

## **Appendix F – TRAFFIC FORECASTING REPORT**



## TRANSPORTATION CABINET

Frankfort, Kentucky 40622  
www.transportation.ky.gov/

**Steven L. Beshear**  
Governor

**Michael W. Hancock, P.E.**  
Secretary

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### MEMORANDM

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**TO:** Mathew Bullock, P.E.  
Chief District Engineer  
District 5 - Louisville

**ATTN:** Keith Downs

**FROM:** John Moore, P.E.  
Director  
Division of Planning

A handwritten signature in black ink, appearing to read "John Moore".

**DATE:** April 15, 2014

**SUBJECT:** Bullitt County Traffic Forecast  
New Route across Salt River from KY 480 to a Termini north of KY 44  
Item No. 5-8709.00

In response to your December 5, 2013 request, we are providing the following forecasts on the attached report:

- 2012 and 2038 Average Daily Traffic and Design Hour Volumes
- 2012 and 2038 Daily and Design Hour Turning Movements
- Truck Percentages and 20-year ESALs

If you have any questions, please contact Jay Balaji of this Division at (502) 782-5045.

JM/JB/BC

#### Attachments

c/att: Tom Hall  
Jonathan West  
Dan Hite  
Paul Looney  
Jill Asher  
Thomas Witt



# *Executive Summary*

**Traffic Forecast Report  
Bullitt County  
New Route across Salt River between KY 480 and  
Further North of KY 44  
Item No. 5-8709.00**

Prepared for:



Prepared by:  
**Jayalakshmi Balaji**  
Division of Planning  
Kentucky Transportation Cabinet  
April 15, 2014

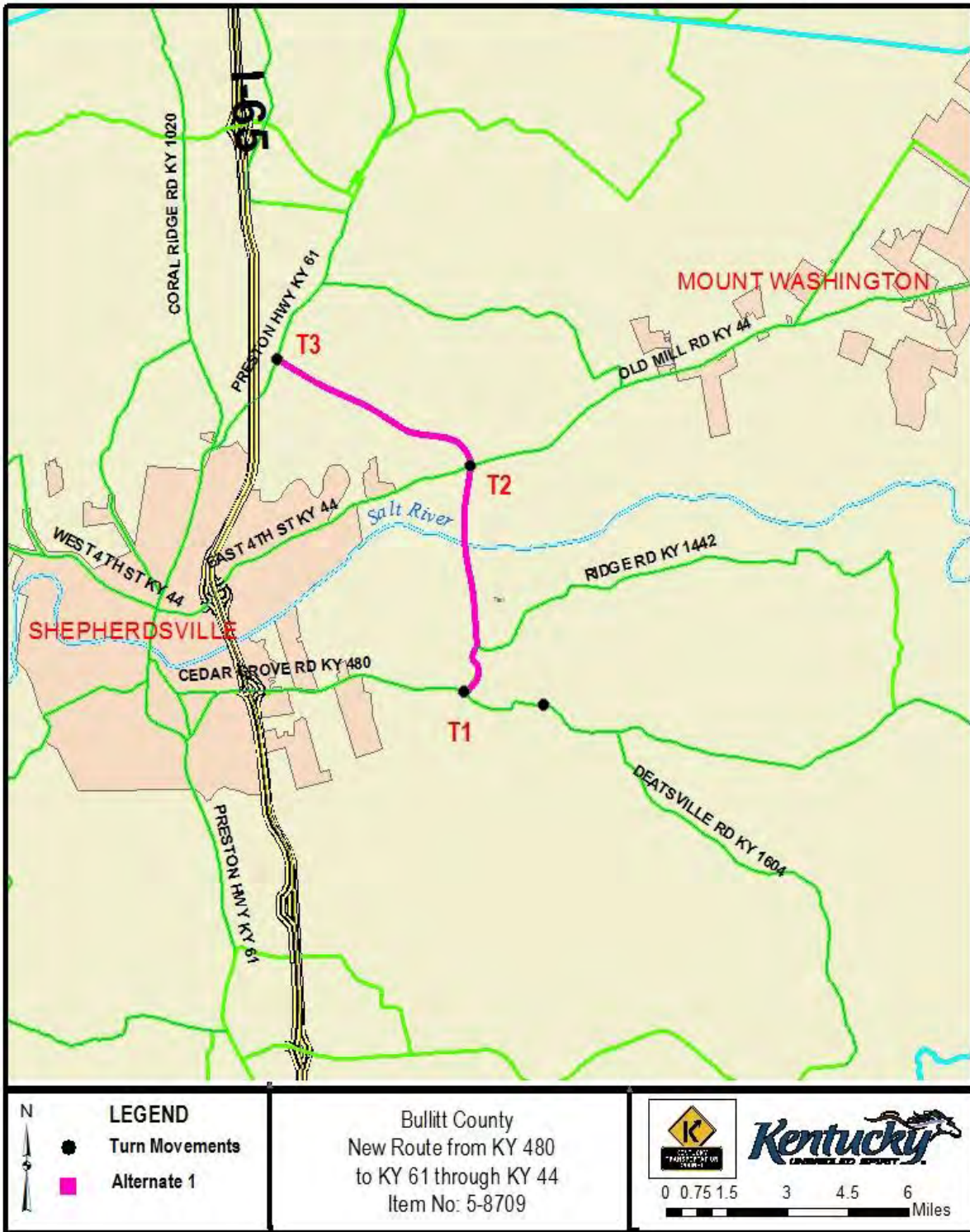
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## **Commonly Used Abbreviations and their Descriptions**

ADT	Average Daily Traffic	Without any adjustment
DHV	Design Hour Volume	30 <sup>th</sup> 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	Considers a 15 minute spike in an hourly count
K-Factor	K-30 <sup>th</sup> hour Factor	DHV divided by ADT (DHV/ADT)
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

# Vicinity Map (Alt #1)



# Vicinity Map (Alt #2)



## **Traffic Forecast Executive Summary**

### **Bullitt County: Construction of a New Route across the Salt River**

### **Item No. 5-8709.00**

#### **FORECAST SUMMARY**

The project calls for the construction of a new route from KY 480 to KY 61 or KY 1526, east of I-65 in Bullitt County. The purpose of this report is to analyze future traffic utilizing the new route. This forecast includes a build scenario for 2 alternate routes. The no build scenario for KY 480 & KY 44 was already provided in the previous forecast done for this project (see Appendix C). Special counts requested for the previous forecast and the KIPDA model were used to forecast the build scenarios. The KIPDA model was run for two different scenarios: 1. Termini points at KY 480 and KY 61 through KY 44 2. Termini points at KY 480 and KY 1526 through KY 44. The percentage change in modeled traffic created by the model was used for each alternate route with the respective scenario. The forecast will be used for the phase II design of this project to help determine turn lane configurations, pavement thickness, number of lanes, etc.

#### **FORECAST TYPE**

The following types of forecasts were developed for both alternate routes:

- 2012 and 2038 Build truck percent forecasts (light/heavy, ADT, DHV).
- 2012 and 2038 Daily and Design Hour Build Turn Movements.
- 20-year ESALs for build scenarios.

#### **CURRENT-YEAR VOLUMES**

Current year volumes were based upon recent class counts as well as the special counts done for this forecast. Two scenarios were created in the KIPDA traffic model for both alternate routes to generate a volume for the new routes for the build scenario. Then a select link analyses was done for the new route using the KIPDA model to forecast diversionary percentages of the traffic. These percentages were then applied to existing counts to add or subtract traffic volume and arrive at the traffic volume for the new routes. Difference between the model and counts were also recorded which were used later in adjusting the KIPDA model future volumes.

The reason for alternate **one** to have more volume in the new route was owing to the assumption of a new interchange at **I 65/KY 61**. This new interchange makes the new route more attractive with travel time savings from Deatsville Road to I-65.

#### **DESIGN-YEAR GROWTH FACTORS**

Multiple sources were analyzed to develop a growth rate. Extensive trend line analysis was conducted along KY 44 and KY 480 for various count stations between Shepherdsville and Mount Washington. These stations showed growth rates ranging from 1.9% to 2.2%. However population forecasts for Bullitt County performed by the Kentucky State Data Center estimates the population

of Bullitt County to grow at a rate of 1.54% annually for the next twenty years. The Bullitt County Joint Planning Commission was contacted to determine how much more development was likely to occur in the future, around KY 44 and KY 480, nearby the project area. The Planning Commission provided proposed developments and future land use map for the whole corridor. They projected a large quantity of residential developments, some business, and light industry developments to be built in this area. The KIPDA model with analysis years of 2012 and 2030 was then studied for the various scenarios. Ultimately, growth rates were derived from the change in volume with the KIPDA model scenarios. The growth rates used for the forecast are:

Scenarios	Growth Rates in Forecast
KY 480 to KY 44 (Alt #1)	1.90%
KY 44 to KY 61 (Alt #1)	1.80%
KY 480 to KY 44 (Alt #2)	2.30%
KY 44 to KY 61 (Alt #2)	1.00%

## **DESIGN HOUR FACTORS**

DHVs were estimated by analyzing the most recent hourly volume data collected at stations 015A43 on KY 44 (MP 15.6), 015A53 (MP 1.8) and 015253 (MP 4.0) on KY 480, 015759 (MP 17.7) on KY 61, 015769 (MP 13.3) on KY 1526 as well as the KIPDA model.

## **TRUCK PERCENTAGE**

Since this road is a new route and the KIPDA model doesn't have a truck component, a truck percentage of 8.7 % was calculated using functional class averages for urban arterials. Based on the proposed developments and future land use map for the whole corridor and the functional class averages for urban arterials a growth rate of 2.0 % was used.

## **ESALs**

Functional class averages from ATR data, traffic counts, and the 2038 ADT projections were used to estimate 20-year ESALs on the project road segment. The 2007 aggregated ESAL report, generated by the Kentucky Transportation Center in collaboration with the Kentucky Transportation Cabinet, were used to grow the important ESAL calculation variables. For more information please see the attached ESAL calculation sheets.

## **TURN MOVEMENTS**

Three turn movements were synthesized for each scenario of each alternate route using the KIPDA model and the actual counts.

- **T1---** This turn movement (see page 2) is on the south end of Alt 1 at the intersection of KY 480 and New Route.
- **T2---** This turn movement in Alt 1 is at the intersection of KY 44 and New Route. between Watergate Dr and Sunview Dr .



*Traffic Forecast Technical Report*

*Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44*

*Item No. 5-8709.00*

- **T3---** This turn movement is on the south end of Alt 1 at the intersection of KY 61 and new route with end point just north of Becnel Ln
- **T4---** This turn movement (see page 3) in Alt 2 is at the intersection of KY 1526 and New Route, east of Stone Company Rd.

The turn movement volumes at T1 and T2 do not match. This is due to the presence of a rural minor collector road (KY 1442) between T1 and T2.

Since a 2018 model was not readily available and the current model uses a 2012 base year, a 2012 current year turn movements is provided. The current year turn movements were grown using methods described above to determine future year turn movements. Analysis is based on the KIPDA model output.

**HISTORICAL POPULATION SUMMARY**

	1960	1970	1980	1990	2000	2010	60 - 70	70 - 80	80 - 90	90 - 00	00 - 10
	Population	Population	Population	Population	Population	Population	Pct	Pct	Pct	Pct	Pct
Kentucky	3,038,156	3,220,711	3,660,334	3,686,892	4,041,769	4,339,367	Change 6.0%	Change 13.6%	Change 0.7%	Change 9.6%	Change 7.4%
Bullitt Co	-	26,090	43,346	47,567	61,236	74,319	-	66.1%	9.7%	28.7%	21.4%

Sources: US Bureau of the Census; Kentucky State Data Center

**FUTURE POPULATION PROJECTIONS SUMMARY**

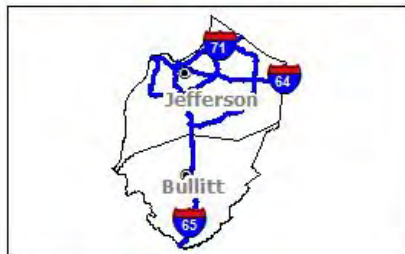
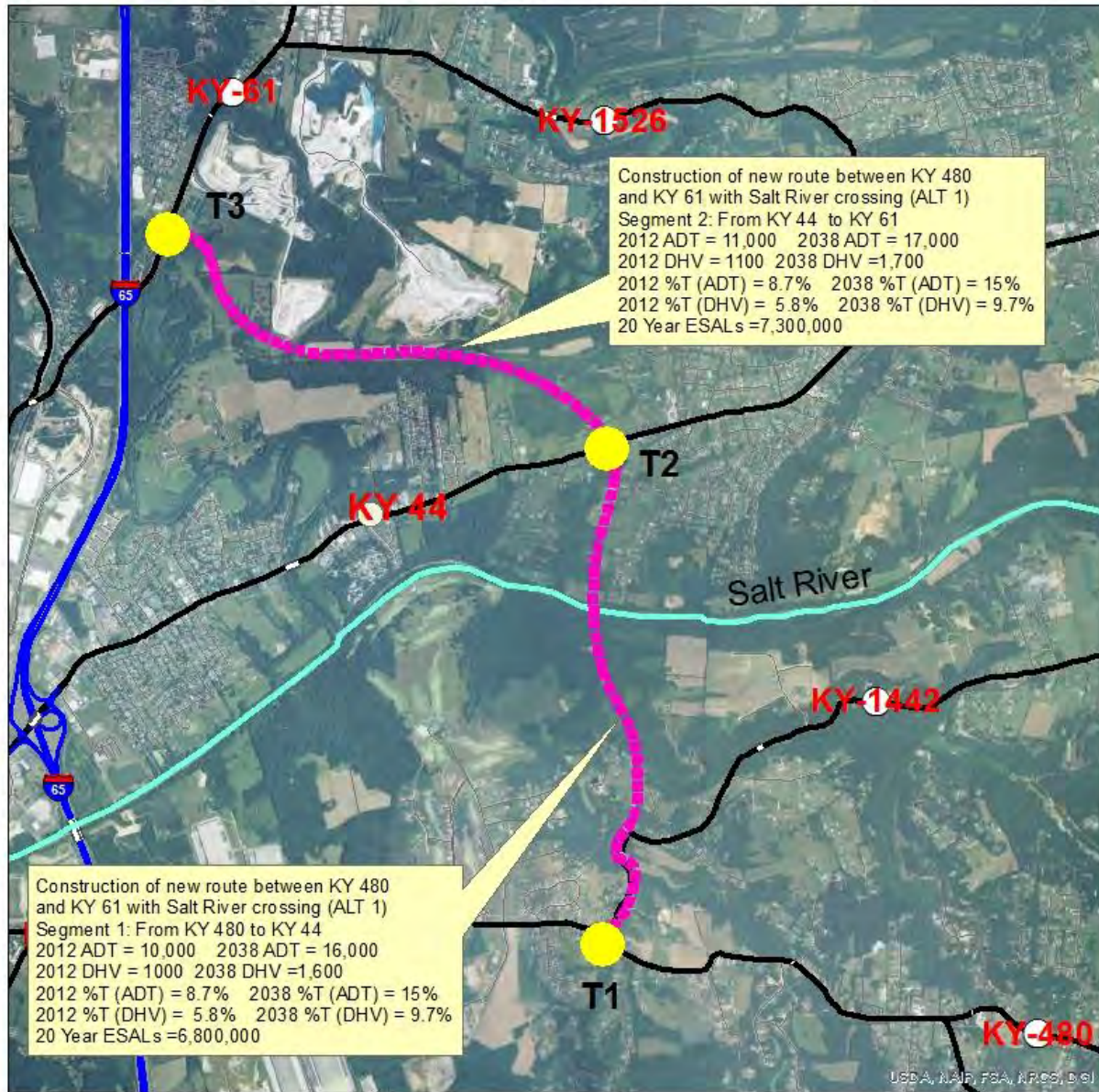
	2010	2015	2020	2025	2030	2035	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35
	Projection	Projection	Projection	Projection	Projection	Projection	Pct	Pct	Pct	Pct	Pct
Kentucky	4,339,367	4,509,429	4,672,754	4,820,390	4,951,178	5,063,331	Change 3.9%	Change 3.6%	Change 3.2%	Change 2.7%	Change 2.3%
Bullitt Co	74,319	81,358	88,508	95,623	102,461	108,891	9.5%	8.8%	8.0%	7.2%	6.3%

Sources: US Bureau of the Census; Kentucky State Data Center

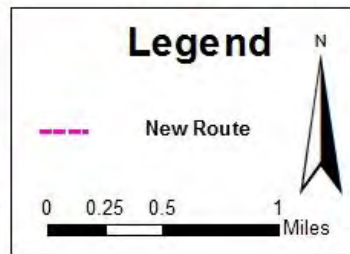
**ANNUAL POPULATION GROWTH RATES FROM HISTORICAL DATA AND PROJECTIONS**

	60 - 70	70 - 80	80 - 90	90 - 00	05 - 10	10 - 15	15 - 20	20 - 25	25 - 30	10 - 30
	GR	GR	GR	GR	GR	GR	GR	GR	GR	GR
Kentucky	0.59%	1.29%	0.07%	0.92%	0.77%	0.71%	0.62%	0.54%	0.45%	0.53%
Bullitt Co	-	5.21%	0.93%	2.56%	1.83%	1.70%	1.56%	1.39%	1.22%	1.27%

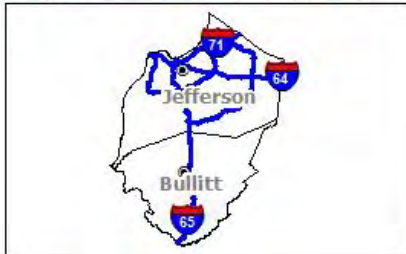
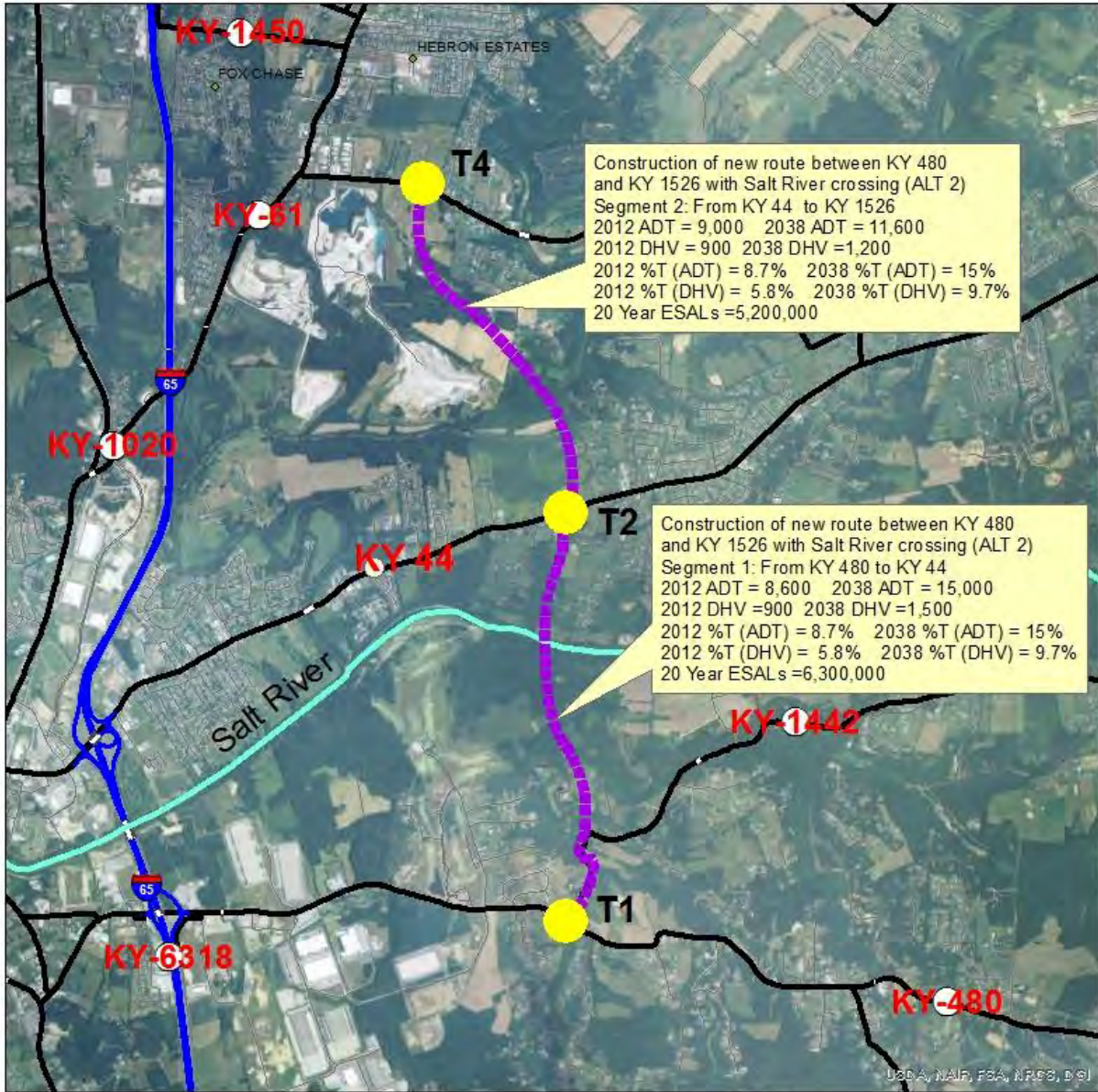
## Summary Map (ALT 1)



**Bullitt County**  
**New Route between KY 480 and**  
**KY 61**  
**Item # 5-8709.00**



## Summary Map (ALT 2)



Bullitt County  
 New Route between KY 480 and  
 KY 1526  
 Item # 5-8709.00



**Legend**

— New Route

0 0.3 0.6 1.2 Miles

## **APPENDIX A**

# **TURN MOVEMENTS ALTERNATE 1**

**2012**

**T1: NEW ROUTE @ KY 480**

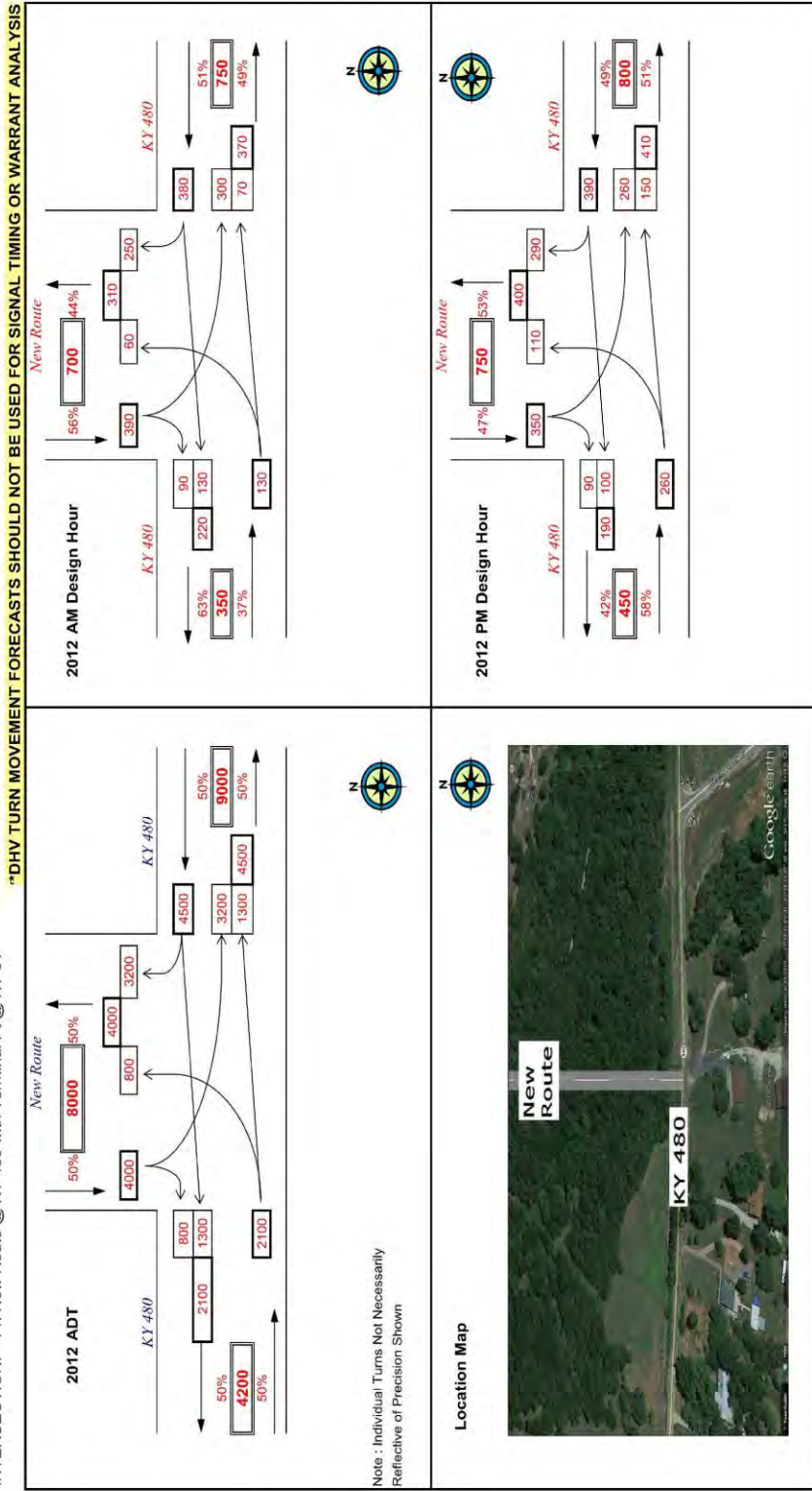
**T2: NEW ROUTE @ KY 44**

**T3: NEW ROUTE @ KY 61**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River and further North  
 ITEM NUMBER: 5-8709  
 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2013  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes  
 INTERSECTION: T1: New Route @ KY 480 with Terminal Pt @ KY 61

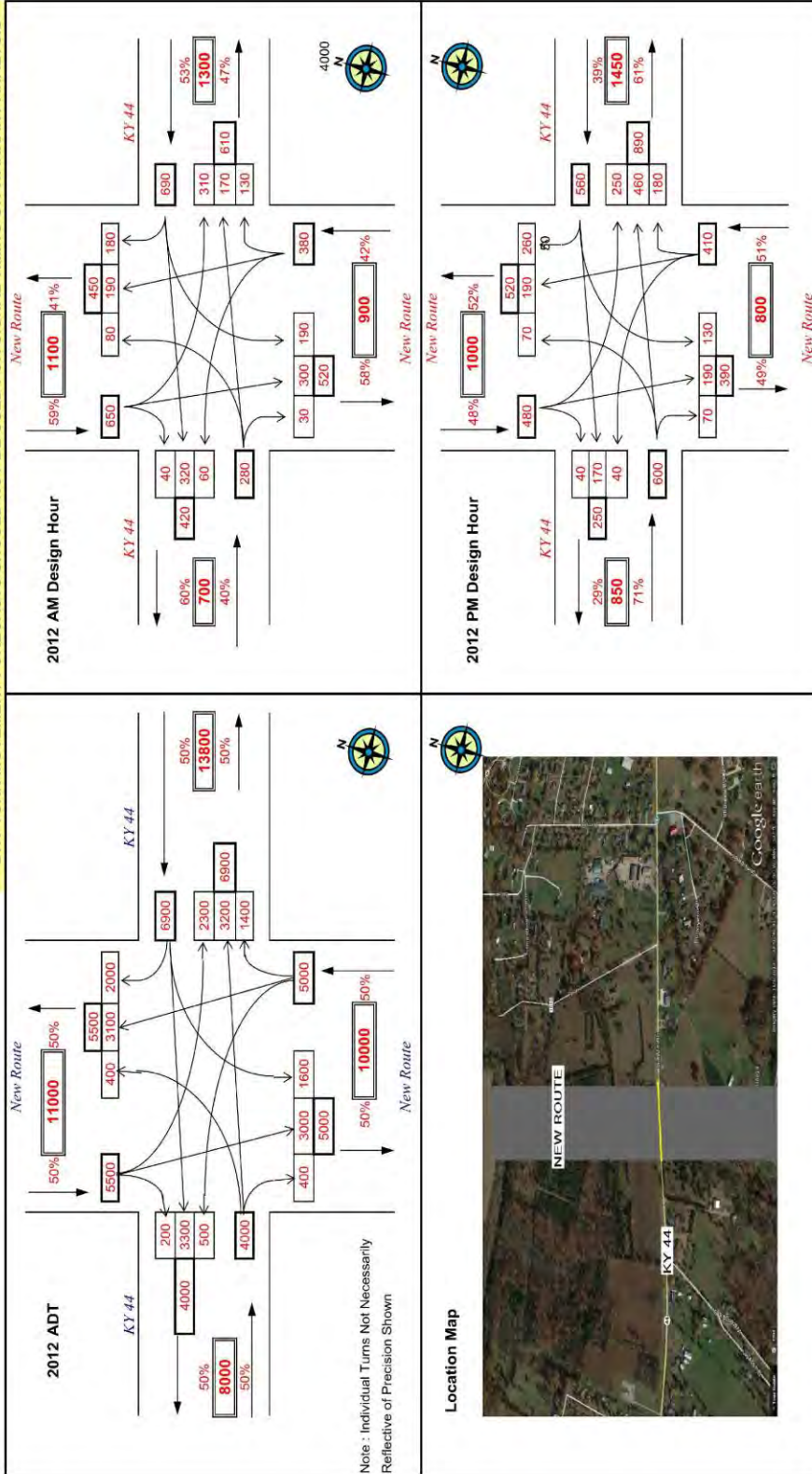


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 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2013  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes (Alt #1)  
 INTERSECTION: T2:KY 44 @ New Route with terminal pt. @ KY 61

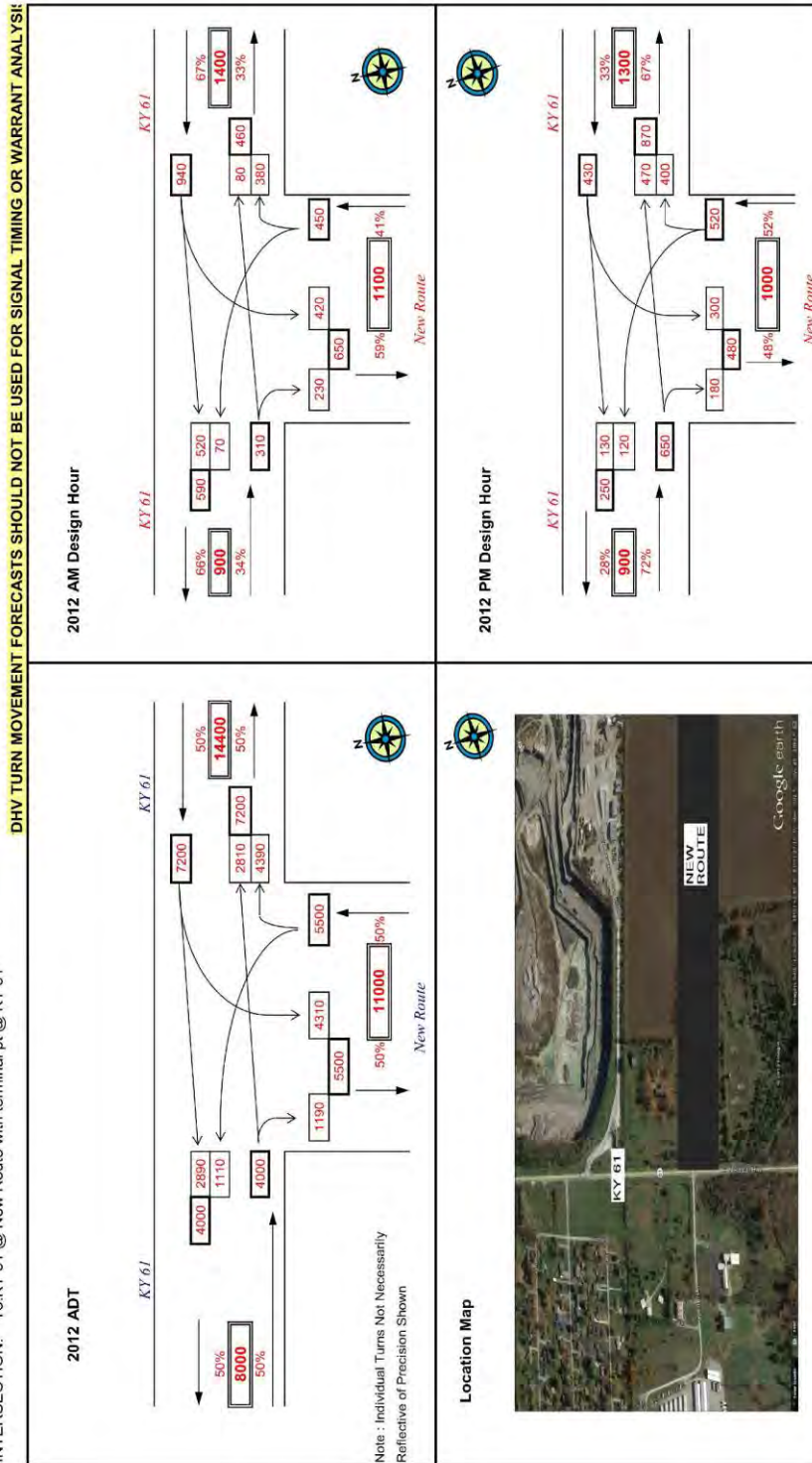
**\*\*DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS**



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 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2013  
 ANALYST: JBALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes (Alt #1)  
 INTERSECTION: T3:KY 61 @ New Route with terminal pt @ KY 61





## **2038**

### **ALTERNATE 1**

**T1: NEW ROUTE @ KY 480**

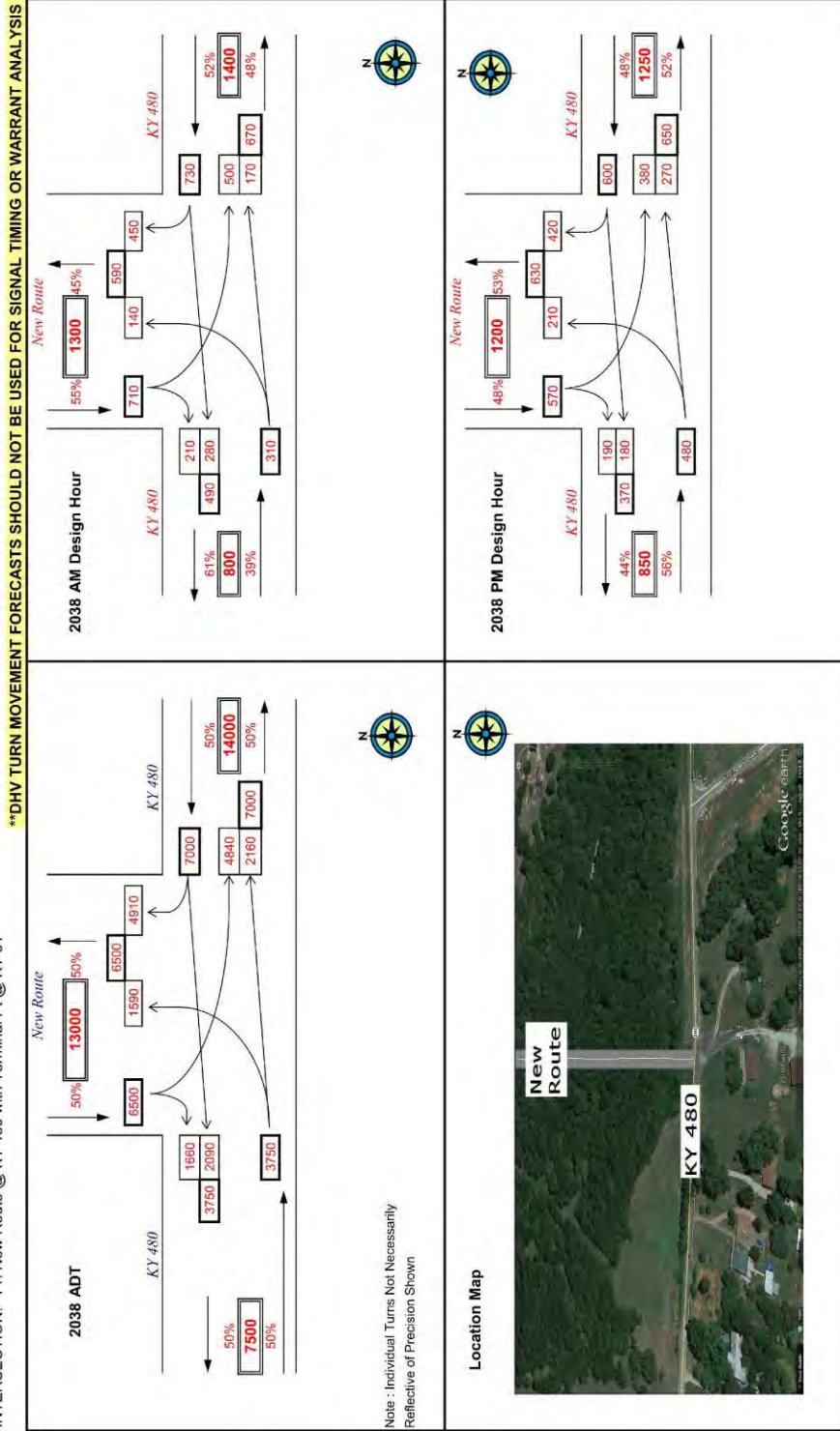
**T2: NEW ROUTE @ KY 44**

**T3: NEW ROUTE @ KY 61**

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 ITEM NUMBER: 5-8709  
 MARS NUMBER: 8763101  
 REQUEST DATE: 12/5/2013  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes  
 INTERSECTION: T1: New Route @ KY 480 with Terminal Pt @ KY 61

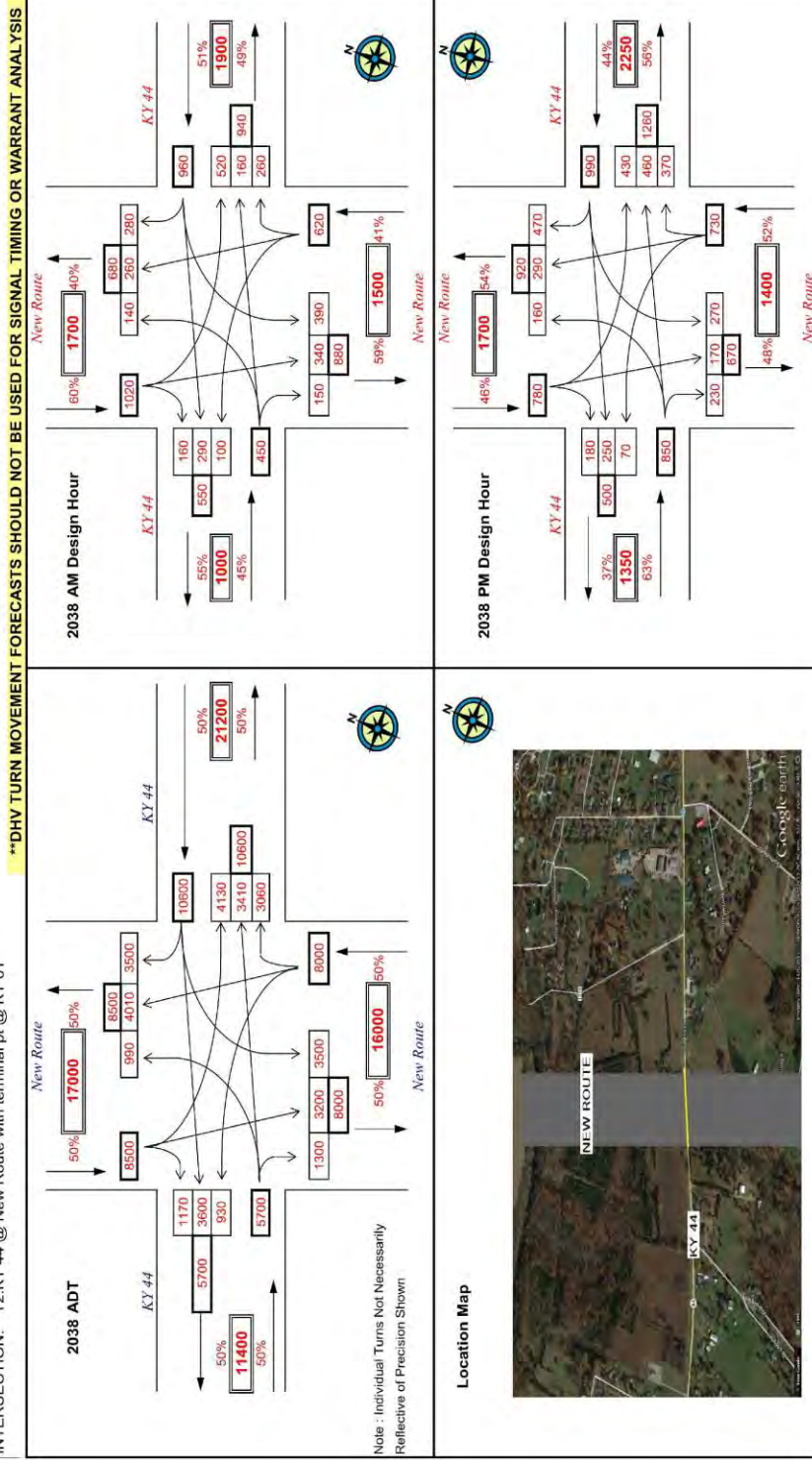


Traffic Forecast Technical Report

Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
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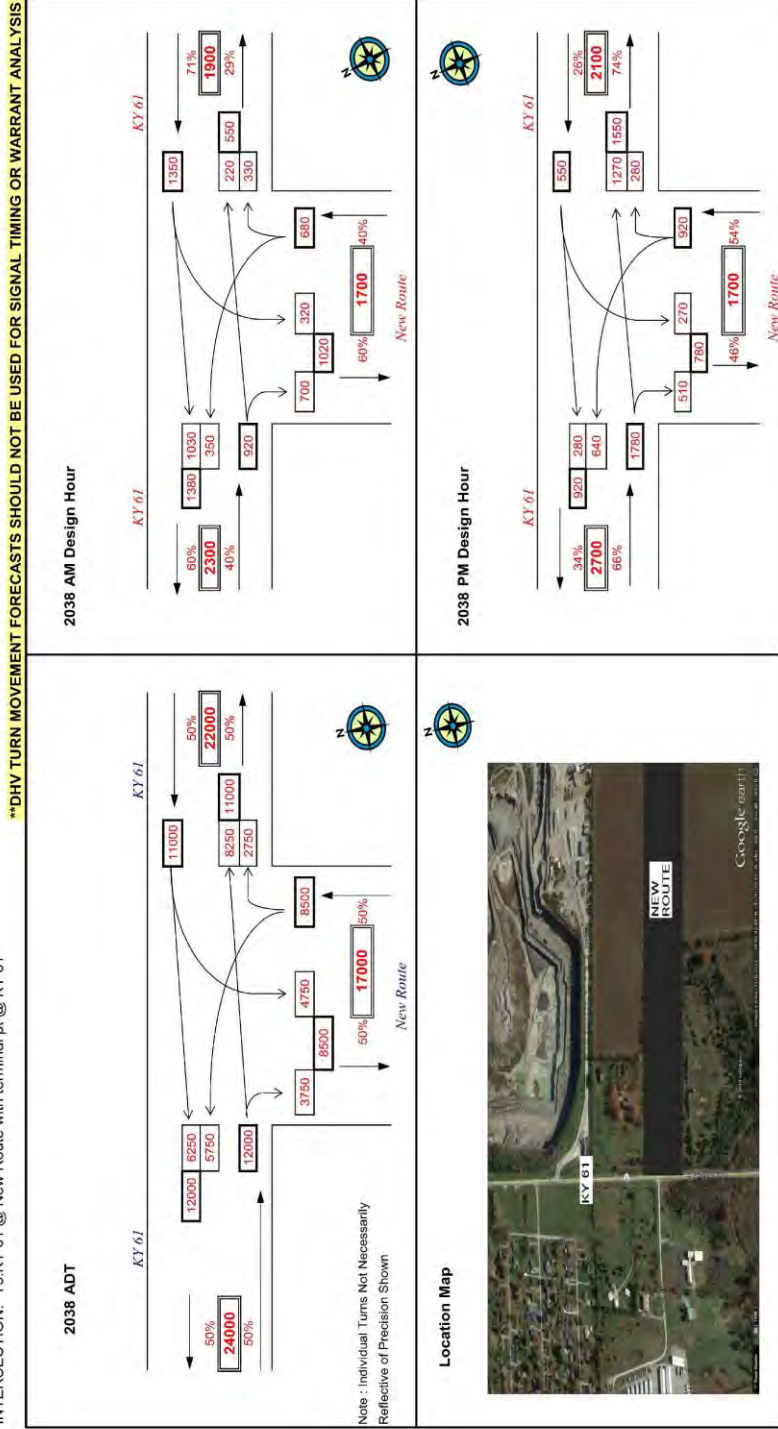
PROJECT: New Route Across Salt River and further north  
 ITEM NUMBER: 5-8709  
 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2013  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes (Alt #1)  
 INTERSECTION: T2:KY 44 @ New Route with terminal pt @ KY 61



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 ITEM NUMBER: 5-8709  
 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2013  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes (Alt #1)  
 INTERSECTION: T3:KY 61 @ New Route with terminal pt @ KY 61



# **TURN MOVEMENTS ALTERNATE 2**

**2012**

**T1: NEW ROUTE @ KY 480**

**T2: NEW ROUTE @ KY 44**

**T4: NEW ROUTE @ KY 1526**

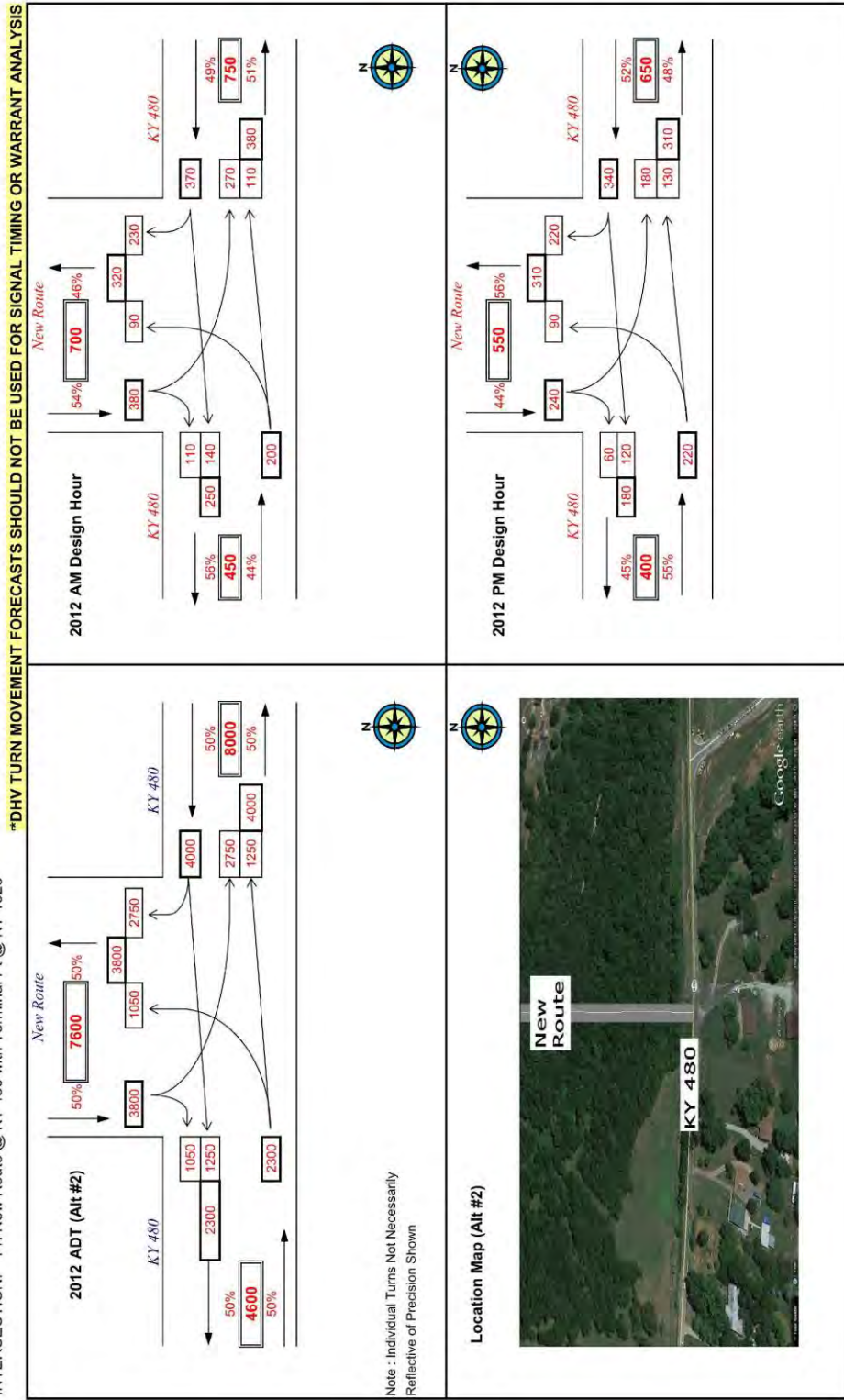
Traffic Forecast Technical Report

Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44

Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River and further North  
 ITEM NUMBER: 5-8709  
 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2013  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes (Alt #2)  
 INTERSECTION: T1: New Route @ KY 480 with Terminal Pt @ KY 1526

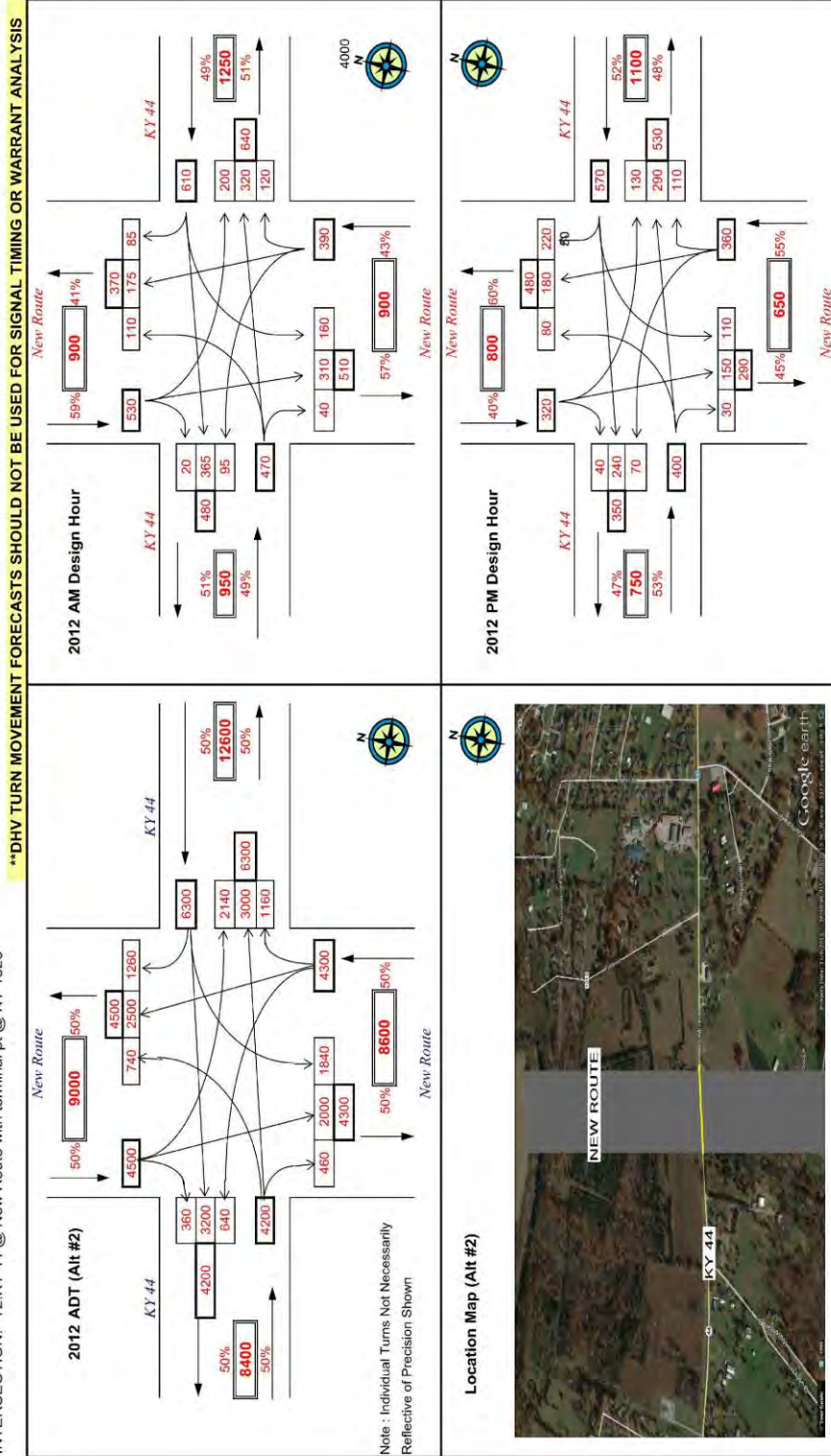


Traffic Forecast Technical Report

Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
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 ITEM NUMBER: 5-8709  
 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2012  
 ANALYST: JBALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes (Alt #2)  
 INTERSECTION: T2:KY 44 @ New Route with terminal pt @ KY 1526



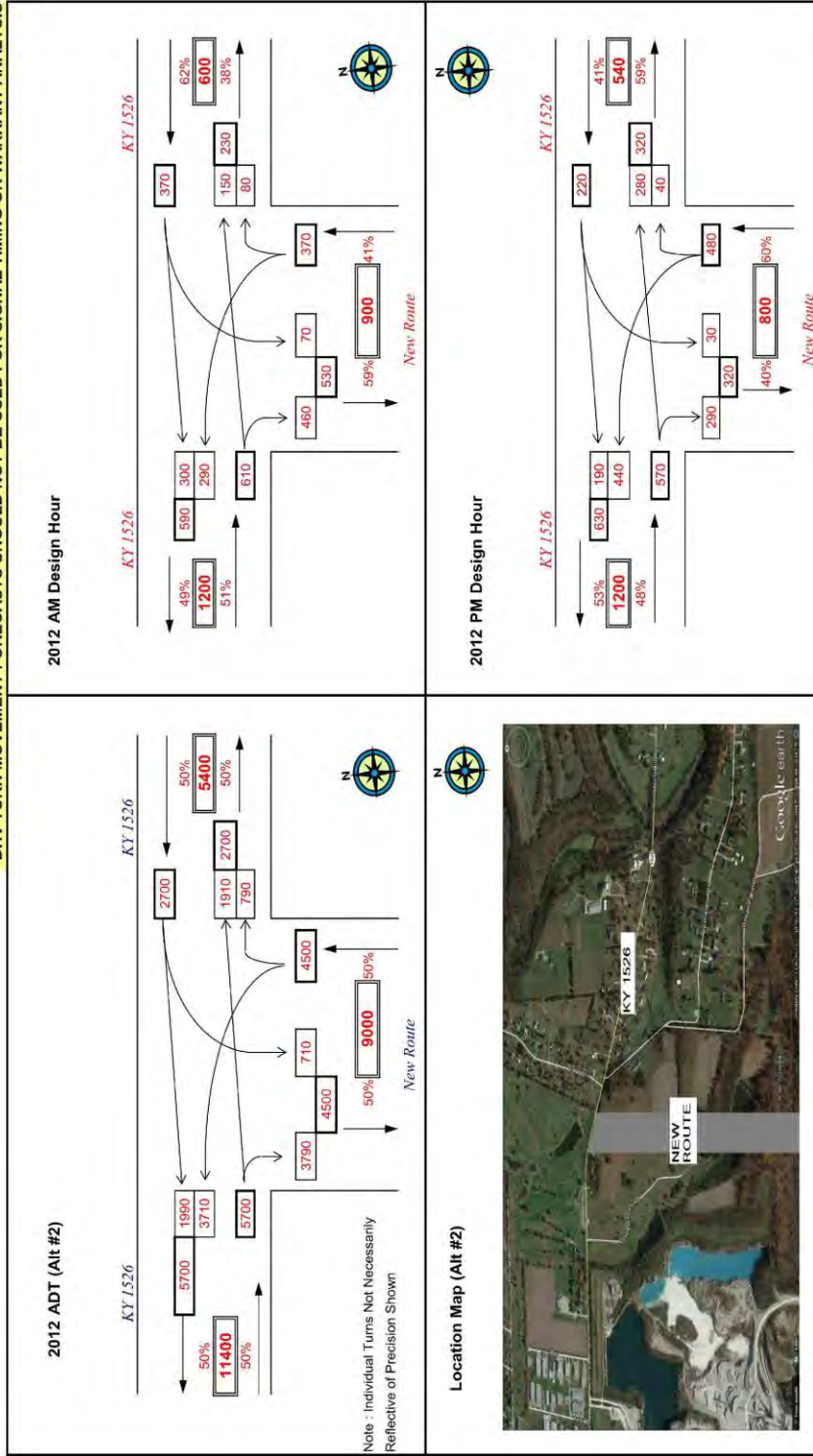
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 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2012  
 ANALYST: JBALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes (Alt #2)  
 INTERSECTION: 14:KY 1526 @ New Route

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





## **2038**

### **ALTERNATE 2**

**T1: NEW ROUTE @ KY 480**

**T2: NEW ROUTE @ KY 44**

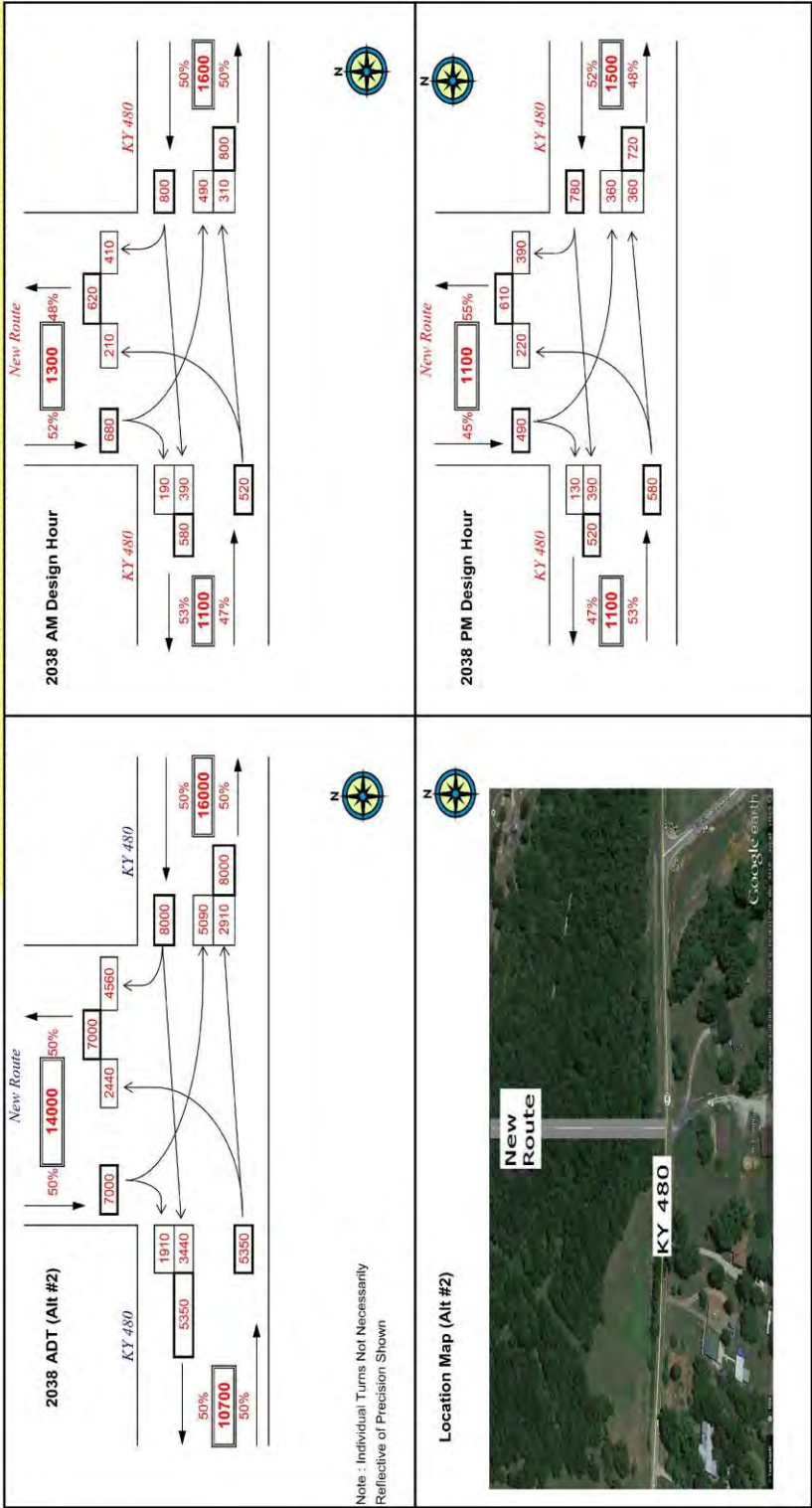
**T4: NEW ROUTE @ KY 1526**

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 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

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 MARS NUMBER: 8753101  
 REQUEST DATE: 12/5/2013  
 ANALYST: JBALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes (Alt #2)  
 INTERSECTION: T1: New Route @ KY 480 with Terminal PI @ KY 1526

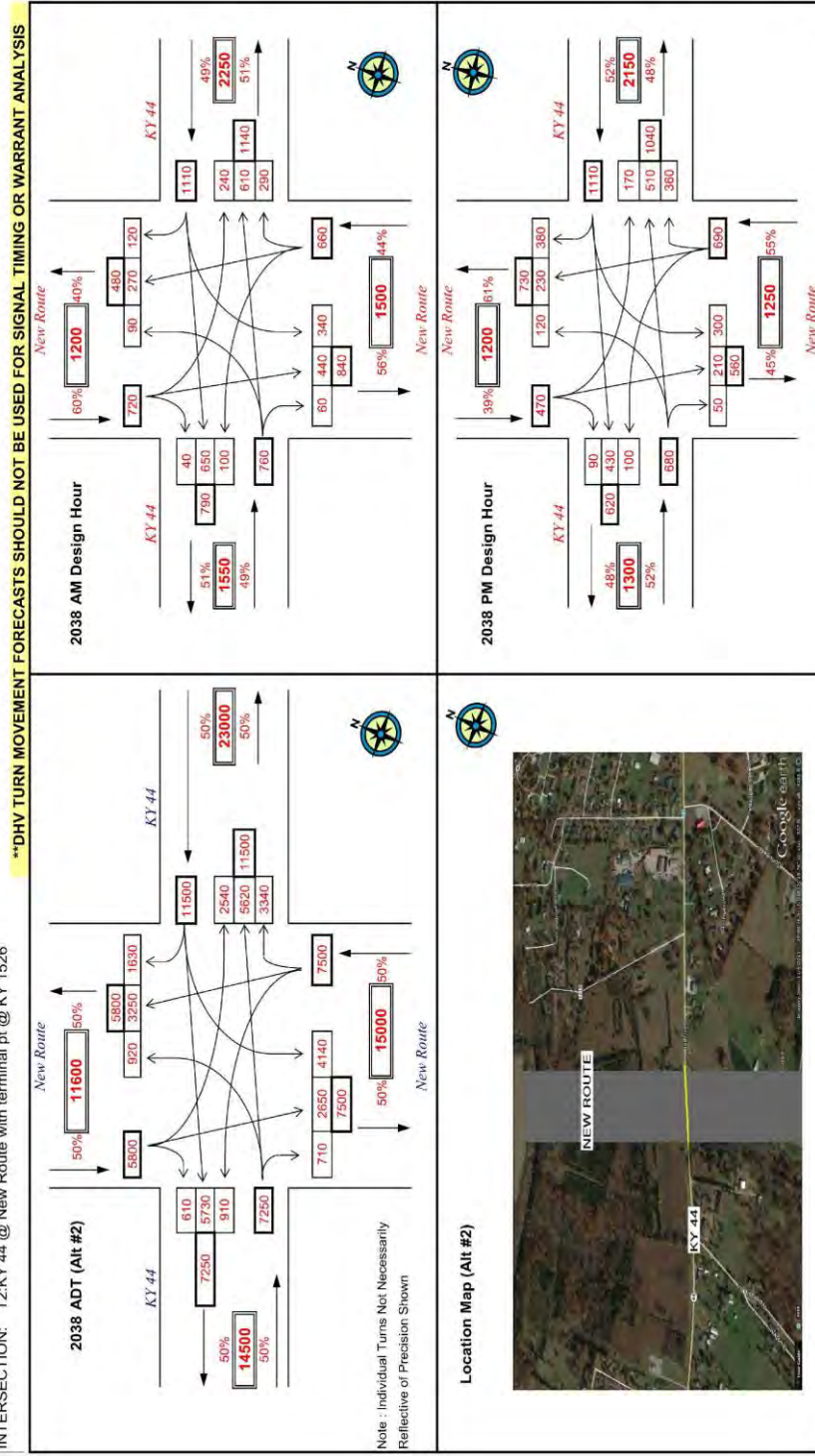
**"DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS"**



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 MARS NUMBER: 8753101  
 REQUEST DATE: 12/15/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes (Alt #2)  
 INTERSECTION: T2:KY 44 @ New Route with terminal pt @ KY 1526

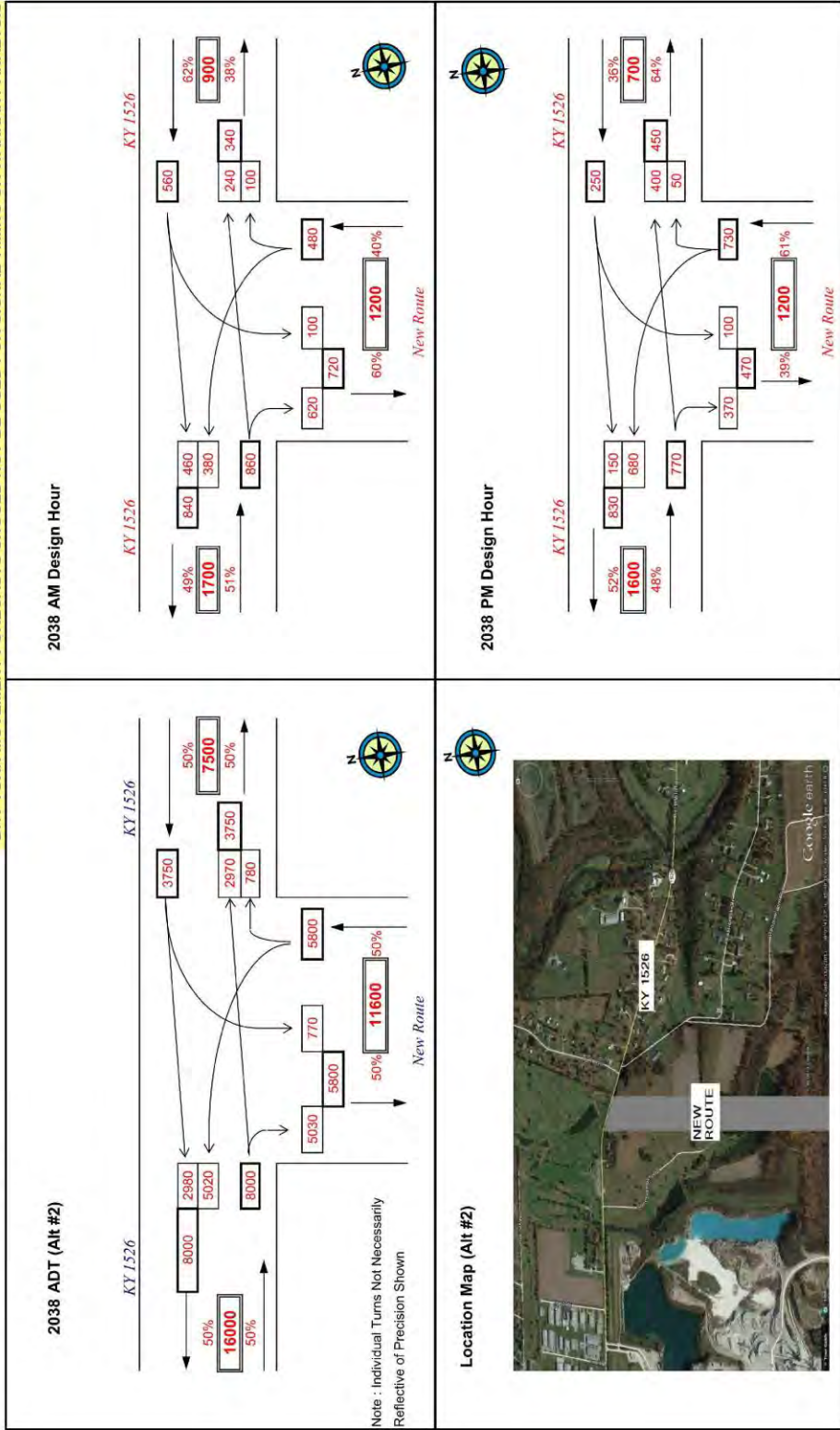


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PROJECT: New Route Across Salt River and further north  
 ITEM NUMBER: 5-8709  
 MARS NUMBER: 8753101  
 REQUEST DATE: 12/15/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes (Alt #2)  
 INTERSECTION: T4:KY 1526 @ New Route

NOTE: AM and PM DHV's represent 30th highest hour estimates for each turn maneuver.

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## **APPENDIX B**

### **ESAL FORECAST SUMMARY SHEETS**

*Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	03/21/14
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	8753101
Project Description	New route from KY 480 to KY 61 across Salt River and KY 44	Item No.	5-8709.00
Scenario	Build (Alt 1)	Route No.	Alt #1
Segment Description	New route from KY 480 to KY 44	Beg. MP	-
		End MP	-
		T.F. No.	13-057
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	10.1%
Traffic Volume	015A53,015253,015A43,KIPDA	K-Factor Source	F.C
Milepoint	1.8,4.0,15.6	PHF	0.85
Truck Percent	2007 Aggregated ESALS	Full Route Unique Identifier	
Milepoint	N/A		N/A
ESAL Information	0		
Growth Rate	1.90%		

**TRAFFIC PARAMETERS:**

	Present Year	Growth Rate	Construction Year	Median Year	Design Year
	2012		2018	2028	2038
Volume (AADT)	10000	1.90%	11000	14000	16000
Percent Trucks (%T)	8.7%	2.0%	10%	12%	15%
Number of Trucks	870	3.9%	1100	1700	2400
Percent Trucks Hauling Coal (%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>					
Axles/Truck (A/T)	3.100	1.00%	3.291	3.635	4.015
ESALs/Axle (ESAL/A)	0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>					
Axles/Truck (A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 6,800,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

**Segment 1: New Route Across Salt River from KY 480 to KY 44 (Alt 1)**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALs
2018	11,196	90.2%	9.8%	10099	1097	0.00%	3.29	0.23	0	0	0.500	157,586
2019	11,408	90.0%	10.0%	10268	1140	0.00%	3.32	0.23	0	0	0.500	168,241
2020	11,625	89.8%	10.2%	10440	1185	0.00%	3.36	0.23	0	0	0.500	179,641
2021	11,846	89.6%	10.4%	10614	1232	0.00%	3.39	0.24	0	0	0.500	191,839
2022	12,071	89.4%	10.6%	10791	1280	0.00%	3.42	0.24	0	0	0.500	204,891
2023	12,300	89.2%	10.8%	10970	1331	0.00%	3.46	0.25	0	0	0.500	218,857
2024	12,534	89.0%	11.0%	11151	1383	0.00%	3.49	0.25	0	0	0.500	233,803
2025	12,772	88.7%	11.3%	11335	1437	0.00%	3.53	0.26	0	0	0.500	249,796
2026	13,015	88.5%	11.5%	11521	1494	0.00%	3.56	0.26	0	0	0.500	266,912
2027	13,262	88.3%	11.7%	11709	1553	0.00%	3.60	0.27	0	0	0.500	285,229
2028	13,514	88.1%	11.9%	11900	1614	0.00%	3.63	0.27	0	0	0.500	304,832
2029	13,771	87.8%	12.2%	12093	1678	0.00%	3.67	0.28	0	0	0.500	325,813
2030	14,033	87.6%	12.4%	12289	1744	0.00%	3.71	0.29	0	0	0.500	348,268
2031	14,299	87.3%	12.7%	12487	1812	0.00%	3.75	0.29	0	0	0.500	372,302
2032	14,571	87.1%	12.9%	12687	1884	0.00%	3.78	0.30	0	0	0.500	398,026
2033	14,848	86.8%	13.2%	12890	1958	0.00%	3.82	0.30	0	0	0.500	425,559
2034	15,130	86.5%	13.5%	13095	2035	0.00%	3.86	0.31	0	0	0.500	455,031
2035	15,417	86.3%	13.7%	13302	2115	0.00%	3.90	0.32	0	0	0.500	486,576
2036	15,710	86.0%	14.0%	13512	2198	0.00%	3.94	0.32	0	0	0.500	520,343
2037	16,009	85.7%	14.3%	13724	2285	0.00%	3.98	0.33	0	0	0.500	556,488
2038	16,313	85.4%	14.6%	13938	2375	0.00%	4.02	0.33	0	0	0.500	595,180

5-yr ESALs  
1,000,000

10-yr ESALs  
2,300,000

15-yr ESALs  
4,200,000

20-yr ESALs  
6,800,000

*Traffic Forecast Technical Report*  
*Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44*  
*Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	03/21/14
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	8753101
Project Description	New route from KY 480 to KY 61 across Salt River and KY 44	Item No.	5-8709.00
Scenario	Build (Alt 1)	Route No.	Alt #1
Segment Description	New route from KY 44 to KY 61	Beg. MP	-
		End MP	-
		T.F. No.	13-057
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	10.1%
Traffic Volume	015A43,KIPDA,015759	K-Factor Source	F.C
Milepoint	15.6, 17.7	PHF	0.85
Truck Percent	2007 Aggregated ESALS	Full Route Unique Identifier	
Milepoint	N/A		N/A
ESAL Information	0		
Growth Rate	1.80%		

**TRAFFIC PARAMETERS:**

	Present Year	Growth Rate	Construction Year	Median Year	Design Year
	2012		2018	2028	2038
Volume (AADT)	11000	1.80%	12000	15000	17000
Percent Trucks (%T)	8.7%	2.0%	10%	12%	15%
Number of Trucks	960	3.8%	1200	1800	2600
Percent Trucks Hauling Coal (%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>					
Axes/Truck (A/T)	3.100	1.00%	3.291	3.635	4.015
ESALs/Axle (ESAL/A)	0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>					
Axes/Truck (A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 7,300,000

General Comments:



Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

**Segment 2: New Route Across Salt River from KY 480 to KY 44 (Alt 1)**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALS
2018	12,243	90.2%	9.8%	11043	1199	0.00%	3.29	0.23	0	0	0.500	172,327
2019	12,463	90.0%	10.0%	11218	1246	0.00%	3.32	0.23	0	0	0.500	183,797
2020	12,687	89.8%	10.2%	11394	1293	0.00%	3.36	0.23	0	0	0.500	196,059
2021	12,916	89.6%	10.4%	11573	1343	0.00%	3.39	0.24	0	0	0.500	209,166
2022	13,148	89.4%	10.6%	11754	1394	0.00%	3.42	0.24	0	0	0.500	223,178
2023	13,385	89.2%	10.8%	11937	1448	0.00%	3.46	0.25	0	0	0.500	238,157
2024	13,626	89.0%	11.0%	12122	1503	0.00%	3.49	0.25	0	0	0.500	254,170
2025	13,871	88.7%	11.3%	12310	1561	0.00%	3.53	0.26	0	0	0.500	271,291
2026	14,121	88.5%	11.5%	12500	1621	0.00%	3.56	0.26	0	0	0.500	289,595
2027	14,375	88.3%	11.7%	12692	1683	0.00%	3.60	0.27	0	0	0.500	309,165
2028	14,634	88.1%	11.9%	12886	1748	0.00%	3.63	0.27	0	0	0.500	330,089
2029	14,897	87.8%	12.2%	13082	1815	0.00%	3.67	0.28	0	0	0.500	352,462
2030	15,165	87.6%	12.4%	13281	1884	0.00%	3.71	0.29	0	0	0.500	376,384
2031	15,438	87.3%	12.7%	13482	1957	0.00%	3.75	0.29	0	0	0.500	401,963
2032	15,716	87.1%	12.9%	13684	2032	0.00%	3.78	0.30	0	0	0.500	429,315
2033	15,999	86.8%	13.2%	13889	2110	0.00%	3.82	0.30	0	0	0.500	458,562
2034	16,287	86.5%	13.5%	14096	2191	0.00%	3.86	0.31	0	0	0.500	489,838
2035	16,580	86.3%	13.7%	14306	2275	0.00%	3.90	0.32	0	0	0.500	523,283
2036	16,879	86.0%	14.0%	14517	2362	0.00%	3.94	0.32	0	0	0.500	559,048
2037	17,183	85.7%	14.3%	14730	2453	0.00%	3.98	0.33	0	0	0.500	597,295
2038	17,492	85.4%	14.6%	14945	2547	0.00%	4.02	0.33	0	0	0.500	638,196

5-yr ESALS  
1,100,000

10-yr ESALS  
2,500,000

15-yr ESALS  
4,500,000

20-yr ESALS  
7,300,000

*Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	04/08/14
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	8753101
Project Description	New route from KY 480 to KY 1526 across Salt River and KY 44	Item No.	5-8709.00
Scenario	Build (Alt 2)	Route No.	Alt #2
Segment Description	New route from KY 480 to KY 44	Beg. MP	-
		End MP	-
		T.F. No.	13-057
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	10.1%
Traffic Volume Milepoint	015A53,015253,015A43,KIPDA 1.8,4.0,15.6	K-Factor Source	F.C
Truck Percent Milepoint	2007 Aggregated ESALS N/A	PHF	0.85
ESAL Information	0	Full Route Unique Identifier	N/A
Growth Rate	2.30%		

**TRAFFIC PARAMETERS:**

	Present Year	Growth Rate	Construction Year	Median Year	Design Year
	2012		2018	2028	2038
Volume (AADT)	8600	2.30%	9900	12000	15000
Percent Trucks (%T)	8.7%	2.0%	10%	12%	15%
Number of Trucks	750	4.3%	990	1400	2300
Percent Trucks Hauling Coal (%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>					
Axles/Truck (A/T)	3.100	1.00%	3.291	3.635	4.015
ESALs/Axle (ESAL/A)	0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>					
Axles/Truck (A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 6,300,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

**Segment 1: New Route Across Salt River from KY 480 to KY 44 (Alt 2)**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AXT	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALs
2018	9,857	90.2%	9.8%	8891	966	0.00%	3.29	0.23	0	0	0.500	138,747
2019	10,084	90.0%	10.0%	9076	1008	0.00%	3.32	0.23	0	0	0.500	148,710
2020	10,316	89.8%	10.2%	9264	1052	0.00%	3.36	0.23	0	0	0.500	159,410
2021	10,553	89.6%	10.4%	9456	1097	0.00%	3.39	0.24	0	0	0.500	170,902
2022	10,796	89.4%	10.6%	9651	1145	0.00%	3.42	0.24	0	0	0.500	183,246
2023	11,044	89.2%	10.8%	9849	1195	0.00%	3.46	0.25	0	0	0.500	196,506
2024	11,298	89.0%	11.0%	10052	1247	0.00%	3.49	0.25	0	0	0.500	210,749
2025	11,558	88.7%	11.3%	10257	1301	0.00%	3.53	0.26	0	0	0.500	226,049
2026	11,824	88.5%	11.5%	10466	1357	0.00%	3.56	0.26	0	0	0.500	242,486
2027	12,096	88.3%	11.7%	10679	1416	0.00%	3.60	0.27	0	0	0.500	260,144
2028	12,374	88.1%	11.9%	10896	1478	0.00%	3.63	0.27	0	0	0.500	279,115
2029	12,659	87.8%	12.2%	11116	1542	0.00%	3.67	0.28	0	0	0.500	299,496
2030	12,950	87.6%	12.4%	11341	1609	0.00%	3.71	0.29	0	0	0.500	321,394
2031	13,248	87.3%	12.7%	11569	1679	0.00%	3.75	0.29	0	0	0.500	344,922
2032	13,552	87.1%	12.9%	11800	1752	0.00%	3.78	0.30	0	0	0.500	370,202
2033	13,864	86.8%	13.2%	12036	1828	0.00%	3.82	0.30	0	0	0.500	397,364
2034	14,183	86.5%	13.5%	12275	1908	0.00%	3.86	0.31	0	0	0.500	426,551
2035	14,509	86.3%	13.7%	12519	1990	0.00%	3.90	0.32	0	0	0.500	457,913
2036	14,843	86.0%	14.0%	12766	2077	0.00%	3.94	0.32	0	0	0.500	491,613
2037	15,184	85.7%	14.3%	13017	2167	0.00%	3.98	0.33	0	0	0.500	527,826
2038	15,533	85.4%	14.6%	13272	2261	0.00%	4.02	0.33	0	0	0.500	566,741

5-yr ESALs  
900,000

10-yr ESALs  
2,100,000

15-yr ESALs  
3,800,000

20-yr ESALs  
6,300,000

*Traffic Forecast Technical Report*  
*Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44*  
*Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	04/08/14
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	8753101
Project Description	New route from KY 480 to KY 1526 across Salt River and KY 44	Item No.	5-8709.00
Scenario	Build (Alt 2)	Route No.	Alt #2
Segment Description	New route from KY 44 to KY 1526	Beg. MP	-
		End MP	-
		T.F. No.	13-057
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	10.1%
Traffic Volume	015A43,KIPDA,015769,015006	K-Factor Source	F.C
Milepoint	15.6, 13.3,15.6	PHF	0.85
Truck Percent	2007 Aggregated ESALS	Full Route Unique Identifier	
Milepoint	N/A		N/A
ESAL Information	0		
Growth Rate	1.00%		

**TRAFFIC PARAMETERS:**

	Present Year	Growth Rate	Construction Year	Median Year	Design Year
	2012		2018	2028	2038
Volume (AADT)	9000	1.00%	9600	11000	11600
Percent Trucks (%T)	8.7%	2.0%	10%	12%	15%
Number of Trucks	780	3.0%	960	1300	1700
Percent Trucks Hauling Coal (%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>					
Axles/Truck (A/T)	3.100	1.00%	3.291	3.635	4.015
ESALs/Axle (ESAL/A)	0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>					
Axles/Truck (A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 5,200,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

**Segment 2: New Route Across Salt River from KY 44 to KY 1526 (Alt 2)**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALS
2018	9,554	90.2%	9.8%	8618	936	0.00%	3.29	0.23	0	0	0.500	134,476
2019	9,649	90.0%	10.0%	8685	964	0.00%	3.32	0.23	0	0	0.500	142,300
2020	9,746	89.8%	10.2%	8752	993	0.00%	3.36	0.23	0	0	0.500	150,600
2021	9,843	89.6%	10.4%	8820	1023	0.00%	3.39	0.24	0	0	0.500	159,406
2022	9,942	89.4%	10.6%	8887	1054	0.00%	3.42	0.24	0	0	0.500	168,747
2023	10,041	89.2%	10.8%	8955	1086	0.00%	3.46	0.25	0	0	0.500	178,658
2024	10,141	89.0%	11.0%	9022	1119	0.00%	3.49	0.25	0	0	0.500	189,172
2025	10,243	88.7%	11.3%	9090	1153	0.00%	3.53	0.26	0	0	0.500	200,328
2026	10,345	88.5%	11.5%	9158	1188	0.00%	3.56	0.26	0	0	0.500	212,164
2027	10,449	88.3%	11.7%	9225	1223	0.00%	3.60	0.27	0	0	0.500	224,721
2028	10,553	88.1%	11.9%	9293	1260	0.00%	3.63	0.27	0	0	0.500	238,045
2029	10,659	87.8%	12.2%	9360	1298	0.00%	3.67	0.28	0	0	0.500	252,181
2030	10,765	87.6%	12.4%	9428	1338	0.00%	3.71	0.29	0	0	0.500	267,181
2031	10,873	87.3%	12.7%	9495	1378	0.00%	3.75	0.29	0	0	0.500	283,096
2032	10,982	87.1%	12.9%	9562	1420	0.00%	3.78	0.30	0	0	0.500	299,984
2033	11,092	86.8%	13.2%	9629	1463	0.00%	3.82	0.30	0	0	0.500	317,902
2034	11,202	86.5%	13.5%	9696	1507	0.00%	3.86	0.31	0	0	0.500	336,916
2035	11,314	86.3%	13.7%	9762	1552	0.00%	3.90	0.32	0	0	0.500	357,091
2036	11,428	86.0%	14.0%	9828	1599	0.00%	3.94	0.32	0	0	0.500	378,499
2037	11,542	85.7%	14.3%	9894	1647	0.00%	3.98	0.33	0	0	0.500	401,216
2038	11,657	85.4%	14.6%	9960	1697	0.00%	4.02	0.33	0	0	0.500	425,322

5-yr ESALS  
800,000

10-yr ESALS  
1,900,000

15-yr ESALS  
3,300,000

20-yr ESALS  
5,200,000

## **APPENDIX C**

### **PREVIOUS FORECAST**

## *Executive Summary*

**Traffic Forecast Report  
Bullitt County  
New Route across Salt River between KY 44 and  
KY 480  
Item No. 5-8709.00**

Prepared for:



Prepared by:  
**Jayalakshmi Balaji**  
Division of Planning  
Kentucky Transportation Cabinet  
April 15, 2014

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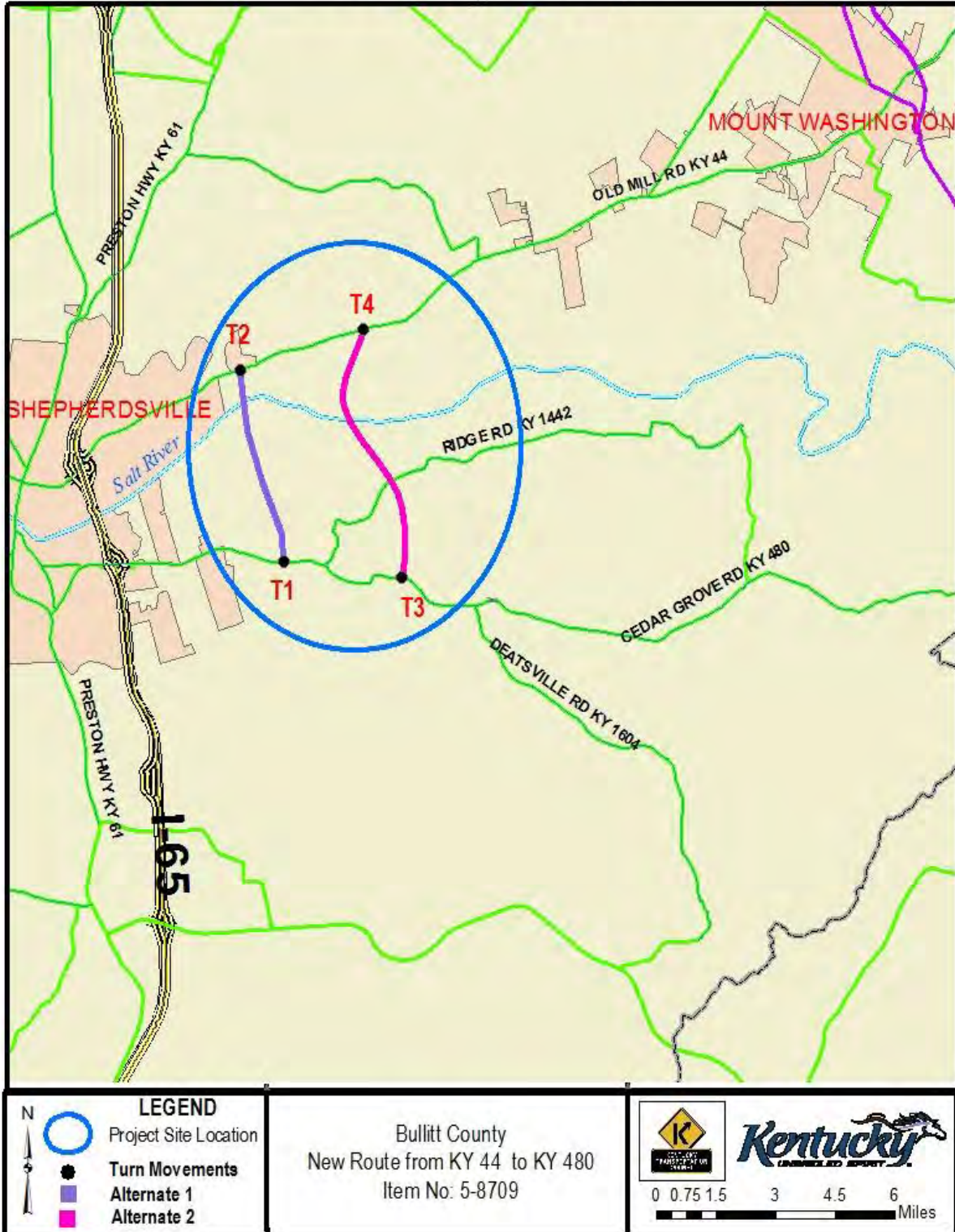
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## **Commonly Used Abbreviations and their Descriptions**

ADT	Average Daily Traffic	Without any adjustment
DHV	Design Hour Volume	30 <sup>th</sup> 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	Considers a 15 minute spike in an hourly count
K-Factor	K-30 <sup>th</sup> hour Factor	DHV divided by ADT (DHV/ADT)
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



# Vicinity Map



## **Traffic Forecast Executive Summary**

### **Bullitt County: Construction of New route across Salt River**

### **Item No. 5-8709.00**

#### **FORECAST SUMMARY**

The project calls for the construction of a new route between KY 44 and KY 480, east of I-65 in Bullitt County. The purpose of this report is to analyze future traffic utilizing the new route. This forecast includes a build scenario for 2 alternate routes as well as a no-build scenario. Special counts were requested for this forecast. In addition, the KIPDA model was used in conjunction with the counts to forecast the build scenarios. The KIPDA model was run with and without the projects listed in the 2030 Metropolitan Transportation Plan (MTP) and the percentage change in modeled traffic created by the model was used for each alternate route with the respective scenario. The forecast will be used for the phase II design of this project to help determine turn lane configurations, pavement thickness, number of lanes, etc.

#### **FORECAST TYPE**

The following types of forecasts were developed for both alternate routes:

- 2012 and 2038 Build with and w/o MTP and No Build truck percent forecasts (light/heavy, ADT, DHV).
- 2012 and 2038 Build with and w/o MTP and No Build ADT and DHV values.
- 2012 and 2038 Daily and Design Hour Build Turn Movements with all MTP projects.
- 2012 and 2038 Daily and Design Hour Build w/o MTP Turn Movements.
- 20-year ESALs for build and no build scenarios.

#### **CURRENT-YEAR VOLUMES**

Current year no-build volumes were based upon recent class counts as well as the special counts done for this forecast. These counts are shown in the count map on page 6. Two scenarios were created in the KIPDA traffic model for both alternate routes (Alternate #1 approximately one mile east of Zappos and Alternate # 2 approximately 2.5 miles east of Zappos) to generate a volume for the new routes for the build scenario. One with all the MTP projects in KIPDA and another without three of the major MTP projects which would be:

- The planned interchange on I-65 @ KY 61 north of Shepherdsville
- The new NW Mt. Washington Connector project that would make a direct connection between KY 44 and US 31E
- The major widening of KY 44 from I-65 to east of US 31E.

The existing counts were used to create a chart that revealed volumes for the forecast area. Then a select link analyses was done for the new route using the KIPDA model to forecast diversionary percentages of the traffic. These percentages were then applied to existing counts to add or subtract traffic volume and arrive at the traffic volume for the new routes. Difference between the model and counts were also recorded which were used later in adjusting the KIPDA model future volumes.

### **DESIGN-YEAR GROWTH FACTORS**

Multiple sources were analyzed to develop a growth rate. Extensive trend line analysis was conducted along KY 44 and KY 480 for various count stations between Shepherdsville and Mount Washington. These stations showed growth rates ranging from 1.9% to 2.2%. However population forecasts for Bullitt County performed by the Kentucky State Data Center estimates the population of Bullitt County to grow at a rate of 1.54% annually for the next twenty years. The Bullitt County Joint Planning Commission was contacted to determine how much more development was likely to occur in the future, around KY 44 and KY 480, nearby the project area. The Planning Commission provided proposed developments and future land use map for the whole corridor. They projected a large quantity of residential developments, some business, and light industry developments to be built in this area. The KIPDA model with analysis years of 2012 and 2030 was then studied for the various scenarios. Ultimately, growth rates were derived from the change in volume with the KIPDA model scenarios. The growth rates used for the forecast are:

Scenarios	Growth Rates in Forecast
No Build	1.9( KY 44), 2.1 (KY 480)
Build with MTP	2.4
Build w/o MTP	2

### **DESIGN HOUR FACTORS**

DHVs were estimated by analyzing the most recent hourly volume data collected at stations 015A43 on KY 44, 015A53 and 015253 on KY 480 as well as the KIPDA model.

### **TRUCK PERCENTAGE**

Since this road is a new route and the KIPDA model doesn't have a truck component, truck percentages were calculated using functional class averages for urban arterials.

### **ESALs**

Functional class averages from ATR data, traffic counts, and the 2038 ADT projections were used to estimate 20-year ESALs on the project road segment. The 2007 aggregated ESAL report, generated by the Kentucky Transportation Center in collaboration with the Kentucky Transportation Cabinet, were used to grow the important ESAL calculation variables. For more information please see the attached ESAL calculation sheets.

## **TURN MOVEMENTS**

Four turn movements were synthesized for each scenario of each alternate route using the KIPDA model and the actual counts.

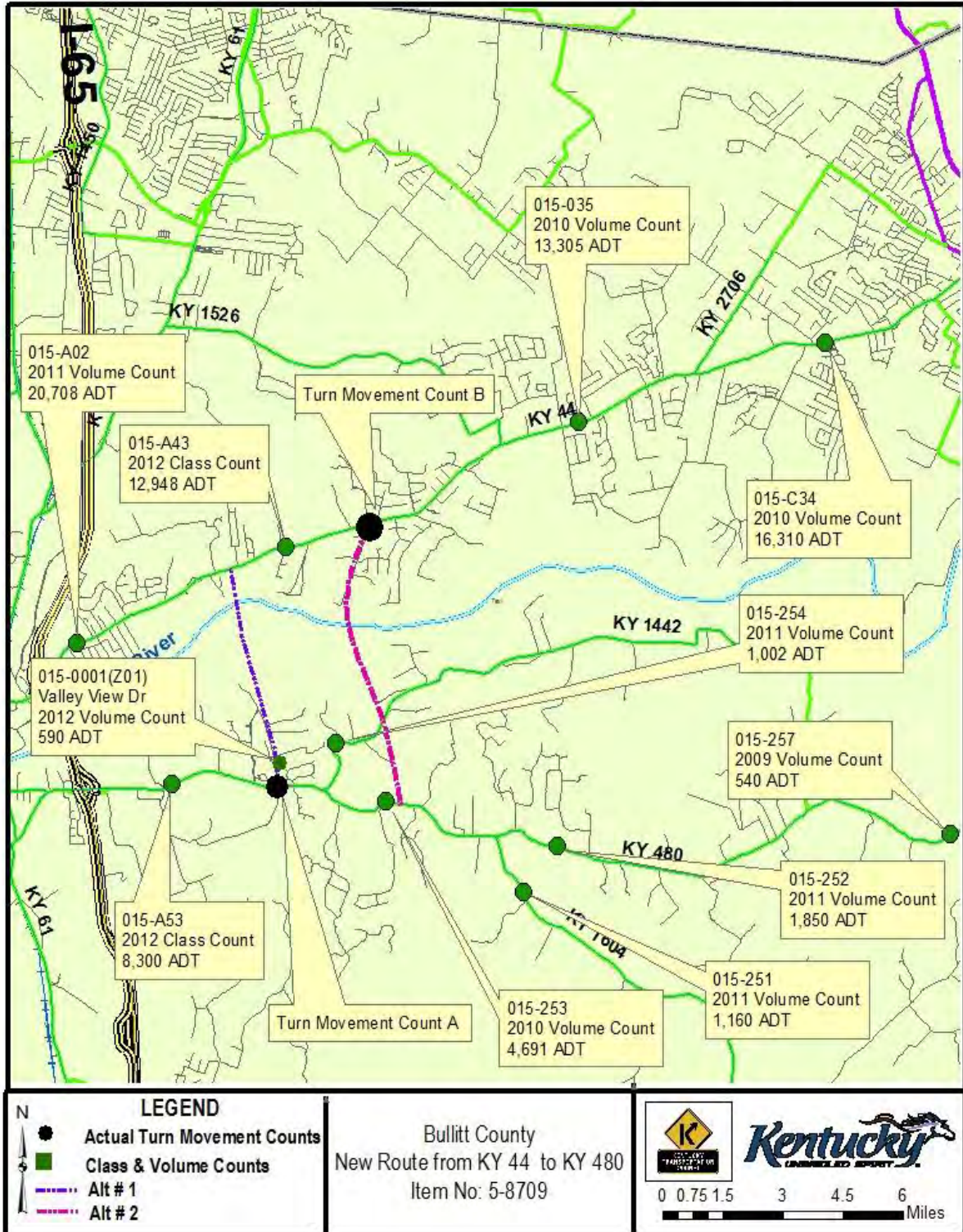
- **T1---** This turn movement (see Turn Movement Count A on page 6) is on the south end of Alt 1 at the intersection of KY 480 and Valley View Drive.
- **T2---** This turn movement is on the north end of Alt 1 at the intersection of KY 44 and New Route. Since the terminal of new route at KY 44 has not yet been decided an approximate end point in between Halls Lane and Big Clifty was chosen (as per the suggestion of the District).
- **T3---** This turn movement is on the south end of Alt 2 at the intersection of KY 480 and new route. Since the terminal of new route at KY 480 has not yet been decided an approximate end point in between Ironwood Trail and Alyssa Brook Dr was chosen (as per the suggestion of the District).
- **T4---** This turn movement (see Turn Movement Count B on page 6) is on the north end of Alt 2 at the intersection of KY 44 and Sunview Drive.

Since a 2018 model was not readily available and the current model uses a 2012 base year , a 2012 current year turn movements is provided instead of a 2018 turn movements (the year new road might be open to public) The current year turn movements were grown using methods described above to determine future year turn movements. Some ADT splits are not 50/50. For turn movements T3 and T4 the volume on the new route does not match. This is due to the intersection of the new route with KY 1442 as well as the presence of a big subdivision near Sunview Dr. Analysis is based on the KIPDA model output.

## **BIKE-PED PLAN REVIEW**

An analysis and recommendation for bicycle and pedestrian accommodations for this route have been provided separately.

# Counts Summary Map



**HISTORICAL POPULATION SUMMARY**

	1960	1970	1980	1990	2000	2010	60 - 70	70 - 80	80 - 90	90 - 00	00 - 10
	Population	Population	Population	Population	Population	Population	Pct	Pct	Pct	Pct	Pct
Kentucky	3,038,156	3,220,711	3,660,334	3,686,892	4,041,769	4,339,367	6.0%	13.6%	0.7%	9.6%	7.4%
Bullitt Co	-	26,090	43,346	47,567	61,236	74,319	-	66.1%	9.7%	28.7%	21.4%
							Change	Change	Change	Change	Change

Sources: US Bureau of the Census; Kentucky State Data Center

**FUTURE POPULATION PROJECTIONS SUMMARY**

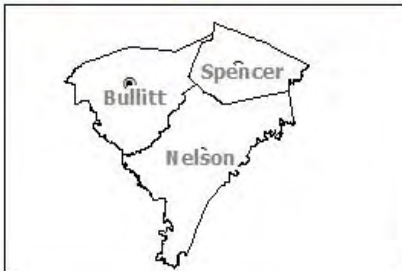
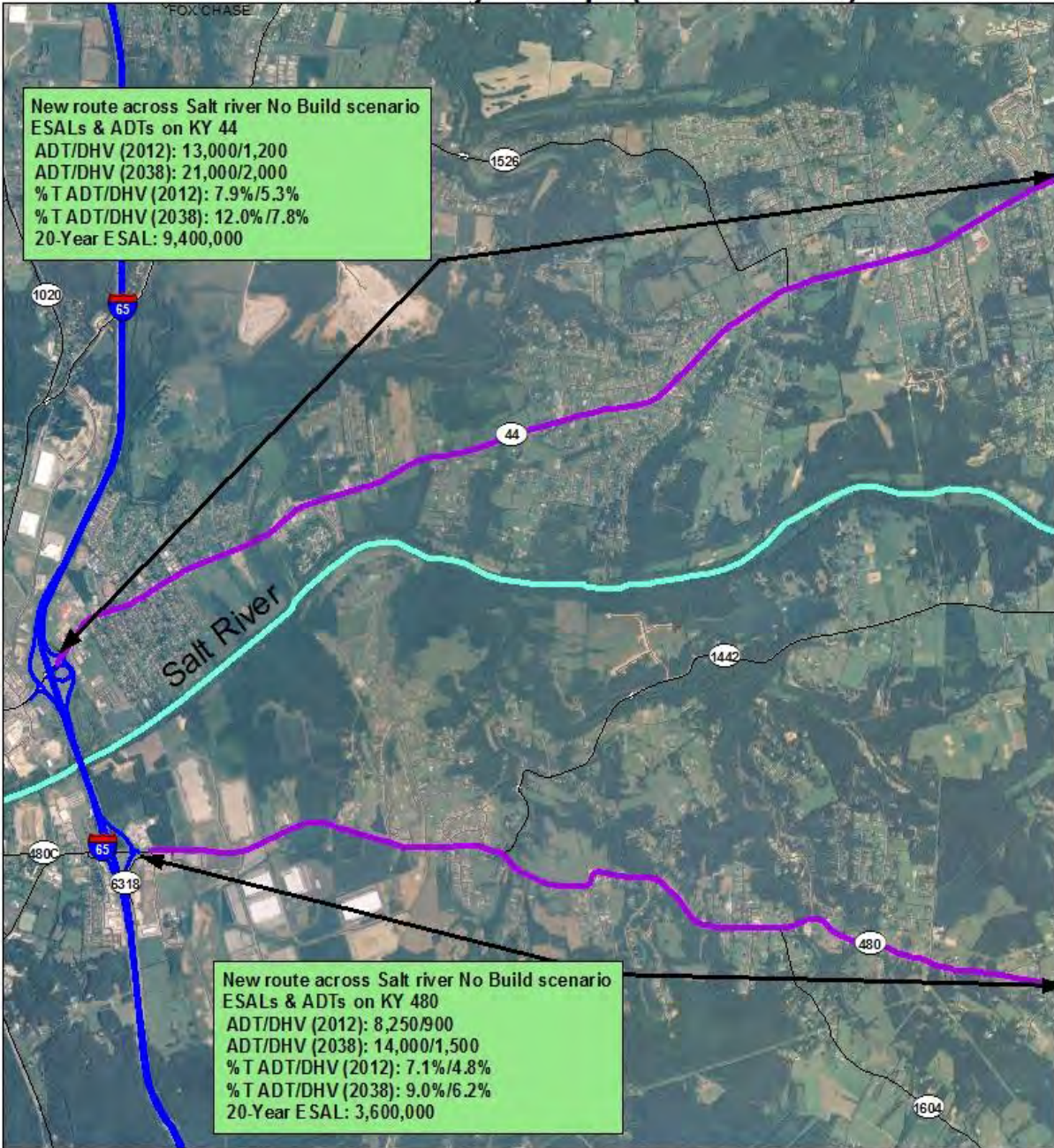
	2010	2015	2020	2025	2030	2035	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35
	Projection	Projection	Projection	Projection	Projection	Projection	Pct	Pct	Pct	Pct	Pct
Kentucky	4,339,367	4,509,429	4,672,754	4,820,390	4,951,178	5,063,331	3.9%	3.6%	3.2%	2.7%	2.3%
Bullitt Co	74,319	81,358	88,508	95,623	102,461	108,891	9.5%	8.8%	8.0%	7.2%	6.3%
							Change	Change	Change	Change	Change

Sources: US Bureau of the Census; Kentucky State Data Center

**ANNUAL POPULATION GROWTH RATES FROM HISTORICAL DATA AND PROJECTIONS**

	60 - 70	70 - 80	80 - 90	90 - 00	05 - 10	10 - 15	15 - 20	20 - 25	25 - 30	10 - 30	10 - 35
	GR	GR	GR	GR	GR	GR	GR	GR	GR	GR	GR
Kentucky	0.59%	1.29%	0.07%	0.92%	0.77%	0.71%	0.62%	0.54%	0.45%	0.53%	0.62%
Bullitt Co	-	5.21%	0.93%	2.56%	1.83%	1.70%	1.56%	1.39%	1.22%	1.27%	1.54%

# Summary Map (No Build)



Bullitt County  
New Route between KY 44 and KY  
480  
Item # 5-8709.00

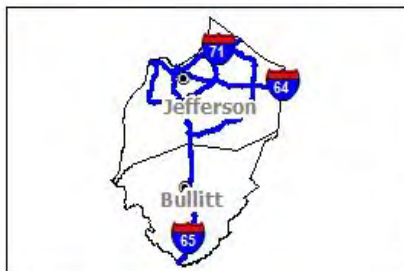
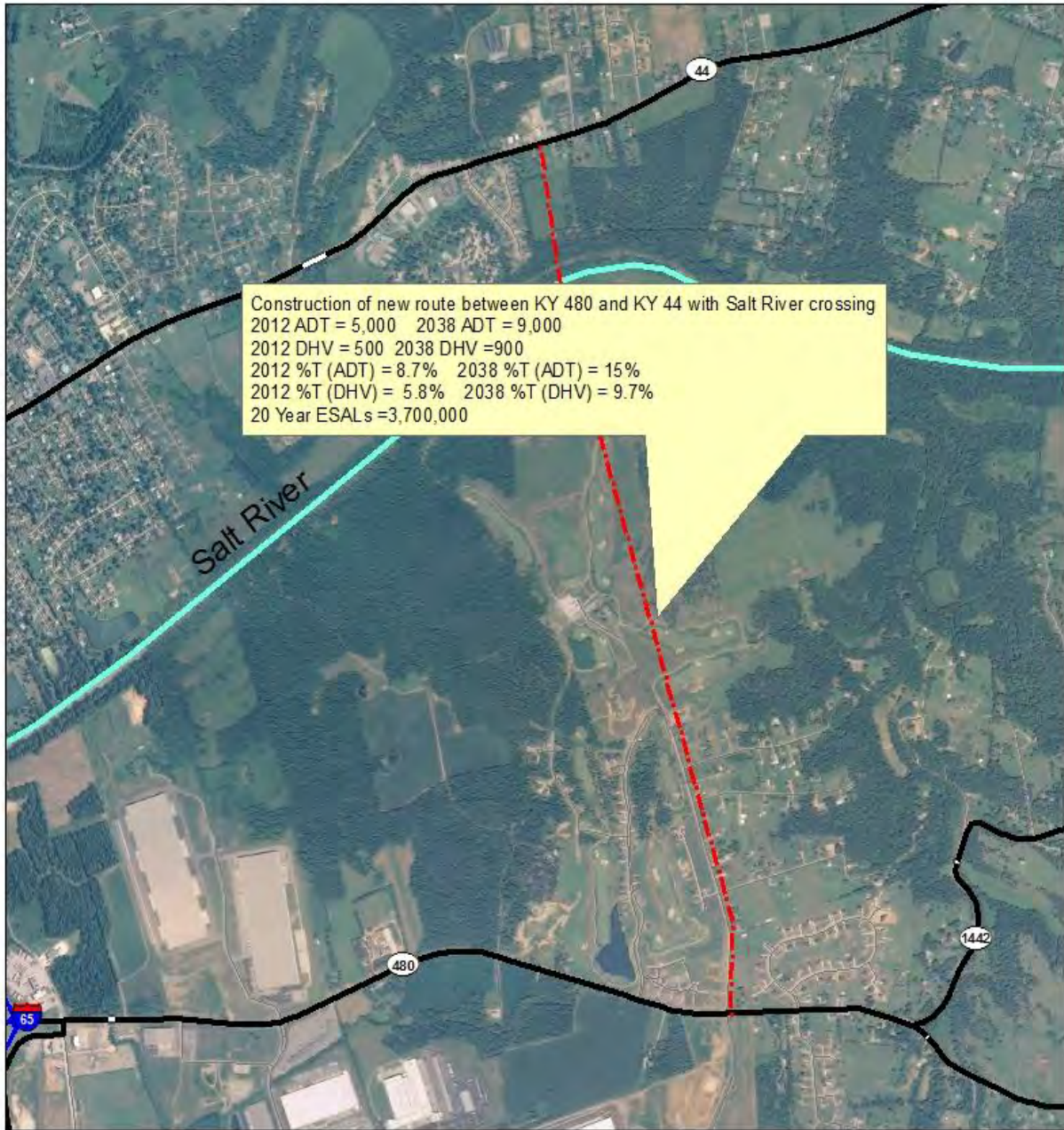


**Legend**

Project Roads

0 0.3 0.6 1.2 Miles

## Summary Map with all MTP Projects (ALT 1)



Bullitt County  
New Route between KY 44 and  
KY 480  
Item # 5-8709.00



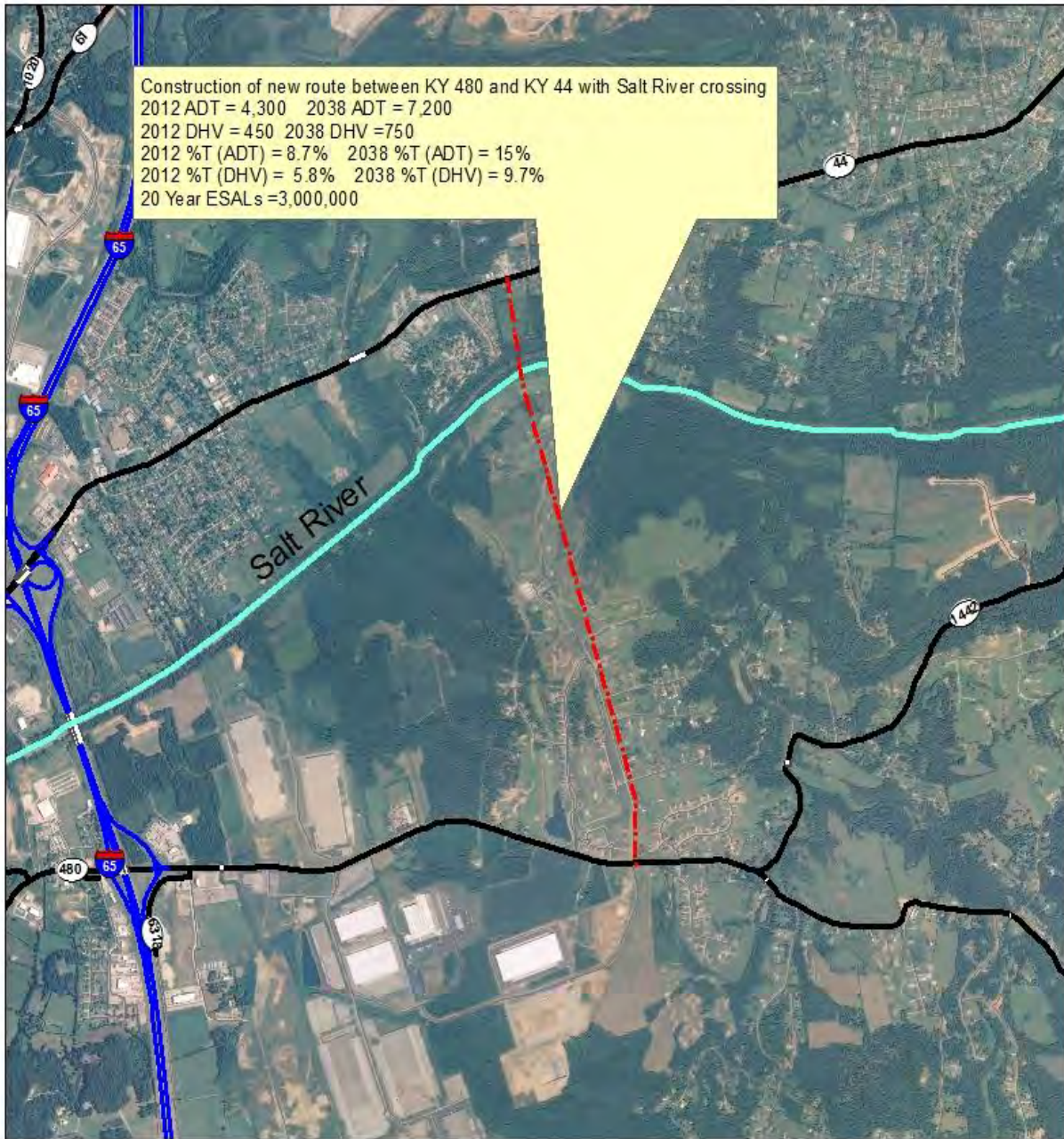
**Legend**

--- New Route  
(Alignment is approximate)

0 0.125 0.25 0.5 Miles



## Summary Map w/o 3 major MTP Projects (ALT 1)



Bullitt County  
New Route between KY 44 and  
KY 480  
Item # 5-8709.00

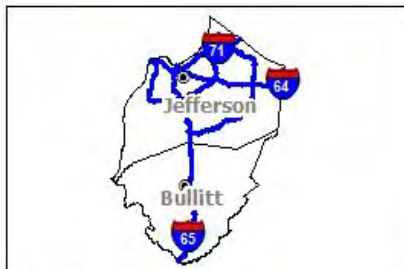
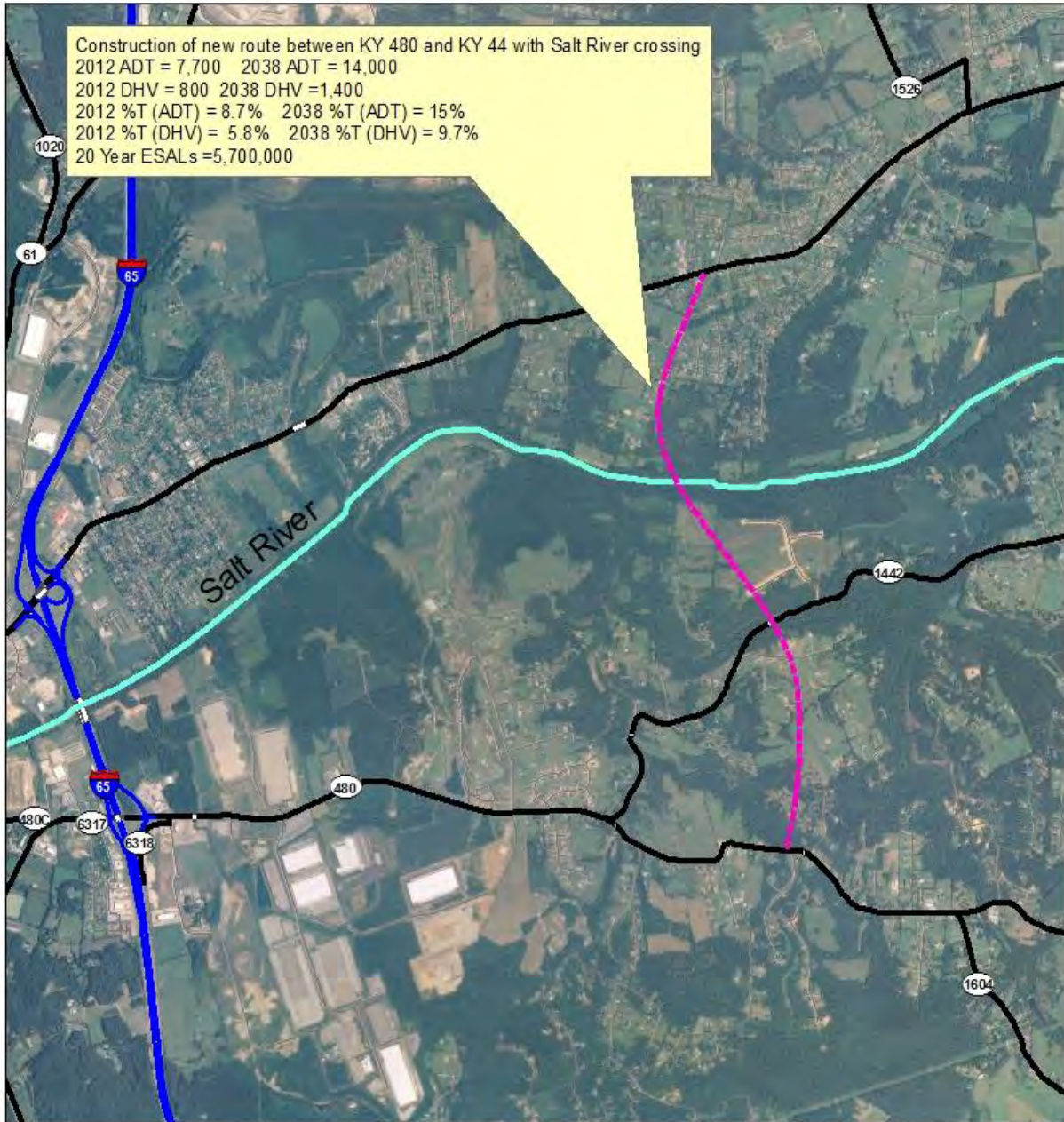


**Legend**

---  
New Route  
(Alignment is approximate)

0 0.175 0.35 0.7  
Miles

## Summary Map with all MTP Projects (ALT 2)



Bullitt County  
New Route between KY 44 and  
KY 480  
Item # 5-8709.00

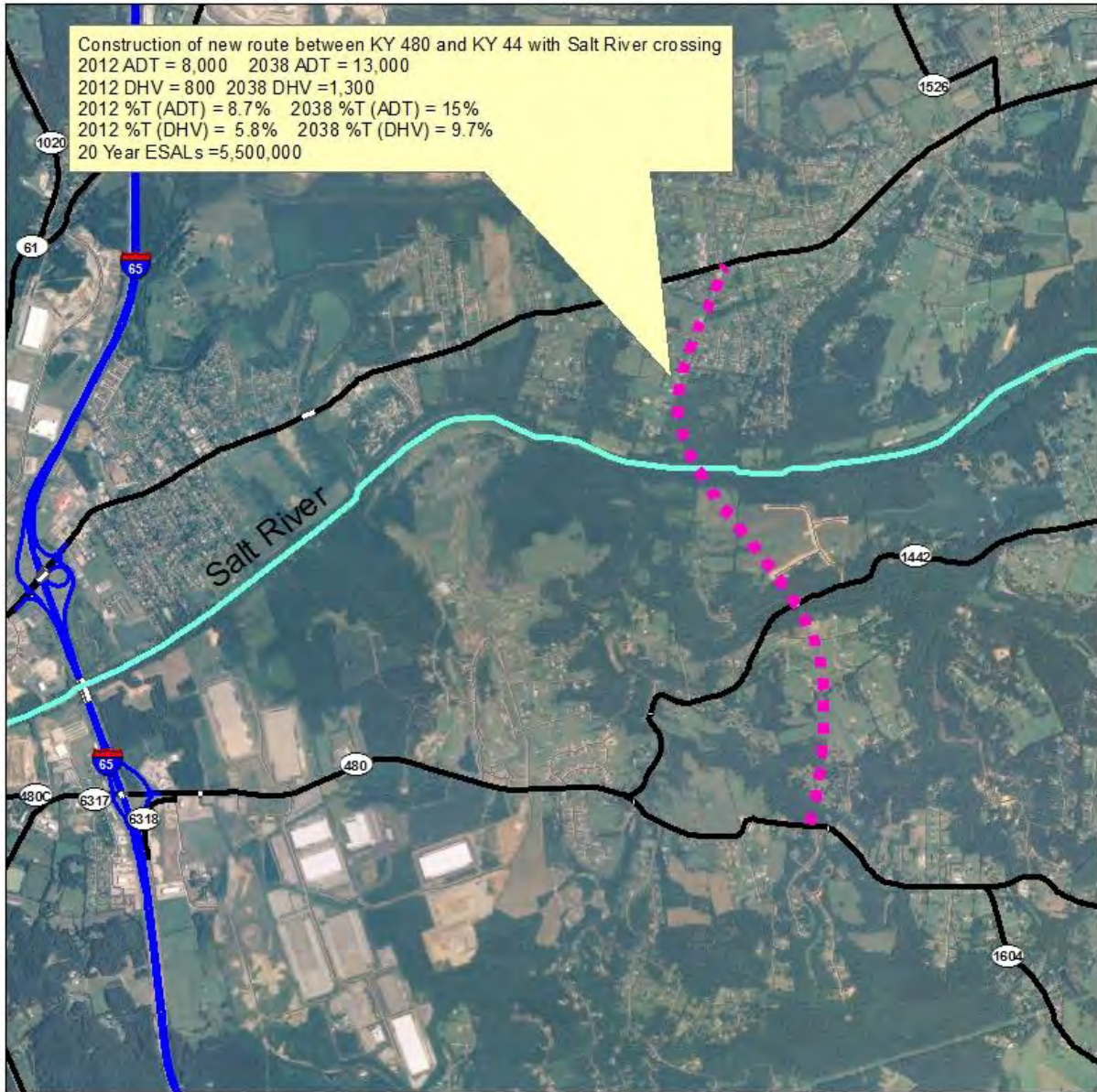


**Legend**

- New Route
- Project Location

0 0.25 0.5 1 Miles

## Summary Map without 3 major MTP Projects (ALT 2)



Bullitt County  
New Route between KY 44 and KY  
480  
Item # 5-8709.00



**Legend**

— New Route

0 0.25 0.5 1 Miles

## **APPENDIX A**

# **TURN MOVEMENTS ALTERNATE 1**

## **TURN MOVEMENTS WITH ALL MTP PROJECTS 2012**

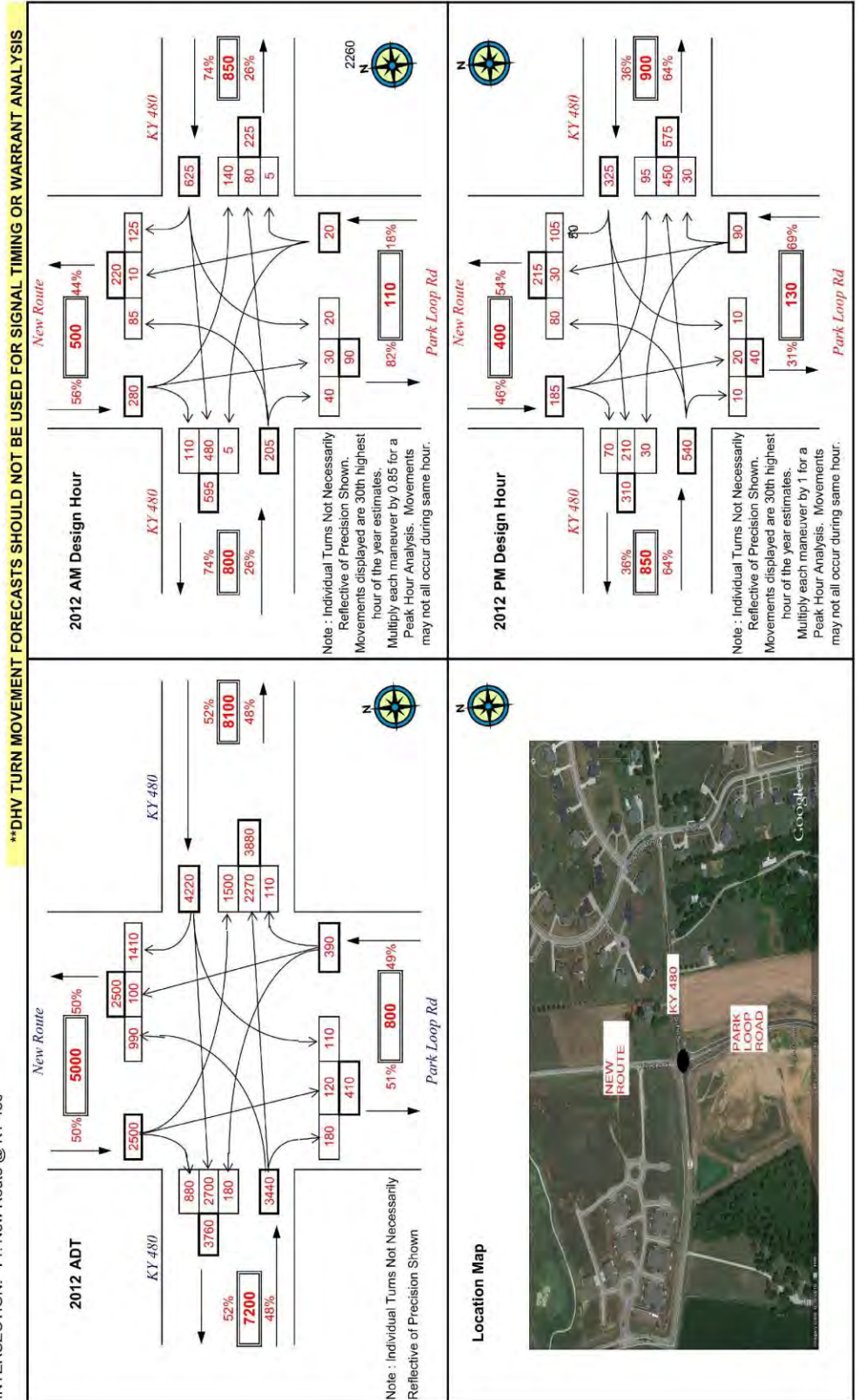
**T1: NEW ROUTE @ KY 480**

**T2: NEW ROUTE @ KY 44**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build With MTP (Alt #1)  
 INTERSECTION: T1: New Route @ KY 480

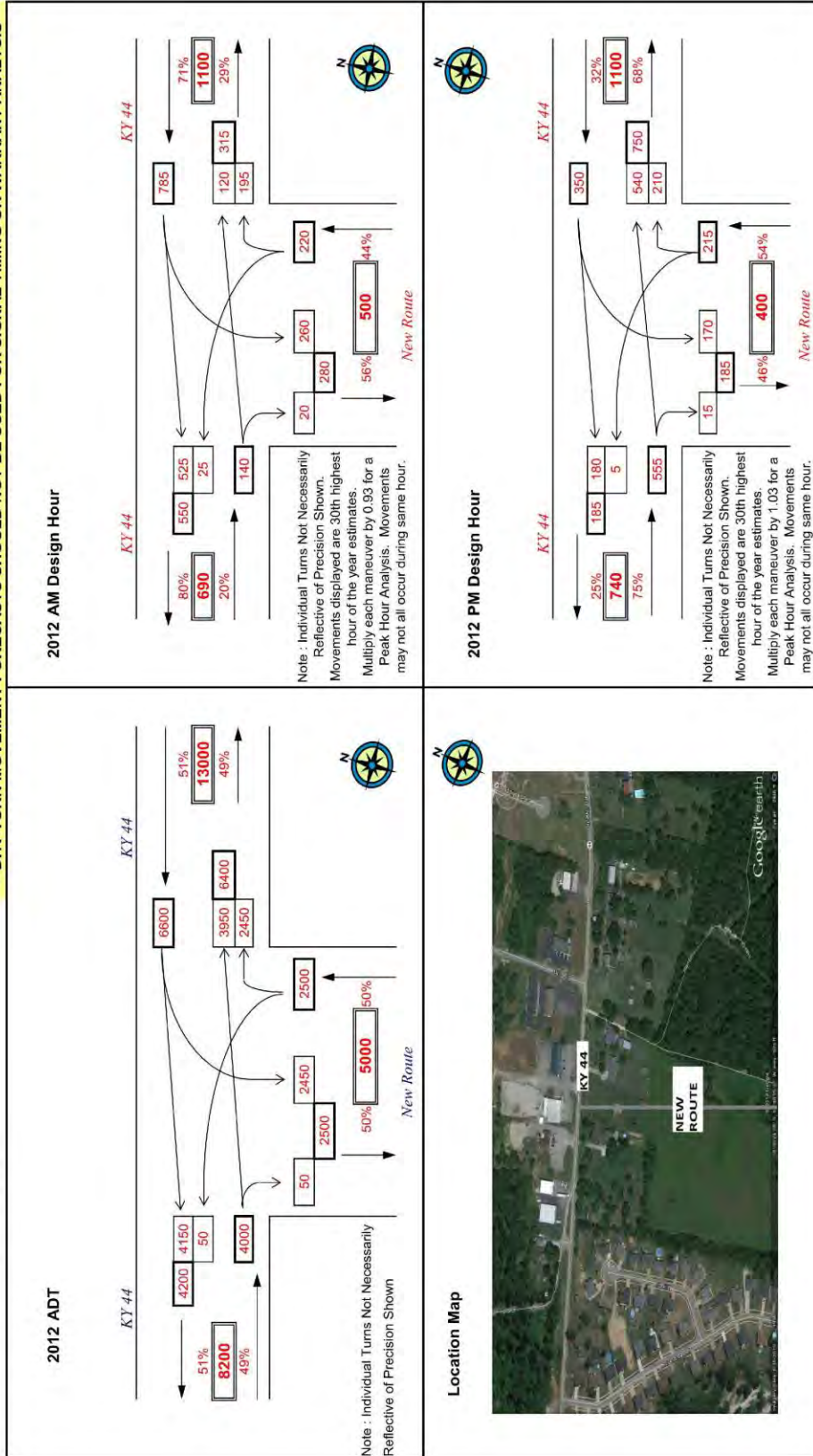


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build with MTP (Alt #1)  
 INTERSECTION: T2: New Route @ KY 44

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



## **2038 WITH MTP (ALT #1)**

**T1: NEW ROUTE @ KY 480**

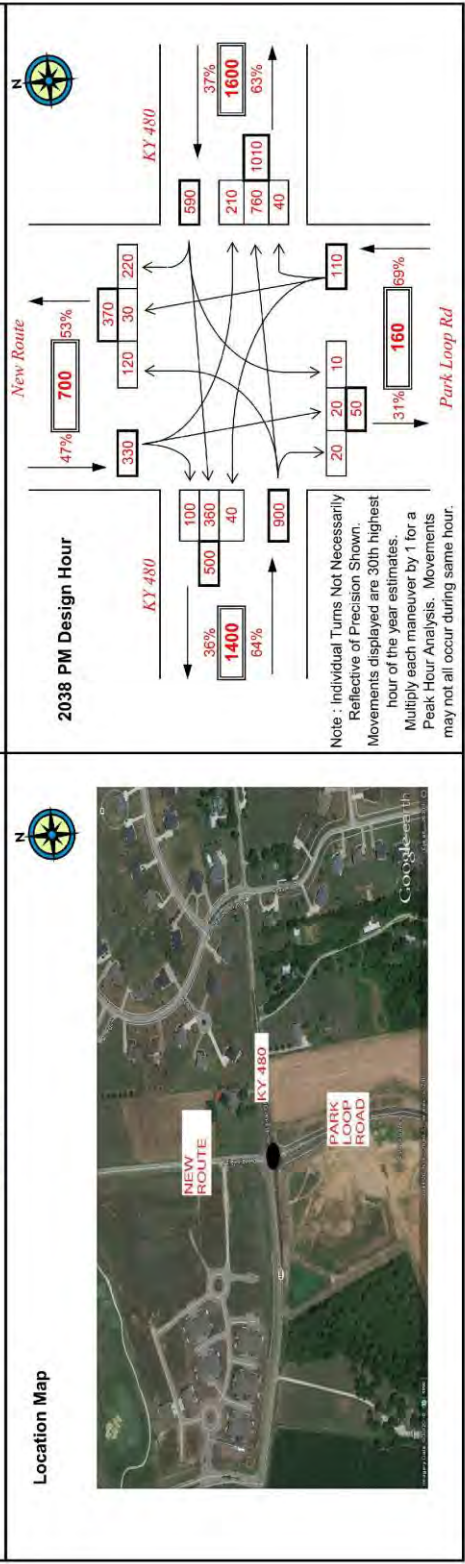
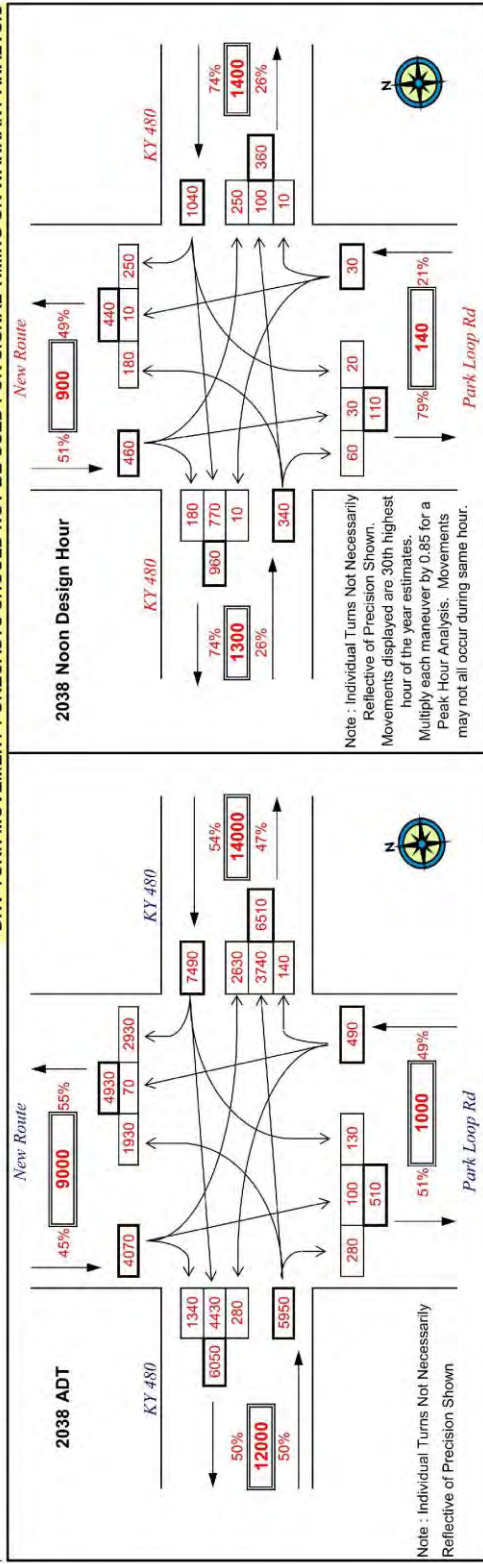
**T2: NEW ROUTE @ KY 44**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHV's represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build with MTP (Alt #1)  
 INTERSECTION: T1: New Route @ KY 480

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



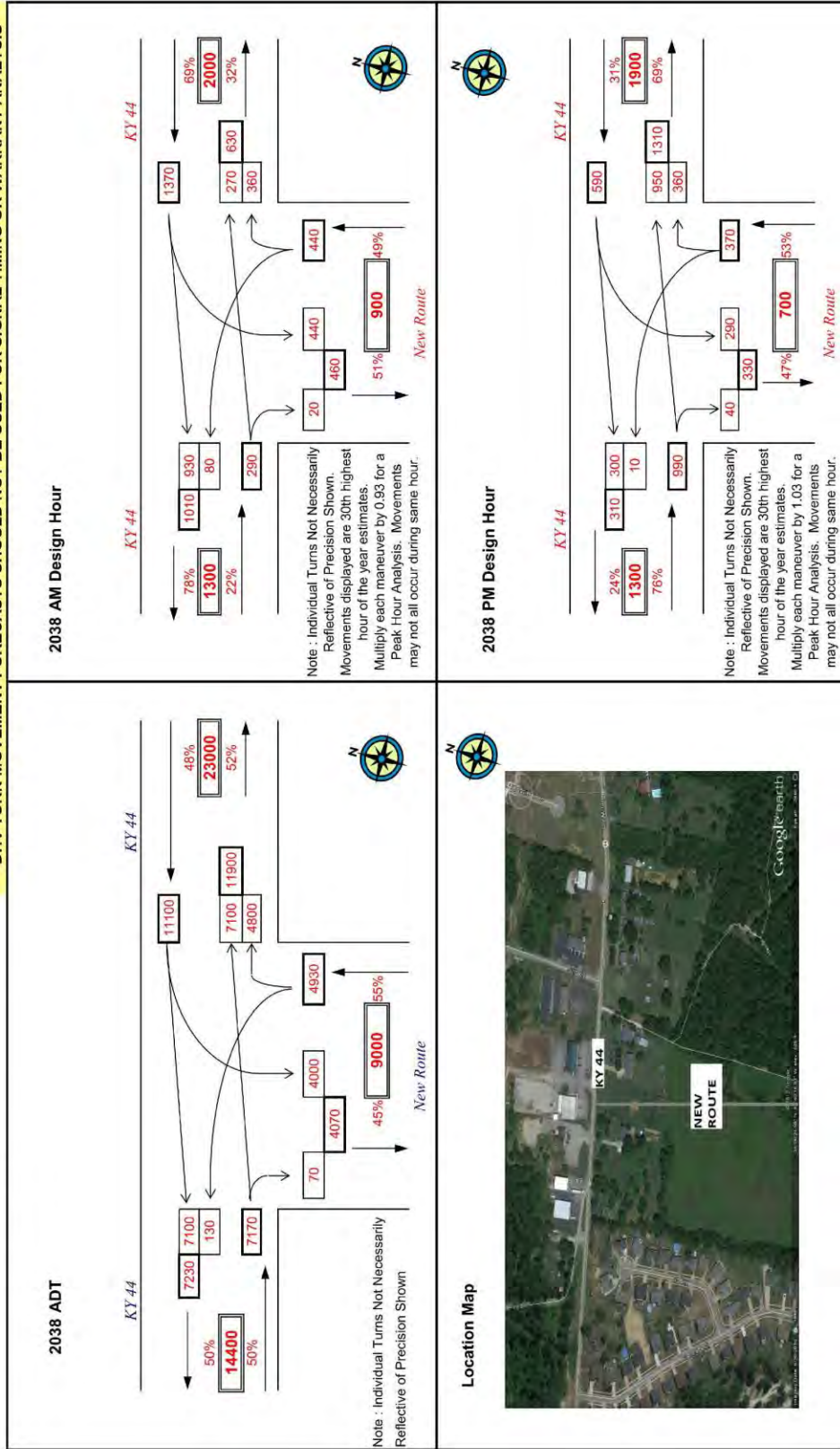


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER: 0  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build with MTP (Alt #1)  
 INTERSECTION: T2: New Route @ KY 44

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



## **TURN MOVEMENTS WITHOUT 3 MTP PROJECTS 2012**

**T1: NEW ROUTE @ KY 480**

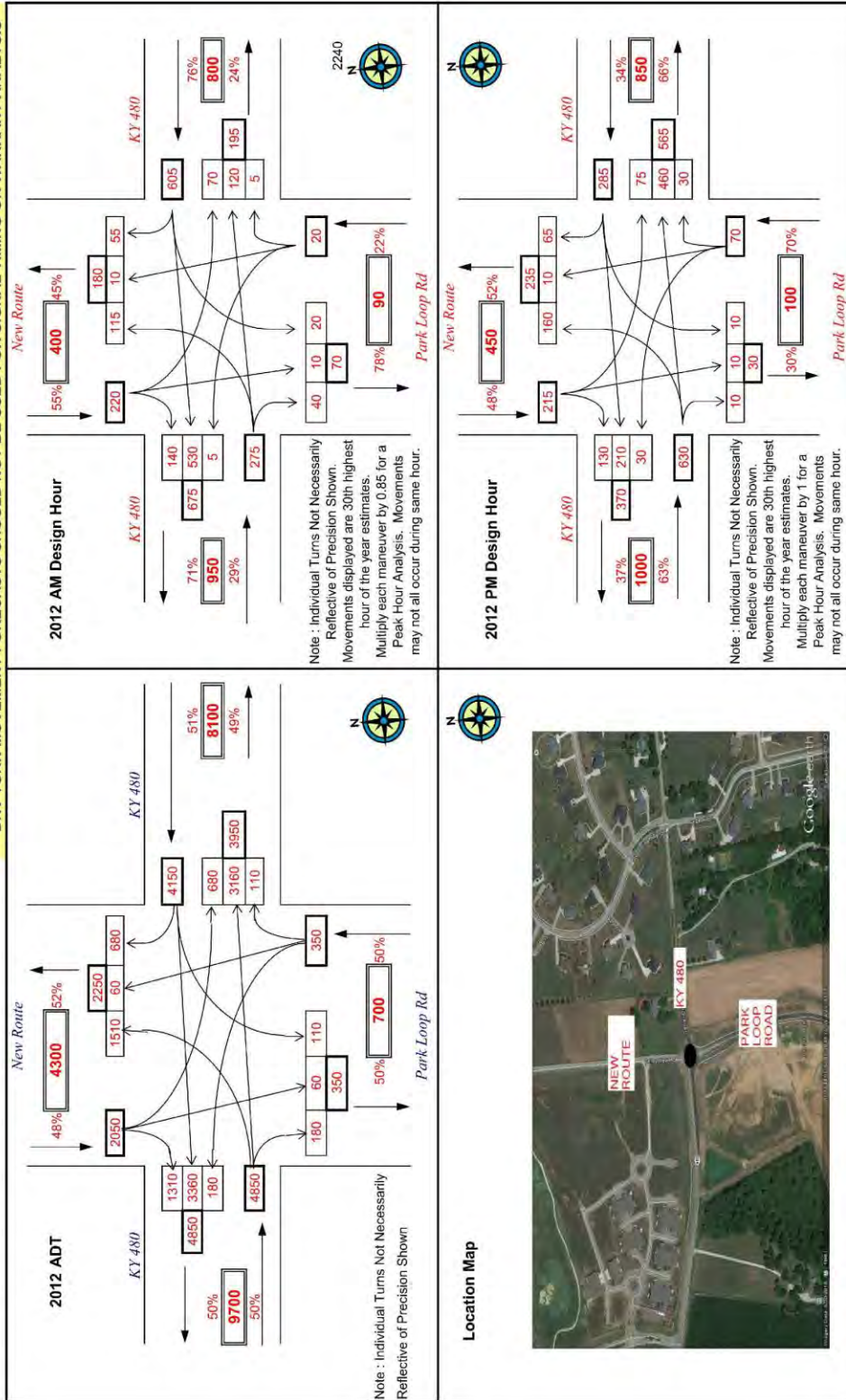
**T2: NEW ROUTE @ KY 44**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build without MTP (Alt #1)  
 INTERSECTION: T1: New Route @ KY 480

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

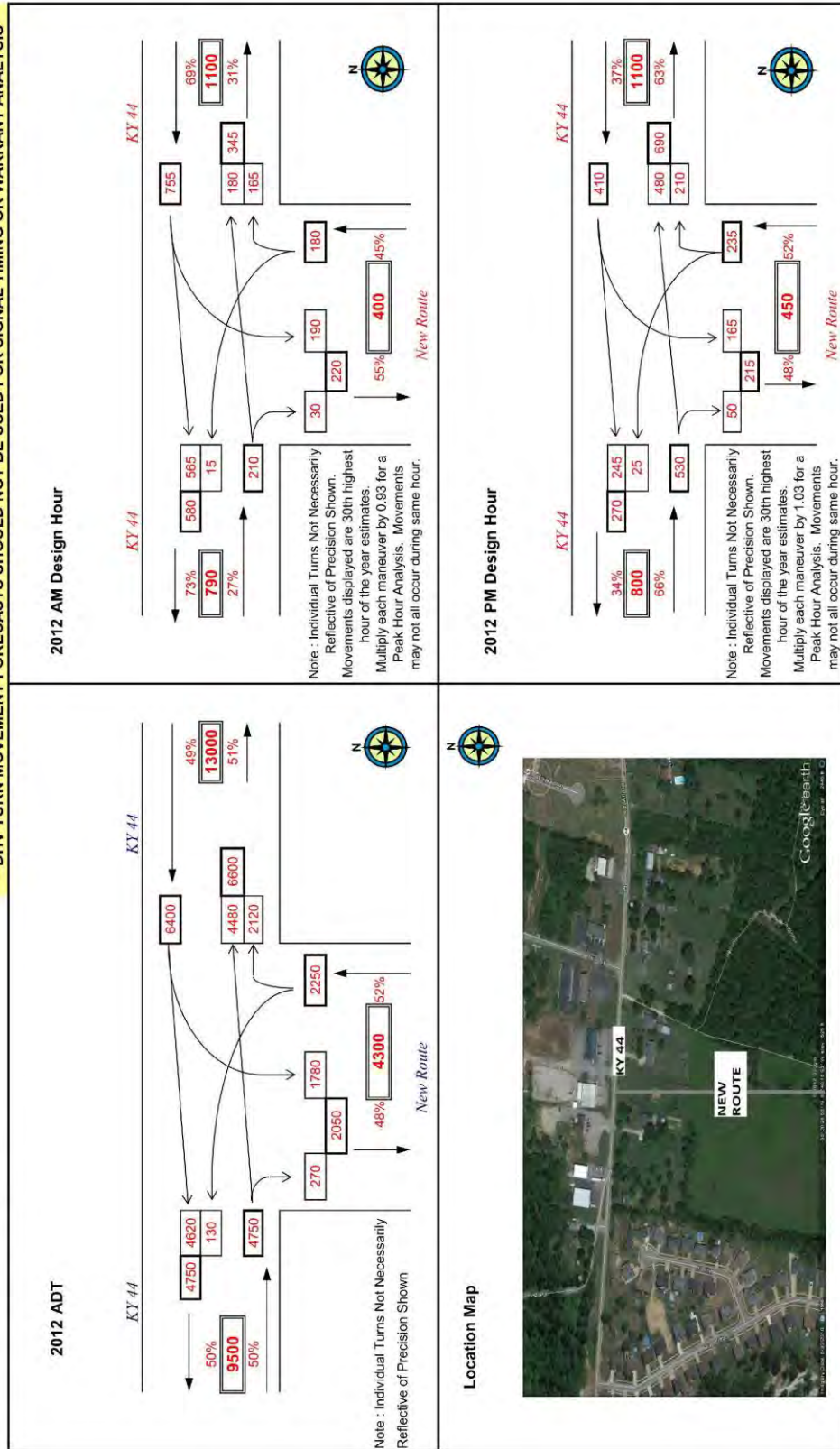


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build without MTP (Alt #1)  
 INTERSECTION: T2: New Route @ KY 44

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



## **2038 WITHOUT MTP (ALT #1)**

**T1: NEW ROUTE @ KY 480**

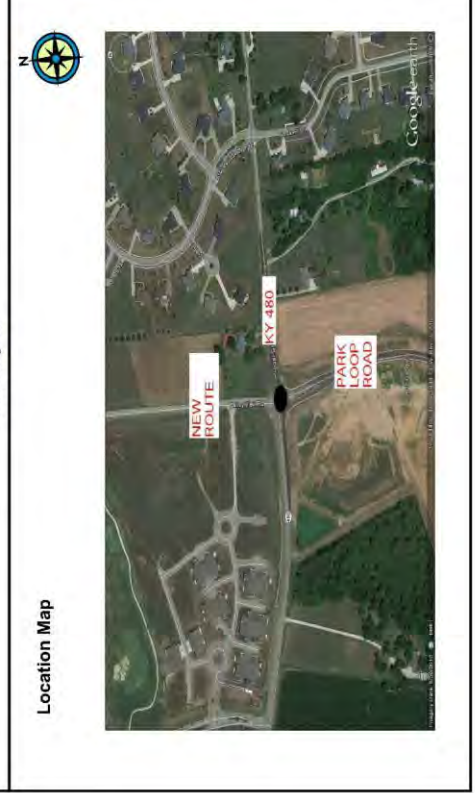
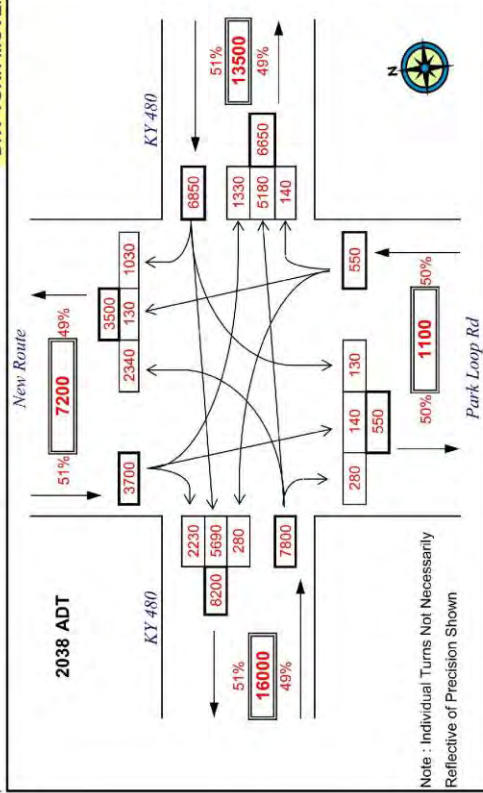
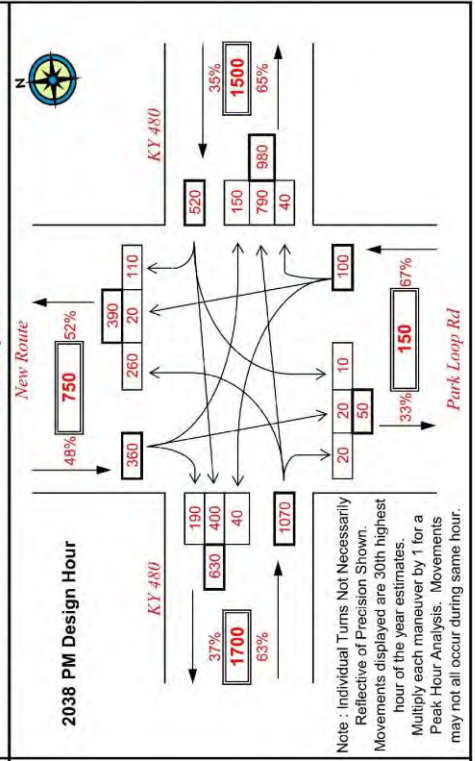
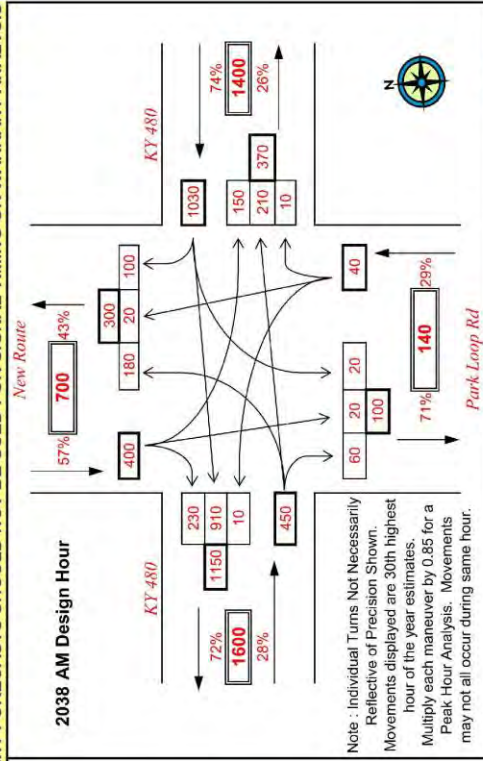
**T2: NEW ROUTE @ KY 44**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHV's represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build without MTP (Alt #1)  
 INTERSECTION: T1: New Route @ KY 480

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

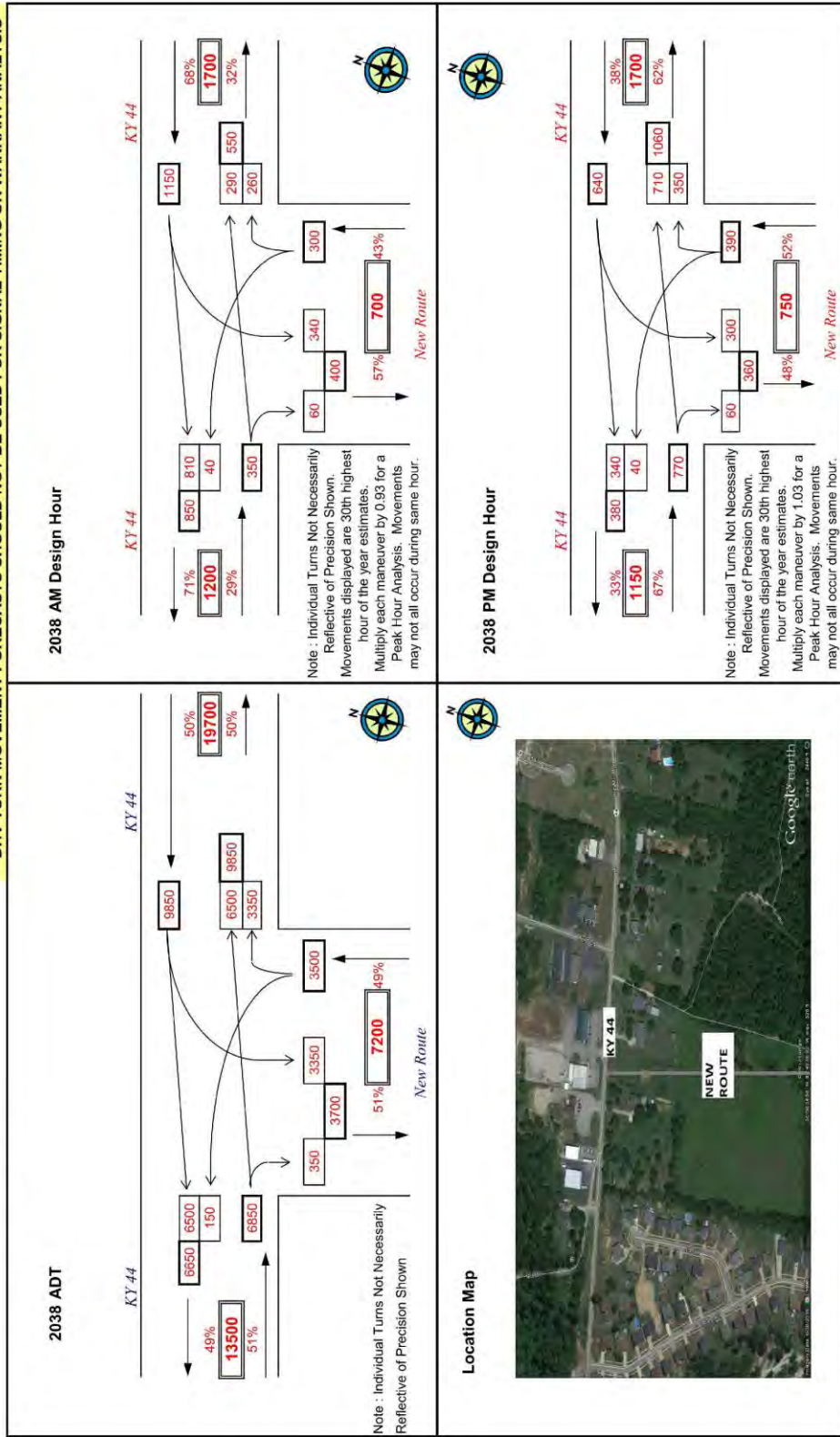


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build without MTP (Alt #1)  
 INTERSECTION: T2: New Route @ KY 44

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



## **APPENDIX B**

# **TURN MOVEMENTS ALTERNATE 2**

## **TURN MOVEMENTS WITH ALL MTP PROJECTS 2012**

**T3: NEW ROUTE @ KY 480**

**T4: NEW ROUTE @ KY 44**

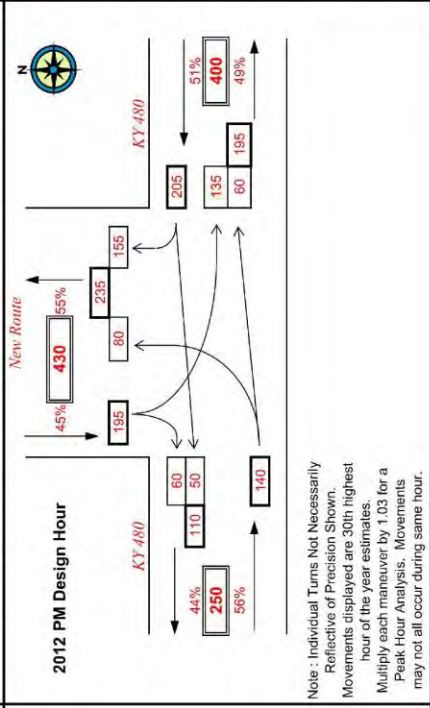
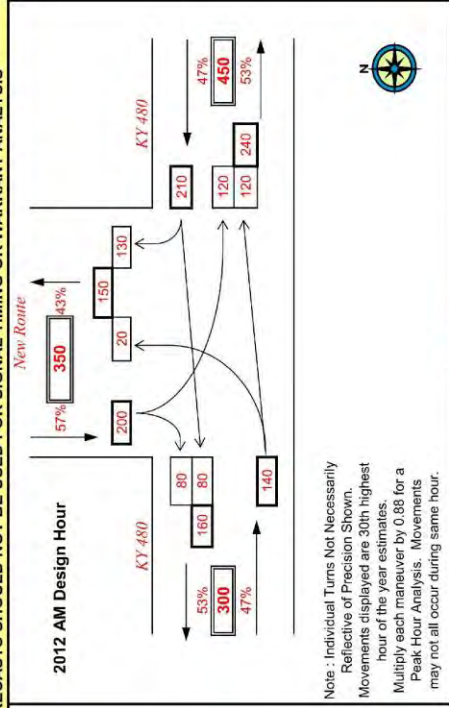
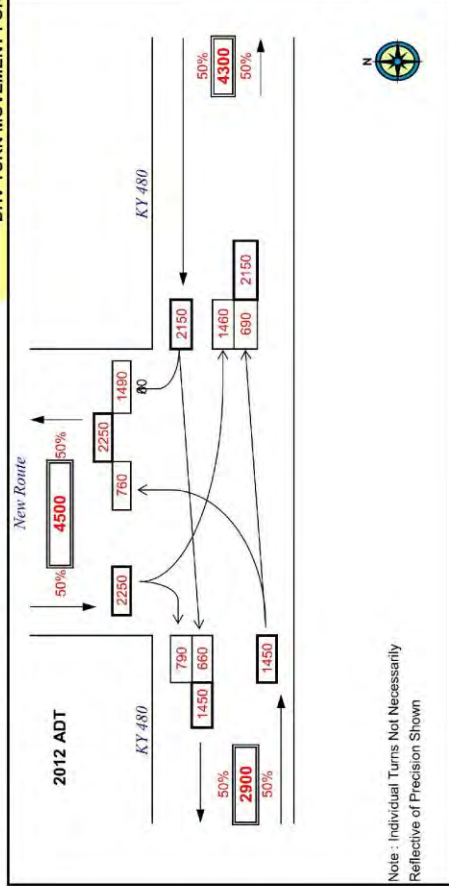


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build through Sunview Dr with MTP (Alt # 2)  
 INTERSECTION: T3: New Route @ KY 480

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

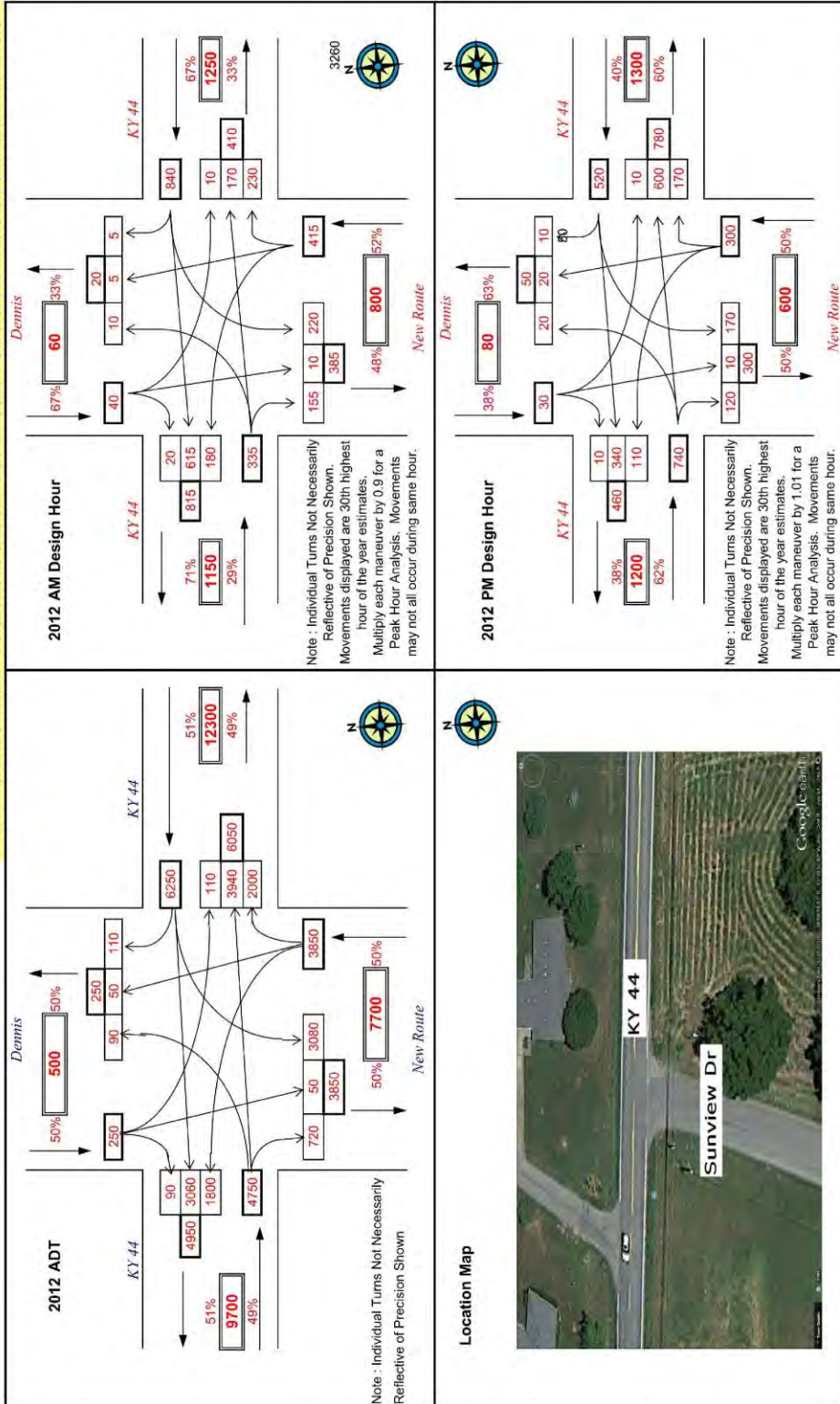


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build through Sunview Dr. with MTP (Alt #2)  
 INTERSECTION: T4: New Route Through Sunview Dr @ KY 44

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



## **2038 (ALT #2)**

**T3: NEW ROUTE @ KY 480**

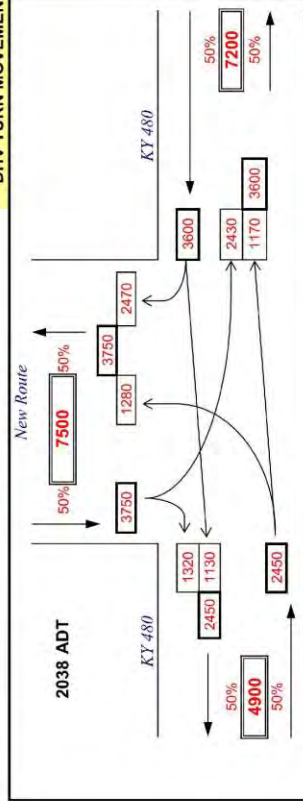
**T4: NEW ROUTE @ KY 44**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

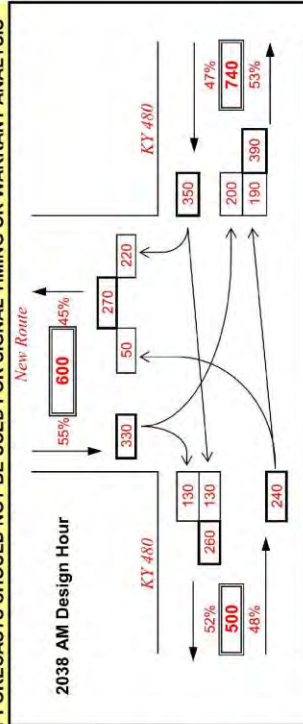
NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build through Sunview Dr with MTP (AH #2)  
 INTERSECTION: T3: New Route @ KY 480

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



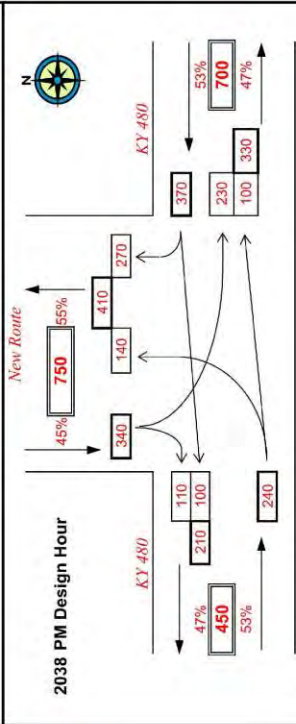
Note: Individual Turns Not Necessarily Reflective of Precision Shown



Note: Individual Turns Not Necessarily Reflective of Precision Shown. Movements displayed are 30th highest hour of the year estimates. Multiply each maneuver by 0.88 for a Peak Hour Analysis. Movements may not all occur during same hour.



Note: Individual Turns Not Necessarily Reflective of Precision Shown. Movements displayed are 30th highest hour of the year estimates. Multiply each maneuver by 1.03 for a Peak Hour Analysis. Movements may not all occur during same hour.

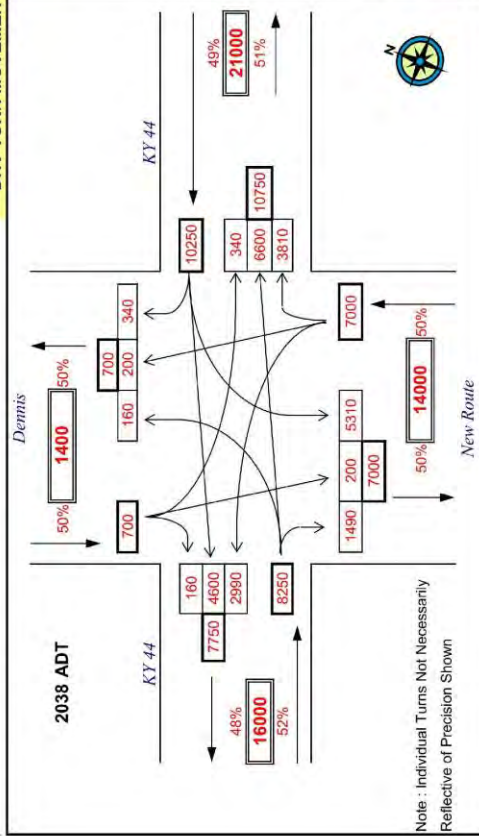
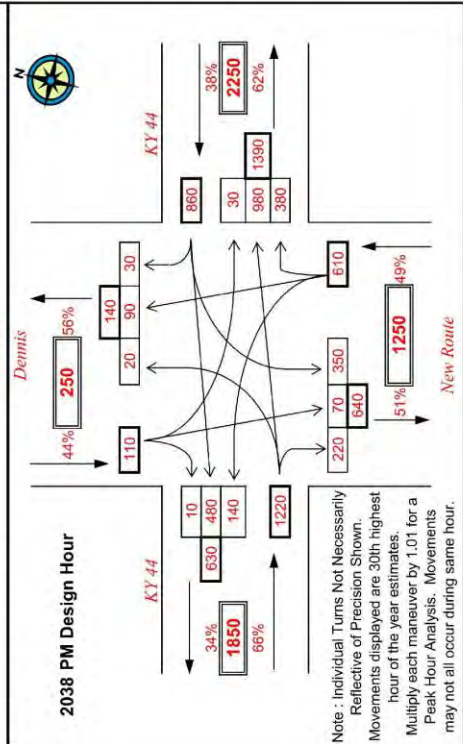
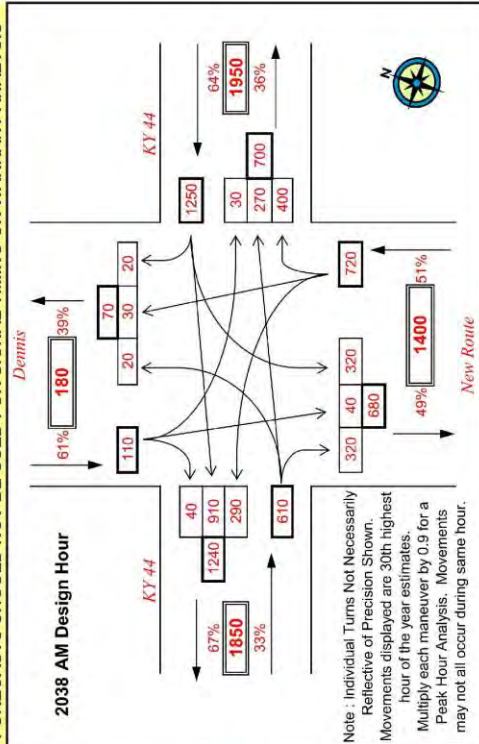


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build with MTP (Alt #2)  
 INTERSECTION: T4: New Route Through Sunview Dr @ KY 44

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



## **TURN MOVEMENTS WITHOUT 3 MTP PROJECTS 2012**

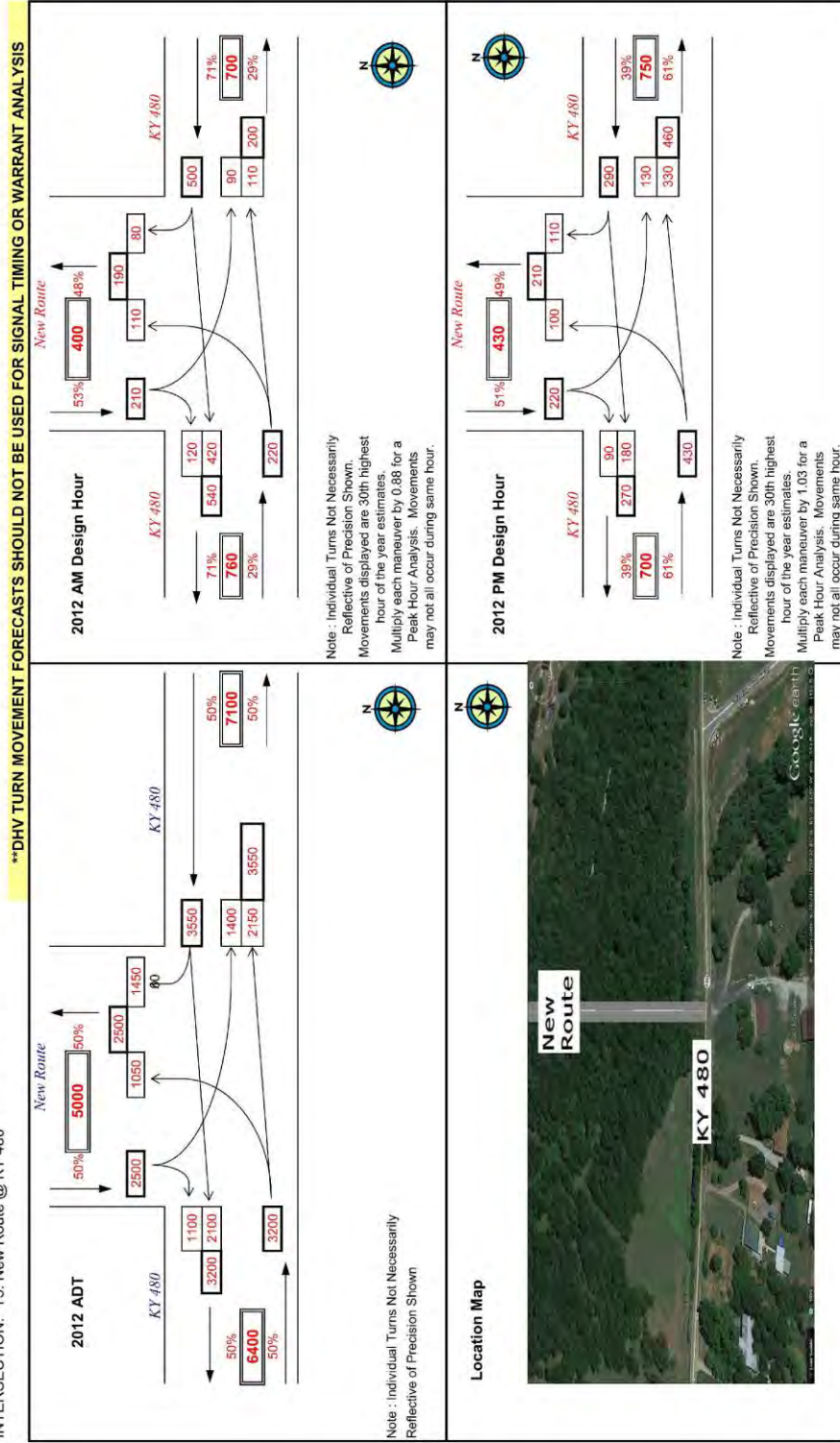
**T3: NEW ROUTE @ KY 480**

**T4: NEW ROUTE @ KY 44**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

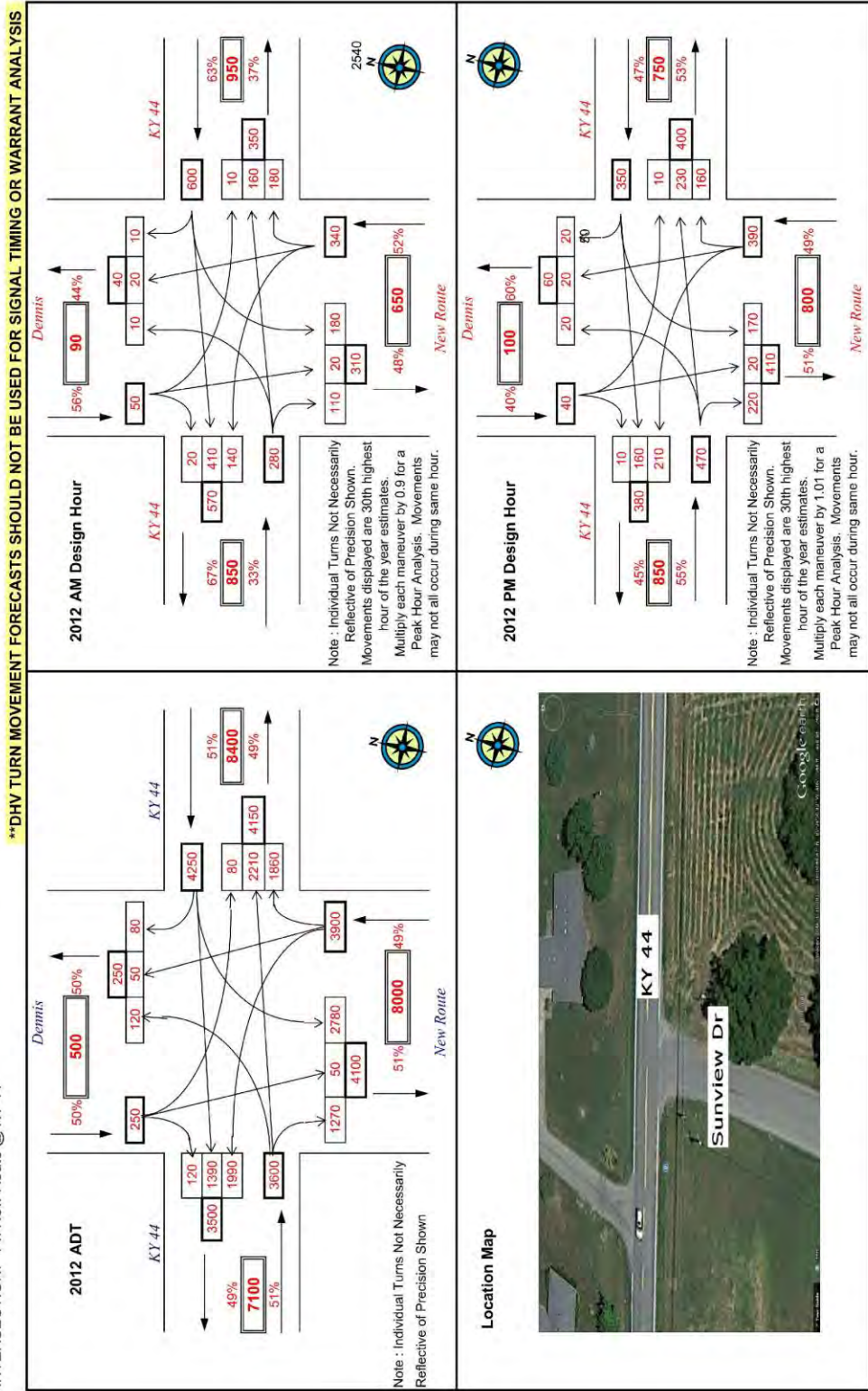
PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build through Sunview Dr without MTP (Alt #2)  
 INTERSECTION: T3: New Route @ KY 480



Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2012 ADT and Design Hour Volumes for build without MTP (f  
 INTERSECTION: T4: New Route @ KY 44





## **2038 (ALT #2)**

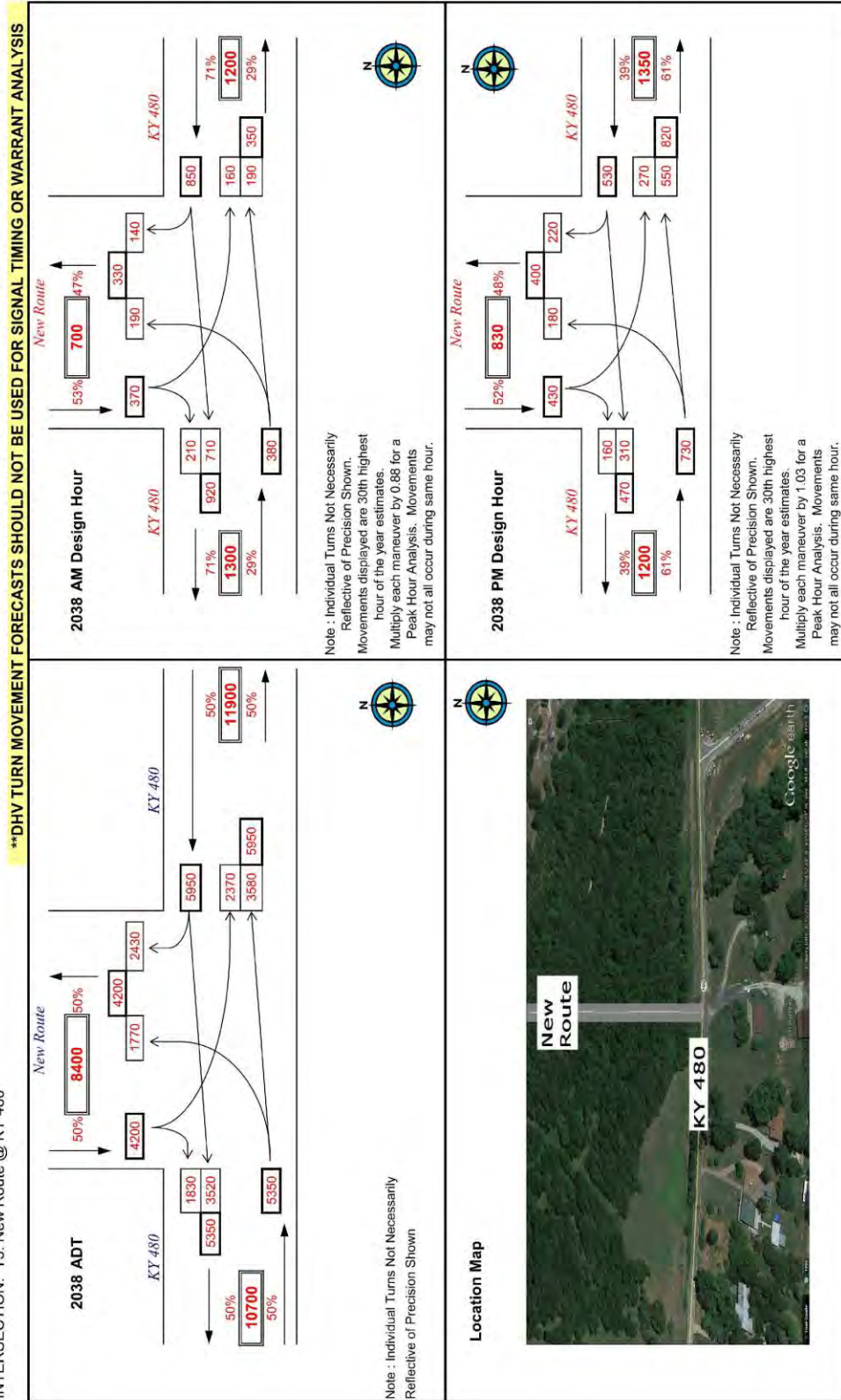
**T3: NEW ROUTE @ KY 480**

**T4: NEW ROUTE @ KY 44**

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER:  
 REQUEST DATE: 9/6/2012  
 ANALYST: J.BALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build through Sunview Dr. without MTP (Alt #2)  
 INTERSECTION: T3: New Route @ KY 480

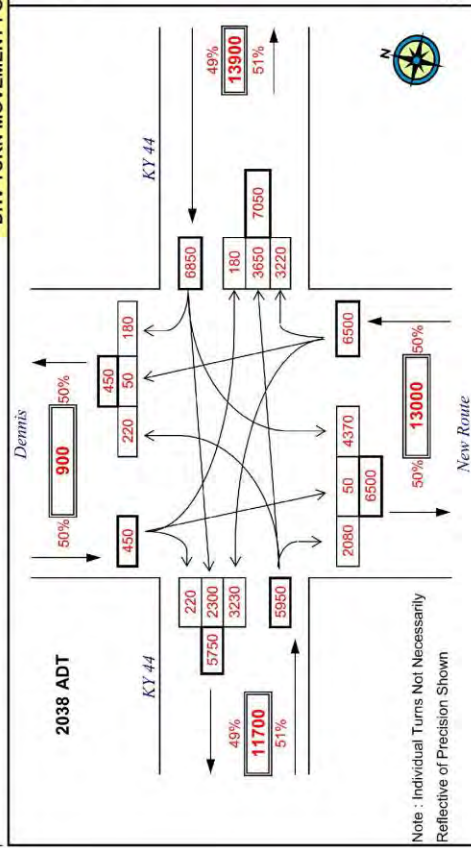
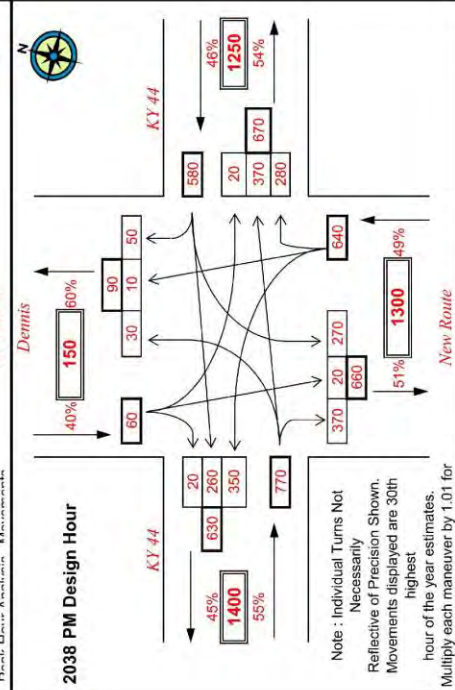
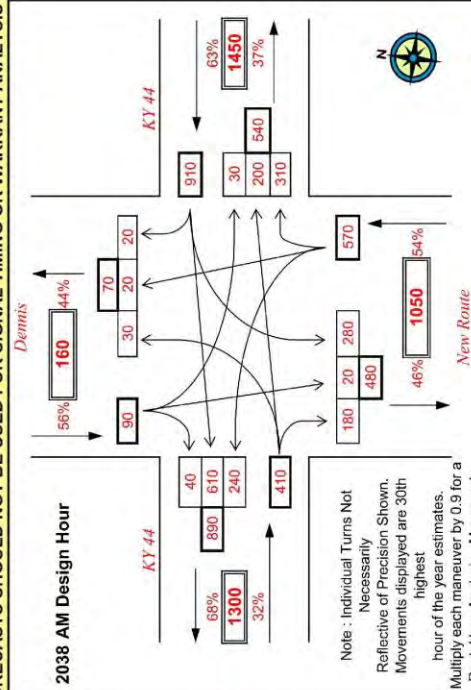


Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

NOTE: AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

PROJECT: New Route Across Salt River  
 ITEM NUMBER: 5-8709  
 MARS NUMBER: 0  
 REQUEST DATE: 9/6/2012  
 ANALYST: JBALAJI  
 SCENARIO: 2038 ADT and Design Hour Volumes for build without MTP (Alt #2)  
 INTERSECTION: T4: New Route @ KY 44

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



## **APPENDIX C**

### **ESAL FORECAST SUMMARY SHEETS**

*Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	02/06/13
Road Name	Old Mill Road	Forecaster	Jay Balaji
Functional Class	14 - Urban Principal Arterial	MARS No.	0
Project Description	New route from KY 480 to KY 44 across Salt River	Item No.	5-8709.00
Scenario	No Build	Route No.	KY 44
Segment Description	KY 44	Beg. MP	-
		End MP	-
		T.F. No.	12-091
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	9.3%
Traffic Volume Milepoint	015A43 15.6	K-Factor Source	015A43
Truck Percent Milepoint	015A43 15.6	PHF	0.85
ESAL Information	0	Full Route Unique Identifier	015-KY-0044 -000
Growth Rate	1.90%		

**TRAFFIC PARAMETERS:**

		Present Year	Growth Rate	Construction Year	Median Year	Design Year
		2012		2018	2028	2038
Volume	(AADT)	13000	1.90%	15000	18000	21000
Percent Trucks	(%T)	7.9%	1.5%	9%	10%	12%
Number of Trucks		1000	3.4%	1300	1800	2500
Percent Trucks Hauling Coal	(%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>						
Axles/Truck	(A/T)	2.670	1.50%	2.919	3.388	3.932
ESALs/Axle	(ESAL/A)	0.310	1.60%	0.341	0.400	0.468
<i>Coal Trucks:</i>						
Axles/Truck	(A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle	(ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 9,400,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

**KY 44 @ MP 15.6**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALs
2018	14,554	91.4%	8.6%	13297	1257	0.00%	2.92	0.34	0	0	0.500	240,539
2019	14,831	91.2%	8.8%	13530	1300	0.00%	2.96	0.35	0	0	0.500	255,963
2020	15,113	91.1%	8.9%	13768	1345	0.00%	3.01	0.35	0	0	0.500	272,403
2021	15,400	91.0%	9.0%	14009	1391	0.00%	3.05	0.36	0	0	0.500	289,927
2022	15,692	90.8%	9.2%	14254	1439	0.00%	3.10	0.36	0	0	0.500	308,607
2023	15,990	90.7%	9.3%	14502	1488	0.00%	3.15	0.37	0	0	0.500	328,520
2024	16,294	90.6%	9.4%	14755	1539	0.00%	3.19	0.38	0	0	0.500	349,748
2025	16,604	90.4%	9.6%	15012	1592	0.00%	3.24	0.38	0	0	0.500	372,377
2026	16,919	90.3%	9.7%	15273	1646	0.00%	3.29	0.39	0	0	0.500	396,502
2027	17,241	90.1%	9.9%	15538	1703	0.00%	3.34	0.39	0	0	0.500	422,221
2028	17,568	90.0%	10.0%	15807	1761	0.00%	3.39	0.40	0	0	0.500	449,641
2029	17,902	89.8%	10.2%	16081	1822	0.00%	3.44	0.40	0	0	0.500	471,984
2030	18,242	89.7%	10.3%	16358	1884	0.00%	3.49	0.40	0	0	0.500	495,011
2031	18,589	89.5%	10.5%	16640	1949	0.00%	3.54	0.40	0	0	0.500	519,176
2032	18,942	89.4%	10.6%	16927	2015	0.00%	3.60	0.40	0	0	0.500	544,536
2033	19,302	89.2%	10.8%	17217	2085	0.00%	3.65	0.40	0	0	0.500	571,150
2034	19,669	89.0%	11.0%	17513	2156	0.00%	3.70	0.40	0	0	0.500	599,080
2035	20,042	88.9%	11.1%	17812	2230	0.00%	3.76	0.40	0	0	0.500	628,391
2036	20,423	88.7%	11.3%	18117	2306	0.00%	3.82	0.40	0	0	0.500	659,153
2037	20,811	88.5%	11.5%	18426	2385	0.00%	3.87	0.40	0	0	0.500	691,437
2038	21,207	88.4%	11.6%	18739	2467	0.00%	3.93	0.40	0	0	0.500	725,319

5-yr ESALs  
1,500,000

10-yr ESALs  
3,400,000

15-yr ESALs  
6,000,000

20-yr ESALs  
9,400,000

*Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	02/06/13
Road Name	Cedar Grove Road	Forecaster	Jay Balaji
Functional Class	7 - Rural Major Collector	MARS No.	0
Project Description	New route from KY 480 to KY 44 across Salt River	Item No.	5-8709.00
Scenario	No Build	Route No.	KY 480
Segment Description	KY 480	Beg. MP	-
		End MP	-
		T.F. No.	12-091
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K-Factor Value	10.9%
Traffic Volume Milepoint	015A53 1.8	K-Factor Source	015A53
Truck Percent Milepoint	015A53 1.8	PHF	0.85
ESAL Information	0	Full Route Unique Identifier	015-KY-0480 -000
Growth Rate	2.10%		

**TRAFFIC PARAMETERS:**

	Present Year	Growth Rate	Construction Year	Median Year	Design Year
	2012		2018	2028	2038
Volume (AADT)	8250	2.10%	9300	12000	14000
Percent Trucks (%T)	7.1%	1.0%	8%	8%	9%
Number of Trucks	590	3.1%	710	960	1300
Percent Trucks Hauling Coal (%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>					
Axles/Truck (A/T)	2.520	0.70%	2.628	2.818	3.021
ESALs/Axle (ESAL/A)	0.245	1.60%	0.269	0.316	0.370
<i>Coal Trucks:</i>					
Axles/Truck (A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 3,600,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

**KY 480 @ MP 1.8**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALS
2018	9,346	92.4%	7.6%	8637	708	0.00%	2.63	0.27	0	0	0.500	99,420
2019	9,542	92.3%	7.7%	8811	730	0.00%	2.65	0.27	0	0	0.500	104,617
2020	9,742	92.3%	7.7%	8989	753	0.00%	2.66	0.28	0	0	0.500	110,095
2021	9,947	92.2%	7.8%	9170	777	0.00%	2.68	0.28	0	0	0.500	115,869
2022	10,156	92.1%	7.9%	9355	801	0.00%	2.70	0.29	0	0	0.500	121,955
2023	10,369	92.0%	8.0%	9543	826	0.00%	2.72	0.29	0	0	0.500	128,370
2024	10,587	92.0%	8.0%	9735	852	0.00%	2.74	0.30	0	0	0.500	135,131
2025	10,809	91.9%	8.1%	9931	878	0.00%	2.76	0.30	0	0	0.500	142,259
2026	11,036	91.8%	8.2%	10130	906	0.00%	2.78	0.31	0	0	0.500	149,773
2027	11,268	91.7%	8.3%	10334	934	0.00%	2.80	0.31	0	0	0.500	157,694
2028	11,504	91.6%	8.4%	10541	963	0.00%	2.82	0.32	0	0	0.500	166,044
2029	11,746	91.5%	8.5%	10753	993	0.00%	2.84	0.32	0	0	0.500	174,847
2030	11,993	91.5%	8.5%	10968	1024	0.00%	2.86	0.33	0	0	0.500	184,128
2031	12,245	91.4%	8.6%	11188	1056	0.00%	2.88	0.33	0	0	0.500	193,913
2032	12,502	91.3%	8.7%	11413	1089	0.00%	2.90	0.34	0	0	0.500	204,229
2033	12,764	91.2%	8.8%	11641	1123	0.00%	2.92	0.34	0	0	0.500	215,106
2034	13,032	91.1%	8.9%	11874	1158	0.00%	2.94	0.35	0	0	0.500	226,574
2035	13,306	91.0%	9.0%	12112	1194	0.00%	2.96	0.35	0	0	0.500	238,666
2036	13,585	90.9%	9.1%	12354	1232	0.00%	2.98	0.36	0	0	0.500	251,415
2037	13,871	90.8%	9.2%	12601	1270	0.00%	3.00	0.36	0	0	0.500	264,859
2038	14,162	90.8%	9.2%	12852	1310	0.00%	3.02	0.37	0	0	0.500	279,034

5-yr ESALS  
600,000  
10-yr ESALS  
1,300,000  
15-yr ESALS  
2,300,000  
20-yr ESALS  
3,600,000



*Traffic Forecast Technical Report*  
*Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44*  
*Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	09/16/13
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	0
Project Description	New route from KY 480 to KY 44 across Salt River	Item No.	5-8709.00
Scenario	Build with MTP (Alt 1)	Route No.	Alt #1
Segment Description	Same	Beg. MP	-
		End MP	-
		T.F. No.	12-091
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	10.1%
Traffic Volume	015A53,0150001,015A43	K-Factor Source	F.C
Milepoint	1.8,0.1,15.6	PHF	0.85
Truck Percent	2007 Aggregated ESALS	Full Route Unique Identifier	
Milepoint	N/A		N/A
ESAL Information	0		
Growth Rate	2.40%		

**TRAFFIC PARAMETERS:**

		Present Year	Growth Rate	Construction Year	Median Year	Design Year
		2012		2018	2028	2038
Volume	(AADT)	5000	2.40%	5800	7300	9000
Percent Trucks	(%T)	8.7%	2.0%	10%	12%	15%
Number of Trucks		440	4.4%	580	880	1400
Percent Trucks Hauling Coal	(%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>						
Axles/Truck	(A/T)	3.100	1.00%	3.291	3.635	4.015
ESALs/Axle	(ESAL/A)	0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>						
Axles/Truck	(A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle	(ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 3,700,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

**New Route Across Salt River with MTP (Alt 1)**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALS
2018	5,765	90.2%	9.8%	5200	565	0.00%	3.29	0.23	0	0	0.500	81,141
2019	5,903	90.0%	10.0%	5313	590	0.00%	3.32	0.23	0	0	0.500	87,053
2020	6,045	89.8%	10.2%	5428	616	0.00%	3.36	0.23	0	0	0.500	93,407
2021	6,190	89.6%	10.4%	5546	644	0.00%	3.39	0.24	0	0	0.500	100,239
2022	6,338	89.4%	10.6%	5666	672	0.00%	3.42	0.24	0	0	0.500	107,585
2023	6,490	89.2%	10.8%	5788	702	0.00%	3.46	0.25	0	0	0.500	115,482
2024	6,646	89.0%	11.0%	5913	733	0.00%	3.49	0.25	0	0	0.500	123,973
2025	6,806	88.7%	11.3%	6040	766	0.00%	3.53	0.26	0	0	0.500	133,104
2026	6,969	88.5%	11.5%	6169	800	0.00%	3.56	0.26	0	0	0.500	142,922
2027	7,136	88.3%	11.7%	6301	836	0.00%	3.60	0.27	0	0	0.500	153,479
2028	7,308	88.1%	11.9%	6435	873	0.00%	3.63	0.27	0	0	0.500	164,833
2029	7,483	87.8%	12.2%	6571	912	0.00%	3.67	0.28	0	0	0.500	177,042
2030	7,662	87.6%	12.4%	6710	952	0.00%	3.71	0.29	0	0	0.500	190,172
2031	7,846	87.3%	12.7%	6852	994	0.00%	3.75	0.29	0	0	0.500	204,294
2032	8,035	87.1%	12.9%	6996	1039	0.00%	3.78	0.30	0	0	0.500	219,481
2033	8,228	86.8%	13.2%	7143	1085	0.00%	3.82	0.30	0	0	0.500	235,815
2034	8,425	86.5%	13.5%	7292	1133	0.00%	3.86	0.31	0	0	0.500	253,383
2035	8,627	86.3%	13.7%	7444	1184	0.00%	3.90	0.32	0	0	0.500	272,279
2036	8,834	86.0%	14.0%	7598	1236	0.00%	3.94	0.32	0	0	0.500	292,603
2037	9,046	85.7%	14.3%	7755	1291	0.00%	3.98	0.33	0	0	0.500	314,464
2038	9,263	85.4%	14.6%	7915	1349	0.00%	4.02	0.33	0	0	0.500	337,978

5-yr ESALS  
500,000

10-yr ESALS  
1,200,000

15-yr ESALS  
2,200,000

20-yr ESALS  
3,700,000

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 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	09/16/13
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	0
Project Description	New route from KY 480 to KY 44 across Salt River	Item No.	5-8709.00
Scenario	Build without MTP (Alt 1)	Route No.	Alt #1
Segment Description	Same	Beg. MP	-
		End MP	-
		T.F. No.	12-091
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K-Factor Value	10.4%
Traffic Volume	015A53,0150001,015A43	K-Factor Source	Z01
Milepoint	1.8,0.1,15.6	PHF	0.85
Truck Percent	2007 Aggregated ESALS	Full Route Unique Identifier	
Milepoint	N/A		N/A
ESAL Information	0		
Growth Rate	2.00%		

**TRAFFIC PARAMETERS:**

	Present Year	Growth Rate	Construction Year	Median Year	Design Year
	2012		2018	2028	2038
Volume (AADT)	4300	2.00%	4800	5900	7200
Percent Trucks (%T)	8.7%	2.0%	10%	12%	15%
Number of Trucks	370	4.0%	480	710	1100
Percent Trucks Hauling Coal (%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>					
Axles/Truck (A/T)	3.100	1.00%	3.291	3.635	4.015
ESALs/Axle (ESAL/A)	0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>					
Axles/Truck (A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 3,000,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

New Route Across Salt River Without MTP (Alt 1)													
Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALS	
2018	4,842	90.2%	9.8%	4368	474	0.00%	3.29	0.23	0	0	0.500	68,162	
2019	4,939	90.0%	10.0%	4446	494	0.00%	3.32	0.23	0	0	0.500	72,842	
2020	5,038	89.8%	10.2%	4525	514	0.00%	3.36	0.23	0	0	0.500	77,854	
2021	5,139	89.6%	10.4%	4605	534	0.00%	3.39	0.24	0	0	0.500	83,222	
2022	5,242	89.4%	10.6%	4686	556	0.00%	3.42	0.24	0	0	0.500	88,971	5-yr ESALS 400,000
2023	5,347	89.2%	10.8%	4768	578	0.00%	3.46	0.25	0	0	0.500	95,129	
2024	5,453	89.0%	11.0%	4852	602	0.00%	3.49	0.25	0	0	0.500	101,725	
2025	5,563	88.7%	11.3%	4936	626	0.00%	3.53	0.26	0	0	0.500	108,791	
2026	5,674	88.5%	11.5%	5022	651	0.00%	3.56	0.26	0	0	0.500	116,359	
2027	5,787	88.3%	11.7%	5110	678	0.00%	3.60	0.27	0	0	0.500	124,466	10-yr ESALS 1,000,000
2028	5,903	88.1%	11.9%	5198	705	0.00%	3.63	0.27	0	0	0.500	133,151	
2029	6,021	87.8%	12.2%	5288	733	0.00%	3.67	0.28	0	0	0.500	142,455	
2030	6,141	87.6%	12.4%	5378	763	0.00%	3.71	0.29	0	0	0.500	152,423	
2031	6,264	87.3%	12.7%	5470	794	0.00%	3.75	0.29	0	0	0.500	163,101	
2032	6,390	87.1%	12.9%	5564	826	0.00%	3.78	0.30	0	0	0.500	174,542	
2033	6,517	86.8%	13.2%	5658	859	0.00%	3.82	0.30	0	0	0.500	186,799	15-yr ESALS 1,800,000
2034	6,648	86.5%	13.5%	5754	894	0.00%	3.86	0.31	0	0	0.500	199,931	
2035	6,781	86.3%	13.7%	5850	930	0.00%	3.90	0.32	0	0	0.500	214,002	
2036	6,916	86.0%	14.0%	5948	968	0.00%	3.94	0.32	0	0	0.500	229,077	
2037	7,055	85.7%	14.3%	6048	1007	0.00%	3.98	0.33	0	0	0.500	245,230	20-yr ESALS 3,000,000
2038	7,196	85.4%	14.6%	6148	1048	0.00%	4.02	0.33	0	0	0.500	262,538	

*Traffic Forecast Technical Report*  
*Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44*  
*Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	09/16/13
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	0
Project Description	New route from KY 480 to KY 44 across Salt River through Sunview Dr	Item No.	5-8709.00
Scenario	Build with MTP (Alt 2)	Route No.	Alt #2
Segment Description	Same	Beg. MP	-
		End MP	-
		T.F. No.	12-091
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	10.1%
Traffic Volume Milepoint	015A53,0150002,015A43 1.8,0.1,15.6	K-Factor Source	F.C
Truck Percent Milepoint	2007 Aggregated ESALS N/A	PHF	0.85
ESAL Information	0	Full Route Unique Identifier	N/A
Growth Rate	2.40%		

**TRAFFIC PARAMETERS:**

		Present Year	Growth Rate	Construction Year	Median Year	Design Year
		2012		2018	2028	2038
Volume (AADT)		7700	2.40%	8900	11000	14000
Percent Trucks (%T)		8.7%	2.0%	10%	12%	15%
Number of Trucks		670	4.4%	890	1300	2100
Percent Trucks Hauling Coal (%CT)		0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>						
Axles/Truck (A/T)		3.100	1.00%	3.291	3.635	4.015
ESALs/Axle (ESAL/A)		0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>						
Axles/Truck (A/CT)		0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)		0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 5,700,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a terminus north of KY 44  
 Item No. 5-8709.00

**New Route Across Salt River with MTP (Alt 2)**

Year	ADT	Car %	Truck %	Cats	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALS
2018	8,877	90.2%	9.8%	8008	870	0.00%	3.29	0.23	0	0	0.500	124,958
2019	9,091	90.0%	10.0%	8182	908	0.00%	3.32	0.23	0	0	0.500	134,061
2020	9,309	89.8%	10.2%	8360	949	0.00%	3.36	0.23	0	0	0.500	143,847
2021	9,532	89.6%	10.4%	8541	991	0.00%	3.39	0.24	0	0	0.500	154,369
2022	9,761	89.4%	10.6%	8726	1035	0.00%	3.42	0.24	0	0	0.500	165,680
2023	9,995	89.2%	10.8%	8914	1081	0.00%	3.46	0.25	0	0	0.500	177,842
2024	10,235	89.0%	11.0%	9106	1129	0.00%	3.49	0.25	0	0	0.500	190,919
2025	10,481	88.7%	11.3%	9301	1180	0.00%	3.53	0.26	0	0	0.500	204,980
2026	10,732	88.5%	11.5%	9500	1232	0.00%	3.56	0.26	0	0	0.500	220,100
2027	10,990	88.3%	11.7%	9703	1287	0.00%	3.60	0.27	0	0	0.500	236,358
2028	11,254	88.1%	11.9%	9910	1344	0.00%	3.63	0.27	0	0	0.500	253,842
2029	11,524	87.8%	12.2%	10120	1404	0.00%	3.67	0.28	0	0	0.500	272,645
2030	11,800	87.6%	12.4%	10334	1466	0.00%	3.71	0.29	0	0	0.500	292,866
2031	12,083	87.3%	12.7%	10552	1531	0.00%	3.75	0.29	0	0	0.500	314,612
2032	12,373	87.1%	12.9%	10774	1600	0.00%	3.78	0.30	0	0	0.500	338,000
2033	12,670	86.8%	13.2%	11000	1671	0.00%	3.82	0.30	0	0	0.500	363,155
2034	12,974	86.5%	13.5%	11229	1745	0.00%	3.86	0.31	0	0	0.500	390,210
2035	13,286	86.3%	13.7%	11463	1823	0.00%	3.90	0.32	0	0	0.500	419,309
2036	13,605	86.0%	14.0%	11701	1904	0.00%	3.94	0.32	0	0	0.500	450,608
2037	13,931	85.7%	14.3%	11943	1988	0.00%	3.98	0.33	0	0	0.500	484,274
2038	14,266	85.4%	14.6%	12189	2077	0.00%	4.02	0.33	0	0	0.500	520,486

5-yr ESALS  
800,000

10-yr ESALS  
1,900,000

15-yr ESALS  
3,500,000

20-yr ESALS  
5,700,000

*Traffic Forecast Technical Report*  
*Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44*  
*Item No. 5-8709.00*

**FORECAST OF EQUIVALENT SINGLE AXLE LOAD ACCUMULATIONS-4 LANE (20-year)**

**ROUTE ID:**

County	Bullitt	Date	09/16/13
Road Name	New route	Forecaster	Jay Balaji
Functional Class	16 - Urban Minor Arterial	MARS No.	0
Project Description	New route from KY 480 to KY 44 across Salt River through Sunview Dr	Item No.	5-8709.00
Scenario	Build without MTP (Alt 2)	Route No.	Alt #2
Segment Description	Same	Beg. MP	-
		End MP	-
		T.F. No.	12-091
		No. of Lanes	2
		1 or 2 way	2

**REFERENCES:**

Previous Forecasts	None	K- Factor Value	10.1%
Traffic Volume Milepoint	015A53,0150002,015A43 1.8,0.1,15.6	K-Factor Source	F.C
Truck Percent Milepoint	2007 Aggregated ESALS N/A	PHF	0.85
ESAL Information	0	Full Route Unique Identifier	N/A
Growth Rate	2.00%		

**TRAFFIC PARAMETERS:**

	Present Year	Growth Rate	Construction Year	Median Year	Design Year
	2012		2018	2028	2038
Volume (AADT)	8000	2.00%	9000	11000	13000
Percent Trucks (%T)	8.7%	2.0%	10%	12%	15%
Number of Trucks	700	4.0%	900	1300	2000
Percent Trucks Hauling Coal (%CT)	0%	0.0%	0%	0%	0%
<i>Non-Coal Trucks:</i>					
Axles/Truck (A/T)	3.100	1.00%	3.291	3.635	4.015
ESALs/Axle (ESAL/A)	0.200	2.00%	0.225	0.275	0.335
<i>Coal Trucks:</i>					
Axles/Truck (A/CT)	0	0.00%	0.000	0.000	0.000
ESALs/Axle (ESAL/CA)	0	0.00%	0.000	0.000	0.000

**ESAL CALCULATIONS:** SEE ATTACHED ESAL CALCULATION SHEET

Design ESALs in Critical Lane 5,500,000

General Comments:

Traffic Forecast Technical Report  
 Bullitt County: Construction of New Route from KY 480 to a termini north of KY 44  
 Item No. 5-8709.00

**New Route Across Salt River without MTP (Alt 2)**

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALS
2018	9,009	90.2%	9.8%	8127	883	0.00%	3.29	0.23	0	0	0.500	126,813
2019	9,189	90.0%	10.0%	8271	918	0.00%	3.32	0.23	0	0	0.500	135,520
2020	9,373	89.8%	10.2%	8418	955	0.00%	3.36	0.23	0	0	0.500	144,845
2021	9,561	89.6%	10.4%	8567	994	0.00%	3.39	0.24	0	0	0.500	154,832
2022	9,752	89.4%	10.6%	8718	1034	0.00%	3.42	0.24	0	0	0.500	165,528
2023	9,947	89.2%	10.8%	8871	1076	0.00%	3.46	0.25	0	0	0.500	176,985
2024	10,146	89.0%	11.0%	9026	1119	0.00%	3.49	0.25	0	0	0.500	189,257
2025	10,349	88.7%	11.3%	9184	1165	0.00%	3.53	0.26	0	0	0.500	202,401
2026	10,556	88.5%	11.5%	9344	1212	0.00%	3.56	0.26	0	0	0.500	216,482
2027	10,767	88.3%	11.7%	9506	1261	0.00%	3.60	0.27	0	0	0.500	231,565
2028	10,982	88.1%	11.9%	9671	1312	0.00%	3.63	0.27	0	0	0.500	247,723
2029	11,202	87.8%	12.2%	9837	1365	0.00%	3.67	0.28	0	0	0.500	265,033
2030	11,426	87.6%	12.4%	10006	1420	0.00%	3.71	0.29	0	0	0.500	283,577
2031	11,654	87.3%	12.7%	10177	1477	0.00%	3.75	0.29	0	0	0.500	303,444
2032	11,888	87.1%	12.9%	10351	1537	0.00%	3.78	0.30	0	0	0.500	324,729
2033	12,125	86.8%	13.2%	10526	1599	0.00%	3.82	0.30	0	0	0.500	347,533
2034	12,368	86.5%	13.5%	10704	1663	0.00%	3.86	0.31	0	0	0.500	371,965
2035	12,615	86.3%	13.7%	10885	1731	0.00%	3.90	0.32	0	0	0.500	398,143
2036	12,867	86.0%	14.0%	11067	1801	0.00%	3.94	0.32	0	0	0.500	426,180
2037	13,125	85.7%	14.3%	11252	1873	0.00%	3.98	0.33	0	0	0.500	456,243
2038	13,387	85.4%	14.6%	11438	1949	0.00%	4.02	0.33	0	0	0.500	488,443

5-yr ESALS  
800,000

10-yr ESALS  
1,900,000

15-yr ESALS  
3,400,000

20-yr ESALS  
5,500,000



### **Bicycle and pedestrian review for project # 5-8709.00**

#### **Project Overview:**

- New Route across Salt River between KY 480 & Further North of KY 44

#### **Existing conditions:**

- Specific mention for this area in the transportation section of the Bullitt County comprehensive plan / pages 7-16 to 7-18.  
(<http://www.krisslowry.com/bullitt/Bullitt%20Comp%20Plan%20Chap%207%20Transportation.nov2013.pdf>)
- No roadway data(new route)

#### **The Bicycle and Pedestrian recommendations are:**

- Extending or connecting to like facilities (current or proposed within 100-300 feet) along KY 44
- Contacting and or working with KIPDA to research current and future bike/ped plans  
(<http://www.kipda.org/Transportation/>)

Prepared by:  
**Troy Hearn**  
Bicycle & Pedestrian Program Coordinator  
Division of Planning  
[www.transportation.ky.gov/Bike-Walk](http://www.transportation.ky.gov/Bike-Walk)  
Kentucky Transportation Cabinet  
April 9, 2014