APPENDIX B – EXISTING CONDITIONS ANALYSIS

Appendix B – Existing Conditions Analysis

Conditions of the entire District 10 existing transportation network are examined in the following section. The information compiled includes current roadway facilities and geometrics, crash history, and traffic volumes within the study area. Data for this section were collected from KYTC's Highway Information System (HIS) database, KYTC's Traffic Count Reporting System, aerial photography, and from field inspection.

ROADWAY SYSTEMS

Functional classification is the grouping of roads, streets, and highways into integrated systems ranked by the level of mobility for through movements and access to adjoining land. This grouping acknowledges that roads serve multiple separate functions and it provides a basis for comparing roads. Functional classification can be used for, but is not limited to, the following purposes:

- Provide a framework for roadways that considers mobility and connecting regions and cities within a state.
- Provide a basis for assigning jurisdictional responsibility according to the roadway's importance.
- Provide a basis for development of minimum design standards according to function.
- Provide a basis for evaluating present and future needs.
- Provide a basis for allocation of limited financial resources.

Figure 1 shows the functional classification of District 10 roadways (major collector and above only). Interstates (shown in black) are controlled-access highways that comprise the Dwight D. Eisenhower National System of Interstate and Defense Highways. These routes are the highest classification of arterials and were designed to connect major metropolitan areas. There are no interstate routes in District 10, but I-64 provides east-west connectivity to the north of District 10, and I-75 provides north-south connectivity to the west. Principal arterials (shown in red) serve major centers of metropolitan areas and provide a high level of mobility for substantial statewide travel. Minor arterials (shown in blue) serve trips of moderate length to smaller geographic areas and provide connections between principal arterials. Major collectors (shown in green) facilitate trips between local roads and the arterial network[1].

Figure 2 depicts the truck weight classifications of District 10 roadways. The Mountain Parkway, the Hal Rogers Parkway, US 460, KY 11, KY 15, KY 28, KY 30, KY 52, and KY 80, among others, are classified as AAA and permit gross vehicle weight up to 80,000 pounds.

In compliance with the Surface Transportation Assistance Act of 1982 (STAA), Kentucky has established a network of highways on which commercial vehicles with increased dimensions may operate. These STAA vehicles include semi-tractor trailers with 53-foot-long trailers and single-unit trucks with a total length of 45 feet. These designated truck routes are shown on **Figure 3**. The Mountain Parkway, the Hal Rogers Parkway, KY 15, KY 80, and KY 114 are federally-designated truck routes. KY 52 west of Irvine and KY 213 in Wolfe County are state-designated routes.

[1] *Highway Functional Classification Concepts, Criteria and Procedures*. U.S. Department of Transportation/Federal Highway Administration. https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section03.cfm#Toc336872985

Reference: Appendix B – Existing Conditions Analysis

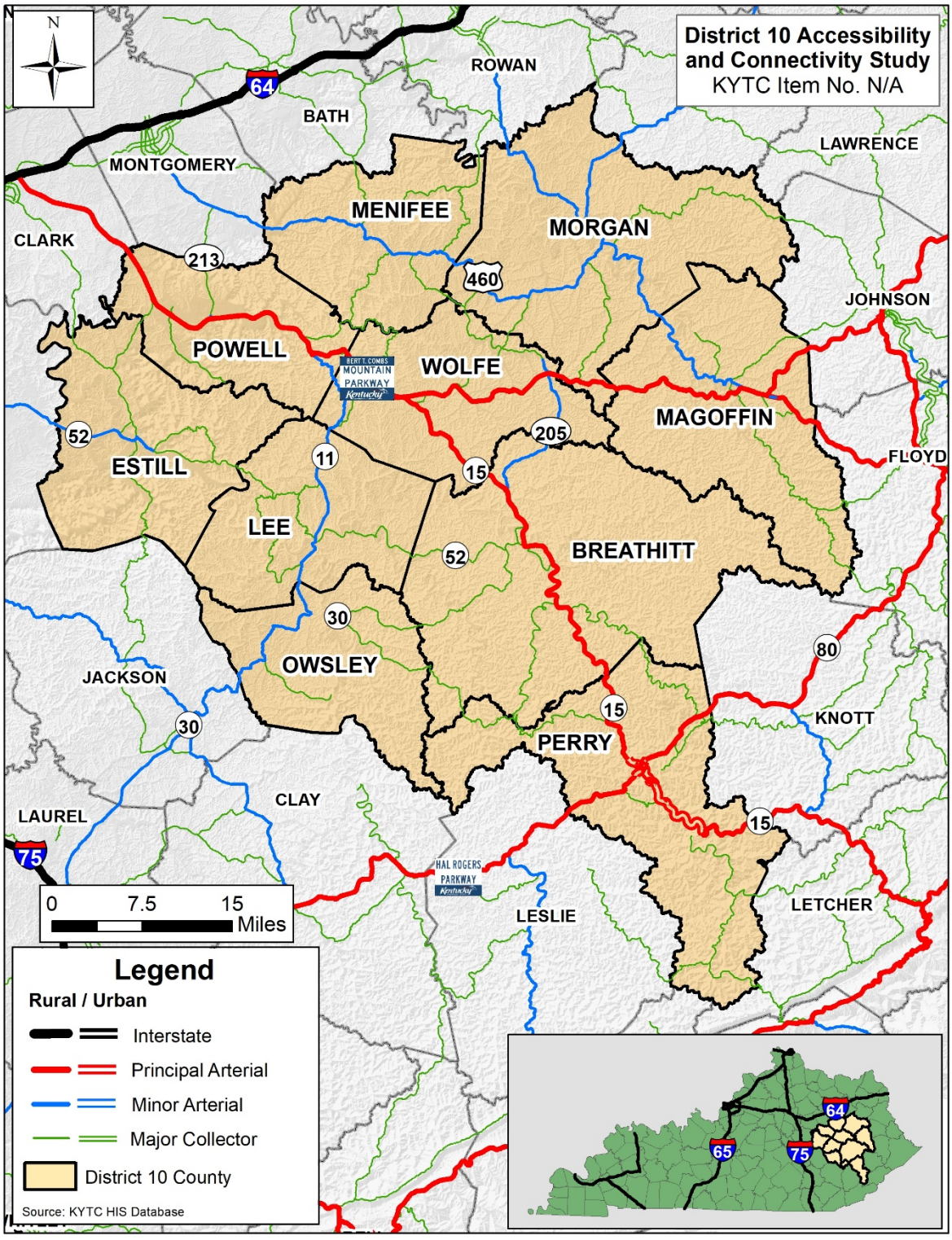

Figure 1: Functional Classification

Reference: Appendix B – Existing Conditions Analysis

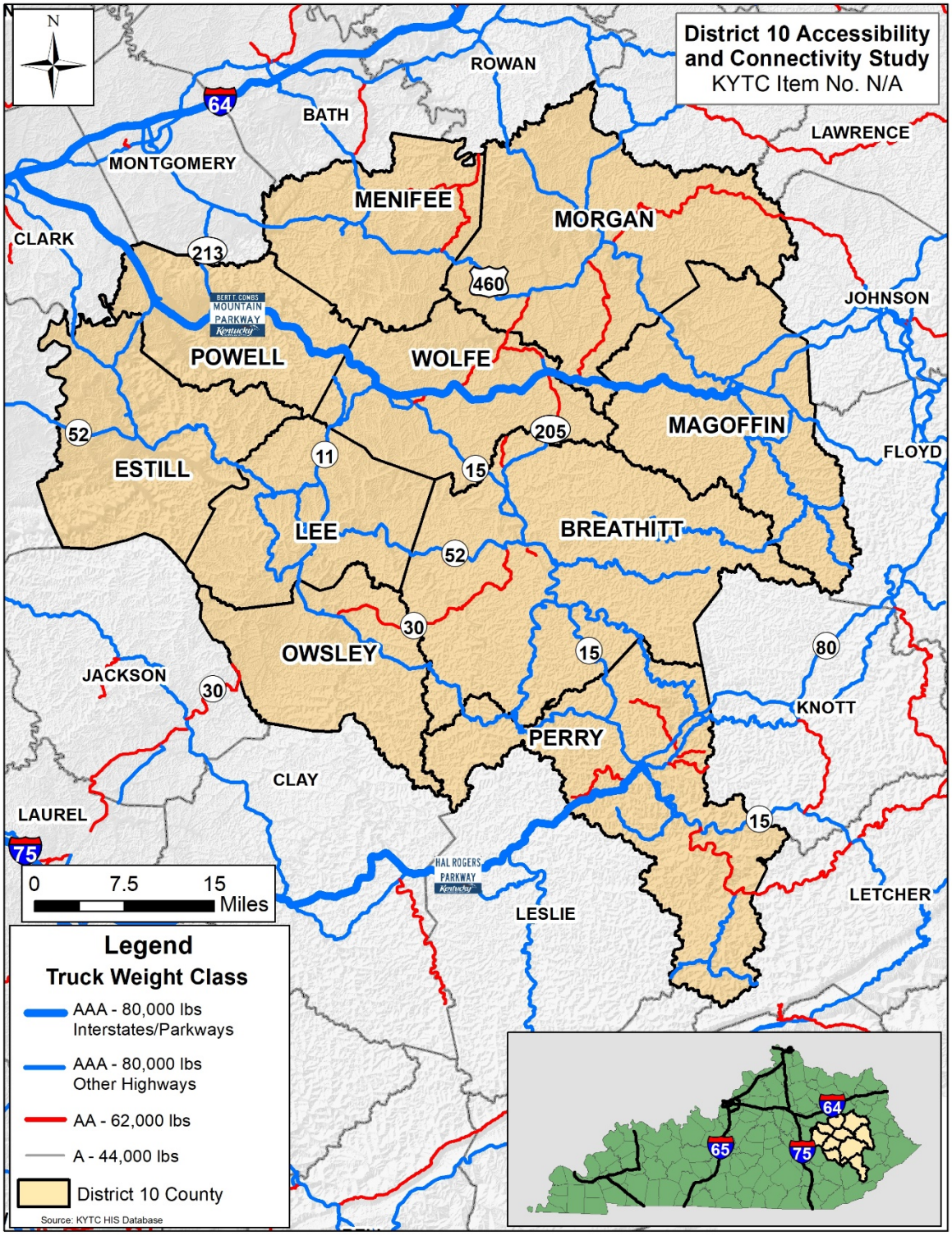

Figure 2: Truck Weight Classification

Reference: Appendix B – Existing Conditions Analysis

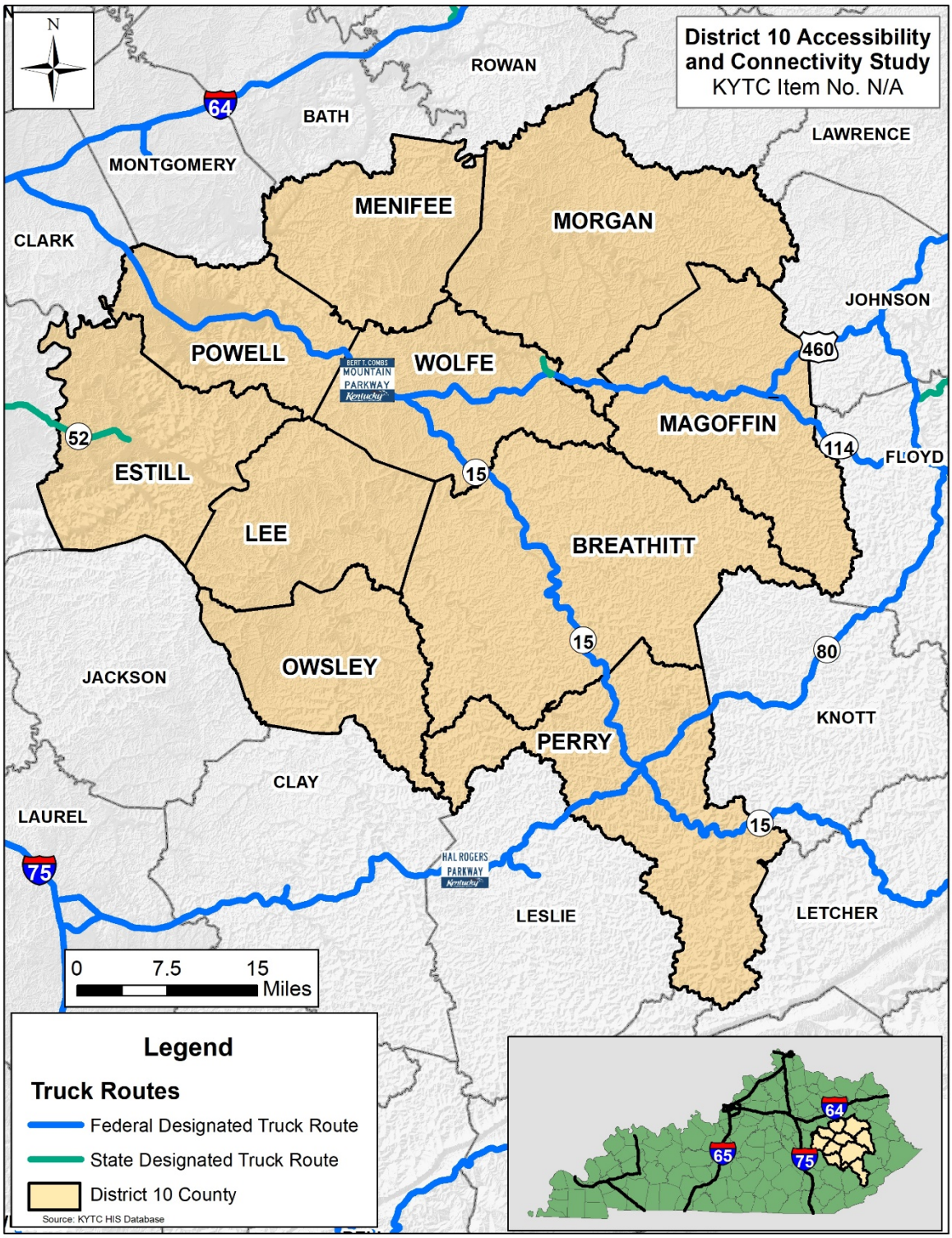

Figure 3: Designated Truck Routes

Reference: Appendix B – Existing Conditions Analysis

ROADWAY GEOMETRIC CHARACTERISTICS

The current number of lanes and lane widths taken from the HIS database along District 10 roadways are shown on **Figure 4**. Multi-lane highways in District 10 include portions of the Mountain Parkway, US 460, KY 15, and KY 80. Current KYTC design guidelines suggest a minimum of 11-foot wide lanes on arterials and collector roadways. Several arterials, including portions of KY 7, KY 11, KY 205, and US 460 have lane widths less than 11 feet.

Shoulder widths are shown on **Figure 5**. Many of the arterial routes have shoulders less than four feet wide, while the recommended shoulder width for such roadways is eight feet. Most of these are rural two-lane routes, such as KY 11 and KY 15, relied heavily on for regional connectivity.

EXISTING TRAFFIC ANALYSIS

The most recent average daily traffic (ADT) volumes from KYTC's traffic count stations are shown on **Figure 6**. ADT volumes on state-maintained routes in District 10 range from 20 vehicles per day (VPD) on KY 542 to 24,100 VPD on KY 15 near Hazard.

To evaluate the adequacy of roadway segments, existing ADT volumes were compared to the road's theoretical capacity. This is the preferred KYTC methodology for evaluating the adequacy of roadway segments. A volume-to-capacity ratio (V/C) represents proportion of traffic demand for using the roadway for the designated time-period in relation to its capacity to serve the demand.

The desired V/C threshold is 0.9 for rural areas and 1.0 for urban areas. A V/C greater than this indicates the road is congested. After performing a V/C analysis using Highway Capacity Manual (HCM) procedures, portions of KY 15, Hal Rogers Parkway, and KY 451 in Perry County have a V/C greater than 0.9, which indicates that mitigation measures (including additional lanes) may be warranted. These segments are shown on **Table 1** and **Figure 7**. All other roadway segments in District 10 operate under their intended design capacity with a V/C less than 0.9.

Reference: Appendix B – Existing Conditions Analysis

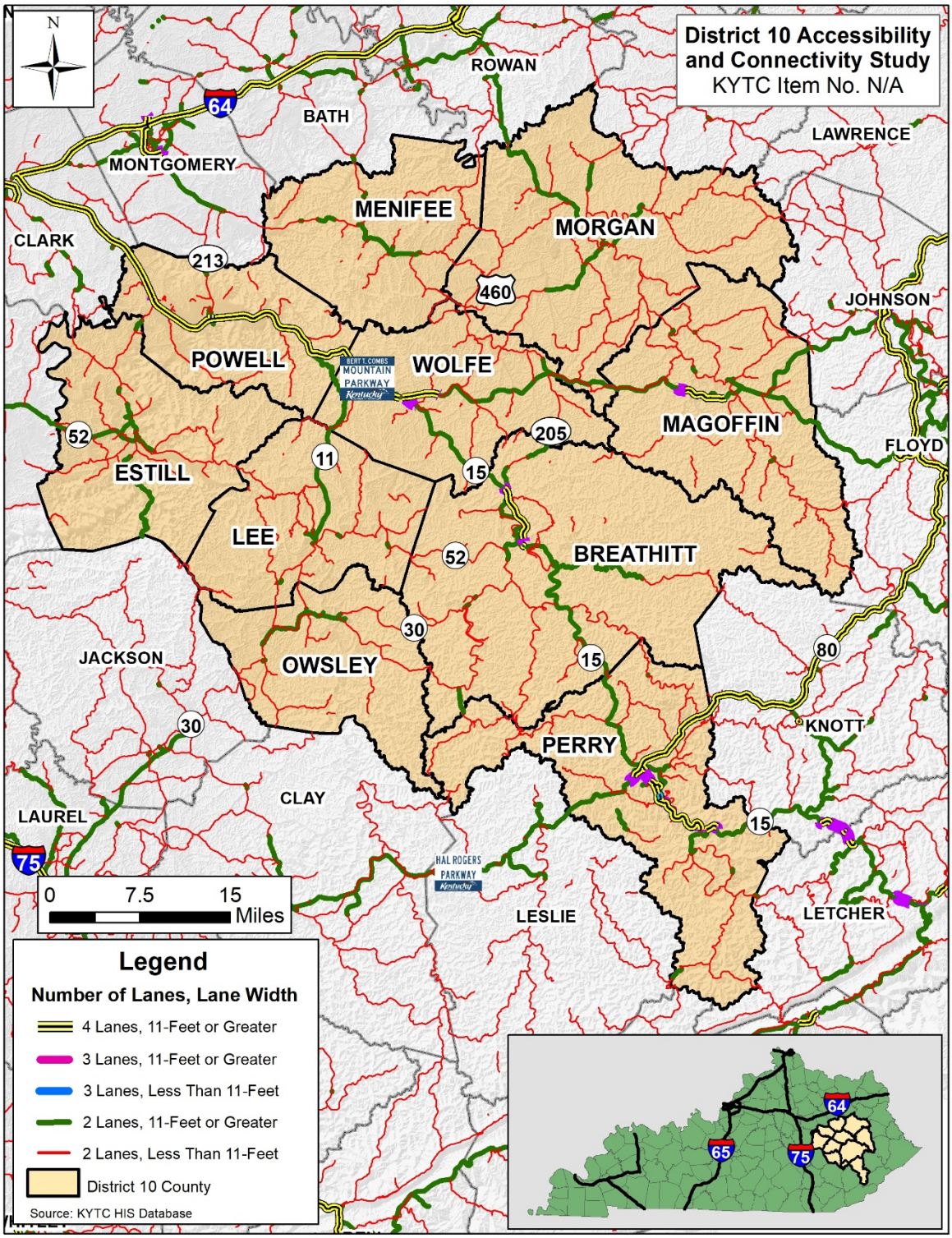

Figure 4: Number of Lanes and Lane Width

Reference: Appendix B – Existing Conditions Analysis

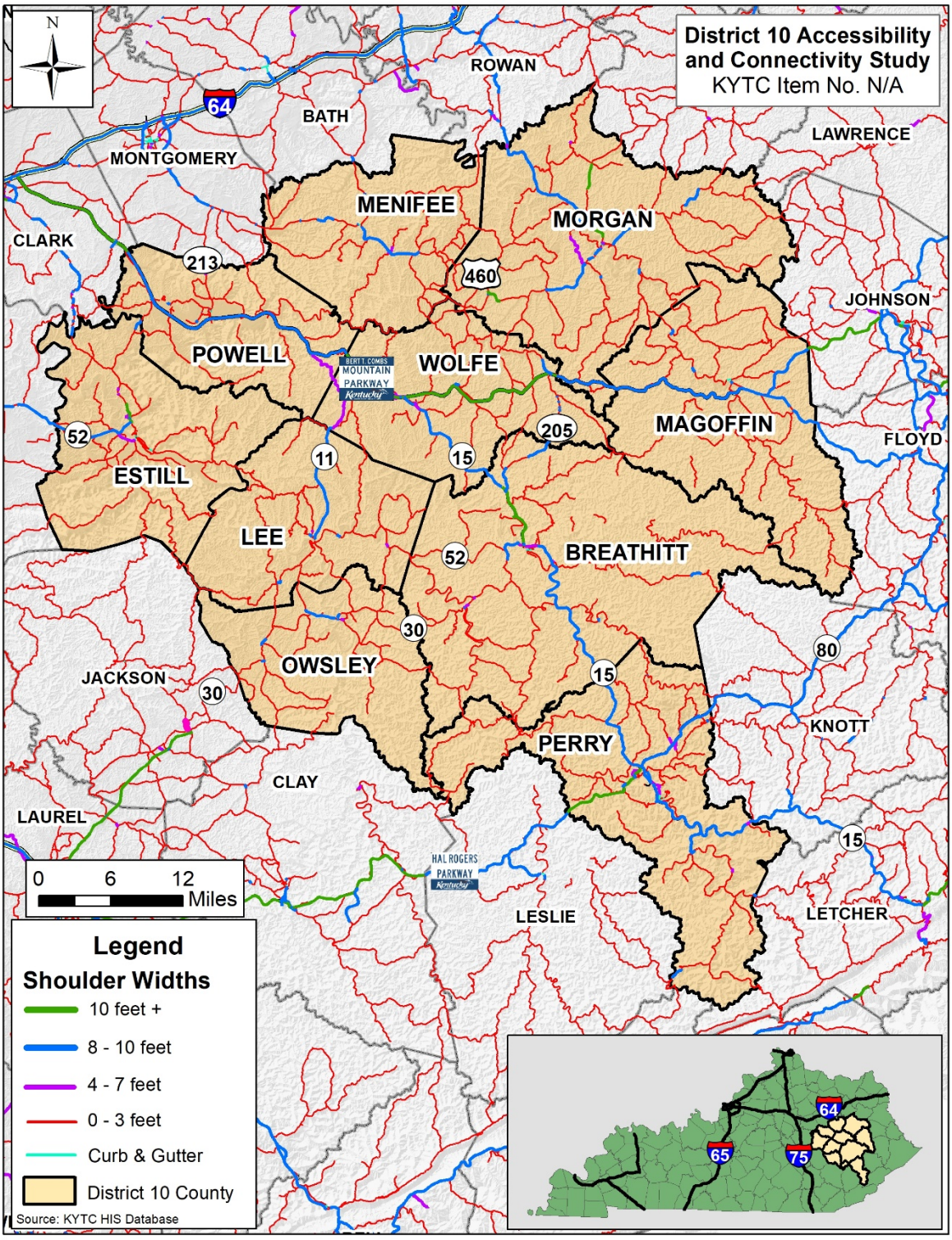

Figure 5: Shoulder Width

Reference: Appendix B – Existing Conditions Analysis

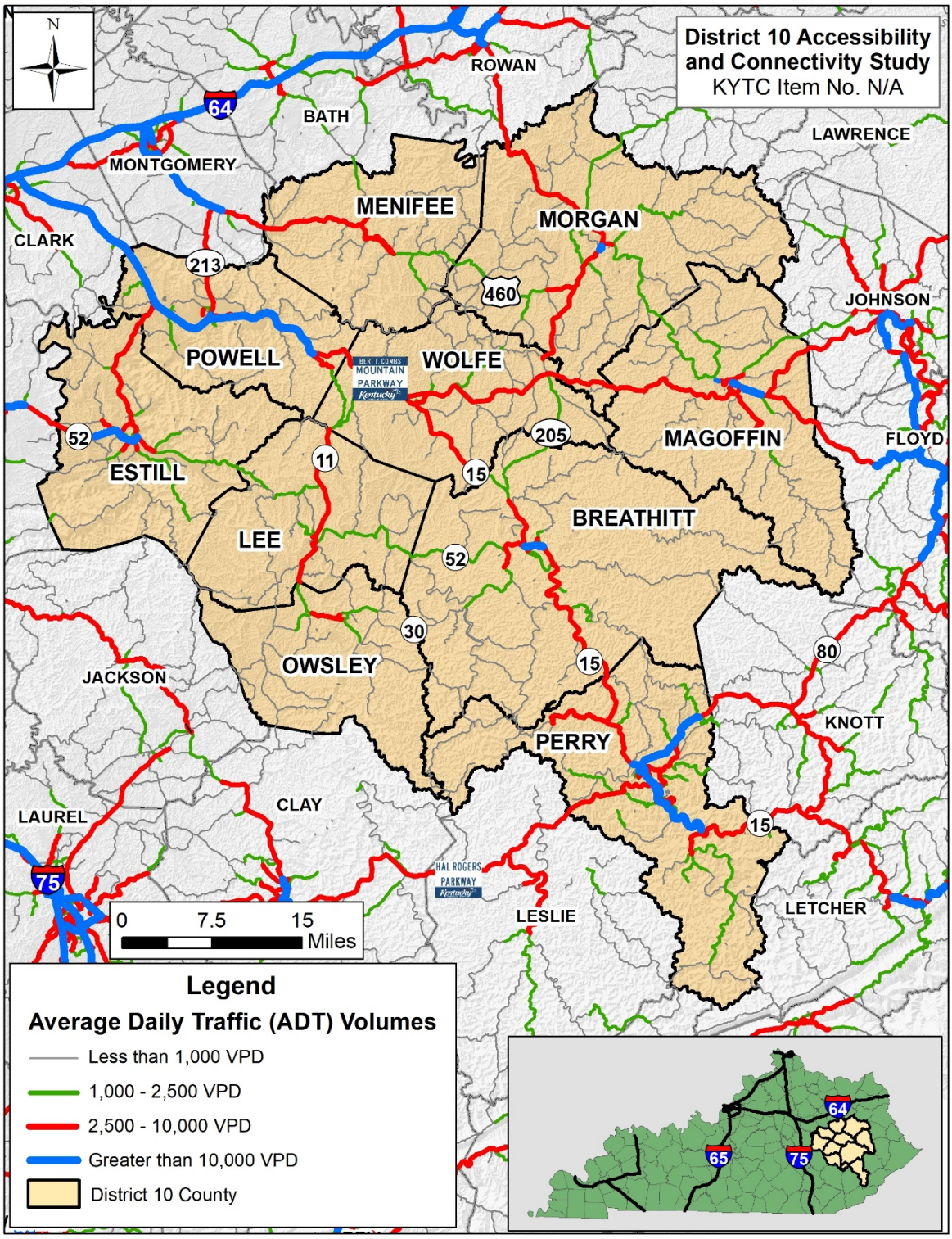

Figure 6: Average Daily Traffic (ADT) Volumes

Reference: Appendix B – Existing Conditions Analysis

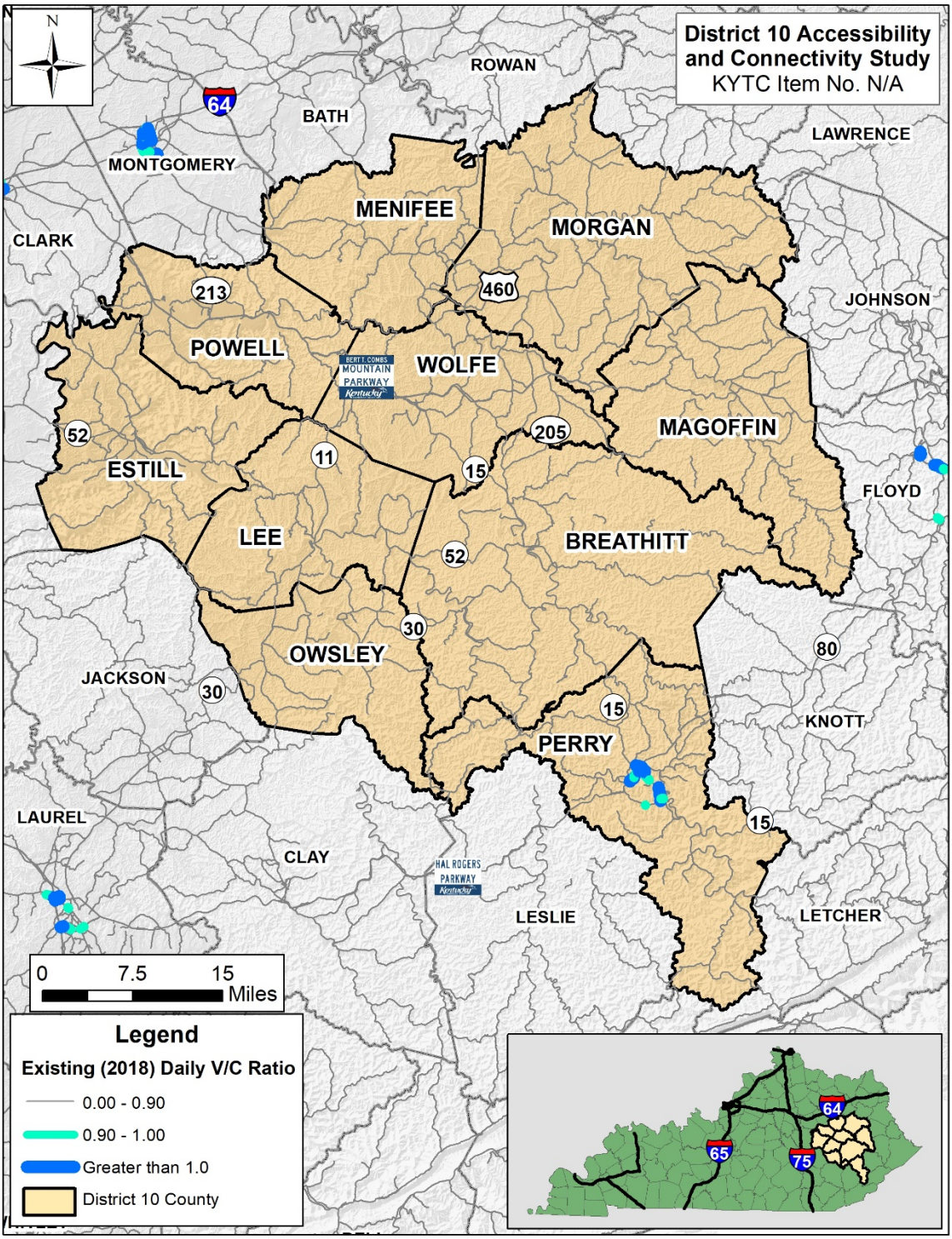

Figure 7: KYSTM Existing (2018) Daily Volume-to-Capacity Ratios

Reference: Appendix B – Existing Conditions Analysis

Table 1: KYSTM Existing (2018) Daily V/C Ratios > 0.9

Route	County	Start MP	End MP	V/C Ratio
KY 15	Perry	15.038	15.46	1.6
HR 9006	Perry	58.232	59.088	1.45
HR 9006	Perry	58.051	58.232	1.18
KY 451	Perry	3.84	3.907	1.08
HR 9006	Perry	56.761	58.051	1.05
KY 15	Perry	6.023	14.849	0.93

CRASH HISTORY

To quantify safety concerns, a crash analysis was performed for state-maintained roadways within District 10. Crashes were geospatially referenced and compared to statewide data to identify locations experiencing above-average crash rates. The methodology is defined in the Kentucky Transportation Center research report Analysis of Traffic Crash Data in Kentucky (2013-2017)[2]. As defined in the methodology report, segments vary in length and are divided along roadways where geometry or traffic volumes change. For each segment, analysts examined the number of crashes, traffic volume, rural/urban, number of lanes, and segment length to determine the critical rate factor (CRF). The CRF is one measure of the safety of a road, expressed as a ratio of the crash rate at the location compared to the critical crash rate for similar roadways throughout the state. A CRF of 1.0 or greater may indicate that crashes are occurring due to circumstances not attributed to random occurrence.

Segment locations with CRF values between 1.0 and 2.0 are shown in **Figure 8** in red. Locations with CRF values greater than 2.0 are shown in blue.

[2] Green, E. R., et al. *Analysis of Traffic Crash Data in Kentucky*. KTC-15-21, September, 2017.

Reference: Appendix B – Existing Conditions Analysis

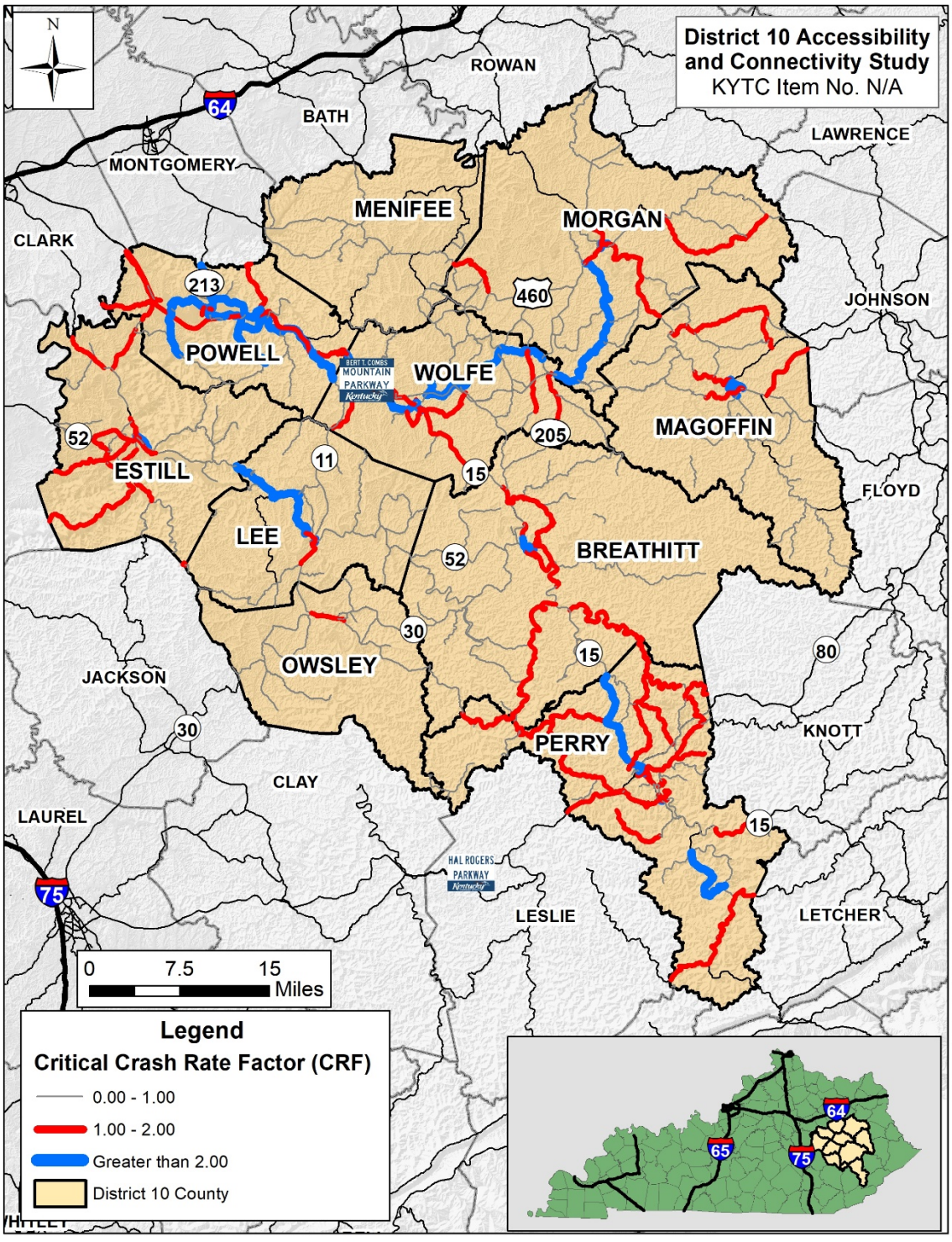

Figure 8: Critical Crash Rate Factors (CRFs)