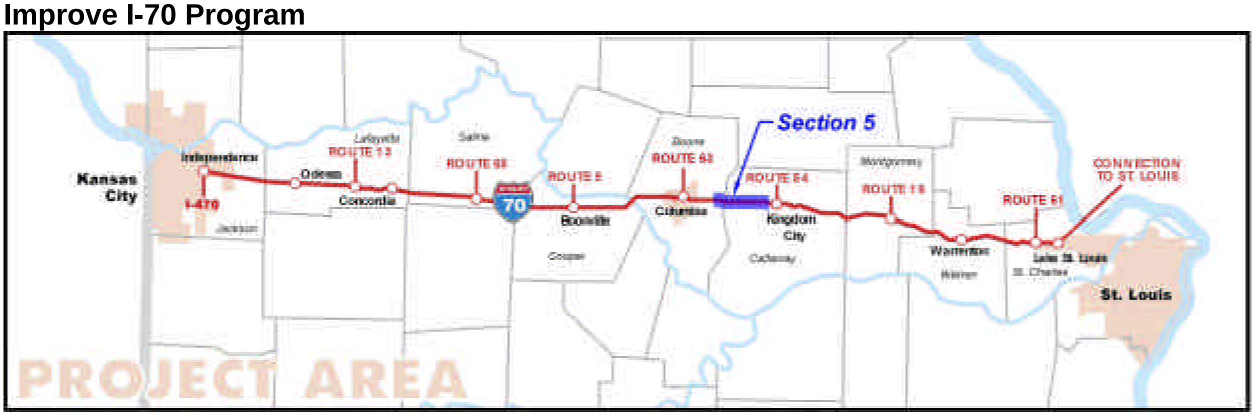
Purpose and Need for Proposed Action

A. Project Overview

The Missouri Department of Transportation (MoDOT) and the Federal Highway Administration (FHWA) are proposing to construct improvements to Interstate 70 between the metropolitan areas of Kansas City and St. Louis to meet the current and future transportation-related needs of this corridor. The map below shows the project area of the Improve I-70 Program. In compliance with the National Environmental Policy Act (NEPA), a First Tier Environmental Impact Statement (EIS) was prepared to aid in determining the most appropriate type of improvement concept for I-70. The FHWA approved the selection of the Widen Existing I-70 Strategy for the I-70 Corridor. The selected strategy is environmentally preferred and 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 Columbia and in the metropolitan areas of Kansas City and St. Louis. A complete summary of the First Tier EIS is included in Appendix A.

Improve I-70 Program



B. Corridor Location

Section of Independent Utility (SIU) 5 includes a section of Interstate 70 between Route Z in Boone County, just east of Columbia and U.S. 54 in Callaway County, just west of Kingdom City. The project includes 13 miles of interstate corridor between milepost 134 and milepost 147. The SIU 5 corridor is generally defined as a corridor centered along the existing I-70 alignment, approximately 700 feet wide. This corridor expands at two interchanges to cover issues associated with each interchange and its land uses. The SIU 5 corridor includes two interchanges — the Route J and DD interchange and the Route M and HH interchange. Little Cedar Creek and Cedar Creek are the primary surface waters in the corridor. The general limits of SIU 5 are shown on Exhibit I-1.

C. Proposed Roadway Type

As recommended in the First Tier EIS, proposed improvements in this section include adding lanes and reconstructing the existing roadway to enhance safety and performance while improving access management. The improvements would replace the existing I-70 roadway in its entirety with a new configuration that would meet current standards for freeway construction. Design criteria have been developed to establish the general design characteristics of the I-70 improvements. These criteria establish common design parameters to be utilized in the design of the improvements within the I-70 corridor.

The design criteria are generally based on the MoDOT Project Development Manual where applicable, but some variances occur where changes are needed to reflect the character of this futuristic facility. The design speed for the new I-70 is 75 mph (121 km/hr), although it would most likely be posted at 70 mph (113 km/hr). Compared to today's state-of-the-art freeway, the existing I-70 facility does not meet current design standards. Current roadway standards for freeways provide wider shoulders and medians than what was originally constructed on I-70.

D. Sections of Independent Utility for Second Tier Studies

MoDOT is carrying forward the Second Tier Studies identified in the First Tier EIS. These Second Tier Studies are necessary to further study and define the improvements to I-70 such that more detailed analyses of the environmental impacts can be performed to more precisely evaluate the impacts of the project.

The proposed improvements for this SIU are categorically excluded from the need to prepare an EIS in FHWA regulation 23 CFR 771.117(d) due to the typical nature of the improvements and the level and intensity of expected impacts, which are not expected to be significant. A documented Categorical Exclusion (CE) is being prepared for this SIU per this regulation. A public and agency coordination process was conducted to document the process of refining the improvements and avoiding and minimizing impacts to natural and social resources.

E. Need for Proposed Action

The goal or purpose of Improve I-70 is to provide a safe, efficient, environmentally sound and cost-effective transportation facility that responds to corridor needs as well as expectations of a national interstate.

The program's purpose and need can be summarized as follows:

Purpose and Need Statement

> **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 between Kansas City and St. Louis.

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 (including use of the existing right of way) through continued and ongoing rehabilitation and maintenance activities of pavement and bridges.

Goods Movement – Improve the efficiency of freight movements using the I-70 corridor.

Access to Recreational Facilities – Facilitate the usage by motorists of nearby regional recreational facilities through improved accessibility.

National Security – Improving I-70 can help to increase transportation system security in Missouri and in the nation as a whole.

Each of the specific needs, as summarized above, has been addressed in detail during the First Tier EIS process. The ordering of these specific needs is not intended to imply any order of importance. Also, the array of individual needs is not intended to replace the findings of the Missouri Long-Range Transportation Direction regarding the prioritization of MoDOT's statewide needs.

1. Roadway Capacity

a. Traffic Trends on I-70

Traffic on I-70 has been increasing over time at a relatively consistent rate. An examination of historic average annual daily traffic (AADT) indicates that in some years growth was not consistent. These fluctuations in traffic volumes from one year to the next could be due to construction or opening of new roadways or other unknown conditions that cause a diversion of traffic to or away from I-70. Table I-1 presents an 11-year history for annual traffic counts on I-70.

The AADTs in the rural areas through which I-70 passes have average annual growth rates ranging from 2.9 to 3.5 percent per year. It is clear from this historic traffic review shown in Table I-1 that the trend is for higher volumes on I-70.

Table I-1: I-70 Historical Average Annual Daily Traffic

Traffic Volume (AADT) by Year											
County	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Callaway	22,100	22,700	23,600	23,000	23,400	21,400	27,300	28,300	29,000	29,500	29,900
The counter location is in Callaway Co. on I-70 east of U.S. 54.											

b. Traffic Forecasts

As input to the I-70 corridor analysis, traffic volumes were forecast using a statewide model. The rural sections of I-70 show the largest percentage increase in traffic from the year 2000 to 2030. Table I-2 contains model forecasts for the subsections of SIU 5. As the table indicates, mainline traffic volumes are forecasted to more than double by 2030. These forecasts were also resolved to peak-hour turning-movement volumes at the ramps and cross-roads for the purposes of intersection operational analysis.

Table I-2: Model-Forecasted Mainline Average Daily Traffic

Section	2000	2020	2030
MO-Z to MO-J/DD	33,460	65,640	78,050
MO-J/DD to MO-M/HH	30,940	62,320	73,510
MO-M/HH to US-54	31,560	62,850	74,140
Source: HDR, 2003			

A number of projects can be reasonably forecasted or are being considered that would have an impact on the I-70 Study Corridor. These projects are not limited to those that are included in the Missouri State Transportation Improvement Program, but rather reflect the reasonably anticipated long-range improvements to the various corridors outside of the I-70 corridor. The roadways could be improved by 2030 (the First Tier EIS design year), although funding is not programmed at this time and the roadways are not identified as priorities. Inclusion in the program does not imply a commitment by MoDOT that construction of these improvements 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 First Tier EIS. The assumed improvements include:

Major 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. It has been proposed that U.S. 36 be designated as I-72 but no action has been taken in this regard and no timetable established.

U.S. 40/I-64 – Improved to an eight-lane or six-lane freeway from downtown St. Louis to Route DD and then four lanes to connection with I-70.

U.S. 50 – Widened and improved to a four-lane highway to provide a freeway or expressway facility from I-435 in Kansas City to I-44 located southwest of St. Louis.

Major 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 U.S. 61.

c. Highway Operations (Level of Service)

Using the base year (2000) and forecasted (2020 and 2030) traffic volumes along I-70, operational analyses were completed to determine the ability of the existing I-70 facility to serve the corridor's travel demands. The analysis was performed using the basic freeway section methodologies from the *Highway Capacity Manual*. The analysis calculates a level of service (LOS) for freeway sections based upon hourly volumes, percent of heavy vehicles in the vehicle mix and the freeway section attributes.

Along with the volume of traffic and the number of lanes on a roadway, the terrain that the roadway traverses also impacts how well traffic flows. Heavy trucks have a greater impact on the traffic flow as roadway grades become steeper and longer. Grades can cause average truck speeds to be substantially reduced as compared to passenger car and light truck traffic. The reduced speeds result in trucks taking up a larger percentage of the available roadway capacity. The impact of terrain can result in I-70 roadway links with similar traffic volumes and the same number of lanes having different levels of service because the terrain is different.

A brief description of each of the LOS categories is as follows:

- **LOS A** – uninterrupted traffic flow, lower volumes and higher travel speeds.
- **LOS B** – stable traffic flow, increasing traffic and reduced travel speeds due to congestion.
- **LOS C** – stable flow, increasing traffic, travel speeds and maneuverability restricted by higher volumes.
- **LOS D** – approaching unstable flow, tolerable travel speeds although considerably affected by changes in operating conditions.
- **LOS E** – unstable flow, with possible stopped conditions, lower operating speeds than level of service D, volume approaching capacity of the roadway.
- **LOS F** – unstable flow, with speeds at low or stopped condition for varying times caused by congestion when downstream traffic volumes are at or over the roadway capacity.

MoDOT's minimum acceptable level of service for rural interstates is LOS C. Therefore, LOS D or worse conditions are considered unacceptable.

Level of service calculations were made for roadway sections of I-70 to identify where and when traffic congestion would occur if no improvements are made to I-70. The results of the roadway LOS analysis for 2000, 2020 and 2030 are presented in Table I-3. As the table indicates, the western portion of SIU 5 (Route Z to Routes J/DD) is forecasted to operate unacceptably (LOS D) by 2020. By 2030, the entire SIU is expected to operate unacceptably (LOS D).

Table I-3: Model-Forecasted Mainline Level of Service (Without Improvements)

Section	2000	2020	2030
MO-Z to Mo-DD/J	B	D	D
MO-DD/J to MO-M/HH	B	C	D
MO-M/HH to US-54	B	C	D
Source: HDR, 2003			

Level of service was also calculated for SIU 5 based on construction of the proposed improvements. The results of this analysis, shown in Table I-4, indicate that LOS would be improved in the corridor in 2020 and 2030.

Table I-4: Model-Forecasted Mainline Level of Service (With Improvements)

Section	2000	2020	2030
MO-Z to Mo-DD/J	B	B	C
MO-DD/J to MO-M/HH	B	B	C
MO-M/HH to US-54	B	B	C
Source: HNTB, 2004			

Level of service calculations were also conducted for the ramp terminal intersections at the two studied interchanges. As Table I-5 indicates, all four of these study intersections are forecasted to operate at LOS B or better through 2030. This finding indicates that future capacity concerns are expected to relate to the mainline, not interchanges. In summary, forecasted LOS D conditions in 2020 and 2030 indicate long-term capacity enhancement needs for SIU 5.

Table I-5: I-70 SIU 5 Intersection Analysis

	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Year 2000				
I-70 WB ramps/MO-J/DD	3.9 (6.5)	A (A)	3.7 (5.3)	A (A)
I-70 EB ramps/MO-J/DD	2.9 (8.6)	A (A)	3.2 (9.3)	A (A)
I-70 WB ramps/MO-M/HH	4.5 (7.6)	A (A)	5.5 (8.0)	A (A)
I-70 EB ramps/MO-M/HH	2.8 (6.2)	A (A)	3.2 (6.6)	A (A)
Year 2020				
I-70 WB ramps/MO-J/DD	4.6 (7.1)	A (A)	4.9 (6.9)	A (A)
I-70 EB ramps/MO-J/DD	2.8 (9.1)	A (A)	3.3 (10.0)	A (B)
I-70 WB ramps/MO-M/HH	5.0 (7.9)	A (A)	6.0 (8.3)	A (A)
I-70 EB ramps/MO-M/HH	2.6 (6.3)	A (A)	3.0 (6.8)	A (A)
Year 2030				
I-70 WB ramps/MO-J/DD	4.9 (7.4)	A (A)	4.3 (6.1)	A (A)
I-70 EB ramps/MO-J/DD	2.8 (9.3)	A (A)	3.4 (10.6)	A (B)
I-70 WB ramps/MO-M/HH	5.2 (8.1)	A (A)	6.3 (8.5)	A (A)
I-70 EB ramps/MO-M/HH	2.5 (6.3)	A (A)	2.9 (7.0)	A (A)
Source: HDR, 2003				

Note: Values outside parentheses represent average delay (seconds per vehicle) for all movements entering the intersections. Values inside parentheses represent average delay only for movements required to stop or yield (cross-road left turns and all off-ramp movements.)

2. Traffic Safety and Crash Trends

As with all roadway facilities, safety is a key consideration for the I-70 corridor. Crashes occur on a regular basis on the corridor, generally as the result of driver error. The design of the roadway facility can impact how forgiving the roadway is to driver error. The following crash data illustrate how important the issue of traffic safety is in the I-70 corridor. The data are from the MoDOT Traffic Management System.

The total number of crashes on I-70 within the study corridor has been increasing. In the 6-year period from 1995 to 2000, the number of crashes increased from 1,777 to 2,565, which is a 44% increase. This increase in the number of crashes primarily results from an increase in the traffic on I-70. This increase in traffic results in an increase in the density of vehicles resulting in less room for driver error.

Table I-6: Mainline Crash Rates within SIU 5

Section	**Crash Rate (per 100 million vehicle miles)**	
	All crashes	**Fatal crashes only**
MO-Z to MO-DD/J	75	1.16
MO-DD/J to MO-M/HH	49	1.04
MO-M/HH to US-54	100	0.43
SIU#5 Mainline Total	**70**	**0.91**
I-70 Mainline Total (all SIUs)	87	1.37
Statewide Rural Interstate	69.22	1.16

Table I-6 contains crash summary statistics for SIU 5. As the table shows, the crash and fatality rates as a whole are below the average for the entire I-70 study corridor. However, the section between Routes M/HH and U.S. 54 exhibits a crash rate above the I-70 average. Rear-end accidents were slightly more prevalent on this section than on the other two, and there was a much higher proportion of contributing circumstances classified as “too fast for conditions”. Upgrading the design standards on I-70 as planned would improve operations and would have a positive impact on safety performance throughout SIU 5.

Although the fatality rates on SIU 5 were below the overall average, the fatalities are worth examining to determine if any pattern is evident. Of the seven fatality records that could be found, three involved median crossovers. All three crossovers involved trucks, underscoring the high truck percentage on I-70 (26 to 27 percent). Of the remaining four fatalities, three involved out-of-control vehicles, and one involved an avoidance maneuver by a vehicle traveling too fast for conditions. The crossover accidents indicate that median improvements are worth considering as part of an overall I-70 improvement strategy.

It is notable that “ran off road – fixed object” was a predominant accident type, constituting 26 percent of crashes on SIU 5. This fact provides evidence that the future design of I-70 should focus on maintaining adequate clear zones and minimizing roadway obstructions.

In summary, the crash rates for SIU 5 were generally lower than those for I-70 as a whole, with the exception of the section between Routes M/HH and U.S. 54. Strategies to improve I-70 to current design standards, including adequate horizontal clearances, median treatments and other elements, would contribute toward improved safety within SIU 5.

3. Roadway Design Features

Compared to today's design standards for a state-of-the-art freeway, some elements of the existing I-70 facility do not meet the current design criteria. These should be addressed as part of any improvement to the corridor. Current roadway standards for freeways provide wider shoulders and medians than what was originally constructed on I-70. Facility upgrades to I-70 would include the following:

- Roadway – Widening of inside and outside shoulders to meet current American Association of State Highway and Transportation Officials (AASHTO) standards. A 12-foot (3.7 m) wide full-depth shoulder is recommended to allow for use as future through lanes during maintenance activities.
- Median – Provide an improved median meeting the minimum standards. Current MoDOT standards recommend a minimum 60-foot (18.3 m) median width for a 70 mph design speed. For this section of I-70, a median width of 124 feet – 24 feet for future seventh and eighth travel lanes, 60 feet for clear zones and 40 feet for a construction buffer – would be required.
- Clear Zone – Provision for a 30-foot (9.1 m) wide (with a 6:1 slope) safety clear zone to meet requirements for 75 mph design.
- Vertical Alignment – Some vertical curves do not meet the current AASHTO standards. Vertical curves need to provide at least a minimum, but preferably the desirable vertical curvature to meet sight distance requirements.
- Interchanges – Reconstruction of existing diamond interchanges to provide a minimum of 750 feet (227.3 m) between ramp intersections with crossroads and the next intersecting roadway that only allows right turns in and right turns out. A minimum of 1,320 feet (440 m) is required between the ramp intersection and the next intersection that allows left turns to and from the intersecting roadway.

4. System Preservation

The original pavement for the SIU 5 corridor was constructed between 1963 and 1964. 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 I-70 First Tier EIS presented pavement rating information compiled by MoDOT. Existing pavement rating measurements showed that approximately one-third of the existing I-70 pavement in Callaway County was considered to be in poor or very poor condition when measuring factors for overall ride quality and surface roughness.

As presented in the First Tier EIS, pavement rating information compiled from MoDOT data shows, on average, fair pavement condition in Boone and Callaway Counties. Pavement rating information is provided for the following:

- Ride Condition Index – 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 AADT.
- Pavement Serviceability Rating – A subjective indicator of ride quality and surface roughness based on human observation utilized by FHWA prior to 1993.
- International Roughness Index – An objective indicator of ride quality and surface roughness developed by the World Bank and utilized by FHWA starting in 1993.

Measurements for each rating were taken from MoDOT data at 0.02-mile (0.03 km) increments along the eastbound and westbound lanes of the existing highway. The average score for each rating and the length of roadway falling into five rankings (Very Poor, Poor, Fair, Good, Very Good) was compiled. This data for Boone and Callaway Counties is shown in Table I-7. This data shows that, depending on the rating used, at least 50% of existing I-70 pavement in Boone and Callaway Counties is ranked as Fair to Very Poor.

Table I-7: Existing Pavement Rating Measurements*

County	Average[1]	Length in Each Condition Classification (in miles)					Total Length (miles)
		Very Good	Good	Fair	Poor	Very Poor	
Ride Condition Index[2]							
Boone	6.00	11.30	10.02	7.38	3.66	11.28	43.64
Callaway	5.54	2.38	13.12	19.58	7.38	13.84	56.3
Condition Score[3]							
Boone	16.64	7.08	6.94	12.72	5.16	11.74	43.64
Callaway	17.24	14.08	1.04	22.60	5.54	13.04	56.30
Pavement Serviceability Rating[4]							
Boone	28.65	7.60	7.04	8.96	5.14	14.90	43.64
Callaway	28.32	4.54	9.28	15.46	10.36	16.66	56.30
International Roughness Index[5]							
Boone	114.21	1.70	17.82	8.28	10.94	4.90	43.64
Callaway	114.63	0.46	14.88	20.38	17.50	3.08	56.30

*Data is combined for eastbound and westbound lanes.

	Very Good	Good	Fair	Poor	Very Poor
[1]Average Score					
[2]Ride Condition Index Score	7.9 to 10.0	7.0 to 7.8	5.8 to 6.9	4.9 to 5.7	0 to 4.8
[3]Condition Score	18.9 to 20.0	17.8 to 18.8	16.4 to 17.7	15.3 to 16.3	0 to 15.2
[4]Pavement Serviceability Rating Score	34.5 to 40.0	32.1 to 34.4	29.3 to 32.0	26.3 to 29.2	0 to 26.8
[5]International Roughness Index Score	0 to 60	60.01 to 94	94.1 to 119	119.01 to 170	>170

The existing SIU 5 corridor has preservation needs that must be addressed by any improvement strategy. Existing pavement needs to be evaluated for major rehabilitation or complete replacement.

5. Goods Movement

The freight flow analysis and supporting truck traffic counts presented in the I-70 First Tier EIS indicate the important role that I-70 has in the movement of goods into, out from and within Missouri. A majority of intrastate movement of goods takes place via truck. Truck traffic along I-70 has been increasing at a rate slightly greater than two percent per year. The percentage of truck traffic on SIU 5 in 2000 was 26 to 27 percent and is projected to increase to 29 percent by

2030. Without improvements to I-70, the movement of goods by truck in the I-70 corridor would be degraded as a result of future traffic congestion, resulting in higher transport costs.

6. Access to Recreational Facilities

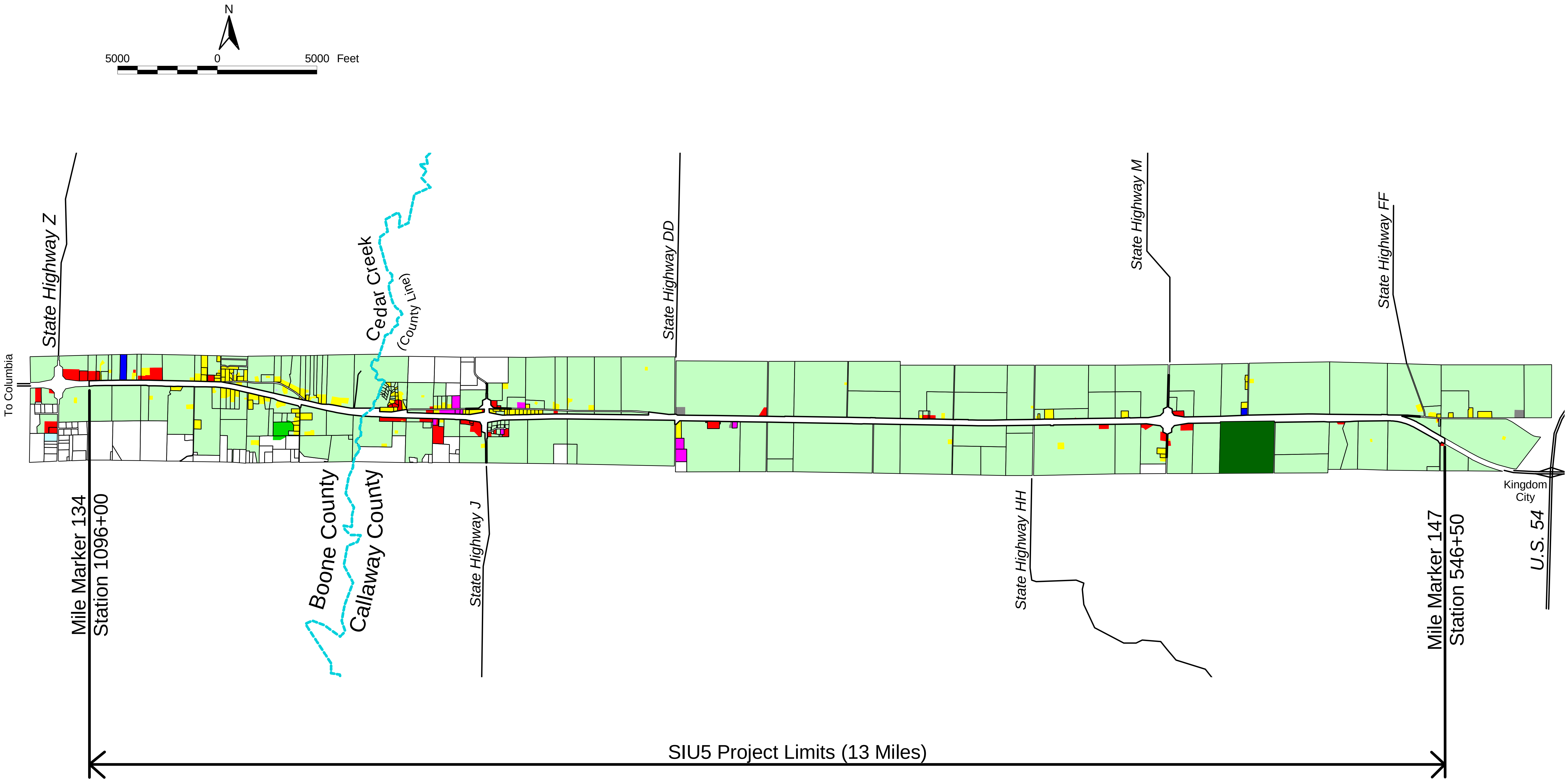
In rural Missouri, I-70 carries more traffic daily than any other interstate highway. As one of only two east-west interstates in Missouri and the only interstate facility which connects the two largest cities in Missouri, St. Louis and Kansas City, I-70 is the largest gateway to the vast amount of tourist and recreational destinations in the state. In some locations, summer traffic volumes on I-70 can be 50 percent higher compared to winter volumes, with many travelers seeking access to recreational and tourist facilities throughout the state. These include such destinations as the Branson/Table Rock Lake area and the Lake of the Ozarks as well as several other regional lakes and state parks. Travelers to these destinations use I-70 as a connection to north/south highways including U.S. 54, U.S. 63, U.S. 61 and U.S. 65.
The SIU 5 corridor provides this important connection. Safe and efficient access is needed on I-70 to access recreational facilities throughout Missouri.

7. National Security

The need to have efficient, convenient and expeditious movement of large quantities of people and goods requires that transportation systems must have a high 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.

Additional capacity along the I-70 corridor will 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 (STRANET) and several interchanges provide connections to STRANET connecting links. The STRANET is designed to facilitate the movement of personnel and equipment for deployment and emergency response. Proposed intelligent transportation system (ITS) implementation along the corridor will also assist in protecting critical assets and will enhance traffic management capabilities.

The physical protection of assets will be considered as part of the design process for I-70 corridor improvements. Improving I-70 can help to increase transportation system security in Missouri and in the nation as a whole. National Security considerations are addressed in more detail in the First Tier Summary in Appendix A.



SECTION
5
Route Z to U.S. 54

Legend

- Agricultural Landuse
- Church Landuse
- Commercial Landuse
- Industrial Landuse
- Park Landuse
- Public/Semi-Public Landuse
- Residential Landuse
- Utility Landuse
- Conservation Area (University of Missouri)

Overall View of Project

EXHIBIT
I-1