

C. TRAFFIC FORECAST REPORTS

July 2017

January 2019

**Traffic Forecast Technical Report
Bardstown
Item No. 04-8809.00**

FINAL REPORT

Prepared for:

Kentucky Transportation Cabinet (KYTC)



Prepared by:



July 2017

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Commonly Used Abbreviations and their Descriptions

%T	Truck Percentage	The ratio of trucks to total traffic volume
ADT	Average Daily Traffic	The average daily traffic at a certain location
ATR	Automatic Traffic Recorder	A permanent and continuous recording traffic count station
D-Factor	Directional Factor	The percentage of traffic flow by direction
DHV	Design Hour Volume	The 30 th highest hourly traffic volume in a year
ESAL	Equivalent Single Axle Load	A measure of traffic volume impact on roadway condition
FC	Functional Class	A numerical code indicating roadway purpose
GR	Growth Rate	A calculated value used to estimate future traffic volumes
K-Factor	K-30 th Hour Factor	DHV divided by ADT (DHV/ADT)
MP	Mile Point	A location description; MPs increase in cardinal direction
PHF	Peak Hour Factor	The highest traffic volume in 15 minutes out of an hour

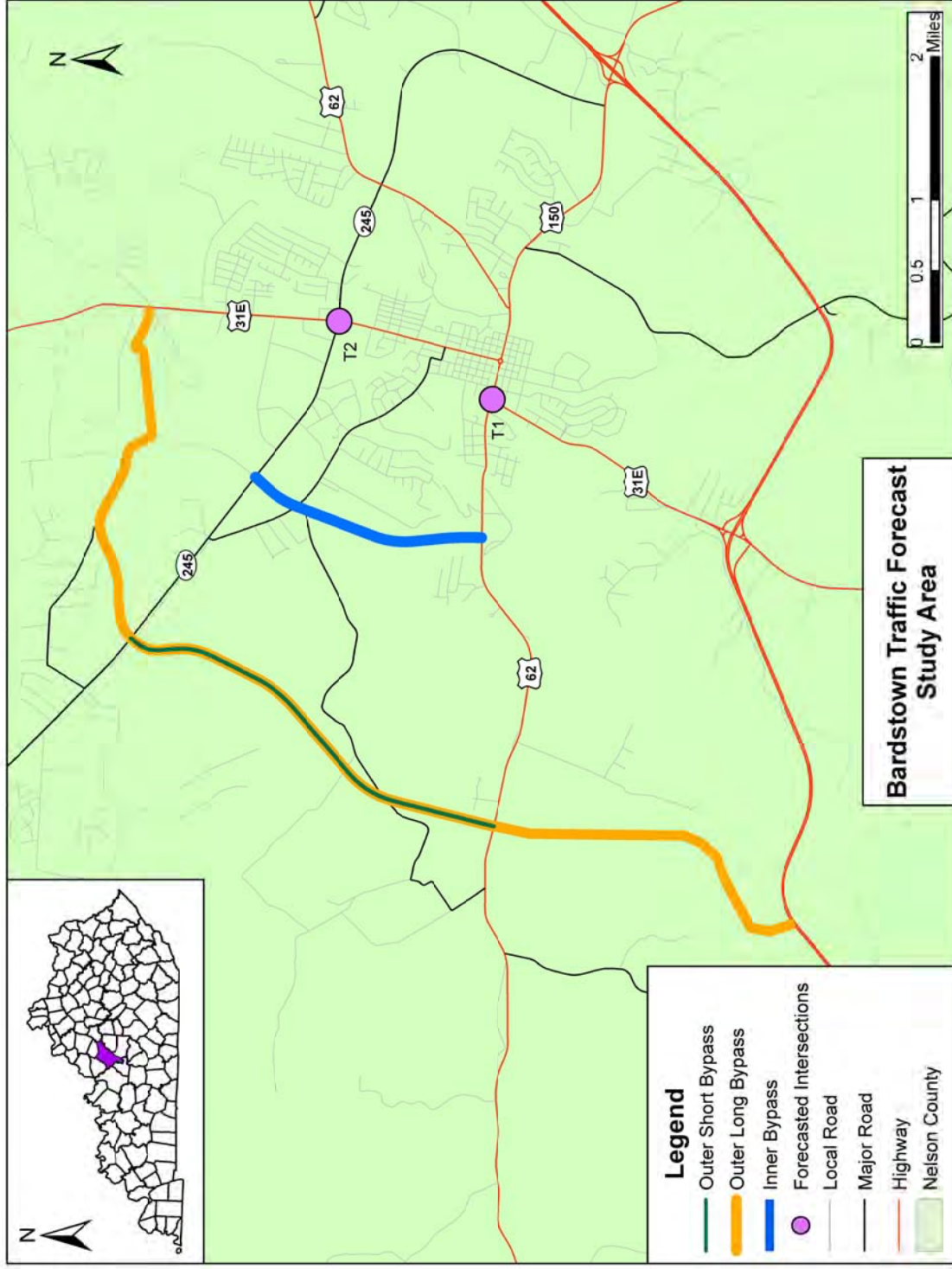
1.0 INTRODUCTION

This document summarizes the steps completed by WSP to prepare a traffic forecast for three alternate bypass options west of Bardstown in Nelson County, Kentucky. The Kentucky Transportation Cabinet (KYTC) District 4 requested this forecast for Item No. 4-8809.00. The three options include an inner bypass between KY 245 and US 62 near Bardstown, a short outer bypass between KY 245 and US 62, and a long outer bypass from US 31E to the Bluegrass Parkway, which includes the short outer bypass and extends the alignment further north and south.

Figure 1 shows a map of the study area.

Three types of forecasts included in this report are Average Daily Traffic (ADT), Design Hourly Volume (DHV), and truck percentages. All three forecast types were completed using the following scenarios: base year 2017, open to traffic year 2025, and future year 2040, for both Build and No-Build conditions.

Figure 1: Study Area



2.0 SEGMENT TRAFFIC VOLUMES

The KYTC collected traffic counts and calculated average daily traffic (ADT) volumes at seven traffic count stations within the study area. All counts were conducted between the years 2014 and 2016. Locations for the count stations, the year of the last traffic count, traffic count station number, and total ADT are listed below:

- US 31E – Beall Ave to Bardstown Bypass (2016): Station A02 = 16,646
- US 31E – US 62W to US 62E (2014): Station A79 = 17,623
- US 31E – KY 245 to KY 332 (2016): Station A99 = 16,134
- US 31E – Martha Collins Bluegrass Pkwy to US 62W (2014): Station B07 = 9,845
- US 62 – Elm Grove St to US 31E (2016): Station A78 = 7,808
- KY 245 – US 31E to KY 1430 (2016): Station A89 = 23,793
- KY 245 – US 62 to US 31E (2015): Station B06 = 28,493

The original counts were updated to a base year of 2017 using a historical traffic growth analysis. Details of that analysis are discussed later in this report.

3.0 INTERSECTION TURNING MOVEMENT VOLUMES

The two intersections included as part of this forecast are identified as US 31E / US 62 (T1) and US 31E / KY 245 (T2).

Turning movement counts were conducted at the two intersections during the AM (7:00 AM – 9:00 AM) and PM (3:00 PM – 5:00 PM) peak periods (Eastern Standard Time). The turning movement counts were then factored to account for seasonal variations.

Intersection turning movement forecasts for 2017 can be found in **Appendix A**. The 2017 No-Build turning movements were forecasted to the open to traffic year 2025 and future year of 2040. No-Build turning movement forecasts for 2025 and 2040 can be found in **Appendices B** and **C**.

4.0 GROWTH RATES

Growth rates were determined based on historical traffic growth analysis, population trends and projections, and results from the Kentucky Statewide Traffic Model (KYSTM).

The growth rates identified for each segment within the study area are shown in **Table 1**. Further discussion regarding the selection of the growth rate can be found in the Traffic Forecast Methodology Report as submitted to the KYTC Division of Planning on June 27, 2017.

Table 1: Proposed Growth Rates

KYTC Count Station	Route	From	To	No-Build Growth Rate	Inner Bypass Growth Rate	Outer Short Bypass Growth Rate	Outer Long Bypass Growth Rate
New Bardstown Bypass	-	-	-	-	2.5%	2.0%	2.0%
A02	US 31E	Beall Ave	Bardstown Bypass	1.0%	0.0%	0.0%	0.0%
A79	US 31E	US 62W	US 62E	1.0%	0.5%	1.0%	1.0%
A99	US 31E	KY 245	KY 332	1.0%	1.5%	0.5%	0.5%
B07	US 31E	Martha Collins Bluegrass Pkwy	US 62W	1.0%	1.5%	1.5%	1.5%
A78	US 62	Elm Grove St	US 31E	1.0%	0.0%	0.0%	0.0%
A89	KY 245	US 31E	KY 1430	0.5%	1.0%	0.5%	0.5%
B06	KY 245	US 62	US 31E	1.0%	1.5%	1.5%	1.5%

Tables 2 through **5** on the following pages detail the forecasted travel volumes for the No-Build and Build scenarios. **Figures 2** through **5** show segment descriptions and provide summaries of key study area segments' forecasted traffic for the No-Build and Build traffic forecasts, respectively.

Table 2: No-Build Traffic Forecast Summary

APPROACH	ROUTE	BEGINNING DESCRIPTION	ENDING DESCRIPTION	2017 ADT	2017 Truck % ADT	2017 Trucks (Daily)	2017 AM K Factor	2017 PM K Factor	2017 AM DHV	2017 PM DHV	2017 Truck % DHV	2017 Trucks (DHV)	2025 No Build ADT	2025 Truck % ADT	2025 Trucks (Daily)	2025 AM K Factor	2025 NB AM K Factor	2025 NB PM DHV	2025 Truck % DHV	2025 Trucks (DHV)	2040 No Build ADT	2040 Truck % ADT	2040 Trucks (Daily)	2040 AM K Factor	2040 NB AM K Factor	2040 NB PM K Factor	2040 NB AM DHV	2040 NB PM DHV	2040 Truck % DHV	2040 Trucks (DHV)
W	KY 245	KY 1430	US 31E	24,020	14.1%	3387	9.0%	10.3%	2,150	2,470	5.0%	124	25000	14.7%	3668	9.0%	10.3%	2240	5.2%	134	26940	15.8%	4260	8.9%	10.3%	2410	2770	5.4%	150	
E	KY 245	US 62	US 31E	29,920	7.7%	2304	8.6%	10.6%	2,560	3,160	5.1%	161	32380	8.3%	2700	8.6%	10.6%	3430	5.5%	189	37580	9.7%	3638	8.5%	10.5%	3210	3960	6.4%	253	
N	US 31E	KY 332	KY 245	17,440	6.9%	1203	9.0%	10.0%	1,570	1,740	1.8%	31	18870	7.5%	1410	9.0%	10.0%	1890	2.0%	38	21900	8.7%	1900	8.9%	10.0%	1960	2190	2.3%	50	
S	US 31E	E Beall Ave	KY 245	18,840	7.5%	1413	9.6%	9.8%	1,800	1,850	2.2%	41	20410	8.1%	1658	9.6%	9.9%	2020	2.4%	49	23680	9.4%	2233	9.5%	9.9%	2240	2340	2.8%	66	
W	US 62	N Elm Grove St	US 31E	9,630	8.7%	838	9.7%	11.4%	930	1,100	2.5%	28	10430	9.4%	983	9.6%	11.3%	1180	2.7%	32	12110	10.9%	1325	9.7%	11.5%	1170	1390	3.1%	43	
E	US 31E	S 3rd St	US 62	18,100	6.1%	1104	9.8%	11.3%	1,770	2,040	2.9%	59	19600	6.8%	1295	9.7%	11.2%	2200	3.1%	68	22750	7.7%	1745	9.8%	11.3%	2230	2570	6.7%	172	
S	US 31E	Bluegrass Pkwy	US 62	11,030	8.4%	927	10.0%	11.2%	1,100	1,240	2.8%	35	11950	9.1%	1087	10.0%	11.2%	1340	3.0%	40	13860	10.6%	1464	10.0%	11.3%	1380	1560	3.5%	55	

Table 3: Inner Bypass Traffic Forecast Summary

APPROACH	ROUTE	BEGINNING DESCRIPTION	ENDING DESCRIPTION	2017 ADT	2017 Truck % ADT	2017 Trucks (Daily)	2017 AM K Factor	2017 PM K Factor	2017 AM DHV	2017 PM DHV	2017 Truck % DHV	2017 Trucks (DHV)	2025 Inner Bypass ADT	2025 Truck % ADT	2025 Trucks (Daily)	2025 AM K Factor	2025 IB AM K Factor	2025 IB PM DHV	2025 Truck % DHV	2025 Trucks (DHV)	2040 Inner Bypass ADT	2040 Truck % ADT	2040 Trucks (Daily)	2040 AM K Factor	2040 IB AM K Factor	2040 IB PM K Factor	2040 IB AM DHV	2040 IB PM DHV	2040 Truck % DHV	2040 Trucks (DHV)
W	KY 245	KY 1430	US 31E	24,020	14.1%	3387	9.0%	10.3%	2,150	2,470	5.0%	124	26000	15.3%	3970	8.9%	10.3%	2320	5.4%	145	30200	17.7%	5353	8.9%	10%	2880	3130	6.3%	197	
E	KY 245	US 62	US 31E	29,920	7.7%	2304	8.6%	10.6%	2,560	3,160	5.1%	161	33680	8.7%	2921	8.5%	10.5%	2870	5.8%	206	42120	10.8%	4568	8.5%	10.6%	3590	4450	6.4%	285	
N	US 31E	KY 332	KY 245	17,440	6.9%	1203	9.0%	10.0%	1,570	1,740	1.8%	31	19640	7.8%	1527	9.0%	10.0%	1760	2.0%	39	24560	9.7%	2387	8.8%	10.1%	2160	2480	2.5%	62	
S	US 31E	E Beall Ave	KY 245	18,840	7.5%	1413	9.6%	9.8%	1,800	1,850	2.2%	41	18840	7.5%	1413	9.5%	9.8%	1840	2.2%	41	18840	7.5%	1413	9.5%	9.9%	1790	1860	2.2%	41	
W	US 62	N Elm Grove St	US 31E	9,630	8.7%	838	9.7%	11.4%	930	1,100	2.5%	28	9620	8.7%	837	9.7%	11.4%	1100	2.5%	28	9640	8.7%	839	10.9%	12.8%	1050	1230	2.5%	31	
E	US 31E	S 3rd St	US 62	18,100	6.1%	1104	9.8%	11.3%	1,770	2,040	2.9%	59	18820	6.3%	1195	9.8%	11.3%	1850	3.0%	64	20300	6.8%	1389	10.3%	11.9%	2100	2410	3.2%	77	
S	US 31E	Bluegrass Pkwy	US 62	11,030	8.4%	927	10.0%	11.2%	1,100	1,240	2.8%	35	12420	9.5%	1175	10.0%	11.3%	1400	3.2%	45	15540	11.8%	1838	10.0%	11.2%	1550	1740	3.9%	68	
1	Inner Bypass	US 62	KY 245	-	-	-	-	-	-	-	-	-	3710	14.9%	552	15.1%	22.9%	850	2.6%	22	5380	14.9%	800	15.1%	22.9%	810	1230	3.7%	46	

Table 4: Short Outer Bypass Traffic Forecast Summary

APPROACH	ROUTE	BEGINNING DESCRIPTION	ENDING DESCRIPTION	2017 ADT	2017 Truck % ADT	2017 Trucks (Daily)	2017 AM K Factor	2017 PM K Factor	2017 AM DHV	2017 PM DHV	2017 Truck % DHV	2017 Trucks (DHV)	2025 Short Outer Bypass ADT	2025 Truck % ADT	2025 Trucks (Daily)	2025 AM K Factor	2025 SOB AM K Factor	2025 SOB PM DHV	2025 Truck % DHV	2025 Trucks (DHV)	2040 Short Outer Bypass ADT	2040 Truck % ADT	2040 Trucks (Daily)	2040 AM K Factor	2040 SOB AM K Factor	2040 SOB PM K Factor	2040 SOB AM DHV	2040 SOB PM DHV	2040 Truck % DHV	2040 Trucks (DHV)
W	KY 245	KY 1430	US 31E	24,020	14.1%	3387	9.0%	10.3%	2,150	2,470	5.0%	124	25000	14.7%	3668	8.9%	10.3%	2230	5.2%	134	26940	15.8%	4260	9.4%	11.0%	2520	2950	6.3%	186	
E	KY 245	US 62	US 31E	29,920	7.7%	2304	8.6%	10.6%	2,560	3,160	5.1%	161	33700	8.7%	2923	8.6%	10.5%	2900	5.8%	206	42120	10.8%	4568	8.5%	10.5%	3590	4440	6.4%	284	
N	US 31E	KY 332	KY 245	17,440	6.9%	1203	9.0%	10.0%	1,570	1,740	1.8%	31	18160	7.2%	1304	9.0%	10.0%	1630	1.9%	34	19560	7.7%	1514	9.5%	10.7%	1850	2100	2.5%	53	
S	US 31E	E Beall Ave	KY 245	18,840	7.5%	1413	9.6%	9.8%	1,800	1,850	2.2%	41	18840	7.5%	1413	9.6%	9.8%	1800	2.2%	41	18860	7.5%	1415	10.5%	11.0%	1980	2,070	2.2%	46	
W	US 62	N Elm Grove St	US 31E	9,630	8.7%	838	9.7%	11.4%	930	1,100	2.5%	28	8840	8.7%	769	10.5%	12.3%	1090	2.5%	27	9620	8.7%	837	9.7%	11.5%	930	1,110	2.5%	28	
E	US 31E	S 3rd St	US 62	18,100	6.1%	1104	9.8%	11.3%	1,770	2,040	2.9%	59	19600	6.6%	1295	9.7%	11.3%	2210	3.1%	69	22750	7.7%	1745	9.8%	11.3%	2,230	2,580	3.2%	83	
S	US 31E	Bluegrass Pkwy	US 62	11,030	8.4%	927	10.0%	11.2%	1,100	1,240	2.8%	35	12420	9.5%	1175	10.0%	11.2%	1390	3.2%	45	15530	11.8%	1837	10.0%	11.3%	1,560	1,750	3.9%	68	
2	Short Outer Bypass	US 62	KY 245	-	-	-	-	-	-	-	-	-	2290	13.0%	297	14.9%	23.4%	540	2.3%	12	3080	13.0%	400	14.9%	23.4%	460	720	3.1%	22	

Table 5: Long Outer Bypass Traffic Forecast Summary

APPROACH	ROUTE	BEGINNING DESCRIPTION	ENDING DESCRIPTION	2017 ADT	2017 Truck %ADT	2017 Trucks (Daily)	2017 AM K Factor	2017 PM K Factor	2017 AM DHV	2017 PM DHV	2017 Truck % DHV	2017 Trucks (DHV)	2025 Long Outer Bypass	2025 Truck %ADT	2025 Trucks (Daily)	2025 LOB AM DHV	2025 LOB PM DHV	2025 Truck % DHV	2025 Trucks (DHV)	2040 Long Outer Bypass ADT	2040 Truck % ADT	2040 Trucks (Daily)	2040 LOB AM K FACTOR	2040 LOB PM K FACTOR	2040 LOB AM DHV	2040 LOB PM DHV	2040 Truck % DHV	2040 Trucks (DHV)
W	KY 245	KY 1430	US 31E	24,020	14.1%	3387	9.0%	10.3%	2,150	2,470	5.0%	124	25000	14.7%	3668	2230	2570	5.2%	134	26,950	15.8%	4262	9.4%	11.0%	2,530	2,960	6.3%	187
E	KY 245	US 62	US 31E	29,920	7.7%	2304	8.6%	10.6%	2,560	3,160	5.1%	161	33700	8.7%	2923	2900	3550	5.8%	206	42,130	10.8%	4568	8.5%	10.5%	3,590	4,440	6.4%	284
N	US 31E	KY 332	KY 245	17,440	6.9%	1203	9.0%	10.0%	1,570	1,740	1.8%	31	18160	7.2%	1304	1630	1810	1.9%	34	19,560	7.7%	1514	9.5%	10.7%	1,860	2,100	2.5%	53
S	US 31E	E Beall Ave	KY 245	18,840	7.5%	1413	9.6%	9.8%	1,800	1,850	2.2%	41	18840	7.5%	1413	1800	1850	2.2%	41	18,860	7.5%	1415	10.6%	11.0%	2,000	2,080	2.2%	46
W	US 62	N Elm Grove St	US 31E	9,630	8.7%	838	9.7%	11.4%	930	1,100	2.5%	28	9640	8.7%	839	930	1100	2.5%	28	9,640	8.7%	839	9.6%	11.4%	930	1,100	2.5%	28
E	US 31E	S 3rd St	US 62	18,100	6.1%	1104	9.8%	11.3%	1,770	2,040	2.9%	59	19600	6.8%	1295	1910	2200	3.1%	68	22,750	7.7%	1745	9.8%	11.3%	2,230	2,560	3.2%	82
S	US 31E	Bluegrass Pkwy	US 62	11,030	8.4%	927	10.0%	11.2%	1,100	1,240	2.8%	35	12420	9.5%	1175	1240	1400	3.2%	45	15,500	11.8%	1834	10.1%	11.4%	1,560	1,760	3.9%	69
3	Long Outer Bypass	US 62	KY 245	-	-	-	-	-	-	-	-	-	3100	14.4%	446	480	720	2.3%	17	4,220	14.2%	600	15.4%	23.2%	650	980	3.8%	37

Figure 2: No-Build Forecast Summary

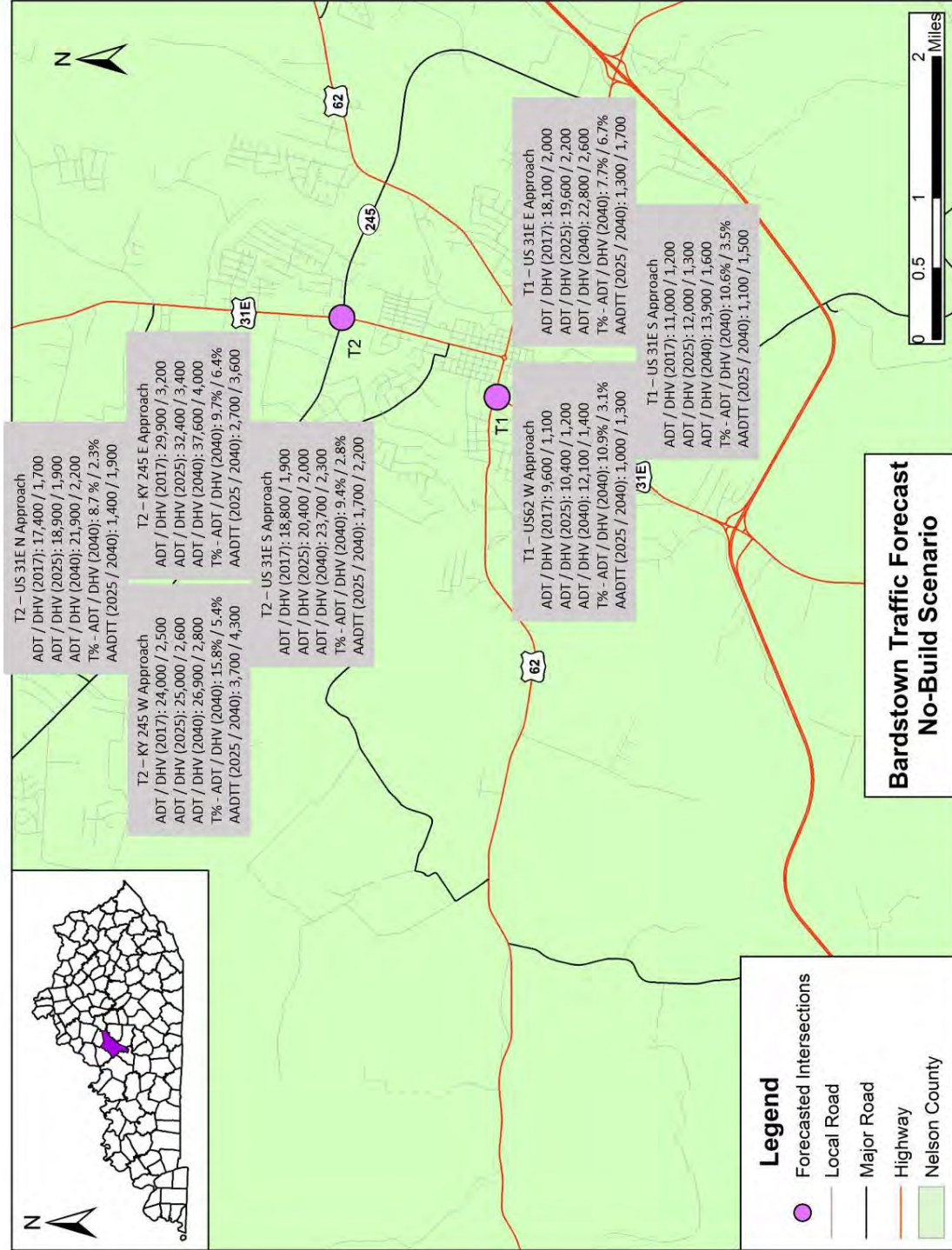


Figure 3: Inner Bypass Forecast Summary

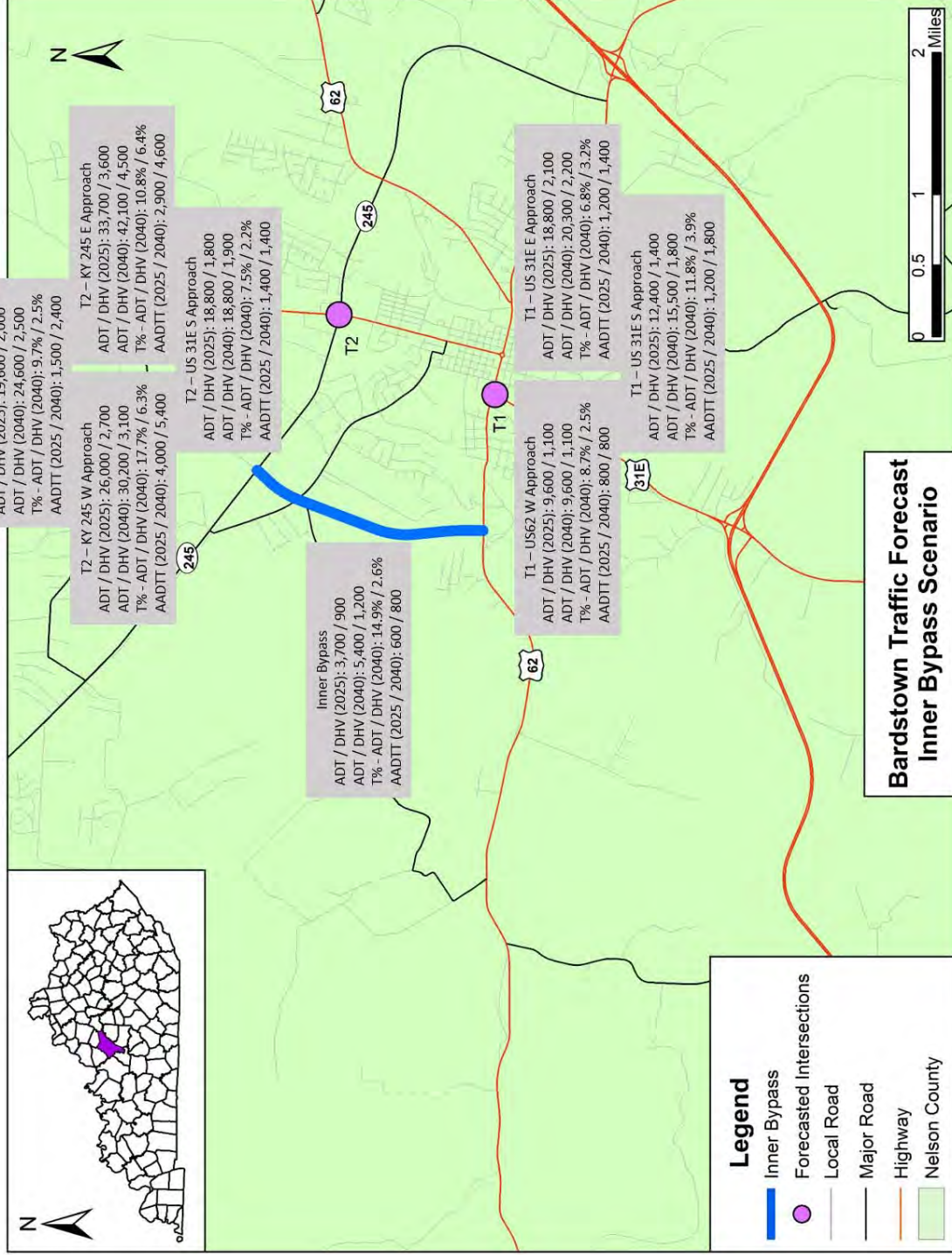


Figure 4: Short Outer Bypass Forecast Summary

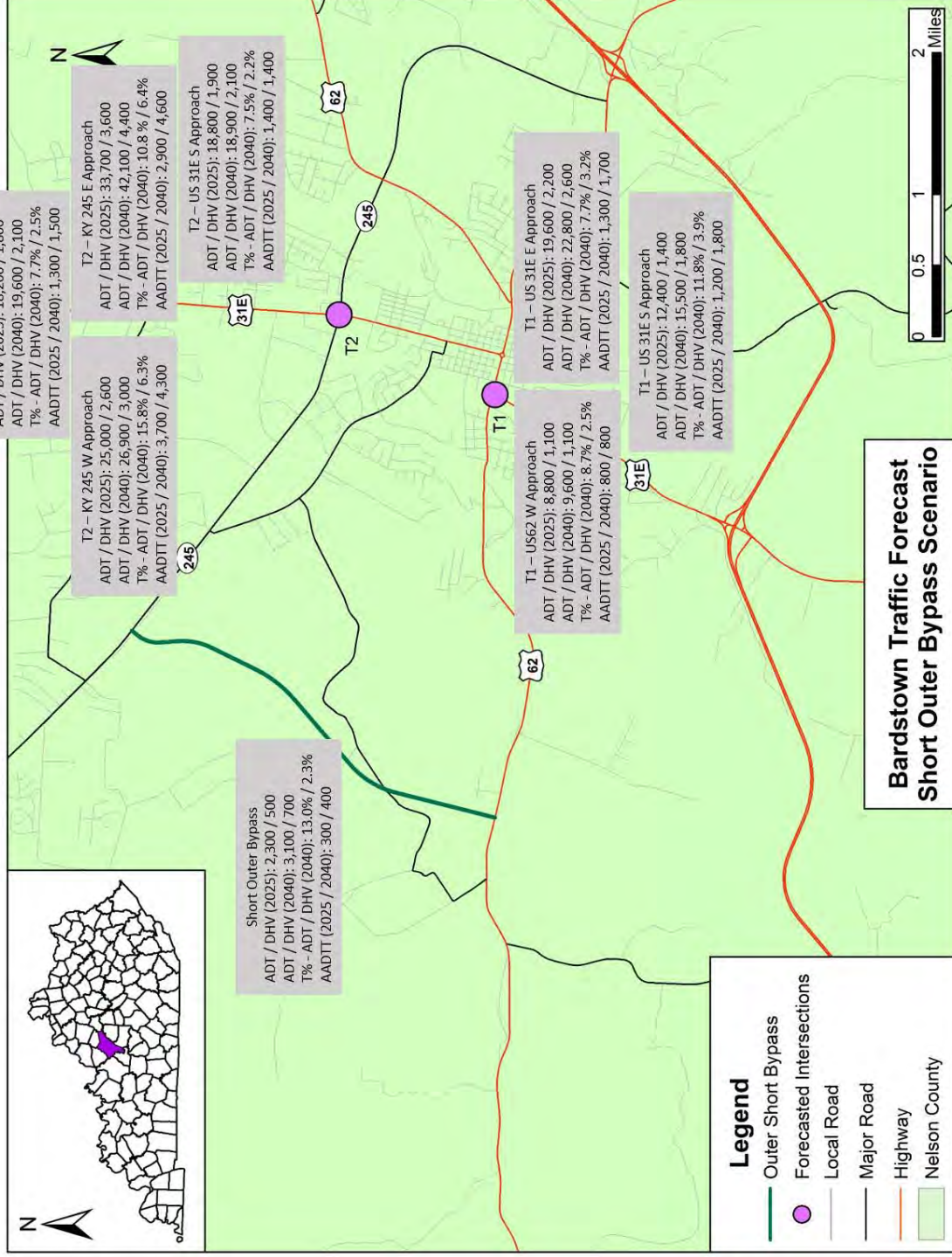
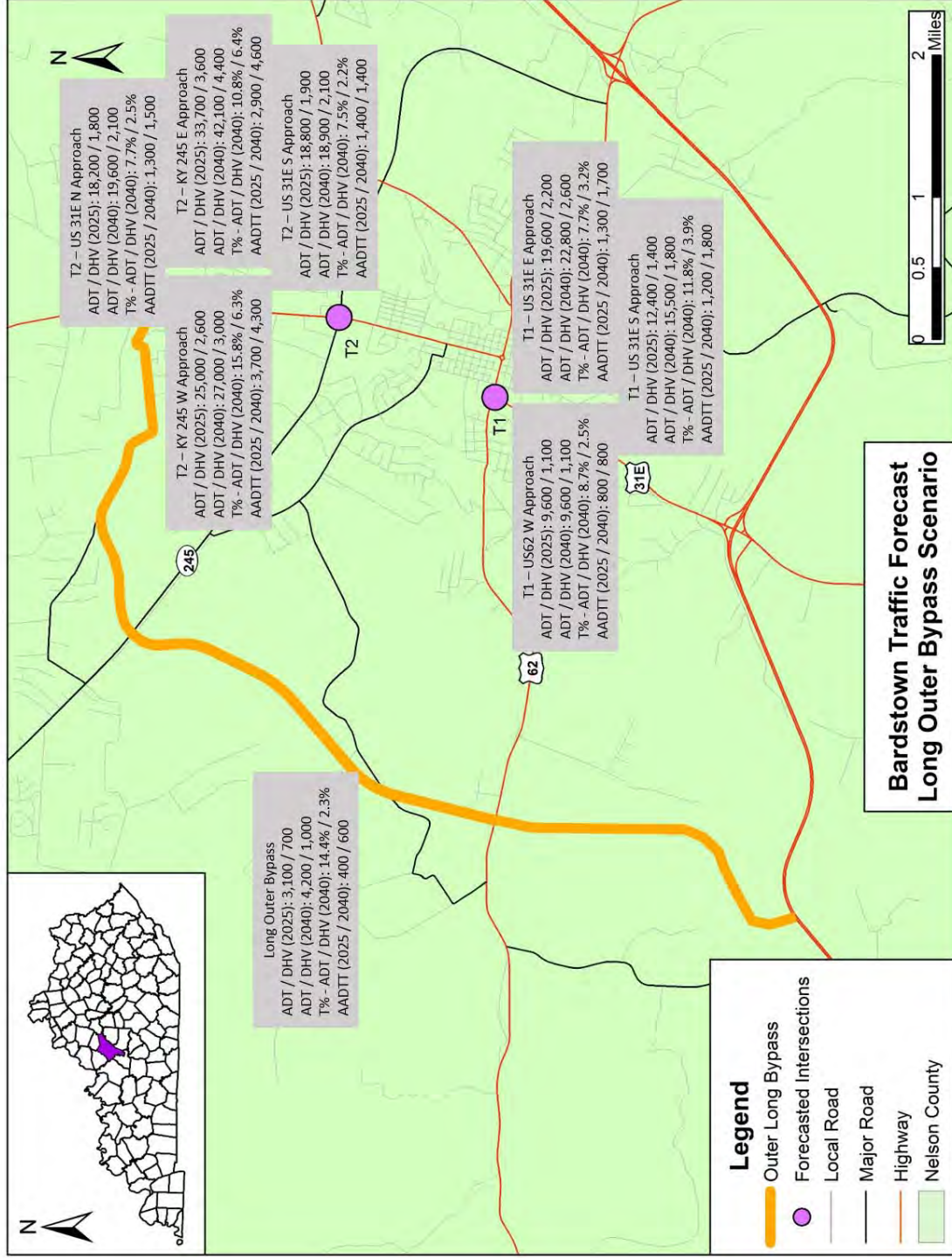


Figure 5: Long Outer Bypass Forecast Summary



5.0 K FACTOR

Hourly factors (K factors) were calculated by using the hourly count data from the KYTC count stations. The summary of raw hourly factors is provided in the Traffic Forecast Methodology Report.

The hourly factors were then adjusted by factors provided by KYTC. These factors were derived from Automatic Traffic Recorder (ATR) data by functional classification, day of week, and month of year.

The final K factors were adjusted slightly to account for volume balancing. Final K factors for each segment and ramp are included in **Tables 2** and **3**.

6.0 PHF

Peak hour factors (PHF) were calculated from the turning movement counts. A general analysis of the PHF indicates a range of 0.62 to 0.95.

7.0 TRUCK PERCENTAGES

Vehicle classification data in the study area was obtained from the Statewide Vehicle Classification Database maintained by KYTC, as shown in **Table 6** below, and also from classifications counts performed during the turning movement data collection. The Statewide Vehicle Classification Database was used to derive ADT truck percentages. Classification data from the turning movement counts was used to derive DHV truck percentages.

Table 6: Truck Percentages

Route	Date	Count Station	Direction	Mile Point	Daily Truck %	AADTT
US 31E	2016	A02	Both	15.1	7.5%	1,200
US 31E	2014	A79	Both	14.0	6.1%	1,100
US 31E	2016	A99	Both	16.0	6.9%	1,100
US 31E	2014	B07	Both	13.0	8.4%	800
US 62	2016	A78	Both	14.0	8.7%	700
KY 245	2016	A89	Both	3.7	14.1%	3,400
KY 245	2015	B06	Both	2.9	7.7%	2,200

8.0 POPULATION

Population data was obtained from the Kentucky State Data Center for Nelson County and Kentucky. **Table 7** displays the historical population growth while **Table 8** displays population projections.

Table 7: Historical Population Growth

Area	1980	1990	2000	2010	% Growth (2000-2010)
Kentucky	3,660,777	3,685,296	4,041,769	4,339,367	7.4%
Nelson County	27,584	29,710	37,477	43,437	15.9%

Source: Kentucky State Data Center

Table 8: Population Forecasts

Area	2010	2020	2030	2040	% Growth (2010-2040)
Kentucky	4,339,367	4,672,754	4,951,178	5,162,292	19.0%
Nelson County	43,437	47,473	51,695	54,752	26.0%

Source: Kentucky State Data Center

As shown in **Table 7**, the population of Nelson County increased 15.9% from 2000 to 2010 compared to only 7.4% for Kentucky during the same time period. Similarly, **Table 8** shows the population of Nelson County to be greater than what is expected by the state forecast. Nelson County is expected to increase by 26.0%, at a rate of 0.87% between the years 2010 and 2040, while a growth of 19.0% in Kentucky is expected between 2010 and 2040 at a rate of 0.63% per year.

9.0 OTHER INFORMATION

Additional information has been provided for reference in subsequent appendices. The information includes:

- **Appendix D: Traffic Data for Pavement Design**
- **Appendix E: Additional Figures**
- **Appendix F: Historical Growth Rates**

Appendix A:

2017 Turning Movement Forecasts

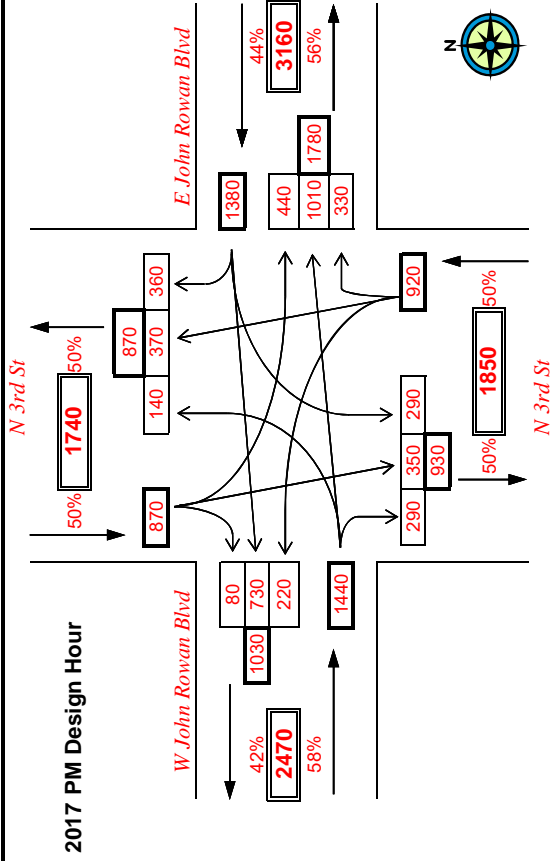
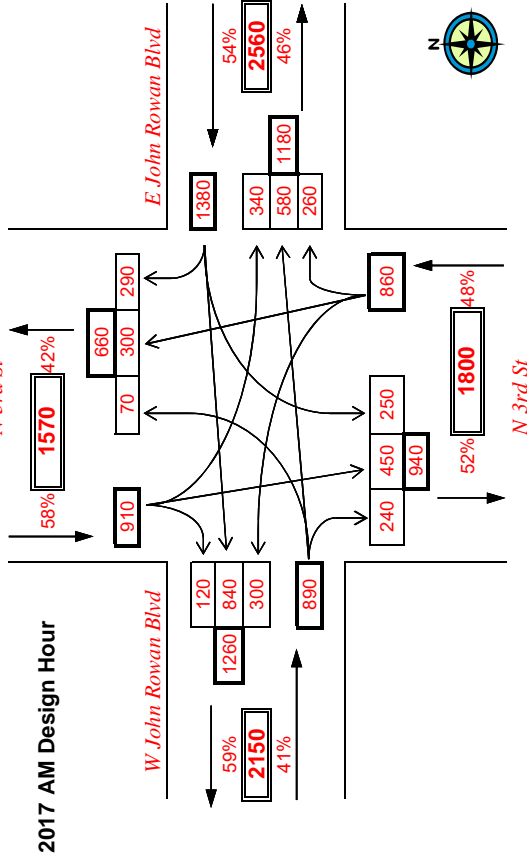
PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 4/28/25
 ANALYST: Cameron Manley
 YEAR: 2017
 INTERSECTION: US 31E & KY 245

Design Hour Volumes

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2017 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2017 No-Build)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map



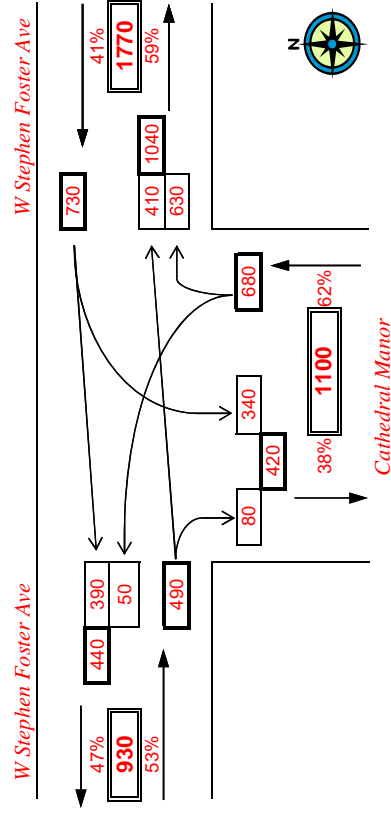
PROJECT: US 31E & KY 245
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: Friday, March 31, 2017
 ANALYST: Cameron Manley
 YEAR: 2017
 INTERSECTION: US 31E & US 62

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2017 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

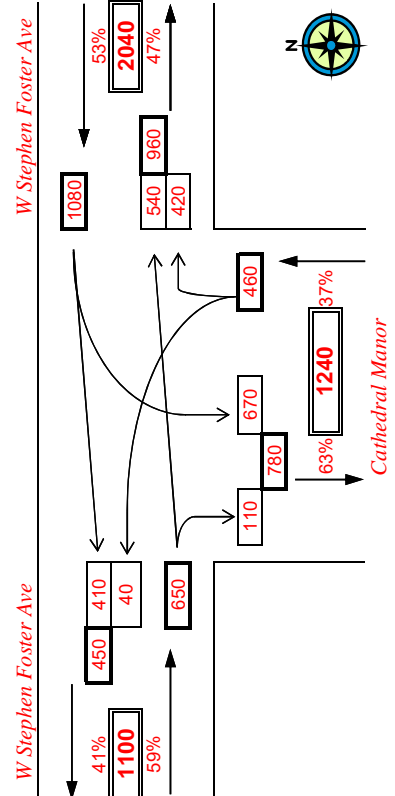
TURN MOVEMENT T1 (2017 No-Build)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

2017 AM Design Hour



2017 PM Design Hour



Location Map



Appendix B:

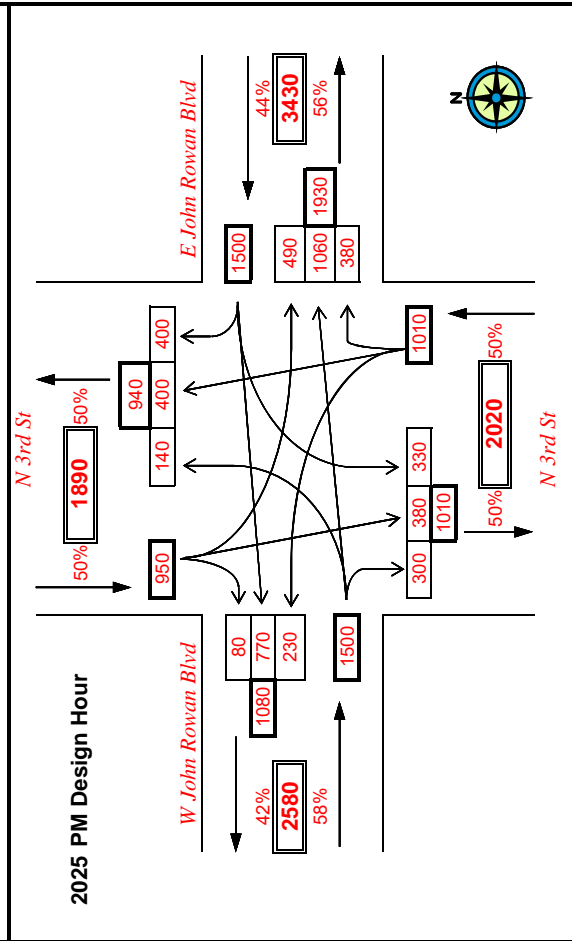
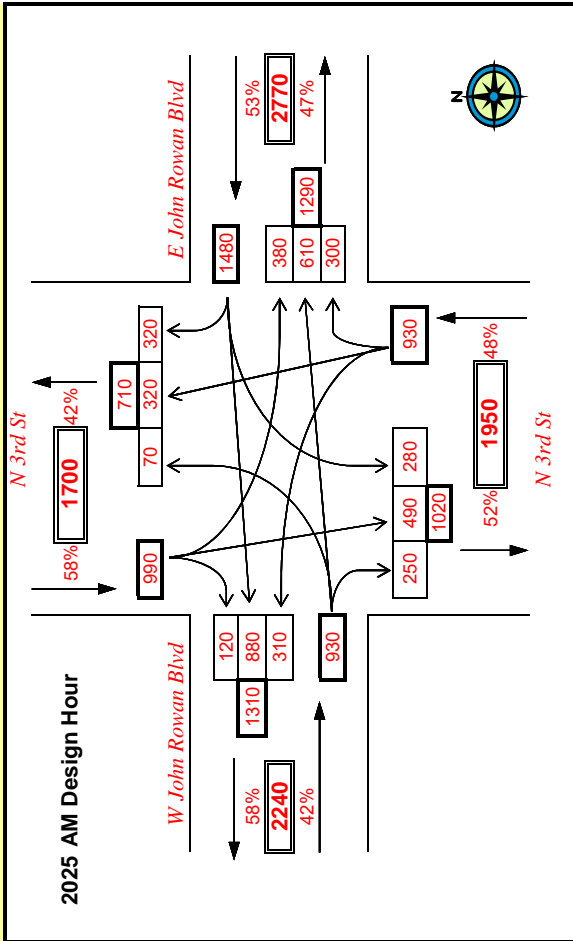
2025 Turning Movement Forecasts

PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2025 No-Build)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map



PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 4/28/25
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

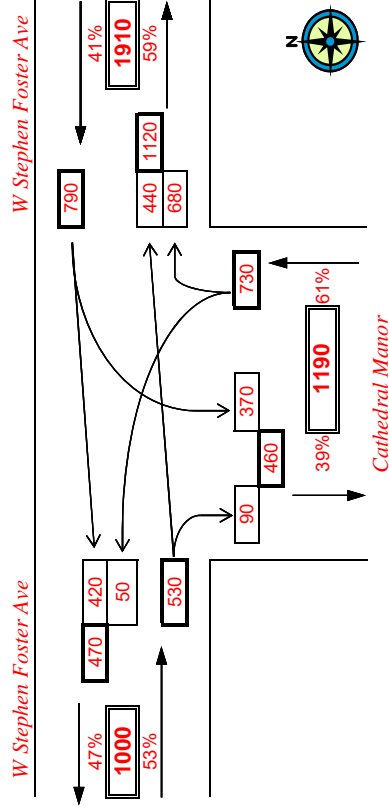
NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T1 (2025 No-Build)

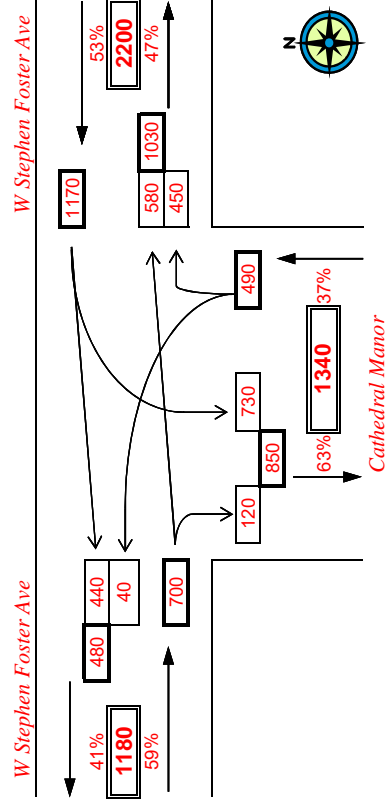
Design Hour Volumes

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

2025 AM Design Hour



2025 PM Design Hour



Location Map

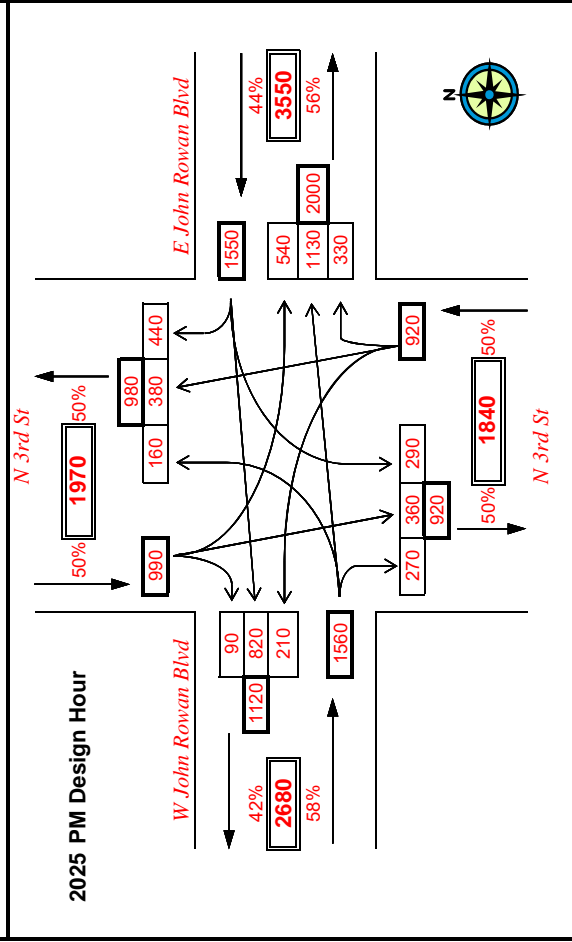
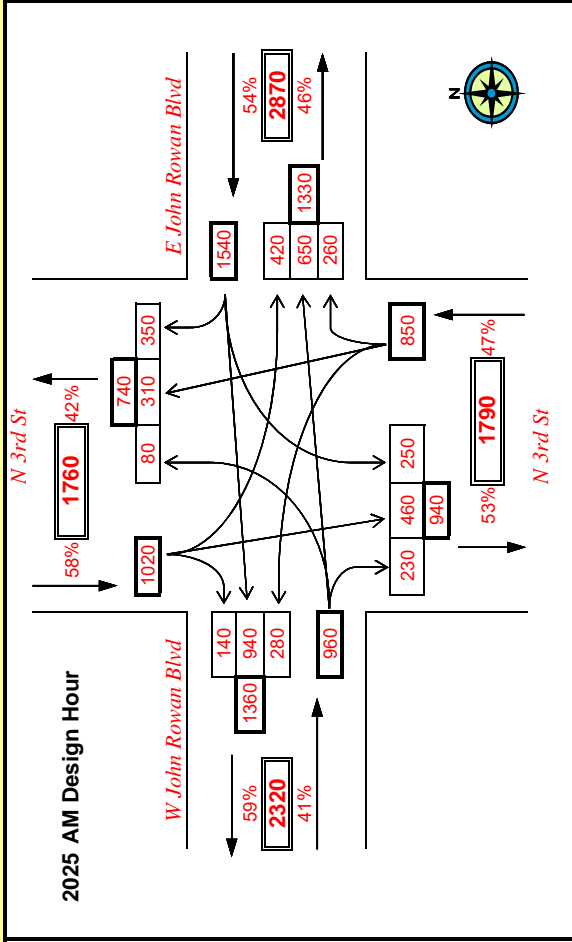


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2025 Inner Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map



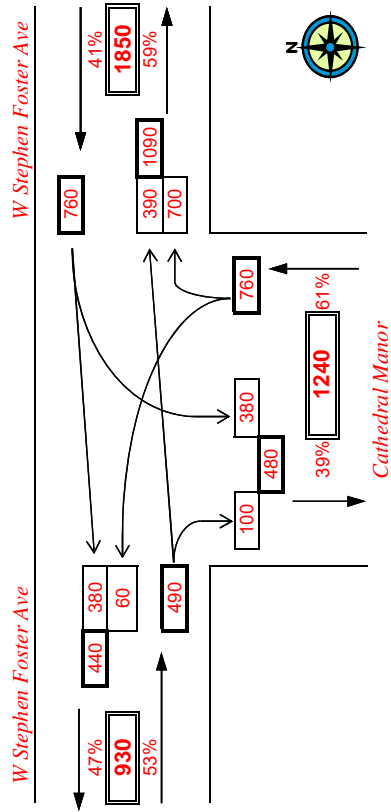
PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2017 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

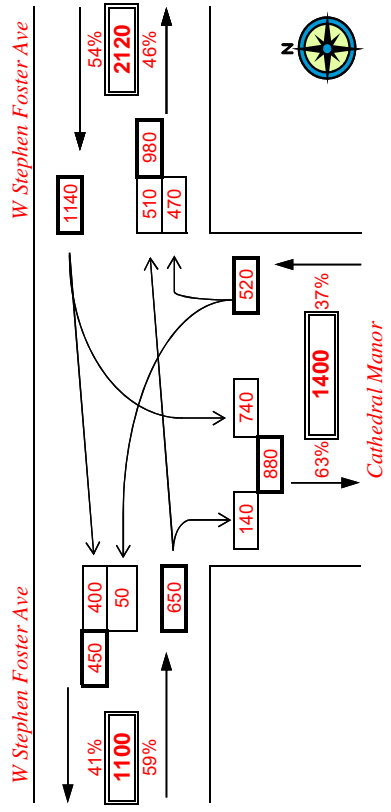
TURN MOVEMENT T1 (2025 Inner Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

2025 AM Design Hour



2025 PM Design Hour



Location Map

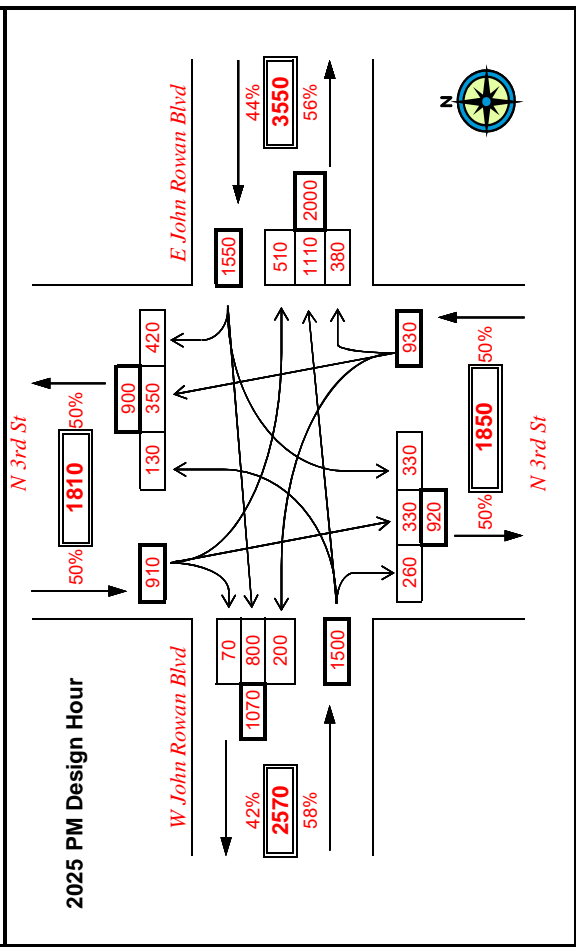
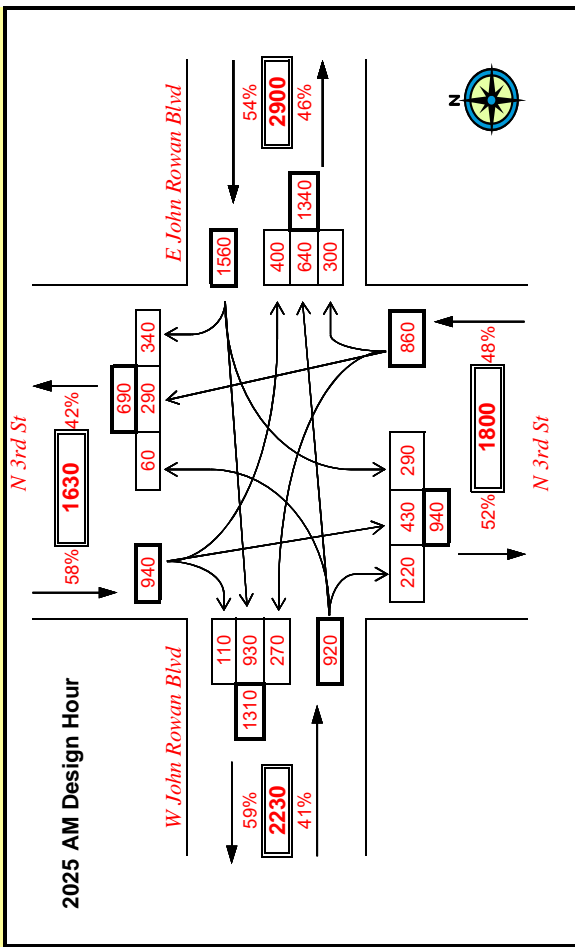


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2025 Short Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map

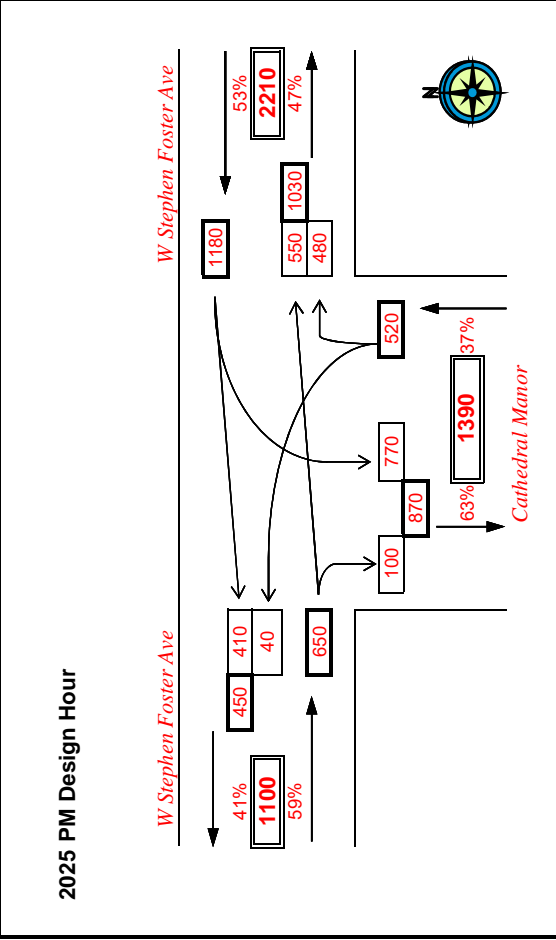
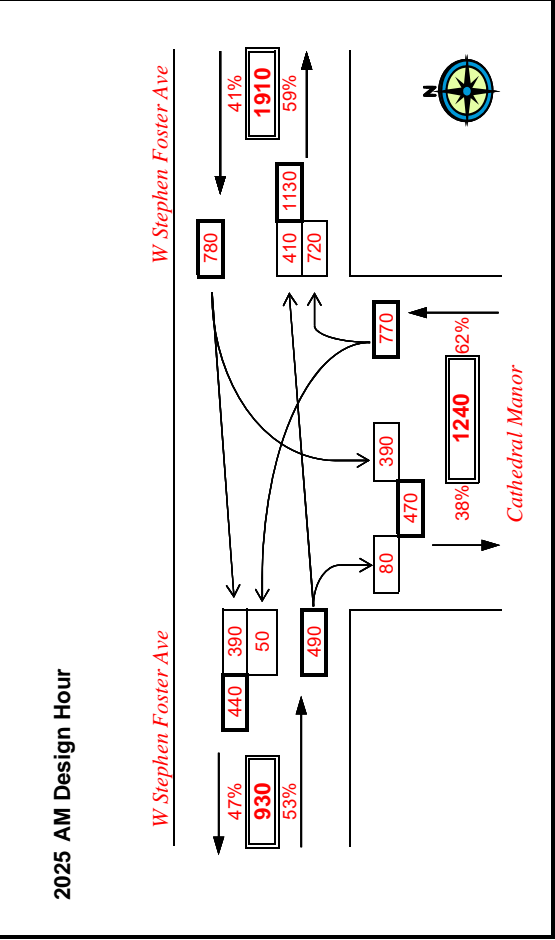


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T1 (2025 Short Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map

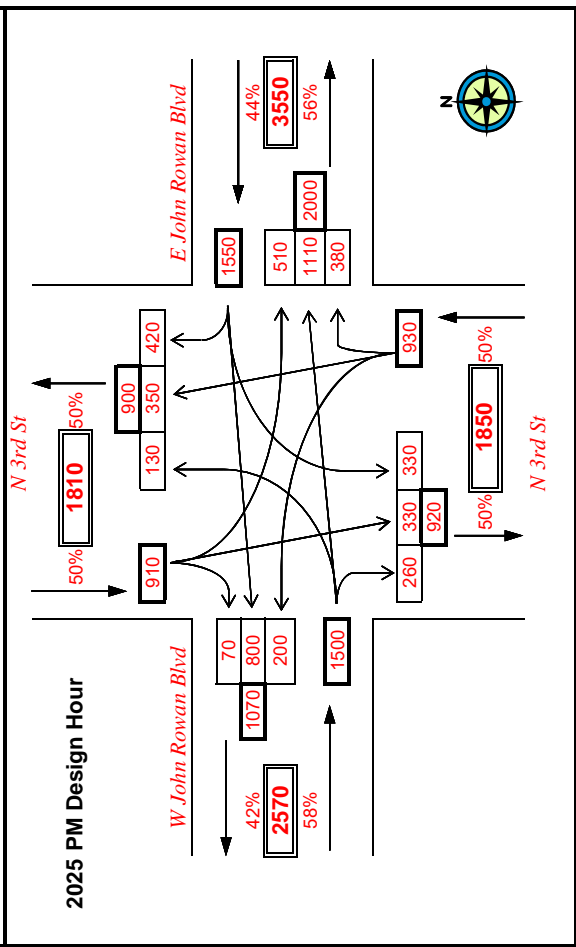
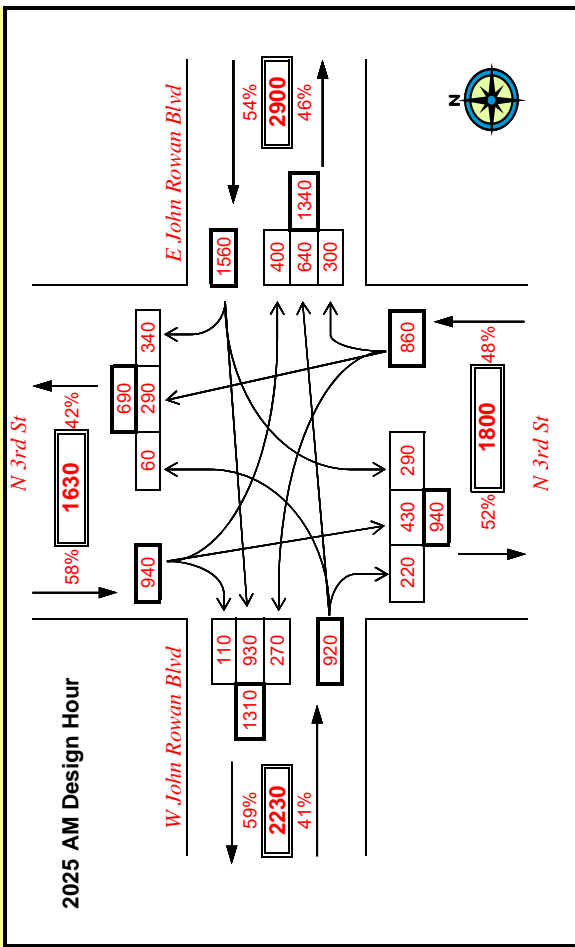


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2025 Long Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



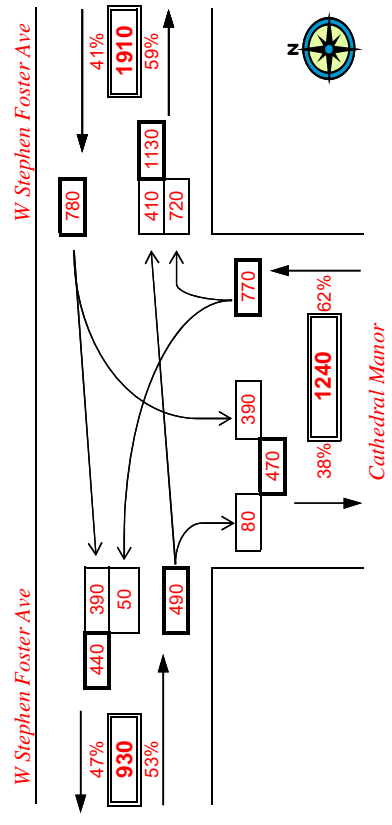
PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2025
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

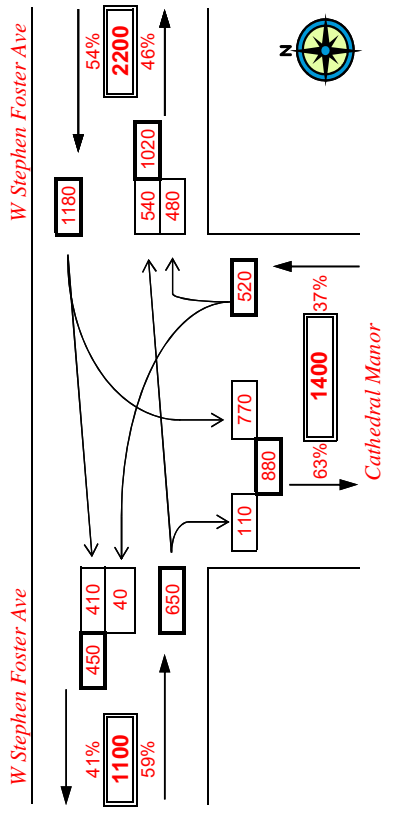
TURN MOVEMENT T1 (2025 Long Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

2025 AM Design Hour



2025 PM Design Hour



Location Map



Appendix C:

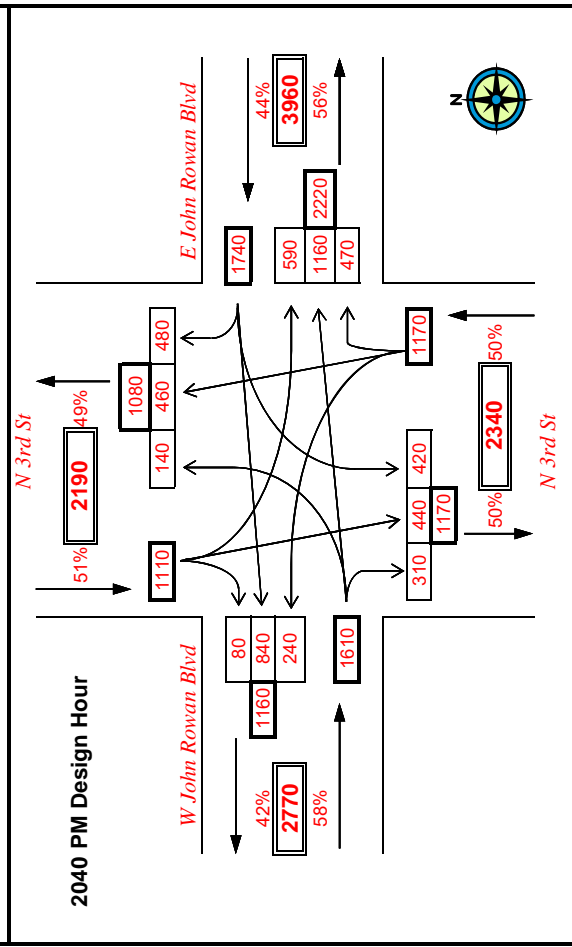
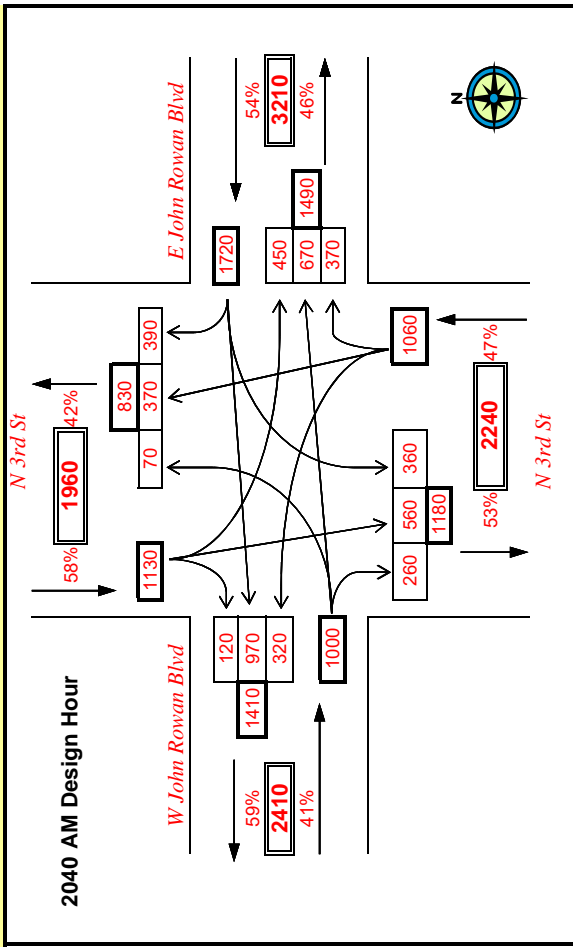
2040 Turning Movement Forecasts

PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2040 No-Build)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map



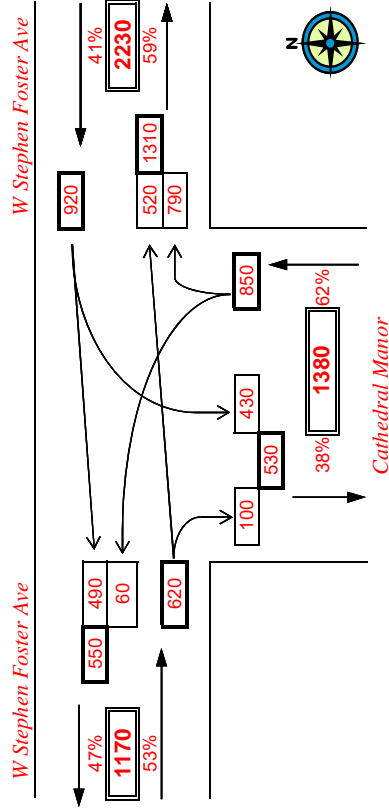
PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MAPS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

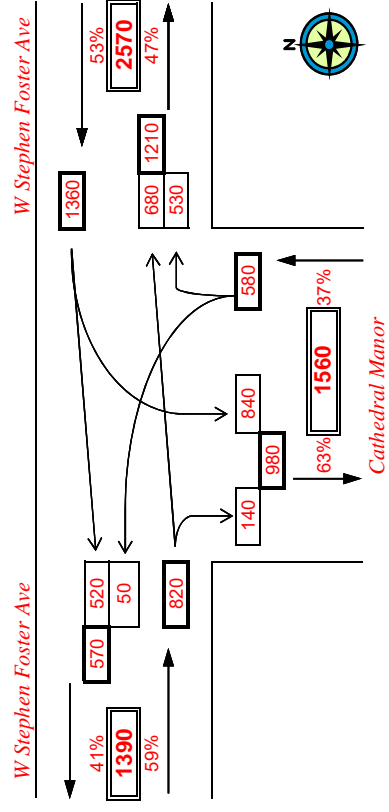
TURN MOVEMENT T1 (2040 No-Build)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

2040 AM Design Hour



2040 PM Design Hour



Location Map

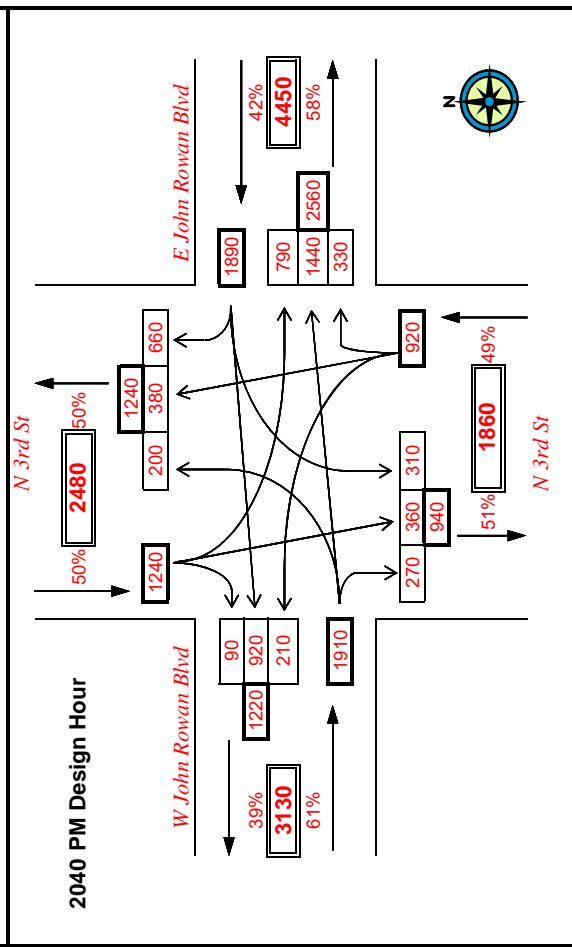
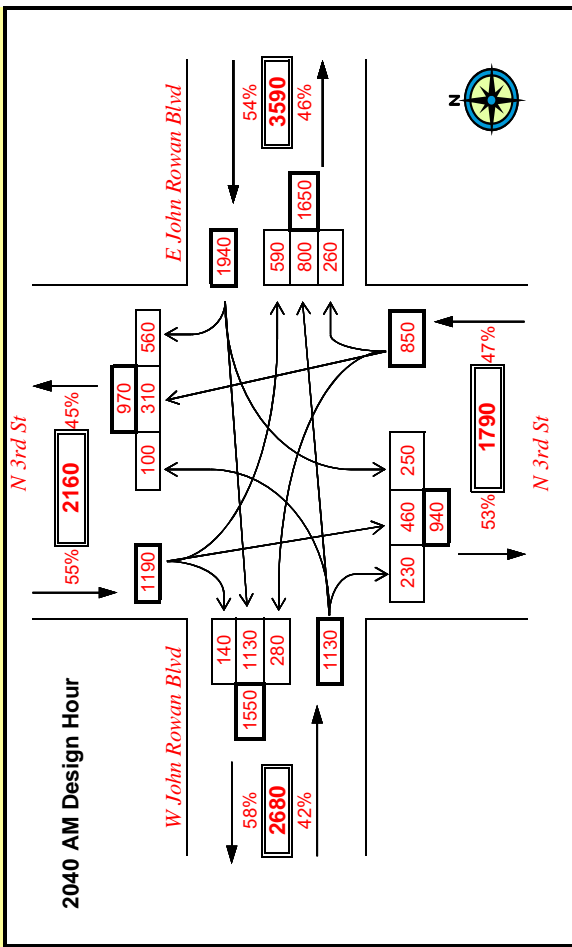


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2040 Inner Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map



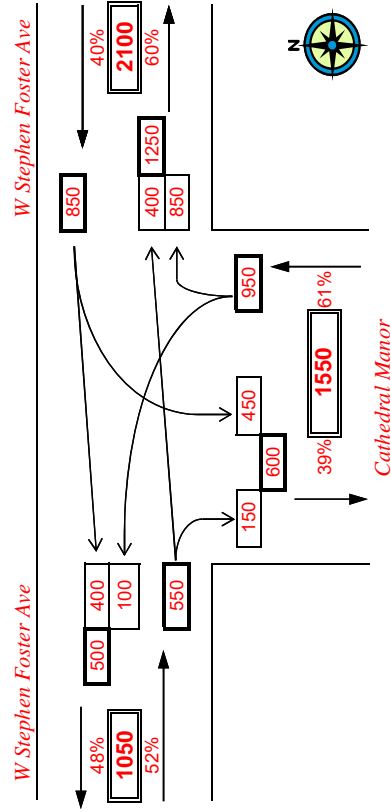
PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MAPS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

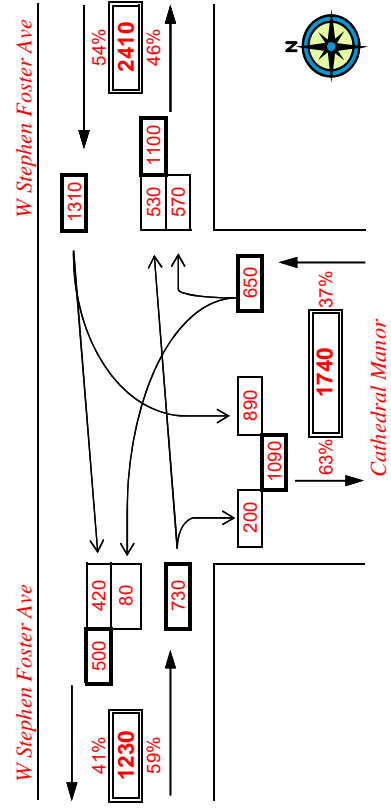
TURN MOVEMENT T1 (2040 Inner Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

2040 AM Design Hour



2040 PM Design Hour



Location Map

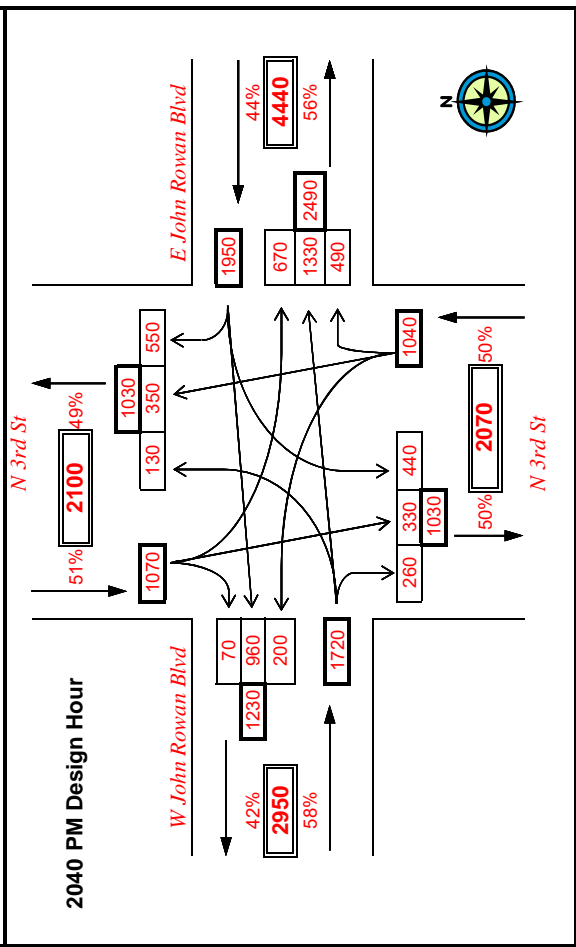
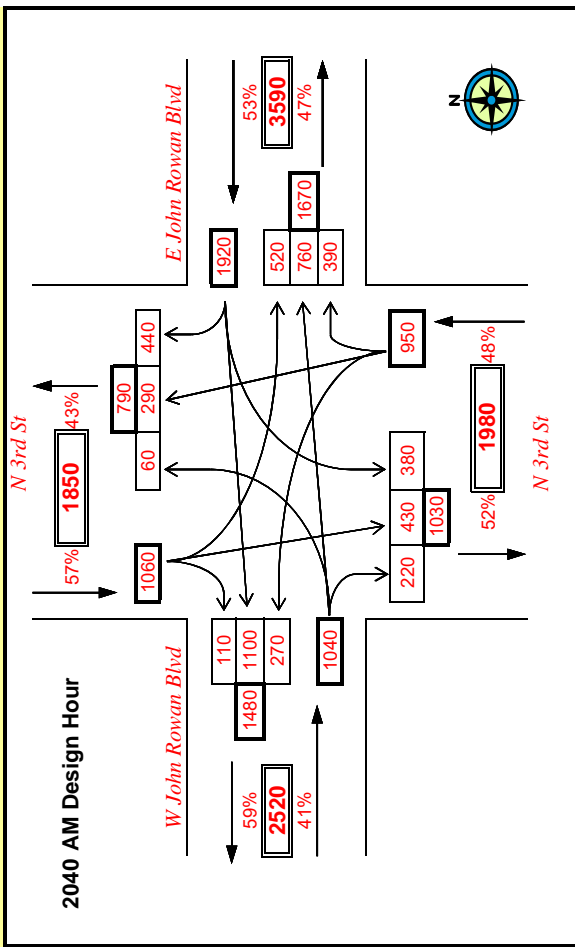


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2040 Short Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map

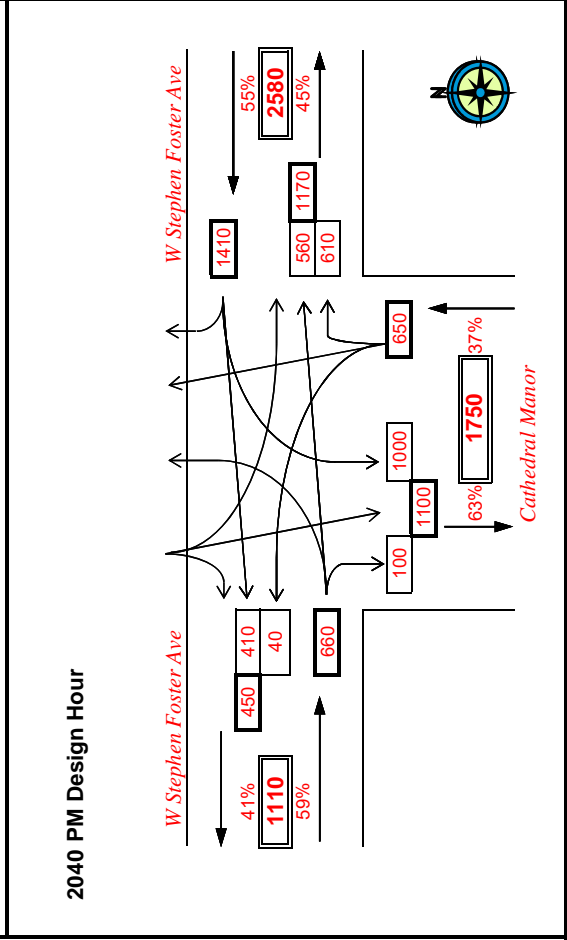
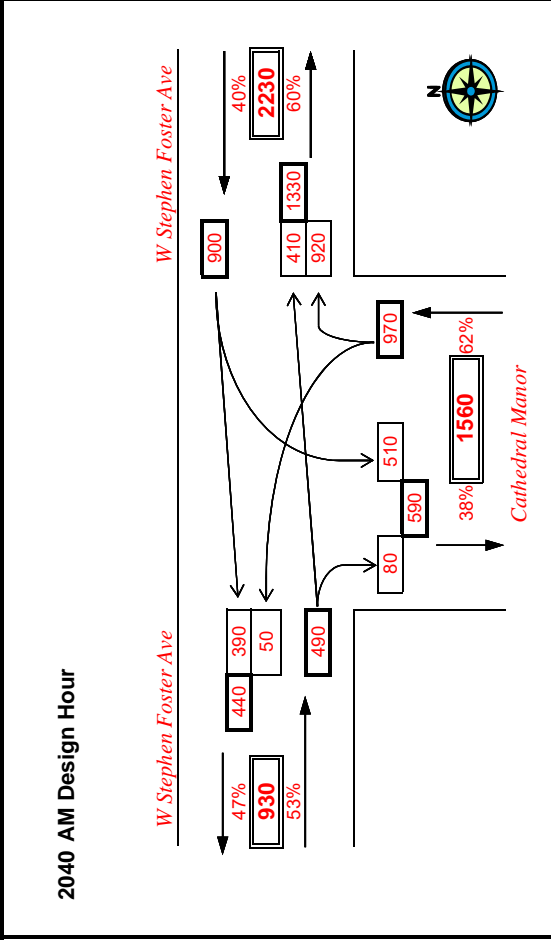


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T1 (2040 Short Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Location Map

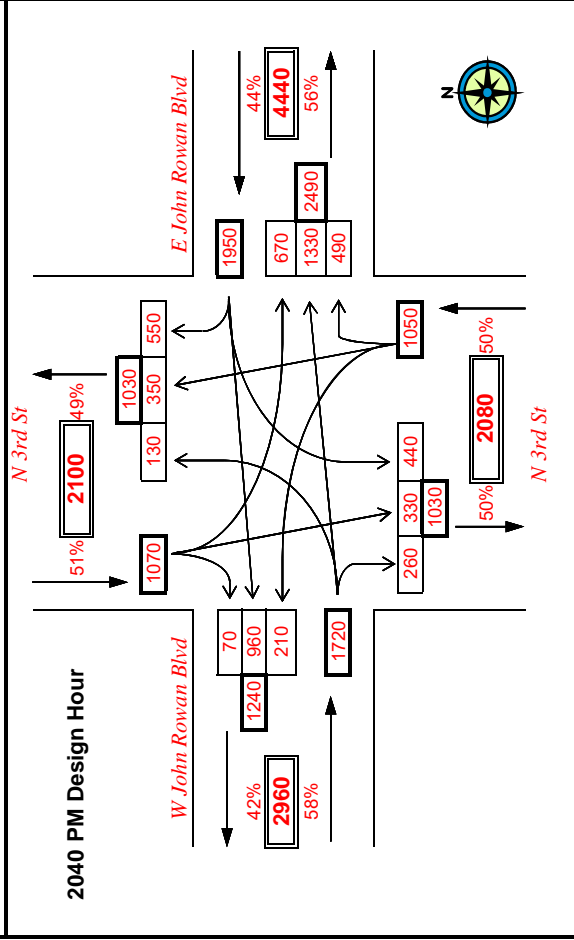
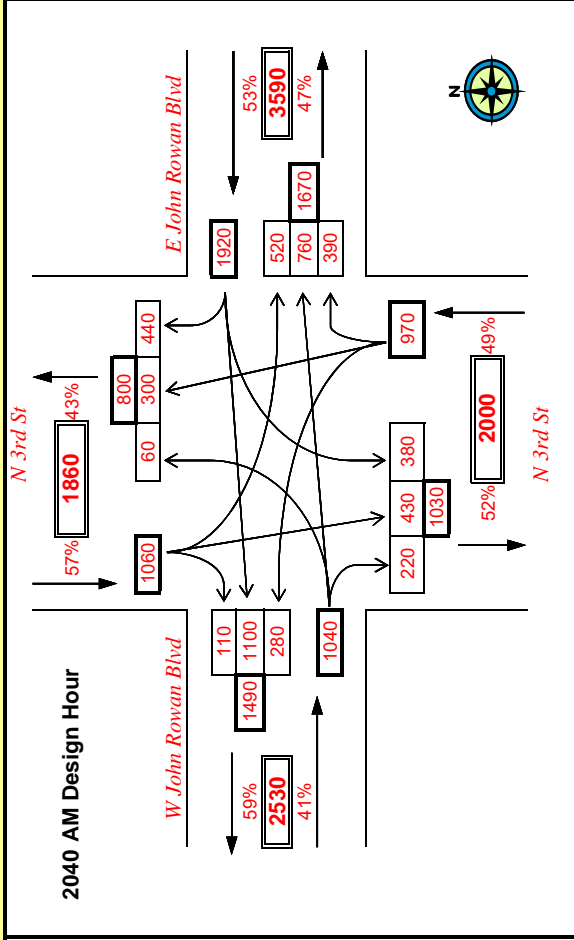


PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT T2 (2040 Long Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



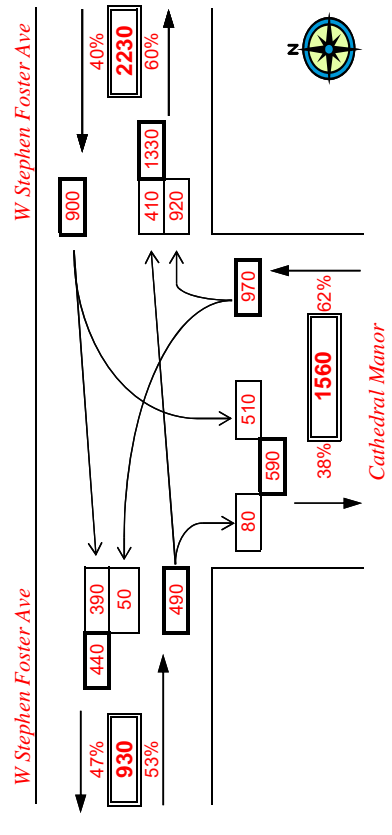
PROJECT: Bardstown Traffic Forecast
 ITEM NUMBER: 4-8809.00
 MARS NUMBER: 0
 REQUEST DATE: 42825
 ANALYST: Cameron Manley
 YEAR: 2040
 INTERSECTION: US 31E & KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2025 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

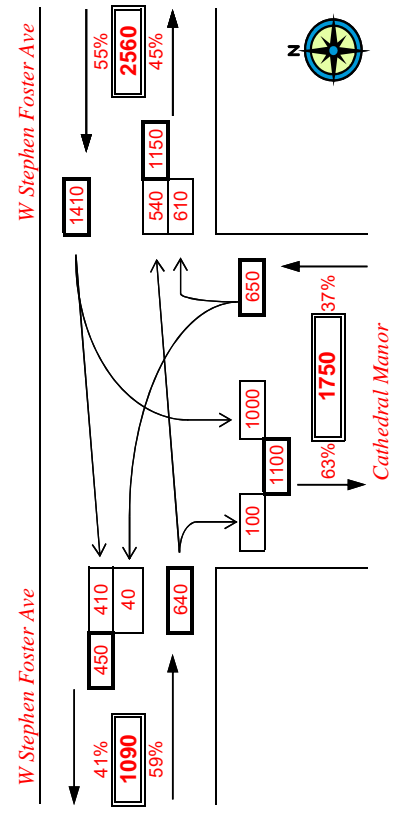
TURN MOVEMENT T1 (2040 Long Outer Bypass)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

2040 AM Design Hour



2040 PM Design Hour



Location Map



Appendix D:

Traffic Data for Pavement Design

TRAFFIC DATA REQUEST FORM

FOR PAVEMENT DESIGN

DESIGNER INPUTS

County: Nelson Project Item Number: 4-8809.00
Funding Code(s): _____
Route: Bardstown Bypass Construction Year: 2025
Begin Milepoint: _____ End Milepoint: _____
Total Number of Lanes: 2 Letting Date: _____
Project Description: Inner Bypass for Bardstown
Designer Comments: _____

Date Needed: _____ Priority: _____
Submitted By: _____ Date: _____

TRAFFIC FORECASTER INPUTS

Functional Class: _____
2-Way Avg. Annual Daily Traffic: 3700
2-Way Avg. Annual Daily Truck Traffic: 600
Construction Year Truck Percentage: 14.90%
20 Year ESALs: _____
Truck Traffic Growth Rate (Linear): 2.50%
% Trucks in Design Direction: 50.40%
% Trucks in Des Lane of Des Direction: 100%
Forecaster Comments: The 2-Way AADT is for the future year of 2025, as is the 2-Way AADT for trucks. The construction year truck percentage is 2025.
Forecast Done By: Anne Warnick, PE Date: 7/26/2017

**TRAFFIC DATA REQUEST FORM
FOR PAVEMENT DESIGN**

DESIGNER INPUTS

County: Nelson Project Item Number: 4-8809.00
Funding Code(s): _____
Route: Bardstown Bypass Construction Year: 2025
Begin Milepoint: _____ End Milepoint: _____
Total Number of Lanes: 2 Letting Date: _____
Project Description: Short Outer Bypass for Bardstown
Designer Comments: _____

Date Needed: _____ Priority: _____
Submitted By: _____ Date: _____

TRAFFIC FORECASTER INPUTS

Functional Class: _____
2-Way Avg. Annual Daily Traffic: 2300
2-Way Avg. Annual Daily Truck Traffic: 300
Construction Year Truck Percentage: 13.00%
20 Year ESALs: _____
Truck Traffic Growth Rate (Linear): 2.00%
% Trucks in Design Direction: 49.90%
% Trucks in Des Lane of Des Direction: 100%
Forecaster Comments: The 2-Way AADT is for the future year of 2040, as is the 2-Way AADT for trucks. The construction year truck percentage is 2025.
Forecast Done By: Anne Warnick, PE Date: 7/26/2017

TRAFFIC DATA REQUEST FORM

FOR PAVEMENT DESIGN

DESIGNER INPUTS

County: Nelson Project Item Number: 4-8809.00
Funding Code(s): _____
Route: Bardstown Bypass Construction Year: 2025
Begin Milepoint: _____ End Milepoint: _____
Total Number of Lanes: 2 Letting Date: _____
Project Description: Long Outer Bypass for Bardstown
Designer Comments: _____

Date Needed: _____ Priority: _____
Submitted By: _____ Date: _____

TRAFFIC FORECASTER INPUTS

Functional Class: _____
2-Way Avg. Annual Daily Traffic: 3100
2-Way Avg. Annual Daily Truck Traffic: 400
Construction Year Truck Percentage: 14.40%
20 Year ESALs: _____
Truck Traffic Growth Rate (Linear): 2.00%
% Trucks in Design Direction: 50.10%
% Trucks in Des Lane of Des Direction: 100%
Forecaster Comments: The 2-Way AADT is for the future year of 2025, as is the 2-Way AADT for trucks. The construction year truck percentage is 2025.
Forecast Done By: Anne Warnick, PE Date: 7/26/2017

Appendix E:

Additional Figures

Figure E-1: KYTC Count Locations

Figure E-2: AM Turning Movement Counts

Figure E-3: PM Turning Movement Counts

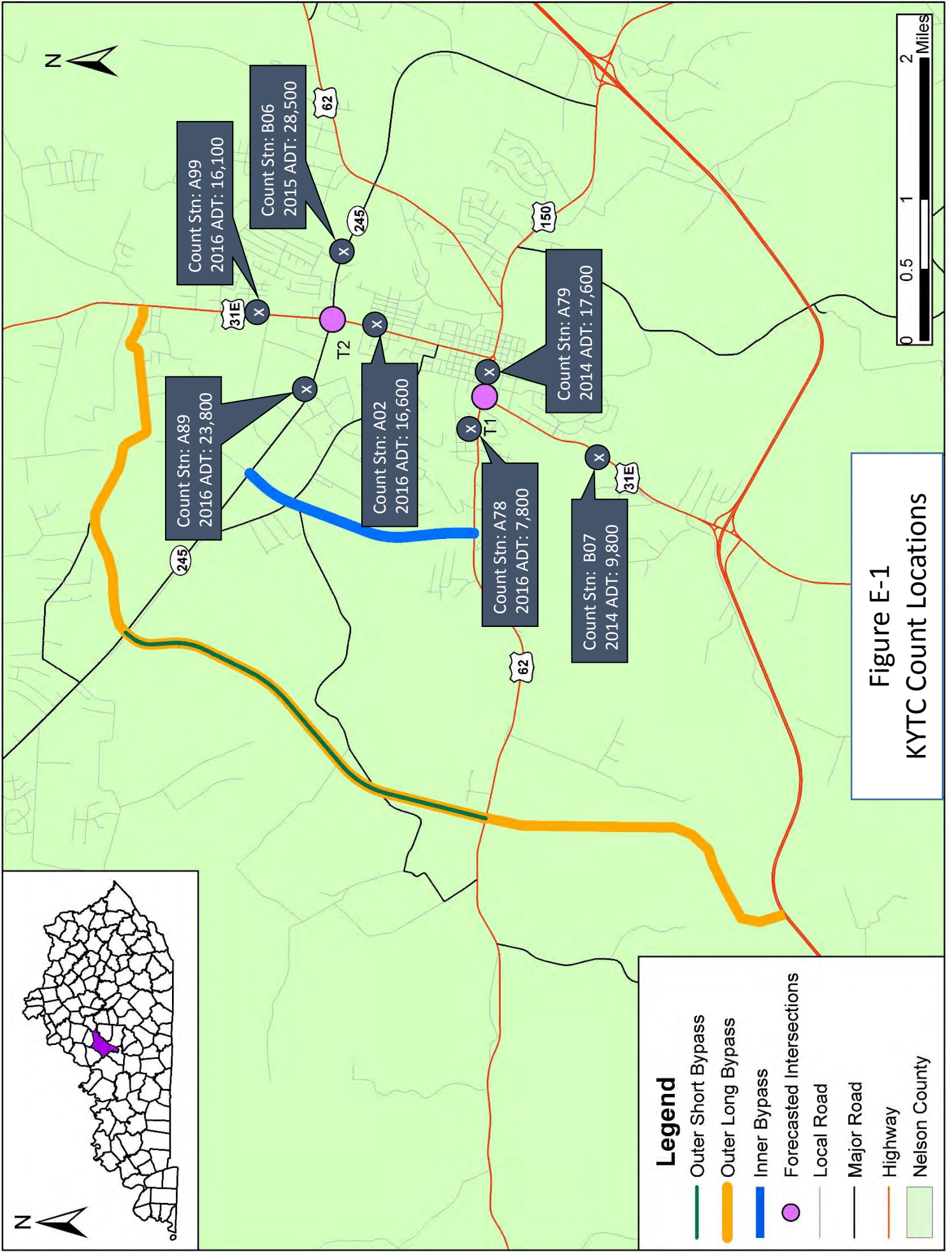
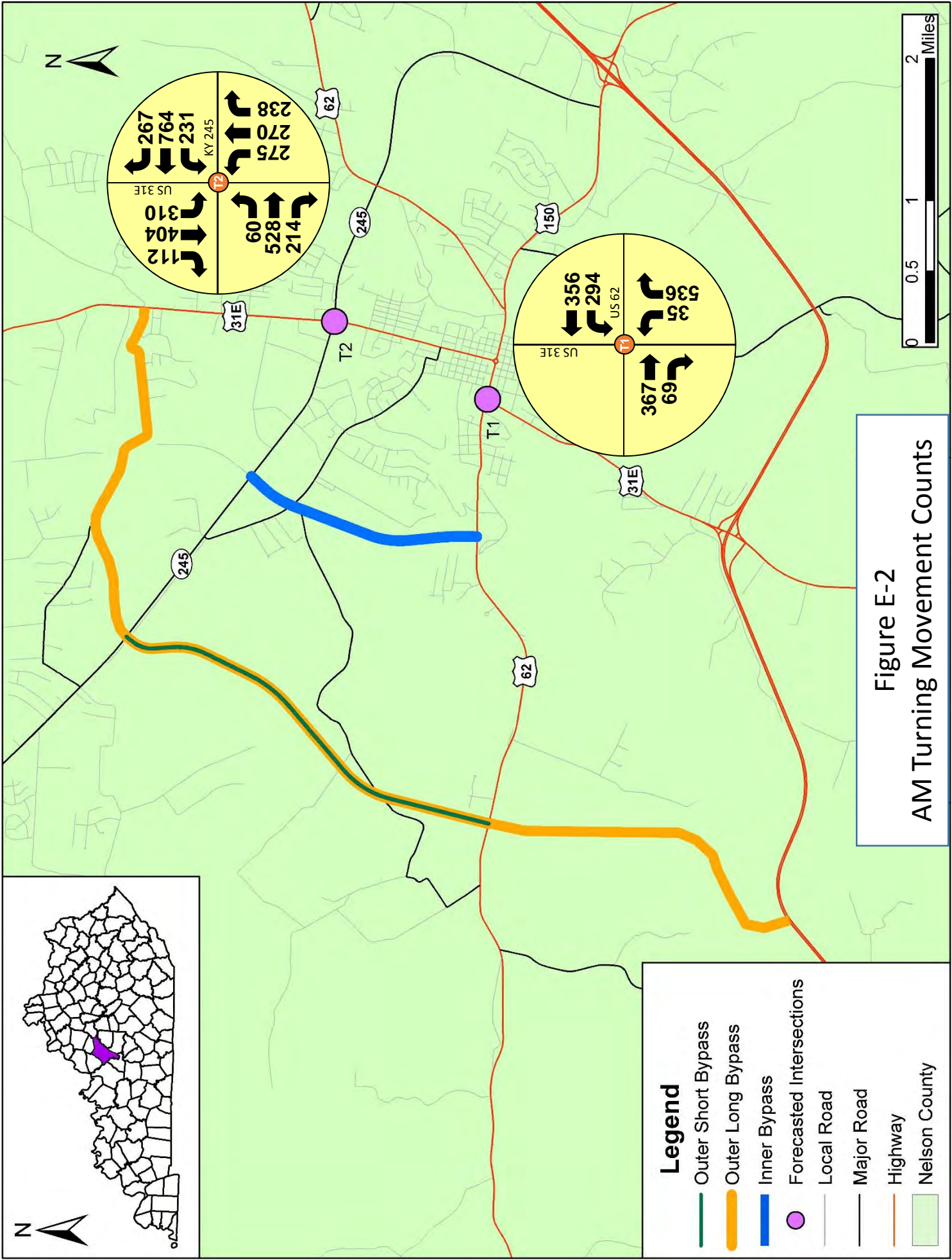
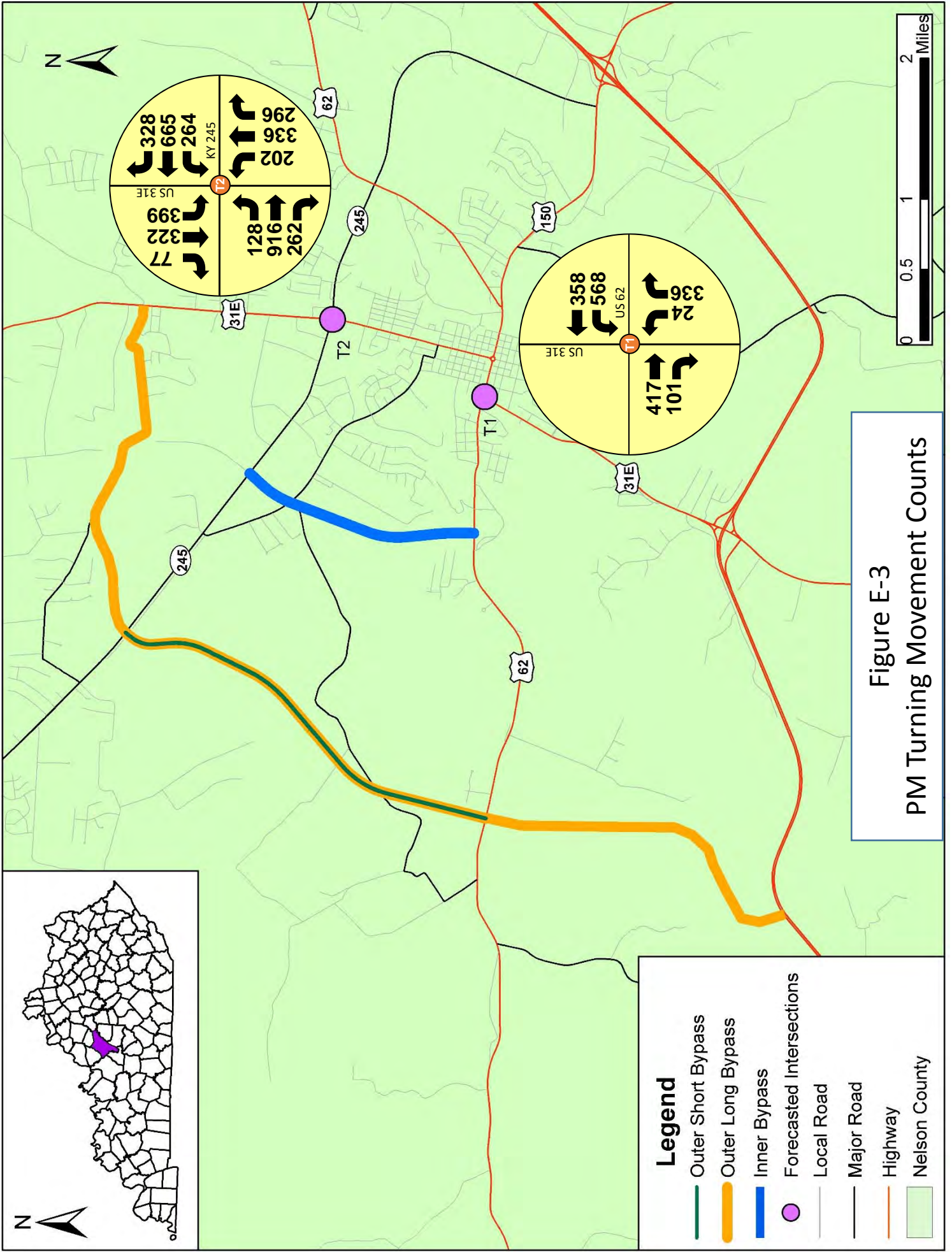


Figure E-1
KYTC Count Locations

Legend

- Outer Short Bypass
- Outer Long Bypass
- Inner Bypass
- Forecasted Intersections
- Local Road
- Major Road
- Highway
- Nelson County





Appendix F:

Growth Rates

Nelson	KY 245	A89	US 31E	KY 1430	3.342	5.15	4,246	1,808	16	2016	23793	2 yr	23300	14700	-1.98%	-1.97%	
										2015	24272	3 yr	24000	24500	0.09%	2.22%	
										2014	23746	4 yr	23500	17900	-1.18%	-4.76%	
										2013	24933	5 yr	25200	38700	1.88%	3.69%	
										2008	20800	6 yr	24700	31300	1.03%	-11.11%	
										2007	23400	7 yr	24600	30600	0.85%	4.46%	
										2006	22400	8 yr	24500	29700	0.84%	-0.88%	
										2005	22600	24300	26800	0.23%	24200	-1.19%	18400
												-0.02%	0.43%	0.47%	27100		
Nelson	US 31E	A99	KY 245	KY 332	15.4	16.729	16,0645	1,329	16	2016	16134	2 yr	16600	30700	2.71%	2.72%	
										2013	14888	3 yr	15900	17600	0.44%	-1.75%	
										2010	15700	4 yr	16100	20100	0.97%	1.81%	
										2004	14100	5 yr	16100	19900	0.93%	0.48%	
										2001	13900	6 yr	15800	17900	0.54%	-2.51%	
										1998	15000	7 yr	15800	18000	0.57%	2.57%	
										1995	13900	8 yr	16000	18800	0.70%	2.79%	
										1992	12800	9 yr	16400	20900	1.06%	5.50%	
										1989	10900	16100	20500	0.99%	21400	1.45%	22400
												1.24%	1.06%	1.46%	22500		
Nelson	KY 245	B06	US 62	US 31E	2.334	3.342	2,838	1,008	16	2015	28493	2 yr	28800	32400	0.51%	0.52%	
										2014	28346	3 yr	32800	132700	6.27%	12.35%	
										2013	25231	4 yr	28500	34500	0.83%	-12.44%	
										2012	28816	5 yr	27400	24700	-0.45%	-0.29%	
										2011	28900	6 yr	26700	20100	-1.23%	-3.34%	
										2010	29900	7 yr	27900	27300	-0.09%	12.83%	
										2009	26500	8 yr	28400	31400	0.44%	0.38%	
										2008	26400	9 yr	29000	35700	0.91%	3.94%	
										2007	25400	28700	42400	0.90%	40000	1.74%	42700
												1.45%	1.71%	1.45%	39900		
Nelson	US 31E	B07	artha Collins Bluegrass Pkw	US 62W	11.933	13.972	12,9525	2,039	16	2014	9845	2 yr	10300	14800	1.59%	1.59%	
										2011	8380	3 yr	10400	15300	1.69%	1.84%	
										2008	8890	4 yr	10000	12300	0.90%	-0.96%	
										2005	9150	5 yr	9400	9200	-0.09%	-3.24%	
										2002	10100	6 yr	9200	8500	-0.34%	0.00%	
										1997	10100	7 yr	9200	8600	-0.29%	2.96%	
										1996	9810	8 yr	9800	10700	0.38%	3.74%	
										1990	7870	9800	11300	0.55%	11600	0.85%	11900
												0.74%	0.62%	0.94%	12100		

Executive Summary

Traffic Forecast Report for Nelson County Western Bardstown Connectivity Study Item No. 04-8809.00

Prepared for:



Prepared by:
Jayalakshmi Balaji, P.E.
Division of Planning
Kentucky Transportation Cabinet
January 16, 2019

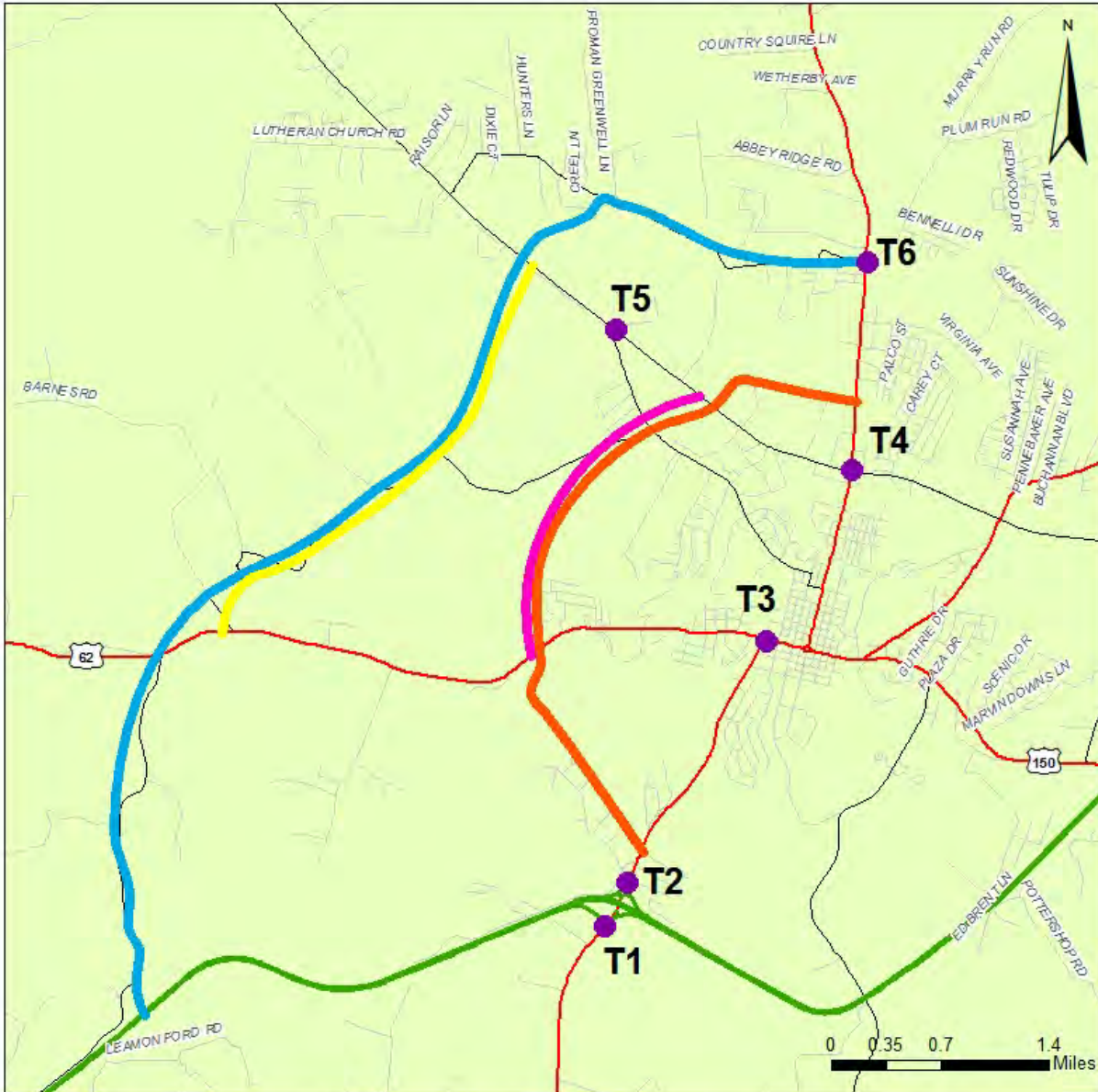
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Commonly Used Abbreviations and their Descriptions

AADT	Average Annual Daily Traffic	Adjusted for seasonal and monthly factors
AADTT	Average Annual Daily Truck Traffic	Total truck volume for a year/365
DHV	Design Hour Volume	30 th highest hour of a <u>year</u>
ESAL	Equivalent Single Axle Load	A measure of traffic's impact on roadway
%T	Truck Percentage	The percentage of trucks to total volume
FC	Functional Class	Refers to a road's importance
GR	Growth Rate	A value normally compounded annually
PHF	Peak Hour Factor	DHV divided by ADT (DHV/ADT)
K-Factor	K-30 th hour Factor	Considers a 15 minute spike in an hourly count
D-Factor	Directional Factor	Percentage of dominant flow to total
MP	Mile Point	Miles increase easterly and northerly
ATR	Automatic Traffic Recorder	A permanent & continuous recording station
KYSTM	Kentucky Statewide Model	A computerized representation of KY roads
BCI	Bicycle Comfort Index	A Level of Service Concept

Fig 1: Study Area



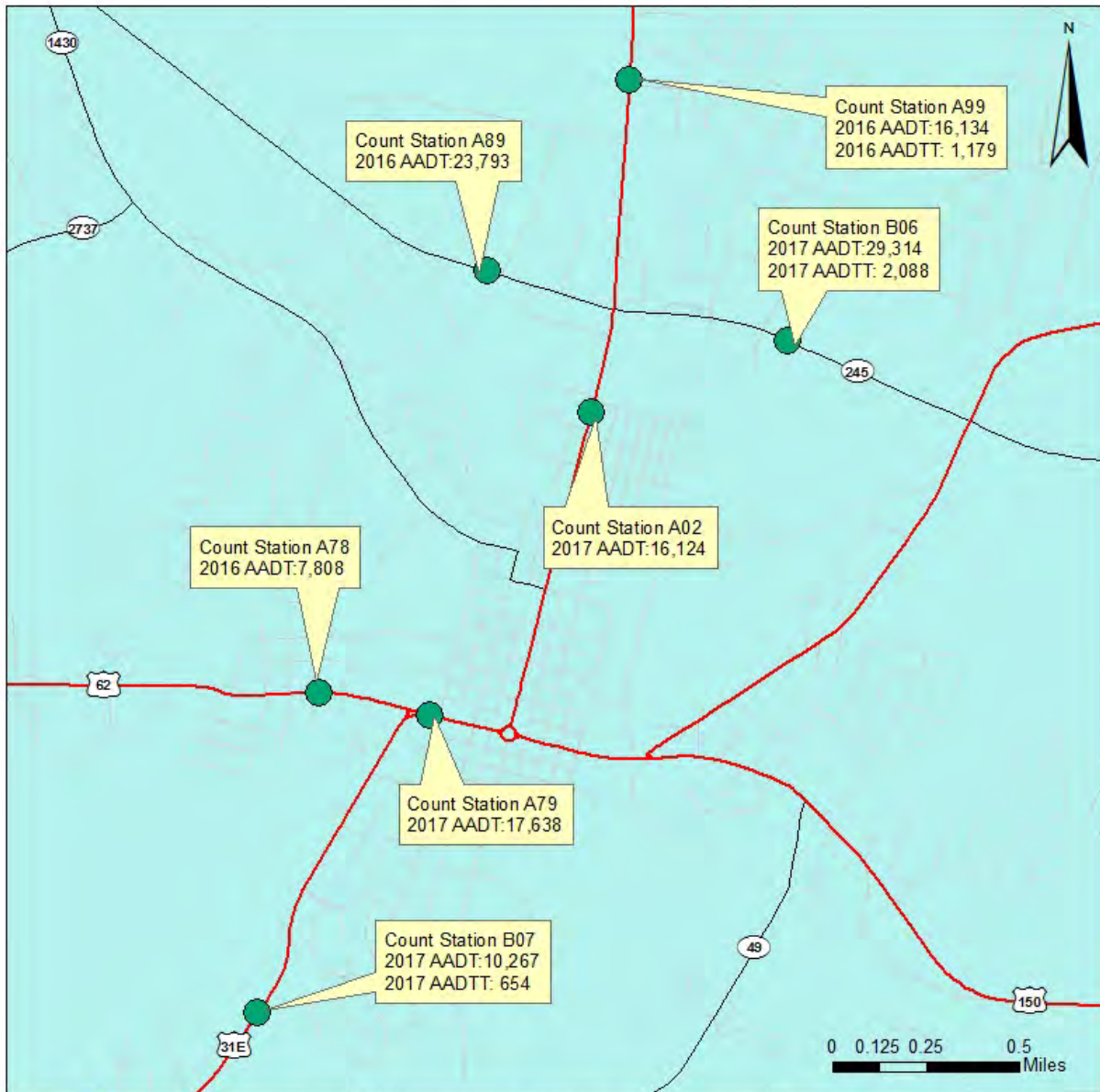
Nelson County
 Bardstown New connector
 Item # 4-8809



Legend

- Outer Long Bypass
- Outer Short Bypass
- Inner Short Bypass
- Inner Long Bypass
- Forecasted Intersections

Count Stations



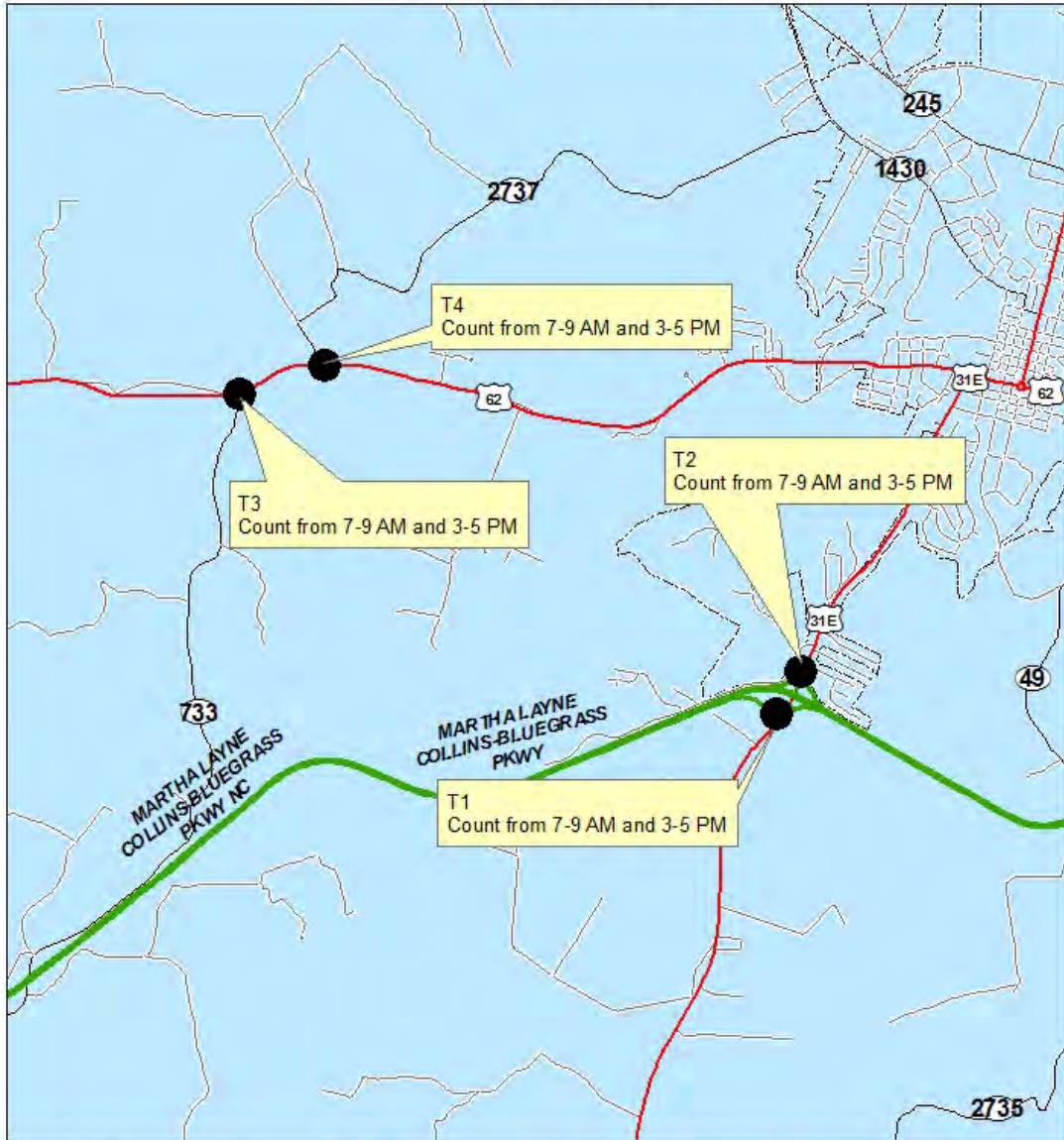
Nelson County
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 Item # 4-8809



Legend

- Traffic Count Stations

Vicinity Map 1



Nelson County
New Route from US 62 to KY 245
Item # 4-8809.00

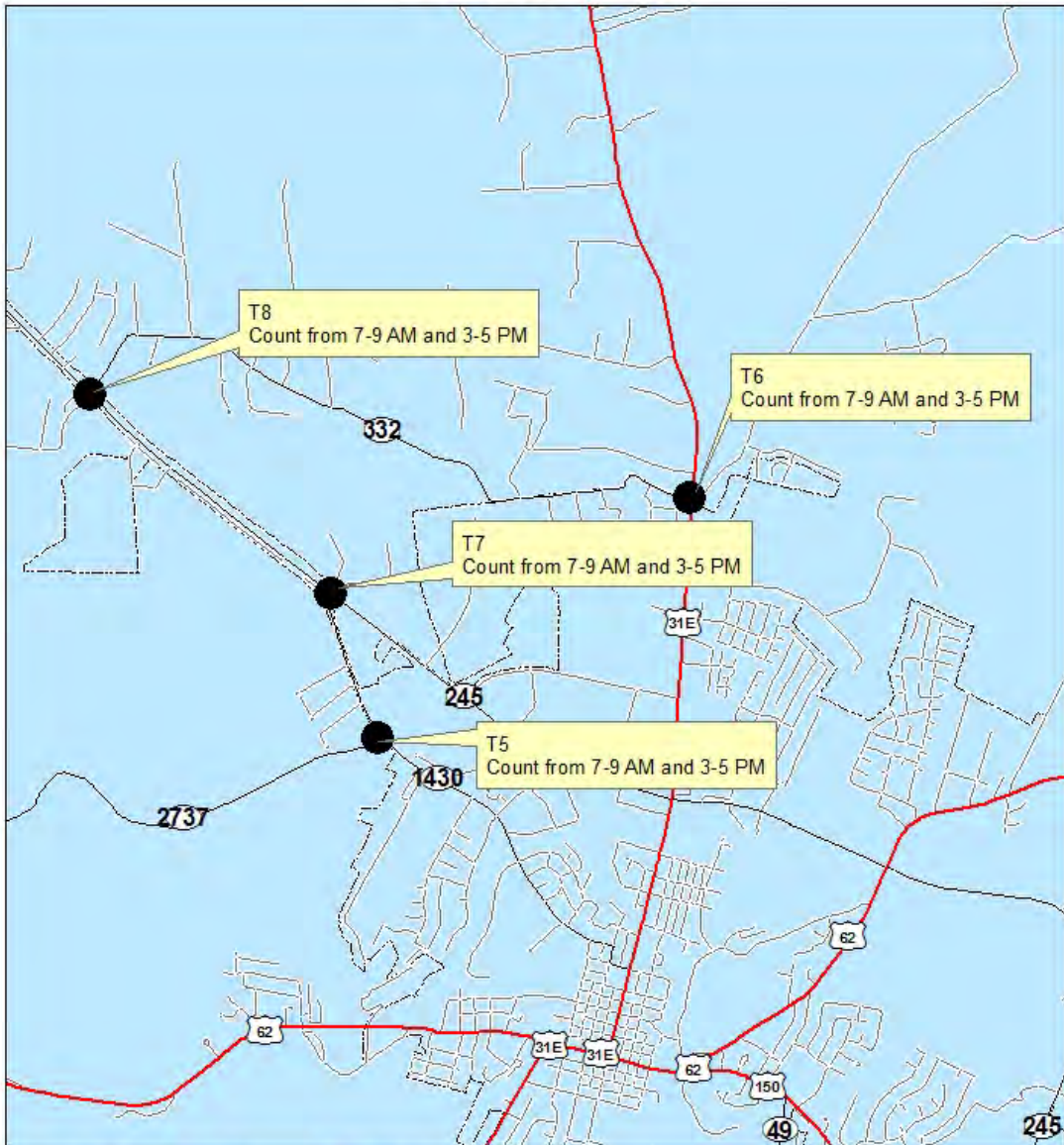


Legend

● Intersections Count Collected

0 0.5 1 Miles

Vicinity Map 2



Nelson County
New Route from US 62 to KY 245
Item # 4-8809.00



Legend

●
Intersections Count Collected

0 0.475 0.95 Miles

Traffic Forecast Executive Summary

Nelson County: Western Bardstown Connectivity Study

Item No. 4-8809

FORECAST SUMMARY

The project calls for the construction of a new connector, west of Bardstown, connecting US 31E near Bluegrass Parkway to the north side of town, in Nelson County. The purpose of this forecast is to analyze the four different connector options and the volume of trucks and other vehicular traffic utilizing those corridors. The four options are:

- Short Inner Connector (Pink Corridor) between US 62 and KY 245
- Long Inner Connector (Orange Corridor) between US 31E near MP 12.3 and US 31E near MP 15.8
- Short Outer Connector (Yellow Corridor) between US 62 and KY 245
- Long Outer Connector (Aqua Corridor) between Bluegrass Pkwy and US 31E near MP 16.7

FORECAST TYPE

The following types of forecasts were developed:

- 2018 and 2040 Average Daily and Design Hourly Truck Percent Forecasts
- 2040 No Build and Build Turning Movements
- 2018 and 2040 ADT and DHV values
- Peak Hour Factors

CURRENT-YEAR VOLUMES

Current year volumes are based upon the most recent volume counts within the study area, the Hardin Meade Model and the intersection and volume counts (see Pg. 3, Pg. 4, and Pg. 5) collected for this project.

The original volume counts were updated to a base year of 2018 using a historical growth rate.

DESIGN-YEAR/GROWTH FACTORS

Growth rates were determined based on historical traffic growth analysis, population trends and projections, and results from Hardin Meade Model.

The Kentucky State Data Center population projections for Nelson County suggest a 0.75% annual growth in population.

Historical growth rates for each segment within the study area are shown in **Table 1**. The 2040 future year Hardin-Meade TDM was used to calculate the travel pattern changes and volume changes for five different scenarios: No build, Short inner connector, Long inner connector, Short outer connector, Long outer connector. After normalizing the 2040 model volumes for over/under assignment of traffic flow, model growth rates were calculated. A combination of the Hardin-Meade TDM growth rates and historical growth rates were used to determine growth rates on the study area arterials. **Table 1** shows the growth rates for all the different model scenarios.

Truck Percentages

Truck volumes and growth rate for the different alternates were based on the Hardin Meade TDM, the class counts collected at count station (Pg. 3), and breakdown percentages by truck class were calculated using the latest class counts.

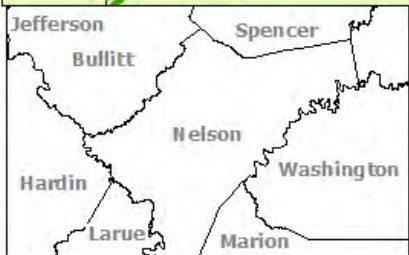
Turn Movements

Six turn movements were requested for this project:

1. US 31E @ Bluegrass Parkway East bound
2. US 31E @ Bluegrass Parkway West bound
3. US 31E at US62
4. US 31E at KY 245
5. KY 245 at KY 1430
6. US 31E at KY 332

Table 1: Historical and Hardin-Meade TDM Growth Rates									
Route	Station	Historical Growth Rate	Growth Rate Hardin-Meade TDM						
			No Build	Short Inner Bypass	Long Inner Bypass	Short Outer Bypass	Long Outer Bypass		
US 31E (MP 14.612 -15.4)	A02	-0.2%	0.9%	-0.1%	-0.1%	0.0%	0.0%	0.0%	
US 31E (MP 13.972 -14.195)	A79	0.3%	0.9%	0.3%	-0.1%	0.5%	0.8%		
US 31E (MP 15.4 – 16.729)	A99	1.2%	0.9%	0.9%	-0.2%	0.7%	0.6%		
US 31E (MP 11.933 -13.972)	B07	0.9%	0.8%	0.8%	-1.4%	0.8%	0.3%		
US 62 (MP 13.921 – 14.274)	A78	-0.5%	0.9%	1.8%	0.4%	1.5%	0.4%		
KY 245 (MP 3.342 – 5.15)	A89	0.7%	0.5%	0.9%	-0.1%	0.5%	0.2%		
KY 245 (MP 2.334 – 3.342)	B06	1.7%	0.9%	0.9%	0.9%	0.9%	0.9%		

Segment ADT volumes



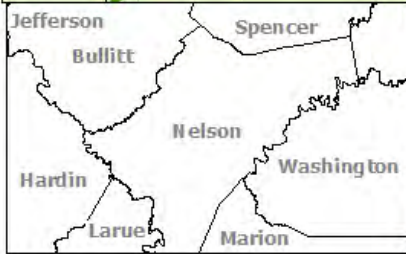
Nelson County
 Bardstown New connector
 Item # 4-8809



Legend

- Outer Long Bypass
- Outer Short Bypass
- Inner Short Bypass
- Inner Long Bypass

Truck volumes



Nelson County
 Bardstown New connector
 Item # 4-8809



Legend

- Outer Long Bypass
- Outer Short Bypass
- Inner Short Bypass
- Inner Long Bypass

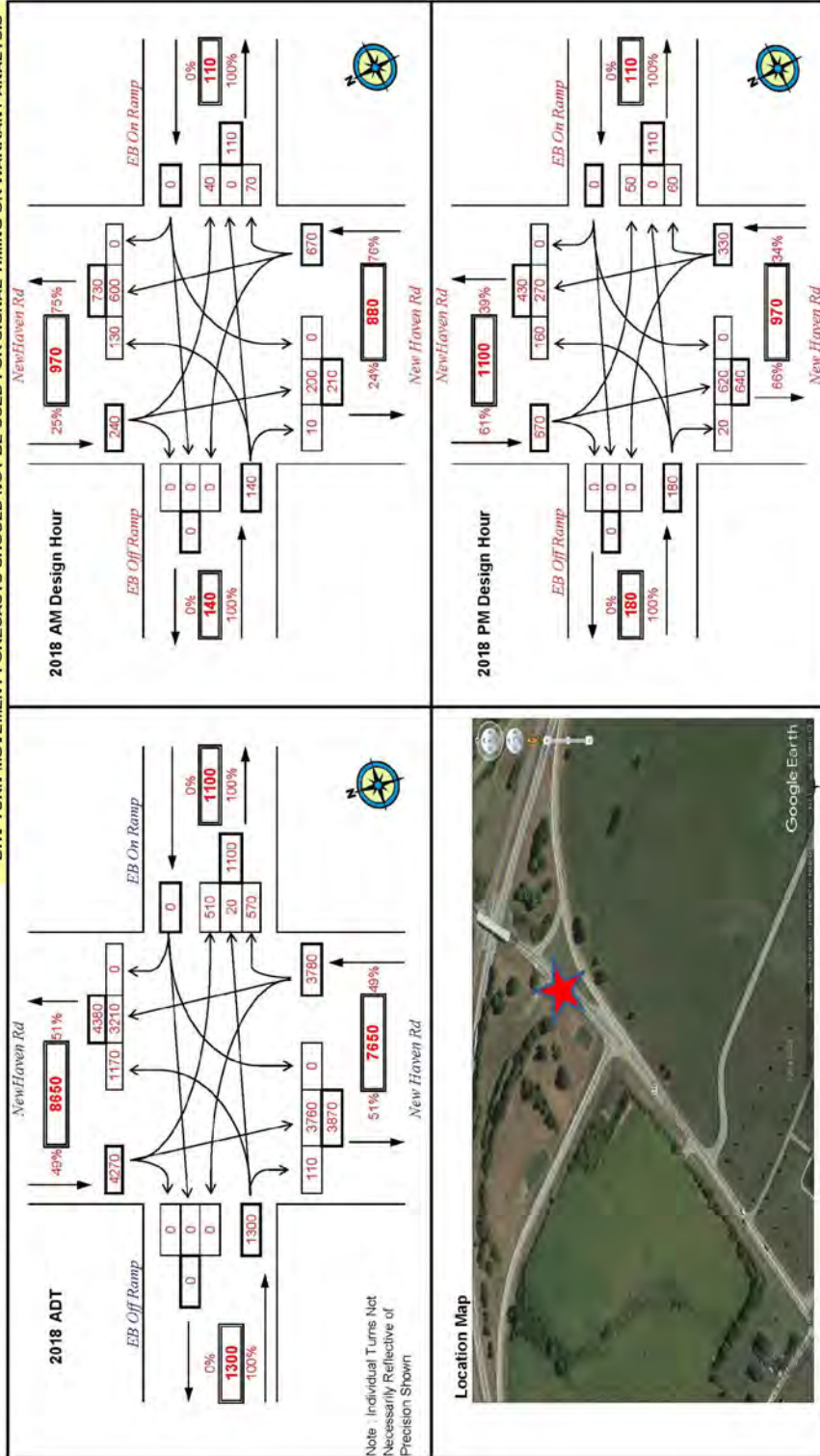
**TURN MOVEMENTS
2018 NO BUILD
2040 NO BUILD**

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2018 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2018
 INTERSECTION: US 31E @ EB BG Parkway

TURN MOVEMENT 1 (2018)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

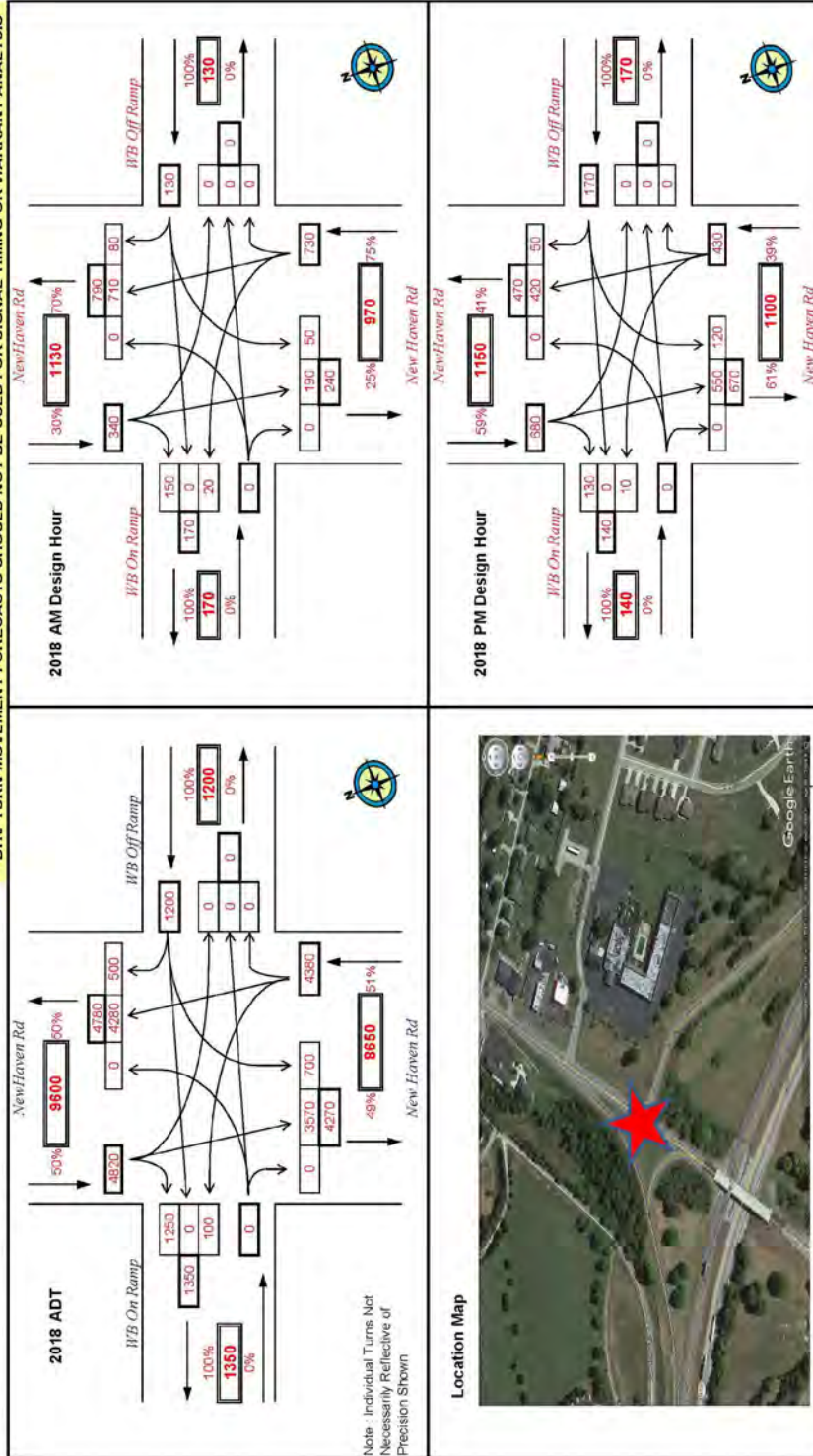


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TURN MOVEMENT 2 (2018)

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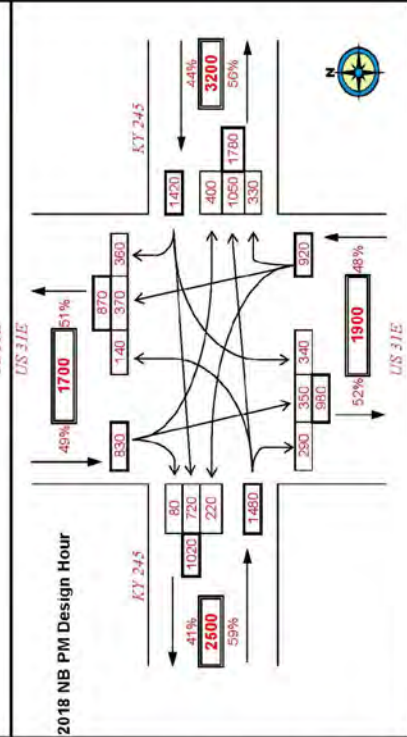
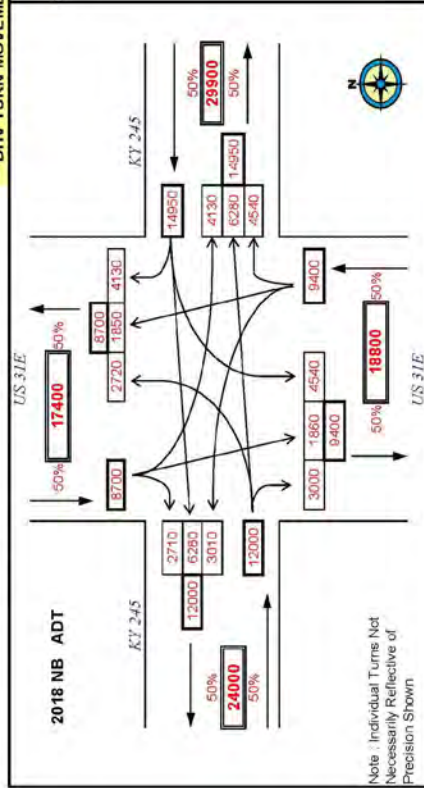
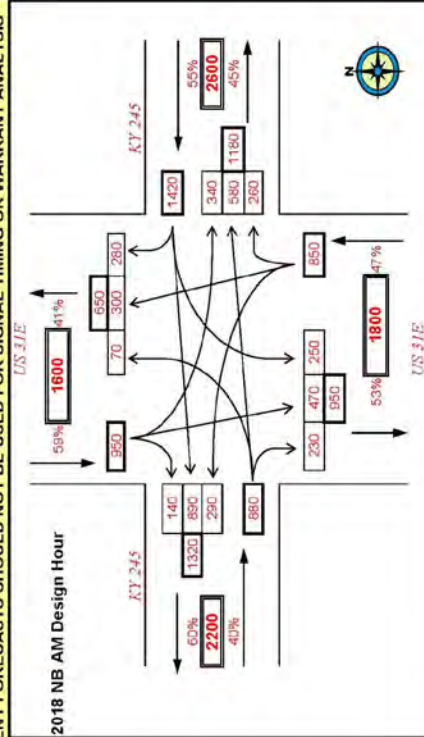


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PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Balaji
 YEAR: 2018 NB ADT and Design Hour Volumes
 INTERSECTION: US 31E @ KY 245

TURN MOVEMENT 4 (2018)

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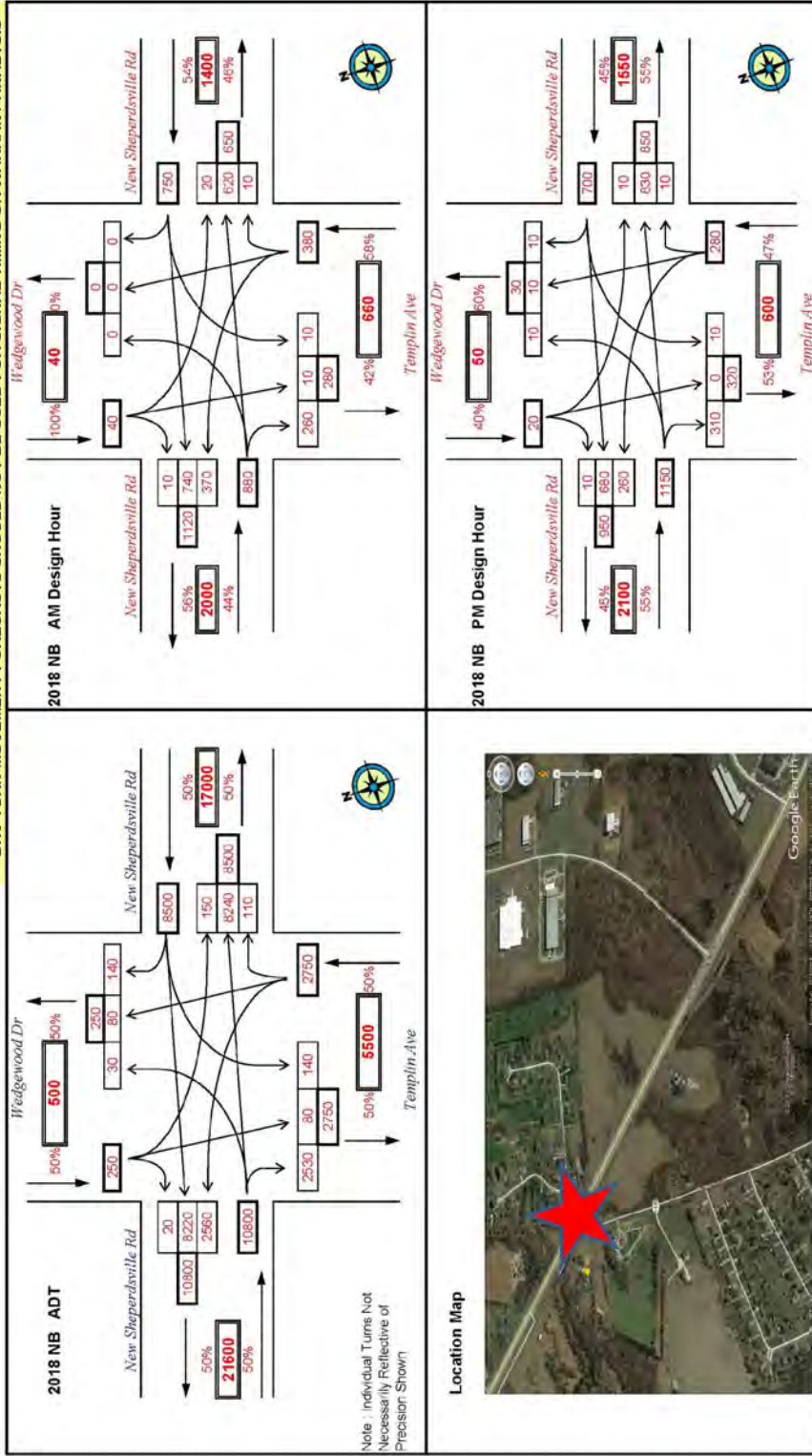


Note: Individual Turns Not Necessarily Reflective of Precision Shown

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2018 NB
 INTERSECTION: KY 245 @ KY 1430

TURN MOVEMENT 5 (2018)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

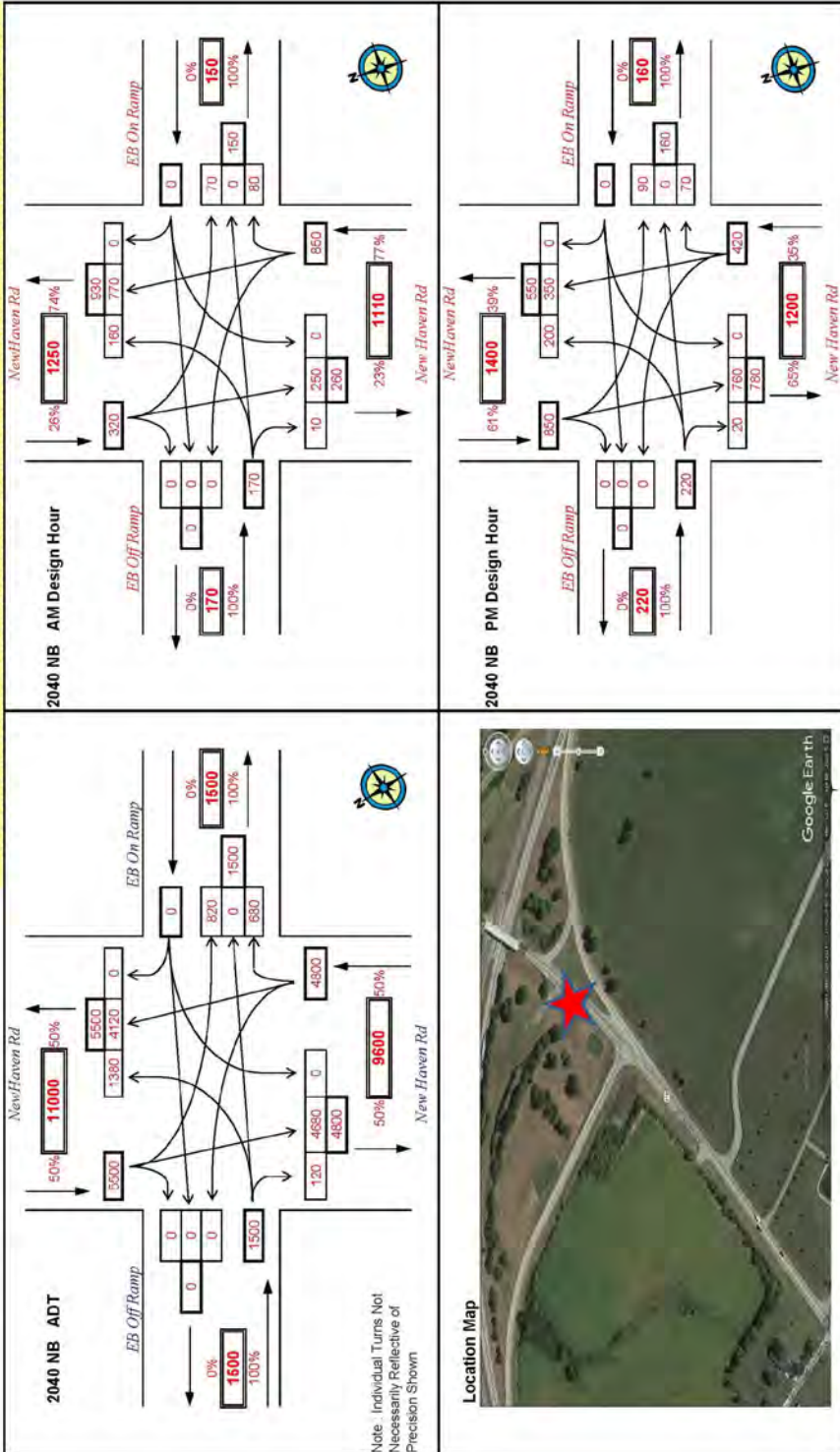


NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 NB Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 NB ADT and Design Hour Volumes
 INTERSECTION: US 31E @ EB BG Parkway

TURN MOVEMENT 1 (2040)

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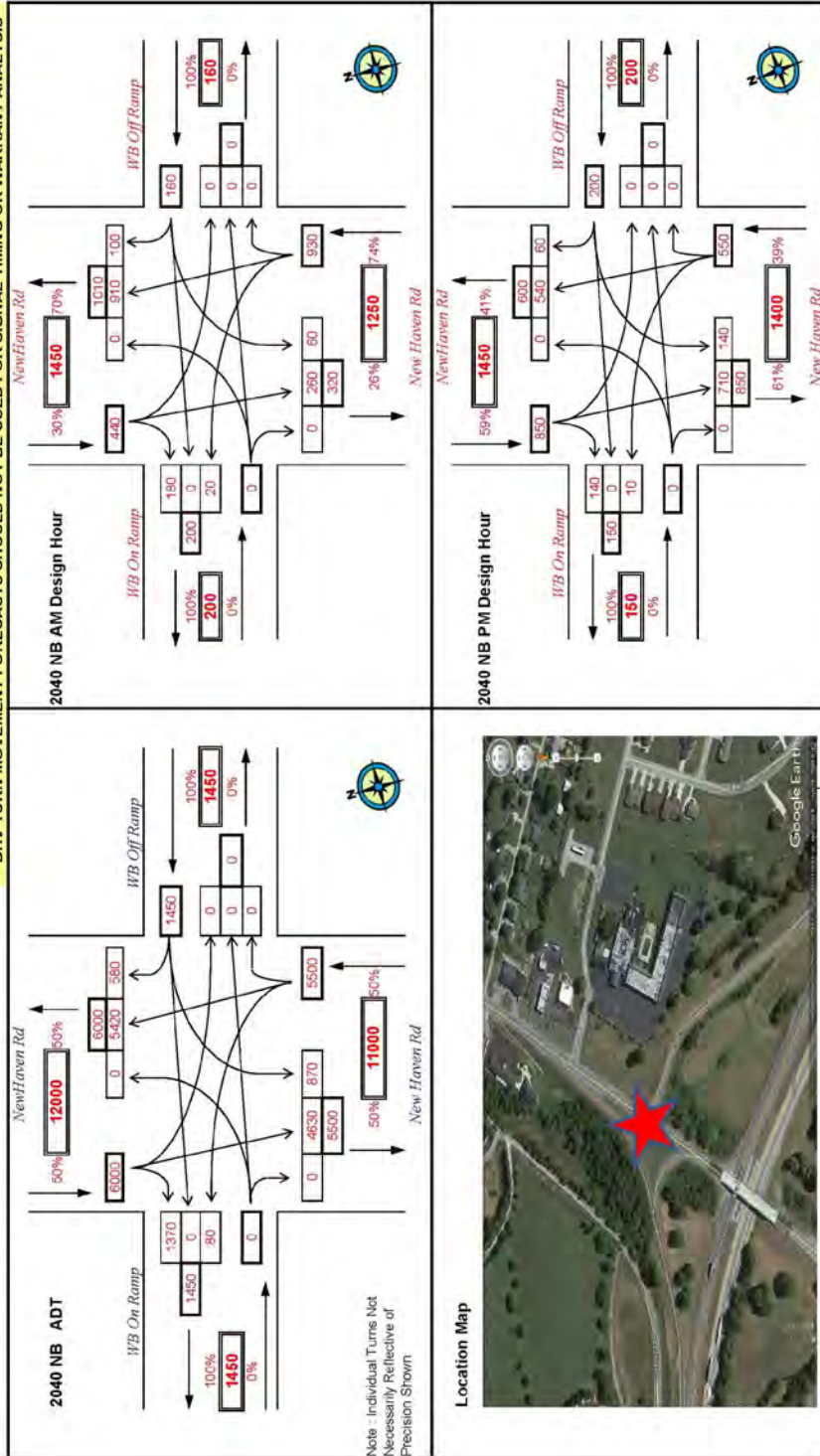


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NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 NB Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 2 (2040)

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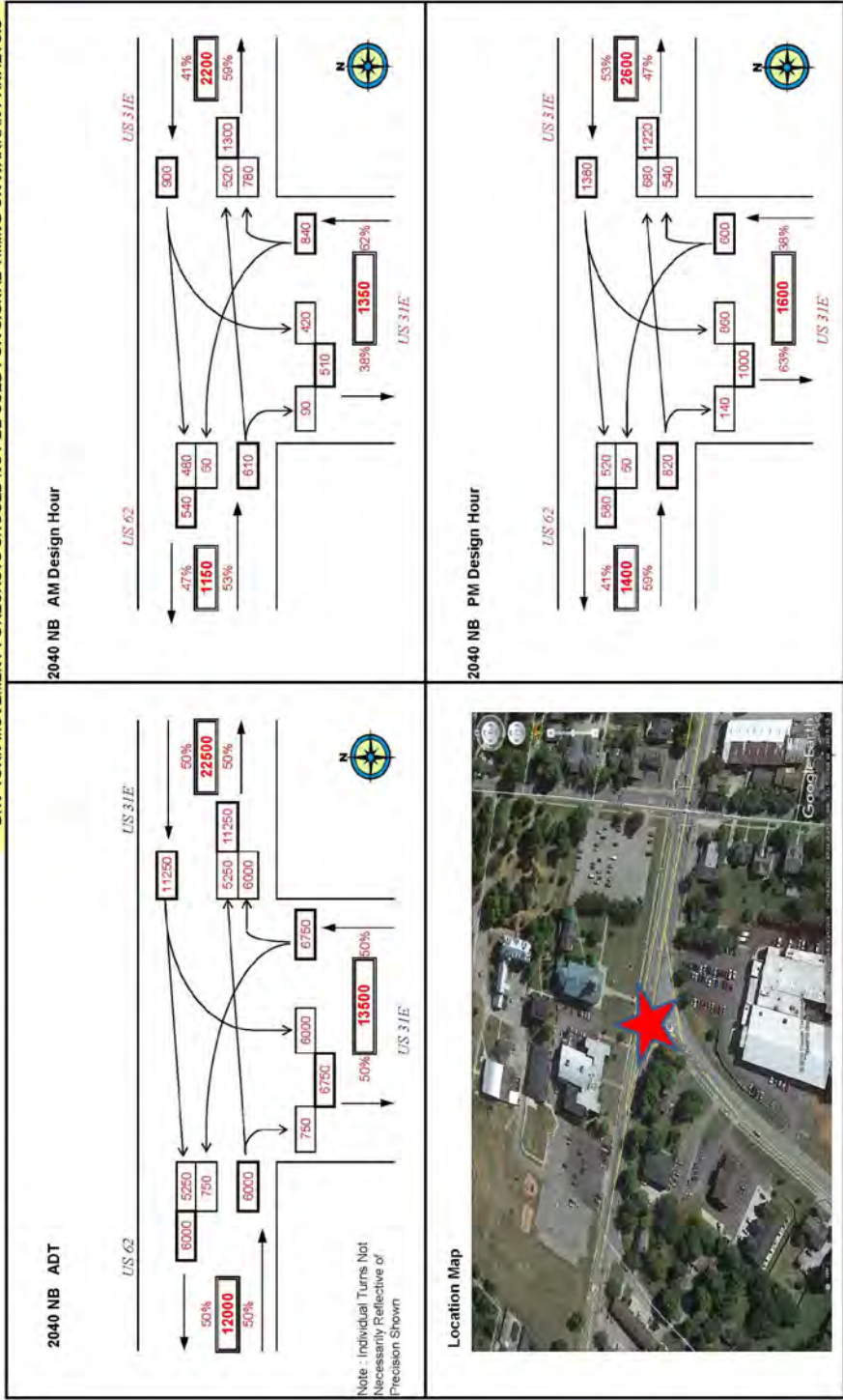


PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Balaji
 YEAR: 2040 NB ADT and Design Hour Volumes
 INTERSECTION: US 31E @ US 62

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 NB Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 3 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS****

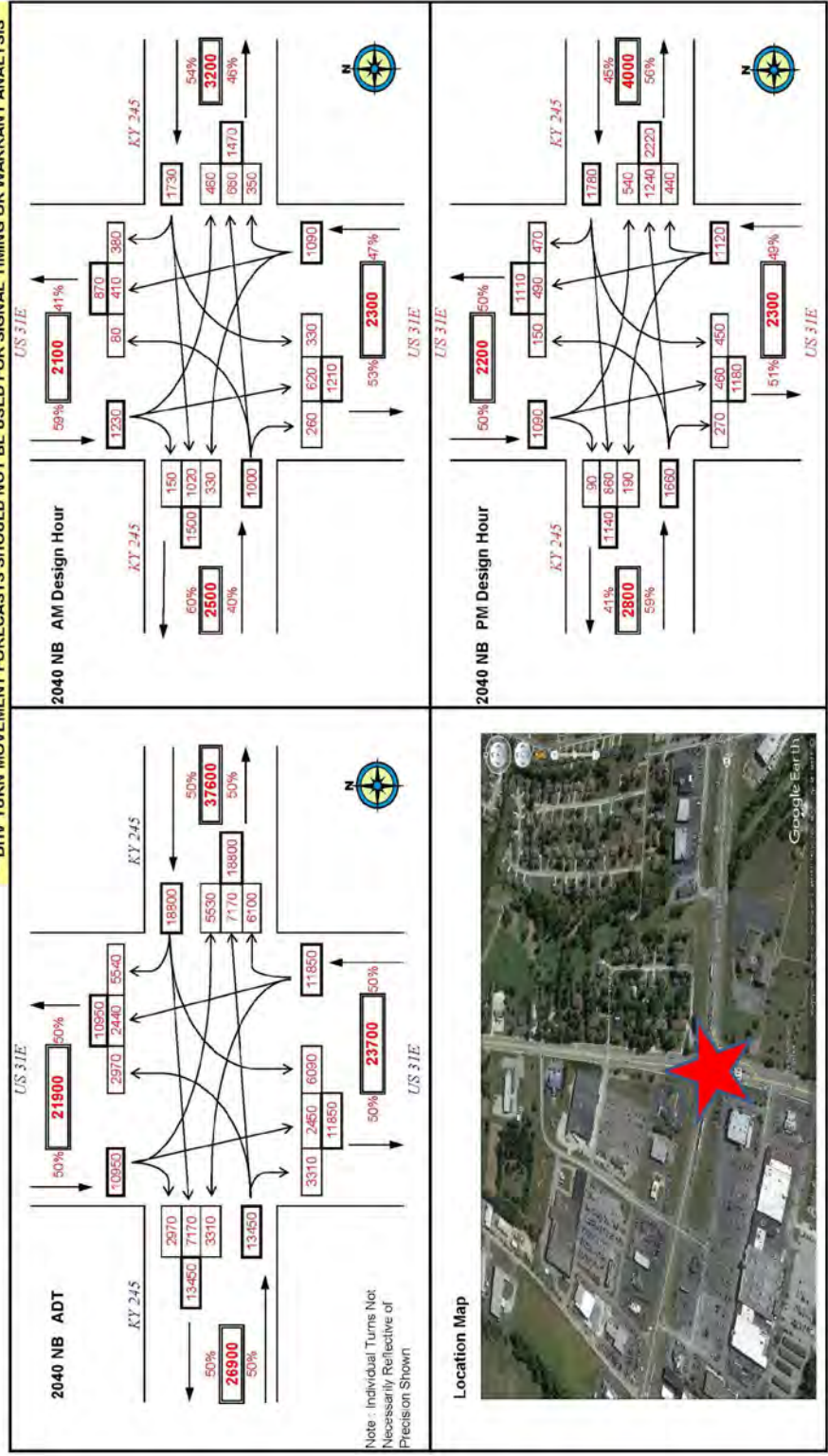


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 YEAR: 2040 NB ADT and Design Hour Volumes
 INTERSECTION: US 31E @ KY 245

TURN MOVEMENT 4 (2040)

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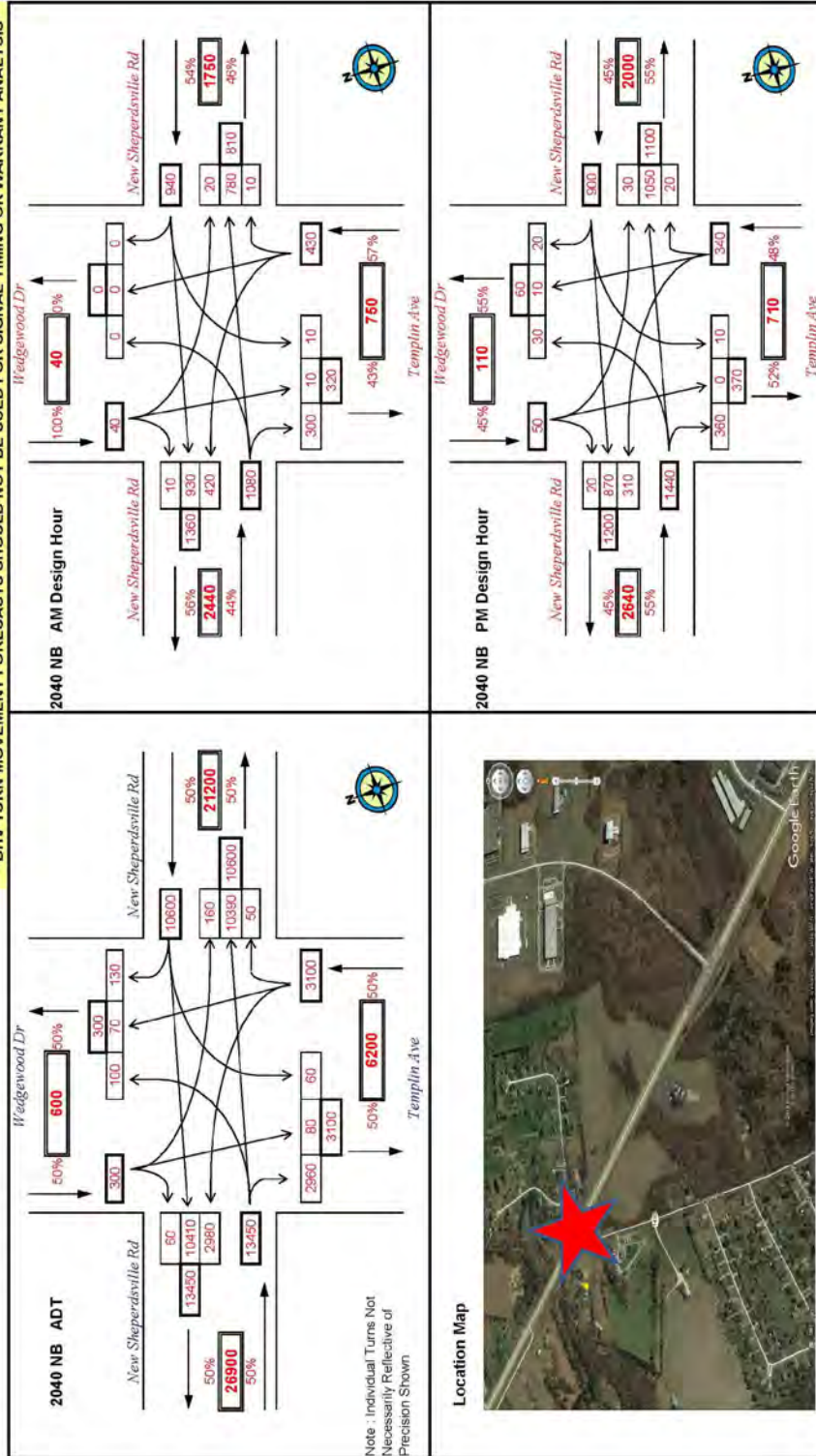


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 ANALYST: Jay Balaji
 YEAR: 2040 NB
 INTERSECTION: KY 245 @ KY 1430

TURN MOVEMENT 5 (2040)

***DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



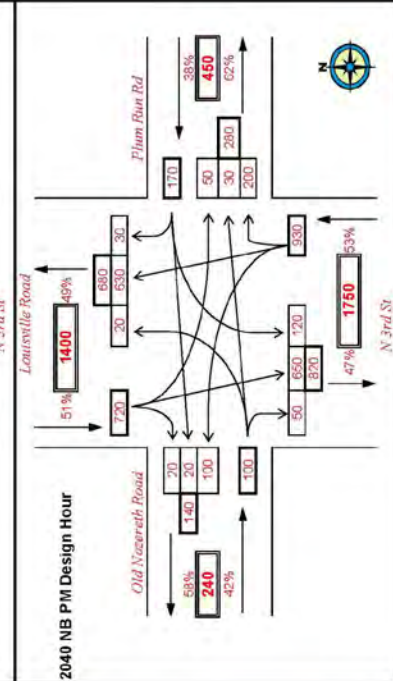
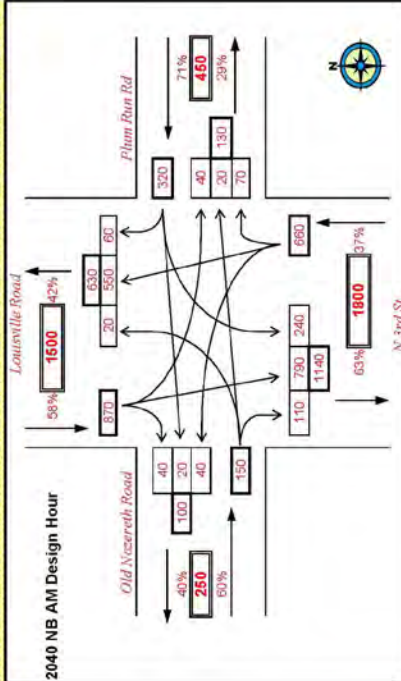
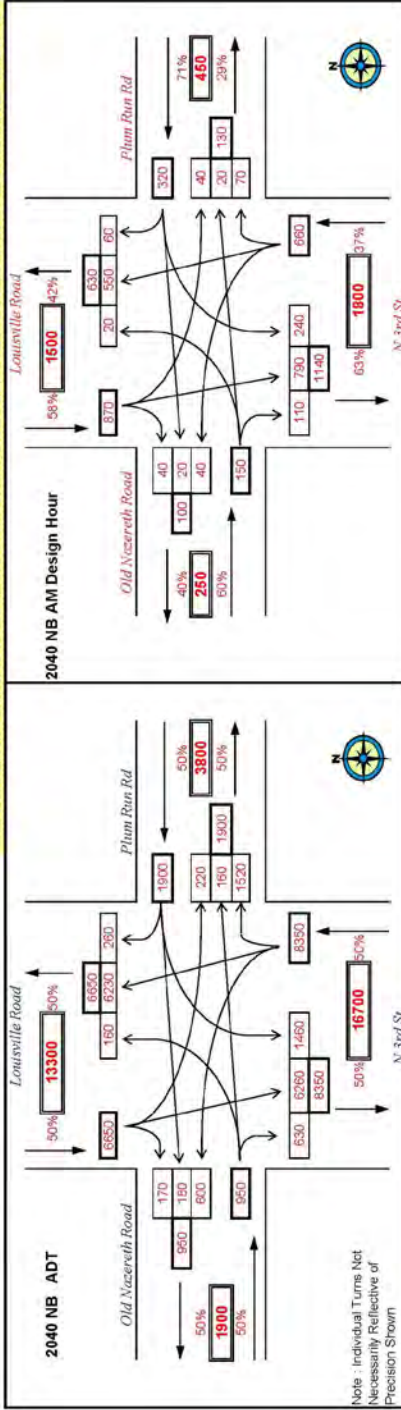
Traffic Forecast Technical Report
 Nelson County: Bardstown Connectivity Study
 Item No. 4-8809

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 NB
 INTERSECTION: US 31E @ KY 332

2040 NB ADT
 13300
 1900
 170
 960
 180
 600
 960
 650
 6268
 1460
 8350
 16700
 50%

TURN MOVEMENT 6 (2040)

**DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS

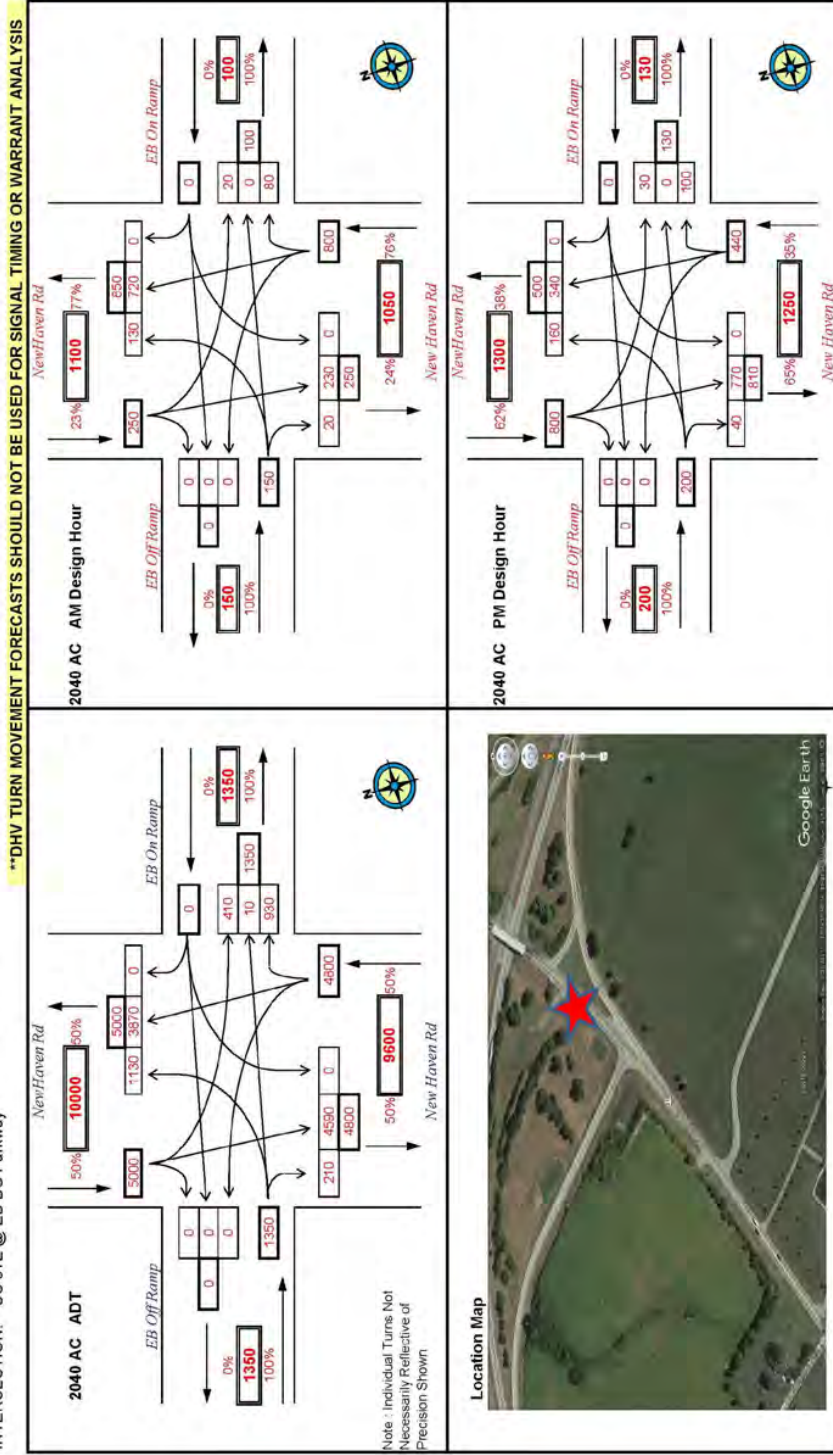


2040 AQUA CORRIDOR

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

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 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 AC
 ADT and Design Hour Volumes
 INTERSECTION: US 31E @ EB BG Parkway

TURN MOVEMENT 1 (2040)

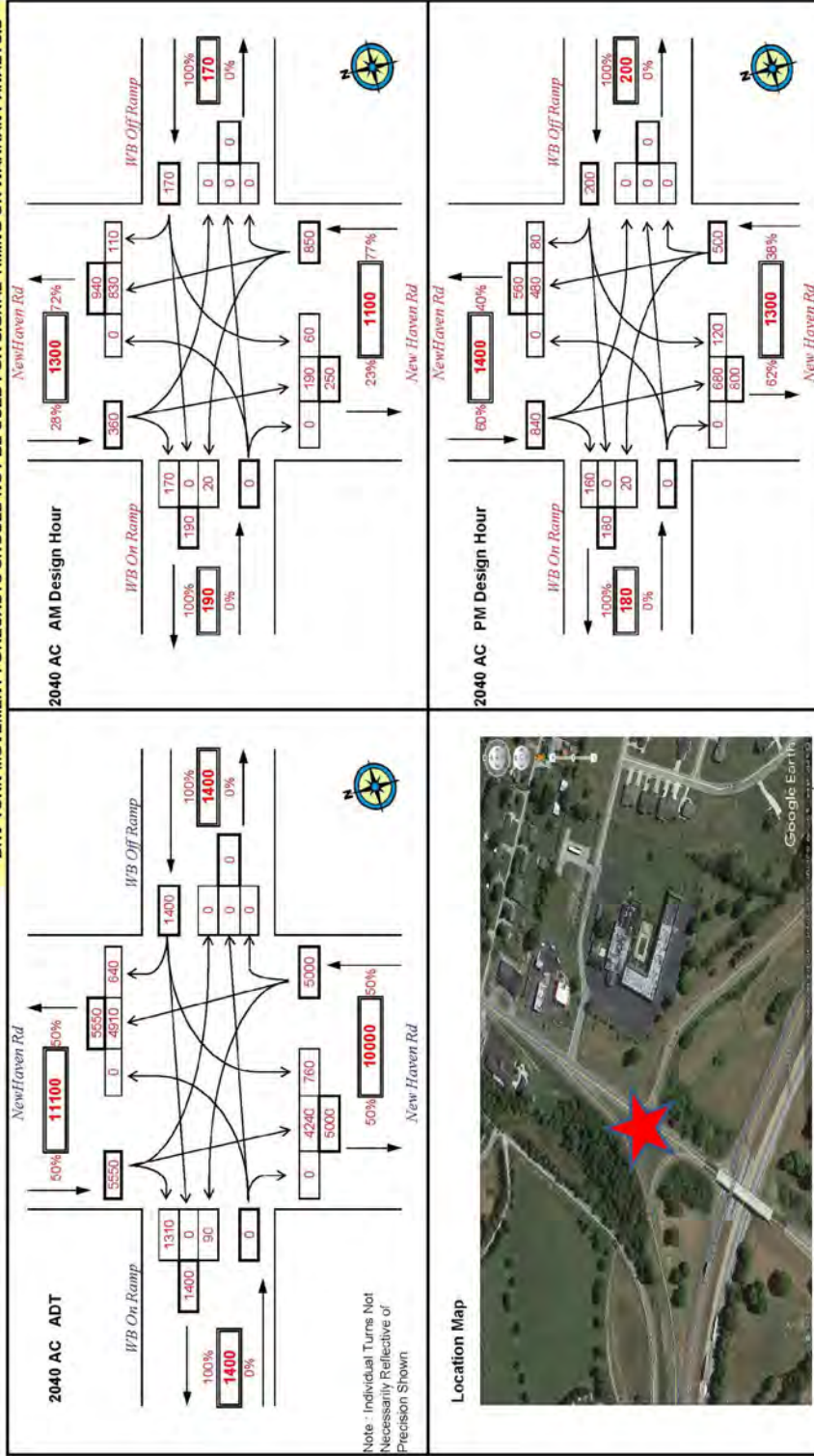


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 YEAR: 2040 AC
 INTERSECTION: US 31E @ WB BG Parkway

TURN MOVEMENT 2 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

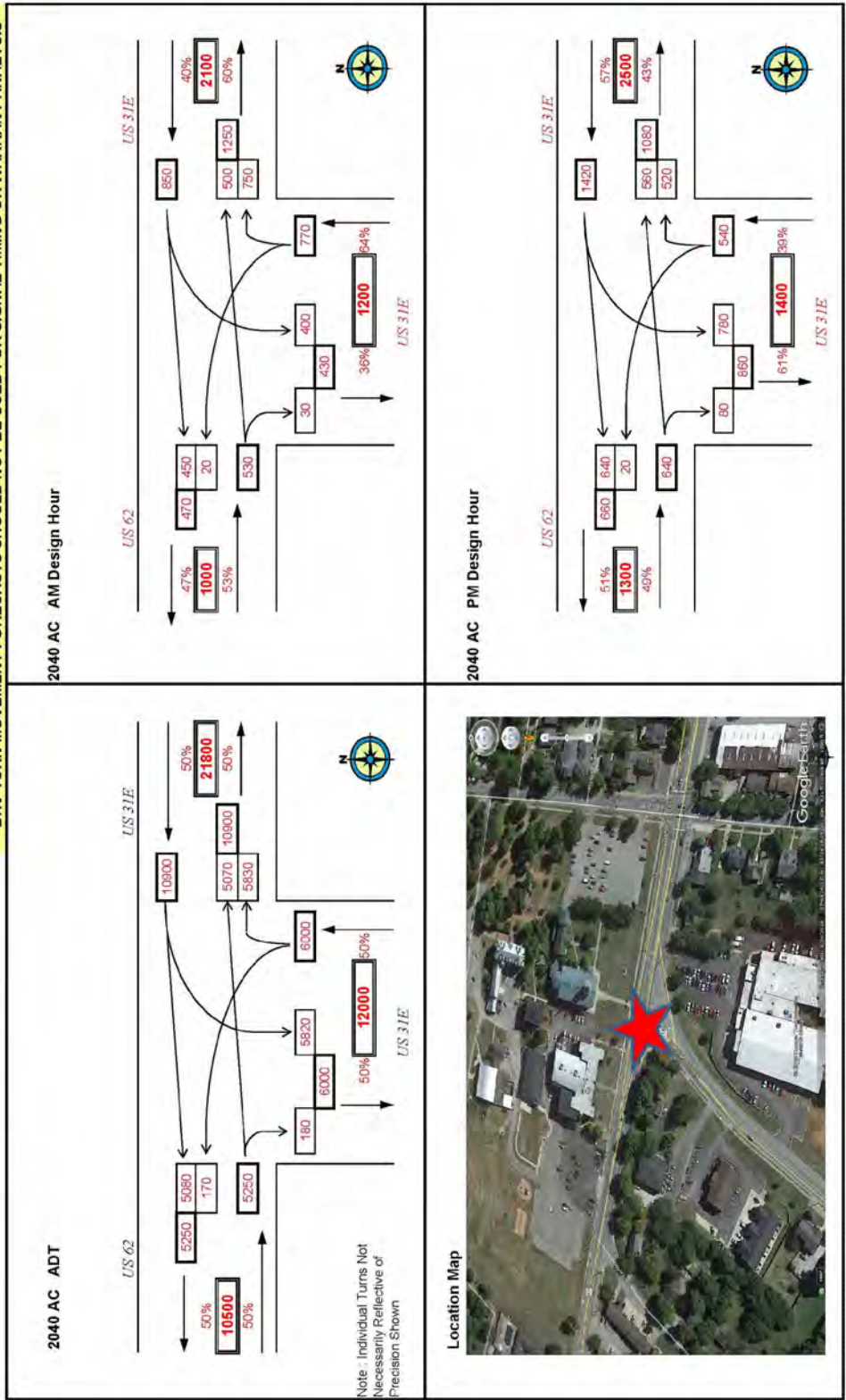


PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Balaji
 YEAR: 2040 AC ADT and Design Hour Volumes
 INTERSECTION: US 31E @ US 62

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 3 (2040)

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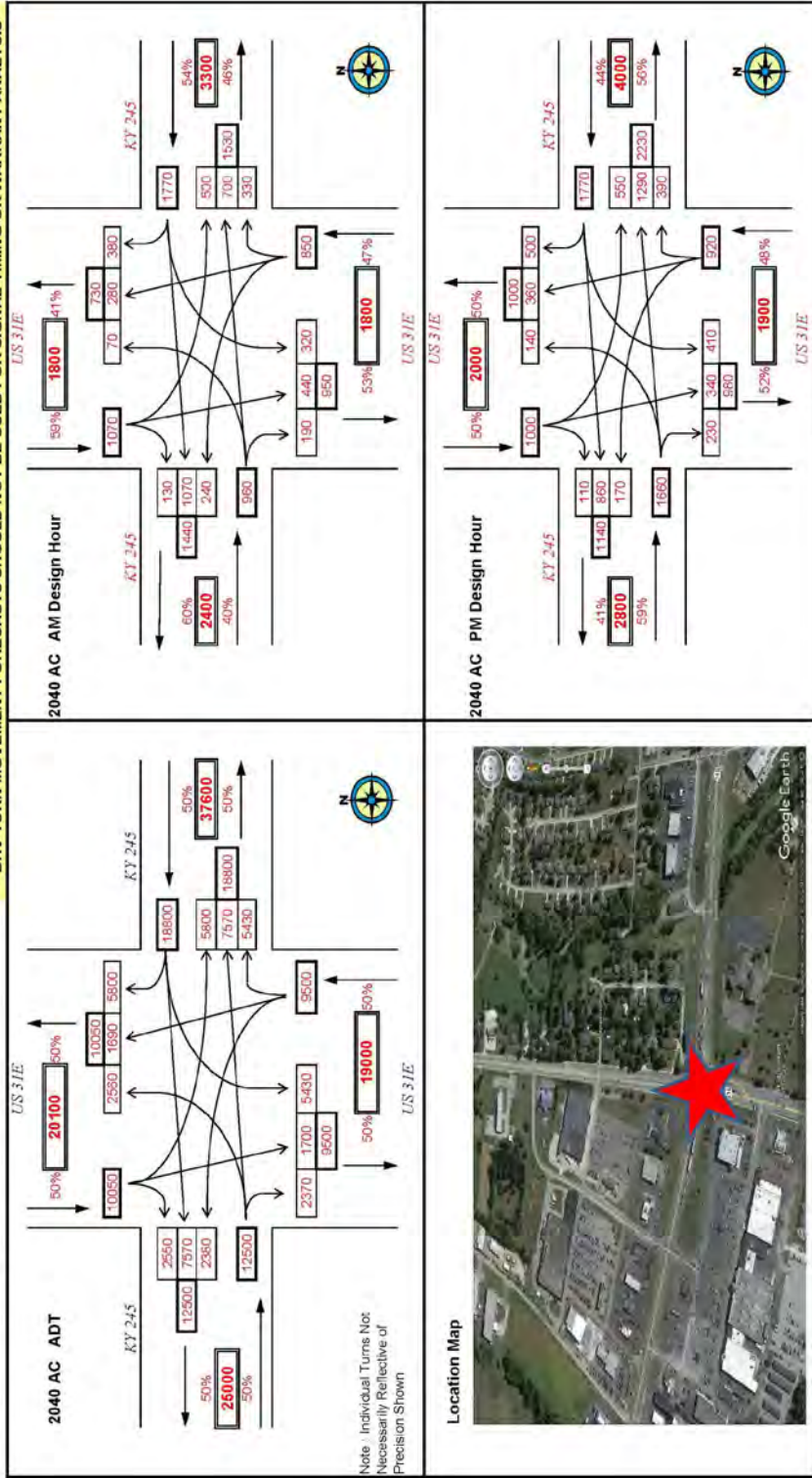


PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Balaji
 YEAR: 2040 AC ADT and Design Hour Volumes
 INTERSECTION: US 31E @ KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 4 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

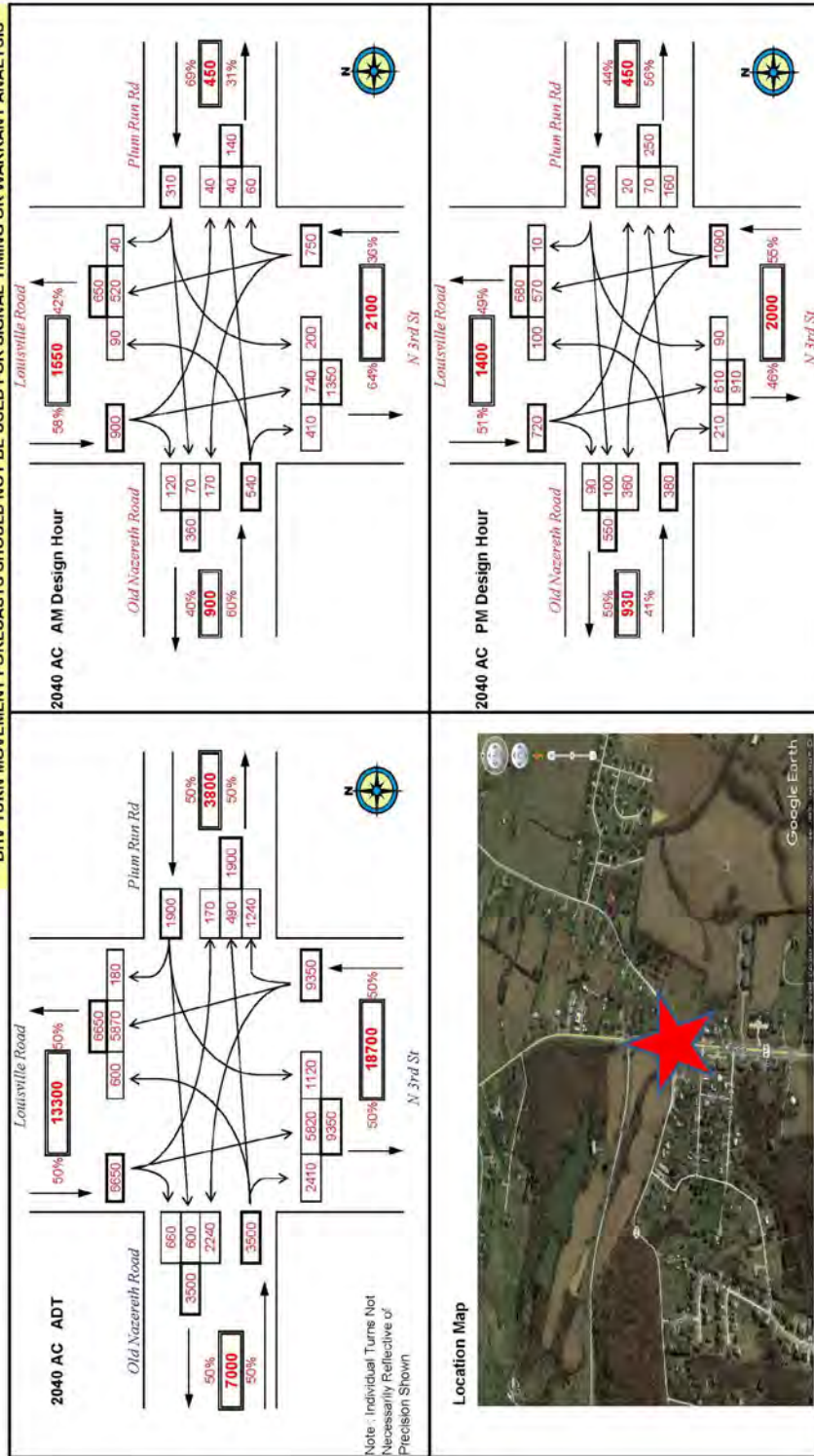


NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balajji
 YEAR: 2040 AC
 INTERSECTION: US 31E @ KY 332

TURN MOVEMENT 6 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



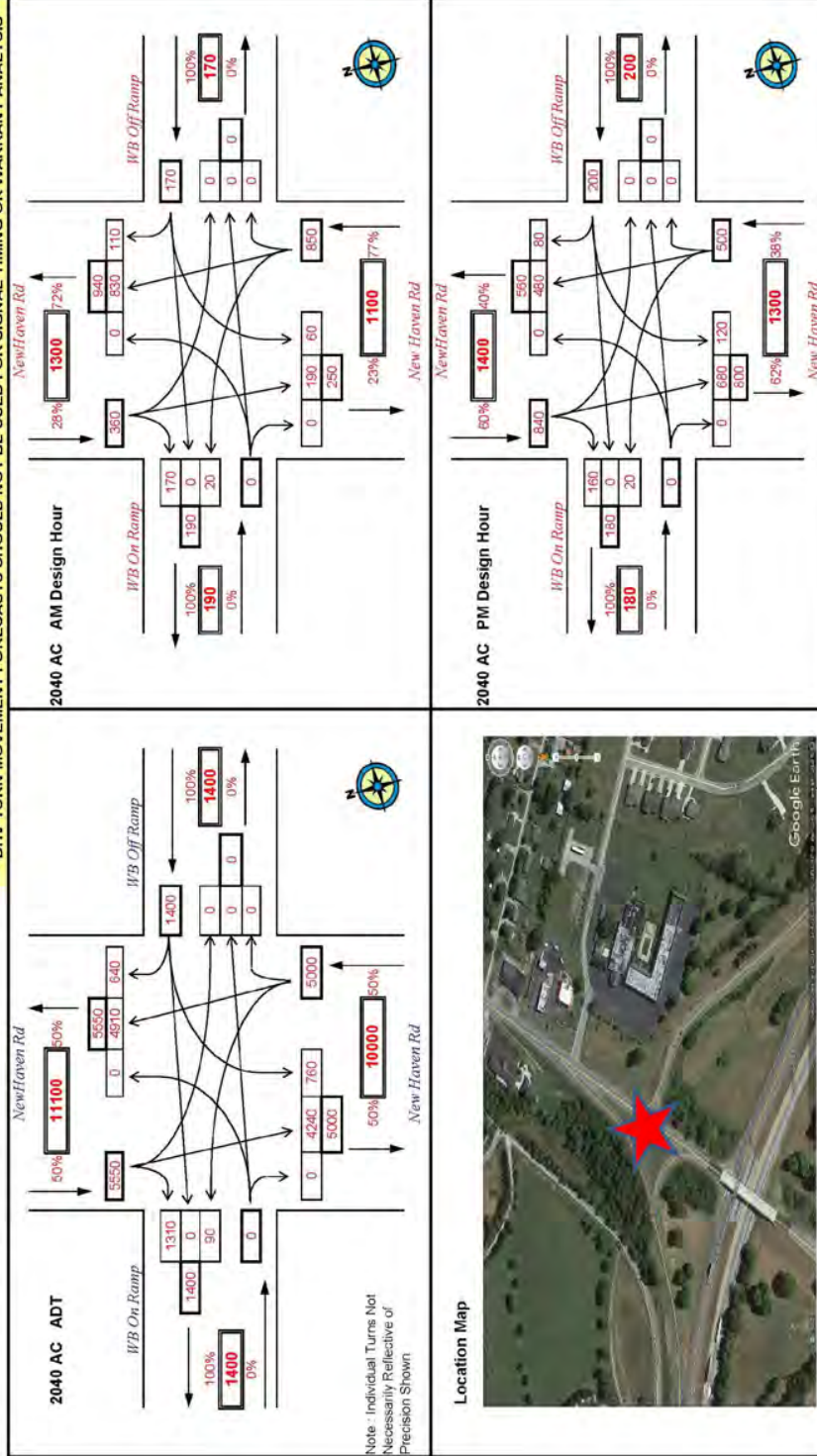
2040 ORANGE CORRIDOR

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PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Batajji
 YEAR: 2040 AC
 INTERSECTION: US 31E @ WB BG Parkway

TURN MOVEMENT 2 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

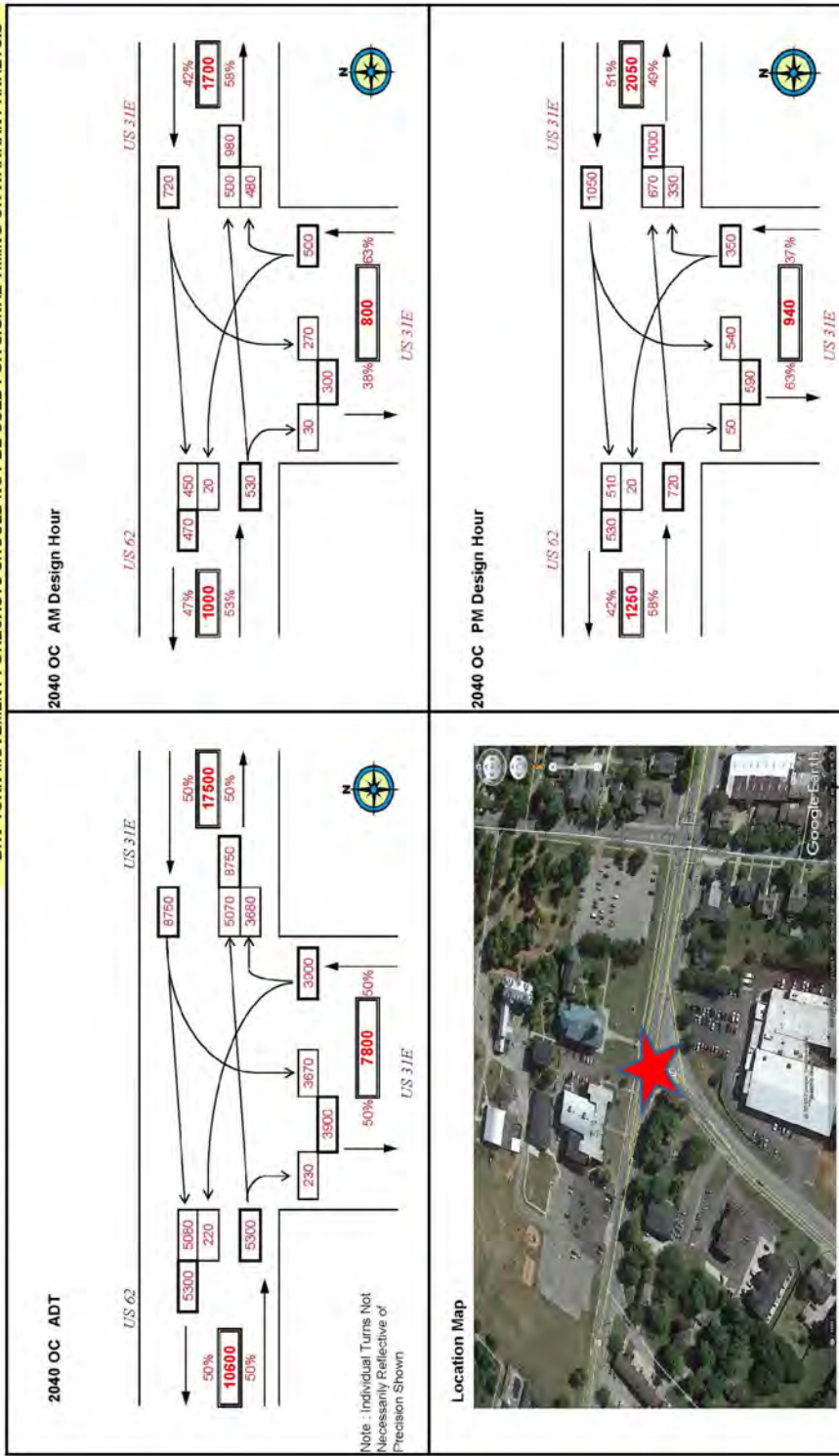


PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Balaji
 YEAR: 2040 OC ADT and Design Hour Volumes
 INTERSECTION: US 31E @ US 62

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 OC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 3 (2040)

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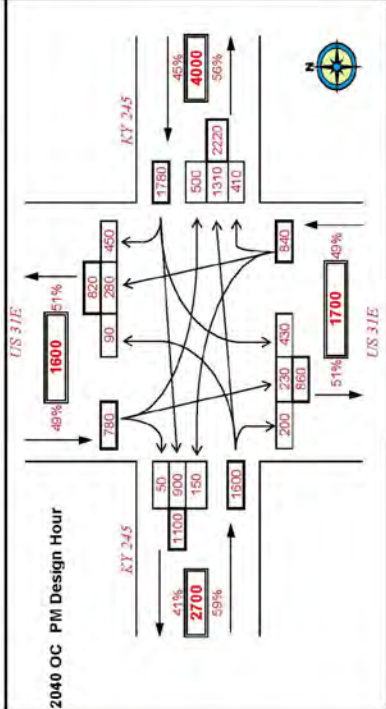
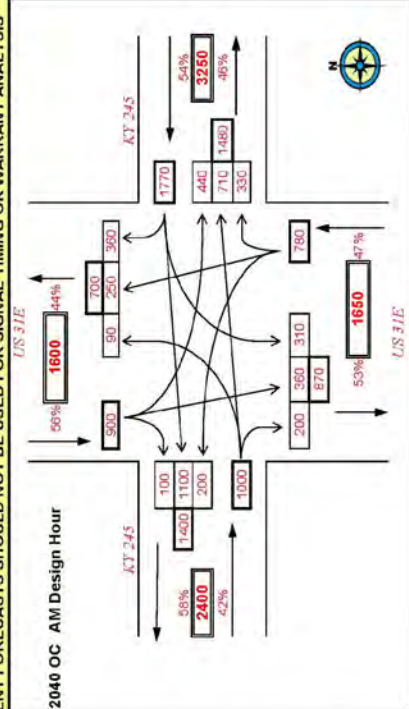
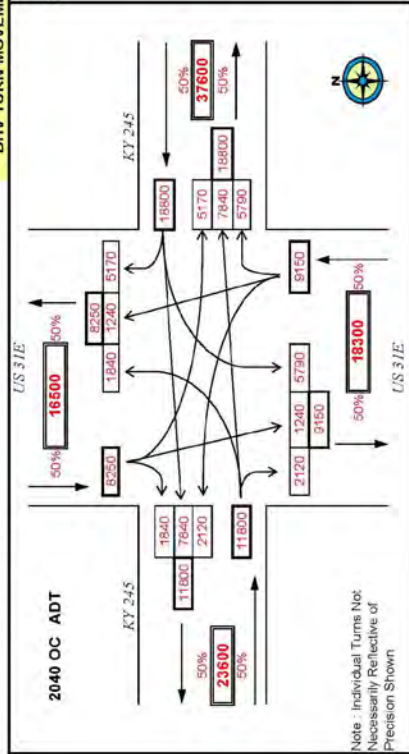


PROJECT: New Connector in Nelson County
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 ANALYST: Jay Balaji
 YEAR: 2040 OC
 INTERSECTION: US 31E @ KY 245

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 OC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 4 (2040)

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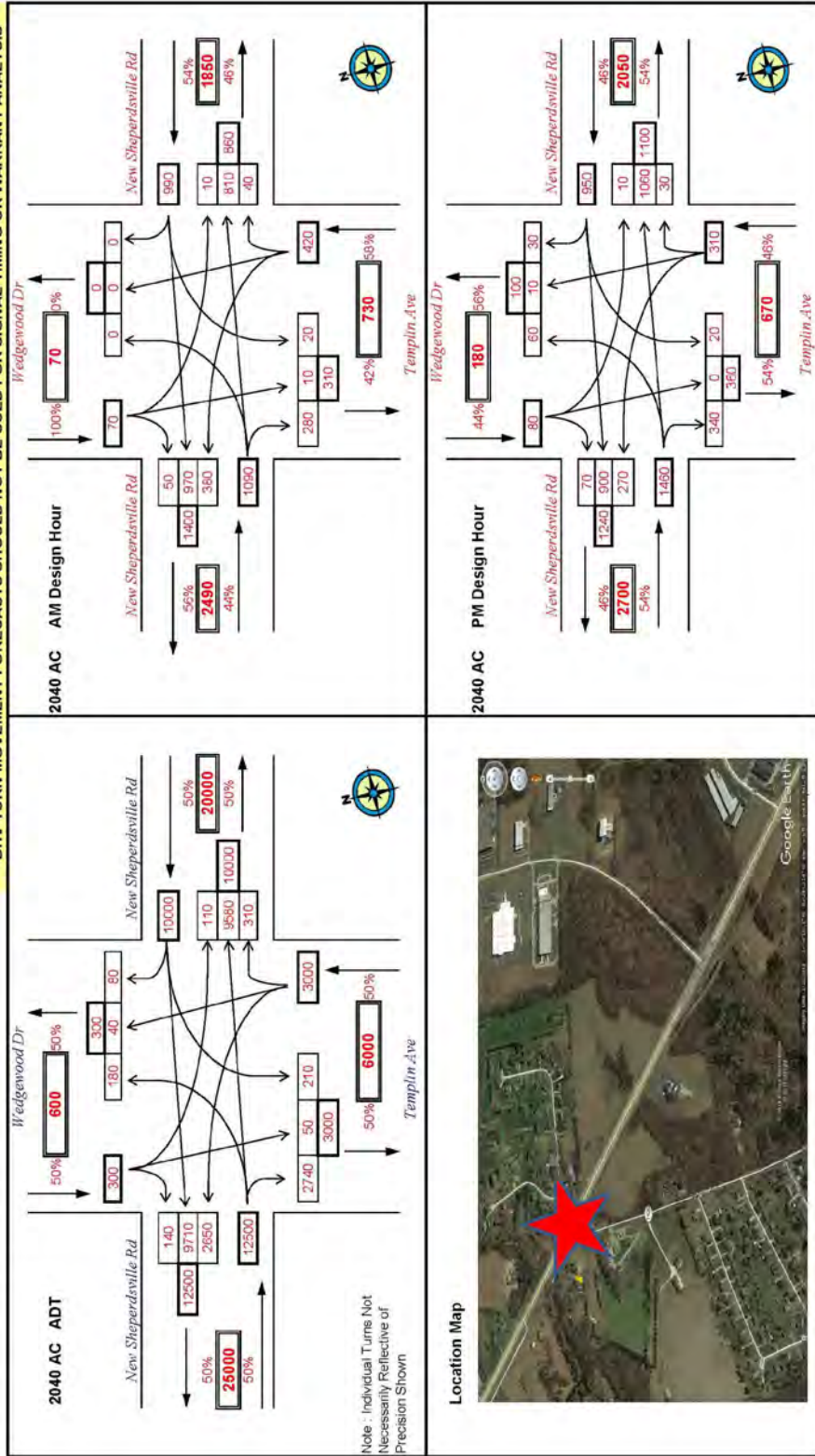


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 YEAR: 2040 AC
 INTERSECTION: KY 245 @ KY 1430

TURN MOVEMENT 5 (2040)

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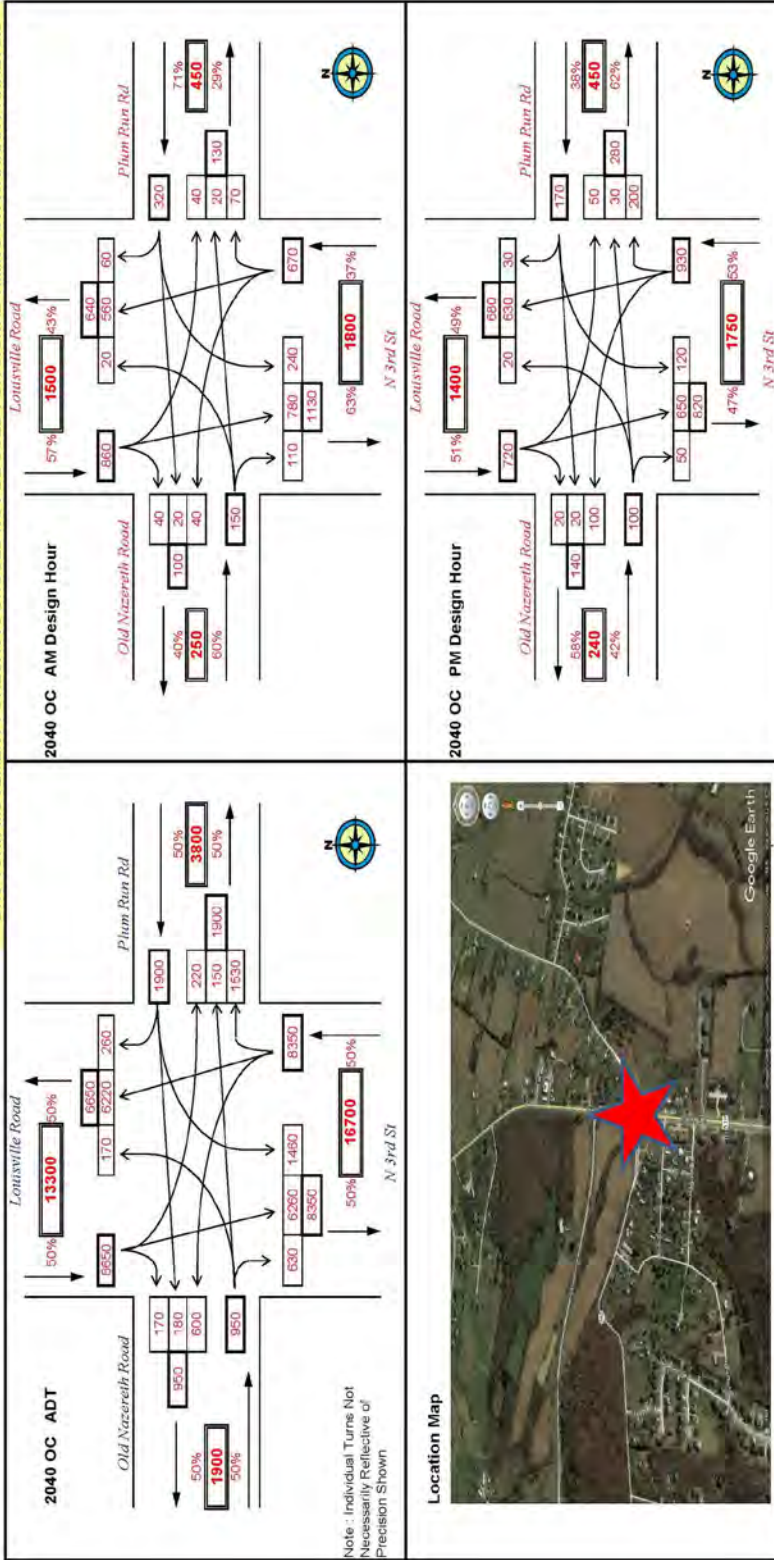


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PROJECT: New Bypass in Nelson County
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 ANALYST: Jay Balaji
 YEAR: 2040 OC
 INTERSECTION: US 31E @ KY 332

TURN MOVEMENT 6 (2040)

--DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS

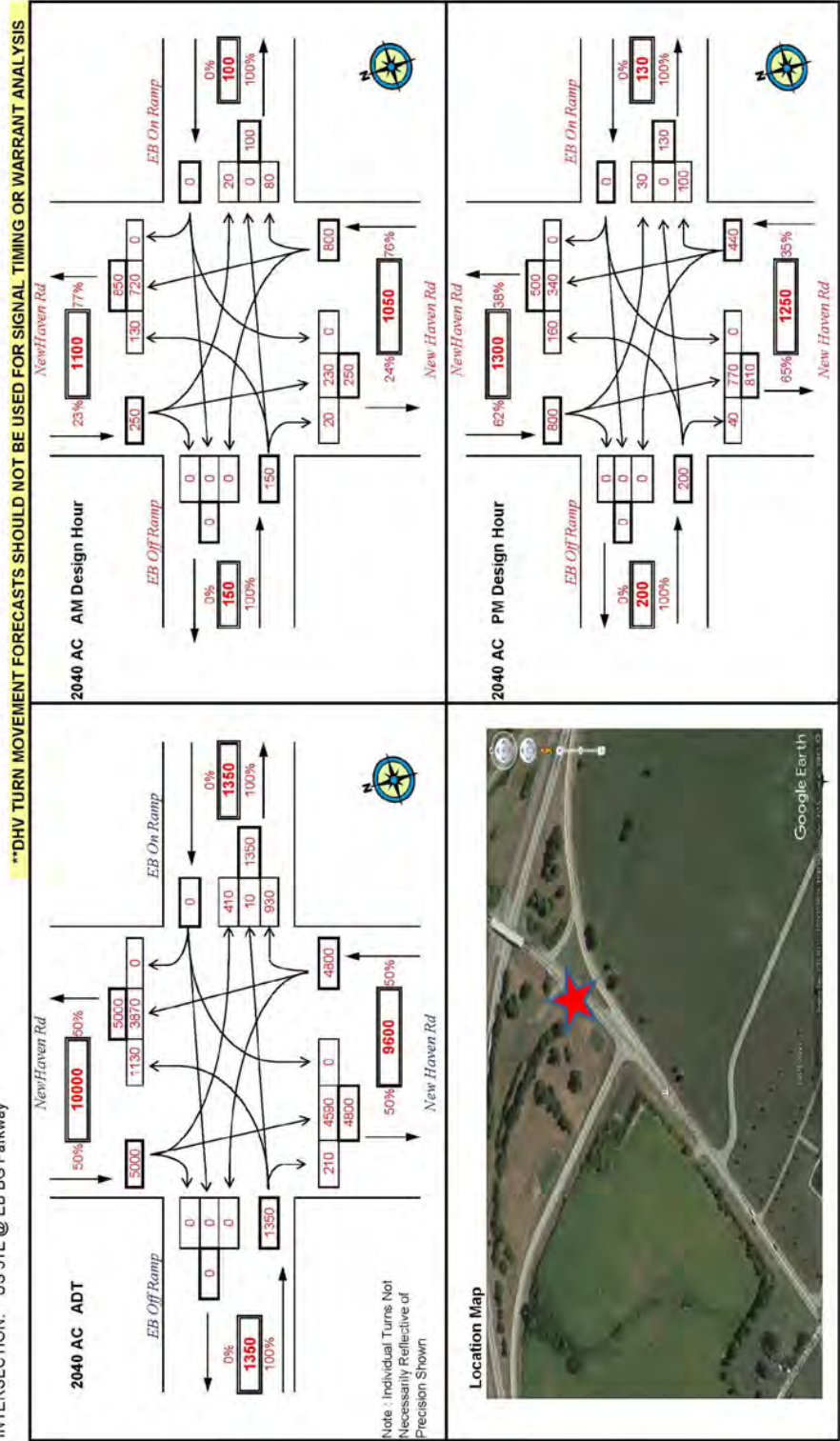


2040 PINK CORRIDOR

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 YEAR: 2040 AC
 INTERSECTION: US 31E @ EB BG Parkway

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

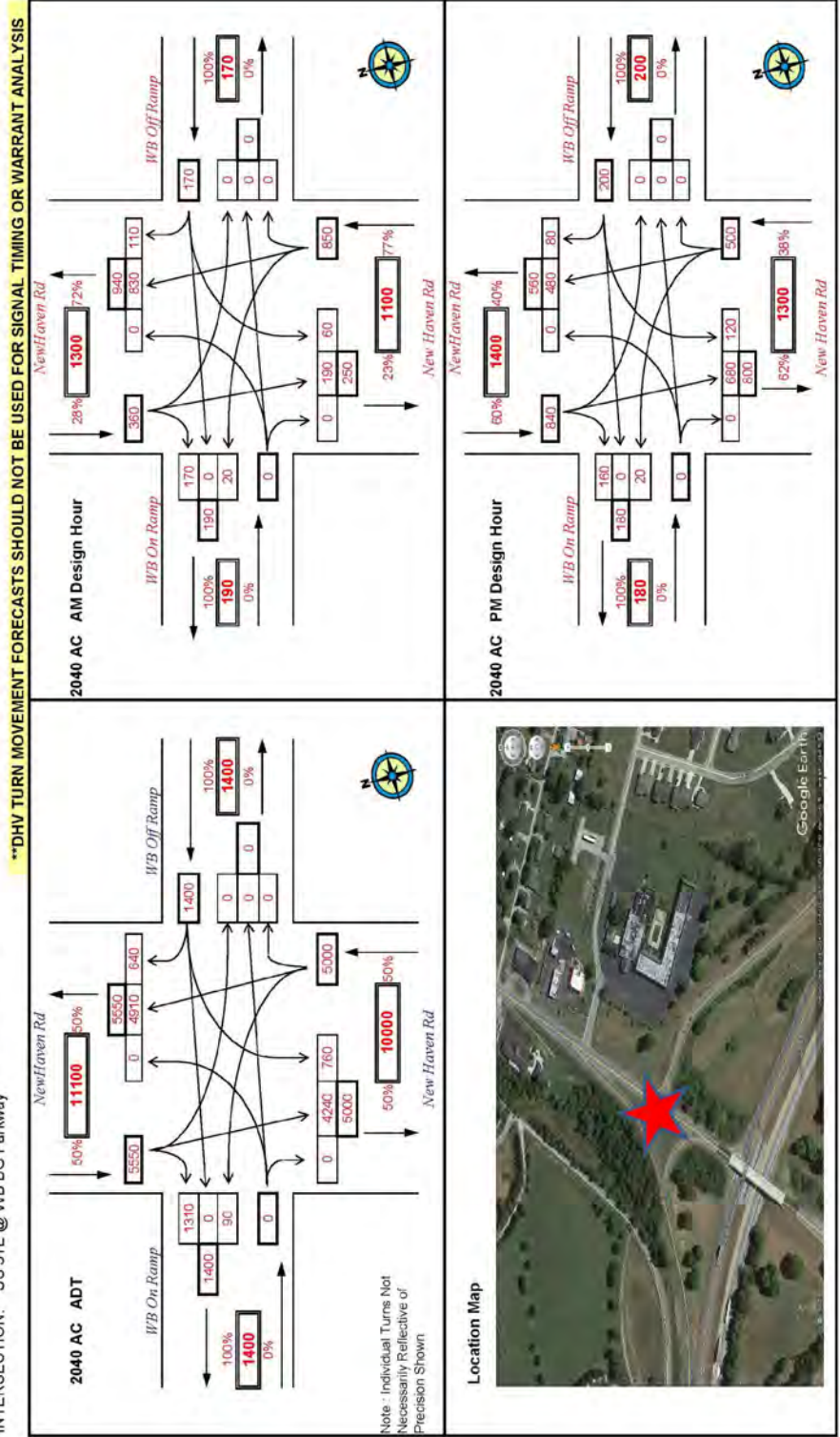
TURN MOVEMENT 1 (2040)



NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 AC
 INTERSECTION: US 31E @ WB BG Parkway

TURN MOVEMENT 2 (2040)

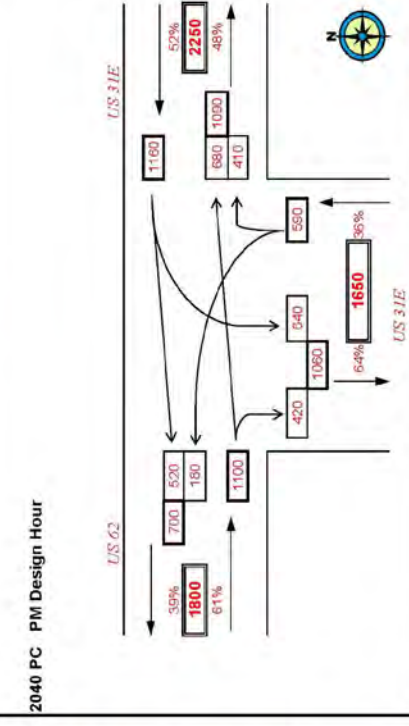
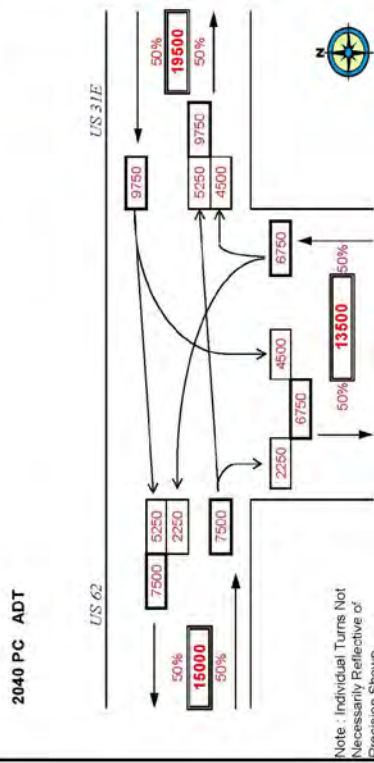
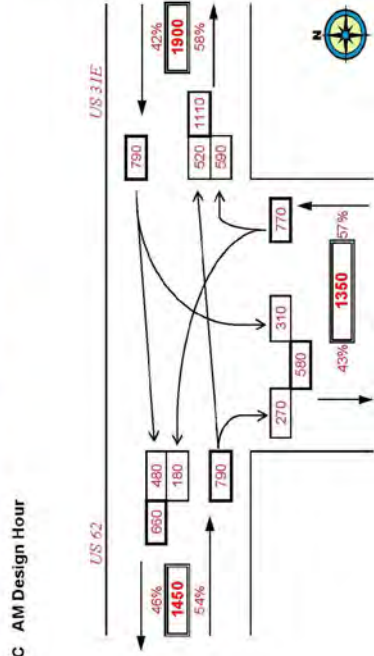


PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Balaji
 YEAR: 2040 PC
 INTERSECTION: US 31E @ US 62

2040 PC ADT
 2040 PC AM Design Hour
 2040 PC PM Design Hour

TURN MOVEMENT 3 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



Note: Individual Turns Not Necessarily Reflective of Precision Shown

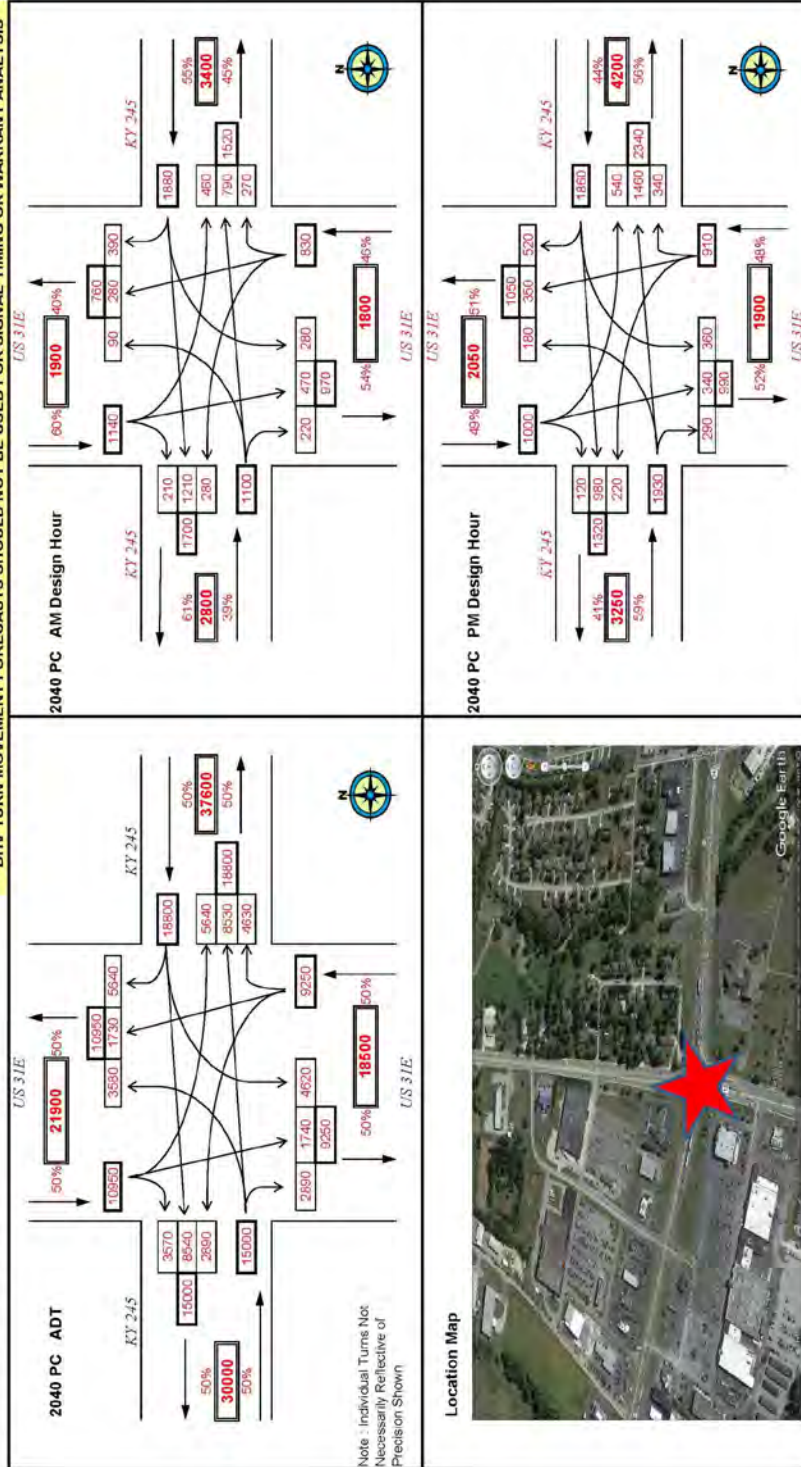
Traffic Forecast Technical Report
 Nelson County: Bardstown Connectivity Study
 Item No. 4-8809

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 PC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Balaji
 YEAR: 2040 PC
 INTERSECTION: US 31E @ KY 245

TURN MOVEMENT 4 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS****

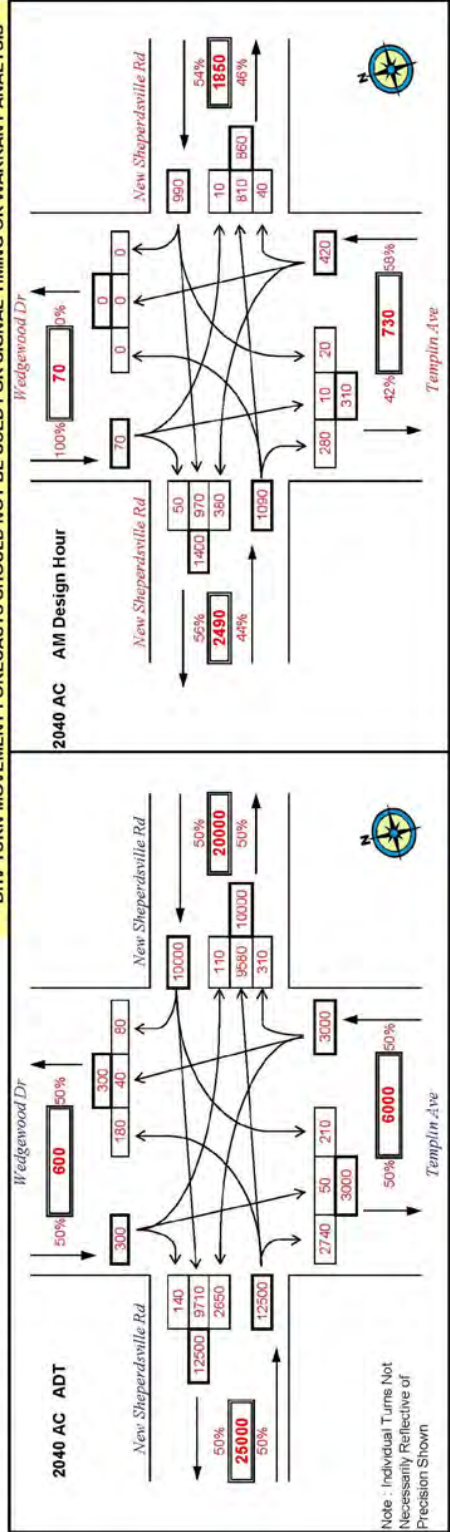


PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 AC
 INTERSECTION: KY 245 @ KY 1430

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 5 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



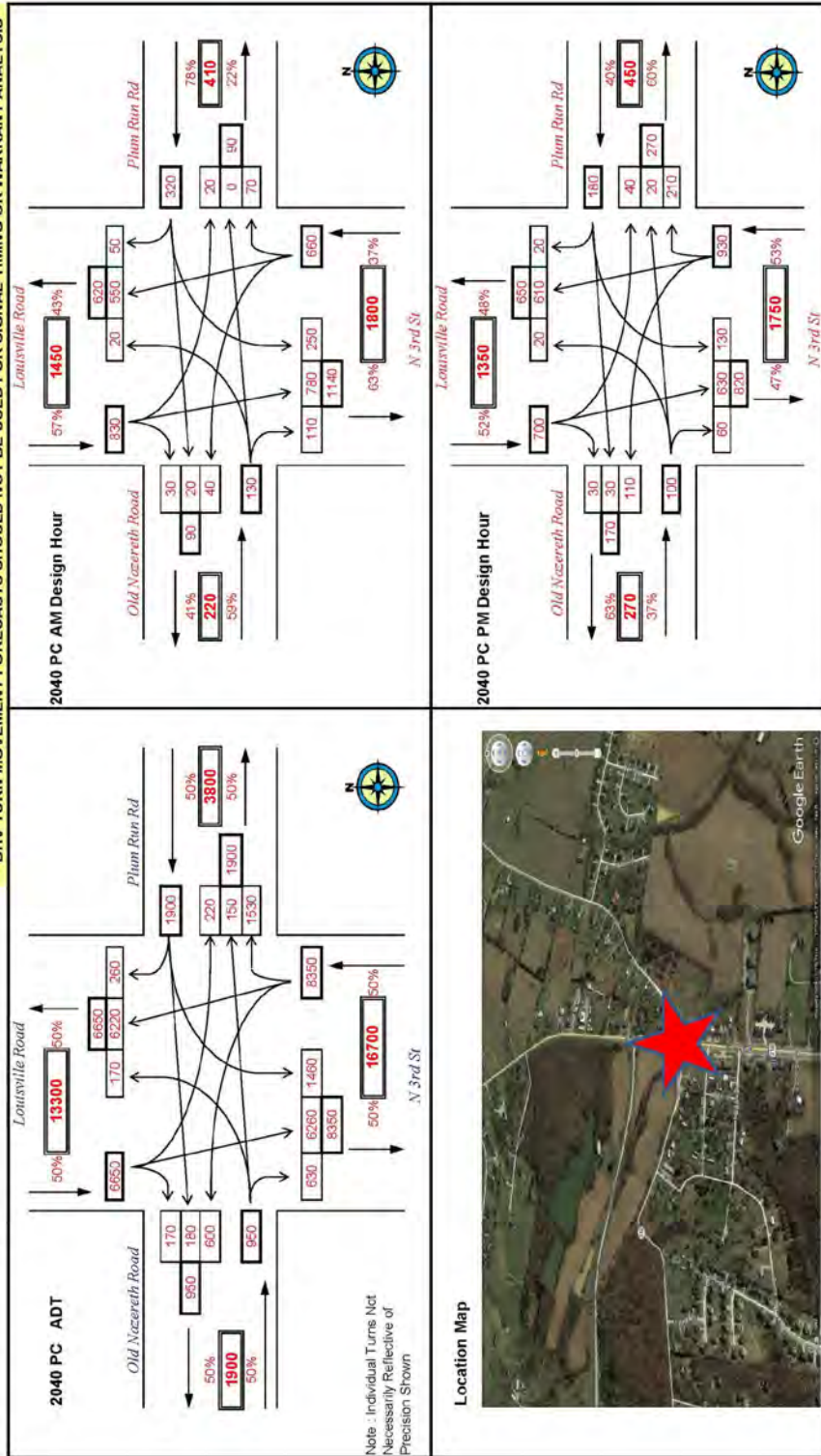
Note: Individual Turns Not Necessarily Reflective of Precision Shown

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 PC Turning Movement Count. AM and PM DHV's represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MAPS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 PC
 INTERSECTION: US 31E @ KY 332

TURN MOVEMENT 6 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



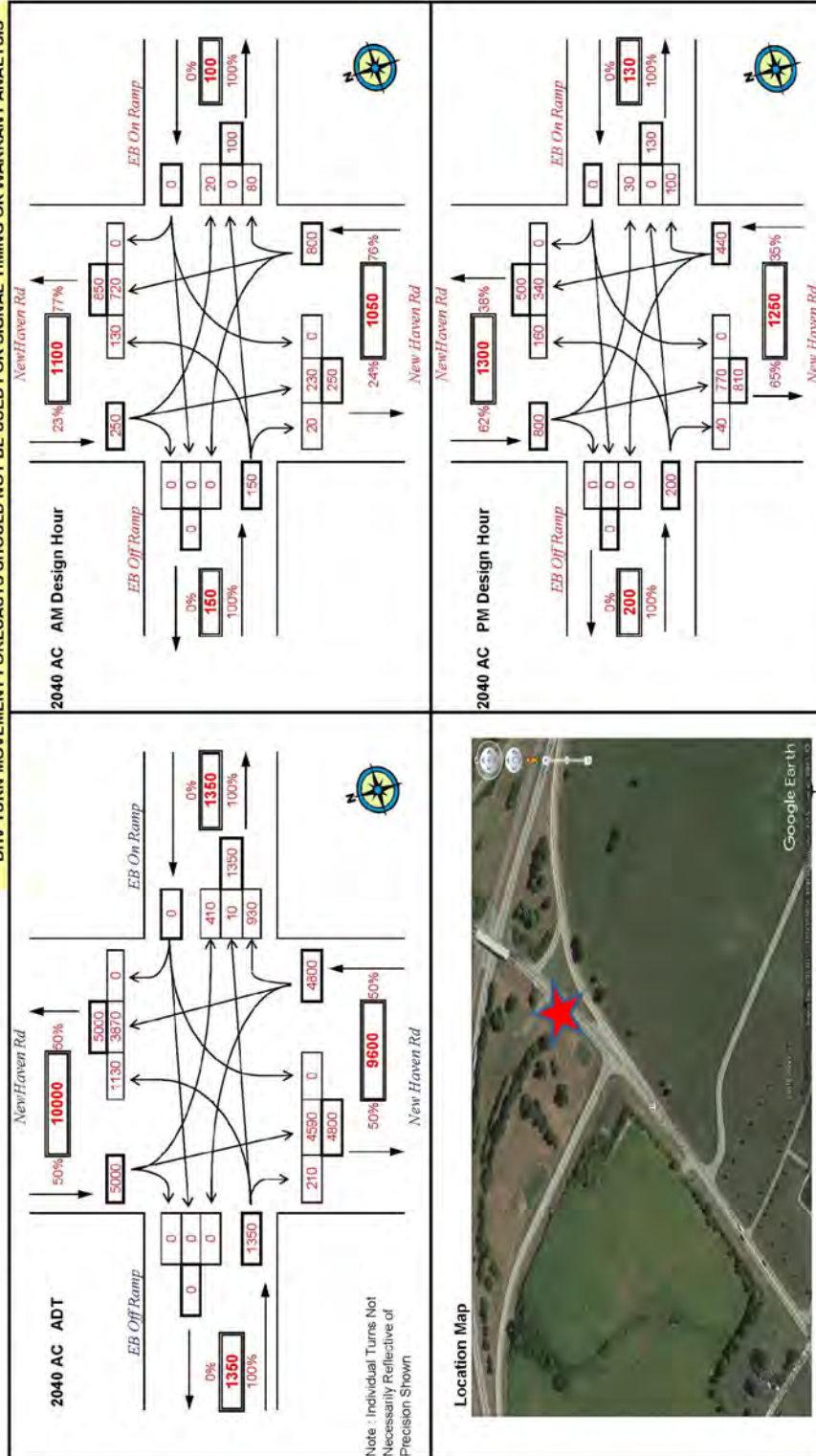
2040 YELLOW CORRIDOR

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Batalli
 YEAR: 2040 AC
 ADT and Design Hour Volumes
 INTERSECTION: US 31E @ EB BG Parkway

TURN MOVEMENT 1 (2040)

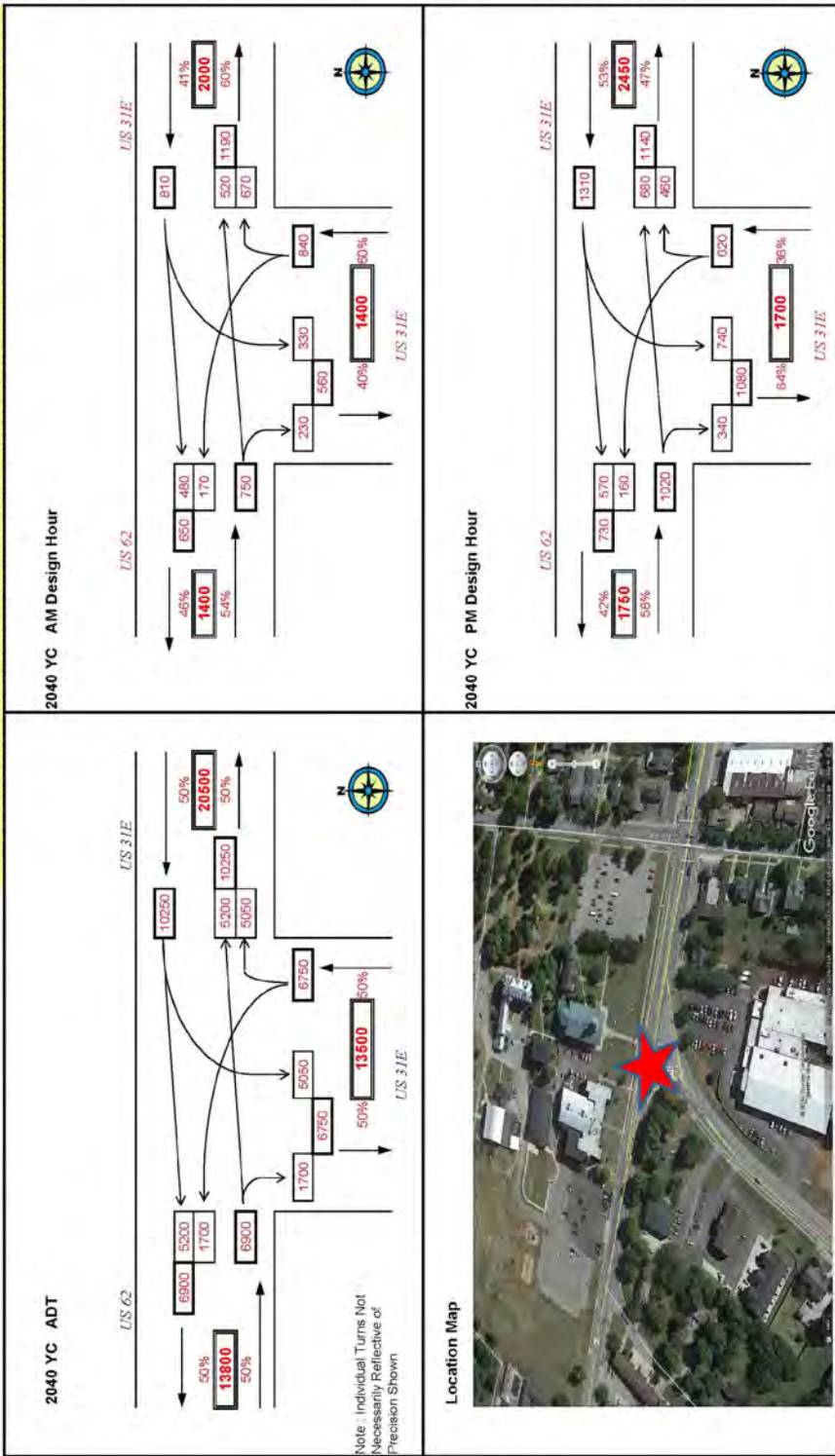
****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



PROJECT: New Connector in Nelson County
 ITEM NUMBER: 4-8809
 MARS NUMBER: 9278301D
 REQUEST DATE: Wednesday, March 28, 2018
 ANALYST: Jay Batall
 YEAR: 2040 YC ADT and Design Hour Volumes
 INTERSECTION: US 31E @ US 62

TURN MOVEMENT 3 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

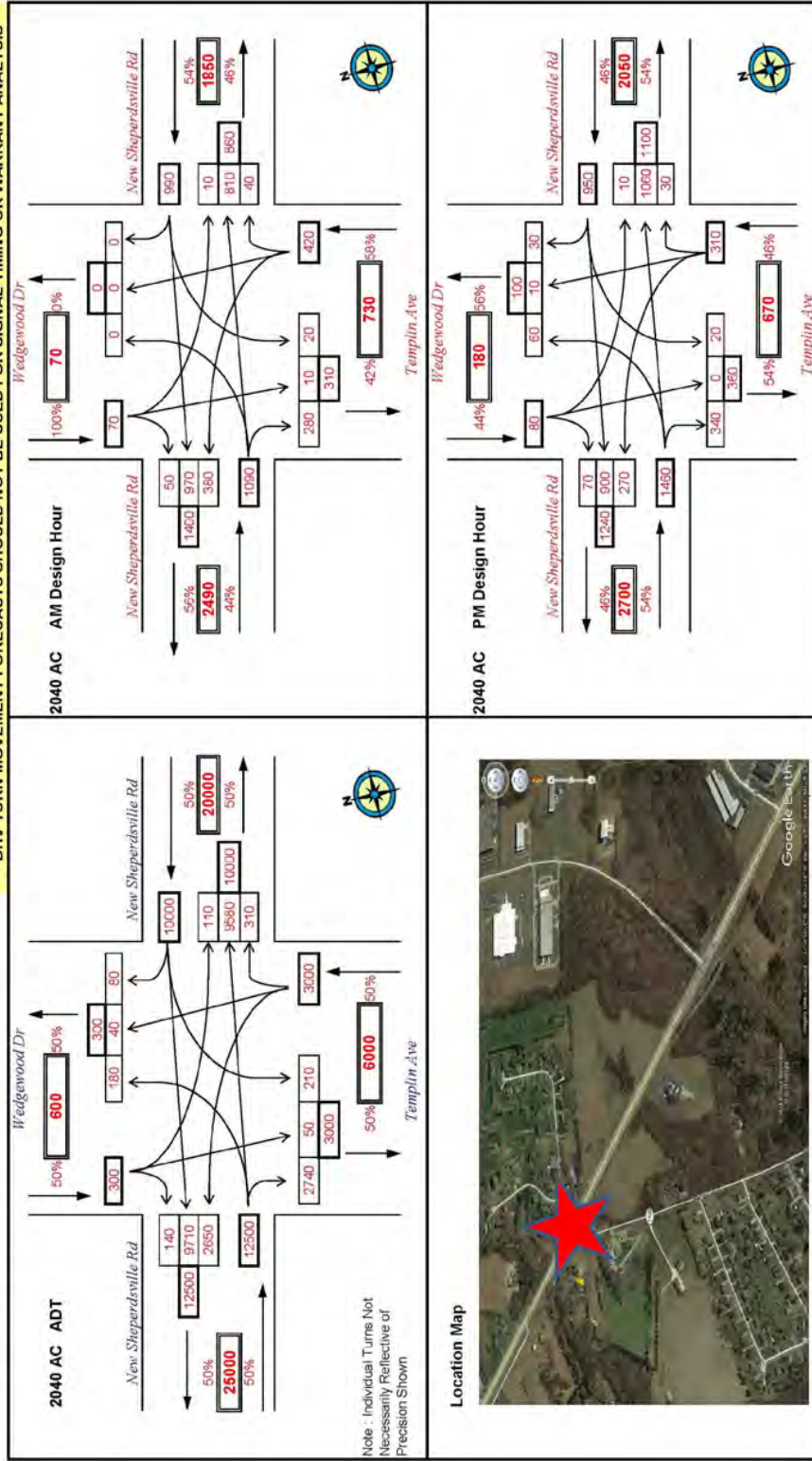


PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MAPS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 AC
 INTERSECTION: KY 245 @ KY 1430

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 AC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 5 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**

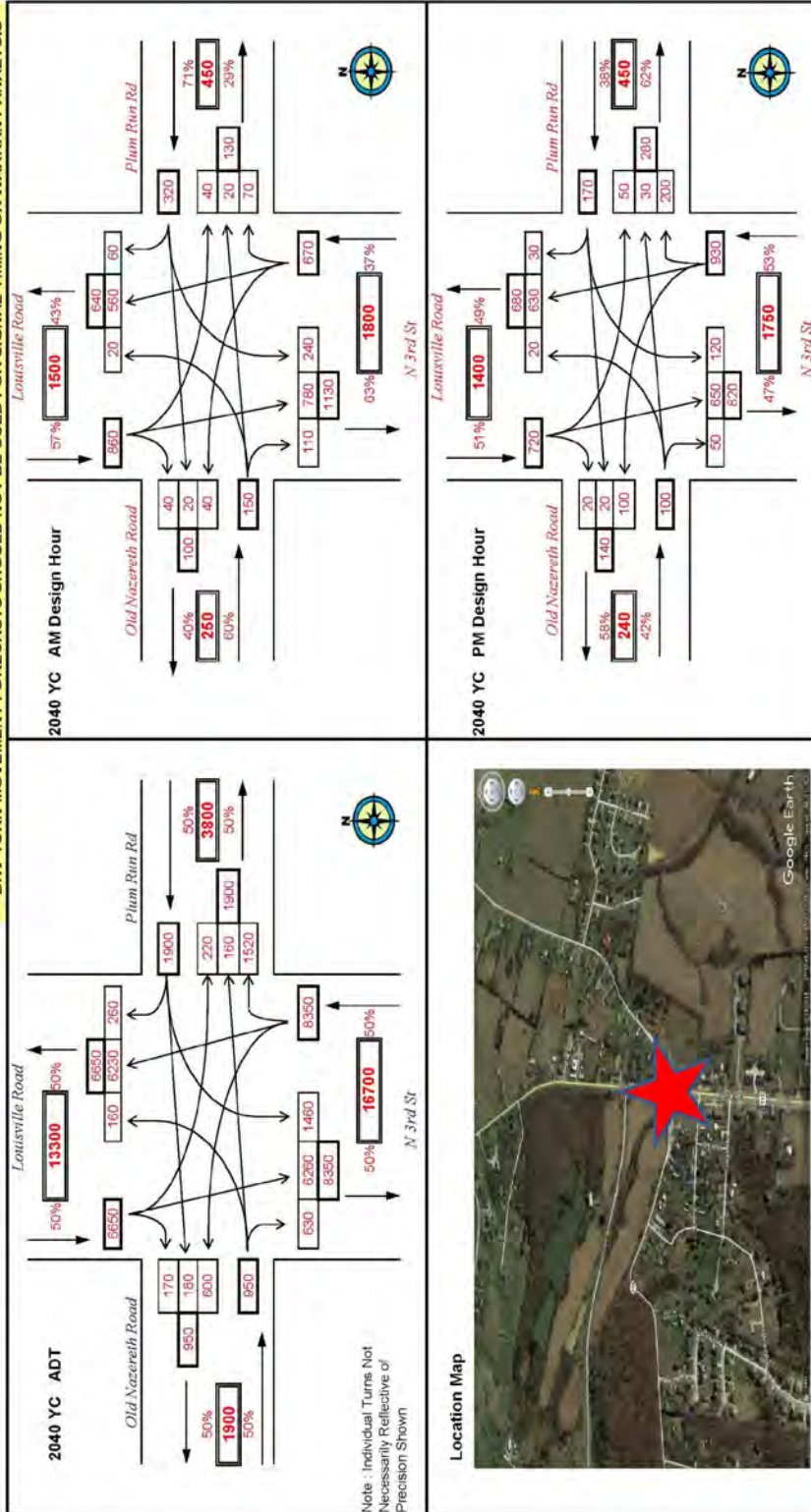


PROJECT: New Bypass in Nelson County
 ITEM NUMBER: 4-8809
 MARKS NUMBER: 9278301D
 REQUEST DATE: Tuesday, October 17, 2017
 ANALYST: Jay Balaji
 YEAR: 2040 YC
 INTERSECTION: US 31E @ KY 332

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2040 YC Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

TURN MOVEMENT 6 (2040)

****DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



PAVEMENT DESIGN

Pavement Design Factors for Bardstown New Route (Orange Corridor)			
Project information:			
Date of Forecast	11/30/2018		
Name of Forecaster	Jay Balaji		
Item Number	04-8809.00		
County name	Nelson		
County Number	90		
District	4		
Emars Number	9278301D		
Function	FD04		
Fund	1100		
Project Type	New Route		
Current Year	2018		
Letting Year	2019		
Construction Year	2020		
Project Description: Long Inner Bypass			
Truck Count and Truck Volume Information:			
Truck Count Station	HM TDM		
Truck Count Volume	800		
Truck Count year			
Truck Volume in Design Direction	440		
Truck Volume in Design Lane of Design Direction	440		
Current Year AADTT	800		
Design Year AADTT	1,100		
Distribution Factors for Functional Class:			
Daily Volume Distribution Factors by vehicle Class			
Vehicle Class	Truck Volume	Truck Percent	
Bus	46	5.74%	
2 axle, 6 tire single unit	5	118 14.80%	
3 axles single unit	6	20 2.56%	
4 or more axles, single unit	7	3 0.40%	
3-4 axles, single trailer	8	52 6.47%	
5 axles single trailer	9	520 65.03%	
6 or more axles, single trailer	10	10 1.30%	
5 or less axles, multi-trailer	11	20 2.52%	
6 axles, multi trailer	12	9 1.08%	
7 or more axles, multi-trailer	13	1 0.10%	
All Vehicle Classes	800	100.00%	
Coal Haul Information:			
Annual Coal Tonnage:			
Coal Trucks per day:			
Percentage of Trucks that are coal:			
Percentage of all vehicles that are coal:			
Route information:			
Route ID	090--0000 -000		
Road Name	New Route		
BMP	0		
EMP	0		
Functional Class	17 - Urban Collector		
Total Lanes (both ways)	2		
1 or 2 way	Two way		
Pavement Type	Asphalt		
Are Trucks Prohibited in a lane?	NO		
Volume Information:			
Volume ADT station	HM TDM		
Current year Volume	5,400		
Design Year Volume	7,500		
Truck % of ADT	14.8%		
FC Average Truck %			
% of Trucks in Design Direction	53.4%		
% of Trucks in Design Lane of Design Direction	100.0%		
Truck Volume Growth Rate	1.5%		
17 - Urban Collector			
Hourly Volume Distribution Factors			
0 12 AM to 1 AM	17	2.10%	
1 1 AM to 2 AM	15	1.82%	
2 2 AM to 3 AM	13	1.63%	
3 3 AM to 4 AM	14	1.76%	
4 4 AM to 5 AM	17	2.09%	
5 5 AM to 6 AM	22	2.72%	
6 6 AM to 7 AM	29	3.64%	
7 7 AM to 8 AM	37	4.67%	
8 8 AM to 9 AM	43	5.40%	
9 9 AM to 10 AM	49	6.09%	
10 10 AM to 11 AM	50	6.26%	
11 11 AM to 12 PM	51	6.40%	
12 12 PM to 1 PM	50	6.23%	
13 1 PM to 2 PM	49	6.13%	
14 2 PM to 3 PM	48	6.05%	
15 3 PM to 4 PM	47	5.88%	
16 4 PM to 5 PM	45	5.62%	
17 5 PM to 6 PM	41	5.10%	
18 6 PM to 7 PM	36	4.49%	
19 7 PM to 8 PM	32	3.98%	
20 8 PM to 9 PM	28	3.52%	
21 9 PM to 10 PM	25	3.17%	
22 10 PM to 11 PM	23	2.82%	
23 11 PM to 12 AM	19	2.41%	
ALL Hours	800	100.00%	



Pavement Design Factors for Bardstown New Route (Aqua Corridor)			
Project information:			
Date of Forecast	11/30/2018		
Name of Forecaster	Jay Balaji		
Item Number	04-8809.00		
County name	Nelson		
County Number	90		
District	4		
Emars Number	9278301D		
Function	FD04		
Fund	1100		
Project Type	New Route		
Current Year	2018		
Letting Year	2019		
Construction Year	2020		
Project Description: Long Outer Bypass			
Truck Count and Truck Volume Information:			
Truck Count Station	HM TDM		
Truck Count Volume	360		
Truck Count year			
Truck Volume in Design Direction	200		
Truck Volume in Design Lane of Design Direction	200		
Current Year AADTT	400		
Design Year AADTT	500		
Distribution Factors for Functional Class:			
Daily Volume Distribution Factors by vehicle Class			
Vehicle Class	Truck Volume	Truck Percent	
Bus	4	23	5.74%
2 axle, 6 tire single unit	5	59	14.80%
3 axles single unit	6	10	2.56%
4 or more axles, single unit	7	2	0.40%
3-4 axles, single trailer	8	26	6.47%
5 axles single trailer	9	260	65.03%
6 or more axles, single trailer	10	5	1.30%
5 or less axles, multi-trailer	11	10	2.52%
6 axles, multi trailer	12	4	1.08%
7 or more axles, multi-trailer	13	0	0.10%
All Vehicle Classes		400	100.00%
Coal Haul Information:			
Annual Coal Tonnage:			
Coal Trucks per day:			
Percentage of Trucks that are coal:			
Percentage of all vehicles that are coal:			
Route information:			
Route ID	090--0000 -000		
Road Name	New Route		
BMP	0		
EMP	0		
Functional Class	17 - Urban Collector		
Total Lanes (both ways)	2		
1 or 2 way	Two way		
Pavement Type	Asphalt		
Are Trucks Prohibited in a lane?	NO		
Volume Information:			
Volume ADT station	HM TDM		
Current year Volume	3,000		
Design Year Volume	4,200		
Truck % of ADT	12.0%		
FC Average Truck %			
% of Trucks in Design Direction	53.4%		
% of Trucks in Design Lane of Design Direction	100.0%		
Truck Volume Growth Rate	1.5%		
17 - Urban Collector			
Hourly Volume Distribution Factors			
0	12 AM to 1 AM	8	2.10%
1	1 AM to 2 AM	7	1.82%
2	2 AM to 3 AM	7	1.63%
3	3 AM to 4 AM	7	1.76%
4	4 AM to 5 AM	8	2.09%
5	5 AM to 6 AM	11	2.72%
6	6 AM to 7 AM	15	3.64%
7	7 AM to 8 AM	19	4.67%
8	8 AM to 9 AM	22	5.40%
9	9 AM to 10 AM	24	6.09%
10	10 AM to 11 AM	25	6.26%
11	11 AM to 12 PM	26	6.40%
12	12 PM to 1 PM	25	6.23%
13	1 PM to 2 PM	25	6.13%
14	2 PM to 3 PM	24	6.05%
15	3 PM to 4 PM	24	5.88%
16	4 PM to 5 PM	22	5.62%
17	5 PM to 6 PM	20	5.10%
18	6 PM to 7 PM	18	4.49%
19	7 PM to 8 PM	16	3.98%
20	8 PM to 9 PM	14	3.52%
21	9 PM to 10 PM	13	3.17%
22	10 PM to 11 PM	11	2.82%
23	11 PM to 12 AM	10	2.41%
	ALL Hours	400	100.00%



Pavement Design Factors for Bardstown New Route (Pink Corridor)			
Project information:			
Date of Forecast	11/30/2018		
Name of Forecaster	Jay Balaji		
Item Number	04-8809.00		
County name	Nelson		
County Number	90		
District	4		
Emars Number	9278301D		
Function	FD04		
Fund	1100		
Project Type	New Route		
Current Year	2018		
Letting Year	2019		
Construction Year	2020		
Project Description: Short Inner Bypass			
Truck Count and Truck Volume Information:			
Truck Count Station	HM TDM		
Truck Count Volume	470		
Truck Count year			
Truck Volume in Design Direction	260		
Truck Volume in Design Lane of Design Direction	260		
Current Year AADTT	500		
Design Year AADTT	650		
Distribution Factors for Functional Class:			
Daily Volume Distribution Factors by vehicle Class			
Vehicle Class	Truck Volume	Truck Percent	
Bus	4	29	5.74%
2 axle, 6 tire single unit	5	74	14.80%
3 axles single unit	6	13	2.56%
4 or more axles, single unit	7	2	0.40%
3-4 axles, single trailer	8	32	6.47%
5 axles single trailer	9	325	65.03%
6 or more axles, single trailer	10	6	1.30%
5 or less axles, multi-trailer	11	13	2.52%
6 axles, multi trailer	12	5	1.08%
7 or more axles, multi-trailer	13	1	0.10%
All Vehicle Classes		500	100.00%
Coal Haul Information:			
Annual Coal Tonnage:			
Coal Trucks per day:			
Percentage of Trucks that are coal:			
Percentage of all vehicles that are coal:			
Route information:			
Route ID	090--0000 -000		
Road Name	New Route		
BMP	0		
EMP	0		
Functional Class	17 - Urban Collector		
Total Lanes (both ways)	2		
1 or 2 way	Two way		
Pavement Type	Asphalt		
Are Trucks Prohibited in a lane?	NO		
Volume Information:			
Volume ADT station	HM TDM		
Current year Volume	3,700		
Design Year Volume	5,100		
Truck % of ADT	12.7%		
FC Average Truck %			
% of Trucks in Design Direction	53.4%		
% of Trucks in Design Lane of Design Direction	100.0%		
Truck Volume Growth Rate	1.5%		
17 - Urban Collector			
Hourly Volume Distribution Factors			
0	12 AM to 1 AM	10	2.10%
1	1 AM to 2 AM	9	1.82%
2	2 AM to 3 AM	8	1.63%
3	3 AM to 4 AM	9	1.76%
4	4 AM to 5 AM	10	2.09%
5	5 AM to 6 AM	14	2.72%
6	6 AM to 7 AM	18	3.64%
7	7 AM to 8 AM	23	4.67%
8	8 AM to 9 AM	27	5.40%
9	9 AM to 10 AM	30	6.09%
10	10 AM to 11 AM	31	6.26%
11	11 AM to 12 PM	32	6.40%
12	12 PM to 1 PM	31	6.23%
13	1 PM to 2 PM	31	6.13%
14	2 PM to 3 PM	30	6.05%
15	3 PM to 4 PM	29	5.88%
16	4 PM to 5 PM	28	5.62%
17	5 PM to 6 PM	25	5.10%
18	6 PM to 7 PM	22	4.49%
19	7 PM to 8 PM	20	3.98%
20	8 PM to 9 PM	18	3.52%
21	9 PM to 10 PM	16	3.17%
22	10 PM to 11 PM	14	2.82%
23	11 PM to 12 AM	12	2.41%
	ALL Hours	500	100.00%



Pavement Design Factors for Bardstown New Route (Yellow Corridor)			
Project information:			
Date of Forecast	11/30/2018		
Name of Forecaster	Jay Balaji		
Item Number	04-8809.00		
County name	Nelson		
County Number	90		
District	4		
Emars Number	9278301D		
Function	FD04		
Fund	1100		
Project Type	New Route		
Current Year	2018		
Letting Year	2019		
Construction Year	2020		
Project Description: Short Outer Bypass			
Truck Count and Truck Volume Information:			
Truck Count Station	HM TDM		
Truck Count Volume	290		
Truck Count year			
Truck Volume in Design Direction	160		
Truck Volume in Design Lane of Design Direction	160		
Current Year AADTT	300		
Design Year AADTT	400		
Distribution Factors for Functional Class:			
Daily Volume Distribution Factors by vehicle Class			
Vehicle Class	Truck Volume	Truck Percent	
Bus	4	17	5.74%
2 axle, 6 tire single unit	5	44	14.80%
3 axles single unit	6	8	2.56%
4 or more axles, single unit	7	1	0.40%
3-4 axles, single trailer	8	19	6.47%
5 axles single trailer	9	195	65.03%
6 or more axles, single trailer	10	4	1.30%
5 or less axles, multi-trailer	11	8	2.52%
6 axles, multi trailer	12	3	1.08%
7 or more axles, multi-trailer	13	0	0.10%
All Vehicle Classes		300	100.00%
Coal Haul Information:			
Annual Coal Tonnage:			
Coal Trucks per day:			
Percentage of Trucks that are coal:			
Percentage of all vehicles that are coal:			
Route information:			
Route ID	090--0000 -000		
Road Name	New Route		
BMP	0		
EMP	0		
Functional Class	17 - Urban Collector		
Total Lanes (both ways)	2		
1 or 2 way	Two way		
Pavement Type	Asphalt		
Are Trucks Prohibited in a lane?	NO		
Volume Information:			
Volume ADT station	HM TDM		
Current year Volume	2,300		
Design Year Volume	3,200		
Truck % of ADT	12.6%		
FC Average Truck %			
% of Trucks in Design Direction	53.4%		
% of Trucks in Design Lane of Design Direction	100.0%		
Truck Volume Growth Rate	1.5%		
17 - Urban Collector			
Hourly Volume Distribution Factors			
0	12 AM to 1 AM	6	2.10%
1	1 AM to 2 AM	5	1.82%
2	2 AM to 3 AM	5	1.63%
3	3 AM to 4 AM	5	1.76%
4	4 AM to 5 AM	6	2.09%
5	5 AM to 6 AM	8	2.72%
6	6 AM to 7 AM	11	3.64%
7	7 AM to 8 AM	14	4.67%
8	8 AM to 9 AM	16	5.40%
9	9 AM to 10 AM	18	6.09%
10	10 AM to 11 AM	19	6.26%
11	11 AM to 12 PM	19	6.40%
12	12 PM to 1 PM	19	6.23%
13	1 PM to 2 PM	18	6.13%
14	2 PM to 3 PM	18	6.05%
15	3 PM to 4 PM	18	5.88%
16	4 PM to 5 PM	17	5.62%
17	5 PM to 6 PM	15	5.10%
18	6 PM to 7 PM	13	4.49%
19	7 PM to 8 PM	12	3.98%
20	8 PM to 9 PM	11	3.52%
21	9 PM to 10 PM	10	3.17%
22	10 PM to 11 PM	8	2.82%
23	11 PM to 12 AM	7	2.41%
	ALL Hours	300	100.00%

