



CHAPTER I

Purpose And Need For The Project

The Missouri Department of Transportation (MoDOT) and the Federal Highway Administration (FHWA) propose improving the I-70 Corridor in Missouri, between the metropolitan areas of Kansas City and St. Louis, to meet the current and future needs of this highly important transportation facility. To facilitate this action, MoDOT completed the First Tier Environmental Impact Statement (EIS) in 2001 as the first step to fulfill this goal.

The Record of Decision (ROD), approved by the FHWA, selected the Widen Existing I-70 Strategy as the preferred strategy. In addition, the First Tier EIS defined seven Sections of Independent Utility (SIU) and identified the appropriate level of environmental documentation necessary for each SIU for the Second Tier Environmental Studies.

This chapter of this Environmental Assessment (EA) provides an overview and description of SIU 1 and identifies the transportation problems that would be addressed by the proposed improvements.

A. Project History

1. Tiered Environmental Process

Tiering refers to addressing broad programs and issues in the initial first tier analyses, and analyzing more specific proposals and impacts in subsequent second tier studies. The tiered process enables a decision-making process that focuses on issues that are ripe for decision and reduces repetition in environmental documentation. First tier decisions frame and narrow the scope of second tier studies and related decisions. For I-70, the first tier process included a Draft and Final First Tier EIS and concluded with a ROD in December 2001. The I-70 Second Tier Studies, such as this SIU 1 EA, entail the more traditional project-level environmental evaluations.

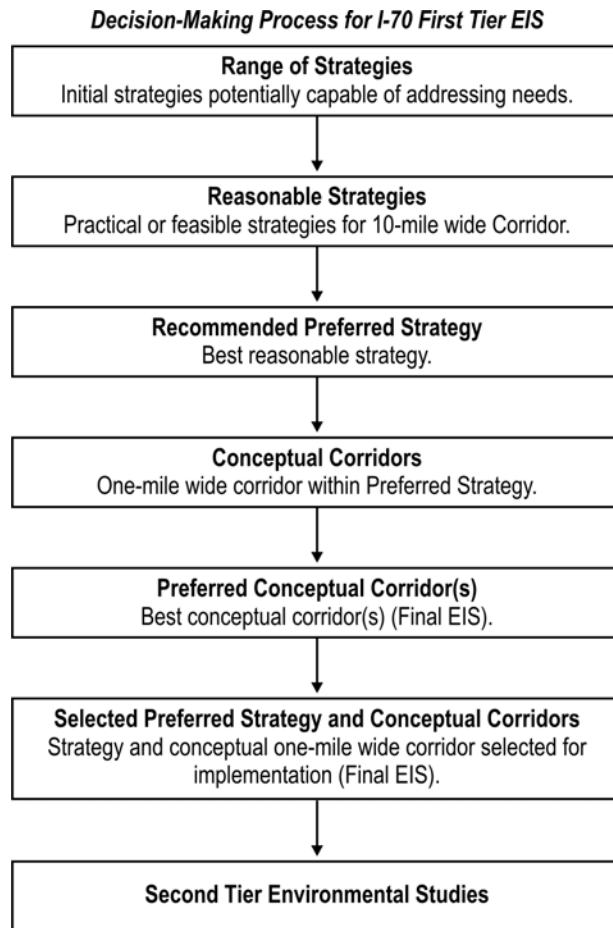
2. Interstate 70 First Tier Approach

The First Tier EIS produced the following outcomes:

- **Approval of general concept** (i.e., preferred strategy) for improving I-70, including a prioritization plan for the corridor.
- Identification of the **SIUs** for the Second Tier Studies, including an action plan for the completion of the environmental process.

- **Documentation** that can be referenced by Second Tier Studies to eliminate repetitiveness and record the First Tier EIS decision.
- Development of **agency and public consensus** for the overall improvement plan.

The following diagram shows the process of developing public/agency consensus through progressively more detailed identification of engineering and environmental impacts of improvement strategies, in ascending level of detail, utilized by the First Tier EIS:



3. First Tier Decision

In 2001, FHWA approved the selection of the Widen Existing I-70 strategy for the I-70 Corridor. The selected strategy is environmentally preferred and it involves the improvement and total reconstruction of the existing I-70 roadway. Future 2030 travel demands dictate that six lanes be provided in the rural areas and a minimum of eight lanes through the metropolitan area of Kansas City. The minimum eight-lane section in metropolitan Kansas City would extend from I-470 in Independence to Adams Dairy Parkway in Blue Springs. Considerations would need to be given to the continuation of these lanes through the I-470 interchange to the west. A complete summary of the First Tier EIS is included in Appendix A.

4. Interstate 70 Major Investment Study

The I-70 Major Investment Study (MIS) was initiated in 2000 by MoDOT in cooperation with the Mid-America Regional Council (MARC) and the Kansas City Area Transportation Authority (KCATA) to evaluate the challenges and opportunities associated with I-70 in Jackson County.

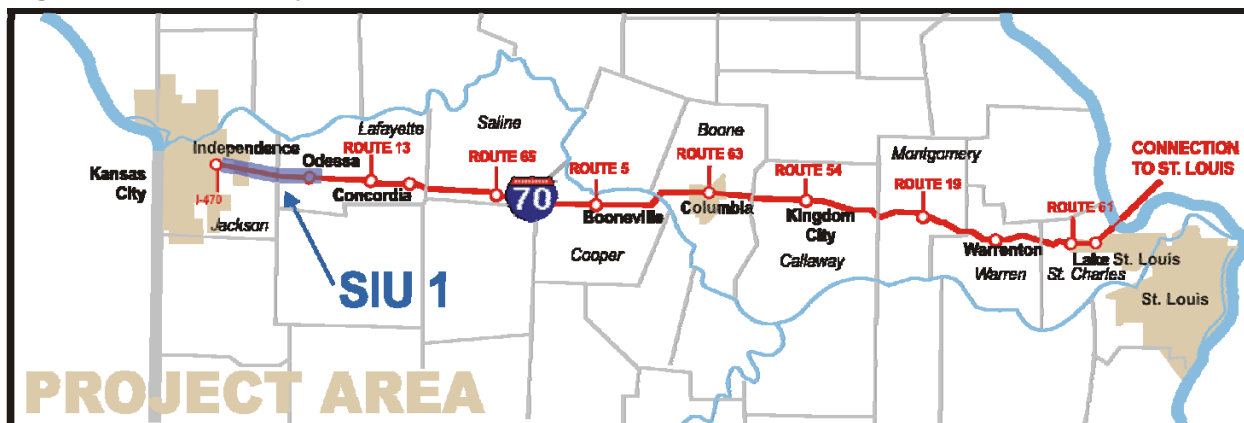
The I-70 MIS corridor is approximately 28 miles (45 kilometers) in length from downtown Kansas City's Central Business District including the downtown loop, eastward to the Route H/F intersection located in Oak Grove. As a result, the I-70 MIS corridor overlaps with the SIU 1 Project Area from I-470 to the I-70/Route H/F interchange in Oak Grove. The findings of this EA for SIU 1 have been coordinated with, and are consistent with, the I-70 MIS process. A copy of the MIS Final Report text is included in Appendix B.

B. Project Description

This Second Tier EA examines the environmental impacts of widening a 24-mile (39-kilometer) portion of I-70 from Independence to Odessa (Figure I-1).

There are currently six lanes of traffic in the urban areas (I-470 to Route 7) and four lanes in the rural areas (Route 7 to mile marker 39) of SIU 1. As determined in the First Tier EIS, the selected strategy for the Improve I-70 Program was the Widen Existing I-70 Strategy.

Figure I-1: SIU 1 Project Area



C. Purpose and Need

The goal of the Improve I-70 Program is to provide a safe, efficient, environmentally sound and cost-effective transportation facility that responds to the needs of each SIU, the overall corridor and the expectations of a nationally important interstate. The specific purpose and need for the SIU 1 portion of the Improve I-70 Program is summarized as follows:

- **Roadway Capacity** – Increase roadway system capacity in accordance with the projected travel demands to improve the general operating conditions of I-70.

- **Traffic Safety** – Reduce the number and severity of traffic-related crashes occurring along I-70.
- **Roadway Design Features** – Upgrade current roadway design features along I-70, including interchanges, roadway alignment and roadway cross sections.
- **System Preservation** – Preserve the existing I-70 facility as needed to carry existing and future loads.
- **Goods Movement** – Improve the efficiency of freight movement using I-70.
- **Access to Recreational Facilities** – Facilitate the usage by motorists of nearby regional recreational facilities through improved accessibility.
- **National Security** – Increase transportation system security and accommodate the potential movement of personnel and equipment as needed for national security.

Each of these specific needs is discussed in the following sections. The order of these specific needs is not intended to imply any relative prioritization or order of importance. Furthermore, the numbering of the individual needs of SIU 1 is not intended to replace the findings of the Missouri Long-Range Transportation Plan (LRTP) regarding the prioritization of MoDOT's statewide needs.

1. Roadway Capacity

a. Traffic Trends on I-70 in SIU 1

Traffic on I-70 in SIU 1 has been generally increasing with time. Table I-1 summarizes the average daily traffic (ADT) for eight areas of I-70 between I-470 and County Road 96/Johnson Road. Although traffic remained relatively stable between I-470 and Woods Chapel Road between 1995 and 2000, the remaining areas of SIU 1 have seen increases between 12 and 80 percent. In the same period, traffic volumes between Woods Chapel Road and Route 7 increased 27 percent and traffic between Route 7 and Adams Dairy Parkway increased by approximately 80 percent.

Table I-1: I-70 SIU 1 Historical Average Daily Traffic 1995-2000

Description	1995	1996	1997	1998	1999	2000
I-470 to Woods Chapel Road	90,421	90,381	90,342	88,409	88,371	90,224
Woods Chapel Road to Route 7	60,420	67,518	61,444	66,920	73,535	76,650
Route 7 to Adams Dairy	38,211	44,296	42,132	46,402	52,776	68,635
Adams Dairy to Route AA/BB	53,600	54,867	56,164	57,492	58,851	59,935
Route AA/BB to Route H/F ¹	NA	NA	NA	NA	NA	NA
Route H/F to Route D/Z	33,970	36,216	40,692	42,169	44,569	43,637
Route D/Z to Route 131 ¹	NA	NA	NA	NA	NA	NA
Route 131 to County Rd 96/Johnson Rd ¹	NA	NA	NA	NA	NA	NA

Source: MoDOT Traffic Management System Data

1 - ADT data from 1995 to 2000 was not available for the following roadway sections: Route AA/BB to Route H/F, Route D/Z to Route 131 and Route 131 to County Road 96/Johnson Road.

Based on the Missouri Statewide and the I-70 MIS travel demand models, traffic volumes are projected to increase at a rate of one to three percent per year between 2000 and 2030 (Table I-2). The resulting 2030 volumes will vary from approximately 120,000 vehicles per day (VPD) at I-470 to approximately 70,000 vpd at County Road 96/Johnson Road in Odessa. The increased traffic volumes will create more traffic congestion and delay on I-70 unless additional capacity is provided.

Table I-2: I-70 SIU 1 Projected Average Daily Traffic 2000-2030 (No-Build)

Description	2000	2005	2010	2015	2020	2025	2030
I-470 to Little Blue Parkway	90,220	94,890	99,550	104,210	108,870	113,530	118,190
Little Blue Parkway to Woods Chapel Road	90,240	95,140	100,040	104,940	109,840	114,730	119,630
Woods Chapel Rd to Route 7	76,650	81,600	86,550	91,500	96,450	101,400	106,350
Route 7 to Adams Dairy	68,640	74,110	79,580	85,060	90,530	96,010	101,480
Adams Dairy to Route AA/BB	59,940	64,610	69,290	73,960	78,640	83,310	87,990
Route AA/BB to Route H/F	43,920	50,500	57,070	63,640	70,210	76,790	83,360
Route H/F to Route D/Z	43,640	49,510	55,390	61,270	67,150	73,020	78,900
Route D/Z to Route 131	27,330	35,390	43,460	51,520	59,590	67,660	75,720
Route 131 to County Rd 96/Johnson Rd	29,680	38,310	44,590	50,870	57,150	63,430	69,710

Source: Missouri Statewide and the I-70 MIS Travel Demand Models

Additional traffic count information provided for the year 2002 was also reviewed. The 2002 traffic counts showed a slight increase in one area and a slight decrease in the remaining portions of the SIU 1 Project Area. After an evaluation of the new data, it was determined that the additional information did not change the conclusions of this study.

A number of projects are either reasonably forecastable or are being considered that would have an impact on the SIU 1 Project Area. These projects are not limited to those that are included in the Missouri Statewide Transportation Improvement Program, but rather reflect the reasonably anticipated long-range improvements to the various corridors outside of the I-70 Corridor. The projects could be completed by 2030 (the First Tier EIS design year), although funding is not programmed at this time and the projects are not identified as priorities on MoDOT's Long-Range Plan. Their inclusion on this list does not imply a commitment by MoDOT that construction of these improvement projects will occur prior to 2030. Rather, this list is based on needs identified and solutions proposed in either ongoing or completed studies for these projects. These assumed improvements establish a baseline condition for this Second Tier EA. The assumed improvement projects include:

Regional East-West Corridors:

- **U.S. 36** – Widened and improved to a four-lane expressway for its entire length between I-29 and the Mississippi River.
- **U.S. 50** – Widened and improved to a four-lane highway to provide an expressway facility from I-435 in Kansas City to I-44 located southwest of St. Louis.

Regional North-South Corridors:

- **Route 13** – Four-lane highway from Springfield to Richmond.
- **U.S. 65** – Four-lane highway from Arkansas to Trenton.
- **U.S. 63** – Four-lane highway from West Plains to Kirksville.
- **U.S. 54** – Four-lane highway from Camdenton to U.S. 61.
- **Route 19** – Four-lane highway from U.S. 54 to 61.

Local East-West Corridors:

- **Route AA at Grain Valley** – The City of Grain Valley is currently evaluating potential improvements to Route AA, which may include widening the existing roadway from two to four lanes.

Local North-South Corridors:

- **Route 7 at Blue Springs** – The City of Blue Springs has recently completed an access management study on Route 7 in Blue Springs near I-70. Future improvements include the addition of bicycle lanes and shoulders north of I-70 by approximately 2007 and south of I-70 by approximately 2012. There is the potential that a median would also be added to Route 7 at some point in the future. However, the timing for the addition of the median is undetermined at this time.
- **Adams Dairy Parkway at Blue Springs** – The City of Blue Springs is considering extending the four-lane Adams Dairy Parkway south to Wyatt Road at some point in the near future.
- **Route F at Oak Grove** – MoDOT is currently evaluating potential improvements to Route F and the frontage roads located near the southwest quadrant of the current I-70/Route F interchange in Oak Grove. Potential improvements to Route F may include widening the existing roadway to four lanes with left turn lanes where necessary from I-70 south to 6th Street.

b. Travel Demand/Flow (Mainline and Interchanges)

The measurement of the effectiveness of a highway to handle traffic is Level of Service (LOS), which is defined by the density and speed of traffic. Levels of Service are comparable to report card grades where a LOS of “A” is the best rating and traffic flow is defined by high speed and low density. Level of Service “E” represents the maximum capacity of the freeway and a LOS of “F” represents oversaturated and queue discharge traffic defined by high density and low speed. Highway Capacity Software is used to calculate LOS. Table I-3 summarizes typical LOS characteristics for freeways.

Table I-3: Level of Service Characteristics for Freeways

LOS	Characteristics
A	Free flow operations, free flow speeds prevail, unimpeded maneuvering
B	Reasonably free flow operations, free flow speeds maintained, slightly restricted maneuvering
C	Speeds at or near free flow, noticeably restricted maneuvering
D	Speeds beginning to decline, freedom to maneuver more noticeably limited
E	Operation at capacity, no usable gaps in traffic, extremely limited maneuverability
F	Breakdown in vehicular flow
<i>Source: Highway Capacity Manual</i>	

Level of Service calculations were performed for the Improve I-70 Program base year (2000) and year 2030. The highway capacity software program estimates the LOS for freeway sections based upon hourly volumes, percent of heavy vehicles in the vehicle mix, and the freeway attributes. The base year and forecasted traffic volumes utilized for these analyses were developed based upon the assumed highway system network described in the Purpose and Need portion of the First Tier EIS.

Level of Service calculations under the No-Build Alternative (e.g., no improvements made to I-70) were made for roadway portions of I-70 and at interchange locations. The results of the roadway LOS analysis for 2000 and 2030 are presented in Table I-4. This analysis shows those areas of I-70 within SIU 1 that do not have sufficient capacity (i.e., number of lanes) to adequately serve the daily traffic demand according to MoDOT's desired service standards; LOS C in rural areas and LOS D in urban areas. This standard is consistent with that used in the I-70 First Tier EIS prepared by MoDOT in 2001. It can be seen from Table I-4 that in 2030 all areas of I-70 within SIU 1 will operate at an undesirable LOS.

Table I-4: I-70 SIU 1 Daily Travel Demand and Roadway Level of Service (No-Build)

Description	Exit		Base Year (2000)		No-Build (2030)	
	To	From	Volume (ADT)	LOS	Volume (ADT)	LOS
I-470 to Little Blue Parkway	Exit 15	Exit 16	90,200	F	118,190	F
Little Blue Parkway to Woods Chapel	Exit 16	Exit 18	90,240	F	119,630	F
Woods Chapel to Route 7	Exit 18	Exit 20	76,650	F	106,350	F
Route 7 to Adams Dairy	Exit 20	Exit 21	68,640	F	101,480	F
Adams Dairy to Route AA/BB	Exit 21	Exit 24	59,940	D	87,990	F
Route AA/BB to Route H/F	Exit 24	Exit 28	43,920	C	83,360	F
Route H/F to Route D/Z	Exit 28	Exit 31	43,640	C	78,900	F
Route D/Z to Route 131	Exit 31	Exit 37	27,330	B	75,720	F
Route 131 to County Rd 96/Johnson Rd	Exit 37	Exit 38	29,680	B	69,710	F

= Undesirable operations based on target LOS C in rural areas and LOS D in urban areas.

Interchange operational analyses were also performed to determine how the I-70 interchange crossroad intersections might operate if no improvements were constructed at the interchange locations. Table I-5 summarizes the results of the interchange operational analyses for the ramp termini intersections with the crossroads.

Table I-5 : I-70 SIU 1 Crossroad Interchange/Intersection Level of Service (No-Build)

Interchange		Base Year (2000)		No-Build (2030)	
		AM	PM	AM	PM
Little Blue Parkway					
	North	A	A	A	A
	South	A	A	A	C
Woods Chapel Road					
	North	C	D	E	E
	South	F	F	F	F
Route 7					
	North	D	E	E	F
	South	C	C	F	F
Adams Dairy Parkway					
	North	B	B	B	B
	South	B	B	B	C
Route AA/BB					
	North	B	B	B	B
	South	B	B	B	C
Route H/F					
	North	B	D	F	F
	South	C	D	F	F
Route D/Z					
	North	A	A	A	A
	South	A	A	B	B
Route 131					
	North	A	A	C	C
	South	B	B	C	C
County Road 96/Johnson Rd					
	North	A	A	A	A
	South	A	A	A	A

= Undesirable operations based on target LOS C in rural areas and LOS D in urban areas.

Many of the existing interchanges within the SIU 1 Project Area will have undesirable crossroad intersection LOSs in 2030. Additional capacity at each of these locations will be needed by 2030 to adequately serve the traffic entering or exiting I-70.

2. Traffic Safety

a. Interstate 70 Crash Statistics

Crash statistics and safety data summarized or presented in this report are protected under federal law (see Appendix C).

Crash information for this analysis was obtained through the MoDOT Traffic Management System database and existing reports. Table I-6 tabulates Property Damage Only (PDO), Injury, Fatal and Total Crashes for the six-year period between 1995 and 2000. During the six-year period, 39 fatal crashes and over 2,700 total crashes occurred in SIU 1.

Table I-6: I-70 SIU 1 Crash Summary (1995-2000)

Year	Total Crashes	Total PDO Crashes	Total Injury Crashes	Total Fatal Crashes
1995	387	275	103	9
1996	381	267	108	6
1997	494	331	157	6
1998	511	363	147	1
1999	473	331	133	9
2000	534	372	154	8
Totals	2780	1939	802	39

Source: MoDOT Office of Transportation Management System

For purposes of comparison, crash rates were calculated using the number of crashes, ADT and vehicle miles traveled (VMT). Crash rates are expressed as the number of crashes per 100 million VMT. Table I-7 summarizes the crash rates for SIU 1 for the six-year period from 1995 to 2000. The statewide five-year average crash rates as of September 2003 are 126.57 for all interstates, 69.22 for rural interstates and 141.04 for urban interstates.

The crash rate for I-470 to Woods Chapel Road exceeds the statewide urban crash rate while the crash rate between Woods Chapel Road and Route 7 is the same as the statewide urban crash rate. All of the rural areas in SIU 1, from Route AA/BB to County Road 96/Johnson Road, exceed the statewide rural crash rate. All SIU 1 freeway areas analyzed had total crash rates equal to, or higher than, the entire corridor average of 87, except for Route H/F to Route D/Z and Route 131 to County Road 96/Johnson Road.

Table I-7: I-70 SIU 1 Crash Rates by Location (1995-2000)

Description	Exit		Length (miles)	Total Crash Rate ¹	Total PDO Crash Rate ¹	Total Injury Crash Rate ¹	Total Fatal Crash Rate ¹
	From	To					
I-470 to Woods Chapel	15	18	3.1	154	106	46	1.30
Woods Chapel to Route 7	18	20	1.8	141	104	36	1.11
Route 7 to Adams Dairy	20	21	1.2	121	86	31	3.07
Adams Dairy to Route AA/BB	21	24	2.8	87	53	33	1.44
Route AA/BB to Route H/F	24	28	3.8	100	74	24	1.65
Route H/F to Route D/Z	28	31	3.3	76	54	20	2.79
Route D/Z to Route 131	31	37	5.6	103	72	30	1.20
Route 131 to County Rd 96/Johnson Rd	37	38	1.3	82	57	24	1.21
Totals			22.8	114	80	33	1.61

1 - Crash rates based on 100 million VMT.

According to MoDOT crash data, summarized in Table I-8, the predominant types of crashes are rear-end and out of control. Possible causes of these types of crashes on I-70 are speed and congestion. The portion of I-70 from Route 7 to Adams Dairy Parkway has the highest total crash rate in SIU 1 and also operated at a LOS of F in 2000.

Table I-8: I-70 SIU 1 Crash Summary by Type (1995-2000)

Crash Type	Total Crashes of this Type	Percentage
Changing Lanes	218	8%
Median Crossover	35	1%
Out of Control	930	34%
Rear End	800	29%
Other	797	28%
Total Crashes	2780	100.0%

The types of crashes experienced on I-70 could be reduced by providing increased capacity. If no improvements are made to increase capacity, the projected increased traffic volumes on I-70 will likely produce increased crashes.

Additional crash information provided for years 2001, 2002 and 2003 was also reviewed. There was an overall decrease in average annual crashes for the SIU 1 Project Area as a whole. Only three of the SIU 1 roadway areas experienced any increase in annual crashes, and these were minimal. After an evaluation of the new data, the additional information did not change the conclusions of the study.

b. Need for Safety Upgrades

Adding capacity to I-70 in the SIU 1 Project Area would improve operational conditions, relieve congestion and reduce the density of traveling vehicles, thereby reducing the crash rate within SIU 1. Interstate improvements could include adding capacity, installing median barriers and making pavement and geometric improvements. Providing capacity improvements to the SIU 1 Project Area would create the opportunity to directly address the localized or systematic safety issues that cause the SIU 1 Project Area's crash problems.

Truck traffic on I-70 is a significant facet of the state's transportation system and economy. The heavy truck traffic affects safety, capacity and preservation of the physical structure of the roadway. An increase in the traffic-carrying capacity of I-70 would provide an ability to maintain reasonable operating speeds, improve LOS and provide a safer driving environment.

As I-70 travel continues to grow, safety conditions will continue to worsen. Only through implementation of aggressive, safety-related measures would the crash rate on I-70 lessen. Until such a program is initiated, the I-70 crash rate will continue to increase.

3. Roadway Design Features

a. Existing Roadway Features

Between I-470 and Odessa the I-70 roadway consists of a six-lane or four-lane freeway. In all rural areas, existing roadway lanes are 12 feet (3.7 meters) wide, with 10- or 12-foot (3.0- to 3.7-meter) outside shoulders and 4- or 6-foot (1.2- or 1.8-meter) inside shoulders. The median width, measured between inside edges of the through lanes, varies in width from 40 to 296 feet (12.2 to 90.2 meters). Where the median is uniform in width, the width typically measures 40 to

60 feet (12.2 to 18.3 meters). Several areas between Grain Valley and Odessa have variable width medians that are 95 to 296 feet (29.0 to 90.2 meters) wide. The non-shoulder areas of the median are comprised of a depressed grass median. The median width always includes the width of the inside shoulders. As stated in the First Tier EIS, these existing design features comply with the standards contained in *A Policy on Design Standards-Interstate System*, American Association of State Highway and Transportation Officials (AASHTO), 1991, which was incorporated by reference in 23 CFR Section 625.4.

The current horizontal alignment of I-70 meets current minimum standards for an interstate facility. There are some locations where the vertical alignment consists of curves that exceed the desired vertical curvature standards for interstate facilities.

The Missouri Department of Transportation is presently completing a pavement replacement project on the I-70 facility within SIU 1 (MoDOT Job Numbers J4I1352 and J4I306). The project includes the reconstruction of six through-lanes of pavement from the I-470 interchange to Route 7 while also bringing this section of I-70 up to current interstate design standards. Any subsequent plans to further upgrade I-70 in this area (including the Build Alternatives described in this EA) would generally include utilizing the current improvements and widening by adding additional lanes to the outside. This portion of the roadway is shown in gray in the Chapter IV exhibits to differentiate it from the Build Alternatives considered in this EA.

Most locations within SIU 1 have complete frontage roadways along both sides of I-70 to provide access to adjoining properties. These frontage roads typically consist of two lane roadways with 12-foot (3.7-meter) travel lanes.

b. Existing Interchanges

There are nine interchanges between I-470 and the Odessa County Road 96/Johnson Road exit (Exit 38), inclusive. Of these nine interchanges, six are diamonds, the two at Odessa are half or three-quarter diamonds and the I-470 interchange is a cloverleaf configuration. Figure I-2 illustrates these types of interchanges.

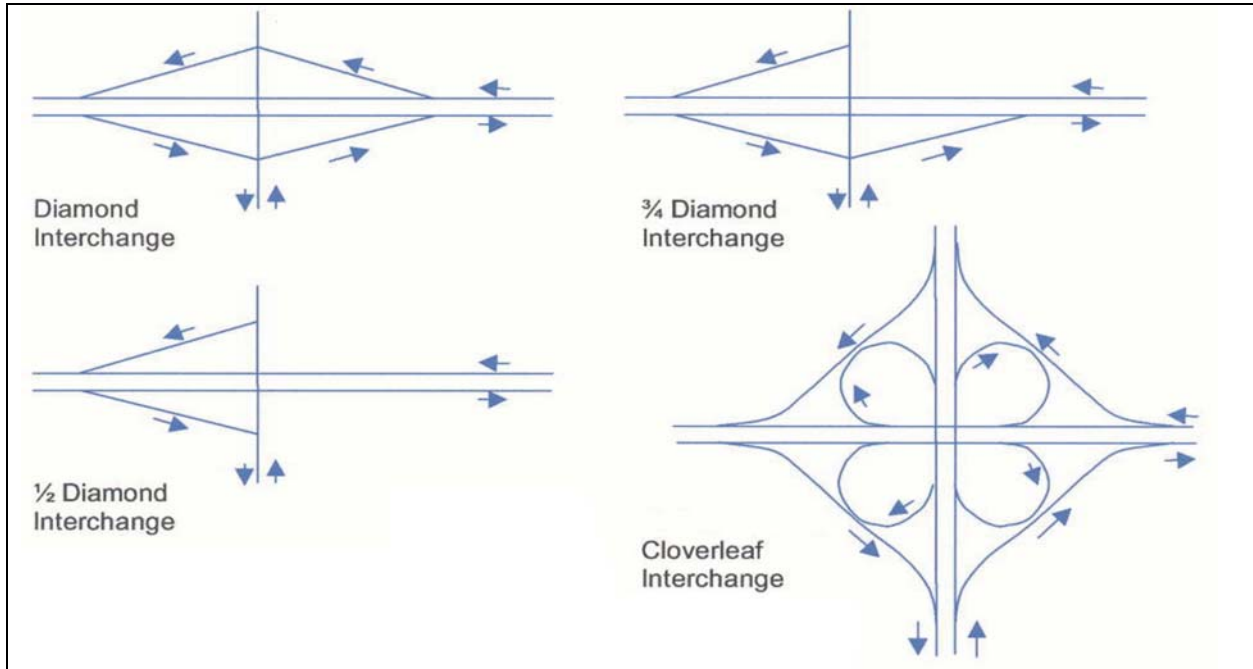
The I-470 interchange is not considered to be part of the SIU 1 Project Area except as the western terminus. The I-470 interchange will be addressed in a First Tier EIS that is currently being initiated for I-70 from the Missouri State line east to the I-470 interchange.

With the exception of Adams Dairy Parkway and Little Blue Parkway, none of the existing interchanges in SIU 1 meet existing MoDOT criteria for spacing between ramp termini and minimum spacing between ramp termini and frontage roads. When the interchanges are evaluated for compliance with MoDOT's current access management guidelines, none of the existing interchanges in the SIU 1 Project Area meet the 800 feet (243.8m) between ramp termini and 1,320 feet (402.3m) spacing between ramp termini and frontage road criteria.

The Little Blue Parkway interchange meets current design standards, access management guidelines and was designed with considerations for the future widening of I-70. The Adams Dairy Parkway interchange also meets current design standards and access management

guidelines. Both interchanges have employed a form of access management that is deemed acceptable.

Figure I-2: Interchange Designs



c. Existing Ancillary Features

Existing grade separations are located at Old Route 40 and Route WW. A former weigh station that has been converted to a truck rest area without facilities is located west of Odessa at Burton Road.

d. Improvements Needed to Conform with Current Design Criteria

Compared to today's design standards for a state-of-the-art freeway, the existing I-70 facility has several design parameters that do not meet current standards. Design parameters that do not meet current standards would be addressed as part of any improvement to the I-70 facility. Current roadway standards for freeways provide many improvements over the standards used when I-70 was originally constructed in the 1950s and 1960s.

The Missouri Department of Transportation, in coordination with FHWA, has established overall program-level design criteria and guidance for the Second Tier Preliminary Engineering Studies of the I-70 improvements. These guidelines were established based on MoDOT's *Policy Procedure and Design Manual* and AASHTO's *Policy on Geometric Design of Highways and Streets*. However, recognizing that the investments in I-70 will be long term, more stringent and conservative design criteria and standards have been defined in anticipation of future corridor needs and ever-evolving design parameters. A more stringent design standard has been established as a desired goal to allow design flexibility within the corridor such that future design evolutions can be reasonably "absorbed" within the project. Furthermore, a more stringent

design standard provides a more conservative estimate of the impacts of the project for the purposes of the environmental planning process and documentation.

As an example, the minimum vertical clearance at bridges is greater than what would be required per currently adopted standards. This will allow the improvements to accept future changes in vertical clearance requirements. For all such instances, MoDOT will assess the program's overall design criteria and standards during subsequent design development to ensure the program strikes the right balance between meeting the needs of tomorrow and the additional costs and impacts of the more stringent design. The Missouri Department of Transportation is committed to adhering, at a minimum, to the appropriate currently adopted criteria and design standards. The goal will be to provide a consistent standard throughout the corridor. However, MoDOT recognizes that constraints in some areas, such as the urban areas, may affect the ability to reasonably accomplish the more stringent standards. If necessary, the rural areas may provide a more stringent design standard while the urban areas, due to tighter constraints, may hold to the minimum design standards.

The complete design criteria for the I-70 Second Tier Studies is included in the *Median Area Study, Design Criteria and Estimating Guide* (available upon request). The design standards used in SIU 1 are consistent with these design criteria.

Some of the criteria used in this study for the design of facility upgrades to I-70 between Independence and Odessa would include the following:

- **Design Year** – 2030
- **Design Speed** – 75 miles per hour (120 kilometers per hour)
- **Roadway** – Provide 12-foot (3.7-meter) travel lanes
- **Shoulders** – Widening the inside and outside shoulders to meet current AASHTO standards. A 12-foot (3.7 m) wide, full-depth shoulder is recommended to allow for use as future through lanes or temporary lanes during maintenance activities
- **Median** – Provide a concrete median in urban areas. Provide an improved median in rural areas meeting the minimum standards, including a width of 120 to 130 feet (37 to 40 meters), 5.5:1 slopes, an 8-foot (2.4-meter) flat bottom ditch and a 4-foot (1.2-meter) ditch depth
- **Safety Clear Zone** – Provision for a 32-foot (9.75-meter), safety clear zone
- **Horizontal Curves** – Provide alignment with maximum horizontal curves of 1 degree and 30 minutes
- **Vertical Alignment** – Provide alignment with a maximum crest vertical curve K-value of 312 and a maximum sag vertical curve K-value of 206
- **Vertical Clearance** – Provide 19 feet (5.8 meters) of vertical clearance over I-70
- **Grade** – Provide alignment with a maximum grade of 3 percent
- **Interchanges** – Reconstruct existing diamond interchanges to provide a minimum of 800 feet (243.8m) between ramp termini and 1320 feet (402.3m) between ramp termini and frontage roads with improved access control

- **Rest Areas** – Provide upgraded safety rest areas with adequate parking for vehicles, particularly trucks

4. System Preservation

a. Existing Pavement Condition

The original pavement for I-70 was constructed between 1956 and 1965, with portions of incorporated U.S. 40 being constructed in the 1940s. Since that time there have been numerous projects to rehabilitate, resurface and reconstruct portions of the roadway to maintain its structural integrity and provide a smooth riding surface.

The most recent pavement rating information was compiled from available MoDOT data, and was summarized in the First Tier EIS, for the following four pavement condition indices:

- **Ride Condition Index (RCI)** – an index measuring the overall condition of the ride using standardized procedures
- **Condition Score** – the calculation for this score is the result of a formula that includes separate measures for surface roughness, surface distress and the average annual daily traffic
- **Pavement Serviceability Rating (PSR)** – a subjective indicator of ride quality and surface roughness based on human observation utilized by FHWA prior to 1993
- **International Roughness Index (IRI)** – an objective indicator of ride quality and surface roughness developed by World Bank and utilized by FHWA starting in 1993

Based on measurements for each of the above indices, existing pavement is rated as: very good, good, fair, poor, or very poor. A portion of I-70 in SIU 1, from I-470 to the intersection at Route 7, is currently undergoing a pavement replacement. Upon completion, pavement in this area should be rated as very good in all categories. Analysis of the current pavement conditions for the remaining areas of SIU 1 showed that the majority of the pavement is rated as fair or poor condition.

b. Existing Condition of Bridges

Analysis of the bridge conditions documented in the First Tier EIS showed the average age of bridges in Lafayette County is 25 years and the average age of bridges in Jackson County is 15 years. The combined Lafayette and Jackson County bridge condition ratings fall within the fair to good categories, with a need for maintenance. Additional information gathered during the second tier study confirmed the information from the First Tier EIS, with approximately 75 percent of the bridges in SIU 1 in either fair or good condition.

In addition to bridge condition ratings, the sufficiency rating for the structures was also reviewed in the First Tier EIS. The sufficiency rating result is a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient bridge. The structures on I-70 in Lafayette and Jackson County score an average value of 92.7 percent while the structures over I-70 score an average value of 65.5 percent. This indicates

that bridges over I-70 are deficient in more areas or in greater value than the bridges on I-70 and may require more immediate maintenance and repair to remain adequately sufficient.

The ratings of individual bridges within the SIU 1 Project Area are presented in Table I-9. Numerical ratings are assigned for each bridge deck, superstructure and substructure, with higher numbers indicating the more satisfactory conditions. These ratings can then be quantified into the five general categories of the Index: Very Good, Good, Fair, Poor and Very Poor. The overall priority rating is a rating of a bridge's condition, width and load carrying capacity. The overall priority rating is a numeric value from 1 to 4, with 1 being the highest priority and 4 being the lowest priority.

Table I-9: I-70 SIU 1 Bridge Ratings

Bridge Number	Direction	Feature Crossed	Over/Under I-70	Year built	Deck Rating	Superstructure Rating	Substructure Rating	Index	Overall Priority Rating
A0053	B	Little Blue River	Over	1964	4	4	8	Poor	2
A5726	B	Little Blue Parkway	Under	1997	9	9	9	Very Good	4
L0981	EB	GM&O Railroad	Over	1963	7	7	7	Good	2
L0981	WB	GM&O Railroad	Over	1963	6	6	7	Fair	2
L0982	B	Woods Chapel Road	Under	1963	6	6	8	Fair	4
L0983	EB	Route 7	Over	1963	8	8	8	Very Good	4
L0983	WB	Route 7	Over	1963	7	7	7	Good	2
A5075	B	Adams Dairy Parkway	Over	1992	8	8	8	Very Good	2
L0984	EB	Route AA/BB	Over	1963	7	7	8	Good	4
L0984	WB	Route AA/BB	Over	1963	7	7	8	Good	4
L0146	EB	Sni-A-Bar Creek	Over	1948	7	7	6	Fair	4
A0167	WB	Sni-A-Bar Creek	Over	1963	8	7	7	Good	4
R0135	B	Old Route 40	Under	1963	7	7	8	Good	4
L0986	B	Route H/F	Under	1963	6	6	7	Fair	4
L0406	EB	Horseshoe Creek	Over	1951	8	8	8	Very Good	4
A0163	WB	Horseshoe Creek	Over	1963	6	6	6	Fair	4
L0407	EB	Little Horseshoe Creek	Over	1951	8	8	8	Very Good	4
A0164	WB	Little Horseshoe Creek	Over	1963	6	6	7	Fair	4
A0056	B	Route D/Z	Under	1963	6	6	8	Fair	4
G0388	EB	Sni-A-Bar Creek	Over	1952	7	7	8	Good	4
A0165	WB	Sni-A-Bar Creek	Over	1963	8	8	8	Very Good	4
A0075	B	Route WW	Under	1963	6	6	6	Fair	4
A0057	B	Route 131	Under	1963	6	6	6	Fair	4
L0352	EB	GM&O Railroad	Over	1950	6	6	6	Fair	4
A0166	WB	GM&O Railroad	Over	1963	7	8	7	Good	4
A0058	B	County Rd 96/Johnson Rd	Under	1963	6	6	7	Fair	4

Note: Data for Bridges is from 2002

E – Eastbound

W – Westbound

B – Both Eastbound and Westbound

5. Goods Movement

The I-70 Corridor is a major east-west route that accommodates a significant volume of daily truck traffic for the purpose of goods movement. Within SIU 1, trucks currently account for approximately 20 percent of total traffic. Commodities are moved into, out of, and through the state at a growing rate, and trucks and passenger vehicles compete for the available roadway capacity. As documented in the First Tier EIS, over 87 percent of the goods originating from or destined to areas within Missouri are transported on trucks.

The important role of I-70 in accommodating the movement of freight is further described through the review of recent traffic count information. Truck traffic on I-70 has been steadily increasing according to truck count data. In 2000, truck traffic accounted for 17 percent of the ADT near I-470 and 24 percent of the ADT near Odessa. The percentage of truck traffic is projected to increase to 21 percent near I-470 and 29 percent near Odessa in 2030. As the percentage of truck traffic continues to grow in the rural areas of SIU 1, the operations of the I-70 roadway will continue to degrade at an ever-increasing rate.

Without improvements to I-70, future traffic congestion would degrade the movement of goods by truck in SIU 1 and result in higher transport costs. An improved transportation facility would facilitate the movement of increasing volumes of goods as well as support local and regional economic growth.

6. Access to Recreational Facilities

Interstate 70 carries more rural daily traffic than any other interstate highway in Missouri. Interstate 70 is one of only two east-west interstates in Missouri, and the only interstate facility that connects the two largest cities in Missouri; St. Louis and Kansas City. Interstate 70 is the largest gateway to the vast amount of tourist and recreational destinations in the state.

Convenient access to recreational areas in Missouri is important to the quality of life of many Missourians and Midwesterners. The Branson/Table Rock Lake area and the Lake of the Ozarks are two of the largest tourist/recreational destinations in Missouri. Travelers use the I-70 connections to major north/south highways, such as U.S. 54, U.S. 63, U.S. 61 and U.S. 65 to arrive at tourist and recreational facilities throughout the state.

Tourism is a \$7.8 billion per year industry in Missouri, employing nearly 191,000 Missourians. Missouri tourism annually generates \$525 million in state taxes. Given the economic importance of the tourist and recreational destinations in Missouri, safe and efficient access is needed to recreational facilities.

While the SIU 1 portion of I-70 does not provide direct access to major tourist attractions, it is a vital part of the overall I-70 corridor that provides access to a major population center (i.e., the Kansas City Metropolitan Area) and as such is a key route for tourists wishing to access major tourist attractions across the State of Missouri.

7. National Defense

Interstate 70 is a major east-west transportation corridor on a national, regional and local level. As such, I-70 is a vital part of the nations National Security System. Within SIU 1, I-70 is the major east-west transportation corridor through the Kansas City Metropolitan Area and outlying areas and provides a efficient route to facilities of national security interest such as the Lake City Army Ammunition Plant located north of Blue Springs.

The need to have efficient, convenient and expeditious movement of large quantities of people and equipment requires that transportation systems must have a degree of access. In cases such as the highway system, access is almost unlimited. Along with the open access, most of the transportation infrastructure, from airports to highway and rail bridges, was designed and built long before concerns about security and terrorism had arisen.

Current planning related to the highway system security is focusing on:

- protecting critical mobility assets,
- enhancing traffic management capabilities, and
- improving department of transportation emergency response capabilities.

Additional capacity along the I-70 Corridor would increase the ability of the corridor to handle diversion from other highway links, should some type of disaster occur. The increased capacity also enhances the ability to handle emergency responses. The I-70 Corridor is part of the Strategic Highway Network (STRAHNET) and at several interchanges provides connections to STRAHNET connecting links. The physical protection of assets would be considered as part of the design process based upon a risk assessment approach. Implementation of the proposed intelligent transportation system along the corridor would also enhance traffic management capabilities and protect critical assets.

Investments made in improving I-70 can help to increase transportation system security in Missouri and in the nation as a whole.