CHAPTER II

DESCRIPTION OF PREFERRED ALTERNATIVE AND INTERCHANGE ALTERNATIVES

The alternatives described in this chapter of the Environmental Assessment (EA) were developed through a comprehensive statewide coordination process and alternative-screening effort. The alternative screening process for the Section of Independent Utility (SIU) 2 Second Tier EA began in March 2002 with the authorization of further environmental and engineering studies. This process involved additional engineering design and coordination, fieldwork and consultation and coordination with public agencies, community organizations and the public.

The engineering design and coordination work provided details about various components of the Preferred Alternative. The environmental work updated and refined similar work performed as part of the First Tier Environmental Impact Statement (EIS) and characterized potential constraints and their relationship to a reasonable range of alternatives for analysis in the Second Tier EA. Based on these updates and refinements and new guidance clarifying the physical characteristics and parameters of the future highway improvements, the screening process was completed in August 2003.

The alternative screening process and memoranda involved the two primary components of the Preferred Alternative:

1. Mainline Improvements
2. Interchange Improvements

The preliminary results were presented in two technical memoranda prepared in May 2003. The first technical memorandum that was prepared was for the mainline improvements. The mainline memorandum was prepared to summarize and evaluate the First Tier EIS mainline recommendations for widening I-70 in SIU 2. As part of this evaluation, windshield surveys were conducted to determine the potential impacts associated with the First Tier EIS widening recommendations and to determine if potential impacts could be avoided by shifting the widening recommendation in certain areas to the opposite side (north or south) of I-70.

To assist with this analysis, SIU 2 was separated into 14 different subsections. Resources such as houses, businesses, wetlands, floodplains, archaeological and architectural sites, schools, churches, parks and conservation areas, cemeteries and other areas were evaluated in each subsection on both the north and south sides of I-70.

The mainline memorandum concluded that although many resources could be avoided by crossing over from north to south or vice versa, each crossover would result in substantial construction related impacts including increased probability for worker/vehicular and vehicular/vehicular accidents, substantial increases in construction costs, increased frequency, duration and intensity of travel time delays due to detours, lane closures and substandard temporary travel routes during construction and secondary economic impacts and disruptions. Based on the evaluation, the conclusions of the mainline memorandum included eliminating two

I-70 crossovers and crossing over from the north to the south east of Sweet Springs. The area of this crossover is further evaluated in this EA.

The interchange memorandum described the evaluation process used to select and evaluate interchange alternatives that were considered during the Second Tier public involvement process for SIU 2. Based on the I-70 program guidance, alternatives were developed and evaluated for five of the 13 interchanges in SIU 2. The standard diamond template was applied to the remaining eight interchanges. The final results of the screening process, including some refinements made after August 2003, are described in this chapter.

The following discussion describes the characteristics of the Build Alternatives and the No-Build Alternative. These alternatives are the subject of the analyses provided in Chapters III and IV of this EA.

A. Build Alternatives

The Preferred Alternative for SIU 2 is composed of a comprehensive set of physical improvements to approximately 60 miles (100 kilometers) of I-70 from Route 131 (but not including the interchange) in Odessa to Route 5 (but not including the interchange) in Boonville, Missouri. In summary, the improvements include:

- Replacing all existing pavement and bridges with an improved geometric design involving the reconstruction of four existing lanes and the addition of one lane in each direction (mainline improvements). These improvements would increase safety and capacity on I-70;
- Interchange reconstruction in compliance with the Missouri Department of Transportation's (MoDOT) current access management guidelines, to the extent practicable, allowing increased capacity and compliant with all current safety criteria;
- Completion of the long-term goal of a continuous frontage road system across the state of Missouri. Although this is a long-term goal, it is not a high priority for MoDOT. MoDOT is not committed to constructing frontage roads in the near term unless a frontage road currently exists at that location or unless it is required for the purposes of maintaining existing local service connections and maintaining access to adjacent properties;
- Implementing the Rest Area Master Plan of consolidating the rest areas along I-70 into three improved and expanded rest areas;
- Reconstruction of the westbound weigh station facility due to roadway construction; and
- Installation of electronic signage and other technology to assist motorists and improve traffic conditions (Intelligent Transportation Systems) (ITS).

The characteristics of these improvements and the Build Alternatives under consideration are described in the following discussion and are shown as Exhibits A-1 to A-64 in Appendix A. The purpose and need for the Preferred Alternative is summarized in Chapter I.

A Build Alternative would include a complete set of improvements. The Preferred Build Alternative would include improvements defined by the set of improvements with the least environmental impact and which best meet the project requirements to improve safety, improve efficiency of the transportation system, address economic issues and meet the national need for a strategic highway corridor network. Selection of the Preferred Alternative will not be completed until the agencies and general public have reviewed this document and have had the opportunity to provide comments.

For clarity, SIU 2 has been divided into 14 mainline subsections and 13 interchange subsections as shown in Table II-1. The interchange subsections correspond to the western and eastern termini of the proposed interchange improvements. Consequently, mainline subsections include those improvements between the project termini and the nearest interchange subsection boundary or between two interchange subsection boundaries. The descriptions in this chapter explain each of the Preferred Alternative components within the various subsections.

In the following discussions, a large number of figures showing features of the Preferred Alternative and Interchange Alternatives within specific subsections of SIU 2 are referenced. These figures are presented in Appendix A. Table II-1 defines the drawings (sheets) from Appendix A associated with each subsection.

Table II-1: SIU 2 Subsection Names, Termini and Figure* References

Mainline Subsections	Description	WESTERN TERMINUS Mile Marker	EASTERN TERMINUS Mile Marker
Subsection ML-1 **Sheets A-1 to A-2**	West terminus at Odessa	39	41
Route M/O Interchange **Sheets A-3 to A-4**	Routes M/0 at Odessa	41	42
Subsection ML-2 **Sheets A-5 to A-7**	Route M/O to Route H	42	45
Route H Interchange **Sheet A-8**	Route H	45	46
Subsection ML-3 **Sheets A-9 to A-11**	Route H to Route 13	46	49
Higginsville Route 13 Interchange **Sheets A-12A and A-12B**	Route 13	49	50
Subsection ML-4 **Sheets A-13 to A-15**	Route 13 to Route T	50	52
Route T Interchange **Sheet A-16**	Route T to Aullville	52	53
Subsection ML-5 **Sheets A-17 to A-20**	Route T to Route 23	53	58
Concordia Route 23 Interchange **Sheets A-21A, A-21B and A-22**	Route 23	58	59
Subsection ML-6 **Sheets A-23 to A-25**	Route 23 to Routes Y/V V	59	62
Routes V V/Y Interchange **Sheet A-26**	Routes Y/ V V at Emma	62	63
Subsection ML-7 **Sheets A-27 to A-30**	Routes Y/V V to Route 127	63	66
Sweet Springs Route 127 Interchange **Sheets A-31A and A-31B**	Routes 127/ZZ at Sweet Springs	66	68
Subsection ML-8 **Sheets A-32 to A-34**	Route 127 to Routes K/EE including the Crossover from North to South	68	71
Routes K/EE Interchange **Sheet A-35**	Routes K/EE	71	72

Table II-1: SIU 2 Subsection Names, Termini and Figure* References (Cont'd)

Mainline Subsections	Description	WESTERN TERMINUS Mile Marker	EASTERN TERMINUS Mile Marker
Subsection ML-9 **Sheet A-36 to A-38**	Routes K/EE to Route YY	72	74
Route YY Interchange **Sheet A-39**	Route YY	74	76
Subsection ML-10 **Sheets A-40 to A-42**	Route YY to U.S. 65	76	78
U.S. 65 Interchange **Sheets A-43A and A-43B**	U.S. 65 to Marshal and Sedalia	78	79
Subsection ML-11 **Sheets A-44 to A-48**	U.S. 65 to Route J	79	84
Route J Interchange **Sheets A-49**	Route J	84	85
Subsection ML-12 **Sheets A-50 to A-53**	Route J to Route K	85	90
Route K Interchange **Sheets A-54 and A-55**	Route K Interchange	90	91
Subsection ML-13 **Sheets A-56 to A-61**	Route K to Routes 135/41	91	97
Route 135/41 Interchange **Sheets A-62A and A-62B**	Routes 135/51 at Boonville	97	99
Subsection ML-14 **Sheets A-63 to A-64**	East Terminus at Boonville	99	99

***The right of way lines as shown on the sheets included in Appendix A are approximate and are not to be used for survey purposes.

1. Mainline and Frontage Road Improvements

Figure II-1 presents the proposed mainline cross section. The preferred strategy from the First Tier EIS included the complete reconstruction of I-70 to provide six lanes of roadway within the existing I-70 corridor. This strategy divided I-70 into two different types of roadway, rural and urban, each with its own set of unique characteristics. SIU 2 was properly characterized as rural roadway. The proposed improvements in SIU 2 would consist of six 12-foot (3.7-meter) travel lanes with 12-foot (3.7-meter) shoulders and a 120- to 130-foot (37 to 40-meter)-wide, assumed to be 124-feet (38 meters) wide median. These improvements address safety issues, allow for the addition of future lanes and/or allow for the possibility of some type of future transportation improvement. Studies have shown that increased median width greatly reduces the possibility of the most common severe freeway crash; cross median crashes (American Association of State and Highway Transportation Officials (AASHTO), 2001). This strategy provides superior mitigation of impacts during construction, provides the least amount of disruption to motorists during construction and meets the current AASHTO and MoDOT roadway guidelines for freeways.

Figure II-1: Proposed Mainline Cross Section

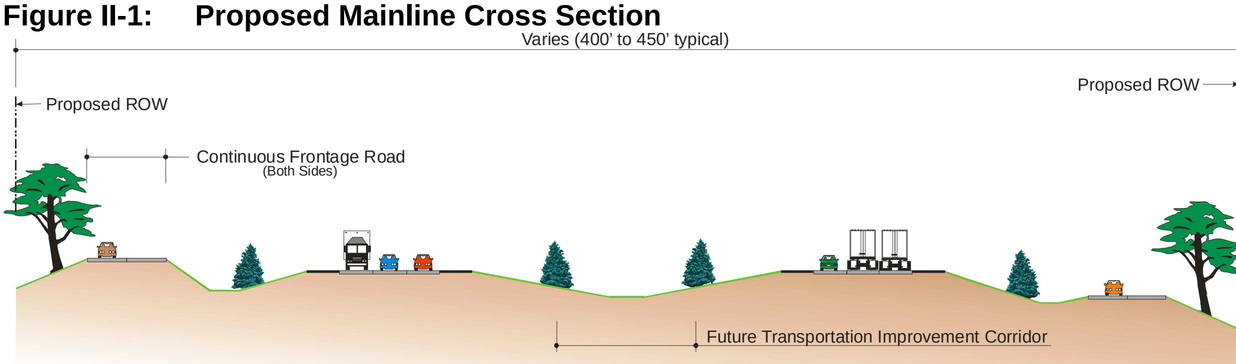
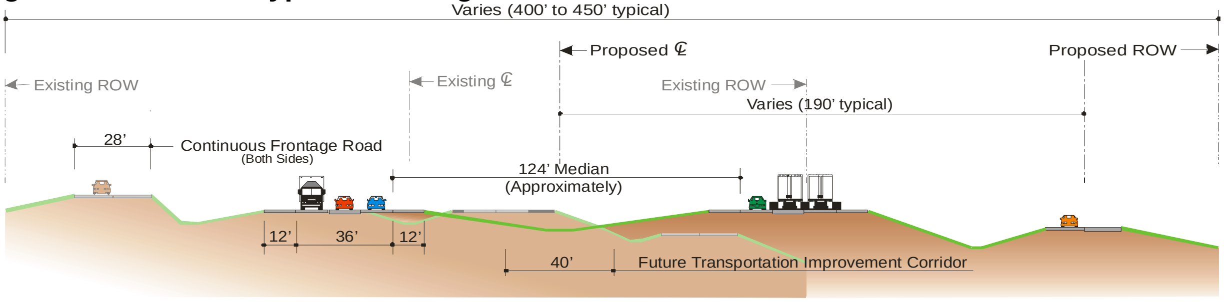


Figure II-2 presents how the preferred cross section would generally apply relative to the existing cross section of I-70. As described in Chapter I and shown in Figure II-2, application of the new cross section would include the existing cross section and expand to either the north or to the south of the existing footprint. The mainline sheets in Appendix A show how the mainline improvements relate to existing conditions.

Figure II-2: SIU 2 Typical Existing and Preferred Cross Section A



In SIU 2, the mainline would be widened to the north from the western terminus at mile marker 39 to mile marker 69, where a transition from north to south would occur. The crossover transition occurs between mile marker 69.04 and mile marker 69.79. From this transition point, the remainder of the mainline would be widened to the south to the eastern terminus of SIU 2. Sheet A-33 shows where the proposed crossover from north to south would occur and relates the proposed improvements to existing conditions.

In addition to the major construction improvements, roadway visibility will be a high priority throughout the entire corridor. This may include durable pavement markings, emergency reference markers, guardrail and barrier delineation and signage.

a. Frontage Roads

In addition to the mainline improvements, MoDOT has a long-term goal of constructing a continuous system of frontage roads across Missouri. Along some sections of SIU 2, existing frontage roads or portions of old U.S. 40 would be utilized as frontage roads. Though continuous frontage roads are a long-term goal and are included as part of the Preferred Alternative for environmental planning purposes, continuous frontage roads are not a high priority. Including continuous frontage roads as part of the Preferred Alternative provides a long-term master plan for the corridor, but MoDOT is not committed to building continuous frontage roads in the near term. MoDOT is committed, however, to construct frontage roads for the purposes of maintaining existing local service connections and maintaining existing access to adjacent properties. Each frontage road will be assessed on an individual basis as to whether or not any existing discontinuities will be addressed as part of the initial construction. Improvement of existing discontinuities will depend on the availability of construction funding and relative priorities.

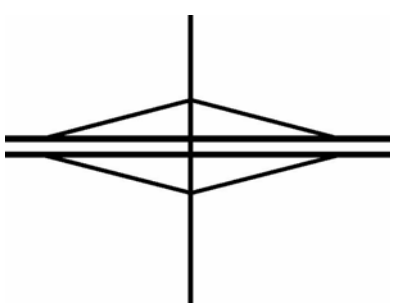
Within SIU 2, there are approximately 128 linear miles (206 kilometers) available for frontage roads on the north and south sides of I-70. Of the 128 miles, 53 miles (85 kilometers) of frontage roads would be constructed initially along with mainline construction to maintain access to residences, businesses or other private lands. Twenty-four miles (39 kilometers) of frontage roads along SIU 2 could be constructed at a later date; 27.6 miles (43 kilometers) of existing frontage roads could be utilized in place; 20.1 miles (32.3 kilometers) of existing roads could be used as alternative frontage roads and 3.2 miles (5.1 kilometers) of SIU 2 would lack frontage roads due to excessive topography and conflicts with terrain. The two locations where the frontage road system would have discontinuities occur east of mile marker 76.9 and east of mile marker 91.4. At both of these locations, topographical features make extensions of the frontage roads either too circuitous or inappropriately expensive given their utility. Exhibits showing the improvements show the future frontage road construction in a format different from the initial frontage road construction. The proposed locations for the frontage roads within ML-1 through ML-14 are shown in the mainline sheets in Appendix A.

According to the *Frontage Road Master Plan Technical Memorandum (MoDOT, 2003)*, new frontage roads would consist of two-lane, two-way roads conforming to the standards for a low volume local road. The frontage roads would utilize two 12-foot (3.7-meter) lanes and two 8-foot (2.4-meter) paved shoulders. The shoulders could also serve as one-way bike lanes. Generally, a 50-mph (80.5 kilometer/hour) design speed was used for the frontage roads, however at crossroad connections, a reduced design speed would be necessary to minimize right of way requirements. It is assumed the frontage roads would have a uniform 26-foot (8-meter) clear zone on each side of the proposed roadbed. Proposed fill sections would have a maximum allowable slope of 4:1. The construction of a continuous system of frontage roads is a long-term goal of the I-70 project; however, MoDOT is not committed to such a system if the system is not economically feasible or if other more reasonable alternatives exist.

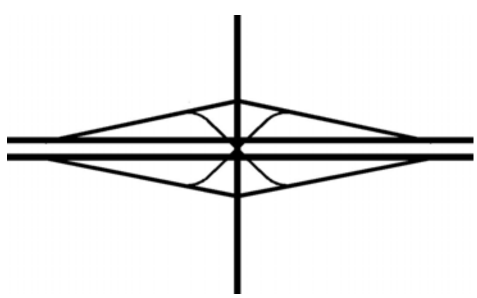
In order to replace existing frontage roads on the side of I-70 being widened (north or south), the acquisition of right of way would be necessary. However, in most cases, on the non-widened side of the proposed I-70 mainline, the geometrical requirements of the typical frontage road section would fit within the existing right of way.

2. Interchange Improvements and Alternatives

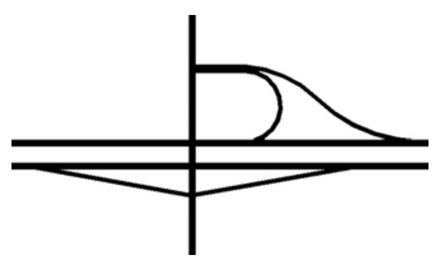
As part of the Preferred Alternative in SIU 2, 13 interchanges, nine overpasses, one underpass and one under highway cattle pass would be improved. However, selection of the Preferred Alternative will not be finalized until the various agencies and the public has had the opportunity to review and comment on this document. Of the 13 interchanges, the standard diamond interchange template was applied at eight locations due to the lack of constraints that would warrant alternative designs.



Standard Diamond



Single Point Urban Interchange



Half Folded Diamond

At the remaining five interchange locations, various alternatives such as the half folded diamond and the single point urban interchange designs were developed, as appropriate, to avoid topographical features and avoid and minimize impacts to commercial or residential developments or environmental resources. At each of the 13 interchange locations and the nine overpass locations, the proposed improvements would require demolition of existing bridges to accommodate the new mainline cross section and demolition of most of the existing interchange ramps and related features where they occur. No new additional interchanges are proposed within SIU 2.

As shown on the conceptual interchange designs in Appendix A, the proposed frontage road system would link to the new interchanges in a manner consistent with MoDOT's Access Management Guidelines for the overall I-70 Program. The Preferred Alternative is consistent with MoDOT's Access Management Guidelines with a few exceptions that are later described in this chapter. Table II-2 presents a summary of the interchange alternatives that are part of the Preferred Alternative.

Table II-2: Summary of Interchange Alternatives

Interchange Location	Proposed Alternatives:*
I-1 Route M/O Odessa	Diamond Interchange
I-2 Route H	Diamond Interchange
I-3 Route 13 Higginsville	Alternative A Diamond Interchange Alternative B Single Point Urban Interchange
I-4 Route T Aullville	Diamond Interchange
I-5 Route 23 Concordia	Alternative A Diamond Interchange Alternative B Single Point Urban Interchange
I-6 Route Y/V V Emma	Diamond Interchange
I-7 Route127 Sweet Springs	Alternative A Diamond Interchange Alternative B Half Folded Diamond
I-8 Route K/EE	Diamond Interchange
I-9 Route YY	Diamond Interchange
I-10 U.S. 65	Alternative A No Action Alternative B Diamond Interchange
I-11 Route J	Diamond Interchange
I-12 Route K	Diamond Interchange offset to the east approximately 3,500 feet (1,067 meters)
I-13 Route 135/41 Boonville	Alternative A Diamond Interchange Alternative B Diamond Interchange located approximately 1,660 feet (488 meters) west of the existing interchange.

* "Alternative" designates the Preferred Alternative

The interchange drawings in Appendix A present the interchange configurations in SIU 2 under consideration relative to existing conditions. Construction of these interchanges would require new or modified access connections to key local roads and properties, detours, temporary lane closures, utility relocation and temporary utility service disruptions in some cases. Private land would be acquired to provide the required right of way. The basis for the typical diamond interchange is described in the following discussion and is followed by a summary of key features and considerations at each location.

a. Standard Diamond Interchanges

The footprint of a typical diamond interchange, plus the typical frontage road footprint required to meet the minimum requirements of MoDOT Access Management Guidelines, together are known as the standard diamond interchange template. This footprint has been applied at eight of the interchanges in SIU 2. However, the template has been slightly modified to better fit the topographical, environmental and other conditions at each interchange site. The design criteria, which determine the footprint of the standard diamond interchange template, are stated in the Technical Memorandum "*Median Area Study, Design Criteria and Cost Estimating Guide, I-70 Second Tier Environmental Studies Kansas City to St. Louis, MO January, 2003*", Section 2.0 Design Criteria. The primary criteria are as follows:

- The ends of the entrance and exit ramps are a minimum of 800 feet (244 meters) apart. Ramps are placed symmetrically around the centerline of I-70 (Section 2.6.1 of the above referenced Technical Memorandum);
- The distance between the ramps and the next full intersection is a minimum of 1,320 feet (402 meters). A distance of 750 feet (229 meters) is acceptable for "right turn in and right turn out only" intersections (Section 2.7 of the above referenced Technical Memorandum);
- Frontage roads would have a minimum 450-foot (137-meter) radius curve adjacent to the intersection and a minimum 1,000-foot (305-meter) radius curve merging back to the typical frontage road (Appendix B of the above referenced Technical Memorandum and the *AASHTO Policy on Geometric Design of Highways and Streets 2001*);
- The exit and entrance ramps are a minimum of 1,000 feet (305 meters) long (Section 2.6.1 of the above referenced Technical Memorandum);
- Roadways serving two properties would be placed on the property line between the two properties, with half of the right of way being taken from each property. Each benefiting property would therefore contribute an equal share of land for the right of way. Placing the public roadway on the property line also has the least impact on existing parcels and minimizes property severance such that no new parcels of land are created; and
- At every interchange, the existing bridge would remain until the new bridge is completed. Upon completion of the new bridge, the existing bridges would be removed. Depending on the construction phasing and staging, some interchanges may need to be temporarily closed during construction.

<u>I-70/Routes M/O Interchange (I-1, Sheet A-3)</u>

The standard diamond interchange template was applied to this interchange. The only minor exception to the standard template involved the section of frontage road in the southeast quadrant that was extended eastward to avoid a potential wetland area.

<u>I-70/Route H Interchange (I-2, Sheet A-8)</u>

This interchange generally follows the standard diamond interchange template, with minor frontage road deviations. The following clarifies frontage road placement by quadrant:

- Northeast Quadrant: Route H is slightly curved at this location in order to design the 90-degree intersection between Route H and the frontage road;
- Southeast Quadrant: The intersection of Route H with the new southern frontage road has been moved southward an additional 100 to 200 feet (30-60 meters) beyond the standard 1,320 feet (402 meters) to minimize the impact on an existing farmstead;
- Southwest Quadrant: The intersection of Route H with the new southern frontage road has been moved southward an additional 100 to 200 feet (30-60 meters) beyond the standard 1,320 feet (402 meters) to minimize the impact on an existing farmstead; and
- Northwest Quadrant: Route H is slightly curved at this location in order to design the 90-degree intersection between Route H and the northern frontage road. The frontage road is also designed to avoid the abandoned Minuteman Missile silo site.

<u>I-70/Route T Interchange – Aullville, MO (I-4, Sheet A-16)</u>

This interchange generally follows the standard diamond interchange template, with minor frontage road deviations. The following clarifies frontage road placement by quadrant:

- Northeast Quadrant: To avoid a property severance, the intersection of Route T with the proposed northern frontage road has been moved north approximately 130 feet (40 meters) beyond the standard 1,320 feet (402 meters) to align with an existing property line;
- Southeast Quadrant: The intersection of Route T with the proposed southern frontage road has been aligned with an existing road. The frontage road follows this existing roadway east approximately one half mile (0.8 kilometers) to a property line in order to minimize impact to wetlands;
- Southwest Quadrant: Typical footprint; and
- Northwest Quadrant: The intersection of Route T with the proposed northern frontage road has been moved north approximately 200 feet (61 meters) to align with a property line. The frontage road has been pushed slightly to the west to avoid impacts to an existing farmstead.

The new bridge would be constructed approximately 300 feet (91 meters) west of the existing bridge. The proposed alignment straightens the existing horizontal curves along Route T and relocates the Route T crossing perpendicular to I-70.

<u>I-70/Routes Y/V V Interchange - Emma, MO (I-6, Sheet A-26)</u>

Although Route Y extends into Emma directly south from this interchange, Route V V is located north of I-70, approximately one mile (1.6 kilometers) east of this interchange. This interchange requires minor deviations from the standard diamond interchange template because this particular section of I-70 is not parallel to the east west section property lines and because the existing interchange is not perpendicular with I-70. The following discussion clarifies frontage road placement by quadrant:

- Northeast Quadrant: Route Y is curved at this location to avoid the existing structures located in the northwest quadrant;
- Southeast Quadrant: The intersection of Route Y with the southern frontage road has been moved south approximately 100 feet (30 meters) beyond the standard 1,320 feet (402 meters) to align with an existing property line;
- Southwest Quadrant: The intersection of Route Y with the new southern frontage road has been moved south approximately 100 feet (30 meters) beyond the standard 1,320 feet (402 meters) to align with an existing property line and to minimize the impact on the existing church property; and
- Northwest Quadrant: The frontage road curve radius extends farther west than the standard template to minimize the impact on existing structures.

The new interchange would cross perpendicular to I-70 and in a location that would minimize impacts to existing structures and the cemetery located to the south.

<u>I-70/Routes K/EE Interchange (I-8, Sheet A-35)</u>

The standard diamond template was applied to this interchange with a minor deviation in the northeast quadrant. In this quadrant, the frontage road has been moved further east to avoid impacts to existing structures.

<u>Route YY Interchange (I-9, Sheet A-39)</u>

In general, the standard diamond template was also applied to this interchange with minor frontage road deviations. The following discussion clarifies frontage road placement by quadrant:

- Northeast Quadrant: Route YY is slightly curved at this location. The 90-degree intersection between Route YY and the northern frontage road requires the frontage road to not be parallel with I-70. The frontage road has been moved further east to avoid impacts to existing structures;
- Southeast Quadrant: The intersection of Route YY with the new southern frontage road has been moved south to follow an existing property line. The southern frontage road was located along the rear of a series of structures with the intent of providing rear access to these properties since the existing frontage road would be required for the expansion of the I-70 mainline;
- Southwest Quadrant: Typical footprint; and
- Northwest Quadrant, Route YY is curved at this location. Aligning the intersection of the frontage road with Route YY at a 90-degree angle requires the frontage road to not be parallel to I-70.

I-70/Route J Interchange (I-11, Sheet A-49)

A modified standard diamond template was applied to this interchange because Route J does not cross perpendicular to I-70. This constraint requires frontage road adjustments in all of the four quadrants as described below:

- Northeast Quadrant: Route AE parallels I-70 approximately 1,000 feet (305-meter) to the north. As a cost and right of way savings measure, this road would be utilized as the northern frontage road through this area. Because this road is located less than the 1,320-foot (402-meter) standard spacing between the ramp and the frontage road, an exception to the access management guidelines would be required;
- Southeast Quadrant: Because existing Route J extends along a southwest to northeast tangent, the new southern frontage road, from its intersection with the proposed Route J is oriented along a similar tangent until it extends back along the south side of I-70. In addition, the new southern frontage road is not aligned with property lines;
- Southwest Quadrant: From the intersection of the frontage road with proposed Route J, the frontage road is oriented along a southeast to northwest tangent until it ties back along the southern side of I-70. Former Route J and associated ramps and frontage roads in this quadrant would be obliterated; and
- Northwest Quadrant: As with the Northeast quadrant, Route AE parallels I-70 approximately 1,000 feet (305-meter) to the north. This road would be utilized as the northern frontage road through this area. Because this road is located less than the 1,320-foot (402 meters) standard spacing between the ramp and the frontage road, an exception to the access management guidelines would be required.

The existing bridge would remain in place during construction of the new bridge located approximately 300 feet (91 meters) to the east. New construction was selected along the east side of the existing bridge to minimize impacts to existing structures on the north side of I-70.

I-70/Route K Interchange (I-12, Sheets A-54 and A-55)

The location of the proposed interchange for Route K is different from all other interchanges in SIU 2 because the selected location is approximately 3,500 feet (1,067 meters) east of the existing interchange. The site of the existing interchange simply does not allow for any design that would comply with the required standards. All other interchanges in SIU 2 are generally located near the existing interchange facilities. Although the standard diamond template was applied to this interchange, the frontage roads would deviate from the typical footprint:

- Northeast Quadrant: A curve was designed in Route K to intersect with Route M to the north. Route M would be utilized as the northern frontage road through this section. This frontage road does not follow the typical alignment for a frontage road;
- Southeast Quadrant: Route K does not exist south of the I-70. Due to the horizontal curve in I-70 at this location, the proposed southern frontage road would not have a typical footprint. In addition, the radius of the curve for the frontage road was extended eastward to avoid residential displacements;
- Southwest Quadrant: Although the frontage road alignment does not follow property lines, it would have a typical footprint in this quadrant; and
- Northwest Quadrant: As mentioned, a curve was designed in Route K to intersect with Route M to the north. Route M would be utilized as the northern frontage road through this section. This frontage road does not follow a typical alignment for a frontage road.

The proposed Route K Bridge would cross perpendicular to I-70 and an existing rock cut would be utilized for the northern abutment.

b. Non-Standard Interchanges

Within SIU 2, there are five interchange sites that required non-standard designs due to topographical features and the presence of constraints (residential/commercial development and/or environmental resources). At these locations, the standard diamond interchange template was considered along with other interchange designs that avoided topographical features and minimized impacts to residential/commercial development and environmental resources.

I-70/Route 13 Interchange – Higginsville, MO (I-3, Sheets A-12A and A-12B)

In 1999, prior to initiation of the I-70 Program and corresponding First Tier EIS, MoDOT completed an EIS and issued a Record of Decision (ROD) for Route 13 and Route 7 in Lafayette, Johnson and Henry Counties (MoDOT 1999). The EIS originally evaluated four alternatives at the I-70/Route 13 Interchange with at least two interchange types, the standard diamond and the controlled cloverleaf, both of which use an east or west bypass with grade separations using the existing I-70 interchange to serve turning traffic. The preferred alternative set forth in the ROD was an eastern bypass of Route 13 as it crosses I-70. This bypass would create an overpass with no direct access to I-70 and would leave the existing Route 13 Interchange at I-70 in place to provide access to I-70 and serve the nearby businesses.

Given that the I-70 Program was not considered and that funding and scheduling for the improvements set forth in the ROD have not been committed, the assumptions for developing the I-70 interchange design alternatives at Route 13 are as follows:

- The design of the new I-70/Route 13 Interchange should not preclude completion of the Route 13 overpass;
- The design of the new I-70/Route 13 Interchange should not depend on completion of the Route 13 overpass.

All four of the interchange design alternatives evaluated in the EIS for Route 13 allow for the bypass alignment as set forth in the ROD. However, due to the proposed wider I-70 cross-section, each bridge would be longer than originally anticipated.

The alternatives at Route 13 were designed consistent with the approved 1999 Final EIS and design for the Route 13 bypass. The bypass crosses over I-70 separately from the existing I-70/Route 13 Interchange. The approved design of the bypass leaves the existing diamond interchange in place for “business loop” traffic and provides connections from Route 13 to the business loop north and south of I-70. For purposes of this EA, it has been assumed that the approved bypass (overpass) is fixed and the bypass project is a reasonably foreseeable project. However, due to the proposed widened cross section for future I-70, the existing interchange must be modified.

- Alternative A consists of a diamond interchange at the existing interchange location. Local officials seemed to favor this design because they felt that it best served the Higginsville Industrial Park located in the northeast quadrant. The diamond interchange is the simplest and perhaps most common interchange configuration. For a diamond interchange there would be a one-way diagonal ramp provided in each quadrant of the interchange. The ramps would be aligned with free flow-flow terminals on the major highway (I-70) and left turns at grade are confined to the crossroad. The advantage of a diamond interchange would be that all traffic can enter and leave the major road at relatively high speeds, left turning movements entail minimal extra travel and require less right of way acquisitions. One negative aspect of the standard diamond is that a median must be provided along the cross road to prevent the possibility of wrong way entrance to the freeway. A diamond interchanges would also require signalization if the crossroad were to carry moderate to large traffic volumes. Implementation of this alternative would cost $30,000,000.
    - Northeast Quadrant: The frontage road and ramp are standard for the diamond design in this quadrant. Because the new interchange would be slightly offset to the east side of the existing bridge, a slight curve was designed into Route 13 in this quadrant. As mentioned, the Higginsville Industrial Park is located in this quadrant and would be avoided by the frontage road;
    - Southeast Quadrant: Typical footprint. The radius of the curve on the frontage road has been slightly decreased to avoid residential structures;
    - Southwest Quadrant: Typical footprint. Property lines were followed with the alignment of the frontage roads as much as possible;
    - Northwest Quadrant: Typical footprint with the exception of the slight curve in Route 13 as mentioned above. Structures have generally been avoided in this quadrant.

- Alternative B consists of a single point urban interchange (SPUI) at the existing location. This design includes a signalized intersection on top of the overpass. This design requires a larger bridge superstructure to accommodate the north and south turning lanes from the mainline. The primary feature of a SPUI would be that all four turning moves are controlled by a single traffic signal and opposing left turns operate to the left of each other. SPUIs are typically characterized by narrow right of way, high construction costs and greater capacity than conventional diamond interchanges.

  Single point urban interchanges offer several advantages; the primary operational advantage of this interchange configuration would be that vehicles making opposing left turns pass to the left of each other rather than to the right so their paths would not intersect. Since the SPUI would have only one intersection, as opposed to two for a conventional diamond interchange, the operation of the single traffic signal on the cross road may result in reduced delay through the intersections as opposed to the combined delays of the two intersections of the conventional diamond interchange. Curve radii for left turn movements through the interchange would be significantly flatter than those of a conventional diamond interchange and therefore the left turns would move at higher speeds. These improvements result in a higher capacity than a conventional tight diamond interchange.

  The primary disadvantage of SPUIs would be high construction costs associated with the large bridge superstructure. The second potential disadvantage with SPUIs would be the length and geometry of the path for left turning vehicles through the intersection. Additional signage would be required for this non-expected path. Traffic coming from the cross road with a right turn to the entrance ramp would merge with other traffic coming from the left turn movement requiring dual lanes on the entrance ramps. Pedestrian and bicycle movement through the SPUI could potentially be difficult due to the large size of the intersection and longer signal times that would be required. The long-term maintenance costs (bridge maintenance, snow removal, signal maintenance, etc.) associated with the SPUI would be greater than the long term maintenance costs associated with the conventional diamond. In addition, the diversion of mainline traffic for maintenance activities and incident response would be more difficult with the SPUI configuration versus the conventional diamond.

Although this alternative has a different bridge superstructure, the frontage road and crossroad lengths, configurations and intersections would be essentially identical between the two alternatives and will not be discussed further. Implementation of this alternative would cost $44,000,000.

The determination to upgrade from a conventional diamond to a SPUI would be based on the need for increased capacity. The expected demand for Route 13 in the year 2030 passing through the conventional diamond interchange with a signal would be at level of service (LOS) C. Given that this LOS is acceptable there is no rationale to upgrade to the SPUI based on traffic capacity. As a result, the use of the conventional diamond interchange (Alternative A) would be appropriate and was selected as the recommended Preferred Alternative at the I-70/Route 13 interchange. Potential environmental impacts and displacements are the same for both Alternative A and Alternative B. Both of these alternatives would potentially impact 1.3 acres (0.5 hectares) of floodplain and displace the same four businesses.

<u>I-70/Route 23 Interchange - Concordia, MO (I-5, Sheets A-21A, A-21B and A-22)</u>

At this interchange, Route 23 passes under I-70 making this interchange an underpass instead of the more common overpass where the crossroad passes over I-70. Alternative A would be a conventional diamond interchange underpass. Alternative B would be a SPUI with an underpass that would be more cost effective than the overpass. All frontage road and crossroad lengths, configurations and intersections would be essentially identical between the two alternatives.
Both of the Concordia interchange designs incorporate a roundabout design for the intersection of Route 23 with First Street. A conventional intersection with turning lanes would have similar impacts to the roundabout design, but would also require the use of a signal. The roundabout design has several distinct advantages over a signalized intersection. The roundabout allows for the free flow of traffic through this intersection while maintaining compliance with the access management guidelines by allowing right-in/right-out only access in the area between the interchange ramps and the first frontage road to the south. In addition, because of the residential, commercial and civil (high school) constraints associated with the southern quadrants of this interchange, First Street must be utilized as the tie-in for the southern frontage road system. Businesses with existing entrances along Route 23 between the proposed frontage roads would relocate their access/entrances to the frontage roads or to other streets.

- Alternative A is a standard diamond interchange design with a roundabout serving as the intersection of Route 23 with First Street. The design has been slightly altered to accommodate the horizontal curve on Route 23 north of I-70. The cost of implementation of this alternative would be $54,000,000.
  - Northeast Quadrant: Existing Route 23 curves to the northeast in this area. The frontage road in this quadrant extends east from the intersection with Route 23, approximately 800 feet (244 meters) beyond the standard 400 feet (122-meter) before the horizontal curve to the south to serve as the northern I-70 frontage road.

This extension was designed into this quadrant to accommodate the future light industrial park planned for this area by the City of Concordia;

  - Southeast Quadrant: The eastbound entrance ramp would require a retaining wall to avoid any impacts to the cemetery. In addition, access from Golden Award Drive west to Route 23 would be discontinued. Businesses and residents along this area would access Route 23 from the rear via east First Street;
  - Southwest Quadrant: Access from Gordon Street east to Route 23 would be discontinued. Businesses would access Route 23 to the rear via west First Street. First Street would continue west from this quadrant serving as the south frontage road; and
  - Northwest Quadrant: Along Fourth Street, the northwest quadrant of this interchange hosts McDonalds, Travel Centers of America truck stop, Concordia Storage, Ambers Restaurant, Concordia Truck Wash, Kuhns Log Homes, Dollar General and Kentucky Fried Chicken (KFC)/Taco Bell. The frontage road in this quadrant is oriented along a southwest to northeast tangent to avoid displacements of Pamida Grocery, Dollar General, Concordia Truck Wash and the Travel Centers of America Truck stop. Although the frontage road design avoids potential impacts to existing structures, the proposed entrance ramp to mainline I-70 would pass through lands associated with the McDonalds, the KFC/Taco Bell, Kuhns Log Homes and Concordia Storage.

- Alternative B is a combination of two other alternatives that were developed during the early design process. Alternative B is a SPUI with a roundabout to the south and would cost $56,000,000 to construct. The following discussion clarifies frontage road placement by quadrant.
  - Northeast Quadrant: Besides the location of the westbound exit ramp, the footprint for the frontage roads and Route 23 in this quadrant is exactly the same as the northeast quadrant of Alternative A;
  - Southeast Quadrant: The footprint of the southeast quadrant is exactly the same as that for Alternative A. The eastbound ramp would require a retaining wall to avoid any impacts to the cemetery;
  - Southwest Quadrant: The footprint of the southwest quadrant is exactly the same as that for Alternative A; and
  - Northwest Quadrant: This quadrant is different from the northwest quadrant of Alternative A because the westbound entrance ramp is located near the existing interchange, consistent with the SPUI design. The Alternative B design allows for the continued use of Fourth Street, which would be extended westward to the new northern frontage road. Although this alternative would displace Concordia Storage, McDonalds and Kuhns Log Homes, impacts to the Dollar General, the Amber's Restaurant, Travel Centers of America and KFC/Taco Bell would be avoided. The frontage road is oriented along the same tangent as in Alternative A and therefore similar impacts would be realized.

The determination to upgrade from a conventional diamond to a SPUI would be based on the need for increased capacity and a minimized overall interchange footprint. Due to the extent of commercial development around this interchange, the minimized overall footprint of the SPUI is required. The benefits of implementing the SPUI design at this location outweigh the slight cost differential. In addition, the benefits of implementing Alternative B include fewer business displacements, fewer business partial impacts, fewer acres of prime farmland and shorter linear distance of stream impacted. Based on these preliminary findings, Alternative B has been selected as the recommended Preferred Alternative.

<u>I-70/Route127, Sweet Springs (I-7, Sheets A-31A and A-31B)</u>

Two alternatives for the Sweet Springs Interchange have been carried forward for further analysis in this EA. Both of these standard diamond alternatives would eliminate the existing interchange characteristics that do not meet current guidelines (eastbound exit ramp connects directly to southern frontage road). The following discussion describes the alternatives.

- Alternative A: This alternative is a standard diamond interchange offset to the east of the existing interchange. To avoid impacts to the cemetery and residences along Oak Street, this design incorporates a roundabout at the southern frontage road intersection with Route 127. The roundabout allows the intersection to be located closer to the I-70 ramps than the 1,320-foot (402 meter) access management standard. As with Concordia, a conventional intersection with turning lanes would have similar impacts to the roundabout design, but would also require the use of a signal. The roundabout design has several distinct advantages over a signalized intersection. The roundabout allows for the free flow of traffic through this intersection while maintaining compliance with the access management guidelines by allowing right-in/right-out only access in the area between the interchange ramps and the first frontage road to the south. The total cost projected to construct this alternative would be $27,000,000.
  - Northeast Quadrant: Because the new interchange would be offset east of the existing interchange, Route 127 would be relocated immediately east of existing Route 127 to just north of the existing frontage road tie-in before it connects back with existing Route 127;
  - Southeast Quadrant: Former U.S. 40 is currently serving as the frontage road and a portion of the slip ramp in this quadrant. In addition, a short connecter from the frontage road to the eastbound entrance ramp provides westbound frontage road motorists with an unsafe direct connection to the eastbound I-70 entrance ramp. Route 127 was shifted slightly eastward in this quadrant to allow for the eastern offset of the proposed bridge. The proposed eastbound entrance ramp to I-70 has been shifted north to avoid impacts to a community of mobile homes. As previously described, a roundabout was designed for the intersection of the proposed southern frontage roads with Route 127. Former U.S. 40 currently serves as the frontage road in this quadrant and although a portion of former U.S. 40 would be removed through demolition, a connection to it from the proposed frontage road would be constructed to provide access for the mobile home community. Lands associated with the cemetery located south of the roundabout would not be impacted by this alternative;
  - Southwest Quadrant: This quadrant is the most developed of the four quadrants at the Sweet Springs interchange. In addition, the nine-acre (4 hectare) sewage lagoon serves as a constraint for the western extension of the frontage road. Former U.S. 40 serves as the existing frontage road and as a slip ramp. The existing slip ramp presents safety issues because westbound frontage road motorists could inappropriately enter eastbound I-70 at this location. In addition, eastbound I-70 motorists are required to decelerate from 70 mph (113 km/hour) to the 40 mph (64 km/hour) speed limit of the frontage road while yielding to oncoming westbound and eastbound frontage road traffic. These safety issues would be addressed by the proposed alternatives. Although a portion of former U.S. 40 would be removed through demolition, much of it would remain in place to provide businesses and residences with access to the frontage road. A proposed roundabout would serve as the connection of the proposed frontage road with Route 127. From Route 127, the proposed frontage road would be extended approximately 2,600 feet (792 meters) along new alignment, west of the sewage lagoon where it would tie back into former U.S. 40. Although this design would require new alignment west from Route 127,

direct impacts to residences along Oak Street would be avoided. Four-way intersections from the new frontage road would provide access to North Miller and Harrison Streets in this quadrant; and

- Northwest Quadrant: Although the MoDOT Sweet Springs shed is the only existing structure present in this quadrant, the City of Sweet Springs is considering a proposal to construct the I-70 Medical Center (hospital) in this quadrant. The footprint for this facility is approximately six acres (2.4 hectares) and has been outlined on Sheet A-31.

- Alternative B: This alternative is a half folded diamond design offset to the east of the existing interchange. This interchange avoids impacts to the proposed hospital site by relocating the westbound entrance ramp from the northwest quadrant to the northeast quadrant. Implementation of this alternative would cost $28,000,000.
  - Northeast Quadrant: Because the new interchange would be offset east of the existing interchange, Route 127 would be relocated immediately east of existing Route 127 to just north of the existing frontage road tie-in before it connects back with existing Route 127. As was mentioned above, the westbound entrance ramp to I-70 would be located in this quadrant;
  - Southeast Quadrant: The footprint of this quadrant is the same as that in Alternative A;
  - Southwest Quadrant: The southwest quadrant for Alternative B is the same as the southwest quadrant for Alternative A as described previously; and
  - Northwest Quadrant: Although the MoDOT Sweet Springs shed is the only existing structure present in this quadrant, the City of Sweet Springs is considering a proposal to construct the I-70 Medical Center (hospital) in this quadrant. The footprint for this facility is approximately six acres (2.4 hectares) and has been outlined on Sheet A-31. Alternative B would avoid impacts to the proposed hospital site by placing the west bound on ramp in the northeast quadrant.

Both alternatives would be located at the existing location slightly offset to the east. The traffic flow and capacity of each interchange would be essentially identical. Other than the differences in the westbound ramp designs, the configuration of the interchanges and frontage roads are exactly the same. Although Alternative B would require additional signage for westbound motorists, the implementation of either alternative would be appropriate with respect to traffic conditions. Alternative B would require the displacement of one additional residence due to the design criteria of the west bound on ramp. Alternative B was selected as the recommended Preferred Alternative for this interchange.

<u>U.S. 65, Sedalia-Marshall (I-10, Sheets A-43A and A-43B)</u>

U.S. 65 is a four lane divided expressway that crosses under I-70 at Marshall Junction. The existing configuration of this interchange is a cloverleaf design that allows for the free flow of traffic through this area. During the early screening phases of this project, a number of different alternatives were evaluated for this interchange. These alternatives included rebuilding the cloverleaf to current standards, the standard diamond, the single point urban interchange and various full deck directional interchanges. Key evaluation factors for reconstructing the U.S. 65 interchange included, traffic, safety, capacity in terms of weave distances, right of way requirements and related costs and the evaluation of various design options compared to impact tradeoffs. Based on the early screening, it was determined that the following designs would be feasible and should be considered for further evaluation: 1) standard diamond, 2) expanded cloverleaf, and 3) fully directional.

After further evaluation, of the safety, right of way requirements, traffic functionality, impacts and costs of these alternatives, it was determined that the only alternatives that would serve the purpose and need of this project at this location would be the No-Action and the standard diamond. Although implementation of the diamond design would change the functionality of this interchange from uncontrolled to controlled, the impacts and cost associated with the cloverleaf or the fully directional did not justify the benefit that they provided over the diamond design. Therefore, two alternatives for the I-70/U.S. 65 Interchange are evaluated in this EA. The mainline of U.S. 65 would remain in place with minimal construction necessary for both of the alternatives. Turn lanes would be added and ramps would merge into U.S. 65; however, there would be no grade or elevation changes to U.S. 65.

- Alternative A is the No Build alternative. The existing cloverleaf interchange would remain in place after the mainline I-70 is widened to three lanes in each direction. The existing 40-foot (12 meter) median would be used for two twelve-foot (4 meter) lanes, two seven-foot (2 meter) shoulders and a two-foot (0.7 meter) concrete median barrier. The existing frontage roads would remain in place with this alternative. No other changes to any of the quadrants would occur with the implementation of this alternative. The disadvantages of the cloverleaf are the additional travel distance for left turning traffic, the weaving maneuver generated and the very short weaving length typically available. The existing loop ramps have substandard radii that require traffic to quickly change speeds (accelerate or decelerate). Although a capacity analysis indicated that with the existing cloverleaf design, in 2030, traffic would operate at an LOS of C, as traffic volumes increase in this area, the substandard radii associated with the existing cloverleaf would become a safety issue. Although this is a No Action alternative, certain costs such as re-paving and configuring the additional lane in each direction with the existing ramps. The cost to implement the No Build alternative would be $8,000,000.
- Alternative B is a standard/conventional diamond interchange design that utilizes the 120- to 130-foot (37- to 40-meter) wide median and larger-than-standard 800-foot (244 meter) separation between ramp intersections, typical along the proposed I-70 corridor. The frontage roads meet the current access management guidelines and would be used in place. The existing cloverleaf ramps would be demolished and the new diamond interchange ramps would be constructed within the existing right of way of the cloverleaf. Although no additional right of way would be required, implementation of this alternative would require controlled intersections at the four ramp terminals. No other changes to any of the quadrants would occur with the implementation of this alternative. A capacity analysis for the diamond design indicated that in 2020 and 2030, a signalized diamond interchange would operate at an LOS C, which is acceptable. Based on evaluation of the factors in this document, Alternative B was selected as the recommended Preferred Alternative for this interchange. The total cost projected to implement this alternative would be $23,000,000.

<u>I-70/Routes 135/41, Boonville (I-13, Sheets A-62A and A-62B)</u>

This interchange is complex because Route 41 to the north is not a through route. Route 41 extends approximately one mile (1.6 kilometers) west from this interchange before it turns north to extend into Arrow Rock. Route 135 extends directly south from this interchange into Pilot Grove. Route OO extends west from this interchange and currently serves as the southern frontage road. The key evaluation factors at this interchange include business and residential impacts and the circuitous frontage road system.

Both Alternatives (A and B) would be conventional diamond interchanges. The only difference would be in the location of the overpass structure. In Alternative A, the proposed overpass bridge would be located near the existing overpass bridge. In Alternative B, the overpass bridge would be relocated approximately 1,600 feet (488 meters) west of the existing interchange. The traffic flow and capacity of each interchange would be essentially identical.

- Alternative A is a standard diamond interchange immediately offset to the west of the existing interchange. The projected cost to implement this alternative would be $22,000,000. The following discussion clarifies the frontage road placement by quadrant:
  - Northeast Quadrant: The footprint of the frontage road and ramp in this quadrant are typical for the standard diamond design. The frontage road in this quadrant extends near the dam of Schrader Lake and the associated subdivision. A connection from the new frontage road to Santa Fe Road would be constructed to provide the residences and businesses with access to the frontage road system;
  - Southeast Quadrant: Although the frontage road in this quadrant is typical, Route 135 is slightly diverted to the west to avoid impacts to the commercial facilities in this quadrant. The commercial facilities in this quadrant would relocate their access to the south frontage road, or to right-in/right-out access on Route 135;
  - Southwest Quadrant: The frontage road in this quadrant has been extended approximately 2,600 feet (792 meters) to avoid impacts to the residential and commercial facilities on the south side of I-70. The properties would require a rear access to the proposed south frontage road. Besides the western extension of the frontage road and the slight western diversion of Route 135, the remainder of this quadrant is typical for the standard diamond design; and
  - Northwest Quadrant: The large pond in this quadrant covers much of the land area in this quadrant. Route 41 was diverted slightly to the east to avoid the center of the pond. Although the entire pond would not be impacted, eastern portions of it would require fill for the slopes of Route 41. The westbound entrance ramp to I-70 was slightly extended north to account for the slight diversion in Route 41.
- Alternative B is also a conventional diamond interchange, but it is located approximately 1,600 feet (488 meters) west of the existing interchange. Alternative B would require changing the alignment of Route 135/41 from a straight north-south alignment to a more circuitous route to tie Route 135 back into the existing route. The projected cost to implement this alternative would be $18,000,000 The following discussion clarifies the frontage road placement by quadrant:
  - Northeast Quadrant: The footprint of the frontage road and ramp in this quadrant are typical for the standard diamond design. A connection from the frontage road to Clear Springs Road would be constructed to provide access into the northeast portion of this quadrant. The frontage road in this quadrant would tie back into the existing eastbound frontage road system near the existing interchange;
  - Southeast Quadrant: Due to the reverse curve resulting from the Route 135 southern tie-in, the frontage road in this quadrant is not standard. The frontage road in this quadrant extends along a southwest-to-northeast tangent between the commercial facilities located along the southwest quadrant of the existing interchange. The commercial facilities in this quadrant would be provided a rear access to the proposed frontage road for access to the frontage road system and the connection to Route 135. Traffic to Pilot Grove from the proposed interchange area would travel south through the reverse curve approximately 2,000 feet (610 meters) to the proposed tie-in with existing Route 135;
  - Southwest Quadrant: Although the eastbound exit ramp for I-70 is standard design, the footprint of the frontage road in this quadrant is not due to the reverse curve

designed for Route 135. In order to cross Route 135 in a perpendicular orientation, the frontage road in this quadrant extends towards the southeast before turning in a northeastern direction to connect back with the proposed Route 135. The proposed frontage road is located on new alignment because no existing frontage road exists in this area; and

– Northwest Quadrant: Although the footprint for the westbound I-70 ramp and frontage road are standard, Holtzclaw Lake covers much of the land area in this quadrant. The right of way along Route 41 has been widened in this quadrant to account for the fill material that would be required for the re-construction of Route 41. Although this fill would encroach on the eastern portion of Holtzclaw Lake, the western portions and the dam would not be impacted.

Alternative A, with its preservation of the existing straight alignment of Route 135/41, would be more advantageous than the alignment with Alternative B because it would better meet drivers' expectations and would provide a more direct route. In addition, it is important to note that the 2030 traffic levels at this interchange would require signalizing the interchange because if the interchange is left as stop controlled, the LOS would drop to "F" in 2030. Alternative A has been selected as the recommended Preferred Alternative at this interchange.

3. Travel Efficiency Benefits

The existing I-70 facility consists of a four-lane divided highway with a 10-foot (3-meter) outside shoulder, two 12-foot (3.7 meter) travel lanes, a 4-foot (1.2 meter) inside shoulder, a 32-foot (9.8 meter) wide grassed median and the same footprint of shoulders and lanes for the opposite direction of travel. The Preferred Alternative would rebuild this facility to include a 12-foot (3.7-meter) paved outside shoulder, three 12-foot (3.7-meter) travel lanes and a 12-foot (3.7-meter) inside paved shoulder, a 120- to 130-foot (37- to 40-meter) wide grassed median and the same footprint of shoulders and lanes in the opposite direction. The Preferred Alternative would also allow for the future construction of up to two additional 12-foot (3.7-meter) traffic lanes in each direction and provide a wider median for future transportation options. Further, a minimum clear zone of 32 feet (9.8 meters) on all edges of the travel lanes would be incorporated, as would some improvements to vertical and horizontal curves.

The Preferred Alternative also involves the redesign of all interchanges and frontage road systems at certain locations to meet updated access management design guidelines. The preferred changes to I-70 and the I-70 interchanges would provide a safer and more efficient transportation system and improve transportation network connectivity. The changes associated with the Preferred Alternative would increase safety, save travel time and reduce future traffic congestion along I-70 and at 13 existing interchanges within SIU 2.

The Missouri statewide model was used to develop baseline (year 2000) and future (year 2020 and year 2030) traffic projections. These projections were used to determine I-70 mainline volumes, ramp volumes and crossroad intersection volumes for operational analysis. Two scenarios were forecasted: the No-Build scenario and the Build (Preferred Alternative scenario). The mainline average daily traffic (ADT) data for I-70 were provided for the current year (year 2000), year 2020 No-Build, year 2030 No-Build, year 2020 Build and year 2030 Build. Although limited 2002 traffic data were available, the 2002 average daily traffic ADT numbers were not substantially different from the 2000 ADT data and therefore, the 2000 ADT are presented herein. The annual growth rates ranged from 2.6 percent per year to 3.1 percent per year depending on the particular subsection of I-70. The percent peak hour volumes ranged from 7 percent to 9 percent of the ADT. The truck traffic on I-70 ranges from 23 percent to 30 percent of the ADT in SIU 2.

Table II-3: I-70 Mainline Volumes in Year 2000 and Projections for 2020 and 2030

Description*	Year 2000 ADT**	Year 2020 Build ADT	Year 2030 Build ADT
CR 96 to Rt. O/M	32,032	63,840	75,710
Rt. O/M to Rt. E/H	29,399	63,240	74,990
Rt. E/H to Rt. 13	28,178	62,840	74,520
Rt. 13 to Rt. T	25,570	59,480	70,540
Rt. T to Rt. 23	28,616	59,250	70,270
Rt. 23 to Rt. Y/V V	26,467	57,400	68,100
Rt. Y/V V to Rt. 127	24,317	57,400	68,100
Rt. 127 to Rt. K/EE	24,558	57,260	67,940
Rt. K/EE to Rt. YY	24,637	57,290	67,970
Rt. YY to U.S. 65	24,715	56,140	66,610
U.S. 65 to Rt. J	22,821	58,110	68,900
Rt. J to Rt. K	26,698	58,280	69,100
Rt. K to Rt. 135/41	28,726	58,730	69,640
Rt. 135/41 to Rt. 5	30,754	64,600	76,600

* SIU 2 generally extends from (but not including the interchange) near Odessa to Route 5 (but not including the interchange) near Boonville. The western terminus of SIU 2 is at mile marker 39 and the eastern terminus is at mile marker 99.

** ADT = Average Daily Traffic

a. Benefits to Traffic Safety

Crash statistics and safety data summarized or presented in this section are protected under federal law. See Appendix D.

The proposed improvements to I-70 would have substantial safety benefits, resulting from the proposed widened median, additional lanes, geometric improvements, guardrail improvements, widening the shoulders and improving the shoulder surface. Some of the key improvements are associated with various access management controls, methods and designs.

Where warranted, appropriate signals, turn lanes and deceleration lanes are provided at each of the new interchanges. The proposed designs improve highway safety by increasing the functional areas of intersections and by providing better auxiliary lanes (turn bays), to reduce or eliminate the effect of speed differentials.

The proposed improvements also attempt to reduce speed differentials by separating the through traffic from the local traffic by the use of a nearly continuous system of frontage roads. This system provides the highest degree of access for adjoining property owners with the highest degree of mobility and capacity for through traffic. The use of frontage roads improves safety by removing a substantial portion of short-distance local traffic from the Interstate traffic stream. Other access control measures, which would be applied as required at the proposed interchanges, are improved visibility and timing of traffic signals. Access points on cross roads would be controlled by appropriate spacing between access points and by the use of appropriate crossroad designs. Effective access management can reduce crashes by a large amount, increase capacity of the through traffic and improve the value of adjoining property.

It has been estimated that the improvements would result in reducing property damage only (PDO) crashes by 13 percent; injury crashes by 15 percent and fatal crashes by 34 percent. These estimates were used to calculate the new rates for the Build scenario, which can be seen in the following tables along with the No-Build scenario rates. These crash rates have been used to project the number of crashes in year 2020 and year 2030 and have also been grouped by No-

Build versus the Build Alternatives. Although 2003 crash data were available, the data were not substantially different from the 2000 crash data as presented herein.

Table II-4: Summary of Crash Rates Both Current and Projected*

SIU 2	Average 6-year crash rates**		
Year/Situation	Fatal Rate	Total Injury Rate	PDO Crash Rate
2000	1.42	2.10	4.83
2020 Build	0.94	1.78	4.21
2020 No Build	1.42	2.10	4.83
2030 Build	0.94	1.78	4.21
2030 No Build	1.42	2.10	4.83

* Methodology for determining future crash information is detailed in the I-70 Program Manual.
** Rates shown above are in crashes per 100,000,000 vehicle miles.

It is estimated that 95 fatalities could occur in 2020 within SIU 2 if I-70 is not upgraded, as contrasted to 63 fatalities in year 2020 within SIU 2 if the Preferred Alternative is implemented. In 2030, it is estimated that 111 fatalities could occur within SIU 2 if I-70 is not upgraded, whereas 76 fatalities could occur if the Preferred Alternative were implemented.

Table II-5: Summary of the Estimated Crashes for the Build and No-Build Alternatives*

			Estimated Annual Crashes		
Description	Yearly VMT**	Daily VMT	PDO Crashes***	Injury Crashes	Total Fatal
Year 2020 No-Build	1,338,856,500	3,668,100	318	136	95
Year 2020 Build	1,373,728,235	3,763,639	283	121	63
Year 2030 No-Build	1,557,851,000	4,317,400	375	161	111
Year 2030 Build	1,629,241,740	4,463,676	335	144	76

*Methodology for determining future crash information is detailed in the I-70 Program Manual
**VMT = Vehicle Miles Traveled, ***PDO = Property Damage Only

The table below compares expected crash rates between the No-Build Alternative and the Build Alternative in 2020 and 2030. It is estimated that 35 fewer PDO crashes, 15 fewer injury crashes and 32 fewer fatalities could occur in 2020 if the Preferred Alternative were implemented. Whereas 40 fewer PDO crashes, 17 fewer injury crashes and 35 fewer fatalities could occur in 2030 if the Preferred Alternative were to be implemented.

Table II-6: Summary of the Differences in the Two Scenarios in the Year 2020 and Year 2030.*

			Estimated Annual Crashed		
Description	Yearly VMT	Daily VMT	PDO Reduction (Crashes)	Injury Reduction (Crashes)	Fatal Reduction (Crashes)
(Year 2020 No-Build) - (Year 2020 Build)	-34,871,735	-95,539	35	15	32
(Year 2030 No-Build) - (Year 2030 Build)	-53,390,740	-146,276	40	17	35

*Methodology for determining future crash information is detailed in the I-70 Program Manual

Monetary values have been estimated for each type of crash. These values are as follows: $3,350 for a PDO, $45,900 for an injury crash and $3,500,000 for a fatal crash. These numbers have been multiplied by the expected reduction in crashes from the proposed improvements to produce an estimated yearly savings in the tables below. Table II-7 represents a summary of costs on the estimated safety cost savings for the build versus No-Build scenario in year 2020.

Table II-7: Safety Benefits for the Year 2020 in Year 2000 Dollars*

Estimated Annual Crashes	(Year 2020 No-Build) minus (Year 2020 Build)		
Description	**PDO Reduction**	**Injury Reduction**	**Fatal Reduction**
CR 96 to Rt. O/M	$870	$11,860	$904,500
Rt. O/M to Rt. E/H	$1,740	$11,860	$1,809,000
Rt. E/H to Rt. 13	$1,740	$0	$1,809,000
Rt. 13 to Rt. T	$1,740	$0	$1,809,000
Rt. T to Rt. 23	$2,610	$11,860	$2,713,500
Rt. 23 to Rt. Y/V V	$1,740	$11,860	$1,809,000
Rt. Y/V V to Rt. 127	$1,740	$11,860	$904,500
Rt. 127 to Rt. K/EE	$1,740	$11,860	$1,809,000
Rt. K/EE to Rt. YY	$870	$0	$ 904,500
Rt. YY to U.S. 65	$1,740	$0	$1,809,000
U.S. 65 to Rt. J	$3,480	$35,580	$3,618,000
Rt. J to Rt. K	$2,610	$11,860	$1,809,000
Rt. K to Rt. 135/41	$6,090	$47,440	$5,427,000
Rt. 135/41 to Rt. 5	$1,740	$11,860	$1,809,000
Total	$30,450	$177,900	$28,944,000

*Methodology for determining future crash information is detailed in the I-70 Program Manual

Table II-8 represents a summary of costs on the estimated safety cost savings for the Build versus No-Build scenario in year 2030.

Table II-8: Safety Benefits for the Year 2030 in Year 2000 dollars*

Estimated Crashes	(Year 2030 No-Build) - (Year 2030 Build)		
Description**	**PDO Reduction**	**Injury Reduction**	**Fatal Reduction**
CR 96 to Rt. O/M	$ 440	$ 6,030	$459,800
Rt. O/M to Rt. E/H	$880	$6,030	$919,600
Rt. E/H to Rt. 13	$880	$6,030	$919,600
Rt. 13 to Rt. T	$880	$0	$459,800
Rt. T to Rt. 23	$1,760	$12,060	$1,839,200
Rt. 23 to Rt. Y/V V	$880	$6,030	$919,600
Rt. Y/V V to Rt. 127	$1,320	$6,030	$919,600
Rt. 127 to Rt. K/EE	$1,320	$6,030	$919,600
Rt. K/EE to Rt. YY	$440	$0	$459,800
Rt. YY to U.S. 65	$880	$0	$459,800
U.S. 65 to Rt. J	$2,200	$18,090	$2,299,000
Rt. J to Rt. K	$1,320	$6,030	$1,379,400
Rt. K to Rt. 135/41	$3,520	$24,110	$3,218,600
Rt. 135/41 to Rt. 5	$880	$6,030	$919,600
Total	$17,600	$102,500	$16,093,000

* Methodology for determining future crash information is detailed in the I-70 Program Manual
** SIU 2 generally extends from (but not including the interchange) near Odessa to Route 5 (but not including the interchange) near Boonville. The western terminus of SIU 2 is at mile marker 39 and the eastern terminus is at mile marker 99.

Substantial annual cost savings to society are anticipated from the proposed improvements. The proposed cost of these improvements is approximately ten times the savings estimated above.

b. Benefits on Traffic Congestion

The procedures of the Highway Capacity Manual (HCM, 2000) were applied to calculate LOS of the freeway mainline, freeway ramp junctions and cross road intersections for the existing and proposed conditions. The table below shows the LOS for the year 2000 and the varying conditions of No-Build year 2030 and Build year 2030 for the mainline subsections in SIU 2 on I-70. The current LOS for all of I-70 subsections in SIU 2 are at a LOS B or better. In the year 2030, under the No-Build scenario, all of the subsections in SIU 2 would be at a LOS D or worse. In the year 2030, under the Build scenario, all of the subsections in SIU 2 would operate at a LOS C or better except for the three subsections near Odessa that would operate at a LOS D. The desirable service level for design year traffic is LOS C.

Table II-9: Operational Analysis of I-70 Sections

Subsection Description*	Desirable LOS	Year 2000 LOS	Year 2030 No-Build LOS	Year 2030 Build LOS
CR 96 to Rt. O/M	C	B	F	D**
Rt. O/M to Rt. E/H	C	B	F	D**
Rt. E/H to Rt. 13	C	B	F	D**
Rt. 13 to Rt. T	C	B	F	C
Rt. T to Rt. 23	C	B	E	C
Rt. 23 to Rt. Y/V V	C	B	E	C
Rt. Y/V V to Rt. 127	C	A	D	C
Rt. 127 to Rt. K/EE	C	A	D	C
Rt. K/EE to Rt. YY	C	A	D	C
Rt. YY to U.S. 65	C	A	D	C
U.S. 65 to Rt. J	C	A	D	C
Rt. J to Rt. K	C	B	D	C
Rt. K to Rt. 135/41	C	B	D	C
Rt. 135/41 to Rt. 5	C	B	F	C
	Indicates an undesirable level of service			

* SIU 2 generally extends from Route 131 (but not including the interchange) near Odessa to Route 5 (but not including the interchange) near Boonville. The western terminus of SIU 2 is at mile marker 39 and the eastern terminus is at mile marker 99.

** Due to lane continuity and the reliability of the traffic model forecast for these three subsections the operations were considered to be acceptable.

Travel times were also analyzed with the highway capacity methodologies. Table II-10 displays the results of the travel times under current conditions, year 2030 No-Build conditions and year 2030 Build conditions. The column on the right shows the amount of time that is saved on each segment under the Build scenario compared to the No-Build scenario. The study examined current and future year 2020 and year 2030 traffic operating conditions and safety around interchanges and cross road intersections. Time savings are a benefit to the public, both commercially and personally. In addition less time spent traveling results in the consumption of less fuel.

Table II-10: Travel Times Analysis for each Subsection Along I-70*

Subsection Description**	Length miles (Kilometer)	Year 2000 Travel Time (min)	Year 2030 Travel Time No-Build (Min)	Year 2030 Travel Time Build (Min)	Time Savings (No-Build – Build) (Min)
CR 96 to Rt. O/M	2.9 (4.6)	2.5	2.8	2.6	0.2
Rt. O/M to Rt. E/H	4.2 (6.8)	3.6	4.1	3.7	0.4
Rt. E/H to Rt. 13	4.0 (6.4)	3.4	3.9	3.5	0.4
Rt. 13 to Rt. T	3.5 (5.6)	3.0	3.4	3.1	0.3
Rt. T to Rt. 23	5.7 (9.1)	4.9	5.0	4.8	0.2

Table II-10: Travel Times Analysis for each Subsection Along I-70* (Cont'd)

Subsection Description**	Length miles (Kilometer)	Year 2000 Travel Time (min)	Year 2030 Travel Time No-Build (Min)	Year 2030 Travel Time Build (Min)	Time Savings (No-Build – Build) (Min)
Rt. 23 to Rt. Y/V V	4.0 (6.4)	3.4	3.5	3.3	0.2
Rt. Y/V V to Rt. 127	4.3 (6.9)	3.7	3.8	3.6	0.2
Rt. 127 to Rt. K/EE	4.5 (7.2)	3.8	4.0	3.8	0.2
Rt. K/EE to Rt. YY	3.2 (5.1)	2.7	2.8	2.7	0.1
Rt. YY to U.S. 65	3.6 (5.8)	3.1	3.2	3.0	0.2
U.S. 65 to Rt. J	6.4 (10.3)	5.4	5.6	5.3	0.3
Rt. J to Rt. K	5.3 (8.5)	4.5	4.7	4.4	0.3
Rt. K to Rt. 135/41	8.0 (12.9)	6.8	7.0	6.8	0.3
Rt. 135/41 to Rt. 5	3.8 (6.1)	3.2	3.7	3.3	0.4
Totals	**63.4 (101.4)**	**54.0**	**57.5**	**53.9**	**3.7**

***** SIU 2 generally extends from Route 131 (but not including the interchange) near Odessa to Route 5 (but not including the interchange) near Boonville. The western terminus of SIU 2 is at mile marker 39 and the eastern terminus is at mile marker 99.

******Travel times were based on estimated speeds from the highway capacity software analysis.

c. Ramp Volumes and LOS

Using the average daily traffic counts as provided for the I-70 ramps in the year 2000, the ramp volumes were estimated for year 2020 and year 2030 in both the Build and No-Build scenarios. These ramp projections were calculated by applying the I-70 subsection increases to the base year volume. Thus, if I-70 increased by three percent annually along a particular subsection, then the ramp connected to that subsection of I-70 was increased by three percent annually. The peak hour volumes for each ramp were calculated from the estimated volumes by multiplying the percent peak hour by the ADT to produce the peak hour volumes for each ramp. The peak hour volumes were used as a basis for the operation analysis in the Highway Capacity Software. The results of the ramp traffic analysis are shown in Table II-11.

Table II-11: Operational Traffic Analysis of I-70 Ramps

			Year 2000	Year 2020		Year 2030	
Interchange*	Ramp	Direction	Existing LOS	No-Build LOS	Build LOS	No-Build LOS	Build LOS
I-70/Route M/O	On	EB	B	D	C	D	C
I-70/Route M/O	On	WB	B	D	C	D	C
I-70/Route M/O	Off	EB	B	D	C	D	C
I-70/Route M/O	Off	WB	B	D	C	D	C
I-70/Route H	On	EB	B	D	C	D	C
I-70/Route H	On	WB	B	D	C	D	C
I-70/Route H	Off	EB	B	D	C	D	C
I-70/Route H	Off	WB	B	D	C	D	C
I-70/Route 13	On	EB	B	D	C	D	C
I-70/Route 13	On	WB	B	D	C	F	C
I-70/Route 13	Off	EB	B	D	C	D	C
I-70/Route 13	Off	WB	B	D	C	D	C
I-70/Route T	On	EB	B	D	B	D	C
I-70/Route T	On	WB	B	D	C	D	C
I-70/Route T	Off	EB	B	D	C	D	C

Table II-11: Operational Traffic Analysis of I-70 Ramps (Cont'd)

			Year 2000	Year 2020		Year 2030	
Interchange*	Ramp	Direction	Existing LOS	No-Build LOS	Build LOS	No-Build LOS	Build LOS
I-70/Route T	Off	WB	B	C	C	D	C
I-70/Route 23	On	EB	B	D	B	D	C
I-70/Route 23	On	WB	B	D	B	D	C
I-70/Route 23	Off	EB	B	C	B	D	C
I-70/Route 23	Off	WB	B	C	B	D	C
I-70/Route Y/V V	Low Volume Interchange**						
I-70 Route 127	On	EB	B	D	B	D	B
I-70 Route 127	On	WB	B	C	B	D	B
I-70 Route 127	Off	EB	B	C	B	D	B
I-70 Route 127	Off	WB	B	C	B	D	B
Route EE	Low Volume Interchange**						
I-70 Route YY	On	EB	B	C	B	D	B
I-70 Route YY	On	WB	B	C	B	D	B
I-70 Route YY	Off	EB	B	C	B	D	B
I-70 Route YY	Off	WB	B	C	B	D	B
I-70/U.S. 65	On	EB	B	B	B***	C	B***
I-70/U.S. 65	On	WB	B	B	B***	C	B***
I-70/U.S. 65	Off	EB	A	B	B***	C	B***
I-70/U.S. 65	Off	WB	A	B	A***	C	B***
I-70 Route J	On	EB	B	C	B	D	B
I-70 Route J	On	WB	B	C	B	D	B
I-70 Route J	Off	EB	B	C	A	D	B
I-70 Route J	Off	WB	B	C	B	D	B
I-70 Route K	On	EB	B	C	B	D	B
I-70 Route K	On	WB	B	C	B	D	B
I-70 Route K	Off	EB	B	C	B	D	B
I-70 Route K	Off	WB	B	C	B	D	B
I-70 Routes 135/41	On	EB	B	D	C	D	C
I-70 Routes 135/41	On	WB	B	C	B	D	B
I-70 Routes 135/41	Off	EB	B	C	B	D	B
I-70 Routes 135/41	Off	WB	B	C	B	D	B
	Indicates an undesirable Level of Service						

* Directional distribution data for Route K/EE and Route Y/V V were not available, so LOS for ramps at these interchanges were not calculated.

** I-70/Route Y/V V and I-70/Route EE interchanges are low volume interchanges and although directional distribution data were not available, the Build LOS for these interchanges is anticipated to be acceptable in 2020 and 2030 based on the low crossroad volumes.

*** LOS values for the Build scenarios for U.S. 65 are for the diamond design

d. Interchange Volumes and LOS

The I-70 off ramps connect to the crossroads, which are the roads that distribute the exiting I-70 volume onto the local road network. Manual traffic counts were performed at the Concordia Interchange (Exit 58) to supplement existing information. Supplemental information was also obtained at other locations. This data was then used to perform forecasts for the year 2030. Comparisons were then generated for the year 2030 Build and year 2030 No-Build scenarios.

Capacity analysis at a two-way, stop controlled intersection depends on the interaction of drivers on the minor or stop-controlled approach with drivers on the major street. A LOS F occurs when there are not enough gaps of suitable size to allow a minor-street demand to safely cross through traffic on the major street (Highway Capacity Manual, 2000). The LOS for the overall intersection at each interchange was calculated as a combination of the interaction between the two intersections (north and south of the interstate) at each interchange.

For the lower volume interchanges where turning movement counts or specific trip distribution information was not available, the crossroad volumes were used as a surrogate and were proportioned based on the crossroad volumes north and south of the interchange. Using these methods, the LOS were developed for the intersections and can be seen Table II-12. For the ramp intersections, a LOS of “D” or better is considered acceptable. The comparison of the LOS shows improvements from the No-Build to Build scenarios and demonstrates that the proposed interchange would provide adequate levels of service.

Table II-12: Intersection LOS for Interchanges in SIU 2

Interchange Crossroad	Interchange Design	Year*	Situation	Type of Control	Overall Intersection LOS
Route M/O	Diamond	2000	Existing Condition	Stop	A
Route M/O	Diamond	2030	No-Build	Stop	A
Route M/O	Diamond	2030	Build	Stop	A
Route H	Diamond	2000	Existing Condition	Stop	A
Route H	Diamond	2030	No-Build	Stop	A
Route H	Diamond	2030	Build	Stop	A
Route 13	Diamond	2000	Existing Condition	Stop	C
Route 13	Diamond	2030	No-Build	Stop	F
Route 13	Diamond	2030	No-Build	Signal	C
Route 13	Diamond	2030	Build	Stop	D
Route 13	Diamond	2030	Build	Signal	C
Route 13	SPUI	2030	Build	Signal	B
Route T	Diamond	2000	Existing Condition	Stop	A
Route T	Diamond	2030	No-Build	Stop	A
Route T	Diamond	2030	Build	Stop	A
Route 23	Diamond	2003	Existing Condition (2003)	Stop	C
Route 23	Diamond	2030	No-Build	Stop	F
Route 23	Diamond	2030	No-Build	Signal	B
Route 23	Diamond	2030	Build	Stop	D
Route 23	Diamond	2030	Build	Signal	B
Route 23	SPUI	2030	Build	Signal	B
Route Y/V V	Diamond	Low Volume Interchange – LOS for all scenarios is acceptable			
Route 127	Diamond	2000	Existing Condition	Stop	B
Route 127	Diamond	2030	No-Build	Stop	B
Route 127	Diamond	2030	Build	Stop	B
Route K/EE	Diamond	Low Volume Interchange – LOS for all scenarios is acceptable			
Route YY	Diamond	Low Volume Interchange – LOS for all scenarios is acceptable			

Table II-12: Intersection LOS for Interchanges in SIU 2 (Cont'd)

Interchange Crossroad	Interchange Design	Year*	Situation	Type of Control	Overall Intersection LOS
US 65	Diamond	2020	Build	Stop	F
US 65	Diamond	2020	Build	Signal	C
US 65	Diamond	2030	Build	Signal	C
Route J	Diamond	2000	Existing Condition	Stop	A
Route J	Diamond	2030	No-Build	Stop	A
Route J	Diamond	2030	Build	Stop	A
Route K	Diamond	2000	Existing Condition	Stop	A
Route K	Diamond	2030	No-Build	Stop	A
Route K	Diamond	2030	Build	Stop	A
Route 135/41	Diamond	2000	Existing Condition	Stop	B
Route 135/41	Diamond	2000	Existing Condition	Signal	B
Route 135/41	Diamond	2030	No-Build	Stop	B
Route 135/41	Diamond	2030	No-Build	Signal	B
Route 135/41	Diamond	2030	Build	Signal	B
	Indicates an undesirable Level of Service				

*Year applies to recorded or projected traffic volumes

4. Corridor Enhancements

The First Tier EIS documented the commitments of MoDOT and the Federal Highway Administration to provide corridor-wide impact coordination, impact mitigation and considerations of corridor enhancements. The document provided agencies and communities the assurance that an enhancement master plan would be developed and that corridor-based considerations would be fulfilled and appropriate special considerations would be provided for each of the second tier studies.

A Corridor Enhancement Subcommittee, one of three subcommittees of the Study Management Group, for the I-70 Corridor is a consortium of the project team and local, state and federal agency technical staff. This subcommittee developed a proposed enhancement plan for the overall I-70 Corridor. The goals of the enhancement plan include creating an approximately 200-mile I-70 transportation corridor that:

- 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.
- Establishes baseline enhancements for the entire corridor and identifies opportunities for additional enhancements by local communities and other partnering agencies.

Included in the conceptual plan are: a program for aesthetic enhancements for the existing natural features in the corridor; visual design treatments to build elements that reduce their sense of scale;

an overall design theme for enhancements to complement the visual context of the corridor (context sensitive solutions); corridor landscape enhancements for both the mainline and interchanges; and riparian habitat enhancement and wildlife corridors treatment.

Appropriate baseline enhancement features will be incorporated into the major reconstruction efforts along the I-70 Corridor, dependent upon the availability of adequate funding. This baseline enhancement concept includes bridge enhancement, landscaping using native grasses and flowers and habitat enhancement at major stream and river crossings. Additional "beyond-baseline" enhancements are dependent upon the participation and funding by local communities and resource agencies.

Key enhancement measures to be considered components of the SIU 2 Preferred Alternative include:

- A plan that would provide enhancements for pedestrians and bicyclists. This would address issues related to I-70 as a physical barrier to north-south movements and local connectivity between community resources (trail/pathway networks, parks, schools, tourist attractions, rest areas, etc.);
- Rest area improvements that would incorporate a corridor-wide theme and design consistency in terms of architecture, shelters and overall design elements (see Chapter II.A.5);
- Bridge treatments that would include special designs and aesthetic features for bridge related piers, abutments, barriers, retaining walls, railings, fencing, bicycle access, sign supports and lighting;
- Corridor landscape enhancements at interchanges that would accommodate local interests and use a common plant species list;
- Riparian habitat enhancement and wildlife corridors based on guidelines for highway improvements and bridged stream corridors; and

In general, these components of the Preferred Alternative are not yet specified in terms of actual site locations and details within SIU 2 and do not present site-specific improvements that present the potential to create adverse impacts of their own. Overall, these enhancements predominantly involve visual quality and aesthetic improvements that would generate beneficial impacts (see Section D in Chapters III and IV.). However, the following discussion elaborates on some key issues presented by possible enhancements within SIU 2.

Interactions between pedestrians, cyclists and motorists are a major consideration in highway planning and design. The mainline section of I-70 is not intended for pedestrian or bicycle use or crossing. Sidewalks are not currently provided on existing bridges and no established bicycle routes cross I-70 in SIU 2. Existing frontage roads provide a limited shoulder width for pedestrians and cyclists. These frontage roads are discontinuous and are not established bicycle routes in SIU 2. The continuous frontage road system, proposed as a long term goal, would further enhance opportunities for bicycling across Missouri. The shoulders of the frontage roads could serve as one-way bicycle lanes.

Mitigation for wetland impacts and related riparian habitat enhancements would require land use changes and/or acquisition of right of way from private property owners. Details about wetland issues, mitigation sites and related enhancements are described in Section E of Chapters III and IV of this document. Final mitigation and enhancement sites would be determined following completion of this EA. Mitigation and enhancement sites are generally defined in the vicinity of areas to be impacted. These locations take advantage of existing wetland conditions related to natural and anticipated man-made drainage features and are of sufficient size to mitigate for multiple incremental losses. Due to the statewide extent of the I-70 Improvement Study a single mitigation site may be used to mitigate impacts for all seven SIUs. The final selection of mitigation and enhancement sites would occur during the final design phase for specific construction phases (see Section E of Chapter IV).

Although no scenic easements or new scenic highway designations would be proposed as part of the Preferred Alternative within SIU 2, the Lamine River valley offers motorists scenic views of the Lamine River and rural Missouri through an area that is nearly devoid of billboards.

5. Ancillary Features: Rest Area and Weigh Station Improvements

Implementation of the Preferred Alternative would impact the westbound rest area facility in Subsection ML-5 and would require the reconstruction of the westbound weigh station facilities in Subsection ML-2. In December 2000, the MoDOT Rest Area Task Force completed the Missouri Interstate Rest Area Plan. Based on this information, MoDOT developed the I-70 Second Tier Rest Area Study that focuses on implementing the recommendations of the Rest Area Task Force for the I-70 Study Corridor. The I-70 Rest Area Study evaluated the existing facilities; the infrastructure required for new facilities and proposed general candidate rest area sites for a Western Rest Area, a Central Rest Area and an Eastern Rest Area. Although the Western Rest Area site included one location in SIU 2 in western Lafayette County, replacement rest areas are not proposed in SIU 2 due to the lack of supporting infrastructure such as water and waste water treatment facilities and/or pipelines. However, rest areas are proposed in SIU 1 and along I-70 east of the SIU 2 eastern terminus.

The existing eastbound weigh station located on the south would be used in place with minor modifications to the entrance and exit ramps. The existing westbound weigh station on the north would require more extensive reconstruction. However, the worst-case condition would require moving the existing facilities north approximately 100 feet (30.5 meters). The basic features of the existing weigh station facilities would be provided by the new facilities. No substantive changes or enhanced capabilities are anticipated (See Appendix A-5 to A-7).

6. Intelligent Transportation Systems Improvements

The installation of Intelligent Transportation System (ITS) improvements along I-70 between Kansas City and St. Louis is anticipated. Implementation of ITS along the I-70 Corridor would improve the operating efficiency of the corridor under both the No Build and Build alternatives. The movement of people and goods along the corridor would be safer, faster and more reliable. ITS systems improve safety by identifying hazards and providing information on those hazards to drivers and system operators. Efficiently identifying and managing incidents in the I-70 corridor would reduce the occurrences of congestion, which reduces average travel time and improves travel time reliability. Implementing ITS systems along I-70 would maximize the return on the investment being made on the critical I-70 corridor. ITS systems recommended for deployment along the I-70 corridor includes:

- Commercial Vehicle Operations
- Parking Management
- Road Weather Information System
- Incident Detection and Management
- Traffic and Travel Information and
- Work Zone Management

The capital cost for implementing ITS in SIU 2 is $8,100,000 with an estimated annual operation and maintenance cost of $810,000. These costs do not include the cost for developing and operating an I-70 corridor traffic operations center.

B. No-Build Alternative

The No-Build Alternative would leave I-70 in its current configuration. No interchange, mainline or other improvements would be implemented. No new capacity would be added and no substantial safety improvements would be implemented. Routine and programmed maintenance activities such as minor repairs and repaving would be expected. Through 2030, the maintenance costs associated with the No-Build alternative would be $850,000,000. These maintenance costs would be more than the costs of maintenance requirements of the Build Alternative for equivalent time periods. A separate ITS may be implemented under the No-Build Alternative.

The No-Build Alternative for SIU 2 would not merge well or facilitate the beneficial use of the Build Alternatives for the remainder of I-70 in Missouri, the Purpose and Need defined for I-70 in the First Tier EIS and the Purpose and Need for this SIU, as set forth in Chapter I of this EA.

The No-Build Alternative is analyzed to illustrate future conditions if no improvements are made to this section of I-70. This analysis serves as a baseline condition, which is then compared to conditions that would be anticipated following implementation of the Build Alternatives.