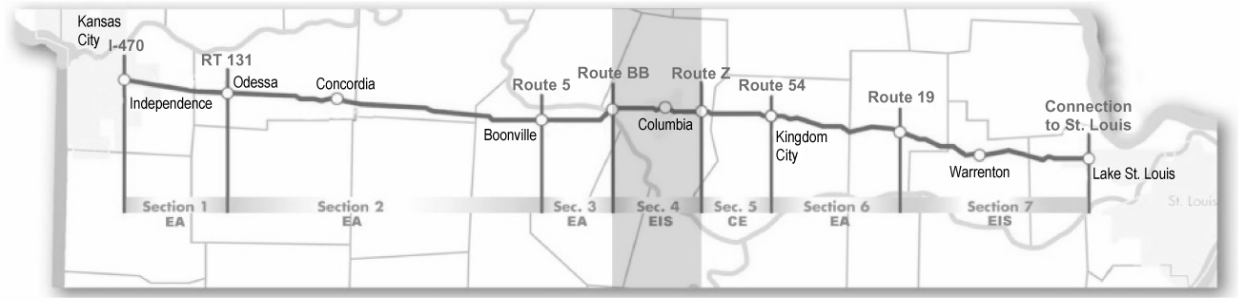
CHAPTER I
Purpose and Need Statement

A. Summary of Purpose and Need

The Missouri Department of Transportation (MoDOT) and the Federal Highway Administration (FHWA) are investigating improvements to Interstate Route 70 (I-70) across Missouri, from Kansas City to St. Louis. This effort is known as Improve I-70. In accordance with the National Environmental Policy Act (NEPA), a tiered approach was taken in the Improve I-70 investigation. A First Tier Environmental Impact Statement (First Tier EIS) was initiated to examine the entire 200-mile (321.9-kilometer [km]) section of I-70. The First Tier EIS focused on identifying the most appropriate types of improvements for I-70 on a conceptual level. It also identified seven Sections of Independent Utility (SIU) within the First Tier study area. A series of Second Tier studies was undertaken to identify specific improvements most appropriate to each SIU. The Second Tier studies are more traditional project-oriented investigations. This document addresses SIU 4. **Figure I-1** depicts the study area for the First Tier study and the seven SIUs created for the Second Tier studies. The establishment of the SIUs during the First Tier studies also established the logical termini to be used during the Second Tier studies.

Figure I-1: Improve I-70 First Tier Study Area and Second Tier SIUs

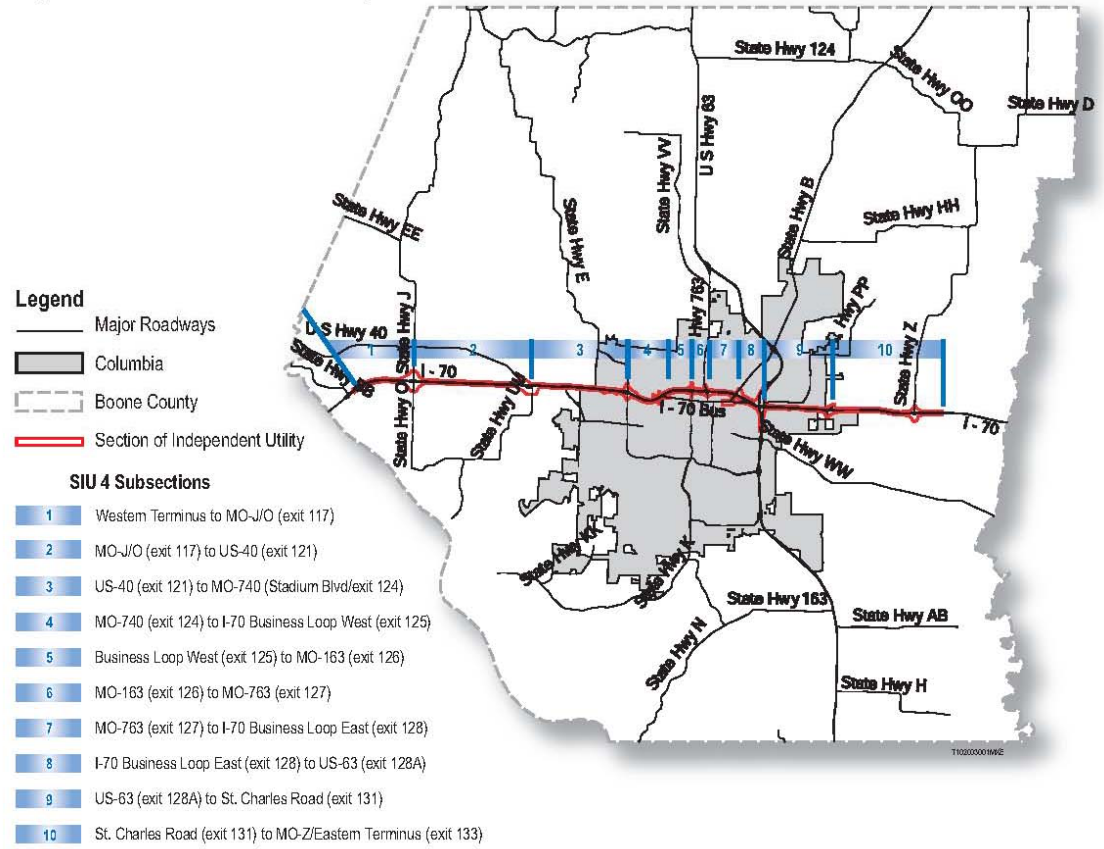


As discussed in the First Tier EIS purpose and need statement, the overall (corridor-wide) goal of the Improve I-70 project is "to provide a safe, efficient, environmentally sound and cost-effective transportation facility that responds to corridor needs as well as expectations of a national interstate." The elements of the First Tier purpose and need statement include *roadway capacity* (increase roadway system capacity), *traffic safety* (reduce the number and severity of traffic-related crashes)**,** *roadway design features* (upgrade roadway design features), *system preservation* (continue ongoing rehabilitation and maintenance activities), *goods movement* (improve the efficiency of freight movement using the I-70 corridor), *access to recreational facilities* (improve motorist access to nearby amenities) and *national security*.

Section of Independent Utility 4 includes the city of Columbia and the portion of I-70 from just west of the Missouri Route J/O interchange (MO-J/O, exit 117) to just east of the MO-Z interchange (exit 133). This 18-mile (29.0-km) section of four-lane divided highway has limited

access and contains 10 interchanges. Section of Independent Utility 4 spans virtually the entire width of Boone County. **Figure I-2** depicts the general vicinity of SIU 4.

Figure I-2: SIU 4 Vicinity Map



Approximate Scale: One Inch = Six Miles

The logical termini for SIU 4 were determined in the First Tier EIS and roughly conform to metropolitan planning boundaries. The western logical terminus is a point just east of exit 115 (but not including the interchange). Exit 115 is the first interchange east of the Missouri River crossing. The eastern logical terminus of SIU 4 is exit 133. Exit 133 is the last interchange prior to the Boone County Line. These termini are logical because they encompass an area that will allow for the development/evaluation of all possible alternatives to address the area's transportation problems. Section of Independent Utility 4 fully represents the extent of influence that the City of Columbia has on I-70. **Exhibit I-1** depicts the I-70 corridor and its most important cross roads and service roads.

Purpose and need are the transportation-related problems that a project is intended to address. The generation and evaluation of alternatives is conducted to develop the most appropriate solution to the identified problems. The purpose and need associated with the Second Tier of the I-70 (SIU 4) EIS are to:

1. Accommodate existing and future traffic volumes on I-70;
2. Improve outdated I-70 design elements;
3. Accommodate all users of I-70 and
4. Improve user safety.

1. Accommodating Existing and Future Traffic Volumes on I-70

Within SIU 4, the overall volume of traffic on I-70 is projected to at least double between 2000 and 2030 (the project's design year). Under a No-Build Alternative, these increases would result in poor operational conditions for travelers on I-70. In terms of Average Daily Traffic (ADT), the No-Build I-70 traffic volumes are expected to increase from 33,017 to 59,714 (2000) to 81,610 to 120,210 (2030). Nearly every portion of the system would experience at least a doubling in volume. These increases will negatively impact the roadway's ability to function properly.

The same trend exists in regard to Level of Service (LOS). Level of Service is a measure of a highway's ability to handle traffic demand. Traffic parameters and roadway design factors, such as ADT volumes, percentage of daily volume occurring in the peak hour, truck percentages, number of driving lanes, lane widths, vertical grades, presence or absence of traffic signals and type of access and spacing allowed all affect LOS. Guidelines for calculating LOS on various types of highways have been established by the Transportation Research Board (*Highway Capacity Manual,* Special Report 209, 2000). The LOS ranges from A to F in order of decreasing operational quality. The LOS categories used to describe freeway operations are summarized as follows:

LOS A—Uninterrupted traffic flow, lower volumes and higher travel speeds.

LOS B—Stable traffic flow, increasing traffic and reduced travel speed due to congestion.

LOS C—Stable flow, increasing traffic, travel speeds and maneuverability are restricted by higher volumes.

LOS D—Approaching unstable flow, tolerable travel speeds but considerably affected by changes in operating conditions.

LOS E—Unstable flow, with possible stopped conditions, lower operating speeds and 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.

If no action is undertaken, all sections would fail to meet the threshold LOS (**Table I-1**).

Table I-1: No-Build I-70 LOS Data

SIU 4 Subsections/Interchange Area	Desired Level of Service	2000 Peak Hour Level of Service		2030 Peak Hour Level of Service	
		Eastbound	Westbound	Eastbound	Westbound
1 MO-BB to MO-J/O	C	B	B	**D**	**D**
MO-J/O Interchange Area	C	B	B	**D**	**D**
2 MO-J/O to U.S. 40	C	B	B	**F**	**F**
U.S. 40 Interchange Area	D	C	C	**F**	**F**
3 U.S. 40 to MO-740	D	C	C	**F**	**F**
MO-740 Interchange Area	D	D	D	**F**	**F**

Table I-1: No-Build I-70 LOS Data

SIU 4 Subsections/Interchange Area	Desired Level of Service	2000 Peak Hour Level of Service		2030 Peak Hour Level of Service	
		Eastbound	Westbound	Eastbound	Westbound
4 MO-740 to Bus Loop West	D	C	C	**F**	**F**
B. Loop (W) Interchange Area	D	D	D	**F**	**F**
5 Bus Loop West to MO-163	D	D	D	**F**	**E**
MO-163 Interchange Area	D	D	**E**	**F**	**F**
6 MO-163 to MO-763	D	C	D	**F**	**F**
MO-763 Interchange Area	D	D	D	**F**	**F**
7 MO-763 to Bus Loop East	D	D	D	**F**	**F**
B. Loop (E) Interchange Area	D	D	D	**F**	**F**
8 Bus Loop East to U.S. 63	D	D	D	**F**	**F**
U.S. 63 Interchange Area	D	D	D	**F**	**F**
9 U.S. 63 to St. Charles Road	D	C	C	**F**	**F**
St. Charles Interchange Area	D	D	D	**F**	**F**
10 St. Charles Road to MO-Z	D	B	B	**F**	**F**
MO-Z Interchange Area	D	B	B	**E**	**E**

Shaded Bold *indicates that the LOS does not meet the threshold criteria.*

Rural LOS Threshold: C

Urban LOS Threshold: D

Subsections 1-3 are Rural; all others are Urban.

The interchange Area LOSs are composite LOSs, meaning that they represent the worst LOS of the respective ramps and mainline traffic within each interchange area.

Year 2002 traffic data have been reviewed. The results of the evaluation did not indicate a need to change the conclusions developed previously. Therefore, the traffic data and analysis have not been updated from the year 2000.

Consequently, one element of the SIU 4 purpose and need is to develop alternatives that accommodate existing and projected traffic volumes.

2. Improve Outdated I-70 Design Elements

Interstate 70 has been in place for many decades, and there are numerous design features that do not meet the standards required of modern roadway facilities. Because the overall intent of the Improve I-70 program is the examination of a 200-mile (321.9-km) section of I-70 and redeveloping it to satisfy future needs, there is an opportunity to improve outdated design elements.

As defined here, outdated design elements are geometric elements of the roadway design that do not adhere to current standards. An example of this would be roadway lane widths that are narrower than the applicable minimum. There are numerous geometric standards associated

with a roadway design, including horizontal alignment, vertical alignment, cross section elements and median width. Poorly adapted design elements degrade operation and safety. The conditions found within SIU 4 are not uncommon to an interstate highway of this age and are often the result of reasonable standards and decision-making at the time of the original design. As the planning process moves toward implementation of a large-scale improvement project, it is prudent to design the preferred alternative to improve as many outdated design elements as possible. All other things being equal, an alternative that eliminates outdated design elements is superior to one that does not.

Consequently, one element of the purpose and need is to improve the existing facility in order to more closely adhere to current standards.

3. Accommodate All Users of I-70

Section of Independent Utility 4 is roughly equidistant between the major population centers of Missouri: Kansas City and St. Louis. Interstate 70 is the primary east-west link across the state. As a result, it plays an important role in freight movement and general inter/intra-state travel. This is borne out by the high percentages of truck traffic and through movements within the I-70 traffic stream. Because SIU 4 traverses the city of Columbia, it is also an important component in the local roadway network. The numerous I-70 interchanges within Columbia allow local users[1] to enter and exit I-70 throughout the city. This creates a situation where the existing traffic streams are in conflict. Trucks present an additional operational challenge because of their size and limited maneuverability. Motorists (truck and non-truck) on non-local and through trips expect the interstate to minimize their travel time, making them less likely to react well to sudden stops or movements. Local users can also be either trucks or passenger vehicles. By their nature, they tend to strain interchange capacities because, per mile of travel, they use such facilities very heavily. The high numbers of entrances and exits tend to create conflicts with through traffic. It is the intent of this project to accommodate the various traffic streams to the extent practical.

Consequently, one element of the purpose and need for SIU 4 is to develop alternatives that accommodate all users of I-70. All other things being equal, the alternative that best accommodates all users of I-70 would be superior.

To examine this issue, the Draft Environmental Impact Statement (DEIS) presented data related to accommodating all users of SIU 4. First, the nature of the major traffic streams that use I-70 was discussed. Among the major traffic streams on I-70 are truck traffic component, the traditional long-distance (through) traffic component and the local traffic stream associated with Columbia. The basic nature of these traffic streams brings them into conflict. Within SIU 4, the conflicts can be substantial as traffic is forced to negotiate an urban area. The development and evaluation of alternatives required consideration of the ability of different roadway configurations to accommodate these traffic streams.

Second, an investigation of interchange operation was presented. Operations at the interchanges affect all I-70 users. Based on existing data, SIU 4 interchange operation can be

[1] Local is defined as those vehicles that use I-70 as a link in their trips as they would an arterial or collector roadway. In general, local trips are incompatible with the transportation planning goals of the Interstate Highway System. Rather than distance traveled, the local trips are more easily identified by their travel pattern. Local trips tend to enter and exit I-70 after travelling only an interchange or two.

described overall as acceptable. Areas where current operations do not meet threshold criteria include the eastbound movements at the I-70/U.S. 63 interchange, the westbound movements at the I-70/U.S. 40 interchange and the westbound movements at the I-70/MO-740 interchange. Based on the expected future conditions, operations at every interchange are expected to degrade and most would be unacceptable by 2030. For I-70 to operate in a manner consistent with its role within the Interstate Highway System, its interchanges must operate effectively. The overall system would suffer if the interchanges cannot accommodate traffic loads. The ability to design effective interchange configurations, within the highly developed I-70 corridor, would be a challenge throughout the Second Tier process.

Finally, the way that local movements interface with I-70 was examined. This includes how I-70 affects north-south traffic and how the existing service road system affects operation. How well alternatives accommodate the different traffic streams, how well they manage traffic at the interchanges and how effective they are at providing non-highway alternatives for local travelers would determine the extent to which they can be said to accommodate all of the users of I-70.

4. Improve User Safety

Both the frequency and severity of crashes on I-70 have been increasing over time. The First Tier EIS related the increasing levels of crashes to the ever-higher traffic volumes on I-70. Traffic volumes on SIU 4 are expected to at least double by 2030. The number of crashes would proportionally increase as traffic volumes increase. Consequently, one purpose and need element for SIU 4 is to develop alternatives that improve user safety on I-70.

Proposed improvements to I-70 would have significant safety benefits. A monetary safety benefit was determined by applying monetary values to forecasted 2030 crashes by severity. The 1995-2000 crash rates were adjusted to reflect improvements to I-70 due to adding additional lanes, wider median and improved geometry. The adjusted crash rates were used in conjunction with forecasted 2030 traffic volumes to determine the number of crashes. A safety benefit was calculated comparing the Build and No-Build Alternatives. The Build Alternative uses the improved crash rates to determine the projected number of crashes. The No-Build Alternative uses the 1995-2000 crash rates to determine the projected number of crashes. The total safety benefit of the improvements to I-70 during the year of 2030 is projected to be $56 million and a reduction of just over 400 crashes.

B. Clarifications to Draft Environmental Impact Statement

1. Limitations to the Improvement of the Existing I-70 Design

One of the elements of this project's purpose and need is to "Improve the Outdated I-70 Design Elements". The intent of this element was to primarily make improvements to those aspects of the highway that affected the driver's experience. While this is a somewhat malleable concept, it was never intended to create a highway that would fundamentally deviate from the typical highway that currently exists. Safety, speed of travel and proximity to trip ends were the most common concepts defining the driver's experience.

Periodically through the Second Tier EIS it was suggested, by some stakeholders, that I-70 should be redeveloped to create a more "scenic" facility. The word "parkway" was often used. Generally, a roadway was envisioned that meandered through the landscape in a manner that would take it into the proximity of aesthetically pleasing landscape elements. The roadway would also "blend" into the landscape in a naturalistic way. The resulting road would have numerous curves and a minimal amount of straight sections. The intent is to create a facility that would be a tourist attraction, in and of itself. For the most part, the suggestions supporting a more scenic roadway addressed the entire portion of I-70 – not necessarily SIU 4.

Within SIU 4, the preferred alternative is the redevelopment of an existing facility in a largely urban area. In order to minimize impacts, every effort was taken to minimize the amount of work outside the existing highway's footprint. A scenic parkway concept would create a set of consequences that would so negatively impact the existing community, that it would be difficult to imagine their implementation. While the areas outside of Columbia (and the new corridor concepts evaluated earlier in the process) might be more amenable to a scenic parkway, it would require that the adjacent SIUs be included in the scenic realignments. It would be difficult to create truly scenic roadway while requiring it to reconnect to the other SIU termini.

While creation of a scenic parkway was not the intent of the purpose and need element: "Improve the Outdated I-70 Design Elements," the project team sought to incorporate aesthetic elements into the project, to the extent possible. The I-70 First Tier EIS documented the commitments of MoDOT and FHWA to provide corridor-wide impact coordination, impact mitigation and considerations of corridor enhancements. This led to the development of the I-70 Corridor Enhancement Plan. The goals of the enhancement plan included creating an approximately 200-mile I-70 transportation corridor that does the following:

- Complements the existing natural environment;
- Maintains sensitivity to the existing context of the corridor;
- Provides a sense of consistency along the entire route;
- Showcases Missouri natural resources through enhancements, which also highlight Missouri history, cultural resources and economy and
- Establishes baseline enhancements for the entire corridor and identifies opportunities for additional enhancements by local communities and other partnering agencies.

As provided for in the I-70 Corridor Enhancement Plan, aesthetic enhancements potentially apply to SIU 4. Many of the design elements would require further evaluation, as design activities proceed, to ensure that they are appropriate and would truly enhance the post-construction environment. Aesthetic enhancements will also be dependent on the availability of funding and the participation of local governments in cooperative funding arrangements. The design elements that are currently under consideration for SIU 4 include the following:

Railing and Fencing

The I-70 Corridor Enhancement Plan addresses two types of railing and fencing: those for the protection of pedestrians and those used for right of way demarcation purposes.

Bridge Treatments

The I-70 Corridor Enhancement Plan provides for the possibility of an aesthetic design program to unify the visual theme of the corridor. Among the possible design element treatments (appropriate to SIU 4) include bridge abutments, piers and roadway/bridge barriers.

Bicycle Trail Crossings

Although there are no existing trail crossings of I-70, several are proposed, and MoDOT is committed to facilitating these crossings. All treatments must comply with all applicable regulations (including Americans with Disabilities Act Accessibility Guidelines [ADAAG], American Association of State and Highway Transportation Officials [AASHTO], etc.).

Lighting

Lighting for the new I-70 corridor would follow the same general pattern of the existing system. Existing street lighting would be replaced, in kind.

Landscape Enhancements

Enhancements in the median area could include naturalizing the median with vegetative treatments, such as native Missouri wildflower plantings or other plantings, which could provide a vertical element in the median with trees and shrubs as contrasted to the flat horizontal character of the highway and existing wide median.

2. Refining the Concept of the "Accommodating All Users of I-70"

Interstate 70 plays an important role in freight movement and in general inter/intra-state travel. Because SIU 4 also traverses the city of Columbia, it plays an important role in the local roadway network. This creates a situation where the existing traffic streams are often in conflict. It is the intent of this project to accommodate the various traffic streams to the extent practical. Consequently, one element of the purpose and need for SIU 4 is to develop alternatives that accommodate all users of I-70. All other things being equal, the alternative that best accommodates all users of I-70 would be superior.

So, while the SIU 4 EIS specifically acknowledges that local users are to be accommodated, it does not create an unlimited mandate. Not every local project, no matter how well intentioned or important to the local roadway network, must be (or should be) incorporated into the I-70 project. Separating purely local interests from those elements that should be included in a major project is a constant issue. Section of Independent Utility 4 was no exception.

The project team has worked closely with the local entities responsible for transportation planning within the study area (principally Boone County, Columbia Area Transportation Study Area [CATSO] and Columbia). The goal has been to ensure that significant negative and avoidable impacts to the transportation network are avoided or minimized from implementation of the I-70 project. The benchmark for comparison is the project's impact on the area's long-range transportation plan (CATSO's 2025 Transportation Plan – Major Roadway Plan). The Major Roadway Plan was developed with the expectation that I-70 would be improved, either through a bypass or within the existing corridor. Based on these expectations, the local transportation planners developed the Major Roadway Plan to meet local needs through 2025.

The DEIS extensively discussed the coordination between the I-70 project team and local transportation planning agencies. Specifically, the DEIS addressed the CATSO Technical Committee review of the project's reasonable alternatives. The local transportation planning agencies also provided comments on the DEIS[2]. Overall, the comments support the preferred alternative. However, it is clear that there is a local desire to see the I-70 project include a new interchange located west of Stadium Boulevard.

After initiation of the Second Tier EIS, the CATSO Coordinating Committee amended the Major Roadway Plan to include a placeholder for a new interchange, between Perche Creek and the Stadium interchange. The placeholder was intended to acknowledge that a new interchange was planned in the general vicinity but that the exact location would be determined at a later date. The amendment also included new extensions to Scott Boulevard and Route E to connect the new interchange to the local roadway network. The new interchange is often referred to as the Scott interchange. On December 9, 2004, CATSO took action to upgrade the Scott Boulevard extension to I-70 from a placeholder to an identified project in the Major Roadway Plan.

As stated in the DEIS, projects that involve the Interstate Highway System must balance the needs of through traffic and local traffic. For local users, new interchanges increase mobility. However, new interchanges have the potential to degrade the primary purpose of the interstate, which is to facilitate long distance, through traffic movements. They also include additional social, economic and environmental impacts that need to be considered. Consequently, one SIU 4 evaluation measure was the investigation of whether the existing Stadium interchange could be reconstructed and/or modified in accordance with the applicable operational standards and without considerable impacts to the surrounding environment. New interchanges would only be considered if the existing interchange could not be modified with an acceptable level of impact.

The SIU 4 project team determined that a Stadium interchange with ramps to and from the east at Fairview Road provided the most effective traffic relief and allowed the Stadium interchange, and the Bernadette/Stadium intersection, to operate at acceptable LOS. It was determined that a new interchange near the location of CATSO's placeholder would not provide operational benefits to I-70 or the Stadium interchange.

So while the Scott interchange was not included as part of the preferred alternative for the Improve I-70 project, that is not intended to convey that the Scott interchange is not justifiable outside the context of the Improve I-70 project. Consequently, the responsibility to justify a Scott interchange lies with its local proponents. To assist the local proponents, the I-70 project team has provided traffic modeling data that include a new interchange. The local benefits are discussed in **Table I-2**.

[2] See Chapter V for continued discussion of the comments provided by the local transportation planning agencies.

Table I-2: Regional and Area Benefits of a Scott Boulevard Interchange

As part of the I-70 Second Tier EIS, a traffic modeling study was conducted that included a new (Scott) interchange. Although the Scott interchange does not provide benefits to the operation of I-70 (and specifically to the operations at the Stadium interchange), it provides some regional and area benefits that may justify it outside the context of the I-70 project.
Regional Benefits
Decrease in vehicle hours traveled (VHT) of 1,100 hours per day
No change in vehicle miles traveled (VMT)
Decrease in volume to capacity ratio (V/C) of one percent
Increase in future capacity across I-70 of 7.5 percent
Area Benefits*
Decrease in V/C on Stadium, north of Broadway, of 14 percent
Decrease in V/C on Broadway, west of Stadium Boulevard, of 18 percent
Decrease in V/C on Broadway, east of Scott Boulevard, of 15 percent
Increase in area cordon of 7,800 vehicles per day (two percent)
Decrease in VMT on Broadway (32 percent) between Scott and Stadium boulevards
Decrease in VHT on Broadway (34 percent) between Scott and Stadium boulevards
Decrease in VMT on Fairview Road (two percent) between Broadway and Kunlun Drive
Decrease in VHT on Fairview Road (four percent) between Broadway and Kunlun Drive
**Area, in this context, means the immediate vicinity – Scott Boulevard to Stadium Boulevard/I-70 to Broadway*