Steven L. Beshear
Governor

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

Michael W. Hancock, P.E.
Secretary

MEMORANDUM

TO: Patty Dunaway, P.E.
Chief District Engineer
District 4 - Elizabethtown

ATTN: Charlie Allen, P.E.

FROM: Keith Dotson
Assistant Director
Acting Director
Division of Planning

DATE: October 3, 2013

SUBJECT: Marion County Traffic Forecast
KY 49 Improvements and Bridge Replacement
Item No. 4-1076.00, 4-8707.00, 4-8708.00

In response to your February 28, 2013 request, we are providing the following forecasts on the attached report:

- 2013 and 2040 Average Daily Traffic and Design Hour Volume
- 2013 and 2040 Average Daily and Design Hour Truck Percent
- Truck Percentages and 20 year ESALs

If you have any questions, please contact Jonathan Reynolds, P.E. of this Division at (502) 782-5076.

KD/JR/BC

Attachments

c/att: Brad Eldridge
Paul Looney
John Moore
Dan Hite
Brad Bottoms
Steve Ross

Executive Summary

Traffic Forecast Report
Marion County
KY 49 Improvements and Bridge Replacement
Item No. 4-1076.00, 4-8707.00, & 4-8708.00

Prepared for:

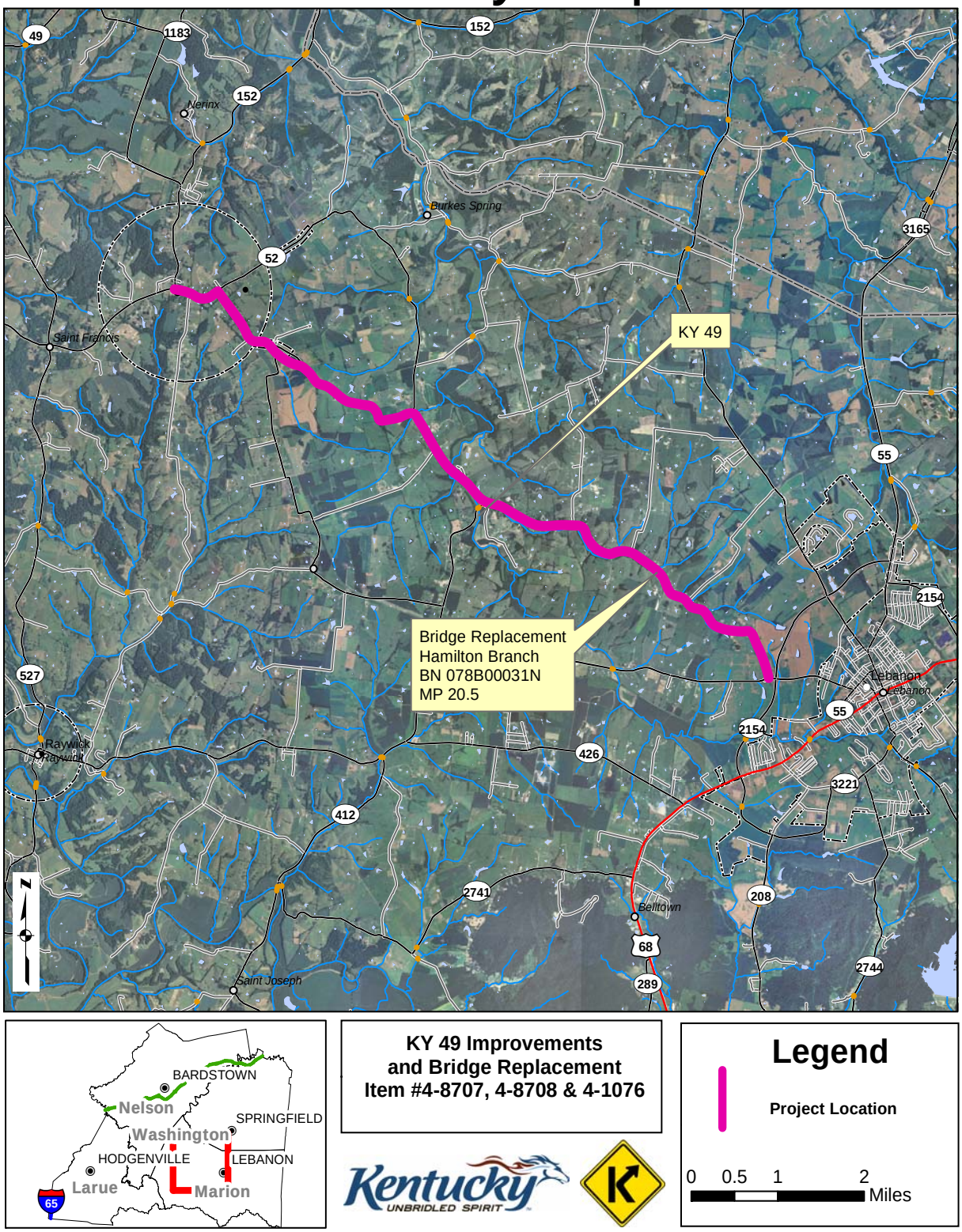
Prepared by:
Jonathan Reynolds, PE
Division of Planning
Kentucky Transportation Cabinet
October 1, 2013

Table of Contents

Commonly Used Abbreviations and their Descriptions

ADT	Average Daily Traffic	Without any adjustment
DHV	Design Hour Volume	30th highest hour of a year
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-30th 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



KY 49 Improvements and Bridge Replacement
Item #4-8707, 4-8708 & 4-1076

Kentucky UNBRIDLED SPIRIT

Legend

Project Location

0 0.5 1 2 Miles

Traffic Forecast Executive Summary
Marion County: KY 49 Improvements and Bridge Replacement
Item No. 4-1076.00, 4-8707.00, & 4-8708.00

FORECAST SUMMARY

The project calls for roadway improvements along KY 49 from Lebanon to Loretto and replacing the bridge over Hamilton Branch in Marion County. The purpose of this report is to analyze current and future traffic utilizing KY 49 between MP 18.698 and MP 27.540. District 4 requested traffic forecasts for the project road segment.

FORECAST TYPE

The following types of forecasts were developed:

- 2013 and 2040 ADT and DHV values
- 2013 and 2040 Average Daily and Design Hourly Truck Percent Forecasts
- 20-year ESALs

BASE-YEAR VOLUMES

The 2013 ADT volume is based on the most current 48-hour counts collected at traffic station 078A84 (MP 18.6), 078507 (MP 21.7), 078782 (MP 25.6) and 078795 (MP 27.3) all on KY 49. All figures are subject to rounding.

DESIGN-YEAR/GROWTH FACTORS

While the Kentucky State Data Center predicts population growth in Marion County between now and 2035 to be 0.64% annually (see page 5), exponential growth analyses performed on historical data from traffic stations along KY 49 have been growing 1.0% annually. Therefore, a 1.0% growth rate was used for the purposes of this forecast.

DESIGN HOUR FACTORS

DHVs were estimated by analyzing the most recent hourly volume data collected at stations 078A84, 078507, 078782, and 078795 on KY 49. The peak AM and PM volumes were derived by dividing the highest hourly volumes from these counts by their daily totals. Functional class design hour factors based on the day and month of these counts were then applied. Finally the calculated K-factors were used in combination with the ADT forecast to produce DHVs for 2013 and 2040.

TRUCK PERCENTAGE

A 2013 class count at station 078507 provided the basis of a 7.0% truck percentage for KY 49. Statewide research indicates a 1.0% annual growth rate for %T as the trend for the truck component of overall traffic on rural major collector roads statewide.

ESALs

Functional class averages from ATR data, traffic counts, and the 2040 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

Turn movements were not requested and therefore not included.

HISTORICAL POPULATION SUMMARY

	1960 Population	1970 Population	1980 Population	1990 Population	2000 Population	2010 Population	60 - 70 Pct Change	70 - 80 Pct Change	80 - 90 Pct Change	90 - 00 Pct Change	00 - 10 Pct Change
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%
Marion Co	-	16,714	17,910	16,499	18,212	19,820	-	7.2%	-7.9%	10.4%	8.8%

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

FUTURE POPULATION PROJECTIONS SUMMARY

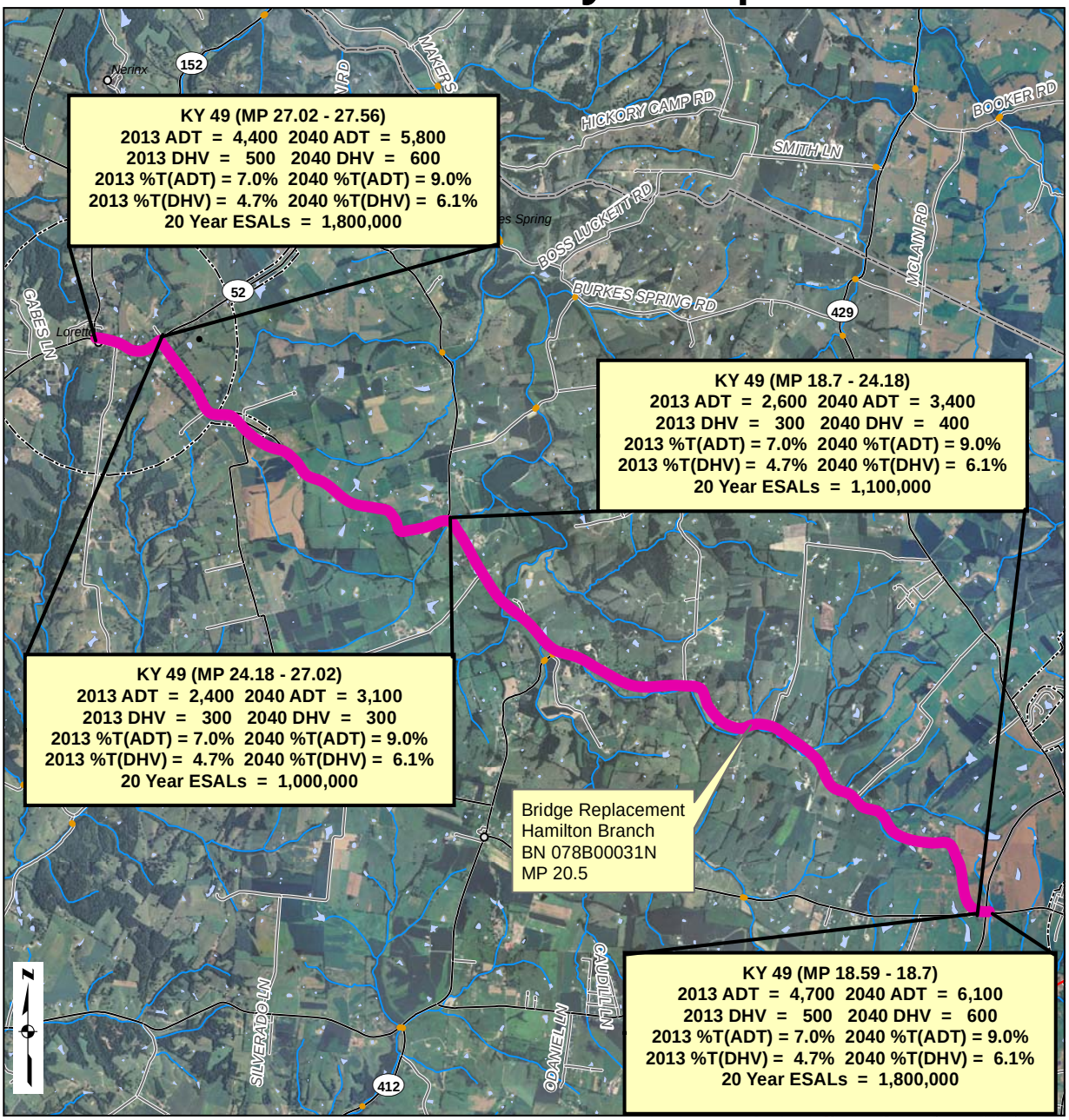
	2010 Projection	2015 Projection	2020 Projection	2025 Projection	2030 Projection	2035 Projection	10 - 15 Pct Change	15 - 20 Pct Change	20 - 25 Pct Change	25 - 30 Pct Change	30 - 35 Pct Change
Kentucky	4,339,367	4,509,429	4,672,754	4,820,390	4,951,178	5,063,331	3.9%	3.6%	3.2%	2.7%	2.3%
Marion Co	19,820	20,637	21,424	22,152	22,757	23,256	4.1%	3.8%	3.4%	2.7%	2.2%

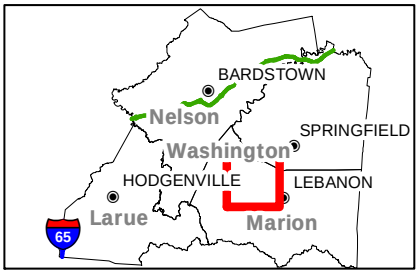
Sources: US Bureau of the Census; Kentucky State Data Center

ANNUAL POPULATION GROWTH RATES FROM HISTORICAL DATA AND PROJECTIONS

	60 - 70 GR	70 - 80 GR	80 - 90 GR	90 - 00 GR	05 - 10 GR	10 - 15 GR	15 - 20 GR	20 - 25 GR	25 - 30 GR	10 - 30 GR	10 - 35 GR
Kentucky	0.59%	1.29%	0.07%	0.92%	0.77%	0.71%	0.62%	0.54%	0.45%	0.53%	0.62%
Marion Co	-	0.69%	-0.82%	0.99%	0.81%	0.75%	0.67%	0.54%	0.43%	0.56%	0.64%

Summary Map





KY 49 Improvements and Bridge Replacement Item #4-8707, 4-8708 & 4-1076

Legend

Project Location

0 0.425 0.85 1.7 Miles

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

ROUTE ID:

County	Marion
Road Name	Loretto Rd
Functional Class	16 - Urban Minor Arterial
Project Description	Corridor Study KY 49
Scenario	Build
Segment Description	KY 84 - KY 2154

Date	08/28/13
Forecaster	Jonathan Reynolds
MARS No.	8685901D
Item No.	4-8707.00
Route No.	KY 49
Beg. MP	18.59
End MP	18.7
T.F. No.	13.013
No. of Lanes	2
1 or 2 way	2

REFERENCES:

Previous Forecasts	none
Traffic Volume	078A84
Milepoint	18.645
Truck Percent	078507
Milepoint	21.4
ESAL Information	2007 Aggregated ESALS
Growth Rate	1.00%

K- Factor Value	10.1%
K-Factor Source	078A84
PHF	0.9

Full Route Unique Identifier: 078-KY-0049 -000

TRAFFIC PARAMETERS:

		Present Year	Growth Rate	Construction Year	Median Year	Design Year
		2013		**2020**	**2030**	**2040**
Volume	(AADT)	4700	1.00%	5000	5600	6100
Percent Trucks	(%T)	7.0%	1.0%	8%	8%	9%
Number of Trucks		330	2.0%	380	450	550
Percent Trucks Hauling Coal	(%CT)	0%	0.0%	0%	0%	0%
Non-Coal Trucks:						
Axles/Truck	(A/T)	2.900	1.00%	3.109	3.434	3.794
ESALs/Axle	(ESAL/A)	0.200	2.00%	0.230	0.280	0.341
Coal Trucks:						
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: 1,800,000

General Comments:

KY 84 - KY 2154 (Build)

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALs	
2020	5,039	92.5%	7.5%	4661	378	0.00%	3.11	0.23	0	0	0.500	53,552	
2021	5,089	92.4%	7.6%	4704	386	0.00%	3.14	0.23	0	0	0.500	56,101	
2022	5,140	92.3%	7.7%	4747	394	0.00%	3.17	0.24	0	0	0.500	58,777	
2023	5,192	92.3%	7.7%	4790	401	0.00%	3.20	0.24	0	0	0.500	61,589	
2024	5,244	92.2%	7.8%	4834	410	0.00%	3.24	0.25	0	0	0.500	64,542	5-yr ESALs 300,000
2025	5,296	92.1%	7.9%	4878	418	0.00%	3.27	0.25	0	0	0.500	67,643	
2026	5,349	92.0%	8.0%	4923	426	0.00%	3.30	0.26	0	0	0.500	70,900	
2027	5,403	92.0%	8.0%	4968	435	0.00%	3.33	0.26	0	0	0.500	74,322	
2028	5,457	91.9%	8.1%	5013	443	0.00%	3.37	0.27	0	0	0.500	77,916	
2029	5,511	91.8%	8.2%	5059	452	0.00%	3.40	0.27	0	0	0.500	81,691	10-yr ESALs 700,000
2030	5,566	91.7%	8.3%	5105	461	0.00%	3.43	0.28	0	0	0.500	85,657	
2031	5,622	91.6%	8.4%	5151	471	0.00%	3.47	0.29	0	0	0.500	89,823	
2032	5,678	91.5%	8.5%	5198	480	0.00%	3.50	0.29	0	0	0.500	94,199	
2033	5,735	91.5%	8.5%	5245	490	0.00%	3.54	0.30	0	0	0.500	98,796	
2034	5,792	91.4%	8.6%	5293	500	0.00%	3.57	0.30	0	0	0.500	103,625	15-yr ESALs 1,200,000
2035	5,850	91.3%	8.7%	5340	510	0.00%	3.61	0.31	0	0	0.500	108,698	
2036	5,909	91.2%	8.8%	5389	520	0.00%	3.65	0.32	0	0	0.500	114,027	
2037	5,968	91.1%	8.9%	5437	530	0.00%	3.68	0.32	0	0	0.500	119,626	
2038	6,027	91.0%	9.0%	5486	541	0.00%	3.72	0.33	0	0	0.500	125,508	
2039	6,088	90.9%	9.1%	5536	552	0.00%	3.76	0.33	0	0	0.500	131,688	20-yr ESALs 1,800,000
2040	6,149	90.8%	9.2%	5586	563	0.00%	3.79	0.34	0	0	0.500	138,180	

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

ROUTE ID:

County	Marion
Road Name	Loretto Rd
Functional Class	7 - Rural Major Collector
Project Description	Corridor Study KY 49 & Bridge Replacement over Hamilton
Scenario	Build
Segment Description	KY 84 - KY 52 & Bridge over Hamilton Branch

Date	08/28/13
Forecaster	Jonathan Reynolds
MARS No.	8685901D
Item No.	4-8707 & 4-1076
Route No.	KY 49
Beg. MP	18.7
End MP	24.18
T.F. No.	13.013 & 13.025
No. of Lanes	2
1 or 2 way	2

REFERENCES:

Previous Forecasts	none
Traffic Volume	078507
Milepoint	21.4
Truck Percent	078507
Milepoint	21.4
ESAL Information	2007 Aggregated ESALS
Growth Rate	1.00%

K- Factor Value	11.0%
K-Factor Source	078507
PHF	0.9

Full Route Unique Identifier: 078-KY-0049 -000

TRAFFIC PARAMETERS:

		Present Year	Growth Rate	Construction Year	Median Year	Design Year
		2013		**2020**	**2030**	**2040**
Volume	(AADT)	2600	1.00%	2800	3100	3400
Percent Trucks	(%T)	7.0%	1.0%	8%	8%	9%
Number of Trucks		180	2.0%	210	250	310
Percent Trucks Hauling Coal	(%CT)	0%	0.0%	0%	0%	0%
Non-Coal Trucks:						
Axles/Truck	(A/T)	2.900	0.70%	3.045	3.265	3.501
ESALs/Axle	(ESAL/A)	0.245	1.60%	0.274	0.321	0.376
Coal Trucks:						
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: 1,100,000

General Comments:

KY 84 - KY 52 & Bridge over Hamilton Branch (Build)

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALs	
2020	2,788	92.5%	7.5%	2578	209	0.00%	3.05	0.27	0	0	0.500	34,184	
2021	2,815	92.4%	7.6%	2602	213	0.00%	3.07	0.28	0	0	0.500	35,596	
2022	2,844	92.3%	7.7%	2626	218	0.00%	3.09	0.28	0	0	0.500	37,069	
2023	2,872	92.3%	7.7%	2650	222	0.00%	3.11	0.29	0	0	0.500	38,605	
2024	2,901	92.2%	7.8%	2674	227	0.00%	3.13	0.29	0	0	0.500	40,208	5-yr ESALs 200,000
2025	2,930	92.1%	7.9%	2699	231	0.00%	3.15	0.30	0	0	0.500	41,880	
2026	2,959	92.0%	8.0%	2723	236	0.00%	3.18	0.30	0	0	0.500	43,624	
2027	2,989	92.0%	8.0%	2748	240	0.00%	3.20	0.31	0	0	0.500	45,444	
2028	3,019	91.9%	8.1%	2773	245	0.00%	3.22	0.31	0	0	0.500	47,342	
2029	3,049	91.8%	8.2%	2798	250	0.00%	3.24	0.32	0	0	0.500	49,322	10-yr ESALs 400,000
2030	3,079	91.7%	8.3%	2824	255	0.00%	3.27	0.32	0	0	0.500	51,388	
2031	3,110	91.6%	8.4%	2850	260	0.00%	3.29	0.33	0	0	0.500	53,543	
2032	3,141	91.5%	8.5%	2875	266	0.00%	3.31	0.33	0	0	0.500	55,792	
2033	3,172	91.5%	8.5%	2902	271	0.00%	3.33	0.34	0	0	0.500	58,138	
2034	3,204	91.4%	8.6%	2928	276	0.00%	3.36	0.34	0	0	0.500	60,586	15-yr ESALs 700,000
2035	3,236	91.3%	8.7%	2954	282	0.00%	3.38	0.35	0	0	0.500	63,139	
2036	3,269	91.2%	8.8%	2981	288	0.00%	3.40	0.35	0	0	0.500	65,803	
2037	3,301	91.1%	8.9%	3008	293	0.00%	3.43	0.36	0	0	0.500	68,583	
2038	3,334	91.0%	9.0%	3035	299	0.00%	3.45	0.36	0	0	0.500	71,484	
2039	3,368	90.9%	9.1%	3062	305	0.00%	3.48	0.37	0	0	0.500	74,510	20-yr ESALs 1,100,000
2040	3,401	90.8%	9.2%	3090	311	0.00%	3.50	0.38	0	0	0.500	77,667	

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

ROUTE ID:

County	Marion
Road Name	Loretto Rd
Functional Class	7 - Rural Major Collector
Project Description	Corridor Study KY 49
Scenario	Build
Segment Description	KY 52 - KY 52

Date	08/28/13
Forecaster	Jonathan Reynolds
MARS No.	8685901D
Item No.	4-8707.00
Route No.	KY 49
Beg. MP	24.18
End MP	27.02
T.F. No.	13.013
No. of Lanes	2
1 or 2 way	2

REFERENCES:

Previous Forecasts	none
Traffic Volume	078782
Milepoint	25.6
Truck Percent	078507
Milepoint	21.4
ESAL Information	2007 Aggregated ESALS
Growth Rate	1.00%

K- Factor Value	11.0%
K-Factor Source	078782
PHF	0.9

Full Route Unique Identifier: 078-KY-0049 -000

TRAFFIC PARAMETERS:

		Present Year	Growth Rate	Construction Year	Median Year	Design Year
		2013		**2020**	**2030**	**2040**
Volume	(AADT)	2400	1.00%	2600	2800	3100
Percent Trucks	(%T)	7.0%	1.0%	8%	8%	9%
Number of Trucks		170	2.0%	200	220	280
Percent Trucks Hauling Coal	(%CT)	0%	0.0%	0%	0%	0%
Non-Coal Trucks:						
Axles/Truck	(A/T)	2.900	0.70%	3.045	3.265	3.501
ESALs/Axle	(ESAL/A)	0.245	1.60%	0.274	0.321	0.376
Coal Trucks:						
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: 1,000,000

General Comments:

KY 52 - KY 52 (Build)

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALs	
2020	2,573	92.5%	7.5%	2380	193	0.00%	3.05	0.27	0	0	0.500	31,555	
2021	2,599	92.4%	7.6%	2402	197	0.00%	3.07	0.28	0	0	0.500	32,858	
2022	2,625	92.3%	7.7%	2424	201	0.00%	3.09	0.28	0	0	0.500	34,218	
2023	2,651	92.3%	7.7%	2446	205	0.00%	3.11	0.29	0	0	0.500	35,636	
2024	2,678	92.2%	7.8%	2468	209	0.00%	3.13	0.29	0	0	0.500	37,115	5-yr ESALs 200,000
2025	2,704	92.1%	7.9%	2491	213	0.00%	3.15	0.30	0	0	0.500	38,659	
2026	2,731	92.0%	8.0%	2514	218	0.00%	3.18	0.30	0	0	0.500	40,268	
2027	2,759	92.0%	8.0%	2537	222	0.00%	3.20	0.31	0	0	0.500	41,948	
2028	2,786	91.9%	8.1%	2560	226	0.00%	3.22	0.31	0	0	0.500	43,700	
2029	2,814	91.8%	8.2%	2583	231	0.00%	3.24	0.32	0	0	0.500	45,528	10-yr ESALs 400,000
2030	2,842	91.7%	8.3%	2607	236	0.00%	3.27	0.32	0	0	0.500	47,435	
2031	2,871	91.6%	8.4%	2630	240	0.00%	3.29	0.33	0	0	0.500	49,425	
2032	2,899	91.5%	8.5%	2654	245	0.00%	3.31	0.33	0	0	0.500	51,500	
2033	2,928	91.5%	8.5%	2678	250	0.00%	3.33	0.34	0	0	0.500	53,666	
2034	2,958	91.4%	8.6%	2703	255	0.00%	3.36	0.34	0	0	0.500	55,925	15-yr ESALs 700,000
2035	2,987	91.3%	8.7%	2727	260	0.00%	3.38	0.35	0	0	0.500	58,282	
2036	3,017	91.2%	8.8%	2752	266	0.00%	3.40	0.35	0	0	0.500	60,742	
2037	3,047	91.1%	8.9%	2777	271	0.00%	3.43	0.36	0	0	0.500	63,308	
2038	3,078	91.0%	9.0%	2802	276	0.00%	3.45	0.36	0	0	0.500	65,985	
2039	3,109	90.9%	9.1%	2827	282	0.00%	3.48	0.37	0	0	0.500	68,778	20-yr ESALs 1,000,000
2040	3,140	90.8%	9.2%	2852	288	0.00%	3.50	0.38	0	0	0.500	71,693	

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

ROUTE ID:

County	Marion	Date	08/28/13
		Forecaster	Jonathan Reynolds
Road Name	Loretto Rd		
		MARS No.	8685901D
Functional Class	7 - Rural Major Collector	Item No.	4-8707 & 4-8708
		Route No.	KY 49
Project Description	Corridor Study KY 49 & Road Improvements from KY 52 to W Marion Elem	Beg. MP	27.02
		End MP	27.56
Scenario	Build	T.F. No.	13.013 & 13.040
Segment Description	KY 52 - KY 152	No. of Lanes	2
		1 or 2 way	2

REFERENCES:

Previous Forecasts	none	K- Factor Value	11.0%
		K-Factor Source	078795
Traffic Volume	078795	PHF	0.9
Milepoint	27.3		
Truck Percent	078507	Full Route Unique Identifier	
Milepoint	21.4	078-KY-0049 -000	
ESAL Information	2007 Aggregated ESALS		
Growth Rate	1.00%		

TRAFFIC PARAMETERS:

		Present Year	Growth Rate	Construction Year	Median Year	Design Year
		2013		**2020**	**2030**	**2040**
Volume	(AADT)	4400	1.00%	4700	5200	5800
Percent Trucks	(%T)	7.0%	1.0%	8%	8%	9%
Number of Trucks		310	2.0%	350	420	520
Percent Trucks Hauling Coal	(%CT)	0%	0.0%	0%	0%	0%
Non-Coal Trucks:						
Axles/Truck	(A/T)	2.900	0.70%	3.045	3.265	3.501
ESALs/Axle	(ESAL/A)	0.245	1.60%	0.274	0.321	0.376
Coal Trucks:						
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: 1,800,000

General Comments:

KY 52 - KY 152 (Build)

Year	ADT	Car %	Truck %	Cars	Trucks	CT%	AX/T	ESAL/AX	AX/CT	ESAL/CA	LDF	ESALs	
2020	4,717	92.5%	7.5%	4363	354	0.00%	3.05	0.27	0	0	0.500	57,851	
2021	4,765	92.4%	7.6%	4403	361	0.00%	3.07	0.28	0	0	0.500	60,240	
2022	4,812	92.3%	7.7%	4444	368	0.00%	3.09	0.28	0	0	0.500	62,732	
2023	4,860	92.3%	7.7%	4485	376	0.00%	3.11	0.29	0	0	0.500	65,332	
2024	4,909	92.2%	7.8%	4526	383	0.00%	3.13	0.29	0	0	0.500	68,045	5-yr ESALs 300,000
2025	4,958	92.1%	7.9%	4567	391	0.00%	3.15	0.30	0	0	0.500	70,874	
2026	5,008	92.0%	8.0%	4609	399	0.00%	3.18	0.30	0	0	0.500	73,826	
2027	5,058	92.0%	8.0%	4651	407	0.00%	3.20	0.31	0	0	0.500	76,905	
2028	5,108	91.9%	8.1%	4693	415	0.00%	3.22	0.31	0	0	0.500	80,117	
2029	5,159	91.8%	8.2%	4736	423	0.00%	3.24	0.32	0	0	0.500	83,468	10-yr ESALs 700,000
2030	5,211	91.7%	8.3%	4779	432	0.00%	3.27	0.32	0	0	0.500	86,964	
2031	5,263	91.6%	8.4%	4822	441	0.00%	3.29	0.33	0	0	0.500	90,612	
2032	5,316	91.5%	8.5%	4866	450	0.00%	3.31	0.33	0	0	0.500	94,417	
2033	5,369	91.5%	8.5%	4910	459	0.00%	3.33	0.34	0	0	0.500	98,387	
2034	5,423	91.4%	8.6%	4955	468	0.00%	3.36	0.34	0	0	0.500	102,529	15-yr ESALs 1,200,000
2035	5,477	91.3%	8.7%	5000	477	0.00%	3.38	0.35	0	0	0.500	106,851	
2036	5,532	91.2%	8.8%	5045	487	0.00%	3.40	0.35	0	0	0.500	111,360	
2037	5,587	91.1%	8.9%	5090	497	0.00%	3.43	0.36	0	0	0.500	116,064	
2038	5,643	91.0%	9.0%	5136	507	0.00%	3.45	0.36	0	0	0.500	120,972	
2039	5,699	90.9%	9.1%	5182	517	0.00%	3.48	0.37	0	0	0.500	126,093	20-yr ESALs 1,800,000
2040	5,756	90.8%	9.2%	5229	527	0.00%	3.50	0.38	0	0	0.500	131,437	