


**Final Report**  
**65-71 Regional Corridor Study**

*Item No: 5-564.00*  
*KYTC District 5, Kentucky*

September 2020





# 65-71 Regional Corridor Study

## Final Report

### *Prepared for*

Kentucky Transportation Cabinet  
Central Office  
District 5



### *Prepared by*

HDR



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# Executive Summary

The 65-71 Regional Connector Study examines the need for, and the feasibility of, a new and/or upgraded highway that would connect I-65 in Bullitt County to I-71 in Oldham County.

## Purpose and Need

The need for new or improved transportation connections in the study area is based on:

1. Substantial and increasing congestion on the radial freeways (I-71, I-64, and I-65) as well as the outermost circumferential freeway (I-265).
2. A lack of circumferential routes, with inefficient travel between I-65, I-64, and I-71 outside I-265. This causes many trips to go in to the region's core and back out with considerable diversion from the desired direction of travel.
3. Congestion or operational issues on the radial arterials (US 31E, KY 155, US 60 and KY 22) as well as the few partial circumferential routes (KY 44, KY 53, KY 55).
4. Significant existing and planned residential, industrial, and commercial development, especially in Bullitt, Oldham, and Shelby Counties.
5. Increased freight / economic activity and general mobility needs in the study area that cannot be accommodated by the existing circumferential rural two-lane highways.

In response to these needs and input from five project focus groups, the study identified four primary purposes for a new or improved connection between I-65 in Bullitt County and I-71 in Oldham County.

1. Improve regional **connectivity and mobility**;
2. Improve **accessibility** to and within growing communities;
3. Reduce **congestion** on existing routes by improving traffic flow on and between major arterials and Interstates; and
4. Provide **economic development opportunities**, and support land use, development, and growth objectives.

## Alternatives

**Alternatives Development** – Numerous corridors for the new regional connection were developed based on major trip origins and destinations, highway network configuration, topography and geography, environmental considerations, and focus group feedback. Over 30 alternative corridors for new or upgraded highways were considered in the study.

**Level 1 Evaluation** – The Level 1 evaluation considered 15 initial alternatives grouped into 5 “families”; four sets of new highway corridors and one set of upgraded highway corridors. These alternatives are shown in **Figure ES-1** and **Figure ES-2**. Typical-sections were developed to illustrate and develop cost estimates for the alternatives. Each alternative corridor was rated with respect to: mobility, land use, safety, environment, cost, and constructability. There were subcategories for each rating; for example, “mobility” included travel time, traffic volume, congestion relief, accessibility, system redundancy, and freight. The focus groups were also surveyed for feedback on each alternative.

**Figure ES-1: Level 1 New Highway Corridors**

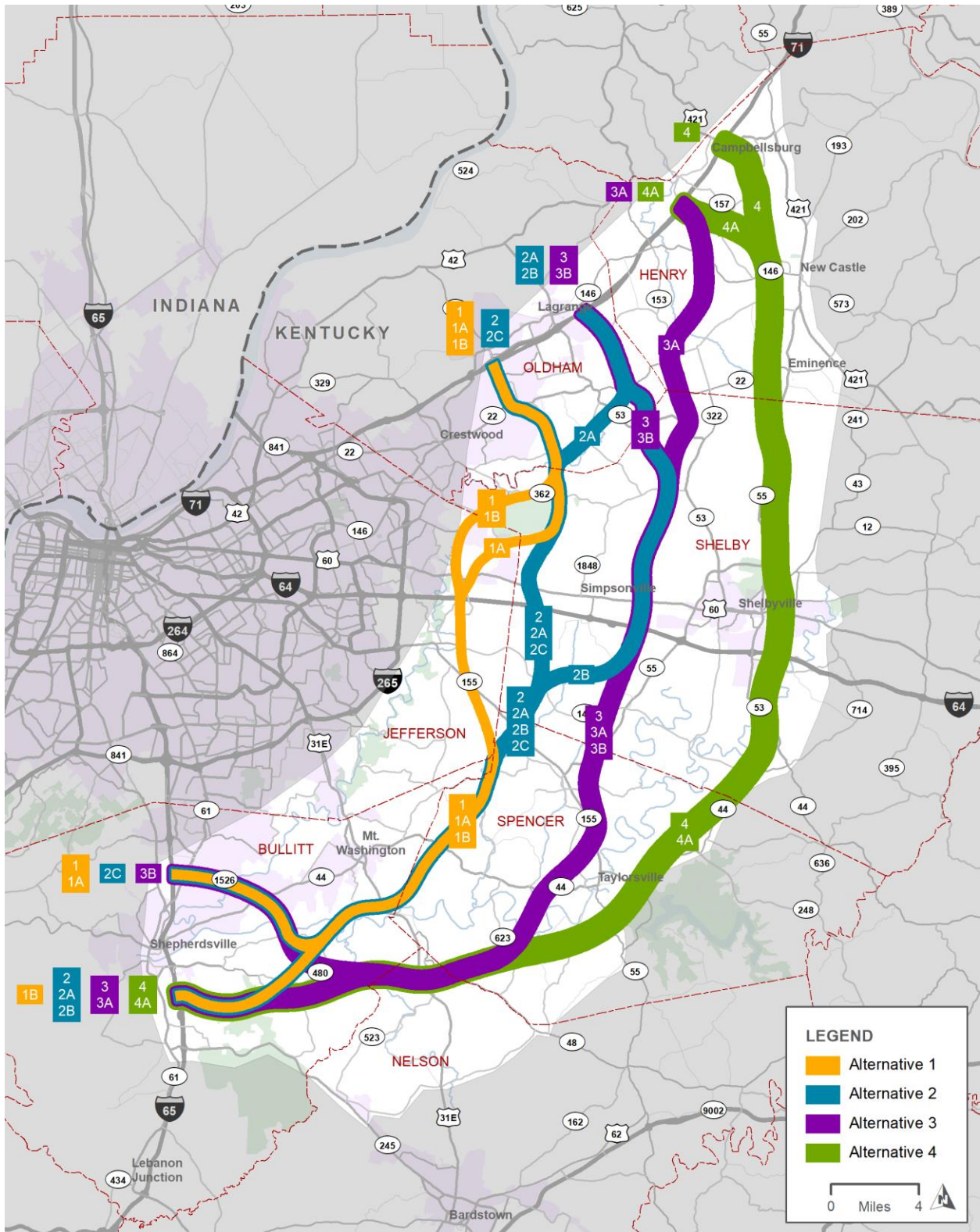
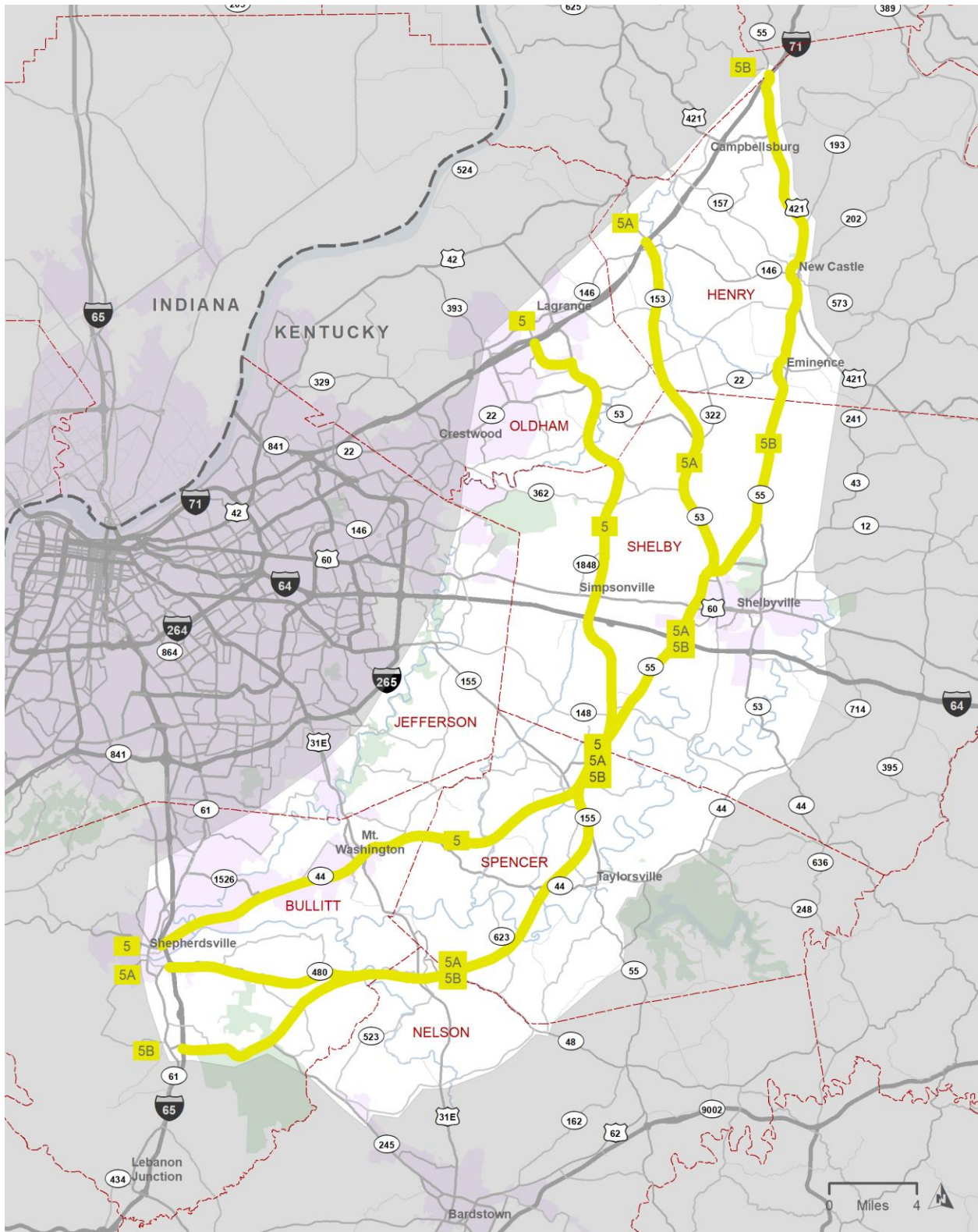


Figure ES-2: Level 1 Upgrade of Existing Corridors



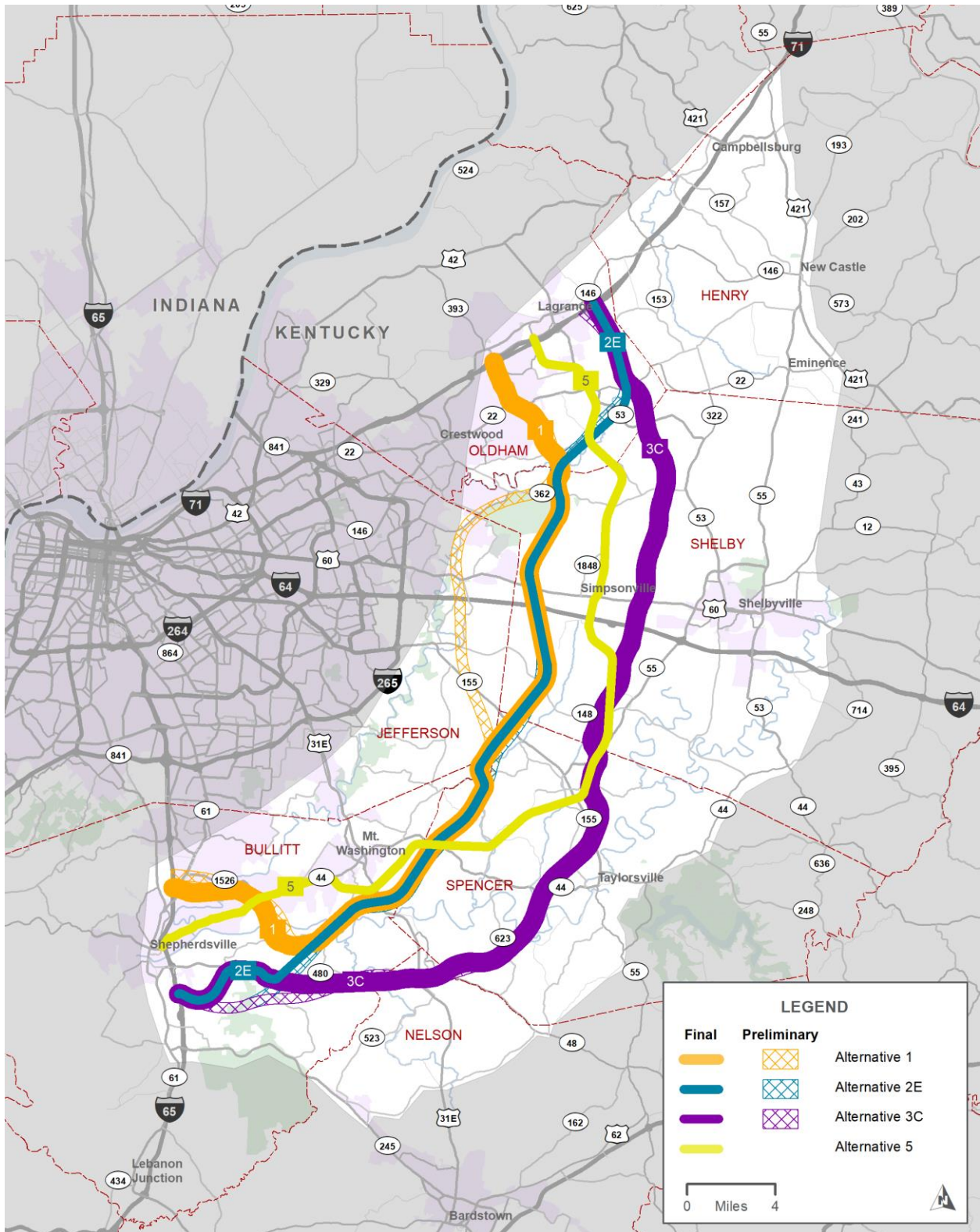
Based on the analysis and feedback the 15 alternatives were narrowed down to the four most promising concepts, shown in **Figure ES-3**. The easternmost alternatives (Set 4) were eliminated outright as they had the longest length, highest cost, lowest volume, fewest mobility benefits, and most impacts. To ensure a holistic review, at least one alternative was carried forward from each remaining set. The western alternatives (Sets 1 and 2) performed best for the new corridors, with lower distances, lower costs, higher volumes, and generally higher benefits. The east-central alternatives (Set 3) received mixed scores due to their high costs and limited mobility benefits; however, they scored well in the land use and development category. The upgrade of existing alternatives (Set 5) performed well from a cost to benefit perspective because while their benefits were fewer, their costs were also lower. Based on the information, the best corridors from Sets 1, 2, 3, and 5 were retained for further study.

**Level 2 Refinement and Evaluation** – During the Level 2 evaluation process, the alternatives were “right-sized” to reduce potential environmental, development, and property impacts, while lowering costs and improving effectiveness in meeting the project purposes. For example, the corridors were adjusted to avoid existing development and conservation areas. They were also adjusted at either end to tie into arterial highways and service interchanges where necessary. This resulted in non-freeway sections near I-65 and I-71 for some new corridors (such as on KY 393 in Buckner). Due to design criteria requirements such as design speed, minimum radius, lane and shoulder width, the upgrade of existing alternative was also adjusted. These changes increased the length of new highway alignment along that corridor as well as the expected cost for the alternative. The revised corridors are displayed in **Figure ES-3**.

The refined alternatives were evaluated and rated using the same categories and subcategories from the Level 1 evaluation. This second round of analysis showed that the most eastern corridor (3C) was longer, had a higher cost, lower benefits, and more impacts than the other three alternatives. It was therefore dropped from further consideration. Alternatives 1 and 2E were the remaining new highway corridors, and they were identical except at the southern and northern ends. When the two tie down points on I-65 and I-71 were compared, it showed that there were system benefits to connecting further away from I-265. The connections south of Shepherdsville and north of La Grange were both preferred for mobility, access, land-use/economic benefits, and reliability reasons. This decision was supported by the technical analysis and the focus group feedback. Thus Alternative 2E was the most highly rated new corridor. Alternative 5, the “upgrade alternative” that largely utilizes existing right-of-way, was also rated highly because it scored well in the mobility, accessibility and land-use categories relative to its cost, which was the lowest of all alternatives.



Figure ES-3: Level 2 Corridors – Preliminary & Final



## Recommendations

**Highest Scoring New Highway Alternative** - Of all the new highway alternatives considered, Alternative 2E ranked first with the highest overall score. Alternative 2E would begin at the new I-65 service interchange now under construction south of Shepherdsville. It would run at-grade (with intersections) from there to KY 480 and pass south and east of Mt. Washington. Additionally, Alternative 2E would connect to I-64 west of Simpsonville and connect to I-71 north of La Grange past KY 712 (Jericho Road). This alternative would provide the greatest benefits for mobility and connectivity, while supporting development and growth objectives. It connects well with the regional and statewide network. At 6 to 12 miles outside I-265, Alternative 2E is close enough to major destinations and development densities to attract considerable traffic but far enough out to limit impacts to major developed areas. The conceptual cost is \$950M.

**Highest Scoring Upgrade Alternative** - Alternative 5 was recommended as the upgrade alternative with the highest score per \$100 million, making it the most cost-effective option. Despite being considered an “upgrade alternative,” much of Alternative 5 would run on a new alignment near existing highways with partial access control. This alternative connects to I-65 at the existing KY 44 interchange in Shepherdsville and would include improvements to KY 44 from Shepherdsville to the start of a new southern bypass around Mt. Washington. Alternative 5 would intersect I-64 at the Simpsonville interchange and I-71 at the new La Grange Parkway interchange (soon to be constructed). While Alternative 5 attracts less traffic and does not benefit regional mobility as much as Alternative 2E’s, it still improves connectivity and supports some new development. It prioritizes local circulation and minimizes environmental impacts, but increases property impacts. The conceptual cost is \$690M.

The two final recommended corridors offer several practical implementation benefits. These benefits include:

- Neither alternative is exclusive. A portion of each and/or combination of both could be constructed over time.
- Both alternatives overlap with and/or demonstrate the importance of high priority regional projects.
- Both alternatives define several new priority projects offering an indication of future needs.

## Alternative Combinations

“Hybrid” combinations could be pursued by segmenting the network (see **Figure ES-4**, “Recommended Alternatives”) and selecting the best alternative within each segment. Given that the final Alternative 2E has some at-grade sections and final Alternative 5 has many new highway alignment sections, the two options are somewhat interchangeable. This approach would allow for customized solutions addressing local needs and costs while still improving mobility.

One example combination, illustrated in **Figure ES-5**, is to follow Alternative 5 in Segment 1 to the Mt. Washington Bypass, switching to Alternative 2E for Segments 2a and 2b to connect to I-64 at a new interchange. Then use an offset on I-64 to follow Alternative 5 in Segment 3 and Alternative 2E in Segment 4. Also, in some segments (Such as Segment 1 and 4), it is possible that portions of both alternatives could be pursued as part of a long range plan for those communities.

## Synergy with Other Projects

The 65-71 Regional Connector recommendations were developed to support and/or work in harmony with other planned roadway projects throughout the region.

For example, Alternative 5 includes upgrades to KY 44, which have been under consideration for some time. It also includes upgrades to KY 53 and ties into the new La Grange Parkway with its proposed I-71 Interchange.

Alternative 2E ties into the new I-65 interchange under construction in Bullitt County and would upgrade a portion of KY 480. It would also include construction of a new interchange on I-64 between I-265 and Simpsonville.

**Figure ES-4: Recommended Alternatives**

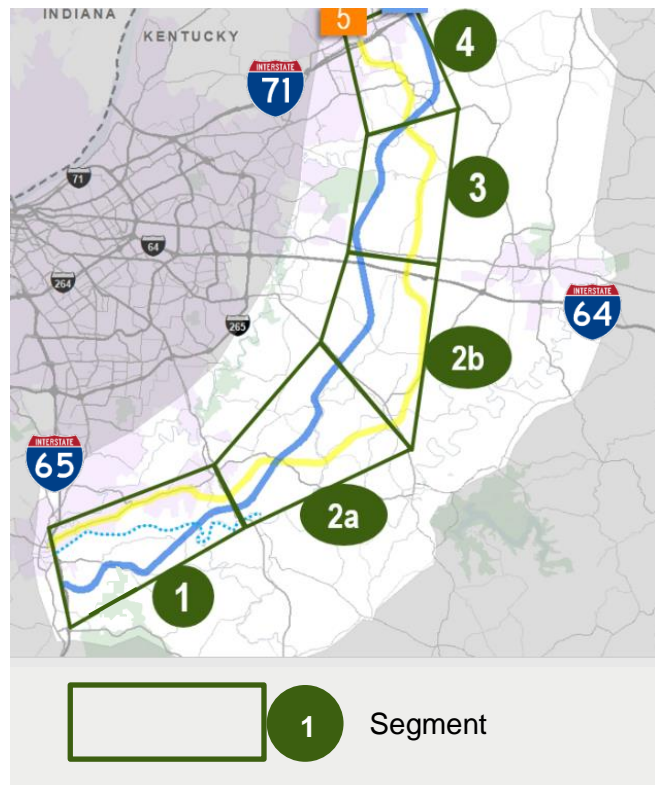
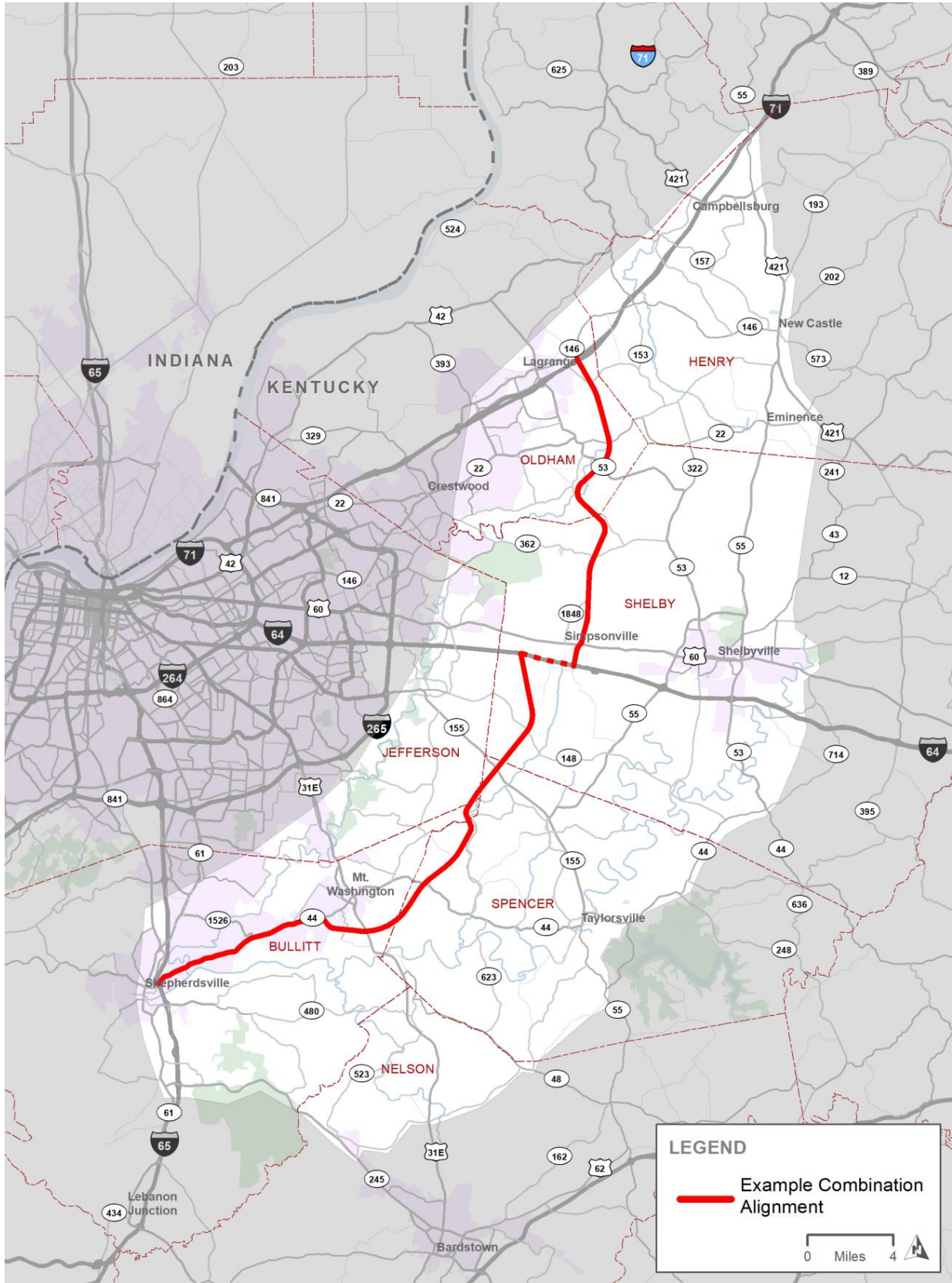


Figure ES-5: Example Combination Alternative



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# 1 – Introduction

The Kentucky Transportation Cabinet (KYTC) initiated the 65-71 Regional Connector Study (Item No. 5-564) to examine the need for and feasibility of a new and/or upgraded highway that would connect I-65 in Bullitt County to I-71 in Oldham County. The area being studied is outside the Gene Snyder Freeway (I-265) and includes portions of seven counties.

In 2019, the KYTC Strategic Highway Investment Formula for Tomorrow (SHIFT), a ranking that weighs safety, congestion, economic growth and other factors, ranked this project 39<sup>th</sup> among the top 50 highest-priority projects statewide.

## Project Location

The proposed 65-71 Regional Connector corridors that were analyzed as part of this study span a 40- to 50-mile route between Interstate 65 near Shepherdsville (to the south) and Interstate 71 near La Grange (to the north). The **study area**, shown in **Figure 1-1**, forms a one-third circle belt around the southeastern side of Greater Louisville, falling within portions of Bullitt, Nelson, Spencer, Shelby, Jefferson, and Oldham counties. Established communities within the study area include Shepherdsville, Mt. Washington, Taylorsville, Shelbyville, Crestwood, Simpsonville and La Grange. Major facilities that would potentially intersect a future connector include (from south to north) U.S. 31E, KY 44, KY 155, KY 148, Interstate 64, US 60, KY 362, and KY 22. The study area is predominately rural, with some suburban and small town development as well as pockets of industrial and commercial development near the interstates.

## Purpose and Need

The project team conducted a thorough evaluation of the project area in order to identify current and future mobility needs as well as other key needs that could be addressed by a major transportation project in the study area. That analysis is presented in **Chapter 2** “Existing Conditions” and **Chapter 3** “Future No-Build Conditions”. The summary purpose and need, which is based on that analysis, is presented here for reference and context.

The 65-71 Regional Connector will serve several important purposes:

1. Improve regional connectivity and mobility;
2. Improve accessibility to and within growing communities;
3. Reduce traffic congestion by improving flows on and between major arterials and Interstates; and
4. Provide economic development opportunities and support local land use, development, and growth objectives.

The need for new or improved transportation connections in the study area is based on:

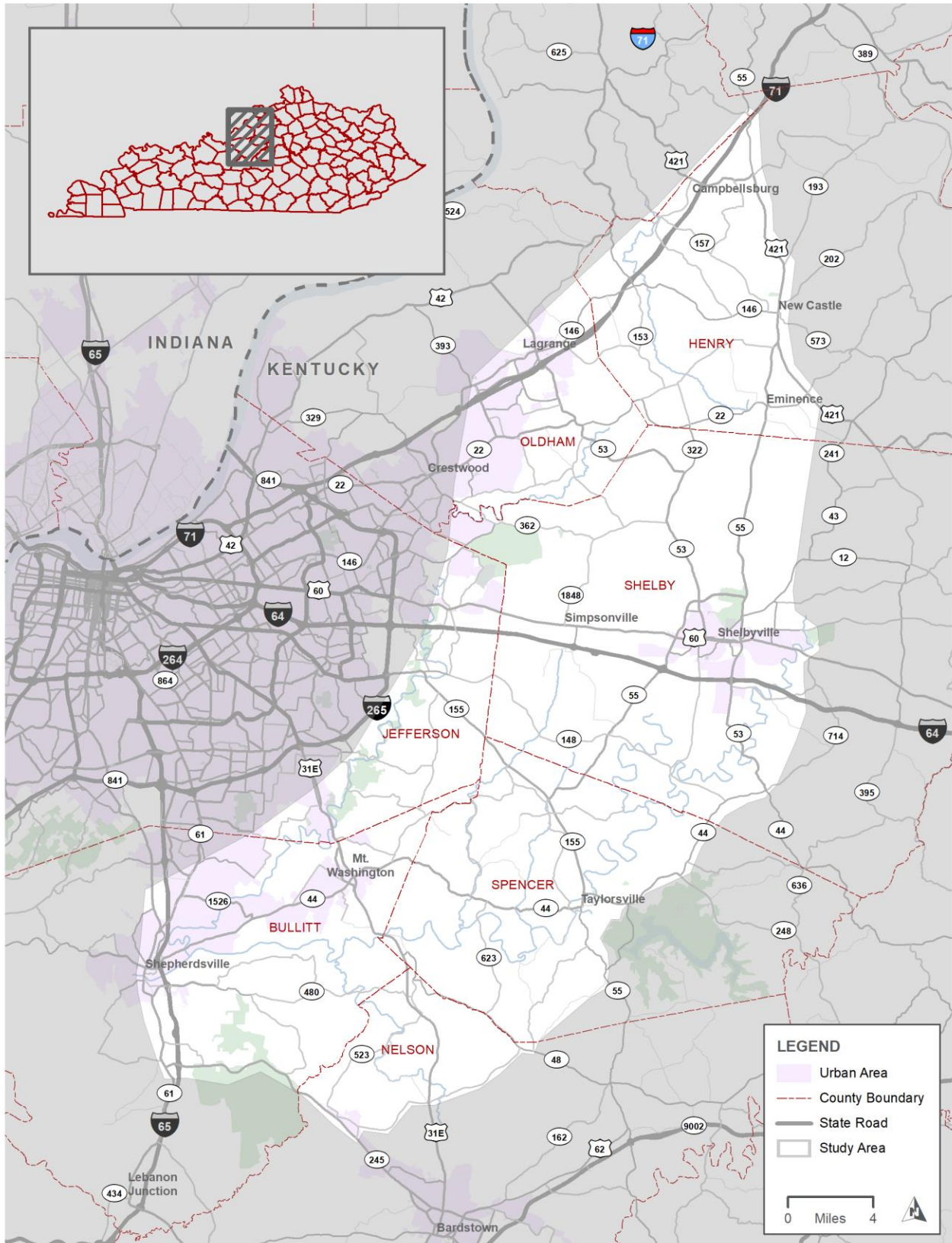
1. Substantial and increasing congestion on the radial freeways (I-71, I-64, and I-65) as well as the outermost circumferential freeway (I-265).
2. A lack of circumferential routes, with no efficient way to travel between I-65, I-64, and I-71 outside I-265 without using circuitous two-lane rural highways. This causes many



trips to go in to the region's core and back out; with considerable diversion from the desired direction of travel.

3. Congestion or operational issues on the radial arterials (US 31E, KY 155, and KY 22) as well as the few partial circumferential routes (KY 44, KY 53, KY 55).
4. Significant existing and planned residential, industrial, and commercial development, especially in Bullitt, Oldham, and Shelby Counties.
5. Increased freight / economic activity and general mobility needs in the study area that cannot be accommodated by the existing circumferential rural two-lane highways.

Figure 1-1: Study Area



DATA SOURCE: LOJIC, KIPDA, KY GeoNet, Esri  
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## Prior and Related Studies and Projects

KYTC has studied many of the feeder routes to Louisville over the past 15 years. Each of the major radial and circumferential interstate routes in the area (I-65, I-64, I-71, and I-265) is expected to experience traffic increases necessitating future improvements. KYTC has also conducted interchange studies and made interchange improvements throughout the study area. I-65 both north and south of Shepherdsville, I-71 near La Grange, and I-64 west of Simpsonville are hotspots for interchange studies and construction.

In Jefferson County, the I-265 corridor is ranked in the top 20 on KYTC's 2020 Strategic Highway Investment Formula for Tomorrow (SHIFT) Program Statewide Projects priority listing. Past KYTC studies have prioritized segments and recommended improvements at interchanges all along the corridor. Widening and major interchange reconstruction projects (at I-64 and I-71) are currently underway. The outcome of these improvements could impact decisions about the scope and location of a future 65-71 Regional Connector.

The SHIFT Program prioritizes potential projects for statewide and regional funding by evaluating their performance across a variety of metrics. The 2020 SHIFT Program included 7 projects in the 65-71 Regional Connector study area on its "Statewide" list. Similarly, SHIFT's "North Region" project listing contained 52 projects from the study area with 5 of those ranking in the top 25.

Numerous projects have also been recommended through the metropolitan and local planning processes. The Kentuckiana Regional Planning & Development Agency (KIPDA) Metropolitan Planning Organization's (MPO's) "Horizon 2035 Metropolitan Transportation Plan" includes 35 projects within the study area boundary. Local Comprehensive Plan updates for the study area counties yielded additional smaller projects designed to establish local system connections to the major routes covered by the KYTC and KIPDA.

The 2017 Kentucky Freight Plan (KFP) identified I-65, I-265, I-64, and I-71 as critical freight corridors. The KFP contained a priority list of freight projects most essential to freight operations; it strongly recommended improvements to the I-265 / I-71 Interchange.

The 65-71 Regional Connector planning study has been conducted within the context of the aforementioned high-priority projects. The alternatives have been developed to work in harmony with other planned projects throughout the region, including improvements to I-65, I-265, I-64, I-71, KY 44, KY 155, and others. This includes potential new interchanges along I-65, I-64, and I-71. As discussed at the end of this document, there may be elements of the 65-71 Regional Connector project that could be constructed such that they build on or support other ongoing projects in the region.

## 2 – Existing Conditions

The study team conducted an existing conditions analysis to create a foundation of known, relevant information within the study area. Existing corridor features have the potential to impact the development and/or evaluation of the project alternatives. This section presents a “snapshot” of the important natural and human-made features in the area that have been considered in the study. For a more comprehensive and detailed account of existing conditions, see the *65-71 Regional Connector – Existing Conditions Report* (April 5, 2019), in Appendix A.

### Socioeconomic Trends

According to the Kentucky State Data Center (KSDC), four counties in the study area – Jefferson, Oldham, Shelby and Bullitt – are forecasted to be among the top 10 fastest-growing counties in Kentucky over the next 20 years. Nearly all study area counties are projected to experience significant growth in population and employment in the future. See **Table 2-1**. With regard to total magnitude, Jefferson County is projected to account for 54% of the total regional growth, with the remaining 46% in the other six counties as shown by **Figure 2-1**.

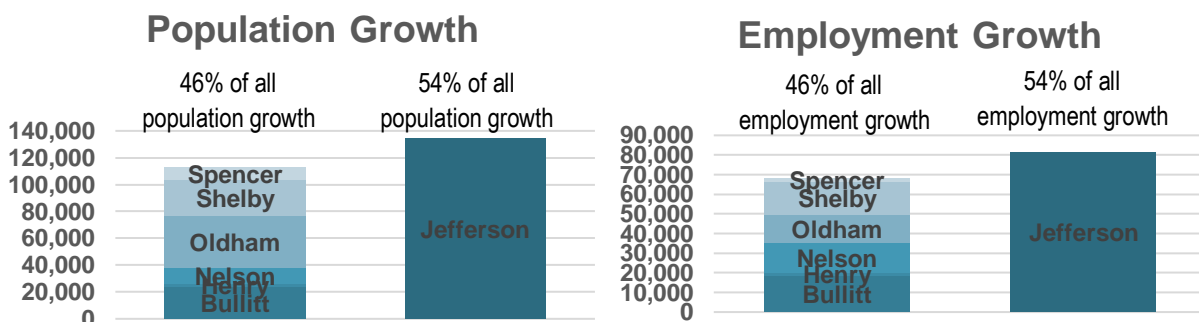
**Table 2-1: Projected Population and Employment by County (2010-2040)**

|                            | Population*    |                  |              | Employment**   |                |              |
|----------------------------|----------------|------------------|--------------|----------------|----------------|--------------|
|                            | 2010           | 2040             | % Growth     | 2010           | 2040           | % Growth     |
| Jefferson                  | 741,096        | 875,459          | 18.1%        | 505,868        | 587,225        | 16.1%        |
| Bullitt                    | 74,319         | 98,245           | 32.2%        | 24,631         | 43,200         | 75.4%        |
| Henry                      | 15,416         | 17,783           | 15.4%        | 6,315          | 7,900          | 25.1%        |
| Nelson                     | 43,437         | 54,752           | 26.0%        | 14,244         | 29,591         | 107.7%       |
| Oldham                     | 60,316         | 99,124           | 64.3%        | 20,816         | 34,815         | 67.3%        |
| Shelby                     | 42,074         | 69,239           | 64.6%        | 13,318         | 30,160         | 126.5%       |
| Spencer                    | 17,061         | 26,065           | 52.8%        | 2,636          | 4,721          | 79.1%        |
| <b>Non-Jefferson Total</b> | <b>252,623</b> | <b>363,371</b>   | <b>43.8%</b> | <b>81,960</b>  | <b>150,387</b> | <b>83.5%</b> |
| <b>All Counties Total</b>  | <b>993,719</b> | <b>1,238,830</b> | <b>24.7%</b> | <b>587,828</b> | <b>737,612</b> | <b>25.5%</b> |

\*Source: Latest Kentucky State Data Center population projections at <http://www.ksdc.louisville.edu/wp-content/uploads/2016/10/projection-report-v16.pdf>, Henry County population adjusted to account for growth since 2010.

\*\*Source: MSA Forecast by County for all but Nelson for 2020 to 2040. 2010 employment from U.S. Census.

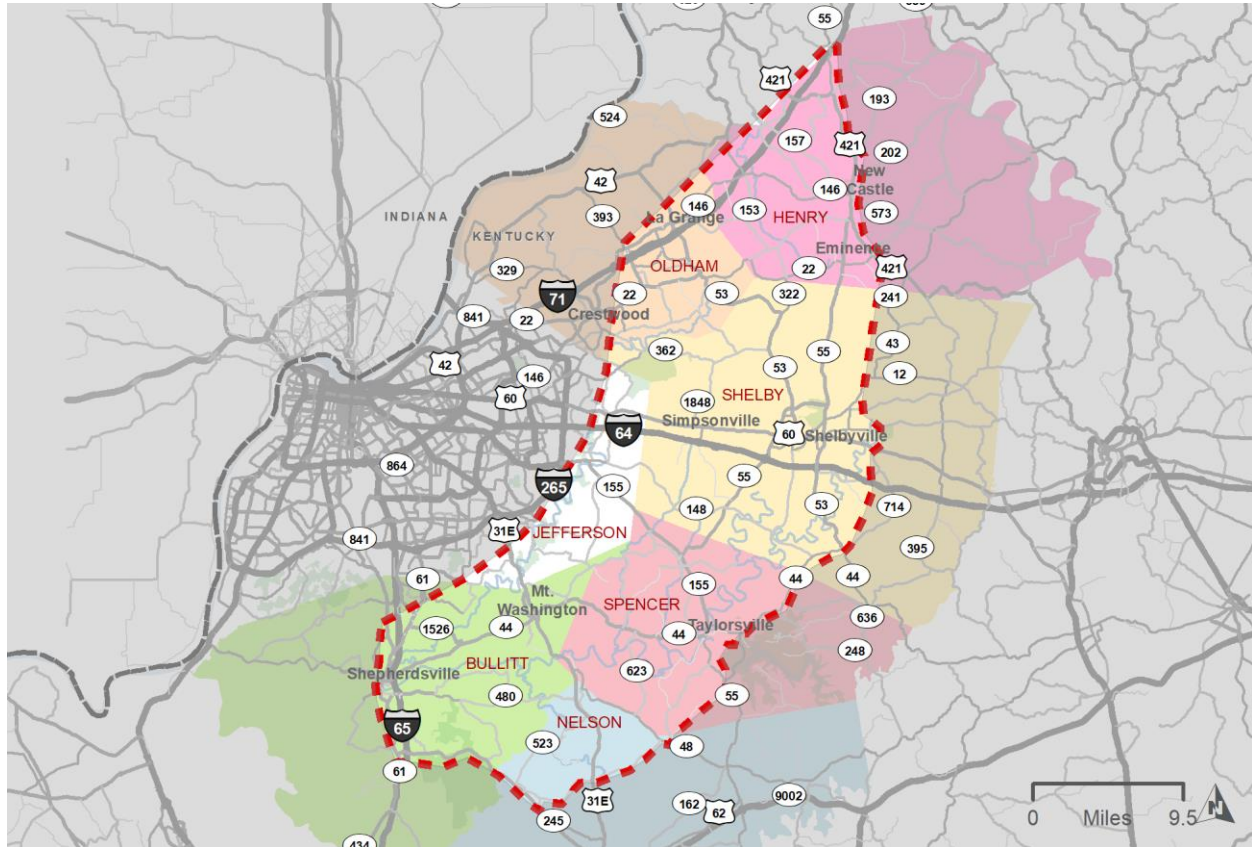
**Figure 2-1: 2010 to 2030 Population and Employment Growth**



## Land Use

**Figure 2-2** provides a brief overview of existing land use patterns and expected future developments by study-area County for the outer counties.

**Figure 2-2: Land-Use Patterns**



| County                          | Bullitt  | Henry  | Nelson   | Oldham  | Shelby   | Spencer   |
|---------------------------------|--|--|--|---|--|---|
| Pop (2019)                      | 81,700   | 16,100   | 46,200   | 66,800  | 49,000   | 19,400  |
| Area (mi <sup>2</sup> )         | 300  | 291  | 424  | 196   | 386  | 192   |
| Major roads                     | I-65, KY 44, US-31E  | I-71   | US-31E   | I-71  | I-64   | KY 155  |
| Major towns (population)        | Mt Washington (15k)<br>Shepherdsville (12k)                                      | Eminence (3k)<br>New Castle (1k)                           | Coxs Creek (6k)  | La Grange (9k)<br>Buckner (4k)  | Shelbyville (16k)<br>Simpsonville (3k)   | Taylorsville (1k)   |
| Existing Land Use in Study Area | Residential, commercial and industrial development along I-65, KY 44, and US 31E | Mainly rural, with small incorporated communities          | Mainly rural, with low-density residential and some commercial | Mainly suburban residential and commercial; some towns and business parks       | Mix of rural, suburban, and town; industrial and commercial; outlet mall at Simpsonville | Large-lot (1 ac+) single-family residential                         |
| Future Land Use in Study Area   | New industrial and commercial development along I-65 with residential elsewhere  | Additional low to moderate density residential development | Rural with small areas of "village residential"                | Additional residential and commercial development near I-71 and major arterials | New growth of all types along I-64, around larger towns, and along major arterials       | Residential development near Taylorsville and along major arterials |

Note: Population from 2019 Census Estimates

# Transportation System

## SYSTEM OVERVIEW

Greater Louisville has a hub-and-spoke highway network with three major interstates (I-65, I-64, and I-71) and multiple major arterials (US 31E, US 60, KY 22, KY 155, etc.) radiating out from the city core (**Figure 2-3**). Two circumferential interstate highways within Jefferson County distribute traffic around the core: The Watterson Expressway (I-264) and the Gene Snyder Freeway (I-265).

I-265 is currently a four-lane highway but it is planned to be widened to six lanes, with improvements to all system interchanges. The I-71 to I-64 improvements are under construction. The I-64 to I-65 improvements are programmed to be constructed in the 2027-2030 timeframe.

The 65-71 Connector study area, located outside Jefferson County's I-265 corridor, is bounded on the north and south by I-71 and I-65, respectively, and bisected by a third major interstate, I-64.

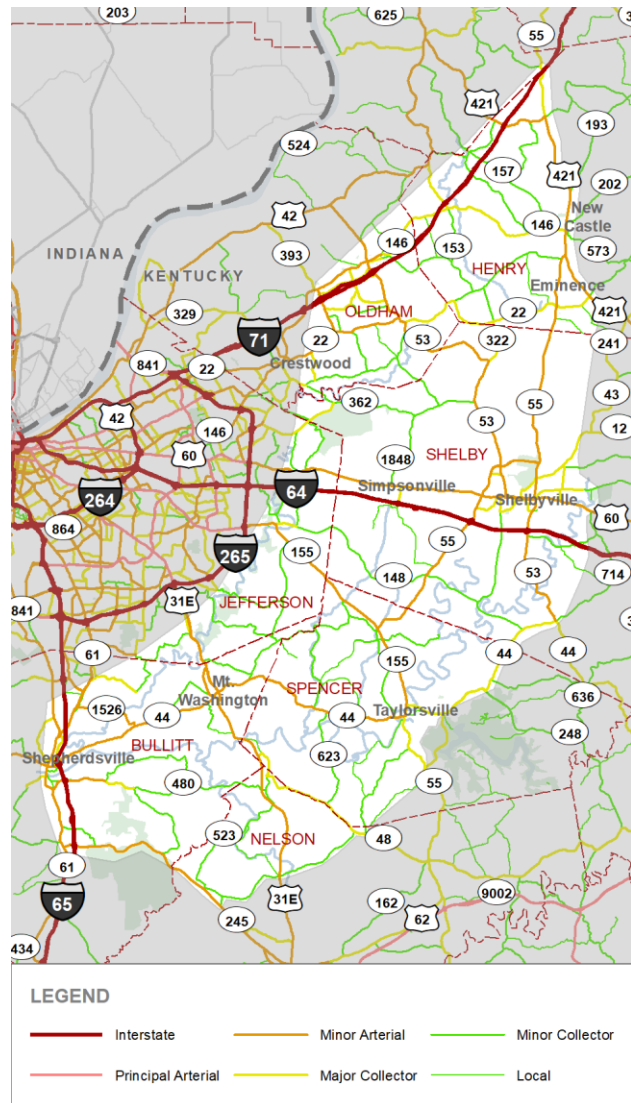
Beyond I-265, the only circumferential routes are arterial highways. These routes are typically indirect, sometimes congested, and have significant design limitations (sharp curves, narrow shoulders, access management issues, etc.). Given the projected growth in the outer six counties, it is not certain that the current, mainly rural, highway system will be adequate to accommodate the future transportation needs in the study area.

## OPERATIONAL ANALYSIS METHODOLOGY

To better quantify the level of congestion that is regularly experienced along many of the study area roadways, the existing operational performance was evaluated. To do this, the project team devised a methodology to assign a level of service (LOS) grade to each roadway based on *Highway Capacity Manual – Sixth Edition* (HCM6) methods in conjunction with the 2018 draft Florida Department of Transportation (FDOT) LOS guidelines. The FDOT process was used because it is one of the few planning-level methods that allows the use of average daily traffic (ADT) counts for calculating LOS.

As described in **Table 2-2** and **Figure 2-4**, LOS is used to provide a rating scale for congestion and operations of a roadway. LOS A represents a free-flowing facility. Average densities

**Figure 2-3: Existing Transportation Network**

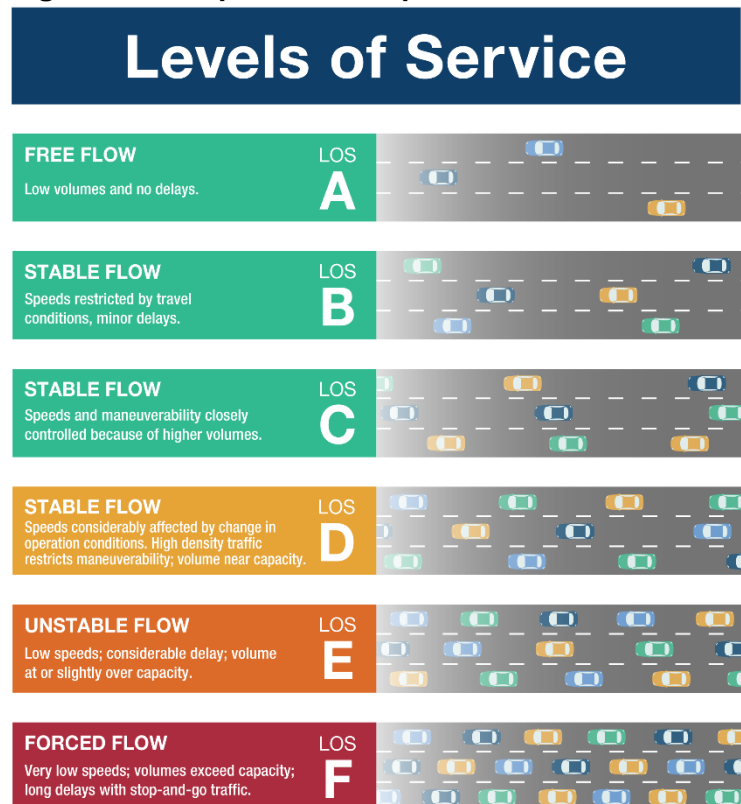


increase and travel speeds decrease with the different levels of service down to LOS F, which represents a congested roadway that is over capacity with very low travel speeds. For rural areas, LOS A to LOS C is typically considered acceptable; for suburban and outer urban areas, LOS A to LOS D is typically considered acceptable.

**Table 2-2: HCM LOS Thresholds for Freeways**

| Level of Service | Basic Freeway Segments Density (pc/mi/ln) | Freeway Weaving & Merge/Diverge Segments Density (pc/mi/ln) | Freeway Traffic Flow Characteristics   |
|------------------|---|---|--|
| A                | ≤ 11                                      | ≤ 10  | Free flow, vehicle maneuverability unimpeded.  |
| B                | > 11-18                                   | > 10-20   | Reasonably free-flow, maneuverability only slightly restricted, physical and psychological comfort high.   |
| C                | > 18-26                                   | > 20-28   | Speeds near free-flow, freedom to maneuver noticeably restricted, incidents can cause local deterioration to service quality.  |
| D                | > 26-35                                   | > 28-35   | Speeds decline with increasing flow, freedom to maneuver seriously restricted, reduced physical and psychological comfort, minor incidents can create queues.        |
| E                | > 35-45                                   | > 35  | Operation at capacity, highly volatile, little room to maneuver, incidents can produce serious breakdown and queues, physical and psychological comfort levels poor. |
| F                | > 45 Demand exceeds capacity              | Demand exceeds capacity                                     | Demand exceeds capacity, breakdown with unstable flow, these conditions exist within queues formed behind bottlenecks.   |

**Figure 2-4. Graphical Description of Level of Service**



## OPERATIONAL PERFORMANCE

The evaluation of existing operational performance indicates that a number of the study area corridors operate at LOS D or worse. These segments are shown in **Figure 2-5**. Henry County was the only county in the study area for which no segments were found to operate at LOS D or worse.

There is congestion on major routes with considerable development such as KY 44 and KY 480 in Bullitt County, KY 155 in Spencer County, US-60 in Shelby County, KY 22 and KY 146 in Oldham County, and several secondary routes.

In addition to traffic from new development, the lack of connectivity between I-71, I-64, and I-65 contributes to congestion in the study area. Virtually every trip made between counties and communities outside I-265 must occur on narrow back-roads and/or be made circuitously via I-265. The lack of regional circumferential mobility between heavy employment zones along I-65 south of Shepherdsville, major retail attractions at I-64 near Simpsonville, and major residential areas along I-71 near La Grange adds to the daily congestion on I-265.

The current condition where drivers must choose between circuitous back-roads or a congested I-265 could be alleviated by an outer beltway designed to accommodate “suburban-to-suburban” connections along the outer edge of Greater Louisville.

The use of parkway and/or Interstate design standards would also allow freight traffic to bypass the Louisville urban area for trips between I-65 and I-71, enabling faster and/or more reliable travel times in this important freight corridor.

Specific network characteristics of many of the study area roadways are detailed in the Existing Conditions Report. This includes information such as functional classification, interchange access, number of lanes, posted speed limits, actual average speeds, existing daily traffic volumes, operational level of service, designated freight routes, shoulder widths, and bridge condition ratings.

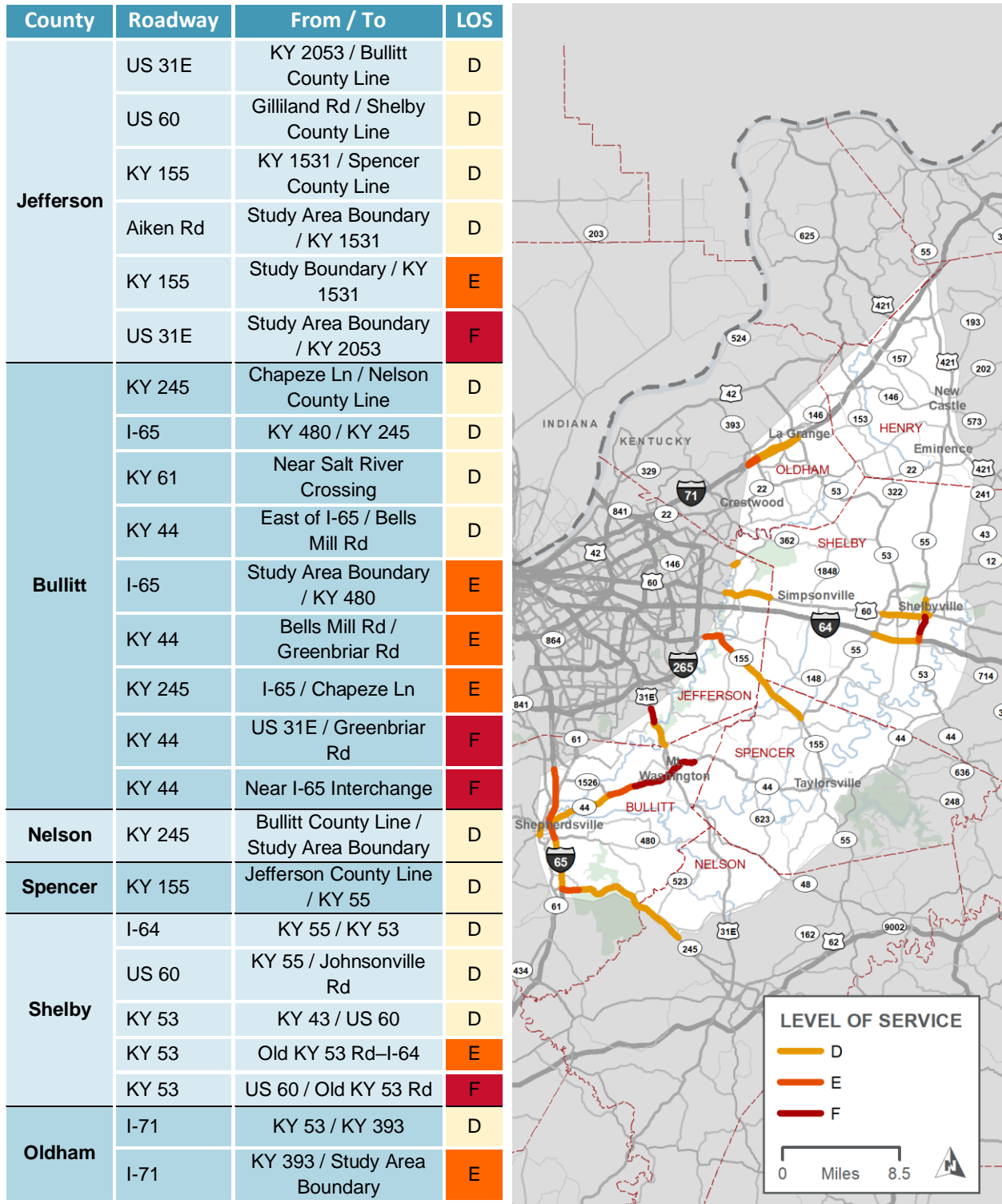
## SAFETY

The study team conducted a crash analysis of key study area roadways. Crash records for 2013 through 2017 were obtained for the study area. Excluding interstate crashes, a total of 15,885 crashes occurred during the five year period, including 90 fatalities.

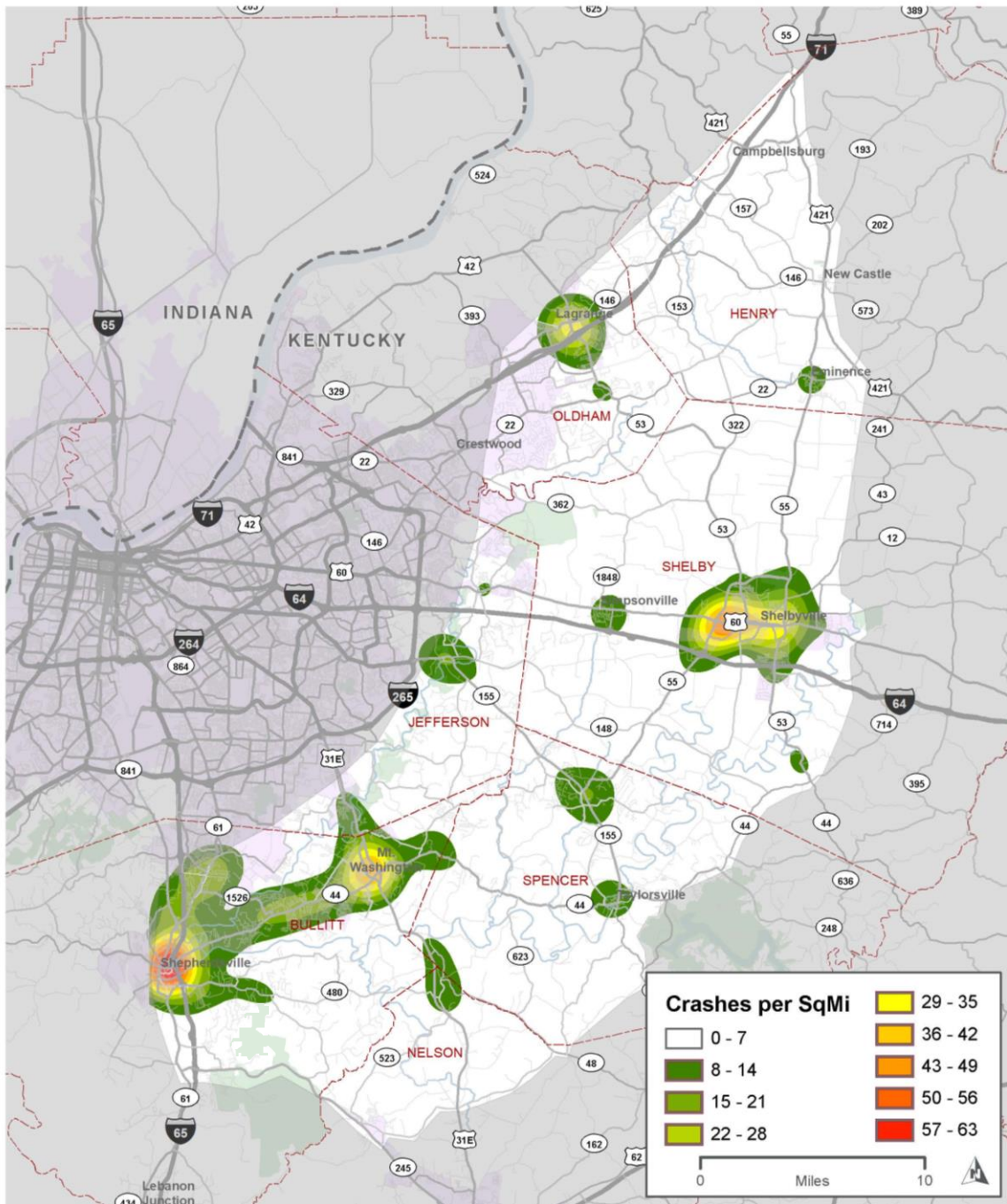
Crash patterns were analyzed for “hot spot” areas where crashes appear to occur more frequently. When interstate crashes are excluded, the main hot spots cluster around the urbanized portions of the study area, including La Grange, Shelbyville, Mt. Washington, and Shepherdsville. A crash density map is shown in **Figure 2-6**.



**Figure 2-5: Existing Operational Performance**



**Figure 2-6: Non-Interstate Crash Density**



Non-interstate, non-interchange crash experience in the study area appears to support the notion that the roadway network inadequately serves the growing demands placed on it—especially roads providing regional and interstate connectivity. Crashes are occurring on (1) roads with design deficiencies (vertical/horizontal curves, narrow lanes, narrow/absent shoulders); (2) roads in small towns or at controlled intersections that have large speed limit transitions, and; (3) roads with high speeds and appreciable truck volumes.

A review of the Excess Expected Crash (EEC) data from KYTC supports this position. According to KYTC guidance, EEC “is a measurement which estimates the number of crashes above what is predicted by a crash prediction model of roadways or intersections of similar type, length, and characteristics in Kentucky.” The two-lane highway route between I-65 in Shepherdsville and I-64 in Shelbyville has a value of +443 (**Figure 2-7**). This high value indicates that this route may not be appropriate for accommodating high volumes of cross-country travel. Compare this to the EEC of -69 for the Interstate route (I-65, I-265, and I-64).

**Figure 2-7: EEC Comparison Shepherdsville to Shelbyville**



## Utilities and Railroads

The locations of existing infrastructure such as utilities and railroads were obtained and documented in detail in the Existing Conditions Report. As the alternative corridors for a Regional Connector are considered, it is important to be aware of these potential conflicts.

Utilities – Water transmission, Sewerage, AT&T Legacy (Fiber), Electric transmission, and Gas and Hazardous liquid transmission, are all present within the study area.

Railroads – Five different sets of railroad tracks traverse the study area in various locations. These are owned and operated by three different rail companies: CSX Transportation, Norfolk Southern Railway, and RJ Corman Railroad.

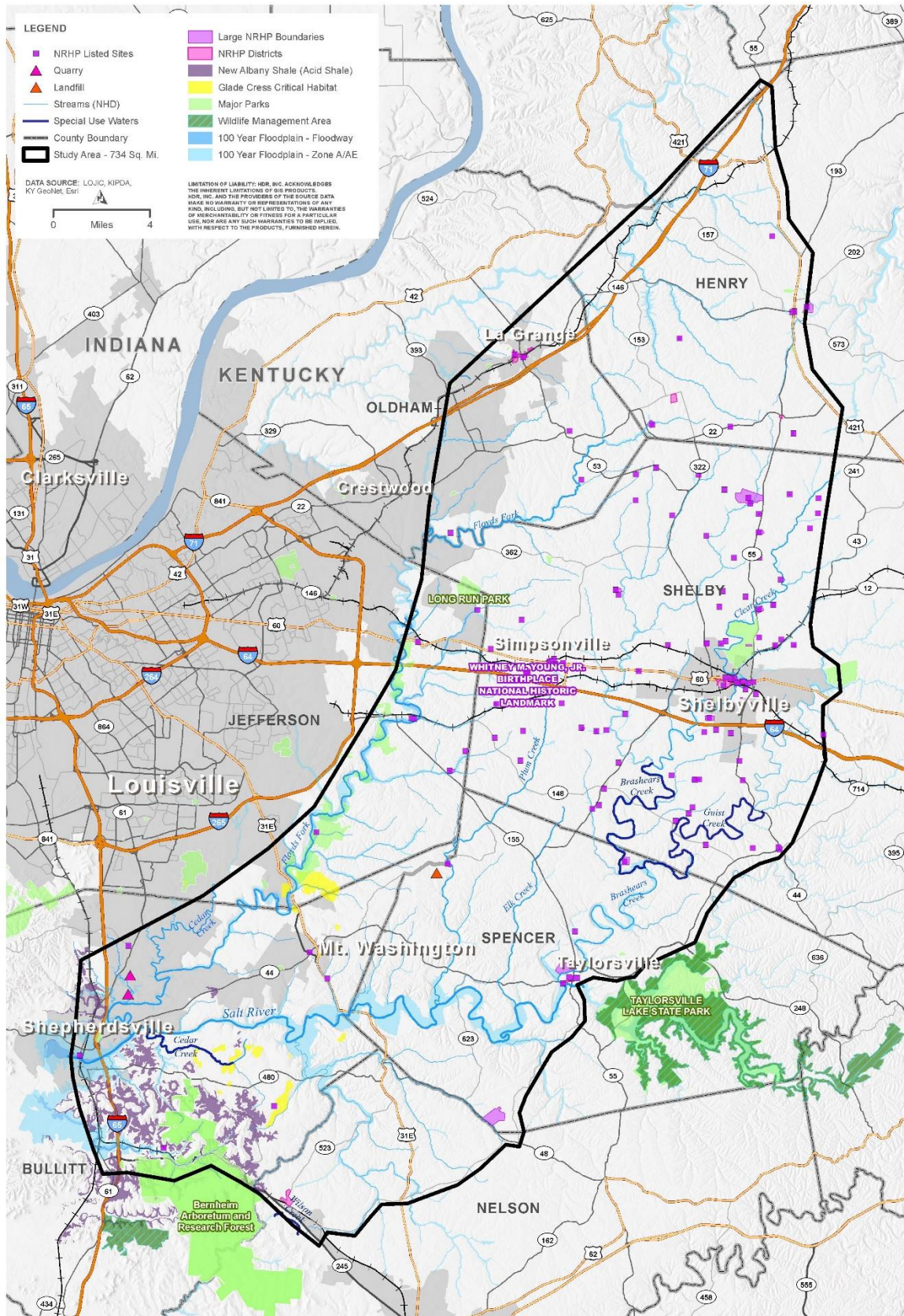
## Environmental Overview

The environmental overview included examination of the natural environment (watersheds, floodplains, wetlands, threatened/endangered species, ecologically important lands, and geology) as well as the human environment (air quality, noise, environmental justice, community facilities, land use, farmlands, hazardous materials, historic structures, archaeological sites, and parks). A summary of the environmental constraints discovered during this process is presented in **Table 2-3**. Several key features are mapped in **Figure 2-8**. The full Environmental Overview document is provided in Appendix D.

**Table 2-3: Environmental Constraints Summary**

| Category   | General Consideration  | Key / Primary Concerns  |
|--|--|---|
| <b>Natural Environment</b>                                 |  |   |
| Streams  | Surface drainage primarily within Salt River watershed<br>11 major drainage features (streams)   | KY Division of Water Exceptional Use Waters: <ul style="list-style-type: none"> <li>• Cedar Creek</li> <li>• Wilson Creek</li> <li>• Brashears Creek</li> <li>• Guist Creek</li> </ul>  |
| Wetlands   | In all study area counties   | Farm ponds, marshy areas, low-lying fields  |
| Threatened & Endangered Species                            | 9 federally listed species with 1 species having critical habitat  | <ul style="list-style-type: none"> <li>• Critical habitat for KY glade cress</li> <li>• Known Indiana bat and northern long-eared bat priority locations in Bullitt, Jefferson, Nelson, and Spencer counties</li> </ul>   |
| Managed & Ecologically Important Lands                     | Several managed lands providing conservation and critical habitats   | <ul style="list-style-type: none"> <li>• Pine Creek Barrens NP and Apple Valley Glades State NP - KY glade cress habitat</li> <li>• Bernheim Arboretum and Research Forest</li> <li>• The Parklands of Floyds Fork</li> <li>• KY Department of Fish &amp; Wildlife Resources Fee-In-Lieu-Of (FILO) sites</li> </ul> |
| Geology  | New Albany Shale in southwestern portion of study area   | Acidic tendencies of New Albany Shale – can affect water quality  |
| <b>Human Environment</b>                                   |  |   |
| Air Quality  | Transportation criteria pollutants<br>“Project with Low Potential MSAT Effects”  | Bullitt, Jefferson, and Oldham counties designated as nonattainment for 8-hour Ozone  |
| Noise  | Noise sensitive land uses  | Medium to high density residential areas within 500 feet of a new roadway   |
| Environmental Justice<br><i>Minority % &gt; County %</i>   | 15 census tracts   | Census tracts with both minority and low-income % > county's %: <ul style="list-style-type: none"> <li>• 3 census tracts in Bullitt County</li> <li>• 1 census tract in Henry County</li> <li>• 2 census tracts in Shelby County</li> <li>• 1 census tract in Oldham County</li> </ul>                              |
| <i>Low-income % &gt; County %</i>                          | 17 census tracts   |   |
| Community Facilities and Services                          | 57 schools<br>Other community facilities located in all study area counties  | Schools, hospitals, government buildings, religious institutions, public parks, trails  |
| Land Use   | All counties have land use plans as part of Comprehensive Plans  | Predominantly rural study area, zoned agricultural and low-density housing  |
| Farmland   | 41 prime farmland soil classifications (“All Areas are Prime Farmland”)<br>Agricultural Districts  | 45% of farmland soils are “All Areas are Prime Farmland” classification<br>Agricultural Districts, with concentration in Shelby and Henry counties  |
| Hazardous Materials/USTs                                   | 1 landfill<br>2 quarries<br>Major industrial parks<br>Numerous UST sites   | <ul style="list-style-type: none"> <li>• Williams Landfill Area</li> <li>• Bullitt County Stone Quarry</li> <li>• Quality Crushed Stone Quarry Area</li> </ul>  |
| Historic Structures  | 124 individually listed NRHP sites<br>13 historic districts encompassing 478 contributing resources<br>164 sites meeting NRHP criteria                                       | National Historic Landmark – Whitney M. Young, Jr. Birthplace<br>Potential for intact historic farmsteads meriting large NRHP boundaries  |
| Archaeological Sites                                       | 327 previous archaeological surveys<br>7 Phase II/III<br>Over 550 previously identified sites<br>464 mapped cemeteries with 16 cemeteries identified as archaeological sites | Particular potential for sites within wide floodplains and terraces of stream valleys;<br>Potential for additional cemeteries that are archaeological sites   |
| Section 4(f) Properties / Section 6 (f) Properties (Parks) | 4(f) resources - 43 parks and NRHP listed and NRHP eligible sites<br>6(f) resources - 17 parks   | All public parks and all NRHP listed and NRHP eligible sites are 4(f) resources<br>Parks having received 6(f) funds require additional coordination   |

Figure 2-8: Existing Environmental Constraints (updated 3/20/20)



## 3 - Future No-Build Conditions

As documented in Section 2, the study area has been experiencing steady growth, and appears to be poised to continue to do so into the future. With current congestion levels already resulting in poor levels of service in some areas, the continued growth will only serve to worsen conditions. This chapter documents the forecasted conditions for the 2040 horizon year without a 65-71 Regional Connector.

### Travel Demand Model (TDM) Development

The project team determined that the best tool for evaluating potential travel-demand effects was the Kentucky Statewide Traffic Model (KYSTMv17), a travel demand model built within the TransCAD software platform. This model was updated in 2012 to include a base year of 2010 and future horizon year of 2040. Land use is updated on an ongoing basis with the current “existing” year being 2017. The model was reviewed in detail and updated where necessary to improve forecasting accuracy in the study area. These modifications are described at a high level below. For more detailed information, see the *KYSTM Modeling Process Documentation Report* (January 2, 2020) in **Appendix C**.

First, modifications were made to the Traffic Analysis Zone (TAZ) structure to increase zonal detail, with the goal of generating more realistic traffic assignments within the study area. The original land use estimates were split appropriately as the TAZs were resized. These modifications resulted in an increase of 47 TAZs from the original model.

Second, modifications were made to increase network density in certain parts of the study area. This was completed mainly in conjunction with where zonal density was added. The new model links reflect the addition of actual, existing roadways that were not in the original model.

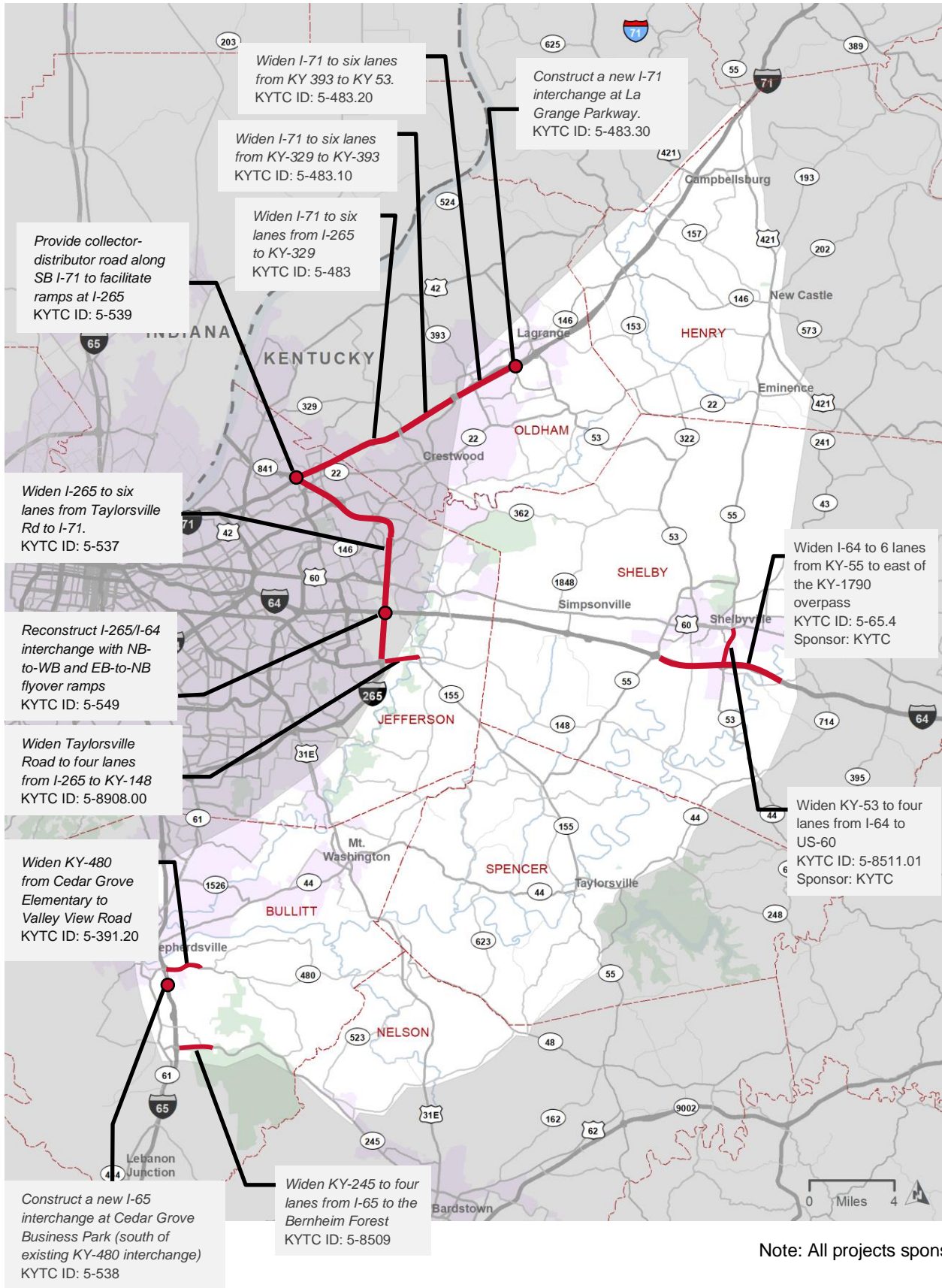
Third, the model land-use was reviewed and updates were made where needed. This process involved comparing the KYSTM land-use to the KIPDA regional travel demand model land-use. It also involved in-person discussions with county planners for several of the study area counties. KYTC also provided updated 2017 employment data.

Lastly, network modifications were incorporated to reflect future improvement projects expected to be in place by the 2040 horizon year. To determine these projects, the KYTC Highway Plan, the KIPDA Metropolitan Transportation Plan, and the KIPDA Transportation Improvement Program were all consulted. Discussions were also held with KYTC staff to confirm the No-Build scenario assumptions. **Figure 3-1** illustrates these projects.

### No-Build Analysis Results

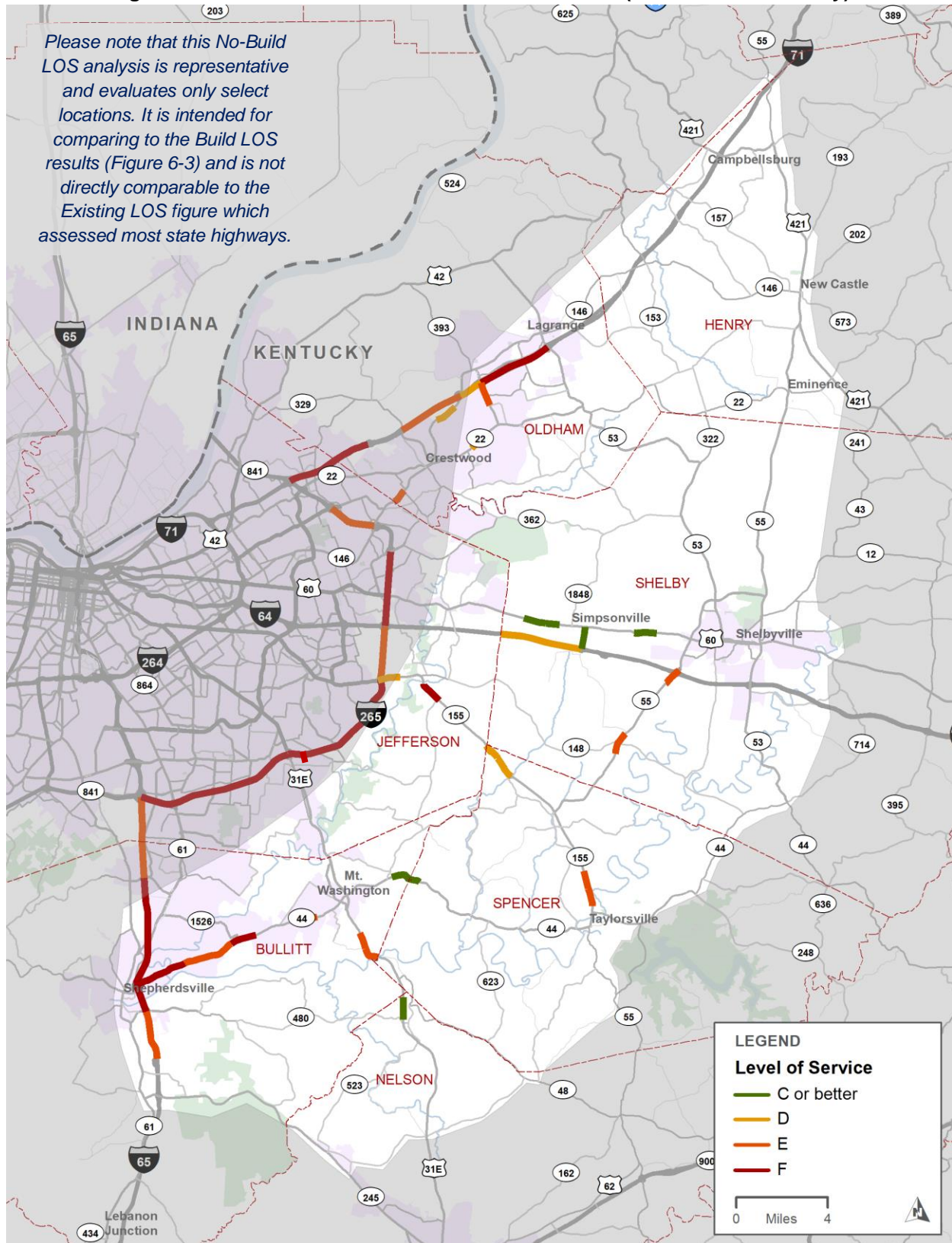
Using the methodologies described in the Existing Conditions section, the forecasted 2040 No-Build volumes were analyzed to determine predicted levels of service. **Figure 3-2** illustrates the LOS for the No-Build condition using those forecasts. Perhaps the most striking feature of the figure is the forecasted concentration of LOS E/F conditions along I-65 and KY 44 in Bullitt County, as well as along I-71 in Oldham County.

**Figure 3-1: Future Improvement Projects**



Note: All projects sponsored by KYTC

**Figure 3-2: 2040 No-Build Condition Level-of-Service (Select Locations Only)**





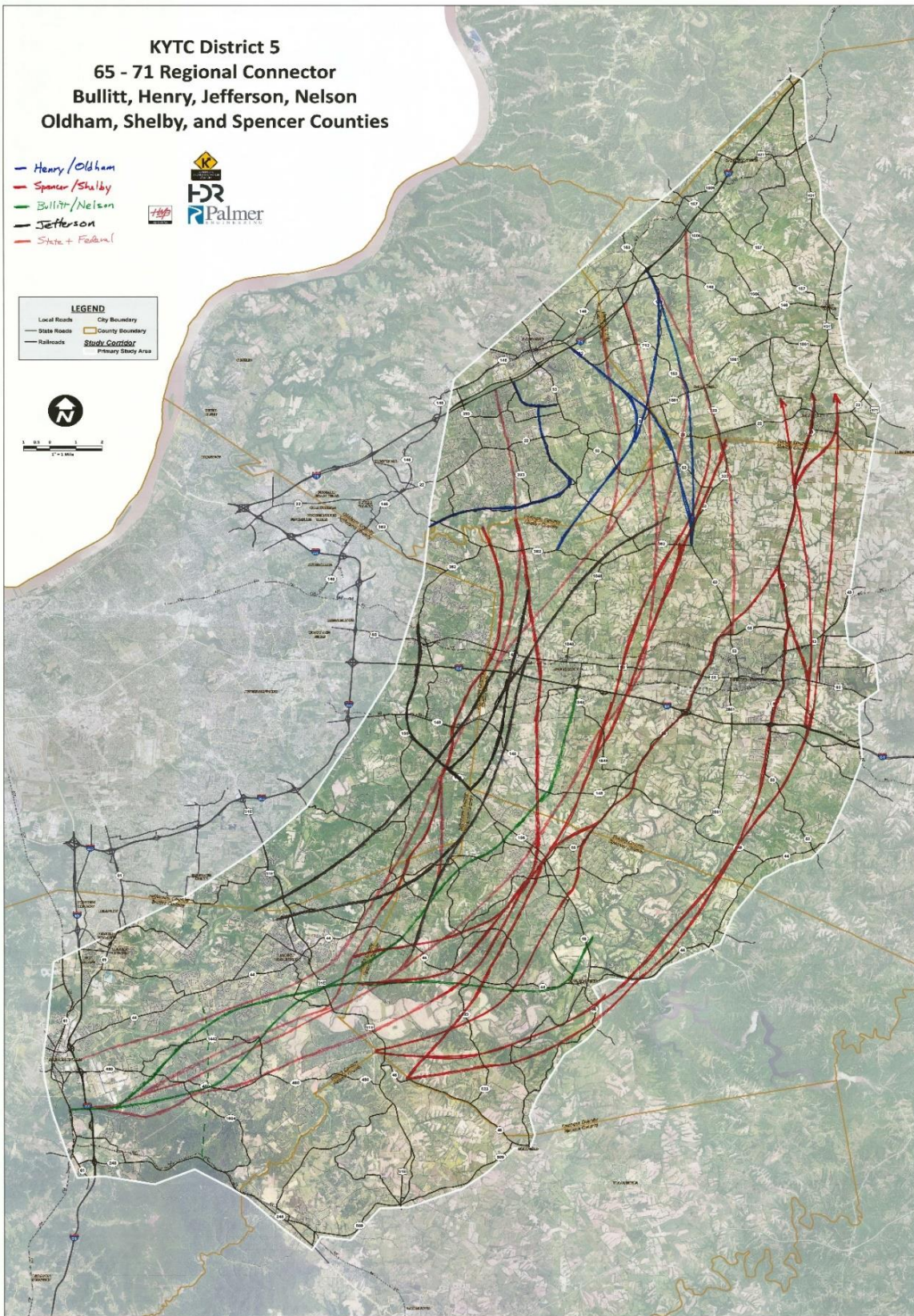
## 4 – Alternatives Development

With the project purpose and need defined and an initial assessment of the existing issues and constraints, the team turned to developing a wide range of potential improvement alternatives. Numerous 2,500-foot wide corridors for a new regional connection were developed based on major trip origins and destinations, highway network configuration, topography and geography, and environmental considerations.

Input on potential corridors and highway facility types was also solicited during the first round of focus group meetings. Generally, the focus groups preferred a four-lane, freeway type facility with a 70 MPH design speed. Full access control was desired with interchanges roughly every three to five miles at key locations. During a sketching exercise, the focus groups were invited to draw potential corridors that they thought the study team should consider. **Figure 4-1** is a master map showing the result of this exercise, color coded by focus group. A detailed explanation of the focus group engagement process is located in Chapter 7, “Focus Group Involvement”.

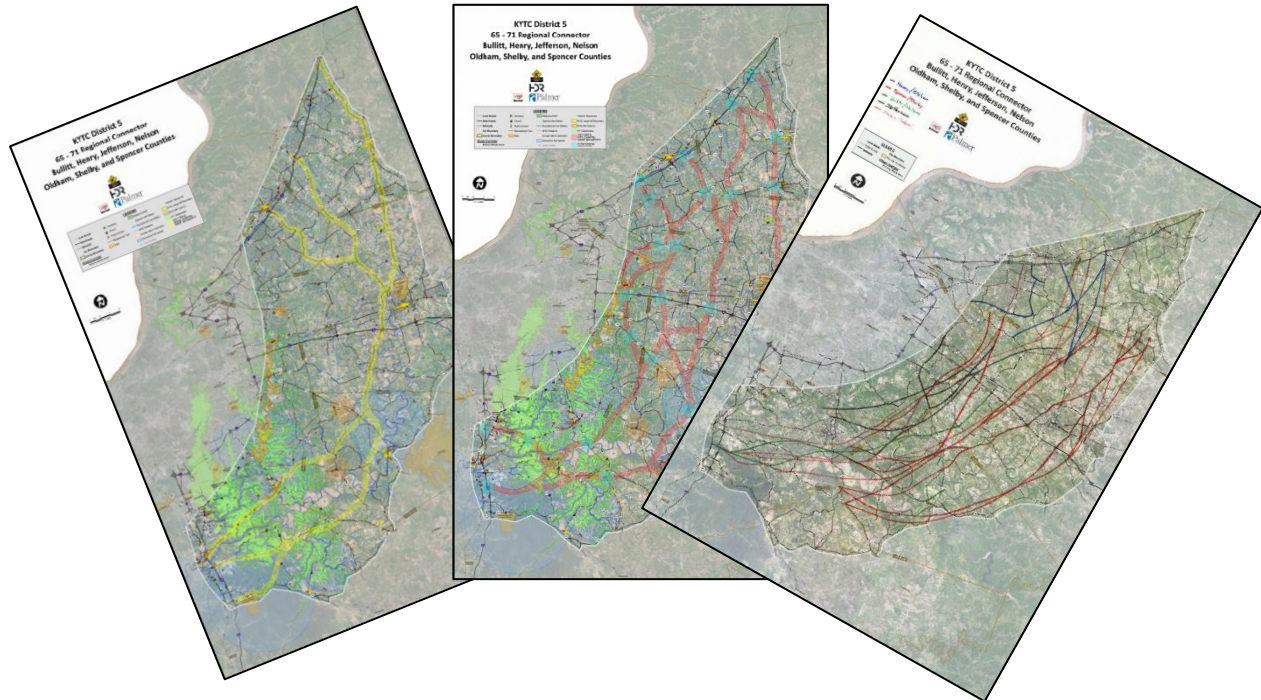
In total, taking into account the focus group input as well as the project team input, over 30 alternative corridors for new or upgraded highways were considered in the study.

Figure 4-1: Focus Group Meetings, Round 1: Hand-Drawn Potential Corridors



**Figure 4-2** shows several maps of potential alternatives developed during this phase to illustrate the wide range of ideas. The No-Build was also an important alternative discussed during this phase.

**Figure 4-2: Examples of Corridors Considered During Alternatives Development**



Some, but certainly not all, of the topics considered in developing alternatives are listed below. These applied to upgrade of existing and new highway alternatives.

- Geography and Topography (e.g. rivers, streams, hills/slopes, highways, interchanges)
- Existing and Proposed Development (e.g. residential, commercial, and industrial)
- Natural and Human Environmental Constraints (e.g. parks, conservation land, and floodways)
- Tie in locations at Interstates and highways (e.g. interchange locations)
- Major cost factors (e.g. Salt River crossings, total length, interchanges)
- Location relative to major communities and trip origins/destinations
- Location on or near existing highways

At the conclusion of this phase, the various ideas were grouped into five “families” of alternatives for evaluation in the Level 1 evaluation.

# 5 – Level 1 Alternatives Evaluation

The Level 1 Evaluation was the first step in the process of examining alternatives to assess their feasibility and determine how well they would meet the project purpose and need. This process considered different corridor alternatives and a variety of design parameters (e.g. design speeds, lanes, and typical sections). In addition, some corridor alternatives used both new and existing highway alignments. The evaluation compared each alternative based on a matrix of performance measures.

## Level 1 Alternatives

The over 30 ideas identified in the alternatives development phase were grouped into five “families” of corridors for evaluation. Each set of corridors included several variations. The variations often included different northern and southern endpoints. The first four families of alternatives present corridors for new grade separated freeways on new alignments (i.e. access only at interchanges). The fifth family presents options for upgrading existing highways to accomplish similar goals, but with an at-grade rural four-lane highway (i.e. no interchanges except at Interstates). Each group of alternative corridors is described below and shown in **Figures 5-1 and 5-2**.

### Alternative 1 Corridors

The Level 1 Alternative 1 corridors (1, 1A, and 1B) are located furthest to the west, and nearest to I-265. They have two variations in the south where they connect to I-65 – one connects north of Shepherdsville near KY 61 (Fig. 5-1; 1, 1A) and one connects south of Shepherdsville at the new I-65 interchange now under construction (Fig. 5-1; 1B). In the central portion of the corridor, there would be a new interchange with I-64 approximately 2.5 miles east of I-265. There are two possible routes north from I-64 to KY 393 (Fig. 5-1; 1 and 1B continue northward; 1A swings eastward). Both corridors intersect near the junction of KY 22 and KY 393, then continue along the existing KY 393 alignment to I-71.

### Alternative 2 Corridors

The Level 1 Alternative 2 corridors (2, 2A, 2B, and 2C) provide a connection slightly east of Alternative 1. The two optional connections to I-65 in the south are the same as for Alternative 1 (Fig 5-1; 2C connects north of Shepherdsville; 2, 2A, 2B connect at the new interchange). In the central section is where the corridors begin to deviate. There are two options for new interchanges at I-64 with one located to the west of Simpsonville (Fig. 5-1; 2, 2A, 2C) and one to the east (Fig. 5-1; 2B). From there, two sub-corridors continue north and provide two options for intersecting with I-71. The first aligns with the Alternative 1 connection along existing KY 393 (Fig 5-1; 2, 2C). The second provides a new I-71 interchange east of La Grange, in the vicinity of the existing KY 712 (Jericho Road) overpass (Fig. 5-1; 2A, 2B). Alternative 2A uses the northern I-71 connection but then turns west to connect to I-64 west of Simpsonville, running parallel to I-71 for about four miles.

Figure 5-1: Level 1 Alternatives 1-4

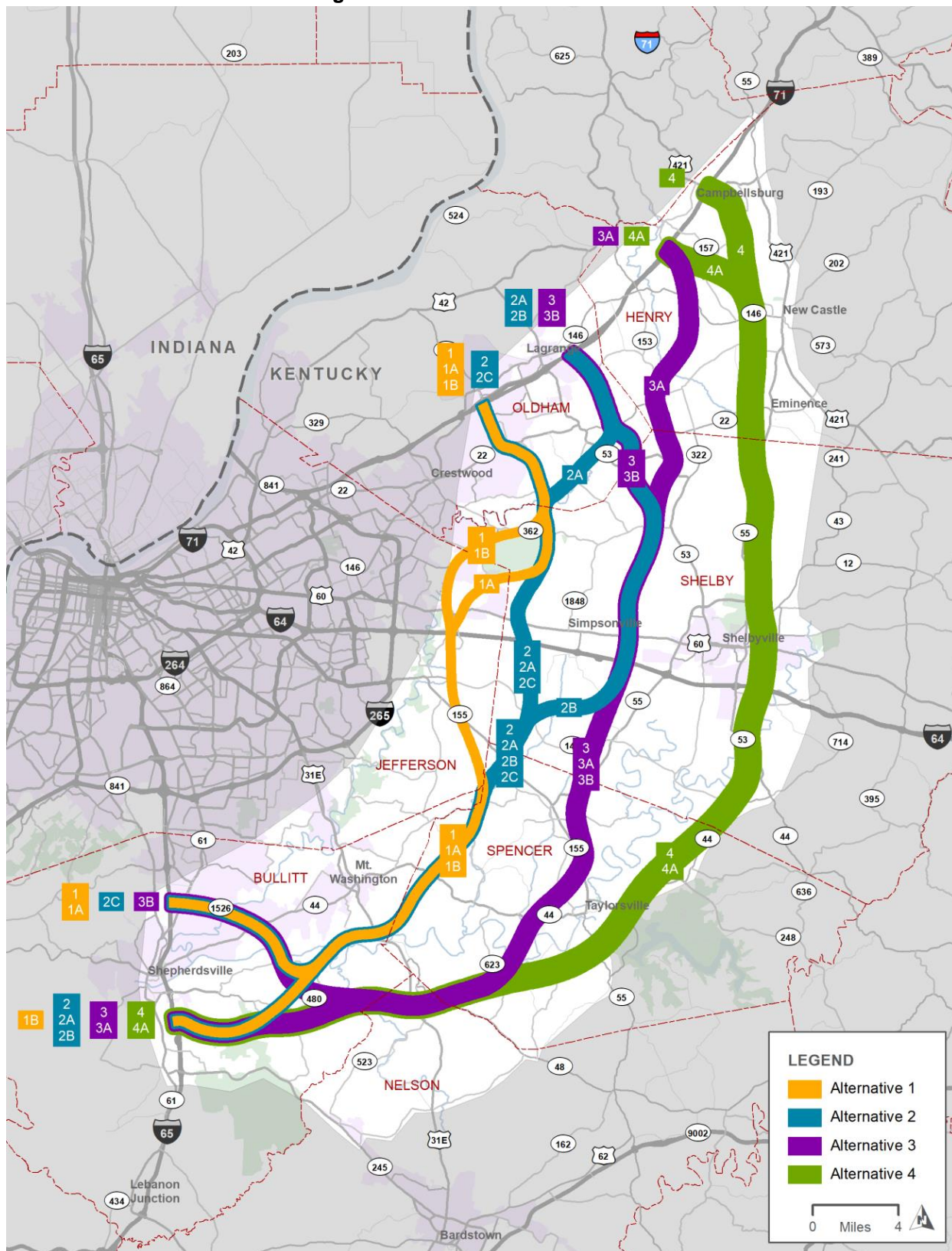
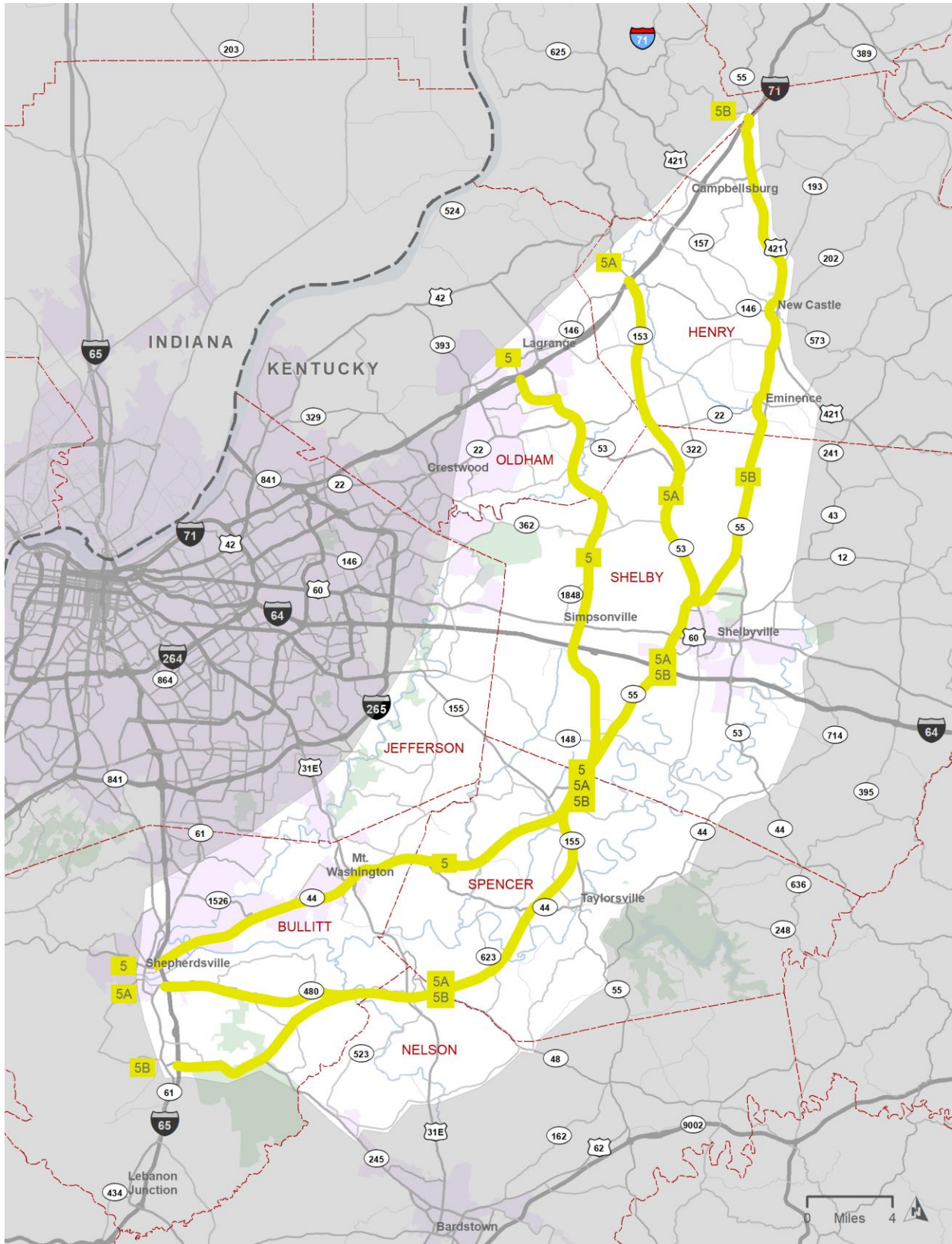


Figure 5-2: Level 1 Alternative 5



### **Alternative 3 Corridors**

The Level 1 Alternative 3 corridors (3, 3A, and 3B) would serve communities further to the east than Alternatives 1 and 2. The two connections to I-65 at the south end would remain the same as the prior alternatives (Fig. 5-1; 3B north of Shepherdsville; 3, 3A at new interchange).

However, the corridors (3, 3A, 3B) then swing out farther east into the northern part of Nelson County before turning north towards Taylorsville. At the I-64 junction, Alternative 3 shows a similar interchange location as the second option under Alternative 2 (Fig. 5-1; 2B - east of Simpsonville).

Two optional connections at I-71 were also considered, with the first matching the Alternative 2 corridor (2A, 2B) of a new interchange in the vicinity of the existing KY 712 (Jericho Road) overpass (Fig. 5-1; 3, 3B). The second option would push even farther to the northeast into Henry County, with a new interchange near KY 1606 (Fallen Timber Road). See Figure 5-1; 3A.

### **Alternative 4 Corridors**

The Level 1 Alternative 4 corridors (4 and 4A) provide the easternmost connections; farthest from I-265 and near the eastern study area boundary. Both variations of Alternative 4 connect to I-65 at a new I-65 interchange south of Shepherdsville (See Fig. 5-1) similar to several other Level 1 Alts. (1B, 2, 2A, 2B, 3 and 3A). The Alt. 4 corridors then continue east past Taylorsville before turning north and following along the eastern boundary of the study area. The proposed connection with I-64 is located east of the KY 53 (Mt Eden Road) interchange, approximately 17 miles east of I-265 (more than half-way to the US 127 interchange serving Frankfort). The corridor continues north, passing to the east of Shelbyville. There are two options at the north end. One option (4A) connects to I-71 in the same place as the northern Alternative 3 (3A), near KY 1606 (Fallen Timber Road). The other connection would extend even further to the northeast, tying into the existing interchange at US 421 near Campbellsburg (Fig. 5.1; 4).

### **Alternative 5 Corridors (Upgrade of Existing)**

The approach to developing the Level 1 Alternative 5 corridors (5, 5A, and 5B) was different from the other alternatives. While Alternatives 1-4 (and each of their variations) assumed either an expressway or freeway typical section along new alignments, Alternative 5 assumed a proposed connection would have an arterial typical section, and in many cases run along upgraded existing highways.

Alternative 5 (See Figure 5.2) provides the westernmost connections. It begins in Shepherdsville, traveling through Mt. Washington on an upgraded KY 44 then crossing through Spencer County and southern Shelby County along a combination of new and upgraded highways to Simpsonville. From I-64 in Simpsonville, the Alt. 5 corridor will again follow new and upgraded highways to KY 53 and the new La Grange Parkway. It ends at the planned new interchange just south of La Grange, scheduled for completion in 2021.

Alternative 5A (Fig. 5.2) follows KY 480 from I-65 east into Nelson County. It uses a combination of new and upgraded highways in Spencer County, then follows KY 55 into Shelbyville. From Shelbyville, it follows KY 55, KY 53, KY 322 and ultimately KY 153 to tie into I-71 near Pendleton. Alternative 5B (Fig 5.2) begins at I-65 following KY 245 eastward through Bullitt County. It turns north to run along the proposed route of the Alternative 5A corridor to KY

55 in Shelbyville. From Shelbyville, it generally follows KY 55 northeast to I-71 in Henry County to the north most tip of the study boundary.

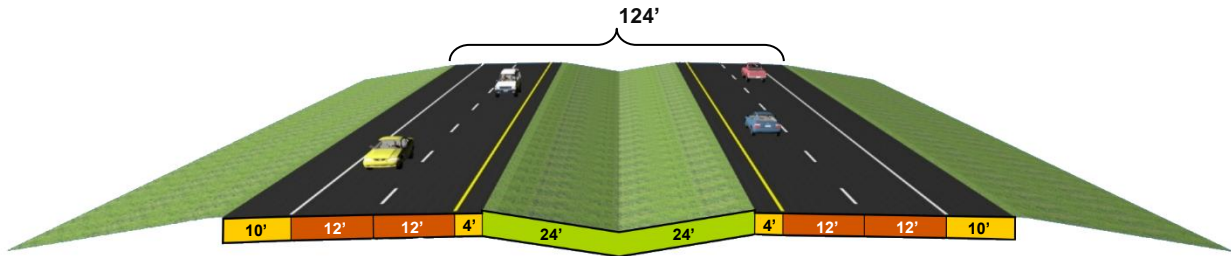
## **Design Parameters**

As mentioned in the descriptions above, many of the alternatives were designed to provide a high-speed, continuous freeway connection along a new roadway alignment, while some were developed to re-use existing infrastructure to the extent possible while still providing improved connections at lower speeds. For the alternative corridors using all new alignments (1, 2, 3, and 4), there was also consideration given to a two-lane initial and four-lane ultimate design. The design parameters, including typical section, design speed, interchange vs at-grade connections, and re-use of existing facilities were all important considerations in the development of alternatives for the Level 1 evaluation.

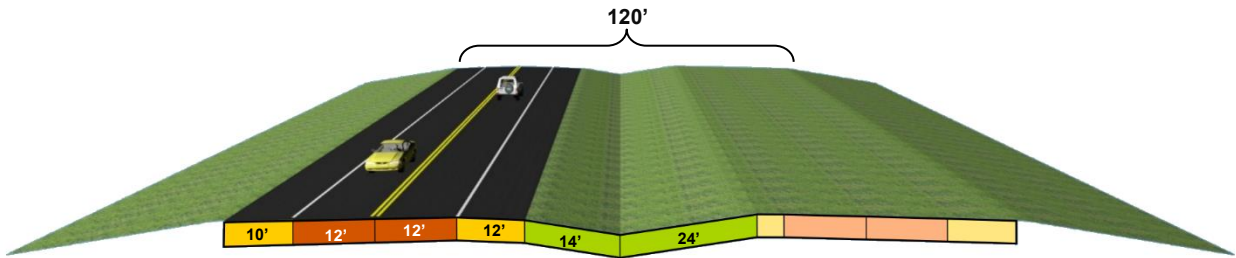
The typical sections developed for all alternatives are shown in **Figure 5-3**.



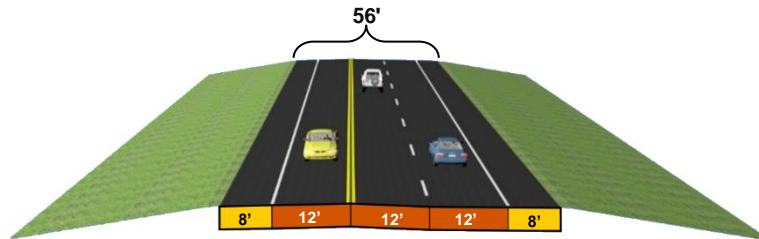
**Figure 5-3: Typical Sections**



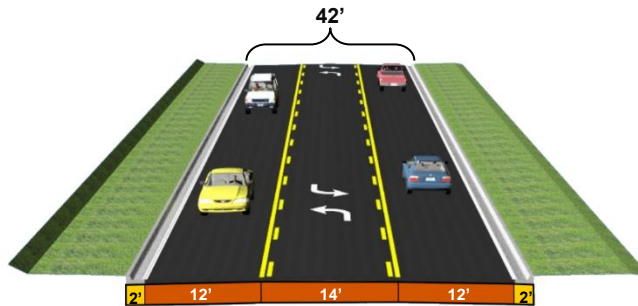
A. Typical section: four lanes with grassy median



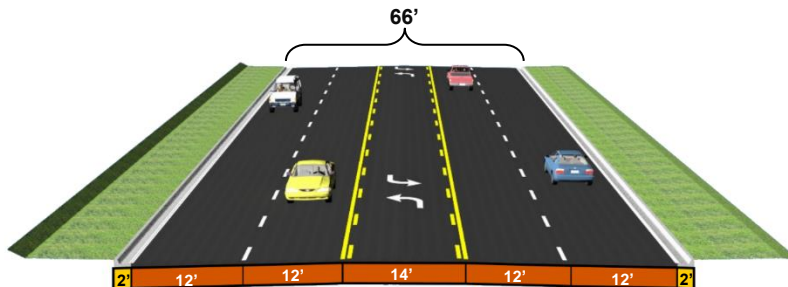
B. Initial section: two lanes with reserved ROW for future build-out



C. "2+1" section: two lanes with passing lane



D. Narrow urban section: two lanes with center turn lane



E. Wide urban section: four lanes with center turn lane

## **New Highway Corridors**

Alternative groups 1 through 4 were proposed to be interstate or parkway-type facilities using an approximate 70-mph design speed. System interchanges would be provided at each of the three interstates, and service interchanges would be provided at other strategic locations along each corridor, with a minimum spacing distance of three miles. As shown in Figure 5-3, the section includes a four-lane roadway (two lanes in each direction) with 12-foot lanes and a 56-foot depressed median. Four-foot inside shoulders and 10-foot outside shoulders are proposed, for a pavement edge-to-edge width of 124 feet.

While Alternatives 1 through 4 are presented as Interstate-type facilities with interchanges in their ultimate configuration, traffic projections may show that such a facility is not warranted initially. In the near-term, an alternate facility type, called a “regional connector roadway,” could provide a combination of at-grade intersections and interchanges. Interchanges would still be provided at existing Interstates. The typical section would be similar to the one presented in Section A in **Figure 5-3**, except a narrower median could be considered.

Another interim configuration that could be considered would be to construct an initial two-lane section while reserving the right-of-way to ultimately build the full four-lane section. An example of this is illustrated by Section B in **Figure 5-3**.

## **Upgrade of Existing Highway Corridors**

A significant portion of the Alternative 5 family of corridors would be built as improvements to existing roadway corridors with an anticipated design speed of 55 mph. Within these corridors, the four-lane divided highway typical section could be used where right-of-way allows. However, for the more constrained areas, several optional typical sections were developed. For example, highway segments could be widened to a “2+1” facility which would be similar to the initial two-lane section, but with the inclusion of passing lanes alternating in each direction. This section, illustrated by Section C in **Figure 5-3**, would have a reduced (56-foot) edge-to-edge width, with 12-foot lanes and 8-foot shoulders on each side.

For certain portions of the Alternative 5 corridors, narrower and more urban typical sections could be considered. These sections could include center turn lanes and curb and gutter. Both three-lane and five-lane typical sections were developed. The three-lane section (Section D in **Figure 5-3**) includes a 42-foot-wide roadway section, which includes 12-foot travel lanes, a 14-foot center turn lane, plus 2 feet for curb and gutter. The five-lane section (Section E in **Figure 5-3**) includes two 12-foot travel lanes in each direction, separated by a 14-foot-wide center turn lane. In this option, 2-foot curb-and-gutters are provided in each direction. The total edge-to-edge width of the five-lane section is 66 feet. The design speed for both of these urban typical sections ranges from 45 to 55 miles per hour.

In addition to capacity and geometry improvements, access management concepts, where right-of-way allows, would also be considered. Access management concepts such as raised median islands with an increased median width of 20 feet would help to eliminate several of the conflict points associated with access control by permit segments. Restricted Crossing U-Turn (RCUT) intersections could also be used in congested areas to reduce signal needs and reduce conflict points.

## Level 1 Evaluation Matrix

The Level 1 alternatives were holistically evaluated using 20 metrics across 6 categories, each of which connects directly to the project's purpose and need. The metrics were developed using best practice transportation performance metrics, in conjunction with input from the focus groups on performance metrics that could be used to measure whether goals were being met.

Weights were also developed for each metric based on their relative importance. Draft weights were developed and then debated in detail with the entire project team during a project work session. The weights were also influenced by focus group input.

This scoring method is the foundation for the Level 1 evaluation matrix, which allows the alternatives to be ranked against each other. Each category is described below along with the metrics and weights used to evaluate them.

### Mobility

The Level 1 mobility category considers six metrics: travel time, travel volume, congestion relief, accessibility impact, system redundancy/resiliency, and freight.

- Travel time (weight 10) – the time taken to travel between origins and destinations. Scoring was based upon congested travel times.
- Traffic volume (5) – the volume of vehicles accommodated. Scoring was based upon forecasted volumes from the travel demand model.
- Congestion relief (10) – improvement in congestion metrics, such as level of service. Scoring was based upon forecasted metrics (e.g. vehicle hours of travel) from the travel demand model as well as forecasted volume and operational considerations.
- Accessibility impact (5) – connectivity to existing communities and development. Scoring was based upon visual inspection of corridors and access points (interchanges) in relation to existing and proposed development.
- System redundancy / resiliency (5) – whether route complements existing routes, creating a backup in case of closures. Scoring was based upon a qualitative assessment of the improvement to the system.
- Freight (5) – connectivity to industrial developments; projected truck volumes. Scoring was based upon travel time estimates, visual inspection, and forecasted truck volumes from the travel demand model.

### Land Use and Development

The land use and development category considers two metrics: support of local development goals, and land-use compatibility.

- Support of Local Development Goals (10) – compatibility with proposed land use; accessibility to future growth areas; impact on future land use. Available future land use plans and other planning documents from local and regional entities were consulted in the scoring of this metric.

- Land Use Compatibility (5) – impact on existing development, particularly sensitive communities. Available census data regarding the location of sensitive populations, as well as visual inspection of aerial photography, was used in the scoring of this metric.

### **Safety**

The safety category was informed by a qualitative/quantitative assessment of how each alternative might affect safety by either adding or removing traffic from highways with poor safety ratings. It also considered how an alternative might directly improve the safety performance of a highway through upgrades of existing highways. The weight in the matrix was 10 points.

One safety rating considered was the EEC metric developed by the Kentucky Transportation Center (KTC). According to the KYTC *Statewide Planning Contract Guidance*, EEC is a “measurement which estimates the number of crashes above what is predicted by a crash prediction model of roadways or intersections of similar type, length, and characteristics in Kentucky.” It is calculated using Kentucky specific safety performance functions. An EEC greater than zero indicates that the expected crashes that take into account the historical crash data exceed the theoretical predicted crashes. This means that the road segment has more crashes than other similar road segments in Kentucky. Alternatives that are expected to increase traffic on existing roadways that have an EEC of greater than zero were scored lower for this metric.

A second safety rating was the Critical Rate Factor (CRF) which was calculated for each state highway as part of the existing conditions assessment. The KYTC *Statewide Planning Contract Guidance* defines the CRF as the “ratio of the Actual Crash Rate to the Critical Crash Rate.” Again, if an alternative was predicted to increase traffic on highways flagged using the CRF method, then it received a lower score.

### **Environmental**

The environmental category considered two metrics: environmental impacts and disturbance of farmland.

- Environmental impacts (5) – Impact of the alternatives on critical habitats, wetlands, floodplains, streams, historic and archaeological sites, section 4f/6f parks, natural refuges, and designated prime farmland. This analysis was completed using Geographic Information System (GIS) tools to analyze data regarding the location/amount of each environmental consideration obtained from available and appropriate sources. Scoring was based upon the level at which each element was expected to be impacted.
- Disturbance of farmland (5) – Impact of the alternatives on the quality and contiguity of surrounding farmland.

### **Cost and Construction**

The Cost and Construction category considered four metrics: cost, utilization of existing infrastructure, right-of-way impacts, and utility impacts.

- Cost (10) – Cost of the alternative in question relative to other alternatives and the no-build scenario. This metric is a measure of the anticipated construction cost, with less expensive alternatives scoring better than the more expensive alternatives.
- Utilization of existing infrastructure (5) – whether the alternative in question would utilize existing roadway infrastructure, including pavement, bridges, and interchanges. Alternatives that would use existing infrastructure were scored higher in this category.
- Right-of-way impacts (1) – whether the alternative in question requires acquisition of new right-of-way. Alternatives requiring the least amount of new right-of-way were scored the highest in this category.
- Utility impacts (1) – impact of the alternative in question on existing utility lines, including but not limited to transmission lines, sewerage, pipelines, and public utility facilities. Available data regarding the location of utilities was obtained from local utility companies. Alternatives with the fewest conflicts/impacts to existing utilities were scored the highest.

### Focus Group Preferences

The Focus Group category included focus group sessions that were hosted in order to obtain feedback on the alternatives (see **Chapter 7**, “Focus Group Involvement”). Each alternative was assigned a score based on feedback at each focus group session. Each session had a weight of 2 in the matrix. The focus group meetings were divided into the following groups, which included legislators, city and county personnel, economic development and chamber of commerce representatives, local planning organization representatives, and key major business and recreational interests. Four distinct regional focus groups were formed as well as one group of federal and statewide elected officials and agency representatives:

- Oldham County and Henry County
- Shelby County and Spencer County
- Bullitt County and Nelson County
- Jefferson County
- State and Federal Agencies

Most of the focus groups ranked Alternative 5 highly; it was ranked first by three groups (Bullitt-Nelson, Jefferson, and State and Federal Agencies). The Alternative 2 and 3 families also frequently appeared in most focus groups’ top-five rankings.

### Points per \$100 Million

In addition to the 6 categories noted above, a final piece of information was considered: the number of points scored per \$100 million in estimated project cost. This provides a high-level indication of the relative benefit-cost for each alternative.

## Level 1 Evaluation Results

The alternatives were given a score of 1 to 5 points in each metric, with 1 indicating worst performance and 5 indicating best. These points were then multiplied by the metric’s weight. A **summary score**, which is the sum of these weighted point values across all 20 metrics, was calculated for each alternative. The matrix and summary scores are shown in **Figure 5-4**.

One overarching conclusion of this initial evaluation was that corridors closer to the urban area scored higher. They also appeared to provide greater benefits compared to their costs (more points per \$100 million spent). Western corridors tended to have higher mobility scores, attracting more traffic and serving major trip destinations better. Their lower lengths also resulted in lower costs and in some cases lower impacts. The net result was that the Alternative 1 family of corridors and the Alternative 5 corridor were toward the top of the ratings, followed by the Alternative 2 corridors. The Alternative 3 family of corridors along with Alternatives 5A and 5B were lower on the ratings list. The Alternative 4 family of corridors ranked last.

Alternative 1B and Alternative 5 tied for the highest score, with summary ratings of 348. Alternative 1B benefitted from strong performance in the mobility category, with high scores in the traffic volume and freight metrics categories. It scored at least 3 points in each metric, with the exception of utilization of existing infrastructure. Alternative 5 scored less consistently across the metrics, with poor marks in system redundancy and right-of-way impacts, but it received high marks from the five focus groups. This may be related to its cost efficiency—at 55.7 points per \$100 million in cost, it delivered the most value per dollar of all the alternatives.

Alternatives 1A and 1 filled out the third and fourth-place positions, respectively, each performing well in the mobility category. Alternative 2 filled the fifth-place spot, with moderate mobility scores bolstered by achieving the highest marks in environmental metrics, as well as positive feedback from the focus groups. The other Alternative 2 corridors were next on the list due to high mobility and land-use scores. Results were mixed for the Alternative 3 family of corridors as well as Alternatives 5A and 5B, but all were characterized by low mobility scores. Alternatives 4 and 4A were the worst-performing, each scoring poorly across the land use, environmental, and cost categories. They had mixed mobility scores and were forecasted to have the lowest volumes of the new highway options. These alternatives also had the highest costs, at over \$1.25 billion each. For these reasons, the project team decided that the Alternative 4 group of corridors could be removed from further consideration.

**Figure 5-4: Level 1 Evaluation Results**

|    | Summary Rating | Total Project Length (mi) | Total Project Cost (\$Mil) | Points Per \$100M |
|----|----------------|---------------------------|----------------------------|-------------------|
|    | 102            |                           |                            |                   |
| NB | 224.0          | -                         | \$0                        |                   |
| 1B | 348.0          | 41.70                     | \$987                      | 35.3              |
| 5  | 348.0          | 45.30                     | \$625                      | 55.7              |
| 1A | 336.0          | 41.80                     | \$1,017                    | 33.0              |
| 1  | 332.0          | 41.90                     | \$1,019                    | 32.6              |
| 2  | 311.0          | 40.20                     | \$942                      | 33.0              |
| 2C | 303.0          | 40.40                     | \$974                      | 31.1              |
| 2A | 301.0          | 43.30                     | \$994                      | 30.3              |
| 2B | 294.0          | 45.50                     | \$1,032                    | 28.5              |
| 3  | 289.0          | 48.20                     | \$1,077                    | 26.8              |
| 3B | 271.0          | 49.80                     | \$1,152                    | 23.5              |
| 5A | 248.0          | 52.50                     | \$685                      | 36.2              |
| 3A | 238.0          | 52.90                     | \$1,157                    | 20.6              |
| 5B | 221.0          | 61.90                     | \$760                      | 29.1              |
| 4  | 211.0          | 59.50                     | \$1,288                    | 16.4              |
| 4A | 203.0          | 58.40                     | \$1,269                    | 16.0              |

| Rank | ID | Mobility    |                |                   |                      |                              | Land Use and Development |                                    | Safety                 | Environmental | Cost and Construction |          |      |                                   | Focus Group Preferences |                 |              |                |              |           |                        |
|------|----|-------------|----------------|-------------------|----------------------|------------------------------|--------------------------|------------------------------------|------------------------|---------------|-----------------------|----------|------|-----------------------------------|-------------------------|-----------------|--------------|----------------|--------------|-----------|------------------------|
|      |    | Travel Time | Traffic Volume | Congestion Relief | Accessibility/Impact | System Redundancy/Resiliency | Freight                  | Support of Local Development Goals | Land Use Compatibility | Safety        | Environmental Impacts | Farmland | Cost | Impact on Existing Infrastructure | ROW Impacts             | Utility Impacts | Henry/Oldham | Shelby/Spencer | Built/Nelson | Jefferson | State/Federal Agencies |
|      |    | 10          | 5              | 10                | 5                    | 5                            | 5                        | 10                                 | 5                      | 10            | 5                     | 5        | 10   | 5                                 | 1                       | 1               | 2            | 2              | 2            | 2         | 2                      |
| --   | NB | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 1    | 1B | ●           | ●              | ●                 | ●                    | ●                            | ●                        | ●                                  | ●                      | ●             | ●                     | ●        | ●    | ●                                 | ●                       | ●               | ○            | ○              | ○            | ○         | ○                      |
| 2    | 5  | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 3    | 1A | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 4    | 1  | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 5    | 2  | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 6    | 2C | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 7    | 2A | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 8    | 2B | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 9    | 3  | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 10   | 3B | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 11   | 5A | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 12   | 3A | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 13   | 5B | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 14   | 4  | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |
| 15   | 4A | ○           | ○              | ○                 | ○                    | ○                            | ○                        | ○                                  | ○                      | ○             | ○                     | ○        | ○    | ○                                 | ○                       | ○               | ○            | ○              | ○            | ○         | ○                      |

# 6 – Level 2 Alternatives Refinement & Evaluation

## Alternatives Refinement

Following the completion of the Level 1 Alternatives Evaluation, the project team proceeded to filter the initial 15 corridors down to a smaller representative set of options for a more detailed analysis. The Level 1 Evaluation Matrix, as well as feedback from the focus groups, provided considerable information from which to draw conclusions about the most appropriate alternatives to carry forward.

During the second round of focus group meetings, the 15 corridors and typical cross-sections produced during the Level 1 process, were presented along with various datasets (including traffic projections and the Environmental Overview). The focus groups were asked to cast four votes for their preferred alternatives. A detailed overview of this round of meetings is located in **Chapter 7**, “Focus Group Involvement”.

The Level 2 alternatives were “right-sized” by tailoring design parameters to improve constructability and reduce costs. In addition, attempts were made to minimize, or avoid entirely, environmental conflicts throughout the project corridor.

**Level 1 Alternatives Dismissed from Further Consideration** – Alternative 4 (and its 4A variation) scored the poorest among the Level 1 alternatives, and was determined to be too costly and located too far to the east to effectively serve the needs within the study area. Therefore, Alternative 4 was not carried forward to Level 2. Similarly, Alternatives 3A and 2B were the furthest east and performed the worst of their respective sets, so those were removed from consideration as well. Alternatives 5A and 5B performed much worse than Alternative 5, so they were also removed from the Level 2 analysis. Finally, further review of Alternative 1A raised substantial development impact issues that would be costly to overcome; therefore, it was also dropped from consideration. In summary, Alternatives 1A, 2B, 3A, 4, 4A, 5A, and 5B were all dropped after the Level 1 analysis, leaving Alternatives 1, 1B, 2, 2C, 3, 3B, and 5 for further consideration and refinement.

**Alternatives Carried Forward** – As the team examined the remaining new alignment corridor alternatives it became apparent that there were only two remaining end points each on I-65 and I-71 and only three corridors through the center of the study area. That meant that Alternatives 1, 2A, and 3 could be used to adequately represent all six of the remaining new alignment corridor alternatives (1, 1B, 2, 2C, 3, and 3B). This retained one alternative from each family and would facilitate the identification of issues related to each main corridor and each end point tie in location. The three representative options could be adjusted during the Level 2 work to create any desired combination (such as starting south of Shepherdsville and ending southwest of Lagrange similar to 1B or 2). Alternative 5 was also carried forward as highest scoring “Existing Route Upgrade” alternative. The alternatives studied in the Level 2 analysis are presented in **Figure 6-1**.

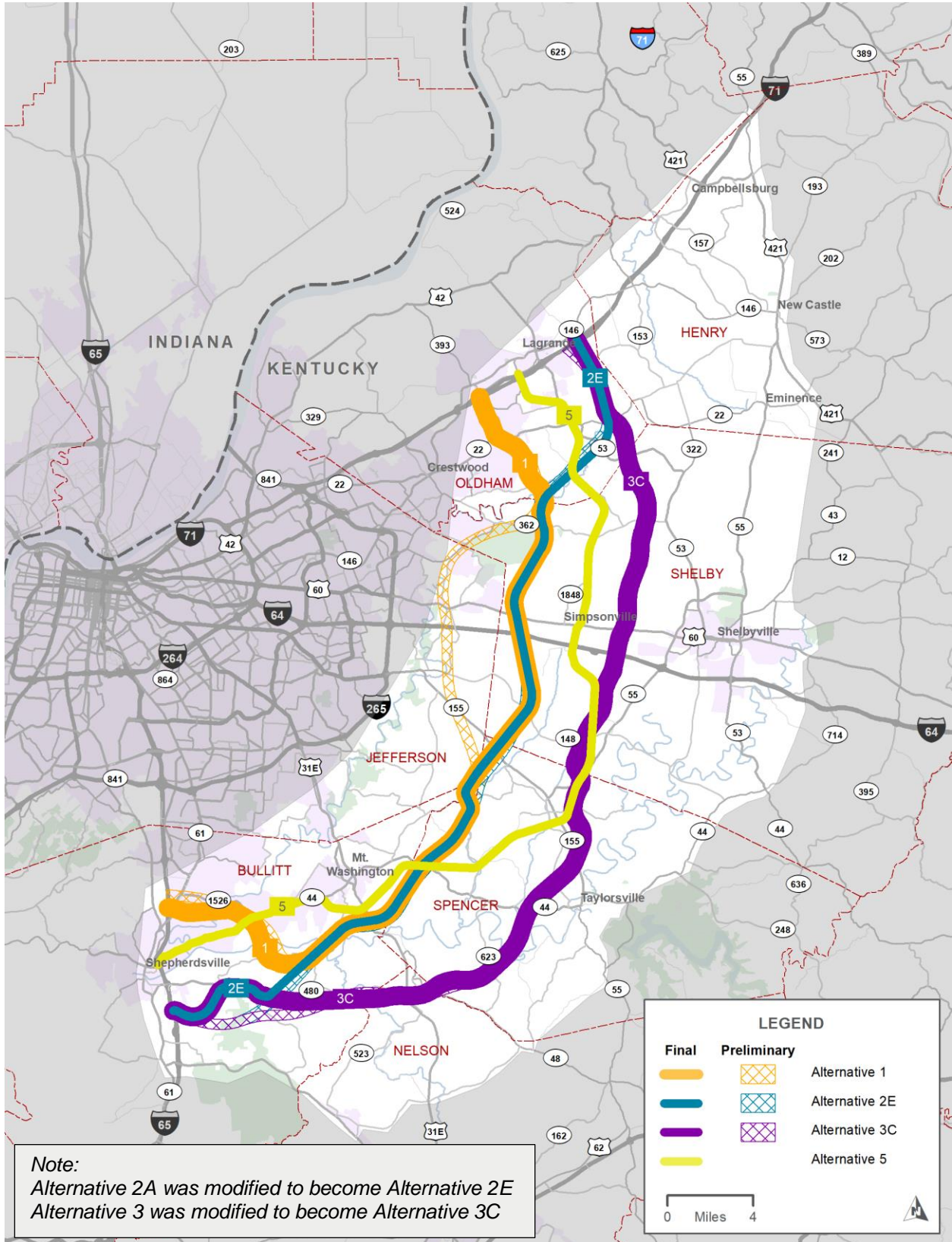
**Level 2 Refinements** – Several refinements were made to the Level 2 Alternatives to minimize right-of-way impacts, facilitate constructability, lower costs, and avoid environmental features.



**Figure 6-1** illustrates how the four representative corridors that were initially carried forward (1, 2A, 3, and 5) were modified during the Level 2 analysis.

- Alternative 1 was modified significantly; its westward jog in the central segment of the project area, between KY 1319 and KY 362, was shifted eastward to follow the Alternative 2A corridor. This reduced impacts and removed a new parallel freeway only three miles from I-265.
- Alternatives 2A and 3 were refined near the southern terminus of the project, where the corridors were modified to avoid Bernheim Forest's recent property acquisition between KY 245 and KY 480. Both corridors were adjusted to turn north to KY 480 as shown. They then turn east to rejoin the original corridors. With this modification, Alternative 2A was renamed Alternative 2E and Alternative 3 was carried forward as Alternative 3C.
- A southern Mt. Washington bypass was added to Alternative 5 based on Level 1 focus group feedback. Alternative 5 was also refined along its length based on more detailed engineering. For example, some planning level curves in the Level 1 alternative, such as the northward turn at KY-155 and the westward turn south of Lagrange, were flattened to conform to geometric design standards. This refinement work showed that more new highway segments were needed to meet the design criteria (making it more like the other new highway options).

**Figure 6-1: Level 2 Alternatives**



*Note:*  
 Alternative 2A was modified to become Alternative 2E  
 Alternative 3 was modified to become Alternative 3C

## Level 2 Evaluation

The evaluation categories (mobility, land use and development, safety, environmental, cost and construction, and focus group preferences) and their respective metrics were carried forward into the Level 2 evaluation process.

### Mobility

As mentioned under the Level 1 Evaluation section, numerous factors feed into the mobility category, including travel time, traffic volume, and congestion relief. One important resource for evaluating results in these categories is the Travel Demand Model (TDM).

Model-level alignments for each of the four Level 2 Build alternatives were coded into the KYSTM network to assess how traffic would divert under each scenario. Modest long-term land use changes were assumed for the Build scenarios, with some new housing and employment shifted closer to the new corridors. **Figure 6-2** shows the existing and 2040 No-Build traffic volumes on I-265 for comparison to the 2040 Build scenario traffic volumes illustrated in **Figure 6-3**. As shown, the proposed new and upgraded highway alternatives lower the traffic volumes on I-265 by a few thousand vehicle per day. The reduction in volumes on I-265 is limited due to latent demand for I-265. Almost all traffic that shifts from I-265 to the new highway corridor is replaced by traffic currently using other slower routes that now see an opportunity to use I-265.

Each of the proposed corridors is expected to attract considerable traffic by 2040, with Alternatives 1 and 2E predicted to attract between 21,000 and 43,000 vehicles per day (vpd) depending on the location. The Alternative 3 forecasts are slightly lower at 20,000 to 35,000 vpd. This shows the effects of the longer length and being further removed from major origins and destinations. Alternative 5, with its lower speeds, has the greatest traffic volume variability with between 7,000 and 50,000 vpd. The lower volumes are in rural areas and the highest volume is on the upgraded KY 44. The resulting forecasts were analyzed (using methodologies described previously) to determine a predicted level of service. **Figure 6-4**, illustrates the locations throughout the study area that are expected to experience LOS D or worse for each Build alternative.

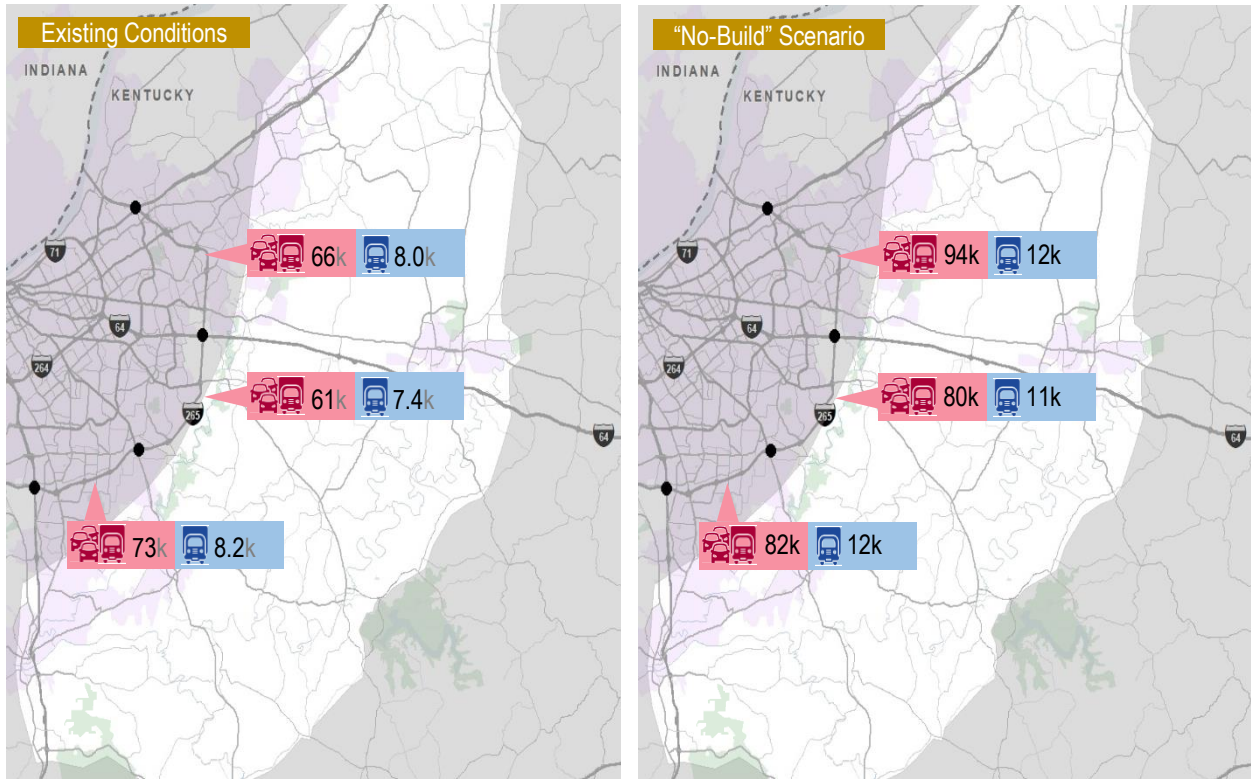
As shown, I-265 remains heavily congested under all of the Build alternatives, although there does appear to be some relief directly south of KY 155 where each of the Build alternatives show LOS D while No-Build showed LOS F. A main reason for the continued congestion on I-265 is latent demand. Even as traffic shifts away from I-265 to use new optional routes, additional traffic shifts to it from other congested routes. Thus, to improve traffic flow on I-265, widening would be needed regardless of whether or not a new connector is constructed.

Within the study area, many of the same congestion hot spots continue to exist under all alternatives, including I-65 and KY 44 in Bullitt County and I-71 in Oldham County. Alternatives 2E and 5 appear to show fewer locations projected to operate at LOS F than Alternatives 1 and 3C.

Travel time results were also derived from the TDM for particular origin-destination (O-D) pairs such as Shepherdsville to Shelbyville, Shelbyville to La Grange, and the entire distance from Shepherdsville (I-65) to La Grange (I-71). **Figure 6-5** shows the difference in travel times for

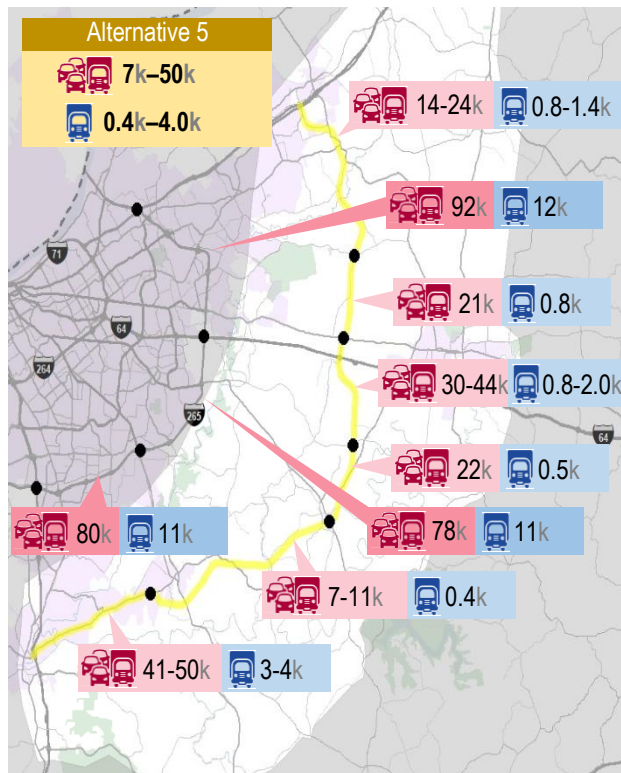
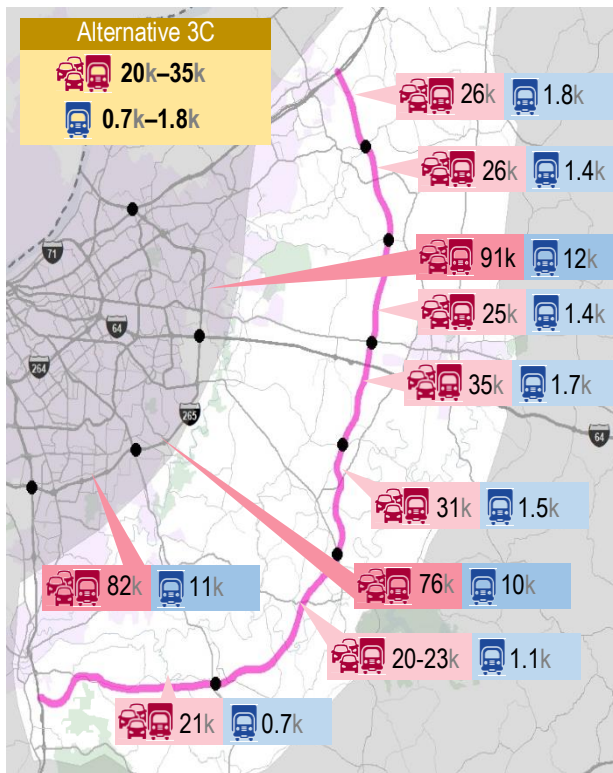
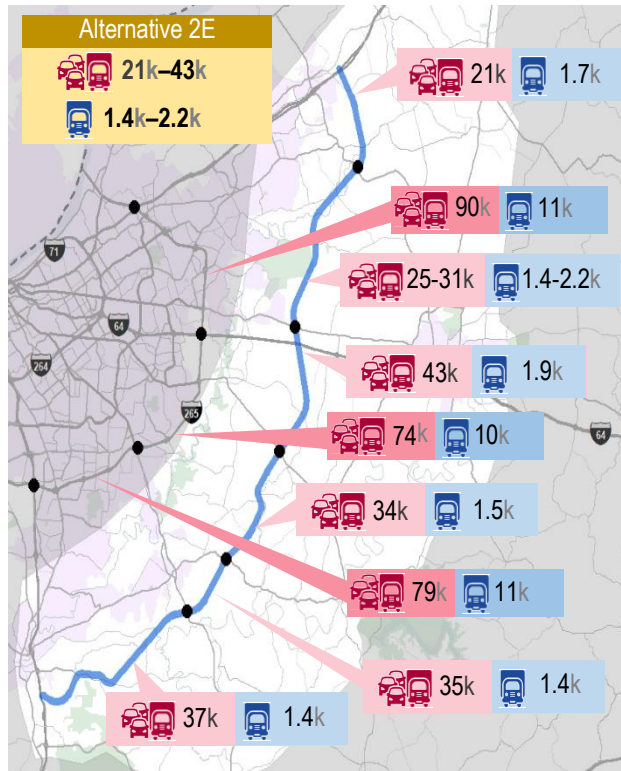
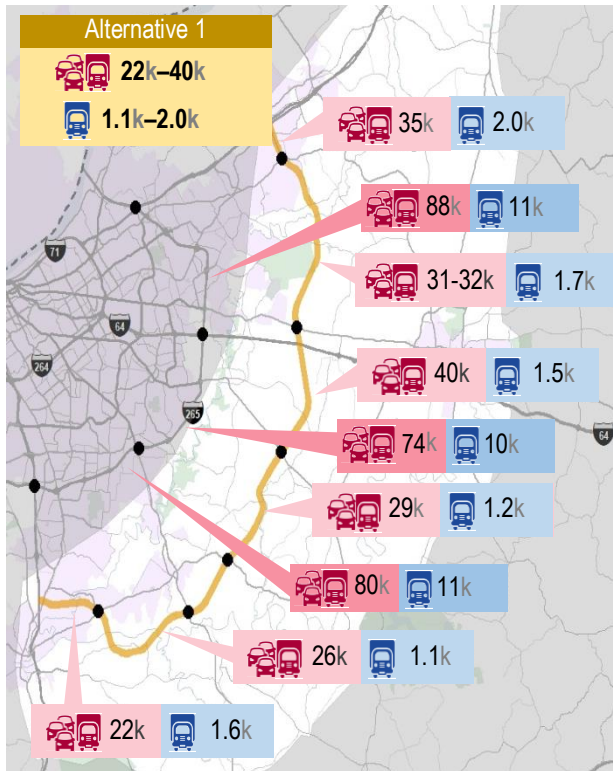
each alternative in comparison to the No-Build. Alternative 2 shows the most travel time savings for each O-D pair.

**Figure 6-2: Existing and 2040 No-Build Traffic Volumes**

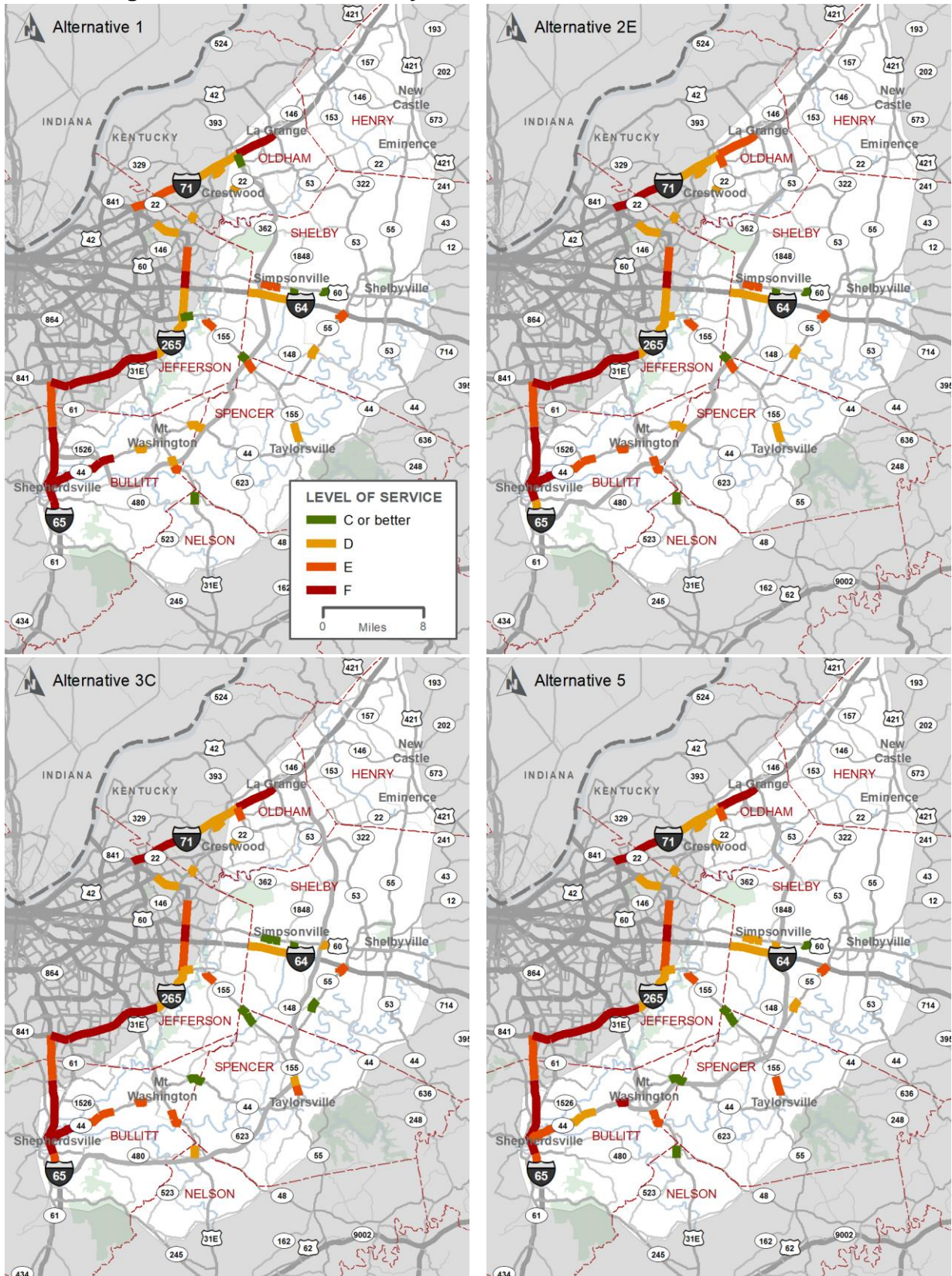


*Note: Existing and 2040 No-Build scenario traffic volumes on Interstate 265 are shown for comparison to the projected traffic volumes under each corridor alternative, as shown in Figure 6-4.*

**Figure 6-3: 2040 Traffic Analysis Volume Results for Level 2 Alternatives**

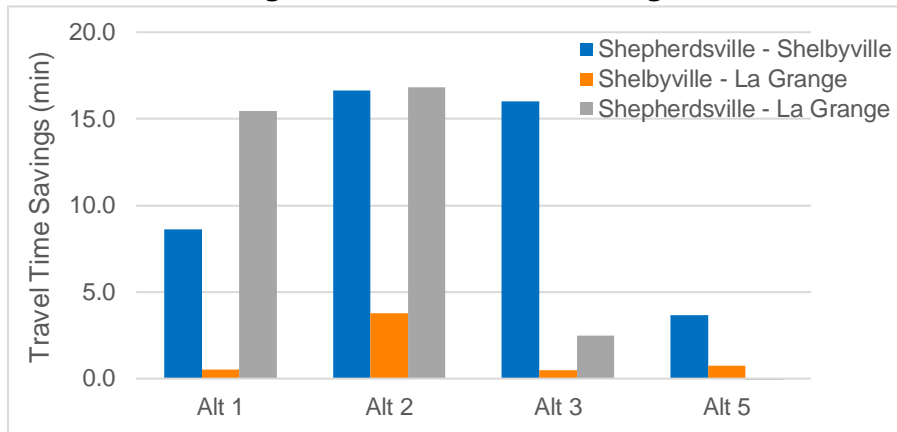


**Figure 6-4: 2040 Traffic Analysis LOS Results for Level 2 Alternatives**



Note: These LOS analyses are representative and evaluate only select locations. They are intended for comparing Build alternatives with each other and to the No-Build (Figure 3-2). It is not intended to be compared to the Existing LOS analysis which examined most state highways in the study area.

**Figure 6-5: Travel Time Savings**



**Land Use and Development**

Based on meetings with local planners, consideration of current and proposed land-use plans and development, and feedback obtained at the focus group meetings each corridor was scored regarding how well it supported local development goals and how compatible it was with land-use. Rankings indicated that Alternatives 2E and 3C both support the development goals in the outer counties better than 1 and 5. This includes connecting major development areas. Regarding land-use compatibility, 3C was rated the lowest in part because of impacts to residential/agricultural areas.

**Safety**

The Level 1 methodology of using the EEC metric was enhanced for application to the Level 2 alternatives. Segments with an EEC value greater than zero were evaluated based on the forecasted KYSTM volumes for each alternative. The predicted changes in net EEC values for each Level 2 alternative are shown in **Table 6-1**.

**Table 6-1: Estimated Change in EEC**

| Alternative           | Estimated Change in EEC |
|-----------------------|-------------------------|
| <b>Alternative 1</b>  | -150                    |
| <b>Alternative 2E</b> | -260                    |
| <b>Alternative 3C</b> | -250                    |
| <b>Alternative 5</b>  | +60                     |

All three new highway corridor alternatives (Alternatives 1, 2E, and 3C) are projected to decrease the EEC in the study area, indicating they could improve safety. From a safety perspective, they would shift traffic from lower performing to higher performing highways. Conversely, the existing upgrade alternative (Alternative 5) would potentially increase the EEC by attracting more traffic to highways that have safety issues. However, the safety screening does not take into account potential improvements to existing highways (such as KY 44) as part of the project, which could reduce the EEC.

For more information on the methodology and subsequent results, see part 2 of Appendix C.

## Environmental

The Level 1 environmental features were expanded upon to include the evaluation of socioeconomic disparities, locations of schools/churches/cemeteries, geology features, Hazmat sites, and forest cover. These features were again evaluated using GIS coverage of each feature and their locations in comparison to the proposed corridor locations for each alternative.

Various environmental constraints were noted during the screening process. The study area intersects with multiple state-protected streams, wetlands, habitats for federally listed threatened and endangered species (including one critical habitat for the Kentucky glade cress), and multiple managed land reserves. Additionally, the proposed corridors fall within an 8-hour ozone nonattainment zone and may impact noise-sensitive land uses (particularly residential development).

The screening also identified minority and low-income census tracts, community facilities, prime farmland, historic structures and districts, and archaeological sites within the study area; if the proposed alternatives are carried forward, further consideration will need to be given to adverse impacts on these features.

Alternative 5 scored best for environmental impacts (though it does have the potential for more historical property impacts). Alternatives 1 and 3C scored similarly with regard to environmental impacts, though the types of impacts differed between the two. Alternative 2E scored lower for the full range of potential environmental impacts, but it scored better for farmland impacts than all but Alternative 5.

More information about the environmental screening process is located in part 2 of Appendix D.

## Cost and Construction

Detailed cost estimates were developed for each of four Level 2 alternatives. These costs included design, right-of-way, and utility relocation costs in addition to construction costs which were further broken down into earthwork/pavement, drainage, structures, and interchange improvement costs. **Table 6-2** shows the total costs with a 20% contingency included. As shown, Alternative 3 is the most expensive, while Alternative 5 is the least expensive.

**Table 6-2: Estimated Costs for Level 2 Alternatives**

| Alternative | Total   |
|-------------|---------|
| 1           | \$860M  |
| 2E          | \$950M  |
| 3C          | \$1.24B |
| 5           | \$690M  |

## Focus Group Preferences

A third round of focus group meetings was held to solicit feedback on the four refined Level 2 alternatives. The attendees were informed of the adjustments to the alternatives and presented new traffic, safety, and environmental data. A detailed overview of this round of meetings is located in **Chapter 7**, "Focus Group Involvement".

The preferences of the focus groups are generally summarized as follows:



- **Oldham-Henry** – Prefer the interchange location northeast of LaGrange with its potential connectivity to a new industrial area. (Alts. 2E and 3C, Fig. 6-1)
- **Shelby-Spencer** – Prefer the orange line that is as far west as possible in Shelby County. (Alts. 1 and 2E, Fig. 6-1)
- **Bullitt-Nelson** – Split between fixing KY 44 (Alt. 5, Fig. 6-1) and the desire to tie into the new interchange south of Shepherdsville (Alts. 2E and 3C, Fig. 6-1).
- **Jefferson and State and Federal Officials** – Jefferson preferred No-Build, State and Federal Officials preferred Alt. 5 due to low cost and fixing KY 44. (Alt. 5, Fig. 6-1)
- **State Legislators** – More favored following Alternatives 1 or 2E further west but some saw Alt. 5 at a lower cost as preferred. (Alts. 1, 2E and 5, Fig. 6-1)

## Level 2 Scoring and Results

Information gathered during the Level 2 evaluation process was fed into the scoring matrix. No modifications were made to the scoring system (1-5 points per metric) or metric weighting from what was used in Level 1. Each alternative was re-scored to reflect changes made during the concept/alternative refinement process.

Following the Project Team’s evaluation, the alternatives were presented to the same five focus groups as in the Level 1 evaluation process, and their scores were incorporated into the matrix with the same weighting.

The results showed that Alternative 2E was the highest-scoring alternative with a summary rating of 364, performing well across all categories. While Alternative 2E did not provide the largest reduction in travel times, the lowest cost, or the smallest environmental impact, its well-rounded performance—including best-in-field scores in the land use and safety categories—elevated it to the top. This demonstrates the matrix’s emphasis on holistic performance, as opposed to maximal performance in a small number of metrics. Alternative 2E also received the highest number of points from the five focus groups.

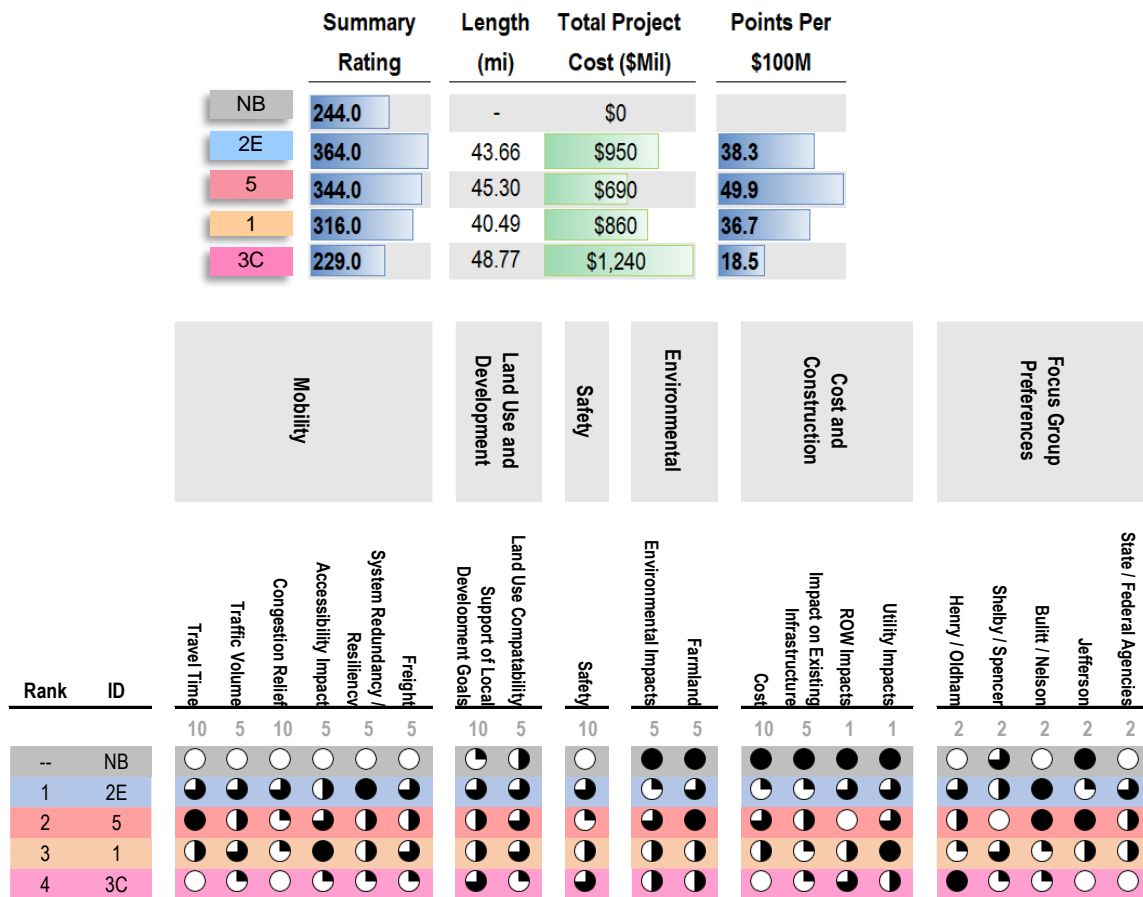
Alternative 5—the “existing route upgrade” option—was the second-highest scoring alternative, with a summary rating of 344. Given its utilization of existing routes, it outperformed in the environmental category, would be highly cost-efficient, and would still provide significant mobility benefits (particularly travel time reduction and improved accessibility).

Alternative 1 was the third-highest-scoring alternative, with a summary rating of 298. As the westernmost alternative, it scored well in the accessibility impact, system redundancy / resiliency, and land use compatibility metrics. This alternative also received the highest utility impacts score. However, its environmental, safety, and cost/construction performance ratings were mixed. Alternative 1 also had the unique challenge of crossing KY 44 and therefore attracting more traffic to that already congested highway.

Alternative 3C was the lowest-scoring alternative, receiving 207 summary points. It performed poorly in the mobility category, owing to its eastern corridor capturing less circumferential traffic than the other alternatives. Its high price tag of \$1.24 billion—higher than the next most

expensive alternative, 2E, by \$290 million—also contributed to its lower score. This reinforced the findings of the project team in the Level 1 evaluation that the eastern corridors did not meet the needs and purposes identified for this project.

**Figure 6-6: Level 2 Evaluation Matrix**



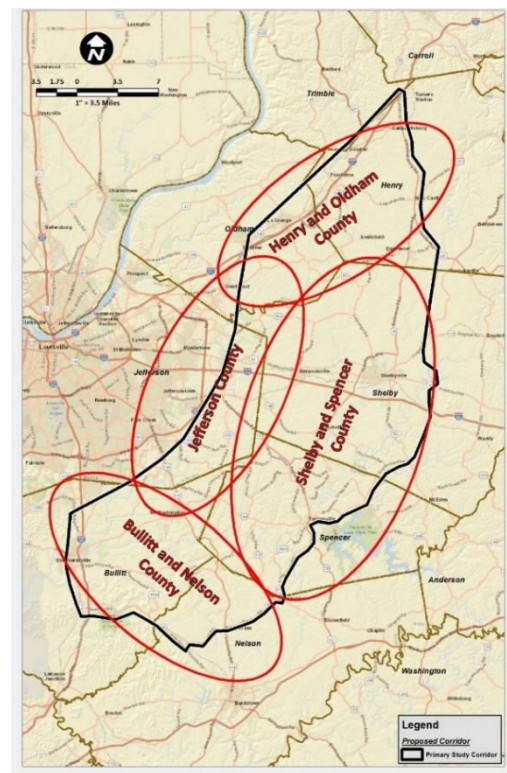
## 7 – Focus Group Involvement

The sheer size of the study area – seven counties encompassing 475,000 acres – led the Project Team to form a series of focus groups to share information with, and receive input from. In order to improve the logistics and participation for this large area, four distinct regional focus groups were formed as well as one group of federal and state elected officials and agency representatives. These focus groups covered:

- Oldham and Henry Counties
- Spencer and Shelby Counties
- Bullitt and Nelson Counties
- Jefferson County
- State and Federal Agencies and Officials

The Project Team developed Focus Groups for each area, including elected city and county officials, state legislators, economic development and chamber of commerce representatives, local planning organization representatives, and key major business and recreational interests. City, county, state, federal, and local planning organization representatives were chosen to achieve representation from all levels of government with jurisdiction over the study area. Business, economic development, and recreational interests provided insight into development patterns and sensitive environments across the study area. In general, the focus group members were selected to provide a broad representative cross-section of interests and perspectives for this high-level planning study. The State and Federal Agencies and Officials focus group included key state and federal resource / environmental agencies. This group also included members of Kentucky's Congressional delegation that represented portions of the study area. These elected officials were asked to either attend or send representatives on their behalf.

**Figure 7-1: Focus Groups**



Given the sheer size of the corridor and the lack of any funding beyond this initial planning study, the Project Team decided to not conduct any large-scale public involvement. A series of three focus group meetings were held at strategic points during the study process to gather information from representatives of each area. The focus group meetings were held in January 2019, May/June 2019, and January 2020. Focus group members were invited by letter to meetings held in LaGrange, Shelbyville, Shepherdsville, and Louisville. Each focus group meeting was held in a two-hour, morning or afternoon timeframe.

**Figure 7-2: State and Federal Agency Focus Group**



## Focus Group Meetings – Round 1

The first series of focus group meetings were held on January 22-24, 2019. The meetings began with introductions and a description of the proposed study area. Focus Group members were told the goal of the study was to evaluate a wide range of corridors to identify three to four broad corridors that could be advanced for further design and environmental study. The scope and schedule were presented and it was clarified that there was only funding for this current planning study; no future phases were funded.

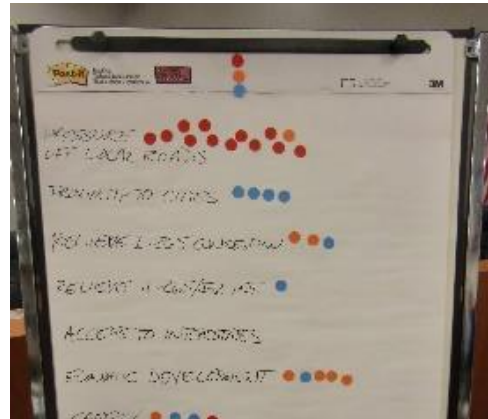
Existing conditions were presented in a PowerPoint and on mounted display boards placed in the room. Focus group members were allowed time to review the display boards, ask questions, and add notes providing additional information. Existing conditions displays included:

- Average Daily Traffic
- Level of Service
- Crash Maps
- Critical Crash Rate Maps
- Origin-Destination Data
- Land Use Data
- Planned Transportation Projects
- Environmental Data

Each focus group participated in a facilitated discussion of the purpose and need for the project. Focus group members suggested potential study goals and then were given dots to rank the potential goals first, second, or third. This information was utilized by the Project Team to draft the Purpose and Need for the project and to establish secondary goals.

**Figure 7-3: Focus Group Dot Ranking**

The group participated in a facilitated discussion of their vision for an improvement project, whether on existing routes or as a new corridor. This discussion was used to help the planning consultants determine design parameters to use when studying a range of corridor improvements. Generally, the focus groups all preferred a four-lane, freeway type facility with a 70 MPH design speed. Full access control was desired with interchanges roughly every three to five miles at key locations.

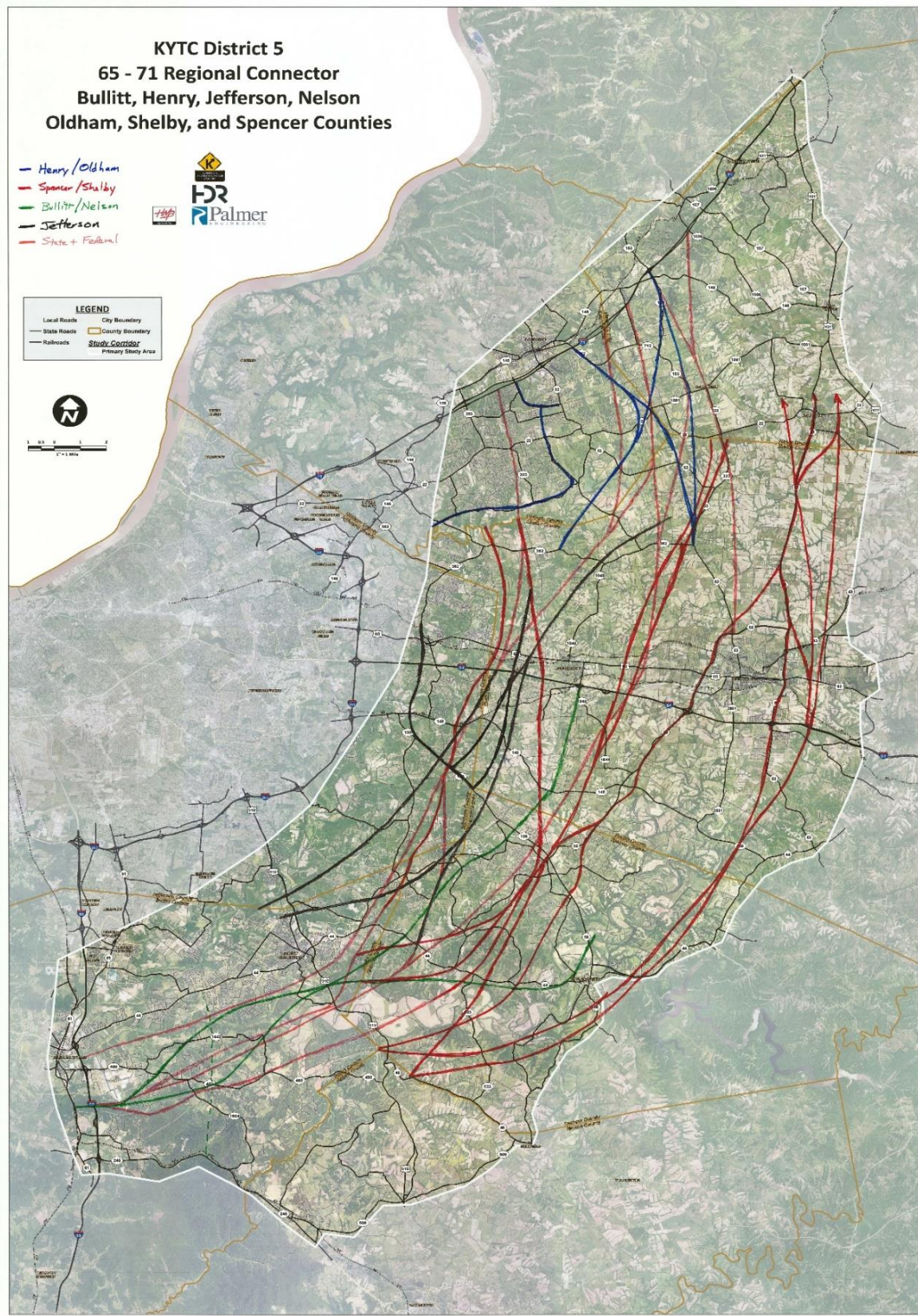


**Figure 7-4: Oldham and Henry County Focus Group**

The meetings concluded with the focus group members looking at maps of the corridor and drawing potential corridors that they thought the study team should consider. Following the last meeting, a master map was created showing all of the suggested alternatives color coded from each focus group (see **Figure 7-5**). There was an emphasis on where interchanges should be constructed on I-65, I-64 and I-71. Potential corridors included both new highway corridors as well as corridors following existing roadways that could be upgraded. Not all proposed alternatives covered the entire length of the project as some focus groups provided information in their geographic area only. Summaries for the first round of focus group meetings can be found in **Appendix E**.



Figure 7-5: Focus Group Meetings, Round 1: Hand-Drawn Potential Corridors



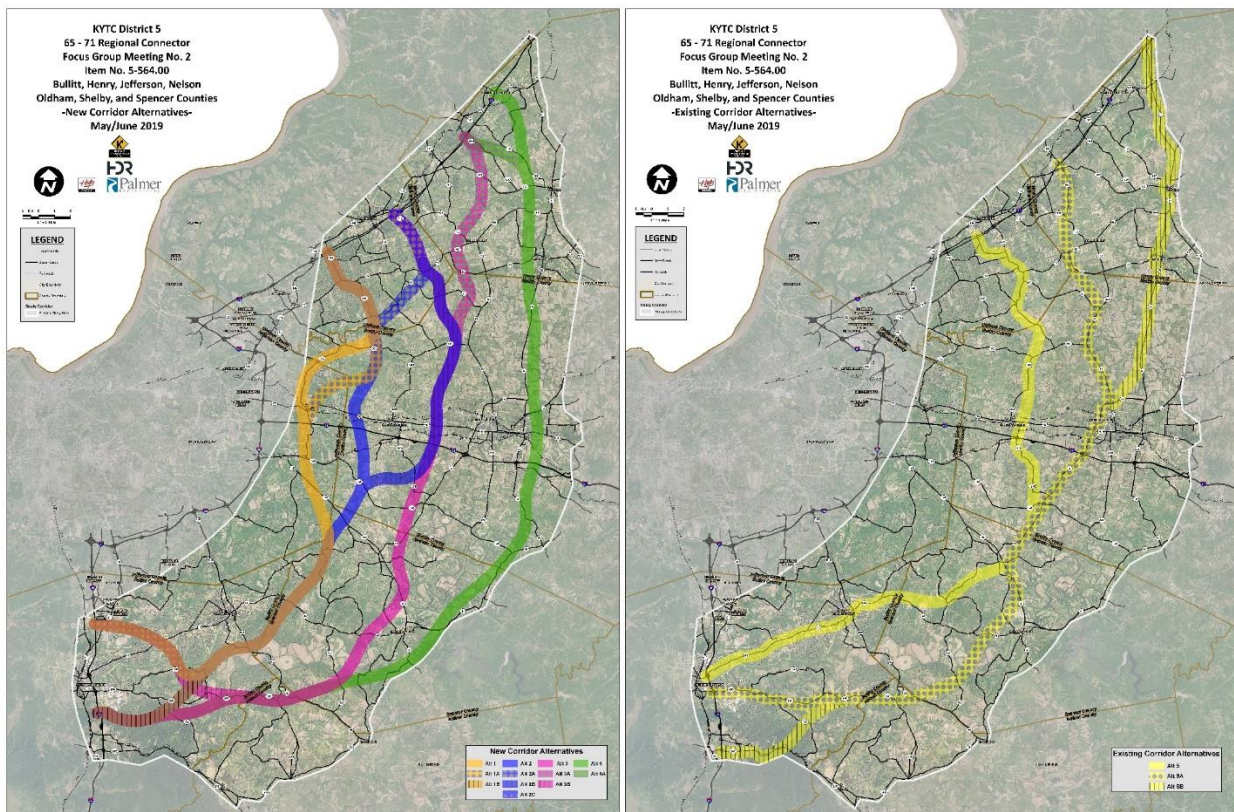
## Focus Group Meetings – Round 2

The second series of focus group meetings were held on May 30-31 and June 3, 2019. The main goal of these meetings was to gain feedback to help narrow down the list of alternatives to three or four broad corridors for more detailed study. The team presented the project’s draft purpose and need, which was informed by input from the first round of focus group meetings.

Focus group members were shown maps of the 12 new highway corridors and the three upgrade of existing corridors that had been developed based on the team’s technical work and the initial focus group input. A combined map was presented (See **Figure 7-6**) that showed the 15 color-coded corridors.

The 12 new highway alternatives were grouped into four families (1, 1A, 1B) (2, 2A, 2B, 2C) (3, 3A, 3B) and (4, 4A). All of these were developed as 70-mph, four-lane, freeway type corridors with interchanges defined at major cross roads. The three upgrade of existing corridors (5, 5A, and 5B) were developed to follow existing roadways with generally a 55-mph design speed and interchanges only at I-65, I-64, and I-71. Some segments with lower volumes could be constructed as a two-lane initial/four-lane ultimate section.

**Figure 7-6: Level 1 Alternatives as Presented**

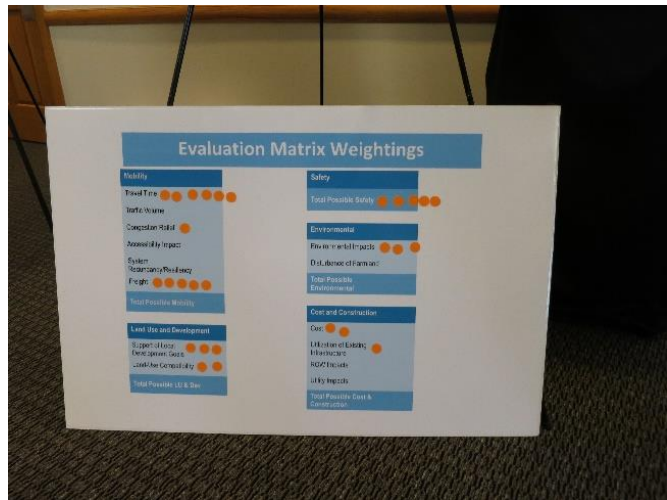


A range of typical sections was presented including Four-Lane Freeway, Two-Lane Initial/Four-Lane Ultimate, Two-Lane with Passing Lanes, Five-Lane Urban, and Three-Lane Urban. Maps showing the traffic forecasts for each family of alternatives were presented. In general, the forecasted volumes (2040) were higher for the alternatives closer to Louisville, and volumes were higher closer to the interstates.

Travel-time comparisons were shown for six sample pairs of locations. Some were from interstate to interstate while others were from community to community. Some alternatives provided a considerable benefit of over 20-percent travel-time reduction, while others showed little to no improvement if the fastest path was on existing routes instead of the new 65-71 Regional Connector.

**Figure 7-7: Focus Group Evaluation Matrix Input**

The draft Level I Alternatives Comparison Matrix was presented and a description was provided for the rating scale. It was explained that some categories were rated qualitatively (subjective) while others were rated quantitatively (objective). A line for a No-Build alternative was also rated. A brief description was given of the elements used in the matrix by category, and the focus group members were asked to pick the four categories they thought were most important in narrowing down alternatives. Their ratings helped to develop weightings for the categories in the matrix.



An Environmental Overview was also presented. GIS layers were used to quantitatively rank the alternatives based on potential impacts in the 2500-foot corridor. A map showing all of the alternatives in each focus area was available with environmental resources labelled.

**Figure 7-8: Focus Group Level 2 Alternatives Input**

Prior to showing each group indicating preferences for which alternatives to advance to Level 2, an open discussion was facilitated regarding the aspects that focus group members liked or disliked for each alternative. The group was then given four dots to show their preference for their four favorite alternatives in order. It was emphasized that No-Build was also an option. The ratings from the focus





groups were then used by the Project Team, along with the technical analysis, in the Level 1 Alternative Comparison Matrix to select four alternatives for the Level 2 evaluation.

Summaries for the second round of focus group meetings can be found in **Appendix E**.

## Focus Group Meetings – Round 3

The third series of focus group meetings were held on January 14-15, 2020. The Jefferson County and State and Federal Officials focus groups held a combined meeting due to generally lower attendance during the first two rounds with these groups. Since the Kentucky General Assembly was in session on January 14<sup>th</sup> and 15<sup>th</sup>, the legislators could not attend those focus group meetings. To allow them an opportunity to participate, a meeting was scheduled in Frankfort on January 24, 2020 with all of the legislators invited. The presentation was shortened to be more of a briefing given the constraints on their time while in session.

Each meeting in this third round began with introductions and an explanation of the current status of the 65-71 Regional Connector planning study as it related to development of the 2020 Six-Year Road Plan. A review of the input received at the first two rounds of focus group meetings was presented. The process for narrowing Level 1 Alternative Corridors down to four corridors (1, 2A, 3, and 5) being studied further in Level 2 was described.

**Figure 7-9: Shelby Spencer Focus Group**



During Phase 2 evaluation, some modifications/refinements were made to the initial Level 2 alternatives. Modifications to alternatives were presented as:

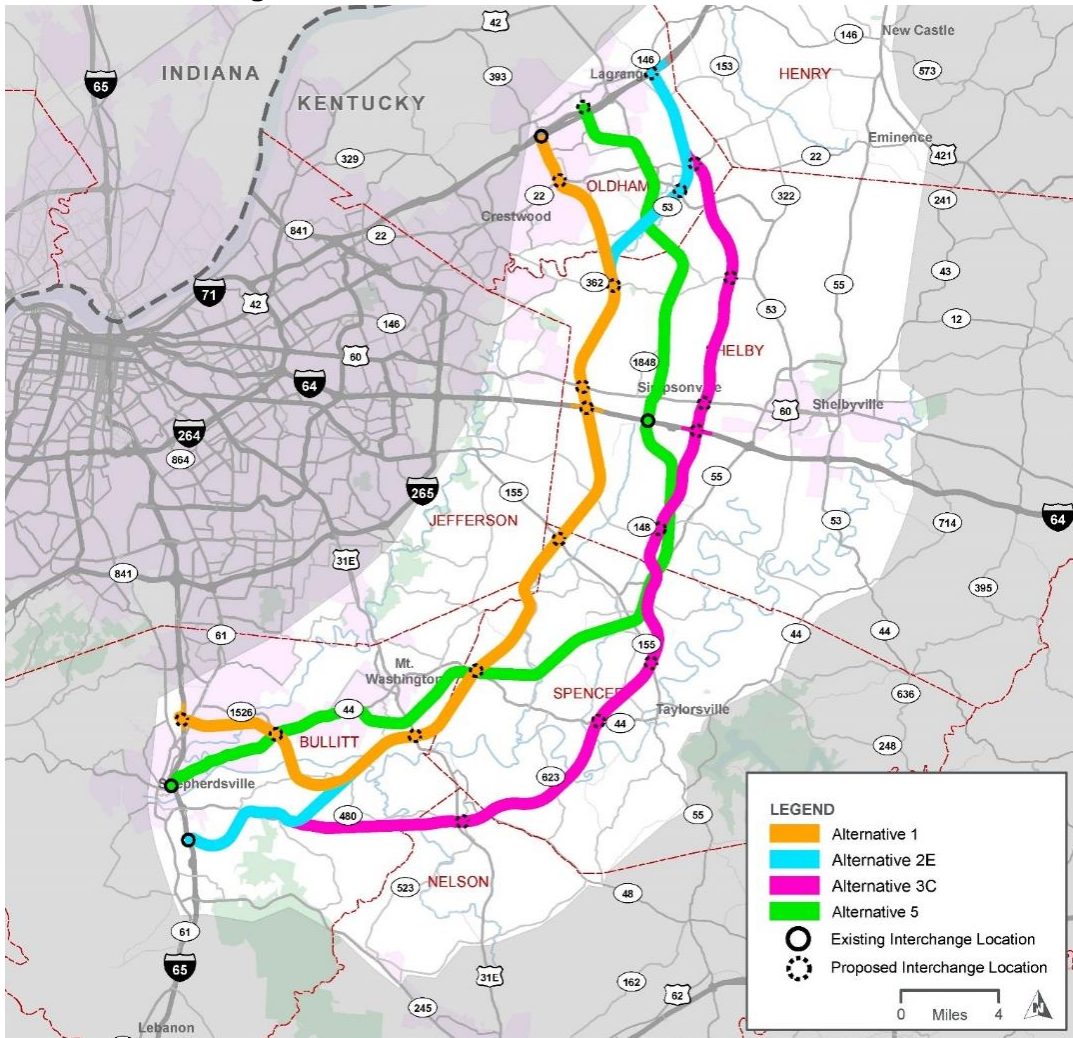
- In October 2018, KYTC announced that alternatives that impacted Bernheim Forest between KY 245 and KY 480 would be modified to avoid impacts to additional lands purchased by Bernheim. Level 2 Alternatives 2A and 3 were modified to Alternatives 2E and 3C to avoid Bernheim properties.
- Alternative 1 was modified in eastern Jefferson County due to the impracticality of being close to I-265. This corridor impacted neighborhoods and golf courses and would require the addition of lanes on I-64 between I-265 and the new corridor. Alternative 1 was modified to follow the Alternative 2E corridor in western Shelby County.
- The project team decided, due to focus group input, to eliminate the system-to-system interchanges at I-65 and I-71 and to utilize existing interchanges as much as possible to

reduce cost. This impacted Alternatives 2E and 3C on I-65, which would instead utilize the new interchange at Exit 115 now under construction, and Alternative 1 on I-71 which would instead utilize the KY 393 roadway and interchange with widening and minor improvements.

- The Alternative 5 corridor was modified to include a Mt. Washington southern bypass based on focus group input. The existing KY 44 through Mt. Washington would be difficult to widen and would require considerable mitigation of historic impacts.

A map showing refined Level 2 Alternatives was presented (see **Figure 7-10**). The focus group was reminded that although the study is examining 2,500-foot-wide corridors, the actual acquisition footprint would only be about 250 to 400 feet wide depending on earthwork considerations.

**Figure 7-10: Level 2 Alternatives as Presented**



The focus groups were presented with updated traffic forecasts, travel time comparisons, study-area-wide safety comparisons, and Level 2 Alternative corridor maps. The Level 2 Alternative

Comparison Matrix was presented with ratings for Mobility, Land Use, Safety, Environmental, and Cost/Construction. It was emphasized that No-Build was also an option. Updated information from the Environmental Overview was presented for the Level 2 alternatives, using a much larger set of GIS data.

The focus groups then held a facilitated discussion regarding the segments of independent utility that could be built as separate projects. The process for determining logical termini between major traffic generators and the fact that the total project would be constructed over a long period of time in segments was explained to each focus group. Each group was asked for opinions on priority segments and construction sequencing. It was generally conveyed by most that the area of most pressing need is providing traffic relief on KY 44 between Shepherdsville and Mt. Washington either through widening of KY 44 (Alt. 5) or through new routes (Alt. 1, 2E, or 3C).

**Figure 7-11: Jefferson, State and Federal Focus Group Round 3**



Each focus group discussed their preferences of alternatives prior to being given a questionnaire to fill out. The questionnaire asked about the pros and cons of each alternative corridor as well as a preferred alternative. Some members expressed a preference for a hybrid alternative combining two different alternatives. A few drew their hybrid preference on a map and turned it in with the questionnaire.

The preferences of the focus groups are generally summarized as follows:

- **Oldham-Henry** – Prefer the I-71 interchange location north of La Grange (Alts. 2E and 3C) because it opens up a new access point and would serve a new industrial area.
- **Shelby-Spencer** – Prefer the most western corridor (Alts. 1 and 2E), which would shift the highway as far west as possible in Shelby County.
- **Bullitt-Nelson** - Split between fixing KY 44 (Alt. 5) and the need for a connection to the new interchange south of Shepherdsville (Alts. 2E and 3C).
- **Jefferson and State and Federal Officials** – Jefferson wanted No-Build, State and Federal Officials preferred Alt. 5 due to the low cost and upgrade of KY 44.
- **State Legislators** – More favored following Alternatives 1 or 2E further west but some saw Alt. 5 at a lower cost as preferred.

Summaries and questionnaires from the third round of focus group meetings can be found in **Appendix E**.

## 8 – Conclusions and Recommendations

Various transportation needs were identified in the project area, leading to the development of specific project purposes for a new or improved connection between I-65 in Bullitt County to I-71 in Oldham County:

1. Improve regional **connectivity and mobility**;
2. Improve **accessibility** to and within growing communities;
3. Reduce **congestion** on existing routes by improving traffic flow on and between major arterials and Interstates; and
4. Provide **economic development opportunities**, and support land use, development, and growth objectives.

Over 30 corridors were considered to identify potential corridors for a new or upgraded highway that could meet these project purposes. Through a two-level evaluation process the western corridors performed better than the eastern corridors across several of the key evaluation categories and specific metrics. Based on the analyses the eastern Alternative 3 and 4 corridors in **Figure 8-1** were ultimately all eliminated, as were Alternatives 5A and 5B in **Figure 8-2**. In addition, the Alternative 1 corridors were either eliminated or melded into the Alternative 2 corridors due to impacts, performance, and focus group feedback. The final recommended corridors, shown in **Figure 8-3**, were modified versions of Alternative 2A (adjusted to Alternative 2E) and Alternative 5.

**Figure 8-1: Level 1 New Highway Corridors**

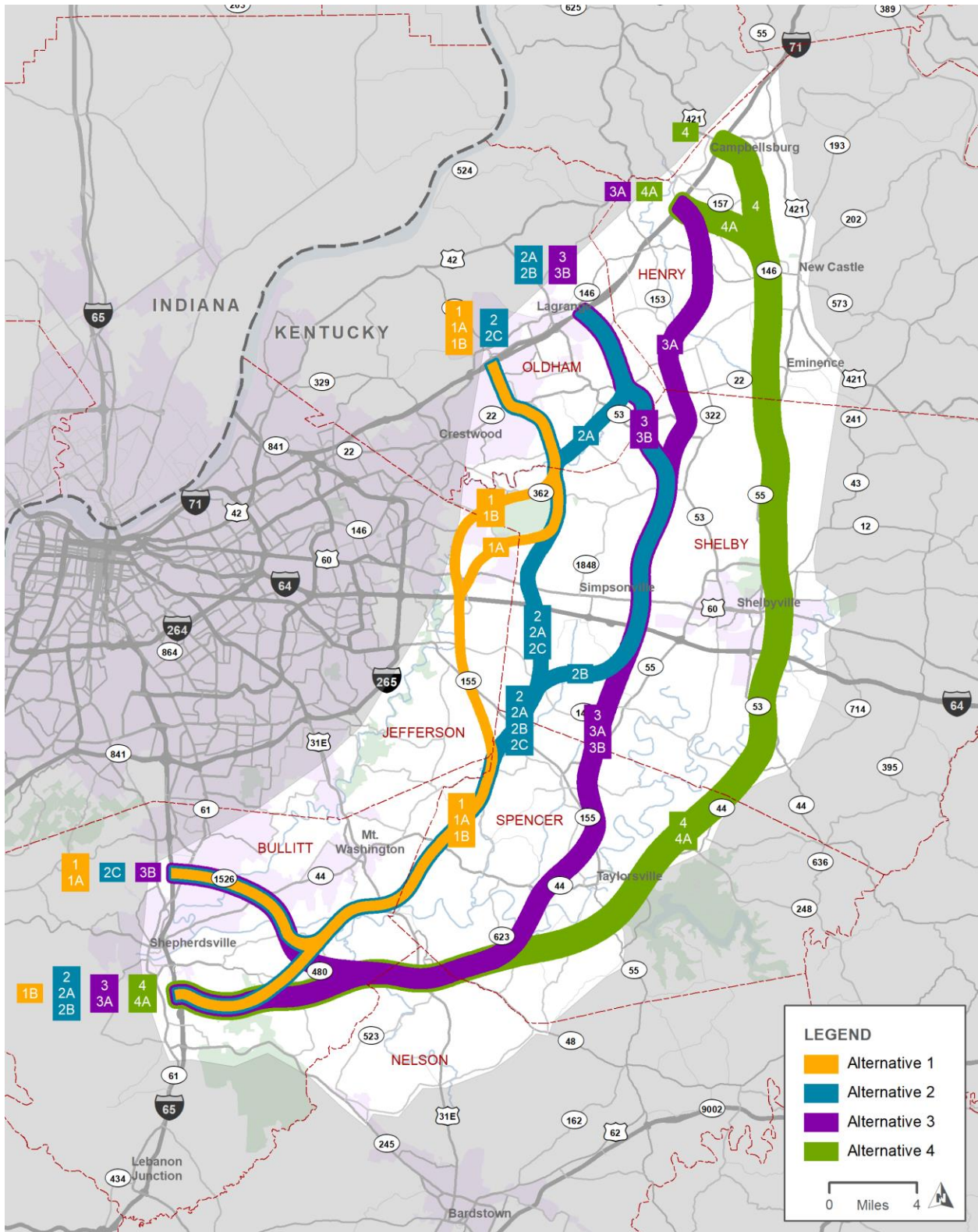


Figure 8-2: Level 1 Upgrade of Existing Corridors

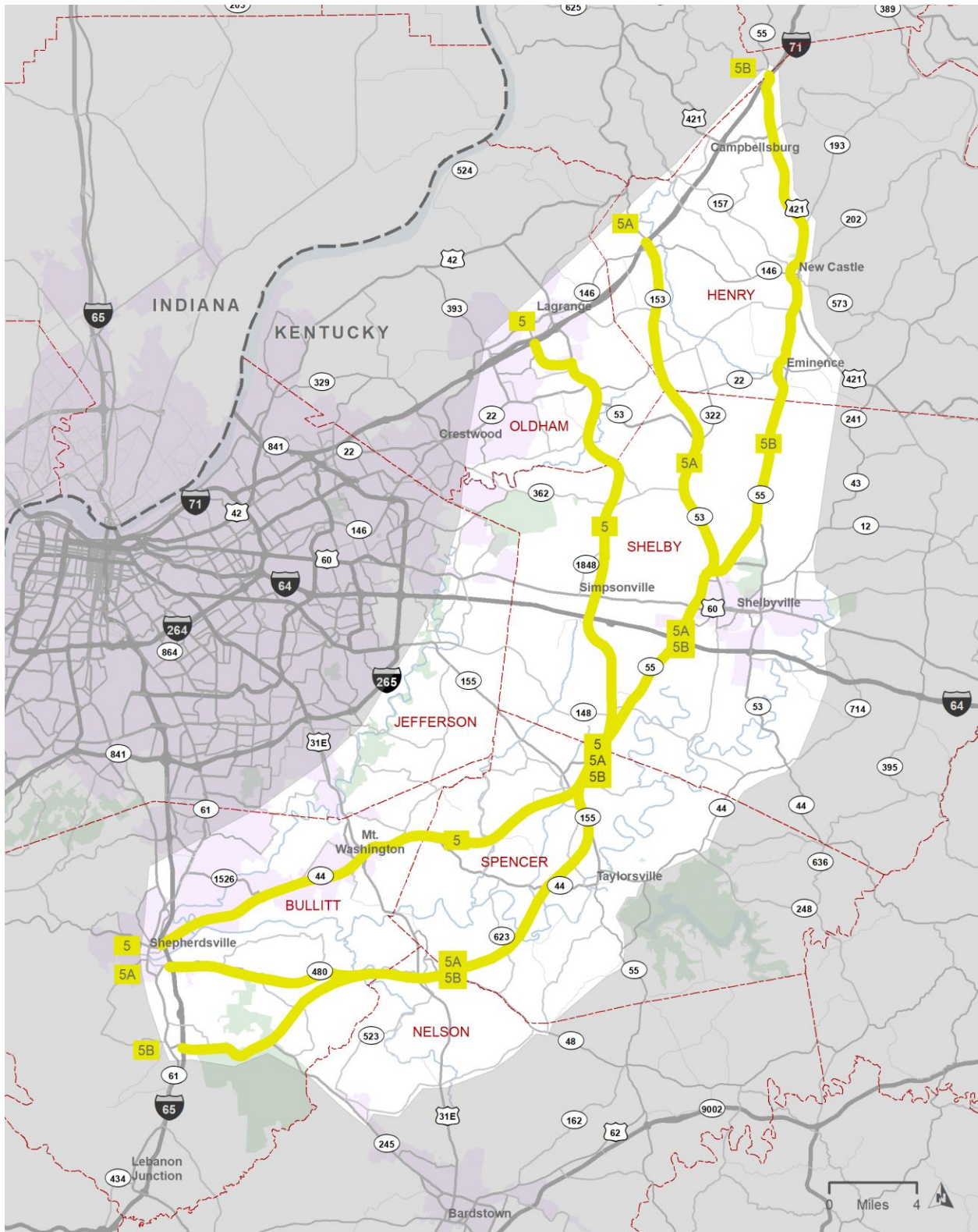
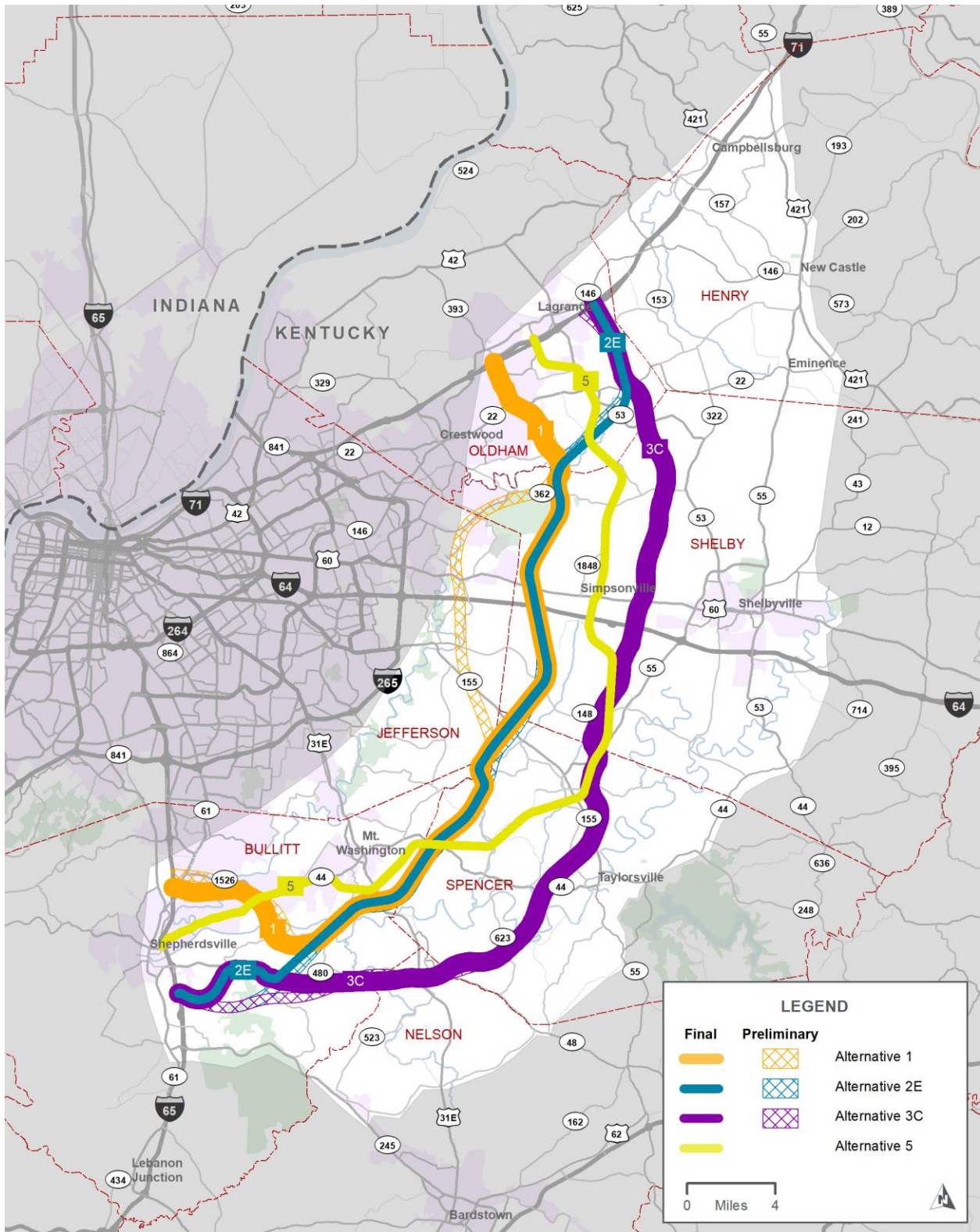


Figure 8-3: Level 2 Corridors – Preliminary & Final



## Recommendations

The Project Team recommends Alternative 2E as the best new corridor and Alternative 5 as the best upgrade of an existing corridor.

**Best New Highway Alternative** – Of all the new highway alternatives considered, Alternative 2E ranked best with the highest overall score. Alternative 2E provides the greatest mobility increase and best compatibility with existing and future land uses. Its position on the western side of the study area enhances system resiliency by providing a clear alternative circumferential route to I-265 and increases access by linking the fastest-growing exurbs of Louisville. Its proposed termini, at I-65 south of Shepherdsville and I-71 east of La Grange, would be ideally located to support future economic development.

Alternative 2E would begin at the new I-65 interchange now under construction south of Shepherdsville, which would not require modification. The alternative would run at-grade (with intersections) from there to KY 480, pass south and east of Mt. Washington, connect to I-64 west of Simpsonville, and terminate at I-71 north of La Grange past KY 712 (Jericho Road). This alternative would provide the greatest benefits for mobility and connectivity while supporting development and growth objectives. Alternative 2E connects well with the regional and statewide network. It would attract significant traffic from major destinations and high-density development, but it is far enough out to limit impacts to major developed areas. The conceptual cost is \$950M.

**Best Upgrade Alternative** – Alternative 5 was recommended as the best upgrade alternative with the highest score per \$100 million, making it the most cost-effective option. Alternative 5 is a highly cost-efficient option that would minimize environmental and land-use impacts. At the southern end of the study area, its corridor along KY 44 would be well-positioned to serve a relatively dense suburban population, improving local circulation and safety.

Alternative 5 would mainly be on new alignment near existing highways with partial access control. The alternative connects to I-65 at the existing KY 44 interchange in Shepherdsville. Proceeding eastward, KY 44 would be upgraded from Shepherdsville to the start of a new southern bypass around Mt. Washington. The alternative would intersect I-64 at the Simpsonville interchange and I-71 at the new La Grange Parkway interchange (soon to be constructed). While Alternative 5 is less effective than Alternative 2E, it improves connectivity and supports some new development. The alternative prioritizes local circulation and minimizes environmental impacts but increases property impacts. The conceptual cost is \$690M.

The two final recommended corridors offer several practical implementation benefits:

- They are not exclusive, portions of each could be constructed over time.
- They overlap with and/or demonstrate the importance of high priority regional projects.
- They define several new priority projects offering an indication of future needs.



## Alternative Combinations

“Hybrid” combinations could be pursued, by segmenting the network (see **Figure 8-4**, “Refined Corridors and Segmented Approach”) and selecting the best alternative within each segment. Given that the final Alternative 2E has some at-grade sections and final Alternative 5 has many new highway alignment sections, the two options are somewhat interchangeable. This approach would allow for customized solutions addressing local needs and costs while still improving mobility.

Splitting the Connector corridor into five segments allows for a more detailed analysis of the opportunities afforded by, and relationship between, the two recommended alternatives. Segment 1 encompasses Shepherdsville, Mt. Washington, and the developed area between them along KY 44. Segment 2a spans the mostly rural area between Mt. Washington and KY 155, and Segment 2b covers a similarly-developed area between KY 155 and I-64. Segment 3 encompasses Simpsonville and its rural environs to the north. Segment 4 includes the developed area south of I-71 between Buckner and La Grange.

In segments 1 and 4, each alternative provides a distinct advantage. As noted previously, Alternative 5 boosts local circulation and safety along the KY 44 corridor in Segment 1. Meanwhile, Alternative 2E is well-positioned for future/planned economic growth. Therefore, in these segments, it is possible that portions of both corridors could be constructed. Segment 2a, where the corridors overlap, is a logical point for a switchover between Alternative 2E and Alternative 5 if a hybrid of each option is ultimately constructed.

In Segments 2b and 3, Alternative 2E provides a clear mobility advantage. Its proximity to I-265 makes it a more viable alternate circumferential route around Louisville than Alternative 5.

An example combination of Alternatives 2E and 5 is shown in **Figure 8-5**. It uses portions of both alternatives to meet key objectives in each segment. This hybrid option as drawn is offset along I-64, which may require improvements along that section of Interstate. Also, in some segments, such as Segment 1 and 4 at either end, it is possible that both alternatives could be pursued as part of a long range plan for those communities.

**Figure 8-4: Refined Corridors and Segmented Approach**

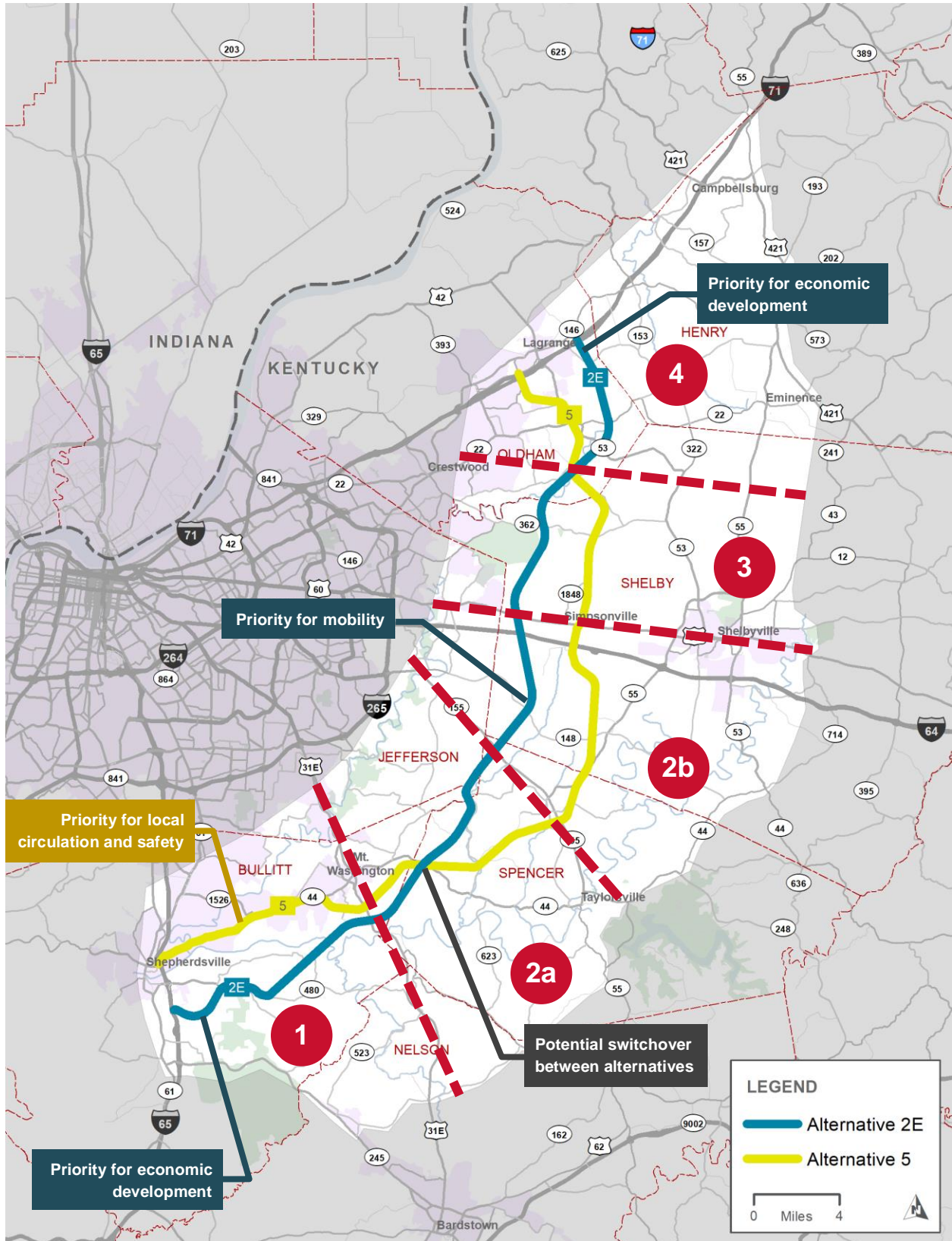
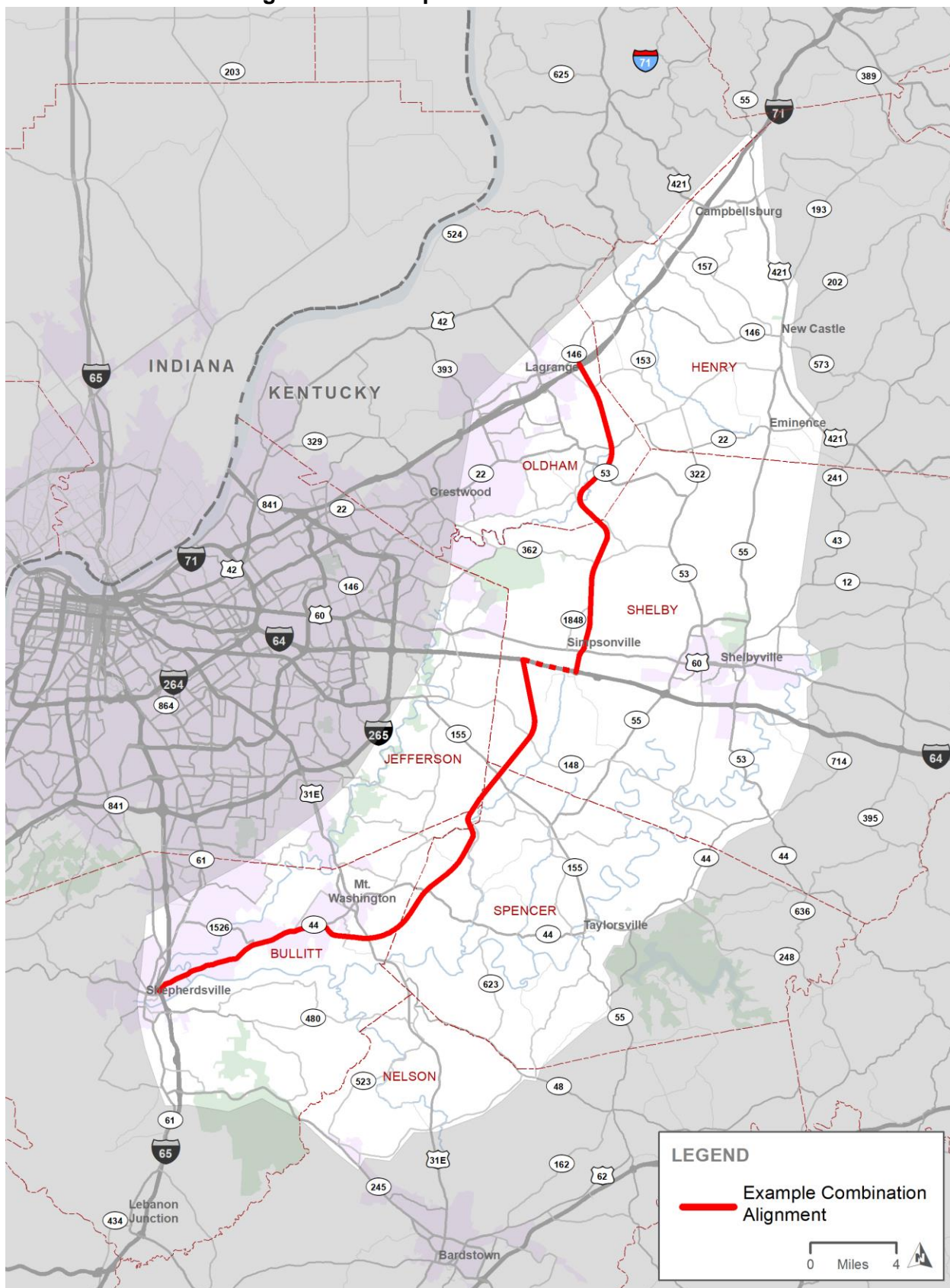


Figure 8-5: Example Combination Alternative



## Next Steps

This document is the first component of a multi-phase planning effort for a future connector between I-65 in Bullitt County and I-71 in Oldham County. The potential alternatives outlined in this study should be taken into consideration as improvements to intersecting or adjacent roadways (i.e. KY-44, I-65, I-265, I-71, and I-65) are planned and designed. Additionally, KYTC, KIPDA, and other agencies may consider the findings of this report as they conduct other project development activities within the study area.

The recommendations in this report are not monolithic, and, as the previously described segmentation suggests, the two recommended alternatives may be mixed or constructed in independent segments. KYTC and other agencies may consider follow-up studies to determine what options and combinations perform best. If certain segments of the corridor require immediate attention, agencies could pursue independent planning or preliminary design of smaller segments of the alternatives presented here.

Ultimately, none of the recommendations presented here have been funded or are included in the FY 2020–2026 Highway Plan. Construction of the 65-71 Regional Connector will depend on identification of a funding source and completion of preliminary engineering and an Environmental Assessment.

Questions or comments about this report or the 65-71 Regional Connector may be forwarded to:

Division of Program Management or Division of Planning  
Kentucky Transportation Cabinet  
200 Mero Street  
Frankfort, KY 40601