Traffic Forecast Report

Boone County
Mall Road Interchange Connector
Feasibility Study
Item No. 6-446.00

February 2020

Prepared for:

KENTUCKY TRANSPORTATION CABINET

In Partnership with:

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1.0 Project Description

The Kentucky Transportation Cabinet (KYTC) initiated the Mall Road Interchange Connector Scoping Study to examine a new connection between KY 237 (Pleasant Valley Road) and the Mall Road interchange (I-71/I-75 exit 180A) in northeastern Boone County. The US 42 corridor, leading to the subsequent I-71/I-75 interchange to the south (exit 180) operates over capacity causing drivers to experience severe traffic congestion during peak commute hours. Planned large-scale developments in the vicinity will further impact regional traffic flows. This report summarizes methodologies and analysis procedures associated with the development of traffic analyses to support the scoping study.

Summarized in **Figure 1**, study roadways with milepoint (MP) limits are shown in **Table 1**.

Table 1: Study Area Roadways

Route	Local Name	MP Limits
US 42	US 42	12.350-13.550
KY 237	Pleasant Valley Road	1.500-2.500
KY 842	Hopeful Church Road	2.750-4.600
CR-1016J **CS-1308**	Cayton Road	0.872-1.491 0.000-0.064
CS-1002	Mall Road	0.000-0.900

This report documents the methodology used to prepare traffic forecasts and microsimulation analysis procedures for the following scenarios:

- Existing year 2019
- 2045 No-Build
- 2045 3-Lane Build
- 2045 4/5-Lane Build

Future year scenarios are based on the travel demand model (version 8.1) maintained by OKI Regional Council of Governments, the metropolitan planning organization (MPO) for the Cincinnati/Northern Kentucky region. Modeling tasks are discussed further in **Chapter 3.0**.

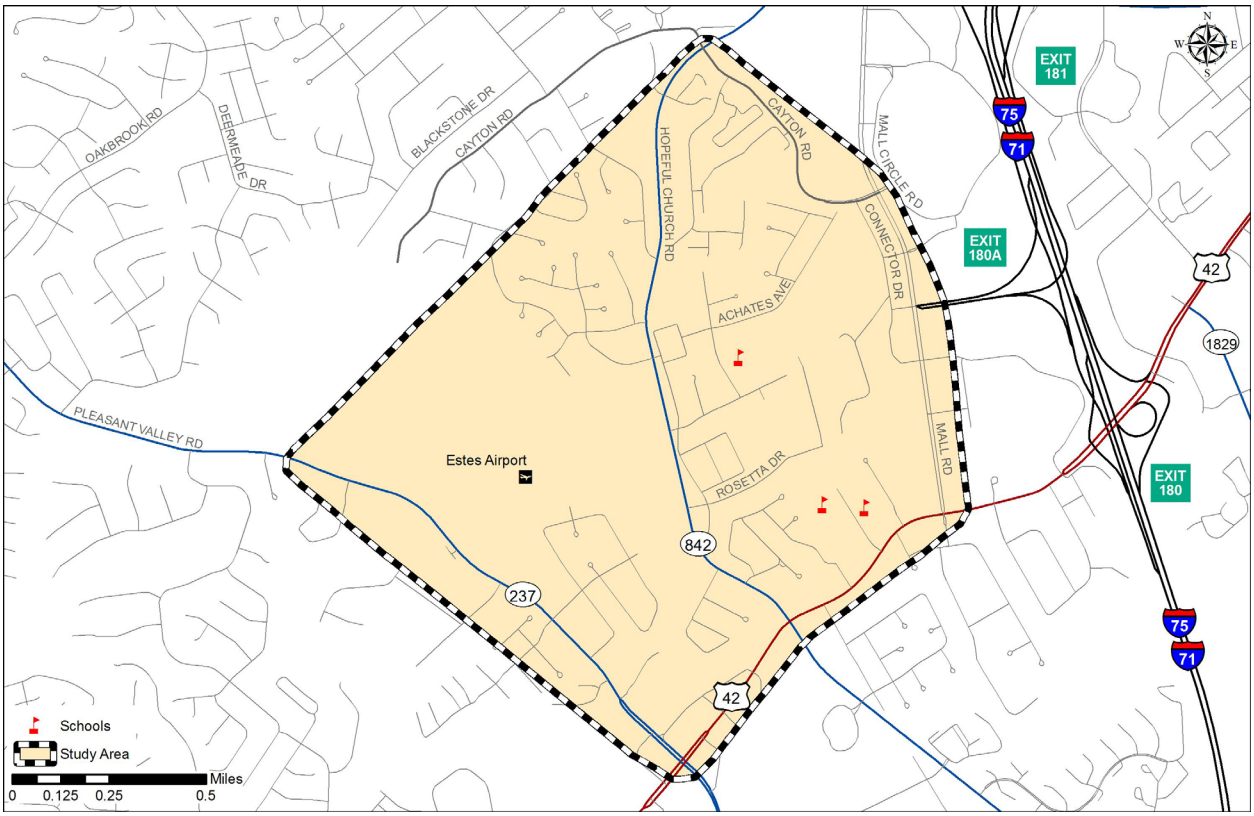


Figure 1: Study Area Map

2.0 Data Collection Efforts

A. May 2019 Traffic Counts

KYTC provided historic traffic volumes, truck percentages, K-factors, and peak hour directional distributions on study area roadways as available. Qk4 collected additional counts in May 2019 at 11 key intersections shown on **Figure 2**. Turning movement counts at major intersections were used to define existing traffic including daily, AM, and PM peak hour volumes.

- 24-hour Miovision turning movement counts were conducted at six major intersections, classifying vehicles into one of five categories: motorcycles, cars, buses, single-unit trucks, and articulated trucks. Any pedestrians and on-road bicyclists were also recorded.
- 12-hour Miovision turning movement counts were conducted at five additional intersections, classifying vehicles into the same five categories.
- A 72-hour tube count was performed on KY 237, collecting directional traffic data separated by FHWA's 13-bin vehicle classifications (**Figure 4**, page 5).

It should be noted that no traffic data was collected at the US 42/KY 842 intersection as construction at that location impacted traffic flows during the data collection period. During 2019, the intersection was reconstructed with a jug handle, eliminating all left turn movements from the US 42/KY 842 intersection. Quadrant Road provides new connections, as shown in **Figure 3**.

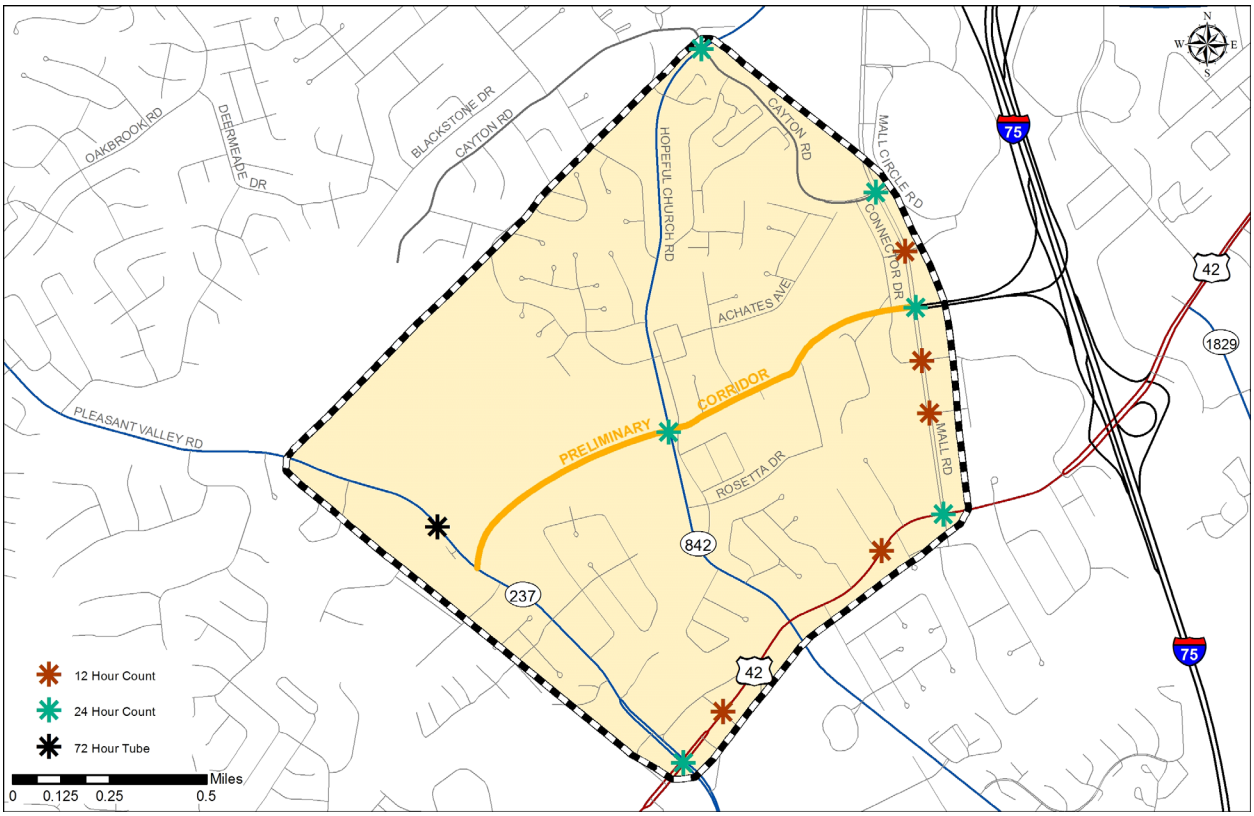


Figure 2: May 2019 Count Locations

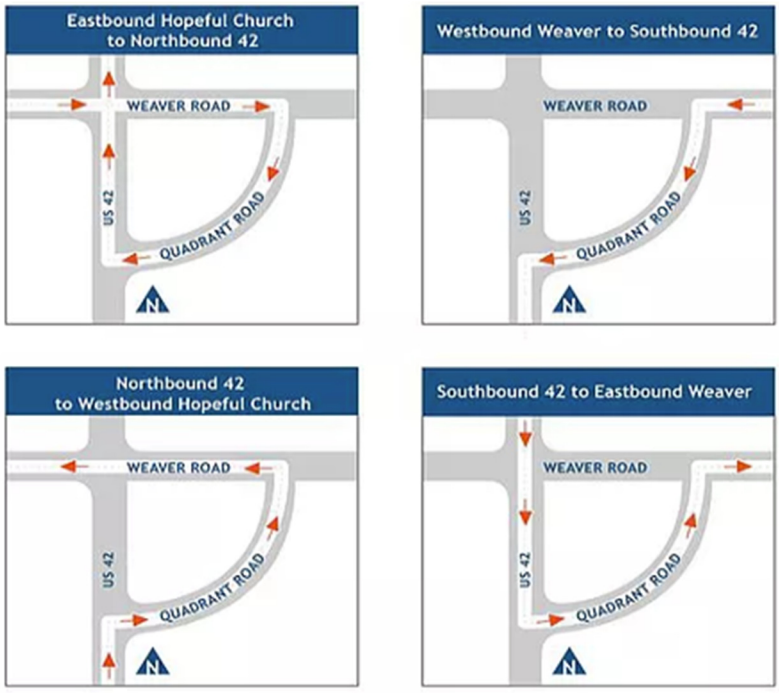


Figure 3: New Jug Handle Layout at US 42/KY 842

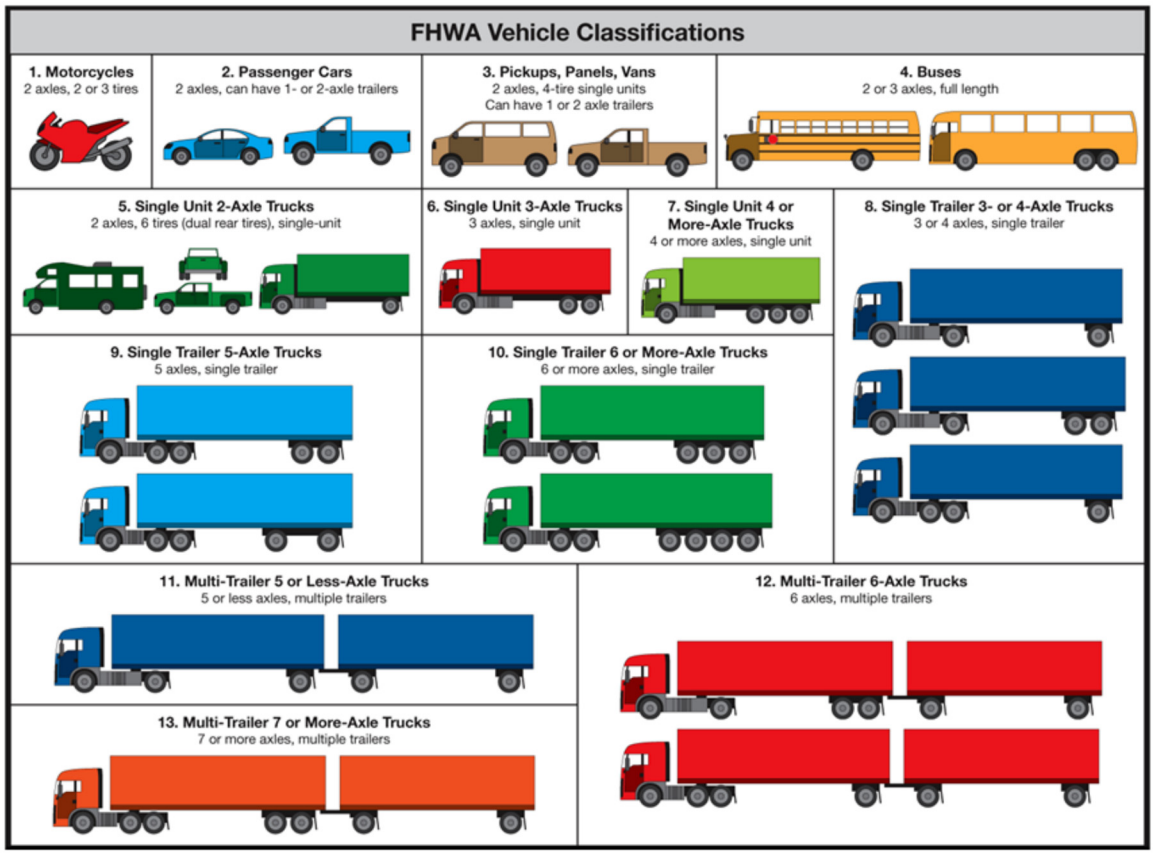


Figure 4: Summary of FHWA Vehicle Classifications

Existing 2019 turning movement counts at major intersections are summarized in **Figure 5**.

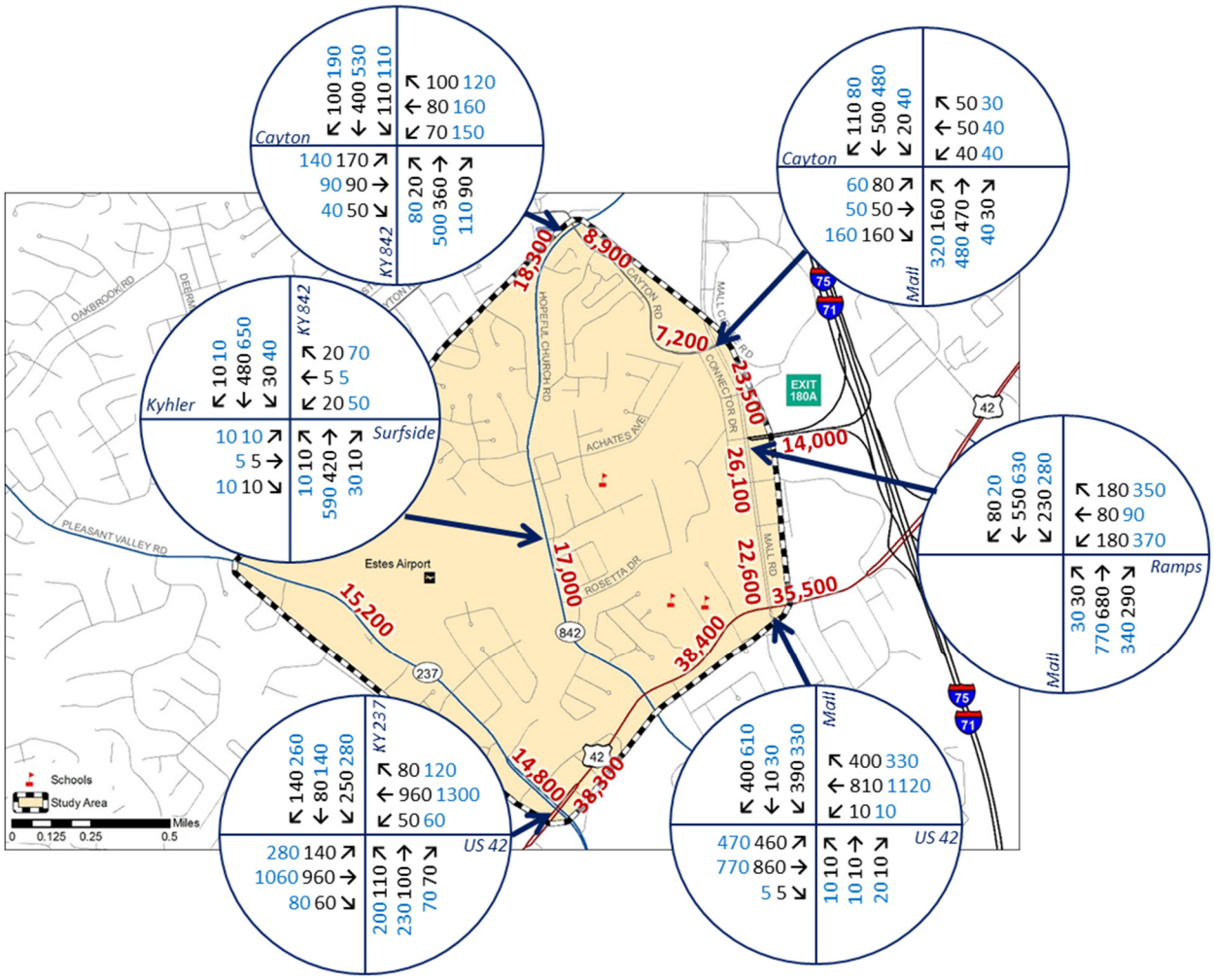


Figure 5: ADT, AM and PM Peak Turning Movement Counts at Major Intersections

Classification data from recent traffic counts in the vicinity are summarized in **Table 2**. The average from the five data collection sites shows 0.3% of vehicles are motorcycles (class 1), 93.2% passenger cars (class 2-3), 0.7% buses (class 4), 3.5% single-unit trucks (class 5-7), and 2.4% articulated/multi-unit trucks (class 8+).

Table 2: Daily Traffic Volume by Class per KYTC Counts

	B88 US 42 MP 12.8	**K48** Mall Rd MP 0.1	**K49** Mall Rd MP 0.8	**H54** KY 842 MP 4.0	**N/A** KY 237 MP 2.5
1 Motorcycle	310	173	27	35	191
2 Car	98,155	30,744	30,041	32,841	29,971
3 Car	16,338	4,567	3,762	6,405	13,744
4 Bus	779	303	262	233	363
5 Single Truck	3,265	946	907	813	760
6 Single Truck	1,245	291	398	249	252
7 Single Truck	83	245	292	297	109
8 Multi-Truck	329	2,030	281	390	81
9 Multi-Truck	1,510	194	253	255	40
10 Multi-Truck	293	474	511	72	7
11 Multi-Truck	15	2	0	2	5
12 Multi-Truck	10	0	0	0	9
13 Multi-Truck	0	0	0	0	0

Of note, the distribution of small passenger cars (class 2) compared to long-base cars (class 3) is much higher than statewide averages. The average from the five data collection sites shows small passenger cars comprise 77.5% of all vehicles or 83% of passenger cars.

For comparison, vehicle registration data in Boone and Kenton counties provided a secondary source of information supporting the distribution between classes—particularly for passenger cars in classes 2-3. Summarized in **Table 3**, registration data shows a 50/50 split between class 2/class 3 vehicle types.

Table 3: Passenger Car Class Distribution per Vehicle Registrations

	Boone Co.	**Kenton Co.**
Class 2	49%	51%
High-performance Car	5%	5%
Mid-performance Car	20%	21%
Low-performance Car	20%	21%
Minivan	3%	4%
Class 3	51%	49%
Long-base Car	4%	4%
Pickup Truck	16%	16%
SUV	31%	30%

B. Origin-Destination Distribution per 2019 Counts

Appendix A contains summary tables depicting origin-destination pairs for the 22 external network entry points. AM and PM distributions are presented.

C. Other Existing Conditions Data Collection

To supplement traffic counts, Qk4 collected additional information regarding existing traffic conditions: signal timing, queue lengths, and operating speeds.

Queue lengths at signalized cross-streets were noted throughout the PM peak period. Along US 42, congested mainline conditions showed consistent westbound queues backing up beyond the adjacent upstream intersection, from near Harvey Quast Drive back to the bridge over I-71/I-75. Mall Road also experienced multi-intersection queuing; these backups cleared earlier than US 42. Southbound KY 842 approaching US 42 also exhibited substantial queuing, even after reconstruction shifted left turn movements to the jug-handle intersection with Quadrant Road.

KYTC provided observed speed data for study routes, stratifying data between cars and trucks, divided into AM Peak (6 AM-9 AM), Midday (9 AM-3 PM), PM Peak (3 PM-6 PM), and Overnight (6 PM-6 AM) time periods. For reference, results for the PM peak period are mapped in **Figure 6**.

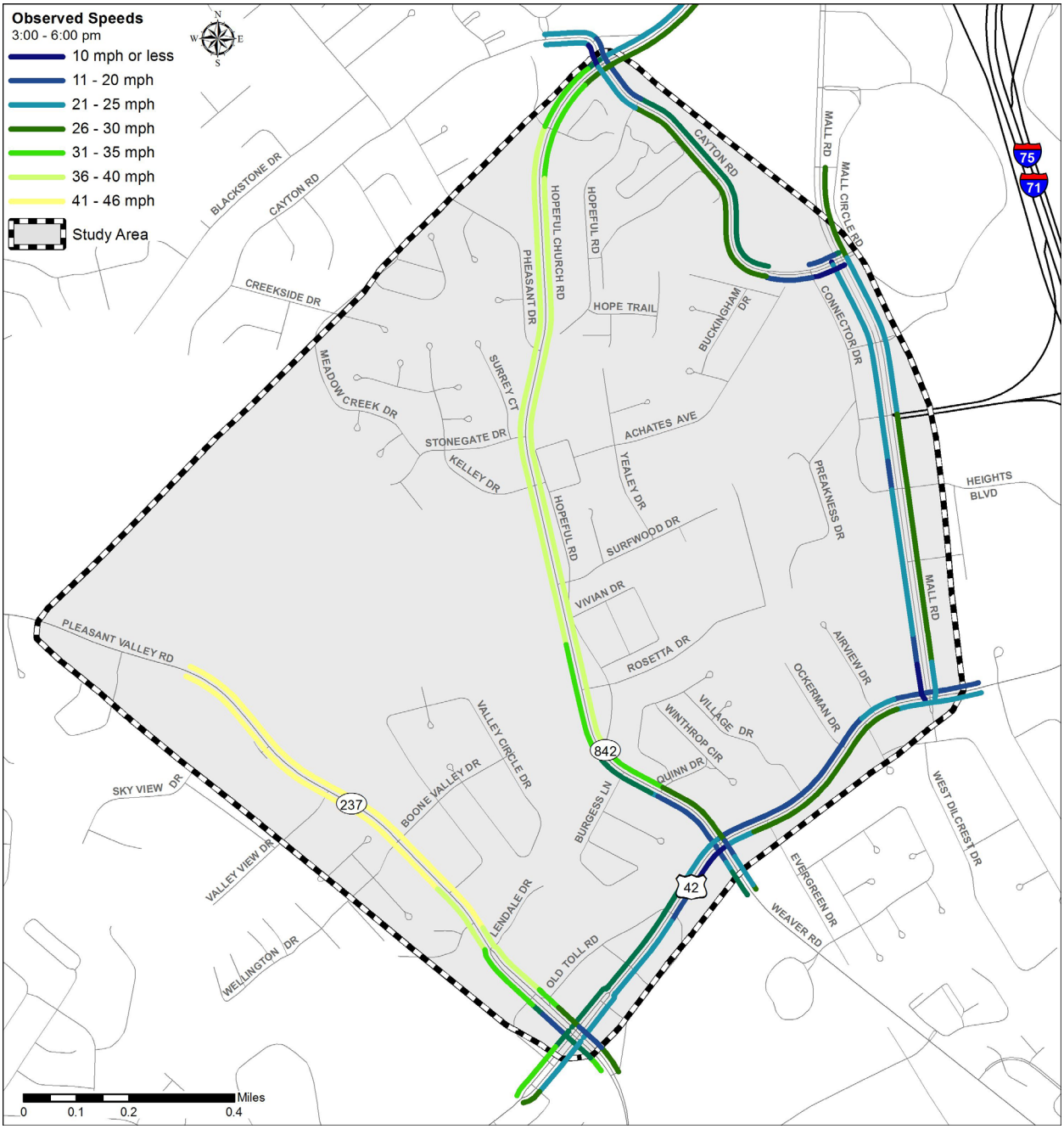


Figure 6: PM Peak Travel Speeds by Direction

3.0 OKI Travel Demand Model

Year 2045 forecasts were generated using OKI's regional travel demand model with a 2040 horizon year. Future year 2045 No-Build and Build forecasts were determined, extrapolated from model runs for 2020 and 2040. The model is a modified four-step model that performs trip generation, distribution, mode choice, and assignment for the OKI and surrounding region. The model runs in Cube Voyager software, although some model steps utilize Cube TranPlan software and still others use custom programs. It includes four time-of-day components: AM Peak (6 AM-

9 AM), Midday (9 AM-3 PM), PM Peak (3 PM-6 PM), and Overnight (6 PM-6 AM). It has separate modes for car and truck traffic. As the model incorporates third-party origin-destination data from StreetLight, additional third-party origin-destination data specific to the study area was not purchased.

A. Socioeconomic Data

A traffic analysis zone (TAZ) is a geographical area delineated by state and/or local transportation officials for tabulating traffic-related data, especially journey-to-work and place-of-work statistics. A TAZ usually consists of one or more census blocks, block groups, or census tracts. OKI split four TAZs within its original 2,067-zone model (**Figure 7**), each located along the preliminary corridor. **Figure 8** summarizes household growth between 2020 and 2040 model scenarios. While development plans remain conceptual to date, the majority of the area is anticipated to develop as single- and multi-family residences at a similar density as nearby subdivisions. The model estimates an additional 970 households between the two zones, concentrated to the north of the preliminary corridor.

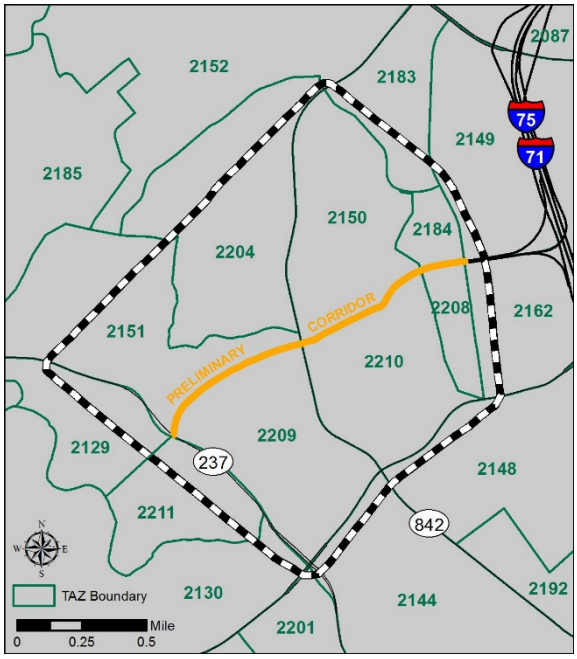


Figure 7: Split TAZs

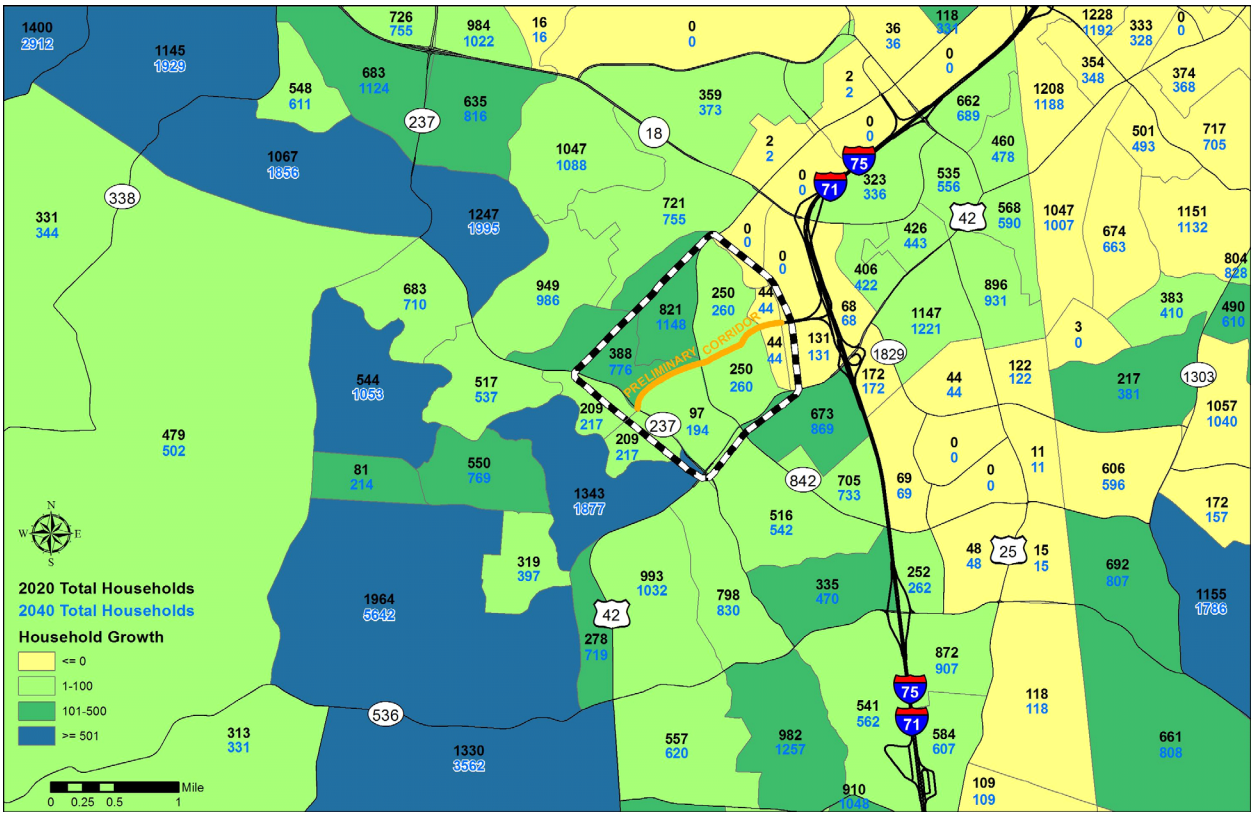


Figure 8: Change in Households by TAZ (2020 to 2040)

Employment is anticipated to experience less robust changes, particularly within study area TAZ (**Figure 9**).

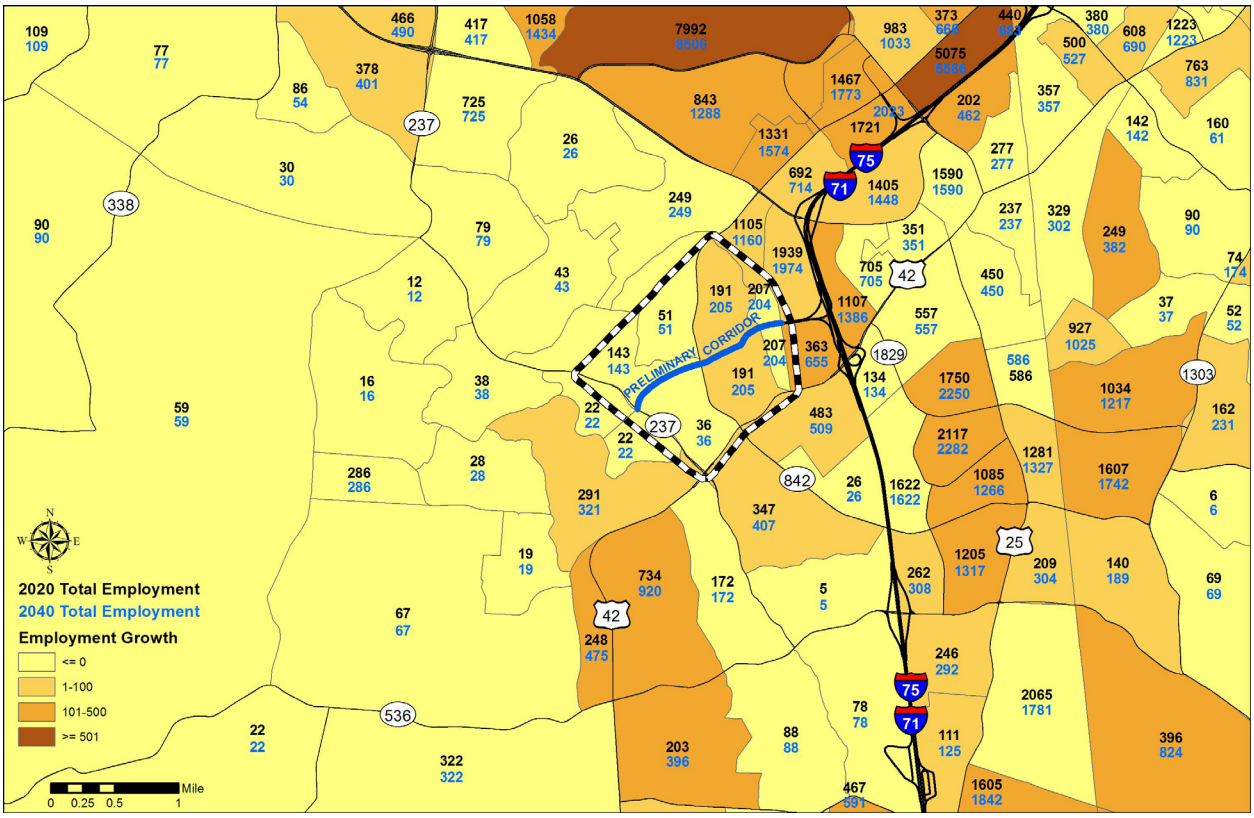


Figure 9: Change in Employment by TAZ (2020 to 2040)

B. Network Updates

Table 4 and **Figure 10** summarizes the existing/committed transportation projects reflected in the OKI model, regionally significant enough to potentially influence traffic flows throughout the area.

Table 4: Existing + Committed Projects in Model

County	PID	Facility	Location	Description	YEAR
Campbell	6-443	US 27	SB right lane from Marshall Lane to Hohns Hill Rd(KY 3490)	Add lane to provide three continous SB through-lanes to Johns Hill Rd	2020
Clermont	82552	Clepper Lane	Existing Clepper Ln from Gate Dr to new interchange e of Bch-Buxton Rd	2-lane extension	2020
Clermont	82557	CR 171 (Old SR 74)	Schoolhouse Rd to Glen Este-Withamsville Rd	Add center turn ln	2020
Boone	6-445	KY 3076	I-275 to KY 236 (Donaldson Rd)	Widen from two to four lanes	2030
Campbell		I-471	US 27 to Ohio State Line	Widen to four lanes to improve safety and reduce congestion	2030
Campbell	6-8104.00	I-471	KY 8 interchange	Construct a new SB off-ramp from I-471 to KY 8	2030
Campbell	6-352	KY 536	US 27 to AA Highway (KY 8)	Extension of existing roadway	2030
Kenton		Brent Spence Bridge	I-71/I-75 bridge over the Ohio River to Dixie Hwy Interchange	New 8 lane bridge	2030
Kenton	6-162.01	KY 536	Boone County Line to KY 17	Widen to four lanes divided roadway	2030
Kenton	6-162.20	KY 536	Boone County Line to KY 1303	Widen to four lanes divided roadway	2030
Butler		S. Gilmore Rd	Resor Rd to Mack Rd	Widen to 4 lanes	2030
Butler		Tylersville Rd	Bypass 4 to Five points	Widen to 4 lanes with TWLTL	2030
Butler		Grand Blvd	SR 4 to Five Points	Widen to 4 lanes	2030
Butler		SR 747	Milliken Rd to SR 4	Widen to 5 lanes	2030
Butler		US 27	Augusta Blvd to Patterson Blvd	Widen to 3 lanes to Resor, 4 lanes to Wessel, 5 lanes to Patterson	2030
Clermont		Alcholtz Rd	Eastgate Blvd to Glen-Este-Wilhamsville Rd	Widen to 4 lanes	2030
Hamilton	94741	I-71	0.1 mile south of Williams Ave overpass to 0.04 mile n of Red Bank	Widen NB I-71	2030
Hamilton	76256	I-75	Glendale Milford Rd to I-275	Add 4th lane each direction	2030
Hamilton	77889	I-75	Begin s of SR 562 interchage end at SR 126 interchange	Widen for additional through lanes	2030
Hamilton	83723	I-75	Monmough overpass to just south of Clifton	Add a lane to I-75	2030
Hamilton	88132	I-75	Between Galbraith Rd and Shepard Ln, SB only	Add one lane SB	2030
Hamilton	88133	I-75	Between Galbraith Rd and Shepard Ln, NB only	Add one lane NB	2030
Warren		Union Rd	SR 63 to SR 123 interchanges	Widen to 4 lanes	2030
Warren		Snider Rd	Fields Ertel Rd to Hunters Green Dr	Widen to 4 lanes	2030
Warren	103753	SR 741	Parksider Dr to SR 42	Widen to 4 lanes with left turn lanes at all intersections	2030
Butler		I-75	Milliken Rd	New interchange at Milliken Rd	2040
Clermont	82370	SR 32	From 0.2 miles e of Eastgate Blvd to Live Branch Stonelick Rd	Widen to 6 lanes	2040

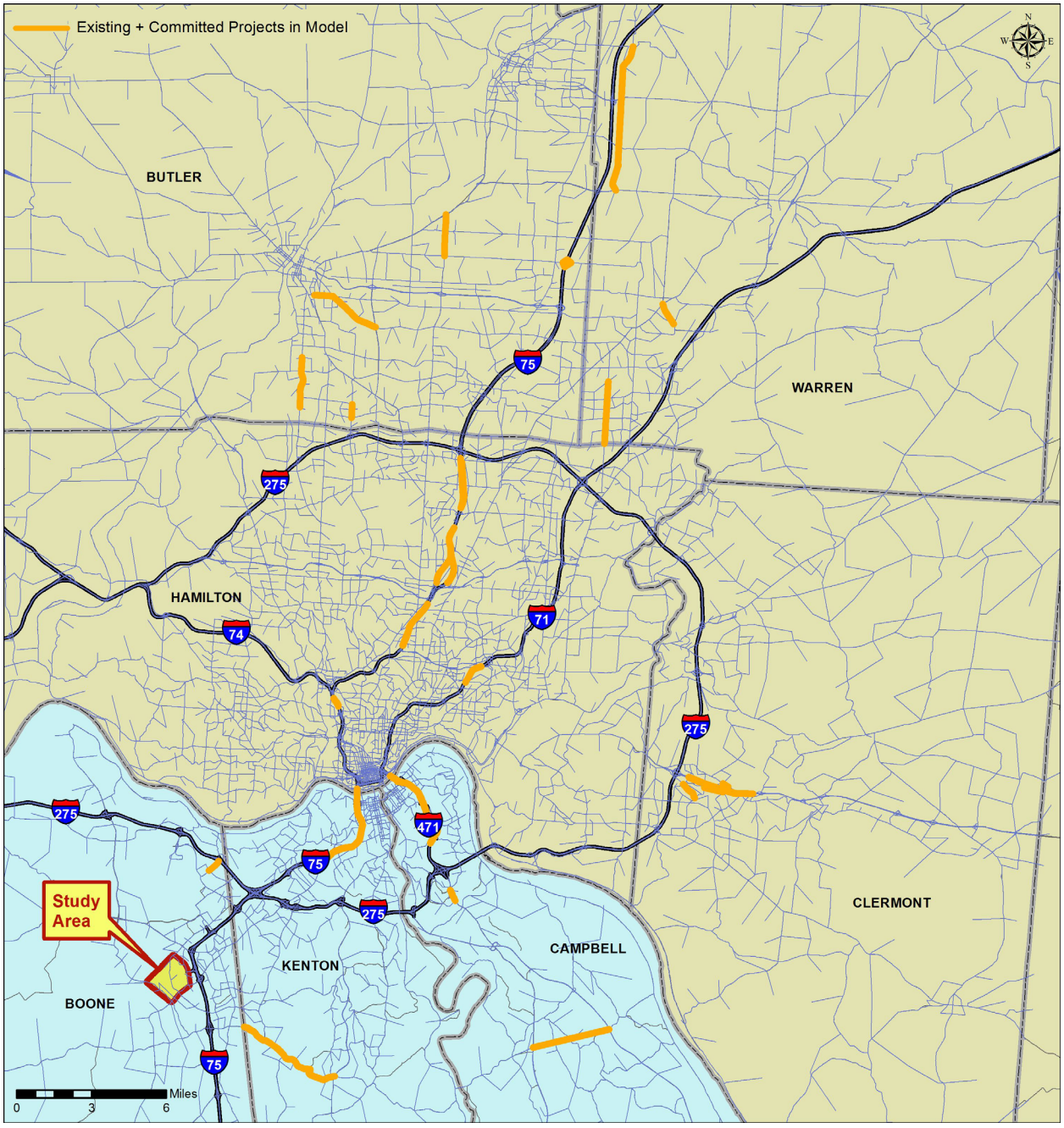


Figure 10: Map of Existing + Committed Projects in Model

C. 2040 No-Build & Build Model Results

Model output for the 2040 No-Build and Build scenarios are summarized in **Appendix B** at the turning movement level for study intersections. **Table 5** provides a summary of volumes by highway segment (both directions combined) anticipated to use the new connector route per day and during each peak hour. As shown, the four/five-lane configuration attracts an additional 2,000-4,000 trips per day compared to the three-lane scenario.

Table 5: Volumes by Segment on New Mall Road Connector

Scenario	KY 237 to KY 842	KY 842 to Mall Rd	Mall Rd Ramps
ADT			
2019 Existing	-	-	14,000
2040 No Build	-	-	15,000
2040 Build (3 Ln)	14,000	26,000	26,000
2040 Build (4/5 Ln)	21,000	32,000	29,000
AM Peak Hour			
2019 Existing	-	-	950
2040 No Build	-	-	780
2040 Build (3 Ln)	940	1,600	1,400
2040 Build (4/5 Ln)	1,500	2,300	1,600
PM Peak Hour			
2019 Existing	-	-	1,400
2040 No Build	-	-	1,500
2040 Build (3 Ln)	1,200	2,200	2,400
2040 Build (4/5 Ln)	1,700	2,700	2,700

Table 6 on the following page provides a summary of of volumes by highway segment (both directions combined) anticipated to use US 42 for the same time periods. The four/five-lane build configuration diverts more traffic from US 42 than the three-lane scenario; the largest changes are evident on the segment between KY 237 and KY 842.

Table 6: Volumes by Segment on US 42

Scenario	West of KY 237	KY 237 to KY 842	KY 842 to Mall Rd	East of Mall Rd
ADT				
2019 Existing	39,000	38,400	38,400	35,500
2040 No Build	52,000	56,000	51,000	40,000
2040 Build (3 Ln)	54,000	50,000	44,000	36,000
2040 Build (4/5 Ln)	54,000	46,000	42,000	37,000
AM Peak Hour				
2019 Existing	2,400	2,400	2,500	2,500
2040 No Build	3,600	3,700	3,300	2,500
2040 Build (3 Ln)	3,700	3,300	3,000	2,500
2040 Build (4/5 Ln)	3,800	3,000	2,700	2,600
PM Peak Hour				
2019 Existing	3,200	2,900	3,000	2,600
2040 No Build	4,400	4,400	4,200	3,200
2040 Build (3 Ln)	4,600	4,000	3,400	2,700
2040 Build (4/5 Ln)	4,600	3,700	3,200	2,700

4.0 Microsimulation of Traffic Operations

Microsimulation models using the Vissim software package[1] were developed for the AM and PM peak hour operations during each scenario. The Existing scenario was calibrated using collected existing conditions data (**Chapter 2.0**) to ensure models replicate existing performance. Default variables were adjusted as appropriate to reflect Kentucky driver behaviors as discussed below. Model outputs from OKI (**Chapter 3.0**) form the basis for future year scenarios and origin-destination assumptions.

A. Vissim Inputs for Calibration

AM and PM Vissim models were built to evaluate traffic operations under the Existing, No-Build, and Build scenarios. The model included all study area routes listed in **Table 1**. To ensure accuracy of these models, AM and PM Existing models were calibrated by 15-minute volumes on links, observed queue lengths, peak travel speeds, and vehicle types.

[1] PTV Vissim 10.00 – 16 [79178]

Other adjustments to default model conditions included the following:

- The Wiedemann 74 car-following model was used to replicate local driver behavior patterns, lowering driver aggression assumptions.
- Lane widths were adjusted from 12 feet to 10 feet on US 42 to better mimic operating speeds, simulating the friction provided by un-modeled minor intersections and driveways.
- Default assumptions regarding truck acceleration rates were also lowered slightly.

As part of the model calibration process, link volume outputs were compared to the model counted volumes/model assignment to ensure traffic is entering and exiting the network as expected.

Table 7 and **Table 8** compare collected travel speed data to modeled speeds during the AM and PM peaks, respectively.

Table 7: Measured versus Modeled Travel Speeds During AM Peak Hour

	Collected Speeds		Modeled Speeds		% Difference	
Data Collection Point	Card	Non-Card	Card	Non-Card	Card	Non-Card
Mall Rd 0-0.066	25.1	15.9	27.9	19.5	1.11	1.23
Mall Rd 0.066-0.122	30.0	24.5	28.5	31.5	0.95	1.29
Mall Rd 0.122-0.257	31.9	27.6	27.8	32.3	0.87	1.17
Mall Rd 0.257-0.395	31.9	27.8	27.7	32.3	0.87	1.16
Mall Rd 0.395-0.450	32.7	26.5	25.9	26.1	0.79	0.98
Mall Rd 0.450-0.535	31.3	26.9	27.1	31.8	0.87	1.18
Mall Rd 0.535-0.676	28.5	25.1	29.6	32.1	1.04	1.28
Mall Rd 0.676-0.844	30.0	28.4	30.8	32.4	1.03	1.14
US 42 12.508-12.583	24.6	24.0	24.1	24.9	0.98	1.04
US 42 12.583-12.608	25.1	28.1	23.7	25.9	0.94	0.92
US 42 12.608-12.668	25.1	28.1	23.2	26.7	0.93	0.95
US 42 12.668-12.718	25.2	26.9	24.3	24.3	0.96	0.90
US 42 12.718-12.790	25.2	28.2	22.3	23.9	0.89	0.85
US 42 12.790-12.803	24.5	27.7	23.3	25.8	0.95	0.93
US 42 12.803-12.811	24.3	27.4	23.3	26.4	0.96	0.96
US 42 12.811-12.867	24.2	28.0	22.5	26.8	0.93	0.96
US 42 12.867-12.883	24.2	27.4	22.0	27.4	0.91	1.00
US 42 12.883-12.964	22.5	25.8	20.4	27.5	0.91	1.07
US 42 12.964-13.034	27.5	20.0	25.8	22.1	0.94	1.10
US 42 13.171-13.265	30.2	29.0	24.3	23.3	0.80	0.80
US 42 13.3-13.335	31.0	27.4	25.8	19.9	0.83	0.73
US 42 13.393-13.413	30.6	29.7	25.9	21.2	0.85	0.71
US 42 13.489-13.570	25.9	24.3	27.1	23.7	1.05	0.98

Table 8: Measured versus Modeled Travel Speeds During PM Peak Hour

	Collected Speeds		Modeled Speeds		% Difference	
Data Collection Point	Card	Non-Card	Card	Non-Card	Card	Non-Card
Mall Rd 0-0.066	26.6	13.7	23.7	14.2	0.89	1.04
Mall Rd 0.066-0.122	28.1	19.3	22.9	11.1	0.82	0.58
Mall Rd 0.122-0.257	29.3	24.5	22.5	11.7	0.77	0.48
Mall Rd 0.257-0.395	25.8	25.0	21.9	14.7	0.85	0.59
Mall Rd 0.395-0.450	27.9	19.6	21.2	16.9	0.76	0.86
Mall Rd 0.450-0.535	25.3	22.2	20.5	18.6	0.81	0.83
Mall Rd 0.535-0.676	23.9	21.0	22.6	23.1	0.94	1.10
Mall Rd 0.676-0.844	23.1	21.0	24.4	25.2	1.06	1.20
US 42 12.508-12.583	22.1	26.8	18.5	23.7	0.84	0.88
US 42 12.583-12.608	20.6	27.2	18.8	23.4	0.91	0.86
US 42 12.608-12.668	20.6	27.2	18.5	24.3	0.90	0.89
US 42 12.668-12.718	21.2	25.9	18.7	23.2	0.88	0.89
US 42 12.718-12.790	20.6	25.8	17.0	25.2	0.82	0.98
US 42 12.790-12.803	18.9	25.5	18.6	25.3	0.98	0.99
US 42 12.803-12.811	18.5	25.1	18.7	25.4	1.01	1.01
US 42 12.811-12.867	17.1	25.2	18.5	25.3	1.08	1.01
US 42 12.867-12.883	16.3	24.5	17.9	25.5	1.10	1.04
US 42 12.883-12.964	13.8	22.8	16.8	25.7	1.21	1.13
US 42 12.964-13.034	24.2	16.8	25.9	18.1	1.07	1.08
US 42 13.171-13.265	27.1	19.7	25.3	18.6	0.93	0.95
US 42 13.3-13.335	29.0	19.6	24.6	18.2	0.85	0.93
US 42 13.393-13.413	28.3	21.1	25.9	17.2	0.92	0.82
US 42 13.489-13.570	23.5	17.4	26.1	18.1	1.11	1.04

B. Vissim Results

Tables in **Appendix C** summarize the delay, Level of Service (LOS), and max queue lengths for AM and PM peaks for each scenario. Changes in LOS along the US 42 corridor are summarized in **Figure 11** and **Figure 12** for the AM and PM peak hours, respectively.

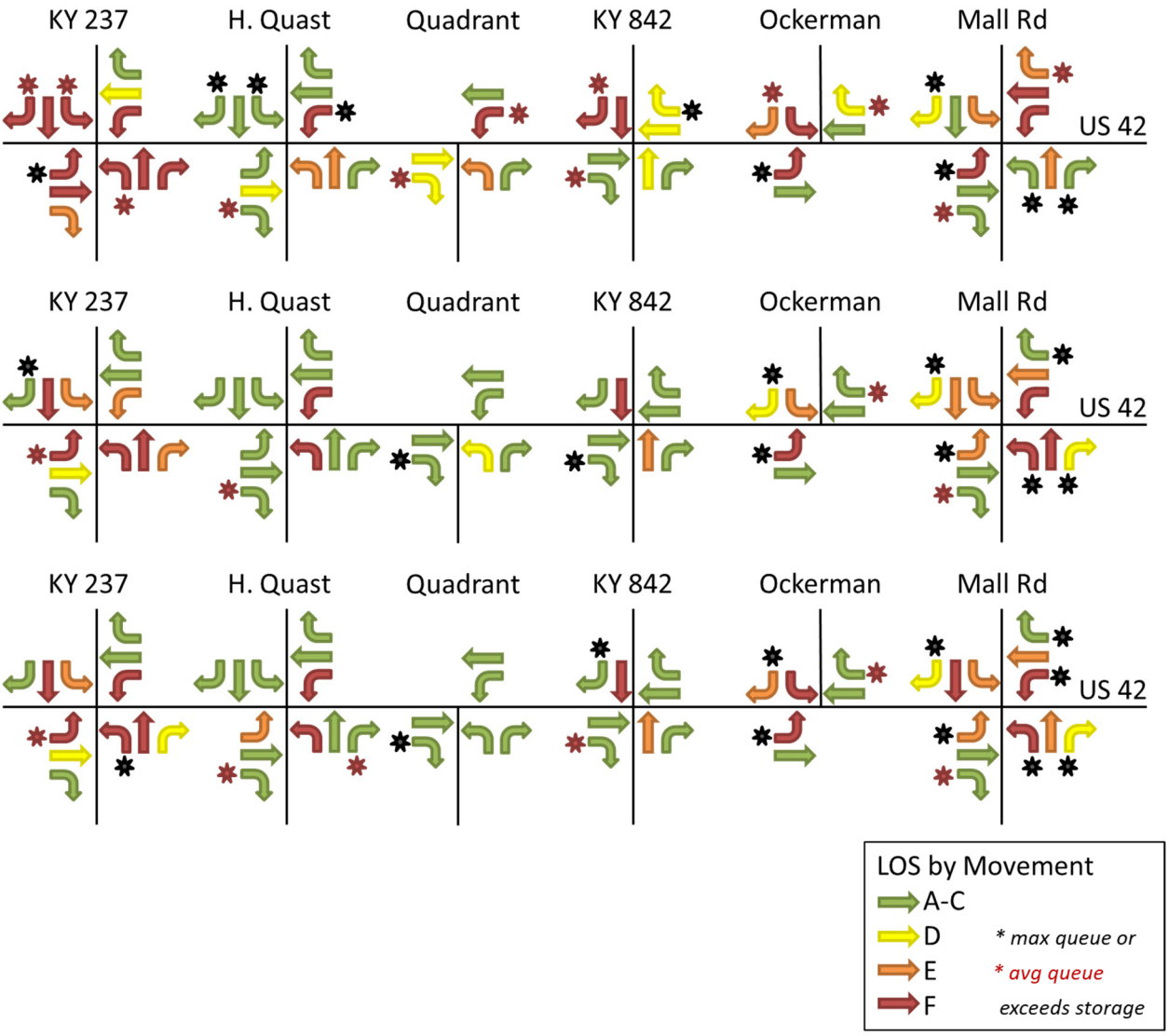


Figure 11: 2045 AM No-Build (top), 3-Lane (middle), and 4/5-Lane (lower) LOS along US 42

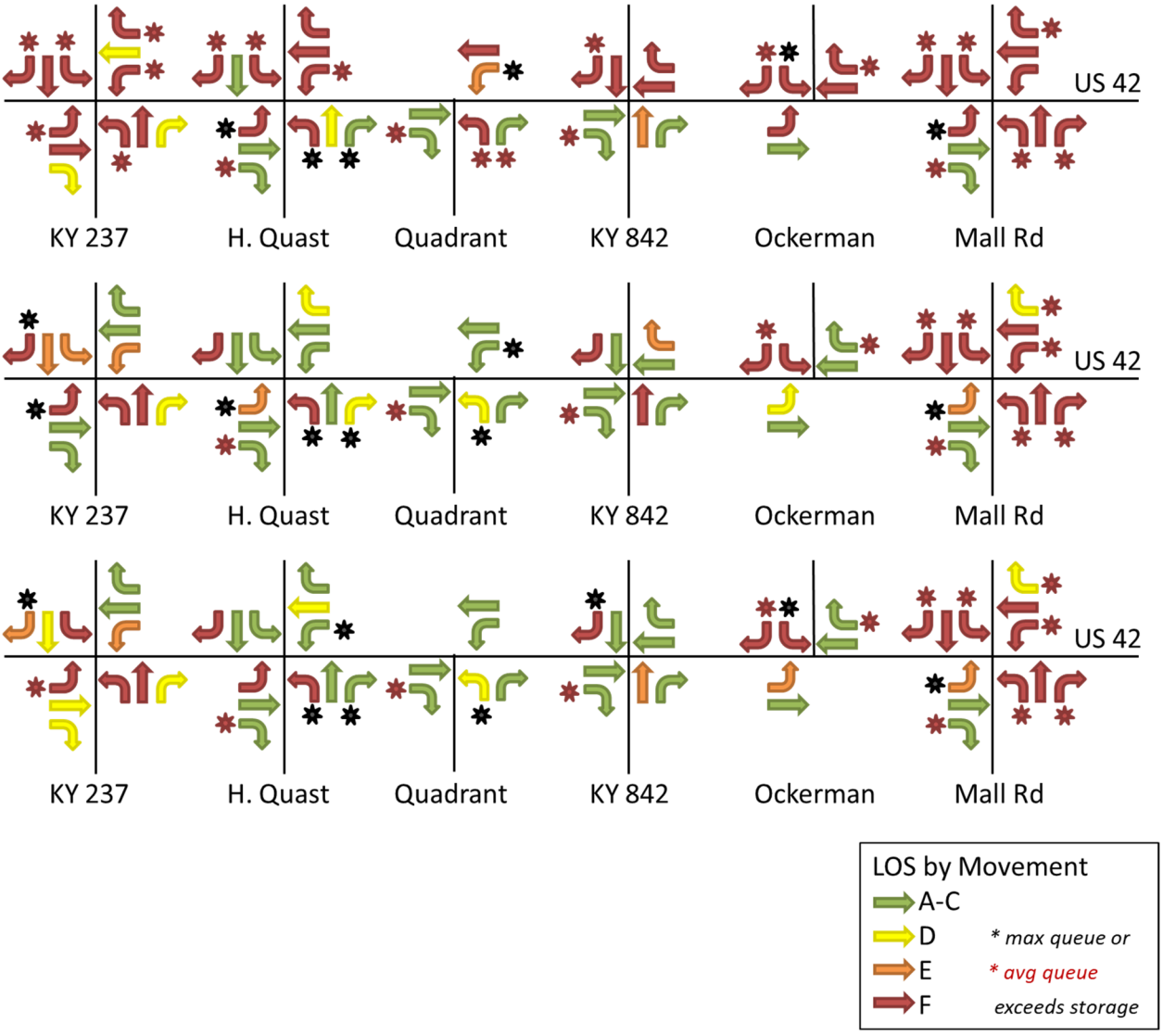


Figure 12: 2045 PM No-Build (top), 3-Lane (middle), and 4/5-Lane (lower) LOS along US 42

Travel times along the US 42 are tabulated in **Table 9**, comparing results between scenarios for the AM and PM peak hours. Results are measured from the center of the Mall Road intersection to/from the center of the KY 237 intersection.

Table 9: US 42 Travel Time by Scenario

Scenario	AM	PM
Existing Eastbound	231 sec	239 sec
Existing Westbound	244 sec	270 sec
No-Build Eastbound	349 sec	266 sec
No-Build Westbound	319 sec	1,538 sec
3-Lane Build Eastbound	220 sec	260 sec
3-Lane Build Westbound	259 sec	359 sec
4/5-Lane Build Eastbound	218 sec	218 sec
4/5-Lane Build Westbound	219 sec	327 sec

Performance along the new Mall Road Interchange connector route is summarized in **Figure 13** and **Figure 14** for the AM and PM peak hours, respectively. The existing off-ramp provides over 2,600 feet of storage before impacting mainline I-71/I-75 operations.

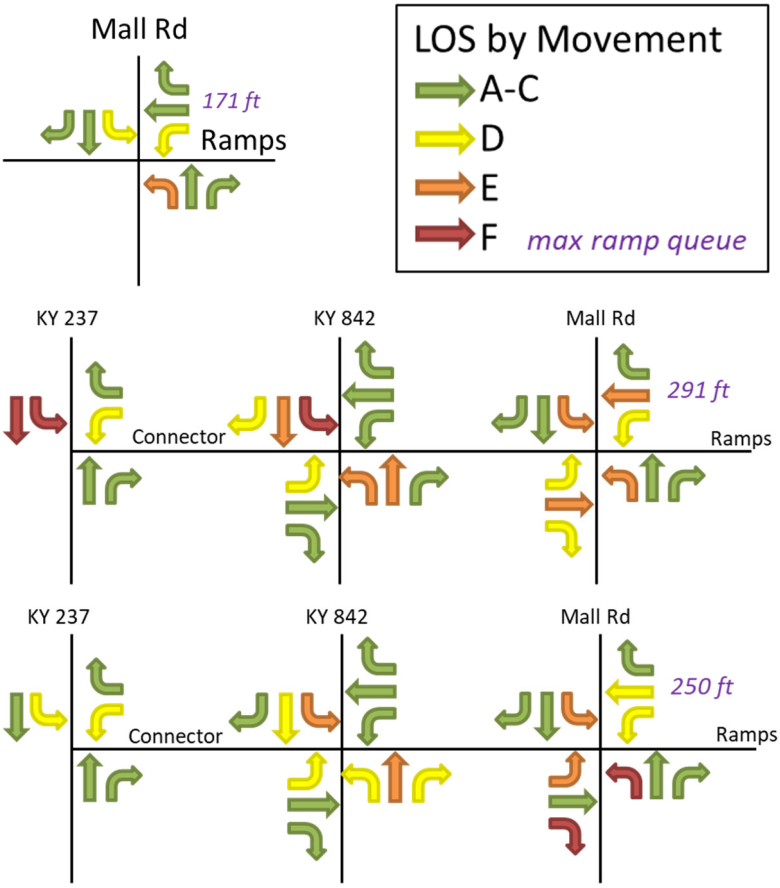


Figure 13: 2045 AM No-Build (top), 3-Lane (middle), and 4/5-Lane (lower) LOS, New Route

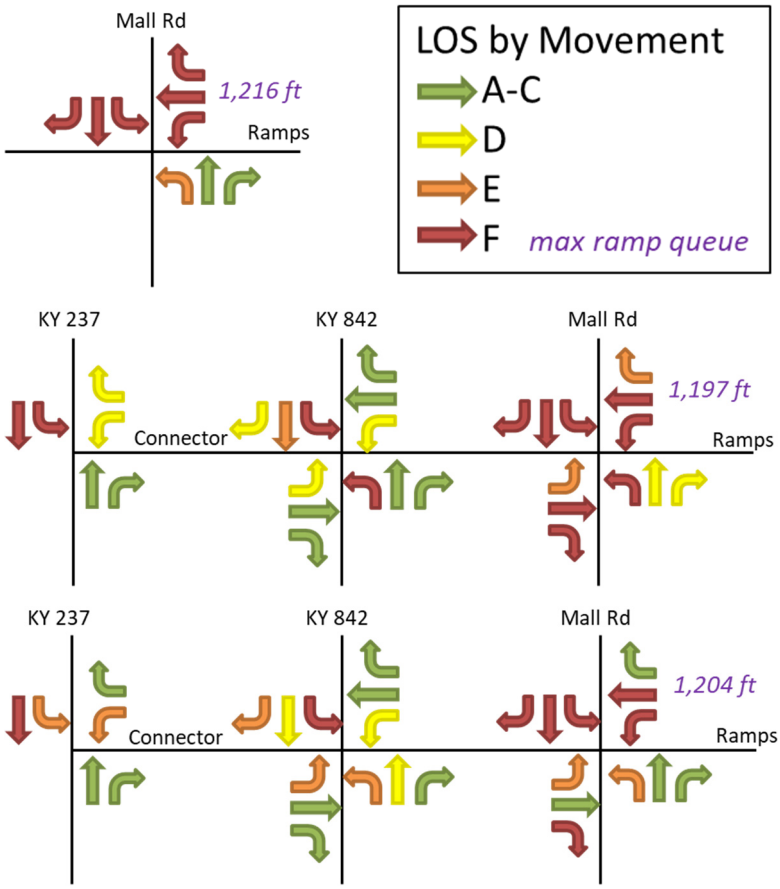
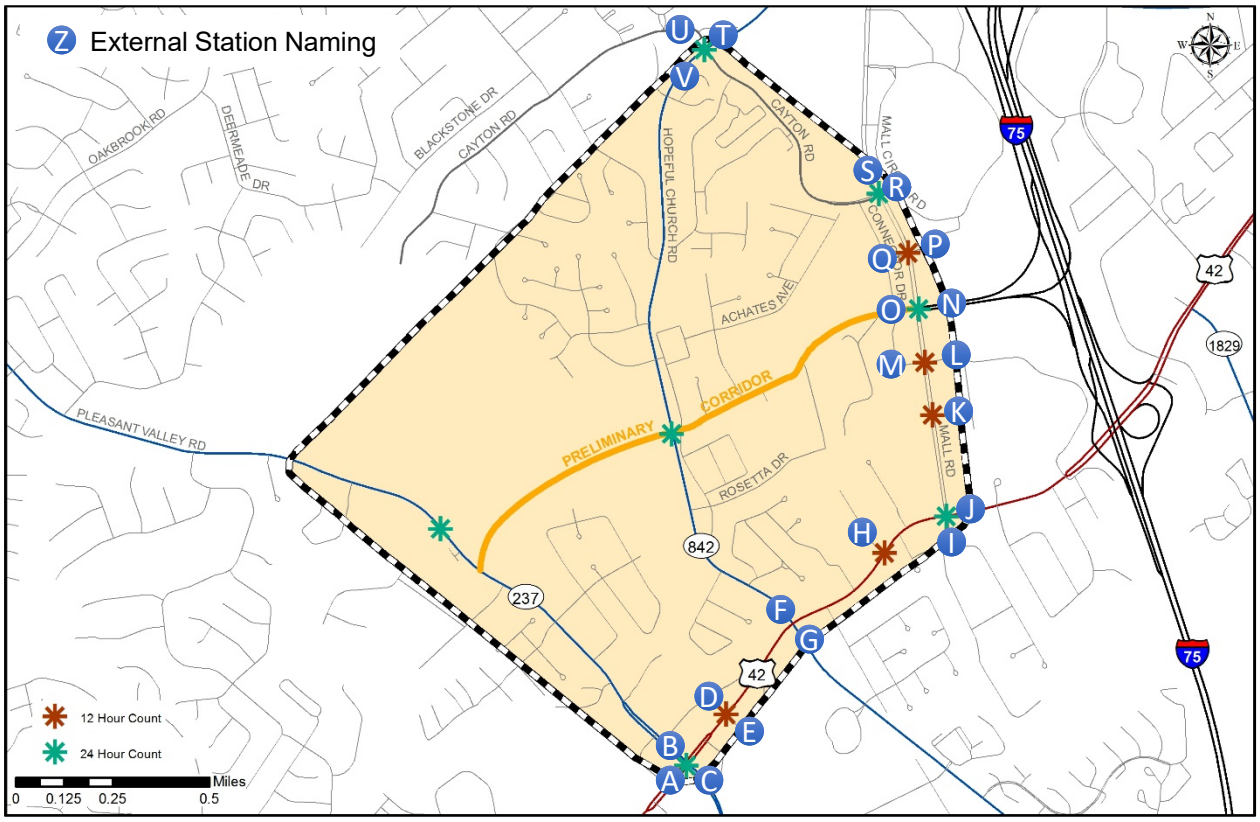


Figure 14: 2045 PM No-Build (top), 3-Lane (middle), and 4/5-Lane (lower) LOS, New Route

Appendix A: Origin-Destination Matrices



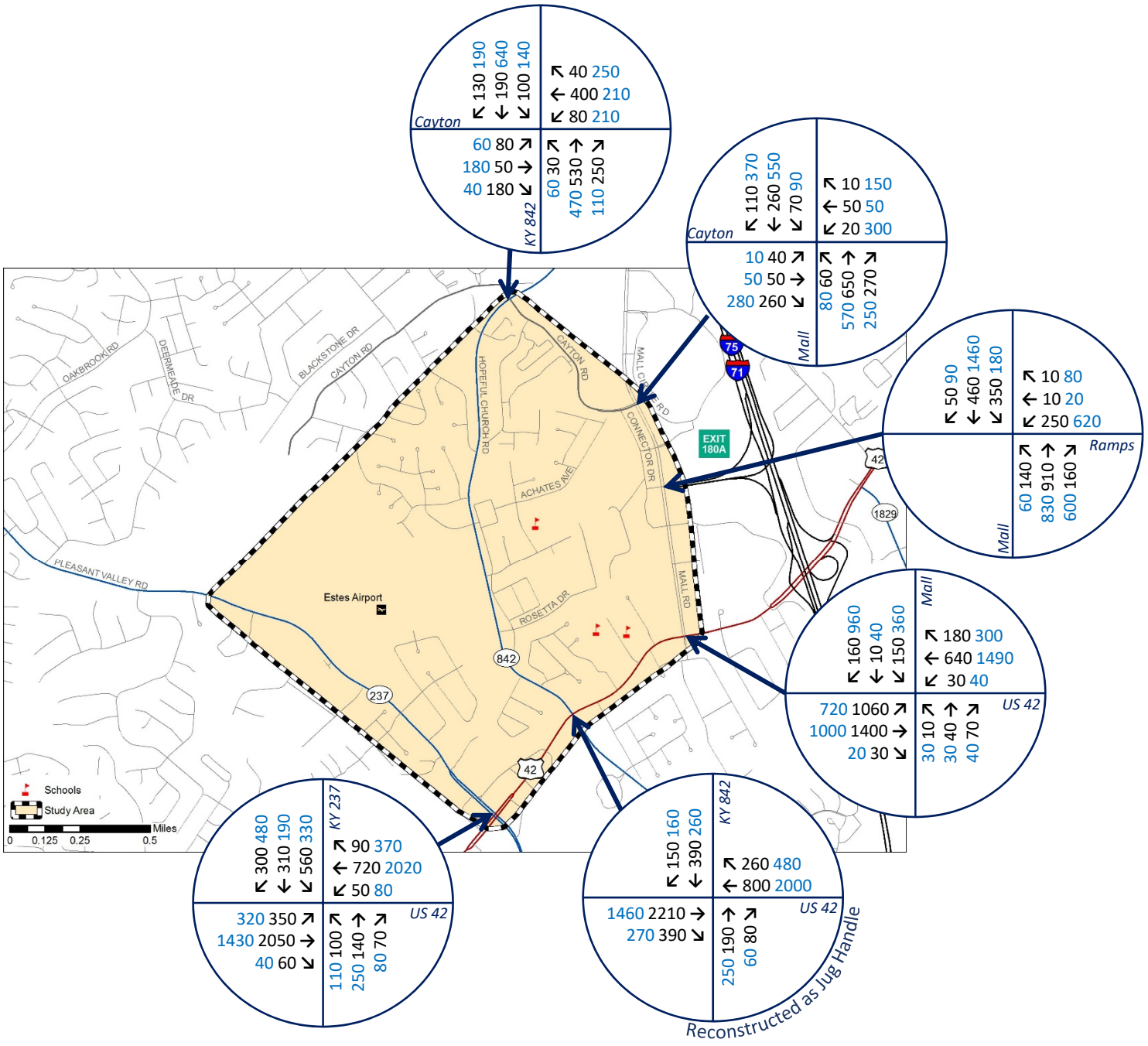
AM Existing OD Matrix

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
A	---	156	99	83	26	95	159	100	2	522	25	10	16	40	3	10	14	2	31	6	2	3
B	198	---	116	22	7	25	41	26	1	135	7	3	4	10	1	3	4	1	8	2	1	1
C	87	79	---	4	1	4	7	5	0	24	1	0	1	2	0	0	1	0	1	0	0	0
D	61	6	2	---	7	7	12	7	0	39	2	1	1	3	0	1	1	0	2	0	0	0
E	30	3	1	17	---	3	5	3	0	18	1	0	1	1	0	0	0	0	1	0	0	0
F	105	11	4	8	14	---	104	23	0	118	6	2	4	9	1	2	3	1	7	1	0	1
G	43	4	2	3	6	56	---	9	0	48	2	1	1	4	0	1	1	0	3	1	0	0
H	65	7	3	5	9	18	15	---	0	71	3	1	2	5	0	1	2	0	4	1	0	0
I	6	1	0	0	1	2	1	2	---	10	2	1	1	2	0	1	1	0	2	0	0	0
J	282	29	11	22	38	78	65	121	2	---	37	15	23	60	5	15	21	3	46	9	3	5
K	13	1	1	1	2	4	3	6	0	25	---	5	7	18	2	5	6	1	14	3	1	1
L	6	1	0	0	1	2	1	3	0	11	3	---	7	40	3	10	14	2	31	6	2	3
M	10	1	0	1	1	3	2	4	0	19	5	2	---	10	1	3	4	1	8	2	1	1
N	19	2	1	2	3	5	4	8	1	35	10	25	1	---	49	15	21	3	46	9	3	5
O	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
P	2	0	0	0	0	0	0	1	0	3	1	2	0	3	0	---	2	0	2	0	0	0
Q	9	1	0	1	1	3	2	4	0	17	5	12	1	19	2	3	---	1	8	2	1	1
R	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	---	5	3	1	2
S	24	2	1	2	3	7	5	10	1	44	12	31	1	47	5	4	13	4	---	19	7	10
T	2	0	0	0	0	0	0	1	0	3	1	2	0	3	0	0	1	3	5	---	77	289
U	7	1	0	1	1	2	2	3	0	13	3	9	0	14	1	1	4	11	21	400	---	65
V	4	0	0	0	1	1	1	2	0	8	2	6	0	9	1	1	2	7	14	562	27	---

PM Existing OD Matrix

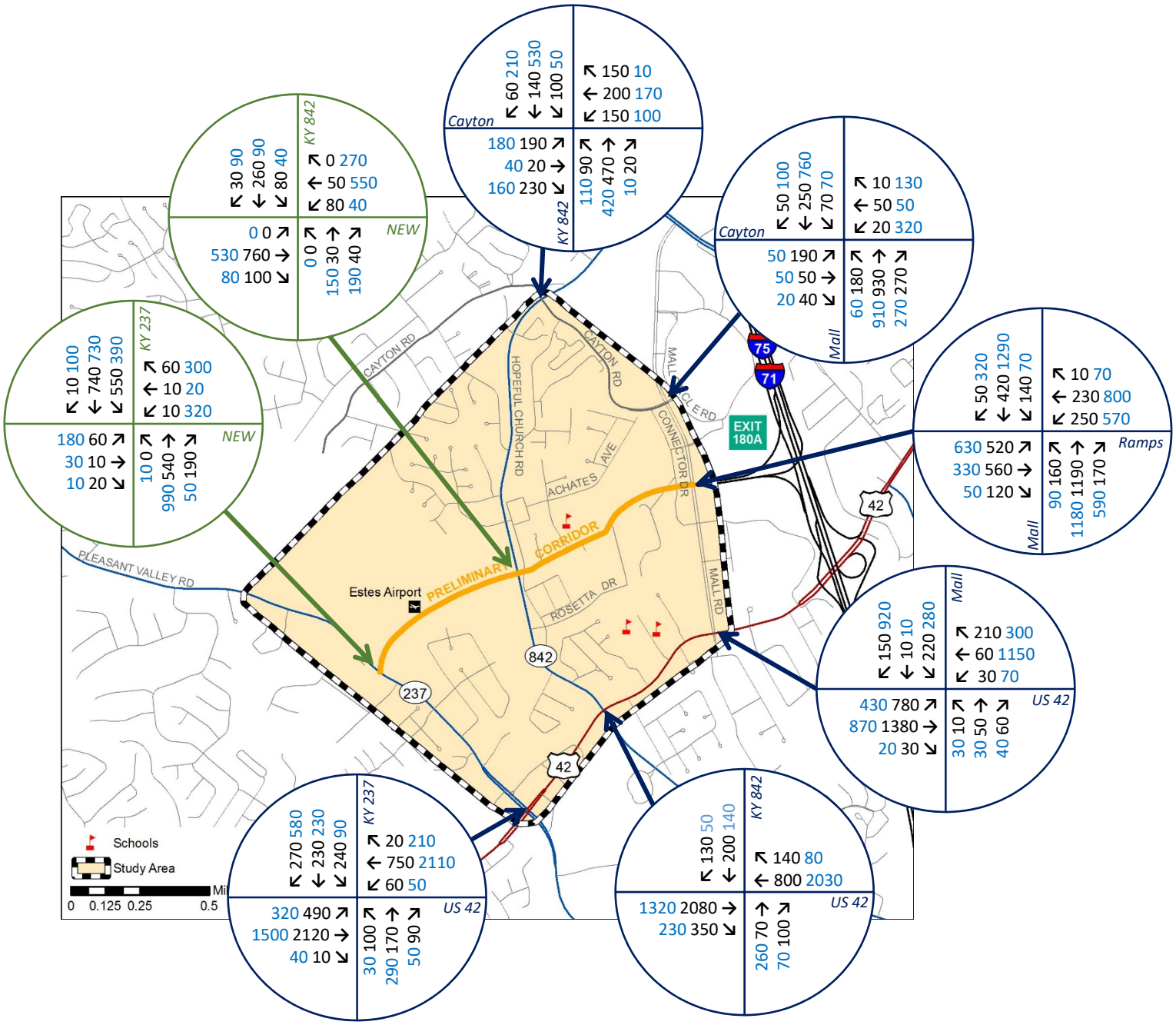
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
A	---	**303**	**104**	**65**	**11**	**137**	**143**	**4**	**3**	**374**	**31**	**16**	**28**	**59**	**6**	**29**	**10**	**6**	**48**	**9**	**14**	**12**
B	260	---	167	22	4	45	47	1	1	123	10	5	9	19	2	10	3	2	16	3	5	4
C	230	240	---	5	1	11	11	0	0	29	2	1	2	4	0	2	1	0	4	1	1	1
D	84	6	4	---	10	14	15	0	0	39	3	2	3	6	1	3	1	1	5	1	1	1
E	35	3	2	12	---	3	3	0	0	8	1	0	1	1	0	1	0	0	1	0	0	0
F	66	5	3	3	4	---	62	1	1	110	9	5	8	17	2	9	3	2	14	3	4	3
G	258	20	13	12	17	105	---	0	0	50	4	2	4	8	1	4	1	1	6	1	2	2
H	52	4	3	2	3	27	11	---	0	60	5	3	5	9	1	5	2	1	8	1	2	2
I	4	0	0	0	0	2	1	0	---	12	2	1	1	3	0	2	1	0	3	0	1	1
J	536	41	27	25	35	274	109	14	11	---	40	21	37	76	7	37	12	8	62	11	19	15
K	26	2	1	1	2	13	5	1	2	28	---	5	9	20	2	10	3	2	16	3	5	4
L	33	3	2	2	2	17	7	1	3	36	10	---	34	123	12	61	20	13	101	18	30	24
M	40	3	2	2	3	20	8	1	4	42	12	18	---	20	2	10	3	2	17	3	5	4
N	89	7	4	4	6	45	18	2	8	94	27	79	11	---	105	84	28	18	140	25	42	34
O	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
P	22	2	1	1	1	11	4	1	2	23	7	20	3	44	3	---	9	1	7	1	2	2
Q	24	2	1	1	2	12	5	1	2	26	7	22	3	49	3	7	---	3	24	4	7	6
R	6	0	0	0	0	3	1	0	1	7	2	6	1	13	1	1	4	---	44	12	19	15
S	67	5	3	3	4	34	14	2	6	72	21	60	8	133	9	8	36	36	---	19	32	25
T	**7**	**1**	**0**	**0**	**0**	**4**	**1**	**0**	**1**	**8**	**2**	**6**	**1**	**14**	**1**	**1**	**4**	**19**	**22**	**---**	**244**	**536**
U	7	1	0	0	0	3	1	0	1	7	2	6	1	13	1	1	4	18	21	158	---	138
V	9	1	0	0	1	4	2	0	1	9	3	8	1	17	1	1	5	23	28	472	82	---

Appendix B: OKI Model Outputs at Study Intersections



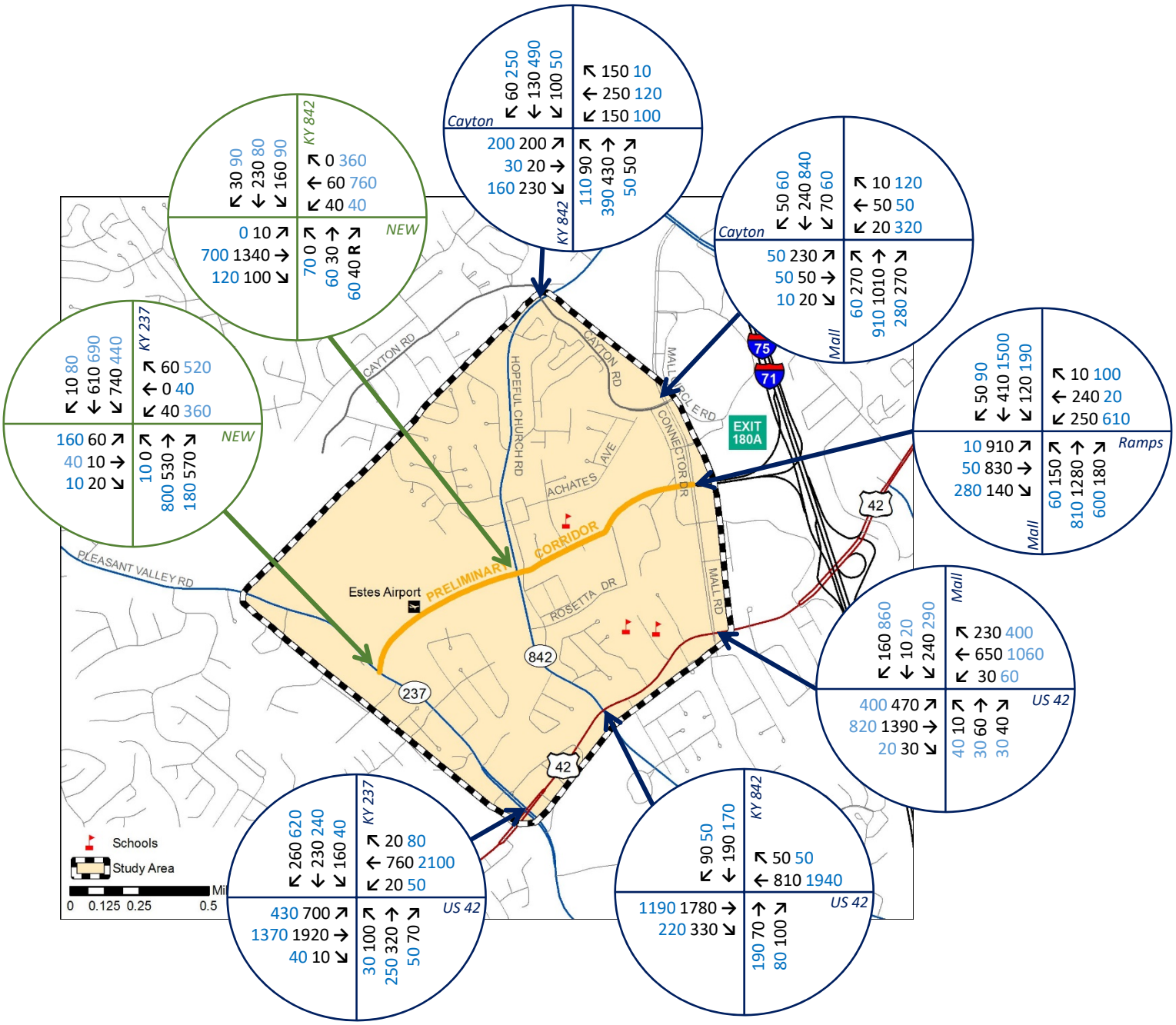
2040 No-Build Scenario

AM PM Peak from OKI Model



2040 Build Scenario (3-Lane)

AM PM Peak from OKI Model



2040 Build Scenario (5-Lane)

AM PM Peak from OKI Model

2019 Existing	AM Peak						PM Peak					
Movement	**Collected Volume**	**Modeled Volume**	**Avg Queue**	**Max Queue**	**Delay**	**LOS**	**Collected Volume**	**Modeled Volume**	**Avg Queue**	**Max Queue**	**Delay**	**LOS**
US 42 & KY 237												
WB, Thru	633	733	75	482	25	LOS_C	1343	1264	348	883	50	LOS_D
WB, Right	64	68	2	80	4	LOS_A	102	90	4	138	10	LOS_B
WB, Left	25	23	14	93	105	LOS_F	67	77	52	195	119	LOS_F
EB, Thru	1153	1163	180	831	37	LOS_D	1005	789	878	1274	123	LOS_F
EB, Left	156	146	48	189	104	LOS_F	303	206	989	1260	385	LOS_F
EB, Right	99	106	3	127	13	LOS_B	104	81	3	94	78	LOS_E
SB, Right	198	179	18	152	12	LOS_B	260	263	76	380	35	LOS_D
SB, Left	299	276	73	334	82	LOS_F	331	317	87	406	90	LOS_F
SB, Thru	116	121	37	135	77	LOS_E	167	167	52	197	88	LOS_F
NB, Left	87	98	518	1278	526	LOS_F	240	153	1165	1279	336	LOS_F
NB, Right	54	42	5	66	28	LOS_C	77	77	16	120	56	LOS_E
NB, Thru	79	68	17	94	506	LOS_F	240	140	39	167	305	LOS_F
US 42 & Harvey Quast												
WB, Thru	635	726	19	393	6	LOS_A	1374	1311	129	1098	26	LOS_C
WB, Left	75	82	57	347	104	LOS_F	79	98	149	1101	102	LOS_F
WB, Right	44	44	1	62	3	LOS_A	56	62	1	86	12	LOS_B
EB, Thru	1356	1343	93	825	8	LOS_A	1293	1124	155	896	18	LOS_B
EB, Right	34	34	110	878	5	LOS_A	15	12	181	954	4	LOS_A
EB, Left	108	105	122	882	91	LOS_F	91	75	64	899	74	LOS_E
SB, Right	70	63	4	73	11	LOS_B	95	82	15	117	40	LOS_D
SB, Left	78	65	2	45	8	LOS_A	96	75	4	64	15	LOS_B
SB, Thru	7	5	2	45	15	LOS_B	10	6	4	64	9	LOS_A
NB, Left	34	36	12	94	59	LOS_E	39	41	18	96	99	LOS_F
NB, Right	36	31	7	96	14	LOS_B	21	19	6	105	25	LOS_C
NB, Thru	17	8	2	69	44	LOS_D	12	7	3	72	49	LOS_D
US 42 & KY 842												
WB, Thru	591	653	45	562	16	LOS_B	1079	1015	870	1617	89	LOS_F
WB, Right	121	172	7	125	7	LOS_A	445	439	135	768	59	LOS_E
WB, Left	100	108	59	226	79	LOS_E	177	158	172	1589	111	LOS_F
EB, Thru	1097	1069	324	1038	51	LOS_D	987	837	556	1545	96	LOS_F
EB, Left	132	124	50	257	73	LOS_E	209	186	64	427	70	LOS_E
EB, Right	221	237	356	1084	51	LOS_D	218	192	599	1593	92	LOS_F
NB, Left	58	60	25	229	70	LOS_E	319	303	636	762	221	LOS_F
NB, Right	72	66	4	90	7	LOS_A	86	64	4	99	69	LOS_E
NB, Thru	56	48	18	125	71	LOS_E	105	80	26	230	141	LOS_F
SB, Right	142	130	9	104	8	LOS_A	80	136	13	135	75	LOS_E
SB, Left	178	176	55	365	53	LOS_D	191	346	1428	1656	142	LOS_F
SB, Thru	104	84	33	170	63	LOS_E	62	102	34	220	119	LOS_F
US 42 & Ockerman												
WB, Thru	670	761	144	628	32	LOS_C	1517	1536	406	1090	37	LOS_D
WB, Right	155	168	161	662	28	LOS_C	21	28	424	1129	22	LOS_C
EB, Thru	1496	1146	81	812	14	LOS_B	1221	1252	13	151	3	LOS_A
EB, Left	218	160	146	857	96	LOS_F	7	12	5	69	75	LOS_E
SB, Right	121	154	150	456	56	LOS_E	102	96	135	436	80	LOS_E
SB, Left	93	130	135	436	82	LOS_F	103	111	116	411	85	LOS_F

2019 Existing	AM Peak						PM Peak					
Movement	**Collected Volume**	**Modeled Volume**	**Avg Queue**	**Max Queue**	**Delay**	**LOS**	**Collected Volume**	**Modeled Volume**	**Avg Queue**	**Max Queue**	**Delay**	**LOS**
US 42 & Mall Rd												
WB, Right	243	232	51	409	8	LOS_A	345	339	401	1409	47	LOS_D
WB, Thru	647	682	85	409	35	LOS_C	1062	1032	729	1409	106	LOS_F
WB, Left	2	2	2	49	153	LOS_F	11	7	3	50	135	LOS_F
EB, Left	321	294	93	341	85	LOS_F	489	583	189	828	87	LOS_F
EB, Thru	1024	969	63	1020	16	LOS_B	685	785	27	286	11	LOS_B
EB, Right	4	2	63	1020	2	LOS_A	5	7	27	286	2	LOS_A
SB, Right	190	257	91	387	46	LOS_D	668	502	1339	1402	194	LOS_F
SB, Left	153	199	91	387	60	LOS_E	359	249	1339	1402	97	LOS_F
SB, Thru	3	0	91	387	0	LOS_A	32	23	1339	1402	160	LOS_F
NB, Thru	10	11	14	176	79	LOS_E	14	15	14	102	81	LOS_F
NB, Left	13	15	14	176	96	LOS_F	8	8	14	102	131	LOS_F
NB, Right	10	9	12	190	29	LOS_C	12	15	13	121	38	LOS_D
Mall Rd & Pinnacle												
NB, Thru	491	460	13	352	7	LOS_A	821	816	45	442	13	LOS_B
NB, Right	89	87	0	48	2	LOS_A	107	98	0	28	4	LOS_A
SB, Thru	318	431	4	279	3	LOS_A	953	715	664	782	245	LOS_F
SB, Left	38	51	12	146	41	LOS_D	93	74	20	145	54	LOS_D
WB, Right	56	70	4	101	9	LOS_A	79	85	6	82	10	LOS_B
WB, Left	61	42	11	120	48	LOS_D	82	69	21	178	170	LOS_F
Mall Rd & Heights												
NB, Thru	448	433	24	318	15	LOS_B	725	728	101	495	34	LOS_C
NB, Right	41	36	0	0	7	LOS_A	61	70	2	103	13	LOS_B
NB, Left	63	56	18	122	51	LOS_D	107	106	55	263	81	LOS_F
SB, Thru	302	417	10	231	7	LOS_A	799	559	720	764	327	LOS_F
SB, Left	84	107	38	157	55	LOS_D	208	151	428	765	183	LOS_F
SB, Right	4	7	21	292	5	LOS_A	28	17	0	0	201	LOS_F
WB, Right	112	122	10	95	10	LOS_B	402	407	104	398	41	LOS_D
WB, Left	28	18	10	95	57	LOS_E	115	122	104	398	175	LOS_F
WB, Thru	7	10	10	95	55	LOS_E	34	36	104	398	60	LOS_E
EB, Left	29	33	12	98	55	LOS_E	67	70	190	218	194	LOS_F
EB, Right	48	48	10	117	7	LOS_A	18	70	219	247	386	LOS_F
EB, Thru	2	1	12	98	121	LOS_F	137	13	190	218	262	LOS_F
Mall Rd & I75 Ramps												
NB, Left	18	20	4	75	45	LOS_D	366	39	15	120	67	LOS_E
NB, Thru	354	358	17	339	13	LOS_B	795	841	89	497	26	LOS_C
SB, Thru	273	424	9	181	6	LOS_A	628	408	695	784	301	LOS_F
SB, Left	90	139	29	112	49	LOS_D	279	183	45	249	69	LOS_E
SB, Right	9	17	0	24	5	LOS_A	19	10	370	457	212	LOS_F
WB, Left	116	108	24	114	46	LOS_D	145	318	760	1197	478	LOS_F
WB, Thru	49	50	24	114	46	LOS_D	9	71	760	1197	234	LOS_F
WB, Right	102	97	12	114	6	LOS_A	13	328	623	1197	34	LOS_C
NB, Right	208	208	16	186	13	LOS_B	366	362	65	497	25	LOS_C

2019 Existing	AM Peak						PM Peak					
Movement	**Collected Volume**	**Modeled Volume**	**Avg Queue**	**Max Queue**	**Delay**	**LOS**	**Collected Volume**	**Modeled Volume**	**Avg Queue**	**Max Queue**	**Delay**	**LOS**
Mall Rd & Plaza												
SB, Thru	277	508	13	190	7	LOS_A	622	391	739	943	239	LOS_F
SB, Left	5	7	1	50	35	LOS_C	11	5	3	47	97	LOS_F
SB, Right	19	33	22	236	6	LOS_A	51	37	785	992	55	LOS_D
NB, Thru	300	310	3	96	4	LOS_A	818	790	79	509	23	LOS_C
NB, Right	70	63	1	71	2	LOS_A	267	278	35	546	8	LOS_A
NB, Left	94	87	36	230	65	LOS_E	89	96	78	293	122	LOS_F
EB, Right	77	48	3	98	9	LOS_A	161	81	194	265	344	LOS_F
EB, Left	12	12	6	69	79	LOS_E	44	14	43	219	140	LOS_F
EB, Thru	3	2	6	69	89	LOS_F	7	1	43	219	130	LOS_F
WB, Left	14	21	9	90	59	LOS_E	145	102	348	451	487	LOS_F
WB, Right	3	1	0	49	7	LOS_A	13	10	1	78	48	LOS_D
WB, Thru	2	4	9	90	85	LOS_F	9	6	348	451	445	LOS_F
Mall Rd & Cayton												
SB, Thru	211	196	9	145	13	LOS_B	487	317	232	366	418	LOS_F
SB, Right	35	38	1	173	4	LOS_A	76	62	253	416	115	LOS_F
SB, Left	2	2	1	22	65	LOS_E	36	27	13	99	105	LOS_F
EB, Right	84	346	25	438	16	LOS_B	147	67	499	1658	785	LOS_F
EB, Left	29	56	19	123	52	LOS_D	64	36	16	187	279	LOS_F
EB, Thru	15	12	3	68	47	LOS_D	54	25	10	94	341	LOS_F
WB, Left	3	1	4	47	120	LOS_F	47	42	29	164	338	LOS_F
WB, Right	5	6	4	47	98	LOS_F	44	47	29	164	66	LOS_E
WB, Thru	6	5	1	67	6	LOS_A	46	34	35	193	41	LOS_D
NB, Left	75	89	33	259	61	LOS_E	337	324	319	813	125	LOS_F
NB, Thru	206	220	4	109	6	LOS_A	467	424	36	330	20	LOS_B
NB, Right	15	16	2	145	5	LOS_A	59	64	33	379	18	LOS_B
KY 842 & Cayton												
SB, Thru	94	40	31	151	87	LOS_F	86	58	21	126	55	LOS_D
SB, Right	65	27	2	94	11	LOS_B	138	99	9	127	11	LOS_B
SB, Left	400	158	270	361	143	LOS_F	158	103	39	229	60	LOS_E
NB, Thru	18	21	10	74	80	LOS_F	175	200	97	512	70	LOS_E
NB, Left	27	38	11	79	52	LOS_D	141	157	51	261	55	LOS_D
NB, Right	51	70	7	128	13	LOS_B	106	99	9	111	14	LOS_B
WB, Left	23	310	20	313	11	LOS_B	93	67	4	72	11	LOS_B
WB, Right	77	15	0	64	3	LOS_A	244	220	8	136	10	LOS_A
WB, Thru	289	13	1	23	11	LOS_B	536	505	113	772	23	LOS_C
EB, Right	60	59	2	87	9	LOS_A	114	119	6	198	6	LOS_A
EB, Left	27	26	1	44	10	LOS_A	82	77	4	89	18	LOS_B
EB, Thru	562	559	117	833	24	LOS_C	472	487	103	1130	20	LOS_C

2045 No-Build

Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 & KY 237								
WB, Thru	181	886	42	LOS_D	56	300	55	LOS_E
WB, Right	5	107	7	LOS_A	759	975	81	LOS_F
WB, Left	50	222	119	LOS_F	408	939	326	LOS_F
EB, Thru	586	841	156	LOS_F	518	848	104	LOS_F
EB, Left	97	795	188	LOS_F	344	834	214	LOS_F
EB, Right	1	86	61	LOS_E	2	89	49	LOS_D
SB, Right	1541	1695	103	LOS_F	1573	1681	146	LOS_F
SB, Left	1535	1662	339	LOS_F	1571	1681	163	LOS_F
SB, Thru	1539	1673	184	LOS_F	1573	1681	154	LOS_F
NB, Left	207	1292	514	LOS_F	177	775	113	LOS_F
NB, Right	35	202	129	LOS_F	9	90	39	LOS_D
NB, Thru	56	1270	465	LOS_F	44	197	65	LOS_E
US 42 & Harvey Quast								
WB, Thru	64	926	15	LOS_B	881	956	163	LOS_F
WB, Left	154	928	136	LOS_F	3	156	16	LOS_B
WB, Right	15	136	37	LOS_D	1	61	139	LOS_F
EB, Thru	640	923	47	LOS_D	145	899	17	LOS_B
EB, Right	677	977	18	LOS_B	167	952	6	LOS_A
EB, Left	95	231	56	LOS_E	87	236	42	LOS_D
SB, Right	41	335	33	LOS_C	292	360	362	LOS_F
SB, Left	16	319	32	LOS_C	63	344	145	LOS_F
SB, Thru	16	319	0	LOS_A	63	344	16	LOS_B
NB, Left	7	72	65	LOS_E	33	225	102	LOS_F
NB, Right	56	123	32	LOS_C	7	116	34	LOS_C
NB, Thru	65	135	65	LOS_E	2	89	26	LOS_C
US 42 & KY 842								
WB, Thru	139	803	43	LOS_D	1533	1641	401	LOS_F
WB, Right	228	789	45	LOS_D	4	189	106	LOS_F
EB, Thru	83	607	10	LOS_B	118	640	13	LOS_B
EB, Right	96	653	9	LOS_A	136	686	12	LOS_B
NB, Thru	41	323	52	LOS_D	73	310	55	LOS_E
NB, Right	71	320	25	LOS_C	4	149	9	LOS_A
SB, Right	461	1658	115	LOS_F	1646	1662	4469	LOS_F
SB, Thru	317	1656	93	LOS_F	1	23	3118	LOS_F
US 42 & Ockerman								
WB, Thru	218	1089	29	LOS_C	985	1094	231	LOS_F
WB, Right	218	1090	39	LOS_D	985	1094	161	LOS_F
EB, Thru	139	967	22	LOS_C	89	841	16	LOS_B
EB, Left	122	850	96	LOS_F	2	42	84	LOS_F
SB, Right	131	432	65	LOS_E	424	467	2411	LOS_F
SB, Left	116	411	81	LOS_F	403	447	1570	LOS_F

2045 No-Build

Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 & Mall Rd								
WB, Right	491	1396	64	LOS_E	667	1386	176	LOS_F
WB, Thru	938	1396	144	LOS_F	1327	1386	635	LOS_F
WB, Left	16	112	169	LOS_F	8	48	400	LOS_F
EB, Left	279	1085	82	LOS_F	178	1081	86	LOS_F
EB, Thru	74	777	27	LOS_C	35	389	17	LOS_B
EB, Right	74	777	26	LOS_C	35	389	13	LOS_B
SB, Right	75	314	41	LOS_D	1364	1426	536	LOS_F
SB, Left	75	314	61	LOS_E	1364	1426	159	LOS_F
SB, Thru	75	314	27	LOS_C	1364	1426	554	LOS_F
NB, Thru	28	196	59	LOS_E	143	366	210	LOS_F
NB, Left	28	196	0	LOS_A	143	366	354	LOS_F
NB, Right	33	211	32	LOS_C	153	381	201	LOS_F
Mall Rd & Pinnacle								
NB, Thru	85	544	23	LOS_C	49	433	24	LOS_C
NB, Right	2	100	11	LOS_B	0	70	5	LOS_A
SB, Thru	4	338	3	LOS_A	752	795	673	LOS_F
SB, Left	296	754	70	LOS_E	752	795	95	LOS_F
WB, Right	6	94	11	LOS_B	86	488	110	LOS_F
WB, Left	24	124	55	LOS_E	366	444	772	LOS_F
Mall Rd & Heights								
NB, Thru	78	497	25	LOS_C	45	418	20	LOS_B
NB, Right	2	100	10	LOS_A	0	21	6	LOS_A
NB, Left	21	147	65	LOS_E	28	177	76	LOS_E
SB, Thru	43	365	38	LOS_D	756	783	1025	LOS_F
SB, Left	144	446	113	LOS_F	13	204	160	LOS_F
SB, Right	64	426	18	LOS_B	817	844	667	LOS_F
WB, Right	21	177	18	LOS_B	293	470	86	LOS_F
WB, Left	21	177	76	LOS_E	293	470	559	LOS_F
WB, Thru	21	177	53	LOS_D	293	470	196	LOS_F
EB, Left	14	97	67	LOS_E	195	221	529	LOS_F
EB, Right	12	118	26	LOS_C	216	242	1114	LOS_F
EB, Thru	14	97	60	LOS_E	195	221	365	LOS_F
Mall Rd & I75 Ramps								
NB, Left	56	449	64	LOS_E	17	100	66	LOS_E
NB, Thru	73	591	21	LOS_C	48	411	21	LOS_C
SB, Thru	42	334	17	LOS_B	755	817	1155	LOS_F
SB, Left	49	185	53	LOS_D	12	130	86	LOS_F
SB, Right	9	69	20	LOS_B	428	490	552	LOS_F
WB, Left	44	171	48	LOS_D	1164	1216	1625	LOS_F
WB, Thru	44	171	23	LOS_C	1164	1216	1906	LOS_F
WB, Right	22	171	4	LOS_A	1012	1216	324	LOS_F
NB, Right	17	148	18	LOS_B	59	423	22	LOS_C

2045 No-Build

Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
Mall Rd & Plaza								
SB, Thru	29	235	65	LOS_E	922	939	1027	LOS_F
SB, Left	35	128	49	LOS_D	3	48	136	LOS_F
SB, Right	29	231	61	LOS_E	968	985	689	LOS_F
NB, Thru	29	235	15	LOS_B	27	224	18	LOS_B
NB, Right	10	125	12	LOS_B	9	196	7	LOS_A
NB, Left	69	414	65	LOS_E	27	137	101	LOS_F
EB, Right	3	70	9	LOS_A	235	258	593	LOS_F
EB, Left	17	149	68	LOS_E	10	217	106	LOS_F
EB, Thru	17	149	15	LOS_B	10	217	415	LOS_F
WB, Left	43	169	86	LOS_F	424	451	2130	LOS_F
WB, Right	22	169	9	LOS_A	0	0	1013	LOS_F
WB, Thru	43	169	105	LOS_F	424	451	1370	LOS_F
Mall Rd & Cayton								
SB, Thru	8	101	11	LOS_B	307	344	2005	LOS_F
SB, Right	35	143	36	LOS_D	351	388	519	LOS_F
SB, Left	9	140	35	LOS_D	5	70	96	LOS_F
EB, Right	691	1673	100	LOS_F	819	1695	3143	LOS_F
EB, Left	22	144	102	LOS_F	25	187	331	LOS_F
EB, Thru	10	89	62	LOS_E	35	187	352	LOS_F
WB, Left	6	70	74	LOS_E	156	187	1999	LOS_F
WB, Right	6	70	110	LOS_F	156	187	265	LOS_F
WB, Thru	4	90	20	LOS_C	175	206	330	LOS_F
NB, Left	59	305	71	LOS_E	20	187	71	LOS_E
NB, Thru	45	366	19	LOS_B	27	375	22	LOS_C
NB, Right	46	408	17	LOS_B	17	417	17	LOS_B
KY 842 & Cayton								
SB, Thru	98	153	18	LOS_B	309	360	1930	LOS_F
SB, Right	16	198	7	LOS_A	353	402	497	LOS_F
SB, Left	47	66	86	LOS_F	25	65	92	LOS_F
NB, Thru	29	301	13	LOS_B	850	1700	2023	LOS_F
NB, Left	50	277	59	LOS_E	313	359	87	LOS_F
NB, Right	31	343	12	LOS_B	79	201	76	LOS_F
WB, Left	6	70	75	LOS_E	157	187	1594	LOS_F
WB, Right	4	89	19	LOS_B	157	187	399	LOS_F
WB, Thru	6	70	75	LOS_E	177	207	329	LOS_F
EB, Right	642	1673	86	LOS_F	26	135	78	LOS_E
EB, Left	22	150	89	LOS_F	26	254	17	LOS_B
EB, Thru	6	71	96	LOS_F	25	297	13	LOS_B

2045 No-Build

Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 Jughandle								
WB, Thru	38	643	8	LOS_A	585	686	194	LOS_F
WB, Left	346	642	114	LOS_F	7	142	68	LOS_E
EB, Thru	507	940	38	LOS_D	283	938	35	LOS_C
EB, Right	414	831	44	LOS_D	213	829	18	LOS_B
NB, Left	20	100	61	LOS_E	579	737	184	LOS_F
NB, Right	36	127	35	LOS_D	276	424	49	LOS_D
KY 842 Jughandle								
NB, Thru	3	67	8	LOS_A	1	96	30	LOS_C
NB, Left	4	102	15	LOS_B	348	447	169	LOS_F
EB, Left	254	815	56	LOS_E	50	211	54	LOS_D
EB, Right	97	223	26	LOS_C	69	199	22	LOS_C

2045 3-Lane	AM Peak				PM Peak			
Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 & KY 237								
WB, Thru	57	579	22	LOS_C	530	886	29	LOS_E
WB, Right	0	52	16	LOS_B	0	56	9	LOS_B
WB, Left	28	201	88	LOS_F	28	142	74	LOS_F
EB, Thru	337	842	60	LOS_E	199	853	35	LOS_F
EB, Left	463	834	183	LOS_F	652	839	124	LOS_F
EB, Right	0	60	6	LOS_A	1	85	23	LOS_C
SB, Right	21	314	18	LOS_B	1606	1686	90	LOS_F
SB, Left	9	128	65	LOS_E	55	177	57	LOS_F
SB, Thru	18	185	53	LOS_D	59	179	60	LOS_F
NB, Left	52	299	71	LOS_E	98	563	300	LOS_F
NB, Right	20	154	38	LOS_D	4	69	55	LOS_B
NB, Thru	36	151	57	LOS_E	28	103	268	LOS_D
US 42 & Harvey Quast								
WB, Thru	13	572	5	LOS_A	141	914	21	LOS_C
WB, Left	83	574	101	LOS_F	136	889	25	LOS_C
WB, Right	0	0	0	LOS_A	9	59	45	LOS_D
EB, Thru	109	884	8	LOS_A	121	884	16	LOS_B
EB, Right	127	937	5	LOS_A	137	938	7	LOS_A
EB, Left	35	143	19	LOS_B	71	844	81	LOS_E
SB, Right	2	59	9	LOS_A	13	94	89	LOS_F
SB, Left	0	23	5	LOS_A	1	23	17	LOS_B
SB, Thru	0	23	9	LOS_A	1	23	8	LOS_A
NB, Left	9	72	80	LOS_F	44	224	113	LOS_F
NB, Right	49	105	32	LOS_C	8	96	38	LOS_D
NB, Thru	51	98	35	LOS_C	2	69	10	LOS_A
US 42 & KY 842								
WB, Thru	15	396	5	LOS_A	119	1306	15	LOS_B
WB, Right	0	55	2	LOS_A	5	85	56	LOS_E
EB, Thru	36	568	6	LOS_A	58	640	9	LOS_A
EB, Right	46	613	23	LOS_C	70	686	27	LOS_C
NB, Thru	67	267	69	LOS_E	157	603	121	LOS_F
NB, Right	10	148	14	LOS_B	8	122	14	LOS_B
SB, Right	0	64	6	LOS_A	3	123	87	LOS_F
SB, Thru	1	42	5	LOS_A	5	75	31	LOS_C
US 42 & Ockerman								
WB, Thru	106	980	24	LOS_C	781	1091	7	LOS_F
WB, Right	105	980	32	LOS_C	781	1091	13	LOS_E
EB, Thru	103	810	14	LOS_B	44	478	15	LOS_B
EB, Left	92	811	105	LOS_F	2	21	37	LOS_F
SB, Right	126	432	61	LOS_E	400	432	266	LOS_F
SB, Left	111	411	82	LOS_F	379	411	298	LOS_F

2045 3-Lane	AM Peak				PM Peak			
Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 & Mall Rd								
WB, Right	57	887	11	LOS_B	598	1408	55	LOS_E
WB, Thru	102	887	42	LOS_D	1157	1408	103	LOS_F
WB, Left	10	77	78	LOS_E	803	1409	149	LOS_F
EB, Left	128	944	70	LOS_E	79	283	74	LOS_E
EB, Thru	62	692	18	LOS_B	45	545	26	LOS_B
EB, Right	62	692	16	LOS_B	45	545	17	LOS_C
SB, Right	61	273	45	LOS_D	1353	1397	190	LOS_F
SB, Left	61	273	69	LOS_E	1353	1397	106	LOS_F
SB, Thru	61	273	33	LOS_C	1353	1397	169	LOS_F
NB, Thru	29	239	92	LOS_F	139	365	216	LOS_F
NB, Left	29	239	82	LOS_F	139	365	179	LOS_F
NB, Right	32	253	38	LOS_D	150	379	175	LOS_F
Mall Rd & Pinnacle								
NB, Thru	35	369	18	LOS_B	48	367	29	LOS_C
NB, Right	4	147	8	LOS_A	2	146	12	LOS_A
SB, Thru	2	93	3	LOS_A	717	794	263	LOS_F
SB, Left	125	485	56	LOS_E	696	795	107	LOS_F
WB, Right	5	96	8	LOS_A	47	443	68	LOS_F
WB, Left	25	157	51	LOS_D	367	431	330	LOS_F
Mall Rd & Heights								
NB, Thru	25	295	12	LOS_B	48	367	34	LOS_C
NB, Right	0	74	5	LOS_A	1	27	9	LOS_A
NB, Left	17	197	50	LOS_D	37	164	85	LOS_E
SB, Thru	22	289	18	LOS_B	737	783	313	LOS_F
SB, Left	44	211	54	LOS_D	34	286	166	LOS_F
SB, Right	38	350	11	LOS_B	798	844	183	LOS_F
WB, Right	11	101	10	LOS_A	70	321	33	LOS_C
WB, Left	11	101	69	LOS_E	70	321	164	LOS_F
WB, Thru	11	101	75	LOS_E	70	321	59	LOS_E
EB, Left	12	73	64	LOS_E	195	218	146	LOS_F
EB, Right	13	95	11	LOS_B	216	239	291	LOS_F
EB, Thru	12	73	58	LOS_E	195	218	143	LOS_F

2045 3-Lane	AM Peak				PM Peak			
Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
Mall Rd & Plaza								
SB, Thru	10	171	10	LOS_A	904	929	354	LOS_F
SB, Right	1	19	138	LOS_F	613	930	154	LOS_F
SB, Left	15	217	4	LOS_A	950	975	97	LOS_F
NB, Thru	9	230	4	LOS_A	57	384	23	LOS_C
NB, Left	0	71	1	LOS_A	37	434	10	LOS_B
NB, Right	124	391	111	LOS_F	247	544	275	LOS_F
WB, Left	3	72	8	LOS_A	224	257	484	LOS_F
WB, Right	20	100	78	LOS_E	83	219	306	LOS_F
WB, Thru	20	100	112	LOS_F	83	219	308	LOS_F
EB, Right	8	53	53	LOS_D	411	457	708	LOS_F
EB, Left	0	55	8	LOS_A	1	73	237	LOS_F
EB, Thru	8	53	71	LOS_E	411	457	424	LOS_F
Mall Rd & Cayton								
SB, Thru	16	149	19	LOS_B	301	336	1129	LOS_F
SB, Left	0	144	12	LOS_B	345	380	404	LOS_F
SB, Right	15	99	54	LOS_D	8	72	172	LOS_F
NB, Thru	15	170	9	LOS_A	824	1656	5413	LOS_F
NB, Right	73	386	46	LOS_D	15	305	251	LOS_F
NB, Left	26	170	41	LOS_D	17	153	231	LOS_F
EB, Right	6	44	63	LOS_E	138	173	819	LOS_F
EB, Left	6	44	80	LOS_F	138	173	97	LOS_F
EB, Thru	1	64	10	LOS_A	157	193	136	LOS_F
WB, Left	36	247	53	LOS_D	31	203	96	LOS_F
WB, Right	41	289	20	LOS_C	66	465	27	LOS_C
WB, Thru	39	328	17	LOS_B	66	507	29	LOS_C
KY 842 & Cayton								
SB, Thru	87	347	64	LOS_E	313	336	3723	LOS_F
SB, Right	1	78	14	LOS_B	0	58	3611	LOS_F
SB, Left	54	358	57	LOS_E	6	36	66	LOS_F
EB, Right	55	198	77	LOS_E	9	100	54	LOS_D
EB, Left	2	48	59	LOS_E	4	50	51	LOS_D
EB, Thru	0	56	4	LOS_A	1	25	7	LOS_A
WB, Left	14	264	11	LOS_B	748	774	3539	LOS_F
WB, Right	10	191	6	LOS_A	0	67	1073	LOS_F
WB, Thru	2	81	19	LOS_B	0	22	740	LOS_F
NB, Left	67	199	53	LOS_D	89	263	98	LOS_F
NB, Thru	712	1656	73	LOS_E	70	665	18	LOS_B
NB, Right	10	69	10	LOS_A	66	120	17	LOS_B

2045 3-Lane	AM Peak				PM Peak			
Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 Jughandle								
WB, Thru	8	250	4	LOS_A	448	635	11	LOS_F
WB, Left	12	124	28	LOS_C	9	122	30	LOS_C
EB, Thru	100	726	13	LOS_B	110	910	31	LOS_B
EB, Right	65	618	10	LOS_B	72	801	22	LOS_B
NB, Left	13	71	38	LOS_D	95	633	43	LOS_F
NB, Right	9	127	15	LOS_B	10	319	9	LOS_A
KY 842 Jughandle								
NB, Thru	3	95	5	LOS_A	6	124	10	LOS_A
NB, Left	1	48	4	LOS_A	12	267	7	LOS_A
EB, Left	22	219	41	LOS_D	43	198	53	LOS_D
EB, Right	26	129	9	LOS_A	16	98	15	LOS_B
Mall Rd & I75 Ramps								
NB, Thru	41	385	20	LOS_B	75	415	31	LOS_D
NB, Left	3	45	79	LOS_E	5	49	59	LOS_F
SB, Thru	16	136	15	LOS_B	739	766	278	LOS_F
SB, Left	22	128	55	LOS_D	3	41	90	LOS_F
SB, Right	0	29	15	LOS_B	410	436	152	LOS_F
WB, Left	87	303	52	LOS_D	1158	1197	536	LOS_F
WB, Right	44	303	6	LOS_A	1005	1197	36	LOS_E
WB, Thru	87	303	56	LOS_E	1158	1197	444	LOS_F
EB, Right	29	267	42	LOS_D	38	190	89	LOS_F
EB, Thru	29	267	57	LOS_E	38	190	51	LOS_F
EB, Left	49	218	45	LOS_D	62	223	61	LOS_E
NB, Right	10	181	18	LOS_B	92	432	30	LOS_D
KY 237 & Proposed Connector								
NB, Right	10	220	9	LOS_A	35	411	11	LOS_B
NB, Thru	10	220	8	LOS_A	35	411	18	LOS_B
SB, Left	1641	1667	1241	LOS_F	1648	1658	4809	LOS_F
SB, Thru	2	122	212	LOS_F	2	212	792	LOS_F
WB, Right	111	336	17	LOS_B	36	592	39	LOS_D
WB, Left	125	351	35	LOS_D	50	336	34	LOS_D
KY 842 & Proposed Connector								
NB, Thru	2	23	71	LOS_E	56	331	32	LOS_C
NB, Right	2	23	0	LOS_A	41	256	27	LOS_C
NB, Left	23	150	60	LOS_E	1599	1661	371	LOS_F
EB, Left	10	120	45	LOS_D	1	50	52	LOS_D
EB, Thru	13	154	26	LOS_C	1	71	16	LOS_B
EB, Right	13	154	9	LOS_A	1	71	11	LOS_B
SB, Left	244	936	101	LOS_F	228	567	95	LOS_F
SB, Thru	18	141	62	LOS_E	4	146	68	LOS_E
SB, Right	18	141	50	LOS_D	4	146	42	LOS_D
WB, Right	6	164	9	LOS_A	8	218	31	LOS_C
WB, Left	25	231	29	LOS_C	25	331	49	LOS_D
WB, Thru	6	164	10	LOS_A	8	218	9	LOS_A

2045 4/5-Lane	AM Peak				PM Peak			
Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 & KY 237								
WB, Thru	103	679	15	LOS_D	382	883	34	LOS_C
WB, Right	0	0	5	LOS_A	0	56	13	LOS_B
WB, Left	35	122	100	LOS_F	14	122	71	LOS_E
EB, Thru	483	843	40	LOS_F	173	851	52	LOS_D
EB, Left	426	829	169	LOS_F	577	847	222	LOS_F
EB, Right	0	62	10	LOS_A	1	88	37	LOS_D
SB, Right	401	1610	31	LOS_F	45	740	64	LOS_E
SB, Left	327	1451	80	LOS_F	20	77	83	LOS_F
SB, Thru	382	1559	90	LOS_F	4	178	43	LOS_D
NB, Left	104	508	434	LOS_F	9	82	386	LOS_F
NB, Right	42	289	49	LOS_D	8	75	48	LOS_D
NB, Thru	40	171	428	LOS_D	45	250	349	LOS_F
US 42 & Harvey Quast								
WB, Thru	27	631	7	LOS_A	385	932	39	LOS_D
WB, Left	71	518	86	LOS_F	127	853	24	LOS_C
WB, Right	0	0	0	LOS_A	0	0	0	LOS_A
EB, Thru	68	779	6	LOS_A	60	884	7	LOS_A
EB, Right	82	832	4	LOS_A	72	937	5	LOS_A
EB, Left	6	49	59	LOS_E	20	271	88	LOS_F
SB, Right	2	62	9	LOS_A	3	41	105	LOS_F
SB, Left	0	19	5	LOS_A	0	24	8	LOS_A
SB, Thru	0	19	6	LOS_A	0	24	9	LOS_A
NB, Left	9	72	80	LOS_F	58	225	151	LOS_F
NB, Right	37	88	30	LOS_C	3	73	14	LOS_B
NB, Thru	41	91	31	LOS_C	0	46	9	LOS_A
US 42 & KY 842								
WB, Thru	16	648	4	LOS_A	96	644	17	LOS_B
WB, Right	0	53	3	LOS_A	1	82	5	LOS_A
EB, Thru	32	447	5	LOS_A	44	641	7	LOS_A
EB, Right	40	492	2	LOS_A	52	686	10	LOS_A
NB, Thru	25	103	70	LOS_E	89	446	68	LOS_E
NB, Right	13	148	17	LOS_B	5	89	9	LOS_A
SB, Right	3	160	12	LOS_B	29	375	417	LOS_F
SB, Thru	2	59	93	LOS_F	5	70	30	LOS_C
US 42 & Ockerman								
WB, Thru	173	1010	29	LOS_C	806	1091	9	LOS_F
WB, Right	173	1011	30	LOS_D	806	1092	11	LOS_E
EB, Thru	97	810	15	LOS_B	9	175	9	LOS_A
EB, Left	98	743	111	LOS_F	9	125	75	LOS_E
SB, Right	151	448	68	LOS_E	395	431	290	LOS_F
SB, Left	136	428	88	LOS_F	375	411	291	LOS_F

2045 4/5-Lane	AM Peak				PM Peak			
Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
US 42 & Mall Rd								
WB, Right	173	1384	28	LOS_C	541	1390	54	LOS_D
WB, Thru	320	1384	72	LOS_E	1049	1390	96	LOS_F
WB, Left	25	176	116	LOS_F	737	1387	150	LOS_F
EB, Left	112	491	66	LOS_E	30	122	65	LOS_E
EB, Thru	87	718	25	LOS_C	20	220	23	LOS_C
EB, Right	87	718	31	LOS_C	20	220	19	LOS_D
SB, Right	64	256	42	LOS_D	1364	1397	184	LOS_F
SB, Left	64	256	67	LOS_E	1364	1397	96	LOS_F
SB, Thru	64	256	81	LOS_F	1364	1397	196	LOS_F
NB, Thru	35	218	68	LOS_D	143	365	208	LOS_F
NB, Left	35	218	102	LOS_F	143	365	180	LOS_F
NB, Right	40	232	44	LOS_D	153	379	172	LOS_F
Mall Rd & Pinnacle								
NB, Thru	37	372	19	LOS_B	24	201	27	LOS_B
NB, Right	3	145	15	LOS_A	1	116	12	LOS_A
SB, Thru	3	149	2	LOS_A	736	771	297	LOS_F
SB, Left	124	501	82	LOS_D	737	772	87	LOS_F
WB, Right	4	71	8	LOS_A	44	471	71	LOS_F
WB, Left	30	171	50	LOS_E	383	429	361	LOS_F
Mall Rd & Heights								
NB, Thru	33	390	17	LOS_B	30	268	31	LOS_C
NB, Right	0	0	5	LOS_B	0	0	8	LOS_A
NB, Left	17	150	61	LOS_D	25	125	89	LOS_E
SB, Thru	23	274	92	LOS_B	744	774	346	LOS_F
SB, Left	70	376	96	LOS_E	19	170	98	LOS_F
SB, Right	39	336	7	LOS_A	805	835	191	LOS_F
WB, Right	11	101	10	LOS_B	53	288	32	LOS_B
WB, Left	11	101	120	LOS_E	53	288	160	LOS_F
WB, Thru	11	101	71	LOS_E	53	288	56	LOS_D
EB, Left	13	72	58	LOS_E	196	222	155	LOS_F
EB, Right	12	93	64	LOS_B	217	243	305	LOS_F
EB, Thru	13	72	48	LOS_D	196	222	117	LOS_F
Mall Rd & Plaza								
SB, Thru	13	154	11	LOS_B	912	929	347	LOS_F
SB, Right	0	21	71	LOS_C	1	48	101	LOS_F
SB, Left	20	200	6	LOS_B	959	975	78	LOS_F
NB, Thru	12	354	4	LOS_A	24	194	13	LOS_B
NB, Left	2	118	2	LOS_A	9	209	6	LOS_A
NB, Right	100	374	91	LOS_F	107	271	183	LOS_F
WB, Left	2	72	8	LOS_A	241	258	1120	LOS_F
WB, Right	16	121	78	LOS_E	1	22	183	LOS_F
WB, Thru	16	121	63	LOS_C	1	22	182	LOS_F
EB, Right	13	89	76	LOS_E	80	257	314	LOS_F
EB, Left	0	54	10	LOS_A	0	55	7	LOS_A
EB, Thru	13	89	77	LOS_E	80	257	63	LOS_F

2045 4/5-Lane	AM Peak				PM Peak			
Movement	**Avg Queue**	**Max Queue**	**Delay**	**LOS**	**Avg Queue**	**Max Queue**	**Delay**	**LOS**
Mall Rd & Cayton								
SB, Thru	15	104	13	LOS_B	302	341	947	LOS_F
SB, Left	3	148	10	LOS_A	346	385	327	LOS_F
SB, Right	14	113	63	LOS_E	9	71	161	LOS_F
NB, Thru	13	205	24	LOS_A	819	1656	4289	LOS_F
NB, Right	116	483	13	LOS_E	14	288	231	LOS_F
NB, Left	24	205	41	LOS_D	15	136	218	LOS_F
EB, Right	6	44	70	LOS_E	137	162	702	LOS_F
EB, Left	6	44	0	LOS_E	137	162	10	LOS_A
EB, Thru	1	64	39	LOS_A	156	182	128	LOS_F
WB, Left	38	180	53	LOS_E	14	119	62	LOS_E
WB, Right	40	430	18	LOS_B	56	419	25	LOS_C
WB, Thru	39	472	10	LOS_B	56	461	22	LOS_C
KY 842 & Cayton								
SB, Thru	81	353	55	LOS_E	303	303	3409	LOS_F
SB, Right	1	73	8	LOS_A	261	285	61	LOS_D
SB, Left	53	326	57	LOS_E	12	126	35	LOS_C
EB, Right	61	281	67	LOS_E	15	159	73	LOS_E
EB, Left	0	22	89	LOS_C	4	74	71	LOS_E
EB, Thru	0	57	6	LOS_A	0	57	5	LOS_A
WB, Left	15	170	9	LOS_B	671	777	3762	LOS_F
WB, Right	12	294	7	LOS_A	1	105	4	LOS_A
WB, Thru	0	24	17	LOS_A	1	48	180	LOS_F
NB, Left	159	321	43	LOS_D	35	331	39	LOS_D
NB, Thru	767	1662	76	LOS_E	156	561	49	LOS_D
NB, Right	0	21	60	LOS_E	27	221	35	LOS_D
US 42 Jughandle								
WB, Thru	5	190	3	LOS_A	479	654	20	LOS_F
WB, Left	15	185	21	LOS_C	4	116	28	LOS_B
EB, Thru	112	914	10	LOS_B	10	169	21	LOS_A
EB, Right	77	805	10	LOS_B	0	60	13	LOS_A
NB, Left	14	75	35	LOS_D	99	431	45	LOS_F
NB, Right	10	125	9	LOS_A	4	118	5	LOS_A
KY 842 Jughandle								
NB, Thru	2	99	6	LOS_A	2	108	4	LOS_A
NB, Left	1	53	4	LOS_A	4	168	5	LOS_A
EB, Left	1	23	34	LOS_D	4	94	35	LOS_C
EB, Right	27	123	18	LOS_B	32	149	19	LOS_B

2045 4/5-Lane	AM Peak				PM Peak			
Movement	Avg Queue	Max Queue	Delay	LOS	Avg Queue	Max Queue	Delay	LOS
Mall Rd & I75 Ramps								
NB, Thru	49	384	23	LOS_C	44	298	31	LOS_C
NB, Left	4	45	87	LOS_F	4	47	87	LOS_E
SB, Thru	34	305	17	LOS_B	740	785	332	LOS_F
SB, Left	38	149	57	LOS_E	4	72	84	LOS_F
SB, Right	0	97	17	LOS_B	410	455	183	LOS_F
WB, Left	71	250	49	LOS_D	1166	1196	633	LOS_F
WB, Right	35	250	5	LOS_A	1013	1196	43	LOS_C
WB, Thru	71	250	48	LOS_D	1166	1196	309	LOS_F
EB, Right	13	48	80	LOS_F	13	72	45	LOS_F
EB, Thru	13	48	13	LOS_B	13	72	30	LOS_B
EB, Left	48	220	57	LOS_E	61	266	61	LOS_E
NB, Right	9	121	18	LOS_B	30	251	30	LOS_C
KY 237 & Proposed Connector								
NB, Right	38	336	11	LOS_B	22	245	20	LOS_C
NB, Thru	38	336	11	LOS_C	22	245	12	LOS_B
SB, Left	61	325	98	LOS_D	22	101	76	LOS_E
SB, Thru	21	226	83	LOS_A	212	758	146	LOS_F
WB, Right	20	195	14	LOS_B	47	433	22	LOS_C
WB, Left	20	195	45	LOS_D	47	433	78	LOS_E
KY 842 & Proposed Connector								
NB, Thru	1	43	77	LOS_E	83	224	37	LOS_D
NB, Right	1	43	42	LOS_D	15	175	24	LOS_C
NB, Left	20	228	52	LOS_D	94	415	65	LOS_E
EB, Left	4	69	38	LOS_D	2	50	63	LOS_E
EB, Thru	3	71	22	LOS_C	0	47	9	LOS_A
EB, Right	3	71	8	LOS_A	0	47	7	LOS_A
SB, Left	147	491	66	LOS_E	269	687	111	LOS_F
SB, Thru	12	154	43	LOS_D	6	117	47	LOS_D
SB, Right	12	154	34	LOS_C	6	117	59	LOS_E
WB, Right	4	97	7	LOS_A	5	162	9	LOS_A
WB, Left	18	197	25	LOS_B	36	291	41	LOS_D
WB, Thru	4	97	9	LOS_A	5	162	6	LOS_A