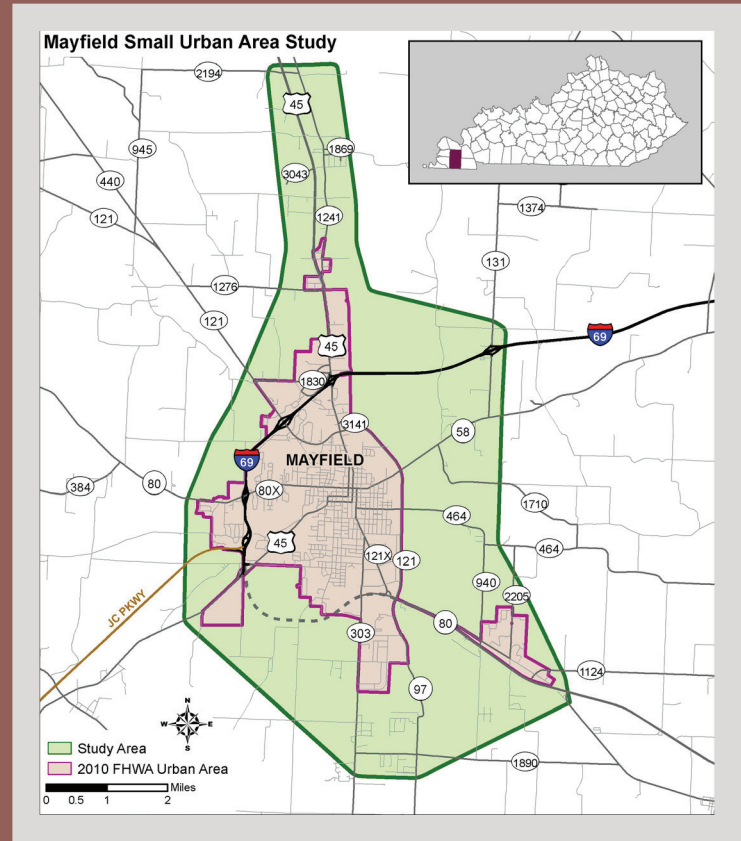




FINAL MAYFIELD

SMALL URBAN AREA STUDY
GRAVES COUNTY, KY | APRIL 2021



IN PARTNERSHIP WITH



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- A. Traffic Forecast Report
- B. Crash History
- C. Cultural Historic Overview Summary
- D. Socioeconomic Data
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ACRONYMNS LIST

ADT	Average Daily Traffic
CCRF	Critical Crash Rate Factor
CHAF	Continuous Highway Analysis Framework
CMF	Crash Modification Factor
DHV	Design Hourly Volume
EEC	Excess Expected Crashes
EJ	Environmental Justice
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
HDM	Highway Design Manual
HIS	Highway Information System
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
KTC	Kentucky Transportation Center
KYTC	Kentucky Transportation Cabinet
LEP	Limited English Proficiency
LO/S	Local officials/stakeholders
LOS	Level of Service
LOSS	Level of Service of Safety
LWCFA	Land and Water Conservation Fund Act
MP	Milepoint
mph	miles per hour
NBI	National Bridge Inventory
NEPA	National Environmental Policy Act
NHS	National Highway System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
PADD	Purchase Area Development District
PAL	Paducah & Louisville Railroad
PDO	property damage only
RCRA	Resource Conservation/ Recovery Act
R-CUT	Restricted Crossing U-Turn
SHIFT	Strategic Highway Investment Formula for Tomorrow
STAA	Surface Transportation Assistance Act
STIP	Statewide Transportation Improvement Program
SUA	Small Urban Area
TED	Transportation Enterprise Database
TWLTL	two-way left-turn lane
USEPA	US Environmental Protection Agency
v/c	volume-to-capacity ratio

EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated this *Mayfield Small Urban Area (SUA) Study* for the City of Mayfield and surrounding areas in Graves County, Kentucky. SUA studies provide thorough examinations of study area roadways—including geometry, existing traffic patterns, predicted future traffic changes, and safety-related issues—to identify transportation needs and prioritize potential solutions. Shown in **Figure ES - 1**, the study area encompasses roughly 41 square miles; study routes represent approximately 57 centerline miles of state-maintained highways plus three miles of high-volume local routes.

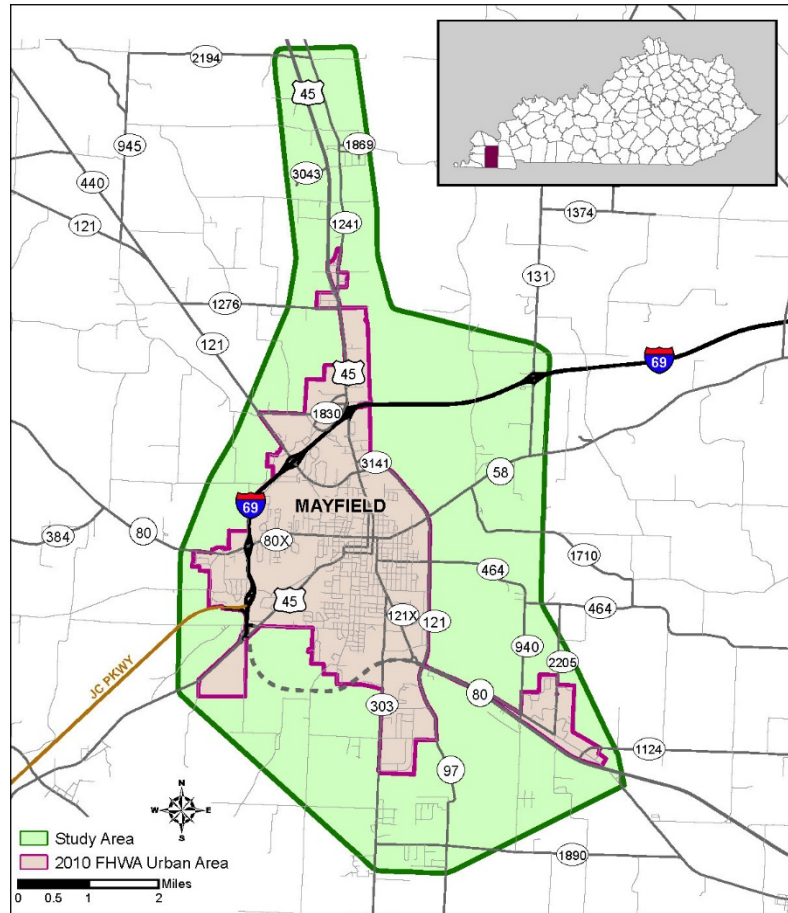


Figure ES - 1: Project Location Map

Planned and Committed Projects.

Two projects are included in Kentucky's *FY 2020—FY 2026 Highway Plan*: Item No. 1-80103 proposes to widen KY 303 (Cuba Road) and Item No. 1-80104 proposes to widen KY 131 from KY 58 to KY 483. Both include all project development phases (i.e., design, utility, right-of-way, and construction) and use entirely state-level funding sources. Regionally, efforts to convert the Purchase Parkway to I-69 from Mayfield south to Tennessee (Item No. 1-26) are also ongoing. Thirteen other transportation needs have been identified for future development in the Continuous Highway Analysis Framework (CHAF) database.

Existing Conditions. Existing transportation network conditions include roadway geometrics, roadway systems, multimodal facilities, crash history, and traffic volumes—these are presented in more detail in **Chapter 2.0**.

- Highways providing the highest levels of mobility are US 45, KY 80, and the KY 121 bypass. These routes are classified as Principal Arterials and listed on the National Highway System.

- State-maintained study routes have speed limits ranging from 25 to 65 miles per hour (mph), with the highest speeds on rural portions of US 45 and KY 80.
- Most routes have two lanes and shoulders four feet wide or less, including curb and gutter sections. Exceptions are the higher mobility routes—US 45, KY 121, and KY 80.
- US 45 north of I-69 and I-69/Purchase Parkway are federally designated truck routes. US 45 south of I-69, KY 80, KY 121, and KY 131 are on Kentucky’s Highway Freight Network.
- Geometric reviews note no vertical deficiencies but there are sharp horizontal curves (28+ degrees) on three study routes: US 45 in downtown Mayfield, KY 1241 (Old US 45) at the intersection with US 45, and on KY 1863 in Hickory.
- There are 65 bridges identified within the study area; all structures on study routes are in Good or Fair condition per their latest inspections.

Year 2020 average daily traffic (ADT) volumes were calculated based on historic counts, adjusting pre-2020 volumes to create a consistent 2020 dataset while minimizing influence of the COVID pandemic on volumes. Turning movement counts were collected at nine intersections during October 2020. Four study routes carry more than 10,000 vehicles per day (vpd): US 45, KY 58 (West Broadway), KY 121, and KY 121X (Paris Road/6th Street).

Traffic analyses included two highway performance indicators: Level of Service (LOS), rated A (best, free flow) to F (worst, gridlocked), and volume-to-capacity (v/c) ratios. Most highway segments operate at LOS D or better, which is generally acceptable for urban areas. All routes exhibit a v/c ratio less than 0.5, indicating they are using 50 percent or less of their available capacity during the peak hour analyzed. Signalized study intersections operate at LOS D or better but a few local cross-street approaches at two-way stop-controlled study intersections operate at LOS E-F.

During 2017—2019, 1,089 crashes were reported on study routes. These included 10 fatalities and 210 injury collisions; seven of the ten fatalities were the result of angle collisions. Predominant crash types for all crashes reported on all study routes were rear end collisions (32 percent), followed by angle (27 percent), and single vehicle collisions (22 percent). Six pedestrian strikes occurred, one of which was fatal—north of the city on US 45. Discussed further in **Section 2.7.1**, two types of statistical crash analyses were performed to identify locations with elevated crash rates: Critical Crash Rate Factor (CCRF) and Level of Service of Safety (LOSS).

- A CCRF greater than 1.0 indicates crashes may be occurring more often than can be attributed to random occurrence. Analyses identified four segments and 22 spots with a CCRF greater than 1.0. Segments vary in length, divided along roadways as geometry or traffic

volumes change, and are concentrated downtown. Spots are 0.10-mile long and are scattered throughout the SUA study area, many at busy intersections.

- LOSS is derived from a crash prediction model estimating the number of crashes expected on an average roadway segment, weighted by traffic volume and a statistical correction. When looking at just severe crashes, the intersections at KY 58/KY 131—where a Highway Safety Improvement Program (HSIP) Project was recently implemented—and College/9th streets showed the highest excess of expected crashes, neither of which are study routes.

An environmental overview was conducted to identify resources for consideration during the development of transportation improvement concepts. Project sheets for recommended improvements note environmental red flag considerations where applicable.

Coordination Efforts. The project team—including KYTC District 1 and Central Office personnel, Purchase Area Development District (PADD) staff, and consultant personnel—met virtually throughout the course of the study. Two virtual meetings for local officials and stakeholders (LO/S) were held to gain insight into the Mayfield transportation network; public outreach efforts were undertaken through online engagement activities.

To kick off the study, an online crowdsourcing map collected need data during July and August 2020. The site registered 271 data points divided among four categories: safety (121), congestion (85), geometry (5), and other (60). **Figure ES - 2** shows the distribution of comments. Main themes emerging from the comments included: congestion and safety along KY 303 (Cuba Road), drainage along KY 58 (West Broadway), long traffic queues associated with school traffic, signal timing or phasing at various intersections, and traffic calming/pedestrian safety concerns.

2045 No-Build Traffic. KYTC’s statewide travel demand model formed the basis of year 2045 traffic projections. The model simulates a 24-hour period, accounting for background socioeconomic growth, land use changes, network improvements, and other factors. The KY 80 extension between US 45 and KY 303 opened to traffic in late 2020 and was included in the future No-Build scenario.

Most analysis segments exhibited little to no growth versus 2020 volumes, corresponding to static county population projections. With the KY 80 extension, traffic volumes using KY 80 and the KY 121 Bypass are anticipated to increase, adding about 5,700 and 3,000 vpd respectively. US 45 also increases by about 2,000 vpd near the proposed industrial parks north of town. Aside from these facilities, changes in traffic patterns are relatively minor between the Existing and future No-Build scenarios.

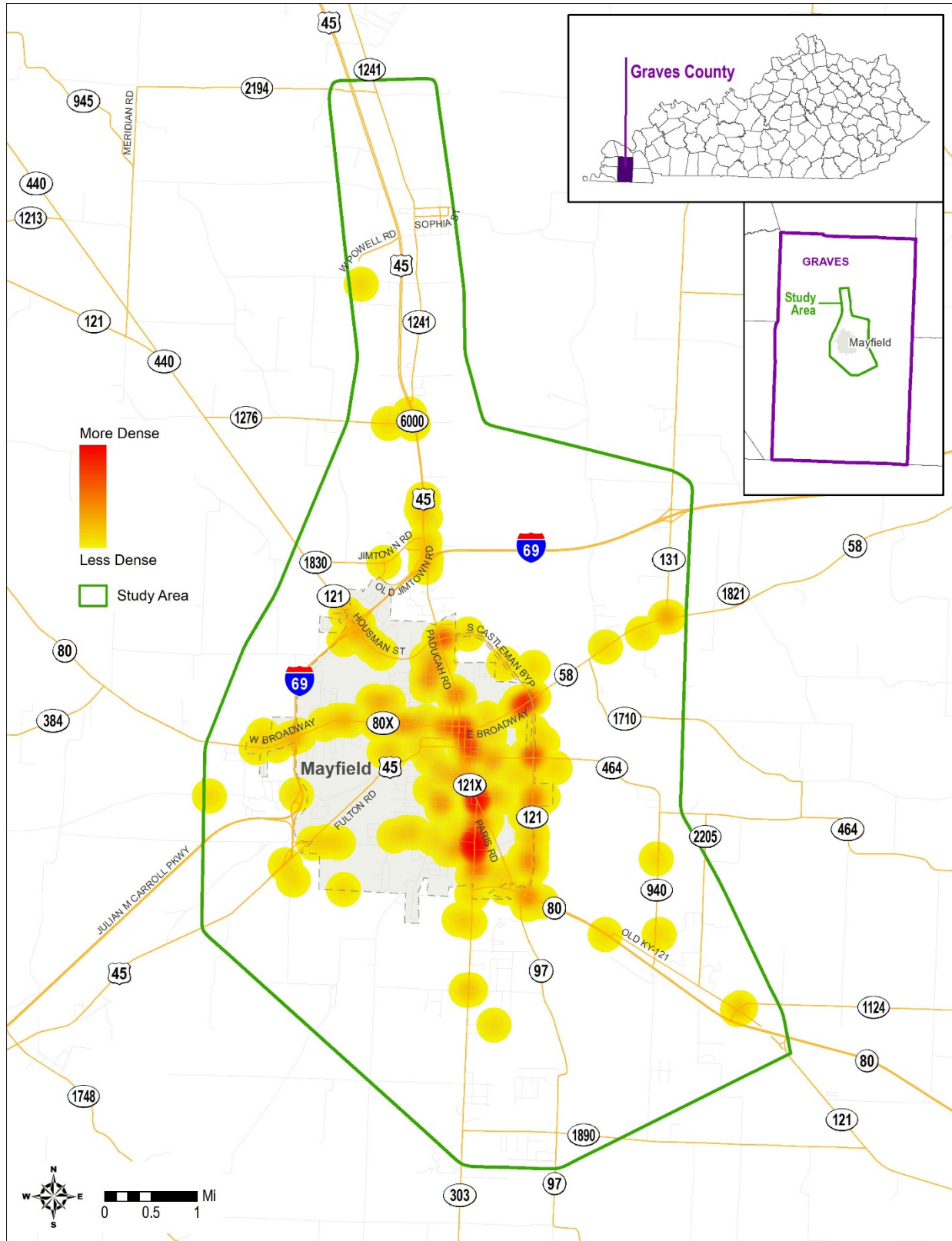


Figure ES - 2: Heat Map showing Public Comment Concentrations

Operationally, several intersections along the bypass experience worse LOS in the future No-Build scenario, associated with the increased volumes. Segments of five routes exhibiting LOS E in 2020 are predicted to remain at LOS E in 2045: KY 80X (West Broadway), KY 121X (Paris Road/6th Street), KY 131, KY 303, and East Farthing Street. No-Build operations degrade to LOS E along portions of four other study routes: KY 58 (East Broadway), the KY 121 bypass, KY 1276, and KY 1710. The highest v/c ratio in the No-Build scenario is 0.58, occurring along KY 121.

Development of Improvement Concepts. Initial concepts to improve safety and reduce congestion were developed based on review of existing geometric deficiencies, existing and future traffic operations, crash concentrations, field reconnaissance, and input from the project team, community leaders, and the public. The consultant team initially evaluated existing conditions data at 40 locations to identify problem areas and feasible solutions. The list was reduced to 19 locations (**Figure ES - 3**), presented to the project team in November 2020. Small-scale improvement concepts included mostly intersection improvements—tweaking signal timing/phasing, increasing visibility, or adding turn lanes—and pedestrian amenities. Large-scale improvement concepts represented corridor-level widening, signal coordination, and/or access management.

Ten small-scale improvement concepts are listed in **Table ES - 1** (page ES-7) alongside corresponding existing conditions data to highlight needs. Eight large-scale improvement concepts are listed in **Table ES - 2** (page ES-7), following the same format.

- The “Crashes” column denotes the total number of crashes occurring within the proposed improvement concept limits, also noting any fatalities.
- The “CCRF” column notes any high CCRF spots or segments that overlap the limits.
- Community input identifies how many corresponding GIS pins were added in the crowdsourcing app or if the concern was mentioned during the initial LO/S meeting.
- Survey rank corresponds to the prioritization surveys distributed to LO/S, discussed further in **Section 8.0**.
- Costs are presented in 2020 dollars.

Highlighted cells represent the worst performers (i.e., greatest needs) in each category.

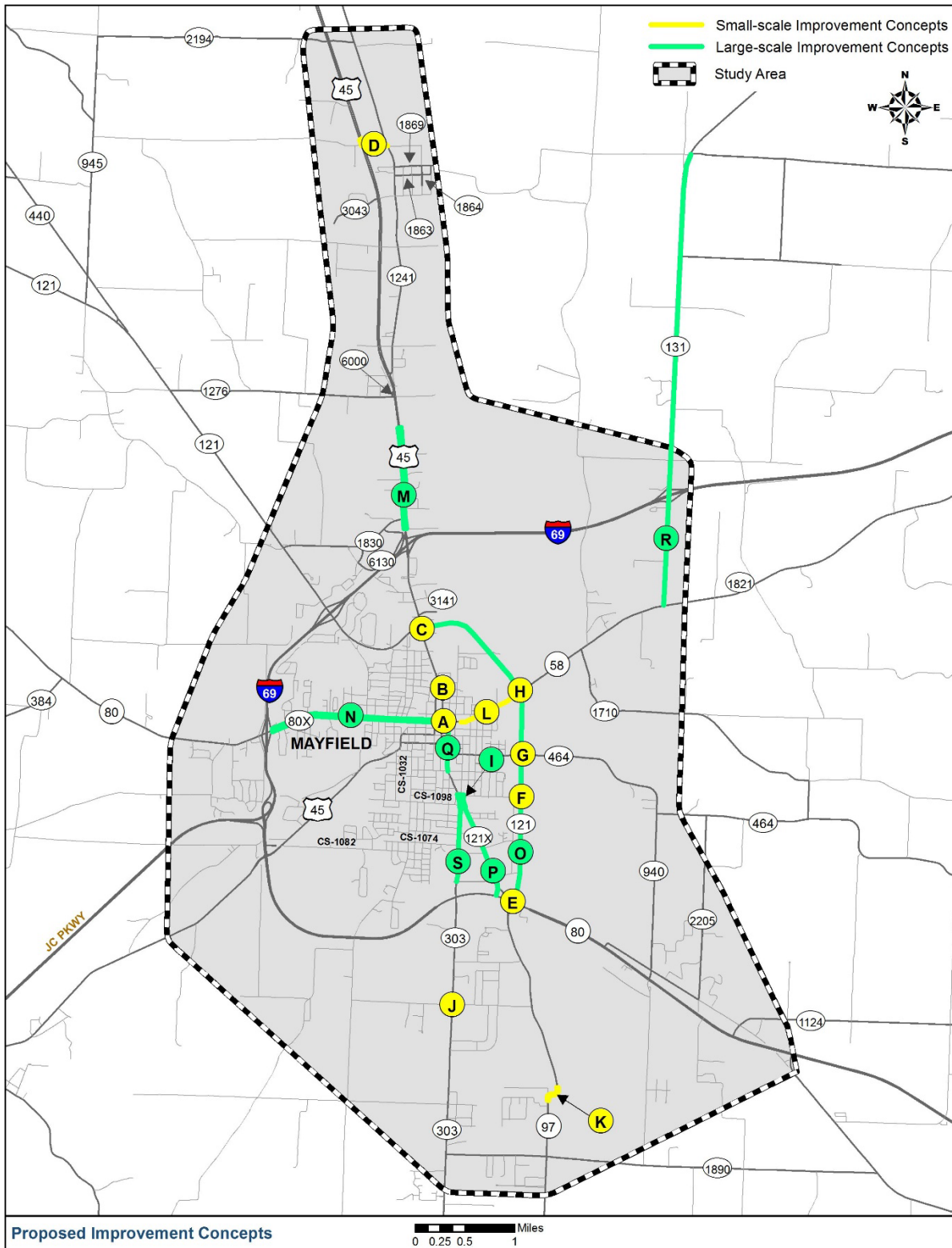


Figure ES - 3: Proposed Improvement Concepts

Table ES - 1: Small-Scale Improvement Concepts

ID	Location	Description	Crashes (Total)	CCRF	Community Input	Survey Rank	Cost
A	US 45/Broadway	Signal & Striping Improvements	25	3 segments: US 45 N: 1.51 KY 80X: 1.32 KY 45 S: 1.64	3	-	\$40k
B	US 45/James St	Crosswalks, Lighting, Improved Visibility	16	2.75 spot	4	4	\$170k
C	US 45/KY 121	Crosswalk & Signal Improvements	39	1.32 spot (north leg)	7	3	\$90k
D	US 45/Poultry Dr	Widen Poultry Dr with R-cut at US 45	7 (1 Fatal)	1.39 spot	LO/S concern	-	\$600k-\$1.5M
E	KY 121/KY 80/KY 97	Signal Improvements	36	1.44 spot (south leg)	5	2	\$290k
F	KY 121/Douthitt St	Signalize with Right Turn Lane	7 (1 Fatal)	-	4	2	\$900k
G	KY 121/KY 464	Add School Zone with Right Turn Lane and Lighting	3	-	10	1	\$390k
H	KY 121/KY 58	Signal, Striping, & Lighting Improvements	24	1.23 spot (KY 58)	5	1	\$270k
J	KY 303/Tucker Rd	Add Left Turn Lanes with Improved Visibility	6 (1 Fatal)	1.16 spot (south leg)	2	-	\$550k
K	KY 97 S-Curve	Repave to fix Superelevation	8	1.2 spot	-	-	\$450k
L	KY 58 E Broadway	Maintenance for Drainage	10	-	10	1	\$220k

Table ES - 2: Large-Scale Improvement Concepts

ID	Concept	Length	Crashes (Total)	CCRF	Community Input	Survey Rank	Cost
M	US 45 N TWLTL	0.9 mi	40	-	3	1	\$1.2M
N	KY 80X W Broadway signal coordination and crosswalks	1.8 mi	95	1.0, 1.2, 1.3 spots; 1.32 segment	19	4	\$850k
O	KY 121 Bypass widening	3.4 mi	75 (2 Fatal)	-	45	-	\$8.1-12.3M
P	KY 121X Paris Road access	1.0 mi	110	1.06 & 1.00 spots	2	5	\$10.0-21.4M
Q	KY 121X Sixth Street intersection improvements and crosswalks	0.5 mi	77	-	17	3	\$1.0M
R	Item 1-80104 KY 131 widening	4.6 mi*	14	-	3	4	\$25.4M
S	Item 1-80103 KY 303 Cuba Road widening	0.8 mi	44	1.43 spot (Willow/Wyatt)	44	2	\$12.8M
I	KY 121X/KY 303 intersection reconfiguration	-	54	1.00 spot (KY 303)	16	3	\$5.7-7.0M

* Extends beyond study area limits

2045 Build Traffic. Spot O, widening the KY 121 Bypass to five lanes between KY 80 and US 45, represents a potential large-scale change in traffic patterns and was modeled in the statewide model. Modeling showed increased roadway capacity would draw an estimated 500-600 vpd to the facility versus the 2045 No-Build scenario. While many of the recommendations are safety-driven with little

impact on capacity, intersection reconstructions would improve operations at US 45/Poultry Drive (Spot D), KY 80/KY 97/KY 121 (Spot E), KY 121/Douthitt Street (Spot F), and KY 121X/KY 303 (Spot I).

Once improvement concepts were developed, virtual meetings were held in early 2021 to gather input from LO/S and the project team and to prioritize potential improvements. Respondents ranked Spots G, H, and L as the highest small-scale priority concepts with Spots M and S as the highest large-scale priority concepts.

Recommendations. Recommended improvement concepts were divided into one of three priority categories—high, medium, or low. The highest priorities for small-scale improvements are associated with three KY 121 Bypass intersections (Spots C, G, and H) and the US 45 (7th St)/KY 80 (Broadway) intersection downtown, Spot A. Spot L was omitted from prioritization as it will be addressed in Spring 2021 by District maintenance forces. Top large-scale priorities were improvements to KY 80X (West Broadway, Spot N), widening the KY 121 Bypass (Spot O), and widening KY 303 (Cuba Road, Spot S). Individual sheets for improvement concepts A through S are presented in **Section 8.1. Table ES - 3** and **Table ES - 4** summarize prioritization for each recommended improvement.

Table ES - 3: Priorities for Small-Scale Improvement Concepts

ID	Location	Description	Cost	Priority
A	US 45/Broadway	Signal & Striping Improvements	\$40k	High
B	US 45/James Street	Crosswalks, Lighting, Improved Visibility	\$170k	Med
C	US 45/KY 121	Crosswalk & Signal Improvements	\$90k	High
D	US 45/Poultry Drive	Widen R cut at US 45	\$600k-\$1.5M	Med
E	KY 121/KY 80/KY 97	Signal Improvements for Visibility	\$290k	Med
F	KY 121/Douthitt Street	Signalize with Right Turn Lane	\$900k	Low
G	KY 121/KY 464	Add School Zone with Right Turn Lane and Lighting	\$390k	High
H	KY 121/KY 58	Signal, Striping, & Lighting Improvements	\$270k	High
J	KY 303/Tucker Road	Add Left Turn Lanes with Improved Visibility	\$550k	Low
K	KY 97 S-Curve	Repave to fix Superelevation	\$450k	Low

Table ES - 4: Priorities for Large-Scale Improvement Concepts

ID	Concept	BMP-EMPea	Length	Cost	Priority
M	US 45 N TWLTL	19.330-20.230	0.9 mi	\$1.2M	Low
N	KY 80X W Broadway signal coordination and crosswalks	0.000-1.825	1.8 mi	\$850k	High
O	KY 121 widening	5.499-8.940	3.4 mi	\$8.1-12.3M	High
P	KY 121X Paris Road access	0.000-1.034	1.0 mi	\$10.0-21.4M	Low
Q	KY 121X Sixth Street intersection improvements and crosswalks	1.389-1.870	0.5 mi	\$1.0M	Med
R	Item 1-80104 KY 131 widening	0.000-4.555	4.6 mi*	\$25.4M	Med
S	Item 1-80103 KY 303 Cuba Road widening	16.034-16.807	0.8 mi	\$12.8M	High
I	KY 121X/KY 303 intersection reconfiguration	0.900-1.200	-	\$5.7-7.0M	Med

Next Steps. The next phase in the project development process for large-scale improvement concepts is Phase I Preliminary Engineering. Concepts not currently included in KYTC's CHAF database should be added to compete for funding alongside other needs statewide.

Small-scale improvement concepts may be initiated through the district's routine maintenance and traffic programs or become part of systematic specialty programs such as HSIP.

1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated the *Mayfield Small Urban Area (SUA) Study* in Spring 2020 for the City of Mayfield and urbanized areas of Graves County, Kentucky. Small urban area studies provide thorough examinations of study area roadways, including analyses of existing and future traffic conditions, and safety related issues intended to identify transportation network needs and potential solutions to efficiently move goods and travelers. SUA study products include prioritized short-term improvement concepts able to be quickly and effectively implemented plus long-term improvement concepts for future programming to address identified safety and capacity needs.

With a population of 10,000, Mayfield is in the Jackson Purchase region of Western Kentucky. Rooted in the textile and tobacco industries, today the city retains a strong industrial base. It lies within the Purchase Area Development District (PADD). Illustrated in **Figure 1** (page 2), the study area encompasses roughly 41 square miles with study routes representing approximately 57 miles of state-maintained highways and three miles of high-volume local routes, all defined by milepoints (MP) in **Table 1** (page 3). I-69 was excluded from the study as KYTC considers interstate needs through separate mechanisms.



Graves County Courthouse

1.1 Study Goals

The Mayfield SUA study documents existing and future transportation conditions on study area roadways. Current year (2020) and future year (2045) traffic operations, current safety conditions, and existing geometric characteristics were evaluated. Potential short- and long-term improvement concepts to address safety and capacity needs were developed to examine priorities for further project development and implementation by the KYTC, local governments, PADD, or other entities. Study tasks included:

- Preparing an inventory of existing conditions and environmental features.
- Evaluating the existing transportation system and developing traffic forecasts.
- Developing improvement concepts with planning-level cost estimates.
- Conducting stakeholder and public involvement activities.
- Documenting recommended concepts with individual project sheets for easy reference.

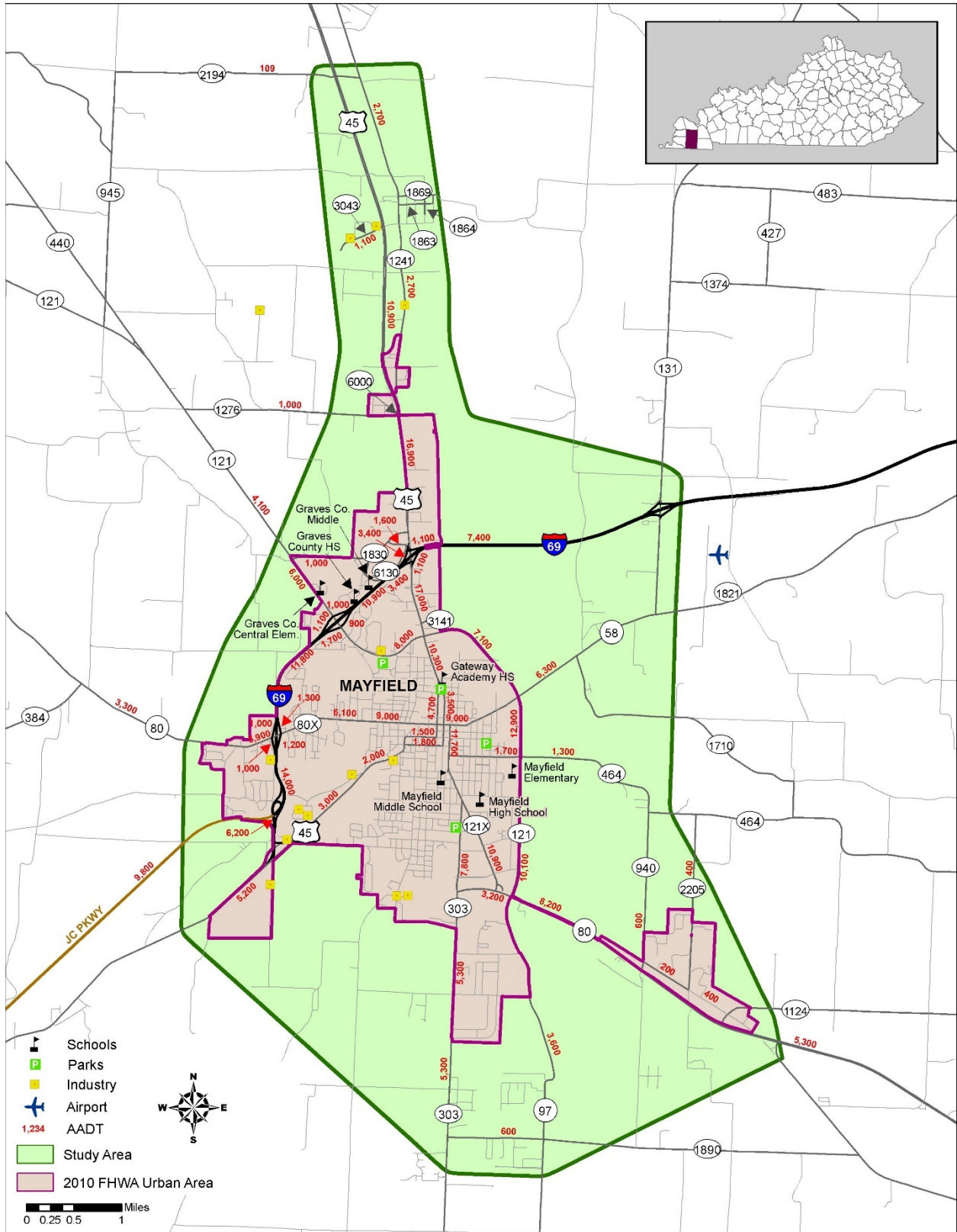


Figure 1: Study Area

Table 1: Study Routes

ROUTE	LOCAL ROAD NAME	BEGIN MP	END MP
KY 58	E Broadway	5.530	8.400
KY 80	KY 80 W, W Broadway	8.700	9.718
KY 80	KY 80 W	12.275	16.100
KY 80X	W Broadway	0.000	1.825
KY 97	KY 97	15.100	18.262
KY 121	S Castleman Bypass	5.499	11.100
KY 121	KY 121 S	5.300	5.499
KY 121X	Paris Road	0.000	1.870
KY 131	KY 131	0.000	1.600
KY 303	Cuba Road	12.900	16.853
KY 464	Backusburg Road	0.000	2.700
KY 940	KY 940	0.000	1.679
KY 1124	KY 1124	0.000	0.600
KY 1241	Old US 45	0.000	3.500
KY 1276	Key Bottom Road	1.500	2.257
KY 1710	KY 1710	0.000	1.513
KY 1830	Jimtown Road	0.000	1.324
KY 1863	Sophia Street	0.000	0.449
KY 1864	Kimble Street	0.000	0.200
KY 1869	Westplains Road	0.000	0.387
KY 1890	KY 1890	0.000	1.700
KY 2194	KY 2194 E	2.904	3.456
KY 2205	Old KY 121	0.000	2.500
KY 3043	W Powell Road	0.000	0.503
KY 3141	Crittendon Ln	0.000	0.185
KY 6000	State Route 6000	0.000	0.049
KY 6130	Old Jimtown Road Conn	0.000	1.061
US 45	US 45 S, Fulton Rd, Walnut Rd, 7 th St, Paducah Rd, US 45 N	13.500	24.400
US 45-001	S 12th Street, Water St, 8 th St	16.669	17.526
CS-1032	S 10 th Street	0.230	1.320
CS-1074	Willow Drive	0.000	0.180
CS-1082	Macedonia Street	0.000	1.280
CS-1098	W Farthing Street	0.420	0.740
CS-1238	E Farthing Street	0.000	0.190

1.2 Previous Studies, Planned and Committed Projects

Reviews of Kentucky's *FY 2020—FY 2026 Highway Plan*¹, the Continuous Highway Analysis Framework (CHAF) database, and Kentucky's Statewide Transportation Improvement Program (STIP) identified several previously completed transportation-related studies and planned improvements in Graves County.

Previous Studies. Two completed transportation planning studies for areas within the study boundary are discussed below.

- The 2011 *I-69 Strategic Planning Corridor Study*² evaluated the Purchase Parkway and I-24 for suitability of routing the Kentucky portion of I-69. Study findings showed the Purchase Parkway provided efficient and safe travel with operating conditions similar to interstate facilities. This study served as the basis for recent and ongoing efforts to convert the Purchase Parkway to I-69.
- The 2005 *Programming Study* for KY 121 in Graves County³ recommended full-width shoulders on KY 121 from KY 1830 to KY 945 and intersection realignments at KY 440, KY 945, and KY 1276. KY 121/KY 440 intersection reconstruction (Item No. 1-8300.00) was completed in 2013.

Planned and Committed Projects. **Figure 2** summarizes transportation projects found in the *FY 2020—FY 2026 Highway Plan* (Plan) and the CHAF database. **Table 3** (page 10) contains CHAF project details and corresponding descriptions. Two projects are included in the current Plan:

- Item No. 1-80103 proposes to widen KY 303 from MP 16.034 (East Farthing Street) to MP 16.807 (Charles Drive) in the southern portion of the city. The Plan identifies \$12.85 million in state funding through construction; only the design phase is included in the biennium.
- Item No. 1-80104 proposes to widen KY 131 from MP 0.000 (KY 58) to MP 4.555 (KY 483) northeast of the city. The Plan identifies \$25.7 million in state funding covering all project development phases through construction but it is all beyond the current biennium.

Two other large-scale projects influence Mayfield's transportation network. The KY 80 extension (Item No. 1-181.5) opened to traffic in late 2020, providing a high-speed, partially controlled access link on the south side of Mayfield. Regionally, efforts to convert the Purchase Parkway to I-69 south to Tennessee (Item No. 1-26) continue as well; design efforts are completed with right-of-way funds authorized in 2020.

¹ Online at <https://transportation.ky.gov/Program-Management/Highway%20Plan/2020HighwayPlanAll.pdf>

² Online at <https://transportation.ky.gov/Planning/Planning%20Studies%20and%20Reports/Tiger%20III%20APPENDIX%20D.pdf>

³ Online at <https://transportation.ky.gov/Planning/Pages/Planning-Studies-and-Reports.aspx>

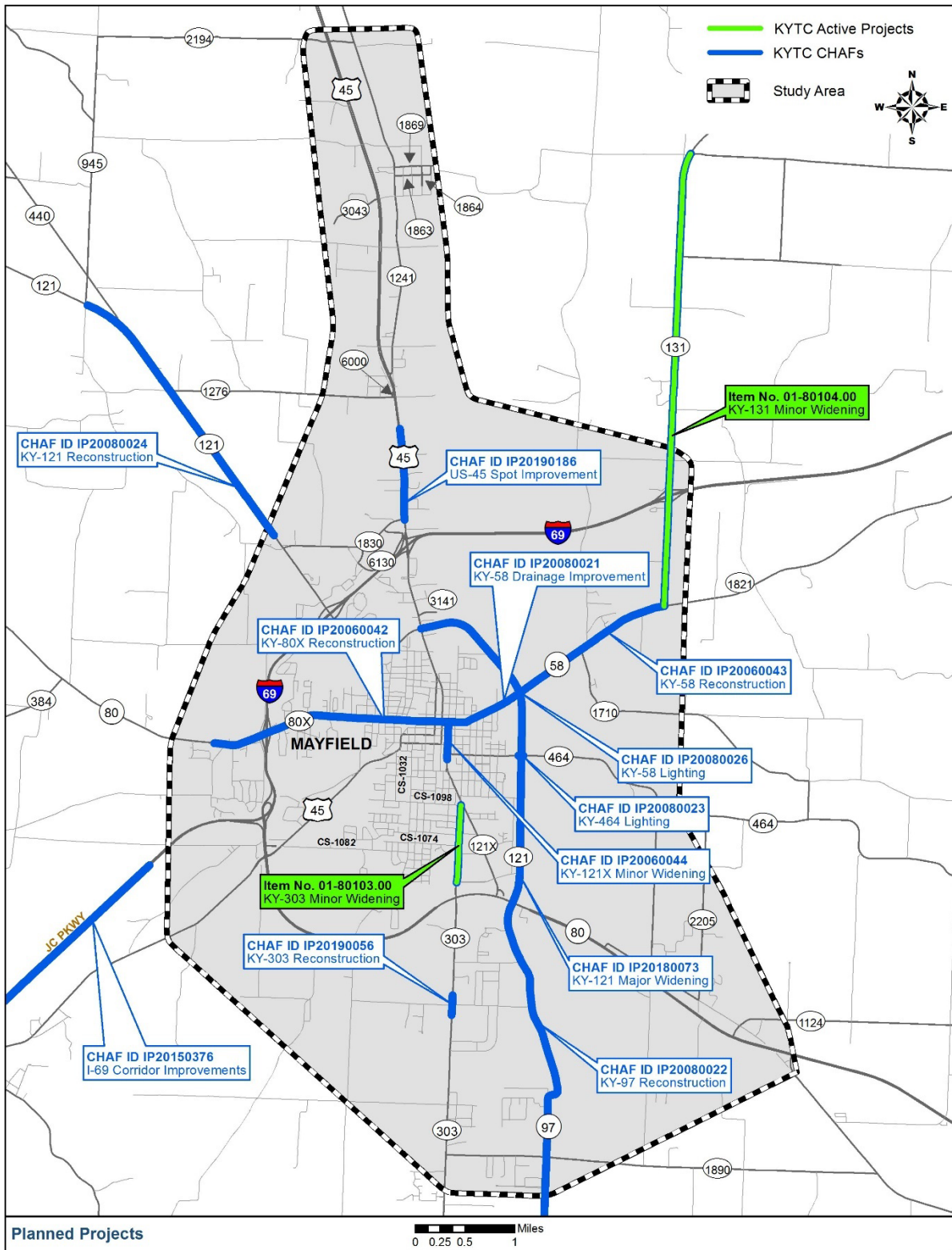


Figure 2: Planned and Committed Projects

Table 2: CHAF Projects

CHAF ID*	Route	BMP	EMP	Purpose	Cost (Millions)
IP20190186*	US 45	19.33	20.23	Address safety, service, and access issues from the intersection at Jimtown Road (MP 19.333) to the bridge over Key Creek.	\$2.3
IP20190056*	KY 303	14.70	14.90	Improve safety and roadway geometrics at intersection with Tucker Road.	\$0.6
IP20180073*	KY 121	5.50	8.94	Upgrade/Widen KY 121 bypass in Mayfield to four lanes.	\$12.4
IP20080027*	KY 131	0.00	4.56	Correct geometric deficiencies and address safety and truck access issues from KY 58 to KY 483.	\$25.5
IP20080026	KY 121 KY 58	7.61 6.43	7.63 6.45	Address safety concerns with nighttime visibility issues at the intersection of KY 121 Bypass and KY 58 in Mayfield. (Lighting)	\$0.3
IP20080024*	KY 121	11.00	14.02	Address safety, congestion, and future capacity issues to accommodate increased truck traffic from 0.041 miles south of Harris Lane to KY 945.	\$66.6
IP20080023	KY 121 KY 464	6.96 0.70	7.00 0.75	Improve safety at the intersection with KY 464 in Mayfield. (Lighting)	\$0.3
IP20080022	KY 97	12.68	18.26	Improve geometric deficiencies and address school access and safety issues from KY 339 / KY 381 in Dedalia to KY 121 Bypass in Mayfield.	\$47.8
IP20080021*	KY 58	6.12	6.44	Address geometric deficiencies and drainage issues along KY 58 between Tice Road to KY 121 Bypass.	\$4.0
IP20060045*	KY 303	16.03	16.81	Address safety, congestion, and access issues from East Farthing Street to Charles Drive in Mayfield.	\$12.7
IP20060044	KY 121X	1.50	1.87	Address access and service issues along KY 121 business route from East College Street to KY 58 in Mayfield.	\$11.0
IP20060043	KY 58 KY 1710 KY 131	6.40 0.00 0.00	8.16 0.20 0.20	Address access, congestion, and geometric alignment issues from the eastern city limits of Mayfield to KY 131.	\$15.2
IP20060042	KY 58 KY 80X KY 80	5.53 0.00 9.17	6.12 1.83 9.69	Address safety, access, and congestion issues on Broadway from 0.5 mi west of the Purchase Parkway to the eastern city limits of Mayfield (KY 121 Bypass).	\$21.5

* CHAFs noted with asterisk were sponsored and scored in the 2020 SHIFT⁴ process

⁴ SHIFT, or the Strategic Highway Investment Formula for Tomorrow is a data-driven project scoring process to compare and prioritize capital improvement projects to make better use of the limited transportation funds in the biennial budget.

2.0 EXISTING CONDITIONS

Existing transportation network conditions assembled for this study include roadway geometrics, roadway systems, multimodal facilities, crash history, and traffic volumes. Data were collected from KYTC's Highway Information System (HIS) database, KYTC's Transportation Enterprise Database (TED), traffic counts, and field reviews.

2.1 Roadway Geometric Characteristics

KYTC's HIS database was queried during July 2020 for study route geometric characteristics and compared to KYTC's 2017 *Highway Design Manual* (HDM) minimum design recommendations for urban roadways detailed in Exhibit 700-04.⁵ Highway data assembled for analyses included:

- Speed limits
- Number of lanes and lane widths
- Shoulder types and widths
- Horizontal and vertical curve data

Speed Limits. Speed limits influence the character and function of roadway segments. As shown in **Figure 3**, state-maintained study routes have speed limits ranging from 25 to 65 miles per hour (mph), with the highest speeds on rural portions of US 45 and KY 80. Local routes show speed limits ranging from 25 to 35 mph.

Number of Lanes and Lane Widths. **Figure 4** (page 9) illustrates the number of lanes and lane widths for study routes. Most routes have two lanes, with exceptions of US 45, KY 121, KY 80, and KY 58, each having three to five lanes.

HDM guidelines recommend minimum 10-foot-wide lanes for urban local and collector routes and for arterial routes with speeds of 35 mph or less. Study area routes with lanes less than 10 feet wide are listed in **Table 3** (page 10).



Five-lane US 45 north of town

⁵ Online at <https://transportation.ky.gov/Highway-Design/Pages/default.aspx>

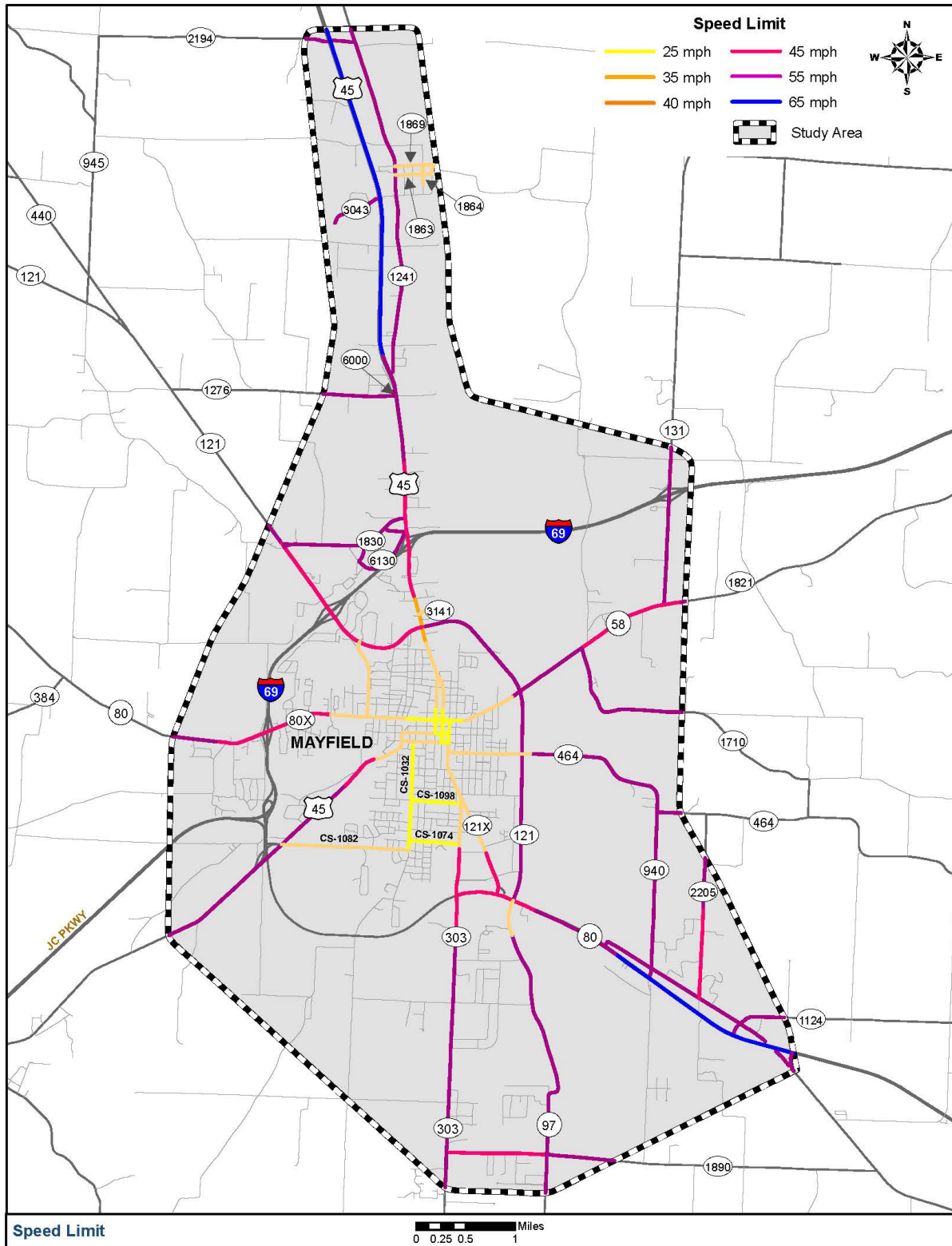


Figure 3: Study Route Speed Limits

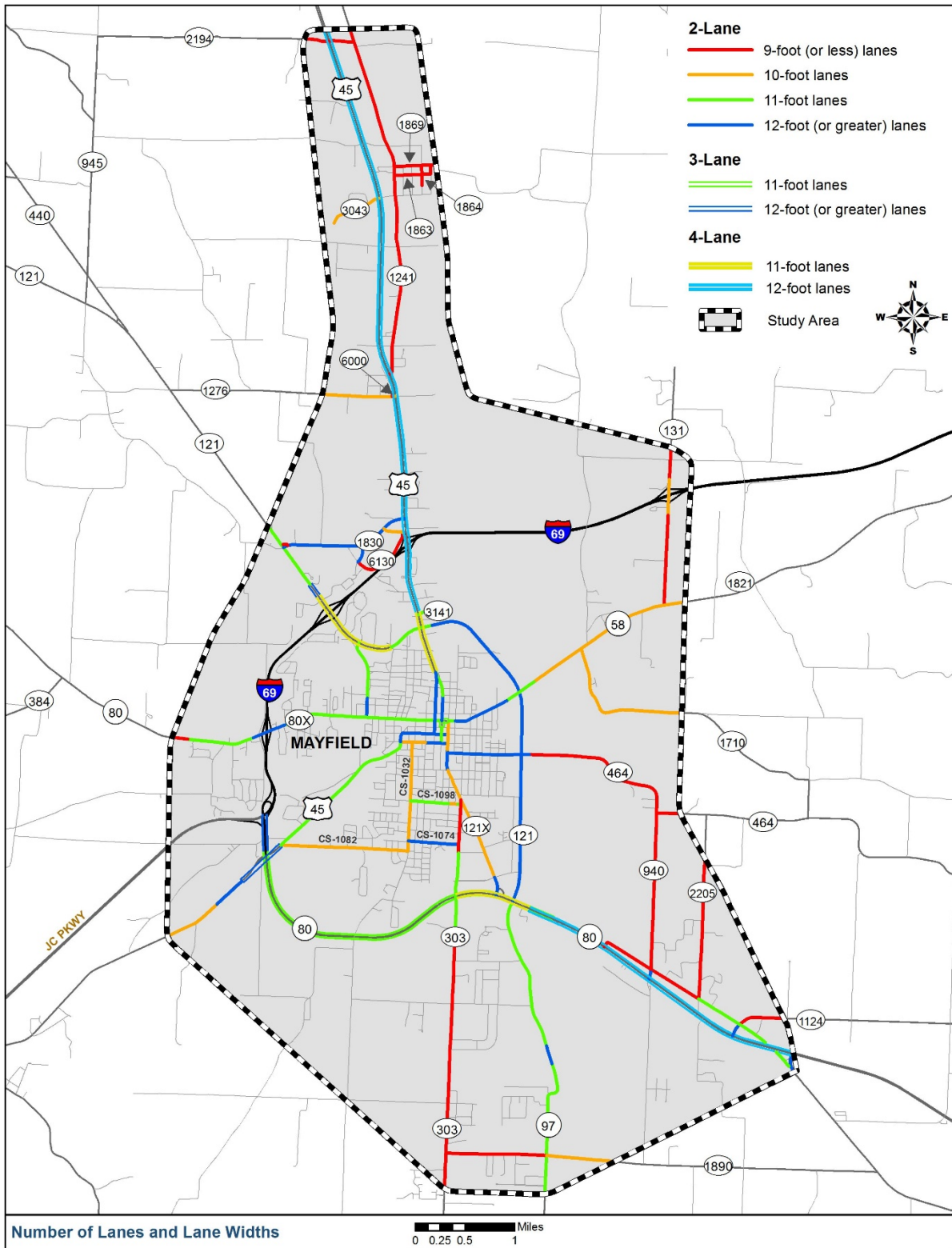


Figure 4: Number of Lanes and Lane Widths

Table 3: Study Routes with Lanes Less than 10 Feet-wide

Route	BMP	EMP	No. Lanes	Lane Width (feet)
KY 131	0.000	1.600	2	9-9.5
KY 303	12.900	16.853	2	9-10
KY 464	0.000	2.700	2	9-12
KY 940	0.000	1.679	2	9
KY 1124	0.000	0.600	2	9
KY 1241	0.000	3.500	2	9
KY 1863	0.000	0.449	2	7
KY 1864	0.000	0.200	2	7
KY 1869	0.000	0.387	2	8
KY 1890	0.000	1.700	2	8-10
KY 2194	2.904	3.456	2	8.5
KY 2205	0.000	2.500	2	9
KY 6000	0.000	0.049	2	9
KY 6130	0.000	1.061	2	9.5
KY 2205	0.000	2.500	2	9
KY 6000	0.000	0.049	2	9

Shoulder Types and Widths. Roadway shoulder types and widths are shown on **Figure 5**. Most routes have shoulders four feet wide or less, including curb and gutter sections. Ten-foot-wide shoulders exist along portions of US 45, KY 121, KY 80. No minimum shoulder widths for urban roadways are presented in HDM Exhibit 700-04.

Vertical and Horizontal Curves. KYTC HIS vertical and horizontal curve data were collected and compared to the HDM design recommendations for maximum vertical grades and minimum horizontal curves.

HIS assigns grade levels for vertical slopes based on steepness: rated from A (flattest) to F (steepest, 8.5% or greater). Varying by functional class, terrain types, and speed limits, the 2017 HDM recommends maximum vertical grades ranging from 8% to 15% for local routes, 8% to 11% for collectors, and 6% to 9% for arterials.

HIS assigns grade levels for horizontal curves based on degree of curvature: ranked from A (most sweeping) to F (sharpest, 28 degrees or greater). The 2017 HDM calculates maximum degree of curvature based on geometric factors.

Figure 6 (page 12) shows grade and curve deficiencies within the study area. HIS notes no vertical deficiencies but Class F horizontal curves were noted on three routes: US 45 (in downtown Mayfield), KY 1241 at the intersection with US 45, and on KY 1863 in Hickory.

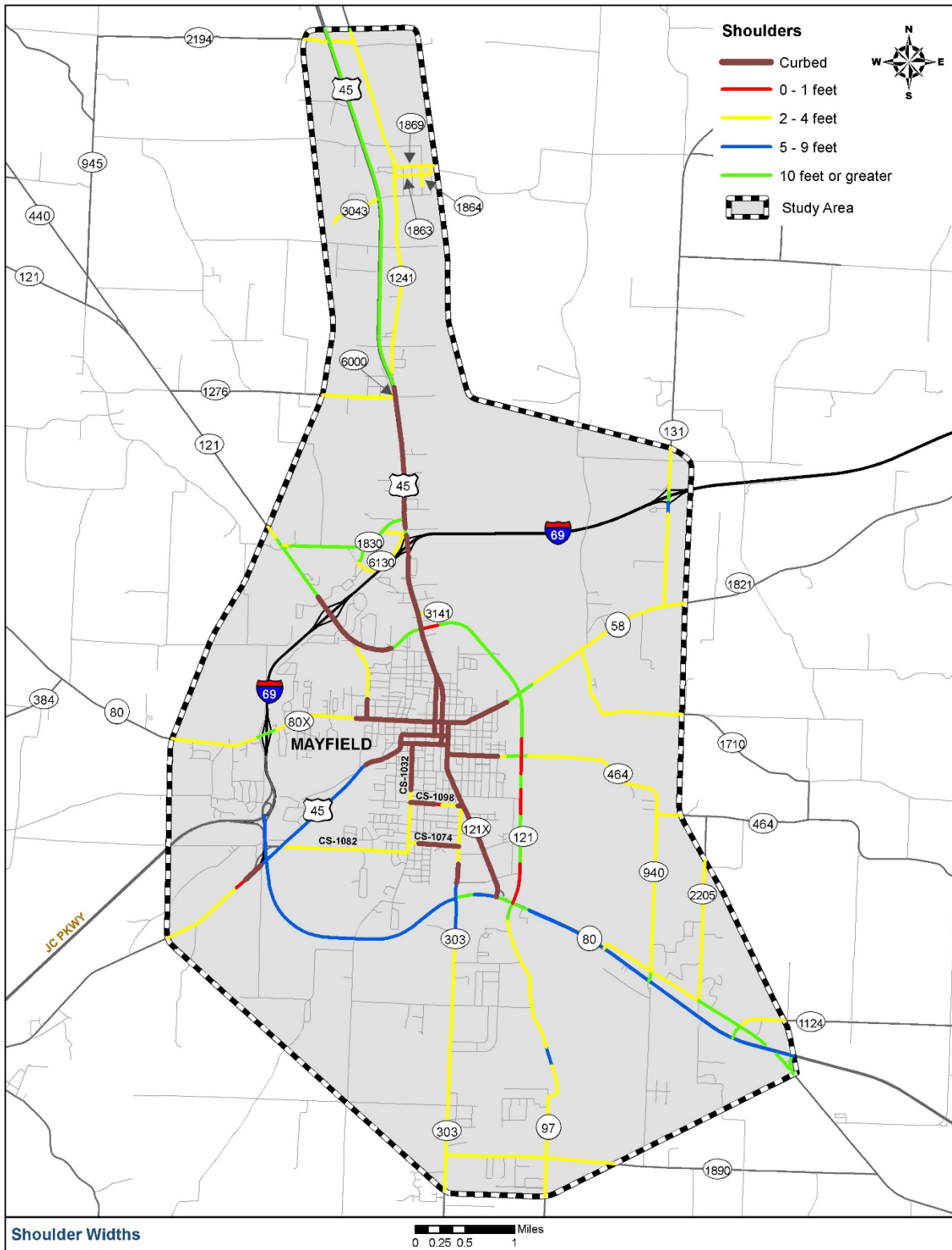


Figure 5: Shoulder Widths

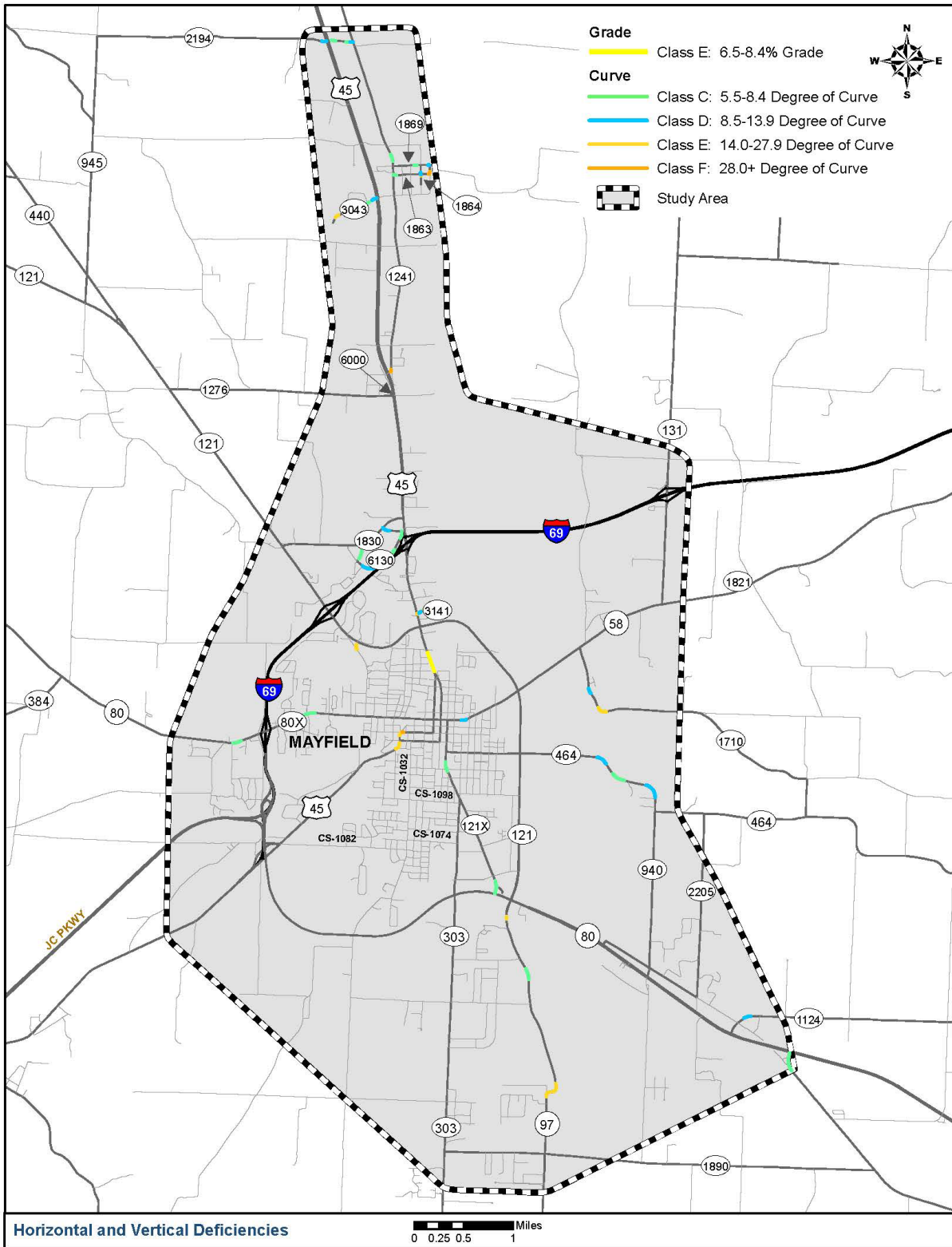


Figure 6: Horizontal and Vertical Alignment Elements

2.2 Functional Class and Roadway Systems

Functional Class. Functional classification is the process of grouping streets and highways according to the character of travel and access to adjacent land uses they provide. This classification system recognizes that travel involves movement through a hierarchical system of facilities that progress from lower classifications handling short, locally oriented trips to higher classifications serving longer distance travel at higher mobility levels.

The following are definitions of major functional classes:

- Principal Arterials serve major centers of metropolitan areas, provide a high degree of mobility, and can also provide mobility through rural areas.
- Minor Arterials serve trips of moderate length, serve geographic areas smaller than their higher arterial counterparts, and offer connectivity to the principal arterial system. The primary difference between this and a Principal Arterial is usually multiple minor arterial routes serve an urban area, radiating from the urban center to serve the surrounding region. In contrast, an expanse of a rural area of equal size would often be served by a single arterial.
- Collectors gather traffic from Local Roads and funnel them to the arterial network. Within the context of functional classification, collectors are categorized as either Major Collectors or Minor Collectors. In the rural environment, collectors generally serve primarily intra-county travel and shorter trips.
- Local Roads are not intended for use in long distance travel, except at the origin or destination end of the trip, due to their direct access to abutting land. They are often designed to discourage through traffic.

Figure 7 shows functional classification of study area routes. Highways providing the highest levels of mobility (Principal Arterials) are US 45, KY 80, and KY 121.

National Highway System. The National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. Study area NHS roadways are US 45, KY 80, and KY 121.

Truck Routes. In compliance with the Surface Transportation Assistance Act of 1982 (STAA), Kentucky established a network of highways on which commercial vehicles with increased dimensions may operate. These "STAA" vehicles include semi-trailers with 53-foot-long trailers and single-unit trucks with a total length of 45 feet. Designated truck routes in the study area are shown in **Figure 8** (page 15). US 45 north of I-69 and I-69/Purchase Parkway are federally designated truck routes. US 45 south of I-69, KY 80, KY 121, and KY 131 are on the Kentucky Highway Freight Network. The new portion of KY 80 is also proposed for inclusion on the state's freight network.

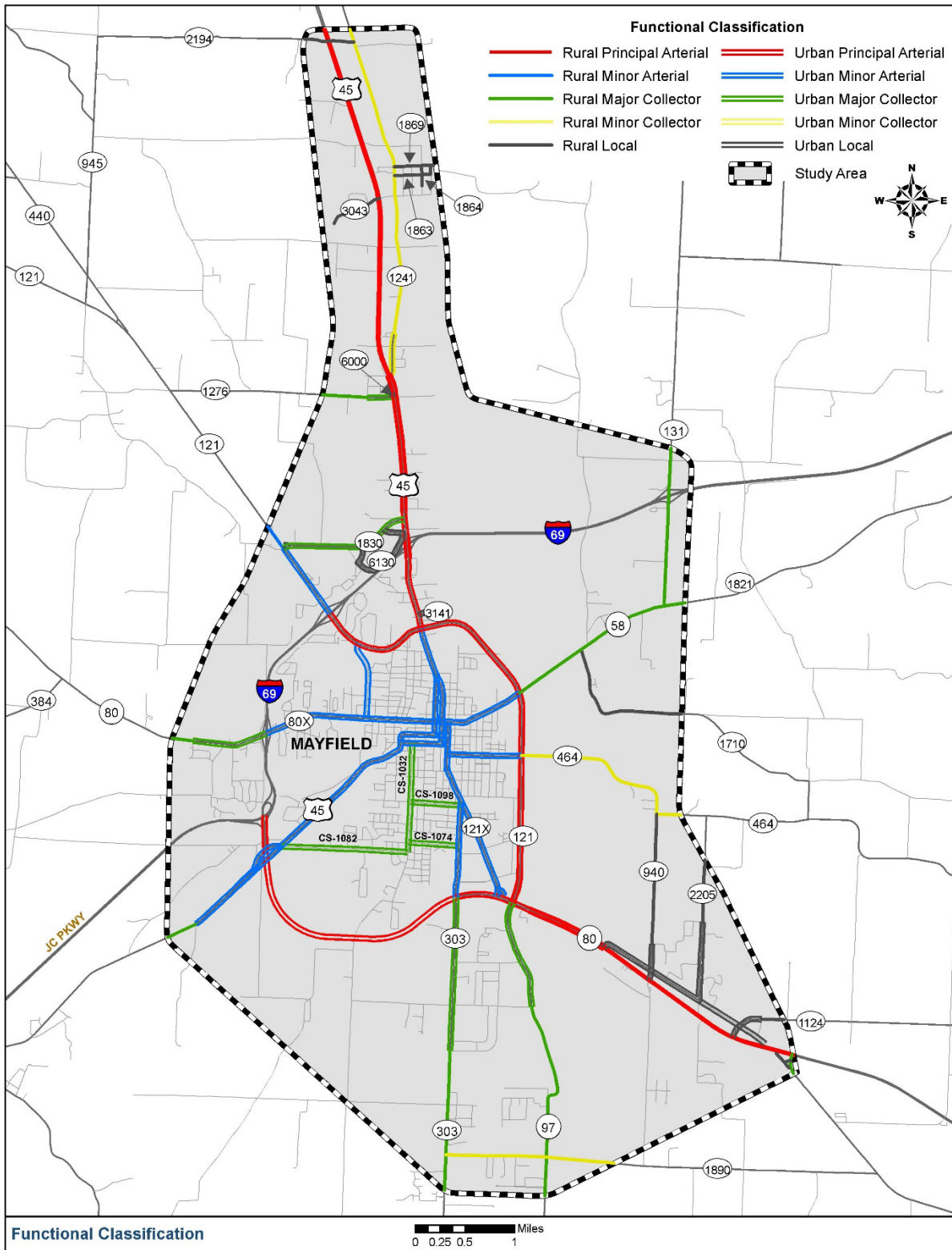


Figure 7: Functional Classification

2.3 Bridges

Figure 10 shows 65 bridges identified within the study area. Of these bridges, National Bridge Inventory (NBI) inspections listed one in poor condition, 38 in fair condition, and 23 in good condition. Bridge No. 042C000195N carrying 8th Street (CS-1027) over Red Duck Creek is in poor condition but is not located on a study route. It carries around 1,650 vehicles per day and was built in 1940. The superstructure is noted as poor condition while the deck and substructure are in fair condition. The structure is not included in the Bridging Kentucky program and is beyond the scope of this study; however, it is noted as a potential future maintenance need within the City.

2.4 Pedestrian and Bicycle Accommodations

Improving safety and infrastructure for walking and bicycling creates an integrated, intermodal transportation system providing travelers with a real choice of transportation modes. Pedestrians and bicyclists have the same origins and destinations as other transportation system users. It is important for all users to have safe and convenient access to all types of facilities, transit stations and stops, employment opportunities, education, health care, and other essential services. Federal Highway Administration's (FHWA) 2019 *Bicycle and Pedestrian Planning, Program, and Project Development* guidance⁶ identifies corresponding federal legislation and reference material. This guidance states that pedestrian and bicycle needs must be given "due consideration" under federal surface transportation law.

Pedestrian Facilities. The city of Mayfield has over 20 miles of sidewalk system for pedestrians, with coverage for most of the city's main streets within the downtown grid network. Of the total sidewalk mileage, nearly 16 miles (78%) is located on state routes, almost 4 miles (19%) on city streets, and less than 1 mile (3%) on private roads. A small section (0.28 mile) of multi-use path is located on the Jackson Purchase Medical Center campus on the north side of town.

Bicycle Facilities. Currently no dedicated bicycle facilities exist in the study area; however, the Mayfield Bikeway Project (**Figure 9**) for the city is slated for construction in 2021.

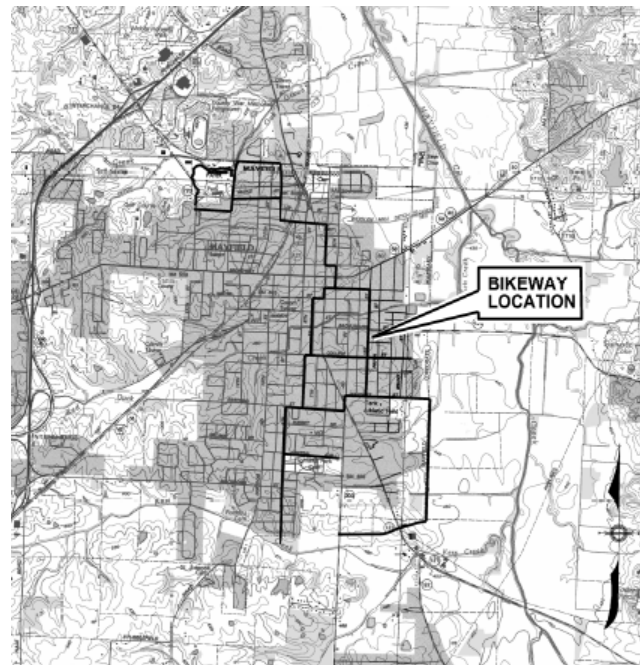


Figure 9: Mayfield Bikeway Project

⁶ Online at https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/guidance_2019.pdf

In accordance with Federal requirements, KYTC's 2002 *Pedestrian & Bicycle Travel Policy*⁷ states the KYTC will consider incorporation of pedestrian and bicycle facilities on all new or reconstructed state-maintained roadways. Furthermore, the KYTC will consider accommodating bicycle transportation when planning the resurfacing of roadways, including shoulders. The policy also provides guidance on maintenance responsibilities by facility type.

2.5 Other Transportation Modes

Transit. The Fulton County Transit Authority is currently in operation providing demand response, human service transportation delivery, and intercity transportation in Fulton County as well as the Kentucky counties of Graves, Hickman, and Carlisle.

Railroad. Paducah & Louisville (PAL) Railroad is a full-service, 265-mile-long regional railroad with service to Mayfield. The PAL connects directly with four of the seven North American Class 1 carriers: Burlington Northern and Santa Fe (BNSF), Chessie Seaboard Consolidated (CSX), Canadian National (CN), and Norfolk-Southern (NS). The tracks run roughly parallel to US 45 through the SUA study area.

Airport. Mayfield Graves County Airport is a general aviation airport with a 5,000-foot paved runway. It is located off KY 58 just east of the study area limits.



Mayfield Airport

2.6 2020 Traffic Volumes and Operations

KYTC provided historic traffic volumes for study area roadways, including average daily traffic (ADT), truck percentages, K-factors, and peak hour directional distributions as available. Most traffic volumes were collected from 2014 to 2018. Year 2020 segment volumes were calculated based on appropriate historical trends, adjusting pre-2020 volumes to create a consistent 2020 dataset while minimizing influence of the COVID pandemic on observed traffic volumes. In addition, 12-hour turning movement counts were collected at nine intersections during October 2020, classifying vehicles into one of five categories: motorcycles, cars, buses, single unit trucks, and articulated trucks. Pedestrians and bicyclists were also recorded. Additional information is presented in the *Traffic Forecast Report* in **Appendix A**.

⁷ Online at <https://transportation.ky.gov/BikeWalk/Pages/Laws-and-Policy.aspx>

2.6.1 Traffic Operations

Traffic operations analyses included two commonly applied highway performance indicators used to describe quality of facility performance: Level of Service (LOS) and volume-to-capacity (v/c) ratios. Computations were performed in concurrence with the *Highway Capacity Manual* (HCM) 6th edition procedures for study route segments.

Level of Service. LOS is a qualitative measure describing traffic conditions based on measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. LOS typically represents a driver’s perspective of traffic conditions based on perceived congestion. As illustrated in **Figure 11**, LOS A is associated with free flow conditions, high freedom to maneuver, and little or no delay. Conditions at or near capacity typically are associated with LOS E. At LOS F, traffic conditions are oversaturated and beyond capacity, with low travel speeds, little or no freedom to maneuver, and lengthy delays. Although LOS C or better is desirable in urban areas, LOS D is generally acceptable. Existing LOS was determined for the highest traffic hour based on design hourly volume (DHV) calculations, applying K- and d-factors (i.e., hourly and directional adjustments) to ADT counts to approximate.







LEVEL OF SERVICE		DESCRIPTION
A		<ul style="list-style-type: none"> Average Travel Speed. Free traffic flow with few restrictions on maneuverability or speed. <p>NO DELAYS</p>
B		<ul style="list-style-type: none"> Stable traffic flow. Speed becoming slightly restricted. Low restriction on maneuverability. <p>NO DELAYS</p>
C		<ul style="list-style-type: none"> Stable traffic flow, but less freedom to select speed, change lanes or pass. <p>MINIMAL DELAYS</p>
D		<ul style="list-style-type: none"> Traffic flow becoming unstable. Speeds subject to sudden change. Passing is difficult. <p>MODERATE DELAYS</p>
E		<ul style="list-style-type: none"> Unstable traffic flow. Speeds change quickly and maneuverability is low. <p>MAJOR DELAYS</p>
F		<ul style="list-style-type: none"> Heavily congested traffic. Demand exceeds capacity and speeds vary greatly. <p>MAJOR DELAYS</p>

Figure 11: Level of Service (LOS)

Volume-to-Capacity. V/c ratios compare the traffic volume on a facility to its theoretical capacity over a specific duration, one hour in this instance. A v/c ratio greater than 1.0 indicates a route has exceeded its theoretical capacity and additional lanes may be justified. As v/c is measured over an hour period by segment, a roadway or intersection could be congested during brief periods but show a relatively low v/c averaged over a longer duration.

Analyses indicated most roadways within the study area operate at acceptable LOS based on segment-level analysis for derived DHVs. The 2020 AADT, LOS, and v/c are summarized in **Table 4** (page 20) for highway segments and mapped on **Figure 12** (page 21). Sections of KY 80X (W Broadway), KY 121X (6th Street and Paris Road), KY 131, KY 303 (Cuba Road), South 10th Street (CS-1032), and E Farthing Street (CS-1238) operate at LOS E. All v/c ratios for study routes are less than 0.5, indicating minimal capacity issues based on HCM segment-level analyses. However, capacity at intersections may be further constrained due to intersection operations.

Table 4: 2020 ADT, LOS, and v/c

Route	BMP	EMP	2020 ADT	2020 LOS	2020 v/c
US 45	13.500	24.400	1,830-17,400	A-C	0.06-0.31
US 45 001	16.669	17.526	1,550-4,660	A	0.05-0.38
KY 58	5.530	8.400	2,990-12,280	A-D	0.12-0.38
KY 80	8.700	16.100	3,300-8,330	A-C	0.06-0.22
KY 80X	0.000	1.825	6,120-9,000	D-E	0.25-0.32
KY 97	15.100	18.262	2,020-3,670	C	0.11-0.15
KY 121	5.300	11.100	1,280-12,900	A-D	0.09-0.47
KY 121X	0.000	1.870	10,870-11,710	E	0.40-0.41
KY 131	0.000	1.600	3,760-4,080	C-E	0.13-0.17
KY 303	12.900	16.853	3,110-7,770	C-E	0.11-0.31
KY 464	0.000	2.700	650-1,750	A-C	0.04-0.09
KY 940	0.000	1.679	570	B	0.03
KY 1124	0.000	0.600	390	A	0.02
KY 1241	0.000	3.500	2,750	C	0.15-0.17
KY 1276	1.500	2.257	1,030	D	0.05
KY 1710	0.000	1.513	620	D	0.04
KY 1830	0.000	1.324	1,100	D	0.13
KY 1863	0.000	0.449	240	B	0.01
KY 1864	0.000	0.200	70	B	0.00
KY 1869	0.000	0.387	180	A	0.01
KY 1890	0.000	1.700	410-630	B-C	0.02-0.03
KY 2194	2.904	3.456	110	D	0.01
KY 2205	0.000	2.500	200-450	A	0.01-0.02
KY 3043	0.000	0.503	1,140	D	0.05
KY 3141	0.000	0.185	240	B	0.02
KY 6000	0.000	0.049	80	A	0.00
KY 6130	0.000	1.061	1,650	C	0.23
CS-1032/S 10 th St	0.230	1.320	1,230-5,000	B-D	0.05-0.19
CS-1074/Willow Dr	0.000	0.180	4,660	C	0.16
CS-1082/Macedonia St	0.000	1.280	2,020-4,080	C-D	0.08-0.15
CS-1098/W Farthing St	0.420	0.740	5,120	D	0.21
CS-1238/E Farthing St	0.000	0.19	9,800	E	0.05-0.19

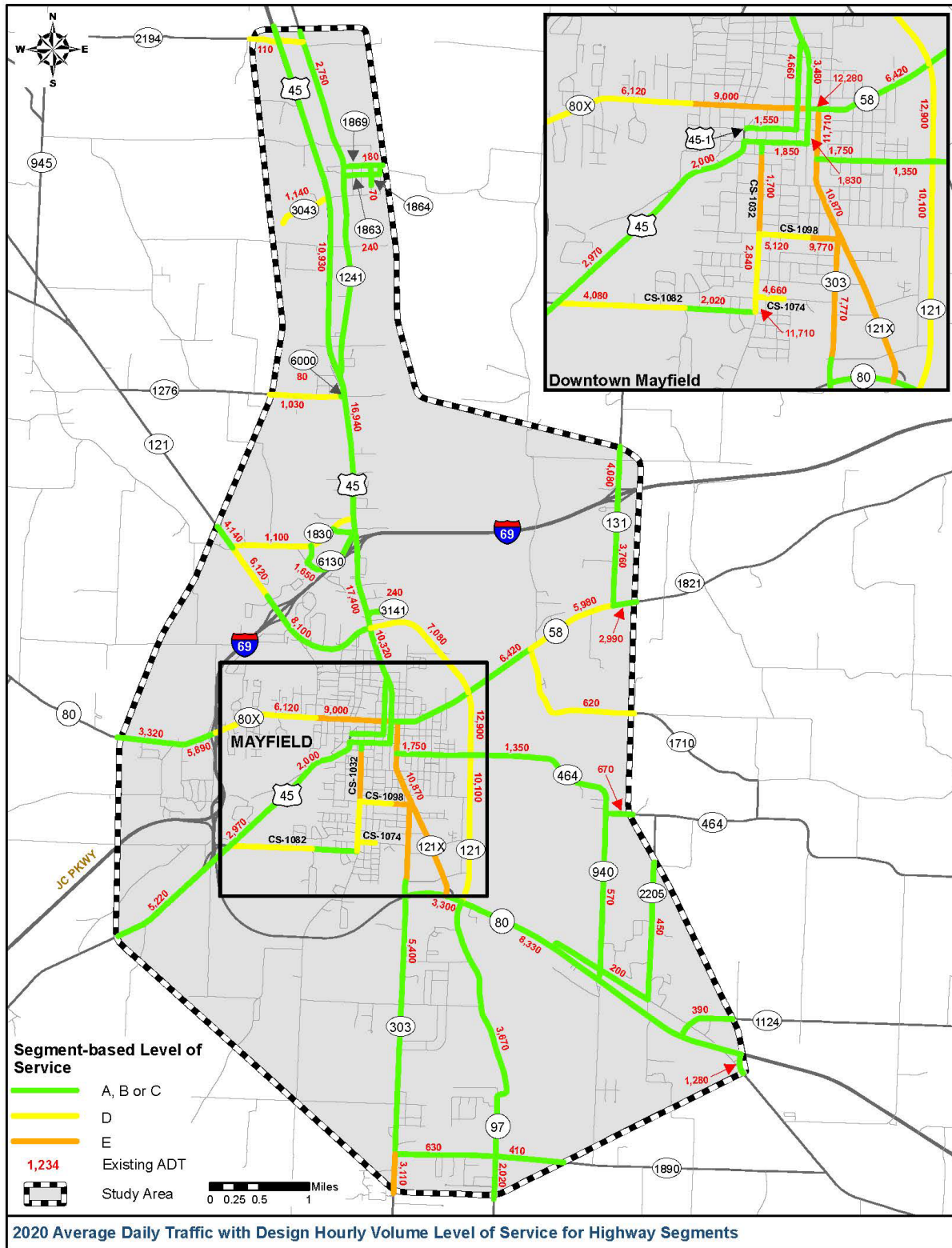


Figure 12: 2020 Existing ADT and LOS for Highway Segments

Key operational metrics at the nine study intersections are presented in **Table 5**. As shown, a few movements operate at LOS F, indicating they are over capacity based on current volumes and geometry: lefts from the minor street at KY 121/KY 464 and at KY 121/Douthitt Street. Both intersections are on the east side of town, adjacent to the city’s elementary and high schools.

Table 5: 2020 Intersection LOS and v/c

Intersection	Control	AM LOS ¹	AM v/c ²	PM LOS ¹	PM v/c ²
US 45 (7 th St) at KY 58 (Broadway)	Signal	A	0.1-0.5	A	0.1-0.7
US 45 (Paducah Rd) at Hickory Rd/Poultry Dr	Two-way Stop	C- E	0.0-0.5	C- E	0.0-0.3
US 45 at KY 121 Bypass	Signal	B	0.1-0.8	B	0.2-0.7
KY 121 Bypass at KY 58 (E Broadway)	Signal	C	0.1-0.8	B	0.1-0.7
KY 121 Bypass at KY 464 (Backusburg Rd)	Two-way Stop	D- F	0.0-0.6	D- F	0.0-0.9
KY 121 Bypass at Douthitt St	Two-way Stop	E	0.0-0.5	F	0.0-1.1
KY 121 Bypass at KY 80/KY 97	Signal	C	0.0-0.9	C	0.1-0.7
KY 121X (Paris Rd) at Douthitt St	Two-way Stop	B	0.0-0.1	B	0.0-0.1
KY 121X (Paris Rd) at 3 rd St/KY 303 (Cuba Rd)	Signal	D	0.5-0.8	C	0.0-0.8

¹ LOS presented for overall intersection at signals and for stop-controlled approaches where unsignalized
² v/c reported by approach/lane group

2.7 Crash History

Historical crash data retrieved from the Transportation Enterprise Database (TED) warehouse were evaluated for study area roadways for a three-year period from January 2017 through December 2019. During the analysis period, 1,089 total crashes were reported on study area roadways and sorted into three categories by severity: fatality, injury, or property damage only (PDO). Crashes were separated and mapped by severity and manner of collision in **Figure 13**; due to large numbers, PDO crashes are not shown on the figure. Individual crash records are included in **Appendix B**.

Crashes by Route. Nearly 75% of total crashes occurred on the five highest volume study routes: US 45, KY 121X (Paris Road), KY 121 (Bypass), KY 303 (Cuba Road) and KY 80X (West Broadway). The breakdown between study routes is shown visually in **Figure 14** (page 24).



KY 121X Paris Road

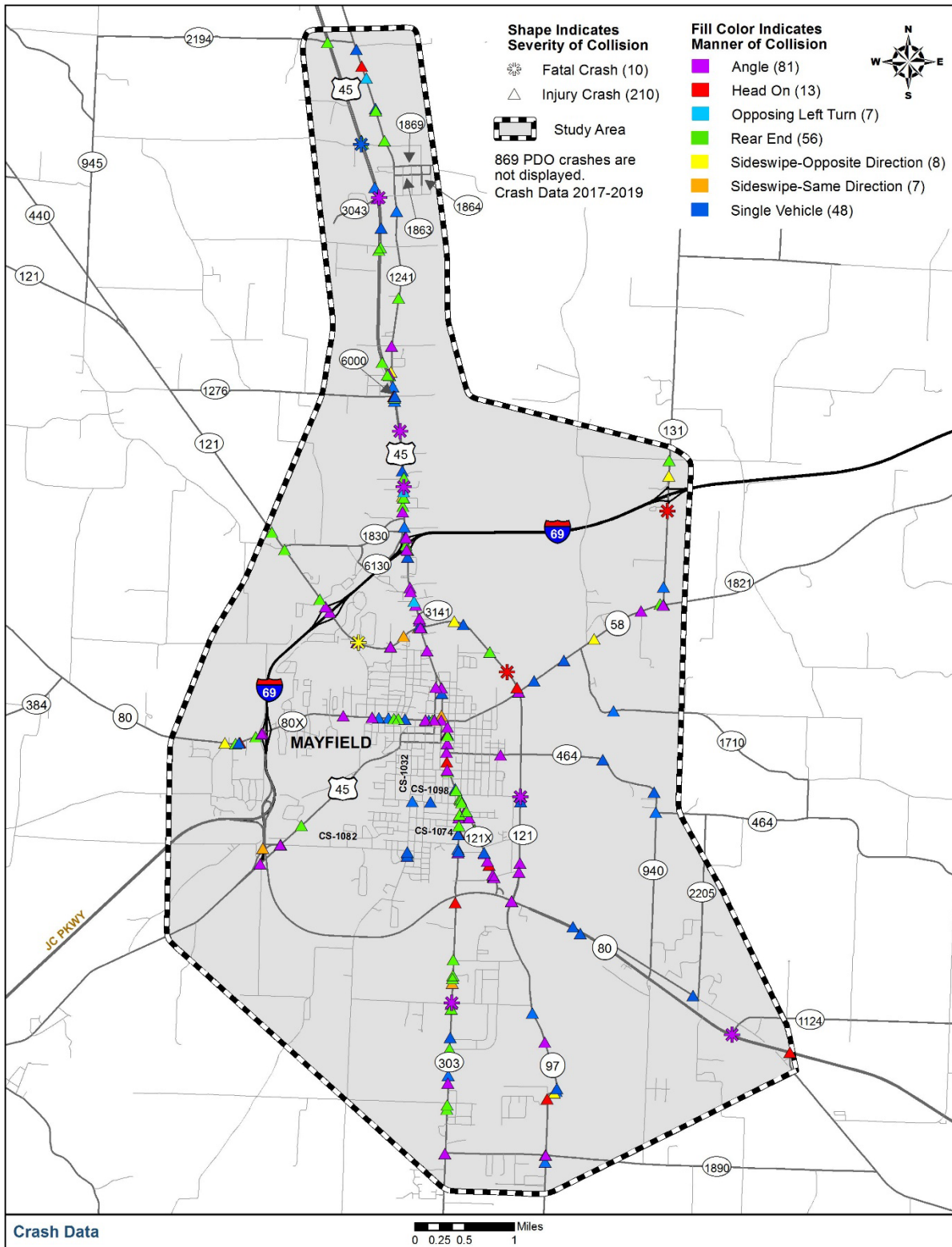


Figure 13: Crash Data (2017-2019)

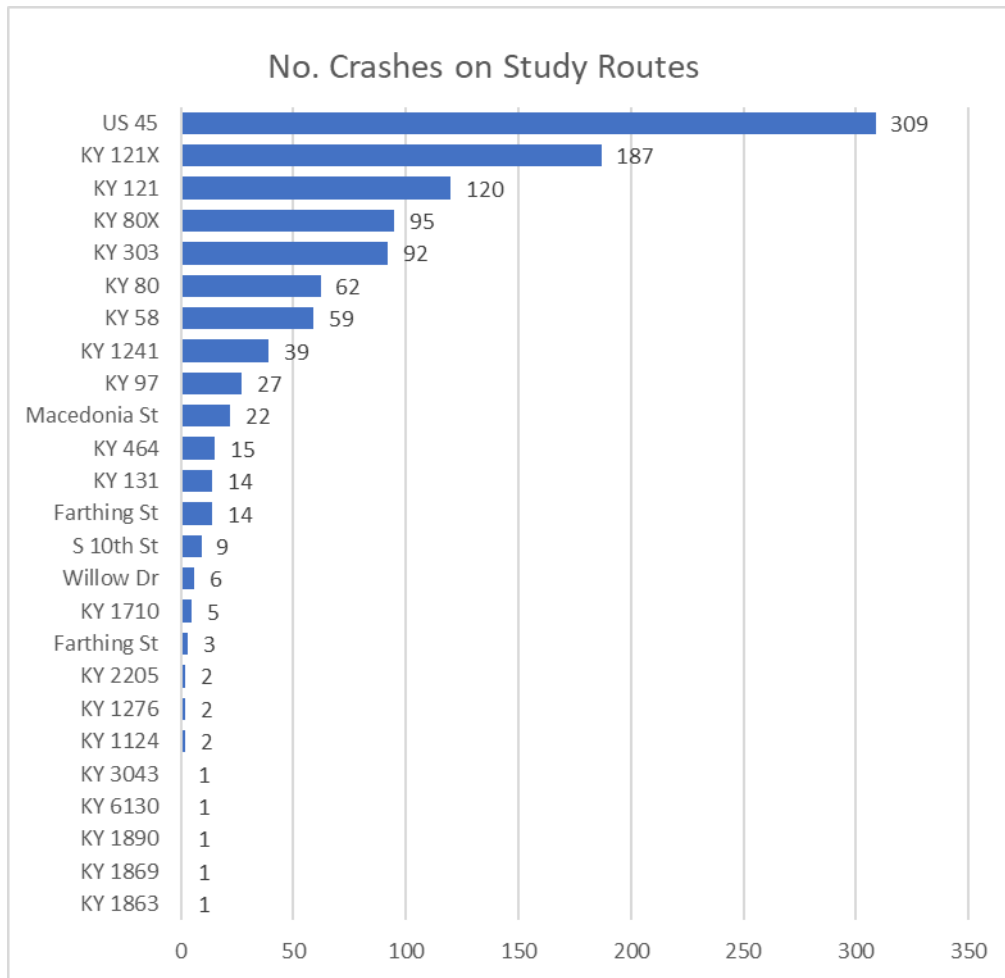


Figure 14: Reported Crashes by Study Route

Severity. As shown in **Figure 15** (page 25), of 1,089 reported crashes, 10 (<1%) were fatalities, 210 (19%) involved injuries, and 869 (80%) were PDOs. Fatal crashes occurred on five routes: four on US 45, three on KY 121, and one each on KY 303, KY 131, and KY 80. Seven of the ten fatalities were angle collisions.

Manner of Collision. **Figure 15** also summarizes crash type trends for all study routes combined, showing predominant crash types as rear end collisions (32%), followed by angle (27%), and single vehicle collisions (22%).

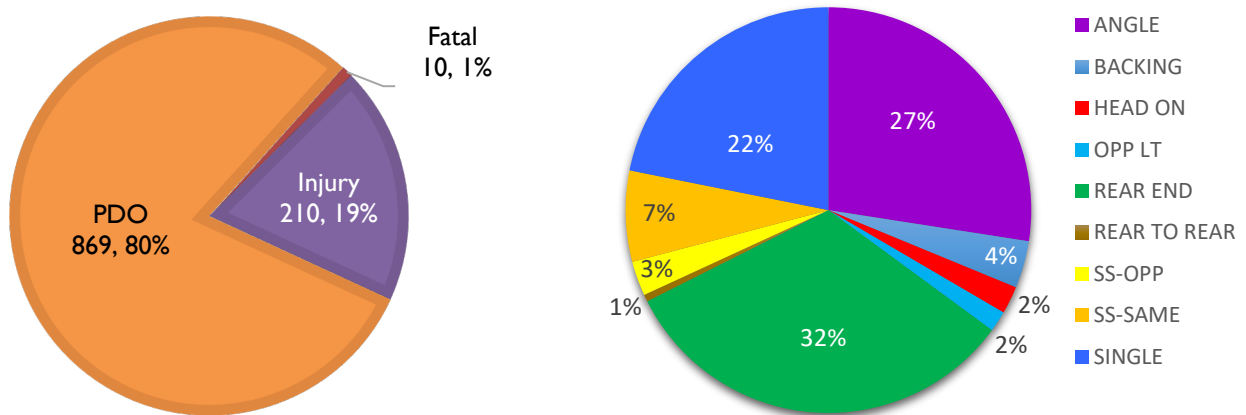


Figure 15: Trends for Severity (left) and Crash Type (right)

Pedestrians. Six of 1,089 reported crashes involved pedestrian strikes, one of which was fatal. The fatal crash occurred north of the city on US 45 southbound lanes (MP 23.151) where the pedestrian was crossing/walking in the travel lanes. Remaining pedestrian injury and PDO strikes occurred within Mayfield city limits.

Bicycles. One of 1,089 reported crashes involved a bicycle strike on KY 121X where the cyclist tried to cross the highway in front of oncoming traffic, resulting in minor injuries.

2.7.1 Statistical Crash Analyses

Two types of statistical crash analyses were performed on study area routes based on methods comparing existing crash rates with crash rates of similar types of facilities throughout Kentucky: *Critical Crash Rate Factor (CCRF)* and *Excess Expected Crashes (EEC)*.

Critical Crash Rate Factor. Crashes were geospatially referenced and compared to statewide data to identify locations experiencing above-average crash rates. The Critical Crash Rate methodology used by the KYTC is defined in the Kentucky Transportation Center (KTC) research report *Analysis of Traffic Crash Data in Kentucky (2014–2018)*.⁸ The report defines two analysis types performed on study routes: “segments” and “spots.”

- Segments vary in length and are divided along roadways as geometry or traffic volumes change.
- Spots are identified by analyzing 0.1-mile-long sections for concentrated crash areas.

Analysts used crash numbers, traffic volumes, roadway type, lane numbers, and segment length to determine the CCRF for each roadway segment and spot. CCRF is one measure of roadway safety, expressed as a ratio of the crash rate at a given location compared to statewide crash rates for similar

⁸ Online at https://uknowledge.uky.edu/ktc_researchreports/1645/

roadways. A CCRF greater than 1.0 indicates crashes may be occurring more often than can be attributed to random occurrence. This procedure is a screening technique identifying locations where further analysis may be needed; it is neither a definitive statement nor measurement of a crash problem.

Analyses on study routes identified four segments and 22 spots with a CCRF greater than 1.0; these sites are illustrated on **Figure 17** and summarized in **Table 6** and **Table 7** respectively, both found on page 28. The segments are concentrated downtown whereas spots are scattered throughout the SUA study area, many at busy intersections.

Excess Expected Crashes. KYTC and the KTC developed a more refined statistical methodology based on the *Highway Safety Manual* (HSM) to evaluate safety needs of projects, including those in the 2020 SHIFT process. EEC is based on a crash prediction model estimating the number of crashes expected on an average roadway segment of a given type and length. It represents the number of excess crashes a segment is experiencing compared to other roadways of its type, adjusting for traffic volumes and a statistical correction. EEC is positive when more crashes are occurring than expected and negative when fewer crashes are occurring than expected.

EECs are then grouped into one of four categories, identified as the Level of Service of Safety (LOSS). Summarized graphically in **Figure 16**, LOSS categories I and II represent sites with fewer than anticipated crashes, up to category IV which has more than 1.5 standard deviations more crashes than expected. Because LOSS-IV sites experience such elevated crash rates, there is a higher probability that safety countermeasures at these locations

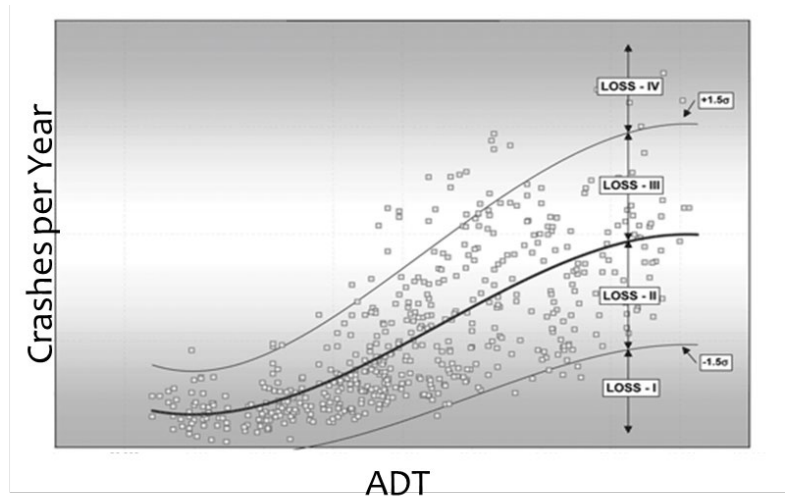


Figure 16: LOSS Categorical Thresholds

will result in larger improvements. **Figure 18** (page 29) shows LOSS-III and IV sites, filtering data by severe (i.e., fatal and apparent injury) and non-severe (i.e., possible injury and PDO) crash types.

Looking at just severe crashes, the highest EECs in the study area are at the KY 58/KY 131 intersection, where a Highway Safety Improvement Program (HSIP) project was recently implemented, and the intersection of College and 9th Streets, neither of which are study routes.

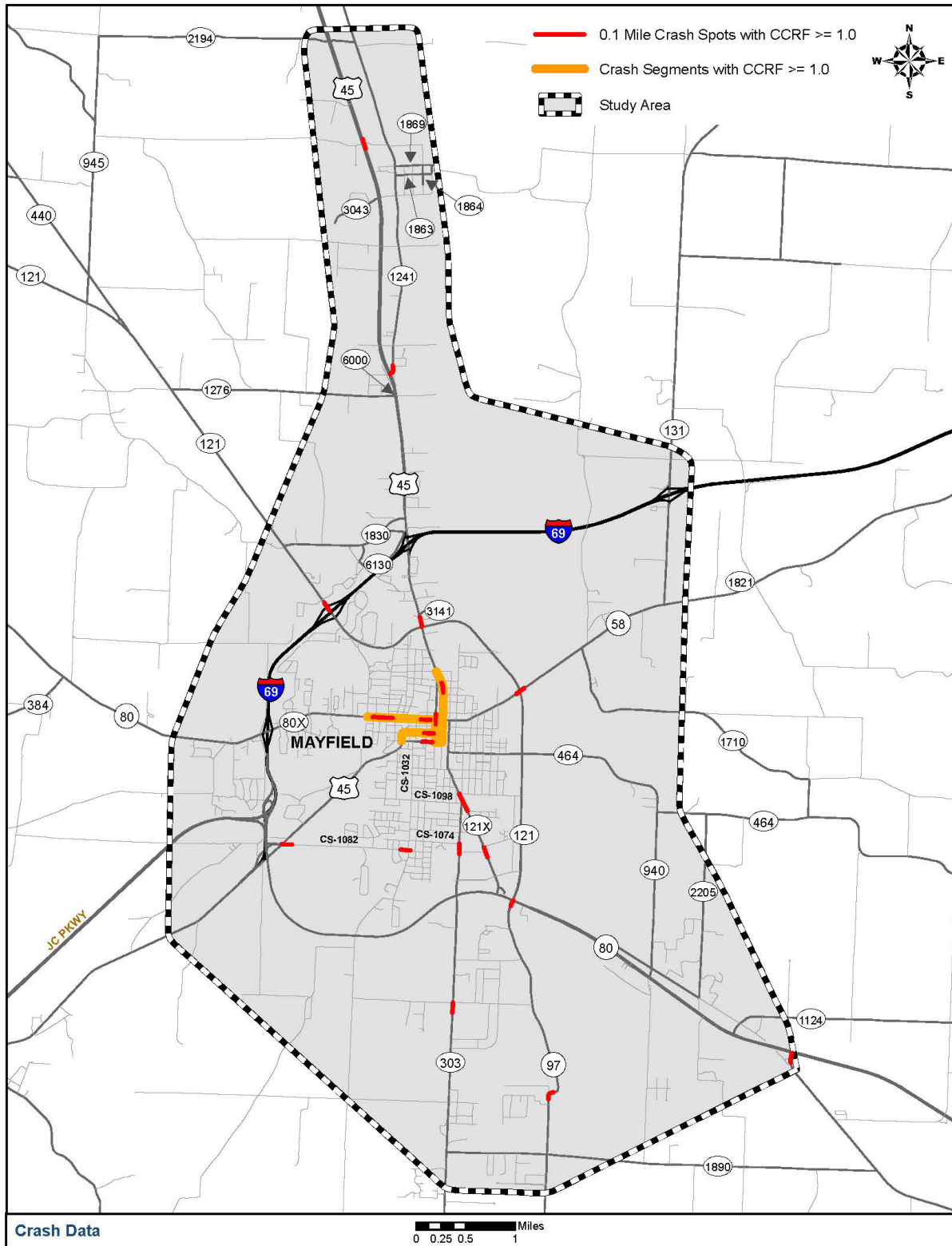


Figure 17: High-Crash Segments and Spots

Table 6: High CCRF Segments

Route	Location	Location	BMP - EMP		ADT	Crashes				CRF
						Total	Fatal	Injury	PDO	
US 45	N 7th Street	One-way Couplet	17.219	17.684	3,476	25	0	5	20	1.51
	W Water Street	Two-way Couplet	16.919	17.219	1,829	17	0	0	17	1.64
	S 8th Street	One-way Couplet	16.594	17.141	1,542	13	0	2	11	1.25
KY 80X	W Broadway	N 17th Street - US 45	1.045	1.825	8,991	70	0	13	57	1.32

Table 7: High CCRF Spots

Route	Local Name	Location	BMP - EMP		ADT	Crashes				CRF
						Total	Fatal	Injury	PDO	
US 45	Paducah Road	Hickory Road	23.100	23.200	10,930	7	1	2	5	1.39
		North bypass	18.200	18.300	17,113	22	0	5	17	1.32
	N 7th Street	James Street	17.500	17.600	3,476	16	0	3	13	2.75
	8th Street	Broadway	17.100	17.200	1,542	8	0	2	6	2.20
	W Water Street	9th Street	16.900	17.000		4	0	0	4	1.10
		10th Street	16.800	16.900	1,847	5	0	0	5	1.25
KY 58	E Broadway	Bypass	6.400	6.500	6,310	9	0	1	8	1.06
KY 80X	W Broadway	9th Street	1.600	1.700	8,991	14	0	3	11	1.29
		15th Street	1.200	1.300		11	0	1	10	1.02
		16th Street, Broadway	1.100	1.200		13	0	3	10	1.20
KY 97	-	KY 80/Bypass	18.200	18.300	3,640	6	0	1	5	1.44
		S-curve at Hay Market Corner Rd	16.100	16.200		5	0	1	4	1.20
KY 121	Bypass	I-69 Interchange	10.100	10.200	6,048	6	0	2	4	3.31
		KY 80 (SE of town)	5.400	5.500	1,279	8	0	0	8	1.02
KY 121X	Paris Road	KY 303, 3rd and Douthitt Streets	1.000	1.100	10,866	17	0	3	14	1.00
		Between Hillcrest Drive and KY 303	0.900	1.000		17	0	1	16	1.00
		Wyatt Drive	0.400	0.500		18	0	2	16	1.06
KY 303	Cuba Road	Willow Dr./Wyatt Dr.	16.300	16.400	7,770	14	0	3	11	1.43
		Tucker Road	14.700	14.800	5,320	6	1	3	3	1.16
KY 1241	Old US 45	US 45	0.000	0.100	2,657	5	0	1	4	1.43
CS 1082	Macedonia Street	10th Street	1.200	1.300	2,017	5	0		5	1.19
		US 45	0.000	0.100	4,079	12	0	3	9	1.87

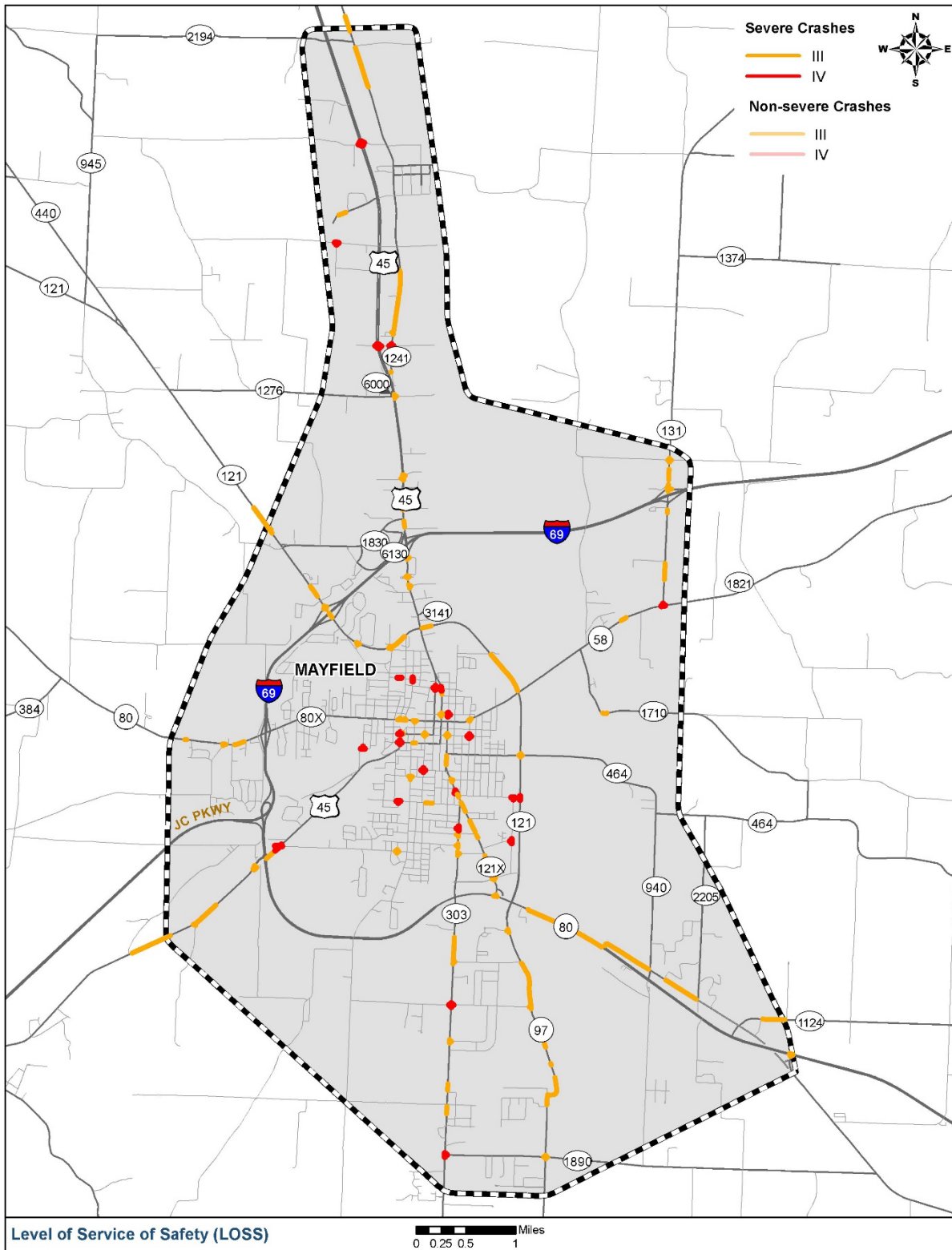


Figure 18: LOSS Categories III and IV for Severe and Non-Severe Crash Distributions

3.0 ENVIRONMENTAL RESOURCES

An environmental overview was conducted to identify resources and potential issues for consideration during the development of transportation improvement concepts. As a high-level planning overview for a large study area, the environmental overview documents general, county-wide issues rather than site-specific issues. Natural and human environmental resources identified from readily available databases are shown in **Figure 19** on the following page and summarized in the following sections. The intent is to identify potential environmental issues that merit investigation during any future project development activities rather than to quantify impacts. Project sheets for recommended improvements in Section 8.1 note environmental red flag considerations where applicable.

3.1 Natural Environment

“Natural environment” typically refers to all living and non-living things found to occur in nature such as streams, wetlands, protected species, farmlands, geotechnical resources, and more.

Water Resources. The largest stream in the study area is Mayfield Creek, which drains about half of Graves County, running along the east side of Mayfield before feeding into the Mississippi River just south of Wickliffe. Moving south to north through the SUA study area, other named water resources include Perry Creek, Little Mayfield Creek, Torian Creek, Kess Creek, Vulton Creek, Red Duck Creek, Oak Grove Creek, Crowley Branch, Key Creek, Byrd Creek, Anderson Creek, Cooley Creek, and Gilbert Creek. There are also several unnamed streams, small lakes and ponds, and wetlands within the SUA boundaries.

No federally designated Wild or Scenic Rivers or Outstanding State Resource Waters exist in the study area. A wellhead protection area exists, roughly bounded by US 45 to the west, W. Broadway KY 121, and E. College Street. A small municipal separate storm sewer system (MS4) located in the city potentially requires additional coordination efforts as part of future project development phases. Small, scattered wetlands exist within the study area, primarily associated with rivers and streams.

Impacts to streams and wetlands require permit coordination with the US Army Corps of Engineers, US Coast Guards, and/or Kentucky Division of Water, depending on the scale of the water resource and potential disturbance.

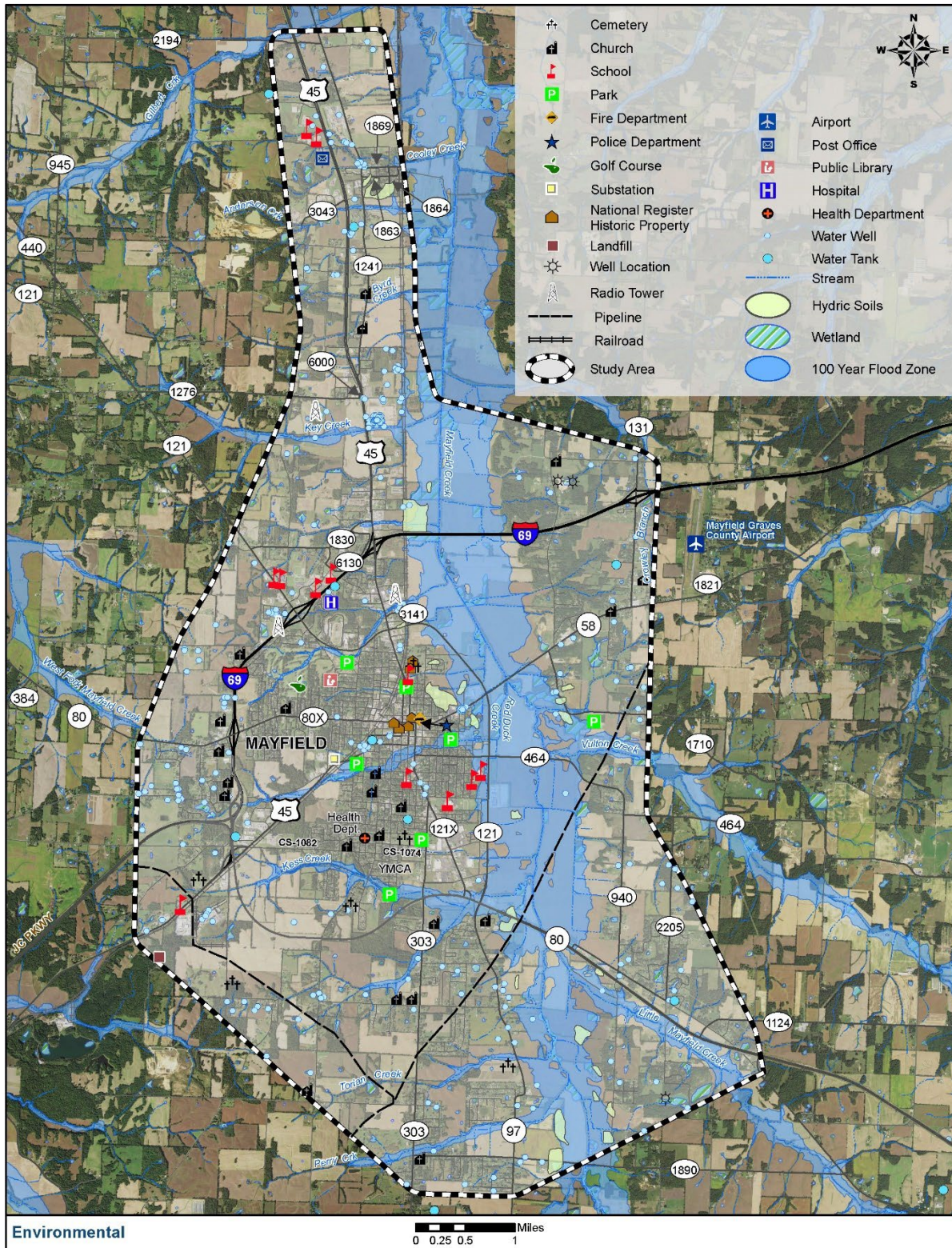


Figure 19: Environmental Overview Map

Protected Species. Three bat species within the study area are on the federal list of Threatened or Endangered Species, summarized in **Table 8**. No designated critical habitat lies within the study area.

Table 8: Threatened and Endangered Species Listed in Mayfield SUA

Name	Scientific Name	Status
Gray bat	<i>Myotis grisescens</i>	Endangered
Indiana bat	<i>Myotis sodalis</i>	Endangered
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened, with 4D Rule

Projects that occur within an area of known bat habitat (i.e., near caves, forested parcels, or stream corridors) will require project-specific evaluation to assess appropriate minimization/mitigation measures. Coordination with the US Fish and Wildlife Service Kentucky Field Office will be necessary to determine the need for future project-specific surveys.

Geotechnical. The study area lies within the Jackson Purchase or Mississippi Embayment physiographic region which consists of alluvial deposits and loess. This part of Kentucky is relatively flat lying with numerous lakes, ponds, sloughs, and swamps. It is not prone to karst features common throughout other portions of the state. Shown in **Figure 19**, numerous water wells serve the area; Kentucky Geological Survey records show neither oil nor gas wells in the vicinity.

Farmland Soils. The Natural Resource Conservation Service (NRCS) soil survey shows nearly 59% of the study area soils as prime farmlands. If drained or otherwise protected from flooding, an additional 6% meets the criteria for prime farmland. Additionally, nearly 7% of the soils represent farmlands of statewide importance. The remaining 28% are not prime farmland soils. The geographic distribution of these designations is shown in **Figure 20**. No agricultural districts or other protected easements were identified in the vicinity of the study area.

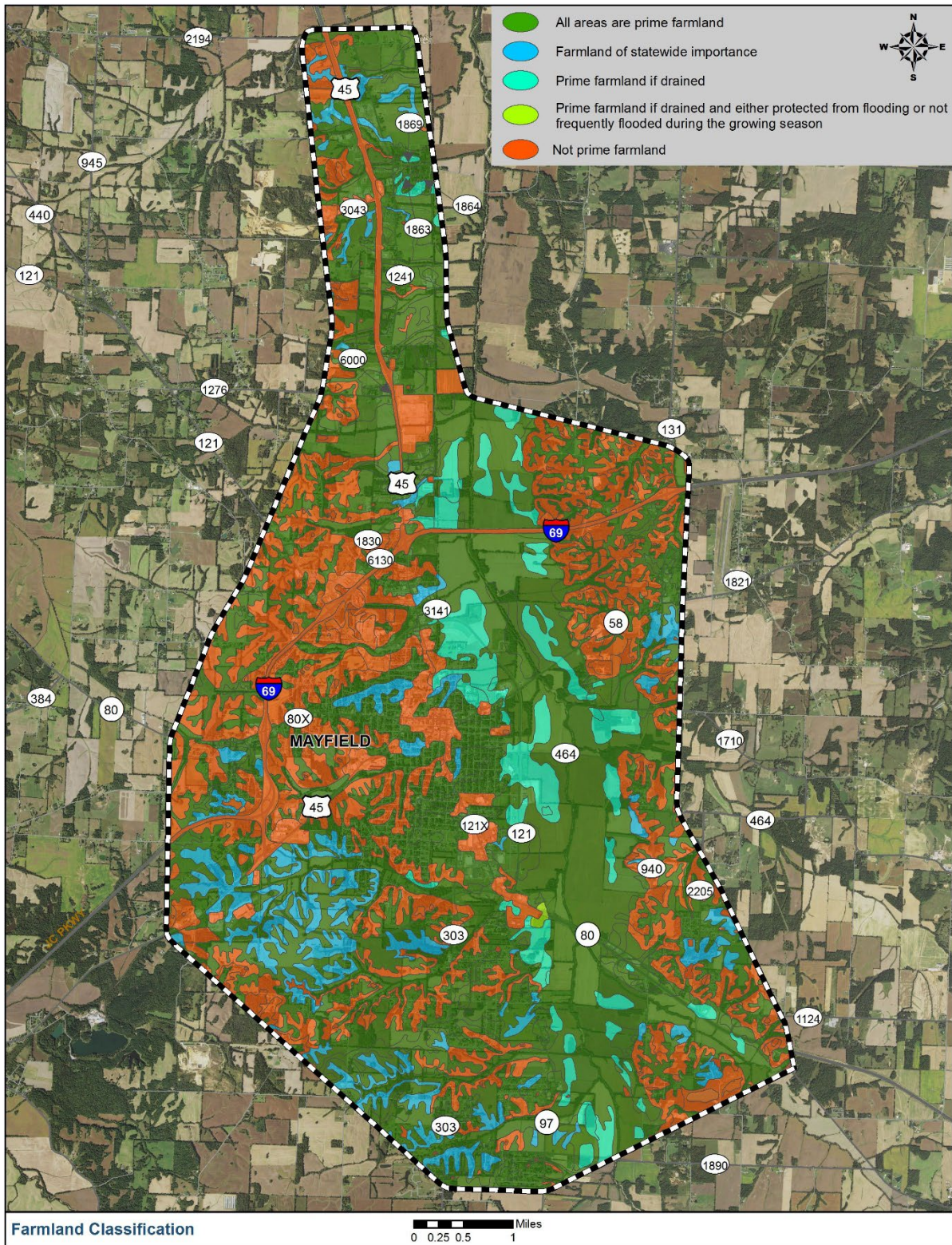


Figure 20: NRCS Farmland Soil Classification

3.2 Human Environment

The human environment is often defined as the built environment—the communities in which we live. Such resources potentially impacted by roadway projects are discussed in the following sections.

3.2.1 Land Use

Land use in and around Mayfield is primarily rural outside of the heart of the city. PADD provided the city's zoning map shown in **Figure 21**. Most is zoned as residential. Areas along KY 80, KY 58, KY 121X, and KY 121 are zoned for businesses with industrial zoning primarily along the rail corridor. School campuses are concentrated north of I-69 between KY 121 and US 45 and southeast of downtown.

No land use zoning regulations exist in Graves County outside of Mayfield city limits. Surrounding rural communities include Hickory, Kirksey, Farmington, Sedalia, Wingo, Dublin, and Fancy Farm.

Numerous community resources are located within the study area, shown in **Figure 19** above.

Parks and Recreation. Each county maintains a network of parks and public greenspaces. Public parks are protected by Section 4(f) of the US Department of Transportation Act of 1966, which protects public parks, recreation areas, wildlife refuges, and historic sites from conversion to a transportation use. Ten park and recreation areas identified in and around Mayfield are listed in **Table 9** (page 36).

Parks and recreation areas receiving grants through the Land and Water Conservation Fund Act (LWCFA) are also protected by Section 6(f) of LWCFA regulations. Overall, 7 LWCFA grants have been awarded Graves County (**Table 10**, page 36).

If a proposed improvement involves additional right-of-way from within a park or recreation area, Section 4(f) and Section 6(f) requirements should be considered during future project development phases.

Churches and Cemeteries. Dozens of churches and other places of worship are located throughout the study area, as shown in **Figure 19**. Six cemeteries serve the region; most notably, Maplewood Cemetery is a large, historic burial ground and features a collection of life-size limestone statues. Additional unmarked burial grounds may exist, particularly as small family plots are common in more rural areas.



Wooldridge Monuments, Maplewood Cemetery

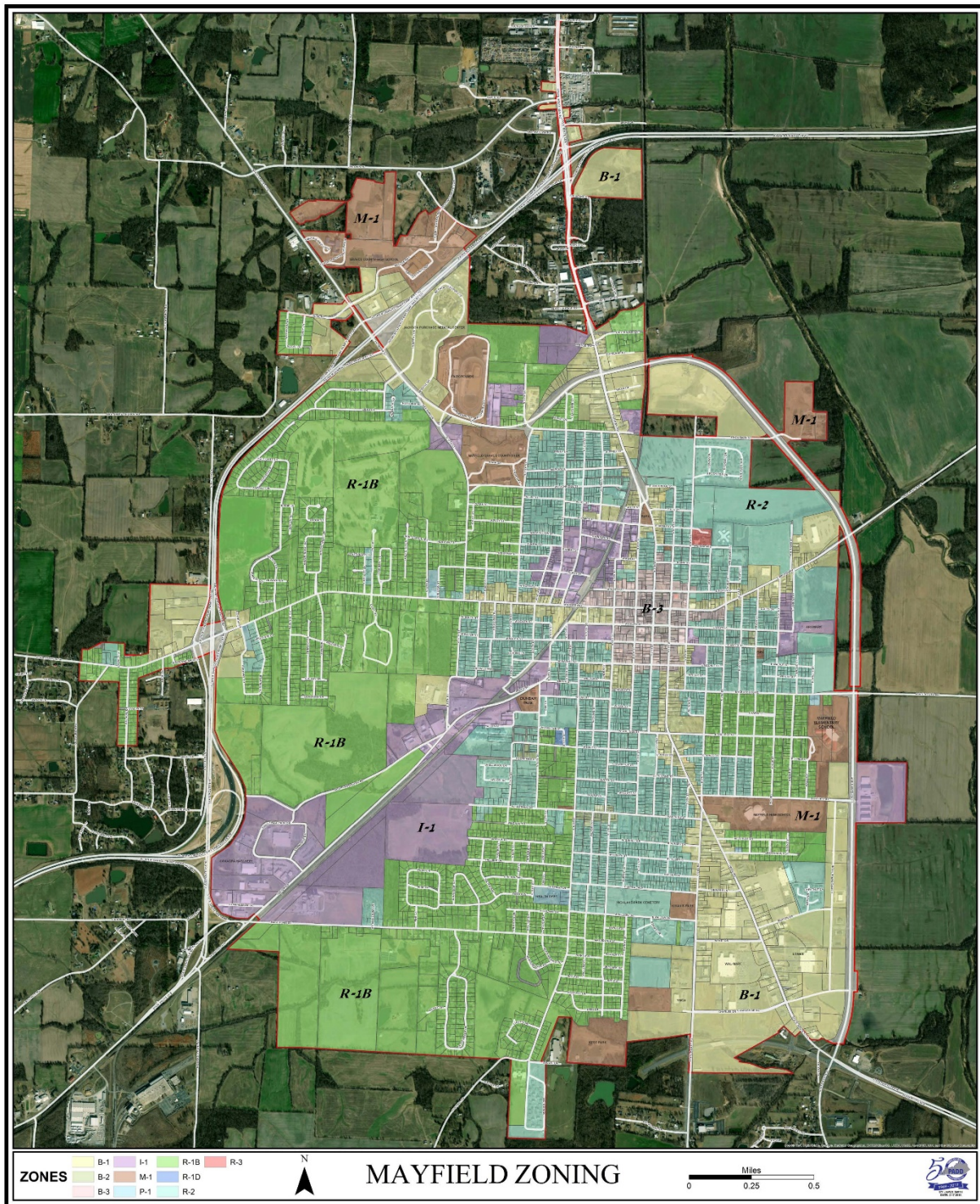


Figure 21: Mayfield Zoning Map

Table 9: Potential Section 4(f) Recreational Properties

Resource Type	Resource Name	Resource Location
Park	Kess Creek Park	201 Locust
Park	Anderson Park	Indiana and 6th Street
Park	Kiwanis Park	KY 303 (Cuba Rd)
Park	Harmon Park	101 West James Street
Park	Dunbar Park	601 South 12th Street
Park	Eddie Williams Park	300 Pryor Street
Park	Lions Club Park	903 North 15th Street
Park	Dog Park	903 North 15th Street
Walking Trail	Oak Grove Walking Trail	903 North 15th Street
Ballparks	Mayfield/Graves County Ballparks	900 North 17th Street

Table 10: Section 6(f) LWCFA* Grants in Graves County

ID	Grant Name	Sponsor	Amount	Year	Type
336	Wingo Neighborhood Park	City of Wingo	\$5,881.38	1978	Combination
391	Mayfield Tennis Courts	City of Mayfield	\$43,386.65	1978	Development
423	Mayfield-Graves County Swimming Pool	City of Mayfield & Graves Co.	\$184,992.78	1978	Development
649	Mayfield Neighborhood Park	City of Mayfield	\$20,079.91	1985	Development
873	Mayfield/Graves County Park	City of Mayfield & Graves Co.	\$32,773.64	1986	Redevelopment
1142	Kiwanis Park	City of Mayfield	\$13,675.23	1995	Development
1237	Mayfield/Graves County Tennis Facilities Expansion	City of Mayfield	\$58,710.00	2006	Redevelopment
336	Wingo Neighborhood Park	City of Wingo	\$5,881.38	1978	Combination
391	Mayfield Tennis Courts	City of Mayfield	\$43,386.65	1978	Development

* Land and Water Conservation Fund Act

Schools. Several school districts representing 12 educational facilities serve the project area: Graves County Schools, Mayfield Independent Schools, Northside Christian School (private), and St. Joseph Catholic School (private).

Major Employers. PADD's 2020 *Comprehensive Economic Development Strategy*⁹ highlights economic development initiatives for the region. Within the SUA study area, the US 45 corridor is the focus for industrial growth. The Pilgrim's Pride Corporation is a poultry plant off US 45 near

⁹ Online at <https://www.purchaseadd.org/local-government/>

Hickory, employing 1,250 individuals. Other large employers include Progress Rail Services Corporation (270 employees), J U Kevil Industries (120 employees), and Mayfield Consumer Products (116 employees)¹⁰. At the former Mid-Continent University, WK&T Technology Park covers 23 acres, envisioned to develop as a state-of-the-art mixed-use campus with an emphasis on innovation and technology. The 200-acre Grace Commercial Park is under development near the US 45/KY 1276 intersection. Nearby Hickory Industrial Park announced a \$7 million investment in August 2020 creating 175 full-time jobs, in addition to 90+ acres remaining for development.



Pilgrim's Pride poultry plant off US 45

Other Services. Civic services are located primarily in downtown Mayfield at city hall and the county courthouse. The Mayfield Fire Department has three fire stations—located on West Broadway, South 10th Street, and South 6th Street. Mayfield Police Department provides law enforcement and Mayfield-Graves County Emergency Medical Service provides emergency medical services.

3.2.2 Historic Resources

Numerous historic districts and properties are located within the study area. Investigations in late 2020 identified 391 previously surveyed resources within the study area limits, plus one historic district. The Mayfield Downtown Commercial Historic District was listed on the National Register of Historic Places (NRHP) in 1984 for its historic and continuing role as the governmental, commercial, and industrial center of Graves County and for its architecture. The district includes 62 contributing structures, dating to the mid-19th and early 20th centuries. Four individual properties have also been listed on the NRHP: Wooldridge Monuments, the post office, the Confederate memorial outside the courthouse, and the Confederate memorial gates at Maplewood Cemetery. Two others—the county courthouse and the J.L. Sherrill Tobacco Warehouse—were previously determined to be NRHP eligible though they have not been formally listed.

A windshield survey to identify additional properties was also conducted, focusing on structures along study routes that could satisfy NRHP criteria. Results are summarized in **Figure 22** with additional details in **Appendix C**.

¹⁰ Statistics provided by KY Cabinet for Economic Development, December 2017

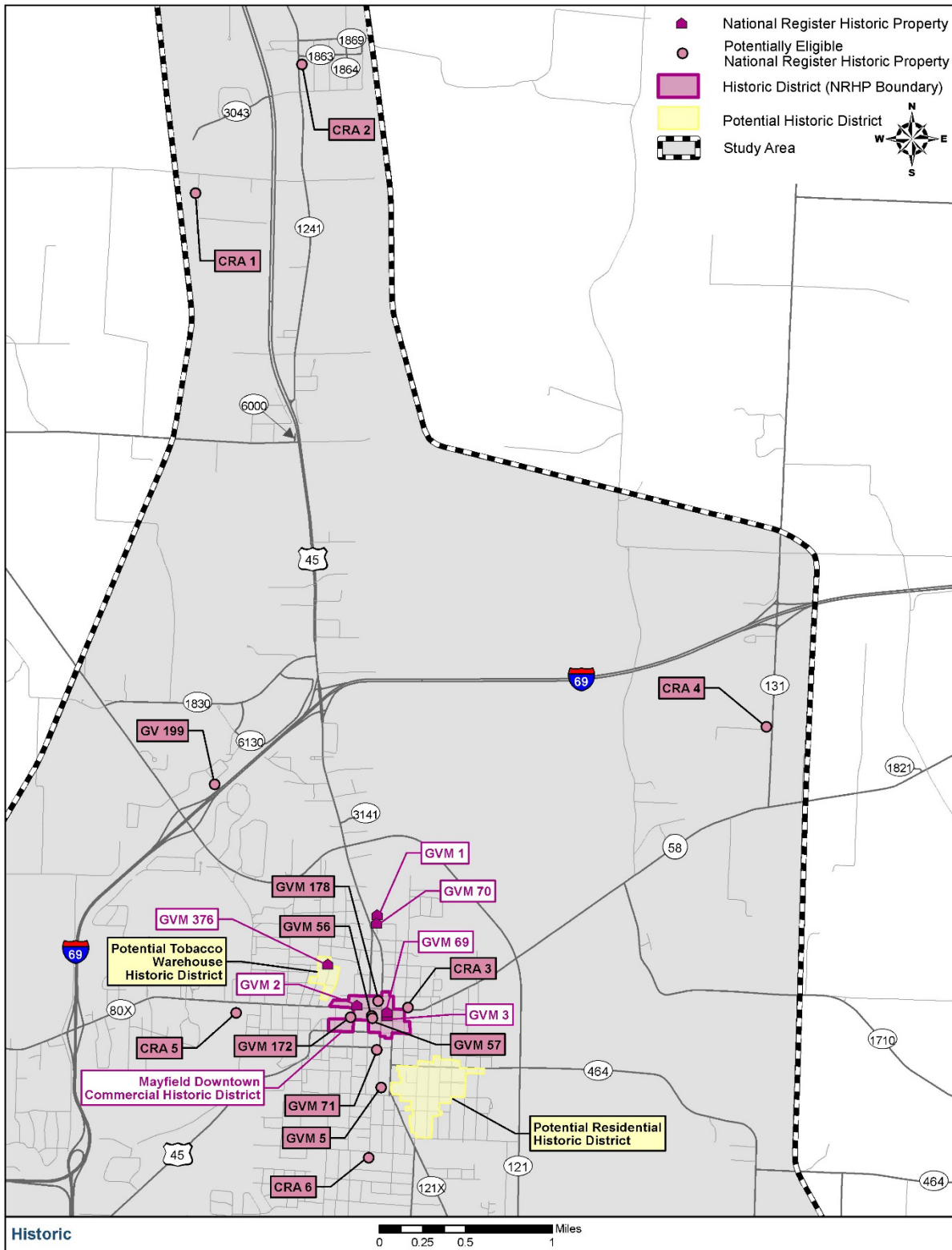


Figure 22: Potential NRHP Resources from Windshield Survey

Based on the windshield survey, two potential districts were identified:

- Tobacco Warehouse District, northwest of downtown, still known today as the “tobacco district” with several intact warehouses and notable streetscaping features.
- Residential Historic District, roughly bounded by KY 464 to the north, Usher and Brand streets to the east, KY 121 to the west, and College and Douthitt streets to the south. Homes primarily consist of single-family residences dating to the late 19th and early 20th centuries. Queen Anne, Colonial Revival, Craftsman, and Tudor Revival style residences, as well as T-plans, Bungalows, and Foursquare dwellings are common in the area.

Beyond the districts, pink dots in **Figure 22** denote individual structures identified as potentially NRHP eligible during the windshield survey. **Table 11** provides summary information for each.

Table 11: Potential NRHP Eligible Resources Beyond Potential Districts

Map ID	Name	Location
CRA 1	Log Residence	111 Chapman Rd
CRA 2	Hickory Post Office	1976 KY 1241
CRA 3	TVA Power Building	301 E Broadway
CRA 4	Log Residence	KY 131
CRA 5	Residence	1114 W Broadway
CRA 6	Residence	W Farthing St
GV 199	Hickory School	Eagles Way
GVM 5	Maplewood	614 S 7 th St
GVM 56	Education Building	110 S 8 th St
GVM 57	First Baptist Church	120 S 8 th St
GVM 71	Magnolia Manor	401 S 7 th St
GVM 172	First Christian Church	115 S 9 th St
GVM 178	Mayfield City Ice Plant	116 W North St

If any proposed improvements involve additional right-of-way from within a listed or eligible NRHP site, Section 4(f) requirements must be considered during future project development phases. Consultation with the Kentucky Heritage Council would also be required in accordance with Section 106 of the *National Historic Preservation Act*.

3.2.3 Demographic Trends

Included as **Appendix D**, an assessment of demographic trends was completed by PADD to identify potential sensitive population concentrations. This socioeconomic study reviewed 2018 Census estimates to identify potential environmental justice (EJ) concentrations of low-income, minority, elderly, disabled, or limited English proficiency (LEP) persons.

Summarized in **Table 12** and **Figure 23**, the analysis concluded that potential EJ populations exceed county averages in 16 of 17 block groups within the study area. Red text highlights concentrations greater than the countywide average.

Additional EJ analyses may be required as part of future project development phases, especially if improvements in any of the block groups with above average EJ populations require additional right-of-way or residential relocations.

Table 12: Summary of Demographic Trends, Graves County

Geography	Population	% Minority	% Below Poverty	% Elderly	% Disabled	% LEP
United States	312,916,765	23.5	13.4	14.9	12.6	8.5
Kentucky	4,293,245	12.4	16.9	15.2	17.3	2.2
Purchase Region	196,370	12.3	17.3	18.9	20.4	1.6
Graves County	37,248	13.2	17.7	17.9	21.0	3.4
CT 201 BG 1	963	34.8	59.6	14.4	29.6	3.8
CT 201 BG 2	1013	38.5	7.5	9.1	18.5	16.7
CT 201 BG 3	1105	17.3	8.6	27.3	23.2	2.4
CT 201 BG 4	874	15.8	36.2	34.6	34.0	0.0
CT 202 BG 1	1611	32.3	31.3	9.8	28.6	5.4
CT 202 BG 2	1599	23.0	21.5	14.1	21.0	4.3
CT 202 BG 3	1468	10.4	19.8	30.2	30.5	0.0
CT 203 BG 1	1086	46.9	58.3	4.8	18.3	37.2
CT 203 BG 2	615	8.6	17.7	25.2	13.5	0.0
CT 203 BG 3	699	14.9	17.5	27.5	15.3	4.4
CT 203 BG 4	1032	39.1	27.3	20.1	28.6	6.4
CT 203 BG 5	2337	3.1	26.0	17.3	23.7	0.0
CT 207 BG 2	1965	10.3	18.3	16.2	20.8	3.8
CT 207 BG 3	708	2.1	5.3	13.4	13.4	0.0
CT 208 BG 3	2566	4.8	7.3	20.8	16.9	0.0
CT 209 BG 1	2182	15.7	7.0	16.2	19.0	7.0
CT 209 BG 2	906	6.4	12.8	19.1	24.3	0.0

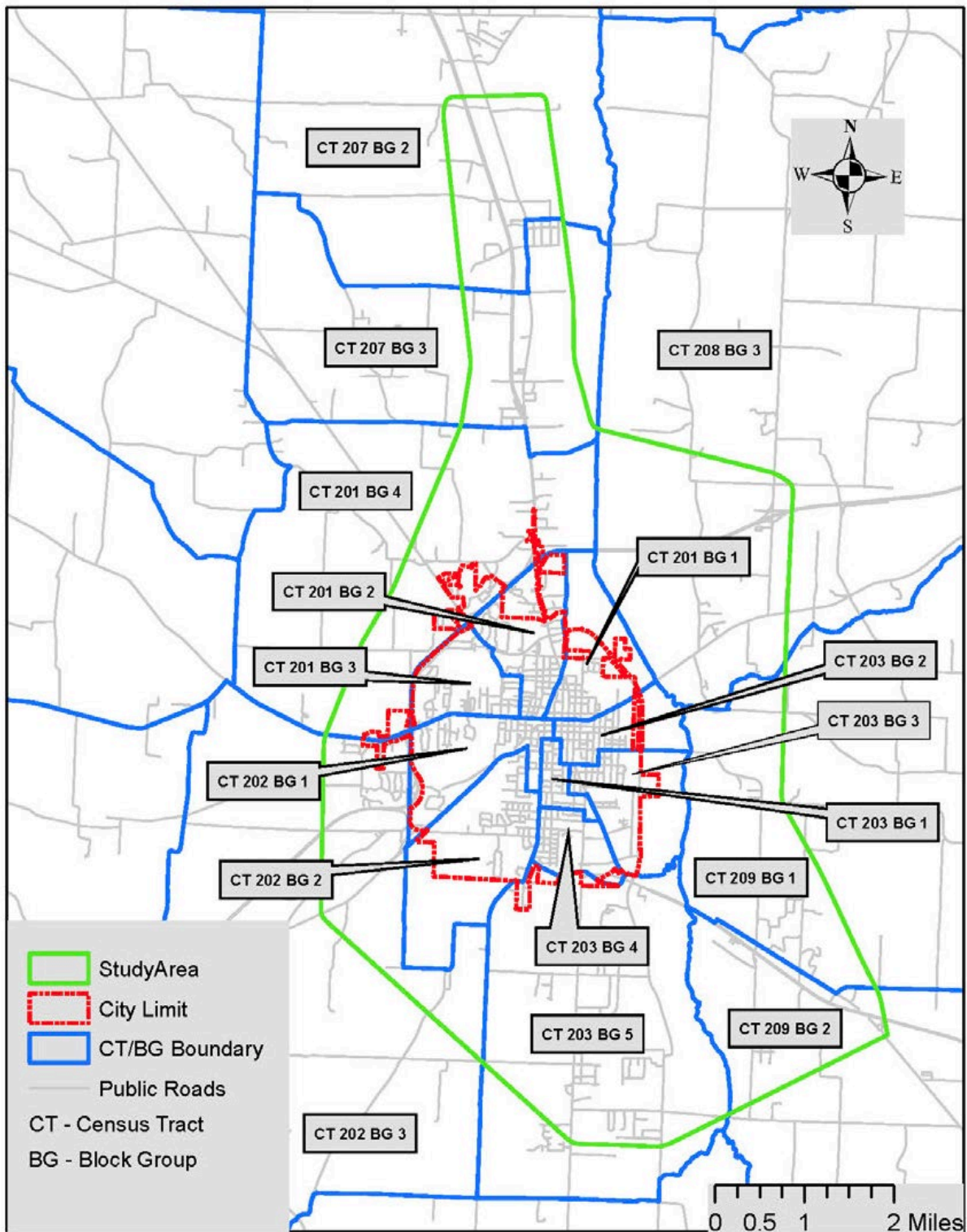


Figure 23: Reference Geographies for EJ Analyses

Hazardous Materials. Due to the large size of the study area, a detailed government database search was not conducted. Instead, readily available records from the US Environmental Protection Agency (USEPA) were compiled to illustrate the range of monitored sites within the study area. As shown in **Figure 24**, these sites include:

- Superfund sites, i.e. abandoned warehouses, manufacturing facilities, and landfills.
- Toxic Release sites, including facilities that have reported toxic releases.
- Hazardous Waste sites like Resource Conservation/ Recovery Act (RCRA) that report all facilities that generate, transport, treat, store, or dispose of hazardous waste.

Air Quality Considerations. Graves County is in attainment for National Ambient Air Quality Standards for all six criteria pollutants monitored by the USEPA: ozone, lead, nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter. Nationally, air quality has been steadily improving with these criteria pollutants declining over the past few decades.

To demonstrate air quality conformity, federally funded transportation capacity projects recommended for further development should be modeled and included in KYTC's STIP to ensure conformity requirements are satisfied.

Noise Considerations. Federally funded transportation projects typically require consideration of noise impacts. Noise sensitive receptors in the vicinity of improvements include residential areas, parks, cemeteries, hospitals, churches, schools, etc. Some commercial properties with exterior uses are also considered noise sensitive. Specific traffic noise impact analyses may be required as part of future project development activities if projects are identified that add capacity or shift traffic closer to sensitive receptors.

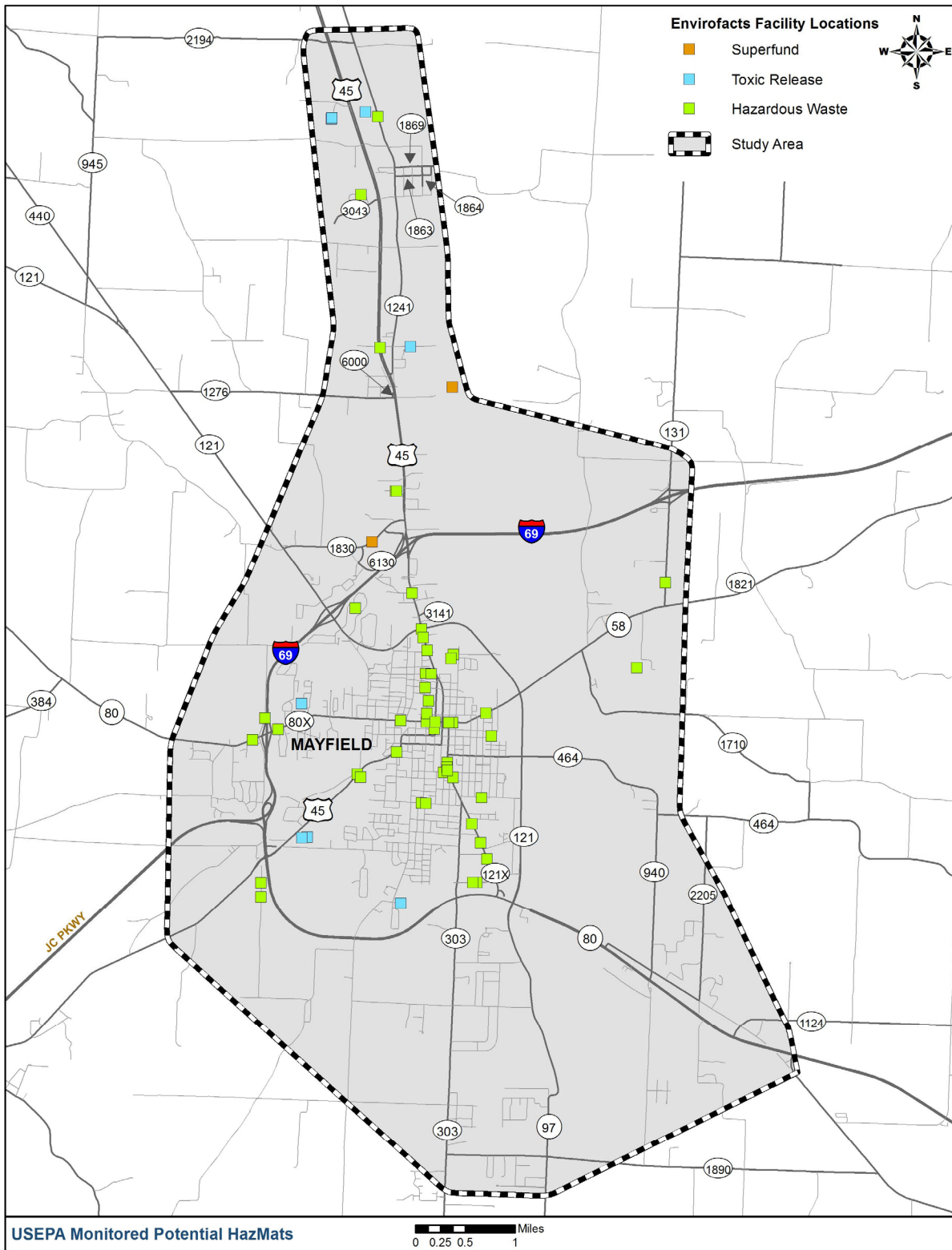


Figure 24: USEPA HazMat Concerns

4.0 INITIAL COORDINATION EFFORTS

The project team—including KYTC District 1 and Central Office personnel from various disciplines, PADD staff, and consultant personnel—met virtually throughout the course of the study. Two virtual meetings for local officials and stakeholders (LO/S) were held to gain insight into the Mayfield transportation network; public outreach efforts were undertaken through online engagement activities. Each endeavor played an important role in identifying areas of concern and developing potential improvements. Topics presented in meetings are discussed below with meeting summaries in **Appendix E**.

4.1 Online Public Engagement

To kick off the study, an online crowdsourcing map collected public input on transportation needs during July and August 2020. The site registered 271 data points divided among four categories: safety (121), congestion (85), geometry (5), and other (60). Main themes emerging from the comments included:

- Congestion and safety along KY 303 (Cuba Road)
- Drainage along KY 58 (West Broadway)
- Long traffic queues on the KY 121 bypass associated with school traffic
- Signal timing or phasing suggestions at various intersections
- Traffic calming and pedestrian safety at James Street, KY 80X (West Broadway), and KY 303 (Cuba Road).

Figure 25 shows the geographic distribution of public comments throughout the study area, highlighting the densest concentrations of comments.



Drainage issues along KY 58



School queuing along KY 121 Bypass

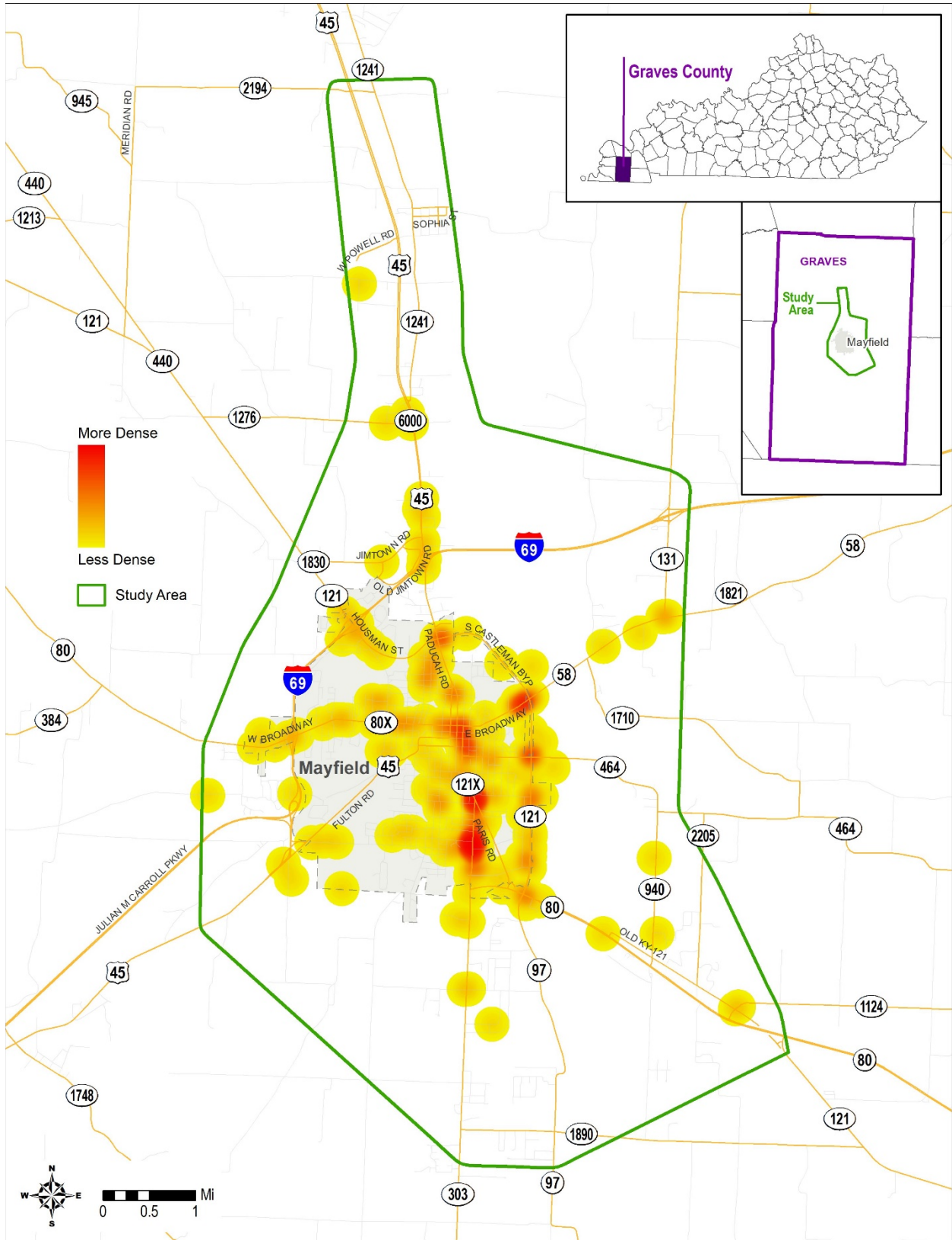


Figure 25: Heat Map showing Public Comment Concentrations

4.2 Project Team Meeting No. 1

On September 24, 2020, the project team met virtually to discuss existing conditions in the study area. The meeting began with a brief presentation and concluded with an open discussion of the study's goals and priorities. Existing conditions data presented included roadway characteristics, crash analyses, 2020 traffic operations, and public input collected via online crowdsourcing.

The team discussed funding for two projects included in Kentucky's *FY 2020—FY 2026 Highway Plan*: Item No. 1-80103 KY 303 widening and Item No. 1-80104 KY 131 widening. As both projects must compete for limited state funds to advance, the team agreed that both should be included in this study's prioritization activities.

4.3 Local Official and Stakeholder Meeting No. 1

On September 28, 2020, the project team hosted the first virtual LO/S meeting. A selection of elected officials, law enforcement agencies, business leaders, utility providers, and school representatives were invited to participate in the study. The meeting began with a brief presentation of existing conditions and concluded with an open discussion of transportation needs in the study area.

The group discussed areas of local concern—specifically semi-truck congestion at US 45 and Poultry Drive during shift changes and recurring congestion at each of the schools in the study area. Queues back up onto KY 121 during afternoon pickup.

5.0 2045 NO-BUILD TRAFFIC FORECAST AND OPERATIONS

KYTC's statewide traffic demand model (version 5961 in TransCAD 7), along with 2020 mainline and turning movement counts, formed the basis of future year 2045 traffic projections. The complete *Traffic Forecast Report* can be found in **Appendix A**.

5.1 Future Year Traffic Assumptions

KYTC's statewide traffic demand model estimated future year growth for all study area roadway segments. The model simulates a 24-hour period, relying on K- and d-factors to derive DHV. For the analysis, geographic zones were adjusted to refine results—splitting zones at major roadways to group similar land uses or special traffic generators like schools. Socioeconomic projections show a loss in total households for the study area, with residential growth concentrated in the southwest portion of the study area limits. Employment is anticipated to increase by 560 new jobs, concentrated in areas west of downtown. The KY 80 extension between US 45 and KY 303 was included in the future No-Build scenario.

5.2 2045 No-Build Traffic

A 2045 No-Build scenario was run to project future traffic volumes, adjusted appropriately to reflect existing count data and eliminate negative growth projections. For roadways showing positive growth, future year model assignments were adjusted and averaged to determine future year ADT and DHV.

Most analysis segments exhibited little to no growth, corresponding to the static county population projections anticipated by the Kentucky State Data Center through 2040.¹¹ With the KY 80 extension, traffic volumes using KY 80 and the KY 121 Bypass are anticipated to increase, adding about 5,700 and 3,000 vpd, respectively. US 45 near KY 1276 also increases by about 2,000 vpd near the proposed industrial parks. Aside from these facilities, changes in traffic patterns are relatively minor between the Existing and No-Build scenarios.

5.3 2045 No-Build Operations

Intersection LOS associated with the No-Build scenario are presented in **Table 13**; shaded cells represent locations where LOS changed versus the Existing forecasts. Several intersections along the bypass experience worse LOS in the future No-Build scenario, associated with the increased volumes.

Table 13: 2045 No-Build Intersection LOS and v/c

Intersection	Control	AM LOS ¹	AM v/c ²	PM LOS ¹	PM v/c ²
US 45 (7 th St) at KY 58 (Broadway)	Signal	A	0.1-0.5	A	0.1-0.7
US 45 (Paducah Rd) at Hickory Rd/Poultry Dr	Two-way Stop	D-F	0.0-1.0	D-F	0.0-0.4
US 45 at KY 121 Bypass	Signal	C	0.1-0.9	C	0.2-0.8
KY 121 Bypass at KY 58 (E Broadway)	Signal	E	0.2-1.1	D	0.1-1.2
KY 121 Bypass at KY 464 (Backusburg Rd)	Two-way Stop	F	0.0-2.0	F	0.0-2.5
KY 121 Bypass at Douthitt St	Two-way Stop	F	0.0-1.0	F	0.0-2.2
KY 121 Bypass at KY 80/KY 97	Signal	F	0.0-2.3	F	0.2-1.1
KY 121X (Paris Rd) at Douthitt St	Two-way Stop	B	0.0-0.1	B	0.0-0.1
KY 121X (Paris Rd) at 3 rd St/KY 303 (Cuba Rd)	Signal	D	0.8-0.9	D	0.0-0.9

¹ LOS presented for overall intersection at signals and for stop-controlled approaches where unsignalized

² v/c reported by approach/lane group

Traffic operations for segments are summarized in **Table 14**; 2045 No-Build ADT volumes and LOS are illustrated in **Figure 26** (page 49). Segments of five routes exhibiting LOS E in 2020 are predicted to remain at LOS E in 2045: KY 80X (West Broadway), KY 121X (Paris Road), KY 131, KY 303, and CS-1238 (East Farthing Street). Operations degrade to LOS E along portions of four study routes:

¹¹ <http://ksdc.louisville.edu/data-downloads/projections/>

KY 58 (East Broadway), KY 121 (Bypass), KY 1276, and KY 1710. The highest v/c ratio is 0.58, occurring along KY 121.

Table 14: 2020 and 2045 No-Build Traffic Operations

Route	2020		2045 No-Build					
			AADT	LOS	v/c			
US 45	13.500	24.400	1,830-17,400	A-C	0.06-0.31	2,200-19,400	A-C	0.05-0.35
US 45 001	16.669	17.526	1,550-4,660	A	0.05-0.38	1,600-4,700	A	0.05-0.17
KY 58	5.530	8.400	2,990-12,280	A-D	0.12-0.38	4,200-12,300	A-E	0.17-0.26
KY 80	8.700	16.100	3,300-8,330	A-C	0.06-0.22	3,500-14,000	B-C	0.09-0.27
KY 80X	0.000	1.825	6,120-9,000	D-E	0.25-0.32	6,900-9,100	D-E	0.29-0.32
KY 97	15.100	18.262	2,020-3,670	C	0.11-0.15	2,200-4,300	C	0.13-0.17
KY 121	5.300	11.100	1,280-12,900	A-D	0.09-0.47	1,400-16,000	A-E	0.10-0.58
KY 121X	0.000	1.870	10,870-11,710	E	0.40-0.41	11,700-13,300	E	0.40-0.51
KY 131	0.000	1.600	3,760-4,080	C-E	0.13-0.17	4,100-4,300	C-E	0.15-0.18
KY 303	12.900	16.853	3,110-7,770	C-E	0.11-0.31	3,100-8,600	C-E	0.11-0.34
KY 464	0.000	2.700	650-1,750	A-C	0.04-0.09	900-1,800	B-C	0.05-0.10
KY 940	0.000	1.679	570	B	0.03	700	B	0.03
KY 1124	0.000	0.600	390	A	0.02	600	A	0.02
KY 1241	0.000	3.500	2,750	C	0.15-0.17	2,900-3,100	C	0.15-0.19
KY 1276	1.500	2.257	1,030	D	0.05	2,000	E	0.10
KY 1710	0.000	1.513	620	D	0.04	900	E	0.06
KY 1830	0.000	1.324	1,100	D	0.13	1,200	D	0.13
KY 1863	0.000	0.449	240	B	0.01	300	B	0.01
KY 1864	0.000	0.200	70	B	0.00	100	B	0.01
KY 1869	0.000	0.387	180	A	0.01	200	B	0.01
KY 1890	0.000	1.700	410-630	B-C	0.02-0.03	600-1,000	B-C	0.00
KY 2194	2.904	3.456	110	D	0.01	200	D	0.01
KY 2205	0.000	2.500	200-450	A	0.01-0.02	300-600	A	0.01-0.03
KY 3043	0.000	0.503	1,140	D	0.05	1,500	D	0.06
KY 3141	0.000	0.185	240	B	0.02	300	B	0.02
KY 6000	0.000	0.049	80	A	0.00	100	A	0.00
KY 6130	0.000	1.061	1,650	C	0.23	2,100	D	0.30
CS-1032/S 10 th St	0.230	1.320	1,230-5,000	B-D	0.05-0.19	1,200-5,000	B-D	0.05-0.19
CS-1074/Willow Dr	0.000	0.180	4,660	C	0.16	4,700	D	0.16
CS-1082/ Macedonia St	0.000	1.280	2,020-4,080	C-D	0.08-0.15	2,000-4,100	B-D	0.07-0.15
CS-1098/W Farthing St	0.420	0.740	5,120	D	0.21	6,600	D	0.27
CS-1238/E Farthing St	0.000	0.190	9,800	E	0.05-0.19	9,800	E	0.05-0.19

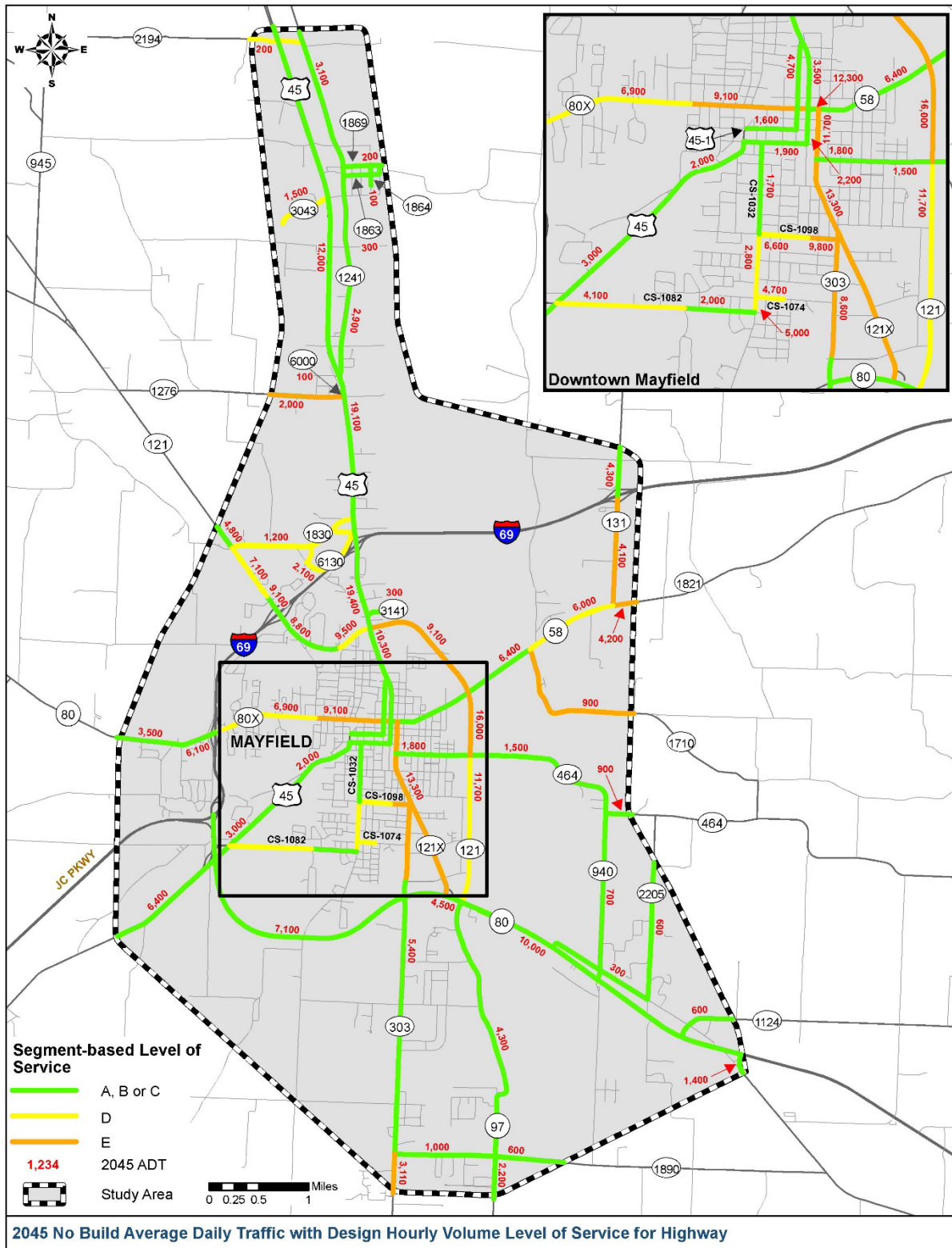


Figure 26: No-Build Traffic Volumes

6.0 CONCEPT DEVELOPMENT

Initial concepts to improve safety and reduce congestion were developed based on review of existing geometric deficiencies, existing and future traffic operations, crash concentrations, field reconnaissance, and input from the project team, community leaders, and the public. Each concept was categorized into two groups:

- **Small-Scale** improvement concepts are relatively lower cost projects that may be implemented in the near future, requiring little to no additional right-of-way, and possibly completed as maintenance actions.
- **Large-Scale** improvement concepts are relatively high-cost projects, often requiring additional right-of-way, additional project development activities, and funding through traditional sources in Kentucky's biennial highway plan.

The concept development process began with a list of all locations within the study limits that:

- Represent KYTC priorities—i.e., any listed in Kentucky's *FY 2020—FY 2026 Highway Plan* or sponsored in the 2020 SHIFT process.
- Operate at LOS E in the 2020 Existing segment-level HCS analyses.
- Contain high crash segments with a CCRF greater than 1.0 or 0.1-mile spots with a CCRF greater than 1.25.
- Reflect local concerns—i.e., any mentioned at the initial LO/S meeting or recurring comments via the public crowdsourcing app.

The consultant team initially evaluated existing conditions data at 40 locations meeting these criteria—reviewing crash trends, community concerns, and geometric features to identify problem areas and feasible solutions. The list was reduced to 19 locations for potential improvements by grouping some intersections into corridors and by removing high crash sites warranting no physical infrastructure improvements—e.g., if ignoring crashes involving DUIs or animal collisions reduced the CCRF below 1.0.

6.1 Project Team Meeting No. 2

On November 4, 2020, the project team met virtually to discuss initial improvement locations and concepts. The meeting began with a brief overview of existing conditions, highlighting the correlation between needs and improvement concepts. A set of initial improvement concepts were discussed: 12 small-scale spots and 7 large-scale corridors. Small-scale improvements included mostly intersection improvements—tweaking signal timing/phasing, increasing visibility, or adding turn lanes—and pedestrian amenities. Large-scale improvements represented corridor-level widening, signal coordination, and/or access management. Detailed discussion items from the meeting are in **Appendix E**.

Improvement concepts advanced for prioritization include 11 small- and 8 large-scale projects illustrated in **Figure 27** (next page) and described in **Table 15** and **Table 16**. Additional information on each concept is provided on individual project sheets in **Section 8.1**.

Table 15: Small-Scale Improvement Concepts Advanced for Prioritization

Location	Needs	Improvement
A. US 45/Broadway	Capacity, safety	Signal and striping improvements
B. US 45/James St	Safety	Crosswalks, lighting, improved visibility
C. US 45/KY 121 Bypass	Safety, comments	Crosswalk and signal improvements
D. US 45/Poultry Drive	Safety, comments	Widen with R-CUT intersection at US 45
E. KY 121 Bypass/KY 80	Safety, future traffic	Signal improvements for visibility
F. KY 121 Bypass/Douthitt St	Safety, school traffic	Signalize with Right Turn Lane
G. KY 121 Bypass/KY 464	Safety, school traffic, comments	School zone with right turn lane and add lighting
H. KY 121 Bypass/KY 58	Capacity, safety	Signals, striping and lighting
J. KY 303/Tucker Rd	Safety, comments	Left turn lanes with improved visibility
K. KY 97 S-curve	Safety	Repave to fix superelevation
L. KY 58 E Broadway	Safety	Maintenance for drainage

Table 16: Large-Scale Improvement Concepts Advanced for Prioritization

Location	Needs	Improvement
M. US 45 north of I-69	Safety	Five-lane with access management
N. KY 80X W Broadway	Capacity, safety, comments	Signal coordination and crosswalks
O. KY 121 Bypass	Capacity, safety, comments	Widen, high visibility signals
P. KY 121X Paris Road	Capacity, safety, comments	Access management
Q. KY 121X Sixth St	Capacity, safety, comments	Signal, crosswalk, and parking improvements
R. KY 131	Future traffic, Six Year Plan	Three-lane
S. KY 303 Cuba Rd	Capacity, safety, comments	Three-lane with sidewalk
I. KY 121X Paris Rd/ KY 303 Cuba Rd	Capacity, safety, comments	Reconstruct intersection

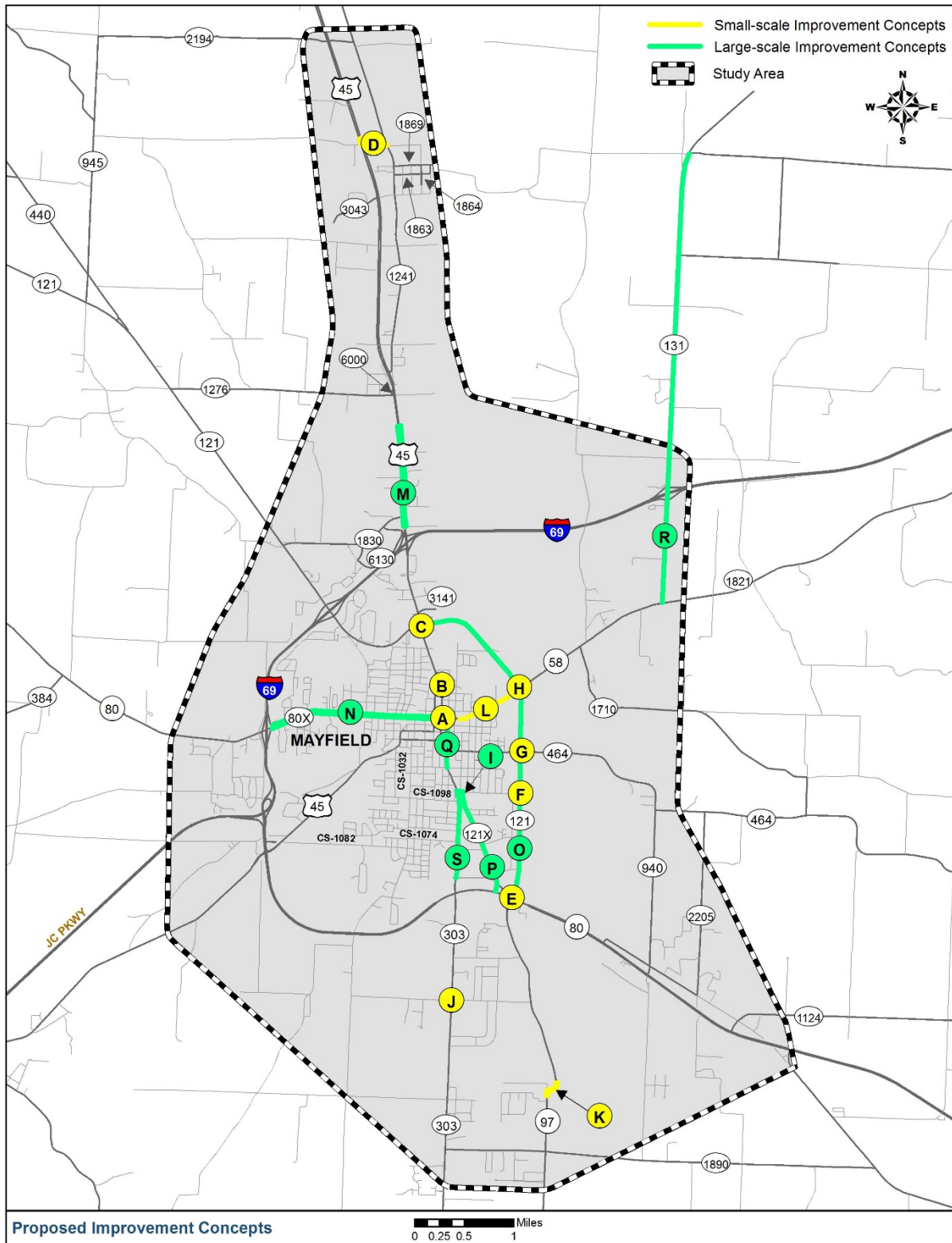


Figure 27: Proposed Improvement Concepts

While most concepts are straightforward, a few merit discussion.

Spot D, near the Pilgrim's Pride poultry plant north of town, includes two components: the intersection itself and the local route connection. The US 45 intersection with Hickory Road and Poultry Drive is proposed for reconstruction as a restricted crossing U-turn (R-CUT) style intersection. An R-CUT eliminates left turn movements from the minor cross streets, converting them to right turns with a downstream U-turn. A standalone component proposes to widen Poultry Drive to provide two 12-foot lanes with 8-foot shoulders to accommodate the high daily volume of semi-truck traffic. This standalone component would need to be locally funded as it is beyond the state-owned system.

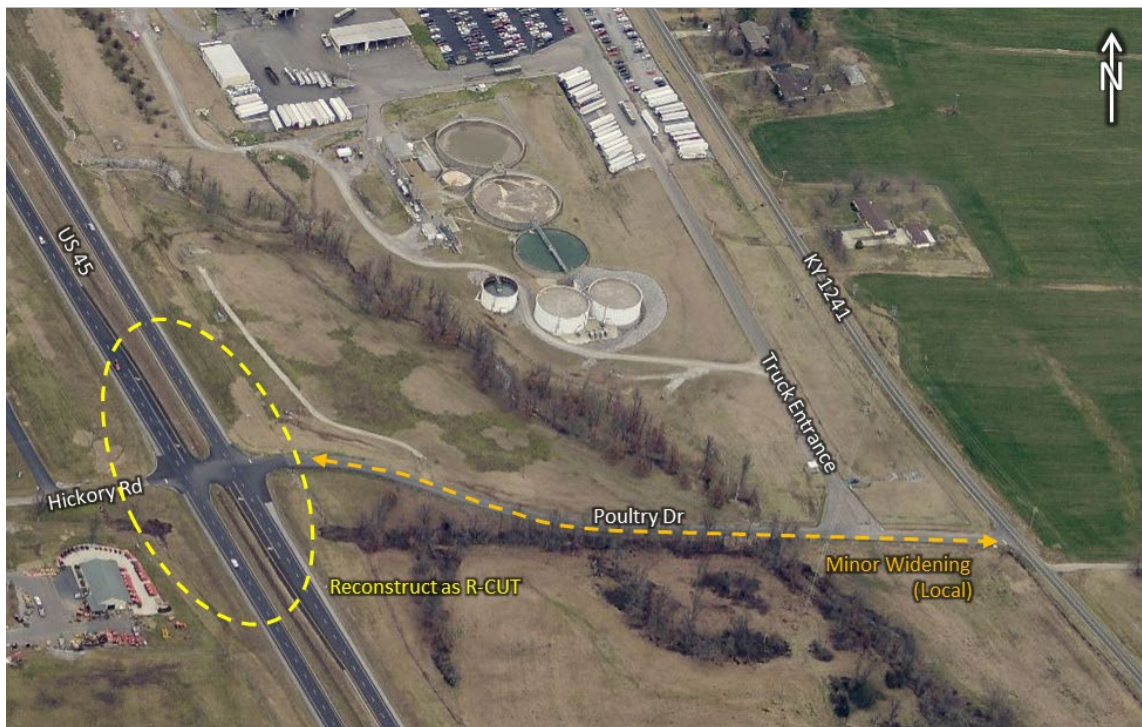


Figure 28: Spot D, US 45 at Poultry Drive

Spot P along KY 121X (Paris Road) represents one of the main commercial strips in town. High traffic volumes and closely spaced driveways contribute to the high number of reported crashes. Additional traffic data and detailed microsimulations are warranted to develop site-specific improvement measures. As this level of effort is beyond the scope of the current SUA study, a representative range of solutions was evaluated. To minimize costs and right-of-way impacts, one option assumes U-turns are enabled at key intersections along the mile-long corridor (e.g., at Charles Drive, Wyatt Drive, Mayfield Plaza entrance, and KY 303), converting intermediate driveways to right-in/right-out configurations. A larger scale improvement option assumes the route is reconstructed with a five-lane typical section.

Spot I includes the signalized offset intersection between KY 121X (Paris Road) and KY 303 (Cuba Road). Closely spaced cross-streets and driveways are routinely blocked by queues during peak periods. The acute angle between intersecting streets requires the stop bars be pulled back from the signal, increasing the time it takes to drive through the intersection thus requiring longer signal cycles. Sidewalks run along the eastern edge of KY 121X and Douthitt Street but no dedicated pedestrian facilities are provided on the south or west sides. This leads to midblock crossings and potential conflicts between pedestrians and vehicles.



KY 121X/KY 303 Intersection looking north (left) and south (right)

Several options (**Figure 29**) were considered at this location as well, including a set of T-intersections with coordinated signals (left) or a roundabout (right).

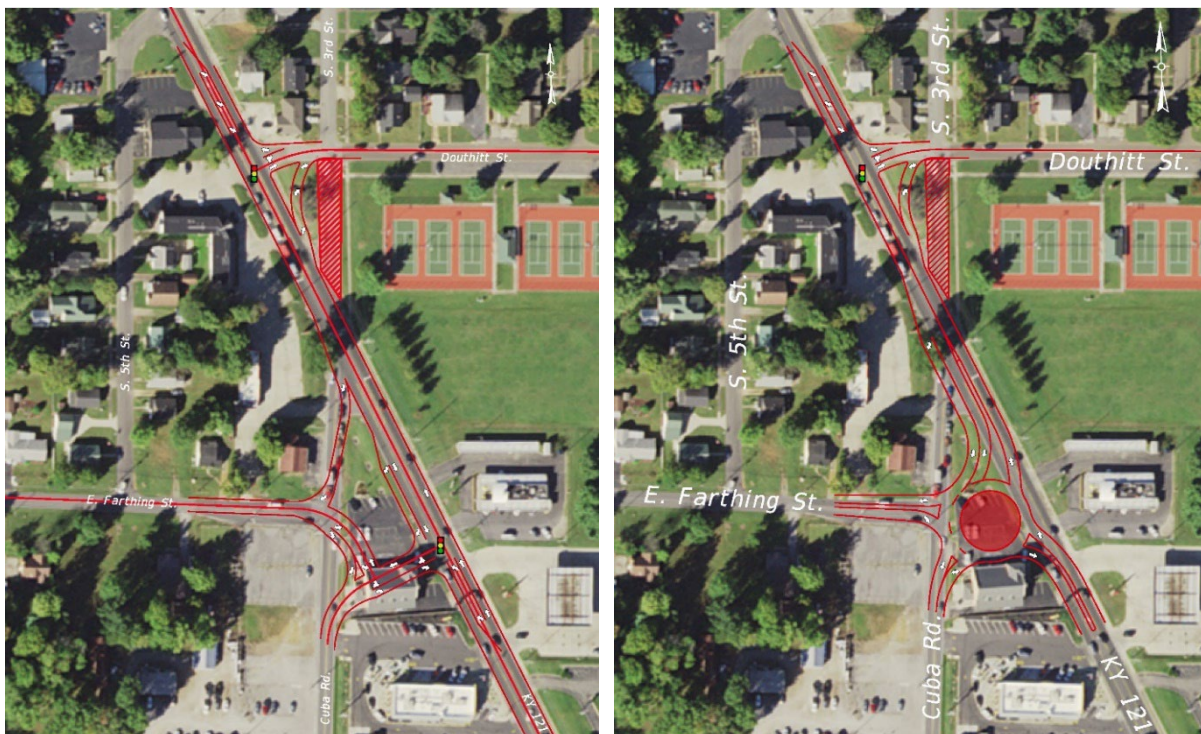


Figure 29: Range of Improvement Options Considered at Spot I

6.2 2045 Build Scenario Traffic

Spot O, widening the KY 121 Bypass to five lanes between KY 80 and US 45, represents a potential large-scale change in traffic patterns and was modeled in the statewide model. Modeling showed increased roadway capacity would draw an estimated 500-600 vpd to the facility versus the 2045 No-Build scenario. Additional information is presented in **Appendix A**.

At several locations, intersection reconstruction recommendations would impact operations:

- **Spot D:** Reconstructing the US 45 intersection with Poultry Drive as an R-CUT improves cross-street movements from LOS E-F (2045 No-Build) to LOS B (2045 Build).
- **Spot E:** The KY 80/KY 97/KY 121 intersection is forecast to operate at LOS F in the 2045 No-Build scenario, constrained by the single eastbound left turn lane onto the bypass. As the bypass is widened (Spot O), a second eastbound left turn lane could be added to reduce delays at the intersection.
- **Spot F:** Signalizing the KY 121 bypass intersection with Douthitt Street improves LOS for the eastbound approach. The eastbound Douthitt Street approach operates at LOS E-F based on 2020 traffic volumes; the signalized intersection operates at LOS B-D overall even with the higher 2045 forecast volumes.
- **Spot I:** Both the coordinated T-intersections and roundabout operate at LOS B in the build scenario, compared to LOS D based on the current configuration.
- **Spot O:** Widening the KY 121 bypass to five lanes improves segment operations from LOS D-E (2045 No-Build) to LOS A-B (2045 Build).



View of KY 121/Douthitt Street Intersection by schools (Spot F)

6.3 Cost Estimates

Table 17 summarizes cost estimates based on KYTC 2019 average bid prices and planning-level quantities for traffic items, pavement, earthwork, etc. Estimates are shown in 2020 dollars using right-of-way and utility costs provided by KYTC District 1.

Table 17: Cost Estimates by Phase (2020 Dollars)

Spot	Total Cost	Design	ROW	Utilities	Construction
SMALL-SCALE IMPROVEMENT CONCEPTS					
A. US 45/Broadway	\$40,000	\$10,000	-	-	\$30,000
B. US 45/James St	\$170,000	\$20,000	-	-	\$150,000
C. US 45/KY 121 Bypass	\$90,000	\$10,000	-	-	\$80,000
D. US 45/Poultry Drive	\$600,000	\$100,000	-	-	\$500,000
<i>R-CUT top vs widen bottom</i>	\$920,000	\$50,000	\$150,000	\$100,000	\$620,000
E. KY 121 Bypass/KY 80	\$290,000	\$30,000	-	-	\$260,000
F. KY 121 Bypass/Douthitt St	\$900,000	\$100,000	-	-	\$800,000
G. KY 121 Bypass/KY 464	\$390,000	\$40,000	-	-	\$350,000
H. KY 121 Bypass/KY 58	\$270,000	\$30,000	-	-	\$240,000
J. KY 303/Tucker Rd	\$550,000	\$50,000	\$150,000	\$100,000	\$250,000
K. KY 97 S-curve	\$450,000	\$50,000	-	-	\$400,000
L. KY 58 E Broadway	\$250,000	\$30,000	-	-	\$220,000
LARGE-SCALE IMPROVEMENT CONCEPTS					
M. US 45 north of I-69	\$1,200,000	\$100,000	-	-	\$1,100,000
N. KY 80X W Broadway	\$850,000	\$100,000	-	-	\$750,000
O. KY 121 Bypass	\$8,100,000-	\$500,000	-	\$0-	\$7,600,000-
<i>3 lane top vs 5 lane bottom</i>	\$12,300,000			\$600,000	\$11,200,000
P. KY 121X Paris Road	\$10,000,000-	\$500,000-	\$4,000,000-	\$800,000-	\$4,700,000-
<i>U-turns top vs 5 lane bottom</i>	\$21,400,000	\$900,000	\$8,000,000	\$4,000,000	\$8,500,000
Q. KY 121X Sixth St	\$1,100,000	\$100,000	-	-	\$1,000,000
R. KY 131	\$25,400,000	\$1,600,000	\$2,300,000	\$2,800,000	\$18,700,000
S. KY 303 Cuba Rd	\$12,800,000	\$800,000	\$3,500,000	\$3,500,000	\$5,000,000
I. KY 121X Paris Rd/ KY 303 Cuba Rd	\$5,700,000-	\$600,000	\$1,200,000-	\$1,000,000	\$2,900,000
	\$7,000,000		\$2,500,000		

Benefit-cost ratios were calculated for large-scale improvement concepts based on a 20-year horizon for anticipated safety improvements. Crash modification factors (CMF) from the CMF Clearinghouse¹² were applied to the three years of crash data to estimate potential safety benefits for proposed improvement concepts. The 2019 *Kentucky Traffic Collision Facts* report¹³ published by KTC provided

¹² Online at <http://www.cmfclearinghouse.org>

¹³ Online at http://kentuckystatepolice.org/wp-content/uploads/2020/10/CrashFacts2019_FY2020.pdf

monetized crash values by severity. A benefit-cost ratio greater than one signifies the discounted present value of benefits exceeds the discounted present value of the costs, indicating the project is fiscally worthwhile. Discount rates of 3 percent and 7 percent were assumed for the analysis.

Benefits could not be reliably quantified for small-scale proposed improvement concepts. Generally, calculations on low-cost concepts produce inflated benefit-cost ratios, making comparison to high-cost improvements problematic.

As presented in **Table 18**, Spots M, P (five-lane option), and S resulted in benefit-cost ratios less than 1.0, which indicates project costs outweigh projected benefits. For Spot M, replacing the raised median with a two-way left-turn lane (TWLTL) increases conflict points, likely resulting in higher crash rates or negative benefits; potential travel time savings are insufficient to outweigh the increase.

Table 18: Benefit-Cost Ratios for Large-Scale Improvement Concepts

ID	Location	Description	3% Discount	7% Discount
M	US 45 N	Five-lane with Access Management	NEG	NEG
N	KY 80X W Broadway	Signal Coordination & Crosswalks	10.74	9.07
O	KY 121 Bypass	Widen	6.08	4.82
		<i>3 lane top vs 5 lane bottom</i>	5.53	4.40
P	KY 121X Paris Road	Access Management	3.00	2.26
		<i>U-turns top vs 5 lane bottom</i>	0.89	0.67
Q	KY 121X 6 th Street	Signals, Crosswalks, and Parking	5.63	4.52
R	KY 131	Widen to Super Two	1.85	1.43
S	KY 303 Cuba Road	Three-lane with Sidewalk	0.64	0.48
I	KY 121X/KY 303	Reconstruct Intersection	1.80-1.99	1.37-1.49

7.0 FINAL COORDINATION MEETINGS

After improvement concepts were further developed, a final round of meetings was held to gather input and prioritize potential improvements. Summaries of the final LO/S and project team meetings are in **Appendix E**.

7.1 Local Official and Stakeholder Meeting No. 2

On January 27, 2021, the project team and LO/S met virtually to discuss and prioritize improvement concepts. Project team members presented information on 19 concepts and fielded related questions. To supplement meeting discussions, LO/S were provided an electronic survey to provide input on prioritization. Overall, three surveys were completed. As shown in **Figure 30** and **Figure 31**, respondents ranked Spots G, H, and L as the highest small-scale priority concepts with Spots M and S as the highest large-scale priority concepts. In both charts, more points awarded represents a higher priority.

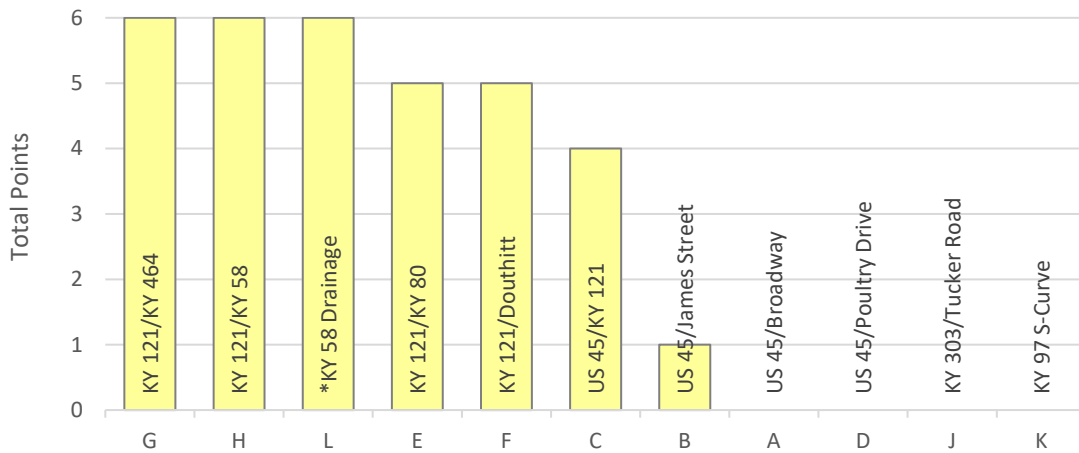


Figure 30: Small-Scale Concept Rankings

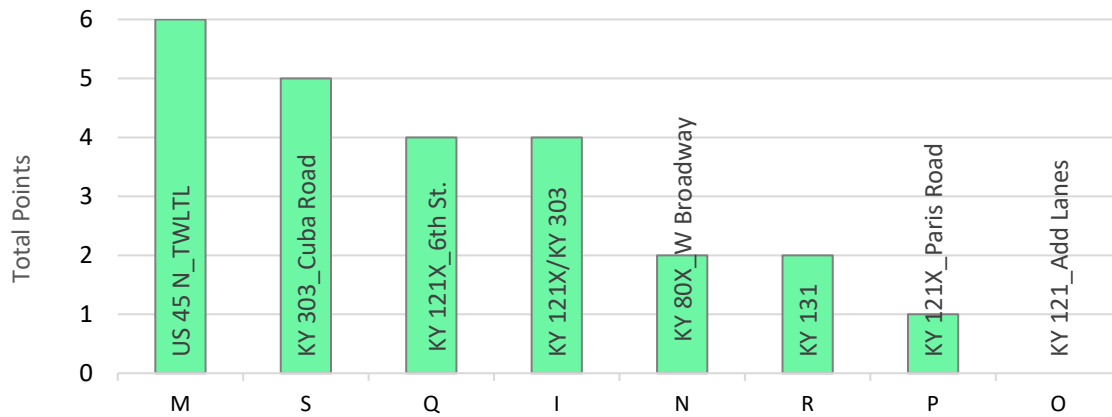


Figure 31: Large Scale Concept Rankings

7.2 Project Team Meeting No. 3

The final project team meeting was held virtually February 24, 2021. Team members reviewed LO/S input and finalized improvement concept prioritization. Key discussion items from the meeting are summarized below:

- A recent repaving project on US 45 addressed some existing needs of the corridor; Spot M became a lower priority locally with the loss of a proposed hemp plant.
- Spot O is likely a higher priority due to future development potential.

8.0 RECOMMENDATIONS

This Mayfield SUA study resulted in a range of conceptual improvements recommended for future implementation. Priorities for ten small-scale improvement concepts are listed in **Table 19** alongside overview existing conditions data; highlighted cells represent the worst performers (i.e., greatest needs) in each category.

- In the table below, the “Crashes” column denotes the total number of crashes occurring within the proposed improvement concept limits, also noting any fatalities.
- The “CCRF” column notes any high CCRF spots or segments that overlap the limits.
- Community input identifies how many corresponding GIS pins were added in the crowdsourcing app or if the concern was mentioned during the initial LO/S meeting.
- Survey rank corresponds to the prioritization surveys distributed to LO/S.
- Costs are presented in 2020 dollars.

Table 19: Priorities for Small-Scale Improvement Concepts

ID	Location	Description	Crashes	CCRF	Community Input	Survey Rank	Cost	Priority
A	US 45/Broadway	Signal & Striping Improvements	25	US 45 N: 1.51 KY 80X: 1.32 KY 45 S: 1.64	3	-	\$40k	High
B	US 45/James Street	Crosswalks, Lighting, Improved Visibility	16	2.75 spot	4	4	\$170k	Med
C	US 45/KY 121	Crosswalk & Signal Improvements	39	1.32 spot (north leg)	7	3	\$90k	High
D	US 45/Poultry Drive	Widen R cut at US 45	7 (1 Fatal)	1.39 spot	LO/S concern	-	\$600k- \$1.5M	Med
E	KY 121/KY 80/KY 97	Signal Improvements for Visibility	36	1.44 spot (south leg)	5	2	\$290k	Med
F	KY 121/Douthitt	Signalize with Right Turn Lane	7 (1 Fatal)	-	4	2	\$900k	Low
G	KY 121/KY 464	School Zone with Right Turn Lane and Lighting	3	-	10	1	\$390k	High
H	KY 121/KY 58	Signal, Striping, & Lighting Improvements	24	1.23 spot (KY 58)	5	1	\$270k	High
J	KY 303/Tucker Road	Add Left Turn Lanes with Improved Visibility	6 (1 Fatal)	1.16 spot (south leg)	2	-	\$550k	Low
K	KY 97 S-Curve	Repave to fix Superelevation	8	1.2 spot	-	-	\$450k	Low

Spot L was omitted from prioritization as it will be addressed in Spring 2021 by maintenance forces.

The project team concurred the highest priorities are associated with three KY 121 Bypass intersections (Spots C, G, and H) and the US 45 (7th St)/KY 80 (Broadway) intersection downtown, Spot A.

Priorities for eight large-scale improvement concepts are listed in **Table 20** alongside overview existing conditions data; again, highlighted cells represent the worst performers in each category. The project team identified improvements to KY 80X (West Broadway, Spot N), widening the KY 121 Bypass (Spot O), and widening KY 303 (Cuba Road, Spot S) as the top priorities.

Table 20: Priorities for Large-Scale Improvement Concepts

ID	Concept	Length	Crashes	CCRF	Community Input	Survey Rank	Cost	Priority
M	US 45 N TWLTL	0.9 mi	40	-	3	1	\$1.2M	Low
N	KY 80X W Broadway signal coordination and crosswalks	1.8 mi	95	1.0, 1.2, 1.3 spots;1.32 segment	19	4	\$850k	High
O	KY 121 widening	3.4 mi	75 (2 Fatal)	-	45	-	\$8.1-12.3M	High
P	KY 121X Paris Road access	1.0 mi	110	1.06 & 1.00 spots	2	5	\$10.0-21.4M	Low
Q	KY 121X Sixth Street intersection improvements and crosswalks	0.5 mi	77	-	17	3	\$1.0M	Med
R	Item 1-80104 KY 131 widening	4.6 mi*	14	-	3	4	\$25.4M	Med
S	Item 1-80103 KY 303 Cuba Road widening	0.8 mi	44	1.43 spot (Willow/Wyatt)	44	2	\$12.8M	High
I	KY 121X/KY 303 intersection reconfiguration	-	54	1.00 spot (KY 303)	16	3	\$5.7-7.0M	Med

* extends beyond study area limits

8.1 Project Sheets

Individual sheets for improvement concepts A through S are presented on the following pages, arranged alphabetically.

A	Graves County	US 45 (7 th St) @ Broadway (KY 80X/KY 58)																	
Small Scale	High Priority	US 45 MP 17.219 KY 80X MP 1.825 KY 58 MP 5.530																	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> Prohibit northbound right turn on red and lengthen all red phase Restripe US 45 for lane indicators Remove parking spaces closest to intersection to improve sight distance 		Phase Estimate	(2020 Dollars)																
		Design:	\$10,000																
		Right-of-Way:	\$0																
		Utilities:	\$0																
		Construction:	\$30,000																
		Total Cost:	\$40,000																
IDENTIFIED NEEDS:																			
Traffic:	AM (PM) forecast at right, operating at LOS A (A) in all scenarios	Broadway	US 45/7 th St																
2017-2019 Crashes:	24 crashes within 100 ft of intersection, with 0 fatal and 1 injury; 54% angle crashes; 3 high CCRF segments	(60) 80 ↗ (460) 320 → (20) 30 ↘	↖ 200 (170) ← 200 (370) ↗ 20 ↑ 110 ↘ 40 (30) (70) (50)																
Existing Geometry:	11-12 ft lanes with curb and gutter as shown below; on-street parking; signalized.																		
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way																	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)																	
<table border="0" style="width: 100%;"> <tr> <td>— High Crash Segments</td> <td>— High Crash Spots</td> <td>★ Fatal</td> <td>△ Injury</td> <td>○ PDO</td> <td>■ Angle</td> <td>■ Left Turn</td> <td>■ Sideswipe</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>■ Rear End</td> <td>■ Single Vehicle</td> <td>■ Head On</td> </tr> </table>				— High Crash Segments	— High Crash Spots	★ Fatal	△ Injury	○ PDO	■ Angle	■ Left Turn	■ Sideswipe						■ Rear End	■ Single Vehicle	■ Head On
— High Crash Segments	— High Crash Spots	★ Fatal	△ Injury	○ PDO	■ Angle	■ Left Turn	■ Sideswipe												
					■ Rear End	■ Single Vehicle	■ Head On												

B	Graves County	NB US 45 (7 th St) @ James Street									
Small Scale	Medium Priority	US 45 MP 17.500-17.600									
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> • Install high visibility signage • Paint crosswalks at intersection and stop bars on James Street • Consider intersection lighting 		Phase Estimate	(2020 Dollars)								
		Design:	\$20,000								
		Right-of-Way:	\$0								
		Utilities:	\$0								
		Construction:	\$150,000								
		Total Cost:	\$170,000								
IDENTIFIED NEEDS:											
2020 Traffic:	3,500 vpd with 7% trucks, operating at LOS A or 0.11 v/c										
2045 Traffic:	3,500 vpd operating at LOS A or 0.11 v/c										
2017-2019 Crashes:	16 crashes with 0 fatal and 3 injury; 63% are angle crashes; high CCRF segment; James Street drivers pull out in front of US 45 traffic that is speeding up to leave town and cresting hill										
Existing Geometry:	One-way, with two 11 ft-wide lanes with curb and gutter; stop-controlled										
Other	Speed limit is 25-35 MPH; a planned bike path follows James Street approaches; 2 public comments on safety										
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way									
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)									
<table border="0" style="width: 100%;"> <tr> <td>— High Crash Segments</td> <td>— High Crash Spots</td> <td>☘ Fatal</td> <td>△ Injury</td> <td>○ PDO</td> <td>■ Angle Rear End</td> <td>■ Left Turn Single Vehicle</td> <td>■ Sideswipe Head On</td> </tr> </table>				— High Crash Segments	— High Crash Spots	☘ Fatal	△ Injury	○ PDO	■ Angle Rear End	■ Left Turn Single Vehicle	■ Sideswipe Head On
— High Crash Segments	— High Crash Spots	☘ Fatal	△ Injury	○ PDO	■ Angle Rear End	■ Left Turn Single Vehicle	■ Sideswipe Head On				

C	Graves County	US 45 (Paducah Road) @ KY 121 Bypass																																																								
Small Scale	High Priority	US 45 MP 18.197 KY 121 MP 8.938																																																								
IMPROVEMENT DESCRIPTION:		Phase Estimate (2020 Dollars)																																																								
<ul style="list-style-type: none"> • Install high visibility backplates and dual red signal heads • Restripe crosswalks in ladder style • Continue to monitor for protected left turn signal warrants 		Design: \$10,000																																																								
		Right-of-Way: \$0																																																								
		Utilities: \$0																																																								
		Construction: \$80,000																																																								
		Total Cost: \$90,000																																																								
IDENTIFIED NEEDS:																																																										
Traffic:	See below for AM (PM) forecasts; operating at LOS B in 2020 and LOS C in 2045																																																									
2017-2019 Crashes:	36 crashes with 0 fatal and 7 injury within 200 ft; 42% angle crashes; high CCRF spot (north leg)																																																									
Existing Geometry:	11-12 ft wide lanes as shown below; signalized																																																									
Other	3 public comments on signal phasing; protected left phases exist on US 45 but KY 121 traffic does not currently meet left turn signal warrants																																																									
ENVIRONMENTAL RED FLAGS: Within existing right-of-way																																																										
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)																																																										
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D	Graves County	US 45 (Paducah Rd) @ Hickory Rd/Poultry Dr																		
Small Scale	Medium Priority	US 45 MP 23.100-23.200																		
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> Construct an R-Cut intersection on US 45 to allow trucks to maneuver safely from Poultry Drive to southbound US 45 Widen Poultry Drive to two 12 ft lanes and 8 ft shoulders to KY 1241 (locally funded project) 		<table border="1"> <tr> <td>Phase Estimate</td> <td>(2020 Dollars)</td> </tr> <tr> <td>Design:</td> <td>\$100,000-\$150,000</td> </tr> <tr> <td>Right-of-Way:</td> <td>\$0-\$150,000</td> </tr> <tr> <td>Utilities:</td> <td>\$0-\$100,000</td> </tr> <tr> <td>Construction:</td> <td>\$500,000-\$1,100,000</td> </tr> <tr> <td>Total Cost:</td> <td>\$600,000-\$1,500,000</td> </tr> </table>	Phase Estimate	(2020 Dollars)	Design:	\$100,000-\$150,000	Right-of-Way:	\$0-\$150,000	Utilities:	\$0-\$100,000	Construction:	\$500,000-\$1,100,000	Total Cost:	\$600,000-\$1,500,000						
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Total Cost:	\$600,000-\$1,500,000																			
IDENTIFIED NEEDS:																				
Traffic:	AM (PM) forecasts shown below; Poultry Drive LOS is E-F in the No-Build scenario compared to LOS B in the Build scenario																			
2017-2019 Crashes:	7 crashes with 1 fatal (pedestrian) and 2 injury; 57% of crashes involved deer; high CCRF spot																			
Existing Geometry:	Four 12 ft wide lanes with 10 ft wide shoulders and 35-50 ft wide grass median; unsignalized																			
Other	140 tractor trailers use this intersection daily to access poultry plant; speed limit is 65 MPH																			
ENVIRONMENTAL RED FLAGS: Farmland, bat habitat																				
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)																				
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		<p>An R-Cut Intersection converts all cross-street movements to right turns but preserves all turn movements for the main street.</p>																		

E	Graves County	KY 121 Bypass @ KY 97/KY 80																																																	
Small Scale	Medium Priority	KY 121 MP 5.499 KY 80 MP 12.862 KY 97 MP 18.262																																																	
IMPROVEMENT DESCRIPTION:		Phase Estimate	(2020 Dollars)																																																
<ul style="list-style-type: none"> • Install high visibility backplates and dual reds on all signals • Check signal loops on south leg; adjust stop bar as needed to improve detection • Construct right turn lane on westbound KY 80 • Install solar LED "Signal Ahead" signs on three approaches 		Design:	\$30,000																																																
		Right-of-Way:	\$0																																																
		Utilities:	\$0																																																
		Construction:	\$260,000																																																
		Total Cost:	\$290,000																																																
IDENTIFIED NEEDS:																																																			
Traffic:	AM (PM) forecasts noted below; dual EB lefts would improve forecasted LOS operations once bypass widened (Spot O)																																																		
2017-2019 Crashes:	33 crashes within 200 ft, with 0 fatal and 5 injury; 73% are rear end crashes; one high CCRF spot																																																		
Existing Geometry:	12 ft wide lanes with 8-12 ft wide shoulders as shown below; signalized																																																		
Other	Confirm signal timings when KY 80 extension opens																																																		
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way																																																	
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F	Graves County	KY 121 Bypass @ Douthitt Street
Small Scale	Low Priority	KY 121 MP 6.500-6.600
IMPROVEMENT DESCRIPTION:		Phase Estimate (2020 Dollars)
<ul style="list-style-type: none"> • Add signal, lighting • Construct right turn lane on southbound KY 121 • Consider School Zone for traffic calming 		Design: \$100,000
		Right-of-Way: \$0
		Utilities: \$0
		Construction: \$800,000
		Total Cost: \$900,000
IDENTIFIED NEEDS:		
Traffic:	AM (PM) forecasts noted below; EB leg operates at LOS E (F) currently, improved to LOS B (D) once signalized with higher 2045 projected volumes	
2017-2019 Crashes:	7 crashes with 1 fatal and 2 injury; 72% are angle crashes	
Existing Geometry:	Three 11-12 ft wide lanes as shown below; unsignalized today	
Other	Speed limit is 55 MPH; 4 public comments on safety and speed	
ENVIRONMENTAL RED FLAGS: Within existing right-of-way		
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)		



Douthitt St	KY 121/Bypass	
↖ 170 (140)	↗ 0 (10)	
↘ 430 (650)	↖ 0 (0)	
↙ 10 (0)	↘ 0 (5)	
(130) 50 ↗	↖	↗
(0) 0 ↘	↖	↘
(20) 20 ↙	(10) 20 ↗	↖
LOS E (F)	(500) 720 ↘	(0) 10 ↙

2020 Forecast
Two-way Stop

Douthitt St	KY 121/Bypass	
↖ 190 (160)	↗ 0 (20)	
↘ 540 (820)	↖ 0 (0)	
↙ 20 (0)	↘ 0 (10)	
(150) 60 ↗	↖	↗
(0) 0 ↘	↖	↘
(20) 0 ↙	(10) 20 ↗	↖
	(620) 910 ↘	(10) 0 ↙

2045 Forecast
LOS B (D)
Signalized; 2-lane Bypass

— High Crash Segments	— High Crash Spots	Fatal	Injury	PDO	Angle	Left Turn	Sideswipe
		Rear End	Single Vehicle	Head On			

G	Graves County	KY 121 Bypass @ KY 464 (Backusburg Road)																																									
Small Scale	High Priority	KY 121 MP 6.976 KY 464 MP 0.730																																									
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> Construct right turn lane on southbound KY 121 Consider School Zone for traffic calming Install roadway lighting 		Phase Estimate	(2020 Dollars)																																								
		Design:	\$40,000																																								
		Right-of-Way:	\$0																																								
		Utilities:	\$0																																								
		Construction:	\$350,000																																								
		Total Cost:	\$390,000																																								
IDENTIFIED NEEDS:																																											
Traffic:	AM (PM) forecasts noted below; EB leg operates at LOS F currently but does not meet signal warrants based on current volumes																																										
2017-2019 Crashes:	6 crashes with 0 fatal and 0 injury; 66% are rear end crashes																																										
Existing Geometry:	Three 12 ft wide lanes and 10 ft shoulders as shown below; unsignalized today																																										
Other	Speed limit is 55 MPH; 4 public comments on speeds and signalization; CHAF IP20080023 includes roadway lighting																																										
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way																																									
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H	Graves County	KY 121 Bypass @ KY 58 (E. Broadway)																																																														
Small Scale	High Priority	KY 121 MP 7.616 KY 58 MP 6.444																																																														
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> • Add high visibility backplates and dual red signal heads • Install auxiliary heads or signage for right turns • Paint islands to delineate right turns • Install roadway lighting 		<table border="1"> <tr> <td>Phase Estimate</td> <td>(2020 Dollars)</td> </tr> <tr> <td>Design:</td> <td>\$30,000</td> </tr> <tr> <td>Right-of-Way:</td> <td>\$0</td> </tr> <tr> <td>Utilities:</td> <td>\$0</td> </tr> <tr> <td>Construction:</td> <td>\$240,000</td> </tr> <tr> <td>Total Cost:</td> <td>\$270,000</td> </tr> </table>	Phase Estimate	(2020 Dollars)	Design:	\$30,000	Right-of-Way:	\$0	Utilities:	\$0	Construction:	\$240,000	Total Cost:	\$270,000																																																		
Phase Estimate	(2020 Dollars)																																																															
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Right-of-Way:	\$0																																																															
Utilities:	\$0																																																															
Construction:	\$240,000																																																															
Total Cost:	\$270,000																																																															
IDENTIFIED NEEDS:																																																																
2020 Traffic:	AM (PM) forecasts noted below; LOS B-C today, projected to degrade to LOS C-D by 2045																																																															
2017-2019 Crashes:	23 crashes within 250 ft with 0 fatal and 3 injury; 52% are rear end crashes; one high CCRF spot																																																															
Existing Geometry:	Three 12 ft wide lanes with 10 ft wide shoulders as shown below; signalized																																																															
Other	Speed limit is 55 MPH; 5 public comments																																																															
ENVIRONMENTAL RED FLAGS: Within existing right-of-way																																																																
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)																																																																
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I	Graves County	KY 121X (Paris Road)/KY 303 (Cuba Road) Intersection	
Large Scale	Medium Priority	KY 121X MP 0.90-1.20 KY 303 MP 16.85 Farthing St. MP 0.19 Douthitt St. MP 0.00	
IMPROVEMENT DESCRIPTION: Reconstruct/consolidate intersections to improve safety, optimize traffic flow, and facilitate pedestrian movements		Phase Estimate	(2020 Dollars)
		Design:	\$600,000
		Right-of-Way:	\$1,200,000-\$2,500,000
		Utilities:	\$1,000,000
		Construction:	\$2,900,000
		Total Cost:	\$5,700,000-7,000,000
IDENTIFIED NEEDS:			
Traffic:	AM (PM) Forecast noted below; signal operates at LOS D (D) today Build: Either two coordinated signals or a roundabout operate at LOS B (B)		
2017-2019 Crashes:	KY 121X: 45 crashes with 0 fatal and 5 injury; 73% are rear end crashes KY 303: 9 crashes with 0 fatal and 0 injury; 89% are rear end and angle crashes; high CCRF spot		
Existing Geometry:	KY 121X: two 10 ft wide lanes with 12 ft center lane and curb/gutter KY 303: two 9 ft wide lanes with 1 ft shoulders; signal at KY 121X intersection		
Other	A planned bike path follows Farthing St to KY 303 (Cuba Rd) to Third St to Douthitt St; 16 public comments		
ENVIRONMENTAL RED FLAGS:		Homes, Businesses, Hazardous Materials, School recreation facilities nearby	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	

J	Graves County	KY 303 @ Tucker Road	
Small Scale	Low Priority	KY 303 MP 14.700-14.900	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> • Construct northbound and southbound left turn lanes on KY 303 • Improve turning radii • Install stop bars on East and West Tucker Road • Install "Intersection Ahead" signs with flashing solar LED 		Phase Estimate	(2020 Dollars)
		Design:	\$50,000
		Right-of-Way:	\$150,000
		Utilities:	\$100,000
		Construction:	\$250,000
		Total Cost:	\$550,000
IDENTIFIED NEEDS:			
2020 Traffic:	5,400 vpd with 6% trucks, operating at LOS C or 0.22 v/c		
2045 Traffic:	5,400 vpd, operating at LOS C or 0.22 v/c		
2017-2019 Crashes:	6 crashes with 1 fatal and 3 injury; 83% are rear end and angle crashes; high CCRF spot		
Existing Geometry:	Two 9 ft wide lanes with 1 ft wide shoulders		
Other	Includes CHAF IP20190056, sponsored in 2020 SHIFT		
ENVIRONMENTAL RED FLAGS:		No environmental red flags noted	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
<p> — High Crash Segments — High Crash Spots ☠ Fatal △ Injury ○ PDO ■ Angle ■ Left Turn ■ Sideswipe ■ Rear End ■ Single Vehicle ■ Head On </p>			

K	Graves County	KY 97 S-curve near Hay Market Corner Road																	
Small Scale	Low Priority	KY 97 MP 16.100-16.400																	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> • Correct superelevation deficiencies in curves • Install high friction surface 		Phase Estimate	(2020 Dollars)																
		Design:	\$50,000																
		Right-of-Way:	\$0																
		Utilities:	\$0																
		Construction:	\$400,000																
		Total Cost:	\$450,000																
IDENTIFIED NEEDS:																			
2020 Traffic:	3,700 vpd with 13% trucks, operating at LOS C or 0.15 v/c																		
2045 Traffic:	4,300 vpd, operating at LOS C or 0.17 v/c																		
2017-2019 Crashes:	8 crashes with 0 fatal and 4 injury; 75% are single vehicle crashes; 50% occurred in wet conditions; high CCRF spot																		
Existing Geometry:	Two 11 ft wide lanes with 1 ft wide shoulders																		
Other	Chevrons and 25-30 MPH advisory signs posted through curve																		
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way																	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)																	
<table border="0" style="width: 100%; font-size: small;"> <tr> <td style="width: 15%;">— High Crash Segments</td> <td style="width: 15%;">— High Crash Spots</td> <td style="width: 10%;">☼ Fatal</td> <td style="width: 10%;">△ Injury</td> <td style="width: 10%;">○ PDO</td> <td style="width: 10%;">■ Angle</td> <td style="width: 10%;">■ Left Turn</td> <td style="width: 10%;">■ Sideswipe</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="width: 10%;">■ Rear End</td> <td style="width: 10%;">■ Single Vehicle</td> <td style="width: 10%;">■ Head On</td> </tr> </table>				— High Crash Segments	— High Crash Spots	☼ Fatal	△ Injury	○ PDO	■ Angle	■ Left Turn	■ Sideswipe						■ Rear End	■ Single Vehicle	■ Head On
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					■ Rear End	■ Single Vehicle	■ Head On												

M	Graves County	US 45 (Paducah Road) Jintown Road to Key Creek	
Large Scale	Low Priority	US 45 MP 19.330-20.230	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> Remove mountable median; construct two-way left turn lane (TWLTL) Improve access management Install high visibility backplates and dual red signal heads 		Phase Estimate	(Escalated CHAF)
		Design:	\$100,000
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$1,100,000
		Total Cost:	\$1,200,000
IDENTIFIED NEEDS:			
2020 Traffic:	16,900 vpd with 8% trucks, operating at LOS B or 0.31 v/c		
2045 Traffic:	19,100 vpd operating at LOS B or 0.30 v/c		
2017-2019 Crashes:	40 total crashes with 2 fatal and 8 injury; 73% are rear end and angle crashes		
Existing Geometry:	Four 12 ft wide lanes with curb and gutter, separated by a 16 ft wide mountable median		
Other	Speed limit is 45-55 MPH; 3 public comments on drainage and turns onto Dorothy Ln; includes CHAF IP20190186, sponsored in 2020 SHIFT		
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way	
PROJECT LOCATION MAP:			
		Existing typical section with mountable median	
— High Crash Segments — High Crash Spots Fatal Injury PDO		Angle Left Turn Sideswipe Rear End Single Vehicle Head On	

N	Graves County	KY 80X (West Broadway) I-69 Interchange to US 45																	
Large Scale	High Priority	KY 80X MP 0.000-1.825																	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> Coordinate signals, lengthen all-red phases, add high visibility backplates Install pedestrian signs/flashers with minor approach crosswalks Redefine curbs/entrances for drainage and access management 		Phase Estimate	(2020 Dollars)																
		Design:	\$100,000																
		Right-of-Way:	\$0																
		Utilities:	\$0																
		Construction:	\$750,000																
		Total Cost:	\$850,000																
IDENTIFIED NEEDS:																			
2020 Traffic:	9,000 vpd with 6% trucks, operating at LOS D-E or 0.25-0.32 v/c																		
2045 Traffic:	9,100 vpd operating at LOS D-E or 0.29-0.32 v/c																		
2017-2019 Crashes:	95 crashes with 0 fatal and 15 injury; 74% are rear end and angle crashes; 60% cited driver distraction; 3 high CCRF spots and high CCRF segment																		
Existing Geometry:	Two 11 ft wide lanes with 0-1 ft wide shoulders; previous paving reduced curb heights																		
Other	Speed limit is 25-45 MPH; 19 comments on safety/congestion from the public																		
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way																	
PROJECT LOCATION MAP:																			
 <p style="display: flex; justify-content: space-around; margin-top: 5px;"> Campbell Ct. (west) 16th Street (west) RR Crossing (west) US 45 (7th Street) (west) </p>																			
																			
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— High Crash Segments	— High Crash Spots	Fatal	Injury	PDO	Angle	Left Turn	Sideswipe												
		Rear End	Single Vehicle	Head On															

O	Graves County	KY 121 Bypass KY 80/KY 97 to US 45																	
Large Scale	High Priority	KY 121 MP 5.499-8.940																	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> Widen to rural template including TWLTL; range of costs for three to five lane widening options presented at right Corridor-wide high visibility backplates and dual red signal heads 		Phase Estimate	(Escalated CHAF)																
		Design:	\$500,000																
		Right-of-Way:	\$0																
		Utilities:	\$0-\$600,000																
		Construction:	\$7,600,000-\$11,200,000																
		Total Cost:	\$8,100,000-\$12,300,000																
IDENTIFIED NEEDS:																			
2020 Traffic:		7,100-12,900 vpd with 9-12% trucks, operating at LOS D or 0.36-0.47 v/c																	
2045 Traffic:		No Build: 9,100-16,000 vpd, operating at LOS D-E or 0.44-0.58 v/c Build: 9,600-16,600 vpd, operating at LOS A-B or 0.20-0.35 v/c																	
2017-2019 Crashes:		75 crashes with 2 fatal and 11 injury; 68% are rear end and angle crashes; 56% cite driver distraction																	
Existing Geometry:		Two 12 ft wide lanes with 10 ft wide with turn lanes at main intersections																	
Other		Speed limit is 55 MPH; includes CHAF IP20180073, sponsored in 2020 SHIFT																	
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way																	
PROJECT LOCATION MAP:																			
<i>Build traffic scenarios assume supplemental turn lanes and optimized signal timings at key intersections</i>																			
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					■ Rear End	■ Single Vehicle	■ Head On												

P	Graves County	KY 121X (Paris Road) KY 80 to KY 303	
Large Scale	Low Priority	KY 121X MP 0.000-1.034	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> • Provide access management practices along the corridor: range of costs represent range of solutions, from right-in/right-out driveways with u-turns to widening and consolidating access points. Detailed traffic/engineering studies needed to define best-fit solution. • Install high visibility backplates at signals 		Phase Estimate	(2020 Dollars)
		Design:	\$500,000-\$900,000
		Right-of-Way:	\$4,000,000-\$8,000,000
		Utilities:	\$800,000-\$4,000,000
		Construction:	\$4,700,000-\$8,500,000
		Total Cost:	\$10,000,000-\$21,400,000
IDENTIFIED NEEDS:			
2020 Traffic:		10,900 vpd with 15% trucks, operating at LOS E or 0.41 v/c	
2045 Traffic:		13,300 vpd, operating at LOS E or 0.51 v/c	
2017-2019 Crashes:		110 crashes with 0 fatal and 16 injury; 76% are rear end and angle crashes; 68% cite driver distraction; 2 high CCRF spots: Wyatt Dr and KY 303	
Existing Geometry:		Two 10 ft wide lanes and a 12 ft wide TWLTL; frequent driveways and cross-streets	
Other		Speed limit is 35 MPH; public comments on safety and congestion, concentrated at intersection with KY 303 (Spot I).	
ENVIRONMENTAL RED FLAGS:		Business impacts; largely within existing right-of-way	
PROJECT LOCATION MAP:			
<p> — High Crash Segments — High Crash Spots Fatal Injury PDO Angle Left Turn Sideswipe — Rear End Single Vehicle Head On </p>			

Q	Graves County	KY 121X (6 th Street) College Street to KY 58 downtown									
Large Scale	Medium Priority	KY 121X MP 1.389-1.870									
IMPROVEMENT DESCRIPTION: Intersection improvements as noted in figure below		Phase Estimate	(2020 Dollars)								
		Design:	\$100,000								
		Right-of-Way:	\$0								
		Utilities:	\$0								
		Construction:	1,000,000								
		Total Cost:	\$1,100,000								
IDENTIFIED NEEDS:											
2020 Traffic:		10,900-11,700 vpd with 15% trucks, operating at LOS E or 0.40-0.41 v/c									
2045 Traffic:		11,700-13,300 vpd, operating at LOS E or 0.40-0.51 v/c									
2017-2019 Crashes:		53 crashes with 0 fatal and 10 injury; 74% are rear end and angle crashes; 75% cite driver distraction									
Existing Geometry:		Two 10 ft wide lanes with turn lanes at key intersections; frequent driveway and cross-streets									
Other		Speed limit is 25-45 MPH; 13 public comments; a planned bike path will follow 6 th St between Water and South streets; CHAF IP 20060044 assumes full reconstruction along same corridor									
ENVIRONMENTAL RED FLAGS:		Within existing right-of-way									
PROJECT LOCATION MAP:											
		KY 58 (Broadway): Coordinate signals; pedestrian bulbout (southwest corner); restripe crosswalks									
		South Street: Coordinate signals; pedestrian bulbout (northwest corner); remove 4 to 6 parking spaces; restripe crosswalks									
		Water Street: Coordinate signals; check signal loops									
		Walnut Street: Install stop bars and crosswalks on Walnut, evaluate turn radii									
		KY 464: Install stop bar and crosswalk on KY 464; evaluate turn radii; access management for driveways									
		College Street: Extend sidewalks, crosswalks, and stop bars on College St; install high visibility backplates on signals									
<table border="0" style="width: 100%; font-size: small;"> <tr> <td style="width: 25%;">— High Crash Segments</td> <td style="width: 25%;">— High Crash Spots</td> <td style="width: 25%;"> Fatal Injury PDO </td> <td style="width: 25%;"> Angle Left Turn Sideswipe </td> </tr> <tr> <td></td> <td></td> <td> Rear End Single Vehicle Head On </td> <td></td> </tr> </table>				— High Crash Segments	— High Crash Spots	Fatal Injury PDO	Angle Left Turn Sideswipe			Rear End Single Vehicle Head On	
— High Crash Segments	— High Crash Spots	Fatal Injury PDO	Angle Left Turn Sideswipe								
		Rear End Single Vehicle Head On									

R	Graves County Item No. 1-80104.00	KY 131 KY 58 to KY 483	
Large Scale	Medium Priority	KY 131 MP 0.000-4.555	
IMPROVEMENT DESCRIPTION: Reconstruct KY 131 as a super 2 highway with 12 ft lanes and 4 ft shoulders		Phase Estimate	(Escalated CHAF)
		Design:	\$1,600,000
		Right-of-Way:	\$2,300,000
		Utilities:	\$2,800,000
		Construction:	\$18,700,000
* includes data within study area only		Total Cost:	\$25,400,000
IDENTIFIED NEEDS:			
2020 Traffic:*		3,800-4,100 vpd with 8% trucks, operating at LOS C or 0.13-0.17 v/c	
2045 Traffic:*		4,100-4,300 vpd, operating at LOS C-E or 0.15-0.18 v/c	
2017-2019 Crashes:*		14 crashes with 1 fatal and 3 injury; 43% are single vehicle crashes.	
Existing Geometry:		Two 9-9.5 ft wide lanes with 1 ft wide shoulders	
Other		Speed limit is 55 MPH; recent HSIP project at KY 58; includes CHAF IP20080027, sponsored in 2020 SHIFT	
ENVIRONMENTAL RED FLAGS:		Streams, homes, farmlands, bat habitat	
PROJECT LOCATION MAP:			
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> </div> <div style="width: 30%;"> <p style="text-align: center;">Typical KY 131</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Example Super 2 Highway</p> </div> </div> <div style="margin-top: 10px;"> <p style="text-align: center;">KY 131/KY 58 Intersection</p> </div>			
<div style="display: flex; justify-content: space-between; font-size: small;"> <div> — High Crash Segments — High Crash Spots Fatal Injury PDO </div> <div> ■ Angle ■ Left Turn ■ Sideswipe </div> <div> ■ Rear End ■ Single Vehicle ■ Head On </div> </div>			

S	Graves County Item No. 1-80103.00	KY 303 (Cuba Road) Charles Drive to KY 121X
Large Scale	High Priority	KY 303 MP 16.034-16.807
IMPROVEMENT DESCRIPTION: Extend urban three-lane section from south, including sidewalk		Phase Estimate (Escalated CHAF)
		Design: \$800,000
		Right-of-Way: \$3,500,000
		Utilities: \$3,500,000
		Construction: \$5,000,000
		Total Cost: \$12,800,000
IDENTIFIED NEEDS:		
2020 Traffic:	7,800 vpd with 6% trucks, operating at LOS E or 0.31 v/c	
2045 Traffic:	8,600 vpd, operating at LOS E or 0.34 v/c	
2017-2019 Crashes:	44 crashes with 0 fatal and 9 injury; 75% are rear end and angle crashes; high CCRF spot	
Existing Geometry:	Two 9 ft wide lanes with 1 ft wide shoulders	
Other	Speed limit is 35-45 MPH; 44 public comments; includes CHAF IP20060045, sponsored in 2020 SHIFT	
ENVIRONMENTAL RED FLAGS: Park, homes, businesses, hazardous materials		
PROJECT LOCATION MAP:		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> </div> <div style="width: 45%;"> <p style="text-align: right;">Match 3-lane KY 303 South</p> <p style="text-align: center; color: red;">High CCRF Intersection</p> </div> </div>		
<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> — High Crash Segments — High Crash Spots ✖ Fatal △ Injury PDO </div> <div> Angle Rear End </div> <div> Left Turn Sideswipe </div> <div> Single Vehicle Head On </div> </div>		

9.0 NEXT STEPS

The next phase in the project development process for large-scale improvement concepts is Phase I Preliminary Engineering. Items not currently included in KYTC's CHAF database should be added to compete for funding alongside other needs statewide. If federal funds are used or permits will be required, additional environmental analyses will be required to satisfy the *National Environmental Policy Act* (NEPA). Coordination with local officials, key stakeholders, and the public is essential as concepts are advanced for implementation.

Small-scale improvement concepts may be initiated through the district's routine maintenance and traffic programs or become part of systematic specialty programs such as the Highway Safety Improvement Program (HSIP).

10.0 ADDITIONAL INFORMATION

Written requests for additional information should be sent to:

Mr. Mikael B. Pelfrey, PE
Director
KYTC Division of Planning
200 Mero Street
Frankfort, KY 40622
Email: Mikael.Pelfrey@ky.gov

Additional study information can be obtained from:

Mr. J. P. Tilley, PE
KYTC District 1 Design
5501 Kentucky Dam Road
Paducah, KY 42003
Email: James.Tilley@ky.gov