4.0 ALTERNATIVE CORRIDOR SCREENING & EVALUATION

This chapter describes the process used to examine and prioritize transportation options that would achieve the study goal to improve existing and anticipated future regional and local north-south travel, with particular emphasis on the area south of the James River Freeway. Through an inclusive process that balances a variety of viewpoints, interests, and regulatory requirements, the alternatives evaluation should also reflect community values and maintain or enhance the social, economic, environmental, and safety conditions in the area.

4.1 Anticipated Future Year Conditions

In addition to addressing existing transportation needs, this study considered strategies to respond to anticipated future population and employment growth. The OTO prepares and maintains future growth forecasts for the Springfield area. The growth forecasts were developed based upon predicted socio-economic growth between the years 2000 and 2030. The growth rates between 1990 and 2000 were extrapolated for the 2030 horizon year, and then reviewed for rationality by the OTO and Olsson/CJW staff for the included cities. Individual areas were reviewed for anticipated development potential and the likelihood of future development type. Following this review, the respective totals for metropolitan dwelling units, retail employment, and non-retail employment were determined. These socio-economic growth forecasts were then input into a transportation model to project future traffic flow.

A summary of the metropolitan area growth totals is displayed in **Table 4.1**.

Table 4.1 Comparison of Socioeconomic Data

Variable	2000	2030	% Growth
Population	257,743	501,726	95 %
Households	104,422	205,837	97 %
Retail Employment	22,544	48,997	117 %
Other Employment	137,663	290,043	111 %
Total Employment	160,207	339,040	112 %

Year 2030 traffic projections were prepared using a travel demand model that has been developed for use by the OTO. These models use the socio-economic forecasts to predict number of trips and the routes used for these trips. The model represents roadway network attributes, which are attached to links and nodes that represent roads and intersections, or other major changes in geometry. After processing the socioeconomic data and network information, the travel demand model produces traffic volume forecasts on the roadway network.

No Build Alternative
The No Build Alternative represents conditions that would exist in the future if no new transportation projects are constructed or implemented. The No Build Alternative includes the existing streets and lane widths, as well as projects that are currently programmed, funded and planned to begin construction within the next five years. From the volume forecasts, roadways can be identified where high traffic volumes result in traffic congestion and travel delay. The year 2030 forecast results show that with the existing plus committed roadway network, regional growth -- particularly growth in the southern portion of the region -- will lead to congested roadway conditions on the north–south corridors. The congested roadways are identified in **Figure 4.1**.

Projected growth in the area south of the James River Freeway results in higher traffic volumes and slower travel times. Both the existing conditions analysis and the future analysis indicate limitations with the connectivity of areas south of the James River with the rest of the metropolitan area. Given the assumptions of future growth developed by the OTO and used in the Long Range Transportation Plan, the traffic model shows, for the forecast year of 2030, that the travel demand on north-south roadways at the James River would increase as shown in **Table 4.2** and would be approximately 70,000 trips over the available capacity. The two crossings within the study area at the James River are limited to U.S. 160 and Cox Road. Cox Road is a two-lane secondary arterial. This level of demand does not include volumes on U.S. 65, which is also forecast to experience traffic congestion. Thus, additional transportation strategies are needed within the four corridors under study, even if U.S. 65 is widened.

Table 4.2 Comparison Future No Build with Current Conditions (South of James River Freeway)

Variable	2000	2030	% Growth
Volumes at James River	37,470	112,800	248%
Roadway Capacity at James River	37,200	37,200	0%
Peak Travel Time (minutes) between Republic Road and Route 14 (6.6 miles)	16.3	56.4	250%
Average Peak Speed (m.p.h.)	24.2	6.9	-71%

In the northern region of the OTO, the City of Willard is connected to the metropolitan area by U.S. 160. Traffic growth will limit mobility from Willard on U.S. 160 north of Springfield. The projected traffic increase and resulting increase in travel time on U.S. 160 between I-44 and the City of Willard is shown in **Table 4.3.** A second location of concern in the northern portion of the OTO area is in the vicinity of the interchange of Highway 13 and I-44. Highway 13 is currently being upgraded to a freeway/expressway between Springfield and Kansas City. The existing diamond interchange, frontage roads and driveways are not consistent with this type of roadway and result in congestion and safety considerations.

Faster growing suburban areas located south of the James River Freeway and north of I-44 have limited arterial networks to accommodate growing traffic volumes. For the southern area, the topography and floodway of the James River is a costly and complex constraint to adding additional roadway network.

Table 4.3 Comparison Future No Build with Current Conditions (U.S. 160 North)

Variable	2000	2030	% Growth
Volume on U.S. 160 South of Willard	14,040	24,200	72%
Roadway Capacity of U.S. 160	13,600	13,600	0%
Peak Travel Time (minutes) From Willey St. in Willard to I-44 (6.4 miles)	14.5	24.6	70 %
Average Peak Speed (m.p.h.)	26.6	15.6	-41%

There could be numerous ramifications beyond increased travel time if mobility problems are not addressed. These ramifications could include impacts on property values, limitations to residential growth, and limitations to commercial attractiveness, and further implications on tax revenues that might be collected if growth were not constrained by lack of mobility in these locations. Transportation mobility is one important factor individuals consider in locating residences or commercial developments in an area. However, there are other factors as well. It is likely that the economic trends of growth in the areas south of the James River Freeway and in Willard will continue with or without transportation mobility enhancements, but possibly at a slower rate. Improving mobility will support access to the Springfield-Branson National Airport, potentially minimize traffic growth on U.S. 65, and provide alternatives for traffic traveling through the Springfield area.

Evaluating Transportation Options

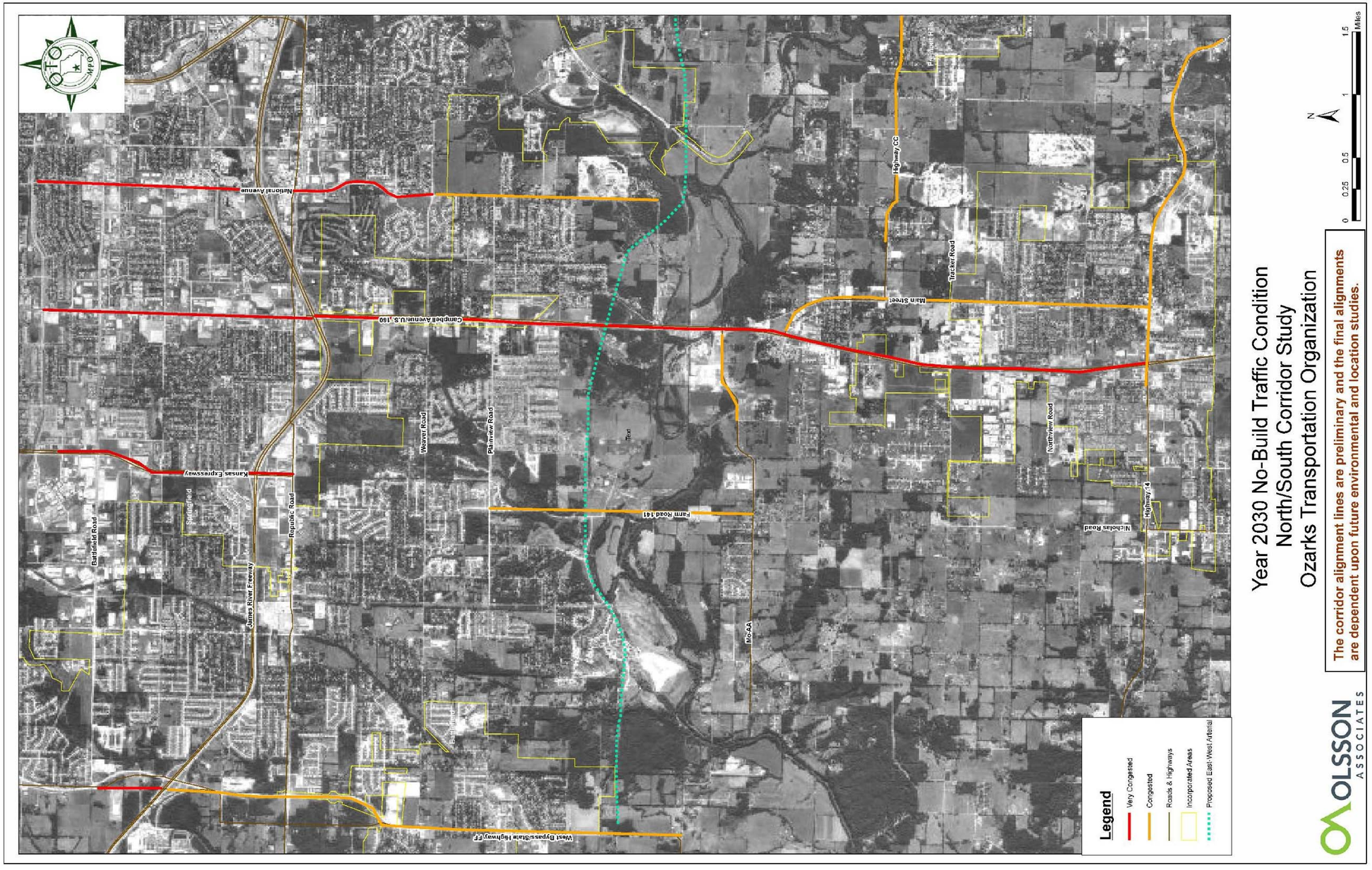
Throughout the remainder of this chapter, different transportation strategies and alternatives will be assessed that could potentially improve travel on the north–south corridors considered in this study. Following the assessment of existing conditions and baseline future conditions, the next step was to develop a process that would be used to evaluate potential transportation strategies and alternatives that would address the identified needs. The evaluation process developed for this study was based upon developing measurements of alternatives to meet study goals as described in Section 1.3 of this report. The evaluation process described was developed with the input of the project Steering Committee.

A three-phase process was used to identify transportation priorities. The process included:

1) A wide range of potential transportation strategies were examined in order to determine the alternatives that were most promising to address study goals.
2) Based on this initial screening, more defined transportation alternatives were developed and evaluated.
3) The most promising alternatives were refined in order to develop the study recommendations.

This evaluation process is described in the following sections.

Figure 4.1 Future Year No-Build Congestion



4.2 Initial Transportation Strategies

The transportation strategies investigated in this study follow the approach endorsed by the Federal Highway Administration as reflected in the OTO Congestion Management System (CMS). This approach is also consistent with the National Environmental Protection Act (NEPA) process. The CMS process includes the following steps:

1) A transportation-system-wide analysis was completed which documents the level of congestion on the north-south arterials.

2) Strategies that evaluate congestion resolution are to be investigated in priority order:

1. Eliminate person trips or vehicle miles of travel;
2. Shift trips from the auto mode to other modes;
3. Shift trips from single occupant auto to multiple occupant vehicles;
4. Improve roadway operations; and
5. Add capacity.

The following initial strategy listing reflects the CMS process and is described as stated in the Long Range Transportation Plan (LRTP).

Travel Demand Management
Travel Demand Management (TDM) strategies focus on ways to minimize the number of vehicle trips. These strategies include offering incentives for using transit or carpooling, encouraging flexible work hours to decrease peak hour travel, or promoting mixed land uses that allow people to live within walking distance of work and other activities. The LRTP describes a number of specific TDM strategies that can be considered.

Transit Service Options
These are strategies to increase the passenger-carrying capacity of transit and transit travel speed, to improve service frequency, and to provide passenger amenities, all which may lead to increased transit use. Such options may include more frequent fixed route transit service and bus rapid transit service.

Example of Bus Rapid Transit


Example of Bus Rapid Transit

High Occupancy Vehicle Lanes

High Occupancy Vehicle (HOV) lanes could be constructed on U.S. 160 for use by transit vehicles or carpool and vanpool vehicles.

Example of HOV lane on a Freeway- could also be used for Arterial

Transportation System Management
Transportation System Management (TSM) provides cost-effective ways of maximizing the capacity of the existing street and highway system. These strategies are defined in the OTO LRTP and typically include strategically placed turning lanes, signal coordination programs, eliminating left turns, or minimizing roadway access points. A set of projects could be completed on existing north-south arterials that would lead to reduced travel delays.

Intelligent Transportation Systems
Intelligent Transportation Systems (ITS) is a type of TSM that focuses on how to get more from the existing transportation system, typically by providing route congestion information and other technology-based transportation solutions. The ITS in the OTO region could be extended to include signals along U.S. 160 south of Plainview Road.


Traffic Operations Center in Springfield

Land Use Planning and Site Requirements
Many suburban areas around the country are re-evaluating how local streets are planned in order to promote shorter distance trips that can be made without accessing the arterial street system. Another key strategy is to provide sidewalks to promote non-vehicular travel.

Some suburban areas are returning to street design concepts used in urban areas that promote neighborhood connections and a good walking environment. Other strategies include zoning classifications that promote mixed land uses and street standards that limit access connections of driveways and minor streets with arterial streets.

Access management along Arterial

Increasing Road Capacity
This strategy addresses traffic congestion problems by adding travel lanes to existing streets and highways, or by constructing new roadways. The widening of U.S. 65 from four to six lanes is assumed in this study. The purpose of analyzing road capacity is to determine priorities for the north-south oriented arterial corridors listed below. In the North-South Corridor Study, seven capacity projects were initially considered:

- U.S. 160/West Bypass/State Highway FF: Construct new sections of four-lane roadway extending south of Highway 14.
- Missouri Highway 13/Kansas Expressway: Construct new sections of four-lane roadway from Republic Road extending south to Highway 14.
- Campbell Avenue/U.S. 160: Widen sections of U.S. 160 to six lanes south of the James River Freeway to Highway 14.
- National Avenue - Construct new sections of four-lane roadway extending south to Highway 14.
- New Alignment west of U.S. 160/West Bypass – Construct, to freeway/expressway standards, a new roadway that would function as the new western outer loop. The loop would extend from Highway 13 to I-44 west of the airport, continue south as part of the James River Freeway and then be constructed as extend south of the James River Freeway to connect to Highway 14.
- Highway 13: Construct a new freeway connection for Highway 13 north of I-44 with a system-to-system interchange with I-44 or connect with the West By-pass.
- U.S. 160 widening north of I-44: Widen U.S. 160 to four lanes north of I-44 to Willard.

4.3 Analysis of Strategies

U.S. 160 south of the James River Freeway is congested today and is forecast to be highly congested in the future. The CMS Plan suggests that specific emphasis be given to improving roadway operations. Given the high level of forecasted traffic volume on U.S. 160, build strategies are anticipated to be needed in order to maintain a desired level of mobility between the southern area of the OTO region and the area north of the James River Freeway.

Improved and extended transit services could contribute to improved mobility in the southern area of the OTO region. Currently, fixed route transit service is limited to the area within the City of Springfield and is provided by City Utilities. Improved transit service may contribute to small improvements in traffic operations by moving greater numbers of people in fewer vehicles. Transit service would provide transportation options to households with limited access to private vehicles and a choice to riders who would prefer to use public transportation rather than drive their personal vehicle. Improvement in transit services including improved transit shelters, travel information, transit signal pre-emption, and increased frequency, leading to higher transit ridership. Extended public transit service would require funding by communities located outside the City of Springfield. New service provided outside the City would likely need to be contracted with City Utilities or organized as part of a regional transit organization.

TSM strategies have previously been used successfully to improve traffic flow. As reported in the CMS, many geometric improvements have been completed on the arterial street system; signalization improvements included re-timing, actuation, and progression for the West Bypass and Kansas Expressway. A list of types of geometric improvements to be included in future transportation programs and plans is included in the appendix.

TDM, which involves shifting trips for single occupant automobiles to higher occupant autos/vans, are being addressed by an expanded Rideshare and Employer Outreach Program. Specific strategies included in the OTO Unified Work Program include employer trip-reduction strategies, improved/increased park-n-ride facilities, rideshare matching services, vanpool/employer shuttle service, and employer flextime programs. All of these strategies contribute to improved travel options and may lead to reduction of traffic congestion.

Given the high level of traffic demands forecasted, with only build strategies the arterial system will not function efficiently unless there is a balance of land use strategies and roadway capacity. In order to best accommodate the land use growth envisioned for the study, corridor project site plans, subdivision plans, and access plans will need to provide for walking trips and shorter-distance connections that can be made without traveling on arterial streets.

The review of existing conditions and growth forecasts indicate that even with the full implementation of transit, TSM, TDM and land use planning strategies, additional roadway capacity will also be needed in order to maintain an acceptable level of travel mobility. The remainder of this chapter will focus on the analysis and comparison of the build alternatives under consideration. The new alignment west of U.S. 160/West Bypass was not pursued further in this study as this is viewed as a project with a longer term horizon than the other projects under consideration in this study. Efforts to integrate transit, TSM, TDM, and land use strategies with these build alternatives should be made to support the overall transportation system performance.

4.4 Description of Build Alternatives

Following provides a more detailed description of the build alternatives examined as part of this study that were considered in addition to non-build transportation strategies described in the previous section. The alignments shown are preliminary and more detailed route alignment studies would need to be completed to provide a more exact alignment location. The build alternatives located in the south portion of the OTO area are shown in **Figure 4-2**. The build alternatives located in the north portion of the OTO region are shown in **Figure 4-3**.

West Bypass/State Highway FF
The West Bypass is part of U.S. 160 north of the James River Freeway. South of the freeway, this route is designated as Highway FF. Highway FF is a four-lane expressway south from James River Freeway to south of Republic Road. As part of this alternative, , the two-lane section of Highway FF beginning just north of Weaver Road would be widened to a four-lane expressway section or possibly relocated from the current alignment. South of Farm Road 194, a new four-lane freeway or expressway section would be constructed to cross the James River, continue in a southeastern direction, and connect to Highway 14 on the west side of The City of Nixa. The route could then be extended farther southeast to connect with U.S. 160 south of The City of Nixa.

Missouri Highway 13/Kansas Expressway
The Kansas Expressway currently ends at Republic Road. In this alternative, the Kansas Expressway extension was initially examined as a new four-lane expressway. The new alignment would likely move slightly eastward in order to avoid existing residential areas. Farther south, the alignment could use or be located close to Farm Road 141. It would continue southward to Highway 14 aligning with Route M. If an alignment were to continue to the south, Route M would be used for a portion of the route which would then bend to the southeast to connect with U.S. 160 south of the City of Nixa.

Campbell Avenue/U.S. 160
In this alternative, the existing Campbell Avenue designated as U.S. 160 south of the James River Freeway, would be widened from four lanes to six lanes. In this alternative, the six lane widening would begin north of James River Freeway and continue south of Highway 14.

National Avenue
National Avenue is currently built to Gaslight. In this alternative, National Avenue would be extended southward from Gaslight as a four-lane arterial roadway. The alignment of this new roadway section would shift in order to minimize impact to residential areas and follow or parallel the Cheyenne Road alignment. The alignment could then continue in a southwest direction to connect back with U.S. 160.

Highway 13 North of I-44
This alternative would construct a new freeway connection for Highway 13 with a shift westward to align with the West Bypass. This new connection would have grade separated connections with the existing Highway 13 then extend to the southwest. U.S. 160 north of I-44 would intersect with the new Highway 13 connection.

U.S. 160 widening north of I-44
This alternative would widen U.S. 160 from two lanes to four lanes north of I-44 to Willard. This route will continue to function as an expressway.

Figure 4.2 Build Alternatives (south)

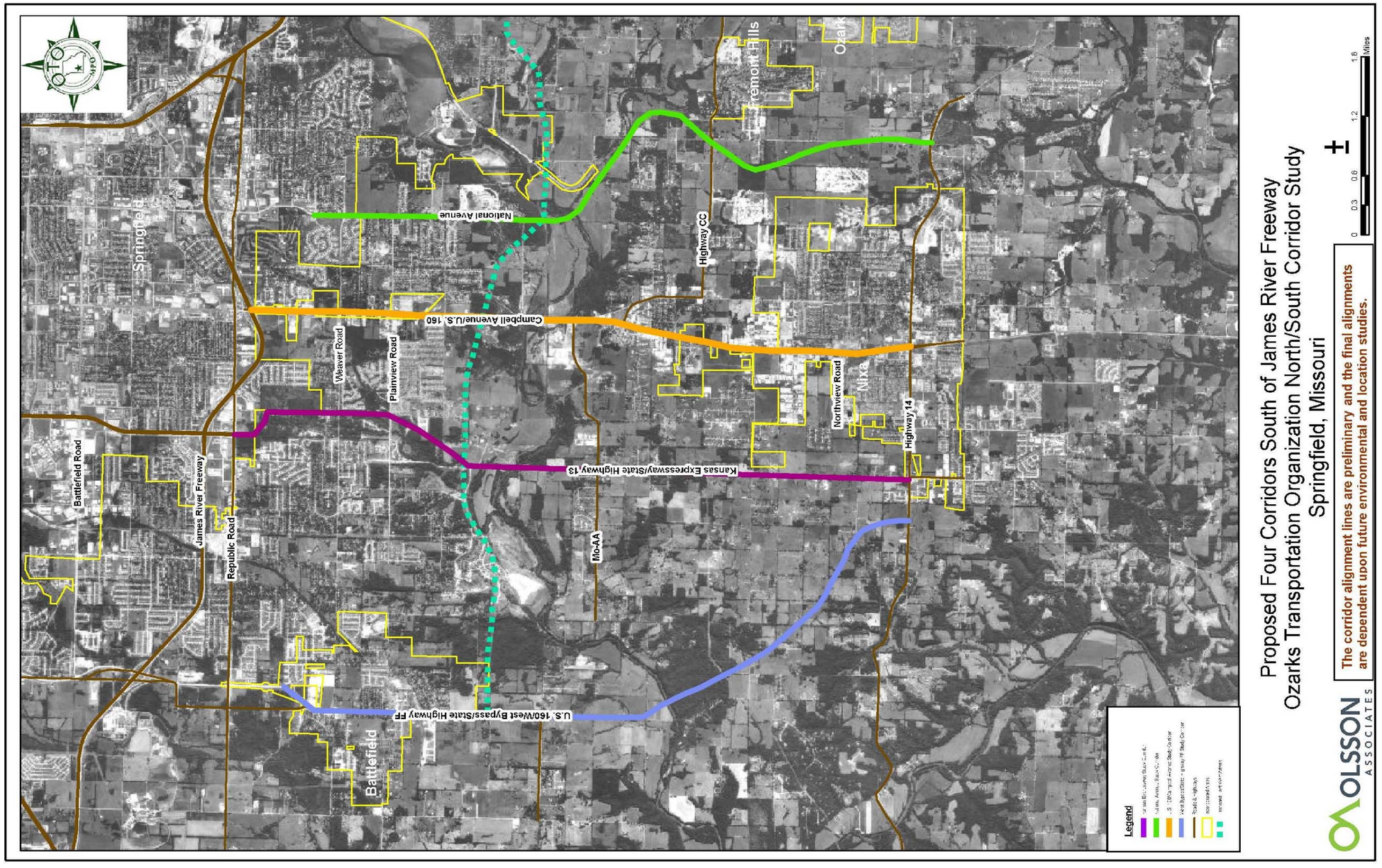
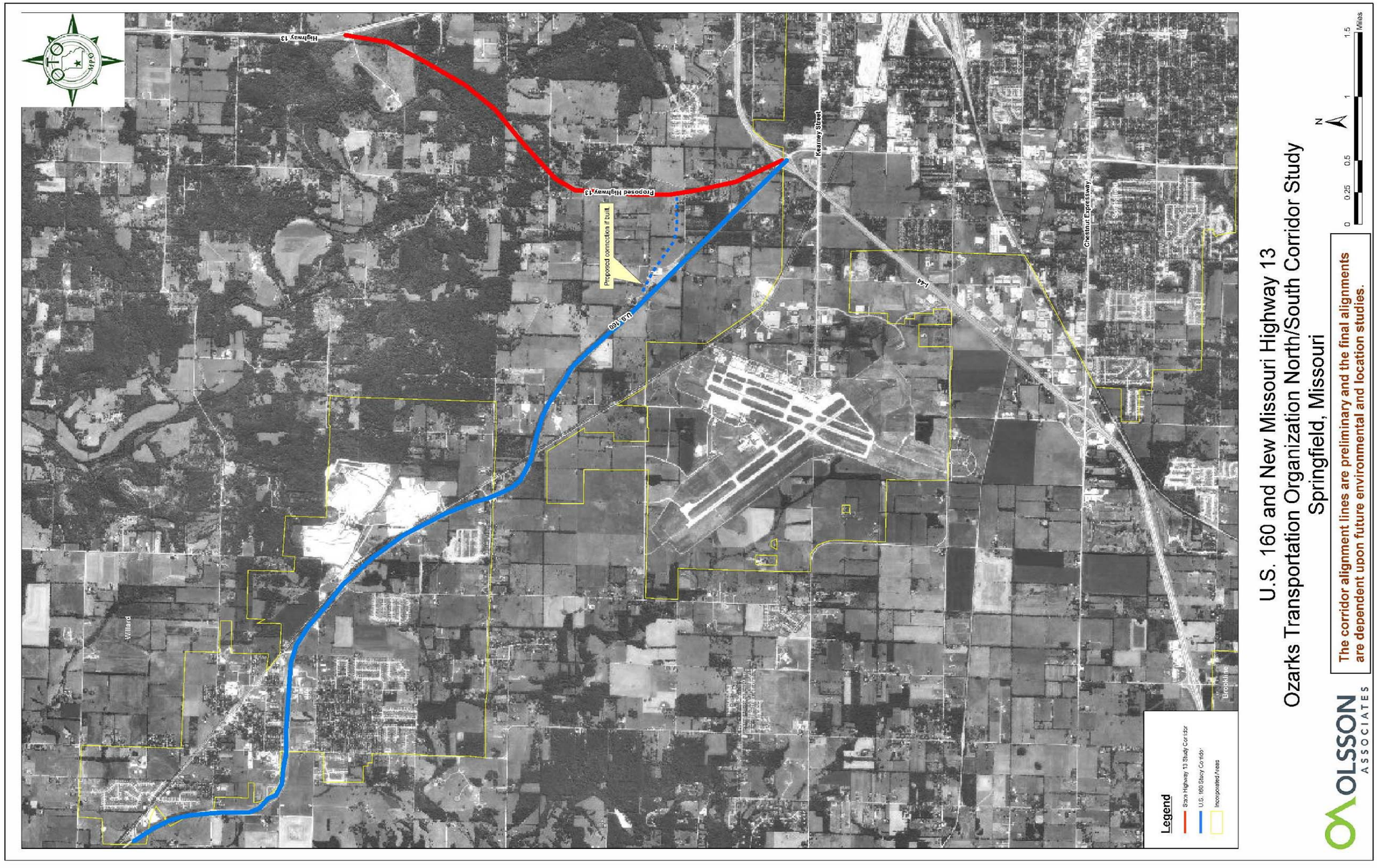


Figure 4.3 Build Alternatives (north)



4.5 Evaluation Criteria

An important step in the process to assess transportation alternatives is to develop a set of criteria to compare the effectiveness of each alternative in achieving study goals. This evaluation considers facility improvements that could address the mobility needs of the north-south corridors and would be consistent with the overall general objectives of the OTO LRTP. Alternatives define a strategy characterized by a conceptual typical section, access plan, and operational elements. The degree to which alternatives achieve project objectives is determined through the application of evaluation criteria that reflect the project objectives. The evaluation criteria for the North-South Corridor Study include the following items:

- Mobility Benefits
  - Travel time reduction for regional north-south traffic
- Growth & Economic Development Benefits
  - Provide opportunity for new development
- Environmental – Impact to the natural environment
  - Minimize impact to wetlands, streams, rivers, floodplains, parks and historic sites
- Environmental – Impact to the built environment
  - Minimize impacts to existing buildings, commercial areas and neighborhoods
- State/federal funding eligibility
  - The degree in which the project serves statewide travel interests and/or would be attractive to MoDOT to participate in project funding
- Magnitude of cost
- Potential for extension to connect with U.S. 160 south of The City of Nixa

These criteria help measure the degree in which an alternative meets the project goals. The evaluation criteria are defined by “relative” measures of effectiveness (MOE). “Relative” MOEs are the relative performances of each alternative as evaluated by the project team. The analytical process used in this study involved designating representative variables that could be quantified and compared between alternatives.

The six alternatives were evaluated by comparing the evaluation criteria using the MOEs previously identified. Using these values, each alternative was assigned a score on a scale from one to five, with one representing the lowest performance relative to the MOE and five representing the highest performance.

Travel Time

Mobility benefits were measured by estimating how much total travel time would be saved if a project were constructed. The estimated travel time savings were obtained using the regional travel model maintained by the OTO. The values shown are the amount of travel time savings and travel times on each alternative estimated for the model’s forecast year of 2030. The values shown are the travel time savings estimated for a typical peak hour that can be attributed to construction on each project individually. The values were obtained by comparing the travel time from the No-Build Alternative with that of each build alternative. When the network travel time summations were compared, the difference was attributed to the roadway alternative being tested in the model. The results were then scaled to a score between one and five.

Alternative	Peak Period Vehicle Hours of Travel Reduced	Scoring
West Bypass/State Highway FF	15,500	3.1
Missouri Highway 13/Kansas Expressway	16,100	3.2
Campbell Avenue/U.S. 160	11,800	2.4
National Avenue	15,600	3.1
Highway 13	3,000	0.6
U.S. 160 widening north of I-44	2,400	0.5

Growth & Economic Development

Growth and economic development benefits were compared by examining general impacts to existing development, including the potential available land for new development. The MOE was the amount of frontage available with each alternative for prime commercial development. The miles of frontage were then assigned scores between one and five to represent the differences between the alternatives. An adjustment was applied to the Campbell/U.S. 160 corridor reducing the MOE from 3 to 2 to reflect the fact that the current corridor has a considerable amount of existing commercial development and would not be able to fully absorb the additional development previously shown.

Alternative	Potential Miles of Commercial Frontage	Scoring
West Bypass/State Highway FF	5.2	4.0
Missouri Highway 13/Kansas Expressway	3.6	3.5
Campbell Avenue/U.S. 160	3.0	2.0
National Avenue	3.0	3.0
Highway 13	1.0	2.0
U.S. 160 widening north of I-44	1.0	2.0

Potential future commercial areas resulting from new access created by the corridor projects should be anticipated at:

- West Bypass/FF – Along the new bypass south of the City of Battlefield, continuing near Highway 14
- Missouri Highway 13/Kansas Expressway – Near Route AA and the future east-west arterial, and north of Highway 14.
- Campbell Avenue/U.S. 160 – Near the future east-west arterial extension and along the existing corridor
- National Avenue - Near Highway 14, along new route near Route CC, and near the future east-west arterial
- U.S. 160 north of I-44 - Along the existing corridor
- Highway 13 north of I-44 – Near U.S. 160 to the north

Impact to the Built Environment
The built environment includes impacts to residential areas that could potentially be directly affected or located close to a possible alignment. This impact is derived from the linear feet of developed land adjacent to each alternative alignment. Positive adjustments were made for the two corridors designated as U.S. 160 where right-of-way for widening is already available and would not require additional acquisition. The MOEs for this category are listed under the developed land column in **Table 4.4**. Scoring is based on a rating given to differentiate the differences between the alternatives.

Impact to the Natural Environment
Impacts to the natural environment include impacts to floodways, parks, historic sites, and karst topography limitations. Relative scores were given based on the amount of streams, wetlands and floodways crossed, plus the linear feet of undeveloped land along the alignment. The scoring is an average of individual ratings to impacts for streams, wetlands, floodplains and undeveloped land. At this level of detail, it is assumed that an alignment will avoid or minimize impacts to schools, cemeteries and churches. Karst impacts were not obtained from an environmental data base, but rather from field observation knowledge of the area. The karst impacts were greater for the Highway 13 Connector and the score was adjusted to reflect this. The MOEs for this category are listed in **Table 4.4** with the average of natural environmental factors shown in the last column.

State/Federal Funding Eligibility
The opportunity for MoDOT participation will involve a number of factors. One factor is whether the alternative under consideration is currently designated a state or US highway, or if it would be an extension of a state or US highway. Another factor would be the ability of the route to accommodate intrastate travel movements. Related to this is the potential for limited access in order to provide for more efficient intrastate travel. MoDOT's practical design policy will require examining cost-effective project alternatives to address needs. In addition, MoDOT will not expand the number of system miles, thus adding new miles will require removal of miles somewhere else currently on the MoDOT system.

Alternative	Consideration	Scoring
West Bypass/ State Highway FF	This is an extension of State Highway FF. It would have the highest potential to be designated as a new state route 160.	3.5
Missouri Highway 13/ Kansas Expressway	This extension could be constructed as a limited access expressway, or as an arterial.	3.0
Campbell Avenue/ U.S. 160	This existing US highway has the highest potential to receive funding.	4.0
National Avenue	This is an extension of a local arterial street and would have the lowest potential for state/federal funding.	2.0
Highway 13 north of I-44	This is a bypass alternative of an existing state route. However, other options are currently being explored by MoDOT that are more consistent with MoDOT's policy of practical design.	3.0
U.S. 160 widening north of I-44	This existing U.S. highway has the highest potential to receive funding.	4.0

Magnitude of Cost
Generalized estimates of probable construction costs were prepared to provide cost comparisons of the alternatives as previously described. The costs include construction, right-of-way, engineering and administration, as well as the costs of interchange modification at the James River Freeway at each location. The costs for interchange reconstruction were obtained from the LRTP and these figures will be refined as further engineering studies are completed. For Missouri Highway 13/Kansas Expressway, cost estimates do not include the cost for right-of-way already purchased by Greene County. The estimated costs were assigned scores from one to five. Scoring is based on a scaling formula to differentiate the differences between the alternatives.

Alternative	Estimated Cost (Mil. $)	Scoring
West Bypass/State Highway FF	94.0	2.5
Missouri Highway 13/Kansas Expressway	102.4	2.3
Campbell Avenue/U.S. 160	84.3	2.9
National Avenue	113.5	1.9
Highway 13 Connector	72.2	3.3
U.S. 160 widening north of I-44	47.1	4.1

The cost estimates are included in the appendix.

An alternatives evaluation matrix was developed which reflects the broad nature of the analysis at this stage of the study. Alternatives were assessed based on the degree to which they impact the criteria. The matrix provides a comparison of corridor characteristic alternatives. An interpretation of the results provides the basis for selection and prioritization of the corridors. The two projects north of I-44 are smaller scaled projects and have been adjusted by one point to reflect this in the scoring.

Other Traffic Impacts
The impacts of the north-south projects on east-west streets were also investigated. Without new north-south routes, traffic primarily uses U.S. 65 and U.S. 160 for north-south travel and disperses on east-west routes such as Route CC or Highway 14 for east-west travel. Other east-west routes such as Republic, Weaver, Plainview, FR 186, and FR 190 accommodate traffic north of the James River. East-west routes south of the James River include Payne, Tracker, Union Chapel, and Dewberry. The travel demand model compared the traffic volumes for the future year with a no-build network with the recommended build projects. The results show that in most cases, building additional north-south routes reduces the traffic volumes on east-west routes as compared to the future no-build network. The only location where traffic volumes tended to increase as compared to the no-build network was in the Nixa area on east-west streets

west of Nicholas. Thus, in addition to the projects and implementation steps listed below, additional street pavement and maintenance would be considered in this area. Future east-west project capacity needs include Highway 14, sections of Route CC, sections of Plainview east of U.S. 160 and sections of Republic Road between the West Bypass and U.S. 160 that are currently two-lane.

The traffic impacts of the alternatives on traffic levels north of the James River Freeway were identified using the Year 2030 OTO traffic model. Given the use of the future year growth forecasts, the model represents how traffic flow would potentially vary on these routes north of the JRF, given capacity increases on that route south of the JRF. The model results should be considered as a comparative indication of trends and not a precise forecasted impact. The results do support concerns expressed by members of the public and the Steering Committee that the extension of Kansas Expressway would increase traffic volumes significantly on Kansas Expressway north of the JRF.

The model results indicate that the traffic impacts of extending Kansas Expressway south of the JRF on the portion of the Kansas Expressway north of the JRF are the highest. A better distribution of traffic occurs with the West Bypass and National Avenue. The extension of either Kansas Expressway or Campbell Avenue would add more traffic to each of these routes to the north of the JRF. While these results provide information on traffic impacts, traffic assignments on all four corridors should also be studied further and refined when the OTO updates the travel model.

Table 4.4 Impact and Environmental Resources

	Streams (linear feet)	Wetlands (acres)	Floodplains (acres)	Schools (#)	Cemeteries (#)	Churches (#)	Undeveloped Land (~ft)	Developed Land (~ft)	Total Score - Natural
West Bypass) James River to Hwy 14)	600 (6 crossings)	1.71	3.51	1	1	0	30547	7475	
	3	2	4	2	2	3	2	4	2.8
Kansas (James River to Hwy AA)	600 (6 crossings)	2.00	7.29	0	0	0	31804	4924	
	3	2	3	3	3	3	2	4	2.5
Campbell (James River to Hwy 14)	300 (3 crossings)	0.4	10.61	1	0	0	17,706	26,437	
	5	5	1	2	3	3	4	2	3.8
National (James River to Hwy 14)	500 (5 crossings)	1.68	8.75	0	0	0	36,142	6,123	
	4	2	2	3	3	3	2	4	2.5
160/Campbell North	400 (4 crossings)	0	7.04	0	0	0	26,365	2,860	
	4	4	3	3	3	3	3	4	3.5
Highway 13 North	300 (3 crossings)	0	5.03	0	0	0	16,692	4,248	
	5	4	4	3	3	3	4	4	4.25

Source: Olsson Associates

Weighting of the Measures of Effectiveness

As part of the evaluation process, the project subcommittee weighed the relative value of the evaluation criteria on a scale from one to three, with three being the most important. The weighting was then used to assist in identifying preferences for the alternatives under consideration. The average weights assigned by the subcommittee are listed below:

Criteria	Weighting
Travel Time Reduction	2.82
New Development Opportunity	1.73
Impact to Natural Resources	2.18
Impact to Built Resources	1.82
State/Federal Funding Eligibility	2.45
Magnitude of Cost	2.55

Using the evaluation criteria described in the first section of this chapter, a recommended prioritization strategy was developed for the six project corridors under study. Both quantitative and qualitative measures described in the previous section were used to differentiate the alternatives. The measures were given a rating between 1 and 5. This rating was primarily based on a qualitative assessment to provide the differing values. The most beneficial values were scored closer to 5 and the least beneficial were scored closer to 1. The methodology was used to highlight differences between alternatives. As both quantitative and qualitative inputs were used, the process is not intended to be a statistics based exercise.

The relative “unweighted” scoring resulted in U.S. 160/Route FF having the highest score followed closely by the Kansas Expressway Extension. U.S. 160/Route FF scored highest in the category of Growth and Economic Development. The Kansas Expressway Extension does provide slightly higher travel time benefits than the other alternatives.

The “unweighted” scoring is objective and does not incorporate the relative importance of the goal. The weights to the MOE that were determined by the Sub-technical Committee were then incorporated into the process. The highest scoring alternatives do remain similar, although the difference between them increased. National Avenue is shown to move higher than U.S. 160/Campbell with the weighted score. It should be noted again that this rating process provides guidance and helps to identify key characteristics associated with the alternatives. Additional issues not specifically described in this process were identified by the Sub-technical Committee and during Public Meetings as summarized in Chapter 2.

Table 4.5 Unweighted and Weighted Scores of the Alternatives
Source: Olsson Associates

		Alternatives					
Criteria:	Weights	US-160 Highway FF	M-13/ Kansas Expwy	Campbell/ US-160	National	New M-13 Connection to I-44	US-160 Widening n/o I-44
Travel Time Reduction	2.82	3.1	3.2	2.4	3.1	0.5	0.6
Growth and Economic Dev't	1.73	4.0	3.5	2.0	3.0	2.0	2.0
Impact to Natural Resources	2.18	2.8	2.5	3.8	2.5	2.5	3.5
Impact to Built Resources	1.82	4.0	4.0	2.0	4.0	4.0	4.0
State/Federal Funding Eligibility	2.45	3.5	3.0	4.0	2.0	3.0	4.0
Magnitude of Cost	2.55	2.5	2.3	2.9	1.9	3.3	4.1
Total Score		19.9	18.5	17.0	16.5	15.2	18.2
Total Weighted Score		44.0	41.0	39.0	36.4	33.2	40.3

4.6 Project Refinement

The evaluation system enabled a number of issues and considerations to be discussed. The issues included:

- The scoring was very close between alternatives, and in particular between Highway FF and the Kansas Expressway.
- MoDOT emphasized the need for the alternatives to support through-traffic movement, which would be further supported by having the alternatives connect back to U.S. 160 south of the City of Nixa.
- There are negative impacts associated with extending Kansas Expressway south of Highway 14 past the high school and other existing development.
- The Highway FF route provides the best opportunity for new commercial development and redevelopment.
- The character of land adjacent to the Kansas Expressway north of the James River is residential and may not be as compatible with an expressway as would other alternatives.
- The were concerns that the Kansas Expressway extension as an expressway would add traffic on the Kansas Expressway north of the James River Freeway, resulting in additional traffic congestion.
- Construction of one of the routes would not provide sufficient vehicle capacity, so the recommended alternative should provide an opportunity to better support improved travel mobility with two identified alignments.

Based upon these findings, a new alternative was developed. This alternative is shown in **Figure 4.4**.

The refined alternative includes the West Bypass/Highway FF extension as a four-lane expressway route as previously indicated. It is recommended that consideration be given to constructing the new sections of this route as a freeway in order to provide greater mobility benefits. The existing section of roadway would be upgraded to expressway standards. The alignment for the Kansas Expressway would continue south from Republic Road as previously indicated. South of Tracker Road, it would bend to the southwest and connect with the West Bypass/Highway FF alignment. The two would share a common alignment as that route would extend south of the City of Nixa and connect with U.S. 160. Access to the West Bypass/Highway FF extension would be limited and potential access points are shown in Figure 4.4.

Right turn in/out driveway access would be consistent with OTO Design Standards. The Kansas Expressway extension would be constructed as a primary arterial to be more compatible with the residential character north of the James River. The extension of the Kansas Expressway would be phased, beginning with construction of a 2-lane roadway with turning lanes and in the future could be widened to four lanes as volumes warranted. Access to the Kansas Expressway extension would be consistent with the OTO Design Standards. No residential driveway access would be permitted. The refined alternative shows the Route FF connection with the Kansas extension located as far east as possible in order to provide access and travel time benefits to the Nixa area. If an alignment is located too far to the west, then benefits to the City of Nixa would be reduced. In that case, traffic might use Nicholas Road to reduce their travel distance. The Route FF extension alignment is located to the west of the more concentrated development in the City of Nixa in order to prevent through traffic from traveling on local city streets which serve residences and schools.

Refined Alternative Results
The benefit and impact results of the refined alternative are listed in **Table 4.6**. The Refined Alternative results and scoring show an improvement in travel time reduction and economic development potential. As the project also results in a higher estimated cost, the overall score of the Refined Alternative is similar to the previous higher scoring alternatives. The total score is 20.4 and the total weighted score is 44.6.

Table 4.6 Summary of Refined Alternative MOEs

Criteria:	West Bypass/FF and Kansas Existing Modified	Score
Travel Time Reduction (Peak Hour)	17309	3.6
New Development Opportunity (miles of roadway frontage for Commercial)	8.6	5
Impact to Natural Resources	(see environmental table)	2.8
Impact to Built Resources	(see environmental table)	4
State/Federal Funding Eligibility		3
Magnitude of Cost Interchanges with JRF	226.2	1.6
Total Score		20.0
Total Weighted Score		44.6

The Refined Alternative addresses the project goals more fully than do the other alternatives. This alternative would improve north-south mobility in the area south of the James River Freeway. Improved mobility would benefit not only the residents and businesses located in the area, but would also benefit through traffic moving between the OTO area and Branson. The Refined Alternative, by providing for a major arterial facility on the West Bypass alignment, would serve to increase access to future commercial areas located in the Cities of Springfield and Battlefield, thereby supporting economic development along the West Bypass corridor. Because of the travel and economic development benefits described, it is recommended that the Refined Alternative that includes developing an extension of the West Bypass to freeway/expressway standards and Kansas Expressway to primary arterial standards be pursued as the highest north-south corridor priority. It is also recommended that the widening of U.S. 160 between I-44 and the City of Willard remain as a high priority project as it is currently shown in the OTO list of high priority projects in the LRTP.

The environmental information for the refined alternative is listed in **Table 4.7**.

Table 4.7

	Streams (linear feet)	Wetlands (acres)	Floodplains (acres)	Schools (#)	Cemeteries (#)	Churches (#)	Undeveloped Land (~ft)	Developed Land (~ft)
State Highway FF	800 (8 crossings)	2.36	4.66	1	2	0	37,989	16,739
Kansas Expressway Extension	600 (6 crossings)	2.31	7.27	1	1	1	28,074	7,850
Totals	1400	4.67	11.93	2	3	1	66,063	24,589

The project priorities of the alternatives studied are listed in **Table 4.8**. The project priorities are based upon the alternative scoring and weighting process described in this chapter. The implementation steps associated with this priority list will be described in the next chapter.

Table 4.8 Project Priorities

New Construction:		System Management:
1)	West Bypass/State Highway FF (44.0)	Campbell Avenue/U.S. 160 (39.0)
	Improve existing and construct new sections of four-lane roadway to extend south of Highway 14.	Transportation System Management including adding turn lanes and improving intersection geometrics, access management, ITS, land use planning and transit service enhancements
2)	Kansas Expressway Extension (41.0)	
	Construct new sections of two-lane roadway to extend south connecting with the extended State Highway FF	
		Further Study:
3)	U.S. 160 widening north of I-44 (40.3)	Highway 13 Connector
	Widen U.S. 160 to four lanes north of I-44 to Willard.	Study as part of MoDOT's Statewide I-44 Corridor Study
4)	National Avenue Extension (36.4)	
	Construct new sections of four lane roadway to extend south of Highway 14.	

Note: The Refined Alternative includes New Construction projects 1 and 2

Figure 4.4 Refined Combination Alternative