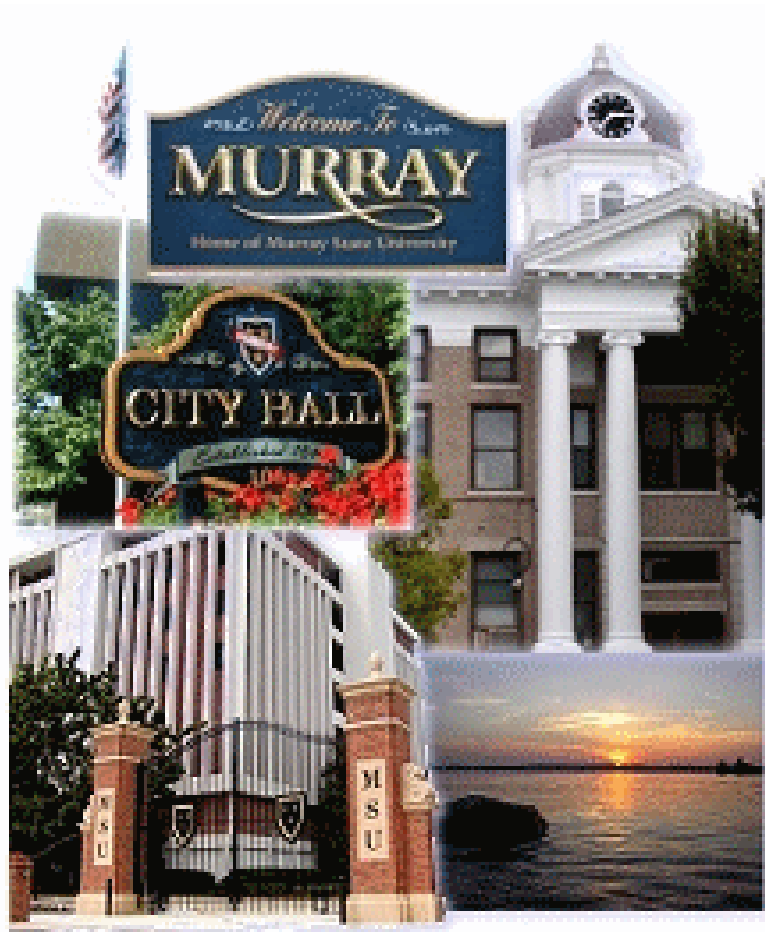


# MURRAY

## SMALL URBAN AREA

### TRANSPORTATION STUDY



Prepared by:  
Kentucky Transportation Cabinet  
Division of Planning

**FINAL**  
**February**  
**2008**



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## **Introduction**

### Study Purpose

This study was conducted by the Kentucky Transportation Cabinet (KYTC) with the goal of improving the transportation system in Murray not so much through transportation systems additions but rather by maximizing the current transportation assets. A strong focus was given to identification and analysis of road system data for problem spots that are safety and congestion related resulting in the identification and prioritization of low cost projects that would have an immediate, positive impact for the traveling public in Murray, Kentucky.

This activity included the following tasks:

- Reviewed and evaluated KYTC's Division of Planning's Highway Information System (HIS) and Collision Reports Analysis for Safer Highways (CRASH) data
- Established project team to guide the study effort
- Met with local officials to obtain input
- Identified potential problem areas
- Field review of problem areas to generate ideas
- Identified possible solutions and estimated project costs
- Developed recommendations and prioritized projects

### Programming and Schedule

Several projects in and near Murray are listed in the Kentucky Enacted Six-Year Highway Plan FY 2007-2012. These projects are:

- Design of a "Roundabout" at the "Five Points" intersection of KY 1327 (College Farm Road/Chestnut Street), KY 748 (North 16<sup>th</sup> Street), and KY 774 (Coldwater Road) scheduled for 2008.
- Widening (to 5-lanes) of KY 121 from US 641 to Coldwater Road; the construction phase is scheduled for 2007.
- Widening of US 641 South from the Clarks River Bridge to the existing 4-lane section; right-of-way acquisition and utility relocation are scheduled for 2008.
- Construction of the segment of new KY 80 just north of Murray from US 641 west to KY 1836 scheduled for 2006 and 2007.

## **Officials and Project Team**

An initial interdisciplinary project team meeting was held on November 2, 2006, at the Kentucky Transportation Cabinet's District One office, while an initial meeting with Murray local officials was conducted on November 3, 2006. Those in attendance at each of these meetings are shown in Table 1.

**Table 1: Meetings Attendees**

Project Team Meeting November 2, 2006

<u>Name</u>	<u>Representing</u>
Allen W. Thomas	KYTC – District 1 Planning
Stacey Courtney	Purchase Area Development District
Jeff Thompson	Purchase Area Development District
Randy Williams	KYTC – District 1 Traffic
John Agee	KYTC – District 1 Traffic
Bruce Siria	KYTC – Central Office Division of Planning

Local Officials Meeting November 3, 2006

<u>Name</u>	<u>Representing</u>
Thomas Clendenen	Murray Street Department Superintendent
Matt Mattingly	Murray Director of Administration
Ken Claud	Murray Chief of Police
Don Elias	Former Murray Director of Administration
David Roberts	Murray Director of Planning and Engineering
Jeff Thompson	Purchase Area Development District
Bruce Siria	KYTC – Central Office Division of Planning

**Project Location, Existing Conditions, and Traffic**

Project Location

The project study area included the Murray city limits, gaps between non-contiguous portions of the incorporated area, plus other developed areas outside of the city limits generally north and west of the Middle Fork of the Clarks River. (For All Exhibits See Appendix A, Page 15) See Exhibit 1: Vicinity Map.

## Existing Highway and Rail Features

Data on the existing conditions in the study area were taken from the Division of Planning's Highway Information System (HIS) database. Table 2 shows some general route information for Murray. Exhibit 2 highlights route segments with an Adequacy Rating Percentile less than 20 percent, while Exhibit 3 shows city streets with a AAA truck weight classification. Average daily traffic (ADT) volumes that exceed 10,000 vehicles per day are shown in Exhibit 4, while congested segments (as measured by the volume to service flow ratio) are depicted in Exhibit 5.

As shown on Exhibit 1, the City of Murray is commercially served by the Kentucky-West Tennessee Railroad (KWT), a short-line operation that operates from about a mile north of Murray to Bruceton, Tennessee—a distance of approximately 62 miles—where it junctions with a CSX mainline. KWT is classified as a Class III railroad, meaning its annual revenues are less than 10% of those for the major (Class I) railroads in the Commonwealth. An average of one train per weekday operates over this line between Murray and Paris, Tennessee. Nearly all of these operations occur in daylight hours. Further north of this point in Kentucky is the Hardin Southern Railroad which was previously used only for recreational purposes but was recently sold to the Calloway Economic Development Council to extend rail freight service north of Murray by connecting with the KWT.

**Table 2: Route Information**

Route	Beginning Milepoint	Ending Milepoint	Lanes	Lane Width (feet)	Year 2005 Average Daily Traffic (ADT)	Adequacy Rating Percentile	Critical Rate Factor (CRF)	Volume to Service Flow Ratio (V/SF)
US 641	5.500	5.952	2	10	8460	9	0.00	0.38
US 641	5.952	6.501	2	10	8460	33	0.96	0.33
US 641	6.501	6.607	2	12	8460	23	0.03	0.31
US 641	6.607	7.169	4	12	13700	52	1.26	0.62
US 641	7.169	8.143	4	12	19700	48	2.13	0.72
US 641	8.143	8.916	4	12	25100	48	1.89	0.74
US 641	8.916	9.126	4	12	23300	69	0.04	0.39
US 641	9.126	9.396	4	12	21000	69	0.00	0.33
US 641	9.396	9.710	4	12	16300	99	0.00	0.22
US 641X	0.000	0.626	2	9	8720	66	0.00	0.31
US 641X	0.626	0.694	2	9	8520	53	0.00	0.31
US 641X	0.694	0.996	2	9	8570	66	0.27	0.31
US 641X	0.996	1.182	2	9	8570	11	0.13	0.31
US 641X	1.182	1.222	2	9	8570	4	0.00	0.31
US 641X	1.222	1.678	2	9	8570	2	1.24	0.65
US 641X	1.678	2.155	2	12	8870	21	0.42	0.52
US 641X	2.155	2.870	2	12	12300	60	0.00	1.08

**Table 2: Route Information (cont.)**

Route	Beginning Milepoint	Ending Milepoint	Lanes	Lane Width (feet)	Year 2005 Average Daily Traffic (ADT)	Adequacy Rating Percentile	Critical Rate Factor (CRF)	Volume to Service Flow Ratio (V/SF)
KY 94	8.728	9.101	2	10	8510	28	1.28	0.31
KY 94	9.101	9.249	2	11	8510	34	0.13	0.63
KY 94	9.249	9.769	2	11	13900	39	2.18	0.50
KY 94	9.769	10.146	2	11	9650	26	2.27	0.34
KY 94	10.146	10.290	2	11	9650	21	0.12	0.34
KY 94	10.290	10.446	2	14	9650	4	0.13	0.75
KY 94	10.446	10.495	2	19	9650	2	0.50	0.80
KY 94	10.495	10.585	2	11	10200	6	0.37	0.78
KY 94	10.585	10.749	2	13	10200	85	0.26	0.33
KY 94	10.749	10.976	2	11	9700	97	0.29	0.34
KY 94	10.976	11.072	2	10	9380	71	0.07	0.34
KY 94	11.072	11.296	2	10	9380	31	0.00	0.32
KY 121	13.656	13.825	2	10	6930	32	0.06	0.27
KY 121	13.825	13.890	2	10	6930	28	0.00	0.26
KY 121	13.890	14.075	2	10	6930	8	0.33	0.90
KY 121	14.075	14.590	2	10	12800	21	1.29	0.46
KY 121	14.590	15.056	2	10	12100	26	2.85	0.74
KY 121	15.056	16.192	2	10	9230	66	0.70	0.34
KY 748	0.000	0.307	2	8	6268	★	0.59	★
KY 774	0.000	0.483	2	10	6200	44	0.49	0.86
KY 821	0.000	0.506	2	9	3580	24	0.70	0.23
KY 822	0.000	0.073	2	10	6510	83	0.00	0.45
KY 822	0.073	1.170	2	10	7100	54	0.43	0.61
KY 1327	0.000	0.972	2	9	4700	★	0.22	★
KY 1327	0.972	1.500	2	9	5530	11	1.12	0.52
KY 1327	1.500	1.540	2	12	13000	39	0.31	0.42
KY 1327	1.540	1.910	2	12	13000	39	1.02	0.51
KY 1327	1.910	2.035	3	8	13000	39	0.38	0.51
KY 1550	4.555	6.400	2	9	3600	27	0.26	0.63
KY 1550	6.400	6.968	2	9	5050	23	0.25	0.73
KY 1660	0.000	1.530	2	9	3760	★	0.15	★
KY 2075	0.000	0.526	2	10	7000	36	0.10	1.24
KY 2075	0.526	0.730	2	12	7000	36	0.02	1.24
KY 2075	0.730	1.678	2	10	7000	36	0.16	1.24

★ Non Available

### Vehicle Crash Analysis

Summaries of vehicle crashes were recorded with valid reference points in the study area during the three-year-period between August 1, 2003 and July 31, 2006. Of these 1,148 crashes, 1,009 were property damage only occurrences, 134 resulted in one or more injuries, and five resulted in one or more fatalities. There are 12 segments with a Critical Rate Factor (CRF) in excess of 1.00 shown highlighted in Table 3. A CRF greater than 1.00

indicates the segment of roadway has had a statistically significant number of crashes and they are likely not occurring at random.

Crash data for five roadway segments flagged in the initial analysis summarized in Table 3 were scrutinized in more detail; the results are shown in Table 4. A significant majority of the crashes are occurring in dry weather (79% overall), though the dominance of that majority is weaker for KY 1327. Similarly, a significant majority of crashes are occurring during daylight hours (81% overall), though the dominance of the majority in this instance is weaker for KY 121. These two statistics indicate that it is unlikely that a majority of the crashes occurring on these roadway segments are related to bad weather or poor visibility.

Nearly half (47%) of the crashes on these five roadway segments were described as “rear end” crashes. Such events are not uncommon along city streets where high traffic volumes contribute to vehicular congestion and where frequent access points generate turning movements which can result in both rear end crashes and “angle collisions”. (Such angle collisions account for 2/3 of the crashes along these roadway segments that were not rear end crashes.) The dominance of rear-end and angle collisions may indicate a potential benefit from an access management strategy for the city of Murray.

**Table 3: Crash Data**

Route	Begin MP	End MP	Crashes				Critical Rate Factor (CRF)
			Property Damage Only	Fatal	Injury	Total	
US 641	5.500	5.952	0	0	0	0	0.00
US 641	5.952	6.417	19	0	2	21	0.46
US 641	6.417	6.501	0	1	0	1	0.01
US 641	6.501	6.607	0	1	0	1	0.01
US 641	6.607	7.169	56	1	10	67	<b>1.26</b>
US 641	7.169	8.143	224	0	26	250	<b>2.13</b>
US 641	8.143	8.916	195	0	29	224	<b>1.89</b>
US 641	8.143	8.916	195	0	29	224	<b>1.89</b>
US 641	8.916	9.126	15	1	4	20	0.04
US 641	9.126	9.396	0	0	0	0	0.00
US 641	9.396	9.710	0	0	0	0	0.00
US 641X	0.000	0.626	0	0	0	0	0.00
US 641X	0.626	0.694	0	0	0	0	0.00
US 641X	0.694	0.996	3	0	1	4	0.27
US 641X	0.996	1.182	4	0	2	6	0.13
US 641X	1.182	1.222	0	0	0	0	0.00
US 641X	1.222	1.678	25	0	0	25	<b>1.24</b>
US 641X	1.678	2.155	9	0	0	9	0.42
US 641X	2.155	2.870	0	0	0	0	0.00

**Table 3: Crash Data (cont.)**

Route	Begin MP	End MP	Crashes				Critical Rate Factor (CRF)
			Property Damage Only	Fatal	Injury	Total	
KY 121	13.656	13.825	1	0	1	2	0.06
KY 121	13.825	13.890	0	0	0	0	0.00
KY 121	13.890	14.075	12	0	1	13	0.33
KY 121	14.075	14.590	32	0	7	39	<b>1.29</b>
KY 121	14.590	15.056	63	0	13	76	<b>2.85</b>
KY 121	15.056	16.192	29	0	2	31	0.70
KY 748	0.000	0.307	7	0	0	7	0.59
KY 774	0.000	0.483	5	0	3	8	0.49
KY 94	7.698	8.728	12	0	2	14	0.49
KY 94	8.728	9.101	18	0	4	22	<b>1.28</b>
KY 94	9.101	9.249	5	0	0	5	0.13
KY 94	9.249	9.769	67	0	4	71	<b>2.18</b>
KY 94	9.769	10.146	42	0	5	47	<b>2.27</b>
KY 94	10.146	10.290	4	0	1	5	0.12
KY 94	10.290	10.446	6	0	0	6	0.13
KY 94	10.446	10.495	9	0	0	9	0.50
KY 94	10.495	10.585	10	0	1	11	0.37
KY 94	10.585	10.749	12	0	1	13	0.26
KY 94	10.749	10.976	15	0	3	18	0.29
KY 94	10.976	11.072	2	0	0	2	0.07
KY 94	11.072	11.296	0	0	0	0	0.00
KY 822	0.000	0.073	0	0	0	0	0.00
KY 822	0.073	1.170	10	0	5	15	0.43
KY 1327	0.000	0.972	5	0	0	5	0.22
KY 1327	0.972	1.500	17	0	1	18	<b>1.12</b>
KY 1327	1.500	1.540	6	0	0	6	0.31
KY 1327	1.540	1.910	21	0	3	24	<b>1.02</b>
KY 1327	1.910	2.035	18	0	0	18	0.38
KY 1550	4.555	6.400	8	0	0	8	0.26
KY 1550	6.400	6.968	4	0	0	4	0.25
KY 1660	0.000	1.530	3	0	1	4	0.15
KY 2075	0.000	1.678	6	0	2	8	0.17
KY 821	0.000	0.506	8	0	0	8	0.70
KY 2594	0.000	0.798	2	1	0	3	0.17

Source: Collision Report Analysis for Safer Highways (CRASH) database, Data: August 1, 2003-July 31, 2006



**Table 4: Crash Conditions**

Route	Begin MP	End MP	Crashes w/ Dry Roadway	Crashes in Daylight Conditions	Most Frequent "Manner of Collision"
US 641	6.607	8.916	84.1%	82.3%	Rear End
US 641X	1.222	1.678	68.0%	88.0%	Vehicle Backing
KY 121	14.075	15.056	69.6%	72.2%	Rear End
KY 94	8.728	10.146	72.9%	81.4%	Rear End
KY 1327	0.972	1.910	61.9%	83.3%	Rear End

Source: Collision Report Analysis for Safer Highways (CRASH) database, Data: August 1, 2003-July 31, 2006

## **Environmental and Socioeconomic Overview**

### Environmental Footprint

A brief environmental analysis was conducted to locate places of significant historical or cultural value as well as places of potential hazards. An environmental footprint can be seen in Exhibit 6. The most significant environmental issues are the expected prevalence of wetlands in the vicinity of the East Fork of the Clarks River, a historic district in the vicinity of the intersection of Main and Eighth Streets, and numerous structures in the downtown area potentially eligible for the National Register of Historic Places.

### Environmental Justice

A review of Year 2000 U.S. Census data for Murray revealed that possible environmental justice issues are present in several Census Block Groups. The highlighted numbers in Table 5 reflect Census Block Groups for which the percentage of an identified population group significantly exceeds the percentage of that same population group for the entire City of Murray. See Exhibit 7 for the location of the census units shown from Table 5. Recommendations resulting from this study effort should not disproportionately impact the residences of these Census Block Groups in a negative fashion.

**Table 5: Selected Murray Census Data, Year 2000**

Census Tract	Census Block Group	% Minority Persons <sup>(1)</sup>	% Elderly Persons	% Low Income	% Low English Proficiency <sup>(2)</sup>
103	1	4.54	8.49	<b>25.11</b>	0.00
103	2	11.27	11.81	<b>35.84</b>	1.06
103	3	12.61	<b>17.55</b>	<b>23.87</b>	<b>2.77</b>
103	4	<b>18.92</b>	1.37	<b>46.47</b>	<b>2.02</b>
104	1	10.48	11.72	<b>25.20</b>	1.33
104	2	<b>23.53</b>	13.53	22.92	1.44
105	1	9.40	<b>21.88</b>	20.80	0.92
105	2	5.25	<b>29.99</b>	17.83	0.00
105	3	12.27	<b>26.88</b>	<b>33.80</b>	0.00
105	4	5.83	16.65	17.11	0.62
106	1	8.78	<b>22.53</b>	<b>23.73</b>	<b>2.35</b>
106	2	5.62	<b>31.57</b>	1.84	<b>1.82</b>
106	3	6.15	13.94	1.99	<b>1.83</b>
106	4	3.16	16.45	8.22	0.00
106	5	2.40	<b>21.09</b>	2.72	1.42
106	6	3.05	<b>19.82</b>	11.70	0.44
<b>COMPARED TO</b>					
Murray		11.80	16.00	22.06	1.41
Kentucky		9.96	12.46	15.82	0.81
United States		24.90	12.43	12.38	4.31

(1) For purposes of this table, "minority" is defined as non-white.; (2) Ages 5 and Above

## Recommendations

The project team and local officials recommend the projects shown in Table 6. A brief discussion of the transportation problems and suggested solutions are listed as follows. They are ranked in high to low priority order.

- 1) New Route - Murray Business Loop from KY 121/US641X Intersection to KY 94: This potential project is in the Project Identification Form (PIF) ~ PIF 01-018-C0000 4.00. The problem statement from that document says: "In 2004 the city of Murray received Federal funds to begin a business loop along the eastern edge of the city to improve access from the south and southwest to the city industrial area. With the designated funds the city has completed the design of the route (with KYTC approval) and will have sufficient funds to purchase the necessary right-of-way to build the route. Additional construction funds will be needed to complete the project. It will connect US 641 S, KY 121 S and KY 94 E, three major road networks serving the city. It will provide alternate routing for semi-trailer traffic accessing the eastern side, removing the need to travel the downtown

area. It will relieve current and future congestion on US 641 and the downtown area. Several arterials in or adjacent to the city would benefit from the volume reduction with the bypass. It could improve traffic safety and decrease crash rates by reducing traffic congestion and delays on local streets. The regional goals and objectives identified therein were:

- i) Promote the efficient movement of people, goods and services
- ii) Improve freight movement
- iii) Improve accessibility
- iv) Reduce travel times, traffic delays and traffic hazards

- 2) KY 94 - Reconfigure Lane Striping from "Left/Straight" & "Right Only" to "Left Only" & "Right/Straight" at 16th Street; Review Signal Phasing: The problems to be addressed with this potential project are congestion and safety.
- 3) US 641 - Minor Widening of US 641/US 641 X Intersection Northbound to Add Right Turn Lane: The problems to be addressed with this potential project are congestion and safety.
- 4) US 641 - Detailed Analysis of Crashes; Recommendations as Appropriate; Review and Adjust Signal Timing at Poplar Street & US 641 Especially Considering Afternoon School Traffic: The problems to be addressed with this potential project are congestion and safety.
- 5) CS 1069 (Poplar Street) - Construct Right-Turn Lane from Westbound Poplar Street to Northbound US 641: The problems to be addressed with this potential project are congestion and safety.
- 6) US 641 - Minor Widening of US 641/KY 94 Intersection to Improve Turning Radii: The problems to be addressed with this potential project are congestion and safety.
- 7) New Route - New Connector from KY 94 Near Doran Road to KY 121: This potential project is identified in PIF 01-018-C0000 5.00. The problem statement from that document says: "The new route would provide a connector road on Murray's west side between KY 94 and KY 121. The route would create an alternate north/south connection to the other highly congested north/south routes in the city - 12<sup>th</sup> (US 641), 16th and 18th Streets. This route could remove some peak period traffic from those streets. The area near the proposed route has had seven new residential areas developed since 2004. This trend is consistent with the large growth in the west and southwest portions of Murray over the last 10 years. The connection would provide alternate access to Calloway County Schools and Murray High School, which generates substantial peak time traffic for the city. It would likely remove some of that traffic from the highly congested intersection at 5 points and reduce some through traffic on 18th Street; a connector route that is in a residential area. It would also provide residential areas in southwest and west sections better access to the KY 121/US 641 commerce areas (Wal-mart, Lowe's, a shopping center, restaurants and Murray State University). The regional goals and objectives identified therein were:

- i) Promote the efficient movement of people and goods
  - ii) Maintain existing arterial system while placing a priority on improving collector roads that support them
  - iii) Improve accessibility
  - iv) Reduce travel times, traffic delays and traffic hazards
  
- 8) KY 94 - Construct Left-Turn Lane from KY 94 to Doran Road South: The problems to be addressed with this potential project are congestion and safety.
  
- 9) US 641 - Construct Sidewalks on 12th Street Between Sycamore and Glendale Streets: The problems to be addressed with this potential project are access and safety.
  
- 10) US 641X ( US 641 Business Route) - Construct Urban Intersection at South 4th Street & Sycamore Street: This potential project is identified in PIF 01-018-B0641X 1.00. The problem statement from that document says: ADT near this intersection is 8,670 (8% trucks) on 2 – 9 foot lanes. A composite rating of 35.0 indicates that 96% of Kentucky's urban minor arterial mileage is rated better. Contributing factors to the low rating are a 0.0 safety rating of a possible 45 points and a condition rating of 15.0 of a possible 30 points. The intersection has substandard design issues given it is a “Y” intersection with one leg of the “Y” allowing traffic to travel in both directions while the other leg allows only US 641X south bound traffic to turn onto Sycamore Street. This merging traffic must yield to east bound traffic. There are no traffic control devices to help accommodate turning movements for all approaches and there are issues with the capacity and safety of this intersection. The regional goals and objectives identified therein were:
  - i) Improve operating efficiency of current infrastructure
  - ii) Improve accessibility
  - iii) Improve safety
  
- 11) KY 822 - Minor Widening to Improve Turning Radii at the Intersection with KY 821 (Sycamore Street): This potential project is identified in PIF 01-018-D0822 10.00. The problem statement from that document says: ADT is 6,640 (4% trucks) on 2-10 foot lanes with 1 foot earth shoulders. The 2004 composite rating of 51.50 indicated 94% of Kentucky's urban minor arterial mileage was rated better. The safety rating of 23 of a possible 55 pts., and CRF of 1.25 combined with a service rating of 3 of a possible 15 pts., and V/SF of 1.39 contributed to the low composite. The 2005 data showed improvement in the numbers, although the safety rating is still somewhat low at 34 of 55. Safety is a concern with low shoulder edges that have approximately a 4” drop off. The intersection with KY 821 (Sycamore Street) is signalized, but is highly congested and lacks turn lanes or turn arrows. Murray Elementary and Murray High School are accessed via this intersection. Shoulder drop-offs and the lack of turning radius make it difficult for school buses to turn without crossing into on-coming traffic lanes. This area also serves a high density residential area and a lack of sidewalks creates pedestrian and bicycle safety issues. 2000-2002 crash

data indicated 30 crashes with 11 being categorized as “Injury” in this particular segment. The regional goals and objectives identified therein were:

- i) Improve the operating efficiency of the existing infrastructure
- ii) Improve accessibility
- iii) Promote efficient movement of people and services
- iv) Improve safety
- v) Reduce travel time, delays and hazards

- 12) KY 822 - 16th Street - Add Turn Lanes, Sidewalks, and Guardrails between KY 1550 (Glendale Road) and KY 821 (Sycamore Street): This potential project is also identified in PIF 01-018-D0822 10.00. The problems to be addressed with this potential project are congestion and safety.
- 13) KY 748 - Brinn Road - Major Widening to 3 Lanes from Chestnut Street (KY 1327) to KY 121: This potential project is identified in PIF 01-018-D0748 1.00. The problem statement from that document says: ADT is 6,261 on 2 – 9 foot lanes with 2 foot shoulders creating congestion and capacity issues. There are poor vertical alignments. Improvements would enhance access to Murray State University (MSU) and decrease traffic demands on Chestnut Street. This route serves local travel in Murray and provides a north-south link through the entire urban area, linking southwest residential areas with major east-west routes, MSU, and major shopping & dining establishments. This will also serve as a connector to the future KY 80 route currently under construction. It also serves as a direct connection route which provides access to Northwest Elementary School to the north and Murray Elementary School to the south. 2002-2004 crash data indicates most of the crashes are near the beginning and ending segments at the signalized locations. A high International Roughness Index (IRI) of 187 is contributing to a low condition index of 15. The segment is in the 22 percentile indicating that 78% of roads in the same class are better. 5-points intersection (KY1327/KY774/KY748/16th Street) is also a concern and major issue related to this segment. The regional goals and objectives identified therein were:
- i) Improvements to operating efficiency of existing system
  - ii) Reduce travel time, delays and traffic hazards
  - iii) Improving the transportation of people, goods, and services
  - iv) Improve accessibility to schools, university, and major shopping centers
- 14) KY 1550 - Construct Turning Lanes on Wiswell Road at the Intersection w/ Robertson Road: The problems to be addressed with this potential project are congestion and safety.
- 15) KY 1660 - More Detailed Analysis of Crashes (crash data was partially available) or Safety Audit, Especially at the Intersections with KY 94, KY 1327, and KY 121; Recommendations as Appropriate: The problem to be addressed with this potential project is safety.
- 16) KY 1550 - Detailed Safety Analysis; Recommendations as Appropriate: The problem to be addressed with this potential project is safety.

- 17) KY 1550 - Evaluate Needs After Development South of KY 1550 Has Occurred: The problems to be addressed with this potential project are access and capacity
- 18) KY 1327 - Construct Turn Lanes at MSU Agricultural Expo Center and at the Calloway County High School: The problems to be addressed with this potential project are access and congestion.

As indicated in the brief crash analysis, the pattern of rear-end and angle collisions is not uncommon in urban settings with relatively high traffic volumes and generally unregulated access points. Further improvements to the existing transportation infrastructure might be identified in the development of a comprehensive access management strategy for the city.

Geographically, the city of Murray is bisected by a major thoroughfare (US 641) that carries the highest traffic volumes in the city. Significant commercial development exists along this corridor. Interestingly, there are significant traffic generators and attractors on either side of this north-south artery. Murray State University and most new residential development lies to the west of US 641 (12th Street), while the traditional central business district (CBD) and significant residential units lie to the east. This pattern generates significant traffic movements across US 641. In addition to the development of an access management strategy, accommodations for pedestrians and bicyclists might need to be more specifically addressed in future efforts. The relatively short distances of some of these trips may lend themselves to non-motorized alternative travel modes.

Finally, significant additional investment in the transportation assets of Murray are nearing completion (KY 80) or being investigated (new facility between South 12<sup>th</sup> Street and the CBD). Recommendations in Table 6 call for a new connector from KY 94 near Doran Road to KY 121. Each of these proposed new facilities may significantly impact the overall traffic patterns within the city of Murray. Thus, it is recommended that the traffic model for Murray, last updated in 1990, be reexamined and updated.

**Table 6: Recommendations**

Rank	Route	Beginning Milepoint	Ending Milepoint	Length	Problem	Possible Solution	UPL?	PIF?	Estimated Costs (Thousands)				
									Design	Right-of-Way	Utility Relocation	Construction	Total
1	New			1.5	Access/Safety	Murray Business Loop from KY 121/US641X Intersection to KY 94	Yes	Yes			\$2,000	\$3,200	\$5,200
2	KY 94	9.2	9.3	0.1	Congestion/Safety	Reconfigure Lane Striping from "Left/Straight" & "Right Only" to "Left Only" & "Right/Straight" @ 16th Street; Review Signal Phasing	No	No	\$10			\$25	\$35
3	US 641	8.09	8.19	0.1	Congestion/Safety	Minor Widening of US 641/US 641 X Intersection Northbound to Add Right Turn Lane	No	No	\$100	\$500	\$300	\$400	\$1,300
4	US 641	7.5	7.6	0.1	Congestion/Safety	Detailed Analysis of Crashes; Recommendations as Appropriate; Review and Adjust Signal Timing @ Poplar Street & US 641 Especially Considering Afternoon School Traffic	No	No	\$50				\$50
5	CS 1069 (Poplar St.)	0.62	0.72	0.1	Congestion/Safety	Construct Right-Turn Lane from Westbound Poplar Street to Northbound US 641	No	No	\$50	\$200	\$200	\$200	\$650
6	US 641	7.65	7.75	0.1	Congestion/Safety	Minor Widening of US 641/KY 94 Intersection to Improve Turning Radii	No	No	\$50	\$100	\$500	\$150	\$800
7	New			1	Access/Capacity	New Connector from KY 94 Near Doran Road to KY 121	Yes	Yes	\$500	\$200	\$350	\$5,500	\$6,550
8	KY 94	8.68	8.78	0.1	Congestion/Safety	Construct Left-Turn Lane from KY 94 to Doran Road South	No	No	\$100	\$250	\$750	\$500	\$1,600
9	US 641	6.67	7.17	0.5	Access/Safety	Construct Sidewalks on 12th Street Between Sycamore and Glendale Streets	No	No	\$50	\$200	\$75	\$500	\$825
10	US 641 Business	1.14	1.24	0.1	Congestion/Safety	Construct Urban Intersection @ South 4th Street & Sycamore Street	Yes	Yes	\$100	\$50	\$500	\$750	\$1,400
11	KY 822	0.68	0.78	0.1	Congestion/Safety	Minor Widening to Improve Turning Radii @ the Intersection with KY 821 (Sycamore Street)	No	No	\$50	\$100	\$500	\$400	\$1,050
12	KY 822	0	0.73	0.73	Congestion/Safety	16th Street - Add Turn Lanes, Sidewalks, & Guardrails between KY 1550 (Glendale Road) and KY 821 (Sycamore Street)	Yes	Yes	\$350	\$400	\$1,000	\$1,100	\$2,850
13	KY 748	0	0.31	0.31	Access/Congestion	Brinn Road - Major Widening to 3 Lanes from Chestnut Street (KY 1327) to KY 121	No	No	\$400	\$1,000	\$1,500	\$2,500	\$5,400
14	KY 1550	4.5	4.6	0.1	Congestion/Safety	Construct Turning Lanes on Wiswell Road @ the Intersection w/ Robertson Road	No	No	\$50	\$50	\$350	\$250	\$700
15	KY 1660	0	1.53	1.53	Safety	More Detailed Analysis of Crashes (crash data was partially available) or Safety Audit, Especially @ the intersections with KY 94, KY 1327, and KY 121; Recommendations as Appropriate	No	No	\$50				\$50
16	KY 1550	6.06	6.21	0.15	Safety	Detailed Safety Analysis; Recommendations as Appropriate	No	No	\$50				\$50
17	KY 1550	5.59	5.69	0.1	Access/Capacity	Evaluate Needs After Development South of KY 1550 Has Occurred	No	No					\$0
18	KY 1327	0.4	0.8	0.4	Access/Congestion	Construct Turn Lanes @ MSU Agricultural Expo Center and @ the Calloway County High School	No	No	\$100	\$100	\$500	\$500	\$1,200

## Contacts

This study was conducted by and report written by Bruce Siria, Project Manager, who retired from KYTC shortly after its completion.

The following persons may be contacted if additional information is needed concerning the project or the study process:

- Daryl Greer, Director, Division of Planning
- Steve Ross, Transportation Engineer Branch Manager, Strategic Planning Activity Center, Division of Planning
- Jim Wilson, Team Leader, Strategic Planning Activity Center, Division of Planning

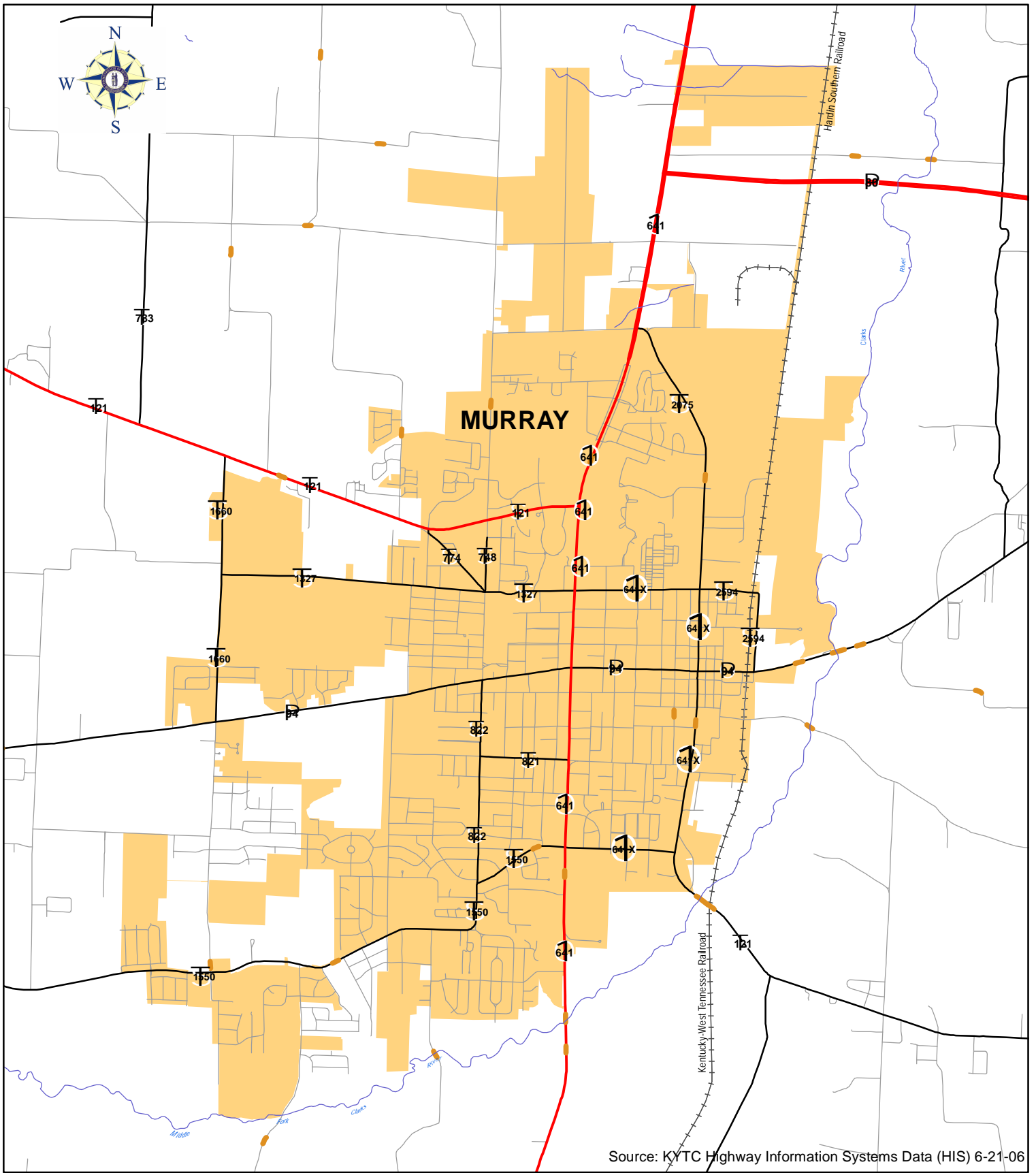
The following address and phone number may be used:

Phone: (502) 564-7183  
Address: Division of Planning  
Kentucky Transportation Cabinet  
Mail Code W5-05-01  
Transportation Office Building  
200 Mero Street  
Frankfort, KY 40622



# **Appendix A**

(All Exhibits)



Source: KYTC Highway Information Systems Data (HIS) 6-21-06

**Legend**

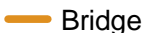





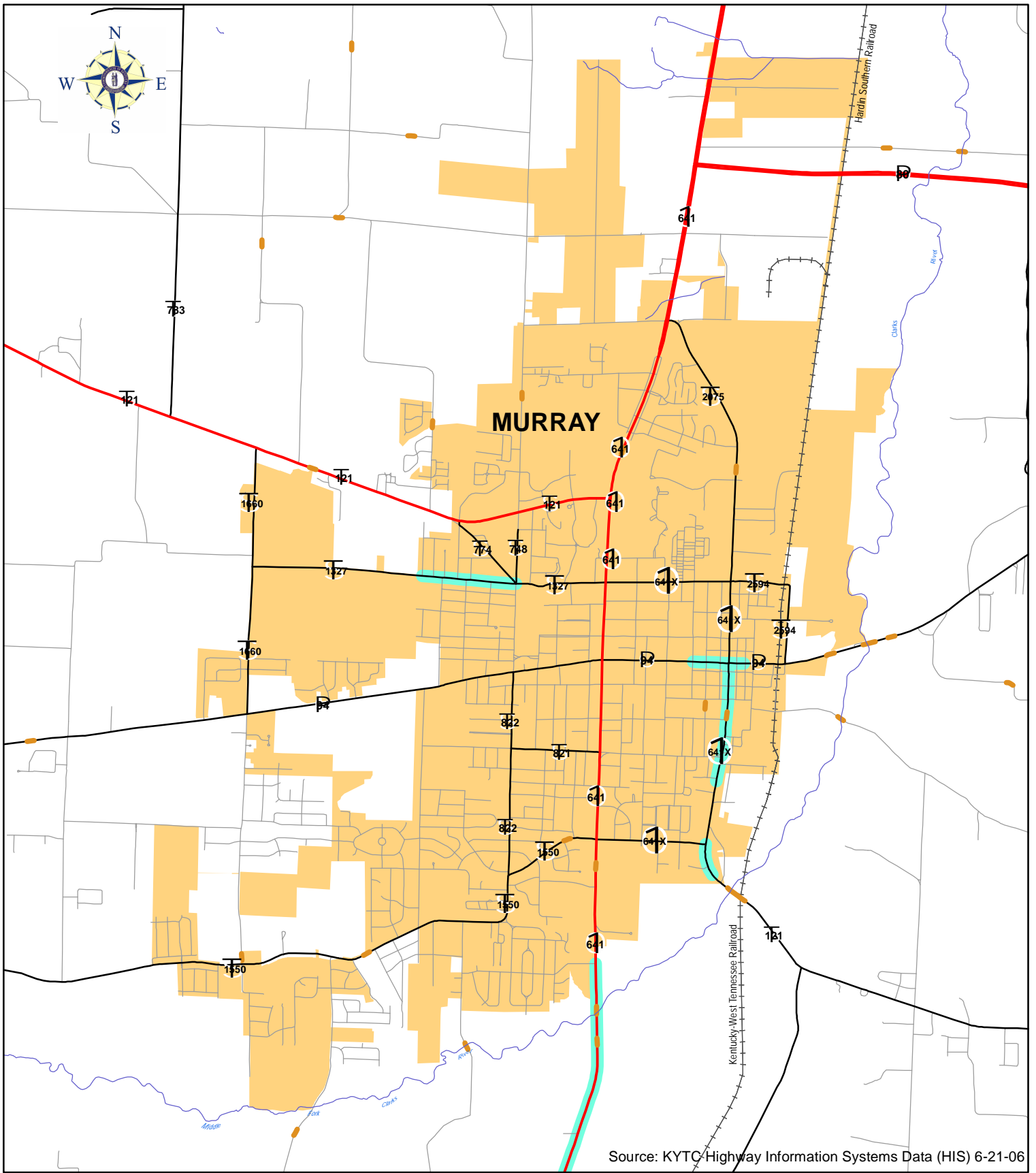
-  Bridge
-  US Highway
-  State Highway
-  Incorporated Area
-  Railroad
-  River/Stream



Exhibit 1

VICINITY MAP  
 Murray and Surrounding Area  
 Transportation Study:  
 Calloway County



Source: KYTC Highway Information Systems Data (HIS) 6-21-06

**LEGEND**








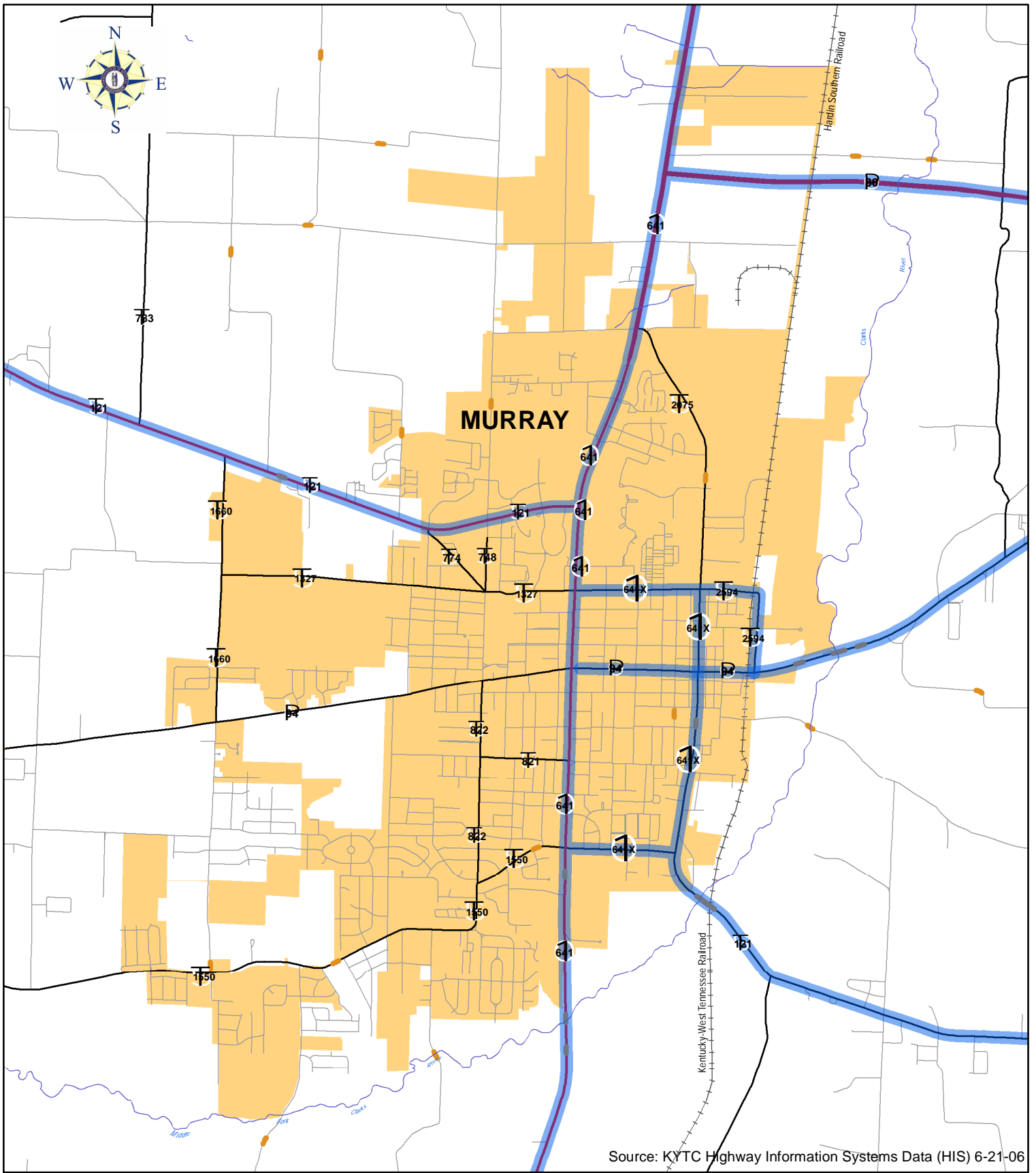
-  Bridge
-  Adequacy Rating Percentile < 20
-  US Highway
-  State Highway
-  Railroad
-  River/Stream
-  Incorporated Area



Exhibit 2  
 Adequacy Rating Percentile:  
 Less than 20  
 Murray and Surrounding Area  
 Transportation Study:  
 Calloway County



Source: KYTC Highway Information Systems Data (HIS) 6-21-06

**LEGEND**

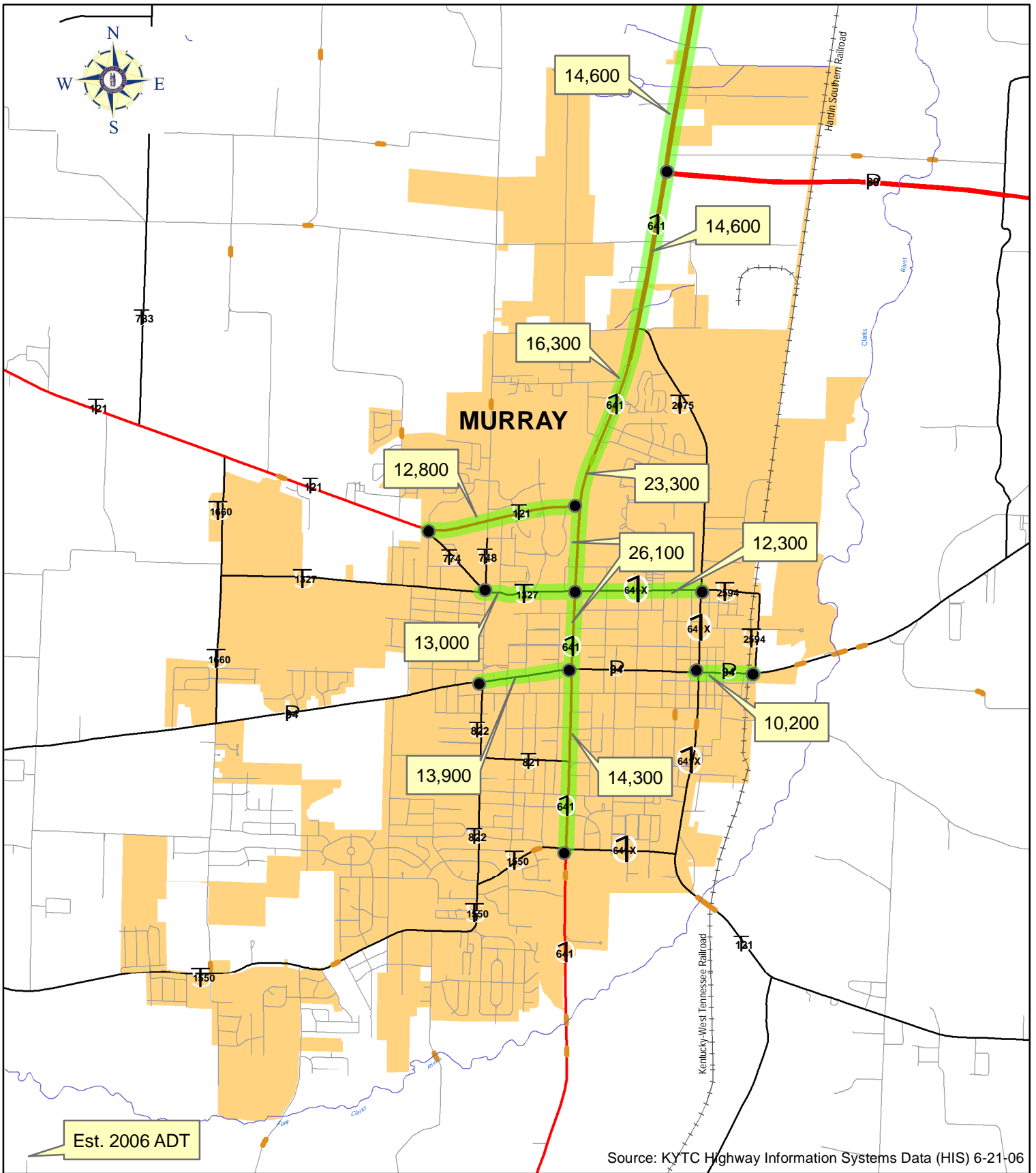
- Bridge
- Incorporated Area
- US Highway
- State Highway
- Truck Weight AAA
- Railroad
- River/Stream

0.5 0.25 0 0.5 1 Miles

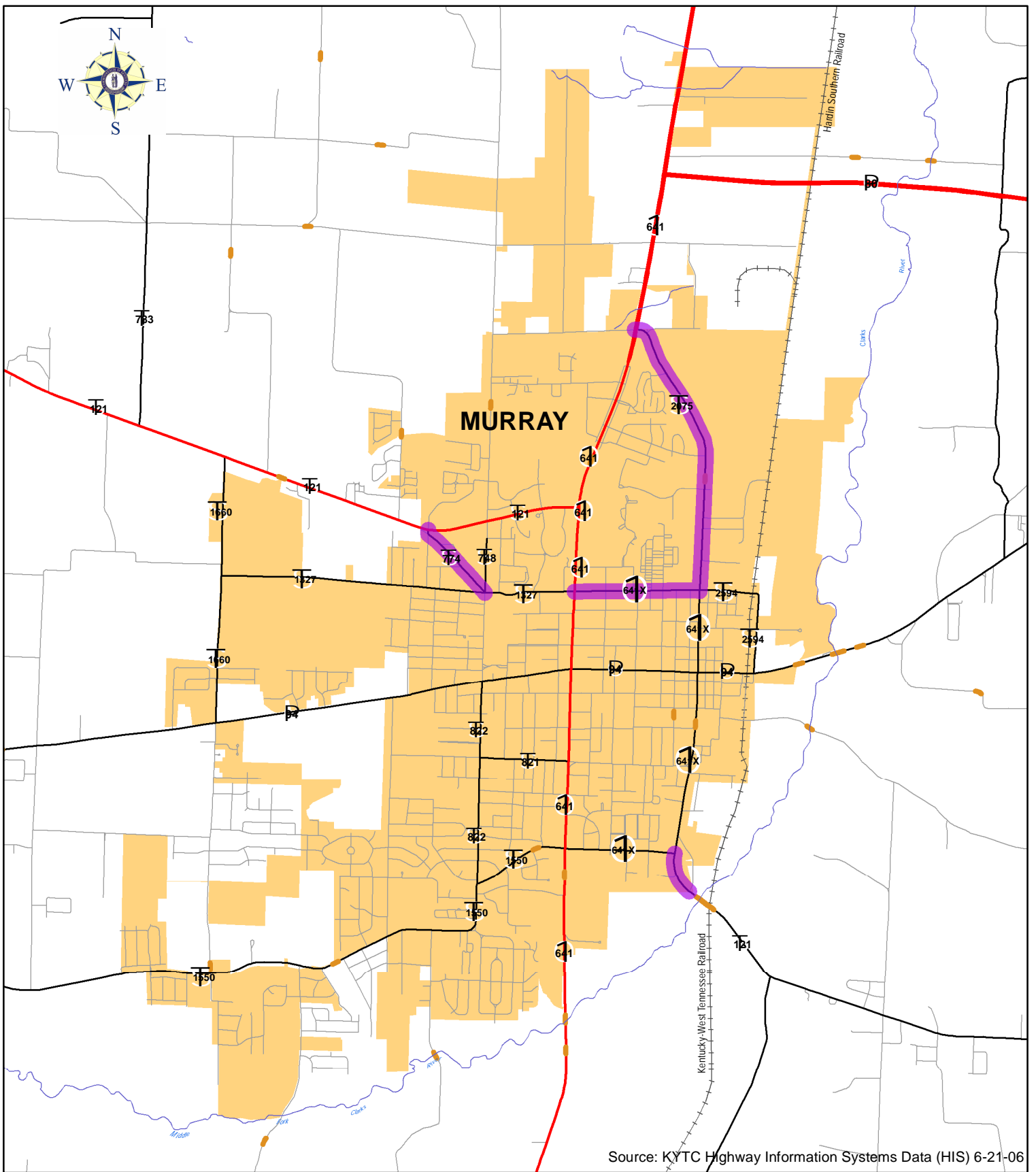
Exhibit 3

Truck Weight: AAA

Murray and Surrounding Area  
Transportation Study:  
Calloway County



<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li><span style="color: orange;">—</span> Bridge</li> <li><span style="background-color: orange; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Incorporated Area</li> <li><span style="color: red;">—</span> US Highway</li> <li><span style="color: black;">—</span> State Highway</li> <li><span style="background-color: green; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> ADT &gt; 10,000</li> <li><span style="color: black;">●</span> Traffic Section Break</li> <li><span style="color: black;">+ +</span> Railroad</li> <li><span style="color: blue;">—</span> River/Stream</li> </ul>	<p>0.5 0.25 0 0.5 1 Miles</p>	<p align="center">Exhibit 4 Average Daily Traffic (ADT) Greater Than 10,000 Murray and Surrounding Area Transportation Study: Calloway County</p>
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Source: KYTC Highway Information Systems Data (HIS) 6-21-06

**LEGEND**








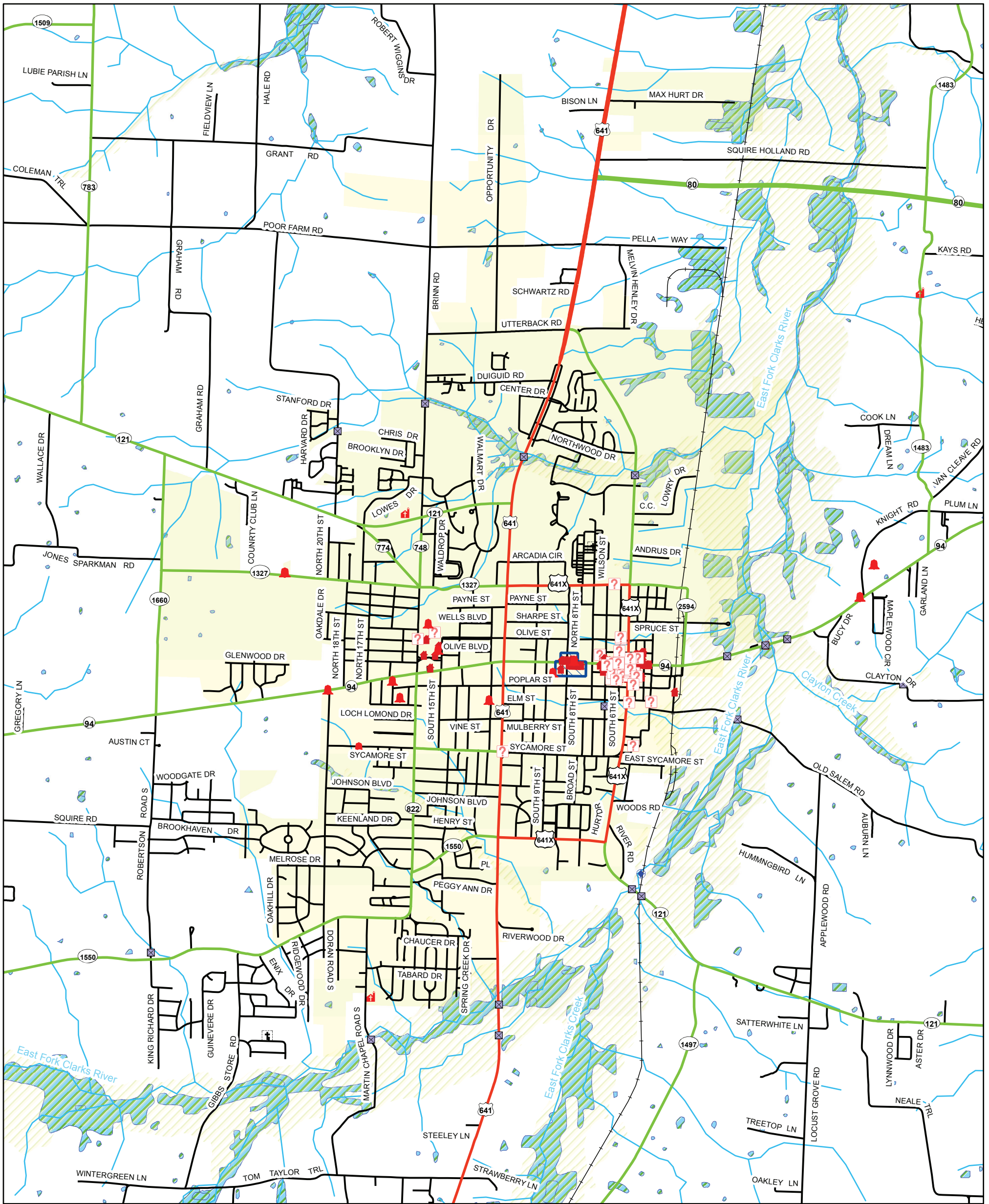
-  Bridge
-  Incorporated Area
-  US Highway
-  State Highway
-  V/SF  $\geq$  0.9
-  Railroad
-  River/Stream



Exhibit 5  
 Volume/ Service Flow  
 Greater Than Or Equal to 0.9  
 Murray and Surrounding Area  
 Transportation Study:  
 Calloway County



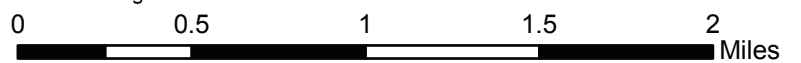
**Environmental Footprint Legend**

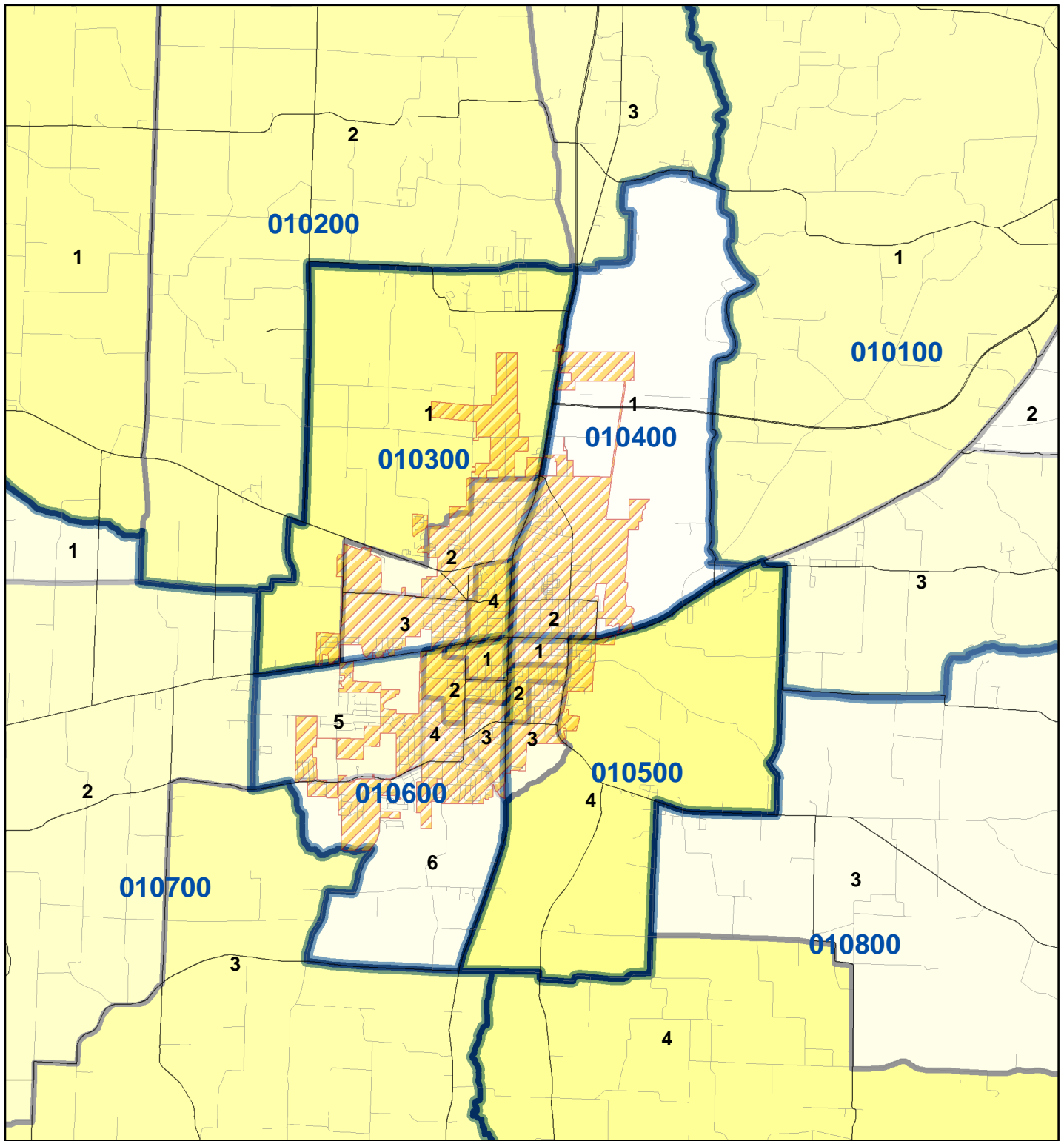
- |                      |                        |                        |                                       |
|----------------------|------------------------|------------------------|---------------------------------------|
| Parkway              | Schools                | Stream                 | Water Withdrawals                     |
| US Highway           | Cemetery               | Lift Station           | Water Purchase Source                 |
| KY Route             | Church                 | Public Well Source     | <b>Historic Structures/Districts</b>  |
| Local Road           | Sewer Treatment Plants | KPDES Site             | Listed/Eligible for National Register |
| Railroad (Active)    | Superfund              | Water Treatment Plants | Undetermined                          |
| Murray City Boundary | Wetlands               | 100 Year Flood         | National Register Historic District   |

**EXHIBIT 6  
ENVIRONMENTAL FOOTPRINT  
MURRAY AND SURROUNDING AREA  
TRANSPORTATION STUDY  
CALLOWAY COUNTY**



Division of Planning





**Legend**




- US Highways
- State Roads
- Local Roads
-  Corporate Boundary
-  Census Tracts
-  Census Block Groups



Exhibit 7

Census Tracts and Block Groups

Murray and Surrounding Area  
Transportation Study:  
Calloway County