dollars)	$27	$103	$50	$48	$3.5
Year Built	2004	1993	2001	1997	1995
Total Job Growth Between Year of Construction and 2006	1,421	23,977	5,671	17,525	2,233
% Increase in Jobs Between Year of Construction and 2006	21%	117%	143%	78%	24%
Average Annual % Increase in Jobs	6%	7%	17%	10%	2%
Annual Added Income for 2006 (Millions)	$42	$1,152	$121	$1,808	$64
Annual Value Added for 2006 (Millions)	$56	$1,651	$186	$4,102	$111

1.5. Important Caveats

- **Local Job Growth Does Not Always Mean Statewide Job Growth.** The case studies examine changes in local-level economic growth. Some of the growth reported in the case studies is new to the state of Kansas. A-1 Plank and Scaffolding in Hays, The Speedway in Wyandotte County, Sonaca NMF in Wichita, and Tank Connection in Parsons, for example, were each considering locations in other states but were attracted to Kansas by transportation access among other factors. In other instances, however, local growth may have occurred in place of growth elsewhere in Kansas. Several businesses now sited along the K-96 corridor in Wichita, for example, have relocated from elsewhere in Wichita to take advantage of the corridor's transportation access and a GM auto dealer in Parsons relocated from downtown to a location adjacent to the US-400 project. Even when businesses relocate from within a region as a result of improved transportation access, they generally anticipate the considerable costs of relocating will be more than offset by savings achieved through reduced transportation costs or growth in demand for their products or services as a result of their new location.
- **New Transportation Facilities are Not the Sole Explanation for Every New Job.** Many of the almost 51,000 jobs added in the vicinity of the five case study projects can be strongly correlated to improved transportation access. Some growth, however, would certainly have occurred without the transportation projects because the sites may possess other advantages like land costs or labor market characteristics that are also powerful influences on business site selection. Each case study project's comparison with a benchmark community helps indicate how much other factors influence growth versus transportation.
- **Why Gauging Economic Growth is Different from Cost Benefit Analysis –** This study focuses on gauging actual economic growth associated with completed transportation projects. By contrast, cost benefit analysis is a technique used to compare a broader range of positive impacts potentially generated by any transportation project, such as improved safety, user cost savings or quality of life AND economic growth, with its costs. This study does not attempt to quantify the dollar value of factors such as improved safety or improved quality of life associated with each case study project.

2.0 Case Study - US-400 Parsons Bypass, Parsons, Labette County, KS



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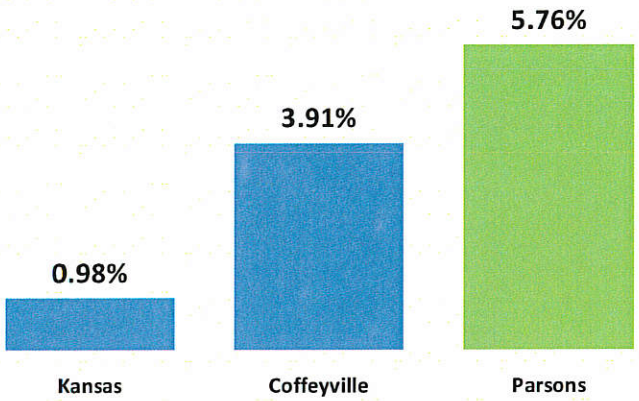
US-400 Bypass - Parsons

Project Cost:	**$27.5 Million**
Project Open Date:	**July 2004**
Jobs Added by 2006:	**1,421[4] (+21%)**
Added Annual Income: (For 2006)	**$42.0 Million[5]**
Annual Value Added: (For 2006)	**$56.0 Million[6]**
Average Jobs Added Per Year:	**418**

Annual Average Job Growth Rate from 2004 (Project Open Date) to 2006



Source: US Census. Coffeyville area includes ZIP code 67337; Parsons area includes ZIP code 67357. (See Appendix 1.A. for map.)

2.1. Background

Kansas DOT's US-400 Parsons Bypass project was competitively selected as part of KDOT's System Enhancements program within the state's Comprehensive Transportation Program. The new highway re-routes US-400 around Parsons' downtown through formerly agricultural land north of Parsons and completes a fully-upgraded "Super Two"[7] route between Parsons and Wichita with four lanes in the stretch close to Wichita. The bypass was opened to traffic in July 2004. It provides an access controlled, high speed alternative to Parsons' Main Street (Old US-400) for vehicles using the US-400 corridor, which links Parsons eastward to Interstate 44 in Missouri and westward to Wichita, western Kansas and Colorado.

Parsons, located in Labette County, Kansas, is the second largest city in southeastern Kansas with an estimated population of 11,237 in 2006. The city's population, however, has been in gradual decline since the 1960s. Labette County and Parsons have faced particularly tough economic times in recent years; in 2000 an F3 tornado heavily damaged portions of Parsons and in 2005 the United States Department of Defense announced plans to close the Kansas Army Ammunition Plant located in Parsons.

Stimulation of economic growth was a major selling point for the new US-400 Parsons Bypass. In its 1999 application to the System Enhancements program, the City of Parsons stated that the "bypass will greatly enhance the city's ability to attract industries and aid in the expansion of industries in Parsons." Studies by Kansas State University and the University of Kansas, written prior to KDOT's improvements along US-400, highlighted the importance of developing good transportation access as a precursor to assuring greater economic prosperity of southeastern

[4] Total job growth estimate is based on the difference between the number of jobs in the in Parsons ZIP code (67357) between 2004 (year project opened) and 2006 (most recent data) based on US Census data.
[5] Income added includes total 2006 salaries and benefits for 1,421 new jobs in Parsons ZIP code.
[6] Value added includes income and total business output minus cost of non-labor inputs
[7] A super two highway is a two-lane road built to high standards, typically including partial control of access, occasional passing lanes and hard shoulders. It is often built for eventual conversion to freeway or at least divided highway status once traffic volumes rise.

Kansas. The economic impacts of the US-400 Parsons Bypass, which has been in place for less than four years, are probably not fully realized, but data suggests that it is already helping to generate a regionally significant number of new jobs in Parsons.

2.2. Scope of US-400 Bypass Project

US-400 is an important east-west state highway located in central and southern Kansas. Its western terminus is about 385 miles west of Parsons at the Colorado state line and its eastern terminus is just across the state line with Missouri at Interstate 44. The US-400 Parsons Bypass project is one of a series of upgrades to US-400 east of Wichita built to accommodate traffic growth and improve safety. The Parsons Bypass project included construction of a 10.9 mile stretch of concrete "super two" highway with restricted access including at-grade connections to US-400 at either end; one at-grade crossing at North 32nd St and one above grade ramp crossing at US 59. Project costs are summarized in Table 2.1. The US-400 Parsons Bypass project was started in 2001 and all improvements were completed by July 2004.

Table 2.1. US-400 Bypass Costs

Category	Cost
Preliminary Engineering	$1.4 million
Right-of-way	$1.4 million
Utilities	$0.1 million
Construction Engineering	$1.5 million
Construction	$23.1 million
TOTAL	$27.5 million

Source: KDOT
Note: Dollars not adjusted for inflation

2.3. Economic Impact of US-400 Parsons Bypass Project

The US-400 Parsons Bypass is credited by local officials as helping bring a new wave of economic growth to Parsons following the decline of employment at the Kansas Army Ammunition Plant and the damage to Parsons caused by an F3 tornado in 2000. The economic impact of the US-400 project stems from its effectiveness in: 1) reducing travel times for regional and local trips in the vicinity of Parsons and 2) improving access to developable land to the north of Parsons, particularly around the intersection of US-400 and US-59. Notable aspects of the project's economic impact include:

- **US-400 Parsons Bypass is Stimulating Growth North of Parsons Downtown Core.** Prior to construction of the bypass, land use in the area to the north of Parsons was mostly devoted to agriculture. Since the project was completed, new development has been concentrated around the intersection of US-400 and US-59. A sampling of the new development that has occurred since the US-400 Parsons Bypass was finished includes:
    - *Tank Connection, Inc:* Tank Connection is a national manufacturer of liquid and dry bulk storage tanks that was attracted to Parsons after the US-400 Parsons Bypass opened. The company employs about 300 people in an 80,000 square foot facility at Tolen Creek Industrial Park.
    - *Stockyards Travel Plaza:* The 24-hour Stockyards Travel Plaza opened in 2004 with facilities for truckers including a restaurant, a gas station, paved parking, animal pens, and showers.
    - *Veterans Administration Medical Clinic:* The existing Veterans Administration Clinic is relocating from downtown Parsons to the US-400 and US-59 area and tripling its operations.

- *Tolen Creek Industrial Park:* A brand new 120 acre greenfield site has been set aside for development.
- *Flynn Industrial Park:* The Flynn Industrial Park was in place prior to the US-400 bypass, but it has grown since US-400 opened. Tenants include Individual Mausoleum, Sapa Industries, Old Dominion Trucking, Westar, Grandview Products, Timber Creek Meats, and Shaffer Sign.
- *WalMart Supercenter:* Walmart relocated and significantly upgraded its Parsons store in 2006, moving from 300 Main Street to an area immediately north of the intersection between US-400 and US-59.
- *Shoe Department:* Shoe Department, Inc. opened a new store located adjacent to the new Parsons WalMart Superstore.
- *Old Dominion Shipping:* Old Dominion freight lines acquired a local shipper and doubled the size of its dock capacity adding 50 jobs in Parsons at the Flynn Industrial Park.
- *Mayse GM Auto Dealership:* A local auto dealership relocated from its tornado damaged downtown site to an expanded site at the intersection of US-400 and US-59.
- *Frontier Farm Credit Service:* Frontier Farm Credit Service opened a new office just west of the US-400 and US-59 intersection in 2008. Frontier Farm Credit Service is a cooperative financial services organization that provides credit to member farmers and farm-related businesses.
- *Sleep Inn:* A new Sleep Inn opened at the intersection of US-400 and US-59 in 2008 adjacent to the Frontier Farm Credit Service offices.
- *Grandview Products Company:* A manufacturer of cabinets located in the Flynn Industrial Park, has doubled the size of their existing buildings and added 40 new jobs.

The development that has taken place in the vicinity of US-400 since 2004 is rapidly creating a new "gateway" to Parsons that is helping revitalize the city's image as a prosperous center in southeastern Kansas.

- **US-400 Parsons Bypass is a Central Element of Parsons' Economic Development Strategy.** The City of Parsons and the local business community have worked together to maximize economic development opportunities created by the new bypass.
- **Adverse Impacts to Downtown Parsons from New Bypass Appear Minimal.** A small number of businesses have left Parsons since the new bypass opened, but they have been more than offset by the arrival of new jobs. Parsons' downtown has, in fact, undergone an award winning revival in the last several years. US-400 Bypass proponents credit the new road with providing a gateway to Parsons that is attracting business throughout the region.
- **Transportation Improvements Were Critical to Parsons Development.** People familiar with the US-400 Parsons Bypass project agree that the new highway has been instrumental in attracting development. Growth in jobs at the Stockyards Travel Plaza, Tank Connection, and Old Dominion Freight, for example, can be tied directly to the new road.

2.4. Economic Impact Analysis

Jobs Have Increased in Parsons Since the US-400 Bypass Opened - To quantify how much the US-400 Bypass project has contributed to job growth in its vicinity, US Census job data for the Parsons ZIP code where the project is located was compared to job growth in the community of Coffeyville, Kansas: (See "Job Growth Comparison" sidebar box for an explanation of these two areas.)

- **Job Growth Strong in Parsons Compared to Coffeyville -** US Census ZIP Code Business Patterns data for the period 2004 to 2006 show a net growth of 1,331 jobs in Parsons, with year-to-year growth averaging 426 jobs or nine percent job growth per year. (See Table 2.2.) This brings total jobs in Parsons to 8,329 employees in 2006. By contrast, the nearby community of Coffeyville experienced modest job growth, adding only 65 jobs in the same time period. Appendix 1.B provides detailed year-by-year job data for both areas.
- **Surge in Parsons Job Growth After US-400 Construction -** US Census ZIP Code Business Patterns data for the period 2004 to 2006 shows a significant surge in jobs in the Parsons area with year-to-year growth averaging 418 jobs. (See Figure 2.1.) This is approximately 20 percent more jobs as the comparable Coffeyville area added in the same period. Appendix 1.B provides detailed year-by-year job data for both areas.

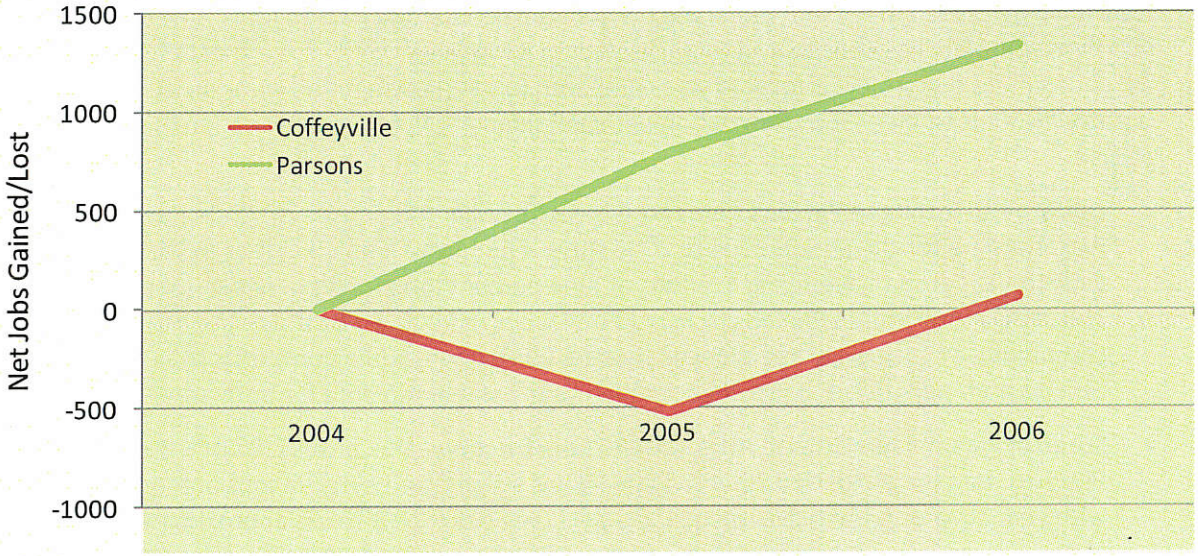
New Parsons Jobs Equate to Increased Income and Gross Regional Product – The 1,421 jobs added to the Parsons economy from 2004 to 2006 translate to an increase in annual income (total wages and benefits) of $42 million and an increase in annual value added (a measure similar to Gross Regional Product) of $56 million.

Table 2.2. Job Growth in the US-400 Corridor Area

	US-400 Bypass/ Parsons, KS	City of Coffeyville, KS
BEFORE CONSTRUCTION (1999 to 2003)		
Average Annual Net Job Gain/Loss	126 jobs/yr (+2%)	-84 jobs/yr (-1%)
AFTER CONSTRUCTION (2004 to 2006)		
Average Annual Net Job Gain/Loss	418 jobs/yr (+6%)	216 jobs (+4%)
Total Jobs Added	1,421 jobs	65 jobs
Percent Increase in Jobs	21% increase	1% increase
INCREASE IN INCOME AND VALUE ADDED		
Annual Added Income (2006)	$42 million	
Annual Value Added (2006)	$56 million	

Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

Figure 2.1. 2004 to 2006 Net Job Growth Comparison between US-400 Bypass Area and Coffeyville, KS



Source: US Census ZIP Code Patterns data

2.5. Conclusions

Built in 2004, the Parsons Bypass project is the most recently completed of the case study projects, therefore economic impacts are still be unfolding as businesses take advantage of the transportation improvements to expand their facilities or locate in Parsons. In the short time since the US-400 Parsons Bypass was finished, however, over 1,400 new jobs have been attracted to Parsons, which is a much greater growth rate than in years prior to the project's completion. Economic development experts in Parsons point to a new cluster of business activity that has emerged around the intersection of the US-400 Bypass and US 59. They indicate that most of the new or expanded business operations here, including a 300-employee storage tank manufacturer, a 24-hour truck stop and restaurant, and a WalMart Supercenter, have been occurred as a direct result of improved transportation access.

US-400 Parsons Bypass Job Growth Comparison Analysis Methodology

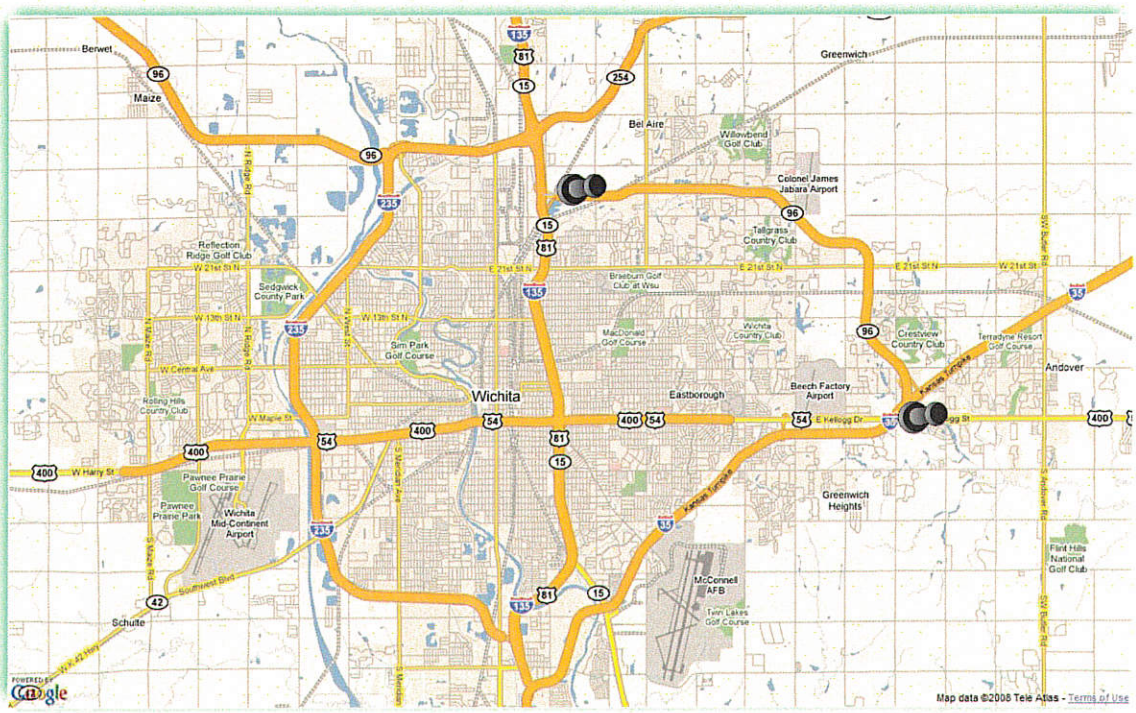
Definitions for Parsons Area and Benchmark Coffeyville Area

- **Project Location – US-400 Parsons Bypass Area – ZIP Code 67357 (See Appendix 1.A for a Map):** This ZIP code includes both downtown Parsons and the project area. Parsons is a micropolitan center in rural southeastern Kansas with an estimated population of 11,237 people in 2006. It is the second most populous city in southeastern Kansas. Parsons is situated at the intersection of US-400 and US-59, which are two important state highways. The population of Parsons has been in gradual decline since the 1940s.

- **Comparison Location – Coffeyville Area – ZIP Code 67337:** This ZIP code includes the entire Coffeyville area. The Coffeyville area is a reasonable benchmark because it is a similarly sized micropolitan center also in rural southeastern Kansas with an estimated population of 10,387 people in 2006. Coffeyville has experienced a slow and steady population decline since around 1960 when its population peaked. Coffeyville is home to Amazon.com's largest distribution center.

	Parsons ZIP	Coffeyville ZIP
2000 Population	14,031	14,272
2000 Labor Force	7,127	6,698
Median Household Income (1999 $)	31,077	28,915
2000 Employees	6,933	6,328
2006 Employees	8,239	6,524

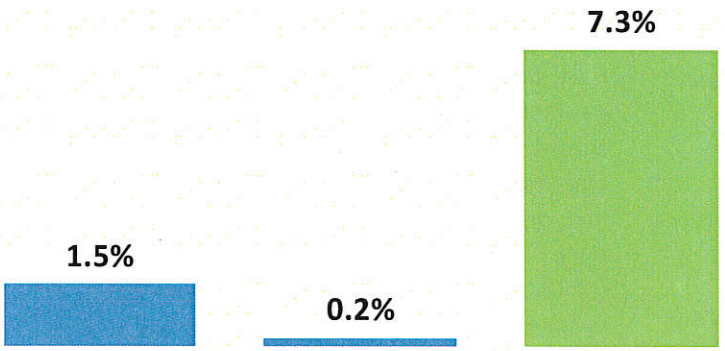
3.0 Case Study - K-96 Northeast Bypass, Wichita, KS



K-96 Northeast Bypass - Wichita

Project Cost:	**$103.2 Million**
Project Open Date:	**Dec. 1993**
Jobs Added by 2006:	**23,977[8] (+117%)**
Added Annual Income: (For 2006)	**$1.2 Billion[9]**
Annual Value Added: (For 2006)	**$1.6 Billion[10]**
Average Jobs Added Per Year:	**1,998**

Annual Average Job Growth Rate from 1994 (Project Open Date) to 2006



Source: US Census. Wichita MSA includes Sedgwick, Butler, Harvey, and Sumner Counties; K-96 Corridor includes ZIP codes 67219, 67220, 67226, 67206, and 67203. (See Appendix 2.A for map)

3.1. Background

Wichita's 10.5 mile K-96 Northeast Bypass, which was constructed on new alignment, was competitively selected as part of Kansas DOT's System Enhancements program in the state's Comprehensive Highway Program. The highway was designed and built jointly by the state, Sedgwick County, and the City of Wichita. It was fully opened to traffic in December 1993. It added new transportation capacity in the northeast quadrant of Wichita's suburbs and has become a key east-west route for getting around Wichita, providing a link to Interstate 135 in the west and the Kansas Turnpike/US-54 in the east. Wichita is located in Sedgwick County, Kansas; it is the largest city in the state with a population of about 360,000. The Wichita metropolitan region is home to 255,000 jobs.[11] It is particularly known as an international center for aviation-related business; Cessna and Hawker Beechcraft are headquartered in Wichita, and Boeing, Airbus, Learjet and Spirit Aerosystems all have sizeable workforces in the Wichita region.

The K-96 Northeast Bypass was built to improve mobility within, and access to Wichita's booming northeast suburbs, which were served by an increasingly congested arterial grid before the Northeast Bypass opened. The project is notable for its role in driving strong growth in industrial, commercial and residential development on Wichita's northeastern edge despite a decline in the region's aviation-driven economy after the attacks of September 11, 2001. A recent account of the highway's impact, reported in the Wichita Eagle, cites several developers and experts who declare the new bypass was a critical component in stimulating significant new growth in Wichita and concludes that development would have occurred more slowly without the highway.[12]

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[8] Total job growth estimate is based on the difference between the number of jobs in the K-96 corridor ZIP codes (67219, 67220, 67226, 67206, 67203) in 1994 (year project opened) and 2006 (most recent data), based on US Census data.

[9] Income added includes total 2006 salaries and benefits for 23,977 new jobs in K-96 Corridor ZIP codes.

[10] Value added includes income and total business output minus cost of non-labor inputs

[11] 2006, US Census data

[12] "The Road to Growth," Wichita Eagle; June 1, 2008

3.2. Scope of K-96 Northeast Bypass Project

K-96 is an east-west state highway located in central and southern Kansas. Its western terminus is about 250 miles due west of Wichita at the Colorado state line and its eastern terminus is at US Route 400 immediately east of Wichita. The K-96 Northeast Bypass project, however, was built primarily to improve east west mobility within the Wichita metro area. It added a 10.5 mile, four-lane, access controlled stretch of expressway through the outer northeast suburbs of Wichita that was built to freeway standards on new right of way. Construction included seven arterial street interchanges and major interchanges at the bypass termini with US 54/Kansas Turnpike and Interstate 135. Project costs are summarized in Table 3.1. The K-96 Bypass was the final link in a freeway loop around Wichita. The project was started in 1989 and all improvements were complete by December 1993. The K-96 Bypass project was complemented by numerous smaller locally and state-funded transportation infrastructure upgrades on local arterial streets in its vicinity that have helped encourage economic growth.

Table 3.1. K-96 Bypass Costs

Category	Cost
Preliminary Engineering	$4.6 million
Right-of-way	$12.8 million
Utilities	$2.3 million
Construction Engineering	$10.9 million
Construction	$72.6 million
TOTAL	$103.2 million

Source: KDOT
Note: Dollars not adjusted for inflation

3.3. Economic Impact of K-96 Northeast Bypass Project

The K-96 Bypass project, which provided better access to greenfield sites in a prosperous statewide center of economic activity, offered great potential for regional-scale development impacts. The economic impact potential of the K-96 Northeast Bypass project stems from its effectiveness in: 1) reducing travel times for trips across the Wichita region by adding capacity and 2) improving access to developable land on the northeast side of Wichita. Notable aspects of the project's economic impact include:

- **K-96 Northeast Bypass Has Accelerated Growth on the East of Wichita.** Some development had already begun on the outer northeastern suburbs of Wichita prior to building the K-96 Northeast Bypass, which the 1989 KDOT "System Enhancement" funding application acknowledged as "one of the fastest developing areas within Sedgwick County." But the new highway has accelerated job growth in the corridor from an average of five percent annually between 1980 and 1988 to an average of 7.3 percent between 1994 and 2006.[13] A sampling of the new development that has occurred since the K-96 Northeast Bypass was opened includes:
    - *Rapid Retail, Office and Restaurant Development along N. Rock Road:* Greenfield development along North Rock Road on either side of the interchange with K-96 began almost immediately following the construction of K-96 and has transformed the Rock Road area into a major retail destination for the region that features a mix of strip malls, "big box" stores, many restaurants, offices and a large movie theater complex.

[13] 1980 to 1988 growth rate is from KDOT System Enhancement application materials; 1994 to 2006 growth rate is from US Census data.

- *Greenwich Business Park:* Planning for this light industrial park in a greenfield location close to the Greenwich Road interchange with K-96 began in the mid-1990s. It includes 26 lots ranging in size from one to 10 acres and accommodating buildings from 5,000 to 200,000 square feet. Current tenants include KD Roofing, a Federal Express distribution facility, Dynatek (home audio), Fox Collision Center (auto repair), Hall's Culligan Water Conditioning, and Wichita Shirt and Cap (custom screen printed tee shirts and other clothing).
- *Northrock Business Park:* This 260,000 square foot office park located on N. Rock Road opened after K-96 was constructed and current tenants include a staffing-services firm, an inventory-management company, an energy consultant and an office-equipment dealer.
- *Sonaca NMF America:* Sonaca NMF is a Belgian-owned manufacturer of aircraft wing skin panels. The firm opened its Wichita location in 1998 and it employs about 80 people. Sonaca's site selection process for choosing its only US plant included consideration of locations in Kansas, Oklahoma and elsewhere.
- *Golf Warehouse:* The Golf Warehouse is a Wichita-based internet retailer of golfing products that was founded in the late 1990s. Its internet fulfillment center, which employs more than 50 people, is located in the Comatara Business Park near K-96 and Webb Road.
- *Star Lumber & Supply Store:* Star Lumber's newly opened flagship store is a 28,000 square foot anchor for a 40,000 square foot strip mall being developed as part of the Greenwich Business Park on the northwest corner of K-96 and Greenwich Road. Star Lumber President Chris Goebel says 15 to 20 employees will be added at the new site.[14]
- *The Collective:* The Collective is a shopping, medical and office "village" on more than 15 acres near the interchange of 21st Street and K-96, anchored by Johnston's Clothiers.
- *Cox Communications Customer Center:* Cox Communications opened a 35,000-square-foot customer contact center in the Comotara Industrial Park that was anticipated at its opening to generate 150 new jobs over its first three years. The firm was also considering locations in Oklahoma.

Economic growth in the K-96 corridor continues. The Waterfront, for example, which is located at Webb and 13th Street adjacent to K-96, is a brand new 165-acre upscale mixed use development that incorporates 200,000 square feet of high-end retail space, restaurants, over 500,000 square feet of offices, a 100-room extended stay Hilton Homewood Suites, and approximately 50 acres of residential single-family homes and mid-rise condominiums.

- **Economic Growth Along the K-96 Northeast Bypass Has Exceeded Original Projections.** The City of Wichita's 1989 "System Enhancement" project funding application projected that growth in the immediate vicinity of the Northeast Bypass would generate 34,868 jobs by 2010. US Census data show, however, that this number of jobs was exceeded by 2001. In 2006 the number of jobs in the project corridor exceeded the city's original projection by 27 percent – or about 9,500 jobs.

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[14] "Star Lumber prepares for construction of $2 million K-96 and Greenwich store," Wichita Business Journal; August 31, 2007

- **Some New Northeast Wichita Jobs May be Relocations within Wichita.** Anecdotal evidence suggests that some of the almost 24,000 new jobs that have sprung up in the K-96 Northeast Bypass corridor since 1994 are jobs that were previously located elsewhere in the city. Some Wichita businesses have chosen to relocate to the northeast side of the city because of its improved transportation access and other benefits. Examples include Star Lumber and Wichita Shirt and Cap, both of which relocated from other locations in Wichita to the K-96 Northeast Bypass corridor. In an interview with the Wichita Business Journal, Star Lumber's President Mr. Chris Goebel said the firm's old location (at Central and Woodlawn)"was not real easy to get to for the contractors," noting "they wanted something near the highway." When firms relocate in this manner, however, additional jobs are often created because the new location allows them to expand based on productivity gains in terms of travel time savings and sales growth due to better accessibility.
- **Transportation Improvements Were Critical to Northeast Wichita's Development.** Most people familiar with the K-96 Northeast Bypass project agree that the highway has been instrumental in attracting development. Wichita's former mayor, Mr. Bob Knight, who was involved in planning for the project is quoted in the Wichita Eagle as saying "you cannot overstate the economic and civic benefits that highway represents."[15] Mr. Roy Hammar, owner and general manager of Wichita Shirt & Cap, which built a $1 million facility in Greenwich Business Park in 2002 is quoted by the Wichita Business Journal as saying "we like the exposure from K-96, and we like the ease of access from K-96," which appears to be a common sentiment among businesses moving to the area. Mr. Bob Hughey, co-owner of Wichita-based imageQuest which is a retailer of digital copying, faxing and printing equipment, opened a $1.7 million facility at Greenwich Business Park in 2004 and told the Wichita Business Journal that "we wanted a signature facility that would be very visible, we chose Greenwich Business Park, right at K-96."

3.4. Economic Growth Analysis

Jobs Have Surged in the K-96 Northeast Bypass Area Since 1994 Compared to Benchmark - To quantify how much the K-96 Northeast Bypass project has contributed to job growth in its vicinity, US Census job data for the ZIP codes where the project is located was compared to similar data for the entire Wichita metropolitan statistical area (MSA). (See "Job Growth Comparison" sidebar box for an explanation of these two areas.)

- **Job Growth is Strong Along the K-96 Northeast Bypass Corridor Compared to Wichita's Overall Job Growth -** US Census ZIP Code Business Patterns data for the period 1994 to 2006 shows strong job growth in the Northeast Bypass area, with year-to-year growth averaging 1,998 jobs and a 117 percent increase in jobs between 1994 and 2006. (See Table 3.2.) By contrast, the remainder of the Wichita metropolitan area experienced modest job growth, adding an average of 324 jobs per year in the same period for a total growth of 2 percent in the same time period. Appendix 1.B provides detailed year-by-year job data for both areas.
- **Total Job Growth Trend Strong Along K-96 Northeast Bypass Corridor Compared to Wichita's Total Job Growth -** US Census ZIP Code Business Patterns data for the K-96 corridor shows a steady and almost continuous addition of jobs in the period from 1994 to 2006. (See Figure

[15] "By luck or design, donation of land for K-96 sparked development," Wichita Eagle; June 1, 2008

3.1.) By contrast, the remainder of the Wichita MSA experienced a strong net growth in jobs during the mid-1990s that has dropped off sharply since 2001. Appendix 2.B provides detailed year-by-year job data for both areas.

New K-96 Corridor Jobs Equate to Increased Income and Gross Regional Product – The 23,977 jobs added to the Wichita economy along the K-96 Northeast Bypass corridor from 1994 to 2006 translate to an increase in annual income (total wages and benefits) of $1,152 million and an increase in annual value added (a measure similar to Gross Regional Product) of $1,651 million.

Table 3.2: Job Growth in the K-96 Corridor Area

	K-96 Bypass Corridor	Wichita MSA (Excluding K-96)
BEFORE CONSTRUCTION (1980 to 1989)		
Average Annual Net Job Gain/Loss[16]	5%	1%
AFTER CONSTRUCTION (1994 to 2006)		
Average Annual Net Job Gain/Loss	1,998 jobs/year (7%)	324 jobs/year (0.2%)
Total Jobs Added	23,977 jobs	3,884 jobs
Percent Increase in Jobs	117% increase	2% increase
INCREASE IN INCOME AND VALUE ADDED		
Annual Income Added (2006)	$1,152 million	
Annual Value Added (2006)	$1,651 million	

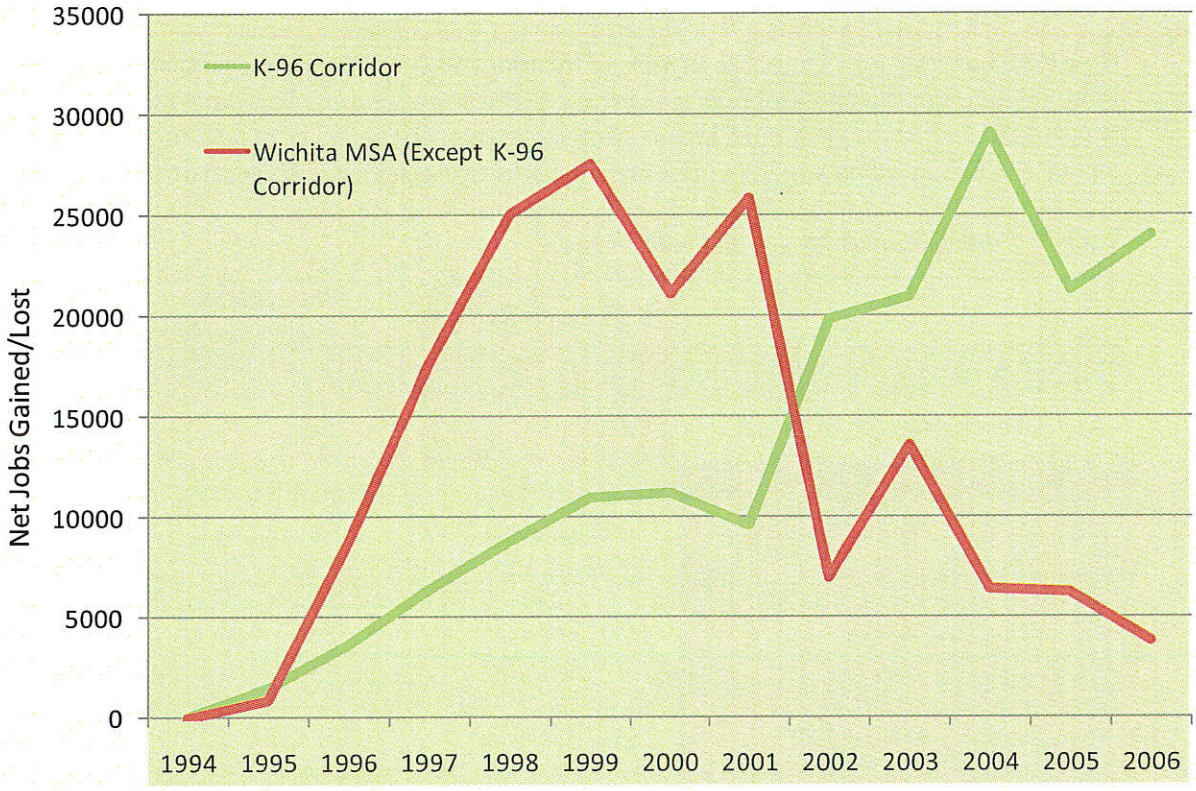
Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

3.5. Conclusions

Since it was built in 1993, the K-96 Northeast Bypass corridor has dramatically influenced Wichita's development patterns by contributing about 75 percent of the region's overall job growth between 1994 and 2006. Employment growth in the K-96 Bypass corridor has added up to almost 24,000 new jobs since 1993. Economic development experts in the region cite the improved accessibility provided by the K-96 Bypass as a primary reason for new development in the corridor, which includes Greenwich and North Rock business parks, and attraction of out-of-state businesses like Cox Communications and Sonaca NMF, as well as development of upscale office, retail, and residential complexes like the Collective and the Waterfront.

[16] US Census ZIP Code Patterns data not available for "Before Construction" period; data taken from KDOT System Enhancements application

Figure 3.1: 1994 to 2006 Net Job Growth Comparison between K-96 Corridor and Wichita MSA (Excluding K-96 Corridor)



K-96 Northeast Bypass Job Growth Comparison Analysis Methodology

Definitions for K-96 Northeast Bypass Area and Benchmark Wichita MSA

- **<u>Project Location –</u> K-96 Northeast Bypass Area – ZIP Codes 67219, 67220, 67226,67206, and 67230 (See Appendix 2.A for a Map):** Prior to construction in 1993, land use in this ZIP code was characterized by an emerging and rapid transformation from low density residential and agricultural land uses to retail, office, and light industrial land uses. Existing employment centers included Koch Industries and the North Business Park. In 1994, a substantial amount of land in the K-96 corridor was available for "greenfield" development.

- **<u>Comparison Location –</u> Wichita Metropolitan Area Excluding K-96 Northeast Bypass:** Given the scale of the K-96 Northeast Bypass project, which affects a large portion of Wichita, the comparison location selected for this case study is the remainder of the Wichita metropolitan area. This area provides a reasonable comparison because it shares a similar labor pool, it includes areas of developable land, and it has a similar economic climate. Segments of US-54/Kellogg have been upgraded in this area in the same time period that K-96 was built, which may have helped increase jobs in the Wichita MSA.

4.0 Case Study - I-70 & 110th St Interchange, Wyandotte County, KS

I-70 and 110th Street Interchange – Wyandotte County

Project Cost: **$49.7 Million**

Project Open Date: **Summer 2001**

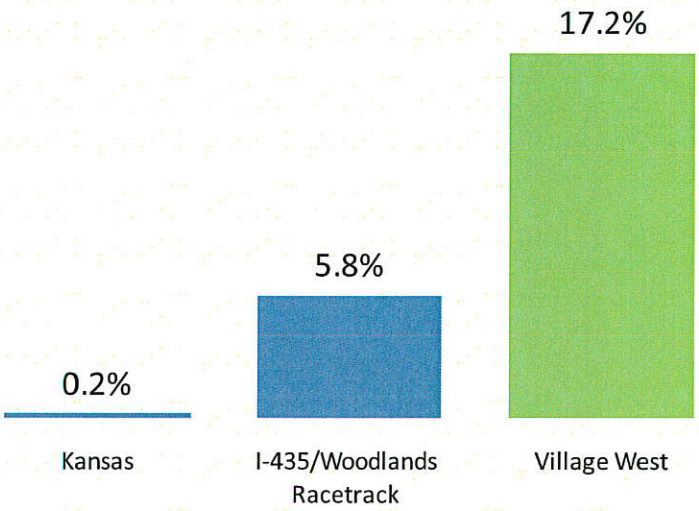
Jobs Added by 2006: **5,671[17] (+143%)**

Added Annual Income (For 2006): **$121 Million[18]**

Annual Value Added (For 2006): **$186 Million[19]**

Average Jobs Added Per Year: **980**

Annual Average Job Growth Rate from 2001 (Project Open Date) to 2006



Source: US Census. I-435/Woodlands Racetrack area includes ZIP code 66109; Village West area includes ZIP code 66111. (See Appendix 3.A for map.)

4.0 Background

Kansas DOT's Interstate 70 and 110th Street interchange project was opened to traffic in summer 2001. The new interchange and adjacent arterial realignment and upgrades serve the 400-acre *Village West* retail, dining and entertainment development, which is located in Wyandotte County, Kansas immediately northwest of the intersection of Interstate 70 and Interstate 435 and about 15 miles west of downtown Kansas City. Initial elements of the Village West development opened immediately after completion of the interchange and development of the site is ongoing. Wyandotte County is the fourth most populous county in Kansas with a population of 153,956 people in 2007. Wyandotte County's population, however, has been shrinking slowly since about 1970.

The Village West has been hailed as a major economic development achievement for the state of Kansas. It is described by the Kansas City Area Development Council (KCADC) as the largest tourism attraction in the state.[20] According to KCADC, the cost to develop Village West was about $573 million, making it the second largest development project to move forward in the Kansas City region during the last decade. Two of Village West's largest anchors are *Kansas Speedway* and the *Legends* retail, entertainment and restaurant complex, both of which are major regional attractions:

- ***Kansas Speedway*** hosts NASCAR and Indy Car racing events. Construction of the Speedway was finished in spring 2001. On race days, the 82,000 spectator Speedway becomes the fourth

[17] Total job growth estimate is based on the difference between the number of jobs in the Village West ZIP code (66111) in 2001 (year project opened) and 2006 (most recent data), based on US Census data

[18] Income added includes total 2006 salaries and benefits for 5,671 new jobs in Village West-related ZIP code.

[19] Value added includes income and total business output minus cost of non-labor inputs

[20] Source: http://www.thinkkc.com/NewsEvents/TopDevelopments/TopDevelopments.php (Checked September 5, 2008)

largest city in Kansas.[21] According to the Kansas City Convention & Visitors Association, season ticket holders to Kansas Speedway come from a six-state area.[22]

- ***The Legends*** is an upscale super-regional outdoor shopping mall with a "warehouse district" architectural motif. The mall opened in 2005 and it has 110 retail outlets with a gross leasable area of 850,000 square feet.[23] The shopping center is surrounded by the Kansas Speedway, Nebraska Furniture Mart, Great Wolf Lodge, and Cabela's outdoor recreation store. According to The Legends' developer, the mall attracts 12 million visitors per year from as far as 250 miles away.

The Legends development continues to grow and the owners of Kansas Speedway are discussing plans to open a casino and hotel at the Speedway site. The Village West development also appears to be a catalyst for additional development close by, including the 300 acre Schlitterbahn Vacation Village water park on a 300-acre parcel east of Interstate 435, which is scheduled to open in 2009.

4.1 Scope of I-70 and 110th Street Interchange Project

Kansas DOT built a package of highway improvements to ensure convenient traffic ingress and egress at the planned Village West development. Improvements built as part of the project include:

- A completely new interchange at Interstate 70 and N. 110th Street that provides the only site access from Interstate 70;
- Widening of Interstate 70 to accommodate traffic growth; and
- Realignment and upgrading of State Avenue; a major arterial that originally bisected the Speedway's footprint.

Table 4.1. I-70/110th Street Interchange Costs

Category	Cost
Preliminary Engineering	$3.3 million
Right-of-way	$5.4 million
Utilities	$1.3 million
Construction Engineering	$2.7 million
Construction	$37.0 million
TOTAL	$49.7 million

Source: KDOT
Note: Dollars not adjusted for inflation

The interchange project was started by KDOT in 1995 and all improvements were completed by summer 2001. Project costs are summarized in Table 4.1. (Additional upgrades to State Avenue west of the Village West development are underway in a separate project at the time of writing.)

4.2 Economic Impact of I-70 Interchange Project

This project's location on the national Interstate system and in close proximity to a nationwide hub for economic activity provides tremendous potential for major development impacts. The significance of the economic impacts realized via the Interstate 70 and 110th Street interchange project are undeniable; in absolute dollar terms the Speedway/Village West is the biggest economic development project in Kansas history. Notable economic impacts associated with the project include:

[21] Source: http://www.kansasspeedway.com/track_info/history/ (Checked September 5, 2008)
[22] Source: http://www.visitkc.com/index.aspx (Checked September 5, 2008)
[23] Source: http://www.legendsshopping.com/ (Checked September 5, 2008)

- **Speedway/Village West Has Brought New Service and Retail Sector Development to Kansas.** Prior to starting construction in 1995, land adjacent to the Interstate 70 interchange and State Avenue upgrade project site was used chiefly for agriculture. Observers note that development of the Kansas Speedway, Legends complex and other development began after the commitment was made by KDOT to add the Interstate 70 interchange. No other locations in Kansas offer a comparable combination of transportation access, "greenfield" space, and proximity to a major metropolitan area's population that could support a development of this scale. New economic activity at the Village West site since 2001 that is attributable to the highway improvements includes:
  - *Kansas Speedway* – an 82,000 spectator NASCAR race track that employs about 2,500 staff during a typical weekend;
  - *Cabela's* – A 180,000 square foot outdoor recreation store;
  - *Nebraska Furniture Mart* – A furnishings and appliance store on an 80 acre campus;
  - *Legends* – An 850,000 square foot outdoor mall whose tenants include Dave & Buster's, The Legends 14 Theatre, Cavender's, T-REX Café, Nike Factory, Books-A-Million and Adidas; and which has added an estimated 2,500 new permanent jobs;
  - *Several Hotels* - including Candlewood Suites, Chateau Avalon, Country Inn and Suites, Great Wolf Lodge, Hampton Inn, and Holiday Inn Express.
- **Transportation Improvements Were Critical to Village West Location Decision.** Most people familiar with the Interstate 70 and 110th Street interchange project doubt that the Village West site would have been developed without KDOT's investment in the Interstate 70 and State Avenue highway improvements. Zimmer Real Estate Services, the Village West site's master developers, cite easy regional transportation access as a major reason for Village West's location, highlighting the fact that it is served by "three full interchanges."[24] The new Interstate 70 and 110th Street interchange offers the only access to visitors traveling east or west. The scale of the development at Village West – Nebraska Furniture Mart alone occupies an 80 acre "campus -" would necessitate substantial infrastructure improvements wherever it was located and the State Avenue upgrades ensure the site can handle traffic to regional retail attractions plus 82,000 speedway visitors.

4.3 Economic Growth Analysis

Jobs Have Expanded in the Village West Area Since 2001 Compared to Benchmark - To quantify how much KDOT's Interstate 70 and 110th Street interchange project has contributed to job growth in its vicinity, data for the Village West ZIP code where the project is located was compared to the Woodlands Racetrack ZIP code with similar characteristics but no transportation improvements. (See "Job Growth Comparison" sidebar box for an explanation of these two areas.)

- **Modest Village West Job Growth Prior To/During Construction -** US Census ZIP Code Business Patterns data for the period 1994 to 2000 shows steady net job growth in the Village West area prior to 2001, with year-to-year growth averaging 303 jobs. (See Table 4.2.) By contrast, the adjacent Woodlands Racetrack area lost an average of 90 jobs per year in the same period. At least some of Village West's job growth in this period is probably attributable to temporary construction jobs associated with both the interchange project, which began in

[24] Source: http://www.villagewest.us/index.html (Checked September 5, 2008)

1995, and the Speedway which also began in about the same timeframe. Appendix 2.B provides detailed year-by-year job data for both areas.

- **Surge in Village West Job Growth After Construction -** US Census ZIP Code Business Patterns data for the period 2001 to 2006 shows a dramatic surge in jobs in the Village West area with year-to-year growth averaging 1,200 jobs. (See Figure 4.1.) This is approximately 20 times as many jobs as the comparable Woodlands Racetrack area added in the same period. Appendix 3.B provides detailed year-by-year job data for both areas.

New Village West Jobs Equate to Increased Income and Gross Regional Product – The 5,671 jobs added to the Wyandotte economy in the Village West area from 2001 to 2006 translate to an increase in annual income (total wages and benefits) of $121 million and an increase in annual value added (a measure similar to Gross Regional Product) of $186 million.

Table 4.2. Job Growth in the Village West Area

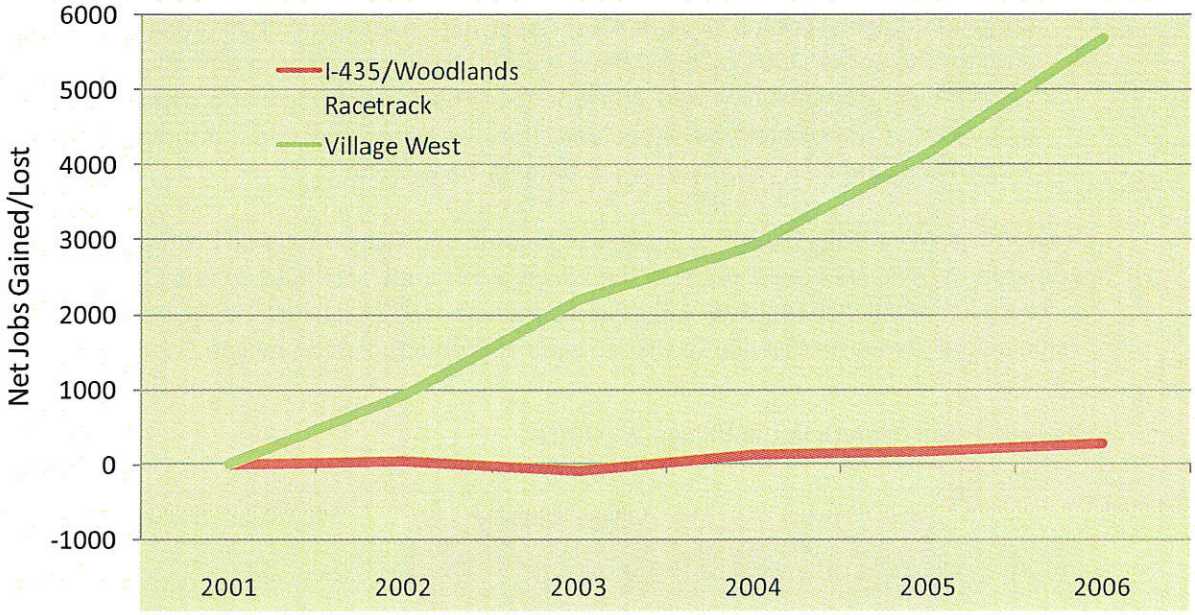
	Village West ZIP	Woodlands Racetrack ZIP
BEFORE CONSTRUCTION (1994 to 2000)		
Average Annual Net Job Gain/Loss	+167 jobs/yr (+7%)	-110 jobs/yr (-8%)
AFTER CONSTRUCTION (2001 to 2006)		
Average Annual Net Job Gain/Loss	980 jobs/yr (+17%)	52 jobs/yr (+6%)
Total Jobs Added	5,671 jobs	282 jobs
Percent Increase in Jobs	143% increase	31% increase
INCREASE IN INCOME AND VALUE ADDED		
Annual Income Added (2006)	$121 million	
Annual Value Added (2006)	$186 million	

Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

4.6 Conclusions

Economic development experts conclude that the $50 million interchange and arterial upgrades among the farm fields of Wyandotte County was vital to spurring development of the Village West – a national-scale sports, retail, and entertainment development, which includes the 85,000 spectator Kansas Speedway facility and the 400-acre Legends retail complex. The new development is estimated to have brought almost 5,700 new jobs to Kansas between 2001 and 2006. Almost half the new jobs are associated with the Kansas Speedway, whose developers were considering sites across the United States prior to settling on Wyandotte County, which provides access to the entire Kansas City metro region via Interstate 70 and Interstate 435.

Figure 4.1: 2001 to 2006 Net Job Growth Comparison between Village West Area and Woodlands Racetrack Area



Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

I-70 and 110th Street Interchange Job Growth Comparison Analysis Methodology

Definitions for Village West Area and Benchmark Woodlands Race Track Area

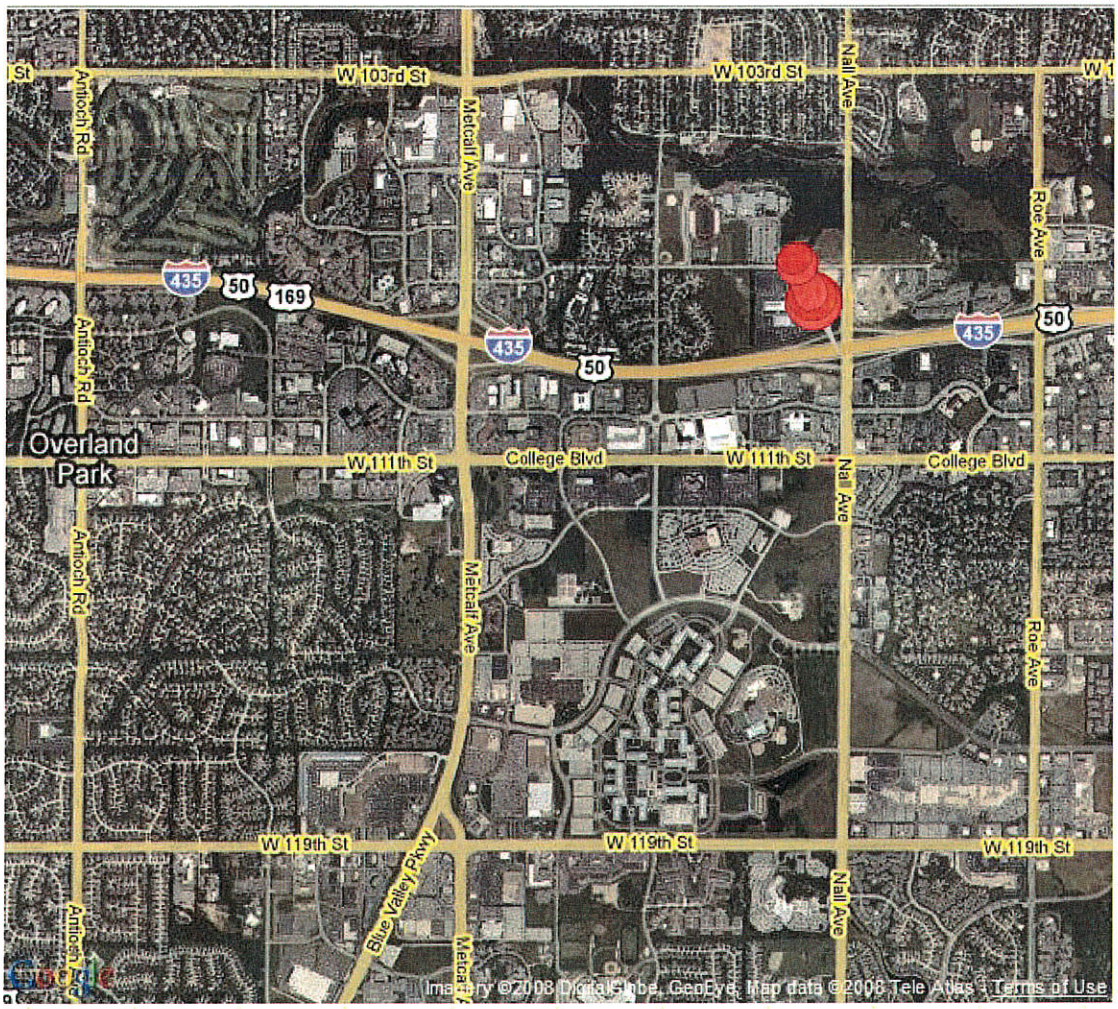
- **Project Location - Village West Area – ZIP Code 66111 (See Appendix 3.A for a Map):** Prior to construction in 1995, land use in this ZIP code was characterized by ultra-low density residential and agricultural land uses that offered potential for "greenfield" development. A substantial amount of land in the ZIP code area is undeveloped. Interstate 435 passes through the center of the ZIP code area where it intersects with Interstate 70.

- **Comparison Location - Woodlands Racetrack Area – ZIP Code 66109:** This location provides a reasonable comparison because it is adjacent to and immediately north of the Village West ZIP code. Like the Village West area, it is located in Wyandotte County about 15 miles from Kansas City. In 1995, prior to completion of the Speedway project, land use in this ZIP code area was similar to that in the Village West area, i.e. characterized by low density suburban and agricultural land uses and a substantial amount of land in the ZIP code area was undeveloped. Interstate 435 passes through the center of the ZIP code area.

Basic comparative information about the two areas is presented in the following chart:

	Village West ZIP	Woodlands Racetrack ZIP
2000 Population	10,828	15,856
2000 Labor Force	5,444	8,473
Median Household Income (1999 $)	39,167	55,959
2000 Employees	3,749	885

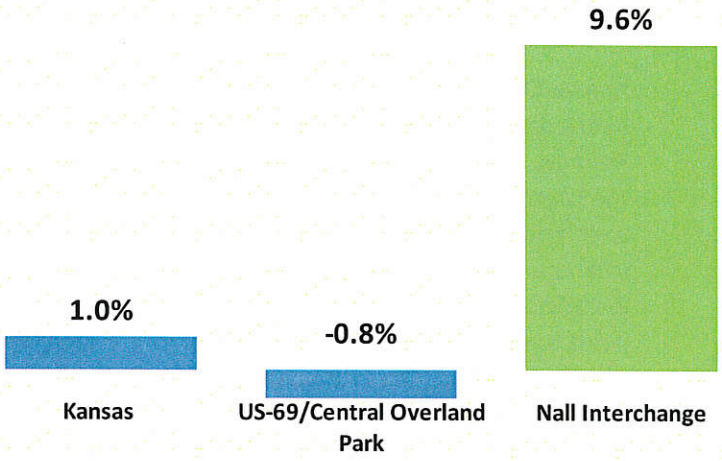
5.0 Case Study - I-435 & Nall/Roe Ave. Interchange, Overland Park, KS



I-435 and Nall/Roe Interchange – Overland Park

Project Cost:	**$48.4 Million**
Project Open Date:	**Nov. 1997**
Jobs Added by 2006:	**17,525[25,26] (+78%)**
Added Annual Income: (For 2006)	**$1.8 Billion[27]**
Annual Value Added: (For 2006)	**$4.1 Billion[28]**
Average Jobs Added Per Year:	**2,414**

Annual Average Job Growth Rate from 1998 (Project Open Date) to 2006



Source: US Census. US-69/Overland Park area includes ZIP code 66210; Nall Interchange area includes ZIP codes 66211 and 66251. (See Appendix 4.A for map.)

5.1. Background

Kansas DOT's Interstate 435 and Nall/Roe Avenue interchange project in Overland Park, Kansas was opened to traffic in November 1997. The project added an interchange at Nall Avenue, reconfigured an existing interchange at Roe Avenue, and widened Interstate 435. It serves development north and south of Interstate 435 including the 200-acre *Sprint-Nextel* corporate headquarters, which began construction in 1997 and is located in Overland Park, Kansas immediately south of Interstate 435 between Metcalf Avenue and Nall Avenue.

The city-within-a-city Sprint campus opened in 1999; today it houses over 13,000 Sprint-Nextel employees and has cemented the blue-chip employer's ties to the Kansas City region. The $300 million headquarters is styled after a college campus with 3.9 million square feet of office space spread across 22 low-rise buildings that feature traditional brick architecture including sloped roofs and arched colonnades. Kansas-based Sprint finalized a merger with Virginia-based Nextel in 2005 to form Sprint-Nextel and has subsequently located its corporate headquarters at Sprint's Overland Park campus. Overland Park is located in Johnson County, Kansas; it is the second largest city in Kansas with a population of 149,080 people in 2000. A prosperous suburb in the Kansas City metro region, Overland Park was ranked 9th in CNN/Money Magazine's "100 Best Cities to Live in the United States."

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[25] Total job growth estimate is based on the difference between the number of jobs in the Nall Interchange ZIP code (66211) in 1997 (year project opened) and 2006 (most recent data), based on US Census data.

[26] The Sprint Campus has its own ZIP code and the US Census withholds precise employment data for this ZIP. All job growth estimates for Nall Interchange are based on using the mid-point for the year-by-year range in employment provided by the US Census for the Sprint ZIP

[27] Income added includes total 2006 salaries and benefits for 17,525 new jobs in Nall/Roe-related ZIP codes.

[28] Value added includes income and total business output minus cost of non-labor inputs

The new Nall Avenue interchange on Interstate 435 was added between two existing interchanges at Metcalf Avenue and Roe Avenue. Accommodation of anticipated rush hour congestion caused by up to 14,000 Sprint-Nextel employees was a major factor in the decision to build a new interchange on Interstate 435 at Nall Avenue. Other new development in the vicinity of the Nall interchange includes the Overland Park Convention Center, a 412 room Sheraton Hotel, and Children's Mercy Hospital.

5.2. Scope of Nall/Roe Interchange Project

Kansas DOT's Nall/Roe Avenue Interchange provides east-west access from Interstate 435 to Nall Avenue, which previously bridged Interstate 435 and reconfigures the interchange with Roe Avenue. Project costs are summarized in Table 5.1. The new interchange is about one mile from the Metcalf Avenue interchange to the west and half a mile from the Roe Avenue interchange to the east. The project also included widening Interstate 435 from six lanes to eight lanes to accommodate growth in traffic. The interchange project was started by KDOT in 1995 and all improvements were completed by November 1997. In addition to KDOT's project, the City of Overland Park has widened Nall Avenue to six lanes in the vicinity of the project and as part of Sprint's development agreement with the city, the telecommunications company paid for about $4.5 million in road improvements around its headquarters campus, such as additional turning lanes at major intersections.[29]

Table 5.1. Nall Interchange Costs

Category	Cost
Preliminary Engineering	$5.7 million
Right-of-way	$0.3 million
Utilities	$0.4 million
Construction Engineering	$1.5 million
Construction	$40.5 million
TOTAL	$48.4 million

Source: KDOT
Note: Dollars not adjusted for inflation

5.3. Economic Impact of Nall/Roe Interchange Project

The Nall/Roe Interchange project is located on the Interstate system and it has improved access to a formerly greenfield site along Overland Park's College Avenue, which runs parallel to the south side of Interstate 435 and is a key corridor within the city's commercial development strategy. The economic impacts realized via the Nall/Roe Avenue project are significant; in particular it has helped accommodate Sprint Nextel, which is the region's largest private sector employer. Notable project-level economic impacts include:

- **Retention and Expansion of a Major Regional Employer.** Prior to completion of the new Sprint Campus in Overland Park, Sprint which is the third largest telecommunications company in the United States and the largest private employer in the metro Kansas City region was based in Westwood, Kansas with offices scattered around the region. When executives decided to consolidate its many metro-area office locations into one campus, overtures came from many other states encouraging Sprint to relocate, according to Mary Birch, former head of the Overland Park Chamber of Commerce. The Nall/Roe Interchange project was a key factor in convincing Sprint to stay in the region.
- **High Paying, Stable Job Opportunities.** Although Sprint-Nextel faces a challenging business climate, its high-paying and stable jobs and status as a blue-chip corporation have been

[29] Source:"Beating the Rush," Kansas City Business Journal, Feb 12, 1999

parlayed by Kansas City-area business and civic leaders into a way to attract other companies to Overland Park, as well as providing a vital customer base for many smaller businesses in the area. According to a study by Johnson County's County Economic Research Institute, each Sprint job generates an additional 2.45 jobs in the surrounding community.

- **Other Economic Activity around the Nall/Roe Interchange.** The Sprint campus is not the only new development to occur around the new interchange. Since 1997, several other notable developments have occurred including:
  - *Overland Park Convention Center* – Overland Park opened a mid-sized, 237,000 square foot conference and convention space in 2004 with an adjoining 412 room Sheraton Hotel.
  - *Development North of Interstate 435* – Formerly open land adjacent to the Nall Interchange on the north side of Interstate 435 is now being developed with a concentration of medical office space.
- **Some New Jobs May be Relocations within Kansas City Region.** Anecdotal evidence suggests that some of the more than 17,000 new jobs that have sprung up in the vicinity of the Nall Interchange since 1998 are jobs that were previously located elsewhere in the region. Sprint's relocation to the Overland Park campus has included moving jobs from elsewhere in Kansas and from other states. Advocates for the Nall/Roe Interchange project note, however, that Sprint was considering leaving Kansas at the time the interchange was built and that the infrastructure project was a key component in convincing Sprint to stay in Kansas.
- **Transportation Improvements Were Critical to Sprint-Nextel Location Decision.** Most people familiar with the decision by Sprint to build its headquarters adjacent to the new Nall interchange acknowledge that the new interchange was a key factor in convincing company executives to move ahead with the project.

5.4. Economic Growth Analysis

Jobs Have Increased Dramatically in the Vicinity of the Nall/Roe Interchange Since 1997. To quantify how much KDOT's interchange project has contributed to job growth in its vicinity, US Census job data for the Nall ZIP code where the project is located was compared to job growth in the adjacent ZIP code for Overland Park, Kansas. (See "Job Growth Comparison" sidebar box for an explanation of these two areas.)

- **Some Nall Interchange Job Growth Occurred Prior To/During Construction.** US Census ZIP Code Business Patterns data for the period 1994 to 1997 shows steady net job growth in the Nall interchange area prior to 1998, with year-to-year growth averaging 1,340 jobs. (See Table 5.2.) By contrast, the adjacent Overland Park area lost an average of 90 jobs per year in the same period. At least some of the job growth in this period is probably attributable to temporary construction jobs associated with both the interchange project, which began in 1995 and the Sprint campus which began in 1997.
- **Doubling in Nall Interchange Job Growth Rate After Construction -** US Census ZIP Code Business Patterns data for the period 1998 to 2006 shows a continued growth in jobs in the Nall area with year-to-year growth almost doubling to an average of 2,414 jobs per year. (See Figure 5.1.) By contrast, Overland Park lost jobs in the same period. Appendix 4.B provides detailed year-by-year job data for both areas.

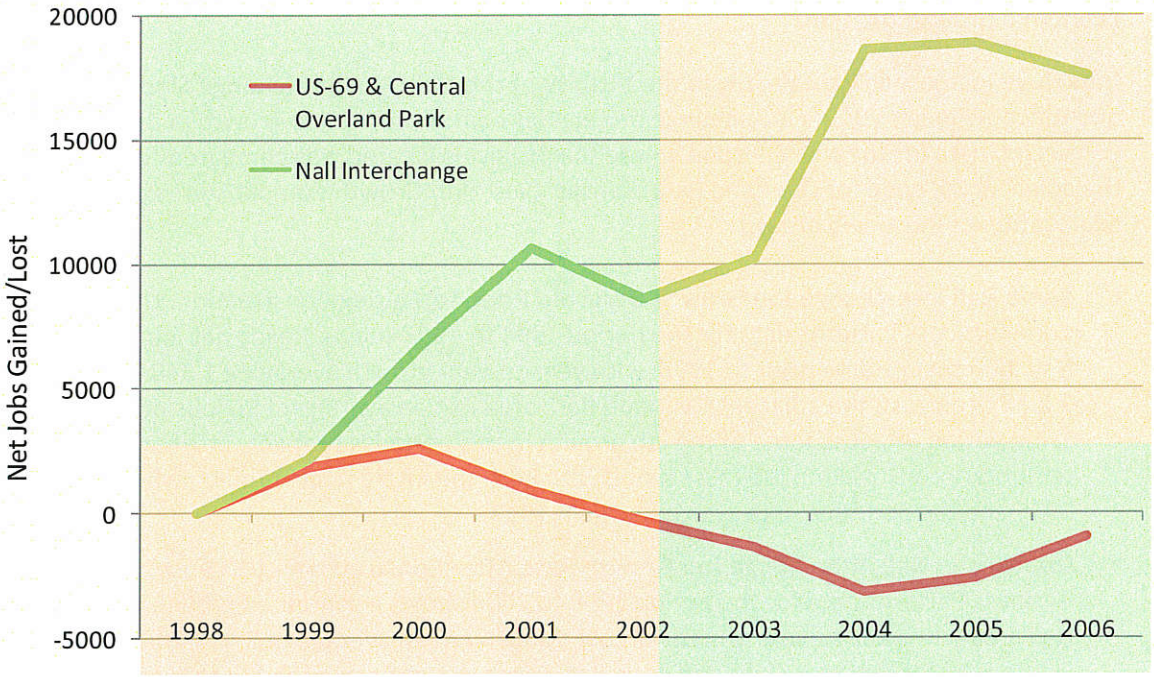
New Nall Interchange Jobs Equate to Increased Income and Gross Regional Product – The 17,525 jobs added to the Overland Park economy in the Nall Interchange area from 1997 to 2006 translate to an increase in annual income (total wages and benefits) of $1.8 billion and an increase in annual value added (a measure similar to Gross Regional Product) of $4.1 billion.

Table 5.2. Job Growth in the Nall Interchange Area

	Nall Interchange ZIP	US-69/Central Overland Park ZIP
BEFORE CONSTRUCTION (1994 to 1997)		
Average Annual Net Job Gain/Loss	+1,340 jobs/yr (+9.1%)	+998 jobs/yr (+3.7%)
AFTER CONSTRUCTION (1998 to 2006)		
Average Annual Net Job Gain/Loss	2,414 jobs/yr (+9.6%)	-274 jobs/yr (-0.85%)
Total Jobs Added	17,525 jobs	-944 jobs
Percent Increase in Jobs	78% increase	-3% decrease
INCREASE IN INCOME AND VALUE ADDED		
Annual Income Added (2006)	$1.8 Billion	
Annual Value Added (2006)	$4.1 Billion	

Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

Figure 5.1: 1998 to 2006 Net Job Growth Comparison between Nall Interchange Area and US-69/Central Overland Park Area



Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

5.6 Conclusions

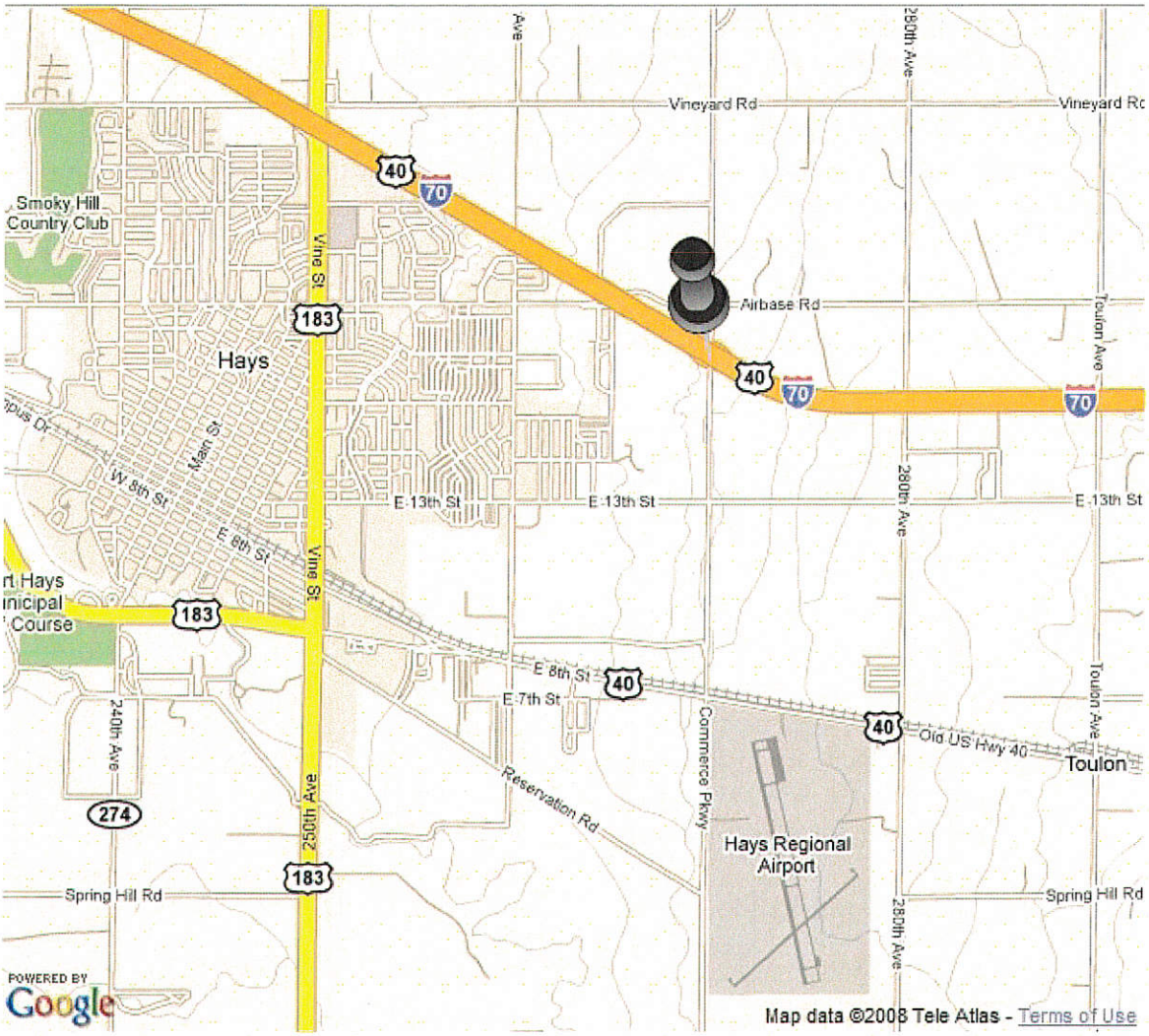
In the mid-1990s, Sprint – the Kansas metro area's largest private employer – seriously considered relocating its headquarters to another state as it embarked on a plan to consolidate a dispersed set of offices scattered across the two-state Kansas City metro area. Instead, Sprint opted to build a 200-acre "greenfield" campus in Overland Park capable of housing 14,000 workers. The State's commitment to build a $48 million interchange helped convince Sprint to stay in Kansas. Total job growth in the vicinity of the Nall Avenue interchange has now reached over 17,500 with other development including the Overland Park convention center and several medical suites.

Definitions for Nall Interchange Area and Benchmark Central Overland Park Area

- **<u>Project Location –</u> Nall Interchange Area – ZIP Code 66211 and 66251 (See Appendix 4.A for a Map):** Prior to construction in 1997, land use in this ZIP code was characterized by low density residential and open land uses that offered potential for "greenfield" development. College Avenue, which is a focal point for Overland Park commercial growth, passes through the center of the Nall ZIP code.

- **<u>Comparison Location –</u> Overland Park/US 69 Interchange Area – ZIP Code 66210 (See Appendix 4.A for a Map):** This location provides a reasonable comparison because it is adjacent to and immediately west of the Nall Avenue interchange ZIP code. Like the Nall interchange area, it is located in Johnson County. In 1997, this ZIP code was more built up than the Nall interchange area, which may in part explain a lower growth rate.

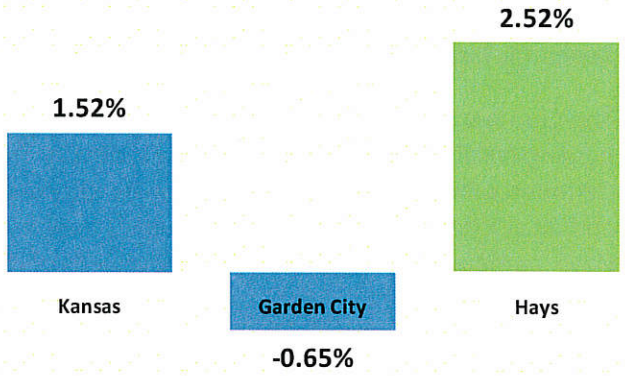
6.0 Case Study - Commerce Parkway Interchange, Hays, Ellis County, KS



Commerce Parkway Interchange - Hays

Project Cost:	**$3.35 Million**
Project Open Date:	**August 1995**
Jobs Added by 2006:	**2,233[30] (+24%)**
Added Annual Income: (For 2006)	**$64 Million[31]**
Annual Value Added: (For 2006)	**$111 Million[32]**
Average Jobs Added Per Year:	**243**

Annual Average Job Growth Rate from 1995 (Project Open Date) to 2006



Source: US Census. Garden City area includes ZIP code 67846; Hays area includes ZIP code 67601. (See Appendix 5.A. for map.)

6.1. Background

Kansas DOT's Commerce Parkway Interchange project was competitively selected as part of KDOT's System Enhancements program within the state's Comprehensive Highway Program. The new Commerce Parkway interchange is located two miles east of the primary US-183 (Vine Street) interchange connecting Hays to Interstate 70. The new interchange was opened to traffic in August 1995. It has improved access from Interstate 70 to the eastern side of Hays including Hays Regional Airport and the Airport Industrial Park, which was built after the interchange was completed. The new interchange has also helped reduce heavy truck traffic at the US-183 exit.

Hays, Kansas is the largest city in northwestern Kansas with an approximate population of 20,000. The Hays region was experiencing declining economic fortunes in the late 1980s when the Commerce Parkway project was proposed, in particular as a result of the closing of Baxter-Travenol Laboratories, an oil-related facility, which employed about 1,200 people at its peak. The Commerce Parkway interchange is credited with attracting economic development to the eastern side of Hays.

Table 6.1. Commerce Parkway Costs

Category	Cost
Preliminary Engineering	$0.3 million
Right-of-way	$0.07 million
Utilities	$0.08 million
Construction Engineering	$0.2 million
Construction	$2.7 million
TOTAL	$3.35 million

Source: KDOT
Note: Dollars not adjusted for inflation

6.1. Scope of Commerce Parkway Interchange Project

Interstate 70 is the most important east-west travel route in Kansas. It connects Hays and other Kansas communities with Denver, Colorado to the west and Kansas City, Kansas to the east. The Commerce Parkway Interchange project adds a grade separated

[30] Total job growth estimate is based on the difference between the number of jobs in the in Hays ZIP code (67601) between 1995 (year project opened) and 2006 (most recent data) based on US Census data.
[31] Income added includes total 2006 salaries and benefits for 2,233 new jobs in Hays ZIP code.
[32] Value added includes income and total business output minus cost of non-labor inputs

diamond interchange that connects Interstate 70 with Commerce Parkway to provide direct access to the Hays Airport Industrial Park about two miles south of Interstate 70 and adjacent to the Hays Regional Airport. In conjunction with the interchange improvement, Commerce Parkway was concurrently upgraded from a gravel surface to concrete pavement with 12 foot travel lanes. Project costs are summarized in Table 6.1. The Commerce Parkway project was started in May 1994 and all improvements were completed by August 1995.

6.2. Economic Impact of Commerce Parkway Interchange Project

The Commerce Parkway Interchange is credited by local economic development officials with helping facilitate growth of the Airport Industrial Park in Hays, Kansas. The economic impact of the Commerce Parkway project stems from its effectiveness in: 1) reducing travel times for regional and local trips in the vicinity of Hays and 2) improving access to developable land to the east of Hays, particularly around the Hays Regional Airport. Notable aspects of the project's economic impact include:

- **City of Hays and Ellis County have Worked to Support Economic Growth Near the Interchange.** The Ellis County Coalition for Economic Development (ECCED) was formed in the late 1980s. City and county officials, led by ECCED have made the Commerce Parkway area a focal point for their economic development efforts. In anticipation of the new interchange, land on either side of Commerce Parkway was re-zoned as light industrial and other infrastructure such as water and sewer have been added along the corridor to help attract economic growth. The Airport Industrial Park is now almost fully occupied and additional land has been acquired to expand opportunities for industrial development.
- **Commerce Parkway Interchange Stimulated Growth to the East of Hays.** Prior to construction of the interchange, land use in the area east of Hays was devoted to agriculture. Since the project was completed, new development has been concentrated in the Airport Industrial Park. A sampling of the new development that has occurred since the Commerce Parkway was finished includes:
    - *A-1 Plank and Scaffolding, Inc:* A-1 Plank and Scaffold is a plank and scaffold manufacturer and custom fabricator with locations in Kansas and California. The firm opened its Kansas facility in the Airport Industrial Park in 1996 and has experienced rapid growth. In 2007, it employed 116 people in Hays. Easy access to Interstate 70 is an important factor for the business, which relies on truck transportation to bring in raw materials and to ship its products.
    - *Sykes Corporation/N.E.W. Inc:* In 1998, Sykes Corporation opened a computer support call center in the Airport Industrial Park with about 435 employees according to local officials. The firm was initially attracted to the Hays site in part because of good transportation access to the industrial park. In 2004, Sykes closed its operations in Hays, but the ECCED and the City of Hays rapidly leased the call center facility to N.E.W., Inc., which is a national provider of extended service plans, buyer protection services and product support with customer support centers across the United States. N.E.W. is the fifth largest employer in Hays, with 373 employees in 2007.
    - *Next-Tech Wireless:* Nex-Tech is a regional phone service provider in western Kansas and it has situated its new wireless headquarters, which includes administrative offices, a warehouse, and data center, in the Airport Industrial Park. Nex-Tech employs about 75

people at the facility. The location is desirable for Nex-Tech because it provides easy transportation network access for technicians

- *Army Reserve Center:* In 2007, a 15 acre Army Reserve Center was opened on Commerce Parkway adjacent to I-70. The center provides training and equipment maintenance functions.

- **Extension of 22nd Street to Commerce Parkway.** The City of Hays is currently building an extension of 22nd Street to connect with Commerce Parkway. This improvement is expected to create further economic growth by providing better access from downtown to the area around the airport and the Commerce Parkway interchange.

- **Transportation Improvements Were Critical to Hays Development.** People familiar with the Commerce Parkway interchange project are convinced that it has had a slow but steady influence on economic growth in Hays. For the businesses that are attracted to the Airport Industrial Park, the good access provided to Interstate 70 is a vital part of the business park's appeal.

6.3. Economic Growth Analysis

Jobs Have Increased in Hays Since the Commerce Parkway Interchange Opened - To quantify how much the Commerce Parkway Interchange project has contributed to job growth in its vicinity, US Census job data for the Hays ZIP code where the project is located was compared to job growth in the community of Garden City, Kansas. (See "Job Growth Comparison" sidebar box for an explanation of these two areas.)

- **Job Growth Strong in Hays Compared to Garden City** - US Census ZIP Code Business Patterns data for the period 1995 to 2006 show a net growth of 2,233 jobs in Hays, with year-to-year growth averaging 243 jobs or two percent job growth per year. (See Table 6.2.) By contrast, the community of Garden City experienced modest job decline, losing 1,258 jobs in the same time period. Appendix 5.B provides detailed year-by-year job data for both areas.

New Hays Jobs Equate to Increased Income and Gross Regional Product – The 2,233 jobs added to the Hays economy from 1995 to 2006 translate to an increase in annual income (total wages and benefits) of $64 million and an increase in annual value added (a measure similar to Gross Regional Product) of $111 million.

Table 6.2. Job Growth in the Commerce Parkway Interchange Area

	Hays, KS	Garden City, KS
BEFORE CONSTRUCTION (1980 to 1987)		
Average Annual Net Job Gain/Loss	0%[33]	No data available
AFTER CONSTRUCTION (1995 to 2006)		
Average Annual Net Job Gain/Loss	243 jobs/yr (+2%)	-88 jobs (-1%)
Total Jobs Added	2,233 jobs	-1,258 jobs
Percent Increase in Jobs	24% increase	-11% decrease
INCREASE IN INCOME AND VALUE ADDED		
Annual Added Income (2006)	$113 million	
Annual Value Added (2006)	$215 million	

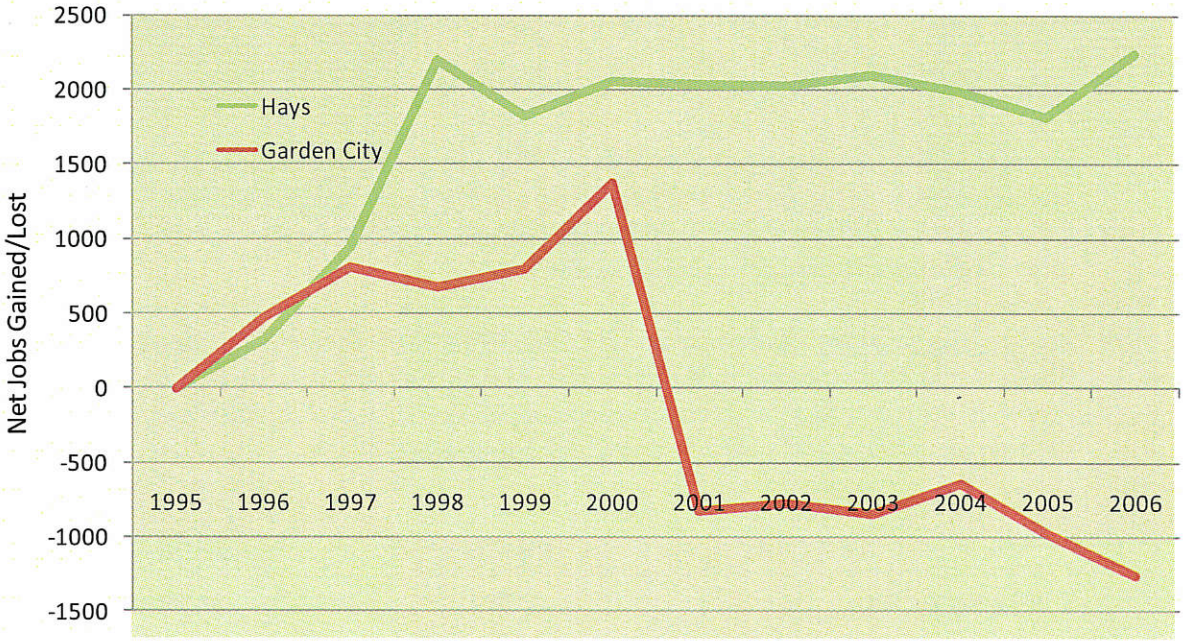
Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

6.4. Conclusions

Slow but steady growth has followed the addition of a second interchange for Hays on Interstate 70 in western Kansas. Following KDOT's investment, the local community has worked hard to attract and retain high quality jobs including developing the Airport Industrial Park, which is accessed from the Commerce Parkway interchange. A-1 Plank and Scaffolding, for example, was attracted to the Airport Industrial Park from California in 1996 and now employs 116 people. A total of 2,233 new jobs have been added in Hays since the Commerce Parkway interchange was finished.

[33] Data from KDOT System Enhancements application

Figure 6.1. 1995 to 2006 Net Job Growth Comparison between Commerce Parkway Interchange Area and Garden City



Source: US Census ZIP Code Patterns data (http://censtats.census.gov/)

Commerce Parkway Interchange Job Growth Comparison Analysis Methodology

Definitions for Hays Area and Benchmark Garden City Area

- **Project Location – Hays Area – ZIP Codes 67601:** This ZIP code includes both downtown Hays and the project area on the eastern edge of Hays. The City of Hays is a micropolitan center in western Kansas with an estimated population of about 20,000 people in 2006. Hays is situated on Interstate 70, which is a vital cross state travel route.

- **Comparison Location – Garden City – ZIP Code 67846:** This ZIP code includes both downtown Garden City and the project area on the eastern edge of Hays. The City of Hays is a micropolitan center in western Kansas with an estimated population of about 20,000 people in 2006. Hays is situated on Interstate 70, which is a vital cross state travel route.

	Hays ZIP	Garden City ZIP
2000 Population	23,052	37,566
2000 Labor Force	13,287	18,159
Median Household Income (1999 $)	32,482	38,087
2000 Employees	11,453	10,833

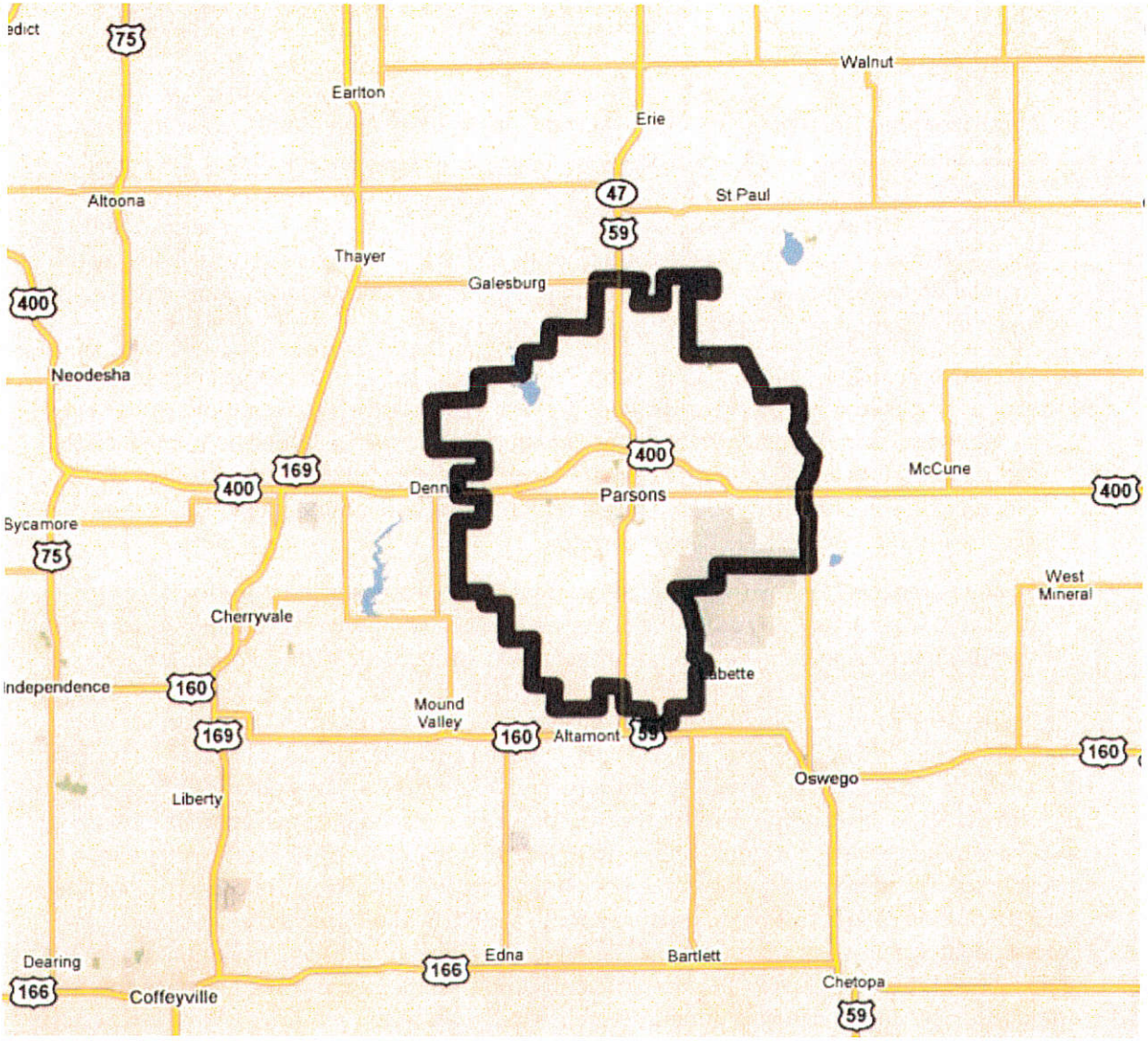
7.0 Conclusions

Each of the case studies suggests that well-planned transportation investments can help a region achieve economic growth. Lessons learned from the case studies include the following keys to success:

- **Local Economic Development Planning Leadership is Vital.** Each of the case study projects was located in an area that featured a strong local economic development growth strategy spearheaded by private and public-sector leaders. On-the-ground leadership, such as that provided by the Ellis County Coalition for Economic Development in the Hays case study or the Overland Park Chamber of Commerce in the Nall Interchange case study, helps lay the foundation for economic growth and sustains it in the long-term. New jobs are only realized, when local communities aggressively reach out to businesses to convince them to relocate.
- **Economic Growth Requires a Long-Term Perspective.** Each of the case studies shows how economic growth unfolds over time. Jobs growth is cumulative, with additional jobs being generated in each successive year as ancillary businesses, such as suppliers to the directly attracted businesses or others are attracted by the "agglomeration economies" of an emerging business cluster and generate additional local economic activity. This pattern has occurred in the Wichita K-96 Bypass corridor.
- **Strong Prospects Are Key to a Project's Success.** Solid prospects like plans for Sprint to relocate to Overland Park, or for the Speedway to be built in Wyandotte County, are critical to making the connection between transportation investments and economic growth.

There are many good reasons to invest in transportation infrastructure; safer roads, for example, ensure fewer deaths in auto crashes, and well equipped air strips in rural areas of the state ensure equal access to critical health care in emergencies; while good transit coverage ensures access to jobs and services for those without a car. Economic development – keeping existing jobs and adding new jobs - should join the list of reasons why Kansas must continue to invest in transportation. Despite back-to-back transportation infrastructure programs, Kansas must be cautious about resting on its laurels. With a 10,000 mile state highway network that accommodates a growing amount of miles driven every year, bridges and pavement wear out and must be replaced. Meanwhile, new economic opportunities appear at a fast pace and they often pose new and challenging infrastructure needs.

Appendix 1.A. – Parsons Analysis Zone



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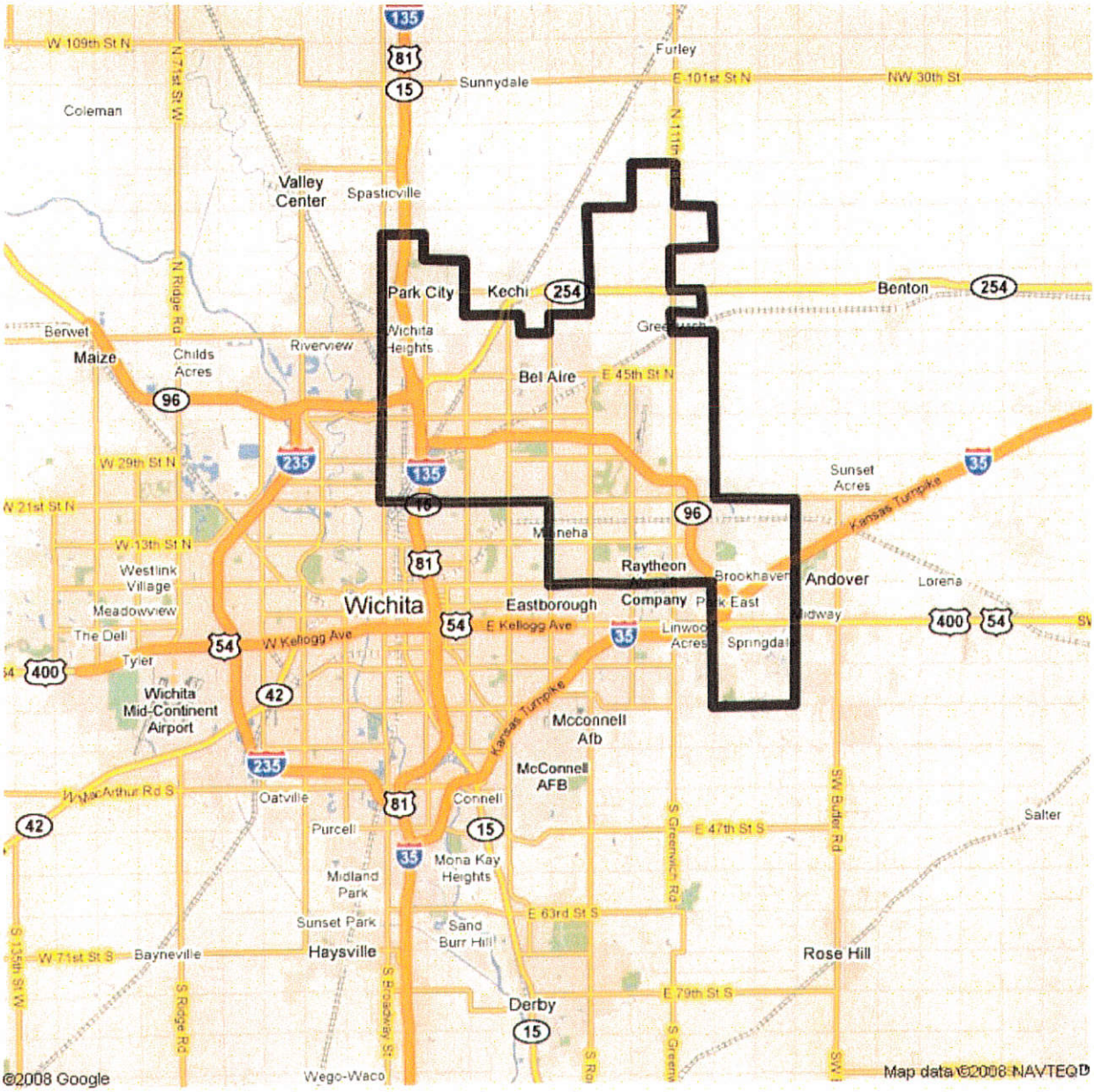
Appendix 1.B. US-400 Parsons US Census Job Data

	Parsons			Coffeyville		
Year	Total Employees[34]	Annual Net Change in Employees	Cumulative Growth in Employees	Total Employees[35]	Annual Net Change in Employees	Cumulative Growth in Employees
2000	6,933	NA		6,328	NA	
2001	6,717	(216)		6,158	-170	
2002	7,250	533		6,066	-92	
2003	7,074	(176)		5,875	-191	
2004	6,908	(166)	0	6,459	584	0
2005	7,693	785	785	5,940	-519	-519
2006	8,328	636	546	6,524	584	65

Source: US Census, County Business Patterns Database

[34] Number of jobs in the Speedway ZIP code:66111 as reported by US Census
[35] Number of jobs in the Woodlands Racetrack ZIP code: 66109, as reported by US Census

Appendix 2.A. – K-96 Northeast Bypass Analysis Zone



Appendix 2.B. K-96 Bypass US Census Job Data

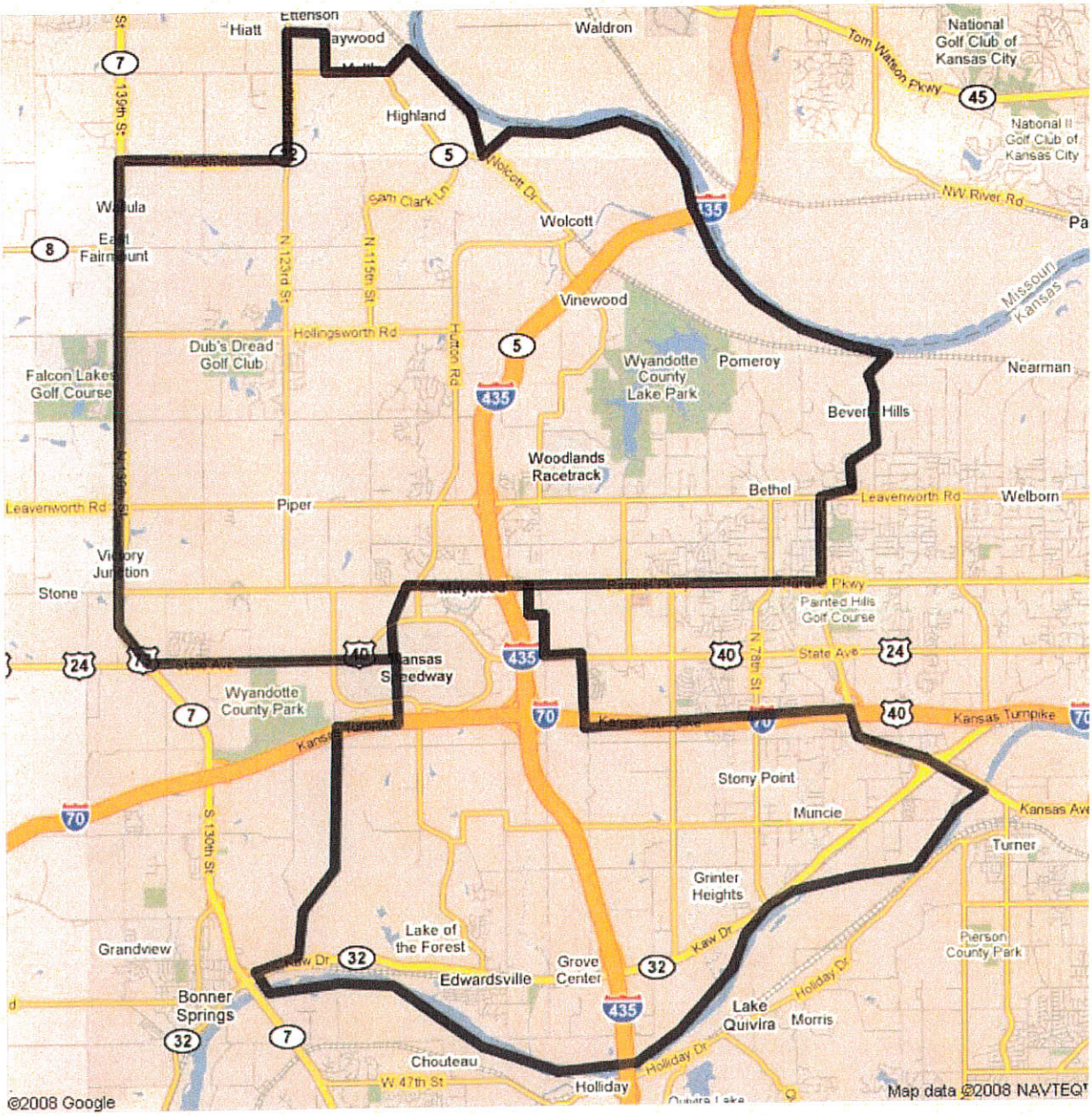
	K-96 Corridor			Wichita MSA (Excluding K-96)		
Year	Total Employees[36]	Annual Net Change in Employees	Cumulative Growth in Employees	Total Employees[37]	Annual Net Change in Employees	Cumulative Growth in Employees
1994	20,447	NA	NA	206,833	NA	NA
1995	21,908	1,461	1,461	207,717	884	884
1996	24,071	2,163	3,624	215,641	7,924	8,808
1997	26,813	2,742	6,366	224,463	8,822	17,630
1998	29,267	2,454	8,820	231,860	7,397	25,027
1999	31,373	2,106	10,926	234,367	2,507	27,534
2000	31,654	281	11,207	227,913	-6,454	21,080
2001	30,012	1,642	9,565	232,647	4,734	25,814
2002	40,249	10,237	19,802	213,819	-18,828	6,986
2003	41,428	1,179	20,981	220,423	6,604	13,590
2004	49,525	8,097	29,078	213,285	-7,138	6,452
2005	41,735	-7,790	21,288	213,086	-199	6,253
2006	44,424	2,689	23,977	210,717	-2,369	3,884

Source: US Census, County Business Patterns Database

[36] Number of jobs in the K-96 corridor ZIP codes:67219, 67220, 67226, 67206, 67203 as reported by US Census

[37] Number of jobs in the Wichita MSA minus K-96 corridor ZIP codes, as reported by US Census

Appendix 3.A. – Village West & Woodlands Racetrack Analysis Zones



Appendix 3.B. I-70 and 110th Street Interchange US Census Job Data

	Village West/Speedway			Woodlands Racetrack		
Year	Total Employees[38]	Annual Net Change in Employees	Cumulative Growth in Employees	Total Employees[39]	Annual Net Change in Employees	Cumulative Growth in Employees
1994	2,745	NA	NA	1,544	NA	NA
1995	3,743	998	998	1,284	(260)	-260
1996	3,185	(558)	440	1,346	62	-198
1997	3,430	245	685	1,021	(325)	-523
1998	3,705	275	960	969	(52)	-575
1999	4,301	596	1,556	928	(41)	-616
2000	3,749	(552)	1,004	885	(43)	-659
2001	3,959	1,117	2,121	913	28	-631
2002	4,866	1,276	3,397	945	32	-599
2003	6,142	718	4,115	817	(128)	-727
2004	6,860	1,234	5,349	1,040	223	-504
2005	8,094	1,234	6,583	1,090	50	-454
2006	9,630	1,536	8,119	1,195	105	-349

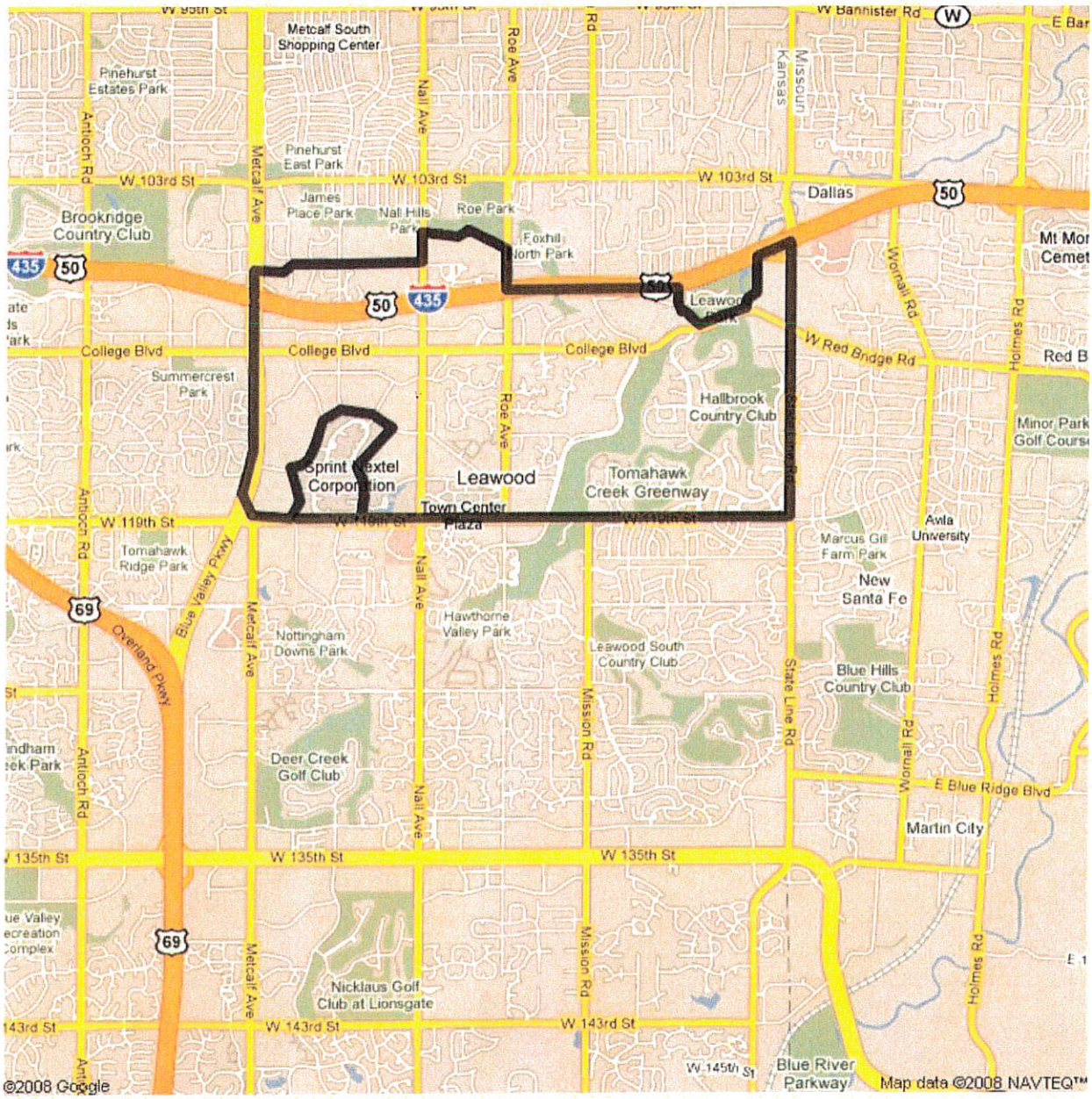
Source: US Census, County Business Patterns Database

[38] Number of jobs in the Speedway ZIP code:66111 as reported by US Census

[39] Number of jobs in the Woodlands Racetrack ZIP code: 66109, as reported by US Census

Appendix 4.A. – Nall Interchange Analysis Zone

ZIP 66211 and 66251:



Appendix 4.B. Nall Interchange US Census Job Data

	Nall/Roe Interchange			Overland Park		
Year	Total Employees[40]	Annual Net Change in Employees	Cumulative Growth in Employees	Total Employees[41]	Annual Net Change in Employees	Cumulative Growth in Employees
1994	14,217	NA	NA	26,180	NA	NA
1995	16,476	2,259	2,259	26,088	-92	-92
1996	15,610	-866	1,393	27,920	1,832	1,740
1997	18,236	2,626	4,019	29,173	1,253	2,993
1998	22,438	4,202	8,221	27,651	-1,522	1,471
1999	24,573	2,135	10,356	29,480	1,829	3,300
2000	29,083	4,510	14,866	30,247	767	4,067
2001	33,046	3,963	18,829	28,579	-1,668	2,399
2002	31,028	-2,018	16,811	27,349	-1,230	1,169
2003	32,589	1,561	18,372	26,289	-1,060	109
2004	40,995	8,406	26,778	24,488	-1,801	-1,692
2005	41,250	255	27,033	25,038	550	-1,142
2006	39,963	-1,287	25,746	26,707	1,669	527

[40] Number of jobs in the Nall & Sprint ZIP codes:66211 & 66251 as reported by US Census
[41] Number of jobs in the Overland Park ZIP code: 66210, as reported by US Census

ZIP 66210


Oak Park Mall
Overland Pkwy
Pinehurst Estates Park
Antioch Rd
Metcalf Ave
Shopping Center
Nall Ave
Roe Ave
Santa Fe Trail Dr
56
Rock Creek Park
W 103rd St
Rosehill Park
Rosehill East Park
Oak Park
Brookridge Country Club
Pinehurst East Park
James Place Park
Nall Hills Park
Roe Park
Foxhill North Par
35
50
69
435
Cottonwood Park
Valleybrooke Park
Corporate Woods North Park
College Blvd
Johnson Coun Community College
Shannon Valley Area
Summercrest Park
Indian Valley Park
Sprint Nextel Corporation
Leawood
Town Center Plaza
Thomas Stoll Memorial Park
Cross Creek Park
W 119th St
Westgate Park
Quivira Park
Tomahawk Ridge Park
Blue Valley Pkwy
S Pflumm Rd
eatherstone Park
Overland Park Golf Club
Nottingham Downs Park
Hawthorne Valley Park
Fairway Woods Park
W 127th St
Switzer Rd
Windham Hill Park
Windham Creek Park
Deer Creek Golf Club
ta Fe St
W 135th St
Overland Park Community Park
St Andrews Golf Club
Blue Valley Recreation Complex
Nicklaus Golf Club at Lionsgate
W 143rd St
Quivira Rd
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Map data ©2008 NAVTEQ™

Appendix 5.A. Hays Commerce Parkway Interchange US Census Job Data

	Hays Interchange			Garden City		
Year	Total Employees[42]	Annual Net Change in Employees	Cumulative Growth in Employees	Total Employees[43]	Annual Net Change in Employees	Cumulative Growth in Employees
1994	8,719	NA	NA	11,461	NA	NA
1995	9,406	687	687	11,659	198	474
1996	9,730	324	1,011	12133	474	806
1997	10,342	612	1,623	12,465	332	681
1998	11,599	1,257	2,880	12,340	(125)	798
1999	11,229	(370)	2,510	12,457	117	1,377
2000	11,453	224	2,734	13036	579	(826)
2001	11,439	(14)	2,720	10833	(2,203)	(769)
2002	11,430	(9)	2,711	10890	57	(842)
2003	11,500	70	2,781	10817	(73)	(639)
2004	11,390	(110)	2,671	11020	203	(972)
2005	11,214	(176)	2,495	10687	(333)	(1,258)
2006	11,639	425	2,920	10401	(286)	474

[42] Number of jobs in the Hays ZIP code:67601 as reported by US Census
[43] Number of jobs in the Garden City ZIP code: 67846, as reported by US Census

Kansas Department of Transportation

Economic Impacts Working Group

Recommended Framework for

Kansas Economic Assessment Tool (K-TEA)

Members

Ms. Mary Birch, Lathrop & Gage (Chair)
Ms. Ann Charles, Local Redevelopment Planning Authority
Dr. Bart Hildreth, Wichita State University
Dr. Tom Johansen, Fort Hays State University
Mr. Steve Kelly, Kansas Department of Commerce
Mr. Jeff Longwell, Wichita City Council
Ms. Carol Meyer, Garden City Chamber of Commerce
Ms. Deb Miller, Kansas Department of Transportation
Mr. Howard Partington, City of Great Bend, Kansas
KDOT Staff: Bruce Burditt, Joe Erskine, Julie Lorenz, Kyle Schneweis, Dennis Slimmer

Background

Working Group's Mission - The Economic Impacts Working Group (the Working Group) was convened by Kansas Department of Transportation (KDOT)'s Secretary Deb Miller in March 2008 for the purpose of making recommendations on a practical approach for improving consideration of economic impacts as a factor in the state's transportation project selection process.

Between March 2008 and June 2008, the Working Group met three times to examine KDOT's currently limited process for considering economic impacts during project selection, to diagnose the need for improved economic impact analysis, to investigate economic analysis techniques used by other state departments of transportation, and to debate tactics that might help KDOT improve its consideration of economic impacts during project selection. This paper summarizes the Working Group's findings.

Need for Work Group - The Working Group's mission originates with KDOT's recently completed Kansas Long Range Transportation Plan (LRTP) in which the agency's stakeholders said strong "support [for] economic growth" must be one of three guiding principles for the next Kansas transportation program. Participants in the year-long dialogue process that led to the LRTP observed that support for economic growth will necessitate decision-making processes by KDOT that can handle fast-moving economic opportunities. They also emphasized development of practical tools that help the state to "make strategic investment choices among various transportation modes – choices that ensure wise use of limited resources" while making sure project selection processes are transparent. The LRTP makes clear the need for greater consideration of economic impacts on a regular basis as part of project selection.

I-80

Product and Audience - This paper documents the Working Group's recommendations for a framework to develop a KDOT Economic Assessment Tool (K-TEA) that may be used to predict the potential impacts on Kansas jobs and incomes associated with proposed projects across all modes of transportation. The Working Group's recommendations are intended to provide KDOT with general guidance for creating a tool for efficiently and effectively analyzing economic impacts of projects for any mode. From these recommendations, the Working Group anticipates that KDOT will formulate a full-fledged technical process for conducting economic impact assessment.

Guiding Principles for Economic Assessment Framework

The Working Group's framework for developing a KDOT Transportation Economic Assessment tool is shaped by a set of guiding principles that ensure it responds to the state's needs:

1. **Examine Predicted Economic Impacts for Selected Project Types -** Scrutiny of potential economic impacts is time intensive and should be reserved for projects where the economic impact potential is uncertain. Projects that add transportation capacity or improve access, for example, may be a catalyst for economic growth and choices about these types of projects should be informed by careful consideration of their predicted economic impacts. Projects that keep pavement and bridges in good shape, by contrast, tend to ensure that transportation sustains the Kansas economy and is not a hindrance to other factors driving economic growth. For these types of projects, engineering criteria are more important drivers of decision-making than consideration of economic impacts.

2. **Focus Analysis on Impacts to Jobs and Income Growth –** Economic development advocates in Kansas are focused on attracting investment to the state that leads to jobs and income growth. Traditionally, KDOT has evaluated projects using engineering-oriented cost benefit analysis methods that measure user savings associated with reducing congestion and quicker travel times. This should be expanded to also examine broader benefits affecting jobs and income caused by better access in the future to labor markets, suppliers and customer markets.

3. **Avoid Comparing "Apples to Oranges" –** The scale of economic impacts associated with a mega-project (like a high-cost, complex urban interchange or upgrading a long stretch of highway to four lanes) is likely to be on a different order of magnitude from the scale associated with a modest capacity improvement project. Project cost should be used as a primary criterion for grouping projects to avoid an unfair focus on high cost projects with large economic impacts.

4. **Favor Net New Job and Income Growth to the State, and Retention of Threatened Jobs -** Projects that generate net new economic growth for the state or help retain threatened jobs deserve greatest support. Projects that transfer economic benefits among regions within the state are not as valuable.

5. **Use Information About Economic Impacts to Assist in Decision-Making -** Data on predicted economic impacts should be used to inform a broader project selection process that also includes consideration of engineering, community and fiscal factors. First and foremost, projects should serve compelling transportation needs.

Recommended Elements for Economic Analysis Framework

The Working Group recommends that KDOT should develop the technical components of its economic impact assessment tool around the following framework:

1. **Establish Pre-Requisite Project Eligibility Criteria.** To ensure that economic impact analysis is reserved for a manageable pool of potential projects that offer the highest potential for economic benefits, the Work Group recommends that KDOT develop simple pre-requisite criteria to determine which projects move forward for further scrutiny using K-TEA. Suggested pre-requisite eligibility criteria for KDOT to consider and more fully develop include:

    - **New Capital Investment –** All projects should be new capital investments that demonstrate benefits in terms of expanded capacity or improved access, whether investments are highway, rail, transit, bicycle and pedestrian, or multimodal focused. Examples of project types that might be accepted include:

        - New rail, highway or transit alignments/routes;
        - Access improvements to airports and multimodal facilities;
        - New interchanges; or
        - Widened highways or capacity improvements on other modes.

    - **Proof of Transportation Need –** All projects should demonstrate a clear transportation need that justifies the project, such as congestion relief, improved safety, enhanced access or modernization of facilities to reduce risk of traffic incidents.

    - **Evidence of Strong Local or Regional Support –** All projects should offer hard evidence of local or regional-level support such as:

        - Local government letters or resolutions of support;
        - Documented commitments to the project in local government or Metropolitan Planning Organization plans;
        - Evidence of multi-jurisdictional project support partnerships;
        - Willingness to make a local financial contribution toward project costs;
        - Preservation of land for project right-of-way;
        - Private investment contribution toward project costs; or
        - Evidence that substantial new public or private capital investments have or will be made in anticipation of the project.

    - **Modest Minimum Dollar Cost Threshold –** All projects should meet or exceed a modest minimum dollar cost that is sufficient to generate reasonable economic impacts. Projects that fall below the minimum may still be pursued, but would not require extensive economic impact analysis.

    Proof of pre-requisite criteria should not be burdensome, but the criteria should set a reasonable standard for initial acceptance that ensures all projects reviewed via K-TEA have some merit in terms of economic impacts.

2. **Group Projects by Construction Cost.** A project's scale is likely to be an indicator of the overall scope and nature of its economic impacts. For example, an important, but low-cost project in rural Kansas where economic activity is not as densely concentrated, may have less economic impact than a high-cost project in the Kansas City region which has a large market for labor, goods and services. The Work Group recommends that KDOT should use project cost to group projects, with KDOT setting the dollar amount that defines "small," "medium" and "large" project.

   After projects have been evaluated in cost categories and if appropriate, KDOT may wish to consider sub-grouping projects by locational categories. For example, groupings might include those located in metropolitan areas with a core city and surrounding areas whose population is greater than 50,000; those located in micropolitan areas with a core city or town and surrounding area whose population is 10,000 to 49,999; and those located in rural areas that have no city or town whose population is under 10,000.

3. **Model Projected Jobs, Income and Investment Impacts.** For projects that are not justified solely on the basis of traffic flow improvement, there should be an assessment of the potential project's impact on jobs and income. That assessment should be based in part on quantified data. The Work Group recommends that projected regional economic impacts for projects should be estimated by KDOT using an "off the shelf" regional economic model. The model should be capable of translating predicted project-level travel time, safety, and accessibility changes into:

   - Additional regional output attributable to the project;
   - Jobs added as a result of the project; and
   - Additional household income attributable to the project.

   Gathering necessary input data for the model should be a collaborative process between KDOT and project sponsors that requires additional commitment of staff resources on both sides. Each output should be used as part of an overall economic impact score for each project as discussed in step #5 below.

4. **Use Qualitative Information to Round Out Analysis of Economic Impacts.** The modeling techniques described in step #3 are acknowledged to provide an incomplete picture of economic impacts. To ensure that a fuller consideration of economic impacts takes place, the Work Group recommends that each project subject to a quantification of economic benefits should also be assessed via an evaluation of non-quantifiable economic impacts. KDOT should develop its own qualitative criteria, which might include:

   - Consistency with statewide economic goals - KDOT should work with the Department of Commerce to investigate appropriate goals;
   - Level of local or regional support, particularly willingness to cost share;
   - Potential to retain threatened jobs; and
   - Severity of adverse local economic conditions (e.g. unemployment, poverty rates, etc.);

   Responsiveness to each criterion should be gauged by project sponsors and validated by KDOT staff. Responses should be used as part of an overall economic impact score for each project as discussed in step #5 below.

5. **Create Composite K-TEA Scores for Projects Based on Quantitative and Qualitative Information.** The Working Group recommends that KDOT should develop a scoring system to translate the quantitative and qualitative information about economic impacts gathered in steps # 3 and #4 into an easy-to-understand composite score for each project. For example, each project could be assigned points based on:

    - Amount of additional regional output;
    - Number of jobs added;
    - Change in household income;
    - Consistency with statewide economic goals;
    - Level of local or regional support;
    - Severity of adverse local economic conditions (e.g. unemployment, poverty rates, etc.);

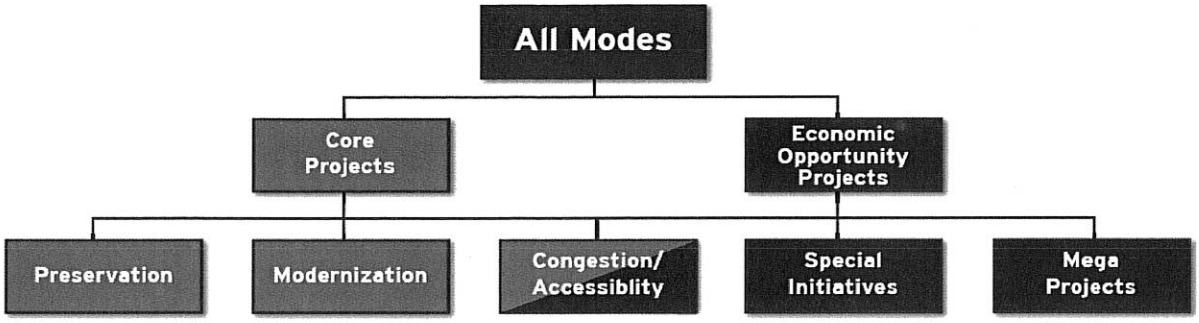
    The Working Group encourages KDOT to consider different options for scoring projects, based on its level of comfort with the accuracy of data and information derived in steps #3 and #4. Options might include assigning points associated with ranges for quantitative elements (e.g., 10 points for" up to 250 jobs created;" and 15 points for "more than 250 jobs created") or weightings for scoring elements that indicate policy priorities (e.g. "jobs added" is a maximum of 50 percent of the total score and "local support" is a maximum of 25 percent of the total score).

K-TEA & KDOT's Project Programming Process

The Working Group recommends that the K-TEA evaluation process should be used to help select some types of projects within the programming model described in the recent Kansas Long Range Transportation Plan (LRTP).

Background on LRTP Program Recommendations. The LRTP presents a two-part program of "Core Projects" and "Economic Opportunity Projects" for meeting Kansas transportation infrastructure needs as shown in Figure One. Drawing primarily on engineering criteria to develop a firm list of projects, the Core Projects program element provides a predictable stream of projects to preserve and modernize transportation infrastructure. Some congestion relief and accessibility improvements are part of this program element. Providing a more flexible complement to the Core Projects element, the Economic Opportunities program element provides KDOT with the ability to meet swiftly emerging development needs that cannot be fully anticipated via the Core Projects. Economic Opportunities projects may include capacity additions, mega projects or access improvements.

Figure One. Program Structure Proposed in Long Range Transportation Plan



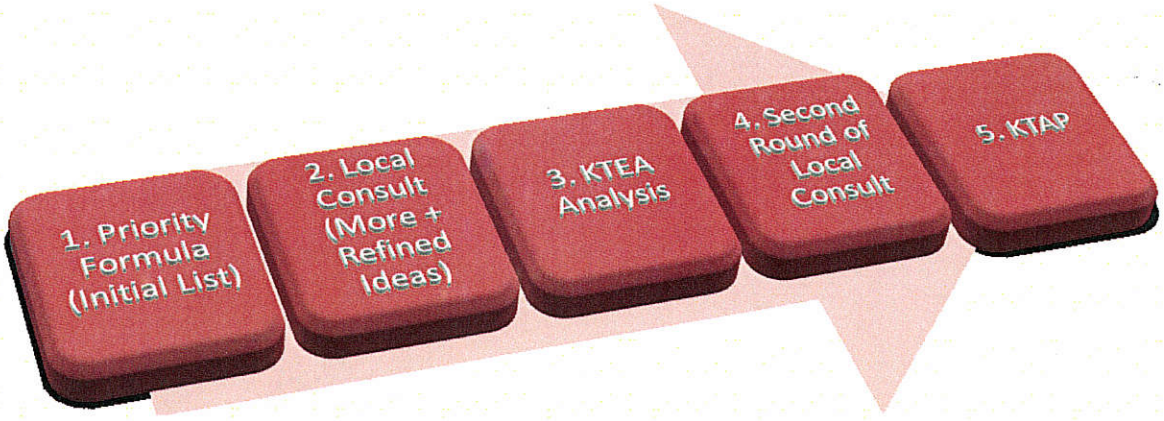
The Working Group concurs with the findings presented in the LRTP, which anticipates that economic analysis and public involvement will be most beneficial for selecting projects in the Economic Opportunities program element and they encourage KDOT to prioritize projects on a regular basis with extensive input from stakeholders and the public to ensure responsiveness to new needs as they emerge. "Local Consult" will be continued and expanded by KDOT to help engage with local stakeholders about their transportation investment needs. The LRTP also recommends a Kansas Transportation Advisory Panel (K-TAP) be established whose members are appointed by the Secretary in consultation with stakeholders and include a mix of local, regional and statewide transportation stakeholders representing the state's geographic regions, transportation modes and economic impact perspectives. Members would provide ongoing counsel to the Secretary regarding: guidance on emerging issues, advice on project selection, and response to local input.

Steps for Integrating KTEA & Program Decisions. The Working Group suggests a five-step process, as shown in Figure Two, for integrating K-TEA with the broader project programming model described above:

Step One – Priority Formula Used to Generate Initial Project List: KDOT should continue to use the "Priority Formula" to generate a listing of project needs, based on engineering criteria. The Priority Formula is an objective, data-driven computer application that uses massive amounts of data about the condition of the state's highway system to identify those highway sections most in need of improvement because of deficiencies in pavement smoothness or problems related to shoulders, hills, curves, traffic volume or safety concerns. The Priority Formula was used to help select projects for both the Comprehensive Highway Program and the Comprehensive Transportation Program.

Step Two – Local Consult Used to Add to and Refine Initial Project List: KDOT should use the Priority Formula list as a starting point for conducting a first round of "Local Consult" outreach across the state to hear from stakeholders about additions and refinements to the listing. Ideas for "economic opportunities" projects that the Priority Formula does not detect would emerge at this step.

Figure Two. Project Selection Process



Step Three – Use K-TEA Analysis to Determine Projects with Greatest Economic Merit: The project ideas developed via the Priority Formula and Local Consult should be analyzed by KDOT using the proposed K-TEA tool to determine their relative economic impacts.

Step Four – Follow-up Local Consult: KDOT should present a refined listing of projects based on initial Local Consult feedback and subsequent K-TEA analysis results for discussion.

Step Five– KTAP Review: KDOT should present a proposed listing of projects to the proposed Kansas Transportation Advisory Panel based on feedback from the second round of Local Consult.

Conclusions

The Working Group is highly supportive of finding new ways to ensure that transportation supports the Kansas economy. Members are confident that improving KDOT's project selection process, by considering economic impacts, is one of the most important ways to maximize the benefits of transportation investments. The K-TEA approach described in this paper was reached by consensus among the Working Group's members and represents a good balance between analytic rigor and practical ease of use. The Working Group is confident it is comparable to economic analysis approaches used by other state DOTs and encourages KDOT to use the framework provided to create a practical decision-making support tool that can help it handle fast-moving economic opportunities.

Proposal for Reforming KDOT's Economic Development Program

Transportation-sensitive economic opportunities don't always require costly solutions. In addition to making major transportation investments that are responsive to economic opportunities of statewide significance, KDOT must also provide transportation improvements for locally or regionally important opportunities.

During development of KDOT's Long Range Transportation Plan, stakeholders recommended that KDOT should overhaul its existing economic development set-aside program with the explicit goal of helping companies that offer the prospect of high-quality employment to decide to remain in Kansas or locate in the state.

Economic Development Program Background

- **Program Focus:** Kansas DOT's Economic Development (ED) program provides annual support for a modest number of smaller-scale, local government-sponsored projects that create transportation improvements on or off the Kansas state highway system, such as access improvements to an industrial park, which support jobs and economic output in Kansas communities. Each ED project chosen by KDOT typically costs under $1 million.
- **Funding Level:** Kansas DOT annually sets aside a combined total of about $13 million for "geometric improvement" and "economic development" projects. In recent years, about $5 million a year has been awarded for ED projects. Project sponsors are expected to provide a 25 percent match for their projects. At present, new ED project applications have been temporarily suspended as the Department's Comprehensive Transportation Program comes to a close.
- **Project Selection Process:** ED projects are selected competitively on an annual cycle; local governments that seek ED funding must submit a formal project application. Once a year, KDOT - in coordination with the Highway Advisory Commission (HAC) - administers a review of all applications that includes site visits. The HAC, which includes representatives from each KDOT district, recommends a set of ED projects for funding to KDOT's secretary.
- **Project Development Process:** ED Projects typically take several years to design and build once they are awarded, with KDOT's local roads program staff typically overseeing project design and construction activities on the sponsor's behalf.

Economic Development Program Reforms

KDOT is currently considering several options for change in the Economic Development Program that are intended to enhance its support for jobs and economic output in Kansas communities:

- **Expand Eligibility to Include All Modes –** Highway projects only are eligible for funding in the ED program at present, however, KDOT recognizes that rail, air and transit projects – such as improving access to a class I rail line or supporting commuter transit service - can

also yield valuable economic benefits. In the future, the ED program may be used to support all modes.

- **Focus on Immediate Opportunities –** At present, KDOT's ED program does not distinguish between speculative projects – such as building road access for a business park that has yet to secure any leases – versus projects that are targeted to an immediate opportunity – such as a business that will expand if it is able to improve the rail access to its distribution facility. Preference in use of funds for immediate opportunities projects is likely to increase the overall economic impact of the program.
- **Develop a Rolling Application Cycle –** An annual application process is not conducive to supporting business decision-making timeframes, which often move quickly. KDOT is considering a rolling application process in which proposals are considered as they are received. High rated proposals would be immediately accepted for funding, but low rated proposals would be set aside to be reconsidered if additional high-rated proposals are not received.
- **Emphasize Economic Development in Selection Criteria -** Today, the program funds important transportation improvements on the local road system but a rigorous selection process based on economic impact criteria is not used. KDOT is considering ways to introduce more effective evaluation of economic development impacts to the project selection process.
- **Ensure Strong Local Commitment –** Highest priority during project selection should be given to projects that are backed by local and regional groups that offer strong project-level partnerships which enable transportation improvements to fulfill their potential for positive economic impacts.
- **Consider Expanded Funding –** KDOT will examine whether funding for the ED program should be increased, particularly to allow support for all modes. A cost-benefit analysis of the program, once refocused, would give direction about a level of funding that is sufficient.

Economic Development
RESEARCH GROUP

Final Report:

Economic Benefits of KDOT Highway Preservation Funding

Prepared for:
Kansas Dept. of Transportation

Prepared by:
Economic Development Research Group, Inc.

November 10, 2008

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ACKNOWLEDGEMENTS

This study was conducted by Economic Development Research Group, Inc. (EDR Group) for the Kansas Dept. of Transportation (KDOT), under subcontract to HNTB Corporation. Primary work was conducted by Lisa Petraglia, Brian Alstadt and Glen Weisbrod of EDR Group. Important direction was provided by Julie Lorenz, Director of the Division of Public Affairs at KDOT. In addition, analysis of Kansas bridge management system and pavement management system was conducted by staff of KDOT, primarily Kyle Schneweis, David Schwartz, Rick Miller, Don Whisler and Kent Anschutz. While the contributions of all parties are appreciated, the findings of this study are solely those of the consultant team.

EXECUTIVE SUMMARY

The Economic Impact of KDOT Highway Preservation Funding
Prepared by: Economic Development Research Group, Inc.
For: Kansas Department of Transportation
October 7, 2008

Kansas DOT invests approximately $384 million annually in highway system preservation, which includes repairs, rehabilitation and replacement of road pavement and bridges to keep them fully functional. Since this investment prevents degradation rather than enabling improvements in travel, its importance is often not immediately apparent to travelers. However, it is ultimately one of the most important elements of transportation funding, for the cost of deferring infrastructure maintenance can be much larger in the long run.

To demonstrate the economic importance of maintaining needed funding for highway system preservation, Kansas DOT sponsored a study to estimate the impact of preservation funding on the economy. This impact is demonstrated by examining how a significant and continuing shortfall in preservation funding – represented by a 60% drop in annual funding level – would affect travel conditions and transportation costs, and ultimately also jobs and income in the state. This level of shortfall is unprecedented but not impossible, given the financial crisis affecting state highway funding today. In any case, it provides an illustrative example of the connection between preservation funding and continued economic growth.

For the illustrative scenario, it was assumed that funding of pavement and bridge preservation would drop from the current level of roughly $385 million/year in 2008 to $154 million/year (in constant 2008 dollars) over the period of 2009 – 2020. KDOT staff applied models to predict how pavement and bridge conditions would deteriorate, and the consultant team then ran a Kansas statewide economic impact analysis system to calculate the additional economic impacts. The results showed that there would be a loss of jobs, worker income and gross state product, which would grow larger each year. By 2020, the Kansas economy would experience a loss of over 12,000 jobs and a loss of over $670 million/year in Gross Domestic Product, including $460 million/year less labor income than would occur if preservation funding were to continue at its current level.

The impact can also be viewed from the viewpoint of highway users. In that case, the value of traveler losses due to additional travel time, vehicle operating expense and safety reduction would be more than triple the savings in highway preservation spending. In other words, there is a 5-to-1 benefit/cost ratio associated with continued preservation funding.

1 INTRODUCTION

1.1 Background and Objective

> *"KDOT maintains about 9,600 miles of state highway. It is more cost-effective to keep a good system in shape than to let it deteriorate and then do repairs. A Pavement Management System helps KDOT track the condition of state roads and strategically target the use of funds for maintenance, preservation, rehabilitation and construction. The interstate system has benefited, with 97.4 percent of interstates rated in highest condition last year; so has the non-interstate system, with 88.5 percent of pavement achieving that rating." –from the* ***Kansas DOT 2008 Annual Report***

The Kansas Department of Transportation (KDOT) "preservation" program provides for continuing maintenance and rehabilitation of interstate and state roads and bridges. This includes filling cracks and potholes and periodic repaving of roads, as well as correction of problems with roadway alignments, shoulders and intersections when needed. It also includes repair and replacement of bridge decks and structural components. The current funding provides approximately $284 million per year for pavement preservation covering 9,600 miles of highway, plus approximately $100 million per year for bridge preservation covering over 3,200 bridges included in KDOT's bridge management system).

Today, both federal highway trust fund revenues and state fuel tax revenues are failing to keep up with funding needs for both highway preservation and highway capacity improvements. In this environment of constrained resources, it becomes particularly important to carefully consider the benefits and costs of funding both types of highway system investment. This report focuses on the former – i.e., the economic value of KDOT's highway and bridge preservation programs.

To conduct this analysis, members of the consultant team and KDOT staff worked together to develop two scenarios: (1) a scenario in which the current level of funding for highway preservation is continued in future years, and (2) a scenario in which funding for highway preservation is substantially reduced in future years. For each scenario, we calculate the effect on highway travel conditions, travel-related costs for highway users, and the expected level of economic activity and growth in the state. The difference between the two scenarios reflects the extent of roadway degradation, additional traveler cost and loss of both jobs and income that would result from a substantial reduction in preservation spending. The results are presented in two ways – in terms of the impact on economic growth and development in Kansas, and in terms of a user benefit/cost ratio.

1.2 Analysis Process

To demonstrate the importance of investment in highway and bridge preservation, it is useful to examine how the performance of facilities degrades without adequate investment. To illustrate this relationship, this study examined the impacts of full versus partial funding of highway and bridge preservation over the period of 2009 to 2020. The partial funding scenario was illustrated by assuming a 60% average drop in annual funding level in real (inflation adjusted) terms. Specifically, it was assumed that the funding of pavement preservation and annual bridge maintenance would drop from the current funding of roughly $385 million/year in 2009 to $154 million/year (in constant 2008 dollars) over the period of 2009 – 2020. This level of shortfall is unprecedented and hopefully will never occur. However, by using scenarios of this type, it becomes possible to illustrate the way in which highway facilities degrade over time in the absence of sufficient maintenance, and how that leads to substantial impacts on travelers and the state's economy.

The analysis process involves four steps, illustrated in Exhibit 1. They are:

- First, road pavement and bridge conditions are analyzed (as discussed in Chapter 2). Kansas DOT staff employ a series of facilities management systems to monitor pavement and bridge conditions. These systems are used to portray how roadway pavement conditions and bridge structural conditions will degrade if there is only partial funding for their maintenance. The degradation of pavement occurs over time as cracks, bumps and potholes develop, and vehicle speeds are reduced. The degradation of bridges also occurs over time as structural integrity weakens, and weight limits are reduced, requiring heavy vehicles to detour to longer alternative routes.

- Second, user travel impacts are analyzed (as discussed in Chapter 3). The changes in vehicle-hours and vehicle-miles of travel are translated into changes in travel time, vehicle operating cost and accident rates. The changes in pavement condition are translated into further impacts on vehicle repair and operating costs. Ultimately, all of these changes in travel conditions and patterns affect business travel, commuting trips and personal trips. Those effects are then translated into changes in the dollar value of total user costs, which increase over time as pavement and bridge conditions further degrade.

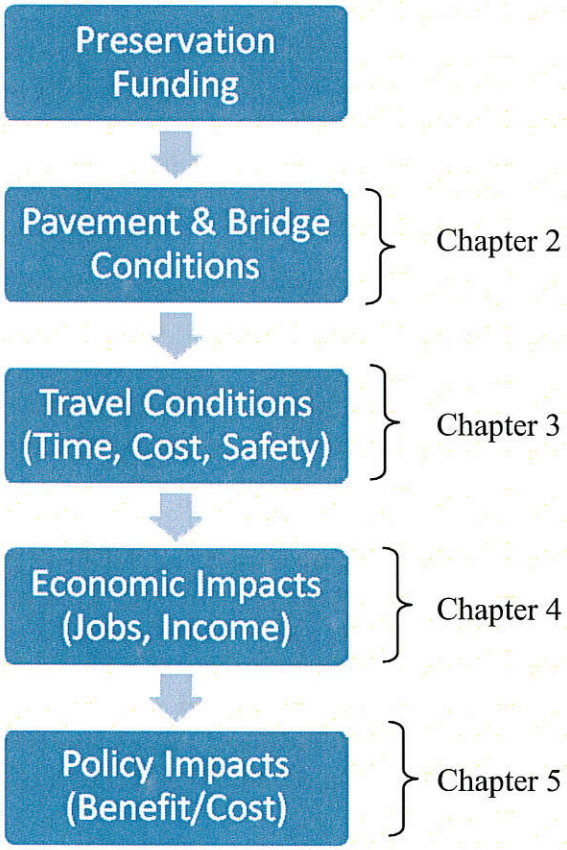
- Third, impacts on the economy are calculated (as discussed in Chapter 4). The calculations are made using the TREDIS model[1] for Kansas to identify how the user impacts affect households as well as business costs and productivity for different sectors of the Kansas economy. Those results are used to estimate the resulting changes in statewide jobs and associated

[1] Transportation Economic Development Impact System

changes in levels of personal income and Gross Domestic Product.

- Finally, the policy implications of these findings are discussed. As part of this analysis step, the net present value of changes in the stream of annual costs and the stream of annual benefits is calculated. This provides a basis for calculating benefit/cost ratios. In addition, the implications for depreciation of state assets and Kansas bond financing are noted.

Exhibit 1. Impact Process



2 Road & Bridge Conditions

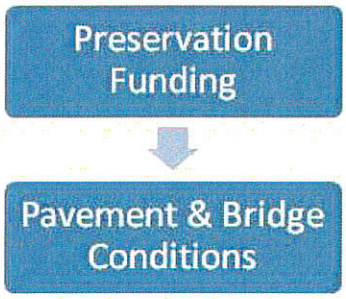
To portray how road and bridge conditions decay from insufficient care due to funding shortfalls for ongoing preservation activities, two scenarios were defined:

- A "Current Funding" scenario, in which annual funding of road and bridge preservation remains level (in constant, inflation-adjusted dollars) through 2020.
- A "Reduced Funding" scenario, in which annual funding of road and bridge preservation is significantly reduced in future years 2009-2020. Bridge preservation funding is assumed to drop 50% from the current level, while pavement preservation funding is assumed to drop 60% from the current level.

Exhibit 2. Scenarios

	2008 Funding	Annual Funding (2009-2020)	Reduced Funding (2009-2020)
Pavement Preservation	$ 284 million	$ 284 million	$ 99 million
Bridge Preservation	$ 100 million	$ 100 million	$ 50 million
Total	$ 384 million	$ 384 million	$ 149 million

For each of the two scenarios, KDOT staff applied their pavement and bridge management systems to assess how those funding scenarios will affect the performance of highway system assets in terms of pavement conditions, bridge structural conditions, and associated changes in vehicular usage, speeds and diversion of traffic.



2.1 Road Pavement Preservation Program

The pavement preservation program covers both minor, ongoing maintenance activities (e.g., crack and pothole filling, resurfacing, etc.) and major reconstruction, for both Interstate highways and State highways. A breakdown of this funding under the alternative scenarios is shown in Exhibit 3. Typical activities conducted under this program are shown in the Exhibit 4 photographs.

Exhibit 3. Pavement Program Components in Millions of 2010 Dollars

Scenario>> Category of Spending:	Current Funding Scenario	Reduced Funding Scenario
Interstate Reconstruction	$ 51 million	$ 0 million
Interstate Maintenance	$ 59 million	$ 30 million
Non-Interstate Reconstruction	$ 46 million	$ 0 million
Non-Interstate Maintenance	$ 128 million	$ 69 million
Total Annual Average	**$ 284 million**	**$ 99 million**

Exhibit 4. Illustration of Pavement Preservation Activities

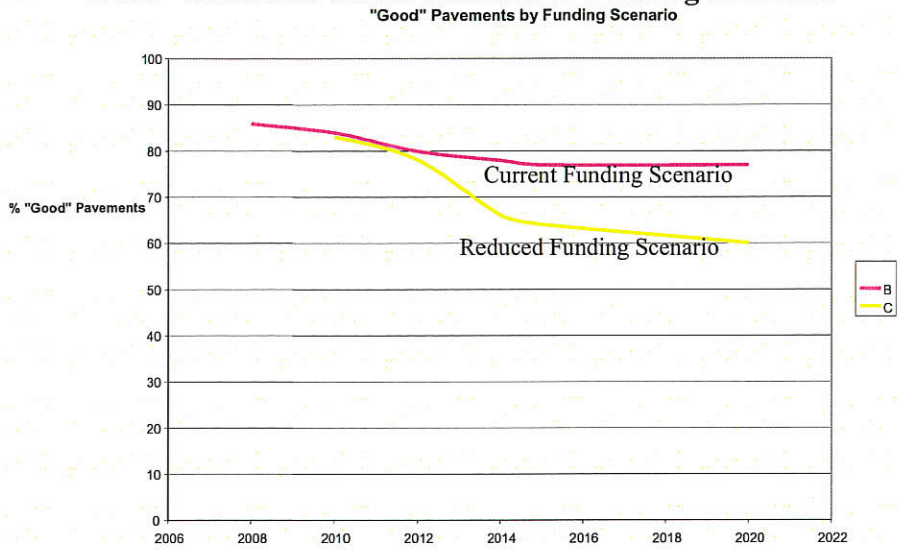
Pavement Recycling

Pavement Crack Sealing

Source: Kansas DOT Annual Reports, 2007and 2008

The pavement preservation activities, illustrated in preceding Exhibit 4, are necessary to maintain vehicle speeds and safety. Kansas DOT staff applied pavement management models to forecast how pavement conditions would change under the alternative scenarios. The results, illustrated in Exhibit 5 (below), indicate that the "Current Funding" scenario would maintain 77% of the state highway miles in what they refer to as "good" condition, while the "Reduced Funding" scenario would lead to a decrease in the quality of pavement over time, so that just 60% of the state highway miles would be considered to be in "good" condition by the year 2020.

Exhibit 5. Percent of the Kansas DOT Pavement System in "Good" Condition Under Alternative Funding Scenarios

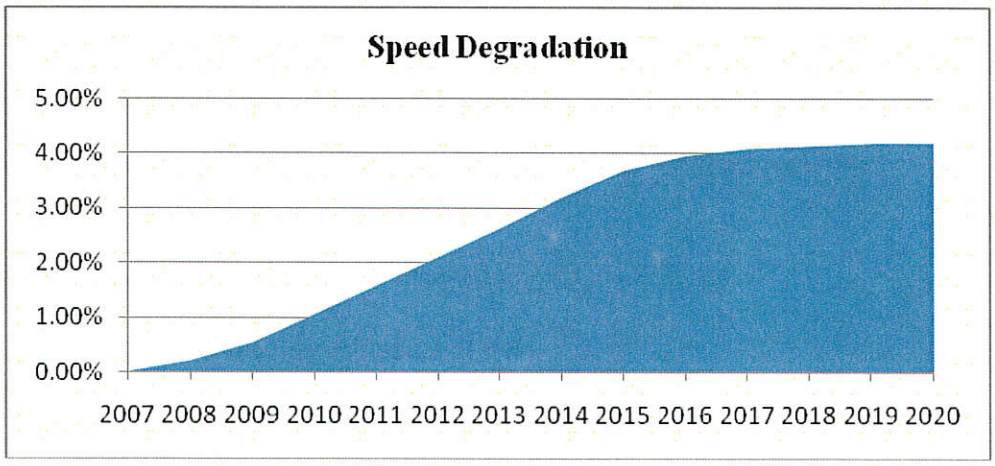


KDOT staff applied an International Roughness Index (IRI) model to estimate the impact of these scenarios on average vehicle speed. The results, displayed in Exhibit 6, indicate that the reduced quality of pavement and corresponding increased roughness associated with the "Reduced Funding" scenario will lead to a slowdown in travel speeds across the state.

The extent of the speed slowdowns will differ widely among routes, depending on the age and existing condition of the pavement, as well as their posted speeds. Over all state-controlled highway miles, the average will be a 4.3% reduction in speed. However, some roads will have much more dramatic speed reductions, while others will have barely perceptible speed reductions. It is also notable that while the initial funding cut will lead to some degradation of pavement and speed reduction, the analysis by KDOT staff assumes that the agency will find a way to maintain a basic, albeit diminished level of road functionality in later years.

In fact, road quality under the "Reduced Funding" scenario will not only reduce speeds, but it will also lead to traveler impacts in the form of increases in total "vehicle-hours" of travel time and increase in vehicle operating costs. Those impacts are further discussed in the Chapter 3 analysis of traveler impacts.

Exhibit 6. Reduction in Speed Due to Pavement Deterioration Under the Reduced Preservation Scenario



The reductions in speed will differentially affect various classes of roads, depending on their current average speeds. A breakdown of the road classes covered under KDOT's pavement preservation program and their current speeds is shown in Exhibit 7 below.

Exhibit 7. KDOT Classification of Roads

KDOT Route Classification	A	B	C	D	E
Avg. MPH	75	70	65	60	55
Centerline Miles	874	2,186	2,452	3,272	1,822
% of Total System Miles	8.20%	20.60%	23.10%	30.80%	17.20%

CLASS A -- The Interstate System, including the Kansas Turnpike.

CLASS B -- Routes that serve as the most important statewide and interstate corridors for travel. The routes serve distinct trip movements since they are widely spaced throughout the State. On major sections of the routes traffic volumes are relatively constant. A significant number of out-of-state vehicles use Class B routes, and trips on the routes are typically very long.

CLASS C -- Defined as arterials, these routes are closely integrated with Class A and B routes in service to all parts of the State. Major locations that are not on A or B routes are connected by a C route. Average trip lengths are typically long.

CLASS D -- These routes provide access to arterials and serve small urban areas not on a Class A, B, or C route. The routes are important for inter-county movement.

CLASS E -- Primarily for local service only, these routes are typified by very short trips. Class E routes are frequently used on a daily basis, sometimes several times a day, to connect rural residents with other routes or to provide access to small towns in the area.

2.2 Bridge Maintenance Program

The bridge preservation program covers both minor, ongoing maintenance activities (e.g., crack and pothole filling, resurfacing, etc.) and major reconstruction of decks and structures. These activities are illustrated in Exhibit 8 below.

Exhibit 8. Illustration of Bridge Preservation Activities

Bridge Deck Replacement

Source: Kansas DOT Annual Report, 2008

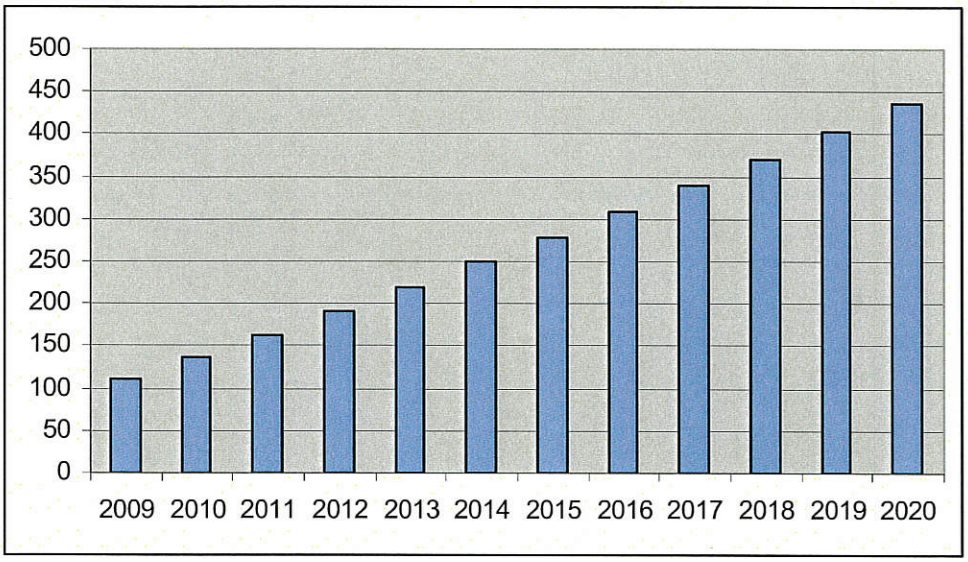
Bridge Structure Replacement

Source: Kansas DOT Annual Report, 2007

To assess the future impact of alternative funding scenarios, the KDOT Bridge section ran its PONTIS model which assigns a health index to each of the over 3,200 bridges in the statewide bridge inventory, which spans structures for all five classes of highway routes. The system can then re-evaluate annually, the condition of bridges when changes in funding levels are under consideration. As specific bridges slide into lower quality rankings, posted weight limits will need to drop further and traffic (cars and trucks) will be detoured.

Details of the Pontis results are shown in the Appendix. They show the change in bridge quality ratings over time, which affects nearly all of the bridges in some way, and which spans all five of the roadway classes. However, a smaller number of bridges (slightly over 100) will fall so low in the ratings as to be reclassified as "poor," thus triggering truck and/or car detours under the "Reduced Funding" scenario. The number of bridges meeting this severe criterion is shown in Exhibit 9 below.

Exhibit 9. Number of Bridges Rated "Poor" Under the Reduced Funding Scenario, by Year



The total miles of detour associated with the bridges rated "poor," and the number of vehicles affected daily, is shown in Exhibit 10. While the largest number of poor quality bridges are forecast in the Class C, D and E routes, it is important to note that the greatest vehicle volumes occur on the Class A (Interstate highway) routes. As a result, even a small number of problematic bridges in Class A can lead to a large volume of "vehicle-miles" of detoured traffic. The additional vehicle mileage leads to greater vehicle operating costs, traveler time costs and more accidents. These impacts on travelers are discussed further in Chapter 3.

Exhibit 10. Miles of Detour and Affected Volumes associated with Bridges Rated "Poor" with the Reduced Funding Scenario

Class	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Non-Trucks	Trucks
A	0	0	4	6	8	10	12	14	16	18	22	28	28	17,925	3,939
B	0	5	15	20	25	30	35	40	40	45	50	55	65	4,071	983
C	0	96	96	102	108	120	126	132	144	150	162	168	174	3,277	539
D	0	80	88	96	104	112	128	136	144	160	168	184	192	1,519	251
E	0	72	96	108	114	126	132	144	150	162	186	198	198	695	106
TOTAL	**0**	**253**	**299**	**332**	**359**	**398**	**433**	**466**	**494**	**535**	**588**	**633**	**657**	**27,487**	**5,818**

Source: KDOT, Bridge Section

3 TRAVELER IMPACTS

All of the changes in pavement and bridge conditions, as reported in Chapter 2, lead to additional changes in travel patterns and conditions. In particular, the reductions in speed will lead to longer travel times for drivers and passengers. The additional pavement roughness will also raise car and truck operating costs. In addition, the increase in vehicle mileage due to diversion from deficient bridges will also tend to increase both vehicle operating costs and the number of traffic accidents.

3.1 Pavement Deterioration Impact: Time and Operating Cost

Travel Time. Chapter 2 previously showed how a deterioration in pavement conditions under the "Reduced Funding" scenario will lead to reduced average vehicle speeds (shown earlier in Exhibit 6). That, in turn, means that average travel times will be higher. To calculate the total time impact on travelers, the projected speed reductions were applied to KDOT's projection of future annual vehicle-hours of travel for both auto and truck trips within each route class.

The results, shown in Exhibit 12, represent the calculated increases in annual vehicle-hours of travel (VHT) under the "Reduced Funding" scenario. These results indicate that the total delay caused by reduced pavement conditions will rise to over 2.5 million annual vehicle-hours in the year 2011, and rise to over 11.2 million in 2017 and over 12.5 million by the year 2020.

Operating Cost. The reduced pavement condition is not expected to change driving distances (as represented by changes in "vehicle-miles of –travel" (VMT), but the per-mile vehicle operating cost is expected to increase as road quality decreases. As a result, an increase in vehicle operating costs is also expected.[2] This cost impact is discussed further in the Chapter 4 discussion of economic impact consequences.

[2] In absence of KDOT sourced information, we model a 5.5% increase in the per-mile vehicle operating cost, derived from Gary Barnes and Peter Langworthy (2004), Transportation Research Record, #1864, pp. 71-77.

Exhibit 12. Increase in Total Annual Vehicle-Hours of Travel Due to Pavement Deterioration Under the Reduced Preservation Scenario

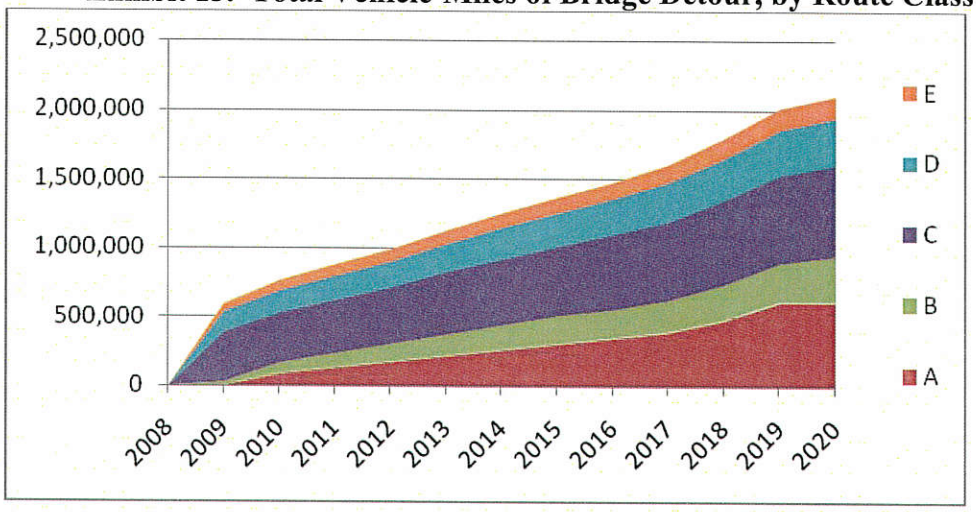
Year	2011	2017	2020
Interstate Highways (Class A)	**802,041**	**3,704,578**	**4,200,993**
Cars	*647,724*	*2,904,013*	*3,217,128*
Trucks	*154,317*	*800,565*	*983,864*
Non- Interstate (Class B thru E)	**1,715,228**	**7,591,776**	**8,322,640**
Cars	*1,420,074*	*6,198,077*	*6,715,860*
Trucks	*295,154*	*1,393,699*	*1,606,780*

3.2 Bridge Deterioration Impact: Detours

Detours and Travel Distances. Chapter 2 previously showed how a deterioration in bridge conditions under the "Reduced Funding" scenario will lead to vehicle detours, and hence longer average travel distances. To calculate the total time impact on travelers, the forecast increase in travel distances was applied to KDOT's projection of annual vehicle-miles of travel for both auto and truck trips within each route class.

The results, shown in Exhibit 13, represent the calculated increases in annual vehicle-miles of travel (VMT) caused by bridge detours. These results indicate that the total additional vehicle-miles under that scenario will rise to over 1 million by the year 2012, rising to over 2 million by the year 2020 which consists of a 3.2% increase of base VMT on Interstate roads, and 5.4% on the non-Interstate roads.

Exhibit 13. Total Vehicle-Miles of Bridge Detour, by Route Class



Of course, the increase in vehicle-hours of travel (VHT) also means that there will be additional increases in driver time and vehicle operating costs as a result of longer travel distances under the "Reduced Funding" scenario. In fact, the impact is even worse under that scenario because the added detour miles will take place on the same deteriorated pavement as existing traffic. So the additional detour miles will take place at lower speeds (raising travel time costs) and also involve a higher per mile vehicle operating cost than if the pavement were in better condition (as would otherwise occur under the "Current Funding" scenario). As a result, the "Reduced Funding" scenario for bridges has both VMT and VHT implications as shown in Exhibits 14 and 15, respectively.

Exhibit 14. Change in Annual VMT due to Bridge-Related Detours Under the Reduced Spending Scenario (millions of additional vehicle-miles per year)

Mode	Road Class	2009	2014	2020	Total 2009 -2020
Truck	(A)_Interstate	0	17.254	40.260	232.932
	(B-E) Non-Interstate	30.774	54.155	82.771	672.773
	Total	30.774	71.409	123.031	905.705
Auto	(A)_Interstate	0	78.509	183.189	1.059.879
	(B-E) Non-Interstate	184.839	307.113	461.304	3.822.538
	Total	184.839	385.623	644.493	4.882.417
All Vehicles	(A)_Interstate	0	95.764	223.449	1.292.811
	(B-E) Non-Interstate	215.613	361.268	544.075	4.495.310
	Total	215.613	457.032	767.524	5.788.122

Exhibit 15. Change in Annual VHT due to Bridge-Related Detours Under the Reduced Spending Scenario (thousands of vehicle-hours per year)

		2009	2014	2020	Total 2009 -2020
Truck	(A)_Interstate	0	230.056	536.798	3,105.761
	(B-E) Non-Interstate	488.655	848.654	1,291.717	10,549.387
	Total	488.655	1,078.710	1,828.515	13,655.148
Auto	(A)_Interstate	0	1,046.794	2,442.520	14,131.726
	(B-E) Non-Interstate	2,943.430	4,852.245	7,267.715	60,424.332
	Total	2,943.430	5,899.039	9,710.236	74,556.058
All Vehicles	(A)_Interstate	0	1.276.851	2.979.319	17.237.487
	(B-E) Non-Interstate	3.432.086	5.700.899	8.559.433	70.973.719
	Total	3.432.086	6.977.750	11.538.751	88.211.205

Exhibit 14 shows that, by 2020, the added Truck VMT represents a 2.5% increase of interstate Truck VMT and 3.5% increase in non-interstate Truck VMT. The Auto VMT increases represent a 3.2% increase of interstate Auto VMT and 4.4% increase in non-interstate Auto VMT. Similar percent changes apply for the increases in truck and auto VHT across the two types of road.

3.3 Dollar Valuation of Traveler Costs

The increases in travel times (represented by VHT) and travel distances (represented by VMT) both lead to added "costs" for travelers. The costs fall into three categories:

- **Added travel time** for cars, trucks and buses using Kansas roads, which lead to time costs for drivers, passengers and cargo movements. Both the degradation of pavement (which slows down travel) and the degradation of bridges (which increases travel distances) lead to travel time increases.

  The added driver and passenger time for business-related travel are typically valued on the basis of the wage rate, and are absorbed by businesses as an additional cost of doing business, while the added time for commuting is typically felt by both workers and businesses. The added value of time for personal (non-work related) trips is also felt by travelers and valued by them, though it does not lead to direct change in net business or household expenses.

- **Added vehicle operating costs** for cars, trucks and buses using Kansas roads, which lead to higher vehicle operating expenses. Both the degradation of pavement (which increases pavement cracks, holes and overall roughness

rating) and the degradation of bridges (which lengthens travel distances) lead to travel cost increases.

These expenses are calculated on the basis of typical car and truck costs of fuel and maintenance per vehicle-mile of travel. They are typically paid for by households (in the case of personal, non-business travel) and by businesses (in the case of business-related travel).

- **Added safety costs**, associated with a higher number of traffic accidents and incidents that occur when pavement conditions worsen and when driving distances are increased. Both factors are affected when pavement and bridges deteriorate.

  The cost of additional traffic accidents is calculated on the basis of average costs of vehicle damage and medical bills, for various classes of accidents. They are typically paid for by households and by businesses (in the form of either direct expenses or higher insurance rates).

The annual dollar valuation of changes in travel times, travel distances and accident rates are shown in Exhibit 16 and Exhibit 17 for the year 2020. They show that altogether, the deterioration of pavement and bridges under the "Reduced Funding" scenarios leads to a total of $1.4 billion/year of additional time cost, vehicle operating cost and accident cost to travelers by the year 2020. The cost occurs every year, though it grows over time so that it is smaller in years before 2020 and even higher in years after 2020.

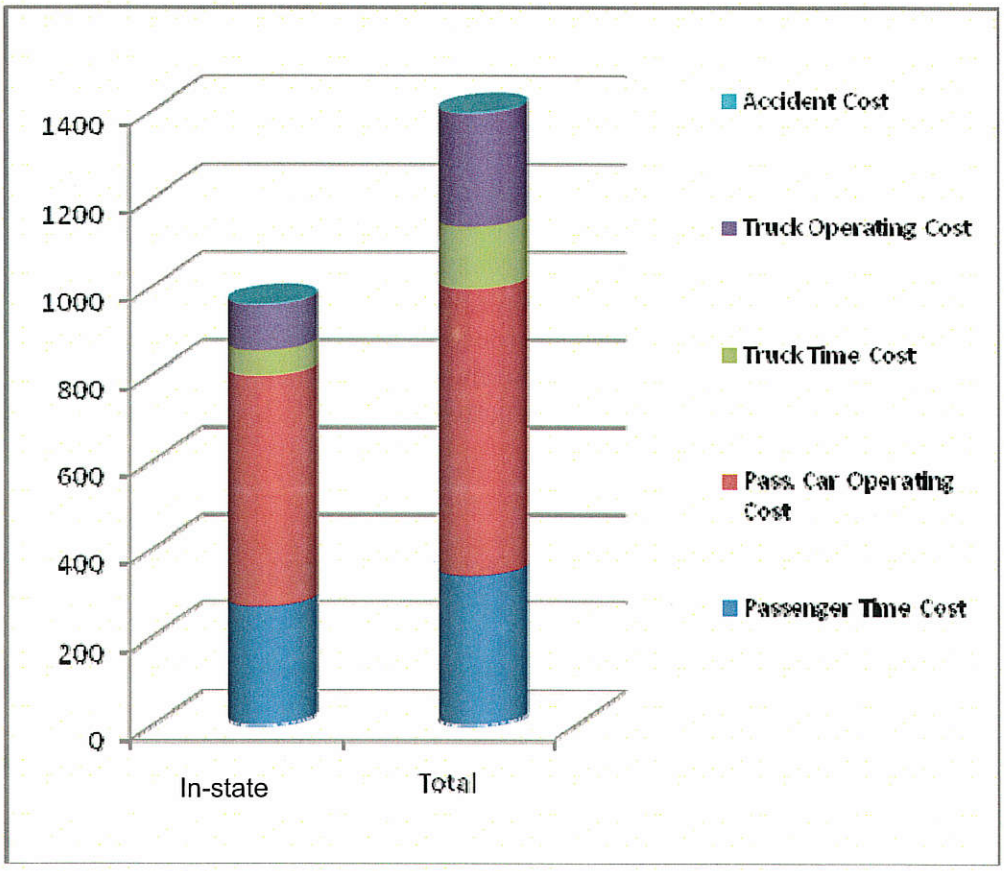
A further split between in-state and total impacts is also shown in these exhibits. The total impact refers to the valuation of all travelers using the affected roads and bridges in Kansas. The in-state impact refers to the portion of those impacts that are felt by persons living in Kansas and businesses located in Kansas. From a benefit/cost perspective, it is appropriate to consider the impact on all travelers using Kansas roads and bridges. However, the in-state impact numbers are most relevant when calculating how the Kansas economy is affected. That additional analysis is presented in Chapter 4.

Several other aspects of these numbers are also notable. First, auto traffic accounts for the largest share of traveler costs. Also, a larger share of auto trips are in-state than truck trips (80 percent compared to 40 percent). However, while trucks account for barely over 15% of the total impact on vehicle-hours and vehicle-hours of delay (as was shown in prior Exhibits 14 and 15), the dollar valuation of truck impacts accounts for over 28% of the total valuation of added user costs. This occurs because truck operating costs and freight time delays are both valued much higher than those for car travel. Details of the time, distance and accident valuation factors for cars and trucks are shown (distinguished by trips purposes) in Appendix B.

Exhibit 16. Additional Annual User Costs by Type, 2020

Type of Cost	Value in Millions of $	
	In-state	Total
Passenger Time Cost	267.6	337.8
Pass. Car Operating Cost	530.2	657.7
Truck Time Cost	57.0	141.2
Truck Operating Cost	103.9	257.5
Accident Cost	2.0	2.7
Totals	960.7	1,396.9

Exhibit 17. Allocation of Additional Annual User Costs by Type, 2020



4 ECONOMIC IMPACTS

The traveler time costs, vehicle operating costs and accident costs that were reported in Chapter 3 subsequently lead to additional impacts on the Kansas economy. These impacts can be measured in terms of changes in jobs, income, value added (gross domestic product) and/or business sales in Kansas. Such changes occur insofar as future scenarios lead to shifts in household living costs, business operating cost, productivity and competitiveness.

4.1 Types of Economic Impacts

Changes in the Kansas economy occur through four basic mechanisms:

(1) Business Costs – Changes in the cost of doing business in Kansas occur through changes in the cost of operating truck and car fleets, and paying the time costs of truck drivers and staff travel time, or else the equivalent change in shipping costs associated with those elements. In addition, some businesses also bear a share of excess costs associated with commuting and parking. Together, all of these classes of business cost end up affecting productivity and profitability, and ultimately also the competitiveness of Kansas businesses. Of course, the value of this cost differs by industry, depending on the extent to which it depends on trucking or "on-the-clock" employee travel.

(2) Household Living Costs – Changes in the cost of living in Kansas occur through changes in the annual expense that households pay for operating their cars, and the medical and repair costs that households pay for traffic accidents. While households also bear impacts on time for personal travel, that is a non-money impact that does not directly affect the flow of dollars in the economy.

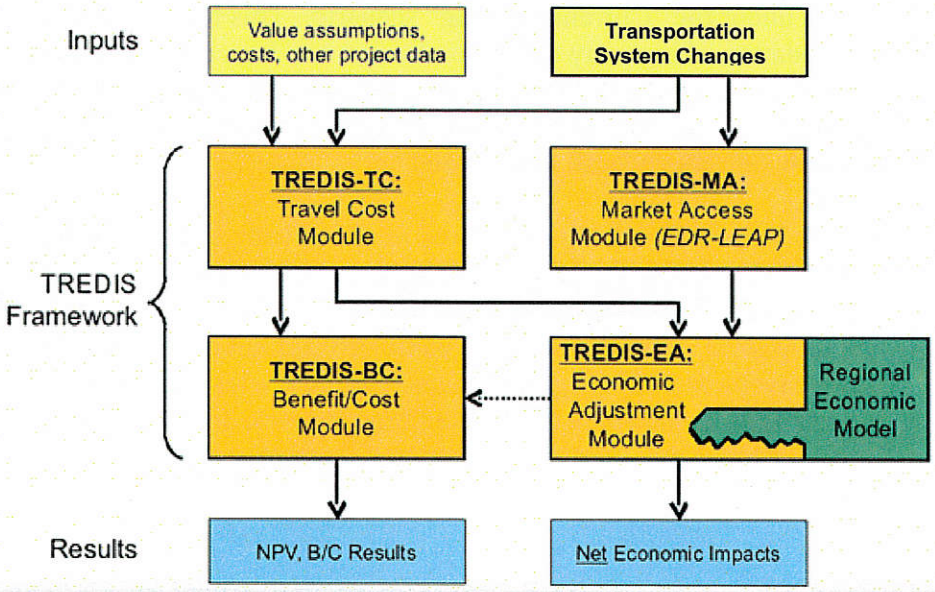
(3) Construction and Other Spending – Additional jobs and income in Kansas are generated by public investment in ongoing maintenance and reconstruction of highway and bridge facilities. These effects are a very real aspect of impact on the economy. However, they are not counted in benefit/cost ratios insofar as alternative spending on other public works projects would also yield similar impacts on construction activity.

(4) Access Changes – Openings or closures of bridges and key access routes can also lead to changes in the breadth of truck delivery markets and labor markets for businesses, as well as job markets for workers. Those impacts may, in turn, affect business market scale opportunities and hence productivity. These impacts are most pronounced when new projects open up new access, or failure to invest leads to closure or restricted use of key bridge or access routes. This class of impact can be important for economic development, but is not estimated in this study because the specific highways or bridges that would be affected by spending constraints is not yet known.

4.2 Economic Analysis System

The Transportation Economic Development Impact System (TREDIS) is a framework for evaluating both user impacts and total regional economic impacts of transportation scenarios. It accounts for both short-term and long-term travel cost impacts, as well as effects of changes in market access and spending patterns. TREDIS utilizes an economic model of the Kansas economy, which combines an input-output model (known as IMPLAN) with a cost response forecasting and analysis system (known as the CRIO – the cost response input-output model), and a detailed accounting framework for calculating impacts on revenues and costs affecting various classes of shippers, carriers, households and government. The system also traces how different industries in the state are affected by changes in costs of alternative road, rail and intermodal transportation options.[3]

Exhibit 18. Components of TREDIS



[3] Additional documentation of TREDIS is available at www.tredis.com

In practice, this analysis framework provides a way of tracking how travel time and expense changes will affect local cost of doing business in future years, as well as local cost of living for households. Changes in these factors end up shifting local spending patterns and cost-competitiveness, thus affecting business growth and investment, and ultimately jobs and income. The economic analysis system also recognizes that some of these changes are absorbed in the local economy, while others are passed on to customers outside of the region.

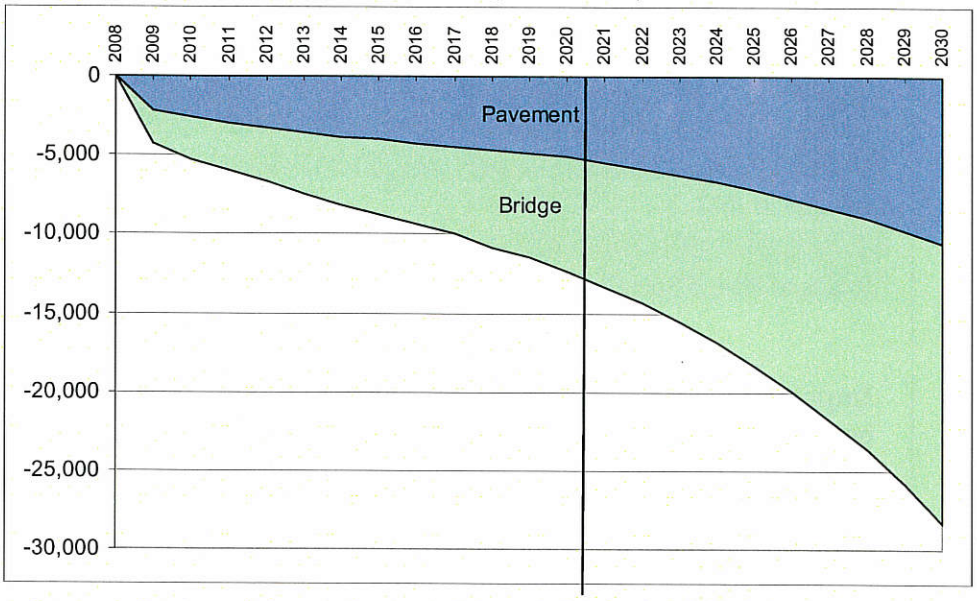
4.3 Impacts on the Kansas Economy

The economic analysis system was applied to forecast growth of the Kansas economy under both the "Current Funding" scenario and the "Reduced Funding" scenario. The overall and sector-specific results reflect foremost the direct reliance of various types of Kansas businesses and their employees on highways. Even for those industries that do not ship freight by truck, or do not capitalize any part of their employee's commute costs in competitive wage rates, there were forecast economic impacts. In those cases, the impacts were the result of effects on other industries that sell them materials or buy their products (referred to as "forward" and "backward" economic links) and rely on truck shipments to do so. The embedded input-output linkages within the TREDIS system account for this latter interaction among Kansas industries.

Employment Impact. The calculation of expected change in total jobs in the Kansas economy is shown in Exhibit 19. It shows that the "Reduced Funding" scenario will lead to a growing loss of jobs over time, compared to what would occur under the "Current Funding" scenario. This result is due to the increasing degradation of highway travel conditions, and hence increasingly negative time, expense and safety impacts that businesses and households incur over time. The graphic also shows that both pavement deterioration and bridge deterioration contribute to the overall loss of jobs.

While the primary analysis covered road and bridge preservation funding over the 2009-2020 period, this graphic also shows how job loss would accelerate in later years (to 2030) if preservation funding were to be remain at the lower, reduced funding level. This is due to the cumulative effect of continued deterioration in both pavement and bridge structures, with the latter effect particularly dramatic due to additional bridge closures and more severe load restrictions.

Exhibit 19. Change in Kansas Statewide Employment Over Time
(Number of jobs with the "Reduced Funding" scenario compared to the "Current Funding" scenario)



Additional Measures of Change in the Economy. The lower level of Kansas employment under the "Reduced Funding" scenario is a result of the forecast slowdown in economic activity growth that is also reflected in other ways – including total wage income for Kansas workers, total "Value Added" for Kansas industries, and total business output (sales volume). Exhibit 20 shows these additional measures of economic change for the year 2020.

It is important to note that these impact measures are not additive; rather, they reflect different perspectives for measuring the same basic change in economic activity. Specifically, value added is a portion of business output that deletes the cost of non-labor inputs. In addition, wages are a portion of value added that is paid to workers.

Since these impacts grow over time, they will be smaller in earlier years and larger in later years. Altogether, the impact of reduced preservation funding for the year 2020 will be a loss of over $1.3 billion/year of business output in Kansas, with a corresponding loss of 1300 jobs with $460 million/year of annual wages. These economic losses dwarf the annual savings in spending on highway and bridge reconstruction and rehabilitation, which would be $236 million/year.

Exhibit 20. Change in Economic Activity in Kansas in Year 2020
(under "Reduced Funding" compared to a "Current Funding" scenario)

Measure of Activity	Due to Pavement Deterioration	Due to Bridge Deterioration	Total Impact
Change in Business Output ($m)	-587.9	-798.4	-1,386.3
Change in Value Added ($m)	-282.9	-393.9	-676.7
Change in Wages ($m)	-200.5	-259.4	-459.9
Change in Jobs	-5,126	-7,225	-12,351.0
Reduced Rehab Spending ($m)	186.0	50.0	236.0

Impact Among Sectors of the Economy. The economic analysis system also breaks down the economic losses by sector of the Kansas economy. This breakdown is shown in Exhibit 21 and illustrated by the pie chart shown later in Exhibit 22. Altogether, it shows that the employment impacts of the "Reduced Funding" scenario affect all sectors of the economy negatively, including manufacturing, wholesale, retail, services and finance.

Exhibit 21. Sector Breakdown of Employment Change in Year 2020
(under "Reduced Funding" compared to a "Current Funding" scenario)

Industry Sector	Employment Change
Agriculture and Nat Resources	-197
Construction	-2,113
Manufacturing	-509
Wholesale Trade	-377
Retail Trade	-2,024
Transportation & Utilities	-682
Services	-3,162
Finance, Insurance & Real Estate	-926
Education & Health Care	-1,811
Government	-508
Total Job Change	**-12,351**

The impact of reduced highway preservation funding spreads to all sectors of the economy through four basic mechanisms.

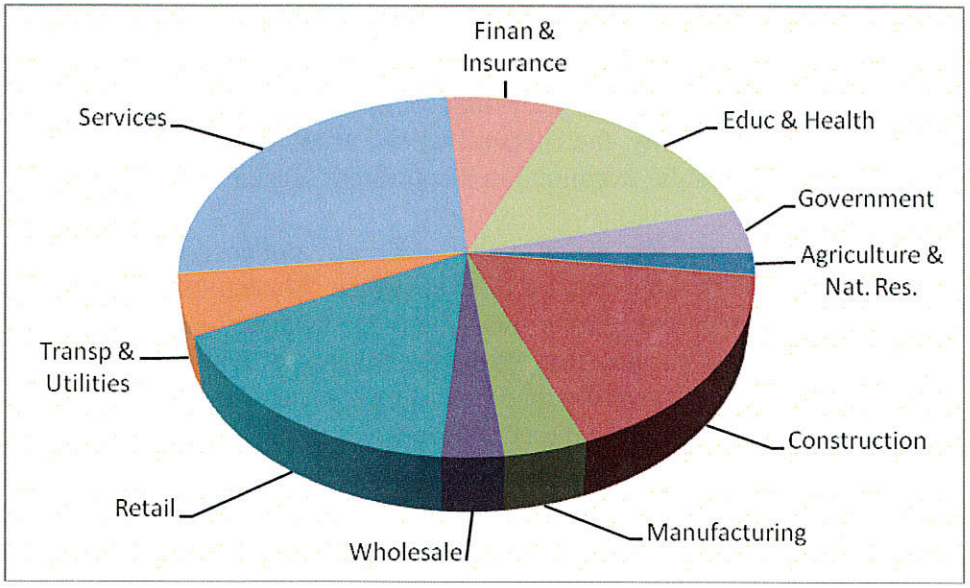
- First, those industries that are dependent on trucking activities are directly hit by higher costs of doing business, which reduces their competitiveness in broader state and national markets. This includes many elements of the agriculture, manufacturing, wholesale and transportation sectors.

- Second, there are indirect impacts on other industries that supply materials or buy products from the directly-affected industries. This includes many elements of the retail sector, service and finance industries as other elements of the manufacturing and trade sectors.

- Third, consumer budgets are directly affected by expected increases in vehicle operating costs and safety costs, and that leads to a further loss of spending on retail and consumer services.

- Finally, jobs in the construction sector that are directly supported by road and bridge rehabilitation projects are also reduced under this scenario.

Exhibit 22. Illustration of the Employment Impact by Sector, 2020
(under "Reduced Funding" compared to a "Current Funding" scenario)



5 POLICY IMPLICATIONS

The traveler cost impacts discussed in Chapter 3 and the economic impacts discussed in Chapter 4 have a series of policy implications. These policy implications come in two forms: (1) as findings on the relative benefits compared to the costs of highway system preservation, and (2) as findings on the depreciation of Kansas assets and financing costs.

5.1 Benefit-Cost Analysis

The cost of highway system preservation occurs as an annual stream of expenditures over time. The economic impacts of alternative funding levels also occurs as an annual change that can be expressed in terms of Value Added (or Gross Domestic Product, which is essentially the same thing). Since deterioration of pavement and bridge structures increase over time, as do their economic impacts, it is necessary to compare the costs and impacts on a consistent basis that accounts for these changes over time

"Benefit-cost analysis" portrays those streams of benefits (or impacts) and costs and then discounts future year impacts to adjust for the time value of later year impacts. In that way, the "present value" of all benefit (or impact) streams and cost streams can be examined in a consistent format.

Exhibit 23 shows the present value of benefit and cost streams associated with adopting one of the scenarios over the other. Special care must be taken in interpreting these results for they involve a change in perspective. While all parts of this report so far have expressed the impacts of highway and bridge deterioration under the Reduced Funding scenario compared to the Current Funding scenario, that comparison becomes confusing when expressed in benefit-cost terms. After all, it involves comparing the dis-benefits of allowing deterioration to the savings in cost for highway system preservation funding. To avoid these double negatives, we flip the two scenarios so that we can compare the added benefit of avoiding system deterioration with the added cost of maintaining full funding for pavement and bridge preservation.

The results are expressed in terms of two comparisons:

(1) **Social Value Definition of Benefits.** First, the benefit is defined in terms of value to highway travelers from maintaining current funding of preservation, and that value is compared to the state government expense of full funding. This is the most widely accepted measure of benefit/cost relationships. It reflects the social valuation of all time savings, expense reduction and accident reduction for all users of Kansas highways, regardless of: (a) whether or not the time savings translates into money flows and (b) whether or not the savings accrue to travelers based in Kansas or those just passing through.

Overall, this social valuation comparison shows a benefit/cost ratio of over 5, meaning that the benefit to travelers on Kansas roads is over five times larger than the added cost of maintaining current funding levels for highway preservation.

The "net present value" represents the difference between social benefits and costs over the 2009-2020 period, after discounting for the time value of money and expressing all results in constant 2008 dollars. Applying that measure, we can see that the option of maintaining current funding has a positive value (beyond the added cost) totaling over $13.5 billion.

(2) **Economic Impact Definition of Benefits.** Second, the benefit is defined in terms of "value added" (defined as wage income + net corporate income) that is added to the Kansas economy, and that value is compared to the state government expense of full funding. This measure of benefit is much more restrictive than the social value of benefits, as it includes only those benefits that: (a) can be measured as changes in money flows (income), and (b) directly accrue to businesses and residents located in Kansas. Thus, the value of personal time and savings for parties not based in Kansas are not recognized as benefits. However, this economic impact measure does add in indirect and induced impacts of additional consumer and business spending in the economy.

Overall, this economic impact comparison shows that benefit/cost ratio of over 1.6, meaning that the income benefit to businesses and residents of Kansas is over 1.6 times greater than the added cost of maintaining current funding levels for highway preservation.

The "net present value" represents the difference between economic benefits and costs over the 2009-2020 time period, after discounting for the time value of money and expressing all results in constant 2008 dollars. Applying that measure, we can see that the option of maintaining current funding has a positive value (beyond the added cost) totaling over $2 billion.

Exhibit 23. Benefit/Cost of Maintaining Current Funding for Preservation
(compared to the Reduced Funding scenario)

Category	PV of Benefit	PV of Costs	Net Present Value (B-C)	Benefit/Cost Ratio (B/C)
Full User Benefit	16,755	3,183	13,572	5.26
Regional Income Benefit	5,205	3,183	2,022	1.64

These findings indicate that it is *economically efficient* for the State of Kansas to remain at current funding levels for its highway system (pavement and bridge) preservation program, as it yields positive benefits and hence positive social return on investment. Alternatively, it can be stated that the reduced funding scenario is *economically inefficient*, as it results in losses exceeding the cost savings. In addition, from an economic development viewpoint, maintaining the current funding level also leads to more income gain in the Kansas economy than the cost savings that could result from reduced funding for these programs.

5.2 Finance and Depreciation of Assets

The Issue. The Kansas Dept. of Transportation finances a capital investment and system enhancements through the issuance of highway bonds. The interest cost of those bonds is dependent on their rating, which is driven in part on revenue sources and the condition and valuation of the state's underlying infrastructure assets. In that respect, a failure to maintain adequate quality of the road pavement and bridge infrastructure assets can adversely affect future bonding.

Required Goals. Kansas DOT capitalizes its highway system assets based on a well-accepted method that is explained in financial statements supporting its highway bonds:

> "This 'modified approach' assumes that infrastructure assets have an indefinite life if they are properly maintained and preserved. When this approach is employed, the assets are not depreciated…"
>
> …"Before a government can use the modified approach, it must meet two requirements. First, the government must manage the eligible assets using an asset management system that has the characteristics set forth below; second, the government must document that the eligible assets are being preserved approximately at (or above) a condition level established and disclosed by the government."
>
> *(State of Kansas, Highway Revenue Bonds, 2004, Appendix B: Basic Financial - Statements, page B-12).*

In addressing the requirement for asset condition goals, the documentation goes on to explain that Kansas has a stated goal of maintaining a minimum acceptable pavement performance in which 85% of the interstate mileage and 80% of the non-interstate mileage is rated as PL-1 (in good condition). The minimum acceptable bridge performance is set at a Health Index (HI) rating of at least 80.[4]

Actual Performance. The "Current Funding" scenario will keep full compliance with those goals in future years, while the "Reduced Funding" scenario will lead to violation of those goals. Specifically:

- Pavement Condition -- Exhibit 5 in Chapter 2 shows that "Current Funding" scenario would keep full compliance with the pavement condition goal, while the "Reduced Funding" scenario will lead to a degradation from the current level of over 90% of the mileage meeting PL-1 to just 60% meeting that standard.

- Bridge Condition – The analysis in this report did not show the Health Index (HI) average for all bridges in the state management system, which is currently estimated to be approximately 93. However, Appendix A does show that the distribution of bridge HI ratings and it confirms that vast majority of bridges do currently have HI ratings of 80 or better. However, that table also shows that the "Reduced Funding" scenario would lead to a significant increase in the number of bridges with a deficient (HI less than 80) rating.

Additional Issues. The State of Kansas Dept. of Administration issues an annual *Comprehensive Annual Financial Report* (CAFR), which provides details of the financial condition of the state. According to the most recent (2007) CAFR, infrastructure assets account for over 80% of the total capital assets of the State of Kansas.[5] In that respect, any significant future degradation of infrastructure assets can potentially also trigger an adverse impact on the State's financial reporting. At this point, the "Current Funding" scenario for highway system preservation will maintain asset value, while the "Reduced Funding" scenario for preservation could threaten that valuation.

---

[4] State of Kansas, Highway Revenue Bonds, 2004, Appendix B: Basic Financial - Statements, pp. B-13, B-42, B-43.

[5] Infrastructure accounts for 9.163 trillion of asset value, out of a total state capital asset base of $11.314 trillion. Source: Kansas Dept. of Administration, Comprehensive Annual Financial Report, 2007.

A APPENDIX

A.Bridge Analysis

The following tables show predicted degradation of Kansas bridges under the "Reduced Funding" scenario, as predicted by the Pontis Bridge Management System. Results are shown for each of the five classes of bridges (A – E), for each year from 1999 to 2020. Bridges with Health Index (HI) rating below 60 are rated as in "poor" condition and would be posted for detour.

50 Million @ 8.5%

2009 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	0	4	49	113	455	0	2	0
B	1	10	39	75	501	1	5	5
C	6	19	81	89	410	16	6	96
D	11	19	72	97	361	10	8	80
E	13	29	88	137	539	12	6	72
						39		253

2010 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	0	8	51	125	437	2	2	4
B	2	12	40	92	480	3	5	15
C	7	24	76	101	397	16	6	96
D	12	23	69	105	351	11	8	88
E	16	33	85	151	521	16	6	96
						48		299

2011 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	1	12	52	137	419	3	2	6
B	3	14	42	107	460	4	5	20
C	8	29	71	112	385	17	6	102
D	13	27	66	113	341	12	8	96
E	18	38	82	165	503	18	6	108
						54		332

2012 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	2	16	53	148	402	4	2	8
B	4	17	43	122	440	5	5	25
C	10	33	68	124	370	18	6	108
D	14	32	63	122	329	13	8	104
E	20	42	82	179	483	19	6	114
						59		359

2013 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	3	20	55	159	384	5	2	10
B	5	20	44	138	419	6	5	30
C	12	38	65	137	353	20	6	120
D	16	36	62	131	315	14	8	112
E	22	48	81	193	462	21	6	126
						66		398

2014 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	4	24	57	169	367	6	2	12
B	6	23	45	153	399	7	5	35
C	14	43	63	148	337	21	6	126
D	18	40	61	140	301	16	8	128
E	24	53	80	208	441	22	6	132
						72		433

2015 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	5	29	56	181	350	7	2	14
B	7	26	47	167	379	8	5	40
C	16	47	61	161	320	22	6	132
D	20	44	59	151	286	17	8	136
E	26	58	79	223	420	24	6	144
						78		466

2016 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	6	34	56	193	332	8	2	16
B	8	30	48	180	360	8	5	40
C	18	51	60	172	304	24	6	144
D	22	48	58	160	272	18	8	144
E	28	63	78	238	399	25	6	150
						83		494

2017 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	8	38	56	206	313	9	2	18
B	9	34	49	194	340	9	5	45
C	20	55	59	184	287	25	6	150
D	24	52	57	170	257	20	8	160
E	31	68	77	253	377	27	6	162
						90		535

2018 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	10	42	56	218	295	11	2	22
B	10	39	50	208	319	10	5	50
C	22	59	58	197	269	27	6	162
D	26	56	56	180	242	21	8	168
E	34	73	77	267	355	29	6	174
						98		576

2019 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	12	47	55	232	275	12	2	24
B	11	44	50	223	298	11	5	55
C	24	63	57	208	253	28	6	168
D	28	60	54	190	228	23	8	184
E	37	78	75	283	333	31	6	186
						105		617

2020 *Bridges per Class*

CLASS	HI≤60 P_1	60<HI≤70 P_2	70<HI≤85 F	85<HI≤95 G_2	HI>95 G_1	Number of Posted Bridges	Avg Detour Length	Total Length of Detours
A	14	52	54	245	256	14	2	28
B	13	48	50	238	277	13	5	65
C	26	67	56	221	235	29	6	174
D	30	64	52	201	213	24	8	192
E	40	83	74	299	310	33	6	198
						113		657

B. Unit Values for Traveler Cost Factors

The key assumptions underlying the valuation of time delay, vehicle operating cost and accident costs, as reported in Chapter 3, are shown below.

1) Values of Time:

- Passenger car, "on-the-clock" business travel: $17.45/hr (A), (B)
- Passenger car, commute and personal trips: $10.47/hr (A), (B)
- Passenger car, personal: $10.47/hr (A), (B)
- Passenger Vehicle Occupancy: On-the-clock: 1.22, Commute: 1.14, Personal: 1.81 (C)

- Truck Driver: $25.18/hr (A), (D)
- Average Drivers per truck: 1.12 (E)
- Truck: Time Value of Inventory: $0.25/ton, Avg. tons per truck: 15 (F), (G)
- Truck: Time Value of Timely Delivery: a factor applied to time value of inventory which varies from $0 for grains to $2 for wholesale goods, $3 for agricultural products and up to $28 for durable manufactured products utilizing "just-in'time" production scheduling. (H)

(A) USDOT, Value of Travel Time in Economic Analysis, Feb.11, 2003, http://ostpxweb.dot.gov/policy/Data/VOTrevision1_2-11-03.pdf
(B) Source: Bureau of Labor Statistics. Average Kansas wage for all occupations as of May, 2007. Commute and personal trip types reduced by 60%, following US DOT recommendation.
(C) Source: Bureau of Transportation Statistics, 2001 National Household Travel Survey, Table A-14, Values reflect U.S averages.
(D) Source: Bureau of Labor Statistics. Average Kansas wage for occupation 53-3032 (Truck Drivers, Heavy and Tractor-Trailer) as of May, 2007. Includes $7.70 fringe (US DOT)
(E) Source: US DOT
(F) Source: NCHRP Report 436 (2001). Value includes capital lock-up and spoilage/logistics costs (adjusted for inflation).
(G) Source: NCHRP Report 436 (2001)
(H) Various analyses for the FHWA Freight Office and studies for Montana DOT

2) Vehicle Operating Costs:

- Passenger Car, smooth pavement: $0.58/mi (I)
- Truck, smooth pavement: $1.18/mi (J)
- Passenger Car, rough pavement: $0.62/mi (K)

- Truck, rough pavement: $1.26/mi (K)

(I) Sources: AAA and US EPA. Assumes average speed of 55 mph and long-term price of $4.00 per gallon fuel (2009 – 2020 time period).
(J) Sources: Berwick and Farooq (2003), and U.S. EPA. Assumes average speed of 55mph and $4.00 per gallon fuel. Values adjusted to $2007.
(K) Source: Values include cost premiums of $0.032 for cars and $0.066 for trucks for "extremely rough" pavement. Derived from Gary Barnes and Peter Langworthy (2004), TRR 1864, pp. 71-77. Values adjusted to $2007.

3) Traffic Accident Costs:

- Fatality Accident Rate: 1.255/100m VMT (L)
- Personal Injury Accident Rate: 31.451/100m VMT (L)
- Property Damage Only Accidents: 108.878/100m VMT (L)

- Fatality Accident Cost: $3,660,000 each (M)
- Personal Injury Accident Cost: $211,000 each (M)
- Property Damage Only Accident Cost: $2,80 each (M)

(L) Sources: USDOT, FHWA, Motor Vehicle Accident Costs, Oct. 1994. (Values adjusted to $2007)
(M) Source: Kansas Dept. of Transportation. Values reflect 5-year averages (2003-2008) over all facility classifications.

4) Travel Characteristics:

- Passenger Car Split of VMT and VHT: On-the-Clock: 6%, Commute: 27%, Personal: 67% (N)
- Local portion of trip-ends for passenger car trips: On-the-clock: 85%, Commute: 93.5%, Personal: 75% (O)
- Local portion of trip-ends for truck trips: within state (both ends in state): 26.6%, one end in state: 27.5%, pass-through trips: 45.9% (P)
- Assumed tons/truck varies by trip ends: "within state" trips carry 8 tons/truck, "one-end" trips carry 14 tons/truck, and "through" trips carry 18 tons/truck.

(N) Source: Kansas Dept of Transportation traffic analysis
(O) Sources: Commute values derived from 2000 Census Journey to Work Database. On-the-clock and Personal values are professional estimates reflecting Kansas' geography.
(P) Source: Kansas Dept. of Transportation

APPROXIMATION OF THE ECONOMIC IMPACTS OF THE KANSAS COMPREHENSIVE TRANSPORTATION PROGRAM

Final Report

Prepared by

Michael W. Babcock
Kansas State University

A Report on Research Sponsored By

THE KANSAS DEPARTMENT OF TRANSPORTATION
TOPEKA, KANSAS

KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS

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EXECUTIVE SUMMARY

The Economics Department of Kansas State University conducted two economic impact studies of the Kansas Comprehensive Highway Program (CHP) in the 1990s. The first study titled *Employment Impact of Highway Construction and Maintenance Activities in Kansas* was published in February 1996, and examined economic impacts of CHP K-jurisdiction contracts completed between July 1, 1991 and May 19, 1994. The second study titled *Economic Impacts of the Kansas Comprehensive Highway Program* published in June 1997 measured economic impacts of $2.86 billion spent on K-jurisdiction CHP projects between July 1, 1989 and June 30, 1997.

In 1999 the Kansas legislature approved a 10 year transportation program that contains billions of dollars for Kansas road and bridge projects. It is appropriate and important to measure the construction economic impacts of the Kansas road and bridge program to facilitate an evaluation of the state's investment in highways, and the cost if highway expenditures are reduced.

Given the need for measuring the construction impacts of the Kansas Comprehensive Transportation Program (CTP), the objectives of the study are:
Objective 1. Approximate *direct* output, income, and employment impacts by highway improvement type for CTP projects let between July 1, 1999 and October 31, 2004.
Objective 2. Approximate *indirect* and *induced* output, income, and employment impacts by highway improvement type for CTP projects let between July 1, 1999 and October 31, 2004.

The *output* impact is the increase in Kansas production as a result of the expenditure for CTP highway and bridge construction projects. The *income* impact is the

increase in Kansas wages and salaries in response to an increase in the income of workers employed on CTP road and bridge construction projects. The *employment* impact is the gain in Kansas employment attributable to CTP highway and bridge construction projects.

The *direct* impact is CTP program induced output, income, and employment within the highway construction industry itself, while the *indirect* impact is the CTP induced output, income, and employment of the industries that supply the construction industry with goods, services, and materials. The *induced* impact is the additional output, income, and employment in various consumer markets produced by the increased consumer spending of people employed on CTP construction projects.

Economic impacts were calculated for the same highway improvement categories as the previous studies of the CHP program.

Category	Highway Improvement Type
1	Resurfacing
2	Restoration and Rehabilitation; Reconstruction and Minor Widening
3	New Bridges and Bridge Replacement
4	Major and Minor Bridge Rehabilitation
5	New Construction; Relocation; Major Widening
6	Safety/Traffic Operations/Traffic System Management; Environmentally Related; Physical Maintenance; Traffic Services

The research objectives were accomplished by utilizing output, income, and employment multiplier data from the June 1997 study referred to above. Therefore, the measured impacts are *approximations* since they are based on the assumption that the

multipliers and other data measured in the 1997 study have not changed.

The major findings of this study include the following:

1. The approximated economic impacts of the CTP during the analysis period are as follows:

(a) output impact, $7.1 billion (2.6 times the value of highway contracts)

(b) income impact, $1.4 billion (2.4 times greater than direct wages and salaries)

(c) employment impact, 114,635 jobs (41 jobs per $1 million of highway contract value)

It is emphasized that these approximate impacts are conservative estimates. In the June 1997 study, it wasn't possible to obtain input data for highway work that was subcontracted. As a result, the estimated impacts omit the economic impact of the inputs that highway contractors purchased from each other.

2. The approximated economic impact of the Kansas CTP (K-jurisdiction) highway construction contracts as measured by output is $7.1 billion (2.6 times the value of highway construction contracts) distributed by highway improvement type as follows:

Highway Improvement Type	Value of Highway Contracts (Millions of Dollars)	Output Multiplier	Output Impact (Millions of Dollars)
Category 1	$639.8	2.671768	$1,709.4
Category 2	$1,263.1	2.587211	$3,267.9
Category 3	$248.2	2.374471	$589.3
Category 4	$108.3	2.518010	$272.7
Category 5	$476.0	2.468194	$1,174.9
Category 6	$57.5	2.159928	$124.2
Total	$2,792.9		$7,138.4

The output impact for each highway improvement type is obtained by multiplying the value of highway contracts by the output multiplier.

3. The approximated economic impact of the Kansas CTP (K-jurisdiction) highway

construction contracts as measured by income is $1.4 billion (2.4 times greater than the value of wages and salaries paid in the road construction industry) distributed by highway improvement type as follows:

Highway Improvement Type	Direct Wages and Salaries (Millions of Dollars)	Income Multiplier	Income Impact (Millions of Dollars)
Category 1	$90.2	2.990495	$269.7
Category 2	$279.1	2.346804	$655.0
Category 3	$62.3	2.087858	$130.1
Category 4	$41.9	1.725710	$72.3
Category 5	$104.7	2.240519	$234.6
Category 6	$10.8	2.123587	$22.9
Total	$589.0		$1,384.6

The direct wages and salaries are the payments to workers in the construction industry attributable to the CTP. The income impact for each highway improvement type is obtained by multiplying the direct wages and salaries by the income multiplier.

4. The approximated economic impact of the Kansas CTP (K-jurisdiction) highway construction contracts as measured by employment is 114,635 full time equivalent (FTE) jobs distributed by highway improvement type as follows:

Highway Improvement Type	Value of Highway Contracts (Millions of Dollars)	Employment Multiplier	Employment Impact (FTE Jobs)
Category 1	$639.8	37.68	24,107.7
Category 2	$1,263.1	42.26	53,378.6
Category 3	$248.2	41.74	10,359.9
Category 4	$108.3	54.44	5,895.9
Category 5	$476.0	39.77	18,930.5
Category 6	$57.5	34.12	1,961.9
Total	$2,792.9		114,634.5

The employment impact of 114,635 FTE jobs is obtained by multiplying the

employment multiplier (employment per million of dollars of output) by the value of highway contracts in each highway improvement type and then summing all six categories. The CTP during the analysis period generated an average of 41 jobs per million dollars of contract value (114,635/$2,792.9 = 41 jobs per $1 million).

Despite large differences in the percentage composition of expenditures by highway improvement type for the June 1997 CHP study and the CTP study, the results of the two studies are virtually identical. The ratio of output impact to value of highway construction contracts is about 2.6 for both studies. The ratio of income impact to direct wages and salaries is about 2.4 in both studies. The jobs per $1 million of highway contract value is 41 in both cases.

Final Report
K-TRAN Research Project KU-97-3

BENEFITS AND COSTS OF THE KANSAS COMPREHENSIVE HIGHWAY PROGRAM

by

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ABSTRACT

This report analyzes the benefits and costs of the Kansas Comprehensive Highway Program (KCHP). The benefit-cost ratio of the program is conservatively estimated to be at least 3. In other words, the program returned at least three dollars' worth of value to Kansans for every dollar's worth of cost to Kansans.

The KCHP was a major program of highway construction and contract maintenance for the state of Kansas. It was passed by the Kansas Legislature in Spring, 1989. Major highway contracting extended from Kansas FY1990 through Kansas FY1997, but some expenditures will continue until roughly 2001. The program was directed entirely to some 10,400 miles of the Kansas State Highway System, which includes Interstate Highways, U.S. Highways, State "K"-Highways and their City Connecting Links. It did not include most city, county, and local roads.

This report has a number of distinctive technical features:

- It analyzes an entire highway program. (Previous benefit-cost analyses of transportation have generally focused on particular projects.)

- It is addressed specifically to Kansas citizens and policy-makers. Therefore, it focuses on effects of the program on Kansans only, and does not address effects of the program on citizens of the U.S. as a whole. (As such, it may be the first "open economy" benefit-cost analysis of a regional highway system [Mohring, 1993].)

- For a regional analysis of this type, multiplier effects turn out to be quite important. The report estimates multiplier effects on both the benefit and the cost side, using a "Social Accounting Matrix" model of Kansas.

- The report provides comprehensive benefit-cost ratios (BCRs). These ratios take all identified costs and benefits for Kansans into account. For estimating external (i.e., non-road user) costs and benefits, as well as other effects that are especially hard to measure, the report adopts a conservative or lower-bound approachthat is basedonextrapolationsfrompublishedreports. For most of the benefits to road-users, the report develops detailed measurements using original data sources.

- The report uses a rigorous "counterfactual" analysis. In particular, it develops a fully detailed model of what would have happened on some 5,000 sections of Kansan highways over several years, if the KCHP had not been adopted.

- The report calculates benefit-cost ratios using a range of different discount rates. If a relatively low discount rate is assumed, then the comprehensive BCR could be greater than 6.

PREFACE

This research project was funded by the Kansas Department of Transportation K-TRAN research program and the Mid-America Transportation Center (MATC). The Kansas Transportation Research and New-Developments (K-TRAN) Research Program is an ongoing, cooperative and comprehensive research program addressing transportation needs of the State of Kansas utilizing academic and research resources from the Kansas Department of Transportation, Kansas State University and the University of Kansas. The projects included in the research program are jointly developed by transportation professionals in KDOT and the universities.

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EXECUTIVE, SUMMARY

- This report provides a benefit-cost analysis for the Kansas Comprehensive Highway Program (KCHP). It shows *comprehensive* benefit-cost ratios (BCRs) from the point of view of Kansas—i.e., it ignores national benefits and costs, but takes all known Kansas costs and benefits into account,. The measured BCRs were at least 3. In other words, the programreturned at least three dollars' worth of value to Kansans for every dollar's worth of cost to Kansans.

- The KCHP was a major program of highway construction and contract maintenance for the state of Kansas which was administered by the Kansas Department of Transportation (KDOT). The program was directed entirely to some 10,400 miles of the Kansas State Highway System, which includes Interstate Highways, U.S. Highways, State 'W-Highways and their City Connecting Links. It did not include most city, county, and local roads.

- The KCHP was passed by the Legislature in Spring, 1989. Major highway contracting extended from FY1990 through FY1997; some expenditures will continue until roughly 2001. The major revenue sources included portions of motor fuel tax revenues, motor vehicle registration fees, and general sales and compensating use, tax, as well as significant federal highway funds, and smaller amounts from other sources.

- This report focuses on effects of the program on Kansans only, and does not address effects of the program on citizens of the U.S. as a whole. It provides detailed, estimates for effects of the KCHP on Kansas through calendar year 1996 (the last year for which complete data were available), and less detailed estimates for effects in subsequent years.

- This report focuses separately on two types of benefits and costs:

  - effects that can be measured with a reasonably high degree of precision (mainly retrospective road-user benefits and tax-related costs). For these items,. the report provides detailed modeling and analysis.
  - effects that can be estimated within a broad range (mainly non-user costs and future benefits and costs). For these items, the report estimates conservative or lower-bound effects on the BCRs, using published information sources.

  The BCRs are broken out in further detail for each of. these general types.

- From the point of view of the Kansas money economy, during the calendar years 1989-1996 (the latest years for which data were available) the most important single effect of the KCHP was to collect around $3.1 billion in state tax revenues and spend it on highway costs, and also leverage an additional $1.1 billion in federal highway funds into the state of Kansas. Additional funds were collected in subsequent years. (These totals are in current dollars, i.e., not adjusted for inflation.)

- In comparison with what would have occurred under pre-existing laws, these sums amount to about $1.6B in *additional* tax revenues and about $.2B in *additional* federal funds.

- After, accounting for multiplier effects and taking present values, *these additional* financial flows from the KCHP generated about $.8M in real money income received by Kansans for each $1 .OM in income lost directly and indirectly because of taxes to support the program. In other words, "Keynesian" or "pump-priming" income benefits of the KCHP by themselves contribute a benefit-cost ratio (BCR) of about .8. Note that these income benefits are in addition to other benefits of the program, especially the use-value of having good highways.

- This report provides detailed modeling for the following types of non-income benefits to users of Kansas highways:

  - time savings and operating cost savings due to improved roads and reduced congestion
  - changes in injuries due to accidents
  - changes in property damage due to accidents
  - changes in fatalities due to accidents
  - changes in riding and driving comfort on Kansas highways
  - the residual value of benefits due to improved highways after 1996 (the last year of complete data in our model).

- These benefits were estimated using computer modeling and statistical analysis over some 45,000 observations of detailed sections of Kansas state and US highways during 1990-1996. Models were constructed that showed conditions both with and without the KCHP.

- It was found that the KCHP led to a very large amount of time saving, and this was the most important type of benefit to road users. By 1996, aggregate time spent traveling on state and federal roads in Kansas had been cut by 15 percent by the KCHP (as compared with what would have happened under the pre-existing highway program). While various types of highway improvements were important, the single most important improvement was the increased quality of the pavement and roadbed (and in particular, avoiding the deterioration that would have occurred without the KCHP).

- By 1996 the value of this time saving exceeded $.5 billion per year. In present value terms, the value of time saving for 1990-1996 was between $.8 billion and $1.5 billion, depending on the discount rate. During that period of time, about $.85 million in travel-time benefits were realized per $1 million of direct and indirect costs expended on the KCHP - i.e., the contribution to the BCR was around .85. Additional travel time benefits from past KCHP construction will continue to accrue in the future.

- In present value terms, the KCHP was estimated to reduce vehicle operating costs during 1990-1996 by about $.2 billion.

- In present value terms, the net effect of the KCHP on accidents, injuries, and fatalities during 1990-1996 just about broke even.

- The KCHP was estimated to cause a reduction of about 10,000 accidents and about 2000 injuries during 1989-1996. Fatality accidents decreased at first but then increased, as speeds increased relatively to the counterfactual world.

- The KCHP did in fact create substantially safer driving conditions. However, without the KCHP, roads would have deteriorated significantly, and it is estimated that, as a consequence, traffic would have slowed down substantially. The safer conditions made possible by the KCHP did lead to a reduction in numbers of accidents. But, as a result of the increased speeds at which drivers drove, fatalities were more likely to occur for a given accident. As time wore on, highway users increasingly chose to consume their improved roads largely in the form of higher speeds and reduced non-fatal accidents, leading to reduced travel times, even at the cost of a relative increase in fatalities per accident. (In each case we are comparing actual conditions with an estimate of the conditions that would have existed in the absence of the KCHP.)

- The most important single component of the BCR was the residual value of user benefits, i.e., the value of future benefits for highway users accruing after 1996. This item by itself probably contributes a BCR of 2 or more. The value is large because it includes all of the measured user benefits lumped together and totaled over a very long time span extending after 1996. This value is rather sensitive to the assumed discount rate, and to other assumptions as well, and could be much larger than 2.

- The value of improvements in riding and driving comfort was estimated using a new survey of highway users. It was found to have a positive but rather small effect on the BCR.

- After accounting for financial or "Keynesian" costs and benefits as well as the user benefits listed above, the KCHP was found to have a BCR conservatively estimated to be at least 3.

- However, these figures account for only some of the benefits and costs of the KCHP. This report also provides a much more complete picture by looking at non-user costs and benefits (i.e., externalities or "spillovers" to persons who aren't using the highways). This is done in a less formal way, based on a review of the literature. In particular, the report examines items such as:

  - effects on air, water, and noise pollution in Kansas
  - effects on urban sprawl and adverse effects on individuals from induced land-use changes
  - effects on costs of delivering other government services
  - effects on productivity in Kansas
  - effects on economic development in Kansas.

- While these additional effects can not be measured with the same precision as user benefits, it is possible to estimate lower bounds for more comprehensive benefit-cost ratios that include all of

these effects. These lower bounds for comprehensive benefit-cost ratios (of approximately 3) turn out to be not much different from the BCRs that omit these externalities.

- The comprehensive BCR is rather sensitive to the assumed discount rate. If a low discount rate is assumed (e.g., well below 5%/year), the BCR could be higher than 6.

ECONOMIC IMPACTS OF THE KANSAS COMPREHENSIVE HIGHWAY PROGRAM

Final Report

Prepared for

Kansas Department of Transportation

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EXECUTIVE SUMMARY

The final contracts for construction of the Kansas Comprehensive Highway Program (CHP) will be awarded by June 30, 1997. As the executive and legislative branches of the Kansas government consider the next state highway program, it is appropriate to measure the construction economic impacts of the CHP to facilitate an evaluation of the state's investment in highways.

The CHP was established by passage of 1989 House Bill 2014 and the first contracts for construction were awarded in fiscal year 1990. After the final CHP contracts for construction are awarded, approximately $4 billion will have been spent on CHP projects. After deducting from the $4 billion the costs for preliminary engineering, utility adjustments, right-of-way acquisition and construction engineering, the remaining $3.18 billion was devoted to as let construction expenditures. After deducting from the $3.18 billion the as let costs for construction projects of jurisdictions off the state highway system, the remaining $2.86 billion was spent on K jurisdiction projects. These are typically those projects on the state highway system outside of cities except for interstate roads, which are classified as K jurisdiction projects regardless of location. This study measures the economic impact of the $2.86 billion devoted to K jurisdiction construction projects. This is achieved through analysis of a sample of these construction contracts which have a total contract value of $2 billion.

Given the need for measuring the economic impacts of the Kansas Comprehensive Highway Program, the objectives of the study are as follows:

> Objective 1. Measure *direct* output, income, and employment impacts by highway improvement type of the Kansas Comprehensive Highway Program.

Objective 2. Measure *indirect* and *induced* output, income, and employment impacts by highway improvement type of the Kansas Comprehensive Highway Program.

The output impact is the increase in Kansas production as a result of the CHP. The income impact is the increase in Kansas wages and salaries in response to an increase in income of the workers employed on CHP construction projects. The direct impact is CHP induced output, income, and employment within the highway construction industry itself while the indirect impact is the CHP induced output, income, and employment of the industries that supply the construction industry with goods, services, and materials. The induced impact is the additional output, income, and employment in various consumer markets produced by the increased consumer spending of people employed on CHP projects.

In cooperation with personnel from the KDOT Office of Management and Budget and the Division of Planning and Development, the research team selected the following highway improvement types for analysis.

Category	Highway Improvement Type
1	Resurfacing
2	Restoration and Rehabilitation; Reconstruction and Minor Widening
3	New Bridges and Bridge Replacement
4	Major and Minor Bridge Rehabilitation
5	New Construction; Relocation; Major Widening
6	Safety/Traffic Operations/Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services

The objectives of the study are accomplished through the use of a 68 sector, survey-based input-output model (Emerson, 1989) for the state of Kansas developed by the Economics Department at Kansas State University. The objectives are achieved by adapting the model to include six additional sectors corresponding to the six highway improvement types listed above. The input-output data for these six sectors is obtained by surveying highway contractors who obtained CHP (K jurisdiction) highway construction contracts during the period July 1, 1991 to September 30, 1996. We did not attempt to survey all contractors since the larger contracts were obtained by a relatively small number of firms. Thus we surveyed the firms that account for a large percentage of the value of CHP (K jurisdiction) highway construction contracts awarded during the sample period. The surveys include both a personal interview of the owner of the contracting firm and questionnaires containing the firm's purchase and employment data.

The major findings of the study include the following.

1. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by output is $7.4 billion distributed by highway improvement type as follows:

Highway Improvement Type	Value of Highway Contracts (Millions of Dollars)	Output Multiplier	Output Impact (Millions of Dollars)
Category 1	$647.0	2.671768	$1728.6
Category 2	1621.6	2.587211	4195.4
Category 3	156.0	2.374471	370.4
Category 4	80.6	2.518010	203.0
Category 5	309.8	2.468194	764.6
Category 6	49.6	2.159928	107.1
Total	$2864.6		$7369.1

The output impact for each highway improvement type is obtained by multiplying the value of highway contracts by the output multiplier.

2. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by income is $1.4 billion distributed by highway improvement type as follows:

Highway Improvement Type	Direct Wages and Salaries (Millions of Dollars)	Income Multiplier	Income Impact (Millions of Dollars)
Category 1	$91.1	2.990495	$272.4
Category 2	358.9	2.346804	842.3
Category 3	39.1	2.087858	81.6
Category 4	31.2	1.725710	53.8
Category 5	68.2	2.240519	152.8
Category 6	9.3	2.123587	19.7
Total	$597.8		$1422.6

The direct wages and salaries are the payments to workers in the construction industry attributable to the CHP. The income impact for each highway improvement type is obtained by multiplying the direct wages and salaries by the income multiplier.

3. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by employment is 117,820 full time equivalent (FTE) jobs distributed by highway improvement type as follows:

Highway Improvement Type	Value of Highway Contracts (Millions of Dollars)	Employment Multiplier	Employment Impact (FTE Jobs)
Category 1	$647.0	37.68	24,379.0
Category 2	1621.6	42.26	68,528.8
Category 3	156.0	41.74	6511.4
Category 4	80.6	54.44	4387.9
Category 5	309.8	39.77	12,320.7
Category 6	49.6	34.12	1692.4
Total	$2864.6		117,820.2

The employment impact of 117,820 FTE jobs is obtained by multiplying the employment multiplier (employment per million dollars of output) by the value of highway contracts in each highway improvement type and then summing all six categories.

4. The output, income, and employment impacts measured in this study under-estimate the economic impact of the Kansas CHP (K jurisdiction) highway construction contracts since we were unable to obtain input purchase data for highway work that was subcontracted. The effect of this is to omit the economic impact of the inputs that the highway contractors purchased from each other. Thus the economic impacts measured in this study are conservative estimates.

5. An output multiplier measures the increase in Kansas total output (production) in response to an increase in the output of one of the various Kansas highway improvement types. An income multiplier measures the increase in Kansas total income in response to an increase in income of the workers employed in one of the various Kansas highway improvement types. The employment multiplier measures the overall employment impact per million dollars of CHP highway contract