

CHAPTER II

Alternatives

This chapter describes the range of alternatives that were developed and evaluated to address the transportation problems identified in **Chapter I**. The development and evaluation of alternatives were based on engineering evaluations; agency coordination; consideration of social, economic and environmental impacts and public input. Among the alternatives analyzed were various complete reconstruction alternatives that add two traffic lanes, alternatives that include bypasses of the city of Lincoln and alternatives that would not require the complete reconstruction of the existing corridor (such as the No-Build¹, transportation demand alternatives and alternate roadway configurations like a 2 plus 1). The justifications for eliminating alternatives from further consideration are also discussed. This chapter concludes by describing the selected alternative and the rationale for its selection.

A. Introduction

Project J5P0892 focuses on the Benton County portion of Route 65, roughly from the Route 52 interchange near the town of Cole Camp to the Route 7 interchange near Warsaw. Within these limits, Route 65 is a two-lane facility with narrow shoulders, at-grade intersections and minimal access control. Increasing traffic volumes, along with challenging topography and difficult road configurations, have led to more and more crashes along Route 65. The increase in crashes has spurred the public to become increasingly involved in the highway planning process. The Benton County Coalition (which transitioned into the Benton County Corporation in late 2005) has vigorously advocated including the reconstruction of this portion of Route 65 Corridor in the Missouri Department of Transportation State Transportation Improvement Program. Currently, the project is scheduled for construction in 2010.

1. Overview of the Alternative Development/Evaluation Process

The process to identify alternatives was based on a series of screenings. The project began with the large study area shown on **Exhibits II-1A and B**. This study area was established as the area within which solutions to the transportation problems of Route 65 could be contained. The alternatives developed and evaluated at this earliest stage of the project were called the **initial range of alternatives**. The initial range of alternatives includes all manner of improving the existing roadway and numerous bypasses to the city of Lincoln. Using engineering, environmental, agency coordination and public involvement, the initial range of alternatives was



In February 2007, the Draft Environmental Assessment (DEA) for the Route 65 improvement project was circulated. The DEA presented the details of the project development process up to the point where the selection of a preferred alternative was made. This allowed for the presentation of impacts and allowed for productive stakeholder involvement.

Based on public input, a public hearing, agency coordination and internal analysis, the preferred alternative was finalized and is referred to as the selected alternative. This selected alternative is the one discussed throughout this Final Environmental Assessment.

¹ The No-Build Alternative would not require the complete reconstruction of the corridor, but would require substantial maintenance-type construction.

evaluated. Based on this evaluation, several alternatives were eliminated. Among the alternatives that were eliminated from further consideration were various possible roadway alignments and several alternative roadway configurations. Most bypasses of Lincoln were eliminated at this stage, as were all alternatives but the creation of a four-lane divided highway in areas outside Lincoln.

The alternatives not eliminated at this stage were known collectively as the **reasonable range of alternatives**. These alternatives represent those that MoDOT considers worthy of additional analysis. At this stage, additional engineering and environmental investigations were conducted. These studies were intended to assist in the selection of the alternative that best solves the project's transportation problems and minimizes impacts to the human and natural environment. This evaluation also included costs, design considerations and public involvement. The reasonable range of alternatives for this project included improving the existing roadway to a four-lane divided highway north and south of Lincoln. In these rural areas, Route 65 can be improved in numerous ways, although all of the reasonable alternatives would keep the existing roadway as one of the proposed roadway pairs. In the Lincoln area, the reasonable alternatives include improving existing Route 65 to a five-lane urban configuration and an eastern bypass of Lincoln. The study area for the reasonable range of alternatives is shown on **Exhibits II-2A–D**.

At the end of the reasonable range of alternatives stage, a preferred alternative was identified. This alternative is discussed in a Draft Environmental Assessment (DEA) circulated in February 2007.

Based on public input, agency coordination and internal analysis, the preferred alternative was refined and is now referred to as the selected alternative. The selected alternative has been refined in minor, but important ways, from the preferred alternative described in the DEA. The selected alternative is the configuration that MoDOT believes best solves the area's transportation problems and minimizes the project-related impacts. The selected alternative can be summarized as:

- North of Lincoln: Improve Route 65 by widening to the east of the existing alignment;
- Within Lincoln: Improve Route 65 to a five-lane urban roadway with two north-bound and two south-bound lanes separated by a central two-way turn lane. The selected alternative uses a curb-and-gutter configuration with an enclosed drainage system. If an enclosed drainage system cannot be designed, an open ditch drainage alternative with a widening to the east would be the selected alternative, and;
- South of Lincoln: Improve Route 65 by alternately widening to the east and west of the existing Route 65.

Exhibits II-3A–J depict the selected alternative.

A detailed description of how the selected alternative described in this document differs from the alternative presented in the DEA is presented in **Chapter II.D**.

B. Initial Range of Alternatives

A broad range of alternatives was considered during the project's alternatives development phase, including the No-Build Alternative, non-highway alternatives (Transportation Demand Management [TDM] and Transportation System Management [TSM]), as well as Build Alternatives. The Build Alternatives include various roadway configuration options and various roadway realignment options.

The development and evaluation of the initial range of alternatives were conducted in two parts. The first screening evaluated the No-Build, non-highway and roadway configuration alternatives. The second screening evaluated the roadway realignment alternatives.

1. Evaluation of No-Build, Non-Highway and Roadway Configuration Alternatives

a. Description of No-Build, Non-Highway and Roadway Configuration Alternatives

No-Build Alternative

Under the No-Build Alternative, no additional highway capacity would be provided to Route 65. No improvements other than normal pavement maintenance, spot traffic operational improvements and minor safety improvements within existing highway right of way would be made. While the No-Build Alternative would be found incapable of adequately addressing the project's purpose and need (see **Chapter II.B.1.b**), it is retained as a baseline for comparison to other alternatives.

Transportation Demand Management

Transportation Demand Management attempts to reduce traffic volume through nonstructural means, such as increased transit ridership or ridesharing (carpooling). This can include developing programs that encourage ridesharing through associations and business incentives. Park-and-ride lots are another typical TDM technique. Park-and-ride lots provide sites at outlying residential areas where commuters may park free and carpool to business centers, thereby reducing vehicular traffic. Other TDM methods can include land use management, restricted parking to encourage other modes of transportation, staggered work hours, telecommuting and electronic commerce.

Transportation System Management

Transportation System Management methods are technological means that can improve capacity by facilitating more efficient movement of traffic. Transportation System Management methods are more likely to be effective than TDM over the short term because they can be incorporated into the existing roadway system and do not depend on voluntary compliance. Transportation System Management methods applicable to the Route 65 corridor might include access point consolidation, improved intersection design and control, improved driveway design and control and signalization of intersections (if warranted).

Build Alternatives – Roadway Configurations

Any Build Alternative for a Route 65 project could include options regarding 1) the type/ configuration of roadways to be built and 2) the location/alignment of roadways to be built. Below is a brief description of the roadway configurations considered in the initial range of alternatives.

Two-lane Roadway with Centerline Rumble Strips: The rumble strip improvements are grooves or rows of raised pavement markers placed perpendicular to the direction of travel to alert inattentive drivers. As a vehicle passes over the rumble strips, noise and vibration are produced, alerting the driver that they are approaching a hazard. In this case, centerline rumble strips would be paired with a minor widening of the roadway to reduce the number of head-on collisions. The rumble strips could be placed at the points along Route 65 where passing is dangerous, possibly dissuading some unsafe passing movements.

Super-2 Roadway: This roadway configuration is an improved two-lane highway with restricted driveway access, but with a mix of grade-separated interchanges and at-grade intersections. Traffic operations are typically at higher speeds due to the geometric design.

Three-Lane, Two-Way, Left-Turn Lane Roadway: The three-lane TWLTL has a continuous three-lane cross-section. It consists of the basic two-lane highway with an added center lane (composing the third lane) that is provided for the exclusive use of left-turning vehicles from either direction.

2 Plus 1 Roadway: The 2 plus 1 concept also has a continuous three-lane cross-section, but with alternating passing lanes. The central passing lane permits directional changes throughout its use. **Figure II-1** is a depiction of a 2 plus 1 roadway configuration.

Four-Lane Divided Roadway: This concept is the safest improvement considered. The four-lane divided highway is typically composed of four, 12-foot lanes (two in each direction of travel) separated by a median of varying width (typically 60 feet).

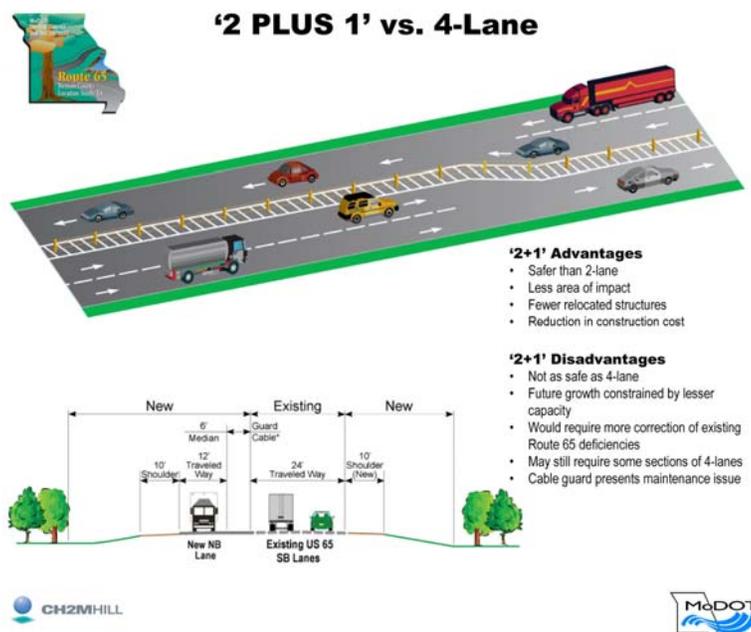


Figure II-1: Depiction of 2 Plus 1 Roadway Configuration

b. Evaluation of No-Build, Non-Highway and Roadway Configuration Alternatives

The evaluation of the No-Build, non-highway and roadway configuration alternatives focused on the project's purpose and need. As identified in **Chapter I**, the three critical elements of the project's purpose and need include 1) improving safety along Route 65, 2) enhancing corridor operations and 3) achieving regional/local continuity goals. **Table II-1** provides a summary of the evaluation of the alternatives relative to their ability to satisfy the project's purpose and need.

Table II-1: Summary of Alternative Evaluation Comparison (Roadway Configurations)

| | Purpose and Need Elements | | | | | | | Recommended for Reasonable Range? |
|-------------------|------------------------------------|---------------------------------------------------|-----------------------------------------------------------|--------------------------------------------|---------------------------------------------|-------------------------------------------|--------------------------------------------------------------|-----------------------------------|
| | Improve Safety | | | Enhance Corridor Operation | | | Achieve Local Continuity Goals | |
| | Ability to Address Crash Hot Spots | Ability to Implement Access Management Techniques | Ability to Implement Safety-Related Design Specifications | Ability to Improve Passing within Corridor | Ability to Enhance Capacity within Corridor | Ability to Improve Intersection Operation | Ability to Provide Access to Important Destinations/Pathways | |
| No-Build | — | — | — | — | — | — | • | Yes |
| TDM | — | — | — | — | — | — | — | No |
| TSM | — | — | — | — | — | — | — | No |
| Rumble Strips | — | — | — | — | — | — | — | No |
| Super-2 | — | — | — | • | — | • | — | No |
| Three-Lane TWLTL | — | • | — | — | — | — | • | No |
| 2 plus 1 | • | • | — | • | • | — | • | No |
| Four-Lane Divided | • | • | • | • | • | • | • | Yes |

• Advances Purpose and Need Goals — Does Not Advance Purpose and Need Goals

Based on this analysis, it was concluded that the simplest non-highway alternatives (TDM, TSM, rumble strips) would not be able to address any of the critical elements of the purpose and need. As a result, these concepts are not carried forward into the reasonable range of alternatives. While the No-Build Alternative does not address the critical purpose and need

elements either, it is retained for further analysis in order to establish a baseline of comparison for other reasonable alternatives.

The super-2 and the three-lane TWLTL alternatives were found to address adequately more of the purpose and need elements, but not to a sufficient degree to warrant their continued consideration in the reasonable range of alternatives. Basically these alternatives would continue the existing two-lane configuration of Route 65. With only one lane in each direction, unacceptable levels of service are expected.

Both the 2 plus 1 and four-lane divided configurations would both provide sufficient capacity for future traffic. While both alternatives would reduce the head-on collision risk, the divided roadway and accompanying median on the four-lane divided configuration would provide the best reduction. Also, while both alternatives would provide more acceleration and deceleration lanes for vehicles entering and exiting Route 65, only the four-lane would address that issue in all locations. The 2 plus 1 would have areas where only a single lane is provided in one direction; this is expected to be counter to driver expectations and may prompt drivers to pass imprudently as the two-lane sections end. Additionally, given the corridor, there would be limited abilities for switching between the directions of the center lane. Regarding sight distance and geometric deficiencies, only the four-lane divided concept would provide opportunities to improve locations where existing design elements are causing safety and operation concerns. Under the four-lane divided roadway, the two new lanes could be built independent of the existing line and grade. The 2 plus 1 concept, however, would not be able to accomplish the same improvements without significant reconstruction of the existing roadbed leading to considerable additional costs and impacts. Because the 2 plus 1 configuration accommodates some of the project's purpose and need elements and might be expected to cost less than a four-lane divided configuration, it was featured prominently at one of the project's public involvement meetings. Overwhelmingly, the public found the 2 plus 1 configuration confusing and undesirable. Because of the substantial deficiencies associated with the 2 plus 1 configuration, it was eliminated from inclusion into the reasonable range of alternatives.

A more detailed evaluation of the No-Build, non-highway and roadway configuration alternatives is provided below:

No-Build Alternative: While the No-Build Alternative would maintain existing access to the important uses within the study area, it would be unable to substantively address the safety and corridor enhancement elements of the purpose and need.

The safety issues on Route 65 are largely the result of a roadway that incorporates few modern access management strategies or design specifications. This results in a situation where elevated crash rates exist. Within the No-Build Alternative, it might be possible, over time, to process some individual intersection improvements under the No-Build Alternative. However, this piece-meal approach would not allow for the implementation of the kind of comprehensive strategy needed to manage access and improve the crash rates along the corridor.

The corridor operation issues along Route 65 result from a narrow and winding roadway with limited passing opportunities and numerous slower moving vehicles. Even the impeccable maintenance of the existing facility would not provide the passing opportunities that would improve this situation. The No-Build Alternative would also do nothing to provide additional capacity needed to satisfy future needs.

The No-Build Alternative is not expected to satisfy the transportation problems associated with Route 65. Nevertheless, the National Environmental Policy Act (NEPA) requires that it be included in the reasonable range of alternatives as a baseline for comparison to other alternatives.

Transportation Demand Management: The type and destination of the vehicles on Route 65 make demand management ineffective at modifying traffic volumes. Given the limited carpooling and transit demand in the project area, this alternative has very little application on Route 65. Transportation Demand Management is a legitimate method for improving transportation efficiency, but its limitations forego its use as a stand-alone solution for the problems of Route 65. Expansion of the roadway is necessary to accommodate the projected future traffic. Without the ability to modify traffic volumes or types, TDM would be ineffective at reducing crashes or otherwise improving operations. Consequently, TDM techniques are not included in the reasonable range of alternatives.

Transportation System Management: While improving deficient elements of the existing system would improve the safety aspects of travel on Route 65, it would do nothing to improve corridor operations. Consequently, TSM techniques are not included in the reasonable range of alternatives as a stand-alone alternative. The techniques of TSM should be included, as appropriate, in the reasonable alternatives.

Two-lane Roadway with Centerline Rumble Strips: Limiting the reconfiguration of Route 65 to a two-lane roadway with centerline rumble strips would have minimal costs and benefits. Relative to the purpose and need evaluation measures, this configuration would only minimally address the crash hot spots, would not improve stopping sight distances and would not add capacity to the roadway. The two-lane roadway with centerline rumble strip is not included in the reasonable range of alternatives.

Super-2 Roadway: Improving the geometry and access parameters of Route 65 would improve safety through better sight distances and improve corridor operations to the extent that geometric improvements are made. However, the costs associated with this limited altering of access and geometry are expected to be high. There are no capacity improvements, and most crash hot spots are unaddressed. This configuration has limited benefits and potentially high costs and disruptions. Consequently, the super-2 roadway configuration is not included in the reasonable range of alternatives.

Three-Lane TWLTL Roadway: Modifying Route 65 with a center turn lane would improve operations at turning movements. These benefits are concentrated at intersections, the commercial area in Lincoln and at individual driveways. This configuration would require right-of-way acquisition throughout the corridor—regardless of whether the alignment is on new alignment or along existing Route 65. In the sparsely developed sections of the corridor, the turn lane may be improperly used as a passing lane, leading to potentially dangerous operations. Consequently, the three-lane TWLTL roadway configuration is not included in the reasonable range of alternatives.

2 plus 1 Roadway: The concept of using a center lane as an alternating passing lane is intended to improve roadway capacity moderately by facilitating the ability to pass slower vehicles. This configuration had the promise of achieving some of the critical elements of the purpose and need. The 2 plus 1 configuration had the potential for providing a mechanism for safe passing (reducing the conditions that lead to head-on collisions), could potentially improve

intersection operation and might limit costs. Upon evaluation, these benefits were determined to be limited. For example, the transition between north-bound and south-bound center lanes is lengthy and limits the number of transitions (and hence the utility) that the corridor can contain. Likewise, while the configuration may increase the capacity to store vehicles at the intersections, it may also be confusing to users. Finally, while the costs associated with a 2 plus 1 configuration may be lower due to reduced right-of-way requirements, any alternations to the existing roadway would require complete reconstruction, lengthening the construction period and requiring costly maintenance of traffic efforts.

Among the negatives associated with the 2 plus 1 configuration are limitations to access and to turning movements. Typically, a cable guard is used to separate the directions of travel (see **Figure II-1**). The cable guard limits the ability for left turns on or off of Route 65. The alternating nature of the center lane also limits the number of passing opportunities in each direction. The configuration is also relatively rare and counter to typical driver expectations. Consequently, the configuration itself may be a net negative relative to driver safety. Additionally, depending on the degree to which the existing roadway is re-engineered, the potential cost advantages diminish. Based on preliminary estimates, cost savings of perhaps 10 percent (over a four-lane divided configuration) may be achieved².

Because it potentially meets some of the evaluation criteria, the 2 plus 1 roadway was presented to the public. Approximately 200 people attended a project public involvement meeting held in February 2006. The 2 plus 1 configuration was resoundingly rejected by the public. The potential for exasperating safety conditions and the limitations on turning movements were seen as major disadvantages. Other objectionable elements were the limited passing zones and the lack of capacity improvements (while the public would still endure a major construction project).

Because of the limited benefits and strong stakeholder opposition, the 2 plus 1 roadway is not included in the reasonable range of alternatives.

Four-Lane Divided: A roadway configuration that provides two travel lanes in each direction, separated by a grassed median, would provide continuity with the portions of Route 65 to the north of the study area. It can be shown to accomplish all of the evaluation criteria. Consequently, the four-lane divided roadway is included in the reasonable range of alternatives.

2. Evaluation of Roadway Realignment Alternatives

The development and evaluation of the initial range of alternatives included not only the roadway configuration elements but also roadway realignment elements. This section discusses the range of alignment alternatives. This evaluation assumed the four-lane divided roadway configuration.

The project area was divided into three sections to develop and evaluate the initial range of alignment alternatives: the section between the northern terminus and Lincoln (north section), the section through Lincoln (Lincoln section) and the section between Lincoln and the southern terminus (south section). A short description of each alternative, by section, is provided below.

² For a 2 plus 1 roadway to accomplish the level of improvements specified in the purpose and need, significant reconstruction of the existing roadbed would be necessary. This is responsible for the higher-than-expected costs.

Exhibits II-1A and B provide a reference map for each of the three sections and their respective alternatives.

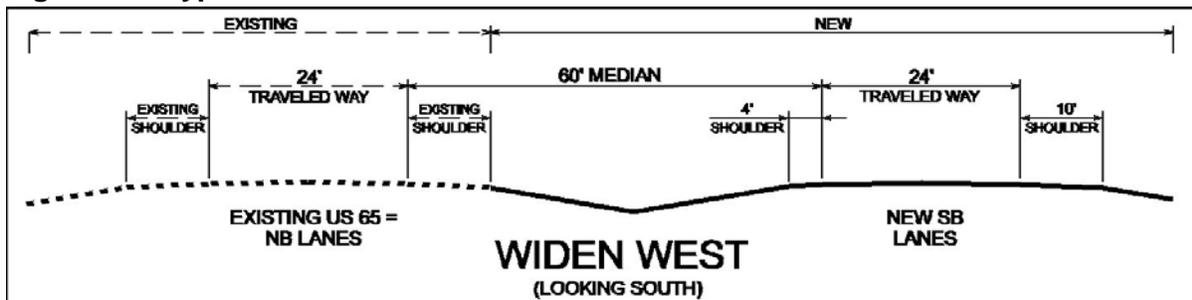
a. **Description of Realignment Alternatives**

North Section Alternatives

Two alternative alignments were developed north of Lincoln. Both would utilize the existing Route 65 travel lanes for one direction of traffic. Alternative NW-1 would construct two new lanes west of the existing lanes. Alternative NE-1 would be the “mirror image” of NW-1, adding two new lanes to the east of the existing Route 65 travel way.

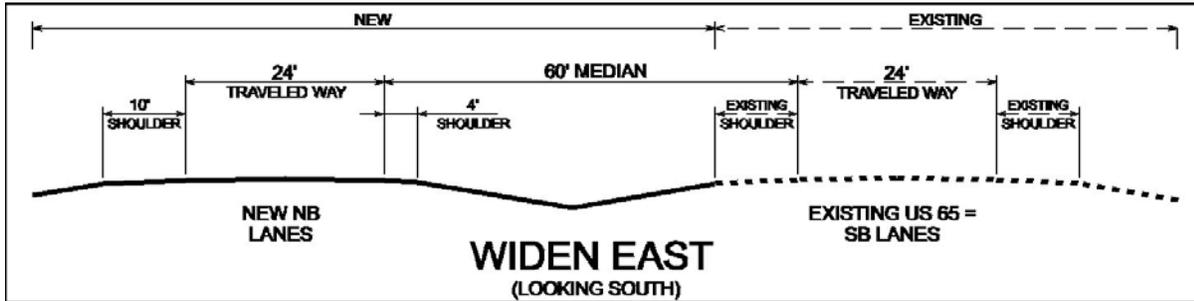
Alternative NW-1: Alternative NW-1 is roughly 1.6 miles in length and would reconfigure existing Route 65 as a four-lane facility (two lanes north-bound/two lanes south-bound) with a 60-foot-wide depressed median separating the north-bound and south-bound travel lanes. The existing lanes would be repurposed as the north-bound lanes, and new south-bound lanes would be constructed to the west of the existing lanes. **Figure II-2** depicts a typical roadway cross-section under Alternative NW-1. Connection would be made at the existing four-lane facility (south of the Route 52/Cole Camp Junction) and end at the north Lincoln terminus (intersection of Route 65 and Route HH).

Figure II-2: Typical Section – Alternative NW-1



Alternative NE-1: Alternative NE-1 is also 1.6 miles in length and similar in design to Alternative NW-1. Alternative NE-1 (**Figure II-3**) would reconfigure existing Route 65 as a four-lane facility (two lanes north-bound/two lanes south-bound) with a 60-foot-wide depressed median separating the north-bound and south-bound travel lanes. The existing lanes would be repurposed as the south-bound lanes, and new north-bound lanes would be constructed to the east of the existing lanes. Connection would be made at the existing four-lane facility (south of the Route 52/Cole Camp Junction) and end at the north Lincoln terminus (intersection of Route 65 and Route HH).

Figure II-3: Typical Section – Alternative NE-1

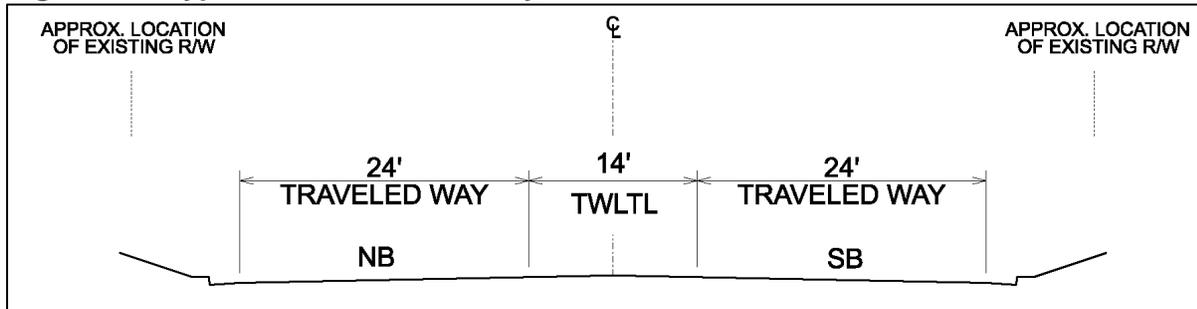


Lincoln Section Alternatives

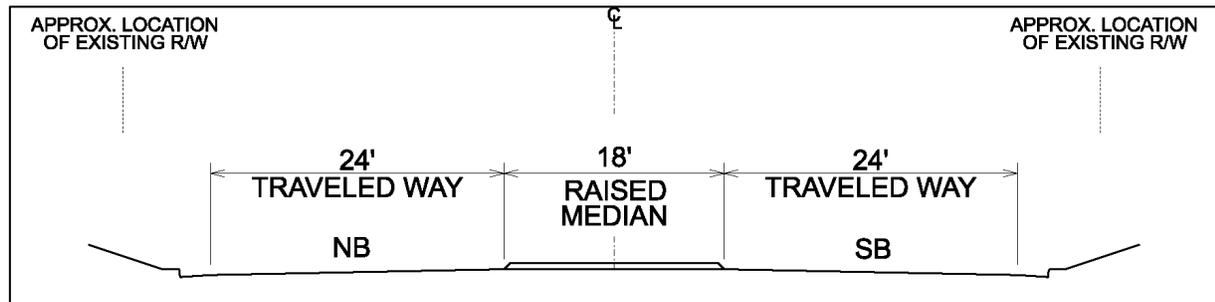
Two types of alternatives were developed in the Lincoln section: alternatives that stayed on the existing Route 65 alignment through the city of Lincoln (through-town alternatives) and alternatives that bypassed the city of Lincoln on new alignment (bypass alternatives).

Alternatives on Existing Route 65 Through Lincoln: The alternatives through town would also widen the roadway to two travel lanes in each direction. Because of the built environment in the vicinity of Lincoln, the median would be modified to one that is more functional for urban areas (particularly for left turns) and narrowed to minimize impacts to the built environment. Three distinct roadway design elements were considered in developing the initial range of alternatives through town: the type of median/center-turn lane, the type of roadway drainage system and the alignment of the larger, improved road. Two median/center-turn lane types were considered: a TWLTL and a raised-barrier median. All through town alternatives would be approximately 5.4 miles in length. These configurations are depicted in **Figures II-4 and 5**.

Figure II-4: Typical Section – Two-Way, Left-Turn Lane



The TWLTL would allow access to abutting properties in generally the same pattern that exists today. While it is possible that some of the existing access points might be consolidated, the TWLTL would provide access to and from any point of access along the route.

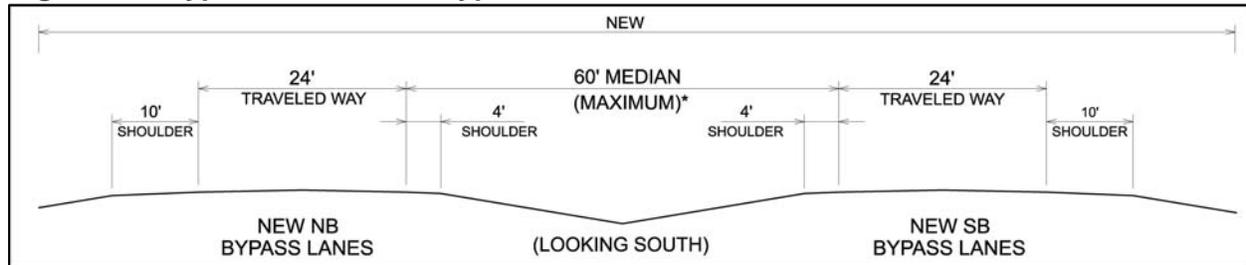
Figure II-5: Typical Section – Raised Median

The raised median would manage access by limiting left turns to locations with turn lanes and/or median openings. Access points without such turn lanes or median openings would be limited to right-in/right-out movements. Vehicles departing to or arriving from the opposite direction would be required to turn around at the nearest median opening.

Two drainage types were also considered: enclosed drainage and open ditch drainage. Existing Route 65 in this section utilizes primarily open ditch drainage to convey runoff, with select locations recently implementing enclosed drainage systems. Whereas open drainage allows storm water to drain from the roadway into roadside ditches, enclosed drainage uses curbs and gutters to route storm water to underground storm sewers. Enclosed drainage systems allow for narrower roadway footprints and lower property acquisitions. They also cost more to install and have higher maintenance costs than open drainage systems. The destination of drainage in Lincoln is primarily the Timber Line Lake, and the outfall of the roadway drainage system must be above the lake elevation. Based on site visits and preliminary engineering, it appears that an enclosed drainage system is feasible in Lincoln.

The alignment of the through-town alternatives was viewed in three ways: widening west of existing Route 65 (LT-W), widening symmetrically about existing Route 65 (LT-C) and widening east of existing Route 65 (LT-E). All three locations would have alignments approximately 5.4 miles in length. They could be implemented as a TWLTL, a raised median or a hybrid of the two. The impacts identified in **Table II-2** assume an open ditch drainage system.

Lincoln Bypass Alternatives: Four bypass alignments were developed as part of the initial range of alternatives, two to the west and two to the east. The function of any bypass would be to provide through traffic the ability to travel unimpeded through the Lincoln area. Each bypass would consist of a new four-lane roadway divided by a 60-foot-wide depressed median, comparable to the north section roadway, as shown in **Figure II-6**. Intersections with key cross-roads would be provided along any bypass alignment to allow access to and from the city of Lincoln. Bypass alternatives would maintain the same speed limit (60 mph) and cross-section as the northern and southern alternatives.

Figure II-6: Typical Section for Bypasses of Lincoln

For all bypass alternatives, existing Route 65 would remain in its existing condition. No additional capacity would be added to the existing route. Spot improvements, such as turn lanes at Route C and Frisch Road, could be implemented in the future as separate projects if traffic volumes warrant them. Some of the existing access points could also be consolidated to improve safety along the existing route. All such improvements could be accomplished within the existing right of way.

The western bypass alignments are identified as LW-1 and LW-2 (see **Figure II-7**).

Alternative LW-1, the near western bypass, is closest to existing Route 65 and passes through the center of Lincoln's western residential areas. This alignment is located slightly west of the Lincoln School, where it parallels Center Street. South of Route C, the alignment is curvilinear to avoid potentially sensitive resources. Alternative LW-1 is approximately 5.5 miles in length.

Alternative LW-2 is the western-most alignment and is slightly longer than LW-1 (approximately 0.2 miles). On the north side of Lincoln, LW-2 stays north of the Lincoln airport and is located in close proximity to the city of Lincoln water treatment ponds. South of Route C, LW-2 crosses Byler Branch. The alignment is located just west of the mobile home park along Gerken Road. It connects to existing Route 65 just south of the auto-salvage yards near Route H. Alternative LW-2 is approximately 5.7 miles in length.

Both LW-1 and LW-2 would have two-way, stop-controlled intersections with Route C and Gerken Road. Beyond those two intersections, access would be limited. Access to severed parcels would be negotiated during the design phase of the study. Where the bypasses depart from existing Route 65, a T-intersection would be provided. Existing Route 65 would become the minor intersecting leg and would be stop-controlled.

The eastern bypass alignments are known as LE-1 and LE-2 (see **Figure II-8**). LE-1, the near eastern bypass, is located just outside the existing Lincoln corporate boundary. Between Frisch Road and Fordney Road, LE-1 parallels Route 65, approximately 2,800 feet to the east. North and south of this area, LE-1 minimizes the distance the alignment takes back to Route 65. This creates additional curves along the alignment. Alternative LE-1 is approximately 5.7 miles in length.

Figure II-7: Alternatives LW-1 and LW-2



Figure II-8: Alternatives LE-1 and LE-2



LE-2, the easternmost bypass, begins north of and ends south of LE-1. The portion of LE-2 between Frisch Road and Fordney Road is identical to LE-1. Overall, LE-2 is slightly shorter than LE-1. LE-2 is approximately 5.3 miles in length. It also uses smoother and fewer curves.

Both LE-1 and LE-2 would have two-way, stop-controlled intersections with Frisch Road and Fordney Road. Beyond those two intersections, access would be limited. Access to severed parcels would be negotiated during the design phase of the study. Where the bypasses depart from existing Route 65, a T-intersection would be provided. Existing Route 65 would become the minor intersecting leg and would be stop-controlled.

South Section Alternatives: Two alternative alignments were developed south of Lincoln as part of the initial range of alternatives. Both would utilize the existing Route 65 travel lanes for one direction of traffic. Alternative SE-1 would construct two new lanes east of the existing lanes. Alternative SW-1 would be the “mirror image” of SE-1, adding two new lanes to the west of existing Route 65. The SW-1 and SE-1 cross-sections would be the same as those shown for NW-1 and NE-1, using a 60-foot-wide median (**Figures II-2** and **II-3**). Both Alternative SE-1 and Alternative SW-1 are approximately 7.4 miles in length.

b. Evaluation of Realignment Alternatives

All of the realignment alternatives, at least minimally, satisfy the critical elements of the project’s purpose and need, which is primarily a function of the four-lane roadway configuration. The evaluation of the roadway alignments hinged largely on the anticipated project-related impacts to the natural and manmade environment and the guidance provided from the project’s agency coordination/public involvement process.

Using secondary sources, such as project-specific mapping and Geographic Information Systems (GIS) data available from the Missouri Spatial Data Information Service (<http://msdisweb.missouri.edu/index.htm>), the alignments were evaluated relative to their impacts on various resources. Resource impacts considered included wetlands, streams, woodlands, floodplains and land acquisition/displacement impacts. **Table II-2** summarizes some of the impacts associated with the different alignments.

Table II-2: Impact Summary Table for Roadway Alignments Within the Initial Range of Alternatives

| | Wetlands | | Woodlands | | Floodplain | | Stream Crossings | | Parcels | Buildings | | | | |
|----------------|--------------------|---------|--------------------|---------|-----------------|---------|------------------|-------------|---------|-----------|-----|------|------|--|
| | Number Affected | (acres) | Number Affected | (acres) | Number Affected | (acres) | Number | Length (ft) | (acres) | Comm. | Ag. | Res. | Gov. | |
| North | | | | | | | | | | | | | | |
| NW-1 | 2 | 1 | 2 | 12 | 2 | 2 | 1 | 244 | 22 | — | 4 | 3 | — | |
| NE-1 | 2 | 1 | 2 | 12 | 2 | 2 | 1 | 249 | 28 | 1 | - | - | — | |
| Lincoln | | | | | | | | | | | | | | |
| LW-2 | 10 | 1 | 4 | 23 | 3 | 4 | — | — | 178 | 2 | 1 | 6 | — | |
| LW-1 | 6 | 1 | 1 | 4 | 2 | 3 | — | — | 150 | 9 | 12 | 28 | — | |
| LT-W | 2 | 0 | — | — | 2 | 1 | 2 | 304 | 65 | 7 | 1 | 5 | — | |
| LT-C | — | — | — | — | — | — | — | — | 68 | 7 | 1 | 7 | 1 | |
| LT-E | 2 | 0 | — | — | 1 | 2 | 2 | 309 | 70 | 11 | 1 | 2 | 1 | |
| LE-1 | 7 | 3 | 2 | 12 | 1 | 3 | 3 | 961 | 174 | 6 | 1 | 3 | — | |
| LE-2 | 5 | 2 | 2 | 16 | 4 | 6 | 4 | 1,676 | 178 | 4 | — | 2 | — | |
| South | | | | | | | | | | | | | | |
| SW-1 | 3 | 0 | 3 | 11 | 1 | 5 | 9 | 5,051 | 104 | 17 | 1 | 6 | — | |
| SE-1 | 2 | 1 | 4 | 11 | — | — | 10 | 2,352 | 122 | 12 | — | 2 | 1 | |
| Notes: | Comm. – Commercial | | Res. – Residential | | | | | | | | | | | |
| | Ag. – Agricultural | | Gov. – Government | | | | | | | | | | | |

The evaluation of the roadway alignments also incorporated the input received during agency coordination and the public involvement process. The Route 65 project team has implemented an extensive outreach program. The most significant events included the following:

- **Coordination with Local Stakeholders:** The Benton County Corporation includes representatives from local and county governments, interested businesses and the Kaysinger Basin Regional Planning Commission. The Route 65 project team has made presentations to the group and established a coordination process with them.
- **Coordination with Transportation and Resource Agencies:** On February 6, 2006, an agency coordination meeting was held. In attendance were representatives from the U.S. Environmental Protection Agency (USEPA) and the Missouri Department of Natural Resources (MDNR). This meeting served to introduce the project and discuss important project-related issues.
- **Coordination with Property Owners and Other Residents:** On February 22, 2006, a public involvement meeting/open house was held at Lincoln High School. Among the notification efforts were letters to property owners within the study area, advertisements in local newspapers and media releases. A newsletter was also generated and distributed. More than 200 persons attended the meeting. The support for an improvement of Route 65 along its existing alignment was

pervasive. Additional public involvement included the generation and distribution of a project newsletter and interviews with local radio stations and newspapers.

Based on the evaluation of the project's purpose and need, environmental impacts and agency coordination/public involvement, the following conclusions were formed regarding the realignment alternatives.

Alternatives NW-1 and NE-1: In the northern portion of the study area, improving Route 65 along its existing alignment would satisfy all of the critical elements of the project's purpose and need. Agency and stakeholder input on the northern portion of the study area was limited. The comments that were offered were site-specific issues (such as the inadequacies of the existing intersections). All of the input could be addressed adequately with either alternative. A critical difference between the alternatives is the location of residences and other structures in close proximity to the existing roadway. Because of the presence of numerous structures along the western side of Route 65, Alternative NW-1 was not seen as viable. **However, to allow for the possibility of transitioning between a western and eastern widening, both Alternatives NE-1 and NW-1 are included in the reasonable range of alternatives.**

Alternative LW-1 and LW-2: The western bypasses of Lincoln would divert traffic off existing Route 65 onto a new roadway and would maintain a 60-mph posted speed limit. Relative to the purpose and need, bypass alternatives can be configured to satisfy the safety and corridor capacity elements, but they would not be expected to achieve regional and local continuity goals. By separating local and through traffic and by providing a higher design speed, the bypass alternatives may offer greater safety and operational benefits to through traffic. It is worth noting, however, that the through-town alternatives can also provide safety and operational benefits that would satisfy the project purpose and need, albeit at a lower design speed and with more conflict points than the bypass alternatives.

Because both western bypasses are capable of satisfying the safety and operational elements of purpose and need, the most significant distinguishing factor becomes the ability to achieve regional and local continuity goals. This is important for many reasons. Route 65 is the main commercial street in Lincoln. A large portion of the city's revenue is generated from Route 65. It is also the focus of the Lincoln Civic Redevelopment Corporation. Lincoln is working on establishing an Enhanced Enterprise Zone with the Department of Economic Development, which would provide incentives for investment. Bypassing the existing corridor is counter to these local efforts. Further, a bypass would split large agricultural parcels and promote secondary land use impacts. Additionally, the near western bypass would divide Lincoln's residential areas and have considerably greater displacement impacts than other alternatives. The western bypasses would also traverse close to the Lincoln airport – a resource expected to yield substantial growth for the community. Finally, all elements of the community, businesses, community leaders and the public were united in their opposition to a bypass of Lincoln.

Consequently, western bypasses of Lincoln (Alternatives LW-1 and LW-2) are not included in the reasonable range of alternatives.

Alternatives LT-W, LT-C and LT-E: The through-town alternatives would improve the capacity of Route 65, but would have a lower posted speed limit (45 mph) than a bypass. Right-of-way acquisition through the existing commercial center would be required, including a number of displacements because of the existing setback of many structures. Implementation of a through-town alignment, using all applicable design criteria, is expected to be able to satisfy the project's safety and corridor capacity elements. Access management measures would be necessary to

maintain safe operations along the corridor and would reduce the freedom of movement that current users experience. Refer to **Chapter II.C.1.h** for details on specific access management measures.

Based on community input, only through-town alternatives are expected to satisfy its regional and local continuity goals. Regardless of the expected impacts, community leaders, stakeholders and the general public support the through-town alternatives. Existing Route 65 plays an important role in the community, and the strong desire is to maintain it in its existing location. Nearly all of the written comments from the public involvement meeting supported the through-town alternatives. Overall, support for alternatives that did not reuse existing Route 65 through Lincoln was very low. While seen as the best solution, the public is cognizant that improving Route 65 through Lincoln could potentially result in substantial disruptions to the community – both during construction and through altering the existing streetscape. The analysis of the initial range of alternatives found that the symmetrical widening, using open drainage, would result in the greatest displacement impacts and alter both sides of the road. The disruptions of the symmetrical widening could be minimized by utilizing a curb-and-gutter drainage configuration. Without the footprint reductions made possible by the curb-and-gutter configuration, the symmetrical widening (using open drainage) was not deemed to be reasonable. On the other hand, widening to only one side of Route 65 had the advantage of minimizing the alteration of the existing streetscape to only one side of the roadway. The asymmetrical alternatives (LT-W and LT-E) included in the reasonable range of alternatives incorporated open drainage in order to account for the possibility that a curb-and-gutter drainage configuration might not be feasible from an engineering standpoint. The use of an open drainage configuration on the asymmetrical alternatives also allowed for the investigation of the cost differential between the different drainage systems. Curb and gutters, in conjunction with the asymmetrical alternatives, were not included in the reasonable range of alternatives because the impact reductions associated with the slightly smaller footprint would be limited. **Consequently, the through-town alternatives (LT-C³, LT-W and LT-E⁴) are included in the reasonable range of alternatives.**

Alternatives LE-1 and LE-2: Like Alternatives LW-1 and LW-2, the eastern bypasses of Lincoln would divert traffic off existing Route 65 onto a new roadway. Relative to the purpose and need, these bypass alternatives can also be configured to satisfy the safety and corridor capacity elements, but they would not be expected to achieve regional and local continuity goals. Route 65 is the main commercial street in Lincoln. A large portion of the city's revenue is generated from Route 65. It is also the focus of the Lincoln Civic Redevelopment Corporation. Lincoln is working on establishing an Enhanced Enterprise Zone with the Department of Economic Development, which would provide incentives for investment. Bypassing the existing corridor is counter to these local efforts. Further, a bypass would split large agricultural parcels, and promote secondary land use impacts. **Nevertheless, the Near Eastern Bypass (LE-1) was included in the reasonable range of alternatives.** This bypass minimizes the difference between trip lengths and avoids Lincoln and most existing development, including the Lincoln Airport. Despite public opposition, this alternative was developed more fully in an effort to provide for a broader context to evaluate impacts.

Alternatives SW-1 and SE-1: In the southern portion of the study area, improving Route 65 along its existing alignment would satisfy all of the critical elements of the project's purpose and

³ With a curb-and-gutter drainage configuration.

⁴ With an open drainage configuration.

need. However, constraints in this section include numerous dwellings and commercial buildings along the roadway, several intersections that would require improvement, the Truman Reservoir and the Lost Valley Fish Hatchery. One particular parcel, The Nature Conservancy's Rock Hill Prairie at Route 65 and CR BB, is known to be a habitat for the federally threatened Mead's milkweed, and therefore must be given close consideration. These constraints would make balancing impacts and benefits difficult. **Consequently, both Alternatives SW-1 and SE-1 are included in the reasonable range of alternatives. A hybrid alignment is also included.**

C. Reasonable Range of Alternatives

The analysis of the initial range of alternatives, including roadway configuration, operations, constructability, impacts and stakeholder input, narrowed the possible configurations and alignments to a subset collectively known as the reasonable range of alternatives.

The reasonable range of alternatives includes the No-Build Alternative along with several Build Alternatives. All of the Build Alternatives involve configurations that utilize a four-lane configuration in rural areas, divided by a grassed median and retaining the existing roadway as two of the travel lanes and a five-lane configuration in the Lincoln urban area. The alignments in the reasonable range of alternatives include the following:

North of Lincoln

- Widening to the west of the existing roadway
- Widening to the east of the existing roadway

Lincoln

- Symmetrical widening of Route 65 with a curb-and-gutter cross-section
- Eastern widening of Route 65 with open-ditch drainage
- Western widening of Route 65 with open-ditch drainage
- Bypass Lincoln along a near-eastern alignment (LE-1)

South of Lincoln

- Widening to the west of the existing roadway
- Widening to the east of the existing roadway
- Widening with an east/west hybrid

Additional engineering and environmental investigations were conducted on these alternatives. The engineering investigations focused on adding design details to the alternatives to better understand the engineering constraints and to better define the "footprint" of each alternative. The environmental field investigations focused on better identifying the resources in the area of the alternatives and fine-tuning impact assessments. The study area within which the environmental assessments were conducted is shown in **Exhibits II-2A–D. Chapter III** presents detailed descriptions of the natural and man-made resources that occur within the study area of the reasonable range of alternatives. **Chapter IV** presents detailed descriptions of the impacts associated with the reasonable range of alternatives. Below is a discussion of the screening process that led to the identification of the selected alternative.

1. Important Engineering Elements Associated with the Reasonable Alternatives

As part of the analysis of the reasonable range of alternatives, additional engineering studies were conducted. This allowed for a refinement of impacts and the development of the selected alternative. The important engineering elements that emerged from the engineering analysis of the reasonable alternatives are discussed below.

a. Drainage

Runoff from the roadway within the existing corridor is collected and conveyed predominantly by open roadside ditches. It would be necessary for each reasonable alternative to maintain these existing drainage patterns.

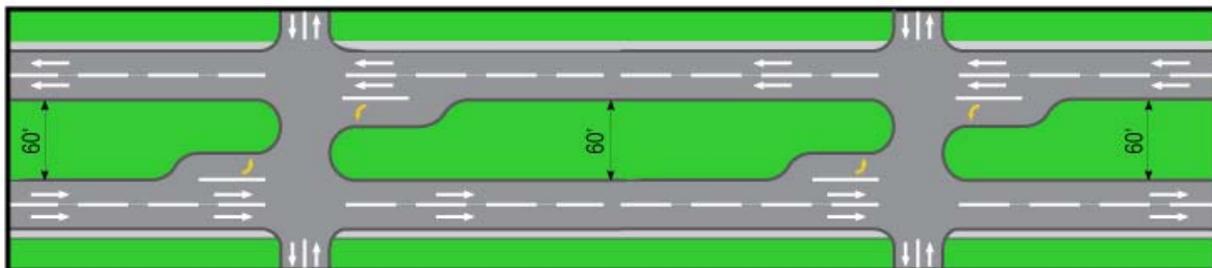
Outside of Lincoln, the existing open roadside ditch drainage system would be maintained and enhanced to accommodate the proposed alternatives east or west of the existing route. Existing stream culverts, if in good condition, would be extended beneath the new set of lanes or replaced if necessary.

Within Lincoln, two concepts are part of the reasonable range of alternatives: an open ditch system similar to the existing system, or an enclosed curb-and-gutter system. To use a similar open ditch system for the new roadway would require a much wider footprint. An enclosed system would impact less area; however, it must be designed to drain to Timber Line Lake just east of existing Route 65. The elevation of the roadway would need to be high enough to allow for the underground pipes to freely discharge to the lake. Preliminary engineering studies have shown that this could be accomplished with only a slight rise in the existing Route 65 profile (~ 6-12 inches higher in certain locations).

b. Median Cross-Overs

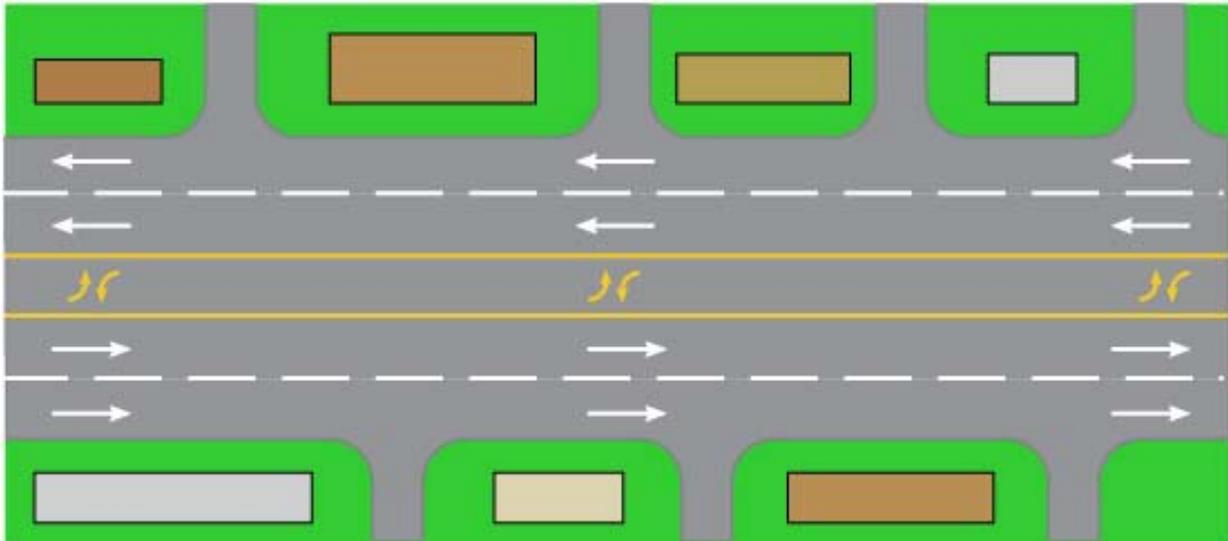
In the areas outside of Lincoln, the reasonable alternatives are all four-lane divided roadways. A 60-foot-wide median (wider in some locations) is provided between the north-bound and south-bound travel lanes. Median cross-overs would be required to provide access across the median. At a minimum, these cross-overs would be provided at each cross-road that intersects Route 65. Left-turn lanes would be cut into the median in advance of these cross-overs to safely remove turning vehicles out of the through-traffic stream (see **Figure II-9**).

Figure II-9: Typical Median Cross-Over Concept (Outside of Lincoln)



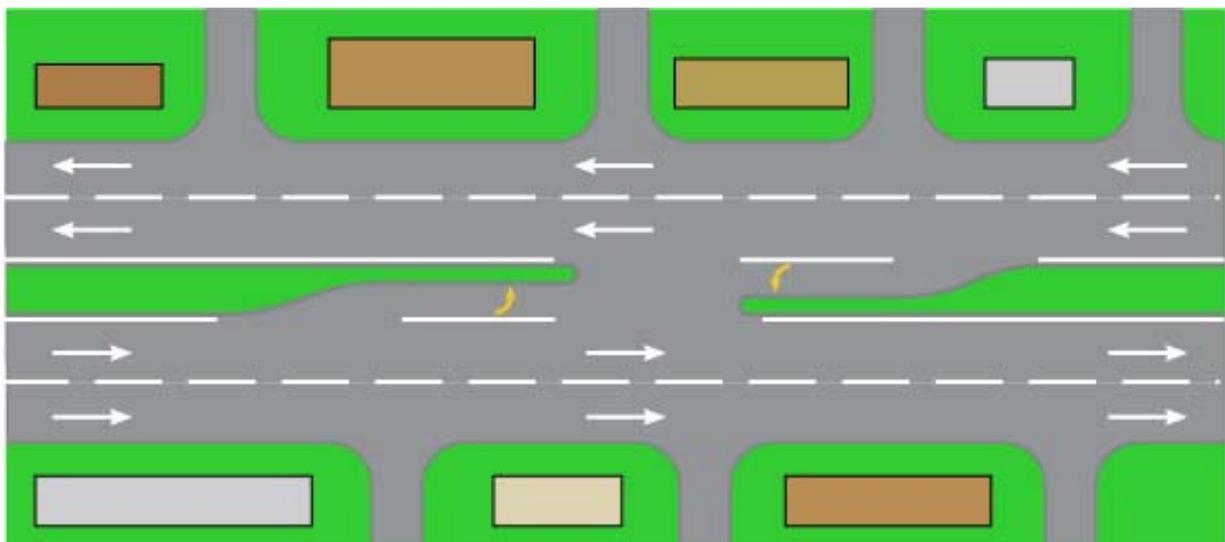
Within Lincoln, the cross-section narrows to a five-lane urban cross-section. Two median treatments were considered: a continuous, two-way, left-turn lane and a raised median. The two-way, left lane is depicted in **Figure II-10**. This type of configuration maximizes access to and from the properties along Route 65.

Figure II-10: Typical Two-Way, Left-Turn Lane Concept (Inside of Lincoln)



A raised median would concentrate access across Route 65 to a number of median openings. All other points of access along Route 65 would be limited to right-in/right-out movements. Traffic approaching from or departing to the opposite direction would be required to turn around at one of the median openings. While this may limit mobility, it would provide more structure to traffic patterns and increase overall safety. The raised median is depicted in **Figure II-11**.

Figure II-11: Raised Median Concept (Inside of Lincoln)



c. Alignments

Outside of Lincoln, the general approach guiding the configuration of reasonable four-lane divided alternatives is to reuse the existing roadway to the maximum extent possible. New lanes would be constructed either east or west of the existing lanes. Typical four-lane divided roadways have identical horizontal and vertical alignments for both sets of travel lanes. For Route 65, however, this would not always be the case because the existing lanes would be left in large part as they are today. While there are many sections of the existing two-lane road alignment that have both horizontal and vertical geometric deficiencies, these deficiencies would be upgraded only where they are linked to a substantive safety problem. The new two lanes would be constructed with improved horizontal and vertical geometry. This consequently results in areas where the horizontal and vertical alignment for the new lanes would be “independent” of those of the existing lanes.

Within Lincoln, three basic horizontal alignment configurations were considered reasonable for the through-town alternatives: widening the existing road to the west, widening symmetrically to both sides of the existing road or widening the existing road to the east. The vertical alignments for any of these configurations would be generally the same.

For the reasonable bypass alternative around Lincoln (LE-1), the alignment would be a completely new facility. Therefore, it would be possible to construct the horizontal and vertical geometry to practical standards of design.

d. Intersections

There are 26 cross-roads that intersect existing Route 65 within the area of the proposed improvements. Twenty-four of these are currently operating as at-grade, two-way, stop-control intersections. The cross-roads serve as the minor road. The other two intersections, Truman Dam Access Road and Highway 7, are grade-separated interchanges with Route 65.

Most of the existing 24 at-grade intersections would remain as two-way, stop-control intersections in the future. Their configurations would be similar for each of the reasonable alternatives, in large part, the same configuration as exists today. Several of the intersections, however, would require significant realignment to improve skewed intersection angles and unsafe sight distances. Among the intersections with the greatest difficulties are those described below:

- **Route HH/Dulaban Road:** This intersection is located in the north section of the project area. It has an existing skew angle of approximately 40 degrees. To improve this intersection, realignment of the existing cross-road geometry is recommended as part of any reasonable alternative. This would likely be accomplished by shifting the intersection slightly north and rotating the angle of intersection closer to perpendicular with Route 65.
- **Route C/Main Street:** Route C/Main Street is the primary east-west route in Lincoln. It has the highest cross-road traffic volumes in Lincoln. In the future, a two-way stop would not be able to control traffic sufficiently through this intersection. While this intersection would not require realignment, it would require a signal or four-way stop to ensure that it can operate safely and efficiently as traffic volumes grow.

- **Route H/Rotermund Avenue:** This intersection is located just south of Lincoln. Like Route HH/Dulaban, it has an undesirable skew angle. This intersection was also identified as a high crash location. To improve the safety and operations at this intersection, realignment of the existing cross-road geometry is recommended as part of any reasonable alternative. This would likely be accomplished by shifting the intersection slightly north and rotating the angle of intersection closer to perpendicular with Route 65.
- **Route T/Poplar Church Road:** This intersection is also located in the south section of the project area. It currently is configured as two separate, closely spaced intersections. This close spacing, combined with the curvilinear Route 65 alignment in this area, causes this location to be high crash area. To improve the safety at this location, realignment of existing Poplar Church Road slightly north to connect directly with Route T is recommended as part of any reasonable alternative. The horizontal and vertical geometry for both directions of travel through this intersection would also be improved as part of any reasonable alternative.

The two grade-separated interchanges at the southern end of the project, Truman Dam Access Road and Route 7, have ramp termini at the cross-road intersections that currently use stop signs on the ramps to control operations on the cross-road. In the future, it is expected that the traffic volumes at these ramp termini would grow to the point where stop control is no longer sufficient. At both of these interchanges, signalized intersections would likely be necessary at both ramp termini to serve the projected traffic safely and efficiently.

e. Transitions at Project Termini

North of the project area, Route 65 exists as a four-lane divided highway. Any reasonable alternative would need to connect to the existing four lanes south of the Route 52/Cole Camp interchange. This would be most easily accomplished with an eastern widening alternative because existing Route 65 is aligned with the westernmost set of lanes to the north.

South of the project area, Route 65 exists as a two-lane divided highway. Connecting to this section of Route 65 would require a transition that narrows from four lanes to two lanes. This transition could most easily be accomplished along the curve between the Highway 7 interchange and the Main Street interchange in Warsaw. Due to the existing configuration of the Highway 7 interchange (as described below), the required transition from four lanes to two lanes would be most easily accomplished with an eastern widening alternative.

f. Interchanges

There are two interchanges within the project limits, both at the south end of the project area. The first is an existing diamond at the crossing of Route 65 and Truman Dam Access Road. The second is an existing diamond at the crossing of Route 65 and Highway 7.

Both of these interchanges would remain as diamond-type interchanges. There is enough distance between the two interchanges to provide safe and efficient access in all directions. An auxiliary lane between the two interchanges would be necessary to ensure safe and efficient weaving between the respective entrance and exit ramps. Turn lanes would be required at the ramp termini to provide adequate cross-road operations. The primary design-related variable associated with these two interchanges is where the new lanes would be built (east or west of the existing lanes). The existing interchange configurations both favor an eastern widening. At

Truman Dam Access Road, Route 65 passes over the cross-road. An embankment has been placed east of the existing bridge in anticipation of a future widening to that side. There is also additional right of way east of the existing lanes where the new lanes could be built. A western widening through the Truman Dam Access Road interchange would be more expensive and have a larger impact footprint. At Highway 7, Route 65 passes under the cross-road. The existing bridge span over Route 65 is long enough to allow two additional lanes to pass under it on the east side of the existing road. Here again, a western widening would result in higher costs and impacts.

g. Cost

The costs estimates generated for the reasonable alternatives are listed below:

North of Lincoln

- Western Widening (NW-1): \$8,100,000
- Eastern Widening (NE-1): \$8,600,000

Lincoln

- Symmetrical Widening (LTC): \$16,700,000
- Eastern Widening (LTE): \$15,200,000
- Western Widening (LTW): \$16,300,000
- Near East Bypass (LE-1): \$14,200,000

South of Lincoln

- Western Widening (SW-1): \$28,700,000
- Eastern Widening (SE-1): \$25,800,000
- Hybrid Widening: \$34,300,000

The goal of this estimate is to compare the relative costs of the reasonable alternatives, rather than to definitively establish the final cost for the project. Based on this estimate, the total estimated construction costs associated with the reasonable alternatives fall within a range where they should be considered equivalent, for comparison purposes.

h. Access Management

Due to the high number of driveways with direct access to Route 65 in Lincoln, access management measures were investigated in an attempt to satisfy more adequately the purpose and need elements of improving roadway safety and improving traffic operations. As highlighted in **Chapter I**, the driveways in this area are contributing to the rear-end crash problem along Route 65 in Lincoln.

The specific access management opportunities investigated to address these issues included driveway elimination, driveway consolidation and driveway relocation. The Missouri Department of Transportation Access Management Guidelines (May 2005) recommend a minimum driveway spacing of 440 feet for a principal arterial in an urban setting. Due to the development that exists, Route 65 through Lincoln was considered to be an urban setting (despite being situated within a rural community). Three approaches were taken during the access management investigation.

The general approach of the first option, option A, was to remove as many driveways as possible without leaving any property owner "landlocked." It was considered acceptable under option A for property owners who currently have access to Route 65 to not have access in the future, provided they have access to one of the Route 65 cross-roads. Under this option, most driveway spacing was at least 300 feet. Most driveways were lined up with the driveways on the opposite side of Route 65. There were no driveways on Route 65 within 350 feet of the intersection with Route C.

The general approach of the second option, option B, was to allow all property owners who currently have access to Route 65 to continue to have access in the future. However, they may have fewer driveways than before or they may have a shared driveway with a neighboring property. In general, the driveway spacing was at least 150 feet, and most were lined up with driveways on the opposite side of Route 65. Under this option, there are driveways within 150 feet of the Route 65 intersection with Route C. However, because there would likely be a raised median on Route 65, along the approach to the Route C intersection, these driveways would likely be right-in/right-out only.

The general approach of the third option, option C, was to maintain access for each individual parcel that currently has access to Route 65. The only shared driveways between parcels are in locations where shared driveways are utilized in the existing condition. Driveways recommended for closure were exclusively in locations where there were multiple driveways for the same parcel. Under this option, there was some driveway spacing of less than 100 feet, and there were several driveways within 150 feet of the Route 65 intersection with Route C. As was the case with option B, these driveways would likely need to be right-in/right-out only.

In summary, option A would provide the safest and most efficient access management system, but it would have a significant impact on access to local businesses. Option C would provide a system very similar to the existing configuration. This would serve the abutting land uses well, but it would do the least to improve safety and operations. Option B represents a balance between A and C. It offers the best balance between the competing forces along the corridor. As a result, the access management measures shown for option B are recommended to be utilized as part of any through-town alternative. Please refer to **Exhibit II-4** for a depiction of the specific driveway closures, consolidations, and relocations proposed for any through-town alternative.

2. Important Environmental Elements Associated with the Reasonable Alternatives

As part of the analysis of the reasonable range of alternatives, additional environmental studies were conducted. This allowed for a refinement of impacts and the development of the selected alternative. The important environmental elements that emerged from the engineering analysis of the reasonable alternatives are discussed below.

a. Section 4(f)

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 limits FHWA participation in projects that adversely impact publicly owned park and recreation lands, wildlife and waterfowl refuges and historic sites. The Secretary of Transportation may only approve projects requiring the use of these lands if there is no feasible and prudent alternative to the use and the project includes all planning to minimize harm.

Relative to publicly owned park and recreation lands, there are several properties that contain characteristics similar to those of a Section 4(f) resource. These resources include the Lincoln School Playground, the Mike Hare Memorial Ball Field, the Rock Hill Prairie, the Truman Reservoir and the Lost Valley Fish Hatchery. It has been determined that Section 4(f) is not an issue for any of these resources. The Rock Hill Prairie is not a publicly owned facility. The Lincoln School Playground and the Mike Hare Memorial Ball Field can be avoided; therefore Section 4(f) is not an issue for those resources. The Truman Reservoir and the Lost Valley Fish Hatchery lie immediately adjacent to Route 65, but Section 4(f) does not apply because the primary use of the property immediately adjacent to Route 65 is not recreational or refuge-related, and the recreation that does occur is not a significant element of the area's purpose (see **Chapters III.B.4.c, III.C.15, IV.B.16 and V.B.4.a** for more information regarding public lands).

Nevertheless, impact minimization was implemented to the extent possible. This includes coordination with the agencies that administer these resources. The management concerns of these groups were included in the decision-making process. For example, the administrator of the Rock Hill Prairie (The Nature Conservancy) was concerned about impacts to Mead's milkweed including drainage alterations, direct property acquisition and construction encroachments (see **Exhibit II-2D**). The administrators of the Truman Reservoir (ACOE) were also concerned about drainage, but also about impacts to the dam embankment and access to the Sterett Creek Recreation Area. The administrators of the Lost Valley Fish Hatchery (Missouri Department of Conservation) were concerned with impacts to the existing wells and well sheds that exist along Route 65 (see **Exhibit II-2D**).

b. Displacements

Development along Route 65 is generally sparse, with the exception of areas associated with Lincoln and Warsaw. Further, the establishment of the reasonable range of alternatives was organized to minimize displacements. Consequently, displacements among the reasonable range of alternatives are relatively low. Differentiators regarding displacements include the following:

- **Avoiding the Widening of Route 65 to the West, North of Lincoln.** In this area, the existing/pending roadside developments are demonstrably denser on the west side of Route 65.
- **Using a Symmetrical Curb-and-Gutter Configuration within Lincoln.** This roadway configuration minimizes the project's footprint and displacements. Preliminary investigations indicate that enclosed drainage is technically feasible⁵.
- **Using a Bypass of Lincoln Does Not Eliminate Displacements.** Displacements occur at the intersections with the major roadways. The bypasses also separate agricultural parcels.
- **Using a Hybrid Widening, South of Lincoln Can Somewhat Reduce Displacement Impacts.** A hybrid configuration allows for substantial improvement to challenging roadway conditions. As a secondary factor, displacements are reduced overall.

c. Socio-Economic

The primary socio-economic issue associated with the reasonable range of alternatives is the consequence of a bypass of Lincoln. The community has consistently held that a bypass of Lincoln is counter to their interests. Lincoln has proactively undertaken ways to improve Route 65 as Lincoln's primary economic corridor. It seems clear that a bypass would work counter to those actions.

d. Endangered Species

The U.S. Fish and Wildlife Service (USFWS) has documented the presence of six federally listed species within Benton County. Mead's milkweed is the most pressing concern relative to project-related decision-making. It is known to exist within the Rock Hill Prairie. The Rock Hill Prairie is located in the southeast quadrant of the Route 65/Route BB intersection. Coordination with The Nature Conservancy, the Missouri Department of Conservation and the USFWS has been conducted throughout the project in an effort to identify potential issues and to minimize impacts. This coordination has concluded that avoidance of the property would safeguard the sensitive habitat. The project team has committed to avoiding impacts to the Rock Hill Prairie.

e. Hazardous Materials

The potential interaction of the project with hazardous materials sites appears roughly equivalent among the reasonable alternatives. Only two sites were identified in proximity to the reasonable alternatives that would require further site assessment. All alternatives would be equally affected by any contamination present at these sites. The first site is Kreisler's Auto

⁵ Roadway drainage in Lincoln is discharged into the Timber Line Lake. The elevation difference between Route 65 and the receiving water is relatively small. This limits the flexibility in the design of an enclosed drainage system. If an enclosed drainage system cannot be designed, an open drainage alternative would be required.

Within the reasonable range of alternatives, there are two open drainage alternatives through Lincoln. These include a widening entirely on the west side of the road and another entirely on the east side of the road. A symmetrical widening with open drainage was eliminated during the initial range of alternatives stage because of the higher number of displacements (on both sides of Route 65) and because of the project's disruptions would affect the entire streetscape of Lincoln. **Chapter II.B.2** summarizes the evaluation of the initial range of alternatives.

Sales, just south of Route H. The second site of concern is Bobby's Towing and Tire, located north of Fordney Road in Lincoln.

f. Secondary Impacts

Secondary and cumulative impacts occur outside the highway right of way and are generated as a result of changes in development patterns. Secondary or cumulative impacts may also be the unintended consequences of roadway improvements. Impacts may include increases in traffic volumes outside the study corridor; changes in population, housing, employment, and tax base or other land use changes. Any bypass of Lincoln would result in secondary impacts. The impact of a bypass to the current downtown businesses would be economically undesirable given that many potential customers would be redirected around town. On the other hand, the potential for new development and businesses along a bypass could be economically desirable. The strong and nearly universal opposition suggests, however, that the secondary impacts associated with a bypass of Lincoln would be overwhelmingly undesirable.

g. Cultural Resources

Cultural resources can include archaeological sites, buildings, structures, bridges, districts and cultural landscapes. According to the criteria in the National Historic Preservation Act (NHPA), significant sites or properties are those that possess integrity of location, design, setting, materials, workmanship, feeling and association. Properties considered significant according to these criteria are eligible for listing on the National Register of Historic Places (NRHP). Planning for federally funded, licensed or permitted projects must consider impacts to properties listed on or determined eligible for listing on the NRHP to be in compliance with the NHPA and NEPA. At the reasonable range of alternatives stage, cultural resource investigations included literature reviews and field evaluations to identify potentially NRHP-eligible architectural resources and literature reviews for archaeological resources. The progress of these studies and the locations of any potentially eligible sites were closely monitored. Ultimately, no NRHP properties are associated with the reasonable range of alternatives.

3. Important Agency Coordination/Public Involvement Elements Associated with the Reasonable Alternatives

Agency coordination and public involvement activities have occurred throughout the entirety of this project. This section discusses some of the important activities that influenced the evaluation of the reasonable range of alternatives.

a. Public Input

The two most significant public involvement events that dealt specifically with the reasonable range of alternatives were meetings with the Benton County Corporation and the project's second public involvement meeting.

On May 9, 2006, the project team made a presentation to the Benton County Corporation. The Corporation is comprised of business owners and political figures interested in the transportation issues affecting Benton County. The reasonable range of alternatives was discussed, general project updates were made and questions were answered. Support for the project was high. Recognition of the project development issues discussed in **Chapter II.2** was acknowledged. Support for improving Route 65 through Lincoln was stressed. Overall, this

group of community boosters supports the project and desire to see it built as quickly as possible.

On May 24, 2006, a second general public involvement meeting was held. Like the first public involvement meeting, this meeting was extremely well-attended. The high level of public interest reinforced that the public viewed the improvement of Route 65 as essential. Just as with the community boosters, the public viewed a bypass of Lincoln as unwise. Overall, the public seemed to appreciate the impact minimization that the project team incorporated in the decision-making process and encouraged the timely completion of the project.

b. Agency Coordination

One of the first outreach efforts conducted for the Route 65 project was an agency scoping meeting⁶. The nature of future outreach efforts to the agencies was largely based on the concerns expressed at the scoping meeting. During the analysis of the reasonable range of alternatives, agency coordination included the following:

- Onsite meetings with the Army Corps of Engineers to discuss the primary use of the areas adjacent to Route 65 and to discuss the project-related concerns regarding the Truman Reservoir.
- On-going conversations between MoDOT, the MDC and the USFWS regarding endangered species impacts – especially the Mead's milkweed.
- Follow-up with the United States Department of Agriculture (Natural Resources Conservation Service [NRCS] and Benton County Soil and Water Conservation District). Among the coordination issues were the Farmland Protection Policy Act, the Conservation Reserve Program, the Wetland Reserve Program and the Grassland Reserve Program.
- On-going conversations with the MDC regarding impacts to the Lost Valley Fish Hatchery.

c. Property Owner Coordination

In addition to the public involvement meetings discussed above, there have been several other direct outreach efforts to property owners in the study area. These include the distribution of project newsletters, outreach to the various media outlets covering the area and letters discussing the project and requesting authorization to conduct on-the-ground field surveys. These efforts provided property owners with direct access to the project team. This access is an opportunity for property owner concerns to be addressed.

One unique property owner is The Nature Conservancy. They own and manage the Rock Hill Prairie. Located in the southeastern quadrant of the Route 65/Route BB intersection, this property is managed as a private nature preserve. An on-going series of conversations with the Director of Stewardship for The Nature Conservancy has been held to discuss impacts to the

⁶ Invitations were sent to the Natural Resource Conservation Service (NRCS), the U.S. Fish and Wildlife Service (USFWS), the State Emergency Management Agency (SEMA), the Missouri Department of Conservation (MDC), the Missouri Department of Natural Resources (MDNR), the U.S. Army Corps of Engineers (ACOE) and the U.S. Environmental Protection Agency (USEPA). Held on February 6, 2006, the meeting was attended by FHWA, MoDOT, MDC and USEPA.

Rock Hill Prairie. Among the concerns that have emerged from these conversations included direct impacts, construction-related encroachments and drainage alterations.

4. Conclusions of Reasonable Range Evaluation

Based on the work done in the reasonable range phase, it was possible that, on its own, no individual alternative was optimal. The preferred alternative in any section could be a hybrid, that is, a combination and modification of the alternatives previously discussed. This is certainly true in the long, south section of the project area.

The important conclusions of the reasonable range evaluation include the following:

- **Higher Number of Displacements for NW-1 vs. NE-1:** The west side of Route 65 in the north section has a substantially higher density of residential structures. Alternative NW-1, and therefore, would result in a substantially higher number of displacements than Alternative NE-1.
- **Overwhelming Public Support for Through-Lincoln Alternatives:** Comments received to date have overwhelmingly supported a through-town alternative in the Lincoln section. The public opposes any bypass of the city. The study team received more than 300 written comments opposed to any bypass of Lincoln. Furthermore, the most favorable through-town alternative is a symmetric widening with enclosed drainage and TWLTL.
- **Mead's Milkweed Areas in South Section on East Side of Route 65:** The cluster of sensitive Mead's milkweed habitat on the east side of Route 65 must be avoided, rendering an eastern widening impractical through this area.
- **Design Issues in the Route T/Poplar Church Area:** In this area, several troublesome design issues converge: difficult curves, poor sight lines and closely spaced intersections. Additionally, a group of nearby residential structures was being investigated for their cultural significance⁷. In order to create a suitable alignment, substantial design effort would be required.
- **Southern Interchanges Favor Eastern Widening at Warsaw:** The nature of the existing interchanges at Truman Dam Access Road and at Highway 7 favor Alternative SE-1 in this area.

⁷ Ultimately, the Karr Farmstead was determined not to be eligible for the National Register of Historic Places.

D. Selected Alternative

Based on all of the work conducted within the Route 65 corridor, a selected alternative has been identified. The selected alternative was identified through public involvement and assessment of socio-economic and environmental consequences. The project team believes that this alternative satisfies the project's purpose and need, minimizes environmental impacts (eliminates all avoidable significant impacts) and, overall, best balances the costs and benefits of project development. This section would describe the selected alternative and examine the key data associated with its identification. The selected alternative is shown in **Exhibits II-3A–J**.

The process that led to the recommendation of the selected alternative included the evaluation of impacts. The impact analysis included right-of-way impacts, environmental impacts, community impacts, displacement impacts and engineering impacts. Among the important engineering evaluations were investigations of construction staging and maintenance of traffic. **Chapter IV** summarizes the impact analysis of the reasonable range of alternatives and the selected alternative. Based on updated estimates, the total construction cost for the selected alternative is approximately \$52 million. **Chapter V** presents a summary of the project's public involvement plan, including the response to comments associated with the information circulated in the DEA.

The selected alternative consists of the following elements.

1. Selected Alternative – North of Lincoln

Within the northern section of the corridor (from the northern terminus to the outskirts of Lincoln⁸), the selected alternative would construct two additional lanes and a median to the east of the existing lanes. This would reconfigure existing Route 65 as a four-lane facility (two lanes north-bound/two lanes south-bound) with a 60-foot-wide depressed median separating the north-bound and south-bound travel lanes. The existing lanes would be repurposed as the south-bound lanes. **Figure II-12** depicts a typical cross-section for the selected alternative, north of Lincoln. All existing intersections would be retained and improved.



At the end of the reasonable range of alternatives stage, a **preferred alternative** was identified and discussed in a Draft Environmental Assessment (DEA) circulated in February 2007. Based on public input, agency coordination and internal analysis, the selected alternative was identified. The **selected alternative** is discussed throughout this document.

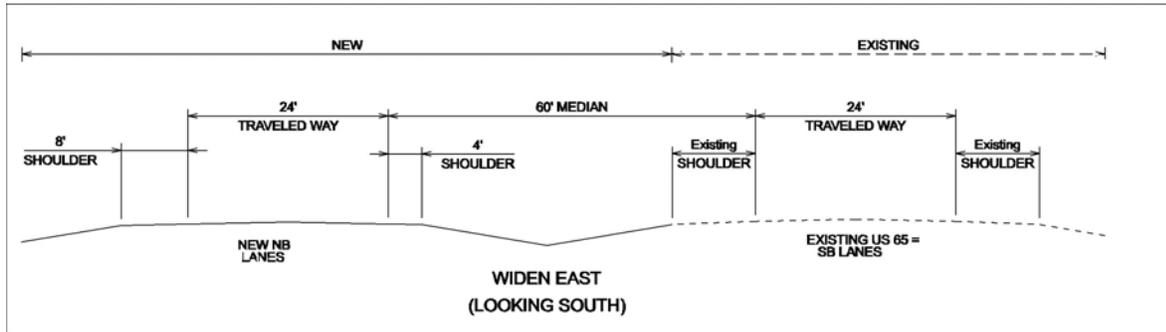
The selected alternative has been updated in minor, but important ways, from the preferred alternative described in the DEA.

The selected alternative is shown in **Exhibits II-3A–J**.

A detailed description of how the selected alternative described in this document differs from the alternative presented in the DEA is presented in **Chapter II.D.4**

⁸ Approximately Frisch Road.

Figure II-12: Typical Section – Eastern Widening



2. Selected Alternative – Lincoln Section

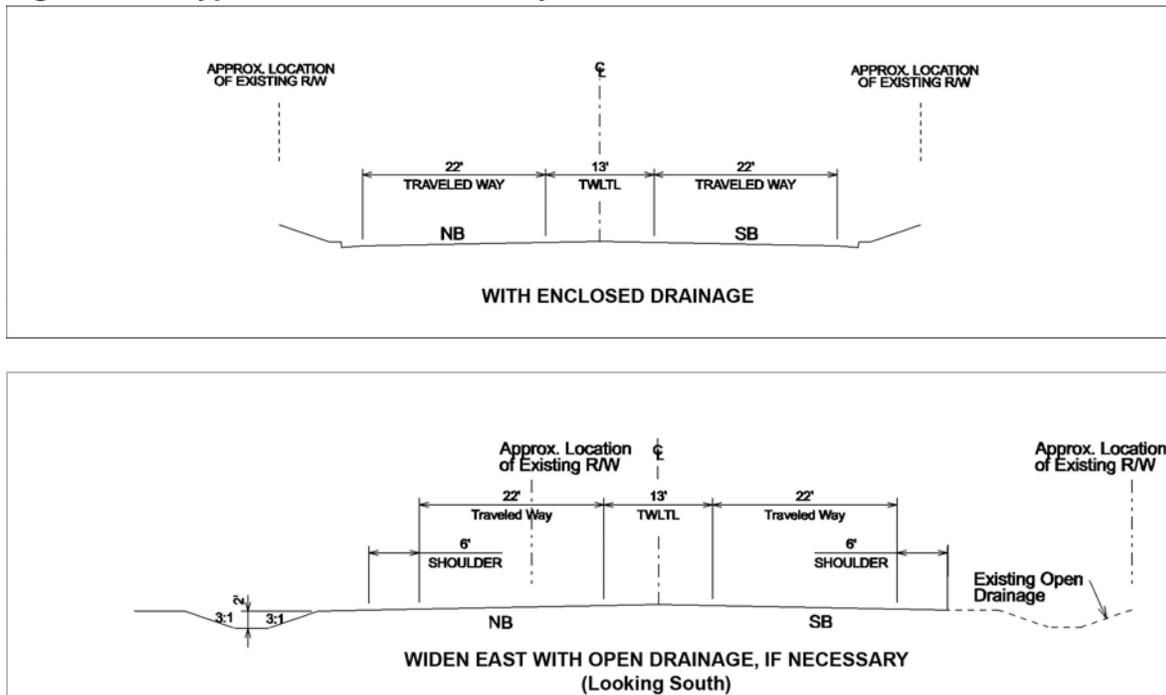
Through the Lincoln section of the corridor (from Frisch Road to approximately 1,800 feet south of Route C), the selected alternative would convert Route 65 to a five-lane, urban cross-section. The existing roadway would be symmetrically widened to a five-lane facility with two south-bound and two north-bound lanes. These would be separated by a TWLTL. The existing roadside ditches would be replaced by a curb-and-gutter drainage system.

The selected alternative through Lincoln was predicated on the feasibility of an enclosed drainage system. If an enclosed drainage system cannot be designed, an open ditch drainage alternative with widening to the east would be the selected alternative. This alternative would configure Route 65 as a five-lane, undivided, urban cross-section with open drainage. This alternative was favored over the open ditch drainage alternative with widening to the west due to the determination that the eastern widening would minimize community impacts. Additionally, it was concluded that the eastern widening that would be most amenable to engineering solutions that could avoid the displacement impacts expected to occur as a result of the larger footprint required by the open drainage configuration.

Figure II-13 depicts a typical cross-section for the selected alternative within Lincoln (enclosed drainage) and a typical cross-section for an eastern open ditch drainage configuration, if necessary. All existing intersections would be retained. Locations of curb cuts/driveways are discussed in **Chapter II.C.1.h** and shown on **Exhibit II-4**. There would be no parking along Route 65 through Lincoln.



The selected alternative through Lincoln is predicated on the feasibility of an enclosed drainage system. If an enclosed drainage system cannot be designed, an eastern open ditch drainage alternative (with a widening to the east) would be the selected alternative. This alternative would configure Route 65 as a five-lane, undivided, urban cross-section with open drainage. The other aspects of the selected alternative would remain unchanged. **Exhibit IV-1Da** depicts the configuration of the open ditch drainage alternative through Lincoln and **Table S-2** presents an impact summary for the version of the selected alternative using an open drainage system.

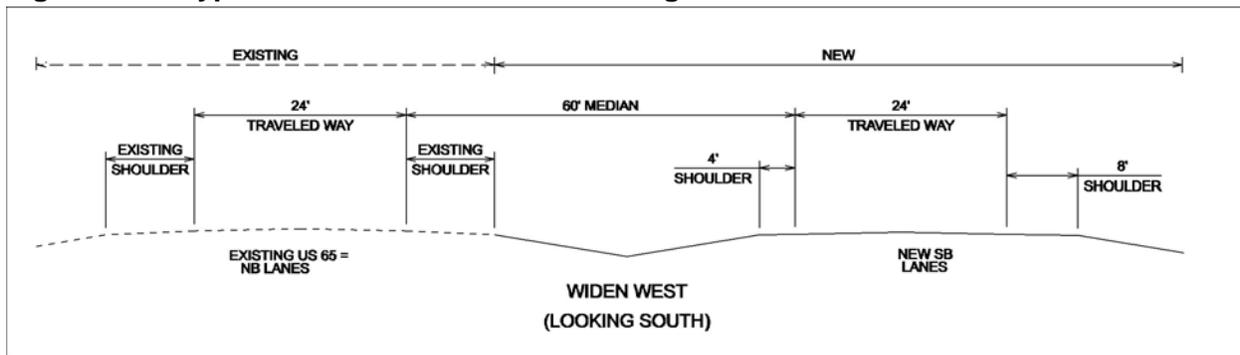
Figure II-13: Typical Section – Two-Way, Left-Turn Lane

3. Selected Alternative – South of Lincoln

The selected alternative for the southern portion of the corridor would reconfigure existing Route 65 as a four-lane facility (two lanes north-bound/two lanes south-bound) with a 60-foot-wide depressed median separating the north-bound and south-bound travel lanes. Several transitions would be used to switch between an eastern widening and a western widening. The existing lanes would be repurposed as either the north-bound or south-bound lanes, as applicable.

Immediately south of Lincoln, the selected alternative would be an eastern widening. See **Figure II-12** for a typical eastern widening cross-section. The eastern widening would continue until approximately Drenon Road. Between Drenon and Meyer Roads, the selected alternative would transition to the west; both the north-bound and south-bound lanes would be on new alignment in this segment. South of Meyer Road, the selected alternative would be a western widening. See **Figure II-14** for a typical western widening cross-section. The western widening would continue until approximately Route T. In this area, the Poplar Church Road intersection with Route 65 would be relocated to be directly opposite the Route T intersection with Route 65, and the alignment would transition to an eastern widening. This is a relatively short transition (roughly 3,000 feet), switching back to a western widening starting at Marina Road and continuing along the entire Truman Lake frontage. Route 65 was originally constructed in this area assuming a future western realignment, and the roadside overhead lines were placed to account for a western widening. The selected alternative avoids any significant disruptions to the Truman Lake. From here until the southern terminus, the selected alternative would be an eastern widening. Auxiliary lanes would be constructed between the Truman Dam Access Road and Route 7 interchanges, which would improve the very short merging distances at the existing ramps. Roadwork would be completed just short of the Main Street interchange.

Figure II-14: Typical Section – Western Widening



4. Selected Alternative – Refinements from DEA Version

Following the circulation of the DEA, several coordination activities were undertaken. Among these coordination activities included a Public Hearing and a Value Engineering (VE) investigation. The Public Hearing was held on March 14, 2007. Details of the Public Hearing are presented in **Chapter V**. The VE session was held in April 2007. A VE session is intended to examine a project and determine whether the selected alternative is designed as efficiently as possible. The process brings together a set of engineers not involved in the project. These engineers examine the plans with the help of the project team. They concentrate on those elements that could result in cost savings.

Based on this coordination, the preferred alternative presented in the DEA was updated in minor, but important ways. These refinements are identified here. They are also denoted with text flags on **Exhibits II-3A–J**⁹. The refinements include the following:

- 1) A right-in/right-out access point was added to the auto garage at the northwest corner of C highway and 65 (Philips 66). The new driveway provides access to C highway (from the west end of the lot).
- 2) Driveway access to the relocated Jenny Lane (for the adjacent properties) was made explicit.
- 3) A dedicated driveway (from Route 65) to Lincoln Medical Clinic (15754 Route 65) was provided. Due to volume and emergency vehicle usage, the dedicated driveway was deemed reasonable.
- 4) The Bullseye Gasoline Station (southeastern corner of Route 65 and Route C) is one of the largest businesses along the Benton County portion of Route 65. Currently, uncontrolled access exists along both Route C and Route 65. The DEA proposed a single driveway from Route C (at the eastern end of the property) and two driveways along 65 on either side of Shelter Insurance. The existing access points nearest to the intersection were eliminated. Based on lengthy discussions with the operator, an additional driveway was provided along Route 65, the driveway opposite Osage Street would now allow left turns and the Route C driveway relocated to the west – to the extent possible.

⁹ Because many of the revisions are related to access management, they are best viewed on **Exhibit II-4**.

- 5) The five-lane section (north of Lincoln) was extended 200 feet so that two existing homesteads would have safer/improved access.
- 6) Pursuant to a MoDOT Value Engineering session, the roadway design would incorporate a reduction (in the outside shoulder width to eight feet). This applies to the four-lane sections of the configuration. Within the five-lane sections, a two-foot reduction in typical section would also be incorporated.
- 7) Pursuant to the Value Engineering session, a compressed median would be investigated in the hilly areas near the southern termini during the final design.