

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Kentucky's FY 2012-FY 2018 Highway Plan included a scoping study of a connection from KY 107 to the I-24 interchange with the Edward T. Breathitt Parkway (EBP) in Christian County. This Abbreviated Interchange Justification Study (AIJS) considers provision of that connection by a proposed full interchange with I-24 at KY 107 southwest of Hopkinsville (see Figure ES1) and performs a cursory review of other alternatives, including non-transportation alternatives. This AIJS represents only the first step of a potential two-step process for securing Federal Highway Administration (FHWA) approval for this project and addresses operational and engineering acceptability. The second step would require a detailed environmental analysis in accordance with NEPA that is beyond the scope of the current study and is therefore not presented in this report. The traditional KYTC environmental overview approach was utilized and depicted in an environmental footprint for this study. The second step necessary for final FHWA approval would require more detailed environmental analyses than those discussed in this study.

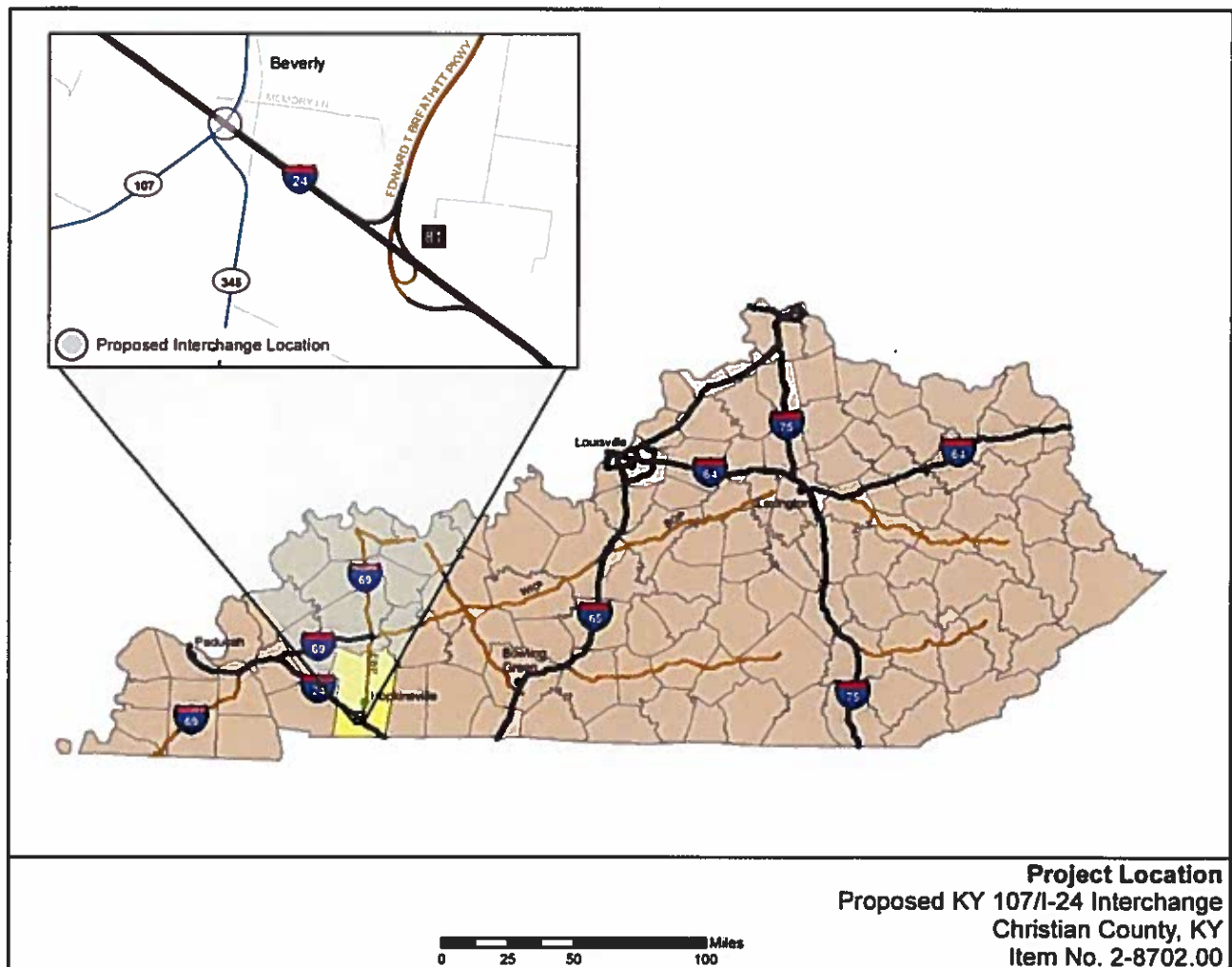


Figure ES 1: Location Map

Tasks in this analysis include:

- Identify the proposed project's purpose after consultation with project stakeholders and evaluate the project's need.

- Analyze projected traffic operations along I-24 in the vicinity of an interchange at KY 107 considering the policies of FHWA and the American Association of State Highway and Transportation Officials (AASHTO), and use that analysis to estimate projected traffic operations at other potential locations for a new I-24 interchange.
- Identify and discuss an overview of environmental issues in the project area.
- Develop a conceptual signing schematic for the KY 107 interchange.
- Determine the approximate cost and impacts for a preliminary interchange design.
- Coordinate with FHWA-KY Division Office.

During a meeting with local officials and other project stakeholders, issues and concerns included:

- Reducing travel times from Herndon to I-24 for emergency vehicles;
- Access to southwest Christian County;
- Property impacts;
- Drainage issues;
- Need for improvements to KY 107;
- Farm traffic;
- Impacts to historic Beverly School, and
- Potential impacts to Amish community and their buggy travel patterns along KY 107.

The issues of reducing travel times, access, and the estimated cost of improving KY 107 from KY 117 to US 68B are addressed in this report. Detailed assessments of property impacts, drainage issues, farm traffic, and the potential impacts to the historic Beverly School and the Amish community are beyond the scope of this report and would need to be addressed during subsequent project phases.

Two (2) primary project goals were identified by local officials:

- Reducing response times to I-24 for emergency vehicles, and
- Providing a transportation link to southwest Christian County.

The purpose of the project is to improve connectivity and reduce travel and emergency response time between I-24 and southwest Christian County, including the communities of Herndon and Beverly (see Figure ES2, p. ES3). Current travel times to the I-24/EBP interchange for emergency responders based in Herndon are at least 13 minutes.

The Traffic Forecast prepared by the Kentucky Transportation Cabinet (KYTC) showed 2,400 vehicles a day (vpd) would initially use an I-24 interchange at KY 107, and usage would grow to 3,200 vpd by the year 2040. Capacity analyses showed I-24 would operate at a Level of Service (LOS) B or higher for the design year 2040 in the vicinity of an interchange at KY 107 (see Figure ES3, p. ES4). Estimates of the usage of other potential I-24 interchanges were based on the I-24/KY107 forecast.

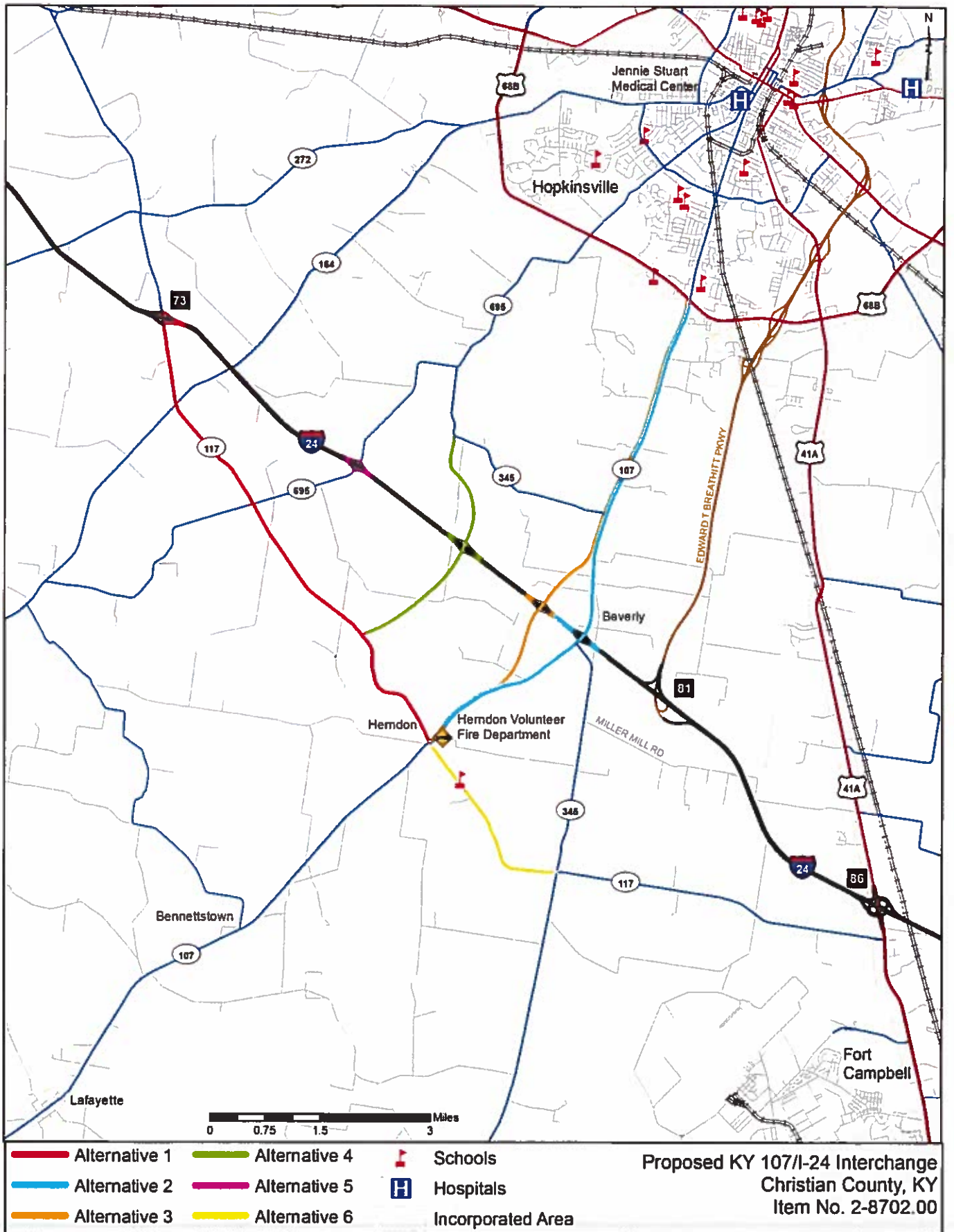
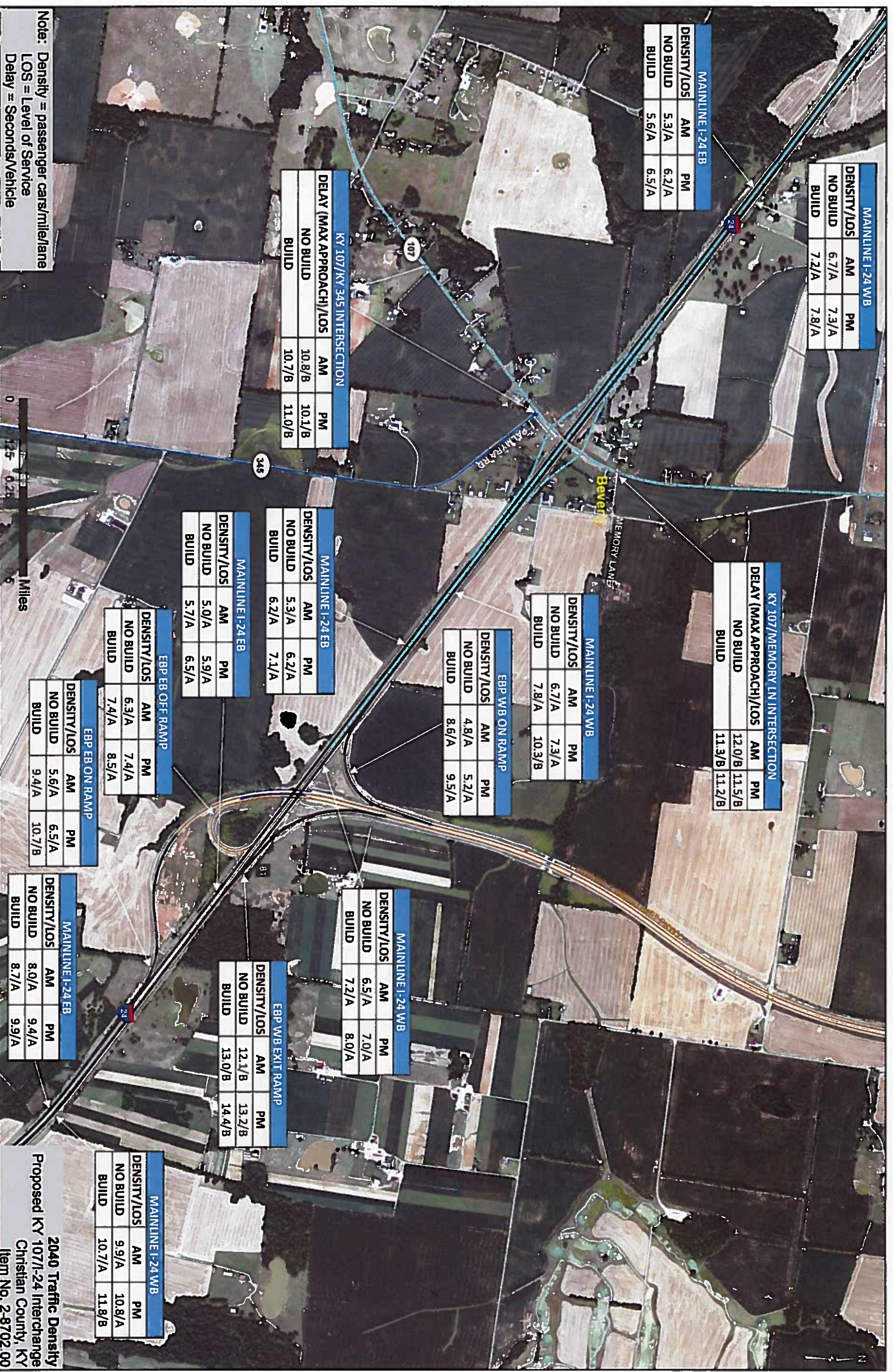


Figure ES 2: Region Surrounding Proposed Project and Alternatives Considered



MAINLINE I-24 WB		
DENSITY/LOS	AM	PM
NO BUILD	6.7/A	7.3/A
BUILD	7.2/A	7.8/A

MAINLINE I-24 EB		
DENSITY/LOS	AM	PM
NO BUILD	5.3/A	6.2/A
BUILD	5.6/A	6.5/A

KY 107/MEMORY LN INTERSECTION		
DELAY (MAX APPROACH)/LOS	AM	PM
NO BUILD	12.0/B	11.5/B
BUILD	11.3/B	11.2/B

MAINLINE I-24 WB		
DENSITY/LOS	AM	PM
NO BUILD	6.7/A	7.3/A
BUILD	7.8/A	10.3/B

EBP WB ON RAMP		
DENSITY/LOS	AM	PM
NO BUILD	4.8/A	5.2/A
BUILD	8.6/A	9.5/A

MAINLINE I-24 WB		
DENSITY/LOS	AM	PM
NO BUILD	6.5/A	7.0/A
BUILD	7.2/A	8.0/A

EBP WB EXIT RAMP		
DENSITY/LOS	AM	PM
NO BUILD	12.1/B	13.2/B
BUILD	13.0/B	14.4/B

KY 107/KY 345 INTERSECTION		
DELAY (MAX APPROACH)/LOS	AM	PM
NO BUILD	10.8/B	10.1/B
BUILD	10.7/B	11.0/B

MAINLINE I-24 EB		
DENSITY/LOS	AM	PM
NO BUILD	5.3/A	6.2/A
BUILD	6.2/A	7.1/A

EBP EB OFF RAMP		
DENSITY/LOS	AM	PM
NO BUILD	6.3/A	7.4/A
BUILD	7.4/A	8.5/A

EBP EB ON RAMP		
DENSITY/LOS	AM	PM
NO BUILD	5.6/A	6.5/A
BUILD	9.4/A	10.7/B

MAINLINE I-24 EB		
DENSITY/LOS	AM	PM
NO BUILD	8.0/A	9.4/A
BUILD	8.7/A	9.9/A

MAINLINE I-24 WB		
DENSITY/LOS	AM	PM
NO BUILD	9.9/A	10.8/A
BUILD	10.7/A	11.8/B

2040 Traffic Density
 Proposed KY 107/I-24 Interchange
 Christian County, KY
 Item No. 2-8702.00

Note: Density = passenger cars/mile/lane
 LOS = Level of Service
 Delay = Seconds/Vehicle



Figure ES 3: 2040 Traffic Densities

The environmental overview identified areas, such as proximity impacts to homes and potential community and environmental justice impacts, which may require further analysis and possible mitigation in subsequent project development phases.

Improving connectivity and reducing travel time from Herndon to I-24 could be achieved by several transportation alternatives.

- Improve KY 117 from Herndon to I-24 at Exit 73; Make improvements to 2 ramps at Exit 73
- Construct a diamond interchange with I-24 at KY 107; improve KY 107 from KY 117 to US 68B

These two alternatives were considered early in the study process and were discussed with project stakeholders. Four (4) additional alternatives were suggested by KYTC for conceptual development, review, and analysis as part of their comments on a draft of this report:

- Construct a diamond interchange with I-24 at a location approximately 2 miles west of EBP; relocate 2.1 miles of KY 107 to connect to interchange; improve balance of KY 107 from KY 117 to US 68B. This location was chosen so that connecting roadways back to KY 107 would not need to cross the Little River
- Construct a Diamond Interchange with I-24 at a location approximately 3 miles west of EBP; connect to existing roads
- Construct a diamond interchange with I-24 at KY 695
- Improve KY 117 from Herndon to US 41A

None of these four additional alternatives have been evaluated to the same level of detail as Alternatives 1 and 2.

Reconstruction of the I-24 interchange at Exit 81 and extending the EBP south to KY 117 was discounted by KYTC early in the study. The No Build Alternative is also included in the alternatives analysis and compares quite favorably with all of the Build Alternatives.

A proposed I-24 diamond interchange at KY 107, with an estimated cost of more than \$20 million (see Table ES1, p. ES6), would reduce emergency response times to I-24 from Herndon more efficiently than other transportation development alternatives. However, non-transportation alternatives could also reduce emergency response times at lower costs by relocating the location from which emergency response vehicles destined for I-24 originate.

Based on the analysis presented in this report, a proposed interchange at KY 107 would result in no significant degradation to the operation of I-24, due to the low forecasted usage of the interchange. Conversely, that low forecasted usage indicates that system connectivity would not be significantly enhanced by that interchange. Further, an interchange at KY 107 would not meet the desired separation of three miles from the adjacent EBP interchange as recommended in AASHTO's *A Policy on Design Standards Interstate System, 2005*.

In summary, an I-24/KY 107 interchange:

- Satisfies the project goal of reducing response time from Herndon to I-24 for emergency vehicles;

Table ES1: Comparison of Alternatives

Alternatives	Travel Time/Distance from Herndon to I-24 @ EBP via Exit 73	Travel Time/Distance from Herndon to I-24 @ EBP via Exit 86	Travel Time/Distance from Herndon to I-24 @ EBP via New Interchange	Travel Time/Distance from Fire Station at US68B/EBP to I-24 @ EBP	Cost Estimate, Transportation Solution	Cost Estimate, Non-Transportation Solution	Cost per Mile Shortened	Cost per Minute Time Savings
Existing/No Transportation Build	18.7 min / 15.6 miles	13.6 min/ 12.3 miles	N/A	6 min/5.8 miles	N/A	\$2,000,000	\$345,000	\$333,000
Alternative 1 – Improve KY 117 from Herndon to I-24 @ Exit 73	17.0 min/ 15.6 miles	13.6 min/ 12.3 miles	N/A	N/A	\$16,750,000	N/A	No reduction in distance	\$9,850,000
Alternative 2 – Construct new I-24 Interchange at KY 107. Improve KY 107 from KY 117 to US 68B	18.7 min/ 15.6 miles	13.6 min/ 12.3 miles	3.9 min/ 3.8 miles	N/A	\$20,300,000	N/A	\$2,388,000	\$2,100,000
Alternative 3 – Construct new I-24 interchange near MP 79.2. Construct 2.1 miles of connector roads north and south back over to KY 107. Improve balance of KY 107 from KY 117 to US 68B.	18.7 min / 15.6 miles	13.6 min/ 12.3 miles	5.5 min/ 5.3 miles	N/A	\$30,700,000	N/A	\$4,385,000	\$3,790,000
Alternative 4 – Construct new I-24 interchange near MP 78.2. Construct connector roads north and south of interchange	18.7 min / 15.6 miles	13.6 min/ 12.3 miles	7.2 min / 7.0 miles	N/A	\$34,600,000	N/A	\$6,530,000	\$5,410,000
Alternative 5 – Construct new I-24 Interchange at KY 695. Improve KY 695 from KY 117 to US 68B	18.7 min / 15.6 miles	13.6 min / 12.3 miles	11 min/ 10.8 miles	N/A	\$18,500,000	N/A	\$12,333,000	\$7,115,000
Alternative 6 – Improve KY 117 from Herndon to KY 345	18.7 min / 15.6 miles	13.1 min/ 12.3 miles	N/A	N/A	\$6,350,000	N/A	No reduction in distance	\$12,700,000

*Costs for Alternative 2 are based on a new bridge just slightly (approximately 50 feet) west of the existing structure to address sight distance issues that would be present at the ramp terminals at the current overpass location, and to assist in maintenance of traffic during construction.

- Provides additional access to I-24 at acceptable Levels of Service; but fails to significantly enhance system connectivity to due to the low forecasted usage;
- Could be signed according to current standards;
- Does not diminish levels of service on the crossroads in the study area;
- May have undesirable impacts to the community of Beverly;
- Would require reconstruction of the KY 107 structure over I-24 to meet sight distance requirements;
- Provides access to a public road while accommodating all traffic movements on that road;
- Does not meet the desired spacing separation of three miles from the adjacent EBP Parkway interchange;
- Has not been demonstrated to be needed to serve a significant volume of projected traffic.