

KY 177 Corridor Study  
Pendleton County | Item No. 6-80258

# Traffic Forecast Report

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July 2024

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## 1.0 PROJECT DESCRIPTION

This traffic forecast report has been prepared by Qk4 for the Kentucky Transportation Cabinet (KYTC) to analyze existing conditions and proposed future traffic to identify options for improving mobility and accessibility in northern Pendleton County. Traffic impacts are evaluated for base year (2023) and future year (2045).

The study area, shown in **Figure 1**, encompasses the community of Butler in Pendleton County. KY 177 provides access between the community and US 27. Regionally, the corridor represents the sole east-west connection over a roughly 15-mile stretch in the highway network. Paired with KY 17, KY 14, and US 25, the KY 177 corridor near Butler provides a two-lane, 19-mile linkage between US 27 and I-75 near Crittenden. The nearest Licking River crossings are north of Falmouth—following KY 22 (minor arterial) towards Williamstown—or at Alexandria via KY 536 (major collector). Two features constrain freight mobility through Butler: a low clearance tunnel beneath railroad tracks and a weight-posted truss over the Licking River (096B00001N).

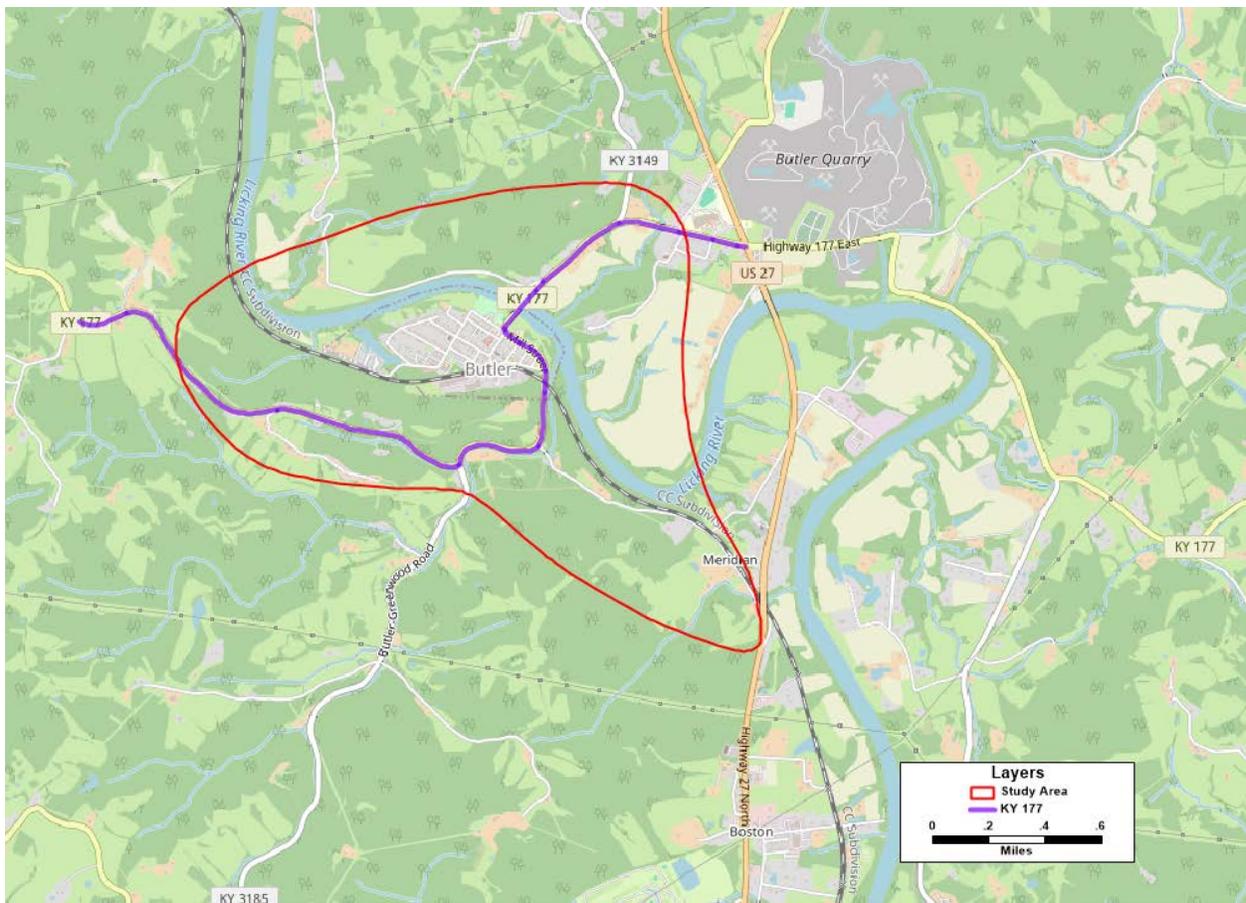


Figure 1: Study Area

To project future year traffic forecasts, the latest statewide model (KYSTMv19, 6003 zones) was applied. A model base year of 2021 served as the existing baseline scenario with a future year forecast of 2045. The KSYTM model runs in TransCAD 8.0 and is a 24-hour model providing daily volume projections. The following sections summarize traffic data collection and forecasting procedures.

### 1.1 TRAFFIC COUNTS

Historic traffic count data between 2003 and 2023 were retrieved from the KYTC traffic counts database for eight locations. Two irregular counts for 2003 ADTs were omitted from analysis at station 096802 and 096757. A list of stations and their most recent count are provided in **Table 1**. Count station data for all analyzed stations are plotted in **Figure 3** for state routes and **Figure 4** for US 27. Overall, trendlines for these stations are flat. Some volume fluctuations are observed around the 2020 count year and are assumed to have been influenced by the pandemic.

Table 1: Study Area Count Stations

Station	Route	Location	Year	AADT	K	D	T%
096803	KY 177	East of KY 467	2022	1101	10.8	58	-
096802	KY 177	West of Butler	2021	1346	10.0	52	13.6
096762	KY 177	North of Butler	2020	2847	9.9	56	-
096758	KY 177	East of US 27	2021	2789	9.2	57	-
096797	KY 3185	South of KY 177	2022	231	12.1	58	-
096760	KY 3149	North of KY 177	2020	280	10.4	58	-
096757	US 27	South of KY 177	2022	6161	10.0	59	11.9
096756	US 27	North of KY 177	2020	6472	9.7	56	-

Video-based peak period turning movement counts were collected at 3 locations along KY 177: US 27, Mill Street, and South Street. Five hours of data were collected at each intersection: 7-9 AM for the morning peak and 3-6 PM for the evening peak. These videos were processed to count and classify vehicles into five categories: motorcycles, cars & light good vehicles, buses, single unit trucks, and articulated trucks. Pedestrians and on-street cyclists were also identified when applicable. The selected count stations and turning movement locations are mapped in **Figure 2** with raw turning movement count data presented in **Appendix A**.

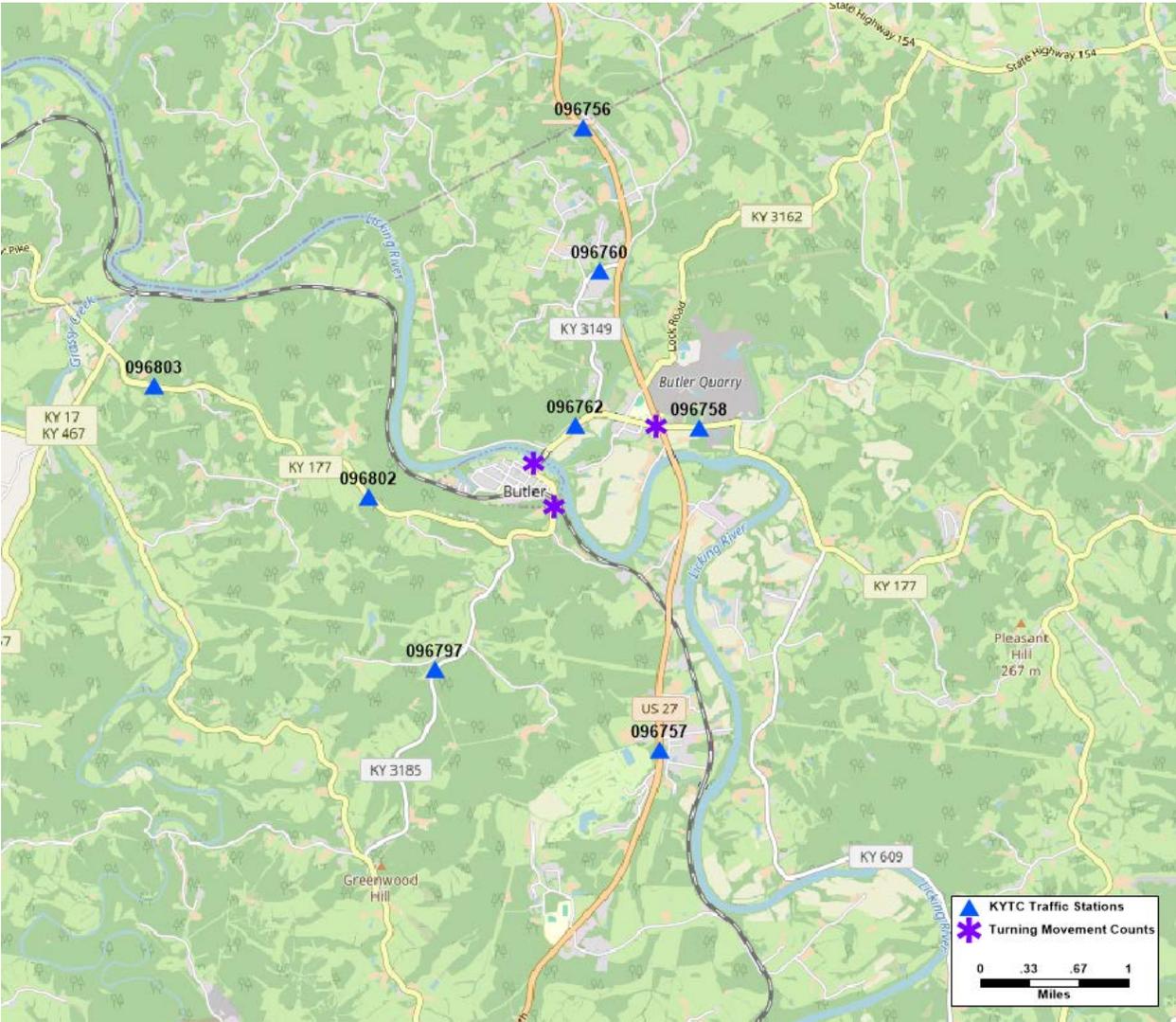


Figure 2: Study Area Traffic Counts and Station Locations

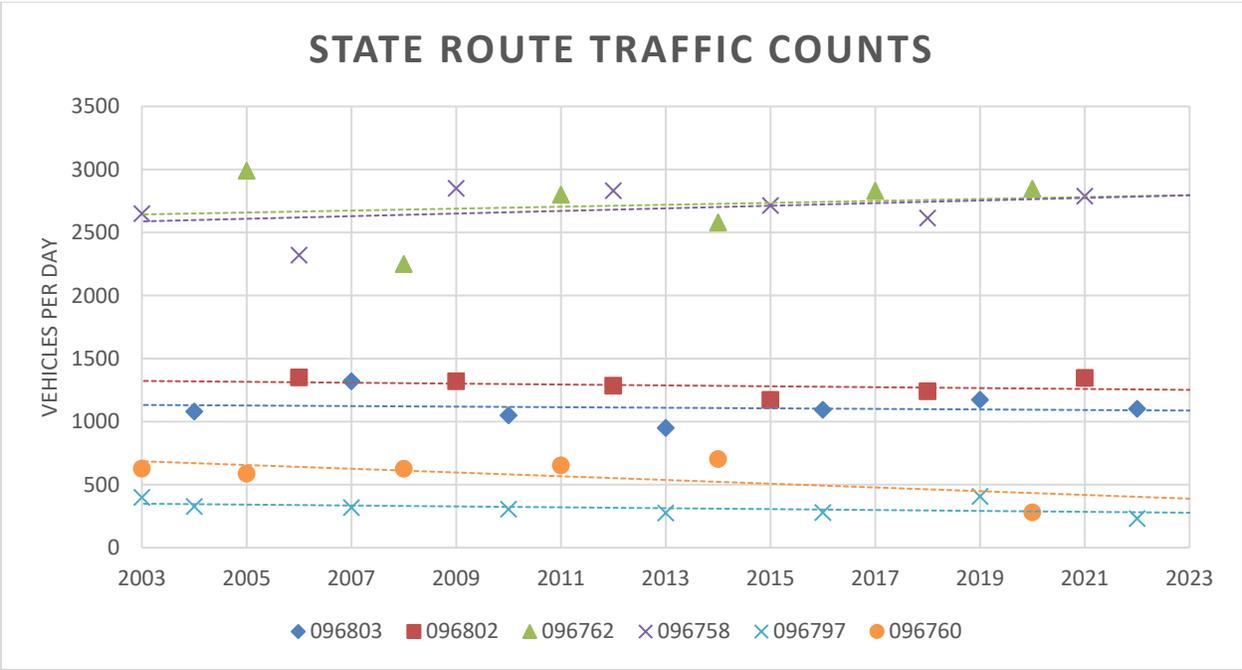


Figure 3: State Route Average Daily Traffic Counts and Trendlines (2003 - 2023)

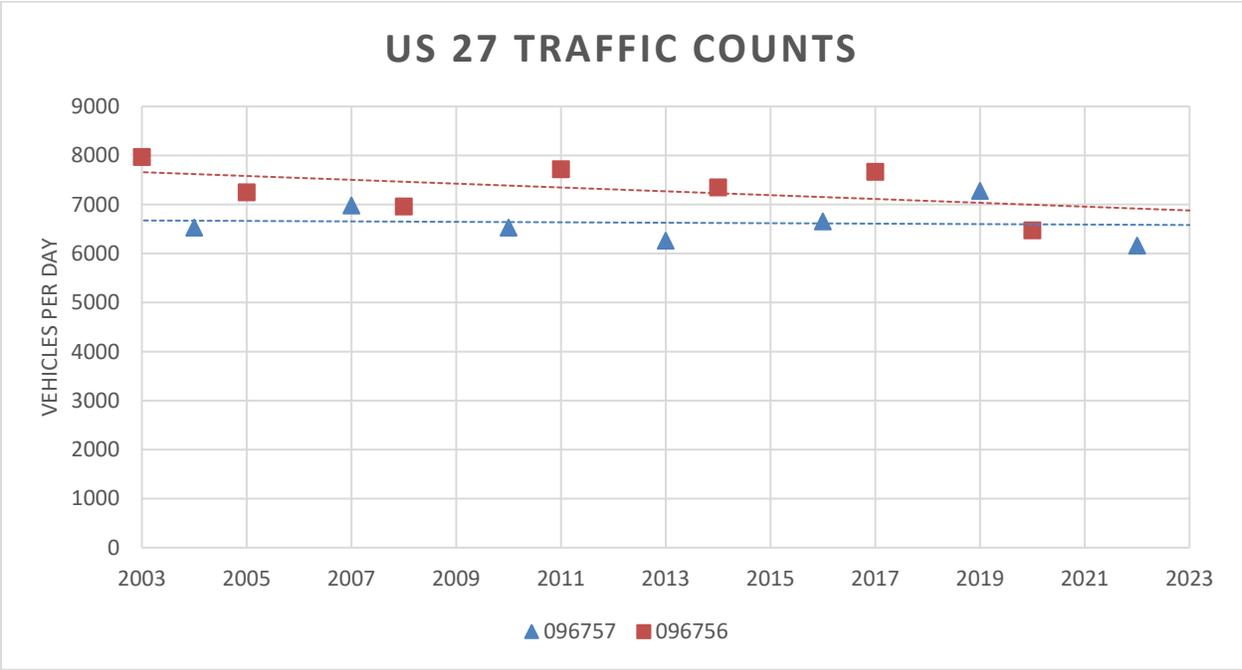


Figure 4: US 27 Average Daily Traffic Counts (2004 - 2023)

## 1.2 SOCIOECONOMIC DATA

Population data for Pendleton County were obtained from decennial Census data and the August 2022 release of the Kentucky State Data Center (KSDC) projections. Shown in **Table 2**, the KSDC data projects a consistent decline in population for Pendleton County through 2045. Employment and household estimates, provided in **Table 3**, were obtained from Kentucky Statewide Travel Model (KYSTMv19, 6003 zones). Both KSDC and KYSTM estimate a decline in socioeconomic variables through 2045.

Table 2: Population Projections - Pendleton County

Pendleton County Population	2010	2020	2025	2030	2035	2040	2045
Census	14,877	14,644					
KSDC Projections (Aug 2022)			14,443	14,126	13,673	13,127	12,544

Table 3: KYSTM Socioeconomic Data Projections

KYSTM Pendleton County Projections			
	2020	2045	Annual Rate
Households	5,466	5,111	-0.25%
Employment	2,203	1,772	-0.80%

## 1.3 GROWTH RATE

An annual growth rate of 0.5% was applied for the study area based on results of the Kentucky Statewide Travel Model, which predicts growth along KY 177 and US 27 between 2021 and 2045 model runs. This modeled growth is largely attributed to the growth of surrounding counties and Cincinnati to the north.

Within the study area, KY 177 carries up to 2,800 vpd today and is projected to increase to 3,000 in the 2045 No-Build scenario. A truck share of 13.6% is assumed, matching the most recent truck classification count at Station 096802.

## 1.4 FUTURE TRAFFIC PROJECTIONS

A range of Build concepts were explored to improve freight mobility on the local network. Given the scale of the statewide model, an improved two-lane connection to the north of Butler was added to the model build scenario, shown as the solid purple line in **Figure 5**. This build scenario demonstrated minimal growth compared to the No-Build Scenario. KY 177 reported a 2023 AADT of 2,700 daily vehicles, with the growth and added northern connector of Build 1 forecasting 3,400 vpd. Under the Build 1 scenario, the model reflects that the existing highway through Butler would continue to serve local trips (<500 vpd) while the regional through trips would shift to this new connection.

A sensitivity analysis was completed to determine impacts to anticipated traffic flows if the Butler Build scenario were part of a larger scale regional connection. Accordingly, an extended connection between US 27 and I-75 was also modeled and analyzed. A representative “Build 1” local connection on new alignment paired with a larger regional connection were modeled, as shown in **Figure 5**. An improved east/west regional connection tied to KY 177 near Butler is forecast to carry up to 4,500 vpd in 2045.

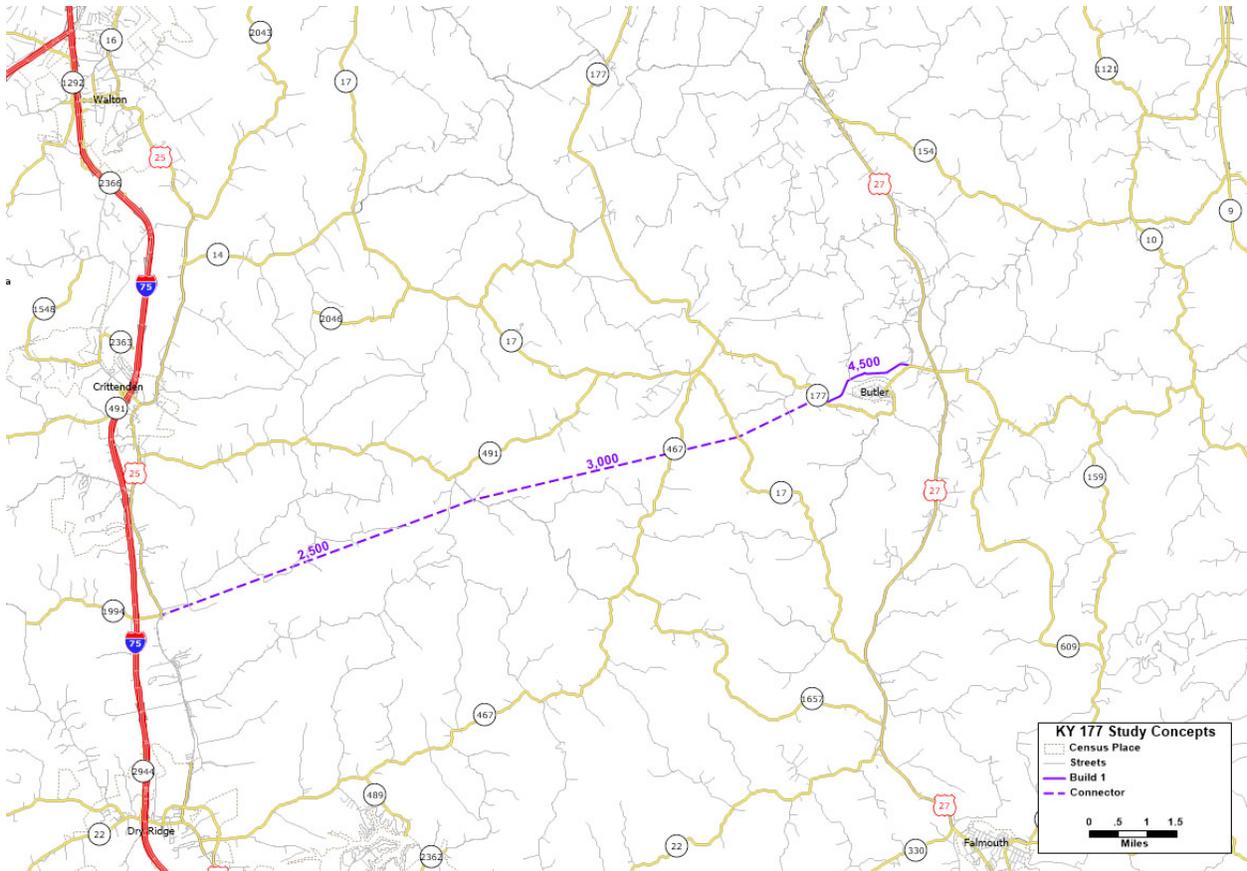


Figure 5: KY 177 Connector Concept: Build 1 (purple) and extended to I-75 (dashed)

A 2021 planning study for a similar east/west regional connector (KYTC Item No. 6-458) estimated 5,000-12,000 vehicles per day along a nearby connector concept, which was part of an even broader development corridor. Given that study’s extensive analyses to forecast induced employment growth over several counties, this range provides an upper limit for the 6-80258 study.

Peak hour turning movement forecasts at the three study intersections for Existing, No-Build, and Build 1 (local connection) scenarios are available in **Appendix B, C, and D** respectively.

# Appendix A

Collected Turning Movement Count Data



Study Name AM KY 177 & Mill St / Matilda St  
 Start Date 08/15/2023  
 Start Time 7:00 AM  
 Site Code  
 Project

Type Road  
 Classification Totals

Start Time	KY 177 Southbound				KY 177 Westbound				Matilda St Northbound				Mill St Eastbound				
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
7:00 AM	2	6	6	0	15	0	0	0	0	1	0	0	0	0	3	6	0
7:15 AM	8	2	11	0	30	2	0	0	1	4	0	0	0	1	5	0	
7:30 AM	9	1	23	0	26	0	0	0	1	3	0	0	1	0	11	0	
7:45 AM	4	6	17	0	23	0	0	0	0	5	0	0	0	0	11	0	
8:00 AM	5	0	10	0	11	2	0	0	0	3	0	0	0	1	5	0	
8:15 AM	2	0	6	0	7	3	0	0	0	1	1	0	0	0	3	0	
8:30 AM	3	0	6	0	9	0	0	0	0	3	0	0	1	0	3	0	
8:45 AM	2	0	7	0	13	0	0	0	0	3	2	0	1	0	0	0	

Study Name PM KY 177 & Mill St / Matilda St  
 Start Date 08/15/2023  
 Start Time 3:00 PM  
 Site Code  
 Project

Type Road  
 Classification Totals

Start Time	KY 177 Southbound				KY 177 Westbound				Matilda St Northbound				Mill St Eastbound			
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
3:00 PM	2	10	15	0	21	0	1	0	1	6	1	0	0	1	7	0
3:15 PM	8	13	24	0	14	0	0	0	0	5	0	1	2	1	4	0
3:30 PM	3	5	19	0	14	2	0	0	1	14	0	0	0	0	4	0
3:45 PM	3	12	7	0	15	2	3	0	0	6	0	0	1	1	7	0
4:00 PM	12	6	16	0	21	3	1	0	1	9	0	0	1	1	11	0
4:15 PM	7	7	15	0	13	0	1	0	1	5	0	0	0	0	4	0
4:30 PM	9	14	19	0	14	0	0	0	1	10	0	0	0	0	10	0
4:45 PM	4	5	18	0	17	1	1	0	0	2	0	0	1	1	2	0
5:00 PM	4	12	11	0	18	2	0	0	0	4	0	0	0	3	4	0
5:15 PM	5	4	19	0	20	0	1	0	0	6	0	0	0	0	7	0
5:30 PM	9	5	23	0	15	2	1	0	0	5	0	0	1	1	5	0
5:45 PM	6	6	15	0	11	0	0	0	1	1	0	0	0	1	7	0



# Appendix B

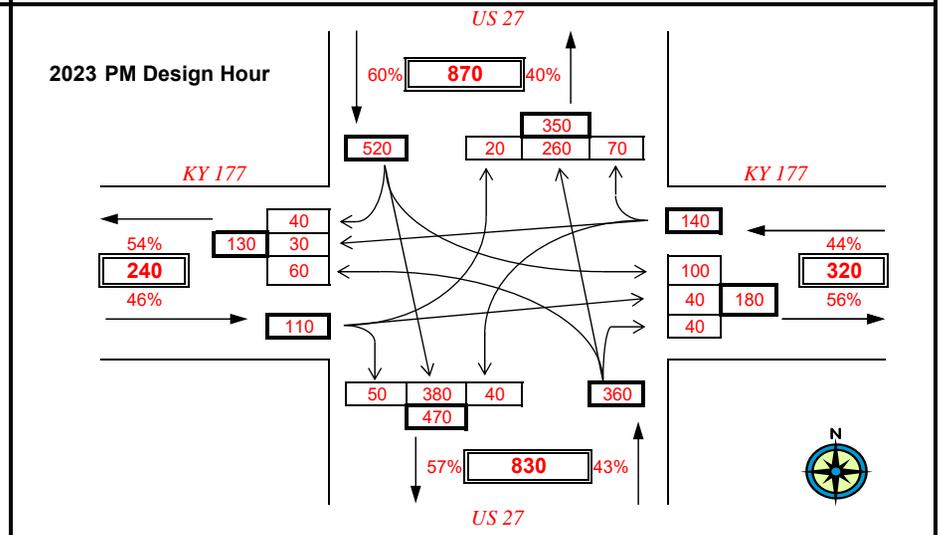
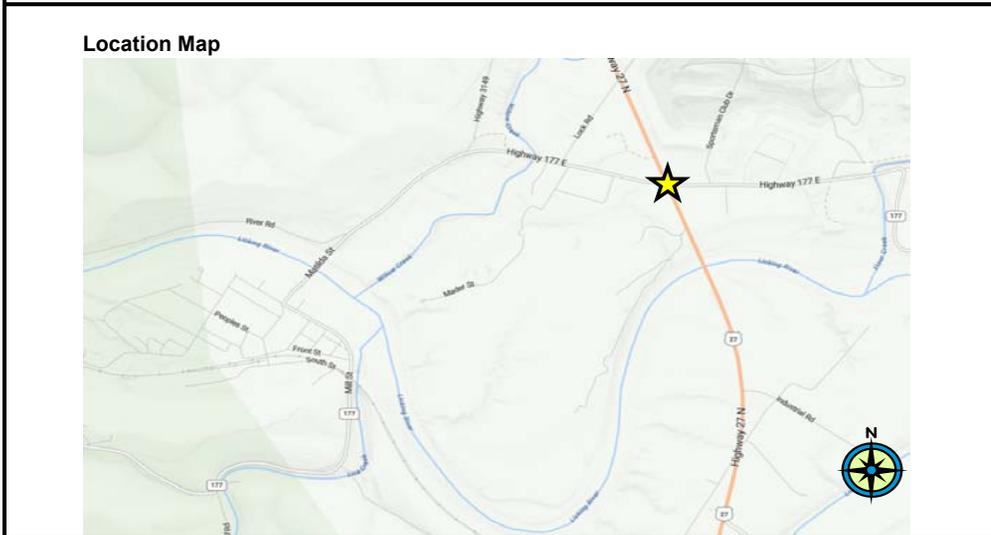
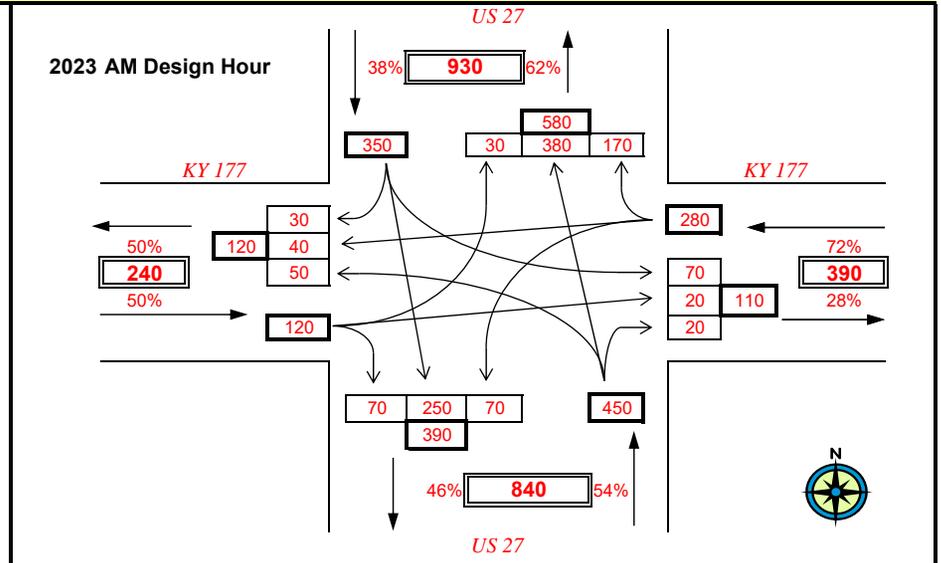
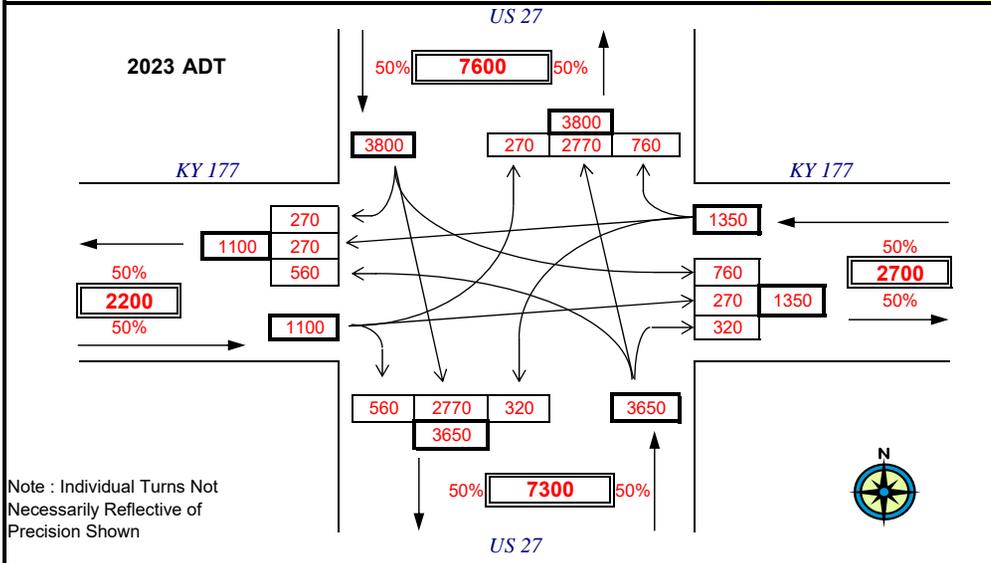
2023 Existing Turning Movement Sheets

PROJECT: KY 177 Corridor Study  
 ITEM NUMBER: 6-80258  
 MARS NUMBER: 0  
 REQUEST DATE: Wednesday, October 4, 2023  
 ANALYST: ST  
 YEAR: 2023 ADT and Design Hour Volumes  
 INTERSECTION: KY 177 & US 27

NOTE: Directional distributions were determined from a 2023 turning movement count.

## TURN MOVEMENT (2023)

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

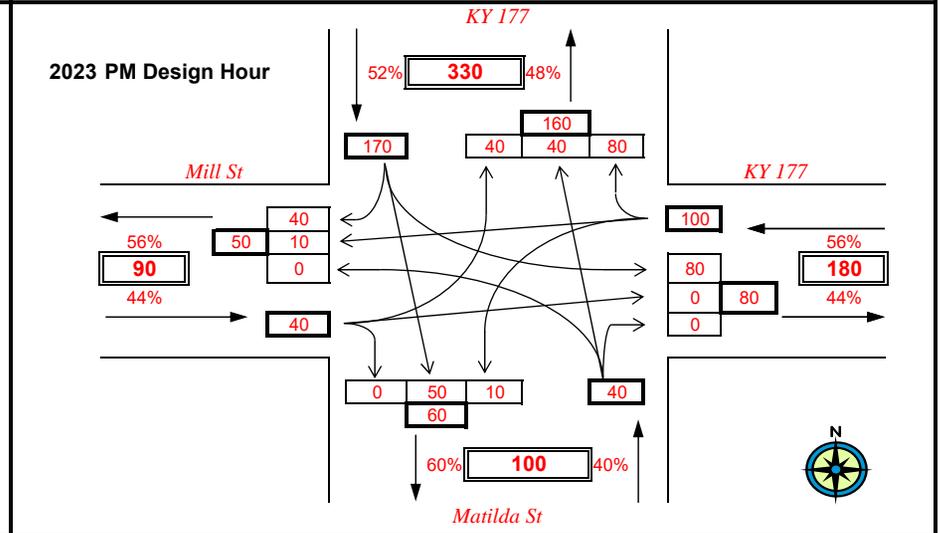
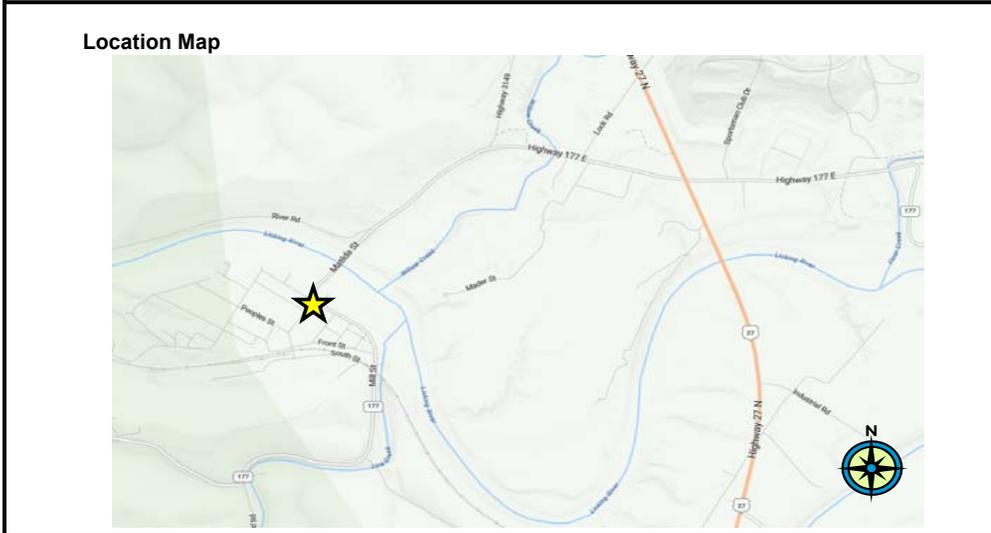
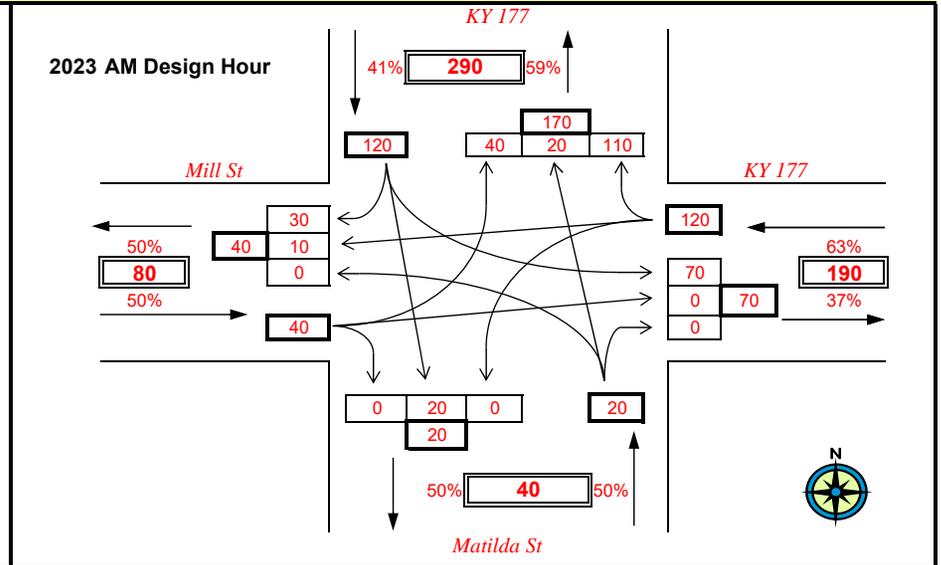
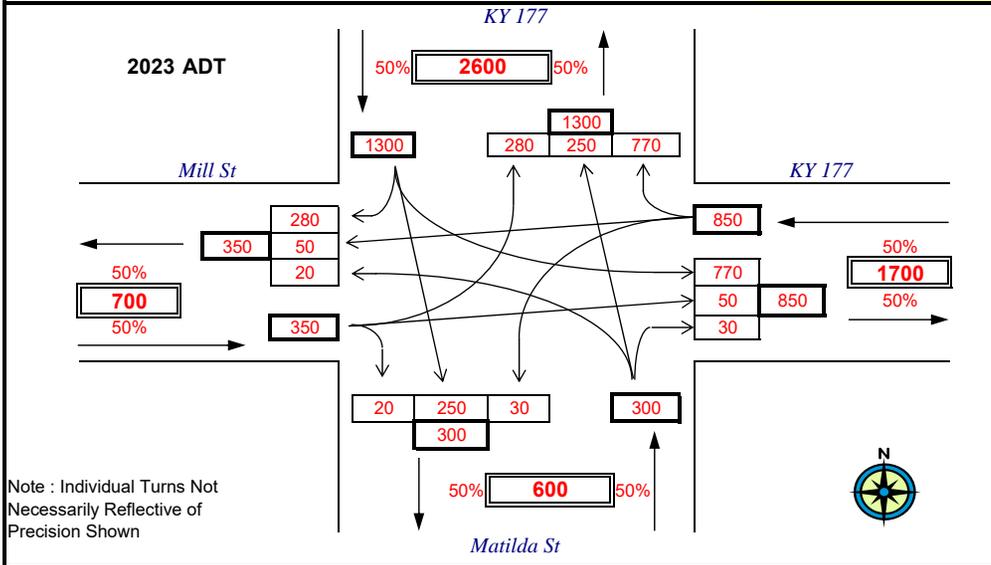


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 INTERSECTION: KY 177 & Mill St

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## TURN MOVEMENT (2023)

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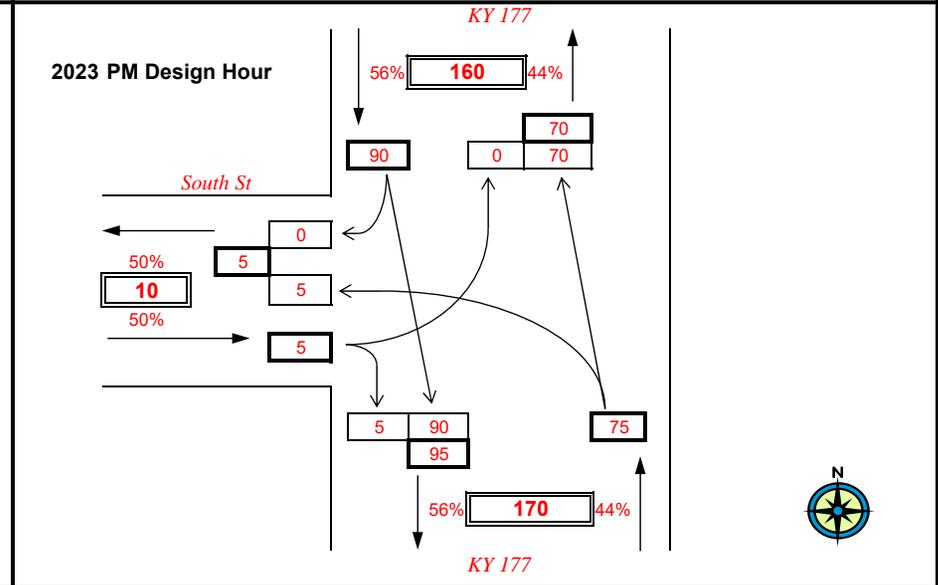
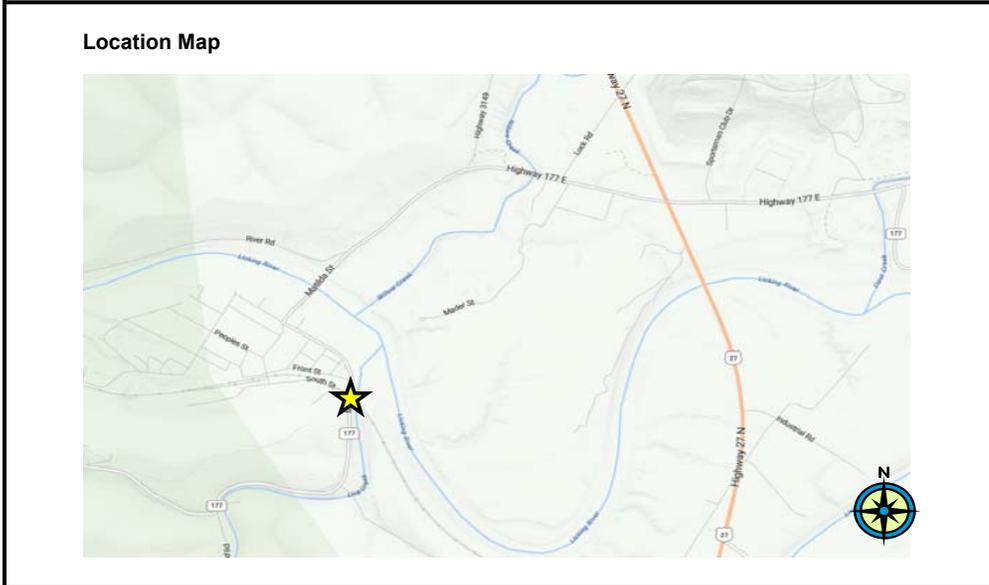
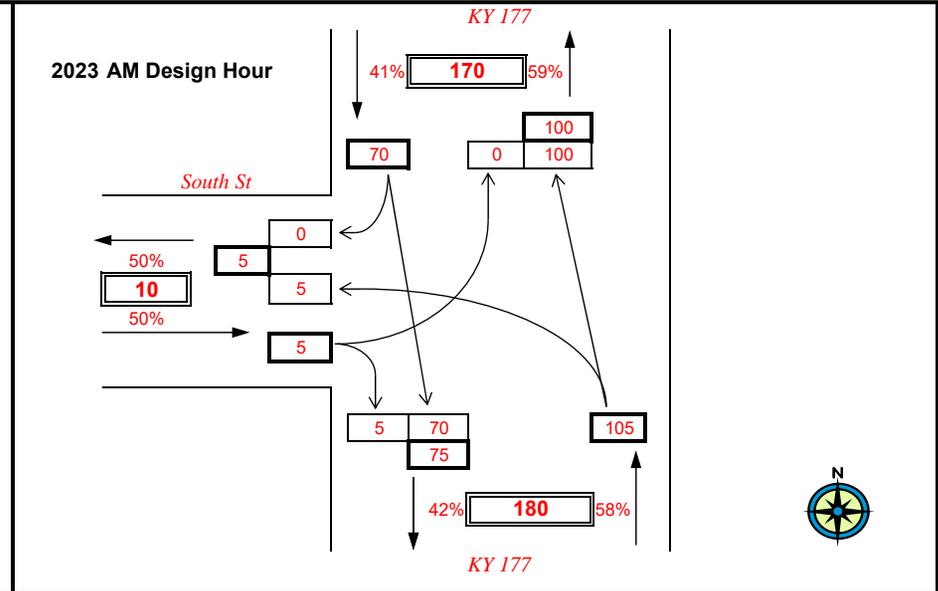
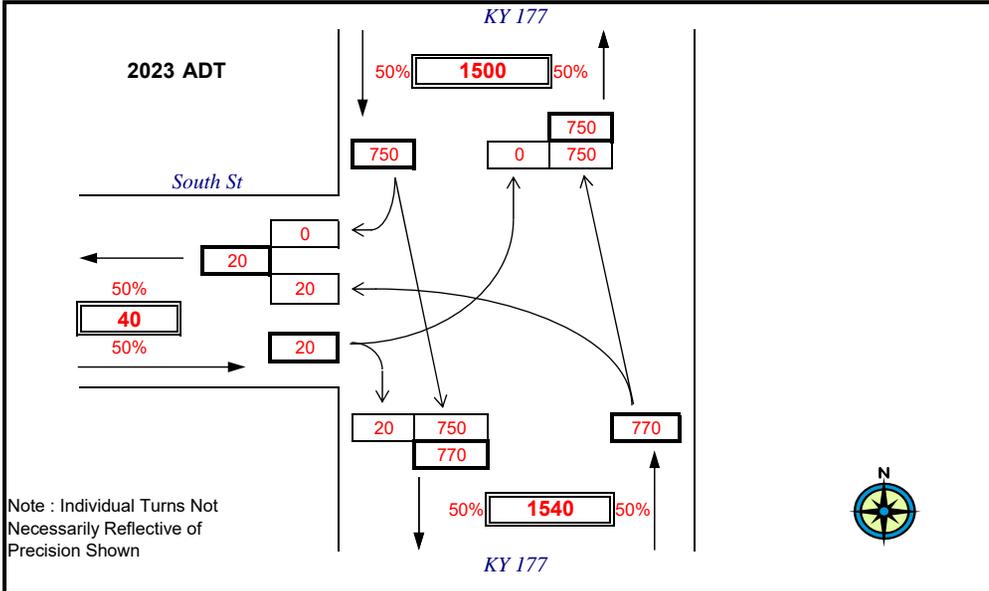


PROJECT: KY 177 Corridor Study  
 ITEM NUMBER: 6-80258  
 MARS NUMBER: 0  
 REQUEST DATE: Wednesday, October 4, 2023  
 ANALYST: ST  
 YEAR: 2023 ADT and Design Hour Volumes  
 INTERSECTION: KY 177 & Mill St

NOTE: Directional distributions were determined from a 2023 turning movement count.

## TURN MOVEMENT (2023)

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



# Appendix C

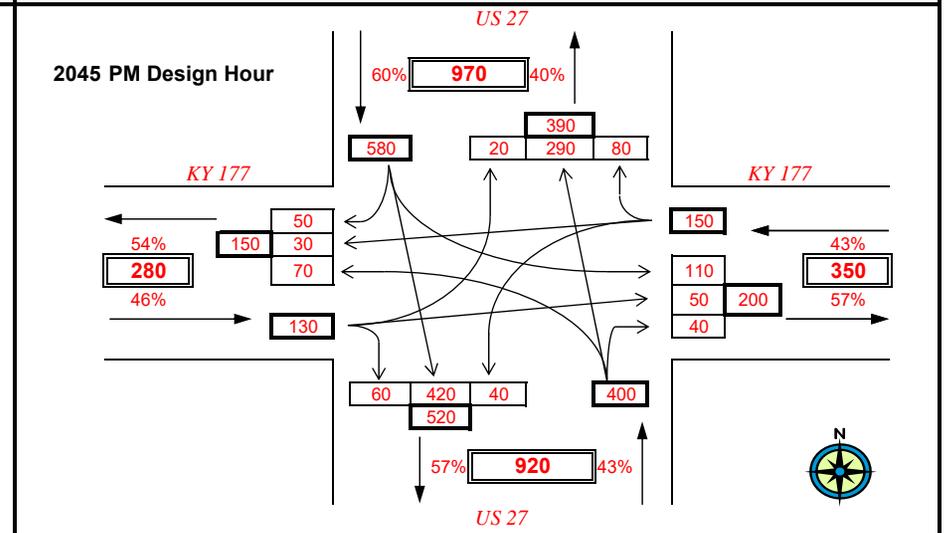
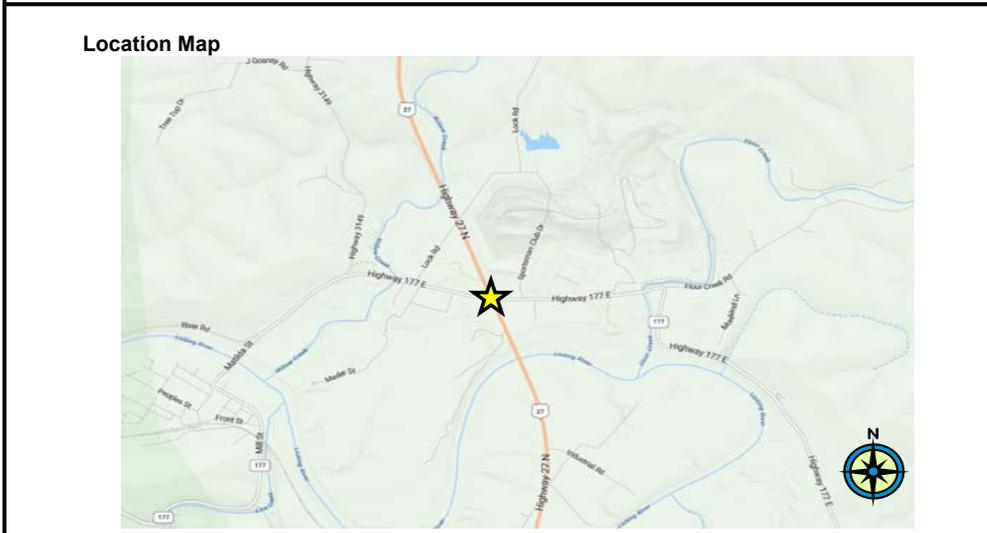
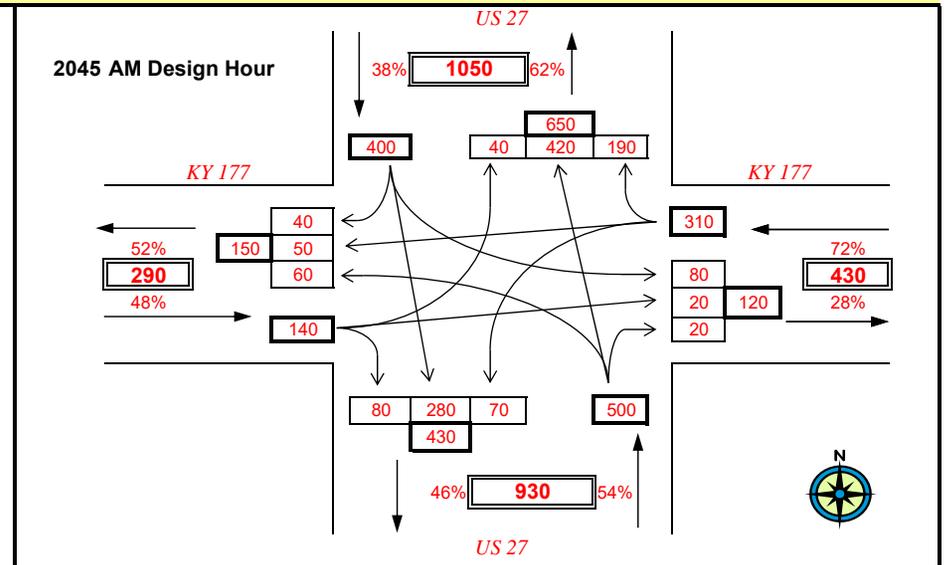
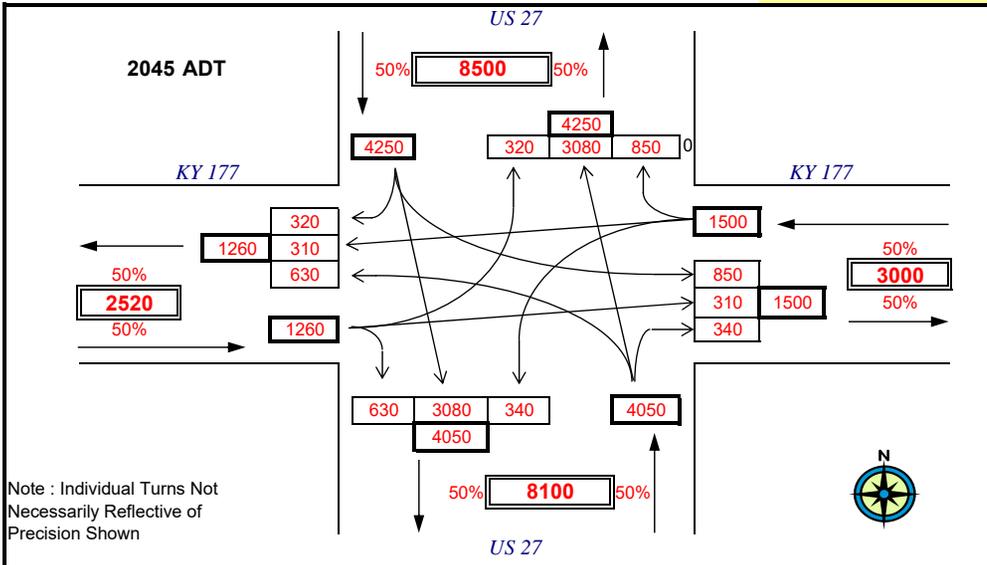
2045 No Build Turning Movement Sheets

PROJECT: KY 177 Corridor Study  
 ITEM NUMBER: 6-80258  
 MARS NUMBER: 0  
 REQUEST DATE: Wednesday, October 4, 2023  
 ANALYST: ST  
 YEAR: 2045 ADT and Design Hour Volumes  
 INTERSECTION: KY 177 & US 27 (No Build)

NOTE: Directional distributions were determined from a calculated turning movement count.

## TURN MOVEMENT (2045)

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

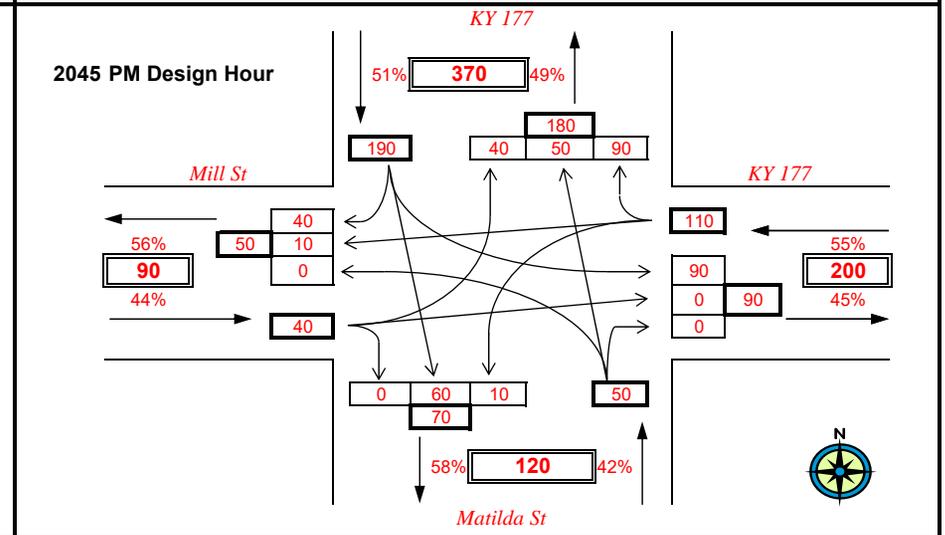
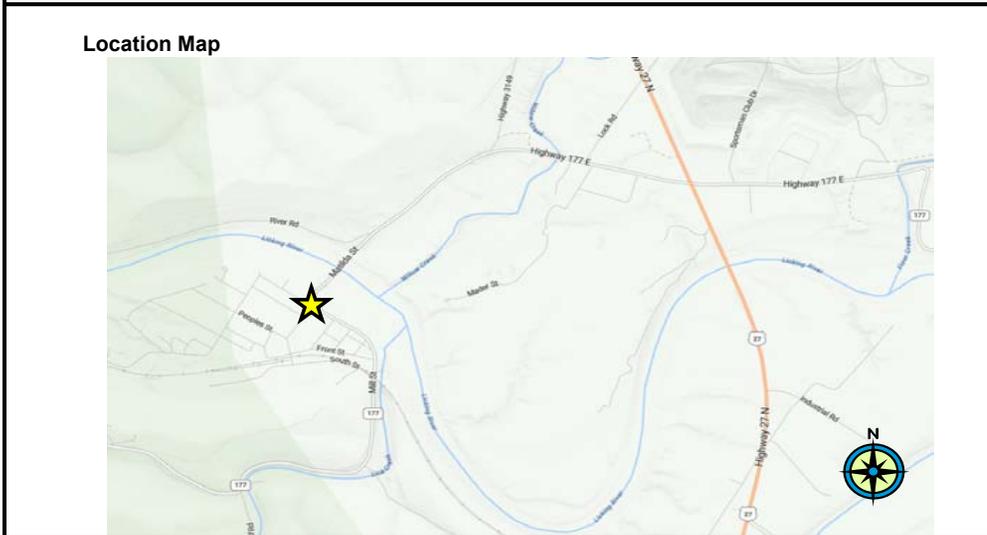
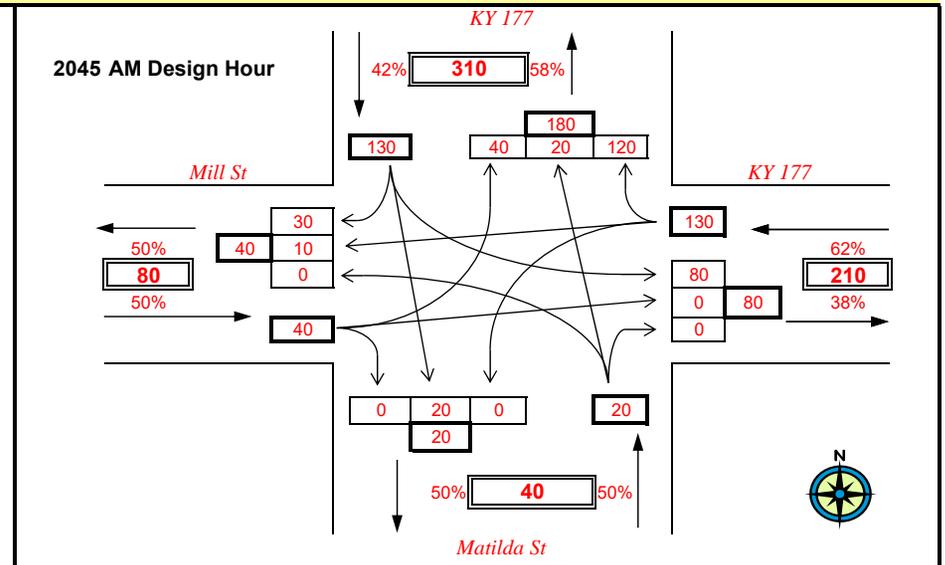
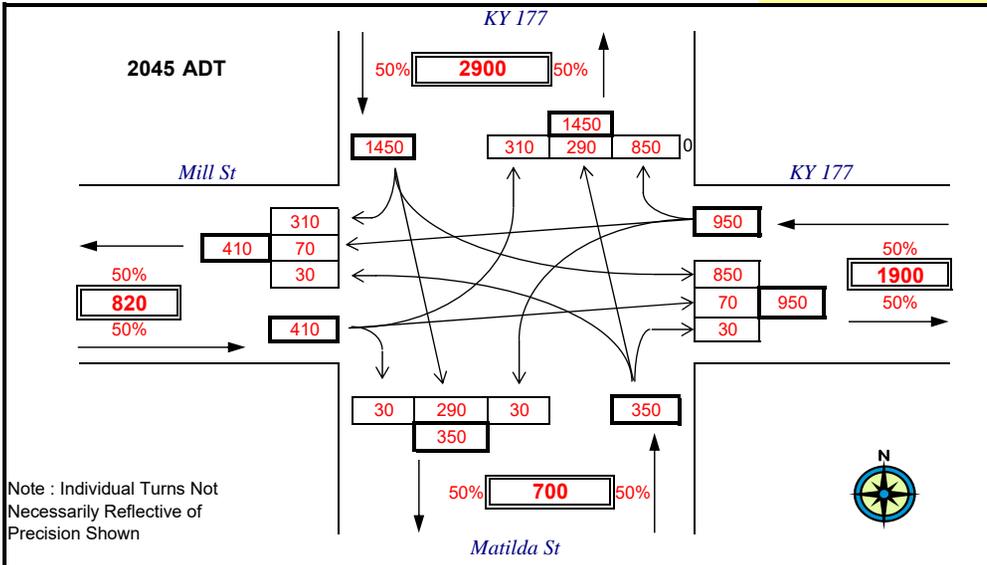


PROJECT: KY 177 Corridor Study  
 ITEM NUMBER: 6-80258  
 MARS NUMBER: 0  
 REQUEST DATE: Wednesday, October 4, 2023  
 ANALYST: ST  
 YEAR: **2045** **ADT and Design Hour Volumes**  
 INTERSECTION: KY 177 & Mill St (No Build)

NOTE: Directional distributions were determined from a calculated turning movement count.

## TURN MOVEMENT (2045)

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





# Appendix D

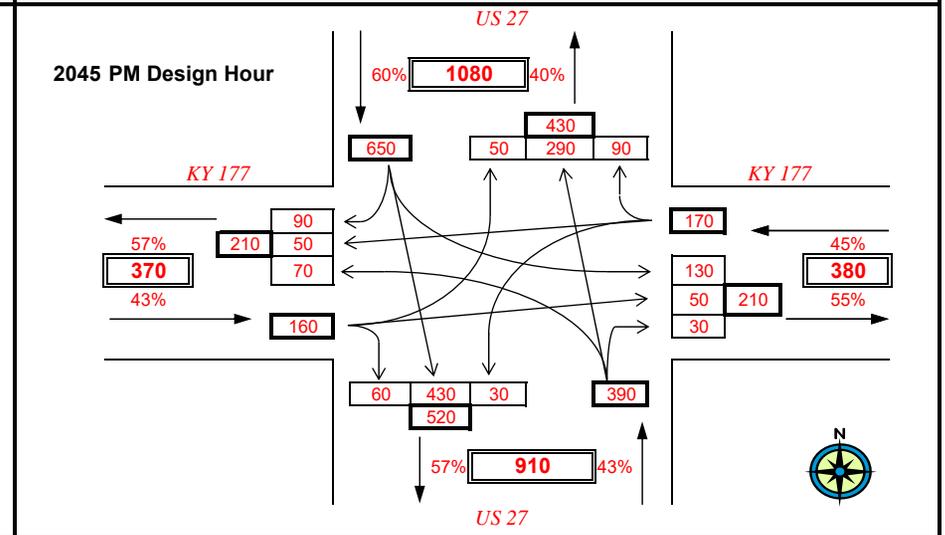
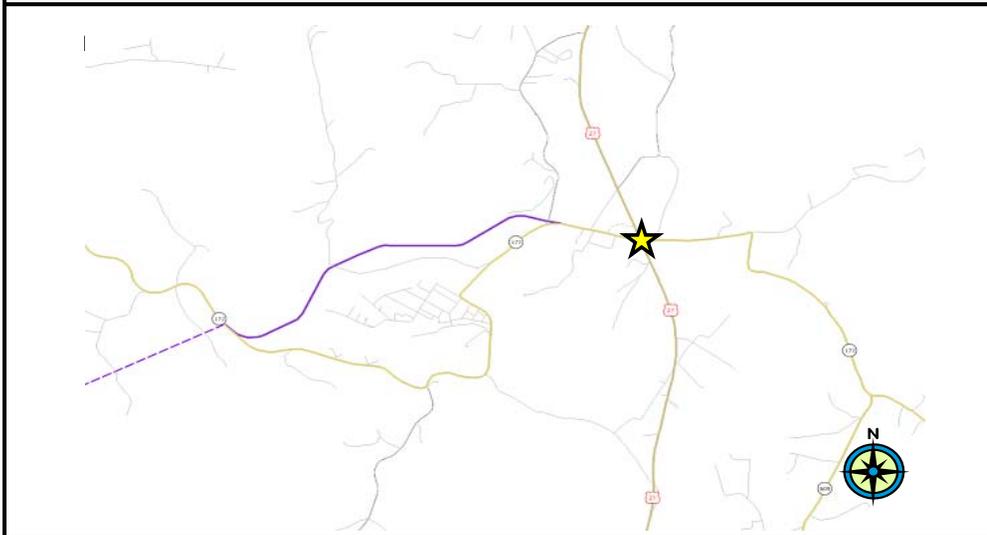
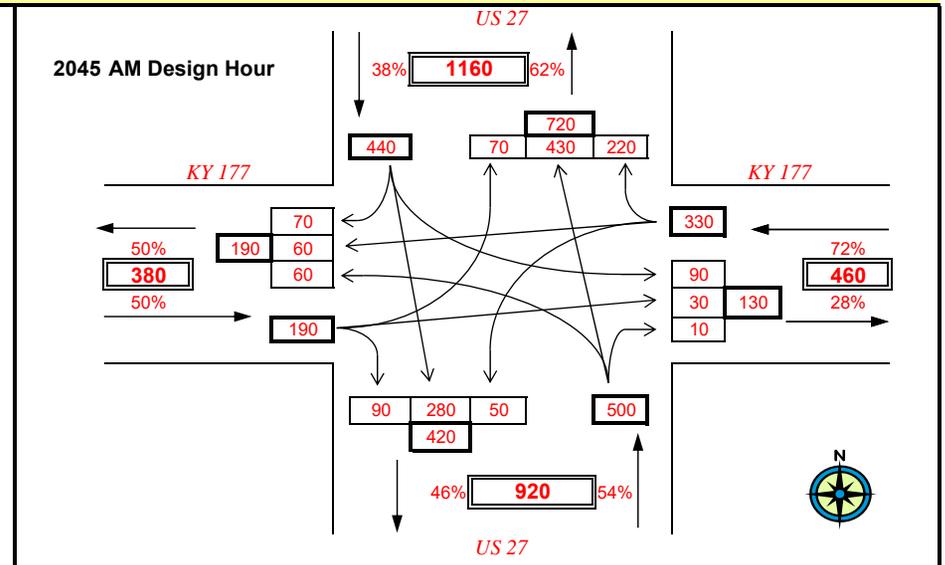
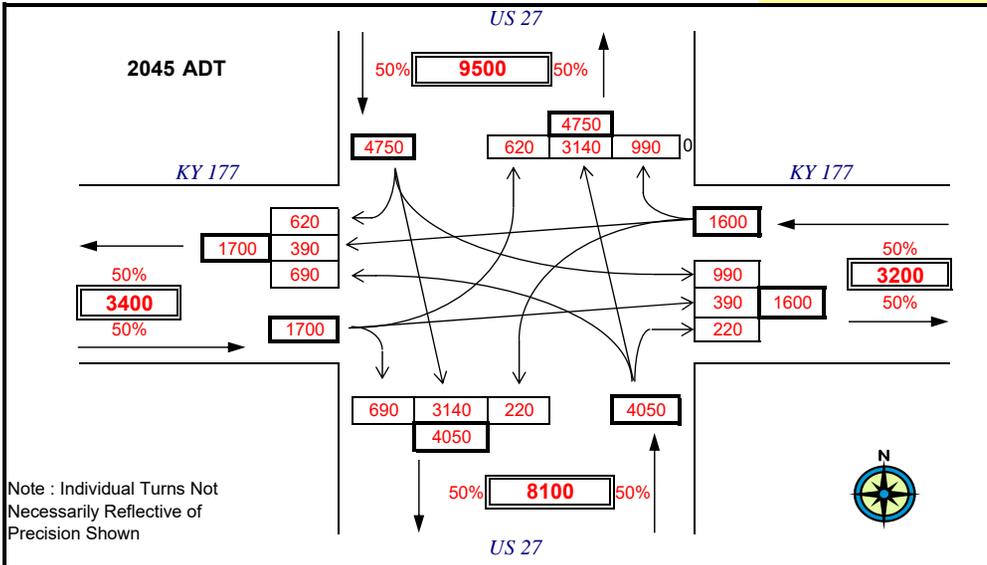
2045 Build Turning Movement Sheets

PROJECT: KY 177 Corridor Study  
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 MARS NUMBER: 0  
 REQUEST DATE: Wednesday, October 4, 2023  
 ANALYST: ST  
 YEAR: 2045 ADT and Design Hour Volumes  
 INTERSECTION: KY 177 & US 27 (Build)

NOTE: Directional distributions were determined from a calculated turning movement count.

## TURN MOVEMENT (2045)

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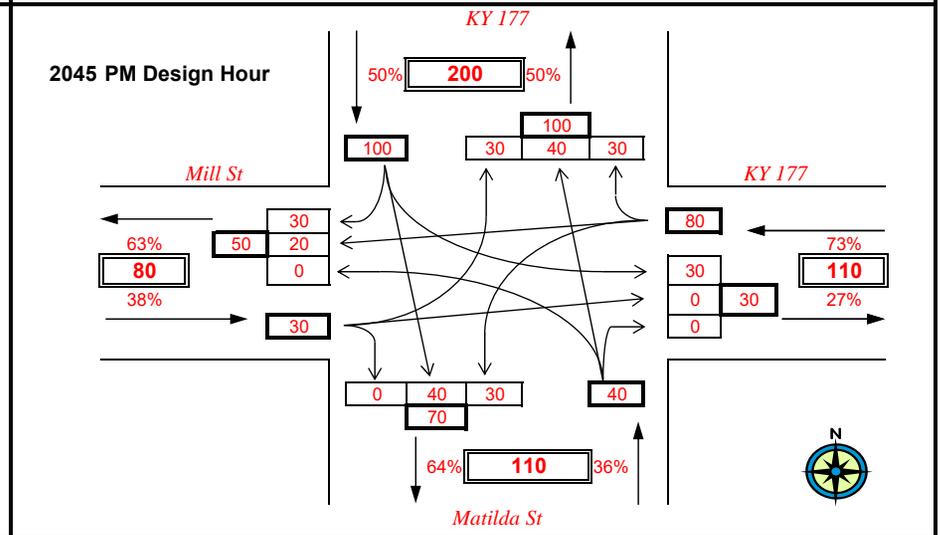
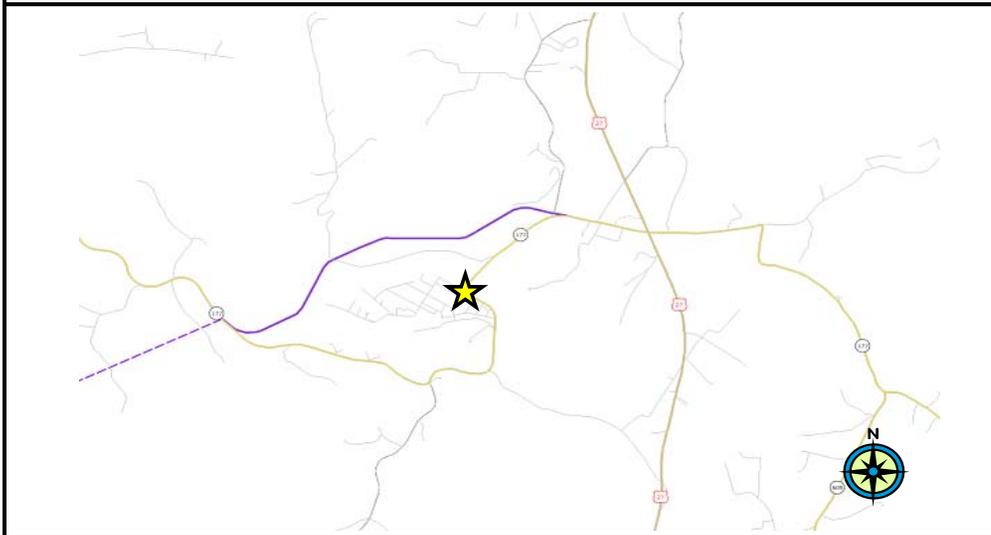
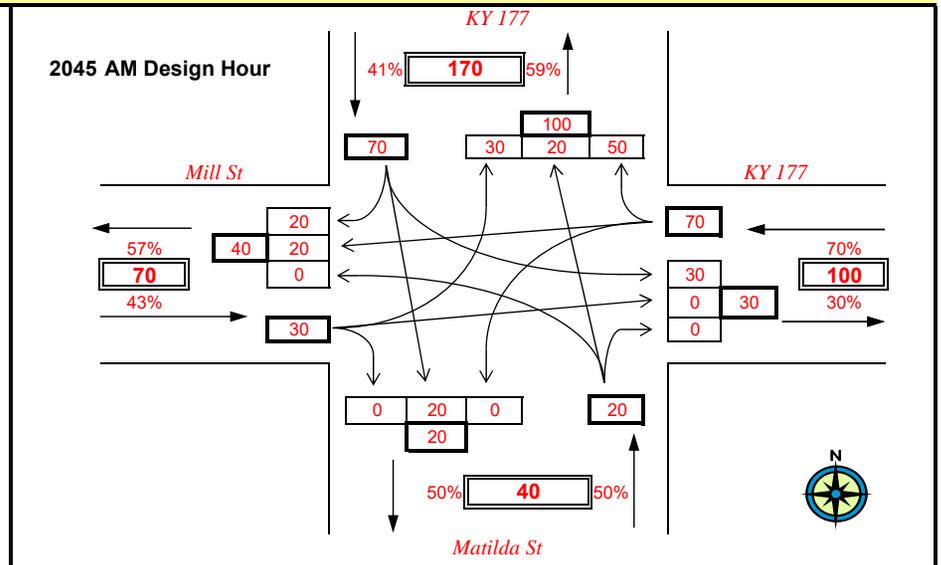
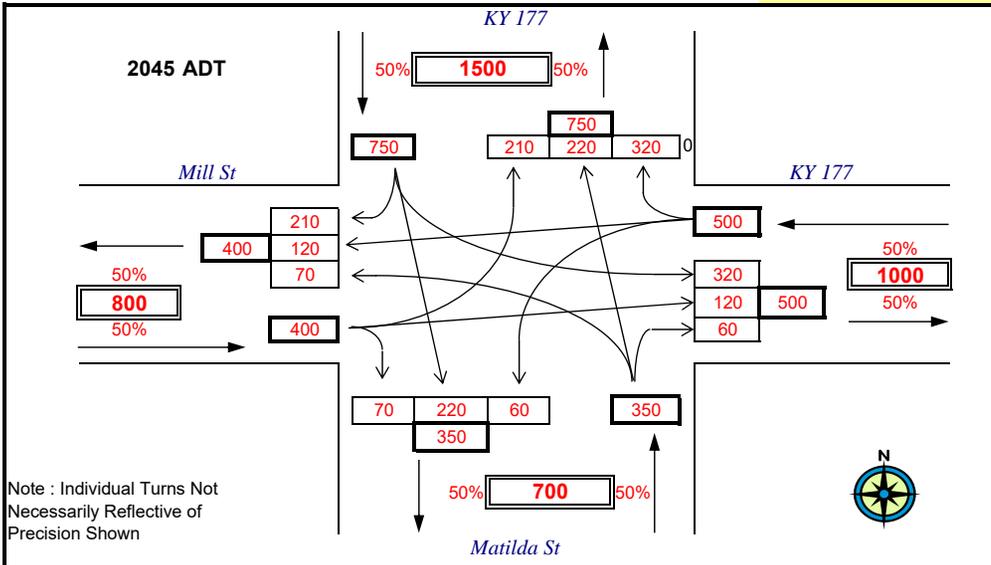


PROJECT: KY 177 Corridor Study  
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 ANALYST: ST  
 YEAR: **2045** **ADT and Design Hour Volumes**  
 INTERSECTION: KY 177 & Mill St (Build)

NOTE: Directional distributions were determined from a calculated turning movement count.

## TURN MOVEMENT (2045)

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 INTERSECTION: KY 177 & Mill St (Build)

NOTE: Directional distributions were determined from a calculated turning movement count.

## TURN MOVEMENT (2045)

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