# **APPENDIX F**: Traffic Forecasting Memorandum



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File:	KYTC Division of Planning KY 32 Traffic Forecasting Technical Memorandum	Date:	Stantec Consulting Services July 26, 2022

## Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

# **PROJECT DESCRIPTION**

As part of the KY 32 Corridor Study, Stantec was tasked with developing traffic forecasts to assist in the evaluation of improvement concepts. Historical traffic data, population trends, traffic impact studies, and results from the District 9 Regional Travel Demand Model were used to develop the forecasts.

This memorandum presents the methodology and assumptions used in the development of the traffic forecasts for the corridor.

# **STUDY AREA**

The KY 32 study corridor, shown on **Figure 1**, extends from the intersection at KY 377 (MP 4.491) to the intersection at US 60 (MP 8.439) in Morehead, Kentucky. There is one interchange with I-64, in the northern portion of the study area at MP 5.6.

# HISTORICAL TRAFFIC DATA

Seven KYTC count stations along the KY 32 study corridor were used to analyze historical traffic trends, as shown in **Figure 2**. The average daily traffic counts (ADT) and calculated compound annual growth rate (CAGR) for both long-term (around 20 years) and short-term (around 10 years) trend lines are presented in **Table 1** and shown graphically in **Figure 3**. The red text in Table 1 represents traffic counts from 2020, which are not an accurate representation of recent traffic patterns due to COVID shutdowns in 2020. The 2020 traffic counts are provided for reference but were not used to estimate the compound annual growth rates. The traffic count stations located along the northern portion of the study corridor (103755, 103A70, 103A69 and 103A54) are referred to as "KY 32 North" and the stations along the southern portion of the corridor (103A43, 103A09, and 103B07) are referred to as "KY 32 South". In general, the long-term growth rates are higher than the short-term growth rates, indicating that daily traffic on KY 32 did not grow as much over the last 10 years as it did in the preceding 10 years.

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Figure 1: KY 32 Corridor Study Area

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Figure 2. KY 32 Project Area and KYTC Count Station ADTs

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### Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

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Voor	KY 32 (North)	KY 32 (North)	KY 32 (North)	KY 32 (North)	KY 32 (South)	KY 32 (South)	KY 32 (South)
Tear	Sta.						
	103755	103A70	103A69	103A54	103A43	103A09	103B07
2000				20,600			18,300
2001			24,000	20,800	25,600		
2002	14,300	17,500		29,300			28,800
2003				28,900		29,700	20,000
2004	14,600		29,200	28,700			
2005				25,700	25,400		22,000
2006		16,300		26,400		27,100	
2007	13,800		26,700	24,800			
2008					24,700		20,900
2009		22,300				27,600	
2010	14,400		30,800				
2011			30,000	28,900	27,500		20,800
2012			29,907			26,412	18,751
2013	14,200					26,273	19,362
2014		23,501	30,103	27,528	25,667	25,563	18,741
2015		24,713	30,833	28,263		26,614	20,444
2016	16,038	23,548	30,124	27,953		26,971	20,264
2017			28,718		26,884	25,382	
2018		23,077	29,239	27,132		25,326	18,788
2019	15,165	23,847	29,809			25,581	19,428
2020		19,259		23,518	21,492	23,030	17,810
Medium- term % CAGR	0.58%	-0.18%	-0.69%	-1.03%	0.95%	-1.04%	-0.68%
Long-term % CAGR	0.35%	1.84%	1.21%	1.54%	0.31%	-0.93%	0.32%

## Table 1. Current KYTC Average Daily Traffic (ADT) Estimates

Source: Kentucky Transportation Cabinet (KYTC) \*2020 counts not used in growth rate calculations

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Figure 3. Historical KYTC Traffic Volumes

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Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

# **POPULATION GROWTH**

Population estimates and projections for Rowan County and the city of Morehead were obtained from the Kentucky State Data Center (KSDC) at the University of Louisville, and 2020 census data were obtained from the United States Census Bureau, as shown in **Table 2**. Between 2000 and 2020, Rowan County's population grew at a rate nearly identical to the statewide average while Morehead experienced higher growth of almost one percent per year. The area is expected to continue to grow, with Rowan County expected to grow at a rate of 0.81 percent per year over the next 20 years.

Area	C	ensus Estimat	es	Annual Growth	Projection	Annual Growth
	2000	2010	2020	2000 - 2020	2040	2020 - 2040
Kentucky	4,041,769	4,339,367	4,505,836	0.54%	4,886,381	0.41%
Rowan County	22,094	23,333	24,662	0.55%	28,982	0.81%
Morehead	5,914	6,845	7,151	0.95%	N	/A

## Table 2: Kentucky and Rowan County Population Projections

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Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

# ANTICIPATED DEVELOPMENTS

There are several locations near the study portion of KY 32 that have the potential to be developed in the next 20 years. The locations of these potential developments are displayed in **Figure 4**. The project team met with the City of Morehead and other stakeholders to discuss expected developments in the study area. A brief summary of the findings is provided below:

- 1. Area northwest of Walmart
  - 100 acres for industrial development
- 2. Wells Sawmill Property
  - The Wells Sawmill Property is a 40-acre plot of land on the northern portion of the KY 32 corridor, just west of Walmart. It is currently being developed into Oak & Prime, a mixed-use commercial and residential development. It is assumed this parcel will be 50 percent developed within 10 years with full build-out by 2045.
- 3. West of Viking Drive (south entrance)
  - There are three available commercial outlets.
- 4. Dollar Tree Shopping Center
  - There is one available lot.
- 5. Rowan County Community Park
  - The Rowan County Community Park is at 2230 Flemingsburg Road, directly across from Walmart. A conceptual development for this land includes multiple fast-food restaurants and retail stores in the northeastern section of the property. It is assumed this parcel will be fifty percent developed within 10 years with full build-out by 2045.
- 6. Old Cranston Road Area
  - Vacant lots are available for development
- 7. Polo 1 Development
  - Polo 1 LLC has plans to develop a 12.5-acre plot of land in the northeast quadrant of the KY 32 interchange with I-64, which was previously a trailer park. Phase 1 of the development, which includes three restaurants and a grocery store, is expected to be completed by 2025. This phase is projected to generate 285 trips during the morning peak hour and 392 trips in the afternoon peak hour. Phase 2, which includes a gas station, a bank, three additional restaurants, and other retail businesses, is expected by 2030. A Traffic Impact Study (TIS) has been developed and shared with the project team. Per the TIS, this phase is expected to generate an additional 235 trips in the afternoon. The traffic impact study used a 1.25 percent annual growth rate to analyze future traffic conditions.
- 8. North of Cracker Barrel
  - A Starbucks was recently opened in this area, and additional out lots remain vacant.
- 9. East of Clinic Drive
  - Long-term development is possible in this area.
- 10. West of Valero
  - This area will likely be developed into a restaurant.
- 11. Former Middle School
  - This building was used by Clearfield Elementary School during the 2021 school year.
  - It is not likely to be developed by St. Claire Health Care.

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Figure 4: Potential Developments along KY 32

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Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

# **DISTRICT 9 REGIONAL TRAVEL DEMAND MODEL**

The District 9 Regional Travel Demand Model version 20161011 ("the model") was updated and used as a tool to develop growth rates for the KY 32 Corridor Study. To better reflect existing and future land use, two traffic analysis zones (TAZs) were split to bring the total number of zones to 697. TAZ 5110 was split into two zones (5110 & 5114) to reflect the anticipated development of the Rowan County Community Park and TAZ 5105 was split into two zones (5105 & 5115) to reflect the anticipated Wells Sawmill development, as shown in **Figure 5**. The next step in revising the model was updating the socioeconomic data to account for future development. This data was updated based on conversations with the project team, local officials, and the most up-to- date information available for each development.

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Figure 5: Updated District 9 Travel Demand Model TAZ Boundaries

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#### Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

Due to the unknown nature of several of the developments along KY 32, two growth scenarios were examined. A "Low Growth" scenario and a "High Growth" scenario were developed to capture the range of possible growth. **Table 3** presents a summary of the "Low Growth" and "High Growth" socioeconomic updates within each TAZ.

TAZ	Unadjusted 2040 Households	Low Growth Households	High Growth Households	Unadjusted 2040 Employment	Low Growth Employment	High Growth Employment
5026	352	352	352	287	39	39
5041	250	250	250	8	250	500
5045	410	410	410	762	200	200
5057	16	28	150	108	216	216
5061	112	112	112	0	190	190
5062	71	71	71	103	150	150
5066	31	31	31	77	349	349
5093	266	266	266	495	100	100
5096	3	3	3	28	28	350
5104	71	6	6	44	344	344
5105	14	74	74	322	683	713
5107	2	2	2	62	538	670
5110	7	7	7	45	150	100
5114	0	0	0	0	0	700
5115	0	0	60	0	0	550

## Table 3: District 9 Regional Travel Demand Model Socioeconomic Updates

The updated "Low Growth" and "High Growth model scenarios were then run, and traffic was assigned to the networks. 2040 assignments were then compared to the base-year assignments to calculate annual growth rates. **Figure 6** presents the "Low Growth" annual growth rates and **Figure 7** presents the "High Growth" annual growth rates. Based on the results, KY 32 is expected to experience higher growth north of the I-64 interchange and lower growth near downtown Morehead. Under the "Low Growth" scenario, annual growth rates on KY 32 range from 0.3 percent to 1.3 percent per year. Under the "High Growth" scenario, growth rates range from 0.7 percent to 2.9 percent per year.

# KENTUCKY STATEWIDE TRAVEL DEMAND MODEL (KYSTM)

As an additional data source, study area growth rates from the Kentucky Statewide Travel Demand Model (KYSTMv19) were also reviewed, as shown in **Figure 8**. No socioeconomic data refinements were incorporated into the KYTSTM. KYSTM growth rates on KY 32 are slightly lower than rates from the D9 TDM, ranging from 0.8 to 1.0 percent per year.

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Figure 6: "Low Growth" District 9 Regional Travel Demand Model Annual Growth Rates (2019 – 2040)

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Figure 7: "High Growth" District 9 Regional Travel Demand Model Annual Growth Rates (2019 – 2040)

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Figure 8: KYSTM Annual Growth Rates (2018 – 2045)

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Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

# CONCLUSIONS

Future growth scenarios were then developed based on historical traffic trends, regional population trends, expected developments, results from the updated District 9 Regional Travel Demand Model, and results from the KYSTM. "Low" annual growth rates along the KY 32 corridor range from 0.8 to 1.1 percent and "High" annual growth rates range from 1.0 to 2.0 percent, as shown in **Figure 9**. With more development expected to occur just north of the I-64 interchange, growth rates are slightly higher in this area. Growth rates on mainline I-64 are slightly lower, 0.3 percent to 0.5 percent for the low and high growth scenarios, respectively.

# **2022 DAILY TRAFFIC ESTIMATES**

The "Low Growth" annual growth rates were applied to the latest KYTC daily traffic counts (excluding 2020) to develop 2022 daily traffic estimates, as shown in **Figure 10**. "High Growth" rates were also applied to the counts and are shown in **Figure 11**.

# **2030 DAILY TRAFFIC FORECASTS**

The "Low" and "High" annual growth rates were also applied to the latest KYTC daily traffic counts (excluding 2020) to develop 2030 daily traffic estimates, as shown in **Figure 12** and **Figure 13**, respectively.

# **2045 DAILY TRAFFIC FORECASTS**

The "Low" and "High" annual growth rates were applied to the latest KYTC daily traffic counts (excluding 2020) to develop 2045 daily traffic estimates, as shown in **Figure 14** and **Figure 15**, respectively.

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Figure 9: Preliminary Annual Growth Rates

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Figure 10: 2022 "Low Growth" Daily Traffic Estimates

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Figure 11: 2022 "High Growth" Daily Traffic Estimates

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Figure 42: 2030 "Low Growth" Daily Traffic Forecasts

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Figure 13: 2030 "High Growth" Daily Traffic Forecasts

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Figure 14: 2045 "Low Growth" Daily Traffic Forecasts

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Figure 15: 2045 "High Growth" Daily Traffic Forecasts

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Reference: KY 32, Rowan County Traffic Forecasting Technical Memorandum

# **NEXT STEPS**

The next step is to use the established "Low Growth" and "High Growth" variations of the annual growth rates to develop 2030 traffic simulation model scenarios.

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