

KY 321

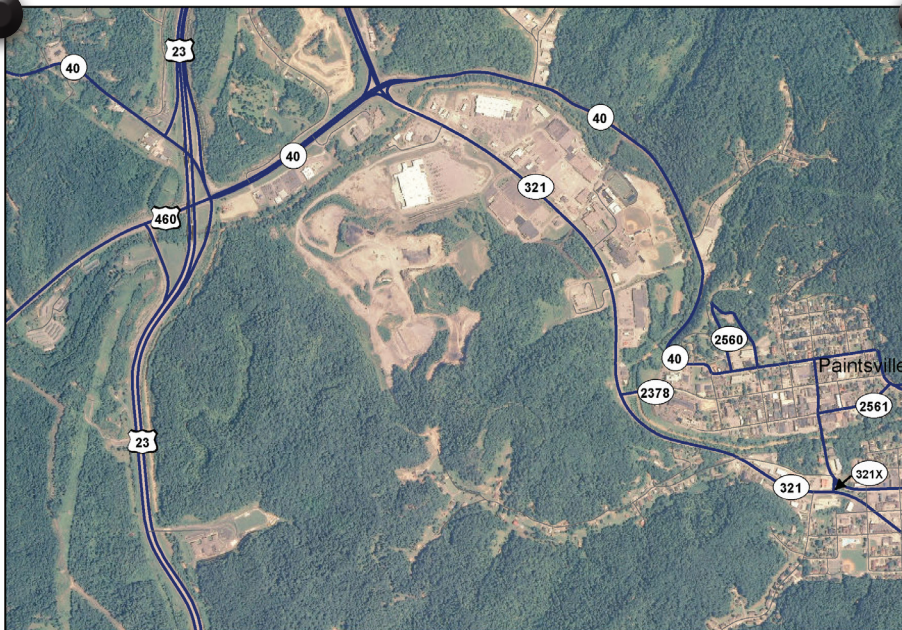
KY 40 TO KY 321X

JOHNSON COUNTY, KY

FINAL REPORT



PROGRAMMING STUDY



PREPARED FOR:



PREPARED BY:



AUGUST 2012

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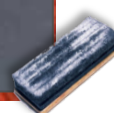
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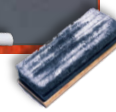
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EXECUTIVE SUMMARY

KY 321 from KY 321X (MP 7.053) north to KY 40 (MP 8.791) is a congested arterial just north of Paintsville (Figure ES-1). It is a two-lane rural roadway with left turns provided through either a two-way left turn lane or back-to-back left turn lanes from KY 2378 (James Trimble Boulevard) north to KY 40. South of KY 2378, KY 321 is a two-lane roadway.

The **purpose** of this project is to relieve congestion and improve safety for both motorists and pedestrians on KY 321. The **need** results from **volume-to-capacity ratios** currently exceeding 0.75 and projected to reach levels greater than 1.0 in the future. **Crash rates are 3.5 times higher** than the threshold for statistical significance. **Goals** for the project are to:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS

KY 321 is a Rural Minor Arterial roadway and a State Secondary route. Abutting KY 321 are **many traffic generators** such as Walmart, Kmart, Food Lion, Lowe's, McDonald's, Arby's, Bob Evans, gas stations, clothing stores, auto supply stores, two banks, a post office, Johnson Central Middle School and Johnson Central High School.

KY 40 in the project area begins at MP 9.073 (KY 321) and ends at MP 10.743 (Church Street). KY 40 is classified as a rural major collector and as a State Secondary route in State Primary Road System.

In the years 2008-2010, 167 of the 207 crashes in the KY 321 study area occurred in a one-mile segment (MP 7.637-8.637), resulting in a **CCRF of 4.131** on that segment. 125 crashes occurred between MP 8.268 and MP 8.876, while 19 of the crashes occur in a 0.1-mile spot (MP 8.409-8.509). None of these resulted in a fatality, but 45 crashes resulted in 63 injuries. **96% of the crashes involved more than one vehicle**, with 52% being rear-end crashes and another 20% being angle crashes.

Levels-of-service on KY 321 **range from B to F northbound and from A to F southbound** (Table ES-1). Average delays in making turning movements from or to KY 321 **exceed 60 seconds** in both the morning and afternoon peak periods at eight intersections. A 1% forecasted annual growth in traffic worsens this condition by the year 2035.



Figure ES-1 – Project Location

Table ES-1 – Current Year Peak Hour Levels of Service at Select Intersections

LOS at Intersecting Roadway	Northbound AM Peak Hours	Northbound PM Peak Hours	Southbound AM Peak Hours	Southbound PM Peak Hours
KY 321X	C	F	B	E
James Trimble Blvd (KY 2378)	D	F	A	B
Apple Tree Shopping Plaza	B	F	A	B
Federal Way (Post Office)	B	A	A	A
Mayo Drive (McDonald's)	C	F	C	C
Kmart Entrance	F	F	F	F
Walmart Entrance	B	C	C	F
KY 40	B	A	C	C

A KYTC Project Team provided guidance and a Stakeholders' Group provided input in the conduct of this study. Project Stakeholders stressed the turning movement delays and safety concerns.

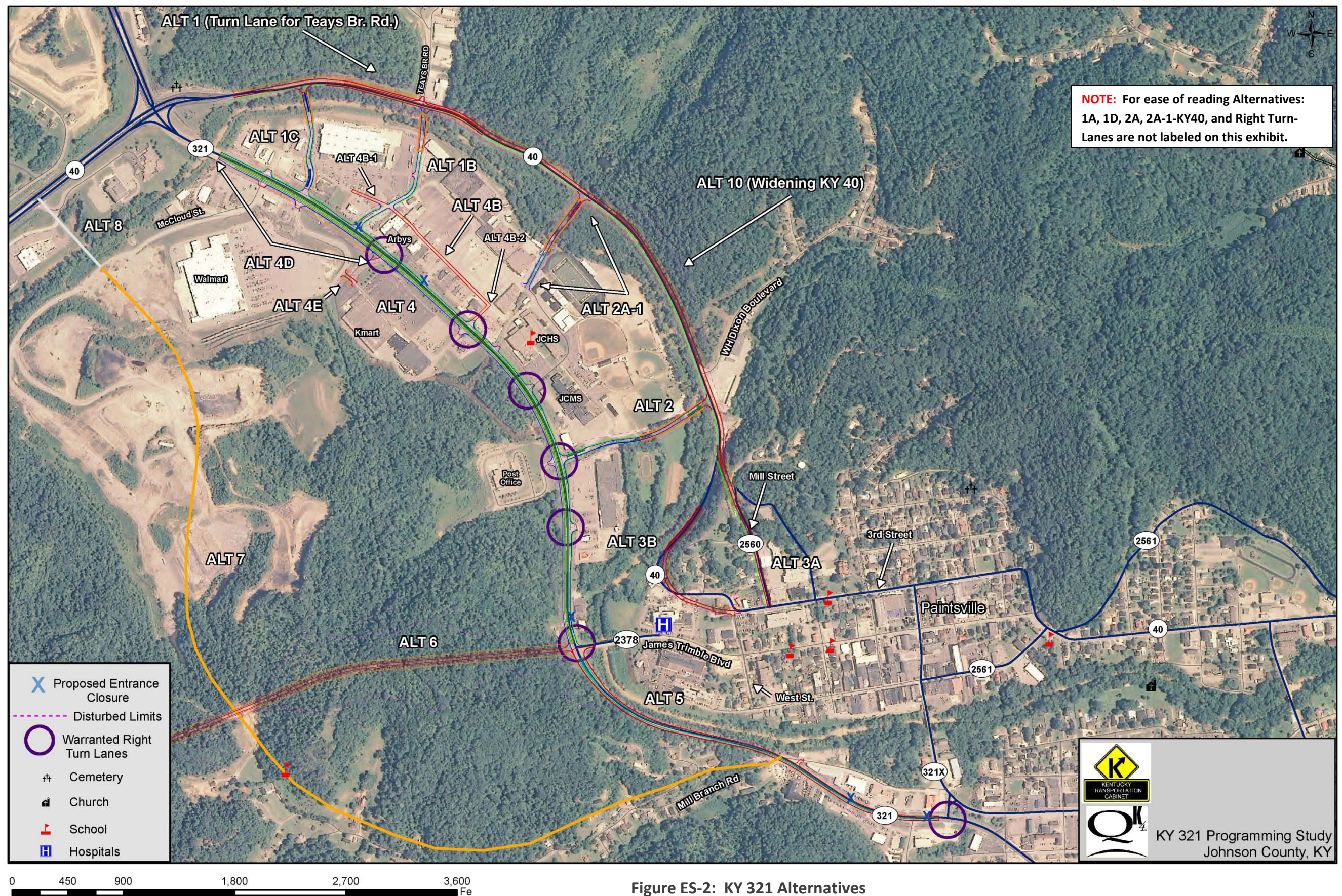
Alternative improvement concepts were developed and evaluated for their effectiveness (see Figure ES-2):

- **“DO-NOTHING” ALTERNATIVE**
 - This alternative would have no construction disruption or cost except for routine maintenance.
- **IMPROVEMENTS TO KY 321**
 - Alternative 4: Five Lane KY 321 from KY 2378 (James Trimble Blvd) to KY 40
 - Alternative 4A: Right In/Right Out Only at McCloud Drive
 - Alternative 4C: Right Turn Lanes at Various Intersections
 - Alternative 4D: Additional southbound lane and an exclusive right turn lane on KY 321 from Paint Creek Bridge south to the northernmost Kmart entrance.
 - Alternative 5: Four-lane KY 321 from KY 2378 (James Trimble Boulevard) to Mill Branch Road then transition to three-lanes to KY 321X
- **OTHER OPTIONS FOR RELIEVING TRAFFIC ON KY 321**
 - Alternatives 4B, 4B-1, and 4B-2: Frontage road north of and parallel to KY 321

- Alternative 6: New connector extending KY 2378 (James Trimble Blvd) west from KY 321 to US 23
- Alternative 4E: Combine Kmart and Walmart entrances to KY 321 for a single shared entrance
- Alternative 7: New Connector from, and west of, KY 321 Near Mill Branch Road behind Walmart to McCloud Street
- Alternative 8: New Connector from, and west of, KY 321 from McCloud Street to KY 40 near Detention Center Road
- **CONNECTORS FROM KY 321 TO KY 40**
 - Alternative 1B: South side of Lowe's
 - Alternative 1C: North side of Lowe's
 - Alternative 2: South side of school complex
 - Alternative 2A: North side of school complex
 - Alternative 2A-1: North side of school complex, but not extending to KY 321
- **OTHER IMPROVEMENTS CONSIDERED**
 - Alternative 1: Left-Turn Lane on KY 40 eastbound to Teays Branch Road
 - Alternative 3A: Relocate KY 40 from approximately WH Dixon Boulevard following Mill Street to 3rd Street
 - Alternative 3B: Improve existing alignment on KY 40 from WH Dixon Boulevard to West Street
 - Alternative 9: Pedestrian Bridge from south side of Lowe's to Teays Branch Road and Improvements to KY 2378 (James Trimble Boulevard) at KY 321
 - Alternative 10: Improve KY 40 on or near existing alignment from near KY 321 to Alternative 3A or 3B

Given input from the Project Team, Stakeholders, traffic and capacity analyses, alternative impacts, terrain, and financial constraints, the Project Team recommended Alternative 4 (widening KY 321 from Paint Creek Bridge south to KY 2378 {James Trimble Boulevard}). Increasing capacity appears to have the most impact on congestion, safety, and providing better access to the hospital and schools. At present, KY 321 between KY 40 and KY 2378 (James Trimble Boulevard) has nearly reached capacity. Other alternatives examined did not

address the purpose and need for the project and project goals as well as Alternative 4. KYTC owns a good portion of the right-of-way which will help reduce costs.



The construction cost estimate of \$8,236,000 was developed utilizing the typical section shown in Figure ES-3 with the following recommendations (shown in Figure ES-4):

- A two-way left turn lane - However, because of left turn volumes, KY 2378 (James Trimble Boulevard) and perhaps Walmart may be better served with separate southbound and northbound left turn lanes, respectively.
- Close northernmost Kmart/Arby's intersection.
- Close entrance next to Burger King
- Combine the two entrances immediately north of James Trimble Boulevard (KY 2378)
- Construction of the right turn lanes addressed in Chapter 6, Section 6.4 of this study (except where recommendations are to close the intersection).

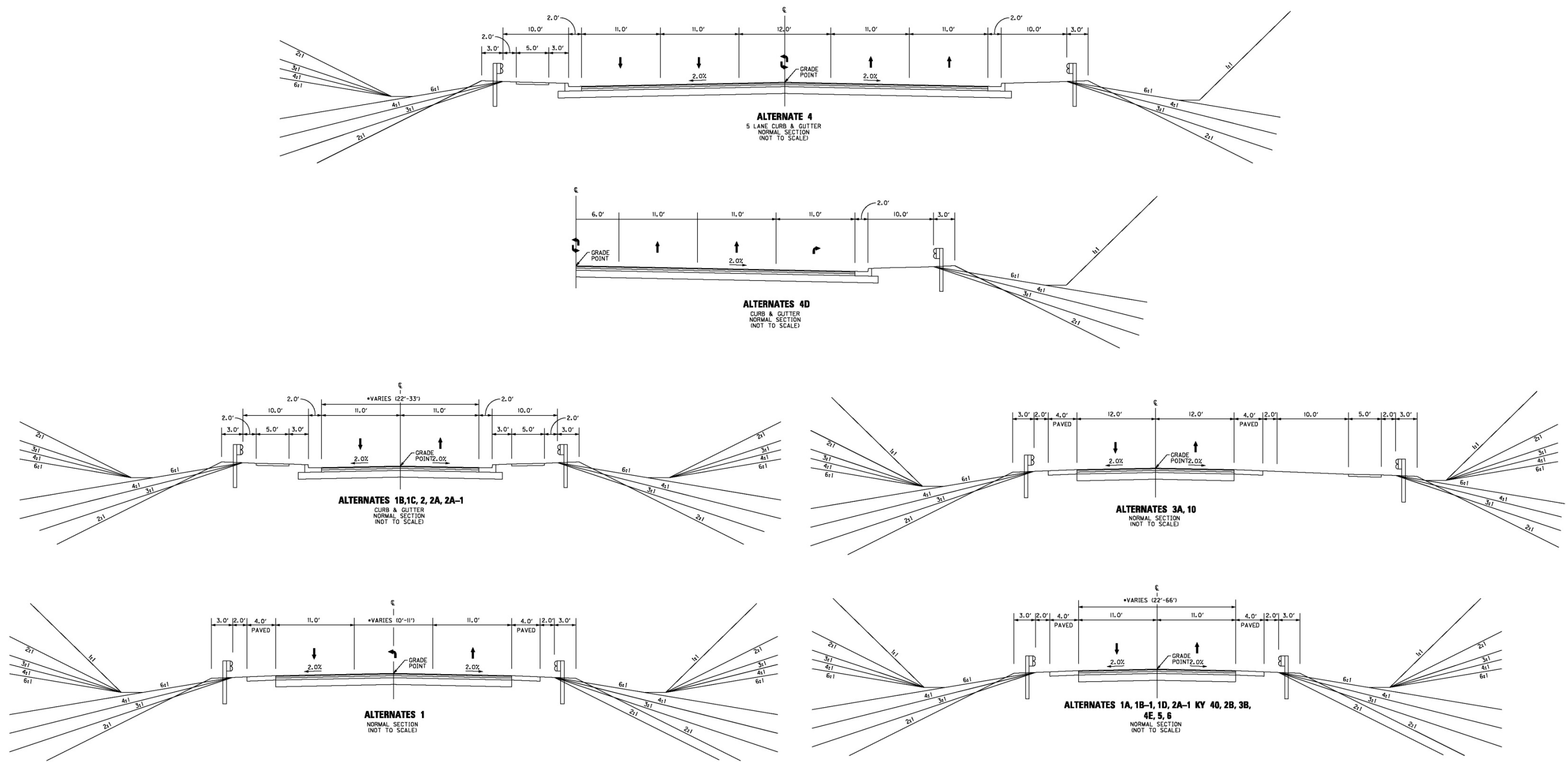
At the second stakeholder's meeting, it was requested that consideration be given to prohibiting the remaining left turns (not targeted for closure with Alternative 4) at unsignalized intersections. The three unsignalized intersections that were not originally a part of Alternative 4 are:

- Central High School Drive,
- The bus exit at Johnson Central High School, and
- Hardee's/Radio Shack/Southernmost Lowe's Intersection.

Additional options that may perhaps improve benefits of implementation of Alternative 4 are as follows:

- Alternative 4E (combine Kmart and Walmart entrances)
- Alternative 4B, 4B-1 and 4B-2 (parallel access road to KY 321 connecting McDonald's intersection to Lowe's,
- Convert Johnson County Middle School Drive to right in/right out, expand the southernmost intersection to the schools and allow all movements at that intersection. Busses would use the northernmost entrance for right turns only. Another option is to allow for a midblock U-turn at the present Burger King intersection. This midblock U-turn would necessitate a section of raised median with a minimum separator width of 40 feet.
- Convert southernmost Lowe's entrance (Hardee's/Radio Shack/Lowe's) to right in/right out and direct left turns to the signalized intersection at Walmart/Lowe's intersection.

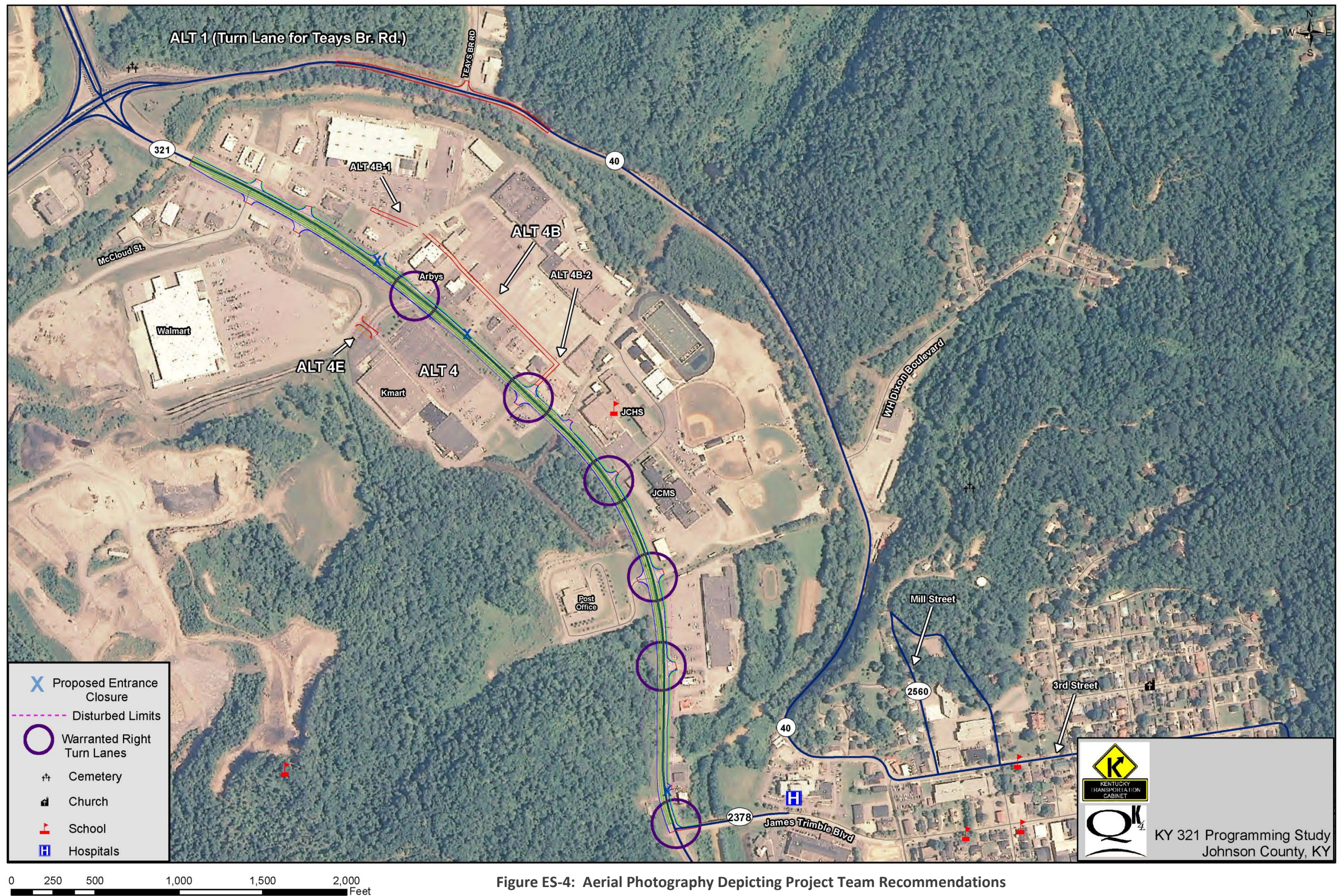
TYPICAL SECTIONS



* SEE ALTERNATIVE SHEETS FOR TURN LANE LOCATIONS

**KY 321 – JOHNSON COUNTY
PROGRAMMING STUDY
IMPROVEMENT ALTERNATIVES**

Figure ES-3 - Alternative Typical Sections



CHAPTER 1 INTRODUCTION

KY 321 from KY 321X (MP 7.053) north to KY 40 (MP 8.791) is a congested rural arterial in a densely developed area just north of Paintsville in Eastern Kentucky (see Figure 1). It is a two-lane roadway with left turns provided through either a two-way left turn lane or back-to-back left turn lanes for the majority of the route from KY 40 to KY 2378 (James Trimble Boulevard). The remaining portion of KY 321 south of KY 2378 to KY 321X is two-lane roadway.

Formerly US 23, KY 321, passes through the commercial section of Paintsville. The US 23 Bypass built in the mid 1990s, removed coal trucks from this portion of KY 321, however, it did not alleviate congestion.

The study area (see Photo Tour in Appendix A) has traffic generators such as Walmart, Kmart, Food Lion, Lowe's, McDonald's, Arby's, Bob Evans, gas stations, clothing stores, auto supply stores, two banks, a post office, Johnson Central Middle School and Johnson Central High School just to name a few. Therefore, residents travel to this stretch of road to conduct business, work, shop, and take their children to and from school and dine.

Because of the rugged terrain, the development in the area is very close together. With the Johnson Central High School and the Johnson County Middle School, the mornings and afternoons provide peak congestion with children being bused to school, dropped off and picked up by their parents.

Improvement options for KY 321 have been on Highway District 12's Unscheduled

Needs List for six to eight years and have consistently ranked in the top 10 or so of priorities for the District and The Big Sandy Area Development District. The District Transportation Plan recently completed also ranked improvement options in the Top 30 of the Unscheduled Projects List. The KYTC's FY 2012 – FY 2018 Highway Plan contains one project in the study area – Item Number 12-194.00, which will address geometric, safety issues and future congestion mitigation on KY 40 at Teays Branch Road. Design is scheduled for FY 2015.

"Old" US 23, now KY 40, snakes around the hillside from downtown Paintsville, and parallels Paint Creek north to the KY 40/ KY 321 intersection. KY 40 is used by many as a "run around" to avoid congested KY 321. Spring 2012, a pharmacy school is proposed to be located on Teays Branch Road off KY 40¹.

The Highway District Office staff has attempted to reduce congestion by improving the KY 40/KY 321 intersection, providing for a right in/right out at Bob Evans, and installing some right turn lanes from the existing shoulder on KY 321.

Over the years, several ideas have been conceptualized in an effort to help with traffic congestion in the area. One idea was a connector between KY 321 and KY 40 near the school complex that would provide another entrance/exit for the schools, and potentially an alternative route to the congested KY 321. Improvements to KY 40 and KY 321 have also been part of these ideas.

¹ As this report was being prepared, the proposed pharmacy school has not moved forward as anticipated.



The Highway District Office estimated total costs for a KY 321/KY 40 Connector south of Johnson County Middle School, a left turn lane at Teays Branch Road, and KY 40 reconstruction from KY 321 to West Street.

With KY 321 congestion relief and safety being the focus, the purpose of this study is to take what has been identified in the past and any new concepts, and develop a traffic model to analyze alternatives and their effects on KY 321 congestion. This study was also to review previous cost estimates and identify any low-cost solutions that could be implemented in the short-term to achieve that goal.

CHAPTER 2 PURPOSE AND NEED

The purpose of this project is to relieve congestion and improve safety for both motorists and pedestrians on KY 321 while considering current and existing future development near KY 321 and the safety of pedestrians.

The need results from current and projected traffic volumes that exceed the desired level today and in the future for the entire project length, and forecasted traffic volumes that produce Level of Service E, and a volume to capacity ratio over 1.0 in the design year (2035). Currently KY 321 from KY 40 to James Trimble Boulevard (KY 2378) carries between 13,500 and 17,600 vehicles per day (vpd). South of James Trimble Boulevard (KY 2378), KY 321 is two lanes and carries approximately 12,600 vpd. The entire project length has a volume to capacity ratio that exceeds 0.75 today and over 1.0 in the future.

A crash analysis identified the project corridor as one with a Critical Crash Rate Factor (CCRF)² greater than 1.0 from KY 321 to James Trimble Boulevard (KY 2378). A large number of crashes are occurring between Johnson Central High School Drive and KY 40. There is also dense development and many access points along the project corridor that add to congestion and crashes. In addition, pedestrians must currently walk either behind guardrail or on the shoulder of the road.

Goals for the project were established at the first Project Team Meeting following stakeholder input and those are as follows:

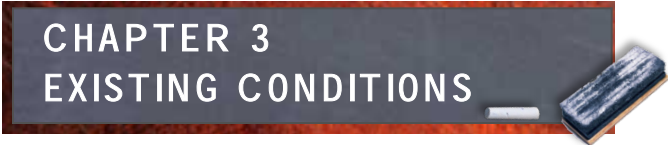
1. Provide for congestion relief on KY 321 and improve safety.
2. Provide better service to Teays Branch Road.
3. Provide better access to Johnson Central High School and Johnson County Middle School.
4. Provide better access to Paul Hall Hospital.
5. Provide for better pedestrian movement.

Terrain and development limit the number of reasonable and financially feasible alternatives.

² The "Critical Crash Rate" is the maximum crash rate expected to occur on a roadway section, given the statewide average crash rate for that functional roadway class, the ADT, and the section length. The ratio of the actual crash rate to the critical crash rate produces a Critical Crash Rate Factor (CCRF). If the roadway section's actual crash rate exceeds the critical rate (i.e. the CCRF is greater than 1.0), then that roadway section has more crashes than is statistically probable to be occurring randomly.

At present in the study area, KY 321 does not have sidewalks with the exception of a sidewalk from James Trimble Boulevard (KY 2378) on the eastside of KY 321 for approximately 200 feet. South of KY 321X sidewalks are provided on KY 321. Residents of the Senior Citizens High-Rise Complex in Paintsville have been known to ride their electric scooters north on KY 321 to the stores at the north end of the project area.

CHAPTER 3 EXISTING CONDITIONS



3.1 Study Area

The KY 321 study area is located in Johnson County along the western edge of Paintsville. The study area is depicted in Figure 2.

3.2 Existing Roadways

KY 321 begins at KY 1428 in Prestonsburg in Floyd County, crosses into Johnson County, and ends at its junction with US 23 north of Paintsville for a length of 14.0 miles. The project study begins at the intersection with KY 321X (MP 7.061) and ends at the junction with KY 40 (MP 8.791).

KY 321 in the project area is classified as a rural minor arterial, since Paintsville is below the population threshold for urban functional classifications, for the length of the project and on the State Primary Road System as a State Secondary route. Prior to the opening of the current US 23 in 1996, that route number was assigned to what is now KY 321. For access management purposes, KY 321 is considered a Class I roadway (posted speed of 45 mph) from

Mill Branch Road north to KY 40 and a Class II roadway (posted speed less than 35mph) from Mill Branch Road south to KY 321X.

KY 40 in the project area begins at MP 9.073 (KY 321) and ends at MP 10.743 (Church Street). KY 40 is classified as a rural major collector and as a State Secondary route on the State Primary Road System.

The current US 23 is the major north-south artery in Johnson County and is on the National Highway System. It is located approximately 1.25 miles west of KY 321 in the project study area.

3.3 Crash Analysis

KY 321 is currently characterized by high crash rates. The study segment of KY 321 from KY 40 to James Trimble Boulevard (also known as KY 2378 or 2nd Street) has a Critical Crash Rate Factor (CCRF) of 3.488. The study segment is part of a larger 5-mile segment (MP 5.616 to MP 10.616) with a CCRF of 2.722. 167 of the 207 crashes occurring in the study segment happened in a one-mile segment (MP 7.637 to 8.637), resulting in a CCRF of 4.131. 125 crashes occur in a 0.608-mile segment between MP 8.268 and MP 8.876 producing a CCRF in excess of 3.0. The crashes and crash segments and spots are illustrated on Figures 3 and 4.

Nineteen of the crashes occur in a 0.1-mile spot between MP 8.409 and MP 8.509 near the Kmart entrance and the side road to the Big Sandy Superstore and Hardee's (refer to Figure 4).

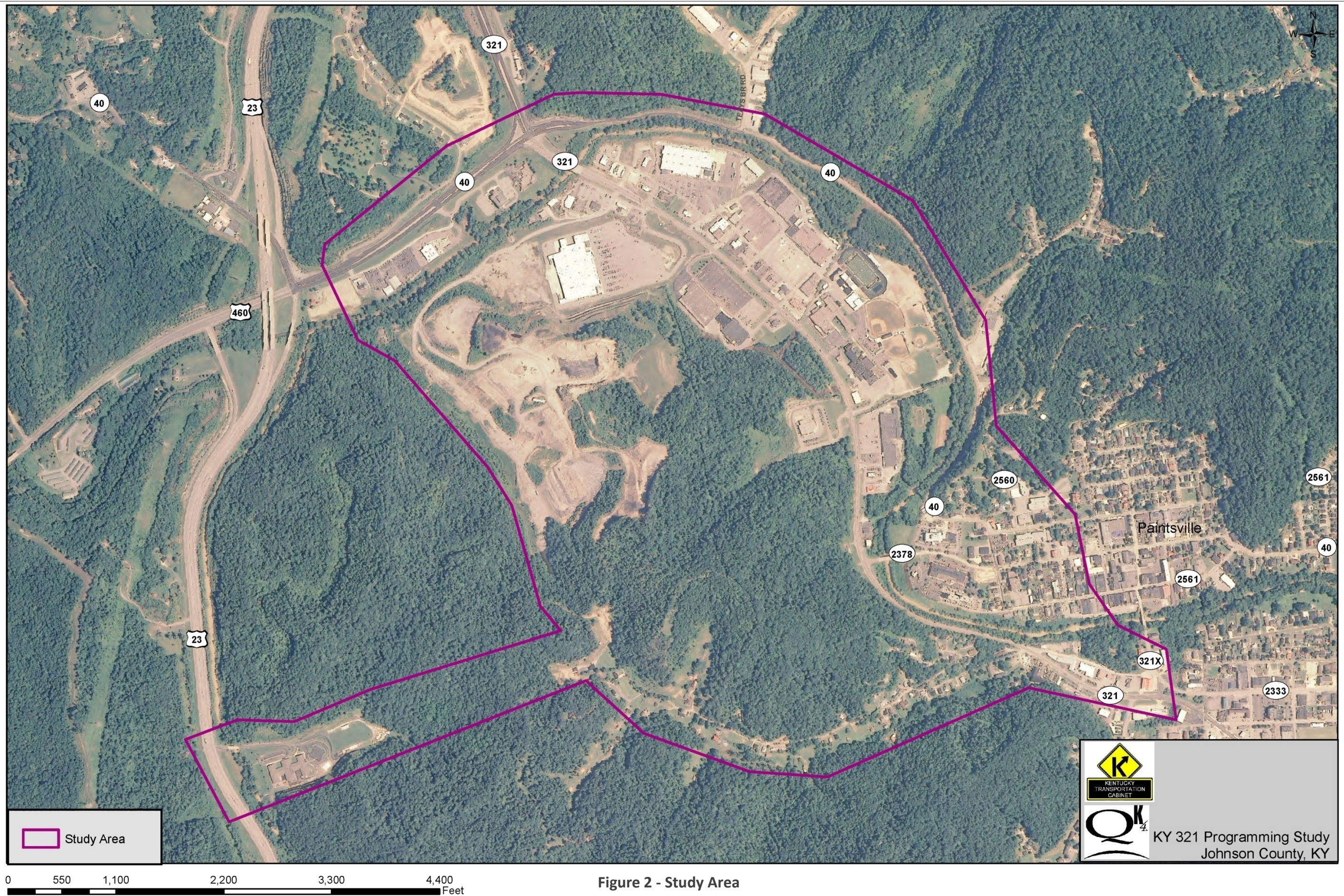
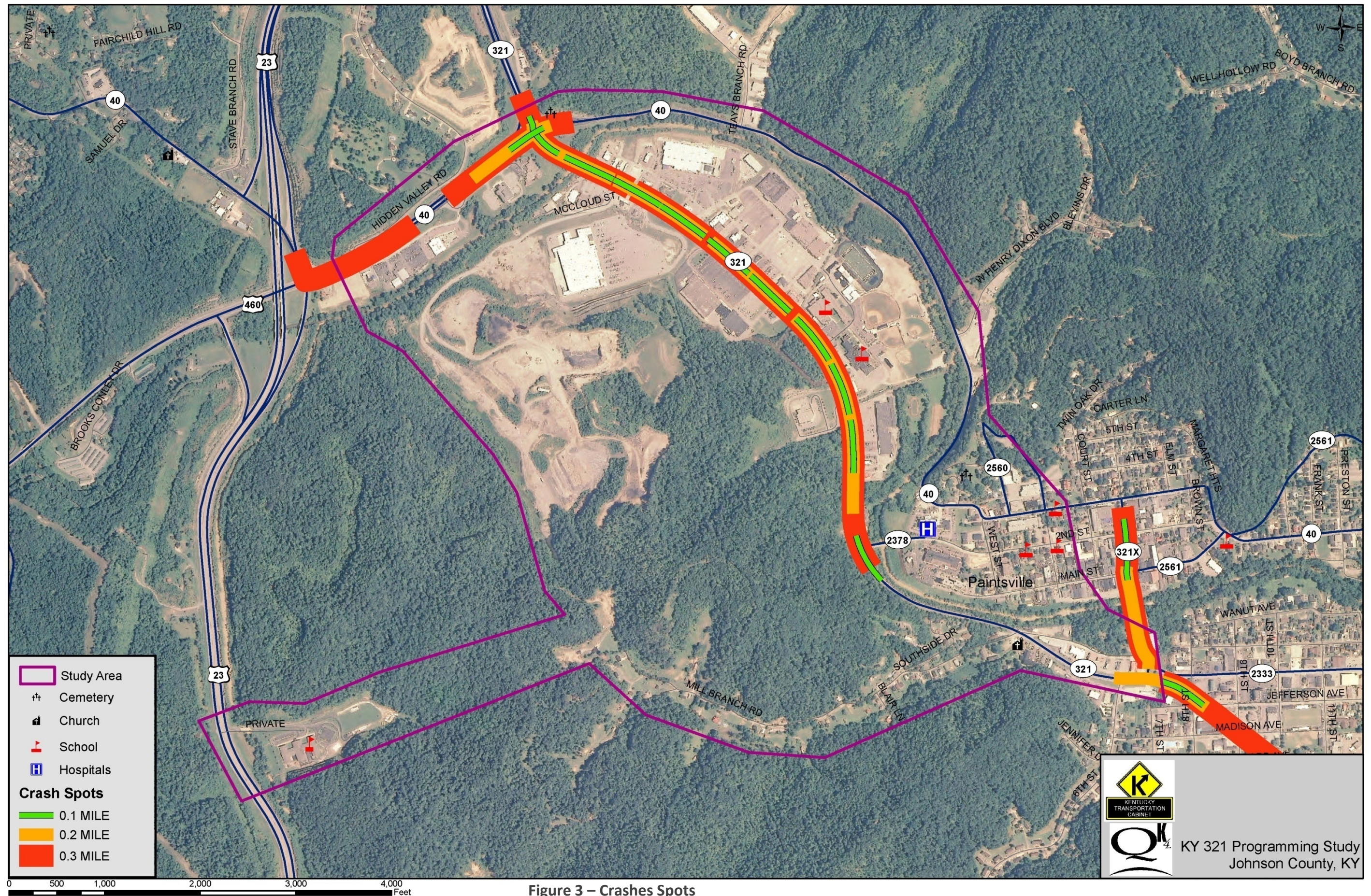
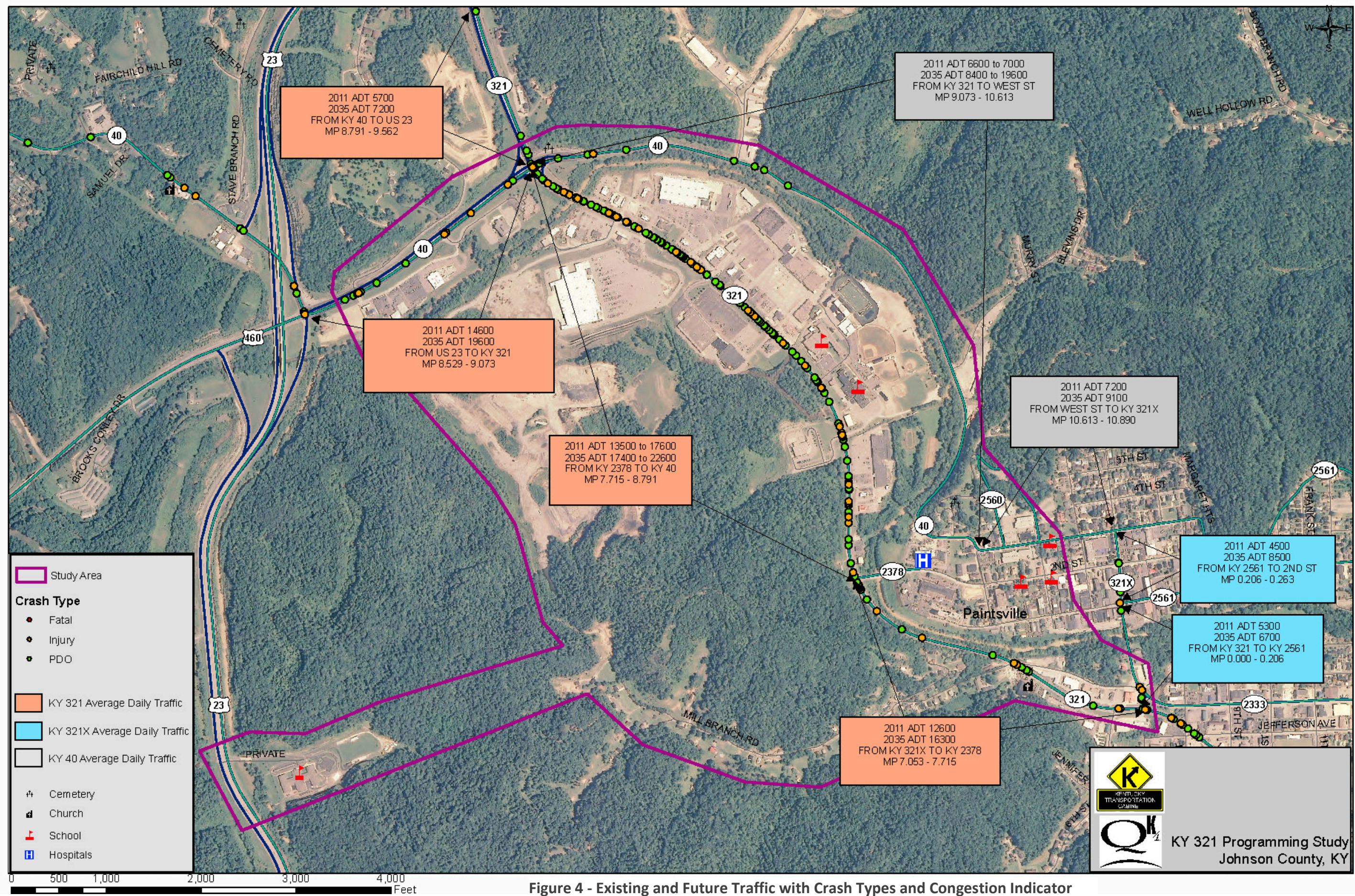


Figure 2 - Study Area

KY 321 in Paintsville from KY 40 to KY 321X





Though no crashes resulted in a fatality, 45 crashes resulted in 63 injuries. 96% of the crashes involved more than one vehicle, with 52% being rear-end crashes and another 20% being angle crashes. These types of crashes are somewhat typical for congested streets. Table 1, Figures 3 and 4 summarize crash data for the study area.

3.4 Existing Levels of Service and v/c Ratios

The study segment of KY 321 is currently showing extensive delays and resulting Level-of-Service (LOS) issues. Tables 2, 3, and 4 depict respectively the delay and LOS for through movements on KY 321, other through movements, and selected turning movements—both from and to KY 321. Calculations are shown in Appendix G.

3.5 Existing Turn Lane Warrants

Right-turn lanes currently are in place northbound on KY 321 at James Trimble Boulevard (KY 2378) and at the entrance to Bob Evans restaurant opposite McCloud Street. Right-turn lanes on KY 321 northbound are also currently warranted at McDonald's, opposite the entrance to Kmart, in the AM peak hour for both school entrances, and at Apple Tree Plaza.

3.6 Adequacy Ratings

The Composite Adequacy Rating Percentile is a method originally developed by the Federal Highway Administration (FHWA) and subsequently refined by KYTC to assess a roadway's condition. The ratings are calculated by individual functional class and based upon three roadway components: safety, congestion, and pavement condition—with each component comprised

of several measures. The rating scores 100 as a perfect, or near perfect, highway. The Adequacy Percentile ranks a particular roadway section compared to other Kentucky roads in the same functional class into a percentile. For example, a road section with a Composite Adequacy Percentile of 75.0 means that 25% of similar roads are rated better. KY 321, in the project area, has an adequacy rating ranging from a percentile of 22 to 47. The safety and service indices lower the adequacy rating percentile score. These ratings and other routes in the study area can be seen in Appendix A.

3.7 Structures

Three highway bridges are part of the study area. Structure Number B00067N, located on KY 321 over Paint Creek at MP 8.67, was last inspected in February 2010 with a resulting Bridge Sufficiency Rating (BSR) of 93.60. Structure Number B00059N, located on James Trimble Boulevard (KY 2378) just east of its intersection with KY 321, was also last inspected in February 2010 with a resulting BSR of 98.60. Finally, Structure Number B00047N on Broadway (KY 321X) was last inspected in June 2011. The resulting BSR was 76.30, though the structure is listed as functionally obsolete (see Appendix B).

3.8 Right-of-Way

Figure 5 shows the approximate KY 321 right of way limits (taken from the as-built plans) from KY 40 south to James Trimble Boulevard (KY 2378) owned by KYTC at present. Most of the right of way along KY 321 north of James Trimble Boulevard (KY 2378) is commercial with very large parcels

Table 1: Selected Crash Data for KY 321 Study Segment

ROUTE	KY 40		KY 321					
Beg MP	8.468	8.854	5.616	7.061	7.637	8.576	8.268	8.409
End MP	8.768	9.154	10.616	8.791	8.637	8.876	8.568	8.509
# Crashes	23	11	235	207	167	57	68	19
CRF	2.238	1.369	2.722	3.488	4.131	3.192	3.100	2.567
# Darkness Crashes	4	4	50	41	34	11	17	8
# Fatal Crashes	0	0	1	0	0	0	0	0
# Injury Crashes	8	5	45	36	31	11	11	5
# Wet Roadway Crashes	3	1	31	25	18	7	10	5
# Single Vehicle Crashes	2	0	11	8	9	1	2	0
# Rear End Crashes	6	5	18	108	87	24	31	14
# Angle Crashes	5	4	53	44	41	17	17	9
# Sideswipe Crashes	4	1	23	16	10	16	7	1

Table 2: Current Year Through Movement Delays and Levels-of-Service on KY 321

Intersecting Roadway	Northbound Through Traffic AM Peak Hours		Northbound Through Traffic PM Peak Hours		Southbound Through Traffic AM Peak Hours		Southbound Through Traffic PM Peak Hours	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
KY 321X	23.5	C	63.6	F	10.8	B	39.6	E
James Trimble Blvd	35.1	D	150.9	F	7.9	A	13.3	B
Apple Tree Shopping Plaza	17.6	B	N/A	F	4.3	A	11.0	B
Federal Way (Post Office)	11.8	B	5.5	A	2.8	A	6.0	A
Mayo Drive	31.7	C	176.8	F	29.5	C	24.5	C
Kmart Entrance	122.1	F	N/A	F	92.6	F	N/A	F
Walmart Entrance	10.1	B	30.9	C	26.6	C	193.5	F
KY 40	10.9	B	6.8	A	24.0	C	33.4	C

Note: N/A - With very high v/c ratios, delay calculations are unreliable.

Table 3: Other Current Year Through Movement Delays and Levels-of-Service Issues

Intersection	Through Traffic AM Peak Hours		Through Traffic PM Peak Hours	
	Delay	LOS	Delay	LOS
KY 40 EB @ KY 321	71.8	E	66.4	E
KY 40 WB @ KY 321	59.3	E	55.6	E

Note: N/A - With very high v/c ratios, delay calculations are unreliable.

Table 4: Turning Movements with Significant Current Delays

Turning Movement	Time of Day	Delay	LOS	Turning Movement	Time of Day	Delay	LOS
From KY 321 SB to James Trimble Blvd	AM Peak	69.4	E	From Johnson Co. Central High School to KY 321 (L/R)	AM Peak	160.6	F
From KY 321 SB to James Trimble Blvd	PM Peak	63.0	E	From Johnson Co. Central High School to KY 321 (L/R)	PM Peak	N/A	F
From James Trimble Blvd left to KY 321	AM Peak	37.9	D	From KY 321 NB left onto Mayo Drive	AM Peak	79.6	E
From James Trimble Blvd right to KY 321	AM Peak	45.3	D	From KY 321 NB left onto Mayo Drive	PM Peak	64.4	E
From James Trimble Blvd right to KY 321	PM Peak	35.1	D	From KY 321 SB left onto Mayo Drive	AM Peak	74.3	E
From Apple Tree Shopping Plaza left to KY 321	AM Peak	47.5	D	From KY 321 SB left onto Mayo Drive	PM Peak	68.1	E
From Apple Tree Shopping Plaza left to KY 321	PM Peak	37.6	D	From KY 321NB left to Walmart	AM Peak	73.0	E
From Apple Tree Shopping Plaza right to KY 321	AM Peak	48.0	D	From KY 321NB left to Walmart	PM Peak	59.6	E
From Apple Tree Shopping Plaza right to KY 321	PM Peak	38.0	D	From KY 321 SB left to opposite Walmart	AM Peak	79.3	E
From KY 321 NB to W Federal Way	AM Peak	78.2	E	From KY 321 SB left to opposite Walmart	PM Peak	68.3	E
From KY 321 NB to W Federal Way	PM Peak	66.4	E	From KY 321 NB left to KY 40	AM Peak	64.1	E
From W Federal Way to KY 321 (L/T/R)	AM Peak	55.6	E	From KY 321 NB left to KY 40	PM Peak	41.5	D
From W Federal Way to KY 321 (L/T/R)	PM Peak	53.7	D	From KY 321 SB left to KY 40	AM Peak	83.3	F
From E Federal Way to KY 321 (L/T/R)	AM Peak	71.3	E	From KY 321 SB left to KY 40	PM Peak	73.5	E
From E Federal Way to KY 321 (L/T/R)	PM Peak	62.0	E	From WKY 40 left to KY 321N	AM Peak	83.3	F
From E KY40 left to KY 321S	AM Peak	91.9	F	From WKY 40 left to KY 321N	PM Peak	73.2	E
From E KY40 left to KY 321S	PM Peak	74.4	E				

Note: N/A - With very high v/c ratios, delay calculations are unreliable.

AM Peak: 7-9 am weekday; PM Peak: 2:30-4:30 pm weekday



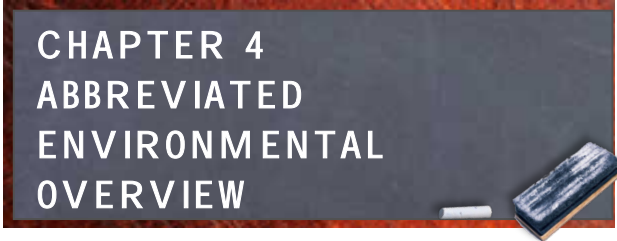
Figure 5 – Approximate KY 321 Right-of-Way owned by KYTC to KY 2378

according to files obtained from the Johnson County Property Valuation Administrator's Office. One property, BB & T Bank, has a large retaining wall at the front of their property for which special care must be taken during any construction in that area to maintain structural integrity of the structure.

There are also large parcels along KY 40 with the exception of WH Dixon Boulevard, Mill Branch Road, the southern end of KY 321 in the project limits, and as expected in the Paintsville downtown area.

3.9 Utilities

Due to limited funding for this study, only visible or readily available utilities were identified. As visible in most aerial photographs, overhead utilities are located on both sides of KY 321 from KY 40 south to the Walmart entrance. The Paintsville City Engineer provided the location of gas, water, sewer and fire hydrants. Those locations are shown in Figure 6 and in more detail in Appendix C.



CHAPTER 4 ABBREVIATED ENVIRONMENTAL OVERVIEW

An abbreviated environmental overview of known resources was conducted to identify any fatal flaws in the project area. All identified resources are shown in Figures 7 and 8.

4.1 Architectural and Archaeological

Archival research performed in 2011 (refer to Appendix D) at the Kentucky Heritage Council as well as a windshield survey, sought potential historic and archaeological sites along the KY 321 corridor and nearby study area. Within the overview area there were five sites on the National Register of Historic Places (NRHP) and 26 sites have been previously identified as being fifty years or older. An additional potentially historic property was identified during the fieldwork for this overview. If future projects are developed in the study area, an architectural survey must be conducted when federal funds or a federal permit is involved.

One property, the Patterson House (Figure 9) located at the corner of James Trimble Boulevard (KY 2378) and West Street is currently listed on the National Register of Historic Places (NRHP). Improvements to KY 40 near "hospital curve" might affect the Patterson House if only visually, as well as a potentially historic cemetery north of KY 40 and west of KY 2560 shown in Figure 10.

A windshield survey revealed an additional potentially historic house (Figure 11), located just south of the Post Office, that may be impacted by improvements to KY 321.

In 2011, an archaeological archival review indicated that the project area has a high potential to contain undocumented prehistoric and historic archaeological sites. Due to its sensitive nature, this overview is not included in the body of this report, but rather is located in the project file in KYTC's Division of Planning.

Paintsville Utilities Water, Gas, & Wastewater System

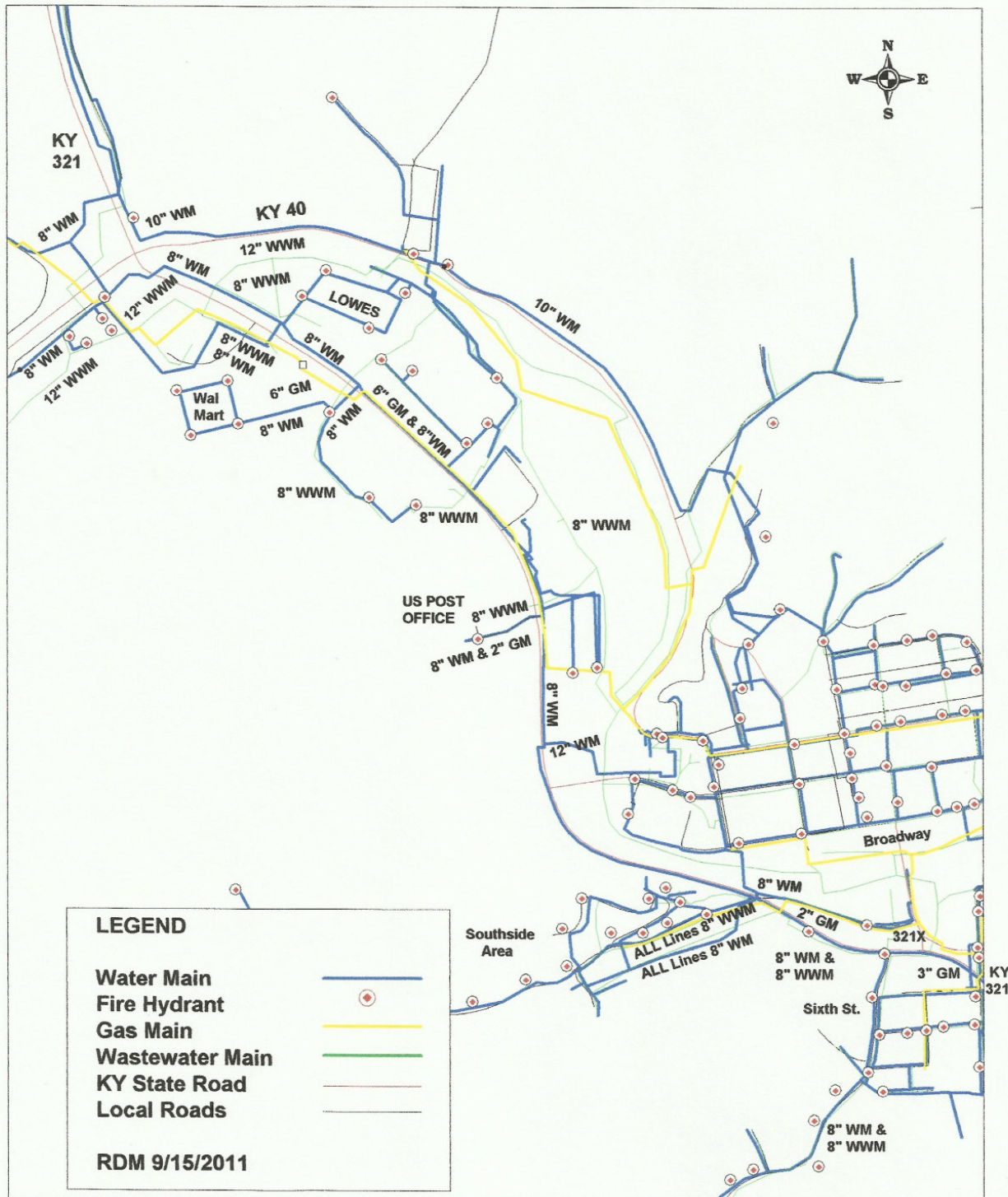


Figure 6 - Utilities

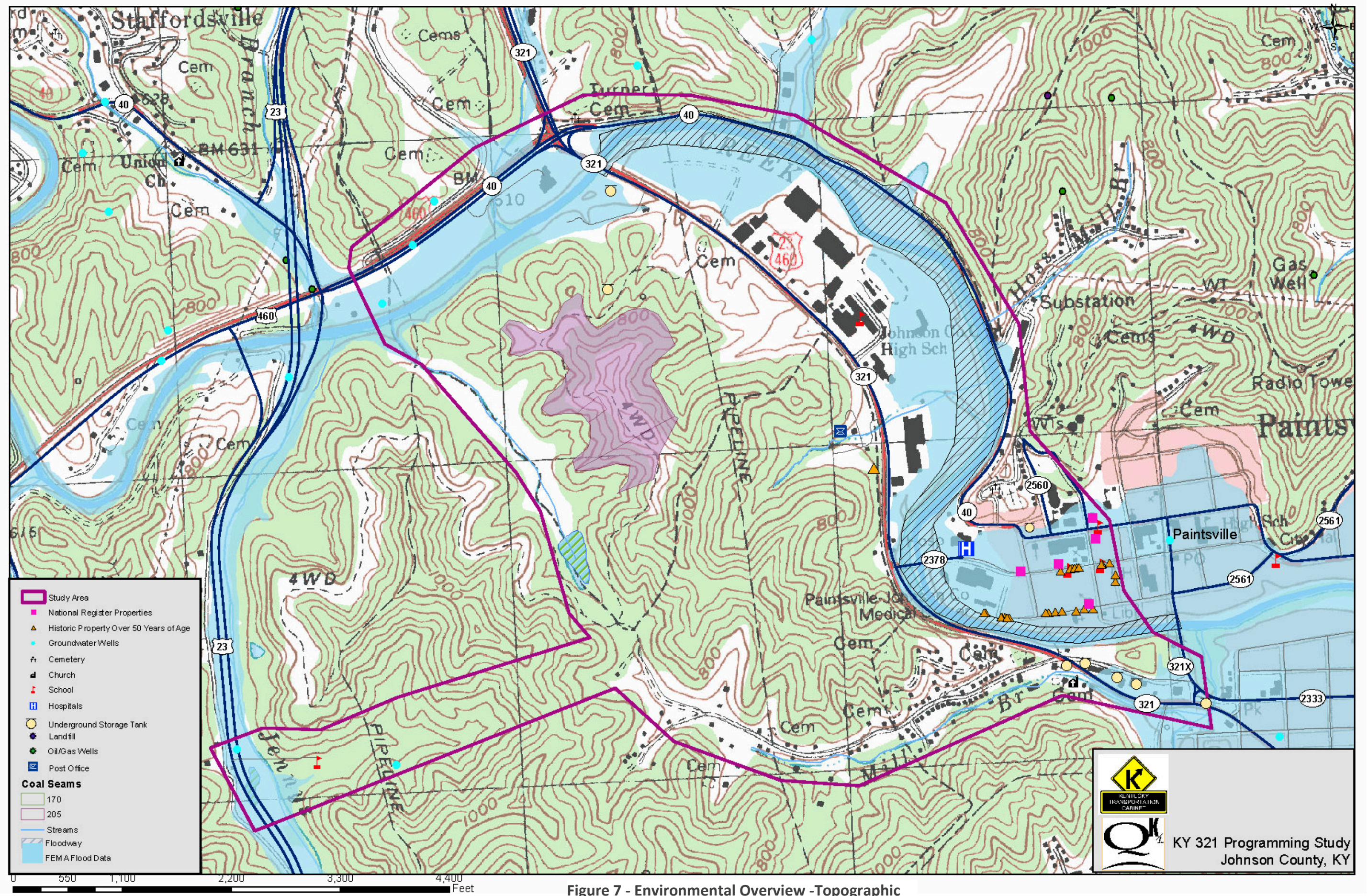


Figure 7 - Environmental Overview -Topographic

KY 321 in Paintsville from KY 40 to KY 321X

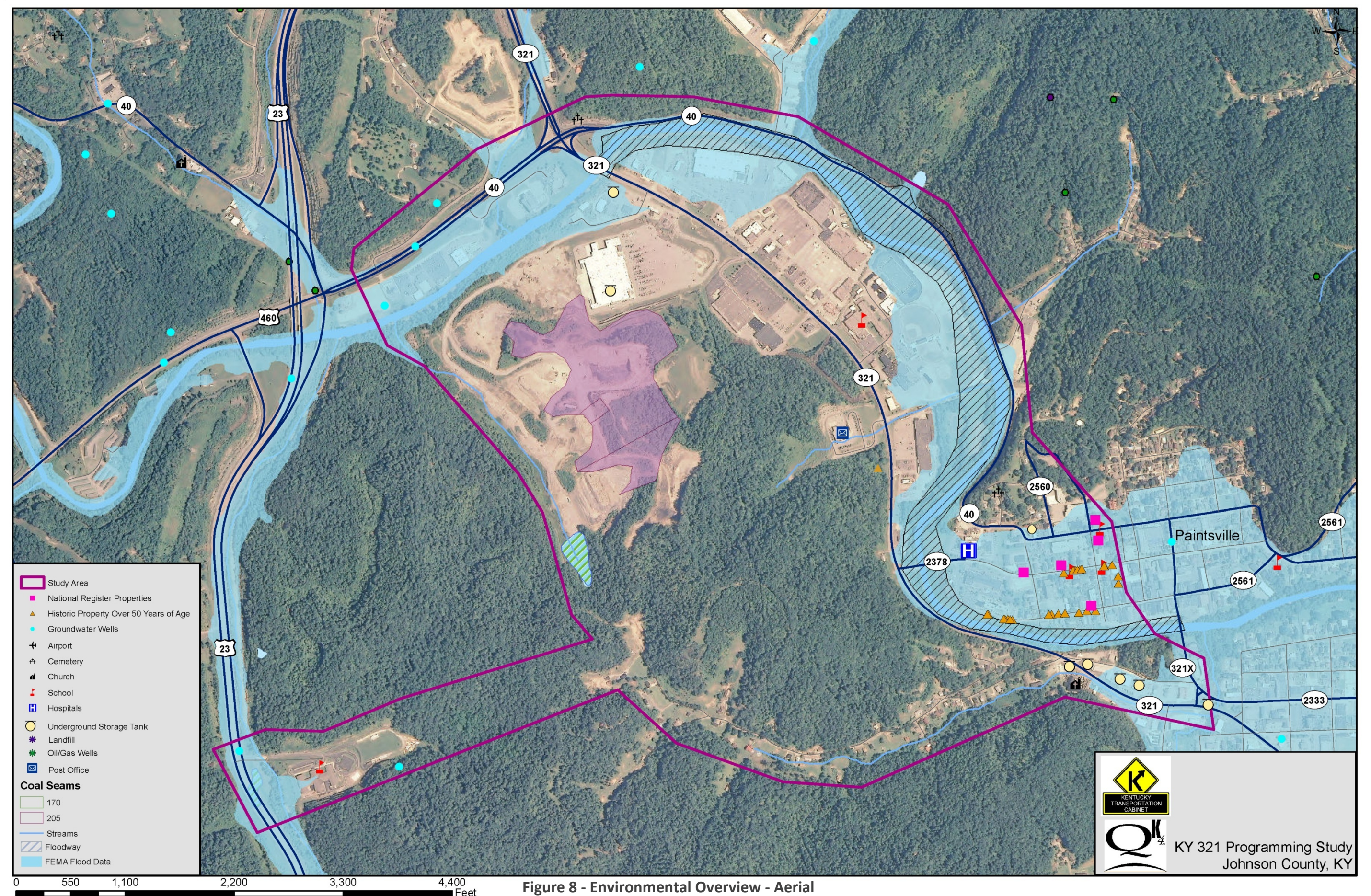


Figure 8 - Environmental Overview - Aerial



Figure 9 - Patterson House

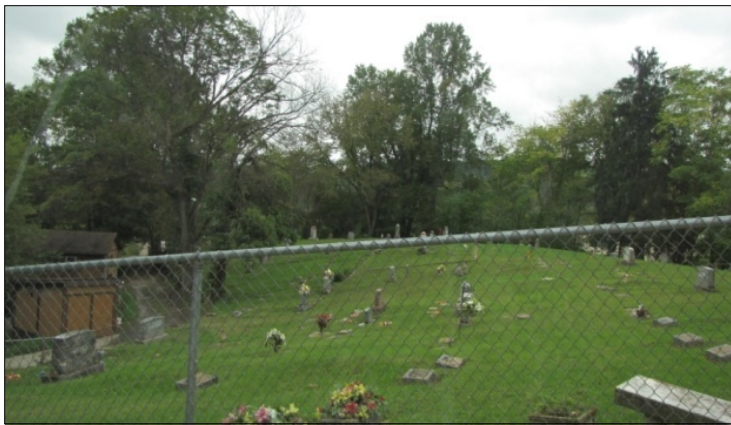


Figure 10 - Potentially Historic Cemetery



Figure 11 – Potentially Historic House Adjacent to the Post Office on West Side of KY 321

4.2 Threatened and Endangered Species

A report from the U.S. Fish and Wildlife Service³ indicated that the Indiana bat (*Myotis sodalis*), an endangered species, was found in Johnson County and might be present within the project area.

A list of 15 species identified in Johnson County by the Kentucky Department of Fish and Wildlife⁴, as threatened, endangered, or of concern is located in Appendix D.

4.3 UST and HAZMAT

Due to limited funding for this study, a windshield survey, instead of a research of known databases was conducted. These sites identify potential constraints from possible environmental contamination within the study area. There were 7 potential UST/hazardous sites identified along the project. Each site is located on Figures 7 and 8.

4.4 100-year Floodplain and Floodway

A one-hundred-year flood is more accurately referred to as the 1% annual probability flood, since it is a flood that has a 1% chance of being equaled or exceeded in any single year.

Floodplains are land areas adjacent to rivers and streams that are subject to recurring inundation.

A floodway is the boundary set within a regulatory floodplain that shall not have encroachments. This boundary is set at the

point encroachments in the floodplain cause the 100-year elevation to reach a maximum 1-foot increase. The floodway usually consists of the stream channel and land along its sides.

As shown in Figure 7, 8 and 12⁵, the city of Paintsville is considered by Federal Emergency Management Agency (FEMA: the regulatory agency) to have a substantial 100-year floodplain area, and a large floodway. Taken from FEMA's digital data⁶, this map has not been revised since 1990. However, a preliminary map dated June 1, 2009 (not available in study size) obtained from the floodplain regulator in Paintsville showed little if any change or updates in the Paintsville area. To be conservative, any new construction improvement options considered spanned any encroachment on the floodplain and floodway.

4.5 Environmental Justice

Because the majority of the study area has commercial development, a formal environmental justice report was not conducted. There is only one house on KY 321 in the study area (adjacent to the Post Office). The remaining residential development is on or near "hospital curve" on KY 40, WH Dixon Boulevard, Mill Branch Road, and Mill Street in downtown Paintsville. If alternatives are implemented that impact these areas, further investigation of possible Environmental Justice may be warranted.

³Source: <http://www.fws.gov/endangered/>

⁴Source: <http://fw.ky.gov/kfwis/speciesInfo/>

⁵Source: <https://msc.fema.gov/webapp/wcs/stores>

⁶Source: <http://www.fema.gov/hazard/map/q3.shtm>

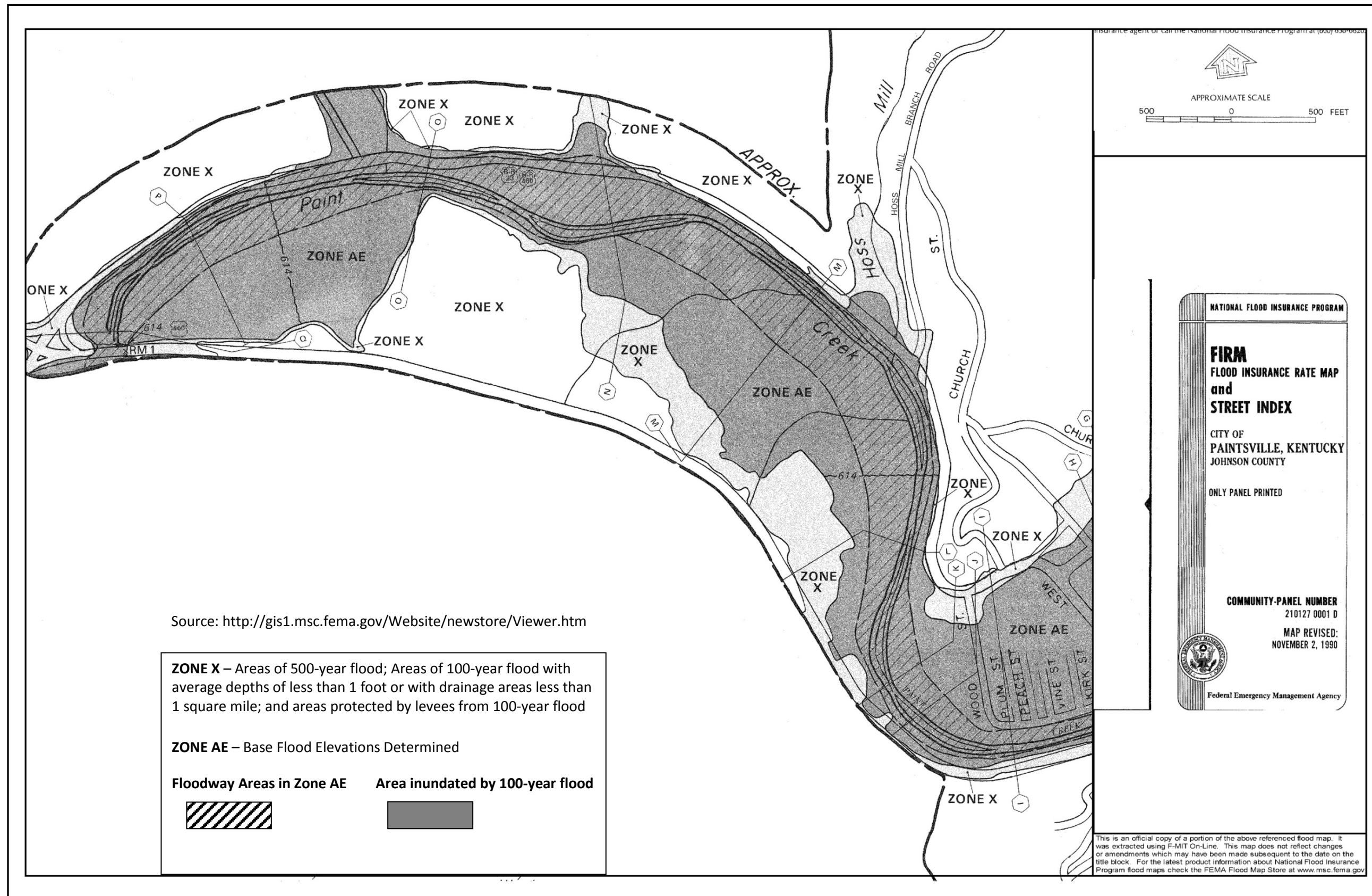


Figure 12 - 100-Year Floodplain and Floodway in Paintsville from FEMA

4.6 Geotechnical Overview

The study area lies within the Cumberland Plateau Physiographic Region of Kentucky known for economically rich coal seams, which have been extensively mined. Geologic mapping indicates the project traverses across the Lee and Breathitt Formations known to consist of thick to thinly interbedded layers of sandstone, shale and coal. Alluvium deposits composed of silt, sand and gravel are found in valleys along Teays Branch and Paint Creek (see Appendix D). The concerns are as follows:

- 1) Due to anticipated depths of the alluvial deposits (0-95 feet), bridge piers located in alluvium may need to be founded on piles or drilled shafts.
- 2) There are multiple underground mine openings in the Van Lear coal bed (shown in Appendix D geologic map) indicating evidence of deep mining near the study area. Available historic mine maps show underground, auger and strip mining has taken place in the Van Lear coal bed north of KY 40 between Teays and Hoss Mill Branch, and just north of Mill Branch. Mining activity in the Van Lear coal bed may affect alternatives that cut into the hillside along KY 40 from KY 321 to West Street, and KY 321 from US Post Office Road to Mill Branch Road. If proposed cut slopes extend to the Van Lear coal bed in these locations, remediation may be required to stabilize the rock cut slopes with flatter than normal slopes and additional costs such as backstowing of mine openings.

- 3) During a field review, an existing landslide was noted on KY 40 at MP 10.0. The embankment failure appeared to be stabilized utilizing railroad rails and lagging. Additional embankment failures may be present on KY 40 along Paint Creek due to erosion or rapid drawdown, but were not seen. Alternatives along KY 40 are recommended to move into the hillside opposite from Paint Creek to prevent existing and potential future embankment failures from affecting the roadway.

CHAPTER 5 EARLY PUBLIC INVOLVEMENT

Public involvement consisted of two Project Stakeholders' meetings with representatives of the Big Sandy ADD, local businesses, developers, Johnson County Schools, Paul Hall Hospital, Midway College School of Pharmacy, and local and state officials.

At the first Stakeholders' Meeting, participants were briefed on the study process, the history of KY 321, previous efforts to identify improvements, and the existing roadway and traffic conditions. The key element of the initial Stakeholders' meeting, however, was to solicit comments and suggestions.

Issues raised by Stakeholders focused on:

- Difficulty in making turns
 - KY 321 southbound to schools
 - Onto KY 321 at unsignalized intersections
 - Combination turn of KY 40 to KY 321 and then KY 321 into Walmart (short, congested weave distance)
 - Left onto KY 40 from hospital
 - Sight distance restrictions turning left from Teays Branch Road to KY 40
- Traffic backups through intersections
 - Walmart signal back to KY 40
 - During school dismissal
- “Unusual” arrangement connecting KY 40 to KY 321 and KY 321 to hospital
- Safety concerns
 - Access to schools and hospital
 - KY 40 curve just north of hospital
 - Lack of pedestrian facilities
 - Rockfall concerns on KY 40 and KY 321 near hospital
- Concerns that future developments will overload current street network
 - Teays Branch Road at KY 40
 - Connection needed between KY 321 and KY 40

- Lack of frontage road interconnection on west side of KY 321 from Post Office to Walmart
- Driver behavior in KY 321 center lane

CHAPTER 6 TRAFFIC MODELING AND FORECASTING

6.1 Traffic Counts

Data from an existing traffic classification study on KY 321 near MP 8.4 conducted in August 2009, was obtained from KYTC. Special counts for this study were conducted while school was still in session by KYTC at these locations (see Appendix E for map):

- KY 321 @ KY 321X
- KY 321X @ KY 2333 (Broadway)
- KY 2378 (James Trimble Boulevard) @ West Street
- KY 40 (3rd Street) @ West Street
- KY 40 @ Teays Branch Road
- KY 40 @ W. H. Dixon Blvd
- KY 321 @ KY 2378 (James Trimble Boulevard)
- KY 321 @ Post Office Drive
- KY 321 @ Entrance to Johnson County Central High School*
- KY 321 @ McDonald’s*
- KY 321 @ Arby’s/Kmart Entrance*
- KY 321 @ Walmart/Lowe’s Entrance*
- KY 321 @ KY 40*

Counts were conducted during the morning peak hours (7:00-9:00), the midday peak hours (11:00-1:00), and the afternoon peak hours (2:45-5:00). Saturday counts between 10:30 and 2:00 were conducted at those locations marked with an asterisk. The count at KY 321 and Post Office Drive was conducted on a Saturday between 8:30 and 10:30, between 11:30 and 2:30, and between 4:00 and 5:00. Two peak times were carried through the remainder of this study for analysis and they are weekday morning and afternoon peaks.

6.2 Assumptions and Methodology

Growth analysis performed on historical data from KYTC count stations (58259, 58A35, 58A82, and 58250) in the project vicinity shows traffic volumes that have been growing at a rate ranging from -2.5% to 0.9% annually over the last 20 years. Johnson County population is projected to grow at a rate of 0.3% annually. Based upon these observations, a growth rate of 1.0% was used to forecast future-year traffic volumes on all roadways for the study.

Traffic on any new roadway segments was forecasted using the manual gravity method. AM and PM peak hour estimates were used using this method and then ADTs were found by dividing the higher of the peak hours by the average K Factor.

For the purposes of this study, the Build and No-Build traffic projections were assumed the same.

6.3 Highway Capacity Analysis

Existing and forecasted traffic was analyzed using both the Highway Capacity Software (HCS) and a CORSIM micro-simulation model. Both sets of analyses modeled the

existing geometric layouts and existing signal timings provided by the KYTC district office where applicable. Results from the HCS analysis are reported using v/c Ratio, delay, and Level of Service. Table 5 below shows Year 2011 and 2035 metrics for through movements and selected turning movements on KY 321. Results from the CORSIM analysis are reported as travel time and delay through the KY 321 corridor collectively.

6.4 Turn Lane Warrants

To explore possible short-term spot improvements that might relieve traffic congestion of KY 321, right-turn lanes were considered at locations where turning movements were available. Right and left turn lane warrants were completed for KY 321 existing and future design hour volumes for AM and PM peaks. All left turns were warranted with the exception of the intersection of KY 321 and KY 321X NB. The right turn lane warrant calculations yielded the following results (see Figure 13). If a current right turn lane exists, it is not listed in the following listing from north to south:

2011 Right turns warranted

- NB at McDonald's/BB&T
- NB at JCMS (AM Only)
- NB at JCHS (AM Only)
- NB at Arby's
- NB at Apple Tree Plaza

Table 5: Selected Highway Capacity Software Metrics for KY 321

LOCATION	AM PEAK							PM PEAK					
	Northbound				Southbound			Northbound			Southbound		
Through Movements-2011	MP	V/C Ratio	Delay	LOS	V/C Ratio	Delay	LOS	V/C Ratio	Delay	LOS	V/C Ratio	Delay	LOS
KY 321 @ KY 321X	7.06	0.01	8.2	A	0.26	10.3	B	0.01	8.4	A	0.29	10.5	B
KY 321 @ James Trimble Blvd	7.72	0.70	35.1	D	0.59	7.9	A	1.04	150.9	F	0.76	13.3	B
KY 321 @ Apple Tree Shopping Plaza	~7.89	0.83	17.6	B	0.62	4.3	A	1.15	N/A*	F	0.91	11.0	B
KY 321 @ Federal Way (Post Office)	~7.98	0.77	11.8	B	0.58	2.8	A	0.78	5.5	A	0.84	6.0	A
KY 321 @ McDonald’s Entrance	~8.22	0.81	31.7	C	0.96	29.5	C	1.08	176.8	F	0.79	24.5	C
KY 321 @ Kmart Entrance	~8.39	0.43	122.1	F	0.11	92.6	F	0.75	N/A*	F	1.42	N/A	F
KY 321 @ Walmart	~8.54	0.48	10.1	B	0.93	26.6	C	0.95	30.9	C	1.08	193.5	F
KY 321 @ KY 40	8.79	0.14	10.9	B	0.39	24.0	C	0.30	6.8	A	0.36	33.4	C

LOCATION	AM PEAK							PM PEAK					
	Northbound				Southbound			Northbound			Southbound		
Through Movements-2035 “No-Build”	MP	V/C Ratio	Delay	LOS	V/C Ratio	Delay	LOS	V/C Ratio	Delay	LOS	V/C Ratio	Delay	LOS
KY 321 @ KY 321X	7.06	0.01	8.6	A	0.40	12.7	B	0.01	8.9	A	0.43	13.3	B
KY 321 @ James Trimble Blvd	7.72	0.97	85.5	F	0.74	9.6	A	1.43	N/A	F	0.96	20.9	C
KY 321 @ Apple Tree Shopping Plaza	~7.89	0.96	23.9	C	0.80	5.4	A	1.47	N/A	F	1.18	N/A	F
KY 321 @ Federal Way (Post Office)	~7.98	1.13	N/A	F	0.80	7.7	A	1.12	N/A	F	1.19	N/A	F
KY 321 @ McDonald’s Entrance	~8.22	1.10	228.3	F	1.25	N/A	F	1.41	N/A	F	1.07	157.4	F
KY 321 @ Kmart Entrance	~8.39	1.74	N/A	F	0.65	N/A	F	4.40	N/A	F	11.0	N/A	F
KY 321 @ Walmart	~8.54	0.77	24.3	C	1.46	N/A	F	1.30	N/A	F	1.52	N/A	F
KY 321 @ KY 40	8.79	0.21	19.4	B	0.61	39.5	D	0.43	11.9	B	0.68	56	E

AM PEAK							PM PEAK							
Selected Turning Movements-2011	V/C Ratio			Delay			LOS	V/C Ratio			Delay			LOS
KY 40 WB Left onto KY 321 SB	0.79			91.9			F	0.85			74.4			E
KY 321NB Left onto KY 40 WB	0.78			64.1			E	0.80			41.5			D
KY 321 NB Left into Walmart	0.85			73.0			E	0.92			59.6			E
KY 321 NB Left into Federal Way (Post Office)	0.53			78.2			E	0.78			66.4			E
KY 321 SB Left into JC Middle School	0.87			71.5			E	0.78			66.4			E
KY 321 SB Left onto James Trimble	0.89			69.4			E	0.85			63.0			E
James Trimble right onto KY 321NB	0.51			45.3			D	0.48			35.1			D

AM PEAK							PM PEAK							
Selected Turning Movements-2035 “No-Build”	V/C Ratio			Delay			LOS	V/C Ratio			Delay			LOS
KY 40 WB Left onto KY 321 SB	0.82			89.0			F	0.88			78.1			E
KY 321NB Left onto KY 40 WB	0.79			60.2			E	0.83			35.6			D
KY 321 NB Left into Walmart	0.88			72.0			E	1.00			78.7			E
KY 321 NB Left into Federal Way (Post Office)	0.53			78.2			E	0.80			65.2			E
KY 321 SB Left into JC Middle School	0.90			70.5			E	0.80			65.2			E
KY 321 SB Left onto James Trimble	0.93			73.0			E	0.89			62.1			E
James Trimble right onto KY 321NB	0.68			51.6			D	0.64			39.4			D

Note: With very high v/c ratios, delay calculations are unreliable



Figure 13 – Locations Examined for Turn Lanes

2035 Right Turn Lanes Warranted (includes 2011 right turns)

- NB at Arby's
- NB at McDonald's
- NB at JCHS Drive
- NB at JCMS
- NB at Apple Tree Plaza
- NB at James Trimble Boulevard (KY 2378) (very short one exists now)
- NB at 321X
- SB at Kmart
- SB at Post Office (PM only)

CHAPTER 7 ALTERNATIVE DEVELOPMENT

Using the developed traffic model, existing crash locations, existing and forecasted future congestion levels, as well as comments from the KYTC Project Team and Project Stakeholders, alternative improvement projects were defined and evaluated for their effectiveness. Low cost improvements that would reduce congestion or somewhat improve congestion were also evaluated. Table 6 illustrates the amount of traffic alleviated at select KY 321 intersections as a result of various alternatives. Again, each alternative was developed keeping in mind the terrain, development and financial constraints.

The overall traffic in and around KY 321 was found to be heaviest in the PM peak. Most trips were determined to be to destinations

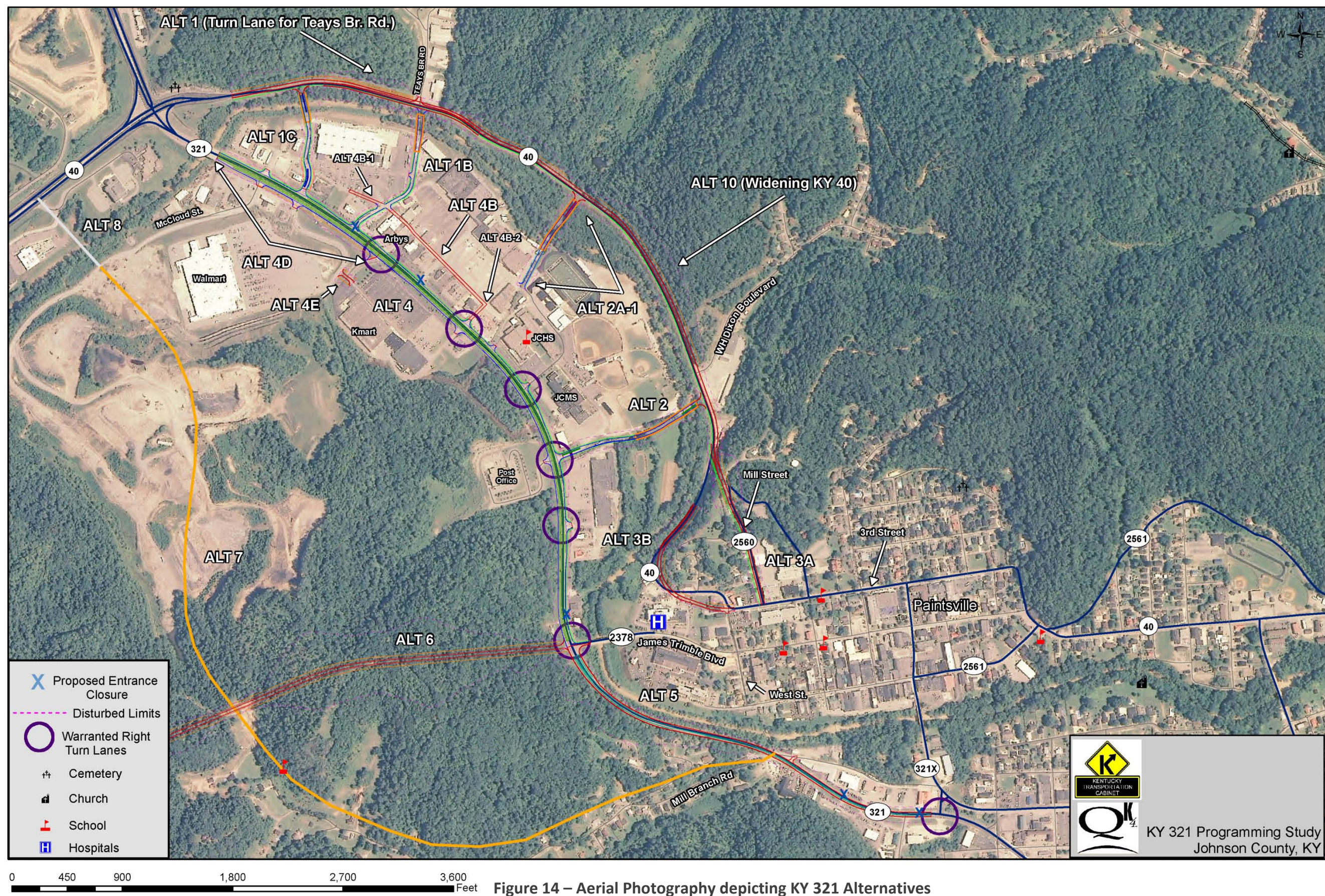
within the project area, rather than “through” trips.

Costs for each alternative were based on a digital elevation model that has not been updated for recent development. Also, the FEMA Flood Insurance Rate Map (FIRM) floodplain information has not been updated since 1990. Some updated field-verified elevations were obtained through Bocook Engineering (a local engineering firm) and were used to supplement the digital elevation model and floodplain information. For purposes of cost estimating, it was assumed that the existing floodplain and floodway would be spanned with any new construction. This would result in higher costs for connectors, or any alternative that spanned the floodplain/floodway. Alternatives developed are illustrated in Figure 14 and on pages 32 through 60. For ease of reading, turn lanes (assumed 11-foot) associated with each connector and right turn lanes (assumed 11-foot) are not illustrated on Figure 14.

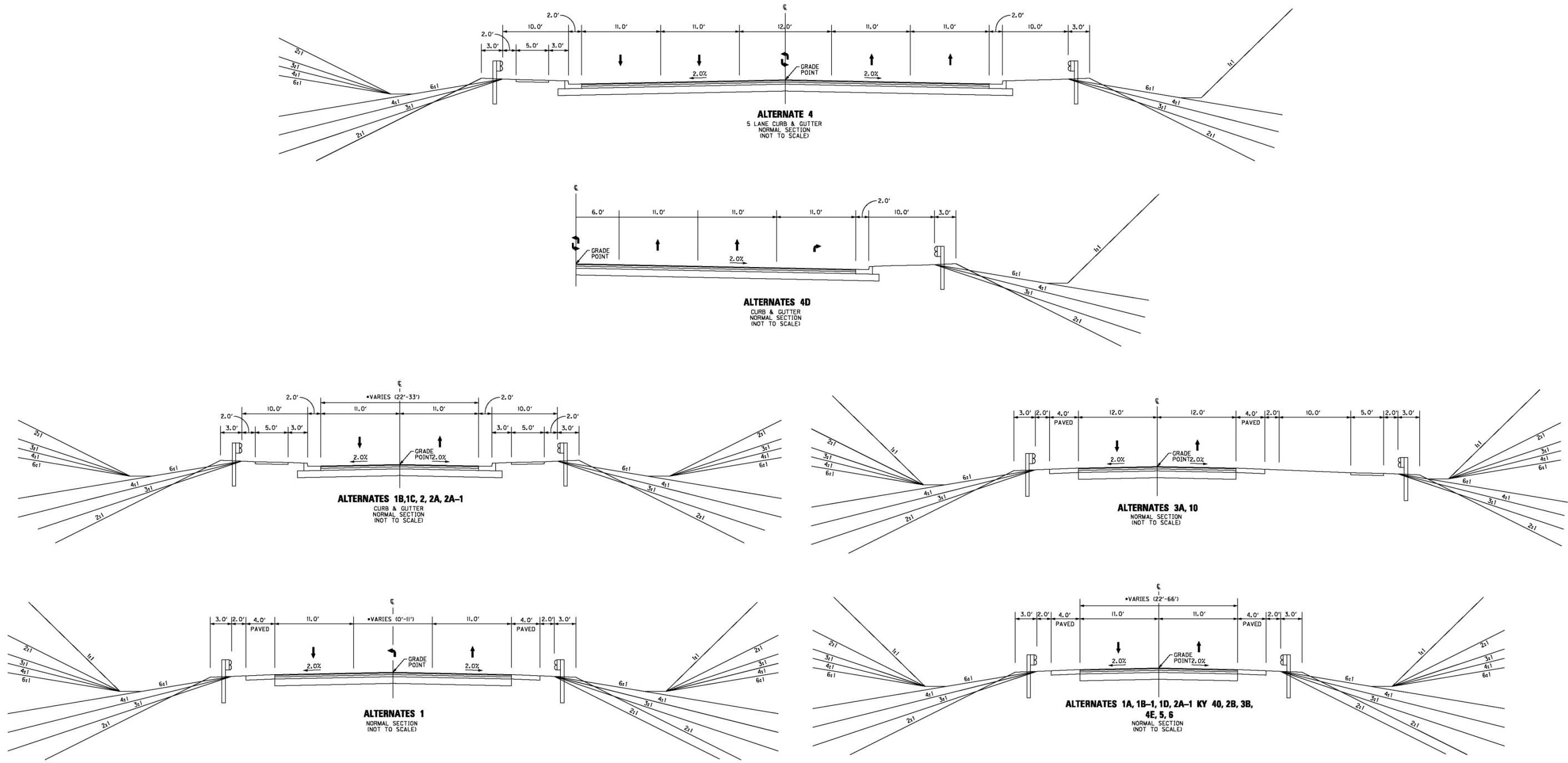
The typical sections illustrated in Figure 15 were utilized for cost estimating purposes. These typical sections may be modified as any project(s) moves forward or additional details become available.

Early in the study process, there were a few options considered but eliminated from consideration:

- An alternative for combining the Walmart and Kmart entrances at the northernmost Kmart entrance near MP 8.4 was considered impractical due to the steep grade required for the entrance (10%).
- A connector between KY 321 and KY 40 between Johnson Central High



TYPICAL SECTIONS



* SEE ALTERNATIVE SHEETS
FOR TURN LANE LOCATIONS

**KY 321 – JOHNSON COUNTY
PROGRAMMING STUDY
IMPROVEMENT ALTERNATIVES**

Figure 15 - Alternative Typical Sections

School and McDonald's was not further considered because of the difficulty in providing access to the school (see Alternative 2A). Absent service to school traffic, a connector between KY 321 and KY 40 this far south would serve little traffic.

- A north-south connector from KY 40 that would utilize West Street and bridge Paint Creek near Mill Branch Road on KY 321 was considered very early. This connector was eliminated from further study due to the dense development and multiple businesses along the north side of the creek.

7.1 No Build

The "No Build" alternative simply assumes that no improvements will be made to the existing section of KY 321 between Milepoints 7.061 and 8.791 other than routine maintenance. Tables 2 through 5 indicate—between the intersection with James Trimble Boulevard (KY 2378) and the entrance to Walmart—projected Levels of Service range from C to F northbound, with the worst levels of service occurring in the afternoon peak hours. Southbound, levels of service are somewhat better in the morning peak times, especially south of the entrance to McDonald's, but break down north of James Trimble Boulevard (KY 2378) in the afternoon peak hours.

Absent any corrective actions, crash rates would likely remain high or even increase.

7.2 Improvements to Existing KY 321

7.2.1 Alternative 4: Five Lane KY 321 from KY 2378 (James Trimble Blvd) to KY 40

To meet the Purpose and Need and the goals for the project, a five-lane alternative with a center two-way left turn lane and eastside sidewalk was evaluated. In the design year, this alternative would improve KY 321 intersection delay or v/c ratio for 32 KY 321 both through and turning intersection movements in the AM and PM peak hours.

At James Trimble Boulevard (KY 2378) travelling southbound, a dedicated left turn lane may be required. Currently the left turn lane provided is too short (220 feet of storage) especially in the AM Peak where traffic backs up at least 11 vehicles.

KYTC owns much of the right of way through the area, which would help reduce costs. This was also the preferred alternative of the Stakeholders.

If this alternative were pursued, more in-depth access management study and signal timings would be necessary. A two-way left turn lane was used for cost estimating purposes however; a different typical section that varies the median type may also be used.

7.2.2 Alternative 4A: Right In/Right Out Only at McCloud Drive

This alternative examines the possibility of making the intersection of KY 321 and McCloud Street a right in/right out access only. It would eliminate left turns at the non-signalized intersection. The existing traffic at this intersection was not counted because initially traffic was observed as minimal. However, nine months into this study, Wendy's has moved to this location. In addition, during the second Stakeholders' meeting, a representative of the developer for this area stated they are currently working with a realtor for a restaurant on the former HRMC clinic property and have previously discussed a possible hotel on the current farm supply property. Their concern is this alternative would force traffic to the Walmart traffic signal, which in turn would adversely affect these businesses as well as the new Wendy's location, Marathon convenience store and City National Bank. Without a northbound left turn at the current entrance, traffic would have to go up to the Walmart parking lot, turn around and come back down to the traffic signal to go northbound on KY 321. An analysis of the traffic from trip generation tables for the development that is existing and proposed, for current year would result in a LOS F for the left turns both into and out of McCloud Street. These results are shown in Appendix F.

7.2.3 Alternative 4C: Right Turn Lanes at Various Intersections

As discussed in Section 6.4 of this study, for the intersections counted, there are four KY 321 right turn lanes warranted today in at least one peak hour, and an additional four

right turn lanes in the design year. Right turn lanes will improve the operation of some movements for those intersections. Overall at least 11 KY 321 movements will be improved with eight right turn lanes. However, they do not meet all goals including provision of pedestrian access. They will also require reconstruction if overall widening of KY 321 were to be implemented at some point in the future.

7.2.4 Alternative 4D: Additional Southbound Lane and Exclusive Right Turn Lane on KY 321 from KY 40 past Walmart

Alternative 4D was developed as a low-cost alternative that would improve congestion, at a major intersection on KY 321. Currently, traffic traveling eastbound on KY 40 turning south onto KY 321 must make three decisions at one point: 1) whether to turn left 2) whether to turn right, 3) and how to merge from two lanes to one lane. This combination creates a bottleneck. This alternative provides additional lanes to move the merge to a lesser congested intersection by adding a dedicated SB through and a dedicated SB right turn lane to the first Kmart intersection.

7.2.5 Alternative 5: Four-Lane KY 321 from James Trimble Boulevard (KY 2378) to Mill Branch Road then Transition to Three-Lanes South to KY 321X

Alternative 5 widens KY 321 to four lanes from James Trimble Boulevard (KY 2378) south to Mill Branch Road. Due to terrain and lack of development on the west side, providing for four lanes minimizes the amount of steep hillside cut and renders a

center turn lane unnecessary. At the second Project Team Meeting, it was decided to transition to three lanes at Mill Branch Road to allow for a center left turn lane due to development at Mill Branch Road South and it makes for a logical transition to the existing three lane section south of KY 321X. Most widening would need to be into the hillside (west side) due to the proximity of Paint Creek east of KY 321. This alternative reduces delay or v/c ratios on 3 KY 321 movements.

This section does have a forecasted ADT of approximately 5,000-6,000 lower as compared to the adjacent section north of James Trimble Boulevard (KY 2378). Crashes do not appear to be an issue south of James Trimble Boulevard (KY 2378) either.

7.3 Other Options for Relieving Traffic on KY 321

7.3.1 Alternatives 4B, 4B-1, and 4B-2: Frontage Road East of, and Parallel to, KY 321

Currently a private frontage road parallels KY 321 from McDonald's to Arby's. This alternative would extend that frontage road to Lowe's behind Hardee's to the north and potentially close the unsignalized intersection between Burger King and Long John Silver's. Traffic counts were not made at this location, therefore, delays and or impacts are only estimated.

7.3.2 Alternative 4E: Merge Kmart and Walmart Entrance to KY 321

This alternative is in an effort to close several entrances on KY 321. It would connect the existing Walmart and Kmart entrances and

allows closure or at least a right in/right out scenario for the first Kmart entrance. Signal timings would need to be adjusted at the Walmart signal and Kmart may lose some parking and internal circulation. Signing may have to be erected for Kmart and Food Lion customers. This connection may have to be moved farther toward the rear of the stores due to a berm and large pipe located between the two developments.

7.3.3 Alternative 6: New Connector Extending James Trimble Blvd west from KY 321 to US 23

This alternative was identified at the first Stakeholders' Meeting. Traffic analysis shows that it would remove traffic from KY 321 north of the schools, however, the cost is very high due to terrain.

7.3.4 Alternative 7: New Connector from, and west of, KY 321 Near Mill Branch Road behind Walmart to McCloud Street

This alternative was identified at the first Project Team Meeting in an effort to provide an alternative route to KY 321. This alternative removed traffic from KY 321 from James Trimble Boulevard (KY 2378) north to KY 40. However, it is costly and would closely parallel US 23 which already provides similar relief to KY 321.

7.3.5 Alternative 8: New Connector from, and west of, KY 321 from McCloud Street to KY 40 near Detention Center Road

This alternative was identified in the first Project Team Meeting. As with Alternative

7, it does remove traffic from James Trimble Boulevard (KY 2378) north to KY 40, however, it appears to serve private development. Due to the floodplain and terrain, the cost is expensive. This may be an alternative that would work in conjunction with Alternative 4A long-term.

7.4 Connectors from KY 321 to KY 40 (Alternatives: 1B, 1C, 2A-1, and 2)

For many years, some local leaders felt that an east/west route that would connect KY 321 and KY 40 would improve congestion on KY 321 and provide a back entrance for the schools. Therefore, several locations for connectors were evaluated along with improvements to KY 40 because of those connectors. Connector alternatives are outlined in the following pages 34 through 41. In summary, the connector that would carry the most traffic, likely have the least impacts, provide the most congestion relief for KY 321, and cost the least is Alternative 1B (see page 34), which is located on the south side of Lowe's. It removes between 1800 to 2600 vpd from KY 321 and would

have a 2035 ADT of 4600 (see Table 6). However, congestion would remain on KY 321 with v/c ratios in excess of 1.0 with excessive delays (see Peak Hour Analysis in Appendix G).

Each connector alternative has accompanying turn lanes or improvement options on KY 40 that would improve their operation. Those improvements are also outlined on pages 34 through 41.

7.4.1 Alternative 9: Pedestrian Bridge from South Side of Lowe's to Teays Branch Road and Pedestrian Improvements to KY 2378 (James Trimble Blvd) at KY 321

These two sites were identified as sites that would be enhanced with pedestrian facilities. James Trimble Boulevard (KY 2378) currently has a 3.9-foot sidewalk behind barrier wall on the bridge over Paint Creek. This sidewalk is in disrepair and is not ADA accessible. There are three options to improve pedestrian movements to KY 321 (see pages 58 and 59).

Table 6: 2035 Traffic Reduction (in vpd) at Select Intersections for Various Alternatives

2035 TRAFFIC REDUCTION ON KY 321 AT SELECT INTERSECTIONS								
SELECT INTERSECTIONS	ALT 1B	ALT 1C	ALT 2A-1	NO BUILD, ALT 3, ALT 4, & ALT 5	ALT 2+3	ALT 6	ALT 7	ALT 8
NORTH OF WALMART	1800	1170	500	0	850	2950	850	3250
NORTH OF MCDONALDS	2610	2110	650	0	900	3540	900	0
NORTH OF SCHOOL	2500	2000	540	0	900	3000	900	0
NORTH OF 2ND ST/JAMES TRIMBLE BOULEVARD	2550	2050	500	0	1100	0	1100	0
NORTH OF KY 321X	2480	1650	440		1100	0	1100	0

KY 321 in Paintsville from KY 40 to KY 321X

The second site is from Teays Branch Road to the back parking lot of Lowe's. Development on Teays Branch Road includes a potential Pharmacy College, and a possible community center to name a few. Early in 2012, a sidewalk was constructed on Teays Branch Road. A pedestrian crossing directly across from Teays Branch Road would encourage pedestrian trips over to KY 321 rather than motorized trips.

7.5 Other Improvements Considered

7.5.1 Alternative 3A: Relocate KY 40 from W. H. Dixon Blvd to 3rd Street

This alternative addresses the sharp curve behind the hospital by routing KY 40 onto Mill Street and providing for a sidewalk on one side. This alternative does not remove congestion from KY 321 unless it is paired with a connector alternative (Alternative 2). But improves safety of KY 40 and improves access to the hospital (see page 42).

7.5.2 Alternative 3B: Improve Existing Alignment on KY 40 from WH Dixon Blvd to West Street

This alternative addresses the sharp curve behind the hospital by purchasing several vacant buildings and removing the blind curve intersection with West Street and KY 40. This alternative does not remove congestion from KY 321 unless it is paired with a connector alternative (Alternative 2). But improves safety on KY 40 and improves access to the hospital (see page 43).

7.5.3 Alternative 1: Left-Turn Lane on KY 40 eastbound to Teays Branch Road

This alternative allows for left turns at Teays Branch Road to improve safety for KY 40 motorists. This alternative does not remove congestion from KY 321 unless it is paired with a connector alternative (Alternative 2), but improves safety of KY 40 and access to new development.

7.5.4 Alternative 10: Improve Existing Alignment on KY 40 from near KY 321 to Alternative 3A or 3B

Because KY 40 between West Street and the KY 40/KY 321 Intersection is utilized as a "cut through" or alternative route to KY 321 improving KY 40 was considered as possible alternative. This alternative would have to be combined with either Alternative 3A or 3B to be effective. Again, this improvement would not relieve congestion on KY 321, however, would provide an alternate route, and would improve pedestrian movement (see page 60).

ALTERNATIVE 1

LEFT-TURN ON KY 40 EASTBOUND AT TEAYS BRANCH ROAD

PROJECT GOALS:

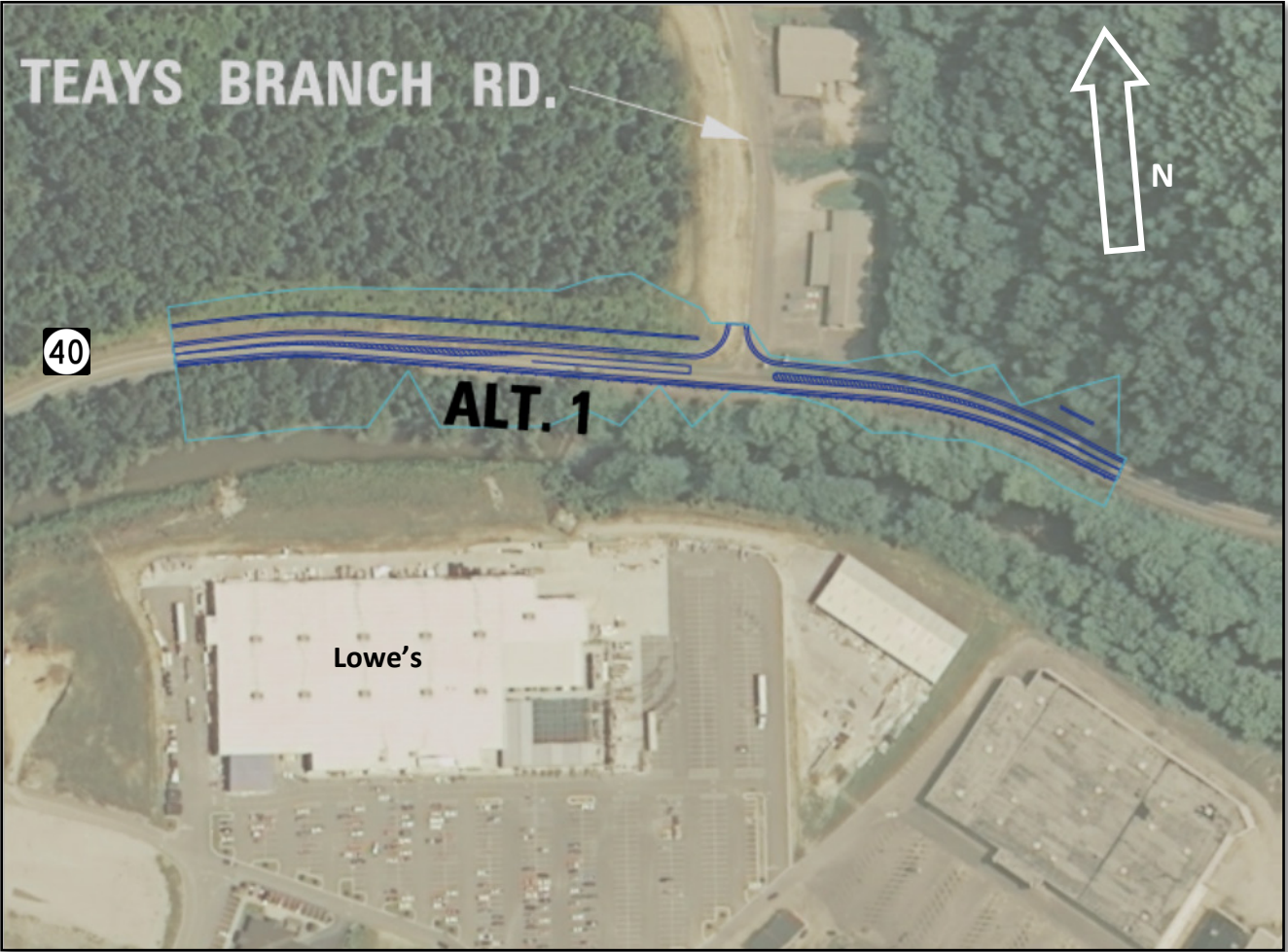
- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NO, NO
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: YES
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

STAKEHOLDER INPUT: Scored 4.50 out of 5.00

RECOMMENDATIONS: Recommended for implementation and is now in KYTC’s 2012-2018 Highway Plan as Item Number 12-194 (Construction phase funding not included.)

Alternative 1	
Length	0.30 miles
Design	\$500,000*
Right-of-Way	\$496,000*
Utilities	\$510,000*
Construction	\$2,300,000
TOTAL	\$3,806,000
*Taken from KYTC 2012-2018 Highway Plan	

At Teays Branch Road looking north



PURPOSE: To facilitate turning movements into expected development on Teays Branch Road

PROPOSED PROJECT: Construct a left turn lane on eastbound KY 40 at Teays Branch Road

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 1 business, 10” water main, 6” force main wastewater, 2” gas main, 2 fire hydrants, overhead utilities on south side of KY 40

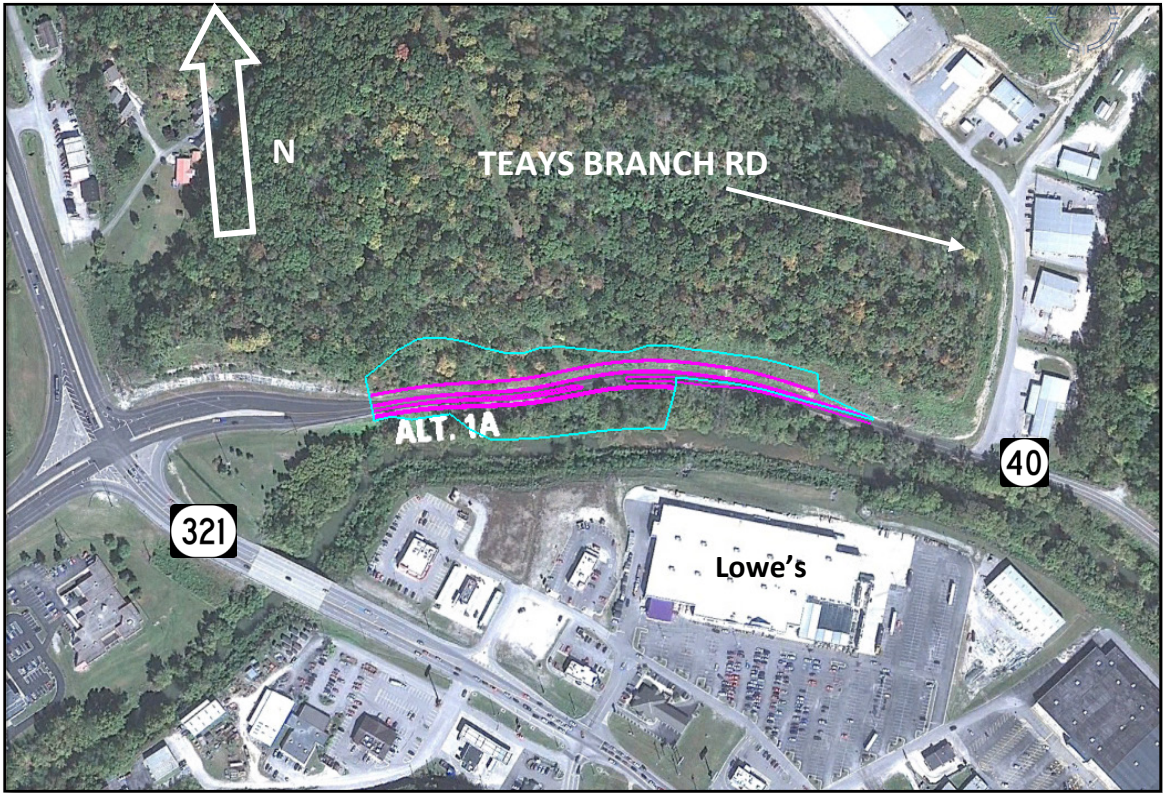
FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 1030 left turns

ADVANTAGES: Provides safer access to a new traffic generator on Teays Branch Road

DISADVANTAGES: No congestion relief for KY 321

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Projected safety improvements at KY 40/Teays Branch Road intersection, but no congestion relief on KY 321

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0



PURPOSE: To improve safety from Teays Branch Road to KY 40

PROPOSED PROJECT: Improve KY 40 to 11" lanes and 6" shoulders from Alternative 1 (proposed left-turn lane at Teays Branch Road) to the KY 321/KY 40 intersection (see Figure 15).

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 10" water main, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 10,300 (unaffected by this improvement)

ADVANTAGES: Provides safer access to a major future traffic generator on Teays Branch Road, and provides consistency from KY 321 to Teays Branch Road

DISADVANTAGES: Does not provide congestion relief on KY 321

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential 40% crash reduction for KY 40 between Teays Branch Road and KY 321/KY 40 intersection, but no congestion relief on KY 321

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0

ALTERNATIVE 1A

IMPROVE KY 40 FROM KY 321 TO LEFT TURN LANE (ALTERNATIVE 1) APPROACHING TEAYS BRANCH ROAD

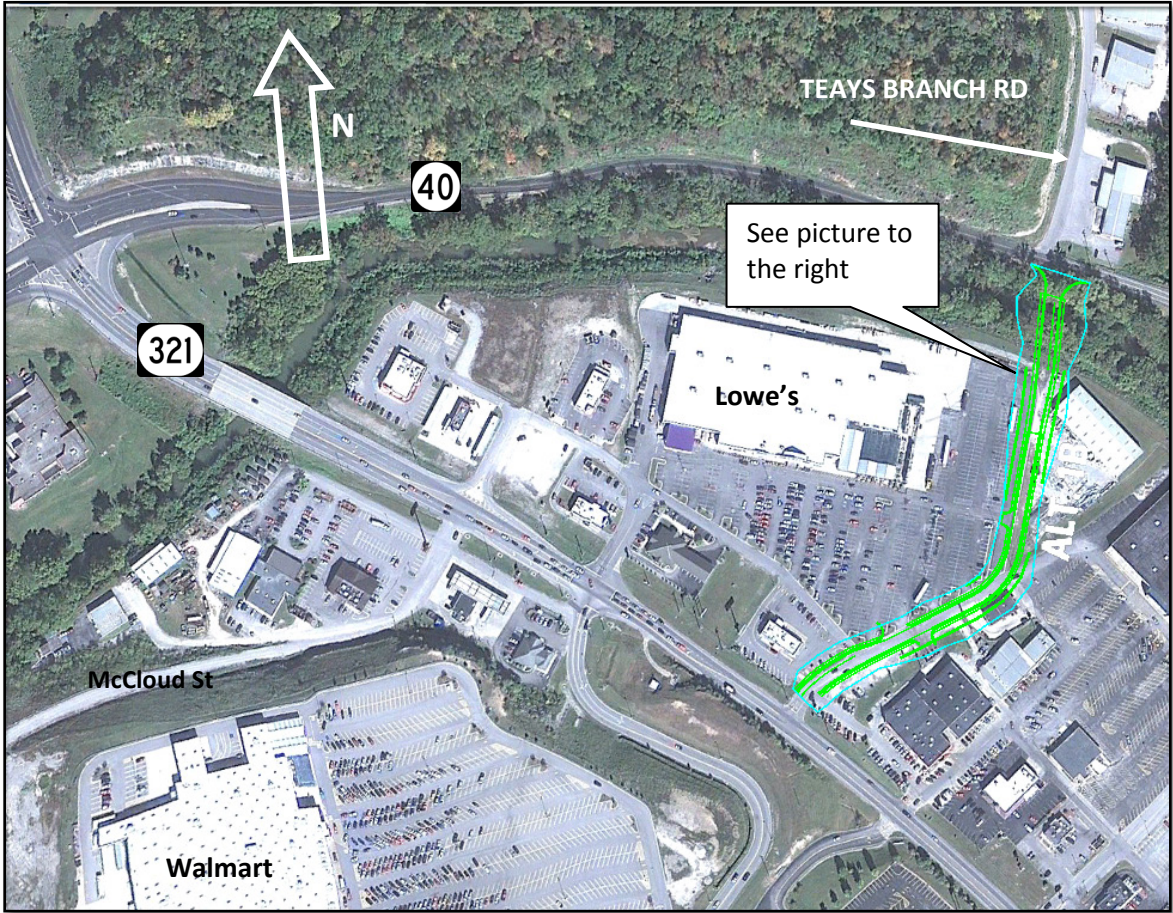
PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NO, NO
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: YES
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

STAKEHOLDER INPUT: Scored 3.67 out of 5.00

RECOMMENDATIONS: This alternative would only be implemented if Alternative 1 or 1C were also implemented.

Alternative 1A	
Length	0.30 miles
Design	\$200,000
Right-of-Way	\$350,000
Utilities	\$500,000
Construction	\$1,339,000
TOTAL	\$2,389,000



PURPOSE: To provide a more direct connection from Teays Branch Road to KY 321 to serve existing and future development

PROPOSED PROJECT: Construct a connector from KY 321 near the present Hardee's/Big Sandy Superstore entrance to KY 40 at its intersection with Teays Branch Road

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Crosses stream, is in 100-year flood plain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 4 businesses, 10" water main, lift station, 2 fire hydrants, 6" force main wastewater, 2 6" gas main, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 4600

ADVANTAGES: Provides a shorter connection to KY 321 for Teays Branch Road traffic, reduces congestion on KY 321, fewer floodplains impacts

DISADVANTAGES: Will impact Lowe's internal circulation, places 3 major intersections (KY 40, Walmart, and Alternative 1B) close together on KY 321

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Reduces traffic volumes on KY 321 by between 1800 and 2600 vehicles per day

ALTERNATIVE 1B

CONNECTOR FROM KY 321 ON SOUTH SIDE OF LOWE'S TO KY 40 AT TEAYS BRANCH ROAD

PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: YES
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES (ON CONNECTOR)

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 29

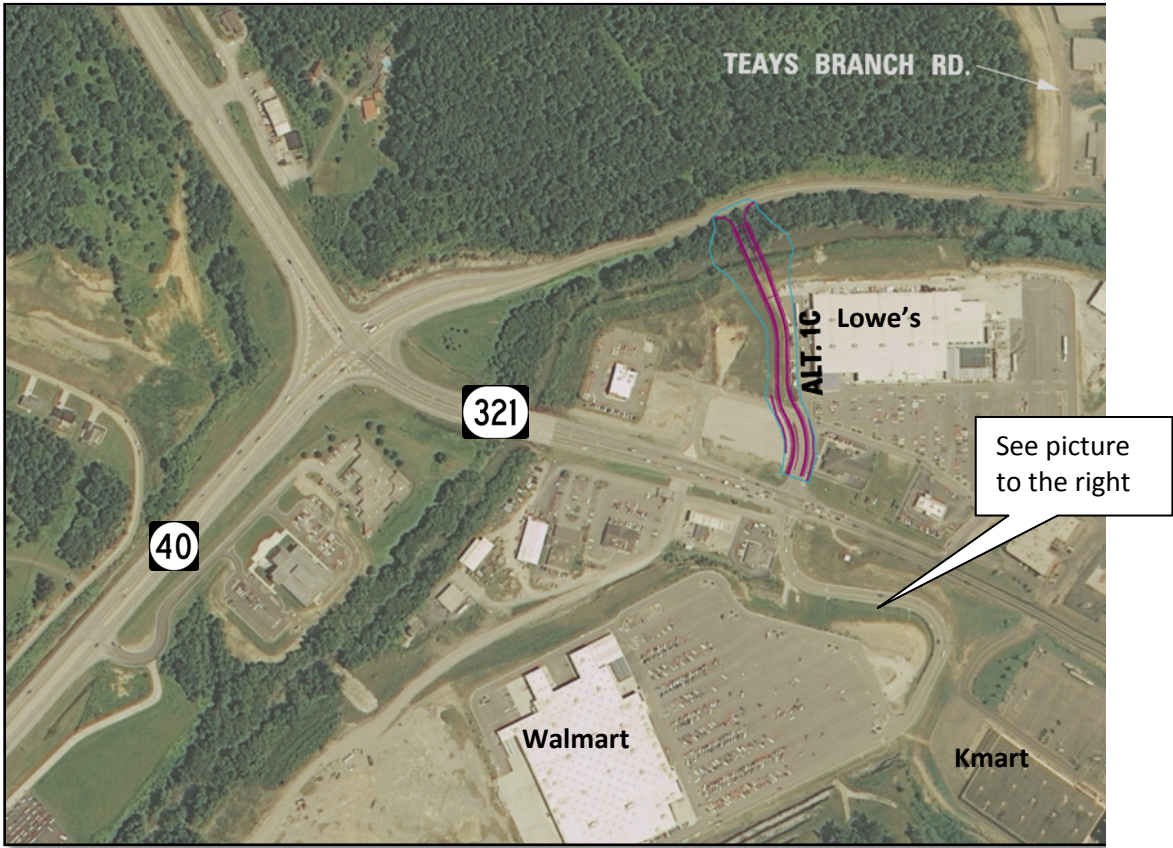
STAKEHOLDER INPUT: Scored 2.25 out of 5.00

RECOMMENDATIONS: Not recommended however, provides the most congestion relief of all KY 321/KY 40 connectors considered

Paint Creek south of the Lowe's building facing KY 321



Alternative 1B	
Length	0.24 miles
Design	\$640,000
Right-of-Way	\$1,203,400
Utilities	\$275,000*
Construction	\$4,260,000
TOTAL	\$,6378,400
* Does not include 35% for KYTC personnel	



PURPOSE: To provide an additional connection from KY 40 to KY 321

PROPOSED PROJECT: Construct a connector from KY 321 opposite the present Walmart entrance to KY 40 between KY 321 and Teays Branch Road

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Crosses stream, is in 100-year flood plain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 2 fire hydrants, 4 businesses, 10" water main, 8" and 12" force main wastewater, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 4300

ADVANTAGES: Provides a shorter connection to KY 321 for Teays Branch Road traffic

DISADVANTAGES: Places 2 major intersections (KY 40 and Alternative 1C) close together on KY 321

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Reduces traffic volumes on KY 321 by between 1170 and 2100 vehicles per day

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 21

STAKEHOLDER INPUT: Scored 1.50 out of 5.00

ALTERNATIVE 1C

CONNECTOR FROM KY 321 ON NORTH SIDE OF LOWE'S TO KY 40 WEST OF TEAYS BRANCH ROAD

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: YES
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES (ON CONNECTOR)

RECOMMENDATIONS: Not recommended

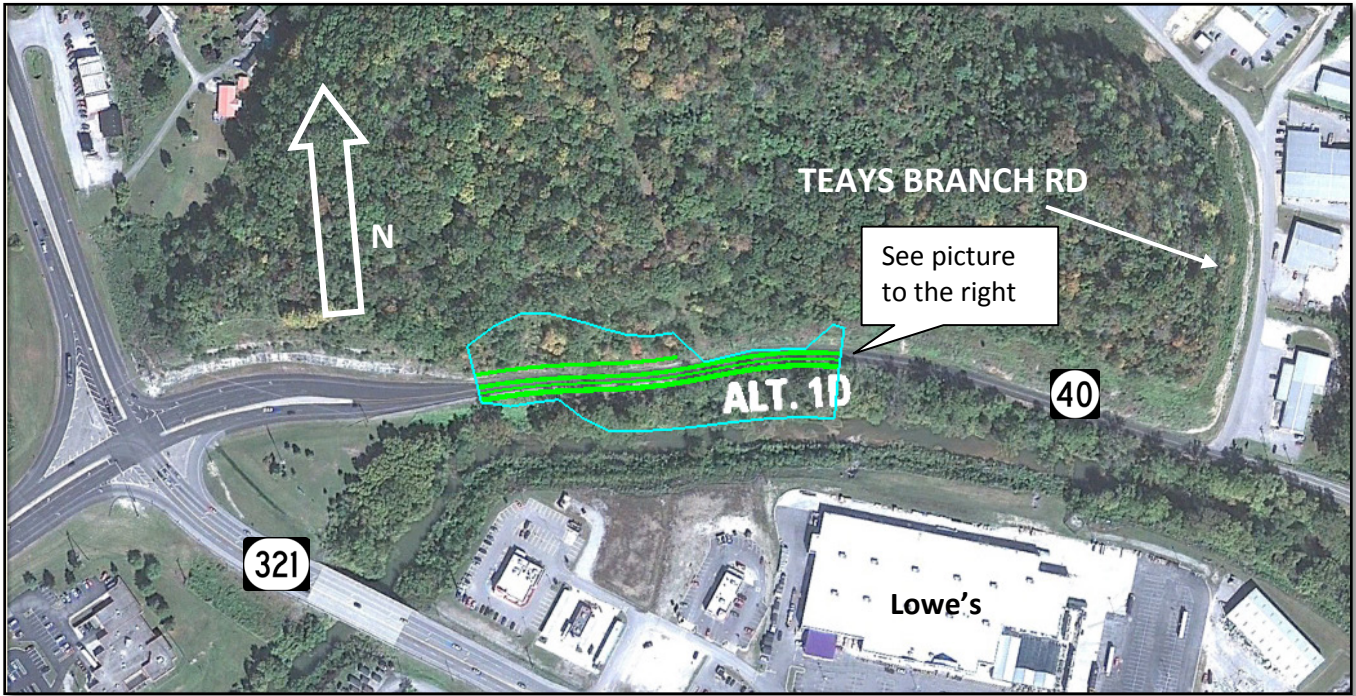
A view of KY 321 intersection with Alternative 1C



Alternative 1C

Length	0.18 miles
Design	\$630,000
Right-of-Way	\$1,590,900
Utilities	\$350,000*
Construction	\$4,149,000
TOTAL	\$6,719,900

* Does not include 35% for KYTC personnel



ALTERNATIVE 1D

IMPROVE KY 40 FROM KY 321 TO ALTERNATIVE 1C

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NO, NO
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: YES
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

PURPOSE: To improve safety by providing consistent driver expectation between two other improvements

PROPOSED PROJECT: Improve KY 40 to 11" lanes and 6" shoulders from Alternative 1C (KY 321/KY 40 Connector north of Lowe's) to the KY 321/KY 40 intersection (see Figure 15).

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: Pipelines, 10" water main, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 10,300 (unaffected by only this improvement)

ADVANTAGES: Provides consistency of driver expectations from KY 321 to Alternative 1C

DISADVANTAGES: Provides no congestion relief to KY 321

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: It would improve safety on KY 40 between Alternative 1C and the KY 321/KY 40 intersection, but provide no congestion relief to KY 321

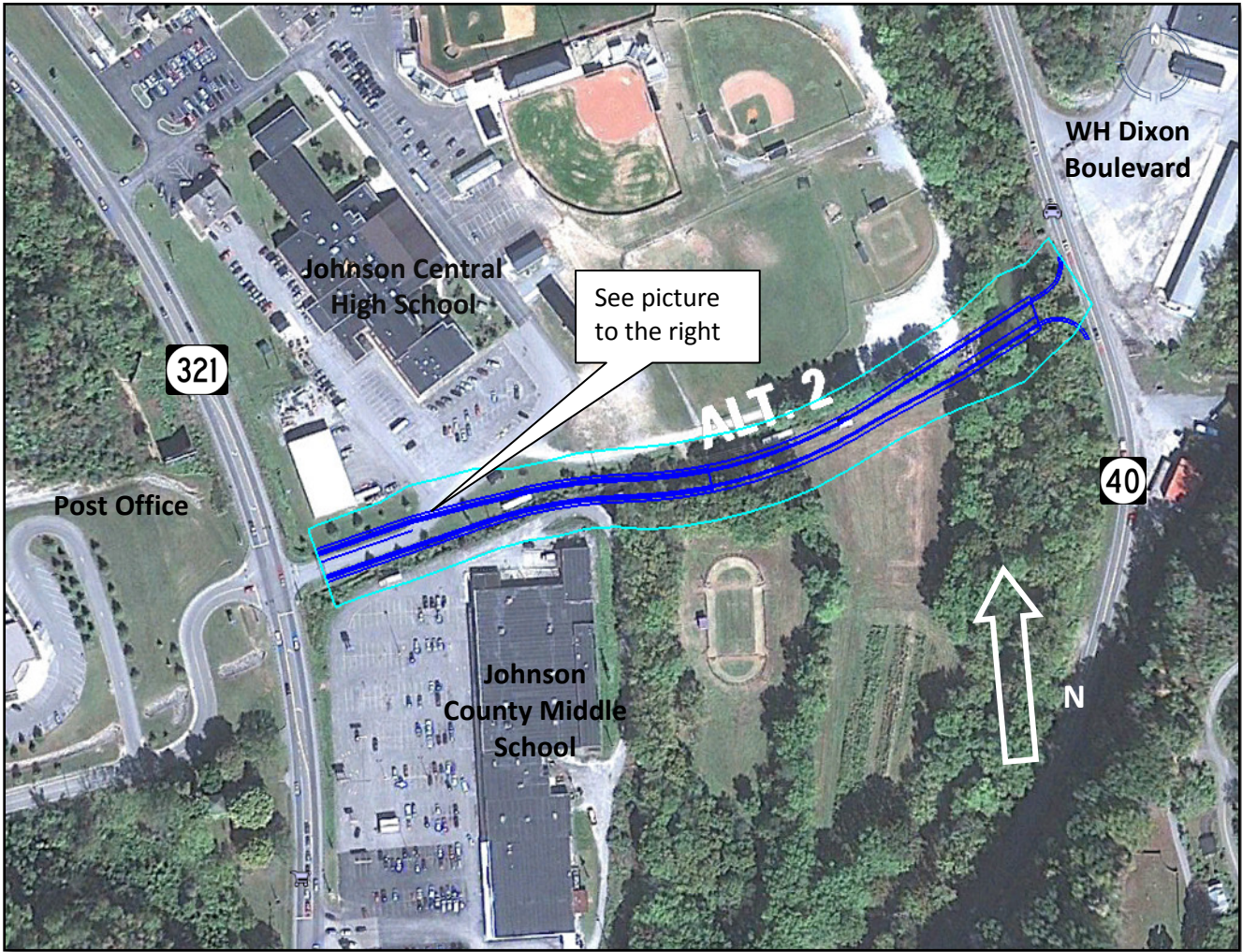
NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0

STAKEHOLDER INPUT: Scored 1.50 out of 5.00

RECOMMENDATIONS: This alternative would likely only be developed if Alternative 1C were implemented.

Alternative 1D	
Length	0.15 miles
Design	\$100,000
Right-of-Way	\$175,000
Utilities	\$250,000
Construction	\$644,000
TOTAL	\$1,169,000





ALTERNATIVE 2

KY 321/KY 40 CONNECTOR ON SOUTH SIDE OF SCHOOL COMPLEX OPPOSITE POST OFFICE ENTRANCE

PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: YES
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Provides slight congestion relief on KY 321 by between 850 and 1100 vehicles daily. The greatest congestion relief on KY 321 would occur south of this connector.

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 15, if coupled with Alternative 3A or 3B

STAKEHOLDER INPUT: Scored 1.75 out of 5.00

RECOMMENDATIONS: Not recommended

Looking east toward KY 40



Alternative 2	
Length	0.25 miles
Design	\$700,000
Right-of-Way	\$200,000
Utilities	\$510,000
Construction	\$6,996,000
TOTAL	\$8,406,000

PURPOSE: To provide an additional connection from KY 40 to KY 321

PROPOSED PROJECT: Construct a connector from KY 321 opposite the Post Office entrance to KY 40 near WH Dixon Boulevard

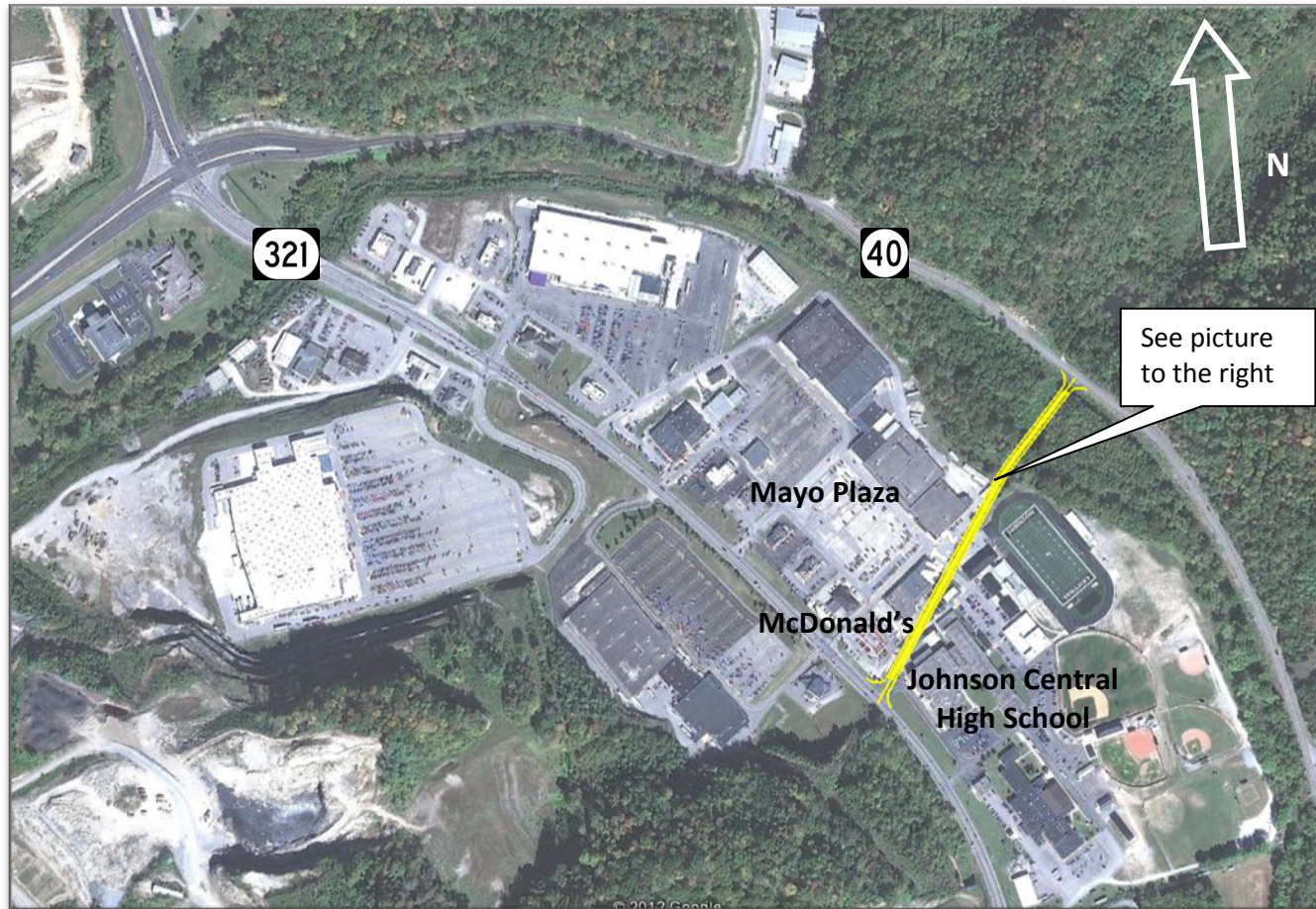
POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Crosses stream, located in 100-year flood plain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 1 business, 2 schools, 1 ball field, school traffic internal circulation, 2" and 6" gas main, 8" water main, 8" wastewater main, archaeological potential, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 4300

ADVANTAGES: Additional vehicular and pedestrian access for schools

DISADVANTAGES: Provides less congestion relief to KY 321 than other connector options. The school access to Alternative 2 would require a steeper grade which may affect parking. Alternative 2 must be coupled with either Alternative 3A or 3B to realize congestion relief on KY 321.



PURPOSE: To provide an additional connection from KY 40 to KY 321

PROPOSED PROJECT: Construct a connector from KY 321 just south of McDonald's to KY 40 between Teay's Branch Road and WH Dixon Boulevard

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Crosses stream; located in 100-year flood plain; floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 1 business, school traffic internal circulation, 2" gas main, 8" water main, 8" wastewater main, archaeological potential

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: Not estimated due to infeasibility

ADVANTAGES: (This alternative not evaluated due to the impacts of the school traffic circulation)

DISADVANTAGES: Would impact internal school traffic circulation and very close to shopping center

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Not able to tie into school

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: N/A (Eliminated early in the process)

ALTERNATIVE 2A KY 321/KY 40 CONNECTOR ON NORTH SIDE OF SCHOOL COMPLEX

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: N/A
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NOT ABLE TO TIE INTO SCHOOL
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: LIMITED
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: LIMITED
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: LIMITED

STAKEHOLDER INPUT: Scored 1.50 out of 5.00

RECOMMENDATIONS: Not feasible without totally disrupting school traffic flow therefore this alternative was eliminated from further consideration early.

Standing near school track/football field looking toward KY 321



ALTERNATIVE 2A-1

SHORTENED KY 321/KY 40 CONNECTOR ON NORTH SIDE OF SCHOOL COMPLEX

PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: LIMITED
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: LIMITED
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES (ON CONNECTOR)

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Projected safety improvements at this intersection, but little congestion relief on KY 321 (440-650 vpd)

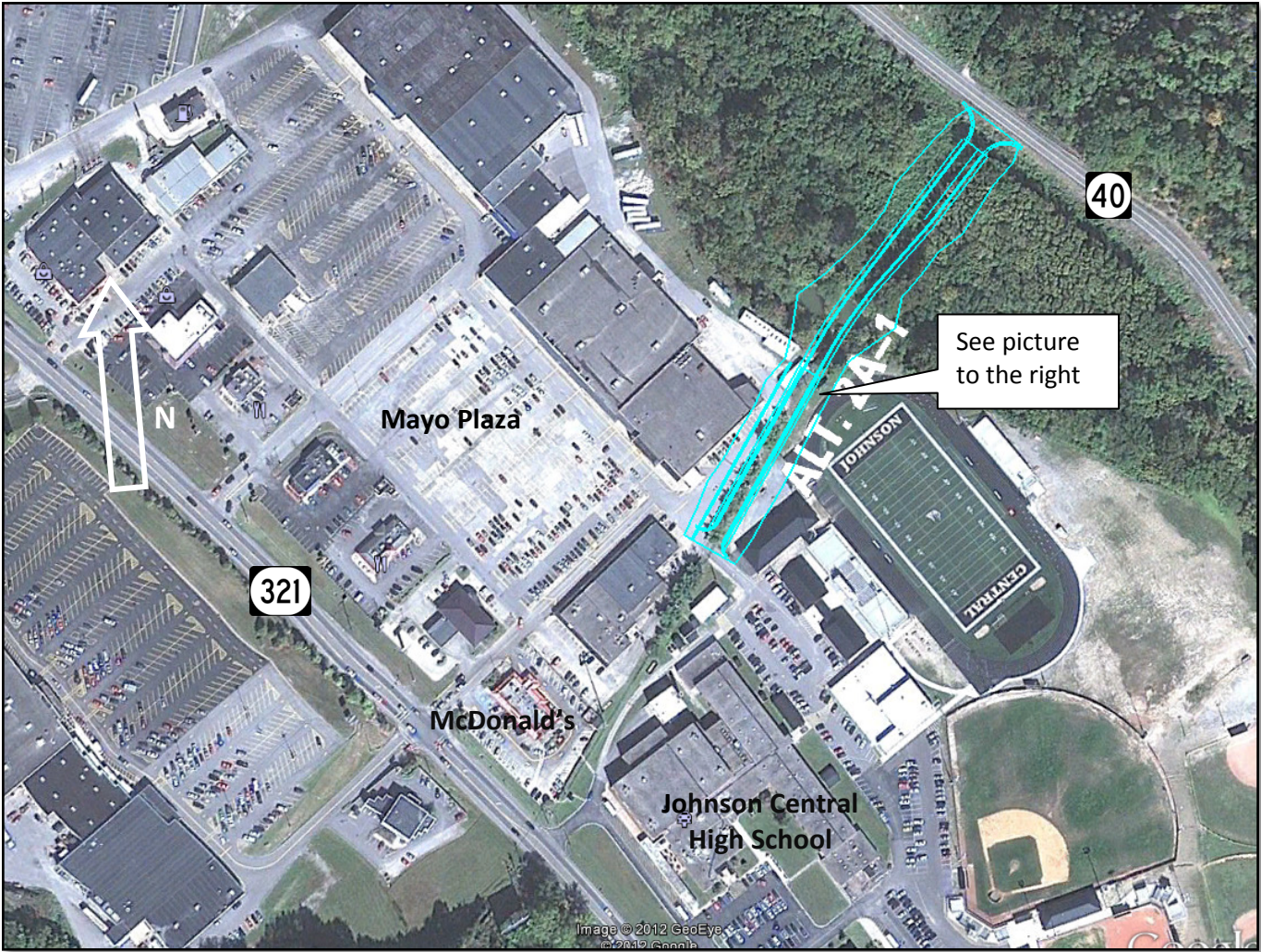
NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 21

STAKEHOLDER INPUT: Scored 1.75 out of 5.00

RECOMMENDATIONS: Not recommended for implementation due to low traffic volumes expected.

Standing near school track looking toward KY 321

Alternative 2A-1	
Length	0.17 miles
Design	\$650,000
Right-of-Way	*
Utilities	*
Construction	\$4,400,000
TOTAL	*
*Was not estimated due to little congestion relief for KY 321	



- PURPOSE:** To provide an additional connection to KY 40
- PROPOSED PROJECT:** Construct a connector route from the shopping complex behind McDonald's on the north side of KY 321 to KY 40 between Teays Branch Road and WH Dixon Boulevard
- POTENTIAL IMPACTS TO NATURAL ENVIRONMENT:** Crosses stream, located in 100-year flood plain, floodway
- POTENTIAL IMPACTS TO HUMAN ENVIRONMENT:** 2 businesses; 2" gas main; 8" and 10" water main; 6" force main wastewater; 1 fire hydrant; overhead utilities on south side of KY 40
- FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035:** 2200
- ADVANTAGES:** Provides additional vehicular and pedestrian access but does not impede internal school traffic circulation
- DISADVANTAGES:** Does not connect directly, or provide pedestrian access to KY 321



PURPOSE: To provide improvements to KY 40 in the vicinity of Alternatives 2A and 2A-1 to accommodate the additional traffic either of those connector routes would generate on KY 40

PROPOSED PROJECT: Construct a left-turn lane northbound and a right-turn lane southbound, near the connector route proposed in Alternatives 2A and 2A-1

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: 100 year floodplain, floodway, steep cut slopes

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 10" water main, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 550 left turns

ADVANTAGES: Provides for safer KY 40 turns

DISADVANTAGES: No congestion relief on KY 321

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Some crash reduction on KY 40 in the vicinity of this improvement; no congestion relief on KY 321

ALTERNATIVE 2A-1-KY 40

LEFT TURN LANE ON NORTHBOUND KY 40 AT INTERSECTION WITH ALTERNATIVES 2A AND 2A-1

PROJECT GOALS:

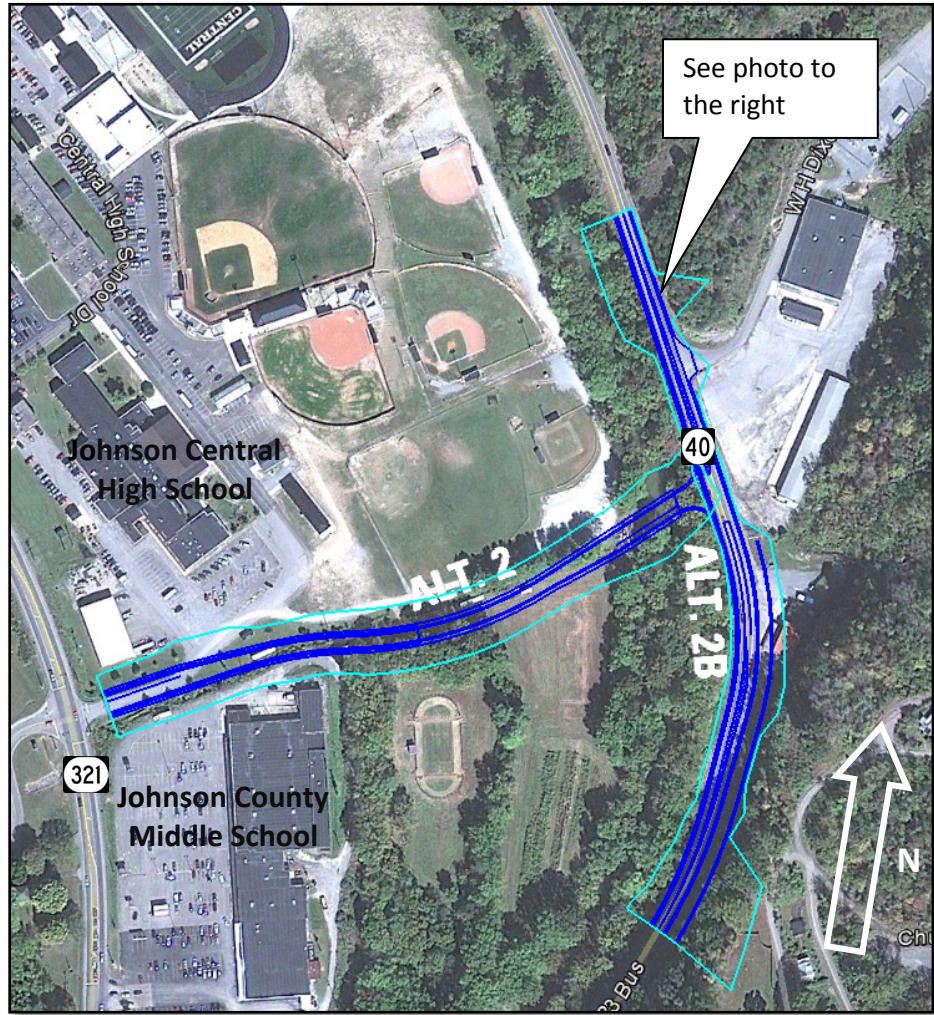
- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NO, YES
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: LIMITED
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: LIMITED
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES (ON CONNECTOR)

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0

STAKEHOLDER INPUT: Scored 1.75 out of 5.00

RECOMMENDATIONS: Not recommended for implementation

Alternative 2A-1-KY40	
Length	0.30 miles
Design	\$235,000
Right-of-Way	\$150,000
Utilities	\$200,000
Construction	\$1,585,000
TOTAL	\$2,170,000



PURPOSE: To provide improvements to KY 40 in the vicinity of Alternative 2 to accommodate the additional traffic that connector routes would generate on KY 40

PROPOSED PROJECT: Construct a left-turn lane northbound and a right-turn lane southbound, in the vicinity of Alternative 2

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 2 businesses, 1 cemetery, 10" water main, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 1120 left turns daily

ADVANTAGES: Increased safety on KY 40 in this vicinity

DISADVANTAGES: No congestion relief of KY 321

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential crash reductions on KY 40, but no congestion relief on KY 321

ALTERNATIVE 2B

LEFT TURN LANE ON KY 40 NORTHBOUND AT THE INTERSECTION WITH ALTERNATIVE 2

PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NO, YES
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: LIMITED
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: LIMITED
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES (ON CONNECTOR)

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0 (without connector)

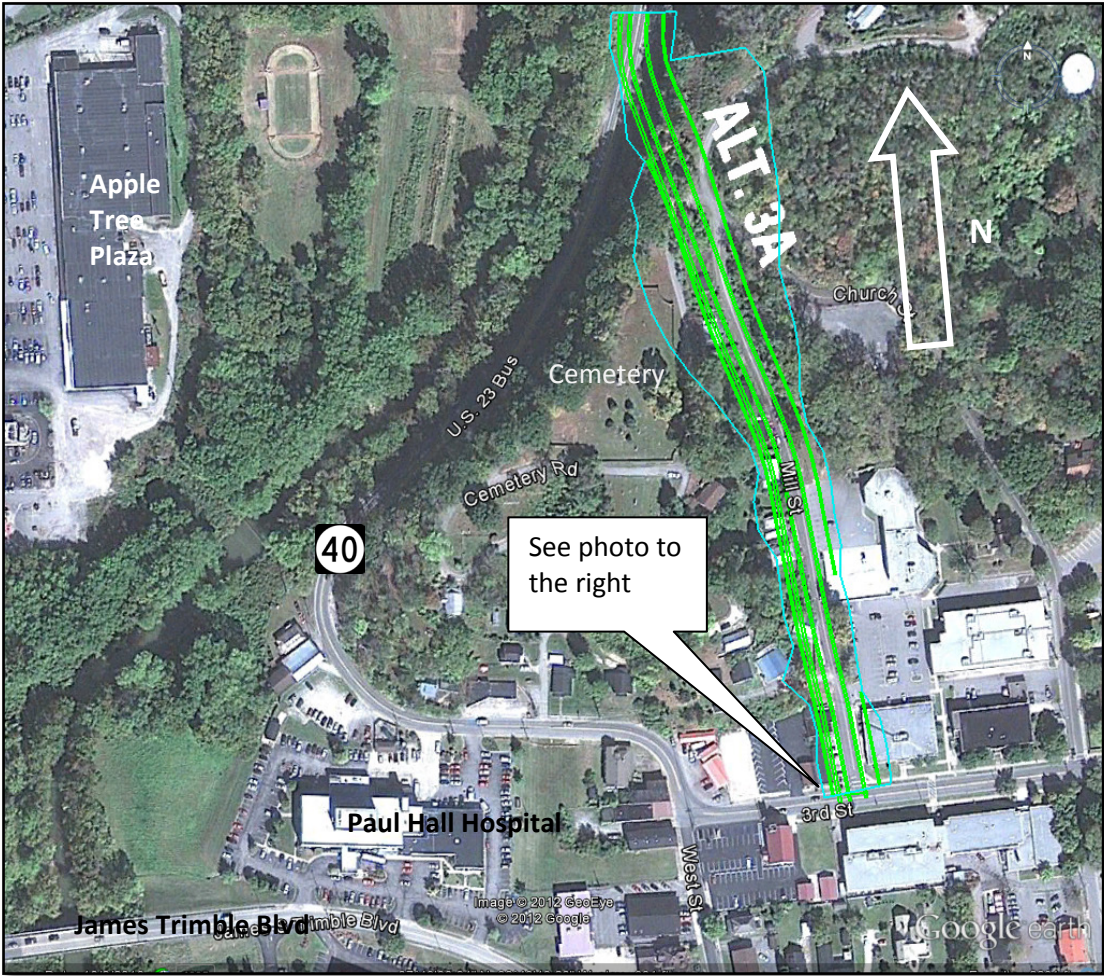
STAKEHOLDER INPUT: Scored 1.75 out of 5.00

RECOMMENDATIONS: Not recommended for implementation

Alternative 2B traveling south on KY 40 at WH Dixon



Alternative 2B	
Length	0.28 miles
Design	\$119,000
Right-of-Way	\$150,000
Utilities	\$200,000
Construction	\$793,000
TOTAL	\$1,262,000



ALTERNATIVE 3A

IMPROVEMENTS TO KY 40 NEAR HOSPITAL ON NEW ALIGNMENT

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES*, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES, IF COUPLED WITH ALTERNATIVE 2
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: YES
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

*ONLY IF COUPLED WITH ALTERNATIVE 2 CONNECTOR

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 15 (only if coupled with Alternative 2 Connector)

STAKEHOLDER INPUT: Scored 1.75 out of 5.00

RECOMMENDATIONS: Not recommended for implementation

Alternative 3A north on Mill Street



Alternative 3A	
Length	0.26 miles
Design	\$450,000
Right-of-Way	\$5,104,800
Utilities	\$240,000*
Construction	\$3,000,000
TOTAL	\$8,794,800
* Does not include 35% for KYTC personnel	

PURPOSE: To improve safety on KY 40 in the vicinity of the Paul Hall Hospital

PROPOSED PROJECT: Reconstruct KY 40 north of the hospital

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes

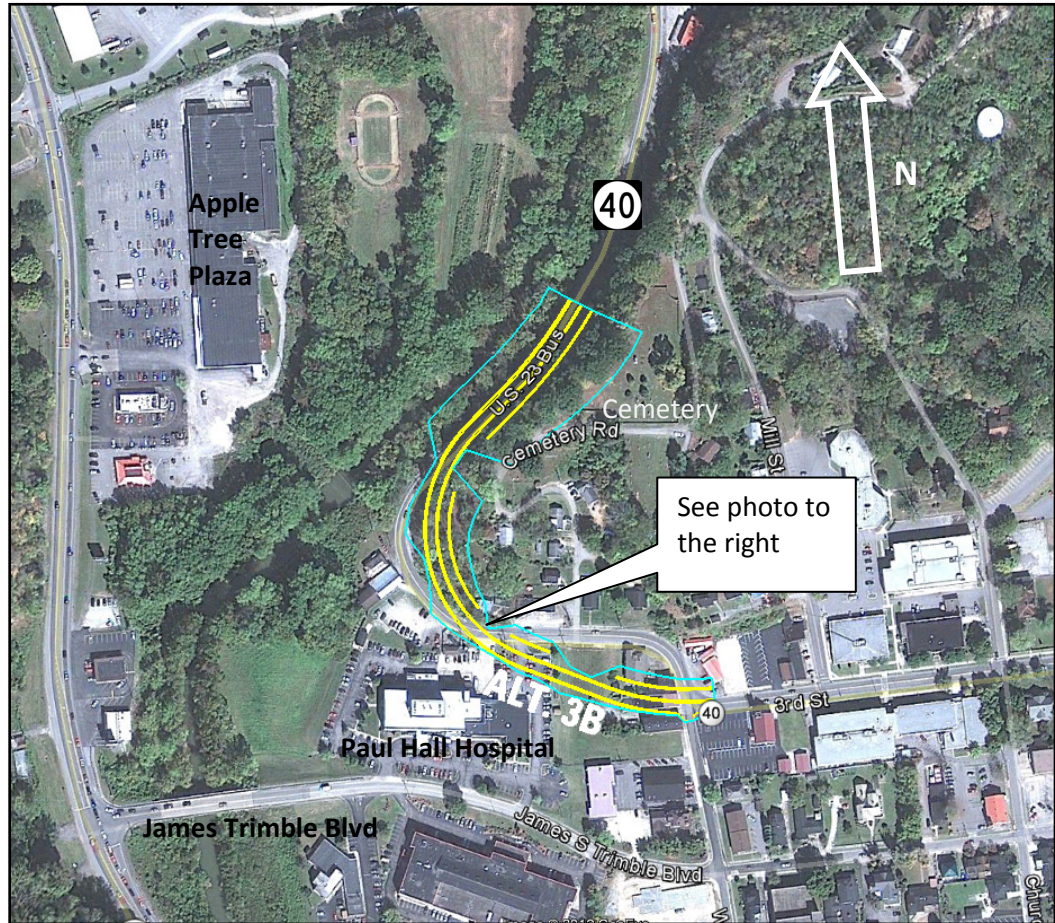
POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 2 businesses, 8 residences, cemetery, 10” water main, 6” force main wastewater, 2” gas line, fire hydrant

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 9300 (with Alternative 2)

ADVANTAGES: Improves a less than desirable curve and adds pedestrian movement. However, to be effective with pedestrian movement it must be coupled with Alternative 2.

DISADVANTAGES: Requires business and residential impacts; has steep cut slopes and the new alignment will have a steeper grade. It also cuts off access to Church Street at the very top of the hill that will need to access their property from WH Dixon Boulevard and may impact the cemetery. It must be coupled with Alternative 2 to realize any congestion improvement on KY 321.

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential 40% reduction in crashes; congestion relief on KY 321 (850 to 1100 vehicles daily) if coupled with Alternative 2.



PURPOSE: To improve safety on KY 40 in the vicinity the Paul Hall Hospital

PROPOSED PROJECT: Construct geometric improvements to KY 40 in the vicinity of the hospital

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 1 business, 2 residences, 4 empty buildings, hospital parking lot, cemetery, 8" water main, 2" gas main, 3 fire hydrants, overhead utilities on south side of KY 40

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 9300 (with Alternative 2)

ADVANTAGES: Improves a less than desirable curve and adds pedestrian movement. However, to be effective with pedestrian movement it must be coupled with Alternative 2.

DISADVANTAGES: Requires some of the hospital parking lot, purchasing some vacant buildings, and will impact one business and residential properties. It must be coupled with a connector to realize any minimal congestion improvement on KY 321.

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential reduction in crashes up to 50%; congestion relief on KY 321 if coupled with Alternative 2.

ALTERNATIVE 3B

IMPROVEMENTS TO KY 40 NEAR HOSPITAL ALONG EXISTING ALIGNMENT

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES*, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES, IF COUPLED WITH ALTERNATIVE 2
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: YES
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

*ONLY IF COUPLED WITH ALTERNATIVE 2 CONNECTOR

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 15 (only if coupled with Alternative 2 Connector)

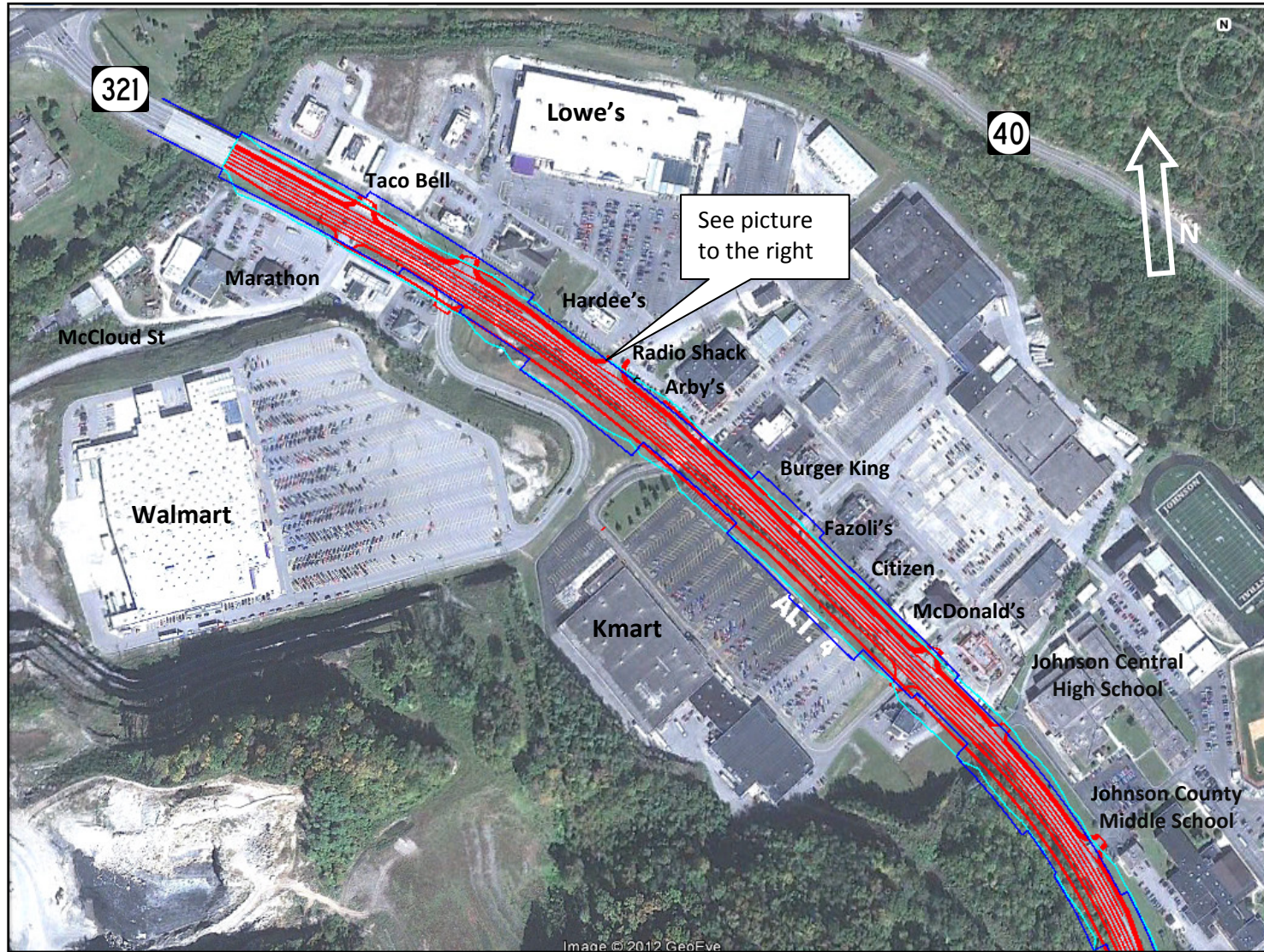
STAKEHOLDER INPUT: Scored 2.50 out of 5.00

RECOMMENDATIONS: Not recommended at this time

Traveling north on KY 40 around "hospital curve"



Alternative 3B	
Length	0.27 miles
Design	\$165,000
Right-of-Way	\$1,500,000
Utilities	\$425,000
Construction	\$1,100,000
TOTAL	\$3,190,000



ALTERNATIVE 4

RECONSTRUCT KY 321 TO FIVE LANES FROM JAMES TRIMBLE BOULEVARD TO KY 40

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: YES
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES

PURPOSE: To reduce congestion on a portion of KY 321

PROPOSED PROJECT: Reconstruct KY 321 to five lanes (4 lanes with center left turn lane) from James Trimble Boulevard north to KY 40

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, floodway

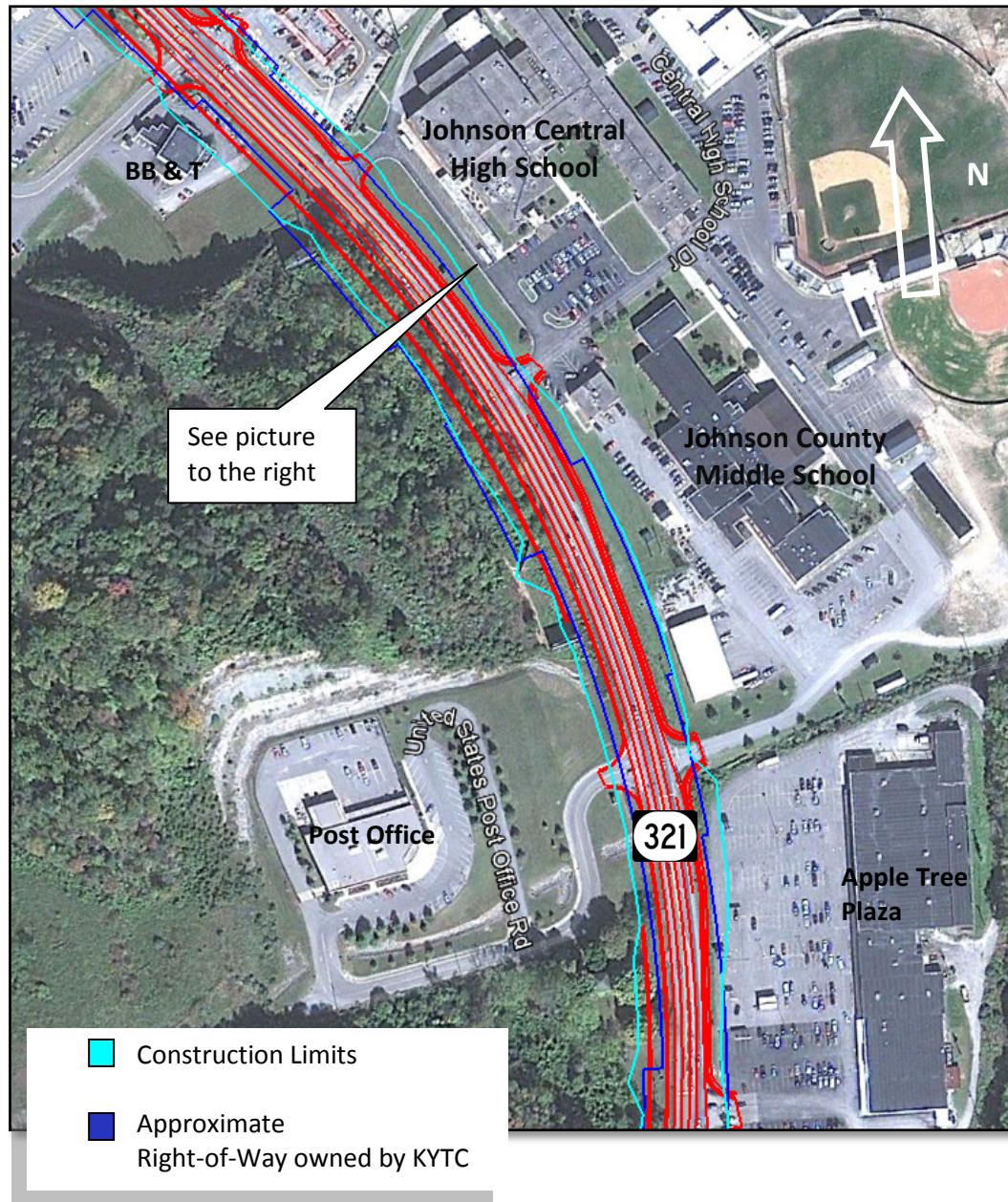
POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 21 businesses, 2 residences, pipelines, 8" water and wastewater main, 2" and 6" gas main, water pump station, overhead utilities on both sides

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 18,100-22,200 (highest volumes just south of KY 40/KY 321 intersection and near schools)

(CONTINUED ON NEXT PAGE)

Traveling south on KY 321





ADVANTAGES: Reduces congestion by adding through lanes, adds safe pedestrian movement along the corridor, KYTC owns much RIGHT-OF-WAY along the corridor

DISADVANTAGES: Business impacts, right-of-way impacts, high utility costs

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential 25% reduction in crashes if right-turn lanes are included, provides congestion relief on KY 321 north of James Trimble Boulevard

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 32

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ALTERNATIVE 4 (CONTINUED)

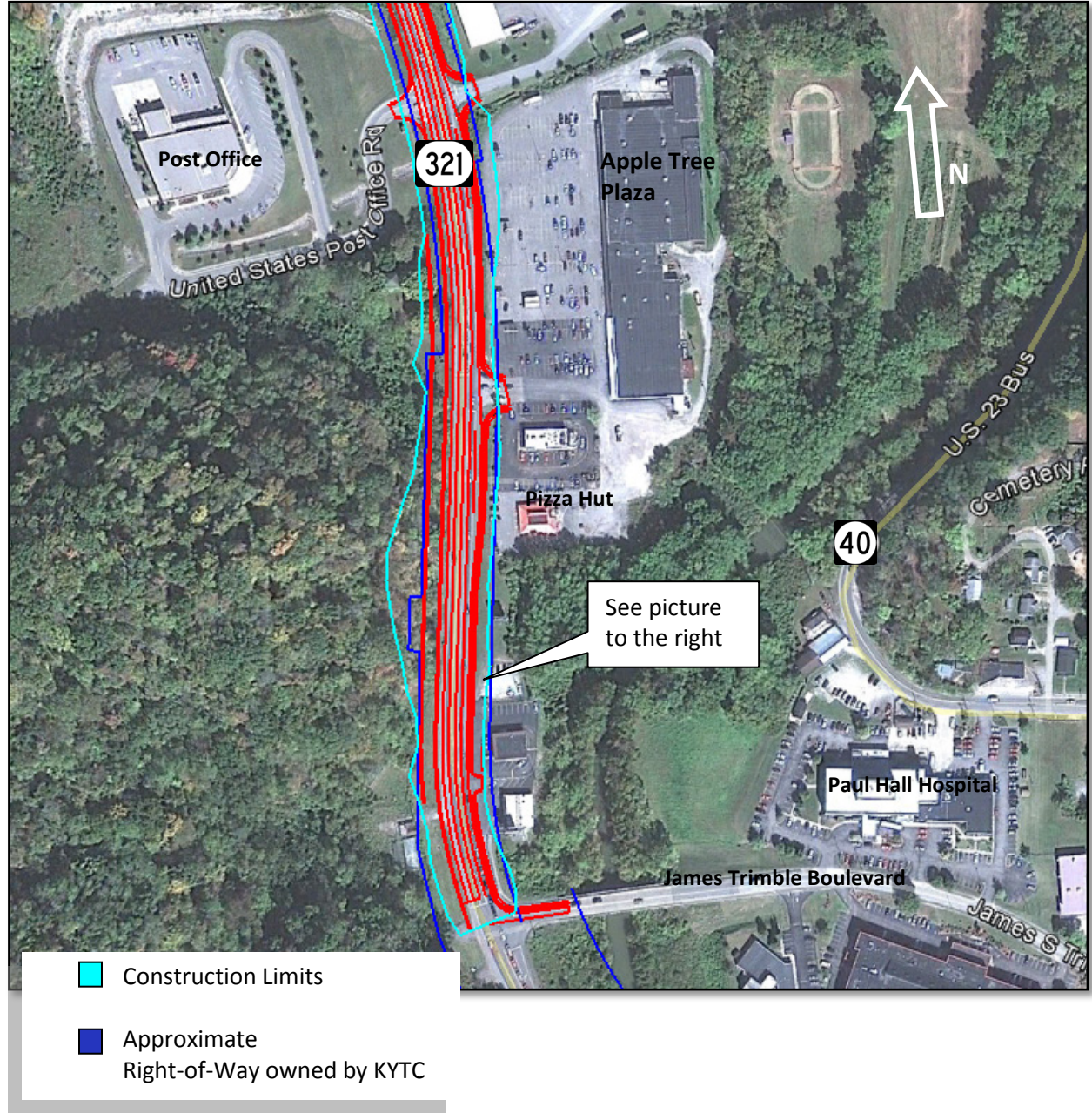
RECONSTRUCT KY 321 TO FIVE LANES FROM JAMES TRIMBLE BOULEVARD TO KY 40

STAKEHOLDER INPUT: Scored 5.00 out of 5.00

RECOMMENDATIONS: Recommended for implementation. If this project must be split into two construction segments, it is recommended that the break be at the school bus exit road.

Traveling north on KY 321 near Johnson Central High School and McDonald's



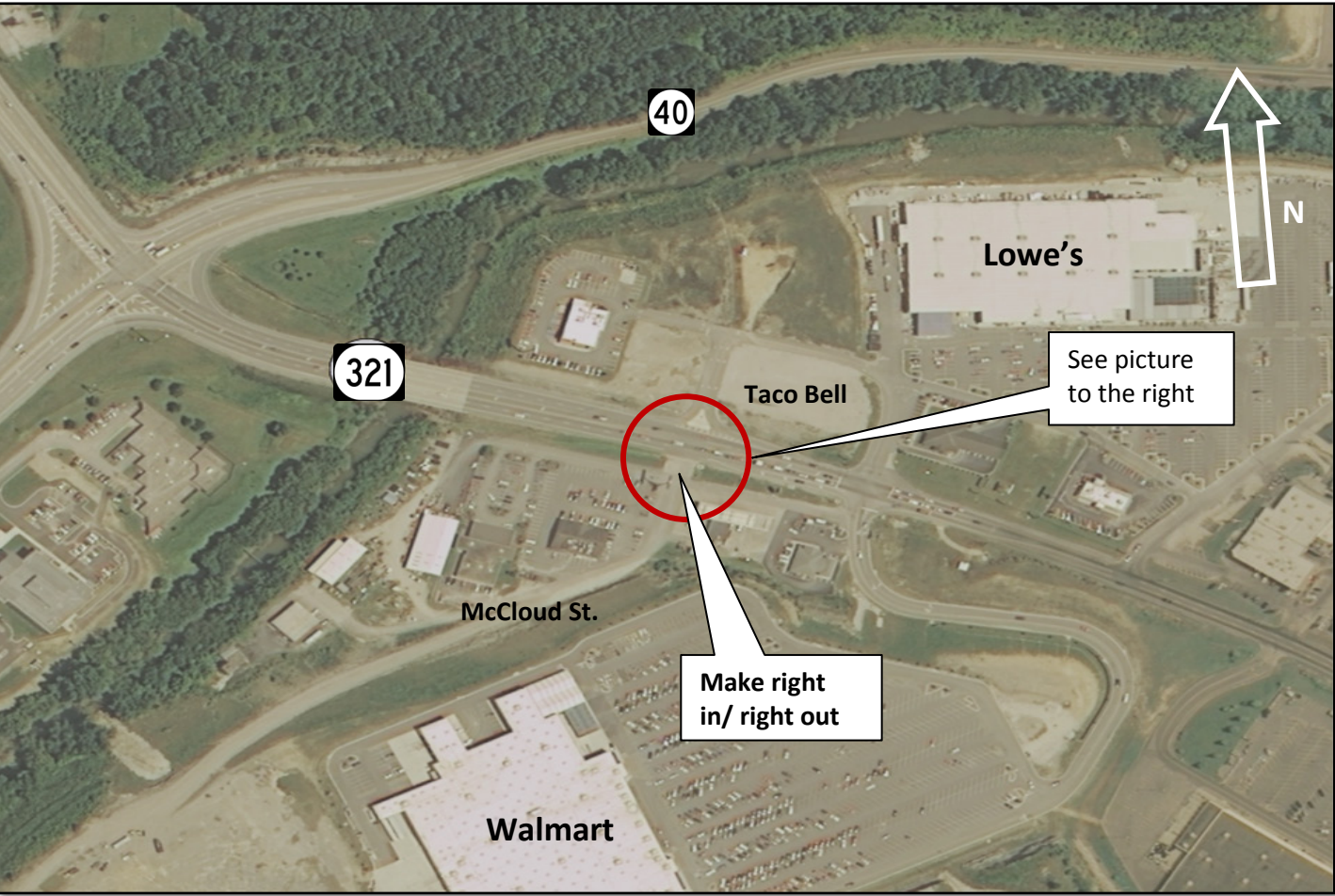


ALTERNATIVE 4 (CONTINUED)

RECONSTRUCT KY 321 TO FIVE LANES FROM JAMES TRIMBLE BOULEVARD TO KY 40

Alternative 4	
Length	1.01 miles
Design	\$1,250,000
Right-of-Way	\$4,250,000
Utilities	\$2,200,000
Construction	\$8,236,000
TOTAL	\$15,936,000





PURPOSE: To reduce congestion on a portion of KY 321

PROPOSED PROJECT: Convert existing intersection of KY 321 and McCloud Drive to right in/right out only

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Minimal

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 5 businesses, 12" wastewater main, 8" and 12" force main wastewater, 3" and 6" gas main, 1 UST, overhead utilities

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 22,200 on KY 321 (unaffected by this alternative)

ADVANTAGES: Eliminates left turns in a congested area

DISADVANTAGES: Left turning vehicles will have significant adverse travel distance, not desired by developer. Will require left turners to turn right on Walmart Road go to the top of the hill, turn around and come back down. If further development occurs on McCloud Street this may not be a viable option due to the number of left turns.

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential crash reduction if right-turn lanes are included; minimal congestion relief on KY 321 at McCloud Street. This alternative actually causes more congestion at the Walmart/KY 321 intersection.

ALTERNATIVE 4A

RIGHT IN/RIGHT OUT ONLY TURN CONFIGURATION ON KY 321 AT McCLOUD DRIVE

PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: MINIMAL, NO
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

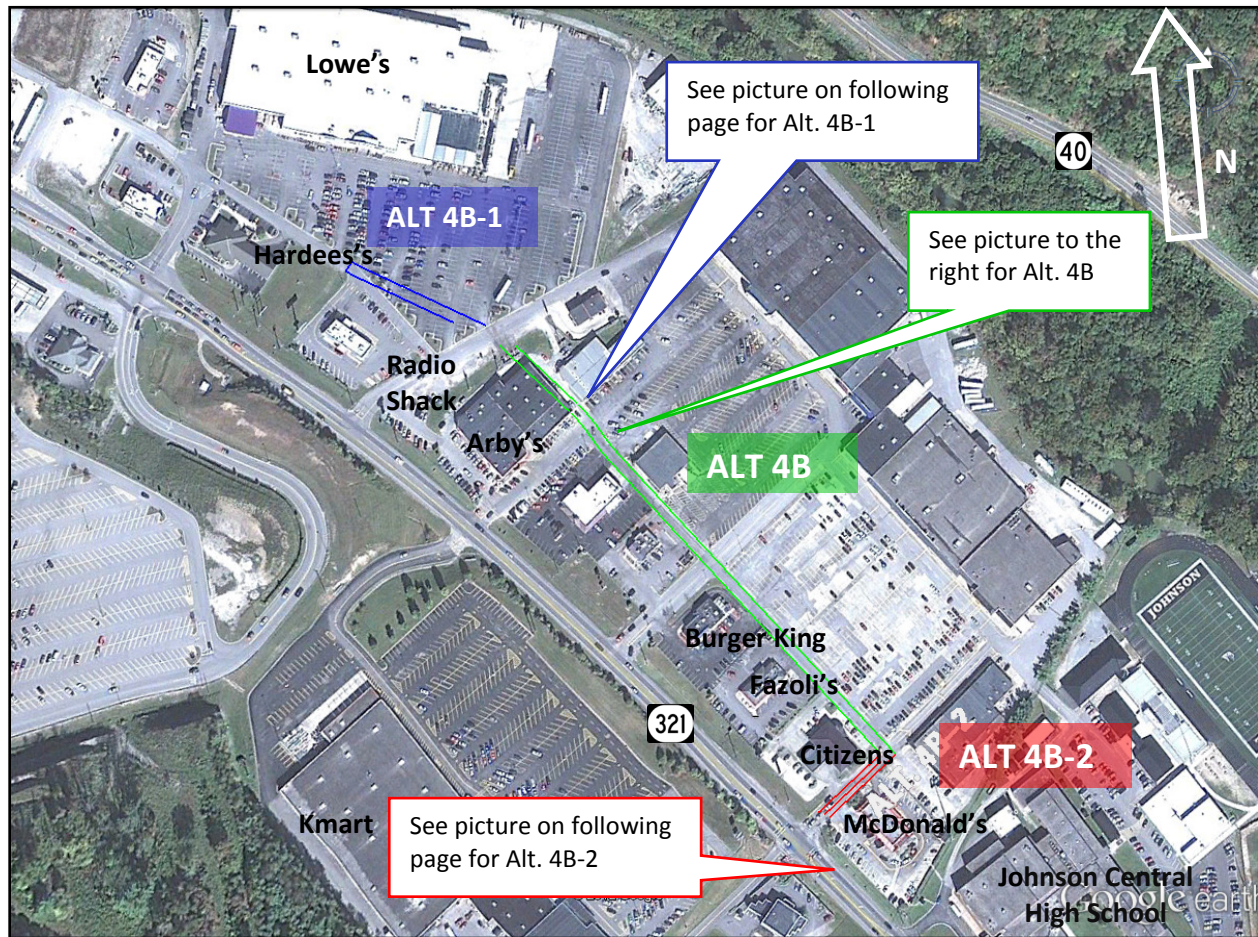
NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 1

STAKEHOLDER INPUT: Scored 3.75 out of 5.00

RECOMMENDATIONS: Recommended short-term



Alternative 4A	
Length	N/A
Design	\$30,000
Right-of-Way	\$30,000
Utilities	\$60,000
Construction	\$200,000
TOTAL	\$320,000



ALTERNATIVE 4B, 4B-1, 4B-2 ACCESS ROAD THAT PARALLELS KY 321

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NOT ESTIMATED
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: MINIMAL
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

PURPOSE: To reduce congestion along a portion of KY 321

PROPOSED PROJECT: Implement a frontage road north of KY 321 opposite Kmart and Walmart through striping, purchase of one business and a portion of the Lowe's parking lot, and traffic control modifications. Possible closure of KY 321 Burger King entrance.

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: 100 year floodplain

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 3 businesses, 8" water and wastewater main

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: Not available

ADVANTAGES: Most of the route exists, just restriping and traffic control would be necessary. It provides minimal congestion relief for KY 321

DISADVANTAGES: Impacts 3 businesses; would have to be implemented by local businesses/developers

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Access management should mitigate congestion and reduce crashes on KY 321, but no quantifiable estimate was made

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Alternative 4B traveling along 4B looking at Lowe's





ALTERNATIVE 4B, 4B-1, 4B-2 (CONTINUED) ACCESS ROAD THAT PARALLELS KY 321

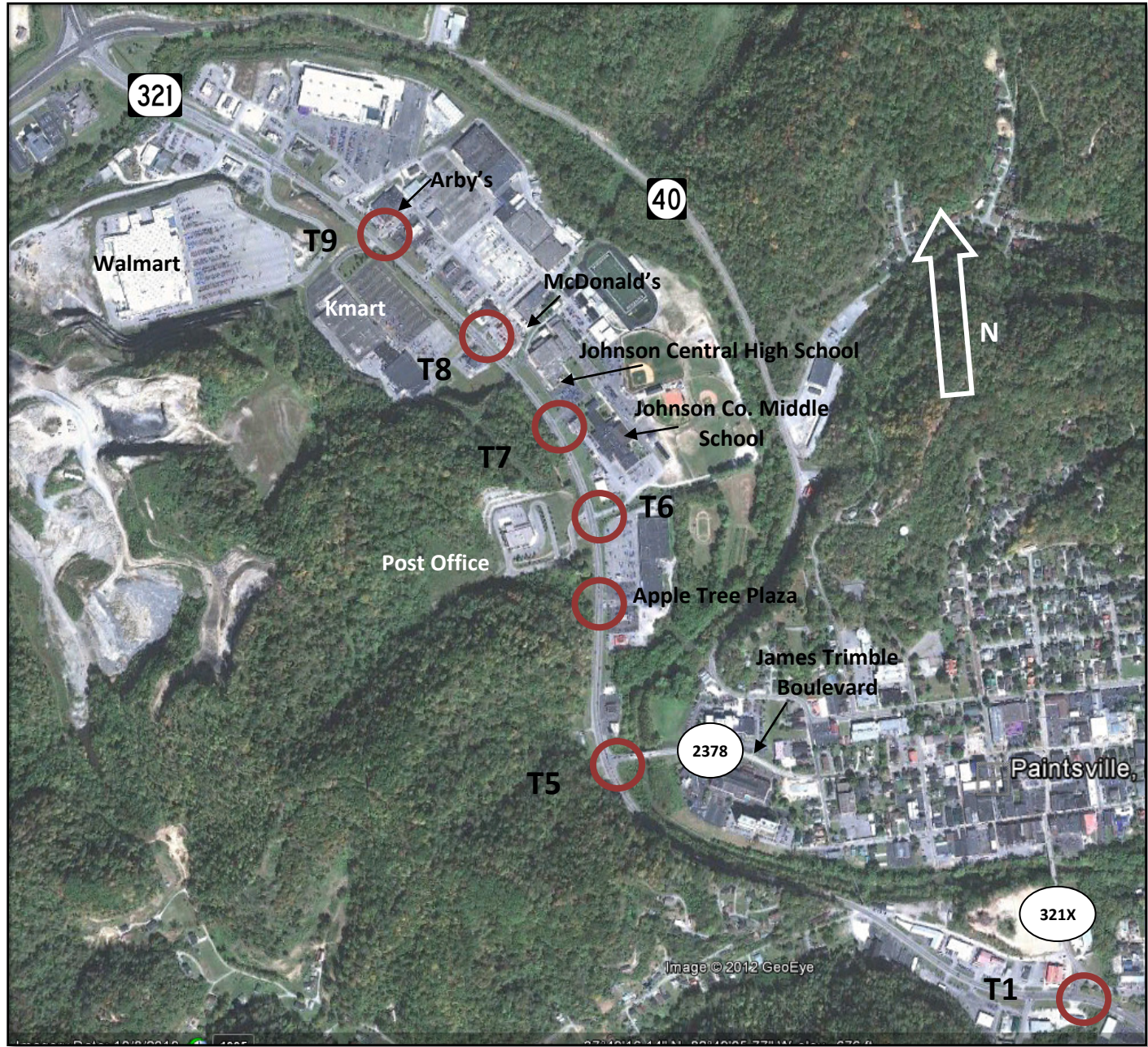
RECOMMENDATIONS: Should be considered if improvements to KY 321 are advanced

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: Did not count traffic to determine the impacts

STAKEHOLDER INPUT: Scored 2.75 out of 5.00

Alternative 4B, 4B-1, 4B-2	
Length	0.50 miles
Design	\$75,000
Right-of-Way	\$7,985,200
Utilities	\$300,000*
Construction	\$500,000
TOTAL	\$9,182,200
* Does not include 35% for KYTC personnel	





PURPOSE: To reduce congestion along a portion of KY 321



ALTERNATIVE 4C

CONSTRUCT RIGHT TURN LANES ON KY 321 AT SEVEN LOCATIONS

- PROJECT GOALS:**
- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
 - 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
 - 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
 - 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
 - 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

PROPOSED PROJECT: Construct right turn lanes on KY 321 at seven locations:

Count Station*	Right Turn Lane Description (Year Warranted)
T9	NB at Arby's (2011 and 2035) SB at Kmart (2035)
T8	NB at McDonald's (2011 and 2035)
T7	NB at Johnson Central High School Drive (2011 AM and 2035)
T6	NB at Johnson County Middle School (2011 AM and 2035) SB at Post Office (2035 PM)
Apple Tree Plaza	Identified through traffic model (2011 and 2035)
T5	NB at James Trimble Boulevard (exists now needs lengthening 2035)
T1	NB at 321X (2035)

*Count Station identified in Appendix E

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POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Minimal

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 2 businesses, 3” and 6” gas main, 8” water main, overhead utilities

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 18,100-22,200 (highest volumes just south of KY 40 and near schools)

ADVANTAGES: Improvement in KY 321 congestion for the right turn lane movements for all intersections and some through movements at those intersections, less cost and fewer impacts to businesses than full widening

DISADVANTAGES: Impacts to parking, business fronts, and utilities, if KY 321 is widened the turn lanes would require reconstruction.

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential 25% reduction in crashes at those intersections; congestion relief on KY 321 at those intersections.

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 11

STAKEHOLDER INPUT: Scored 3.25 out of 5.00

RECOMMENDATIONS: Each turn lane would improve traffic flow but would not improve the overall operation of KY 321 to an acceptable level.

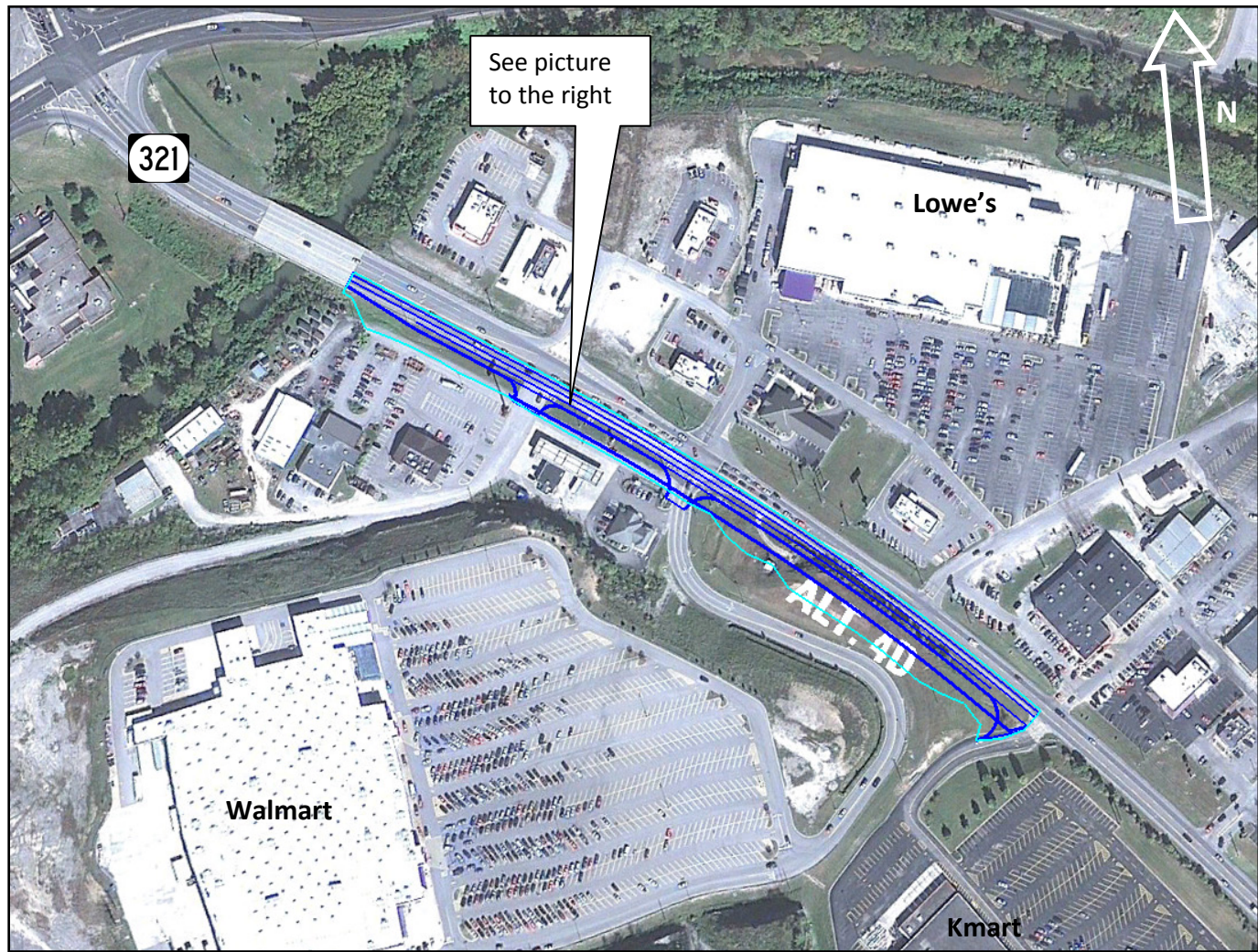
ALTERNATIVE 4C

(CONTINUED)

CONSTRUCT RIGHT TURN LANES ON KY 321 AT SEVEN LOCATIONS



Alternative 4C	
Length	0.33 miles
Design	\$360,000
Right-of-Way	\$1,566,000
Utilities	\$350,000*
Construction	\$2,400,000
TOTAL	\$4,676,000
* Does not include 35% for KYTC personnel	



PURPOSE: To reduce congestion along a portion of KY 321

PROPOSED PROJECT: Construct an additional southbound through lane and right turn lane on KY 321 from Paint Creek bridge south to Kmart entrance

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: 100 year floodplain

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 5 businesses, 1 UST, 3" and 6" gas main, 8" wastewater and water main, overhead utilities

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 21,000 on KY 321 in the vicinity of Walmart entrance

ADVANTAGES: Allows KY 40 traffic turning south onto KY 321 to travel south without having to merge until the Walmart traffic has turned right. KYTC owns a portion of the right-of-way. Alleviates motorists' confusion by separating decision points.

DISADVANTAGES: Provides little congestion relief to KY 321 as a whole

ALTERNATIVE 4D

CARRY ADDITIONAL KY 321 SOUTHBOUND LANE AND TURN LANE FROM PAINT CREEK BRIDGE TO KMART ENTRANCE

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential small reduction in crashes; congestion relief between KY 40 and Kmart entrance

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 1

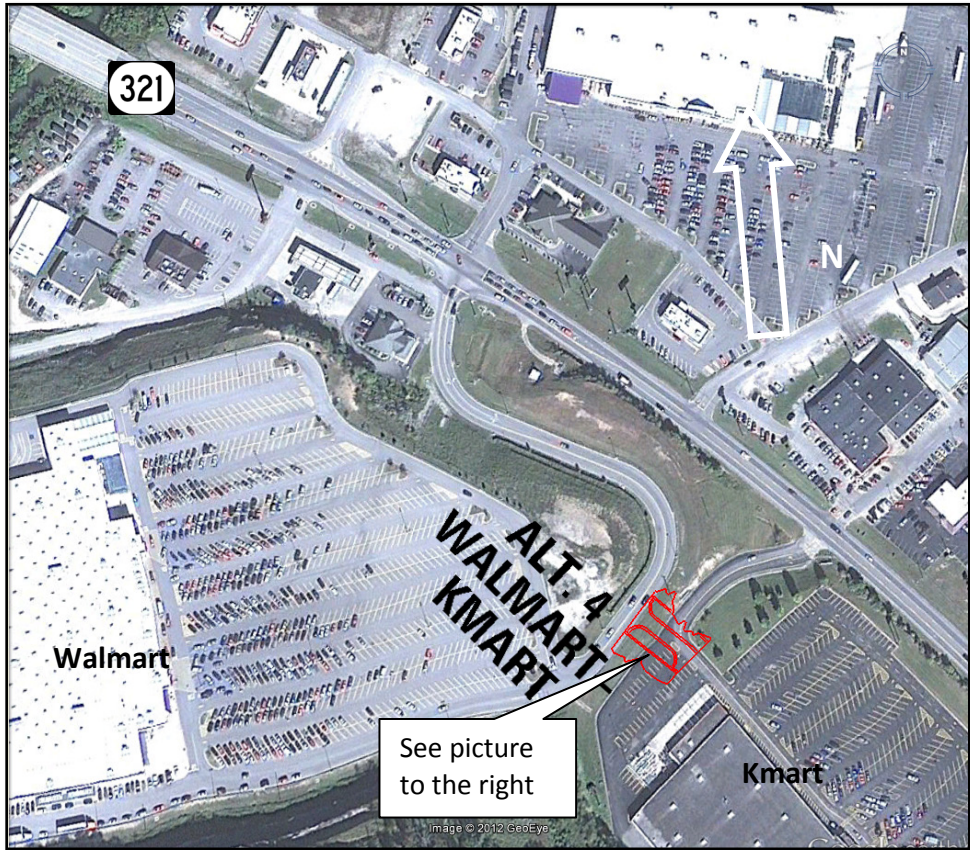
STAKEHOLDER INPUT: Scored 4.75 out of 5.00

RECOMMENDATIONS: Recommended short-term only if alternative 4 is not implemented.

KY 321 south approaching Walmart entrance



Alternative 4D	
Length	0.31 miles
Design	\$275,000
Right-of-Way	\$777,500
Utilities	\$390,000*
Construction	\$1,845,000
TOTAL	\$3,287,500
* Does not include 35% for KYTC personnel	



PURPOSE: To improve traffic flow on KY 321 by eliminating one access point

PROPOSED PROJECT: Close separate entrance to Kmart near MP 8.4 and merge Kmart traffic into Walmart entrance

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Minimal

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 2 businesses, 6” gas main, 8” water main

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 2200

ADVANTAGES: Increases separation between access points on KY 321

DISADVANTAGES: Loss of Kmart parking spaces; need to accommodate more left turns at Walmart entrance. May necessitate the right turn lane at Walmart to be extended; would have to be implemented by local businesses/developers

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Minimal congestion relief on KY 321

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0

STAKEHOLDER INPUT: Scored 1.75 out of 5.00

ALTERNATIVE 4E

MERGE KMART AND WALMART ENTRANCE TO KY 321

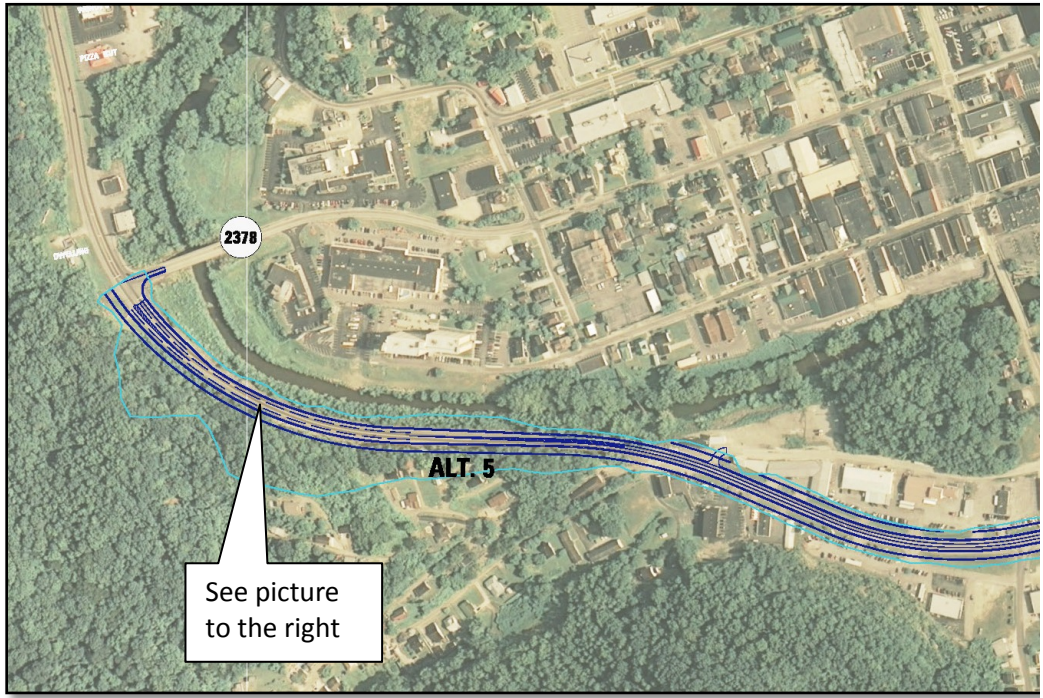
PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: MINIMAL, MINIMAL
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

RECOMMENDATIONS: Should be considered if improvements are made to KY 321.

Berm between Walmart and Kmart parking lots

Alternative 4E	
Length	0.04 miles
Design	\$13,000
Right-of-Way	\$50,000
Utilities	\$50,000
Construction	\$87,000
TOTAL	\$200,000



PURPOSE: To reduce congestion on KY 321 south of James Trimble Boulevard

PROPOSED PROJECT: Reconstruct KY 321 to four lanes south of James Trimble Boulevard, transitioning to three lanes at Mill Branch Road

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 12 businesses, 1 church, 8 residences, 8" and 12" water main, 2" and 4" gas main, 8" wastewater main, 5 USTs, 2 fire hydrants, overhead utilities

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 16,820

ADVANTAGES: Improves congestion and safety along KY 321 South of James Trimble Boulevard. Will also allow for multiple entrances to be closed at southern end of project on the north side of KY 321

DISADVANTAGES: Requires business and residential impacts, very steep cuts along the southbound side of KY 321.

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Potential 25% crash reduction, congestion relief to KY 321 south of James Trimble Boulevard

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 3

STAKEHOLDER INPUT: Scored 3.80 out of 5.00

ALTERNATIVE 5

RECONSTRUCT KY 321 TO 4 LANES SOUTH OF KY 2378 / JAMES TRIMBLE BOULEVARD TRANSITIONING TO 3 LANES AT SOUTHSIDE DRIVE

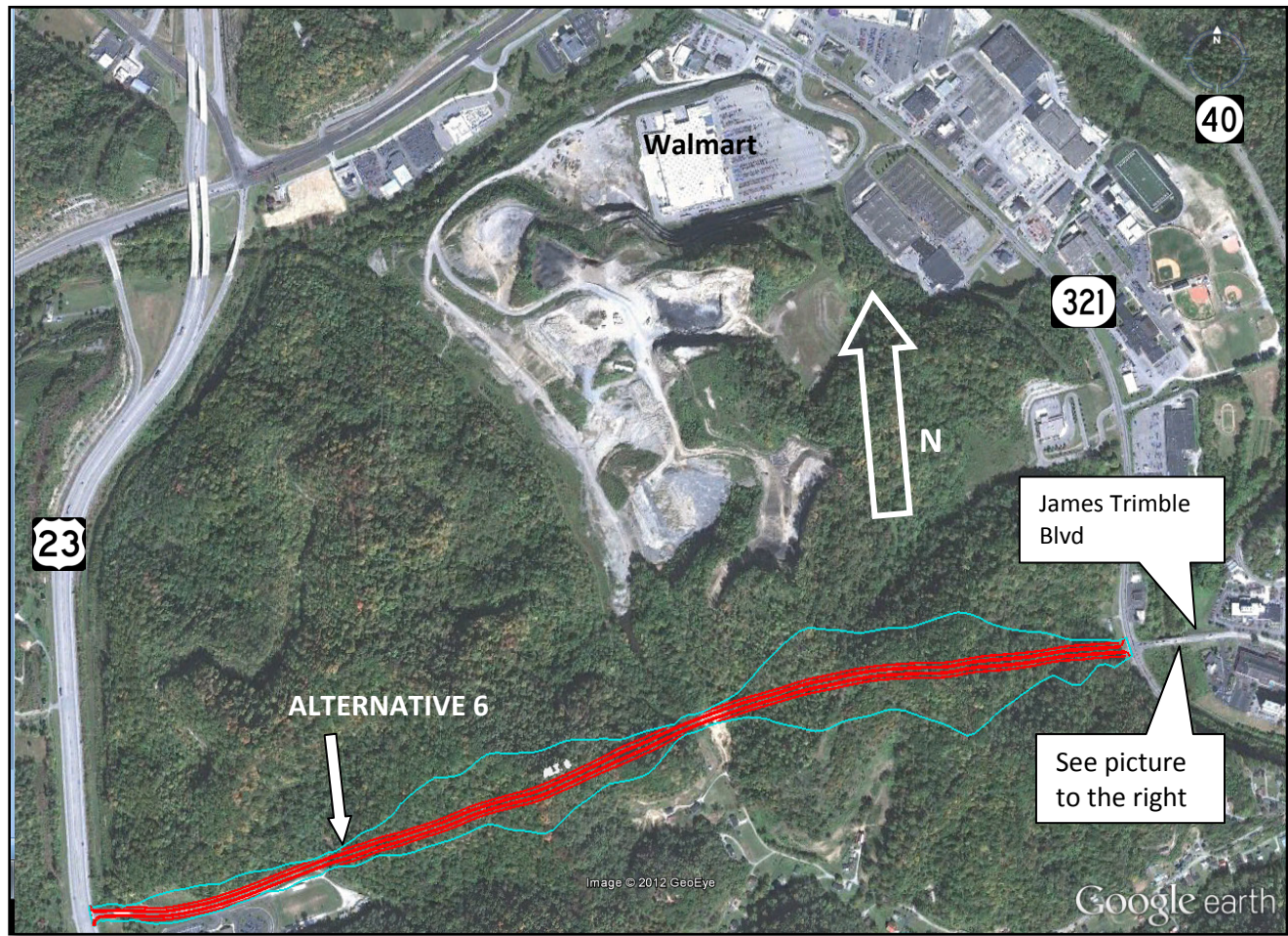
- PROJECT GOALS:**
- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
 - 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
 - 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
 - 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: YES
 - 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

RECOMMENDATIONS: Recommended only after Alternative 4 is constructed.

Traveling south on KY 321 south of James Trimble Boulevard



Alternative 5	
Length	0.65 miles
Design	\$600,000
Right-of-Way	\$2,407,600
Utilities	\$880,000*
Construction	\$3,955,000
TOTAL	\$7,842,600
* Does not include 35% for KYTC personnel	



PURPOSE: To reduce traffic congestion on KY 321 by diverting through traffic to a new route

PROPOSED PROJECT: Construct a new two-lane route between KY 321 at its intersection with James Trimble Boulevard and US 23 in the vicinity of mile point 6.0, approximately 1 mile south of US 460 interchange

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, 1 wetland

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: Possibly 2 residences, 1 school, 12" water main, pipeline

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 4700

ADVANTAGES: Routes through traffic around congested portion of KY 321 and diverts the most traffic from KY 321

DISADVANTAGES: Added system mileage, costly, steep cuts

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Reduction in KY 321 congestion north of school complex by between 2950 and 3540 vehicles daily

ALTERNATIVE 6

EXTEND JAMES TRIMBLE BOULEVARD WEST FROM KY 321 TO US 23

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: YES
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 22

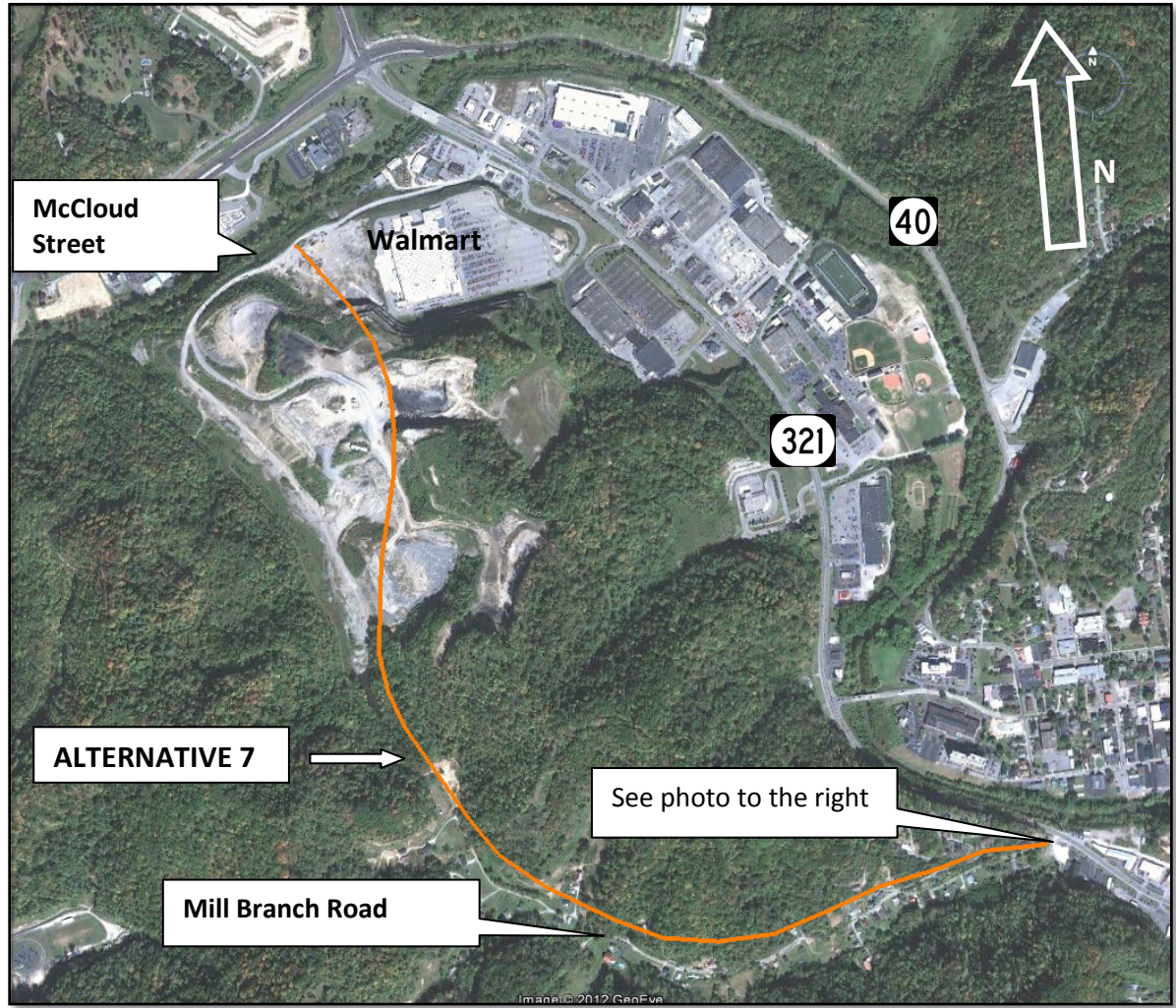
STAKEHOLDER INPUT: Scored 1.50 out of 5.00

RECOMMENDATIONS: Not recommended

Looking west from James Trimble Boulevard – Alternative 6 is straight ahead



Alternative 6	
Length	1.34 miles
Design	\$1,500,000
Right-of-Way	\$805,000
Utilities	\$200,000*
Construction	\$46,845,000
TOTAL	\$49,350,000
* Does not include 35% for KYTC personnel	



PURPOSE: To reduce traffic congestion on KY 321 by diverting through traffic to a new route

PROPOSED PROJECT: Construct a new route between KY 321 near Mill Branch Road and McCloud Street extended

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Crosses streams, 1 wetland, coal seams, 100 year floodplain

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 20 residences, pipeline, 8" water and wastewater main, 2" gas main, potential archaeology concerns, 1 wetland

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 2300

ADVANTAGES: Through traffic bypasses commercial strip, diverts traffic from KY 321

DISADVANTAGES: Added system mileage; high cost

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Congestion relief on KY 321 north of James Trimble Boulevard (2100 fewer vehicles daily)

ALTERNATIVE 7

CONSTRUCT A KY 321 "BYPASS" FROM VICINITY OF MILL BRANCH ROAD TO McCLOUD STREET EXTENDED

PROJECT GOALS:

- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
- 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
- 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: YES
- 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
- 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 19

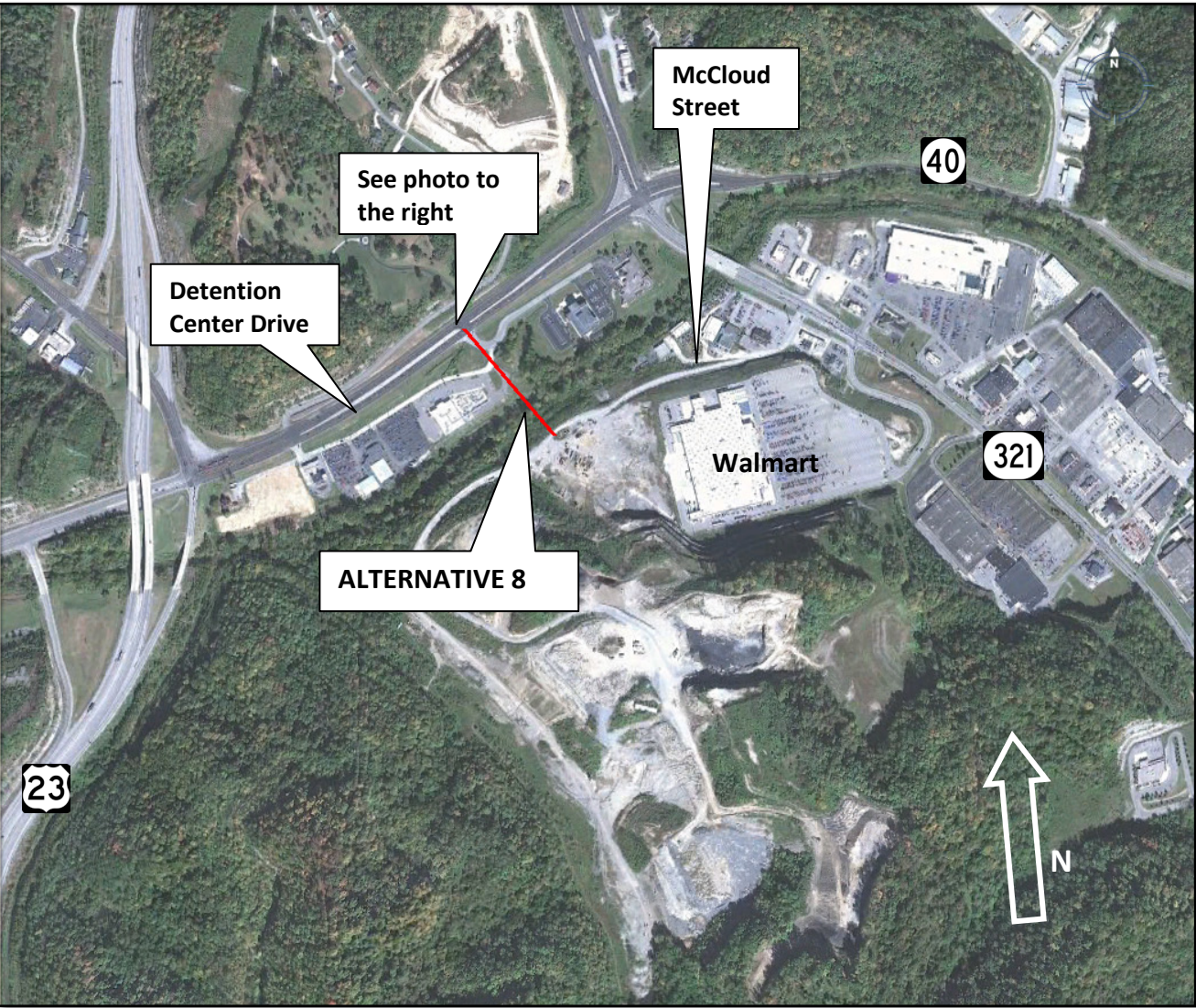
STAKEHOLDER INPUT: Scored 1.25 out of 5.00

RECOMMENDATIONS: Eliminated early from consideration due to length and high cost.

Alternative 7 begins where the blue truck is exiting onto KY 321



Alternative 7	
Length	1.61 miles
Design	\$1,700,000
Right-of-Way	*
Utilities	*
Construction	\$56,479,000
TOTAL	*
* No estimates made since this alternative was eliminated early from consideration	



PURPOSE: To reduce traffic congestion on KY 321 by diverting through traffic to a new route

PROPOSED PROJECT: Construct a new lane route between KY 40 near the Judicial Center to McCloud Street extended

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Crosses stream, 100 year floodplain

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 2 businesses, 6" gas main, 8" water main, 3 fire hydrants, potential archaeology

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 4000

ADVANTAGES: Provides another entrance to a major traffic generator

DISADVANTAGES: Added system mileage, serves a small portion of the KY 321 corridor, would most likely add a new traffic signal on KY 40, long bridge (approximately 800 feet) necessary due to flood plain and mainly serves private development. Most of the alignment will be on structure.

ALTERNATIVE 8

CONSTRUCT A CONNECTOR FROM KY 40 NEAR THE JUDICIAL CENTER TO MCCLLOUD STREET EXTENDED

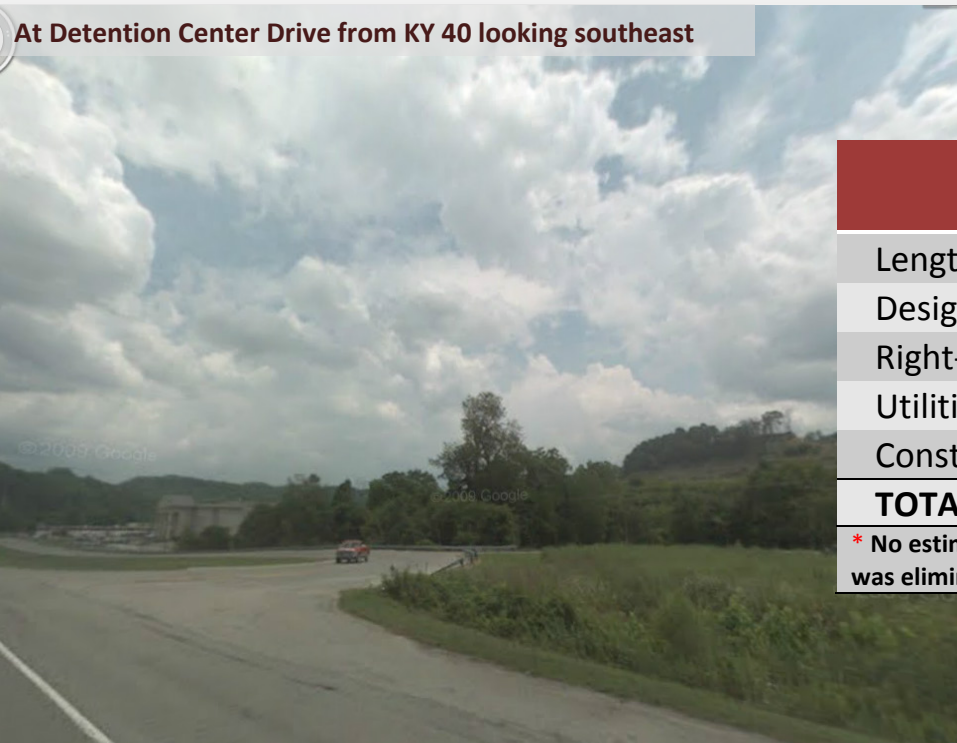
- PROJECT GOALS:**
- 1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: YES, YES
 - 2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: NO
 - 3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
 - 4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: NO
 - 5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: NO

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Congestion relief on KY 321 north of Walmart entrance

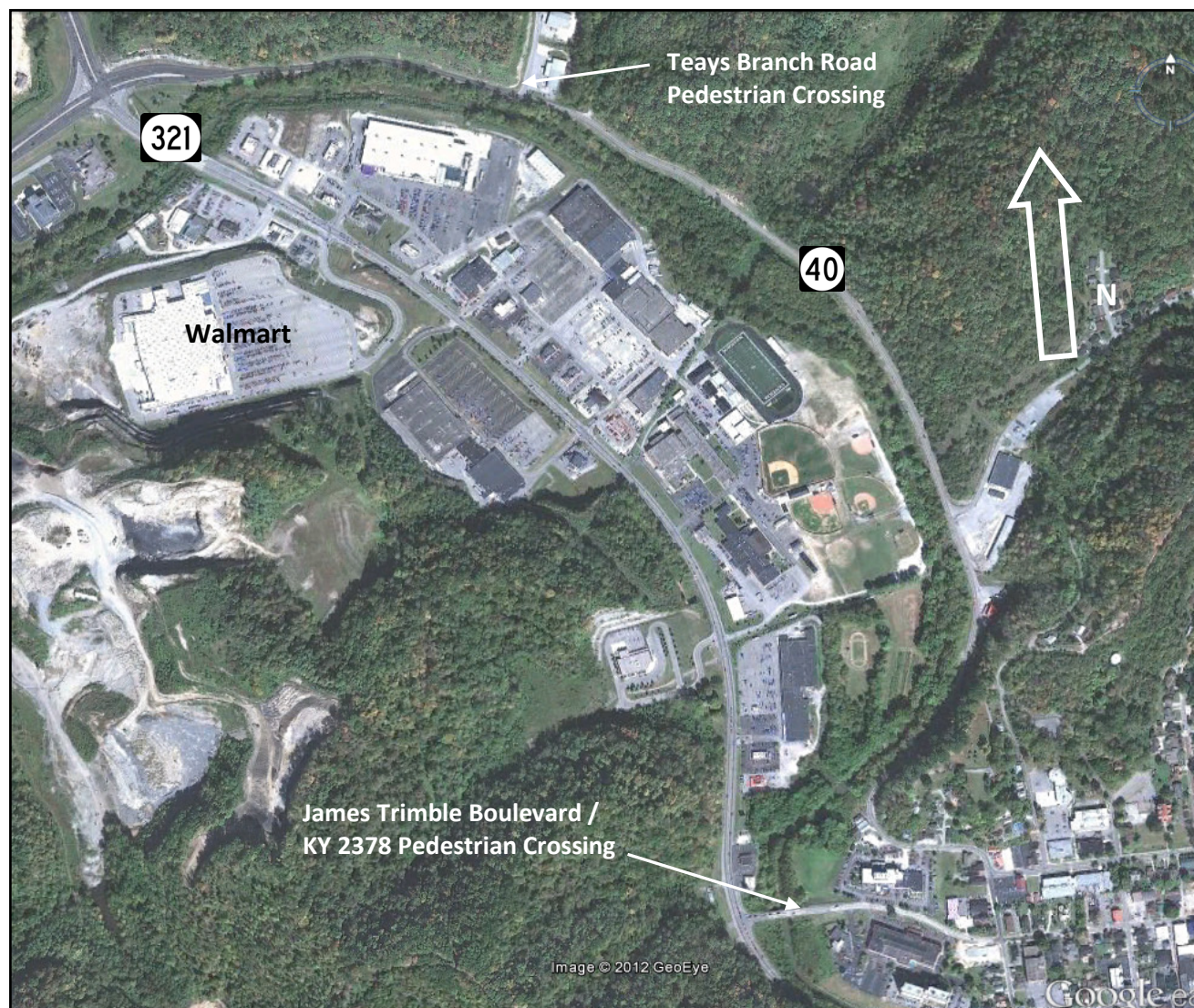
NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 7

STAKEHOLDER INPUT: Scored 1.25 out of 5.00

RECOMMENDATIONS: Not recommended for implementation



Alternative 8	
Length	0.16 miles
Design	\$750,000
Right-of-Way	*
Utilities	*
Construction	\$16,600,000
TOTAL	*
* No estimates made since this alternative was eliminated early from consideration	



PURPOSE: To improve service to pedestrians at two locations within the study area

PROPOSED PROJECT: To construct a pedestrian crossing over Paint Creek just south of Teays Branch Road and improve pedestrian provisions on James Trimble Boulevard at KY 321

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Crosses stream, 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: Hospital, 1 business, 12" water main, 8" wastewater main, archaeology potential

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: Pedestrian usage not estimated

ADVANTAGES: Low cost improvements for non-vehicular traffic

DISADVANTAGES: No congestion relief for KY 321

(CONTINUED ON NEXT PAGE)

ALTERNATIVE 9

CONSTRUCT PEDESTRIAN OPPORTUNITIES ON JAMES TRIMBLE BOULEVARD AT KY 321 AND TEAYS BRANCH ROAD

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NO, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: PEDESTRIANS ONLY
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: NO
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: PEDESTRIANS ONLY
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES



SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Less likelihood of pedestrian-related crashes. Provides no congestion relief for KY 321.

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0

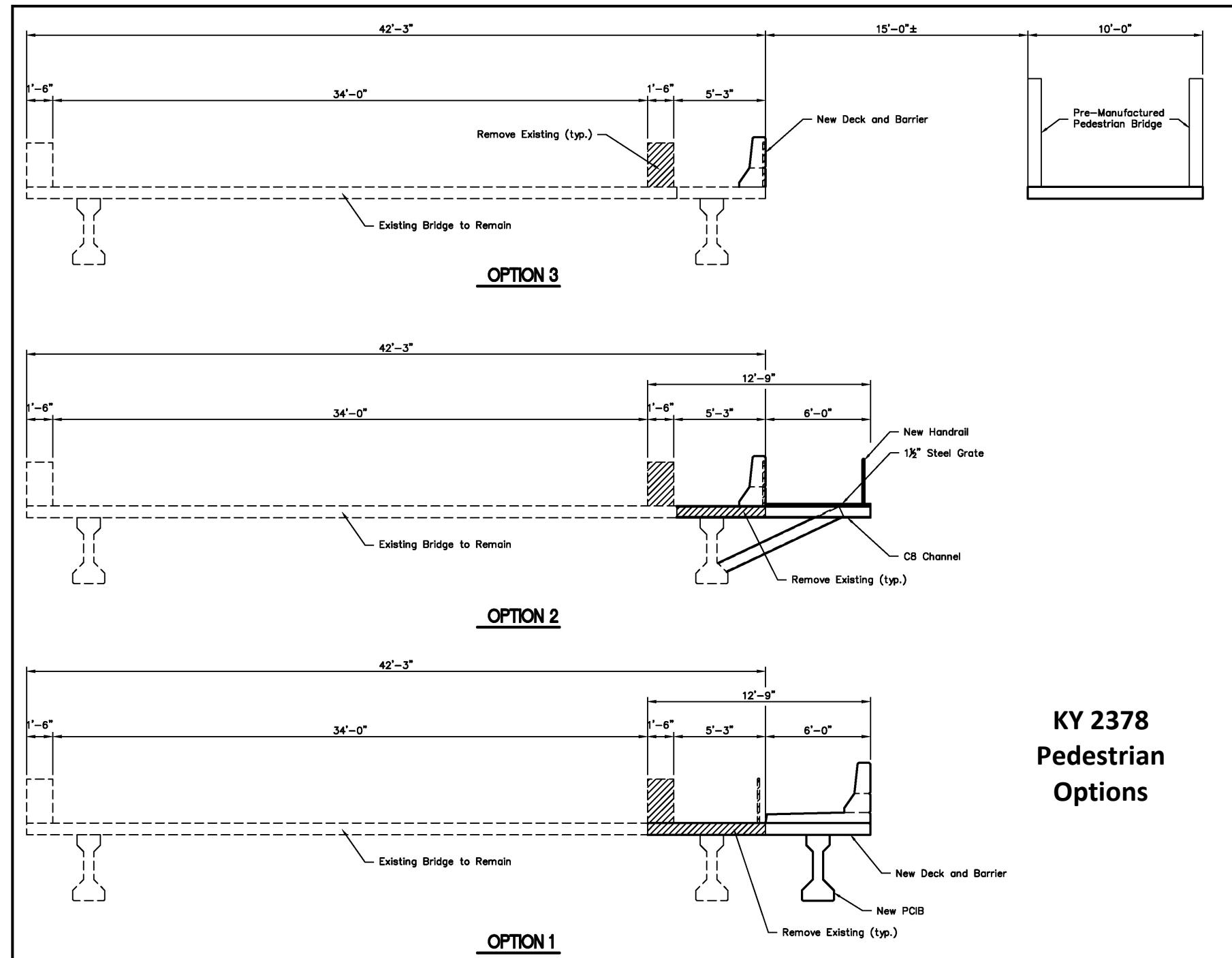
STAKEHOLDER INPUT: Scored 3.75 out of 5.00

RECOMMENDATIONS: Not recommended

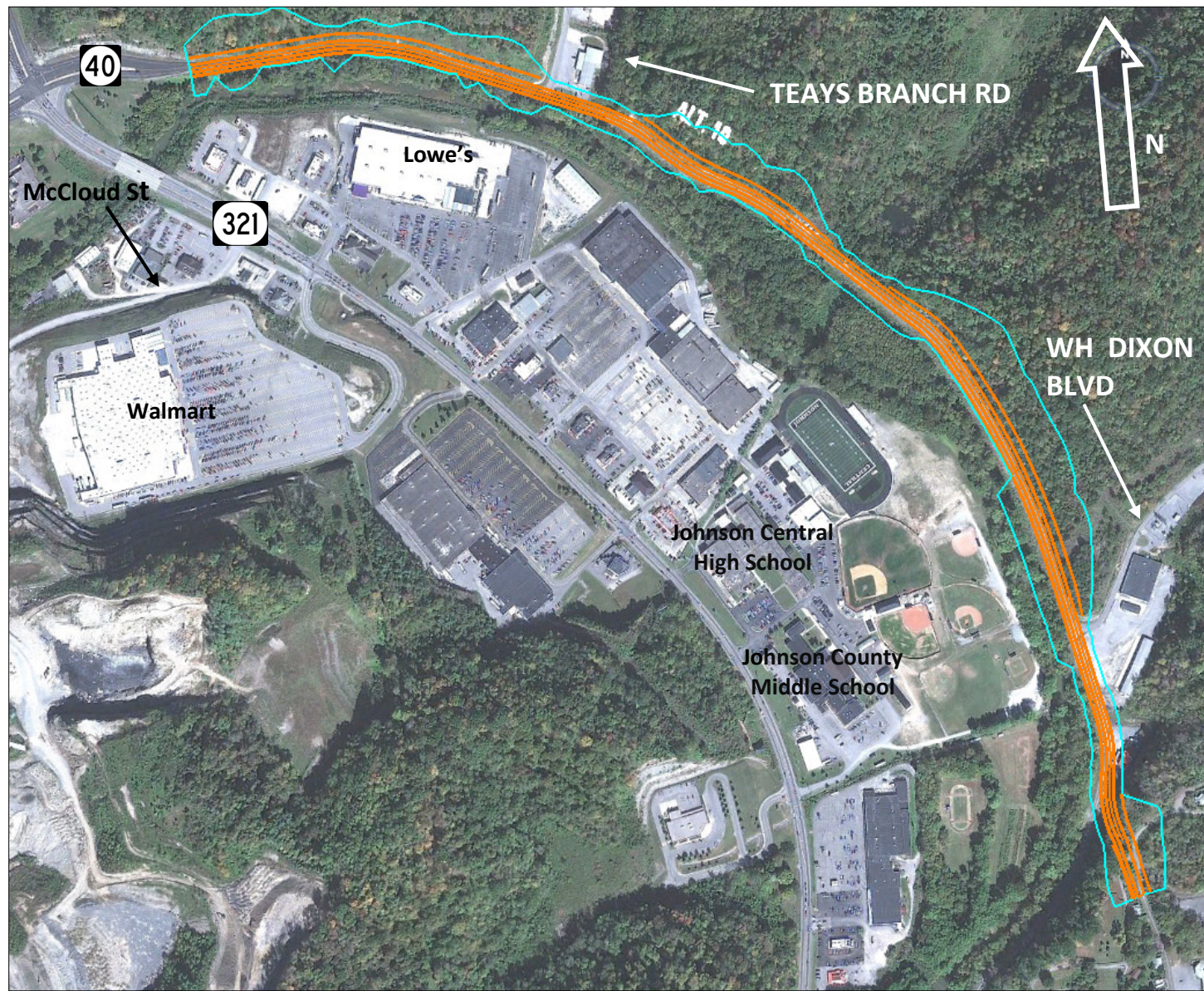
COST OF THE ABOVE: \$390,000 - \$540,000 per bridge

ALTERNATIVE 9 (CONTINUED)

CONSTRUCT PEDESTRIAN OPPORTUNITIES
ON JAMES TRIMBLE BOULEVARD AT KY 321
AND TEAYS BRANCH ROAD



KY 2378
Pedestrian
Options



PURPOSE: To improve safety and geometrics on KY 40

PROPOSED PROJECT: Improve geometrics on KY 40 between KY 321 and 0.5 mile north of the hospital including a sidewalk on the south side of KY 40

POTENTIAL IMPACTS TO NATURAL ENVIRONMENT: Steep cut slopes, 100 year floodplain, floodway

POTENTIAL IMPACTS TO HUMAN ENVIRONMENT: 4 businesses, cemetery, overhead utilities

FORECAST AVERAGE DAILY TRAFFIC IN YEAR 2035: 10,000

ADVANTAGES: Improves safety on KY 40 and provides for pedestrian movements

ALTERNATIVE 10

WIDEN KY 40 FROM KY 321 TO EITHER ALTERNATIVE 3 A OR 3B WITH SIDEWALK ON WEST SIDE

PROJECT GOALS:

1. PROVIDE CONGESTION RELIEF ON KY 321 AND IMPROVE SAFETY: NO, YES
2. PROVIDE IMPROVED SERVICE TO TEAYS BRANCH ROAD: YES
3. PROVIDE IMPROVED ACCESS TO JOHNSON COUNTY SCHOOLS: ONLY WITH A NEW CONNECTOR BETWEEN KY 40 AND KY 321
4. PROVIDE IMPROVED ACCESS TO PAUL HALL HOSPITAL: YES
5. PROVIDE IMPROVEMENTS FOR PEDESTRIANS: YES

DISADVANTAGES: Still leaves KY 321 congested, must be combined with either alternative 3A or 3B

SAFETY IMPROVEMENTS OR CONGESTION RELIEF TO KY 321: Probable reduction in pedestrian related crashes. No congestion relief on KY 321.

NUMBER OF INTERSECTION MOVEMENTS ON KY 321 IMPROVED BY THIS ALTERNATIVE: 0

STAKEHOLDER INPUT: Scored 3.00 out of 5.00

RECOMMENDATIONS: Not recommended

Alternative 10	
Length	1.13 miles
Design	\$800,000
Right-of-Way	\$3,300,000
Utilities	\$4,000,000
Construction	\$8,306,000
TOTAL	\$16,406,000

CHAPTER 8 ALTERNATIVES DISCUSSION

A second Project Team Meeting was held on November 21, 2011 (see Appendix H). The alternatives discussed in Chapter 7 and several that were originally considered and dropped from consideration were discussed at length along with the advantages and disadvantages of each.

These alternatives were presented graphically and evaluated in terms of cost, potential environmental impacts, current and future year traffic, service to Johnson Central High School, Johnson County Middle School, and the pharmacy school.

A detailed traffic congestion evaluation for current and future year traffic for eight of these alternatives was presented and discussed. Locations along KY 321 where the volume to capacity (v/c) ratio and/or the average delay time were improved when compared to the no-build option, except where the improved v/c ratio would still be greater than 1.0, were highlighted. Nine critical intersections along KY 321 in both the morning and afternoon peak periods were identified (see Appendix G).

The 100-year floodplain and flooding of Mill Branch Road near the south end of the project area were discussed in detail.

The alternatives that have the most impact on KY 321 are Alternatives 4 and 5 with Alternative 6 following next. Optimizing signal timings would also improve the volume to capacity ratio even more.

Alternative 5 was modified to transition from four lanes to three lanes at Mill Branch Road

to provide for a transition to KY 321 south of KY 321X.

A second Stakeholders' Meeting was held March 13, 2012. Alternatives from the second Project Team Meeting were presented and discussed with handouts and an preliminary matrix (see Appendix H). Stakeholders were also given opportunity to ask questions and make verbal and written comments.

The alternatives were summarized as follows: any KY 321/KY 40 Connector that is constructed still leaves congestion on KY 321. Based on traffic modeling, impacts to the floodplain/floodway, cost, measures of congestion, and general impacts, Alternative 1B appears to be the best "connector" solution to relieve congestion on KY 321 but Alternatives 4 and 5 are the most effective overall solution to relieve congestion on KY 321. Alternative 4D which is construction of an additional southbound lane and exclusive right turn lane on KY 321 from Paint Creek bridge to the first Kmart entrance does relieve congestion in one of the most congested areas and could be considered a short-term improvement. Lastly, construction of right turn lanes on KY 321 at eight locations identified in Chapter 6, Section 6.4 of this study, would improve the operation of those intersections and any of those right turns could be considered a short-term alternative.

Given the information presented, the comments were as follows:

- Prohibit left turns at unsignalized intersections
- If funding is an issue, Alternative 4 widening could be divided into two sections with the first section being

from the school exit for busses north to the project terminus.

- Consideration should be given to right in/right out scenarios rather than completely closing an entrance
- BB & T bank retaining wall should be avoided if possible, for the stability of the bank building
- An additional three acres of development around the northern terminus of the project near the current Marathon/Wendys development is probable and should be considered as entrance closings are considered.
- It may be desirable to add Alternative 4B, 4B-1, and 4B-2 to Alternative 4.

Seven completed questionnaires were returned and results were tabulated (refer to Appendix H). One respondent simply articulated a preference for Alternative 4 and, ultimately, Alternative 5. Another ideally preferred a combination of Alternatives 2, 4D, and 6 but recognized the fiscal difficulties with that scenario and preferred Alternative 4B as a cost-effective solution. The remaining five respondents scored alternatives with a score of 5 being “very important” and 1 being “least important”.

CHAPTER 9 RECOMMENDATIONS

Given input from the Project Team, Stakeholders, traffic and capacity analyses, alternative impacts, terrain, and financial constraints, the Project Team recommended widening KY 321 from Paint Creek Bridge south to James Trimble Boulevard (KY 2378)

(Alternative 4). This alternative appears to have the most impact on congestion, safety, and provides better access to the hospital and schools. At present, KY 321 between KY 40 and James Trimble Boulevard (KY 2378) has nearly reached capacity. Other alternatives examined did not satisfy the purpose and need for the project and project goals as well as Alternative 4. KYTC owns a good portion of the right of way, which will help reduce costs. An updated alternative matrix is shown in Figure 16. The cost estimates for the project team recommendations shown in Figure 17 were developed utilizing the typical section shown in Figure 15 with:

- A two-way left turn lane - However, because of left turn volumes, James Trimble Boulevard (KY 2378) and perhaps Walmart may be better served with a separate left turn lane.
- The northernmost Kmart/Arby's intersection closed.
- The entrance next to Burger King closed.
- The last two business entrances north of James Trimble Boulevard (KY 2378) would be consolidated into one.
- Construction of the right turns addressed in Chapter 6, Section 6.4 of this study (except where recommendations are to close the intersection).

ALTERNATIVE COMPARISON MATRIX																
ALTERNATIVE NUMBER	DESCRIPTION	LENGTH	CONSTRUCTION COST ESTIMATE ****	POTENTIAL IMPACTS TO		2011 ADT (vehicles per day)	2035 ADT (vehicles per day)	# OF KY 321 IMPROVED INTERSECTION MOVEMENTS	GOAL 1		GOAL 2	GOAL 3	GOAL 4	GOAL 5	ADVANTAGES	DISADVANTAGES
				NATURAL ENVIRONMENT	HUMAN ENVIRONMENT				PROVIDES CONGESTION RELIEF ON KY 321	ESTIMATED CRASH REDUCTION	PROVIDES SERVICE TO TEAYS BRANCH	PROVIDES ACCESS TO JOHNSON COUNTY SCHOOLS	PROVIDES ACCESS TO HOSPITAL	PROVIDES FOR PEDESTRIAN MOVEMENTS		
DO NOTHING	NO BUILD		\$0	None	None	13000-17400	15000-22300	0	No	0%	No	No	No	No	No investment other than routine maintenance	Conditions remain the same, congestion, crashes
1	LEFT TURN LANE AT TEAYS BRANCH ROAD	0.30 mile	\$2,300,000 +	-Steep cut slopes -100 year floodplain -floodway	-1 business -10" water main -6" force main wastewater -2" gas main -2 fire hydrants -overhead utilities creek side	810	1030	0	No	Yes on KY 40 If unsignalized, up to 35% reduction in all crashes and up to 50% reduction in left turn crashes	Yes	No	No	No	Provides safer access to a new traffic generator	Provides inconsistency and driver expectation of the route; still no congestion relief for KY 321
**1A	Improve KY 40 from the Left Turn Lane (ALT 1) to KY 321	0.30 mile	\$1,339,000	-Steep cut slopes -100 year floodplain -floodway	-10" water main -overhead utilities creek side	7000	10300	0	No	Yes Up to 40%	Yes	No	No	No	Provides consistency and safer access to a new traffic generator	No congestion relief for KY 321
1B	KY 321/KY 40 CONNECTOR WITH BRIDGE OVER PAINT CREEK ON THE SOUTH SIDE OF LOWES TERMINATING AT TEAYS BRANCH ROAD	0.24 mile	\$4,260,000	-Crosses stream -100 year floodplain -floodway	-4 businesses -10" water main -lift station -2 fire hydrants -6" force main wastewater -6" gas main (two) -overhead utilities on Paint Creek side of KY 40	3800	4600	29	Reduces future year ADT in the vicinity of this route by 1800-2600 vpd	Likely reduction in KY 321 crashes due to reduced traffic volume.	Yes	No	No	Yes (on connector)	Provides a shorter connection to KY 321 for Teays Branch Road traffic; reduces KY 321 congestion; less floodplain impacts	Places two intersections on KY 321 (KY 40 and the Connector) very close together; will also impact Lowe's internal circulation
1C	KY 321/KY 40 CONNECTOR WITH BRIDGE OVER PAINT CREEK ON THE NORTH SIDE OF LOWES with Bridge	0.18 mile	\$4,149,000	-Crosses stream -100 year floodplain -floodway	-4 businesses -10" water main -2 fire hydrants, -8" and 12" force main wastewater -overhead utilities on Paint Creek side of KY 40	3400	4300	21	Reduces future year ADT in the vicinity of this route by 1200-2100 vpd	Likely reduction in KY 321 crashes due to reduced traffic volume.	Yes	No	No	Yes (on connector)	Provides a shorter connection to KY 321 for Teays Branch Road traffic	Places two intersections on KY 321 (KY 40 and the Connector) very close together
1D	Improve KY 40 from the Connector North of Lowes (1C) to KY 321/KY 40 Intersection	0.15 mile	\$644,000	-Steep cut slopes -100 year floodplain -floodway	-pipeline -10" water main, -Overhead utilities on Paint Creek side of KY 40	7000	10300	0	No	Potential reduction in crashes by up to 40% as a result of improvements to horizontal alignment.	Yes	No	No	No	Provides consistency and safer access to a new traffic generator	No congestion relief for KY 321
2	KY 321/KY 40 CONNECTOR WITH BRIDGE OVER PAINT CREEK ON THE SOUTH SIDE OF JOHNSON CENTRAL SCHOOLS	0.25 mile	\$6,996,000	-Crosses stream -100 year floodplain -floodway	-1 business -2 schools and school ball field -school traffic internal circulation -2" and 6" gas mains, -8" water and wastewater mains -archaeological -Overhead utilities on Paint Creek side of KY 40 and along path of connector	3000	4300	15 (MUST BE COUPLED WITH ALTERNATIVE 3A OR 3B TO ACHIEVE THIS IMPROVEMENT)	Reduces future year ADT in the vicinity of this route by 850 - 1100 vpd	Likely reduction in KY 321 crashes due to reduced traffic volume.	No	Yes	Yes	Yes	Provides for a "backdoor" entrance/exit and pedestrian access for the Johnson County schools.	Provides less relief to KY 321 congestion than other connector options and the connection to school will have a steeper grade
2A	KY 321/KY 40 CONNECTOR WITH BRIDGE OVER PAINT CREEK ON NORTH SIDE OF JOHNSON CENTRAL SCHOOLS	NOT FEASIBLE WITHOUT TOTALLY DISRUPTING SCHOOL TRAFFIC FLOW	NOT FEASIBLE WITHOUT TOTALLY DISRUPTING SCHOOL TRAFFIC FLOW	-100 year floodplain -floodway	-1 business -school traffic internal circulation -2" and 6" gas main -8" water and wastewater main -archaeological potential	NOT FEASIBLE	NOT FEASIBLE	N/A	Not able to tie into school	N/A	Not able to tie into School	Limited	Limited	Limited	Not considered due to the impacts of the school traffic circulation	Would impact the schools internal circulation and cut off one of their main exits
2A-1	SHORTENED KY 321/KY 40 CONNECTOR WITH BRIDGE OVER PAINT CREEK ON NORTH SIDE OF JOHNSON CENTRAL SCHOOLS	0.17 mile	\$4,440,000	-100 year floodplain -floodway	-2 businesses -2" gas main -8" and 10" water main -6" force main wastewater -1 fire hydrant -Overhead utilities on Paint Creek side of KY 40	1700	2200	21	Reduces future year ADT in the vicinity of this route by 500-650 vpd.	N/A	Limited	Yes	Limited	Yes (on connector)	Provides for a "backdoor" entrance/exit and pedestrian access for the schools for Johnson County Schools	Does not provide vehicular or pedestrian access to KY 321; begins in what is almost a parking lot; provides very little congestion relief
**2A-1 KY 40	Left Turn Lane on KY 40 at Connector 2A-1	0.30 mile	\$1,585,000	-100 year floodplain -floodway	-10" water main -overhead utilities on Paint Creek side of KY 40	450	550	0	No	Yes on KY 40 If unsignalized, up to 35% reduction in all crashes and up to 50% reduction in left turn crashes	Limited	Yes	Limited	Yes (on connector)	Provides for safer KY 40 turns	No congestion relief for KY 321
**2B	Left Turn Lane on KY 40 for Alt 2	0.28 mile	\$793,000	-100 year floodplain -floodway	-2 businesses -1 cemetery -10" water main -Overhead utilities on Paint Creek side of KY 40	780	1120	0	No	Yes on KY 40 If unsignalized, up to 35% reduction in all crashes and up to 50% reduction in left turn crashes	Limited	Yes	Limited	Yes (on connector)	Provides for safer KY 40 turns	No congestion relief for KY 321
3A	IMPROVE KY 40 SHARP CURVE ON NEW ALIGNMENT	0.26 mile	\$3,000,000	-Steep cut slopes	-8 residences -2 businesses -cemetery -10" water main -6" force main wastewater -2" gas main -1 fire hydrant	6700	9300 (with Alternative 2)	0	Yes; if coupled with a connector, future year ADT is reduced by 850-1100 vpd in the vicinity of that connector.	Potential crash reductions of up to 40%	No	Yes if coupled with Alternative 2.	Yes	No	Improves a less than desirable curve and adds pedestrian movement. However, to be effective with pedestrian movement it must be coupled with the KY 321/KY 40 connector.	Requires business and residential impacts and has steep cut slopes and the new alignment will have a steeper grade. It also cuts off access to Church Street at the very top of the hill that will need to access their property from WH Dixon Boulevard and may impact the cemetery. It must be coupled with a connector to realize any minimal congestion improvement on KY 321.

KY 321 in Paintsville from KY 40 to KY 321X

Figure 16: Alternatives Matrix

ALTERNATIVE COMPARISON MATRIX																
ALTERNATIVE NUMBER	DESCRIPTION	LENGTH	CONSTRUCTION COST ESTIMATE ****	POTENTIAL IMPACTS TO		2011 ADT (vehicles per day)	2035 ADT (vehicles per day)	# OF KY 321 IMPROVED INTERSECTION MOVEMENTS	GOAL 1		GOAL 2	GOAL 3	GOAL 4	GOAL 5	ADVANTAGES	DISADVANTAGES
				NATURAL ENVIRONMENT	HUMAN ENVIRONMENT				PROVIDES CONGESTION RELIEF ON KY 321	ESTIMATED CRASH REDUCTION	PROVIDES SERVICE TO TEAYS BRANCH	PROVIDES ACCESS TO JOHNSON COUNTY SCHOOLS	PROVIDES ACCESS TO HOSPITAL	PROVIDES FOR PEDESTRIAN MOVEMENTS		
3B	IMPROVE KY 40 SHARP CURVE TO PAUL HALL HOSPITAL	0.27 mile	\$1,100,000	·Steep cut slopes ·100 year floodplain ·floodway	·1 business ·hospital parking lot ·2 residences ·4 empty buildings ·cemetery ·2" gas main ·8" water main ·3 fire hydrants ·overhead utilities on Paint Creek side of KY 40	6700	9300 (with Alternative 2)	0	Yes; if coupled with a connector, future year ADT is reduced by 850-1100 vpd in the vicinity of that connector.	Potential crash reductions of up to 50%	No	Yes if coupled with Alternative 2.	Yes	No	Improves a less than desirable curve and adds pedestrian movement. However, to be effective with pedestrian movement it must be coupled with Alternative 2. It is less expensive than Alternative 3A but has more residential impacts	Requires some of the hospital parking lot, requires purchasing some vacant buildings, and will impact one business and residential properties. It must be coupled with a connector to realize any minimal congestion improvement on KY 321.
4	FIVE LANE KY 321 FROM KY 40 TO KY 2378 / JAMES TRIMBLE BOULEVARD	1.01 mile	\$8,236,000	·Steep cut slopes ·100 year floodplain ·floodway	·21 businesses ·2 residences ·pipeline ·8" water and wastewater main, 2" and 6" gas main ·water pump station ·Overhead utilities on both sides	12600	16280	32	Yes North of James Trimble Boulevard	Yes; as much as 25% if right-turn lanes are included	No	Yes	Yes	Yes	Improves congestion by adding through lanes and adds safe pedestrian movement along the corridor.	Business and some residential impacts, right of way and utility costs will most likely be high
*. **4A	Right In/Right Out Configuration at McCloud Drive	N/A	\$200,000	Minimal	·5 businesses ·12" wastewater main ·8" and 12" force main wastewater ·3" and 6" gas main ·1 UST	Not available	Not available	1	Minimal	No	No	No	No	No	Eliminates left turns	Left turning vehicles will have adverse travel
4B, 4B-1, 4B-2	Access Road that parallels KY 321 (Restriping, Purchase of Business, and Restriping and purchase of some of Lowes Parking Lot)	0.50 mile	\$500,000	·100 year floodplain	·3 businesses ·8" water and wastewater main	Not available	Not available	Did not count traffic to determine but access management improves slightly	Did not count traffic to determine, but should help	N/A	No	Minimal	No	No	Most of the route is already there, just restriping and traffic control would be necessary. It does little to help with congestion on KY 321	Impacts 3 businesses
**4C	Right Turn Lanes at: NB Apple Tree Plaza NB Middle School NB High School NB McDonalds Intersection SB Kmart NB 321X NB James Trimble Boulevard	0.33 mile	\$2,400,000	Minimal	·2 businesses, ·3" and 6" gas main ·8" water main ·overhead utilities	1430, 400, and 820	1810, 510, and 1050	11	Yes for those intersections	Yes; up to 25%	No	Yes	No	No	Improvement in KY 321 congestion for the right turn lane movements for all 6 intersections and some through movements at those intersections, less cost and impacts to businesses	Business impacts to parking and business fronts; utility issues.
4D	Carry additional KY 321 SB lane and Turn Lane from Paint Creek Bridge SB past Walmart entrance dropping at Kmart Entrance	0.31 mile	\$1,845,000	·100 year floodplain	·5 businesses ·1 UST ·3" and 6" gas main ·8" wastewater and water main ·overhead utilities	1870	2730	1	Yes Between Kmart entrance and KY 40	Yes; up to 10%	No	Yes	No	No	Allows WB KY 40 traffic turning south onto KY 321 to travel south without having to merge until the Walmart traffic has turned right	Provides little congestion relief to KY 321 as a whole
4E	Connects the entrances of Walmart and K-Mart and would close the K-mart entrance	0.04 mile	\$87,000	Minimal	·Two businesses ·8" water main ·6" gas main			0	Minimal	Minimal	No	No	No	No	Puts more separation between entrances on KY 321	Loss of Kmart parking spaces, longer left turn signal at Walmart
5	FOUR LANE KY 321 FROM KY 2378/JAMES TRIMBLE BOULEVARD TO KY 321X	0.65 mile	\$3,955,000	·Steep cut slopes ·100 year floodplain ·floodway	·12 businesses ·8 residences ·8" and 12" water main ·2" and 4" gas main ·8" wastewater main ·5 USTs ·2 fire hydrants ·overhead utilities	12600	16280	3	Yes South of James Trimble Boulevard	Yes; up to 25%	No	No	Yes	Yes, if sidewalk is included in reconstruction.	Improves congestion and safety along KY 321 South of James Trimble Boulevard	Business and residential impacts, very steep cuts along the southbound side of KY 321, right of way and utility costs will most likely be high
6	CONNECTOR FROM KY 2378/JAMES TRIMBLE BOULEVARD TO US 23	1.34 miles	\$46,845,000	·Steep cut slopes ·100 year floodplain ·1 wetland	·2 residences, ·1 school, ·12" water main ·pipeline	3700	4700	22	Yes; a reduction in future year ADT of 3000-3500 vpd north of the schools	Likely reduction in KY 321 crashes due to reduced traffic volume.	No	Yes	Yes	No	Routes through traffic around congested portion of KY 321 and diverts the most traffic from KY 321	Added system mileage, very costly, and has steep cuts
7***	CONNECTOR FROM KY 321 AROUND MILL BRANCH ROAD TERMINATING AT Walmart CIRCULATOR ROAD	1.61 miles	\$56,479,000	·Crosses streams ·1 wetland ·Coal seams ·100 year floodplain	·20 residences ·pipeline ·8" water and wastewater main, ·2" gas main ·archaeological potential ·1 wetland	1800	2300	19	Yes; a reduction in future year ADT of 2100 vpd north of James Trimble Boulevard	Likely reduction in KY 321 crashes due to reduced traffic volume.	No	Yes	No	No	Through traffic bypasses commercial strip, diverts traffic from KY 321	Added system mileage; high costly, requires a very long bridge because of the floodplain
8***	CONNECTOR FROM KY 40 TO Walmart CIRCULATOR ROAD WITH BRIDGE OVER PAINT CREEK AND TRAFFIC SIGNAL ON KY 40	0.16 mile	\$16,600,000	·Crosses stream ·100 year floodplain ·floodway	·2 businesses, ·6" gas main ·8" water main ·3 fire hydrants ·archaeological potential	3100	4000	7	Yes, north of the Walmart entrance	Likely reduction in KY 321 crashes due to reduced traffic volume.	No	No	No	No	Provides another entrance to a major traffic generator	Added system mileage, serves a small portion of the KY 321 corridor, and adds a new traffic signal on KY 40
9	PEDESTRIAN OPPORTUNITIES FOR KY 2378 TO KY 321 AND HOSPITAL and to TEAYS BRANCH ROAD	0.04	\$280,000-\$430,000 per bridge	·Crosses stream ·100 year floodplain ·floodway	·1 hospital, ·1 business, ·12" water main ·8" wastewater main ·archaeological potential	4300 (KY 2378)	5900 (KY 2378)	0	No	Yes Up to 65% less likelihood of pedestrian crashes	Yes - Pedestrian	No	Yes - Pedestrian	Yes	Low cost improvements for non-vehicular traffic	No congestion relief for KY 321
10	WIDEN KY 40 FROM KY 321 TO EITHER ALTERNATIVE 3A OR 3B WITH SIDEWALK ON PAINT CREEK SIDE	1.13 miles	\$8,306,000	·Steep cut slopes ·100 year floodplain ·floodway	·4 businesses ·cemetery ·overhead utilities	7000	10000	0	No	Yes Up to 65% less likelihood of pedestrian crashes	Yes	Yes (if coupled with a connector)	Yes	Yes	Improves safety on KY 40 and provides for pedestrian movements	Still leaves KY 321 congested

*At McCloud Drive

**Not shown on exhibit

***Eliminated from further consideration does not

****Does not include R/W and Utilities

*Taken from KYTC 2012-2018 Highway Plan

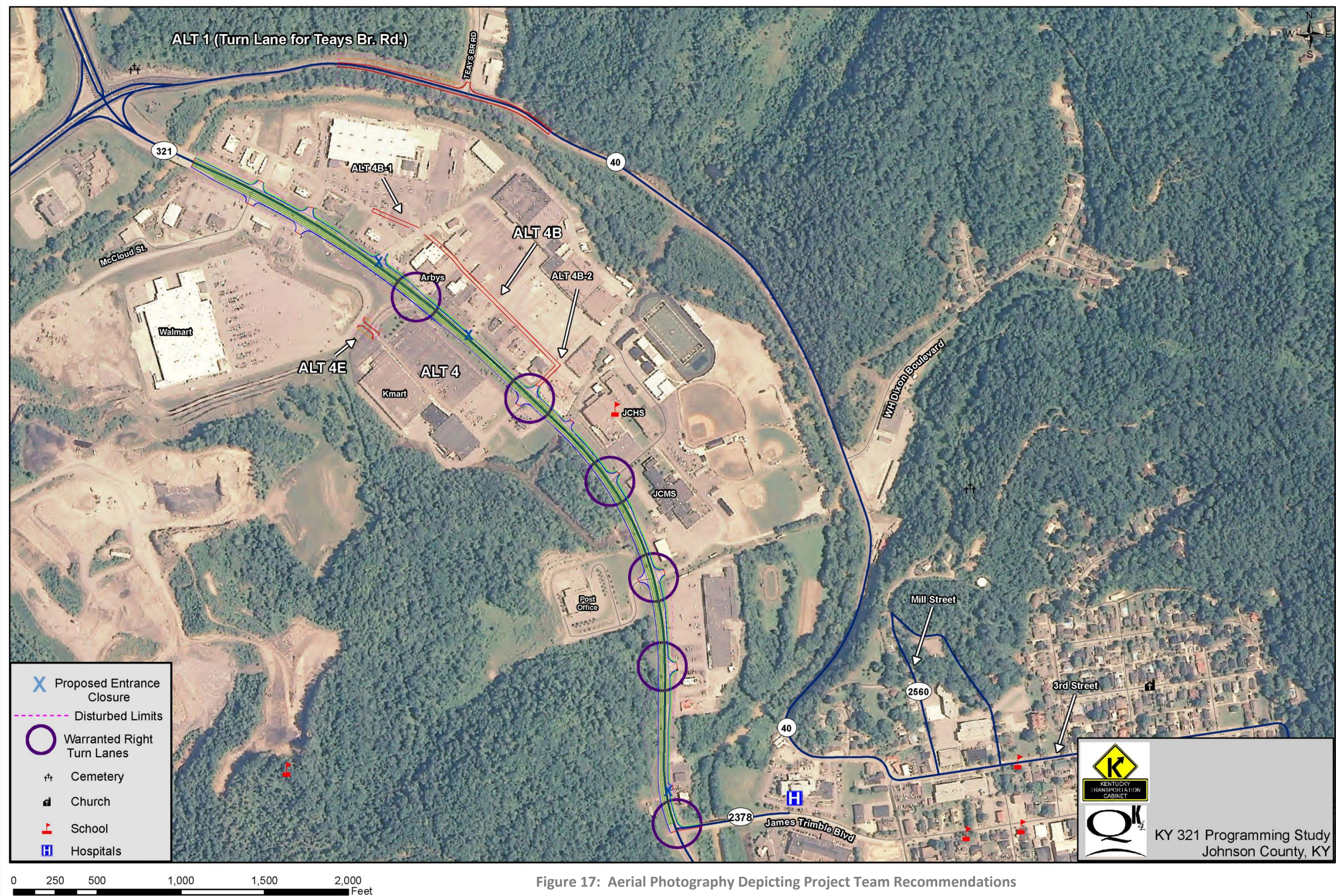
Figure 16: Alternatives Matrix (continued)

At the second Stakeholders' Meeting, it was requested that consideration be given to prohibiting the remaining left turns (not targeted for closure with Alternative 4) at three unsignalized intersections:

- Central High School Drive,
- The bus exit at Johnson Central High School, and
- Hardee's/Radio Shack or Southernmost Lowe's Intersection.

Additional options that may perhaps improve benefits of implementation of Alternative 4 are as follows:

- Alternative 4E (connection of Kmart and Walmart entrances),
- Alternative 4B, 4B-1 and 4B-2 (parallel access road to KY 321 connecting McDonald's intersection to Lowe's,
- Convert Johnson County Middle School Drive to right in/right out, expand the southernmost intersection to the schools and allow all movements at that intersection. Buses would use the northernmost entrance for right turns only. Another option is to allow for a midblock U turn at the present Burger King intersection. This midblock u-turn would necessitate a section of raised median with a minimum separator width of 40 feet.
- Convert southernmost Lowe's entrance (which is Hardee's/Radio Shack/Lowe's) to right in/right out and direct left turns to the signalized intersection at Walmart/Lowe's intersection.



KY 321 KY 40 TO KY 321X JOHNSON COUNTY, KY



KENTUCKY
2225 LAWRENCEBURG ROAD
BUILDING C, SUITES 3 & 4
FRANKFORT, KENTUCKY 40601
PH. 502-352-2197

KENTUCKY - CORPORATE HEADQUARTERS
815 WEST MARKET STREET, SUITE 300
LOUISVILLE, KENTUCKY 40202
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