



Traffic Impact Study

Project Spring

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FOR SUBMITTAL TO:

Rutherford County

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1.0 EXECUTIVE SUMMARY

This traffic study evaluates the anticipated traffic impacts associated with the *Project Spring* development. The site is approximately 169.7 acres and is located east of Manchester Pike and south of Hughes Road within Rutherford County, Tennessee.

The proposed development is planned to consist of 262,000 s.f. of manufacturing warehouse and will generate 1,190 daily trips, 169 AM peak hour trips and 210 PM peak hour trips.

Two alternatives were analyzed, one with the existing Epps Mill Road alignment, and the second with the future TDOT realignment of Epps Mill Road. The results of the analyses show that all study intersections currently operate at an acceptable overall LOS during the AM and PM peak hours.

Under the projected No-Build and Build conditions of the existing Epps Mill Road alignment, all study intersections are projected to continue to operate at an acceptable overall LOS during the AM and PM peak hours, with the exception of Epps Mill Road at I-24 NB On/Off-Ramp (Intersection 3) in the AM peak hour. Under the projected No-Build and Build conditions of the future TDOT realignment, all study intersections are projected to continue to operate at an acceptable overall LOS during the AM and PM peak hours. It should be noted that it is not uncommon for side street approaches to experience higher delay during peak periods and in more urban areas.

1.1 DEVELOPMENT IMPROVEMENT RECOMMENDATIONS

The following improvements are recommended to be completed by the *Project Spring* development.

- Intersection 5 – Manchester Pike at Epps Mill Road/Site Driveway
 - Install a traffic signal.
 - Coordinate the timing of the signal installation with Rutherford County and TDOT to determine if installation should occur before or after the Epps Mill Road realignment.
 - Construct one (1) ingress lane and two (2) egress lanes at the westbound approach to operate under signalized control.
 - Construct one southbound left turn lane with 335' of storage, incorporating bay taper, approach taper, and deceleration distances.
 - See concept in Appendix A.

2.0 INTRODUCTION

This traffic study evaluates the anticipated traffic impacts associated with the *Project Spring* development. The following scenarios are analyzed in this study:

- Existing 2024 Conditions
 - Existing traffic counts and lane configurations.
- Projected 2026 No-Build Conditions
 - Existing traffic counts grown to the build-out year at a standard growth rate and existing lane configurations.
- Projected 2026 Build Conditions
 - Existing traffic counts grown to the build-out year at a standard growth rate plus projected traffic associated with the proposed development and existing lane configurations.

In addition to the build-out year analyses, horizon year analyses were completed for TDOT reference only and are detailed in Appendix G.

The study network analyzed in this study consists of the intersections listed in Table 1. For the purposes of this traffic impact study, the roadways within the study network are assumed to have the following orientations listed in Table 2. The study area and project site are shown in Figure 1. A site plan for the proposed development is included in Appendix A.

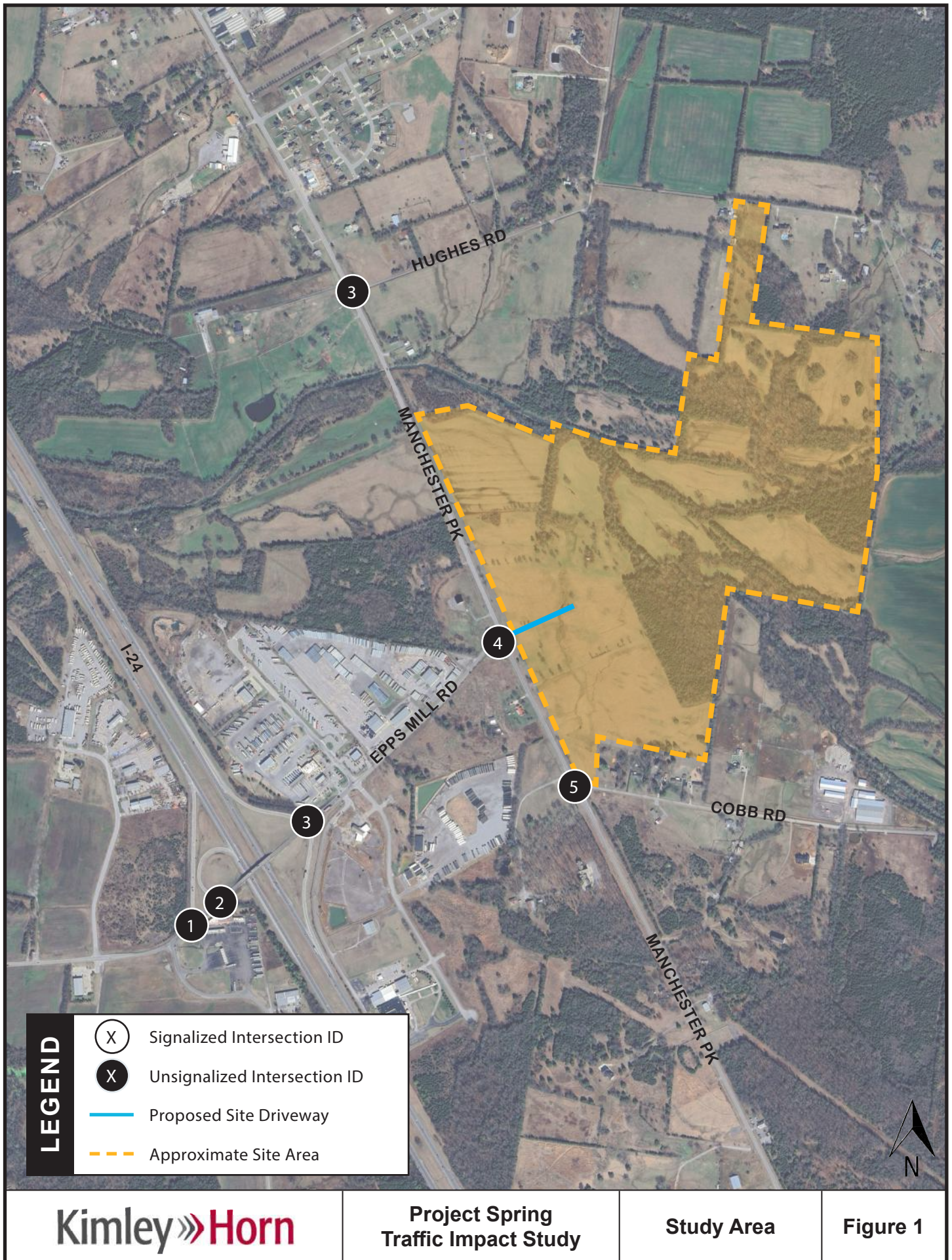
Table 1: Study Intersections

#	Intersection	Existing Control
1	Epps Mill Road at I-24 EB Off-Ramp	TWSC
2	Epps Mill Road at I-24 EB On-Ramp	TWSC
3	Epps Mill Road at I-24 WB On/Off-Ramp	TWSC
4	Manchester Pike at Cobb Road	TWSC
5	Manchester Pike at Epps Mill Road	TWSC
6	Manchester Pike at Hughes Road	TWSC

¹TWSC – Two Way Stop Control

Table 2: Roadway Orientations

Roadway	Orientation
Epps Mill Road	East-West
Manchester Pike	North-South
I-24 Ramps	North-South
Cobb Road	East-West
Hughes Road	East-West
Delbridge Road	East-West



3.0 METHODOLOGY

3.1 SCOPING MEETING

The scope of this study was determined via in person meeting with Rutherford County on 11/12/2024. The final memorandum of understanding (MOU) incorporating assumptions and discussion from the meeting was finalized on 12/19/2024 and is included in Appendix H.

3.2 DATA COLLECTION

Volume peak hour turning movement counts (TMCs) were performed at each study intersection. The TMCs were collected from 7:00 AM - 9:00 AM for the AM peak period and 4:00 PM - 6:00 PM for the PM peak period, with the exception of Manchester Pike at Epps Mill Road (Intersection 5) which was collected from 6:00 AM – 6:00 PM.

3.3 TRIP GENERATION

Traffic for the proposed development was calculated using equations contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*, using equations where available. Internal capture (or mixed-use) reductions represent the concept that trips generated by individual land uses within a site may remain internal to the site. Mixed-use vehicle trip reductions are calculated using guidance from the *ITE Trip Generation Handbook, 3rd Edition*. Alternative modes of transportation include pedestrians, bicyclists, and transit users. Alternate mode reductions account for the notion that some site-generated trips will occur by a means other than automobile. A pass-by trip occurs when a proposed development diverts traffic that is already traveling on a street adjacent to the site. Pass-by reductions are calculated using guidance from the *(ITE) Trip Generation Manual, 11th Edition*.

3.4 CAPACITY ANALYSES

Level-of-service (LOS) determinations were made for the weekday AM and PM peak hours for the study network intersections using *Synchro, Version 12.0*. *Synchro* software uses methodologies contained in the *Highway Capacity Manual, 7th Edition* to determine the operating characteristics of an intersection. Capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a specified period under prevailing roadway, traffic, and control conditions.

LOS is used to describe the operating characteristics of a road segment or intersection in relation to its capacity. LOS is defined as a qualitative measure that describes operational conditions and motorists' perceptions of a traffic stream. The *Highway Capacity Manual* defines six levels of service, LOS A through LOS F, with A being the best and F the worst.

LOS for unsignalized intersections, with stop control on the minor street only, are reported for the side-street approaches and major street left-turns. Low levels-of-service for side street approaches are not uncommon, as vehicles may experience significant delay turning onto a major roadway.

LOS for signalized and all-way stop controlled (AWSC) intersections are reported for the intersection as a whole. One or more movements at an intersection may experience a low level-of-service, while the intersection as a whole may operate acceptably. The LOS criteria for signalized and unsignalized intersections is shown in Table 3.

Table 3: LOS Criteria for Intersections

LOS	Signalized Delay	Unsignalized Delay	Description
A	<10.0	<10.0	Operations with very low delay and most vehicles do not stop.
B	>10.0 and <20.0	>10.0 and <15.0	Operations with good progression but with some restricted movement.
C	>20.0 and <35.0	>15.0 and <25.0	Operations where a significant number of vehicles are stopping with some backup and light congestion.
D	>35.0 and <55.0	>25.0 and <35.0	Operations where congestion is noticeable, longer delays occur, and many vehicles stop. The proportion of vehicles not stopping declines
E	>55.0 and <80.0	>35.0 and <50.0	Operations where there is significant delay, extensive queuing, and poor progression.
F	>80.0	>50.0	Operations that is unacceptable to most drivers, when the arrival rates exceed the capacity of the intersection.

3.5 TURN LANE WARRANTS

TDOT HSAM Vol 3 Geometric Design Criteria was used to evaluate if turn lanes should be implemented along state routes at unsignalized site driveways. From the TDOT HSAM, the following methodologies were applied to perform these evaluations:

- Figure 3-17 ("Left-Turn Warrant Along Four-Lane Rural Roadways (Unsignalized)")
- Figure 3-18 ("Right-Turn Lane Warrant Along Four-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control")

Per the TDOT HSAM, "The volume-based warrants indicate situations where turn lanes would help to mitigate traffic conflicts, not necessarily situations where a turn lane is required or must be constructed. Turn lanes can have an adverse safety and operational effect for pedestrians and bicyclists. All existing and future users of the roadway should be considered when determining turn lane needs."

3.6 SIGNAL WARRANTS

Traffic signal warrant analyses were performed using the methodology provided in Chapter 4C of the *Manual on Uniform Traffic Control Devices (MUTCD)*, 2009 Edition published by the Federal Highway Administration (FHWA). The *MUTCD* provides the following standard, among others, regarding justification for traffic control signals: “The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.” (Source: *MUTCD 2009*, Section 4C.01, Paragraph 03)

According to the *MUTCD*, the investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Grade Crossing

Warrant 1 (Eight Hour Vehicular Volume) Condition 1A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. Warrant 1 Condition 1B is intended for application where Condition 1A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. If both Condition 1A and Condition 1B are 80% satisfied, Warrant 1C would be satisfied.

Warrant 2 (Four Hour Vehicular Volume) is intended to be applied at locations where the volume of intersecting traffic is the principal reason to consider installing a traffic signal.

Warrant 3 (Peak Hour) is intended for use at locations where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Warrant 4 (Pedestrian Volume) is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

3.7 SIGHT DISTANCE

Intersection sight distance measurements and calculations were performed using methodology provided in *A Policy on Geometric Design of Highways and Streets, 7th Edition (2018)*, published by the American Association of State Highways and Transportation Officials (AASHTO).

4.0 EXISTING CONDITIONS

4.1 VEHICULAR NETWORK

Characteristics for the roadways within the study are summarized in Table 4. The existing road geometry is illustrated in Figure 3.

Table 4: Roadway Network

Roadway	Lanes	Posted Speed	Classification	AADT
Epps Mill Road	2	30	Major Collector	3,543
Manchester Pike	2	55	Minor Arterial	5,386
Cobb Road	2	40	Local	N/A
Hughes Road	2	30*	Local	N/A
Miller Road	2	30	Local	N/A

**Not Posted - Assumed Speed*

4.2 VEHICULAR VOLUMES

Vehicle peak hour turning movement counts (TMCs) were performed at each study intersection. Peak hours for the study intersections are shown in Table 5. The existing intersection geometry is shown in Figure 2. The existing peak hour traffic volumes are shown in Figure 3. The complete traffic count data is provided in Appendix B.

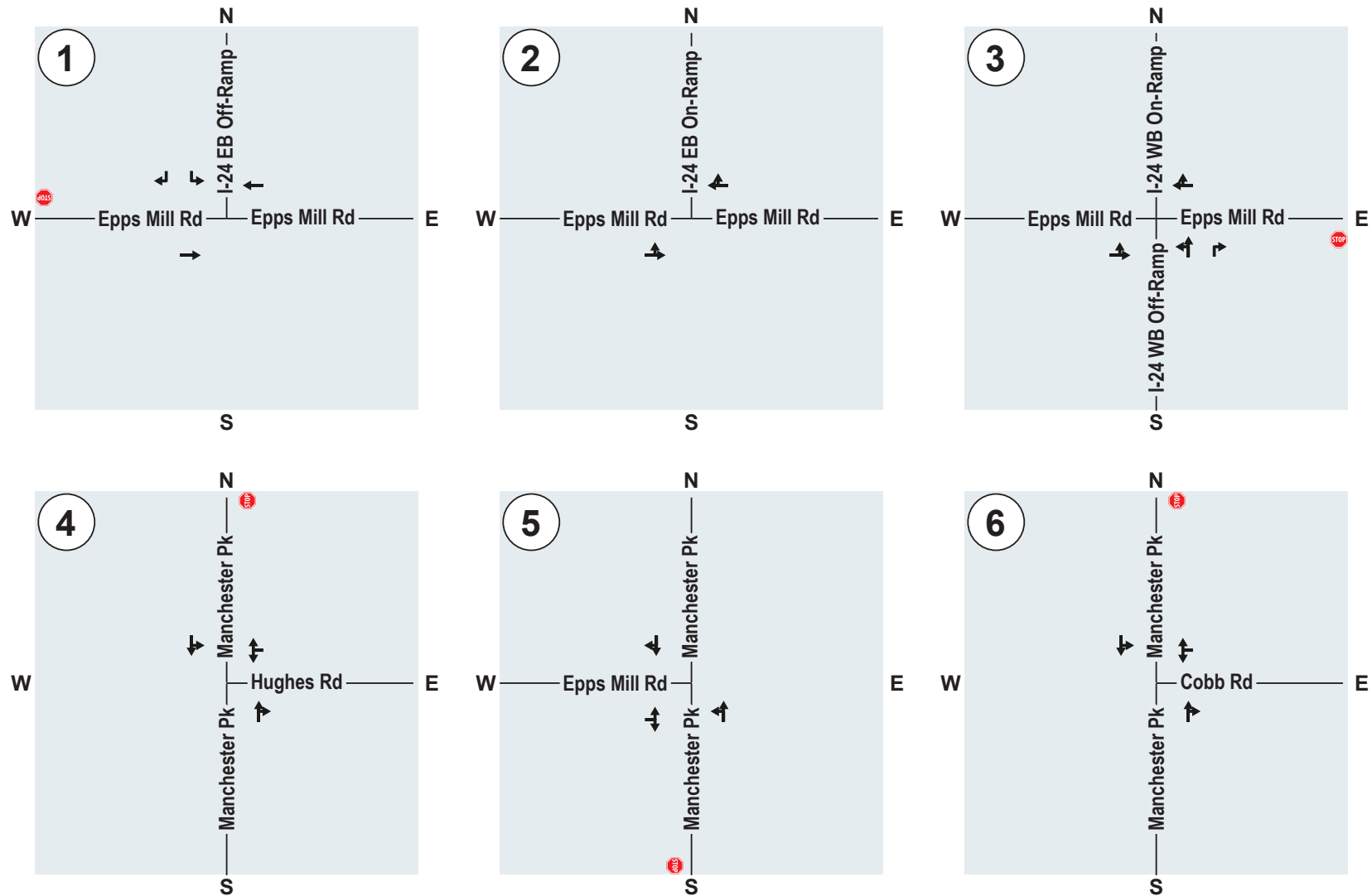
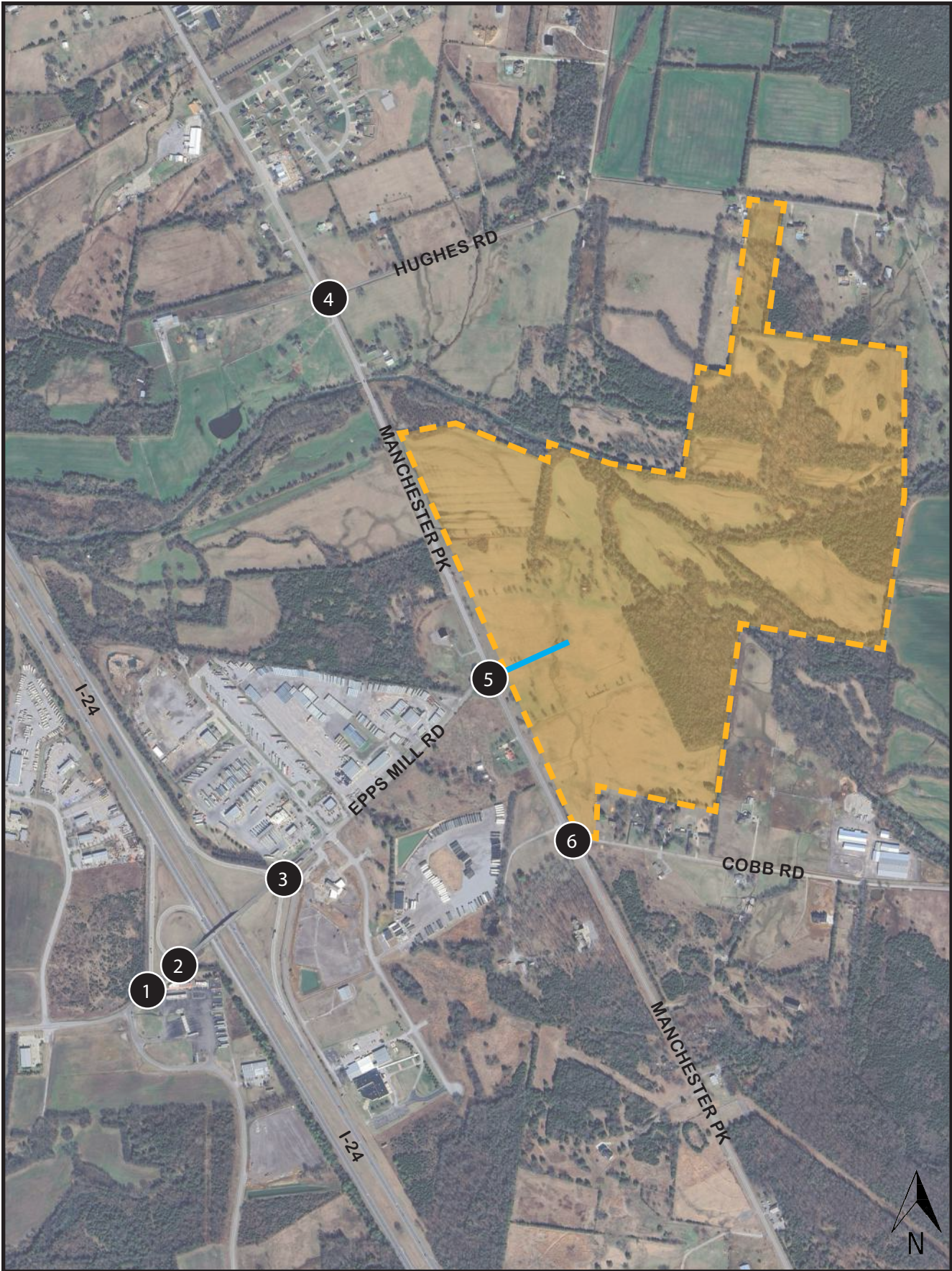
Table 5: Intersection Peak Hours

#	Intersection	Date Collected	AM	PM
1	Epps Mill Road at I-24 EB Off-Ramp	11/21/2024	7:00 – 8:00	4:15 – 5:15
2	Epps Mill Road at I-24 EB On-Ramp	11/21/2024	7:00 – 8:00	4:15 – 5:15
3	Epps Mill Road at I-24 NB On/Off-Ramp	11/21/2024	7:00 – 8:00	4:15 – 5:15
4	Manchester Pike at Cobb Road	11/21/2024	7:00 – 8:00	4:00 – 5:00
5	Manchester Pike at Epps Mill Road	11/21/2024	7:00 – 8:00	4:15 – 5:15
6	Manchester Pike at Hughes Road	11/21/2024	7:00 – 8:00	4:15 – 5:15

In addition to the TMCs, 24-hour average daily traffic (ADT) counts were also collected and are summarized in Table 6 below.

Table 6: ADT Counts

#	Roadway	Location	NB/EB	SB/WB	85th Speed
1	TN-2 Manchester Pike	North of Epps Mill Rd	1,892	1,693	60



LEGEND

X

Signalized Intersection ID

X

Unsignalized Intersection ID

STOP

Existing Stop Sign

→

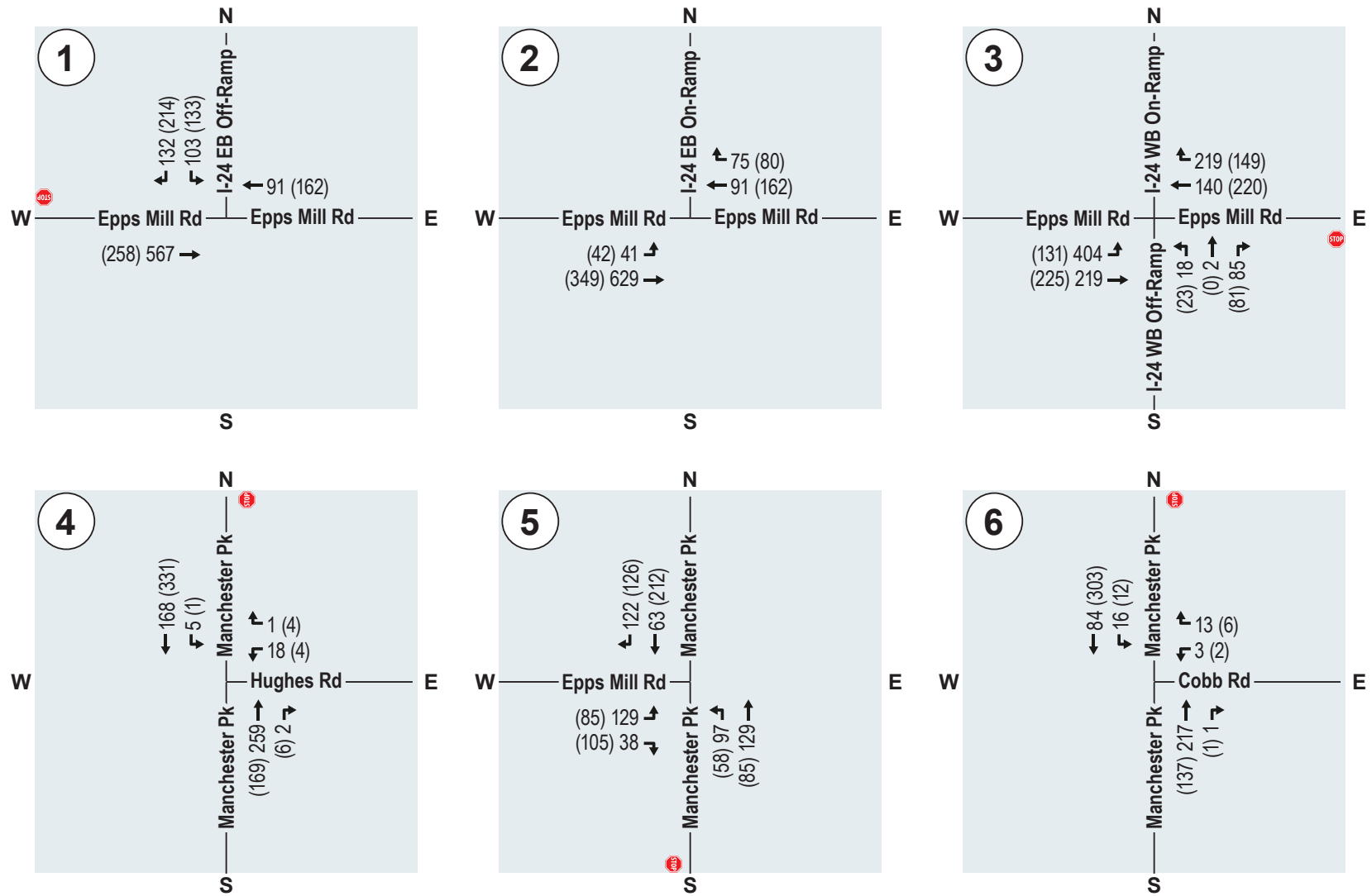
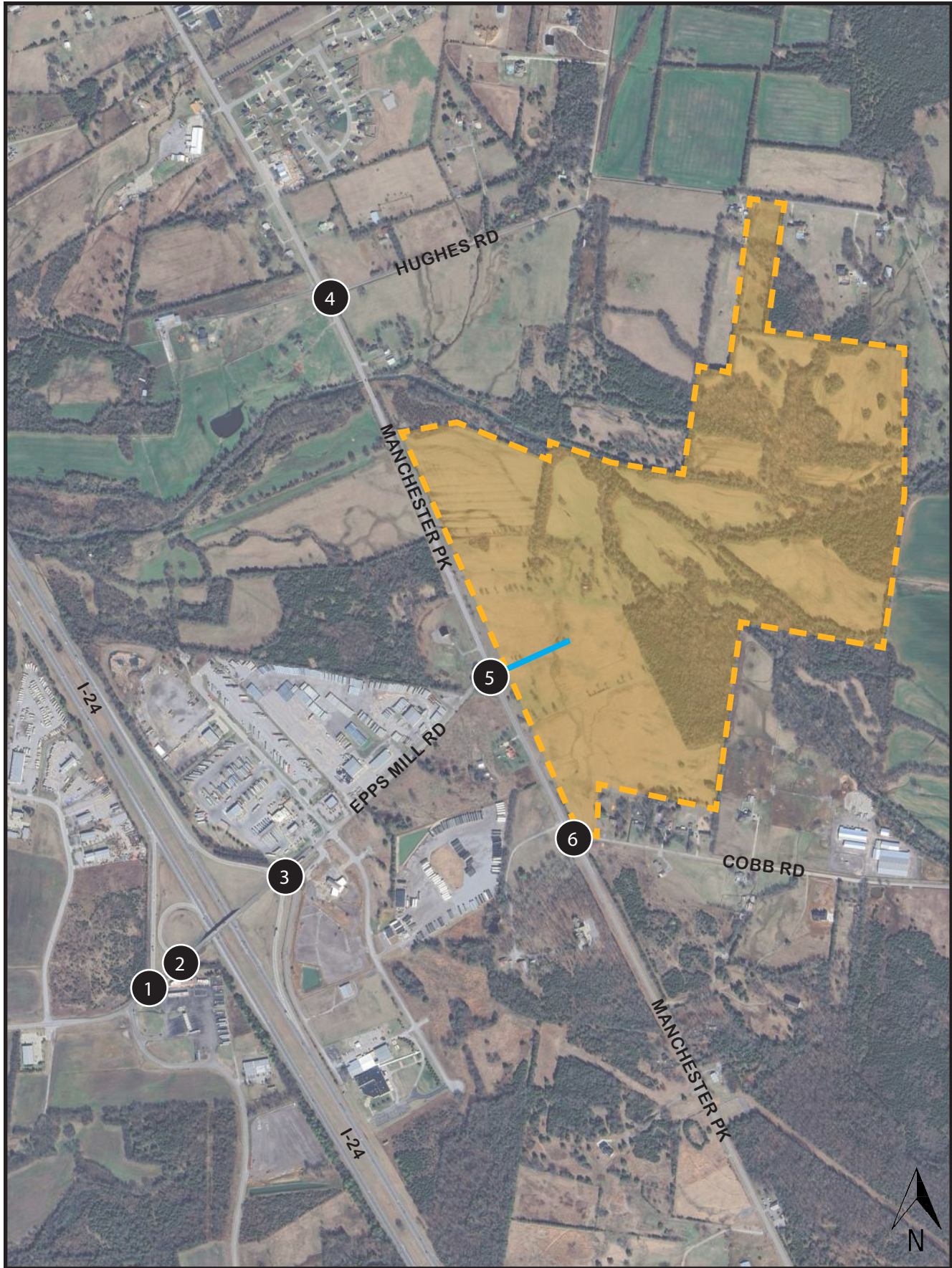
Existing Lane Configuration

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Existing Intersection Geometry

Figure 2



LEGEND		Signalized Intersection ID		Existing Stop Sign	XX	AM Peak Hour Traffic Volumes
		Unsignalized Intersection ID			[XX]	PM Peak Hour Traffic Volumes
		Turning Movement				

5.0 NO-BUILD CONDITIONS

5.1 NO-BUILD VOLUMES

Background traffic is defined as expected traffic on the roadway in future year(s) absent the construction and opening of the proposed project. Background traffic can include a base growth rate based on historical count data as well as population growth data and estimates.

To account for background traffic, the existing traffic volumes were increased by 4.00% per year to account for the expected background growth through the build-out year. The No-Build without TDOT scenario volumes are shown in Figure 5, and use existing lane configurations.

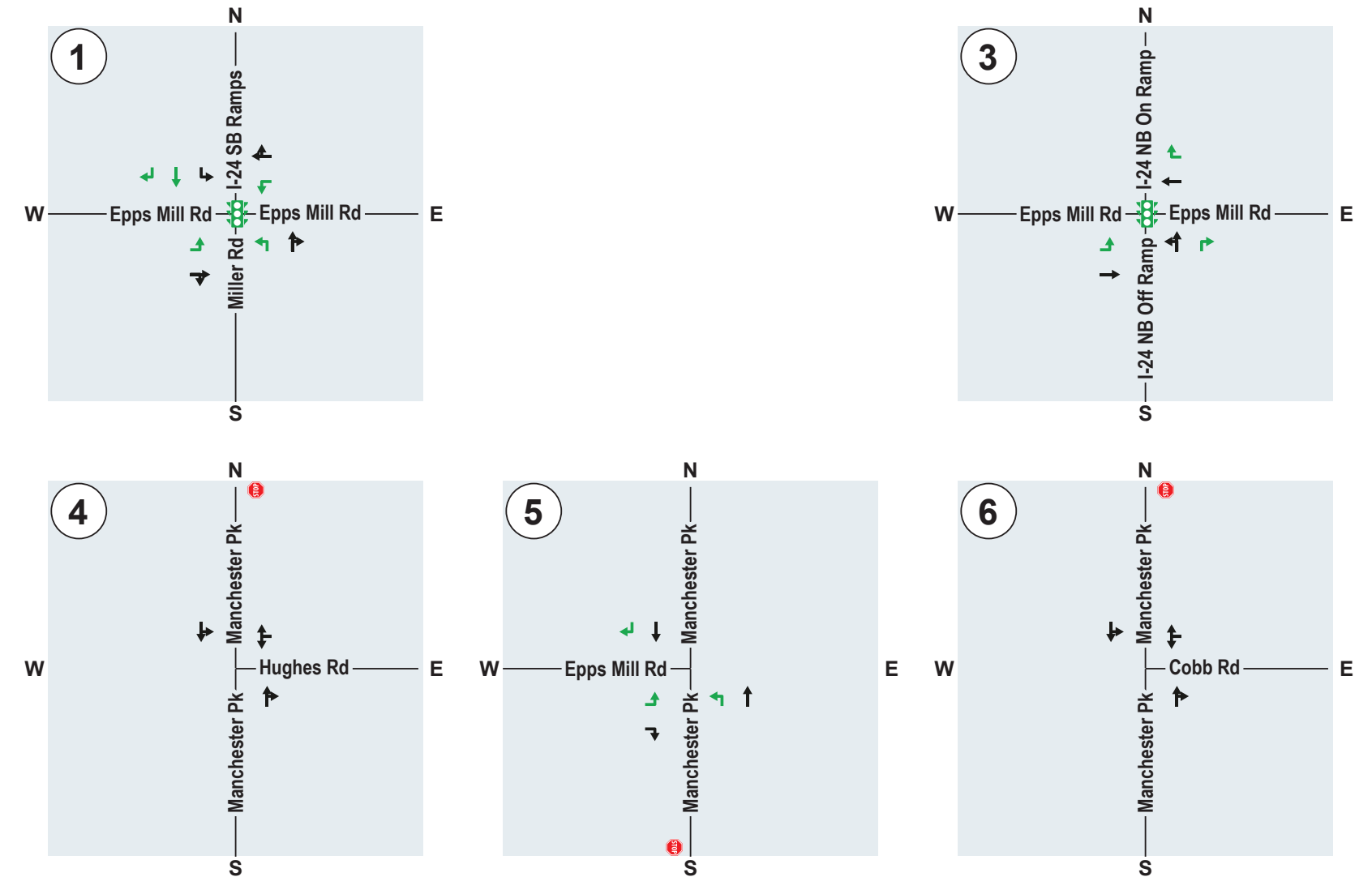
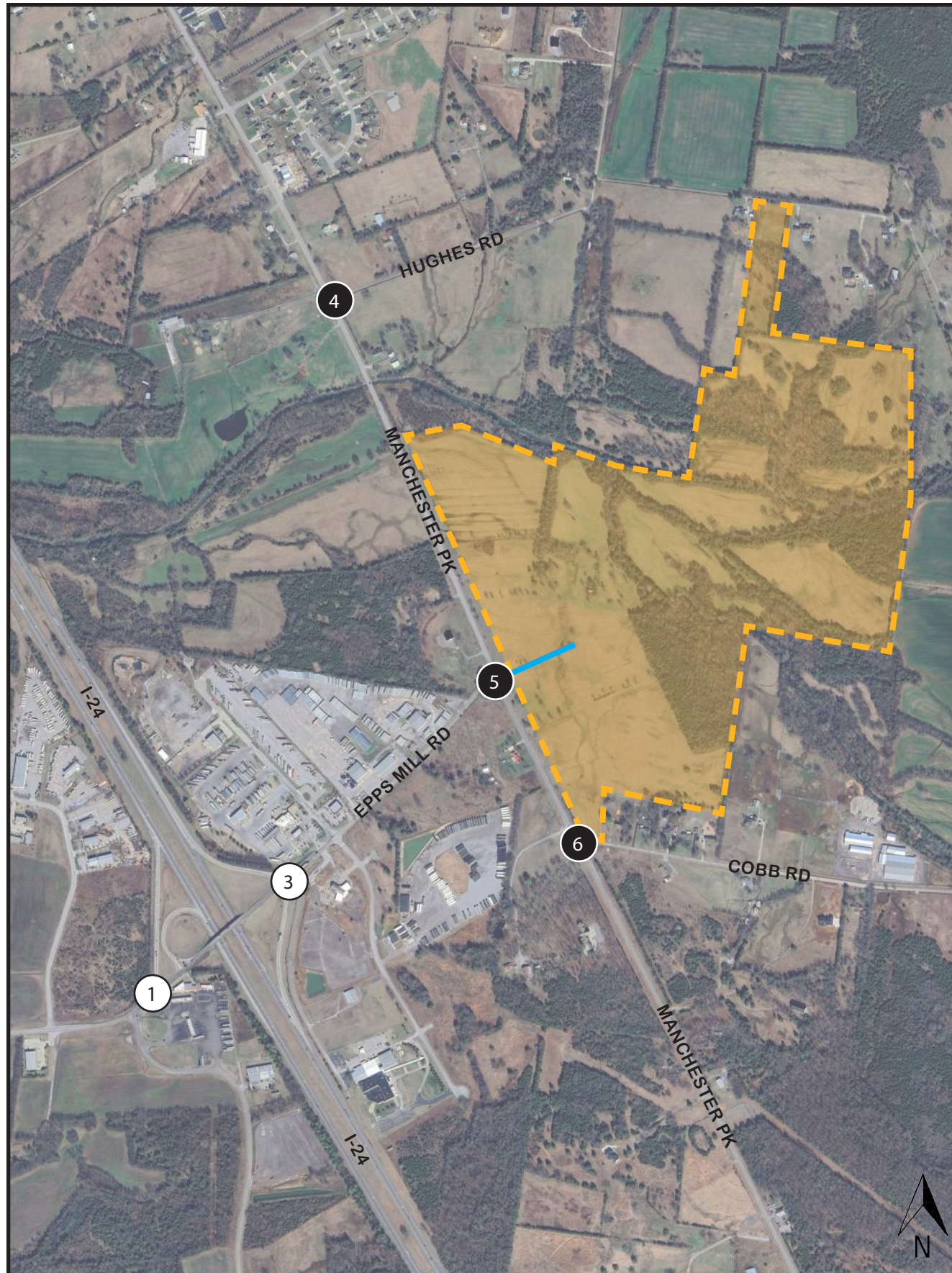
5.2 FUTURE TRANSPORTATION INFRASTRUCTURE IMPROVEMENTS

The improvements listed in Table 7 were incorporated into the capacity analyses for the No-Build with TDOT scenarios. Figure 4 provides a visual representation of how each improvement will impact the study intersections and the lane configuration evaluated for the No-Build with TDOT scenarios.

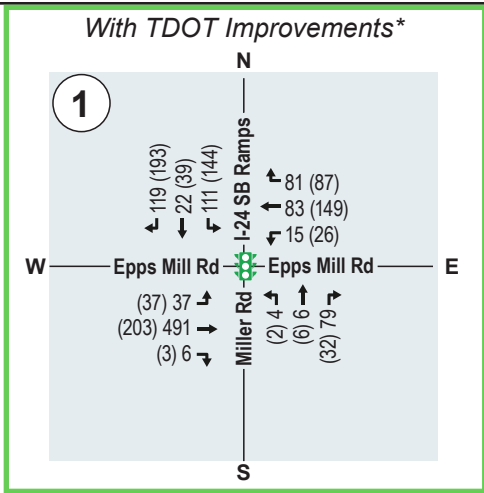
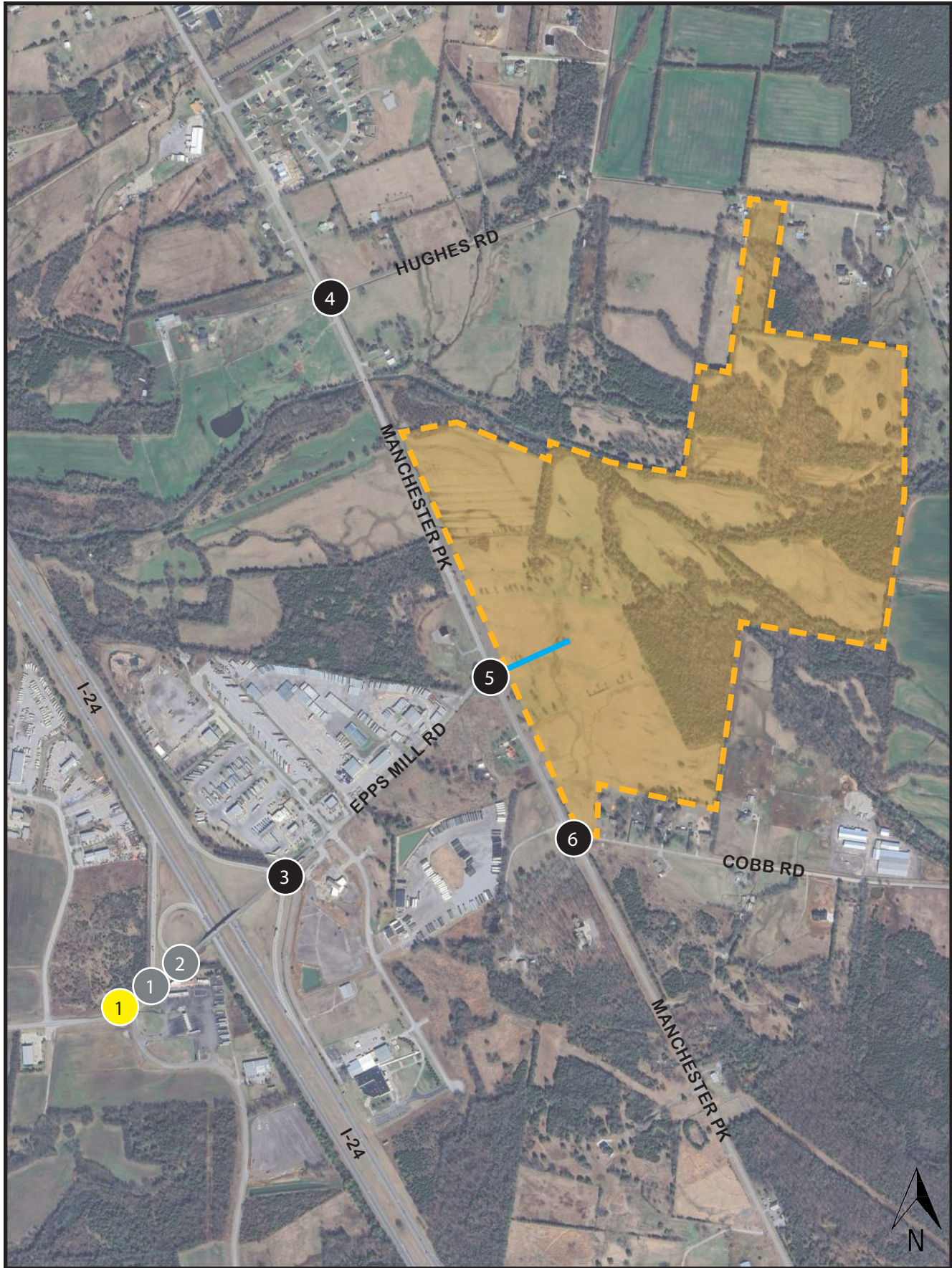
Table 7: Background Improvements

#	Intersection	Improvement	Sponsor	Build Year
1/2	Epps Mill Road at I-24 SB On/Off-Ramp	Ramp realignment with Miller Road. Installation of a traffic signal. Provide additional NBL, SBT, SBR, EBL, and WBL lanes.	TDOT	2026
3	Epps Mill Road at I-24 NB On/Off-Ramp	Installation of a traffic signal. Provide additional NBR, EBL, and WBR lanes.	TDOT	2026
5	Manchester Pike at Epps Mill Road	Provide additional NBL, SBR, and EBL lanes.	TDOT	2026

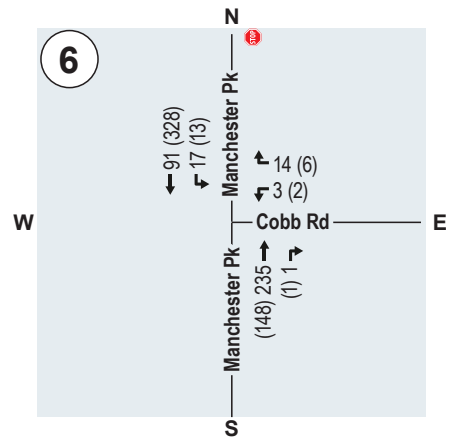
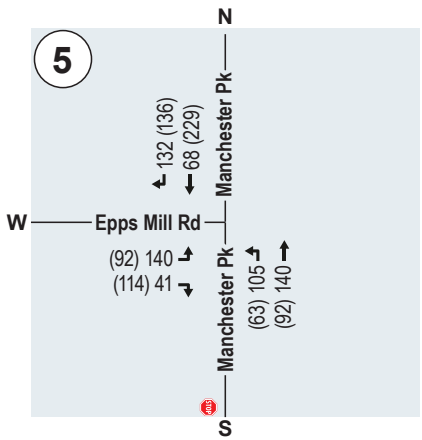
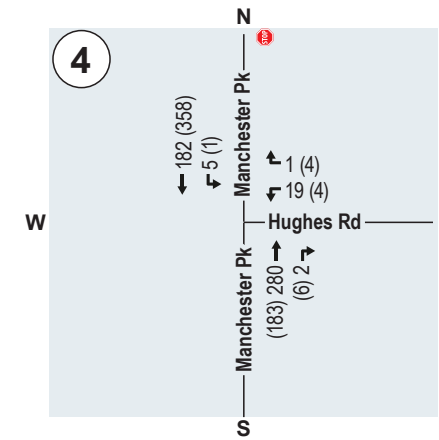
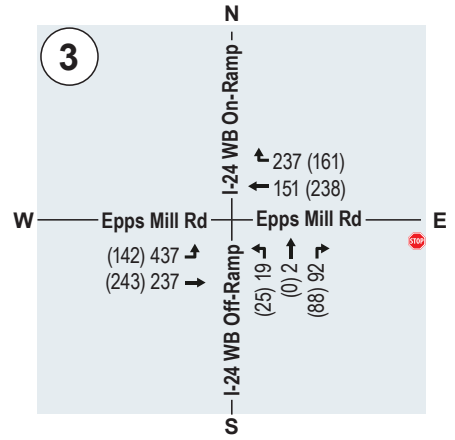
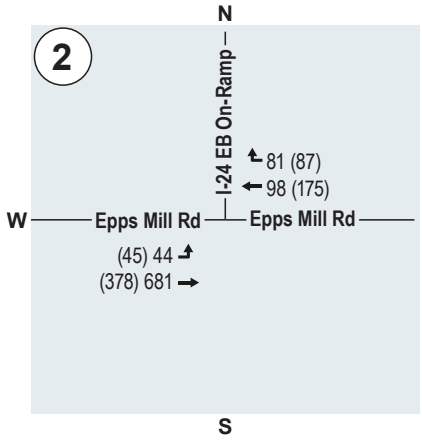
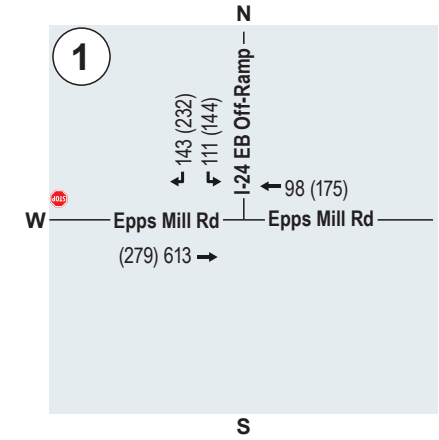
The improvements listed above include the combination of the intersection of Epps Mill Road at I-24 SB Off-Ramp (Intersection 1) and the intersection of Epps Mill Road at I-24 EB On-Ramp (Intersection 2) into one intersection that is aligned with Miller Road. Traffic counts were not collected at the intersection of Epps Mill Road and Miller Road. Data from Replica and the TDOT count station 75000110 were used to redistribute volumes at the new intersection of Epps Mill Road at Miller Road and I-24 SB Ramps. More information regarding these realignment calculations can be found in Appendix C.



LEGEND			
(X)	Signalized Intersection ID		No-Build Traffic Signal
(X)	Unsignalized Intersection ID		Existing Stop Sign
			Existing Lane Configuration
			No-Build Lane Configuration



*Intersections 1 and 2 are combined in the TDOT improvements scenario.



LEGEND	Unsignalized Intersection ID	No-Build Traffic Signal	XX AM Peak Hour Traffic Volumes
	Removed Intersection ID	Existing Stop Sign	[XX] PM Peak Hour Traffic Volumes
	Realigned (with TDOT) Intersection ID	Proposed Stop Sign	→ Turning Movement

6.0 BUILD CONDITIONS

6.1 SITE ACCESS

A brief description of each site access point is listed in Table 8.

Table 8: Site Access Details

#	Intersection	Control/Movement	Location
5	Manchester Pike at Epps Mill Road/Site Driveway A	TWSC	Aligned with Epps Mill Road

Intersection sight distance for vehicles exiting the site meets minimum requirements and is shown visually in Appendix A.

6.2 PROJECT TRAFFIC

6.2.1 PROJECT TRIPS

Trip generation for the proposed development was calculated based on the methodology outlined in Section 3.3.

Due to the location and proposed land uses, the trip generation was performed with no reductions to gross trips.

Table 9 summarizes the project trip generation. A detailed trip generation worksheet for the proposed development is provided in Appendix C.

6.2.2 TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution and assignment of new project trips was based on a review of land uses and population densities in the area as well as the existing peak hour turning movement counts.

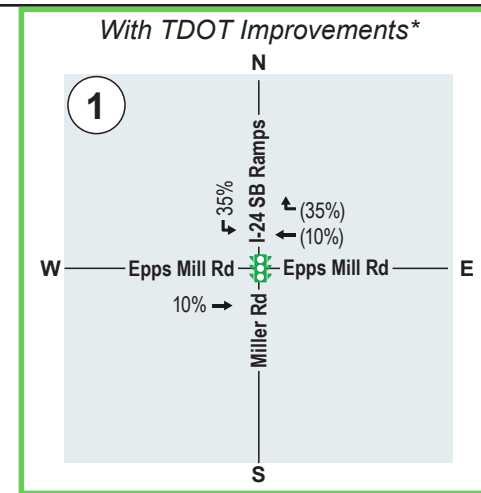
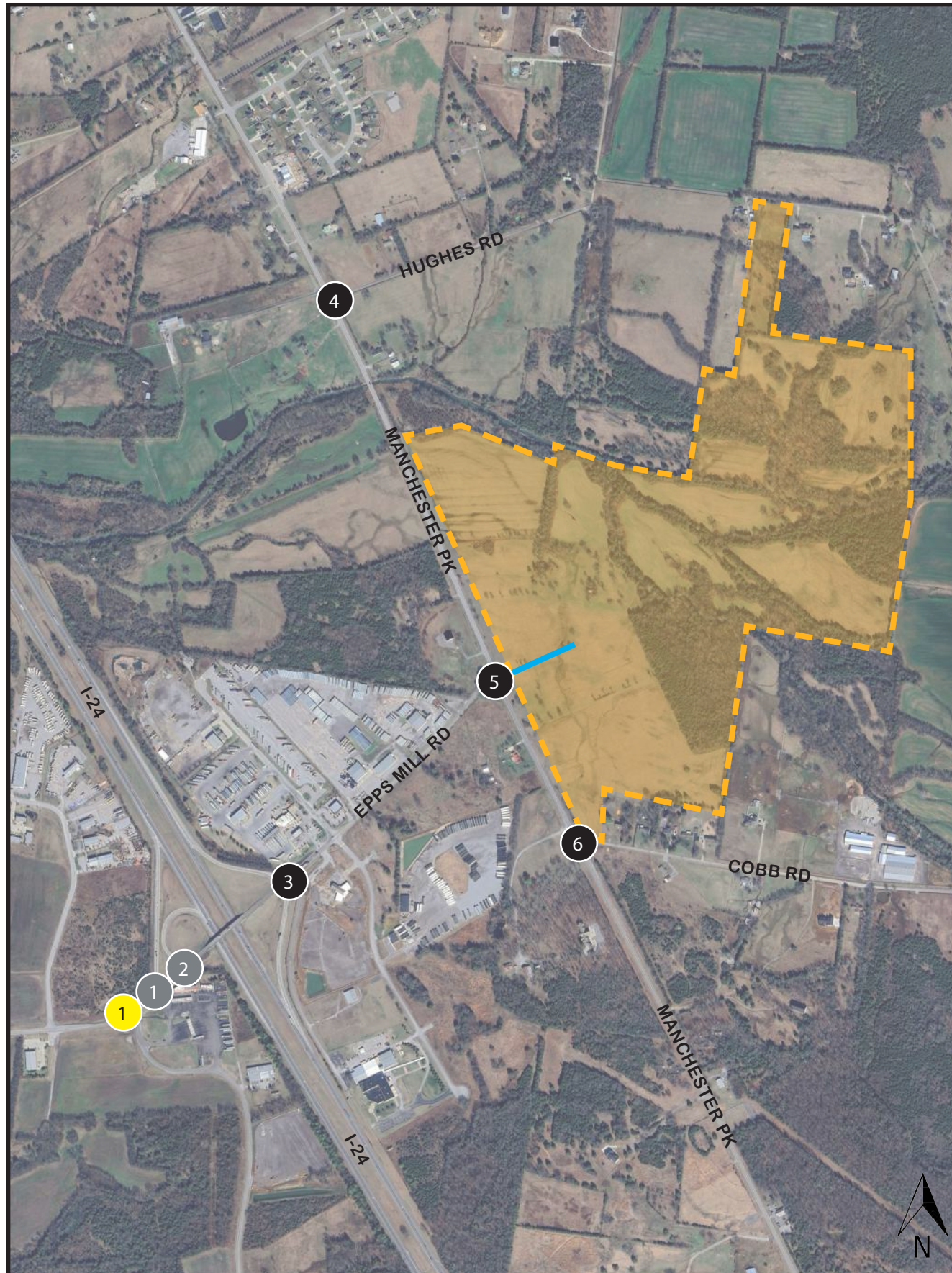
Figure 6 provides the directional distribution and assignment of new project trips. Figure 7 illustrates the assignment of project trips to the study network. The projected build peak hour volumes are shown in Figure 8.

Intersection volume worksheets for all intersections and driveways within the study network are provided in Appendix C.

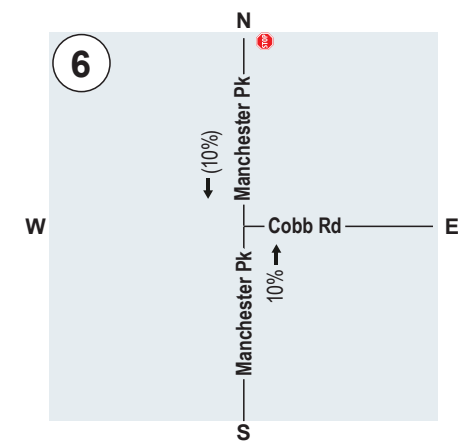
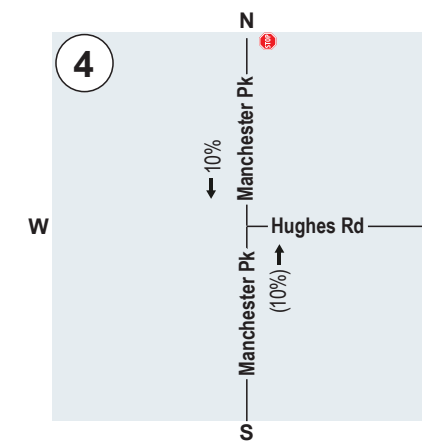
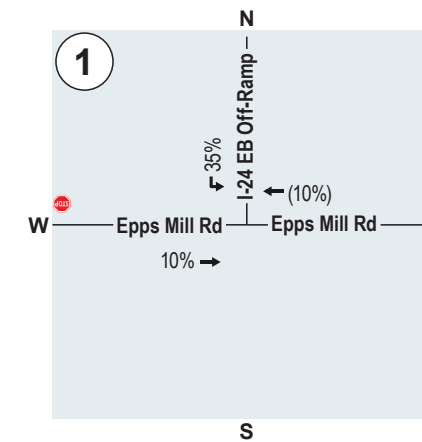
Table 9: Trip Generation

Proposed Trip Generation - Project Spring													
ITE Code	Land Use	Setting/Location	Density	Daily			AM Peak Hour			PM Peak Hour			
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	
140	Manufacturing Warehouse	General Urban/Suburban	262,000	s.f.	1,190	595	595	169	128	41	210	65	145
GROSS PROPOSED TRIPS					1,190	595	595	169	128	41	210	65	145

Notes:

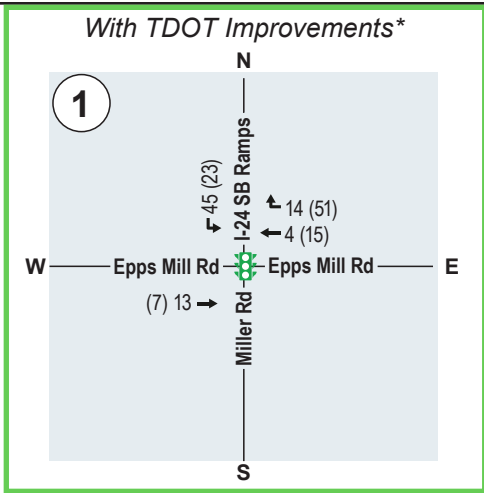
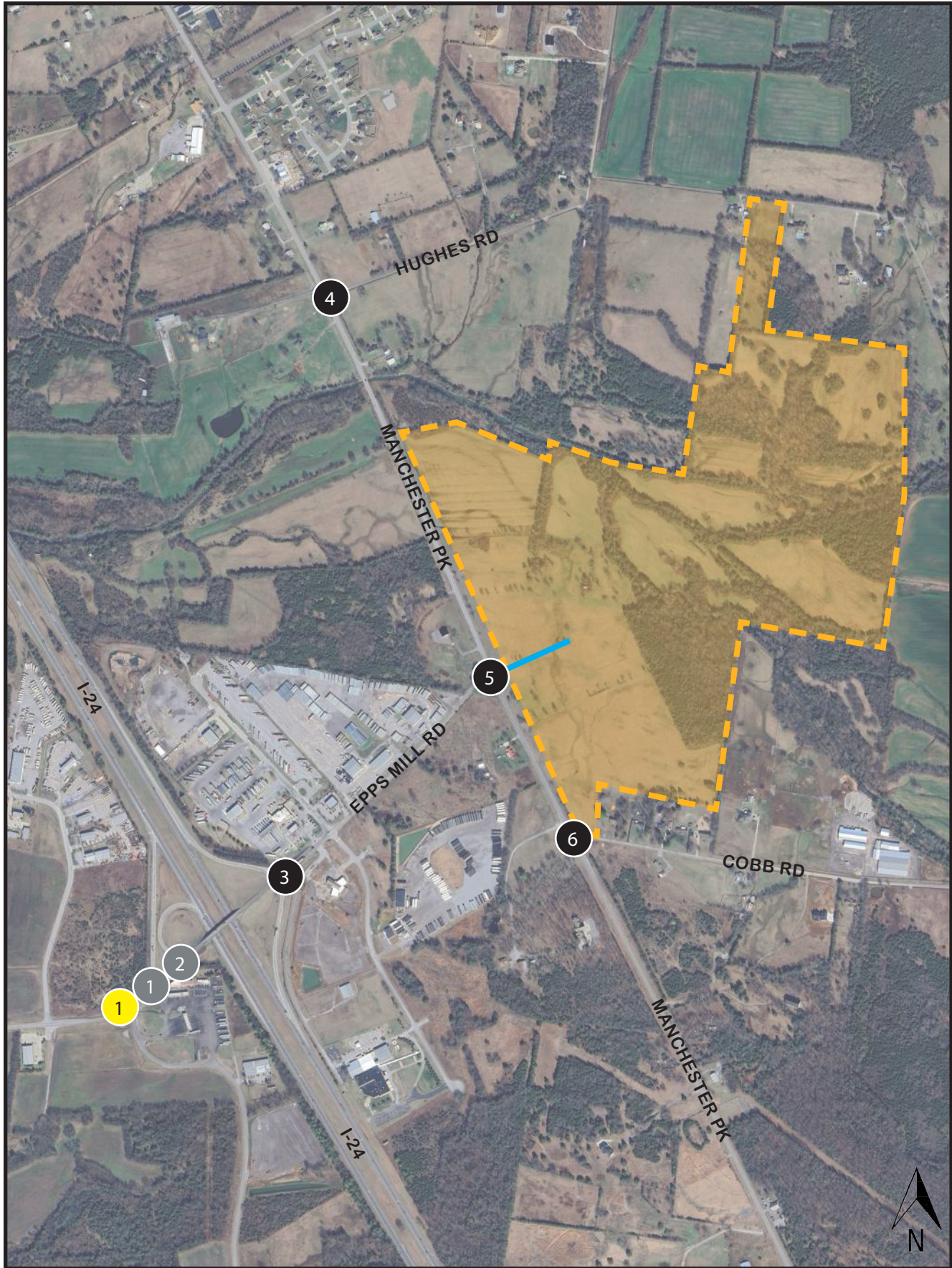


*Intersections 1 and 2 are combined in the TDOT improvements scenario.

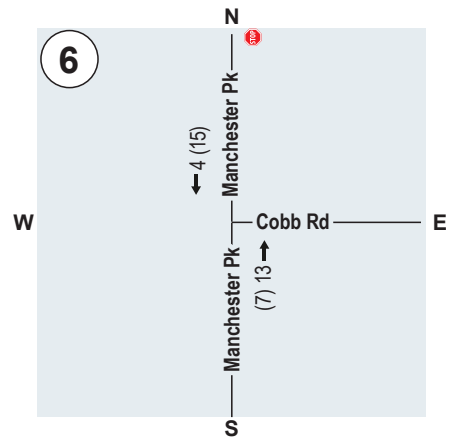
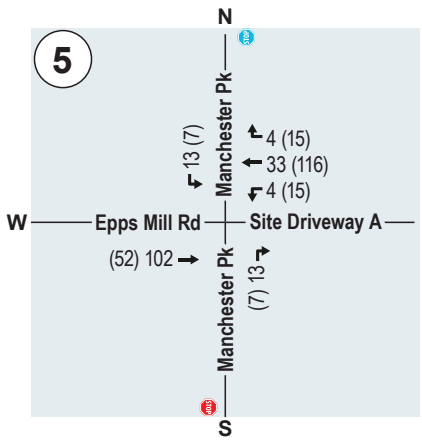
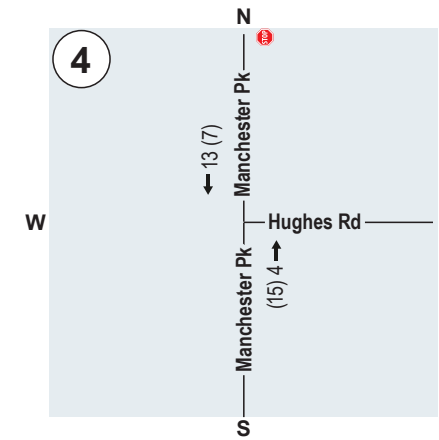
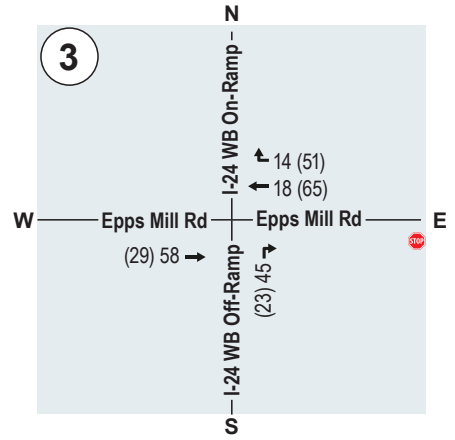
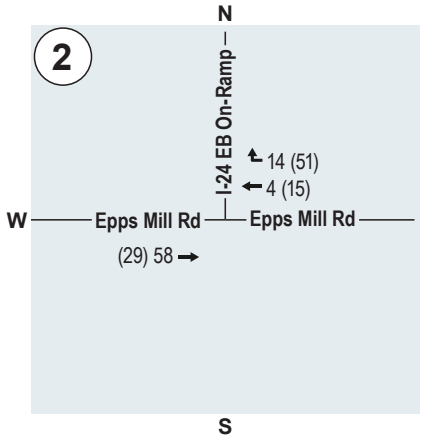
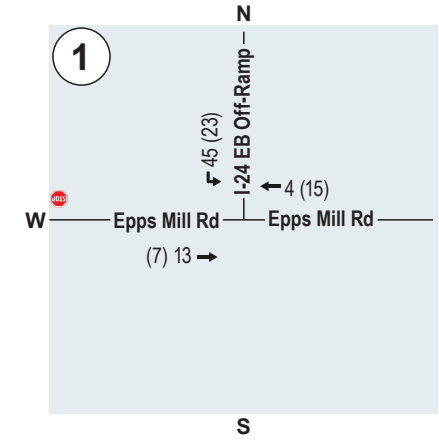


LEGEND

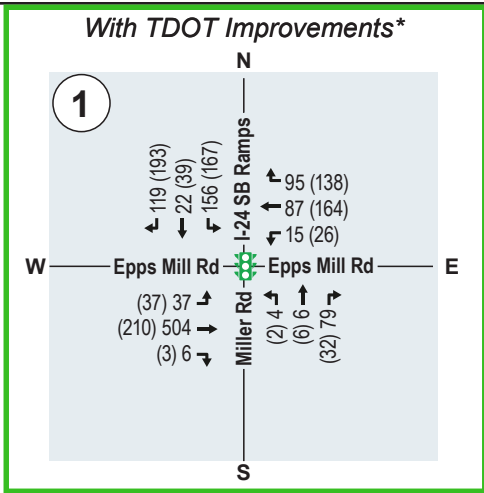
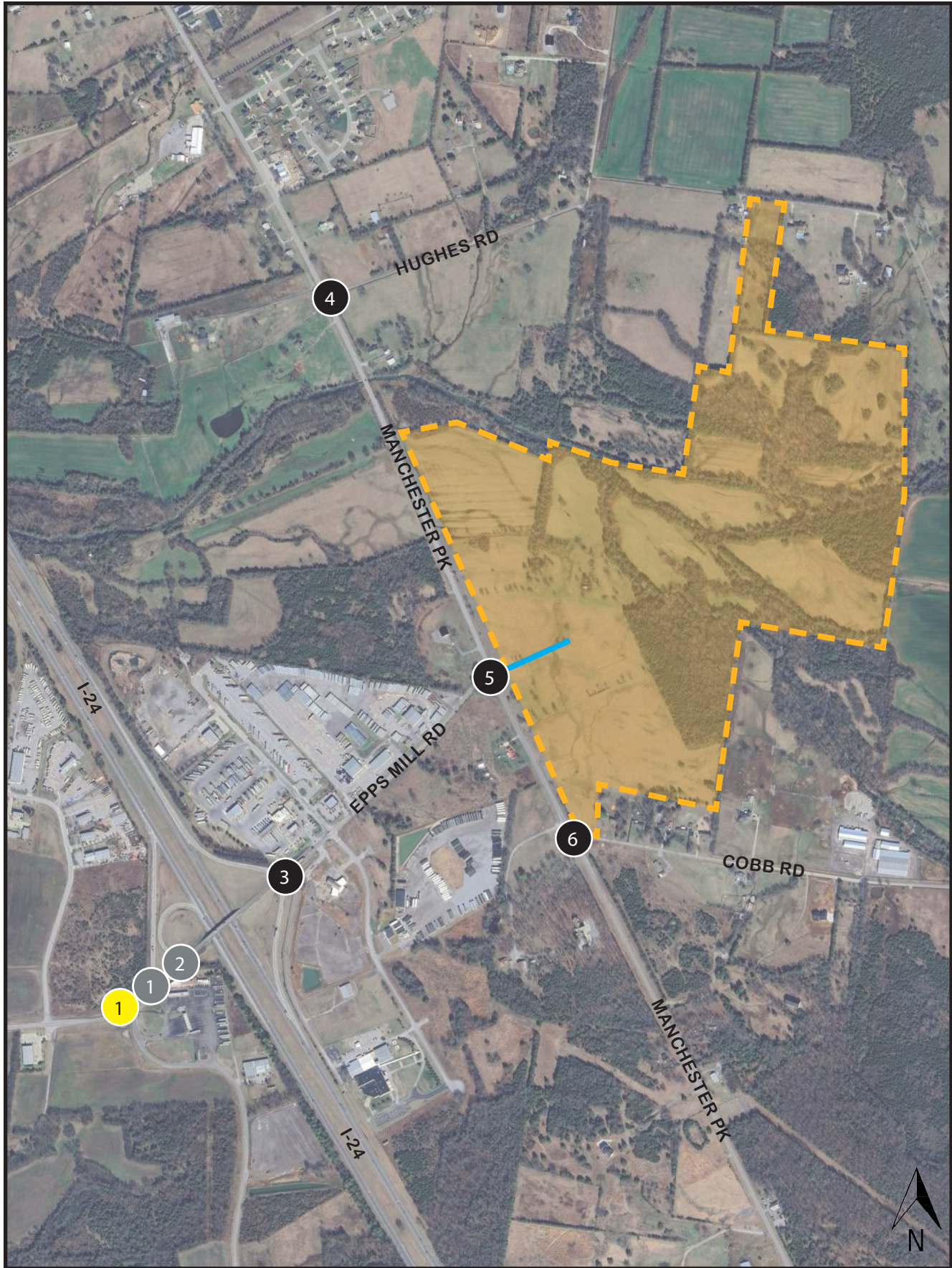
- | | | | | | |
|---|---------------------------------------|--|-------------------------|------|------------------------------|
| ⓧ | Unsignalized Intersection ID | | No-Build Traffic Signal | XX | AM Peak Hour Traffic Volumes |
| ⓧ | Removed Intersection ID | | Existing Stop Sign | [XX] | PM Peak Hour Traffic Volumes |
| ⓧ | Realigned (with TDOT) Intersection ID | | Proposed Stop Sign | → | Turning Movement |



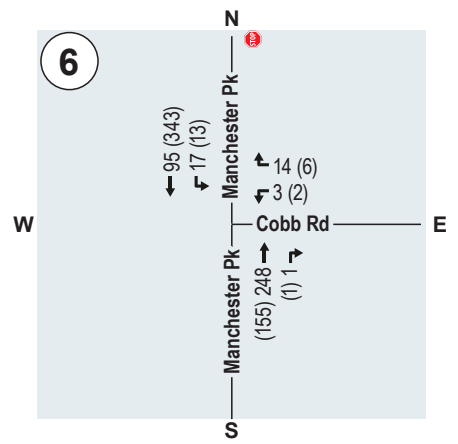
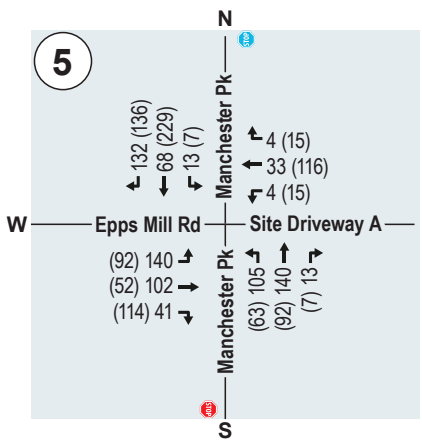
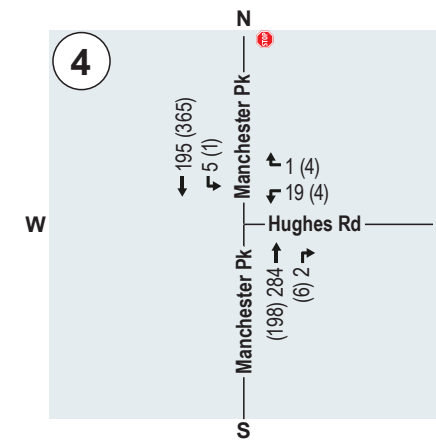
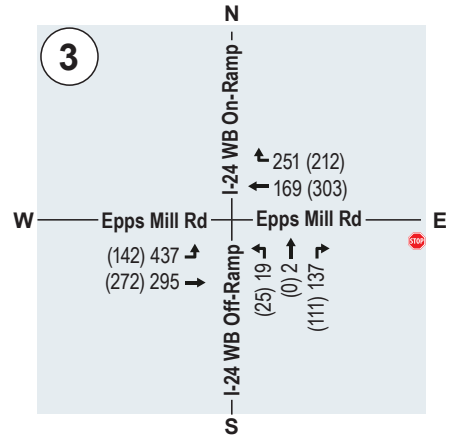
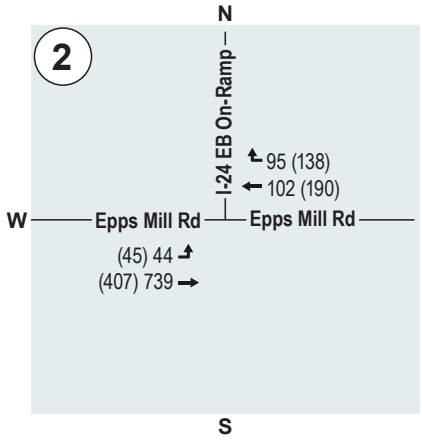
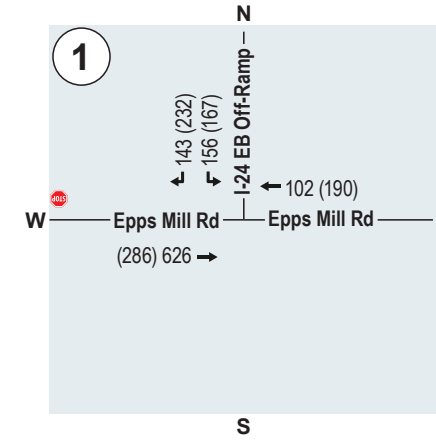
*Intersections 1 and 2 are combined in the TDOT improvements scenario.



LEGEND	Unsignalized Intersection ID	No-Build Traffic Signal	XX	AM Peak Hour Traffic Volumes
	Removed Intersection ID	Existing Stop Sign	[XX]	PM Peak Hour Traffic Volumes
	Realigned (with TDOT) Intersection ID	Proposed Stop Sign	→	Turning Movement



*Intersections 1 and 2 are combined in the TDOT improvements scenario.



LEGEND	Unsignalized Intersection ID	No-Build Traffic Signal	XX	AM Peak Hour Traffic Volumes
	Removed Intersection ID	Existing Stop Sign	[XX]	PM Peak Hour Traffic Volumes
	Realigned (with TDOT) Intersection ID	Proposed Stop Sign	→	Turning Movement

6.3 TURN LANE EVALUATION

The turn lane evaluations were calculated based on the methodology outlined in Section 3.5. The results of the turn lane warrants are summarized in Table 10. Detailed turn lane calculations are provided in Appendix E.

Table 10: Turn Lane Warrants

#	Intersection	Movement	Scenario	AM	PM
5	Manchester Pike at Epps Mill Road/Site Driveway A	NBR	Build	No	No
		SBL	Build	Yes	Yes

Based on the turn lane evaluation, a northbound right-turn lane is not warranted at the intersection of Manchester Pike at Epps Mill Road/Site Driveway (Intersection 5) during the AM and PM peak hour under Build conditions. A southbound left-turn lane is warranted at the intersection of Manchester Pike at Epps Mill Road/Site Driveway (Intersection 5) during the AM and PM peak hour under Build conditions.

6.4 TRAFFIC SIGNAL EVALUATION

The traffic signal evaluations were calculated based on methodology outlined in Section 3.6. The results of the signal warrants are summarized in Table 11. Detailed signal warrant calculations are provided in Appendix F.

Table 11: Signal Warrants

#	Intersection	1A	1B	1C	2	3B
5	Manchester Pike at Epps Mill Road/Site Driveway A	6 / 8	0 / 8	0 / 8	4 / 4	0 / 1

Based on the traffic signal evaluation, a signal is warranted at the intersection of Manchester Pike at Epps Mill Road/Site Driveway (Intersection 5) under the Build conditions. It should be noted that while a signal is warranted, the intersection still operates acceptably without a signal during the AM and PM peak hours of the Build conditions, discussed further in Section 7.0.

7.0 CAPACITY ANALYSIS

The capacity analyses were calculated based on methodology outlined in Section 3.4. The results of the capacity analyses are summarized in Table 12 through Table 19. Detailed capacity reports are provided in Appendix D.

The results of the existing Epps Mill Road alignment analysis shows that all study intersections currently operate at an acceptable overall LOS during the AM and PM peak hours. Under the projected No-Build and Build conditions, all study intersections are projected to continue to operate at an acceptable overall LOS during the AM and PM peak hours, with the exception of Epps Mill Road at I-24 NB On/Off-Ramp (Intersection 3) in the AM peak hour.

Based on the signal warrant analysis conducted in Section 6.4, an improved scenario was conducted for the existing Epps Mill Road Alignment. The addition of a signal at the intersection of Manchester Pike at Epps Mill Road/Site Driveway is projected operate at an acceptable overall LOS during the AM and PM peak hours.

The results of the future TDOT realignment of Epps Mill Road analysis include the following improvements:

- Intersection 1/2 – Epps Mill Road at I-24 EB On/Off-Ramp/Miller Road
 - Ramp realignment with Miller Road.
 - Installation of a traffic signal.
 - Provide additional NBL, SBT, SBR, EBL, and WBL lanes.
- Intersection 3 – Epps Mill Road at I-24 WB On/Off-Ramp
 - Installation of a traffic signal.
 - Provide additional NBR, EBL, and WBR lanes.
- Intersection 5 – Manchester Pike at Epps Mill Road
 - Provide additional NBL, SBR, and EBL lanes.

The results of the future TDOT Epps Mill Road alignment analysis shows that under the projected No-Build and Build conditions, all study intersections are projected to continue to operate at an acceptable overall LOS during the AM and PM peak hours.

With the future TDOT improvements, the addition of a signal at the intersection of Manchester Pike at Epps Mill Road/Site Driveway is projected operate at an acceptable overall LOS during the AM and PM peak hours.

The Build lane configuration with the existing alignment is shown in Figure 9. The Build lane configuration with TDOT improvements is shown in Figure 10.

Coordinate the timing of the signal installation with Rutherford County and TDOT to determine if installation should occur before or after the Epps Mill Road realignment.

Table 12: LOS Summary - Without TDOT Improvements

#	Name	Movement	Existing AM		Existing PM		No-Build AM		No-Build PM		Build AM		Build PM	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Epps Mill Road & I-24 EB Off-Ramp	SB	B	13.6	B	12.6	B	14.7	B	13.3	C	18.5	B	14.3
2	Epps Mill Road & I-24 EB On-Ramp	EBL	A	7.5	A	7.7	A	7.5	A	7.8	A	7.5	A	7.8
		SB	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
3	I-24 WB Off-Ramp/I-24 WB On-Ramp & Epps Mill Road	EBL	B	10.7	A	8.9	B	11.4	A	9.1	B	11.8	A	9.8
		NB	C	24.0	B	12.5	D	33.1	B	13.2	E	36.4	B	14.1
4	Manchester Pike & Hughes Road	SBL	A	8.1	A	7.6	A	8.2	A	7.6	A	8.2	A	7.7
		WB	B	12.2	B	11.3	B	12.6	B	11.6	B	12.9	B	11.8
5	Manchester Pike & Epps Mill Road/Site Driveway A	NBL	A	7.9	A	8.3	A	8.0	A	8.5	A	8.0	A	8.5
		SBL	--	--	--	--	--	--	--	--	--	--	--	--
		EB	C	16.2	B	14.2	C	18.1	C	15.4	D	33.5	C	20.9
		WB	--	--	--	--	--	--	--	--	B	14.6	C	16.3
6	Manchester Pike & Cobb Road	SBL	A	7.8	A	7.6	A	7.8	A	7.6	A	7.9	A	7.6
		WB	B	10.3	B	10.1	B	10.5	B	10.2	B	10.6	B	10.3

Table 13: LOS Summary - Without TDOT Improvements

#	Name	Movement	Existing AM		Existing PM		No-Build AM		No-Build PM		Build AM		Build PM	
			Storage	Queue	Storage	Queue	Storage	Queue	Storage	Queue	Storage	Queue	Storage	Queue
1	Epps Mill Road & I-24 EB Off-Ramp	SBL	40	33	40	33	40	40	40	38	40	70	40	50
		SBR		15		33		15		38		15		38
2	Epps Mill Road & I-24 EB On-Ramp	EBL		3		3		3		3		3		3
3	I-24 WB Off-Ramp/I-24 WB On-Ramp & Epps Mill Road	EBL		58		13		68		15		73		18
		NBL	50	33	50	8	50	13	50	13	50	58	50	13
		NBR		13		10						23		18
4	Manchester Pike & Hughes Road	WBL		3		0		3		0		5		0
		SBL		0		0		0		0		0		0
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL		45		38		55		48		155		85
		WBL									90	0	90	3
		WBR										8		33
		NBL		8		5		8		5		8		5
		SBL									335	0	335	0
6	Manchester Pike & Cobb Road	WBL		3		0		3		0		3		0
		SBL		0		0		0		0		0		0

Table 14: LOS Summary - Without TDOT Improvements - Signal

#	Name	Movement	Build AM		Build PM	
			LOS	Delay	LOS	Delay
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL	D	38.5	D	38.1
		EBT	A	0.0	A	0.0
		EBR	A	0.0	A	0.0
		WBL	C	24.1	C	25.4
		WBT	A	0.0	A	0.0
		WBR	C	22.8	C	25.5
		NBL	B	12.9	B	10.6
		NBT	A	0.0	A	0.0
		NBR	A	0.0	A	0.0
		SBL	A	8.5	A	7.8
		SBT	A	0.0	A	0.0
		SBR	B	10.5	B	11.1
		Intersection	C	21.9	C	20.7

Table 15: Queue Summary - Without TDOT Improvements - Signal

#	Name	Movement	Build AM		Build PM	
			Storage	Queue	Storage	Queue
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBT		229		195
		WBL	90	7	90	16
		WBT		28		78
		NBT		192		116
		SBL	335	16	335	11
		SBT		80		237

Table 16: LOS Summary - With TDOT Improvements

#	Name	Movement	No-Build AM		No-Build PM		Build AM		Build PM	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Miller Road/I-24 EB Ramps & Epps Mill Road	EBL	B	12.7	B	14.6	B	12.9	B	15.8
		EBT	A	0.0	A	0.0	A	0.0	A	0.0
		EBR	C	21.9	B	17.5	C	22.4	B	18.5
		WBL	B	15.1	B	14.1	B	15.2	B	14.6
		WBT	A	0.0	A	0.0	A	0.0	A	0.0
		WBR	C	25.6	C	30.9	C	26.3	C	28.1
		NBL	C	29.3	C	34.3	C	29.3	C	34.3
		NBT	A	0.0	A	0.0	A	0.0	A	0.0
		NBR	D	37.8	D	37.2	D	37.8	D	37.2
		SBL	C	28.6	C	28.8	C	32.4	C	28.4
		SBT	C	26.7	C	28.2	C	26.7	C	27.2
		SBR	C	28.1	C	33.0	C	28.1	C	31.5
		Intersection	C	24.9	C	27.0	C	25.9	C	26.3
3	I-24 WB Off Ramp/I-24 WB On Ramp & Epps Mill Road	EBL	A	5.3	A	3.8	A	6.7	A	4.7
		EBT	A	0.3	A	0.3	A	0.4	A	0.3
		EBR	A	0.0	A	0.0	A	0.0	A	0.0
		WBL	A	0.0	A	0.0	A	0.0	A	0.0
		WBT	B	11.5	A	6.5	B	14.5	A	8.0
		WBR	B	13.2	A	6.2	B	16.7	A	7.5
		NBL	E	60.2	D	42.9	D	43.9	D	41.0
		NBT	A	0.0	A	0.0	A	0.0	A	0.0
		NBR	D	48.3	D	53.8	D	46.4	D	52.7
		Intersection	B	11.0	B	10.0	B	12.9	B	10.9
4	Manchester Pike & Hughes Road	SBL	A	8.2	A	7.6	A	8.2	A	7.7
		WB	B	12.6	B	11.6	B	12.9	B	11.8
5	Manchester Pike & Epps Mill Road/Site Driveway A	NBL	A	8.0	A	8.5	A	8.0	A	8.5
		SBL	--	--	--	--	A	7.6	A	7.4
		EB	B	13.1	B	11.4	C	19.9	B	14.0
		WB	--	--	--	--	C	16.8	C	16.3
6	Manchester Pike & Cobb Road	SBL	A	7.8	A	7.6	A	7.9	A	7.6
		WB	B	10.5	B	10.2	B	10.6	B	10.3

Table 17: Queue Summary - With TDOT Improvements

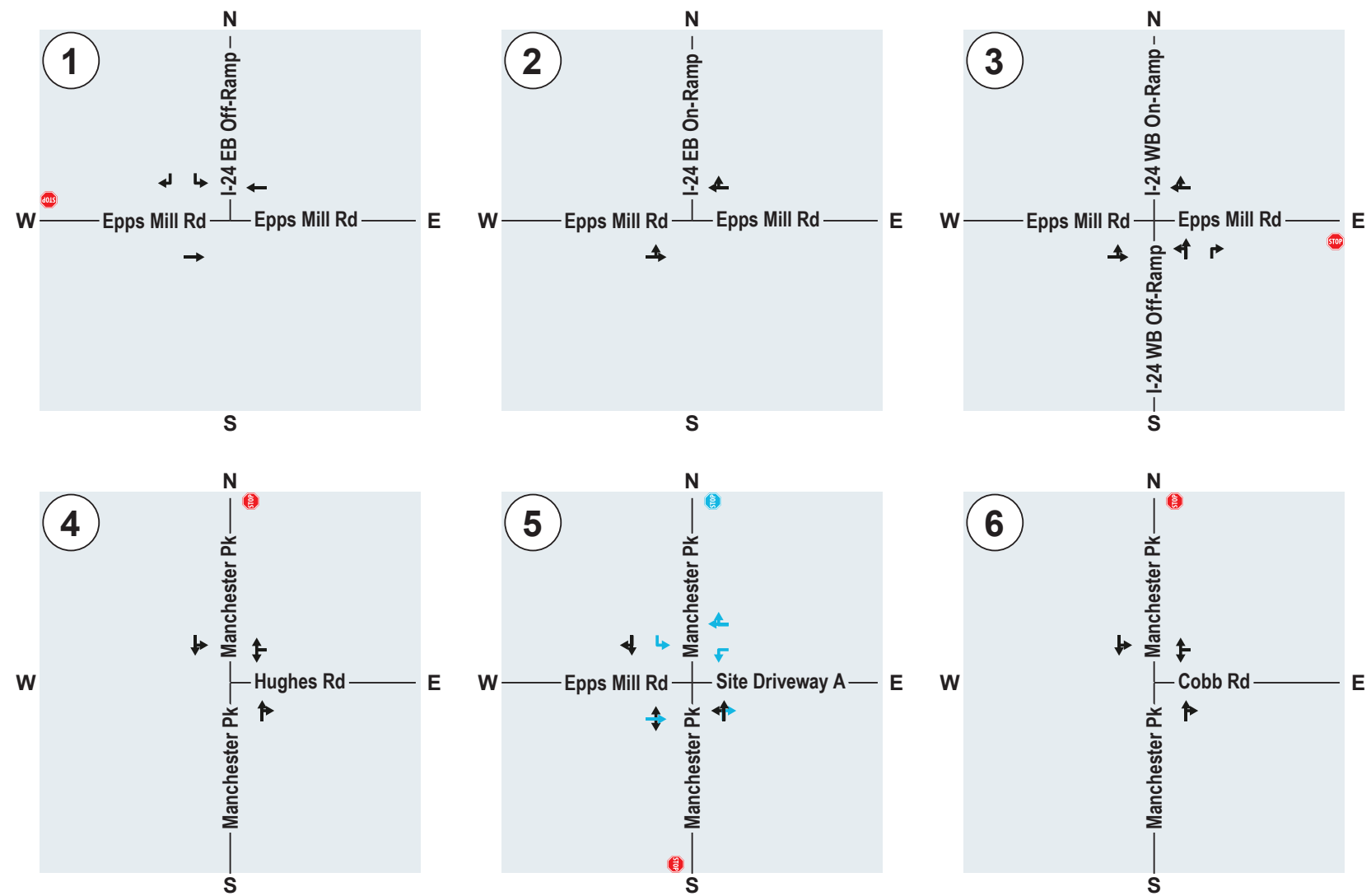
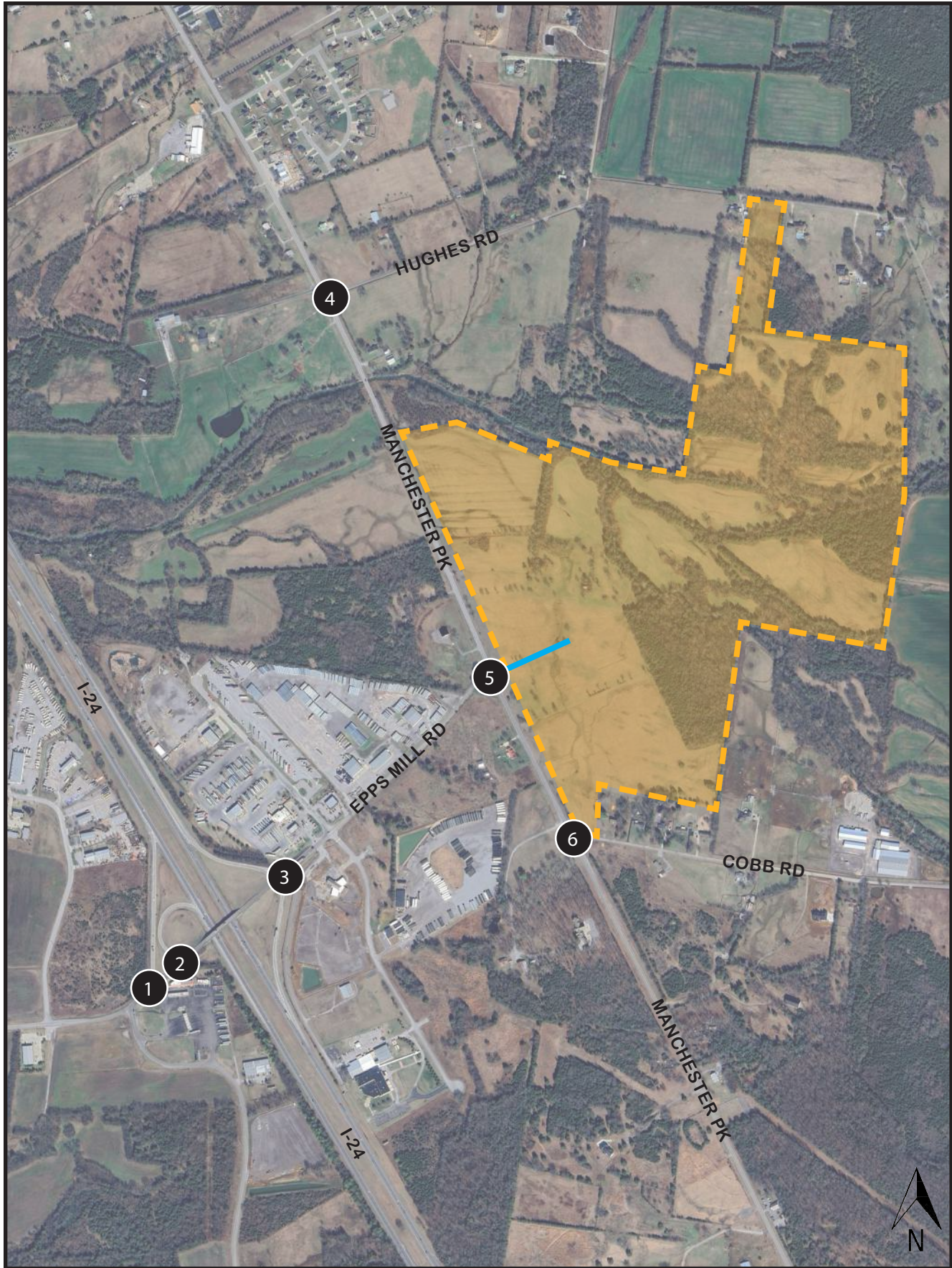
#	Name	Movement	No-Build AM		No-Build PM		Build AM		Build PM	
			Storage	Queue	Storage	Queue	Storage	Queue	Storage	Queue
1	Miller Road/I-24 EB Ramps & Epps Mill Road	EBL	160	25	160	29	160	25	160	29
		EBT		368		153		382		157
		WBL	150	3	150	19	150	2	150	18
		WBT		117		88		132		102
		NBL	185	9	185	5	185	9	185	5
		NBT		43		31		43		31
		SBL	250	95	250	119	250	130	250	137
		SBT		34		48		34		48
		SBR	250	38	250	36	250	38	250	36
3	I-24 WB Off Ramp/I-24 WB On Ramp & Epps Mill Road	EBL	500	20	500	19	500	39	500	18
		EBT		12		30		28		33
		WBT		97		109		114		146
		WBR	200	32	200	20	200	35	200	23
		NBT		34		43		34		42
		NBR	265	39	265	41	265	44	265	45
4	Manchester Pike & Hughes Road	WBL		3		0		5		0
		SBL		0		0		0		0
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL	500	30	500	15	500	58	500	25
		EBR		5		15		38		28
		WBL					90	3	90	3
		WBR						10		33
		NBL	150	8	150	5	150	8	150	5
		SBL					335	0	335	0
		SBR	150		150		150		150	
6	Manchester Pike & Cobb Road	WBL		3		0		3		0
		SBL		0		0		0		0

Table 18: LOS Summary - With TDOT Improvements - Signal

#	Name	Movement	Build AM		Build PM	
			LOS	Delay	LOS	Delay
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL	C	29.0	C	33.3
		EBT	A	0.0	A	0.0
		EBR	C	28.5	D	41.8
		WBL	D	37.0	D	35.6
		WBT	A	0.0	A	0.0
		WBR	D	39.2	D	46.0
		NBL	B	10.5	A	9.5
		NBT	A	0.0	A	0.0
		NBR	B	11.9	A	10.0
		SBL	B	11.3	B	10.2
		SBT	B	12.8	B	12.9
		SBR	B	14.0	B	12.3
		Intersection	B	19.5	C	24.3

Table 19: Queue Summary - With TDOT Improvements - Signal

#	Name	Movement	Build AM		Build PM	
			Storage	Queue	Storage	Queue
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL	500	105	500	76
		EBT		129		97
		WBL	90	9	90	20
		WBT		49		130
		NBL	150	62	150	39
		NBT		112		72
		SBL	335	13	335	9
		SBT		60		168
		SBR	150	0	150	25



X

Signalized Intersection ID

X

Unsignalized Intersection ID

Existing Traffic Signal

Existing Stop Sign

Proposed Stop Sign

→

Existing Lane Configuration

→

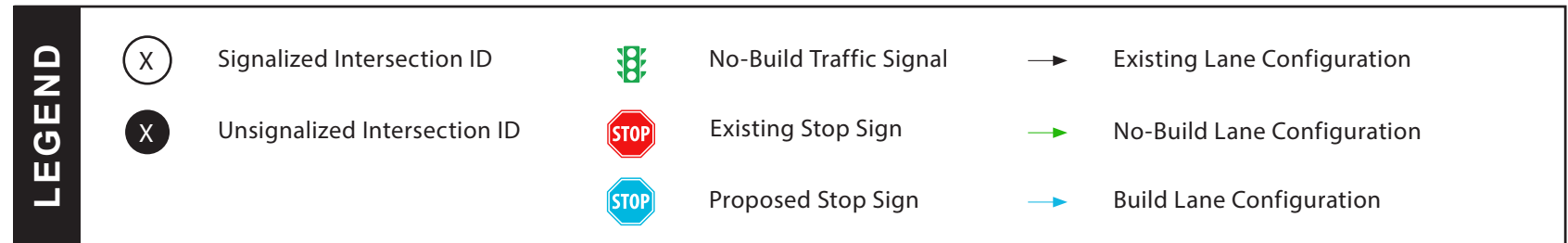
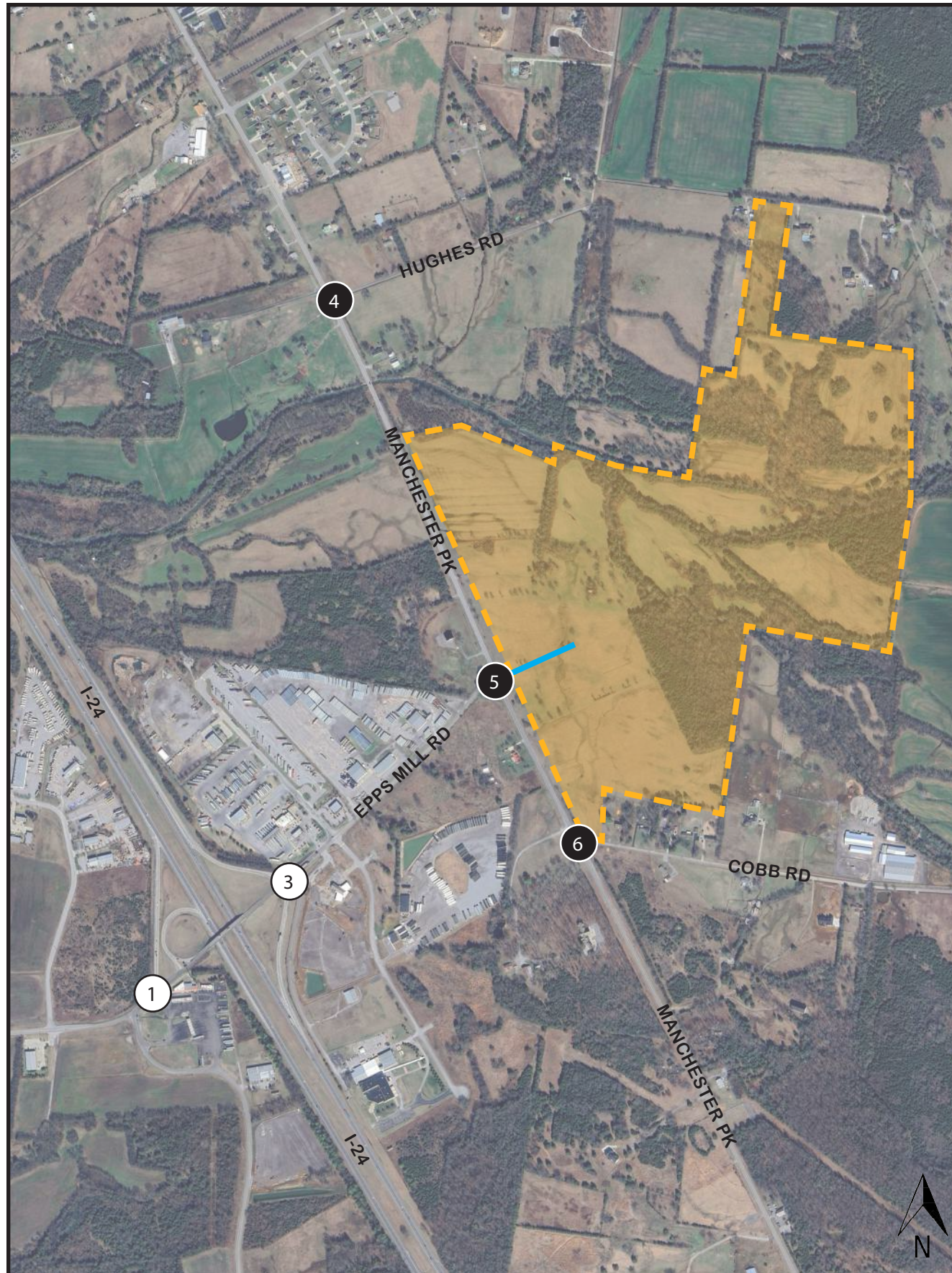
Build Lane Configuration

Kimley»Horn

Project Spring Traffic Impact Study

Build Intersection Geometry

Figure 9



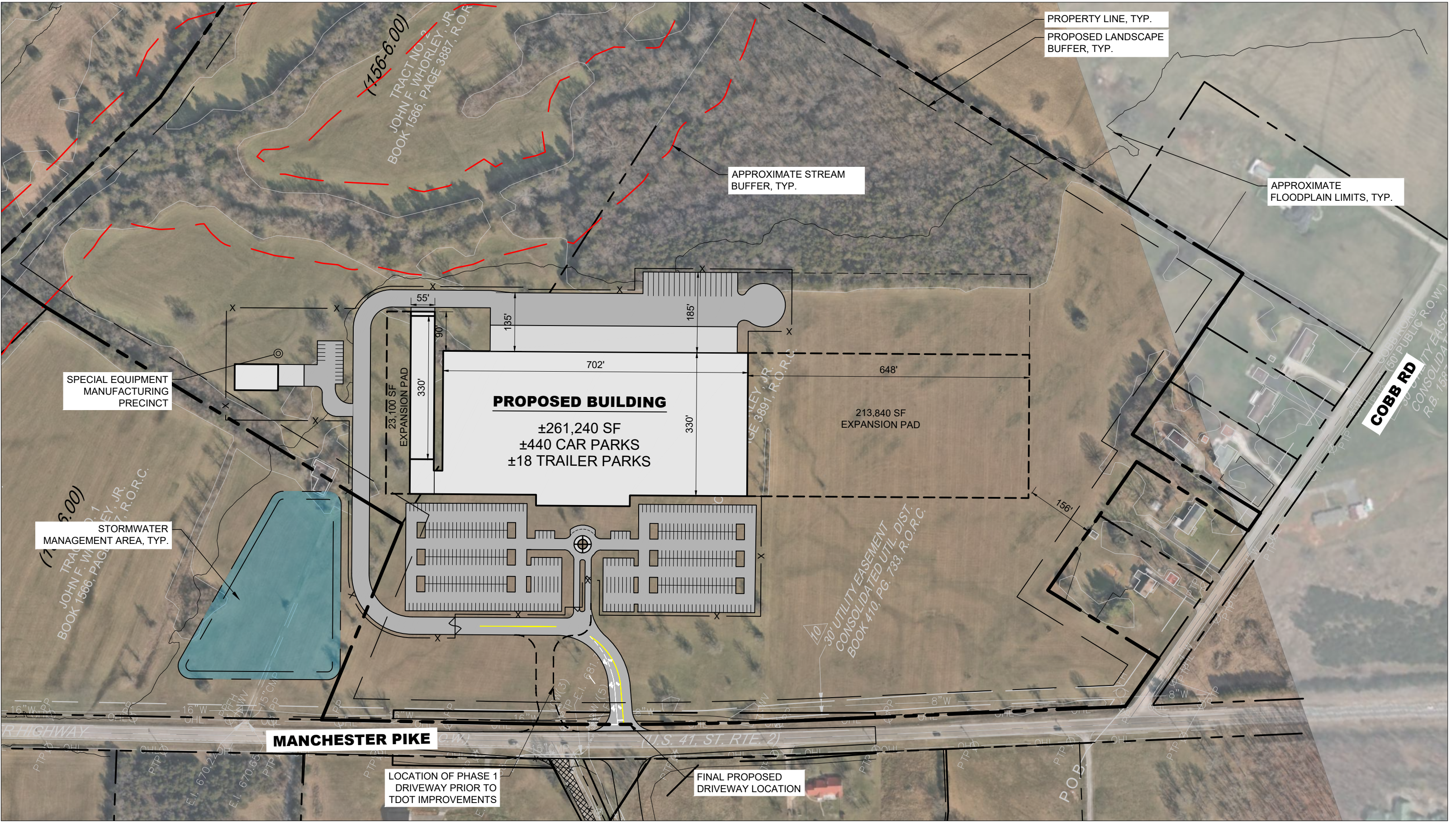
8.0 RECOMMENDATIONS

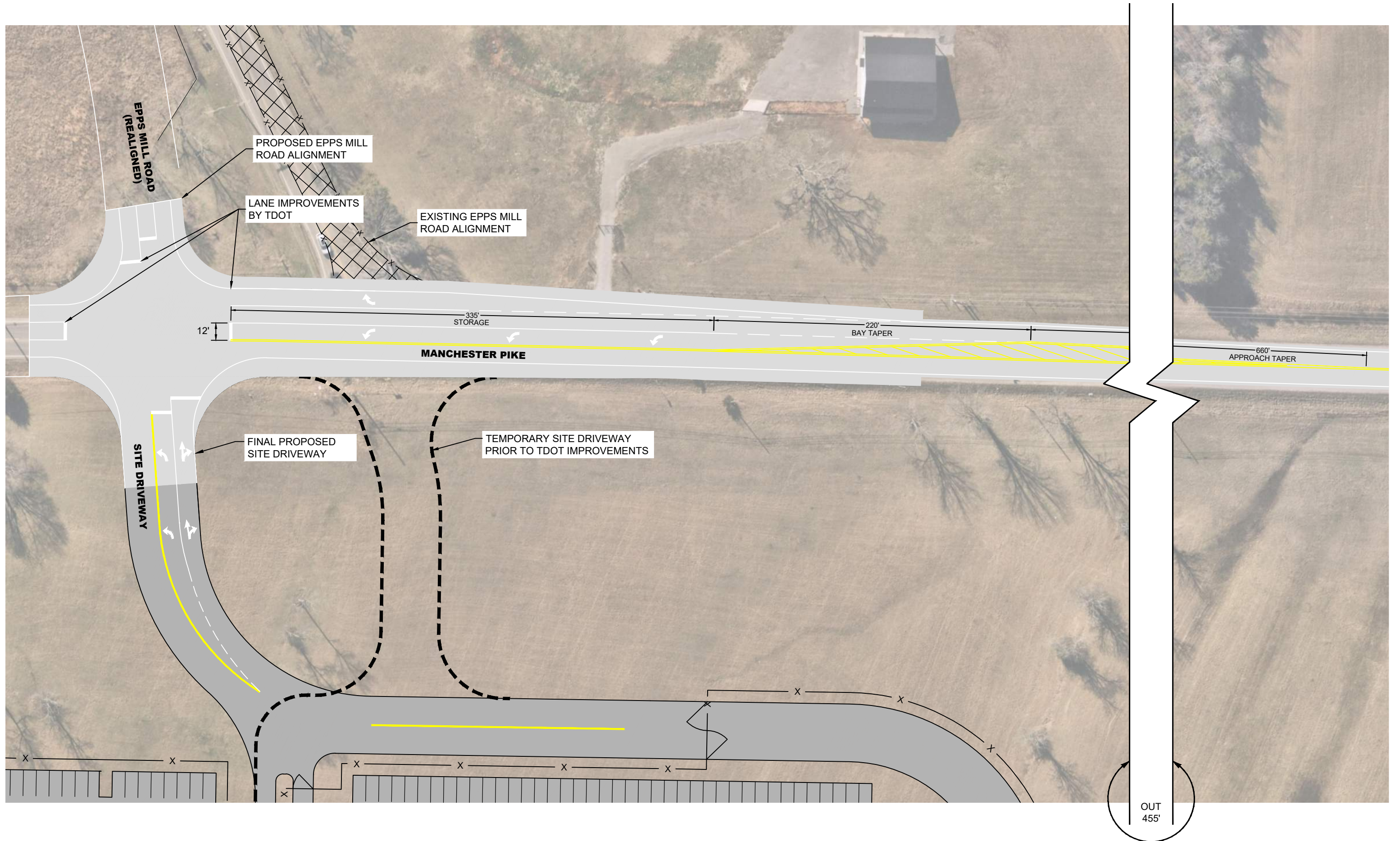
8.1 DEVELOPMENT IMPROVEMENT RECOMMENDATIONS

The following improvements are recommended to serve the traffic associated with the *Project Spring* development.

- Intersection 5 – Manchester Pike at Epps Mill Road/Site Driveway
 - Install a traffic signal.
 - Coordinate the timing of the signal installation with Rutherford County and TDOT to determine if installation should occur before or after the Epps Mill Road realignment.
 - Construct one (1) ingress lane and two (2) egress lanes at the westbound approach to operate under signalized control.
 - Construct one southbound left turn lane with 335' of storage, incorporating bay taper, approach taper, and deceleration distances.
 - See concept in Appendix A.

Site Plan





Traffic Counts



[Click here for Map](#)

Peak Hour Turning Movement Count

Rutherford County, TN



www.marrtraffic.com



Thursday, November 21, 2024	
Period	0700 - 0900
Peak Hour	0700 - 0800

* the Peak Hour Diagram does not include Bikes

I-24 On/Off-Ramp

Southbound

119	96	0	215	97	(1-3)
5	6	0	11	8	(4-7)
8	0	1	9	11	(8-13)
132	102	1	235	116	Total



Session Parameters

(Drop Down Menu)

Peak Hour

Volume

Epps Mill Rd (West)

(1-3)	(4-7)	(8-13)	Total
201	10	12	223
533	17	17	567
0	0	0	0
26	4	10	40
507	13	7	527



Classes	(1-3)	(4-7)	(8-13)	Total
Volume	901	37	30	968
PHF				0.8864

Westbound

	75	0	4	71
	91	4	5	82
	0	0	0	0
	166	4	9	153
	629	7	19	603
Total		(8-13)	(4-7)	(1-3)

All vehicles

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
0700 - 0715	-	-	-	-	-	0	29	-	56	-	0	85	7	128	-	-	0	135	-	24	29	-	0	53	273
0715 - 0730	-	-	-	-	-	0	19	-	34	-	0	53	9	165	-	-	0	174	-	23	23	-	0	46	273
0730 - 0745	-	-	-	-	-	0	26	-	19	-	0	45	15	140	-	-	0	155	-	24	14	-	0	38	238
0745 - 0800	-	-	-	-	-	0	28	-	23	-	1	52	9	94	-	-	0	103	-	20	9	-	0	29	184
Total	0	0	0	0	0	0	102	0	132	0	1	235	40	527	0	0	0	567	0	91	75	0	0	166	968
Approach %	0.00	0.00	0.00	0.00	0.00	-	43.40	0.00	56.17	0.00	0.43	-	7.05	92.95	0.00	0.00	0.00	-	0.00	54.82	45.18	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.59	0.00	0.25	0.69	0.67	0.80	0.00	0.00	0.00	0.81	0.00	0.95	0.65	0.00	0.00	0.78	0.89

Bikes

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
0700 - 0715	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
0715 - 0730	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
0730 - 0745	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
0745 - 0800	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Passenger Vehicles (1-3)

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
0700 - 0715	-	-	-	-	-	0	25	-	52	-	0	77	5	124	-	-	0	129	-	22	29	-	0	51	257
0715 - 0730	-	-	-	-	-	0	19	-	31	-	0	50	8	160	-	-	0	168	-	21	22	-	0	43	261
0730 - 0745	-	-	-	-	-	0	25	-	17	-	0	42	10	133	-	-	0	143	-	20	11	-	0	31	216
0745 - 0800	-	-	-	-	-	0	27	-	19	-	0	46	3	90	-	-	0	93	-	19	9	-	0	28	167
Total	0	0	0	0	0	0	96	0	119	0	0	215	26	507	0	0	0	533	0	82	71	0	0	153	901
Approach %	0.00	0.00	0.00	0.00	0.00	-	44.65	0.00	55.35	0.00	0.00	-	4.88	95.12	0.00	0.00	0.00	-	0.00	53.59	46.41	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.57	0.00	0.00	0.70	0.65	0.79	0.00	0.00	0.00	0.79	0.00	0.93	0.61	0.00	0.00	0.75	0.86

Single Unit Trucks (4-7)

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
0700 - 0715	-	-	-	-	-	0	4	-	2	-	0	6	0	1	-	-	0	1	-	0	0	-	0	0	7
0715 - 0730	-	-	-	-	-	0	0	-	1	-	0	1	0	4	-	-	0	4	-	1	1	-	0	2	7
0730 - 0745	-	-	-	-	-	0	1	-	0	-	0	1	3	5	-	-	0	8	-	4	3	-	0	7	16
0745 - 0800	-	-	-	-	-	0	1	-	2	-	0	3	1	3	-	-	0	4	-	0	0	-	0	0	7
Total	0	0	0	0	0	0	6	0	5	0	0	11	4	13	0	0	0	17	0	5	4	0	0	9	37
Approach %	0.00	0.00	0.00	0.00	0.00	-	54.55	0.00	45.45	0.00	0.00	-	23.53	76.47	0.00	0.00	0.00	-	0.00	55.56	44.44	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.63	0.00	0.00	0.46	0.33	0.65	0.00	0.00	0.00	0.53	0.00	0.31	0.33	0.00	0.00	0.32	0.58

Combination Trucks (8-13)

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
0700 - 0715	-	-	-	-	-	0	0	-	2	-	0	2	2	3	-	-	0	5	-	2	0	-	0	2	9
0715 - 0730	-	-	-	-	-	0	0	-	2	-	0	2	1	1	-	-	0	2	-	1	0	-	0	1	5
0730 - 0745	-	-	-	-	-	0	0	-	2	-	0	2	2	2	-	-	0	4	-	0	0	-	0	0	6
0745 - 0800	-	-	-	-	-	0	0	-	2	-	1	3	5	1	-	-	0	6	-	1	0	-	0	1	10
Total	0	0	0	0	0	0	0	0	8	0	1	9	10	7	0	0	0	17	0	4	0	0	0	4	30
Approach %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	88.89	0.00	11.11	-	58.82	41.18	0.00	0.00	0.00	-	0.00	100.00	0.00	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.25	0.75	0.50	0.58	0.00	0.00	0.00	0.71	0.00	0.50	0.00	0.00	0.00	0.50	0.75



[Click here for Map](#)

Peak Hour Turning Movement Count

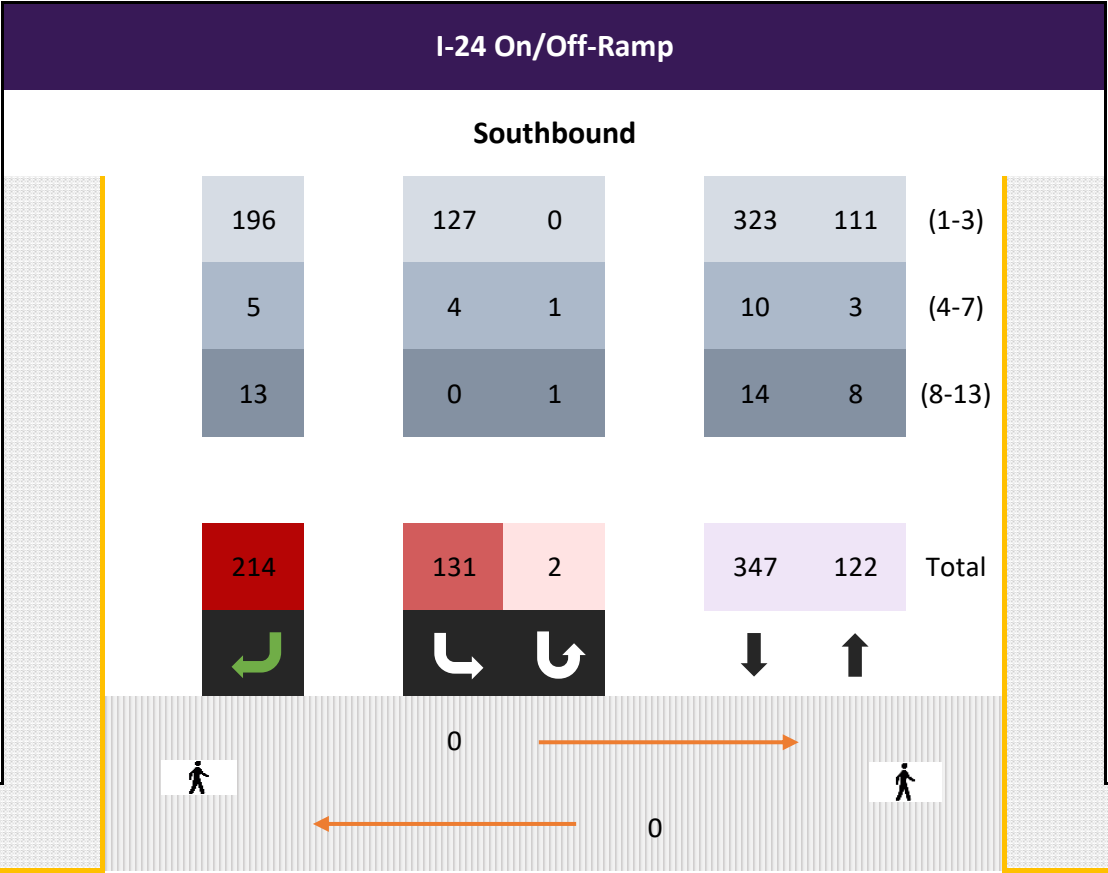
Rutherford County, TN

www.marrtraffic.com



Thursday, November 21, 2024	
Period	1600 - 1800
Peak Hour	1615 - 1715

* the Peak Hour Diagram does not include Bikes

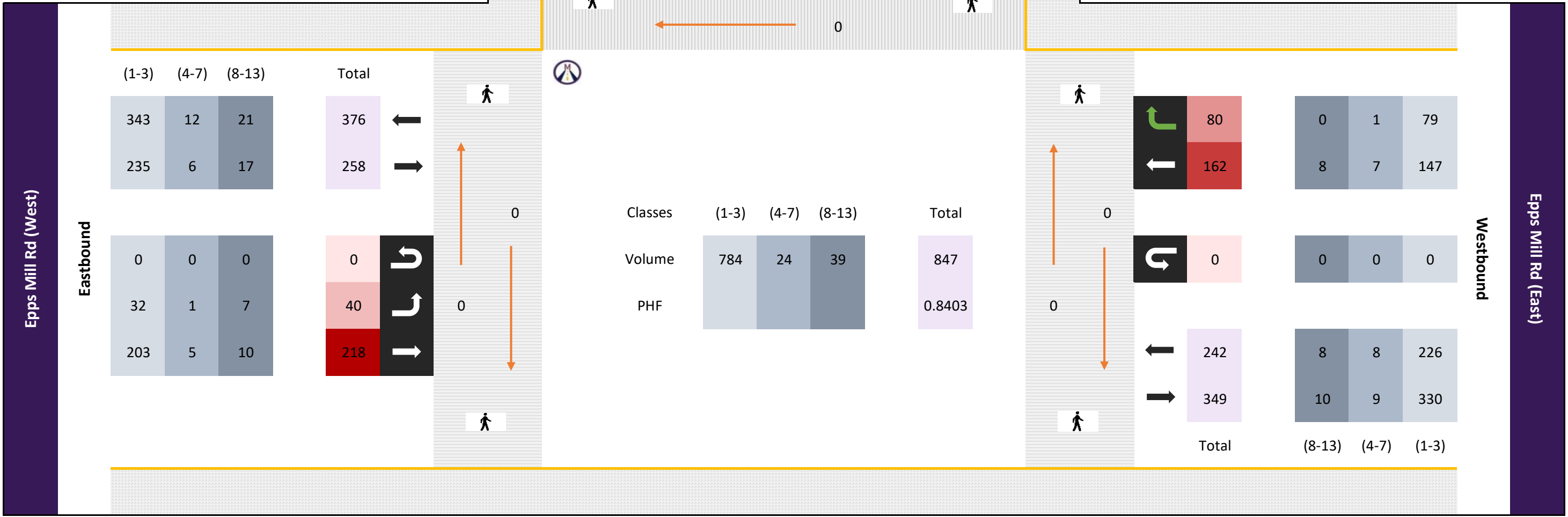


Session Parameters

(Drop Down Menu)

Peak Hour

Volume



All vehicles

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
1615 - 1630	-	-	-	-	-	0	31	-	53	-	1	85	12	44	-	-	0	56	-	42	23	-	0	65	206
1630 - 1645	-	-	-	-	-	0	35	-	47	-	0	82	8	60	-	-	0	68	-	33	19	-	0	52	202
1645 - 1700	-	-	-	-	-	0	36	-	49	-	0	85	5	48	-	-	0	53	-	38	11	-	0	49	187
1700 - 1715	-	-	-	-	-	0	29	-	65	-	1	95	15	66	-	-	0	81	-	49	27	-	0	76	252
Total	0	0	0	0	0	0	131	0	214	0	2	347	40	218	0	0	0	258	0	162	80	0	0	242	847
Approach %	0.00	0.00	0.00	0.00	0.00	-	37.75	0.00	61.67	0.00	0.58	-	15.50	84.50	0.00	0.00	0.00	-	0.00	66.94	33.06	0.00	0.00	-	-
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.82	0.00	0.50	0.91	0.67	0.83	0.00	0.00	0.00	0.80	0.00	0.83	0.74	0.00	0.00	0.80	0.84

Bikes

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
1615 - 1630	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
1630 - 1645	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
1645 - 1700	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
1700 - 1715	-	-	-	-	-	0	0	-	0	-	0	0	0	0	-	-	0	0	-	0	0	-	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	-
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Passenger Vehicles (1-3)

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
1615 - 1630	-	-	-	-	-	0	31	-	51	-	0	82	10	42	-	-	0	52	-	37	23	-	0	60	194
1630 - 1645	-	-	-	-	-	0	33	-	42	-	0	75	6	53	-	-	0	59	-	29	19	-	0	48	182
1645 - 1700	-	-	-	-	-	0	36	-	42	-	0	78	5	46	-	-	0	51	-	35	10	-	0	45	174
1700 - 1715	-	-	-	-	-	0	27	-	61	-	0	88	11	62	-	-	0	73	-	46	27	-	0	73	234
Total	0	0	0	0	0	0	127	0	196	0	0	323	32	203	0	0	0	235	0	147	79	0	0	226	784
Approach %	0.00	0.00	0.00	0.00	0.00	-	39.32	0.00	60.68	0.00	0.00	-	13.62	86.38	0.00	0.00	0.00	-	0.00	65.04	34.96	0.00	0.00	-	-
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.80	0.00	0.00	0.92	0.73	0.82	0.00	0.00	0.00	0.80	0.00	0.80	0.73	0.00	0.00	0.77	0.84

Single Unit Trucks (4-7)

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
1615 - 1630	-	-	-	-	-	0	0	-	0	-	1	1	1	0	-	-	0	1	-	1	0	-	0	1	3
1630 - 1645	-	-	-	-	-	0	2	-	1	-	0	3	0	4	-	-	0	4	-	2	0	-	0	2	9
1645 - 1700	-	-	-	-	-	0	0	-	4	-	0	4	0	0	-	-	0	0	-	1	1	-	0	2	6
1700 - 1715	-	-	-	-	-	0	2	-	0	-	0	2	0	1	-	-	0	1	-	3	0	-	0	3	6
Total	0	0	0	0	0	0	4	0	5	0	1	10	1	5	0	0	0	6	0	7	1	0	0	8	24
Approach %	0.00	0.00	0.00	0.00	0.00	-	40.00	0.00	50.00	0.00	10.00	-	16.67	83.33	0.00	0.00	0.00	-	0.00	87.50	12.50	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.31	0.00	0.25	0.63	0.25	0.31	0.00	0.00	0.00	0.38	0.00	0.58	0.25	0.00	0.00	0.67	0.67

Combination Trucks (8-13)

Time							Southbound						Eastbound						Westbound						Int Total
							I-24 On/Off-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
						App Total	Left 1.1		Right 1.2		U-Turn 1.3	App Total	Left 1.4	Thru 1.5			U-Turn 1.6	App Total		Thru 1.7	Right 1.8		U-Turn 1.9	App Total	
1615 - 1630	-	-	-	-	-	0	0	-	2	-	0	2	1	2	-	-	0	3	-	4	0	-	0	4	9
1630 - 1645	-	-	-	-	-	0	0	-	4	-	0	4	2	3	-	-	0	5	-	2	0	-	0	2	11
1645 - 1700	-	-	-	-	-	0	0	-	3	-	0	3	0	2	-	-	0	2	-	2	0	-	0	2	7
1700 - 1715	-	-	-	-	-	0	0	-	4	-	1	5	4	3	-	-	0	7	-	0	0	-	0	0	12
Total	0	0	0	0	0	0	0	0	13	0	1	14	7	10	0	0	0	17	0	8	0	0	0	8	39
Approach %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	92.86	0.00	7.14	-	41.18	58.82	0.00	0.00	0.00	-	0.00	100.00	0.00	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.00	0.25	0.70	0.44	0.83	0.00	0.00	0.00	0.61	0.00	0.50	0.00	0.00	0.00	0.50	0.81



[Click here for Map](#)

Peak Hour Turning Movement Count

Rutherford County, TN

Thursday, November 21, 2024	
Period	0700 - 0900
Peak Hour	0700 - 0800

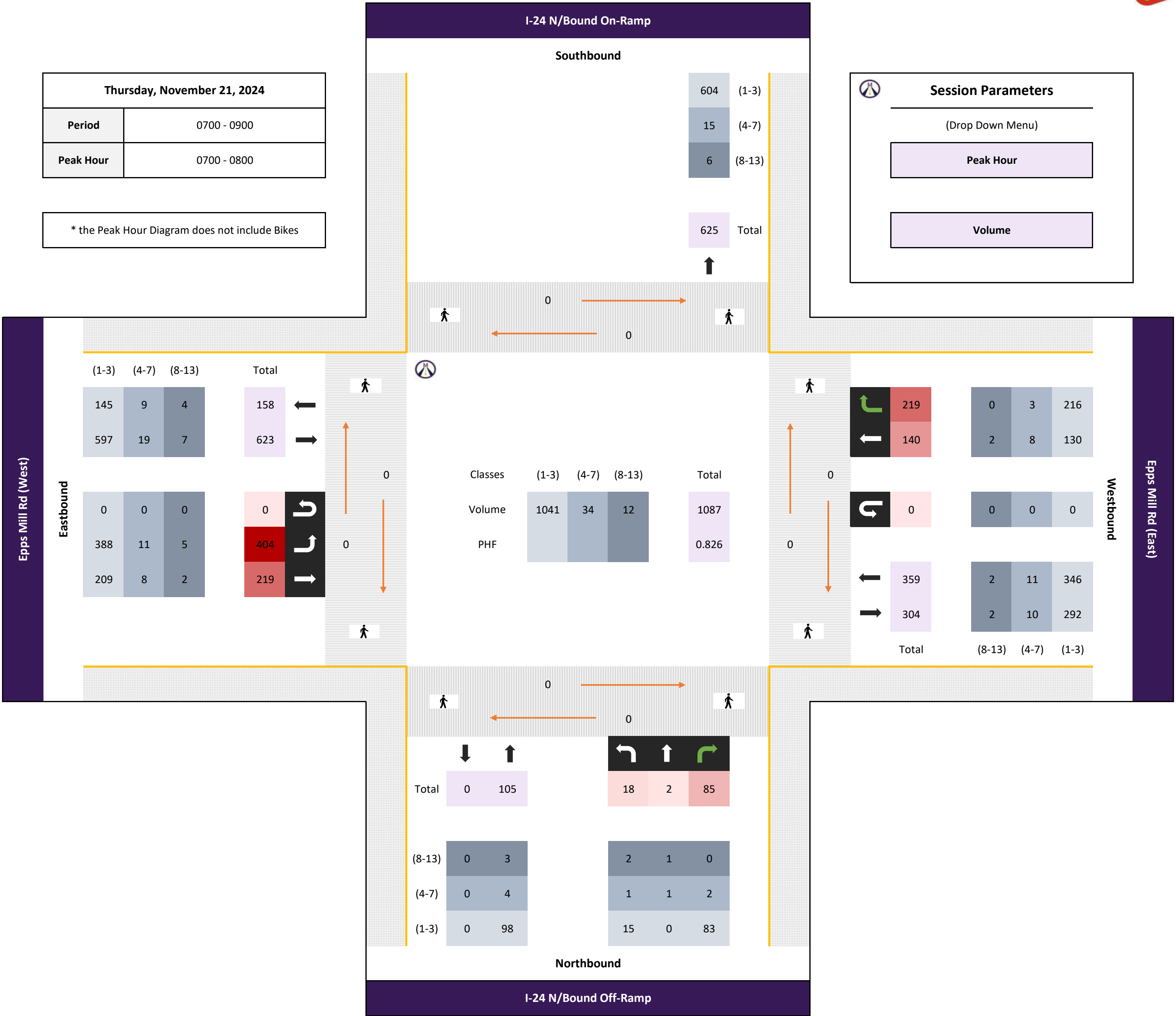
* the Peak Hour Diagram does not include Bikes

 **Session Parameters**

(Drop Down Menu)

Peak Hour

Volume



All vehicles

Time	Northbound						Southbound						Eastbound						Westbound						Int Total
	I-24 N/Bound Off-Ramp						I-24 N/Bound On-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
	Left 2.1	Thru 2.2	Right 2.3			App Total						App Total	Left 2.4	Thru 2.5			U-Turn 2.6	App Total		Thru 2.7	Right 2.8		U-Turn 2.9	App Total	
0700 - 0715	4	1	29	-	-	34	-	-	-	-	-	0	79	70	-	-	0	149	-	40	52	-	0	92	275
0715 - 0730	4	0	26	-	-	30	-	-	-	-	-	0	138	52	-	-	0	190	-	42	67	-	0	109	329
0730 - 0745	6	0	14	-	-	20	-	-	-	-	-	0	115	48	-	-	0	163	-	33	59	-	0	92	275
0745 - 0800	4	1	16	-	-	21	-	-	-	-	-	0	72	49	-	-	0	121	-	25	41	-	0	66	208
Total	18	2	85	0	0	105	0	0	0	0	0	0	404	219	0	0	0	623	0	140	219	0	0	359	1087
Approach %	17.14	1.90	80.95	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	64.85	35.15	0.00	0.00	0.00	-	0.00	39.00	61.00	0.00	0.00	-	
PHF	0.75	0.50	0.73	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.78	0.00	0.00	0.00	0.82	0.00	0.83	0.82	0.00	0.00	0.82	0.83

Bikes

Time	Northbound						Southbound						Eastbound						Westbound						Int Total
	I-24 N/Bound Off-Ramp						I-24 N/Bound On-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
	Left 2.1	Thru 2.2	Right 2.3			App Total						App Total	Left 2.4	Thru 2.5			U-Turn 2.6	App Total		Thru 2.7	Right 2.8		U-Turn 2.9	App Total	
0700 - 0715	0	0	0	-	-	0	-	-	-	-	-	0	0	0	-	-	0	0	-	0	0	-	0	0	0
0715 - 0730	0	0	0	-	-	0	-	-	-	-	-	0	0	0	-	-	0	0	-	0	0	-	0	0	0
0730 - 0745	0	0	0	-	-	0	-	-	-	-	-	0	0	0	-	-	0	0	-	0	0	-	0	0	0
0745 - 0800	0	0	0	-	-	0	-	-	-	-	-	0	0	0	-	-	0	0	-	0	0	-	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Passenger Vehicles (1-3)

Time	Northbound						Southbound						Eastbound						Westbound						Int Total
	I-24 N/Bound Off-Ramp						I-24 N/Bound On-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
	Left 2.1	Thru 2.2	Right 2.3			App Total						App Total	Left 2.4	Thru 2.5			U-Turn 2.6	App Total		Thru 2.7	Right 2.8		U-Turn 2.9	App Total	
0700 - 0715	2	0	29	-	-	31	-	-	-	-	-	0	75	66	-	-	0	141	-	40	52	-	0	92	264
0715 - 0730	4	0	25	-	-	29	-	-	-	-	-	0	134	51	-	-	0	185	-	39	67	-	0	106	320
0730 - 0745	5	0	13	-	-	18	-	-	-	-	-	0	109	46	-	-	0	155	-	27	58	-	0	85	258
0745 - 0800	4	0	16	-	-	20	-	-	-	-	-	0	70	46	-	-	0	116	-	24	39	-	0	63	199
Total	15	0	83	0	0	98	0	0	0	0	0	0	388	209	0	0	0	597	0	130	216	0	0	346	1041
Approach %	15.31	0.00	84.69	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	64.99	35.01	0.00	0.00	0.00	-	0.00	37.57	62.43	0.00	0.00	-	
PHF	0.75	0.00	0.72	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.79	0.00	0.00	0.00	0.81	0.00	0.81	0.81	0.00	0.00	0.82	0.81

Single Unit Trucks (4-7)

Time	Northbound						Southbound						Eastbound						Westbound						Int Total
	I-24 N/Bound Off-Ramp						I-24 N/Bound On-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
	Left 2.1	Thru 2.2	Right 2.3			App Total					App Total	Left 2.4	Thru 2.5			U-Turn 2.6	App Total		Thru 2.7	Right 2.8		U-Turn 2.9	App Total		
0700 - 0715	0	0	0	-	-	0	-	-	-	-	0	2	3	-	-	0	5	-	0	0	-	0	0	5	
0715 - 0730	0	0	1	-	-	1	-	-	-	-	0	3	1	-	-	0	4	-	2	0	-	0	2	7	
0730 - 0745	1	0	1	-	-	2	-	-	-	-	0	4	2	-	-	0	6	-	6	1	-	0	7	15	
0745 - 0800	0	1	0	-	-	1	-	-	-	-	0	2	2	-	-	0	4	-	0	2	-	0	2	7	
Total	1	1	2	0	0	4	0	0	0	0	0	11	8	0	0	0	19	0	8	3	0	0	11	34	
Approach %	25.00	25.00	50.00	0.00	0.00	-	0.00	0.00	0.00	0.00	-	57.89	42.11	0.00	0.00	0.00	-	0.00	72.73	27.27	0.00	0.00	-		
PHF	0.25	0.25	0.50	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.69	0.67	0.00	0.00	0.00	0.79	0.00	0.33	0.38	0.00	0.00	0.39	0.57	

Combination Trucks (8-13)

Time	Northbound						Southbound						Eastbound						Westbound						Int Total
	I-24 N/Bound Off-Ramp						I-24 N/Bound On-Ramp						Epps Mill Rd (West)						Epps Mill Rd (East)						
	Left 2.1	Thru 2.2	Right 2.3			App Total					App Total	Left 2.4	Thru 2.5			U-Turn 2.6	App Total		Thru 2.7	Right 2.8		U-Turn 2.9	App Total		
0700 - 0715	2	1	0	-	-	3	-	-	-	-	-	0	2	1	-	-	0	3	-	0	0	-	0	0	6
0715 - 0730	0	0	0	-	-	0	0	0	0	0	0	0	1	0	-	-	0	1	-	1	0	-	0	1	2
0730 - 0745	0	0	0	-	-	0	-	-	-	-	-	0	2	0	-	-	0	2	-	0	0	-	0	0	2
0745 - 0800	0	0	0	-	-	0	-	-	-	-	-	0	0	1	-	-	0	1	-	1	0	-	0	1	2
Total	2	1	0	0	0	3	0	0	0	0	0	0	5	2	0	0	0	7	0	2	0	0	0	2	12
Approach %	66.67	33.33	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	-	71.43	28.57	0.00	0.00	0.00	-	0.00	100.00	0.00	0.00	0.00	-	
PHF	0.25	0.25	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.50	0.00	0.00	0.00	0.58	0.00	0.50	0.00	0.00	0.00	0.50	0.50



[Click here for Map](#)

Peak Hour Turning Movement Count

Rutherford County, TN



www.marrtraffic.com



Thursday, November 21, 2024	
Period	1600 - 1800
Peak Hour	1615 - 1715

* the Peak Hour Diagram does not include Bikes

Session Parameters

(Drop Down Menu)

Peak Hour

Volume





Rutherford County, TN



Thursday, November 21, 2024	
Period	0700 - 0900
Peak Hour	0700 - 0800

* the Peak Hour Diagram does not include Bikes

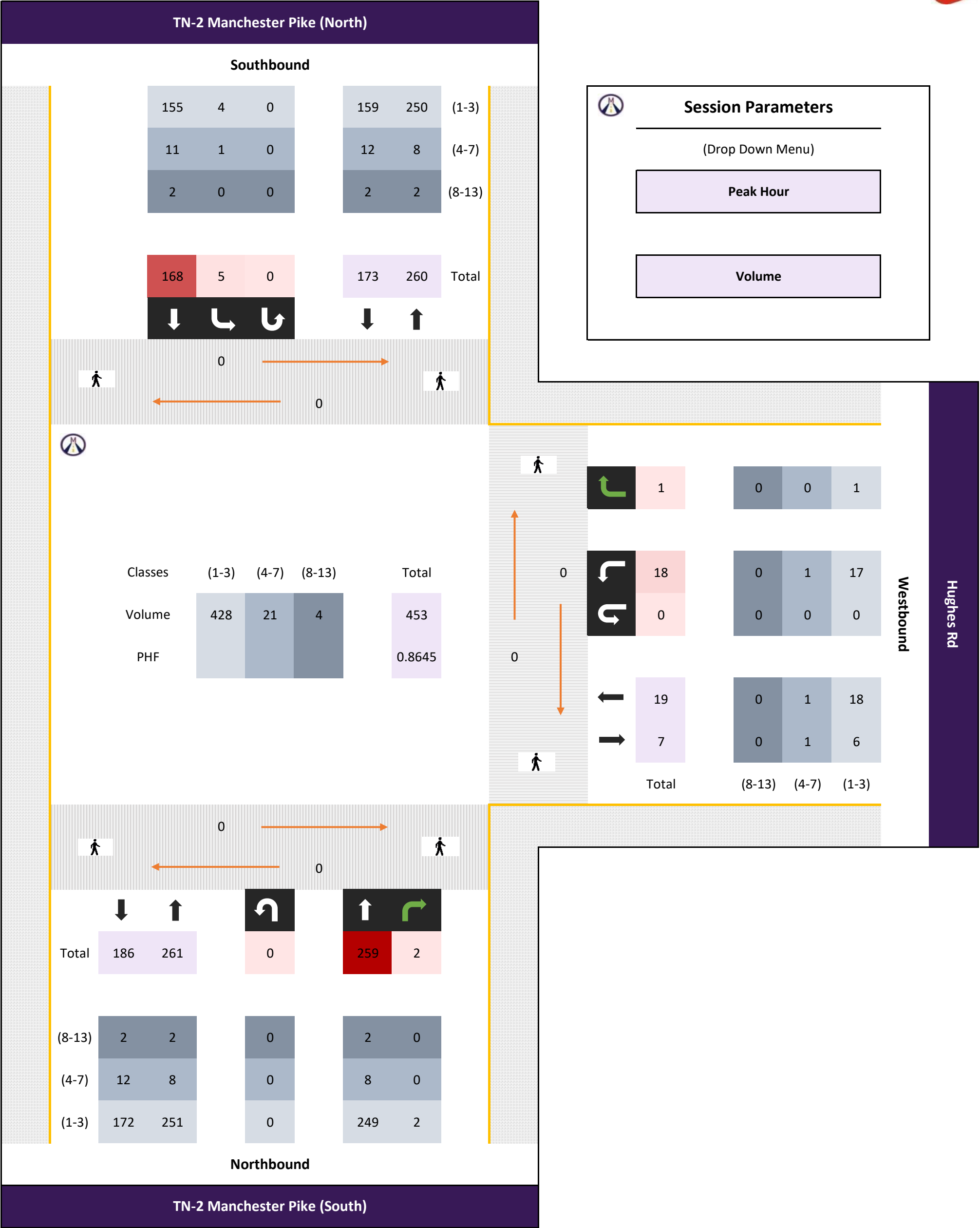


Session Parameters

(Drop Down Menu)

Peak Hour

Volume





Rutherford County, TN



* the Peak Hour Diagram does not include Bikes



Session Parameters

(Drop Down Menu)

Peak Hour

Volume

Thursday, November 21, 2024	
Period	0700 - 0900
Peak Hour	0700 - 0800

* the Peak Hour Diagram does not include Bikes

[illegible]



Session Parameters

(Drop Down Menu)

Peak Hour

Volume

Thursday, November 21, 2024	
Period	1600 - 1800
Peak Hour	1615 - 1715

* the Peak Hour Diagram does not include Bikes

[illegible]



Session Parameters

(Drop Down Menu)

Peak Hour

Volume

Classified Turn Movement Count || All vehicles

Rutherford County, TN

Site 3

TN-2 Manchester Pike (South)
TN-2 Manchester Pike (North)
Epps Mill Rd



Date

Thursday, November 21, 2024

Lat/Long

35.727332°, -86.314461°

[Click here for Map](#)

Weather

Fair
46°F

[Click here for Detailed Weather](#)



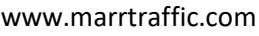
0600 - 1800 (Weekday 12h Session) (11-21-2024)

All vehicles

TIME	Northbound				Southbound				Eastbound				Int Total
	TN-2 Manchester Pike (South)				TN-2 Manchester Pike (North)				Epps Mill Rd				
	Left 3.1	Thru 3.2	U-Turn 3.3	App Total	Thru 3.4	Right 3.5	U-Turn 3.6	App Total	Left 3.7	Right 3.8	U-Turn 3.9	App Total	
0600 - 0615	27	27	0	54	8	14	0	22	8	5	0	13	89
0615 - 0630	19	55	0	74	6	9	0	15	19	6	0	25	114
0630 - 0645	27	53	0	80	14	18	0	32	28	6	0	34	146
0645 - 0700	25	57	0	82	15	26	0	41	16	8	0	24	147
Hourly Total	98	192	0	290	43	67	0	110	71	25	0	96	496
0700 - 0715	30	41	0	71	15	29	0	44	46	9	0	55	170
0715 - 0730	28	39	0	67	17	40	0	57	34	6	0	40	164
0730 - 0745	22	26	0	48	13	31	0	44	25	11	0	36	128
0745 - 0800	17	23	0	40	18	22	0	40	24	12	0	36	116
Hourly Total	97	129	0	226	63	122	0	185	129	38	0	167	578
0800 - 0815	18	39	0	57	11	14	0	25	23	4	0	27	109
0815 - 0830	18	27	0	45	12	13	0	25	15	12	0	27	97
0830 - 0845	8	27	0	35	9	8	0	17	15	11	0	26	78
0845 - 0900	12	24	0	36	10	11	0	21	12	15	0	27	84
Hourly Total	56	117	0	173	42	46	0	88	65	42	0	107	368
0900 - 0915	12	21	0	33	13	4	0	17	16	5	0	21	71
0915 - 0930	12	20	0	32	15	14	0	29	12	5	0	17	78
0930 - 0945	11	26	0	37	15	14	0	29	14	9	0	23	89
0945 - 1000	8	19	0	27	17	16	0	33	7	12	0	19	79
Hourly Total	43	86	0	129	60	48	0	108	49	31	0	80	317
1000 - 1015	9	23	0	32	19	20	0	39	9	10	0	19	90
1015 - 1030	12	17	0	29	23	10	0	33	11	6	0	17	79
1030 - 1045	9	29	0	38	24	19	0	43	7	4	0	11	92
1045 - 1100	9	22	0	31	13	15	0	28	16	9	0	25	84
Hourly Total	39	91	0	130	79	64	0	143	43	29	0	72	345
1100 - 1115	6	27	0	33	12	12	0	24	19	5	0	24	81
1115 - 1130	16	18	0	34	31	24	0	55	21	8	0	29	118
1130 - 1145	10	22	0	32	17	17	0	34	15	13	0	28	94
1145 - 1200	8	19	0	27	22	16	0	38	21	4	1	26	91
Hourly Total	40	86	0	126	82	69	0	151	76	30	1	107	384
1200 - 1215	8	23	0	31	21	14	0	35	27	9	0	36	102
1215 - 1230	9	31	0	40	21	18	0	39	12	15	0	27	106
1230 - 1245	14	21	0	35	27	12	0	39	17	10	0	27	101
1245 - 1300	15	31	0	46	20	15	0	35	13	9	0	22	103
Hourly Total	46	106	0	152	89	59	0	148	69	43	0	112	412
1300 - 1315	11	28	0	39	35	16	0	51	18	15	0	33	123
1315 - 1330	9	21	0	30	23	17	0	40	12	8	0	20	90
1330 - 1345	10	20	0	30	32	23	0	55	13	17	0	30	115
1345 - 1400	11	18	0	29	30	15	0	45	18	16	0	34	108
Hourly Total	41	87	0	128	120	71	0	191	61	56	0	117	436
1400 - 1415	16	20	0	36	17	21	0	38	19	10	0	29	103
1415 - 1430	7	25	0	32	31	21	0	52	13	16	0	29	113
1430 - 1445	10	19	0	29	27	16	0	43	28	11	0	39	111
1445 - 1500	5	16	0	21	34	21	0	55	22	12	0	34	110
Hourly Total	38	80	0	118	109	79	0	188	82	49	0	131	437
1500 - 1515	10	13	0	23	42	16	1	59	15	16	0	31	113
1515 - 1530	12	26	0	38	41	12	0	53	18	21	0	39	130
1530 - 1545	10	24	0	34	57	23	0	80	30	22	0	52	166
1545 - 1600	13	29	0	42	52	20	0	72	12	23	0	35	149
Hourly Total	45	92	0	137	192	71	1	264	75	82	0	157	558
1600 - 1615	10	23	0	33	54	36	0	90	25	24	0	49	172
1615 - 1630	13	16	0	29	62	30	0	92	24	29	0	53	174
1630 - 1645	12	27	0	39	60	24	0	84	15	28	0	43	166
1645 - 1700	14	20	0	34	39	32	0	71	23	21	0	44	149
Hourly Total	49	86	0	135	215	122	0	337	87	102	0	189	661
1700 - 1715	19	22	0	41	51	40	0	91	23	27	0	50	182
1715 - 1730	5	28	0	33	62	21	0	83	19	24	0	43	159
1730 - 1745	12	20	0	32	45	24	0	69	21	24	0	45	146
1745 - 1800	9	24	0	33	41	26	0	67	25	21	0	46	146
Hourly Total	45	94	0	139	199	111	0	310	88	96	0	184	633
Grand Total	637	1246	0	1883	1293	929	1	2223	895	623	1	1519	5625
Approach %	33.83	66.17	0.00	-	58.16	41.79	0.04	-	58.92	41.01	0.07	-	
Intersection %	11.32	22.15	0.00	33.48	22.99	16.52	0.02	39.52	15.91	11.08	0.02	27.00	
Heavy Vehicle %	7	5	-	6	3	8	0	5	7	8	0	7	6
PHF	0.76	0.79	0.00	0.87	0.85	0.79	0.00	0.92	0.89	0.91	0.00	0.90	0.92



Rutherford County, TN



Thursday, November 21, 2024	
Period	0700 - 0900
Peak Hour	0700 - 0800

* the Peak Hour Diagram does not include Bikes

TN-2 Manchester Pike (North)

Southbound

75	16	0	91	224	(1-3)
8	0	0	8	5	(4-7)
1	0	0	1	1	(8-13)

84	16	0	100	230	Total
↓	↪	↻	↓	↑	

0

_____ 0

Classes	(1-3)	(4-7)	(8-13)	Total
Volume	318	14	2	334
PHF				0.8608

0

0

Total	87	218	0	217	1
-------	----	-----	---	-----	---

(8-13)	1	0	0	0	0
(4-7)	9	3	0	3	0
(1-3)	77	215	0	214	1

Northbound

TN-2 Manchester Pike (South)

Session Parameters

(Drop Down Menu)

Peak Hour

Volume

13

3

0

16

17

Total:

2

0

0

2

0

(8-

Westbound

Cobb Rd



Rutherford County, TN



* the Peak Hour Diagram does not include Bikes



Session Parameters

(Drop Down Menu)

Peak Hour

Volume

Classes	(1-3)	(4-7)	(8-13)	Total
Volume	441	13	7	461
PHF				0.9294

		(8-13)	(4-7)	(1-3)
↶	6	1	1	4
↷	2	0	0	2
↶	0	0	0	0
↷	8	1	1	6
↶	13	0	1	12
Total		(8-13)	(4-7)	(1-3)

Bi-Directional Speed & Class Count || Bi-Directional 15min

Rutherford County, TN



Site 1
TN-2 Manchester Pike,
north of Epps Mill Rd

Date
Thursday, November 21, 2024

Weather
Fair
46°F

Lat/Long
35.728310°, -86.315076°

[Click here for Detailed Weather](#)



[Click here for Map](#)

0000 - 2400 (Weekday 24h Session)
Bi-Directional 15min

Time	Bi-Directional 15min													15min	60min
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	Total	Total
0000 - 0015	0	8	1	0	0	0	0	0	0	0	0	0	0	9	26
0015 - 0030	0	2	0	0	1	0	0	0	0	0	0	0	0	3	
0030 - 0045	0	3	1	0	2	0	0	0	0	0	0	0	0	6	
0045 - 0100	0	6	2	0	0	0	0	0	0	0	0	0	0	8	
0100 - 0115	0	4	0	0	0	0	0	1	0	0	0	0	0	5	16
0115 - 0130	0	2	0	0	0	0	0	0	0	0	0	0	0	2	
0130 - 0145	0	2	0	0	0	0	0	0	0	0	0	0	0	2	
0145 - 0200	0	7	0	0	0	0	0	0	0	0	0	0	0	7	
0200 - 0215	0	3	1	0	0	0	0	0	0	0	0	0	0	4	15
0215 - 0230	0	1	0	0	0	0	0	0	1	0	0	0	0	2	
0230 - 0245	0	3	1	0	0	1	0	0	0	0	0	0	0	5	
0245 - 0300	0	3	1	0	0	0	0	0	0	0	0	0	0	4	
0300 - 0315	0	1	2	0	1	0	0	0	0	0	0	0	0	4	24
0315 - 0330	0	5	0	0	1	0	0	0	0	0	0	0	0	6	
0330 - 0345	0	4	0	0	1	0	0	0	0	0	0	0	0	5	
0345 - 0400	0	6	2	0	1	0	0	0	0	0	0	0	0	9	
0400 - 0415	0	6	0	0	0	1	0	0	0	0	0	0	0	7	48
0415 - 0430	0	6	1	0	2	0	0	0	0	0	0	0	0	9	
0430 - 0445	0	7	5	0	1	0	0	1	0	0	0	0	0	14	
0445 - 0500	0	11	6	0	1	0	0	0	0	0	0	0	0	18	
0500 - 0515	0	23	4	0	3	0	0	0	0	0	0	0	0	30	178
0515 - 0530	0	18	9	0	6	0	0	0	0	0	0	0	0	33	
0530 - 0545	0	38	5	1	8	0	0	0	1	0	0	0	0	53	
0545 - 0600	0	40	14	1	7	0	0	0	0	0	0	0	0	62	
0600 - 0615	0	31	12	0	10	1	0	0	0	0	0	0	0	54	375
0615 - 0630	1	61	20	0	14	2	0	0	1	0	0	0	0	99	
0630 - 0645	0	76	17	0	11	1	0	0	0	0	0	0	0	105	
0645 - 0700	0	81	19	0	15	1	0	1	0	0	0	0	0	117	
0700 - 0715	1	91	15	0	19	0	0	0	1	0	0	0	0	127	429
0715 - 0730	0	79	17	1	20	1	0	0	0	0	0	0	0	118	
0730 - 0745	0	63	19	0	16	3	0	1	0	0	0	0	0	102	
0745 - 0800	0	47	19	0	13	2	0	1	0	0	0	0	0	82	
0800 - 0815	0	48	16	0	9	1	0	1	0	0	0	0	0	75	249
0815 - 0830	1	35	21	0	11	0	0	0	1	0	0	0	0	69	
0830 - 0845	0	28	9	0	11	2	0	2	2	0	0	0	0	54	
0845 - 0900	0	30	12	0	9	0	0	0	0	0	0	0	0	51	
0900 - 0915	1	40	14	0	8	0	0	0	0	0	0	0	0	63	251
0915 - 0930	0	38	9	0	6	0	0	0	0	0	0	0	0	53	
0930 - 0945	0	43	14	2	14	0	0	2	0	0	0	0	0	75	
0945 - 1000	0	32	13	0	11	1	0	3	0	0	0	0	0	60	
1000 - 1015	0	37	16	1	6	2	0	0	0	0	0	0	0	62	260
1015 - 1030	1	30	15	0	10	1	0	3	3	0	0	0	0	63	
1030 - 1045	0	42	16	1	14	0	0	0	1	0	0	0	0	74	
1045 - 1100	1	36	10	1	9	0	2	2	0	0	0	0	0	61	
1100 - 1115	0	59	10	0	13	0	0	1	0	0	0	0	0	83	317
1115 - 1130	1	42	21	0	19	0	1	2	1	0	0	0	0	87	
1130 - 1145	1	39	23	0	13	2	0	0	0	0	0	0	0	78	
1145 - 1200	0	40	14	1	12	1	0	1	0	0	0	0	0	69	
1200 - 1215	0	53	15	1	13	0	1	2	2	0	0	0	0	87	327
1215 - 1230	0	46	12	0	15	2	0	0	0	0	0	0	0	75	
1230 - 1245	0	55	19	0	10	0	0	0	0	0	0	0	0	84	
1245 - 1300	0	52	16	0	12	0	0	0	1	0	0	0	0	81	
1300 - 1315	0	64	18	1	17	0	0	0	0	0	0	0	0	100	341
1315 - 1330	0	33	12	0	18	0	0	1	0	0	0	0	0	64	
1330 - 1345	0	50	17	0	20	1	0	1	3	0	0	0	0	92	
1345 - 1400	0	49	18	1	15	0	1	1	0	0	0	0	0	85	
1400 - 1415	0	44	15	1	17	0	0	0	0	0	0	0	0	77	345
1415 - 1430	0	48	16	0	17	1	0	1	2	0	0	0	0	85	
1430 - 1445	0	60	14	0	14	1	1	0	0	0	0	0	0	90	
1445 - 1500	0	63	11	1	16	0	0	1	1	0	0	0	0	93	
1500 - 1515	0	58	19	0	13	0	0	0	0	0	0	0	0	90	442
1515 - 1530	2	59	21	1	18	0	0	1	0	0	0	0	0	102	
1530 - 1545	0	84	24	0	20	0	0	0	2	0	0	0	0	130	
1545 - 1600	0	65	24	2	28	0	0	1	0	0	0	0	0	120	
1600 - 1615	0	72	30	0	26	2	0	1	0	0	0	0	0	131	486
1615 - 1630	0	84	27	0	19	0	0	1	2	0	0	0	0	133	
1630 - 1645	0	69	18	0	20	0	0	0	1	0	0	0	0	108	
1645 - 1700	0	76	20	0	15	2	0	1	0	0	0	0	0	114	
1700 - 1715	0	85	27	1	21	1	0	1	0	0	0	0	0	136	477
1715 - 1730	0	80	27	1	14	0	0	0	1	0	0	0	0	123	
1730 - 1745	0	79	20	1	22	0	0	0	0	0	0	0	0	122	
1745 - 1800	0	64	15	0	15	0	0	1	1	0	0	0	0	96	
1800 - 1815	0	70	14	0	12	0	0	0	1	0	0	0	0	97	288
1815 - 1830	0	52	16	1	9	1	0	0	0	0	0	0	0	79	
1830 - 1845	0	39	7	0	11	0	0	0	0	0	0	0	0	57	
1845 - 1900	0	36	10	0	9	0	0	0	0	0	0	0	0	55	
1900 - 1915	0	25	5	0	6	0	0	0	1	0	0	0	0	37	143
1915 - 1930	0	30	4	0	7	0	0	0	0	0	0	0	0	41	
1930 - 1945	0	28	7	0	4	0	0	0	0	0	0	0	0	39	
1945 - 2000	1	18	5	0	2	0	0	0	0	0	0	0	0	26	
2000 - 2015	1	21	5	0	3	0	0	0	0	0	0	0	0	30	112
2015 - 2030	0	18	4	0	4	0	0	0	1	0	0	0	0	27	
2030 - 2045	0	26	4	0	4	0	0	0	0	0	0	0	0	34	
2045 - 2100	0	15	4	0	2	0	0	0	0	0	0	0	0	21	
2100 - 2115	0	23	9	0	3	0	0	0	0	0	0	0	0	35	106
2115 - 2130	0	20	3	0	3	0	0	0	0	0	0	0	0	26	
2130 - 2145	0	10	5	0	3	0	0	0	1	0	0	0	0	19	
2145 - 2200	0	19	4	0	2	0	0	0	1	0	0	0	0	26	
2200 - 2215	0	16	4	0	0	0	0	0	0	0	0	0	0	20	71
2215 - 2230	0	18	2	0	1	0	0	0	0	0	0	0	0	21	
2230 - 2245	0	8	2	0	2	0	0	0	0	0	0	0	0	12	
2245 - 2300	0	14	1	0	2	0	0	1	0	0	0	0	0	18	
2300 - 2315	0	10	2	0	1	0	0	0	0	0	0	0	0	13	42
2315 - 2330	0	11	4	0	1	1	0	0	0	0	0	0	0	17	
2330 - 2345	0	6	2	0	0	0	0	0	0	0	1	0	0	9	
2345 - 0000	0	1	2	0	0	0	0	0	0	0	0	0	0	3	

Session Total	12	3383	1006	21	834	35	6	37	33	0	1	0	0	5368
Session Average	0.13	35.24	10.48	0.22	8.69	0.36	0.06	0.39	0.34	0.00	0.01	0.00	0.00	55.92
Session Percentage	0.22	63.02	18.74	0.39	15.54	0.65	0.11	0.69	0.61	0.00	0.02	0.00	0.00	

Bi-Directional Speed & Class Count || Volume Summary 15min

Rutherford County, TN



Site 1
TN-2 Manchester Pike,
north of Epps Mill Rd

Date
Thursday, November 21, 2024

Weather
Fair
46°F

Lat/Long
35.728310°, -86.315076°

[Click here for Detailed Weather](#)

 [Click here for Map](#)

0000 - 2400 (Weekday 24h Session)
Volume Summary 15min

Time	Volume Summary 15min		15min Total	60min Total
	NB	SB		
0000 - 0015	2	7	9	26
0015 - 0030	1	2	3	
0030 - 0045	4	2	6	
0045 - 0100	4	4	8	
0100 - 0115	3	2	5	16
0115 - 0130	2	0	2	
0130 - 0145	1	1	2	
0145 - 0200	3	4	7	
0200 - 0215	2	2	4	15
0215 - 0230	0	2	2	
0230 - 0245	1	4	5	
0245 - 0300	3	1	4	
0300 - 0315	3	1	4	24
0315 - 0330	1	5	6	
0330 - 0345	1	4	5	
0345 - 0400	4	5	9	
0400 - 0415	4	3	7	48
0415 - 0430	6	3	9	
0430 - 0445	9	5	14	
0445 - 0500	11	7	18	
0500 - 0515	13	17	30	178
0515 - 0530	25	8	33	
0530 - 0545	41	12	53	
0545 - 0600	43	19	62	
0600 - 0615	35	19	54	375
0615 - 0630	80	19	99	
0630 - 0645	70	35	105	
0645 - 0700	76	41	117	
0700 - 0715	82	45	127	429
0715 - 0730	72	46	118	
0730 - 0745	53	49	102	
0745 - 0800	42	40	82	
0800 - 0815	59	16	75	249
0815 - 0830	42	27	69	
0830 - 0845	38	16	54	
0845 - 0900	35	16	51	
0900 - 0915	39	24	63	251
0915 - 0930	31	22	53	
0930 - 0945	37	38	75	
0945 - 1000	31	29	60	
1000 - 1015	29	33	62	260
1015 - 1030	30	33	63	
1030 - 1045	30	44	74	
1045 - 1100	38	23	61	
1100 - 1115	53	30	83	317
1115 - 1130	32	55	87	
1130 - 1145	39	39	78	
1145 - 1200	38	31	69	
1200 - 1215	50	37	87	327
1215 - 1230	40	35	75	
1230 - 1245	47	37	84	
1245 - 1300	38	43	81	
1300 - 1315	46	54	100	341
1315 - 1330	27	37	64	
1330 - 1345	37	55	92	
1345 - 1400	41	44	85	
1400 - 1415	31	46	77	345
1415 - 1430	41	44	85	
1430 - 1445	50	40	90	
1445 - 1500	34	59	93	
1500 - 1515	29	61	90	442
1515 - 1530	45	57	102	
1530 - 1545	50	80	130	
1545 - 1600	39	81	120	
1600 - 1615	39	92	131	486
1615 - 1630	45	88	133	
1630 - 1645	38	70	108	
1645 - 1700	38	76	114	
1700 - 1715	50	86	136	477
1715 - 1730	43	80	123	
1730 - 1745	39	83	122	
1745 - 1800	44	52	96	
1800 - 1815	29	68	97	288
1815 - 1830	26	53	79	
1830 - 1845	19	38	57	
1845 - 1900	13	42	55	
1900 - 1915	11	26	37	143
1915 - 1930	12	29	41	
1930 - 1945	14	25	39	
1945 - 2000	10	16	26	
2000 - 2015	13	17	30	112
2015 - 2030	7	20	27	
2030 - 2045	10	24	34	
2045 - 2100	10	11	21	
2100 - 2115	13	22	35	106
2115 - 2130	9	17	26	
2130 - 2145	5	14	19	
2145 - 2200	13	13	26	
2200 - 2215	11	9	20	71
2215 - 2230	6	15	21	
2230 - 2245	5	7	12	
2245 - 2300	6	12	18	
2300 - 2315	6	7	13	42
2315 - 2330	5	12	17	
2330 - 2345	3	6	9	
2345 - 0000	1	2	3	

Session Total	2536	2832	5368
Session Average	26.42	29.50	55.92
Session Percentage	47.24	52.76	

Bi-Directional Speed & Class Count || Bi-Directional 60min

Rutherford County, TN

Site 1
TN-2 Manchester Pike,
north of Epps Mill Rd

Date
Thursday, November 21, 2024

Weather
Fair
46°F

Lat/Long
35.728310°, -86.315076°

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0000 - 2400 (Weekday 24h Session)
Bi-Directional 60min

Bi-Directional 60min														60min Total
Time	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
0000 - 0100	0	19	4	0	3	0	0	0	0	0	0	0	0	26
0100 - 0200	0	15	0	0	0	0	0	1	0	0	0	0	0	16
0200 - 0300	0	10	3	0	0	1	0	0	1	0	0	0	0	15
0300 - 0400	0	16	4	0	4	0	0	0	0	0	0	0	0	24
0400 - 0500	0	30	12	0	4	1	0	1	0	0	0	0	0	48
0500 - 0600	0	119	32	2	24	0	0	0	1	0	0	0	0	178
0600 - 0700	1	249	68	0	50	5	0	1	1	0	0	0	0	375
0700 - 0800	1	280	70	1	68	6	0	2	1	0	0	0	0	429
0800 - 0900	1	141	58	0	40	3	0	3	3	0	0	0	0	249
0900 - 1000	1	153	50	2	39	1	0	5	0	0	0	0	0	251
1000 - 1100	2	145	57	3	39	3	2	5	4	0	0	0	0	260
1100 - 1200	2	180	68	1	57	3	1	4	1	0	0	0	0	317
1200 - 1300	0	206	62	1	50	2	1	2	3	0	0	0	0	327
1300 - 1400	0	196	65	2	70	1	1	3	3	0	0	0	0	341
1400 - 1500	0	215	56	2	64	2	1	2	3	0	0	0	0	345
1500 - 1600	2	266	88	3	79	0	0	2	2	0	0	0	0	442
1600 - 1700	0	301	95	0	80	4	0	3	3	0	0	0	0	486
1700 - 1800	0	308	89	3	72	1	0	2	2	0	0	0	0	477
1800 - 1900	0	197	47	1	41	1	0	0	1	0	0	0	0	288
1900 - 2000	1	101	21	0	19	0	0	0	1	0	0	0	0	143
2000 - 2100	1	80	17	0	13	0	0	0	1	0	0	0	0	112
2100 - 2200	0	72	21	0	11	0	0	0	2	0	0	0	0	106
2200 - 2300	0	56	9	0	5	0	0	1	0	0	0	0	0	71
2300 - 2400	0	28	10	0	2	1	0	0	0	0	1	0	0	42
Session Total	12	3383	1006	21	834	35	6	37	33	0	1	0	0	5368
Session Average	0.50	140.96	41.92	0.88	34.75	1.46	0.25	1.54	1.38	0.00	0.04	0.00	0.00	223.67
Session Percentage	0.22	63.02	18.74	0.39	15.54	0.65	0.11	0.69	0.61	0.00	0.02	0.00	0.00	
AM Peak Hour	0600 - 0700	0700 - 0800	0700 - 0800	0500 - 0600	0700 - 0800	0700 - 0800	-	0900 - 1000	0800 - 0900	-	-	-	-	0700 - 0800
AM Peak Hour Volume	1	280	70	2	68	6	0	5	3	0	0	0	0	429
Noon Peak Hour	1000 - 1100	1400 - 1500	1100 - 1200	1000 - 1100	1300 - 1400	1000 - 1100	1000 - 1100	1000 - 1100	1000 - 1100	-	-	-	-	1400 - 1500
Noon Peak Hour Volume	2	215	68	3	70	3	2	5	4	0	0	0	0	345
PM Peak Hour	1500 - 1600	1700 - 1800	1600 - 1700	1500 - 1600	1600 - 1700	1600 - 1700	-	1600 - 1700	1600 - 1700	-	-	-	-	1600 - 1700
PM Peak Hour Volume	2	308	95	3	80	4	0	3	3	0	0	0	0	486

Bi-Directional Speed & Class Count || Volume Summary 60min

Rutherford County, TN

Site 1
TN-2 Manchester Pike,
north of Epps Mill Rd

Date
Thursday, November 21, 2024

Lat/Long
35.728310°, -86.315076°

Weather
Fair
46°F

[Click here for Detailed Weather](#)

[Click here for Map](#)

0000 - 2400 (Weekday 24h Session)
Volume Summary 60min

Time	Volume Summary 60min		60min
	NB	SB	Total
0000 - 0100	11	15	26
0100 - 0200	9	7	16
0200 - 0300	6	9	15
0300 - 0400	9	15	24
0400 - 0500	30	18	48
0500 - 0600	122	56	178
0600 - 0700	261	114	375
0700 - 0800	249	180	429
0800 - 0900	174	75	249
0900 - 1000	138	113	251
1000 - 1100	127	133	260
1100 - 1200	162	155	317
1200 - 1300	175	152	327
1300 - 1400	151	190	341
1400 - 1500	156	189	345
1500 - 1600	163	279	442
1600 - 1700	160	326	486
1700 - 1800	176	301	477
1800 - 1900	87	201	288
1900 - 2000	47	96	143
2000 - 2100	40	72	112
2100 - 2200	40	66	106
2200 - 2300	28	43	71
2300 - 2400	15	27	42

Session Total	2536	2832	5368
Session Average	105.67	118.00	223.67
Session Percentage	47.24	52.76	

Bi-Directional Speed & Class Count || Bi-Directional Speed 60min

Rutherford County, TN



Site 1
TN-2 Manchester Pike,
north of Epps Mill Rd

Date
Thursday, November 21, 2024

Weather
Fair
46°F

Lat/Long
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0000 - 2400 (Weekday 24h Session)

Bi-Directional Speed 60min

Bi-Directional 60min																60min
Time	5-14 mph	15-19 mph	20-24 mph	25-29 mph	30-34 mph	35-39 mph	40-44 mph	45-49 mph	50-54 mph	55-59 mph	60-64 mph	65-69 mph	70-74 mph	75-79 mph	80-99 mph	Total
0000 - 0100	0	0	0	0	0	0	1	6	3	6	5	2	3	0	0	26
0100 - 0200	0	0	0	1	0	0	0	2	3	3	6	0	1	0	0	16
0200 - 0300	0	0	0	0	0	0	2	0	3	5	3	0	1	1	0	15
0300 - 0400	0	0	0	0	1	0	0	2	5	6	3	6	1	0	0	24
0400 - 0500	0	0	0	0	0	0	0	5	13	20	4	4	1	1	0	48
0500 - 0600	0	0	0	1	1	0	0	16	50	68	30	8	3	0	1	178
0600 - 0700	0	0	0	5	3	1	2	54	108	130	55	15	0	2	0	375
0700 - 0800	0	1	1	9	10	3	15	59	131	137	53	6	4	0	0	429
0800 - 0900	0	0	0	0	4	0	3	34	71	99	34	3	1	0	0	249
0900 - 1000	1	0	0	4	0	0	8	25	93	81	37	2	0	0	0	251
1000 - 1100	0	2	0	3	3	1	11	41	63	84	40	12	0	0	0	260
1100 - 1200	0	0	2	11	2	5	14	52	91	92	35	10	3	0	0	317
1200 - 1300	0	0	1	5	2	3	18	40	114	93	43	5	1	0	2	327
1300 - 1400	0	0	3	5	4	1	8	53	111	94	53	7	1	1	0	341
1400 - 1500	0	0	0	4	5	11	11	60	105	91	45	9	3	1	0	345
1500 - 1600	2	0	6	2	2	7	10	52	91	154	93	17	3	1	2	442
1600 - 1700	0	0	7	6	4	1	21	72	137	160	66	8	3	1	0	486
1700 - 1800	0	0	0	5	2	7	15	65	177	140	56	9	1	0	0	477
1800 - 1900	0	0	0	3	6	1	2	32	68	115	42	17	1	1	0	288
1900 - 2000	1	0	0	1	2	1	4	8	37	50	30	7	1	1	0	143
2000 - 2100	0	0	1	0	2	1	1	10	19	36	29	8	4	1	0	112
2100 - 2200	0	0	0	2	0	0	2	10	21	40	25	3	1	1	1	106
2200 - 2300	0	0	0	0	0	0	2	6	17	24	18	3	0	0	1	71
2300 - 2400	0	0	0	0	0	0	1	4	9	7	14	7	0	0	0	42
Session Total	4	3	21	67	53	43	151	708	1540	1735	819	168	37	12	7	5368

10mph Pace Speed	Number in Pace
49-58	3276 (61.0%)

15th Percentile	50th Percentile	Average	85th Percentile	95th Percentile
48	55	54	60	64

Summary

TIME	Bi-Directional 60min															Total
	5-14 mph	15-19 mph	20-24 mph	25-29 mph	30-34 mph	35-39 mph	40-44 mph	45-49 mph	50-54 mph	55-59 mph	60-64 mph	65-69 mph	70-74 mph	75-79 mph	80-99 mph	
Thursday, November 21, 2024	4	3	21	67	53	43	151	708	1540	1735	819	168	37	12	7	5368
Session Total	4	3	21	67	53	43	151	708	1540	1735	819	168	37	12	7	5368

AADT

	Total Days	Coverage	ADT	AADT	SD
Total Days	1	0.27	5368.00	5368.00	-
Weekdays	1	0.27	5368.00	5368.00	-
Weekend Days	-	-	-	-	-

Speed Statistics by Hour

TIME	Total	% Split	Min	Max	Mean	Median	Percentile				>PSL (50mph)	>PSL % (50mph)
							15%	50%	85%	95%		
0000 - 0100	26	0.48	44	73	57	57	47	57	66	71	18	69
0100 - 0200	16	0.30	29	70	55	57	49	57	62	64	13	81
0200 - 0300	15	0.28	41	78	57	57	52	57	62	73	13	87
0300 - 0400	24	0.45	30	73	58	57	51	57	66	68	21	88
0400 - 0500	48	0.89	45	76	56	56	50	56	63	68	40	83
0500 - 0600	178	3.32	29	80	56	56	50	56	61	66	150	84
0600 - 0700	375	6.99	25	77	54	55	49	55	60	64	291	78
0700 - 0800	429	7.99	16	73	53	54	48	54	59	62	310	72
0800 - 0900	249	4.64	30	70	54	55	48	55	60	63	197	79
0900 - 1000	251	4.68	7	66	54	54	50	54	60	62	194	77
1000 - 1100	260	4.84	16	68	54	55	48	55	60	64	179	69
1100 - 1200	317	5.91	21	73	52	53	46	53	60	63	207	65
1200 - 1300	327	6.09	22	96	53	54	48	54	60	63	239	73
1300 - 1400	341	6.35	21	76	53	54	48	54	60	63	241	71
1400 - 1500	345	6.43	29	78	53	53	47	53	60	63	224	65
1500 - 1600	442	8.23	6	94	55	56	48	56	62	65	346	78
1600 - 1700	486	9.05	20	76	53	54	48	54	60	62	340	70
1700 - 1800	477	8.89	26	70	53	53	48	53	59	62	357	75
1800 - 1900	288	5.37	25	75	55	56	49	56	61	66	239	83
1900 - 2000	143	2.66	6	75	55	56	50	56	62	65	120	84
2000 - 2100	112	2.09	22	75	57	57	50	57	63	68	93	83
2100 - 2200	106	1.97	27	88	56	57	50	57	62	65	88	83
2200 - 2300	71	1.32	43	86	56	57	50	57	61	64	58	82
2300 - 2400	42	0.78	42	69	58	59	51	59	65	67	36	86
Session Total	5368		6	96	54	55	48	55	60	64	4014	75

Volume Development

Proposed Trip Generation - Project Spring													
ITE Code	Land Use	Setting/Location	Density	Daily			AM Peak Hour			PM Peak Hour			
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	
140	Manufacturing Warehouse	General Urban/Suburban	262,000	s.f.	1,190	595	595	169	128	41	210	65	145
GROSS PROPOSED TRIPS					1,190	595	595	169	128	41	210	65	145

Notes:

INTERSECTION VOLUME WORKSHEET

INTERSECTION 1
Epps Mill Rd at I-24 EB Off-Ramp

AM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				Epps Mill Rd <u>Westbound</u>				<u>Northbound</u>				I-24 EB Off-Ramp <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 AM Volumes	0	0	567	0	0	0	91	0	0	0	0	0	0	103	0	132
Existing Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	0	20	0	0	0	9	0	0	0	0	0	0	7	0	13
Heavy Vehicle %	2	2	4	2	2	2	10	2	2	2	2	2	2	7	2	10
Background Traffic																
Annual Growth Rate (Build-Out)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor (Build-Out)	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips (Build-Out)	0	0	46	0	0	0	7	0	0	0	0	0	0	8	0	11
No-Build 2026 AM Volumes	0	0	613	0	0	0	98	0	0	0	0	0	0	111	0	143
No-Build 2031 AM Volumes	0	0	746	0	0	0	120	0	0	0	0	0	0	136	0	174
Project Traffic																
Trip Distribution IN			10%											35%		
Trip Distribution OUT							(10%)									
Project Trips	0	0	13	0	0	0	4	0	0	0	0	0	0	45	0	0
Build 2026 AM Volumes	0	0	626	0	0	0	102	0	0	0	0	0	0	156	0	143
Build 2031 AM Volumes	0	0	759	0	0	0	124	0	0	0	0	0	0	181	0	174

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 1
Epps Mill Rd at I-24 EB Off-Ramp

PM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				Epps Mill Rd <u>Westbound</u>				<u>Northbound</u>				I-24 EB Off-Ramp <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 PM Volumes	0	0	258	0	0	0	162	0	0	0	0	0	0	133	0	214
Existing Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Conflicting Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicles	0	0	20	0	0	0	9	0	0	0	0	0	0	7	0	13
Heavy Vehicle %	2	2	8	2	2	2	6	2	2	2	2	2	2	5	2	6
Background Traffic																
Annual Growth Rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips	0	0	21	0	0	0	13	0	0	0	0	0	0	11	0	18
No-Build 2026 PM Volumes	0	0	279	0	0	0	175	0	0	0	0	0	0	144	0	232
No-Build 2031 PM Volumes	0	0	340	0	0	0	213	0	0	0	0	0	0	175	0	282
Project Traffic																
Trip Distribution IN			10%											35%		
Trip Distribution OUT							(10%)									
Project Trips	0	0	7	0	0	0	15	0	0	0	0	0	0	23	0	0
Build 2026 PM Volumes	0	0	286	0	0	0	190	0	0	0	0	0	0	167	0	232
Build 2031 PM Volumes	0	0	347	0	0	0	228	0	0	0	0	0	0	198	0	282

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET																
INTERSECTION 2																
Epps Mill Rd at I-24 EB On-Ramp																
AM PEAK HOUR																
	Epps Mill Rd Eastbound				Epps Mill Rd Westbound				Northbound				I-24 EB On-Ramp Southbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 AM Volumes	0	41	629	0	0	0	91	75	0	0	0	0	0	0	0	0
Existing Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	1	27	0	0	0	9	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2	2	4	2	2	2	10	2	2	2	2	2	2	2	2	2
Background Traffic																
Annual Growth Rate (Build-Out)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor (Build-Out)	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips (Build-Out)	0	3	52	0	0	0	7	6	0	0	0	0	0	0	0	0
No-Build 2026 AM Volumes	0	44	681	0	0	0	98	81	0	0	0	0	0	0	0	0
No-Build 2031 AM Volumes	0	54	828	0	0	0	120	99	0	0	0	0	0	0	0	0
Project Traffic																
Trip Distribution IN			45%													
Trip Distribution OUT							(10%)	(35%)								
Project Trips	0	0	58	0	0	0	4	14	0	0	0	0	0	0	0	0
Build 2026 AM Volumes	0	44	739	0	0	0	102	95	0	0	0	0	0	0	0	0
Build 2031 AM Volumes	0	54	886	0	0	0	124	113	0	0	0	0	0	0	0	0

INTERSECTION VOLUME WORKSHEET

INTERSECTION 2

Epps Mill Rd at I-24 EB On-Ramp

PM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				Epps Mill Rd <u>Westbound</u>				<u>Northbound</u>				I-24 EB On-Ramp <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 PM Volumes	0	42	349	0	0	0	162	80	0	0	0	0	0	0	0	0
Existing Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Conflicting Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicles	0	1	27	0	0	0	9	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2	2	8	2	2	2	6	2	2	2	2	2	2	2	2	2
Background Traffic																
Annual Growth Rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips	0	3	29	0	0	0	13	7	0	0	0	0	0	0	0	0
No-Build 2026 PM Volumes	0	45	378	0	0	0	175	87	0	0	0	0	0	0	0	0
No-Build 2031 PM Volumes	0	55	459	0	0	0	213	105	0	0	0	0	0	0	0	0
Project Traffic																
Trip Distribution IN			45%													
Trip Distribution OUT							(10%)	(35%)								
Project Trips	0	0	29	0	0	0	15	51	0	0	0	0	0	0	0	0
Build 2026 PM Volumes	0	45	407	0	0	0	190	138	0	0	0	0	0	0	0	0
Build 2031 PM Volumes	0	55	488	0	0	0	228	156	0	0	0	0	0	0	0	0

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 3

Epps Mill Rd at I-24 NB Off Ramp/I-24 NB On Ramp

AM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				Epps Mill Rd <u>Westbound</u>				I-24 NB Off Ramp <u>Northbound</u>				I-24 NB On Ramp <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 AM Volumes	0	404	219	0	0	0	140	219	0	18	2	85	0	0	0	0
Existing Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	16	10	0	0	0	10	3	0	3	2	2	0	0	0	0
Heavy Vehicle %	2	4	5	2	2	2	7	2	2	17	100	2	2	2	2	2
Background Traffic																
Annual Growth Rate (Build-Out)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor (Build-Out)	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips (Build-Out)	0	33	18	0	0	0	11	18	0	1	0	7	0	0	0	0
No-Build 2026 AM Volumes	0	437	237	0	0	0	151	237	0	19	2	92	0	0	0	0
No-Build 2031 AM Volumes	0	532	288	0	0	0	184	288	0	24	3	112	0	0	0	0
Project Traffic																
Trip Distribution IN			45%									35%				
Trip Distribution OUT							(45%)	(35%)								
Project Trips	0	0	58	0	0	0	18	14	0	0	0	45	0	0	0	0
Build 2026 AM Volumes	0	437	295	0	0	0	169	251	0	19	2	137	0	0	0	0
Build 2031 AM Volumes	0	532	346	0	0	0	202	302	0	24	3	157	0	0	0	0

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 3

Epps Mill Rd at I-24 NB Off Ramp/I-24 NB On Ramp

PM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				Epps Mill Rd <u>Westbound</u>				I-24 NB Off Ramp <u>Northbound</u>				I-24 NB On Ramp <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 PM Volumes	0	131	225	0	0	0	220	149	0	23	0	81	0	0	0	0
Existing Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	14	5	0	0	0	15	3	0	2	0	5	0	0	0	0
Heavy Vehicle %	2	11	2	2	2	2	7	2	2	9	2	6	2	2	2	2
Background Traffic																
Annual Growth Rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips	0	11	18	0	0	0	18	12	0	2	0	7	0	0	0	0
No-Build 2026 PM Volumes	0	142	243	0	0	0	238	161	0	25	0	88	0	0	0	0
No-Build 2031 PM Volumes	0	172	296	0	0	0	290	196	0	30	0	107	0	0	0	0
Project Traffic																
Trip Distribution IN			45%									35%				
Trip Distribution OUT							(45%)	(35%)								
Project Trips	0	0	29	0	0	0	65	51	0	0	0	23	0	0	0	0
Build 2026 PM Volumes	0	142	272	0	0	0	303	212	0	25	0	111	0	0	0	0
Build 2031 PM Volumes	0	172	325	0	0	0	355	247	0	30	0	130	0	0	0	0

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 4

Hughes Rd at Manchester Pike

AM PEAK HOUR

	<u>Eastbound</u>				<u>Hughes Rd Westbound</u>				<u>Manchester Pike Northbound</u>				<u>Manchester Pike Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 AM Volumes	0	0	0	0	0	18	0	1	0	0	259	2	0	5	168	0
Existing Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	0	0	0	0	1	0	0	0	0	10	0	0	1	13	0
Heavy Vehicle %	2	2	2	2	2	6	2	2	2	2	4	2	2	20	8	2
Background Traffic																
Annual Growth Rate (Build-Out)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor (Build-Out)	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips (Build-Out)	0	0	0	0	0	1	0	0	0	0	21	0	0	0	14	0
No-Build 2026 AM Volumes	0	0	0	0	0	19	0	1	0	0	280	2	0	5	182	0
No-Build 2031 AM Volumes	0	0	0	0	0	24	0	1	0	0	341	3	0	7	221	0
Project Traffic																
Trip Distribution IN															10%	
Trip Distribution OUT											(10%)					
Project Trips	0	0	0	0	0	0	0	0	0	0	4	0	0	0	13	0
Build 2026 AM Volumes	0	0	0	0	0	19	0	1	0	0	284	2	0	5	195	0
Build 2031 AM Volumes	0	0	0	0	0	24	0	1	0	0	345	3	0	7	234	0

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 4

Hughes Rd at Manchester Pike

PM PEAK HOUR

	<u>Eastbound</u>				<u>Hughes Rd Westbound</u>				<u>Manchester Pike Northbound</u>				<u>Manchester Pike Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 PM Volumes	0	0	0	0	0	4	0	4	0	0	169	6	0	1	331	0
Existing Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	0	0	0	0	1	0	1	0	0	9	0	0	0	11	0
Heavy Vehicle %	2	2	2	2	2	25	2	25	2	2	5	2	2	2	3	2
Background Traffic																
Annual Growth Rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips	0	0	0	0	0	0	0	0	0	0	14	0	0	0	27	0
No-Build 2026 PM Volumes	0	0	0	0	0	4	0	4	0	0	183	6	0	1	358	0
No-Build 2031 PM Volumes	0	0	0	0	0	5	0	5	0	0	222	8	0	1	436	0
Project Traffic																
Trip Distribution IN															10%	
Trip Distribution OUT												(10%)				
Project Trips	0	0	0	0	0	0	0	0	0	0	15	0	0	0	7	0
Build 2026 PM Volumes	0	0	0	0	0	4	0	4	0	0	198	6	0	1	365	0
Build 2031 PM Volumes	0	0	0	0	0	5	0	5	0	0	237	8	0	1	443	0

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 5

Epps Mill Rd at Manchester Pike

AM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				<u>Westbound</u>				Manchester Pike <u>Northbound</u>				Manchester Pike <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 AM Volumes	0	129	0	38	0	0	0	0	0	97	129	0	0	0	63	122
Existing Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Conflicting Pedestrians		0		0				0				0			0	0
Heavy Vehicles	0	6	0	3	0	0	0	0	0	2	4	0	0	0	6	8
Heavy Vehicle %	2	5	2	8	2	2	2	2	2	2	3	2	2	2	10	7
Background Traffic																
Annual Growth Rate (Build-Out)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor (Build-Out)	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips (Build-Out)	0	11	0	3	0	0	0	0	0	8	11	0	0	0	5	10
No-Build 2026 AM Volumes	0	140	0	41	0	0	0	0	0	105	140	0	0	0	68	132
No-Build 2031 AM Volumes	0	170	0	50	0	0	0	0	0	128	170	0	0	0	83	161
Project Traffic																
Trip Distribution IN			80%									10%		10%		
Trip Distribution OUT						(10%)	(80%)	(10%)								
Project Trips	0	0	102	0	0	4	33	4	0	0	0	13	0	13	0	0
Build 2026 AM Volumes	0	140	102	41	0	4	33	4	0	105	140	13	0	13	68	132
Build 2031 AM Volumes	0	170	102	50	0	4	33	4	0	128	170	13	0	13	83	161

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 5

Epps Mill Rd at Manchester Pike

PM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				<u>Westbound</u>				Manchester Pike <u>Northbound</u>				Manchester Pike <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 PM Volumes	0	85	0	105	0	0	0	0	0	58	85	0	0	0	212	126
Existing Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Conflicting Pedestrians		0		0			0			0		0			0	0
Heavy Vehicles	0	4	0	5	0	0	0	0	0	7	6	0	0	0	3	8
Heavy Vehicle %	2	5	2	5	2	2	2	2	2	12	7	2	2	2	2	6
Background Traffic																
Annual Growth Rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips	0	7	0	9	0	0	0	0	0	5	7	0	0	0	17	10
No-Build 2026 PM Volumes	0	92	0	114	0	0	0	0	0	63	92	0	0	0	229	136
No-Build 2031 PM Volumes	0	112	0	138	0	0	0	0	0	76	112	0	0	0	279	166
Project Traffic																
Trip Distribution IN			80%									10%		10%		
Trip Distribution OUT						(10%)	(80%)	(10%)								
Project Trips	0	0	52	0	0	15	116	15	0	0	0	7	0	7	0	0
Build 2026 PM Volumes	0	92	52	114	0	15	116	15	0	63	92	7	0	7	229	136
Build 2031 PM Volumes	0	112	52	138	0	15	116	15	0	76	112	7	0	7	279	166

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 6

Cobb Rd at Manchester Pike

AM PEAK HOUR

	<u>Eastbound</u>				<u>Cobb Rd Westbound</u>				<u>Manchester Pike Northbound</u>				<u>Manchester Pike Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 AM Volumes	0	0	0	0	0	3	0	13	0	0	217	1	0	16	84	0
Existing Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	0	0	0	0	1	0	3	0	0	3	0	0	0	9	0
Heavy Vehicle %	2	2	2	2	2	33	2	23	2	2	2	2	2	2	11	2
Background Traffic																
Annual Growth Rate (Build-Out)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor (Build-Out)	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips (Build-Out)	0	0	0	0	0	0	0	1	0	0	18	0	0	1	7	0
No-Build 2026 AM Volumes	0	0	0	0	0	3	0	14	0	0	235	1	0	17	91	0
No-Build 2031 AM Volumes	0	0	0	0	0	4	0	17	0	0	286	1	0	21	111	0
Project Traffic																
Trip Distribution IN											10%					
Trip Distribution OUT															(10%)	
Project Trips	0	0	0	0	0	0	0	0	0	0	13	0	0	0	4	0
Build 2026 AM Volumes	0	0	0	0	0	3	0	14	0	0	248	1	0	17	95	0
Build 2031 AM Volumes	0	0	0	0	0	4	0	17	0	0	299	1	0	21	115	0

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET

INTERSECTION 6

Cobb Rd at Manchester Pike

PM PEAK HOUR

	<u>Eastbound</u>				<u>Cobb Rd Westbound</u>				<u>Manchester Pike Northbound</u>				<u>Manchester Pike Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 PM Volumes	0	0	0	0	0	2	0	6	0	0	137	1	0	12	303	0
Existing Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	0	0	0	0	0	0	2	0	0	10	0	0	1	7	0
Heavy Vehicle %	2	2	2	2	2	2	2	33	2	2	7	2	2	8	2	2
Background Traffic																
Annual Growth Rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips	0	0	0	0	0	0	0	0	0	0	11	0	0	1	25	0
No-Build 2026 PM Volumes	0	0	0	0	0	2	0	6	0	0	148	1	0	13	328	0
No-Build 2031 PM Volumes	0	0	0	0	0	3	0	8	0	0	180	1	0	16	399	0
Project Traffic																
Trip Distribution IN											10%					
Trip Distribution OUT															(10%)	
Project Trips	0	0	0	0	0	0	0	0	0	0	7	0	0	0	15	0
Build 2026 PM Volumes	0	0	0	0	0	2	0	6	0	0	155	1	0	13	343	0
Build 2031 PM Volumes	0	0	0	0	0	3	0	8	0	0	187	1	0	16	414	0

Project Spring Traffic Impact Study

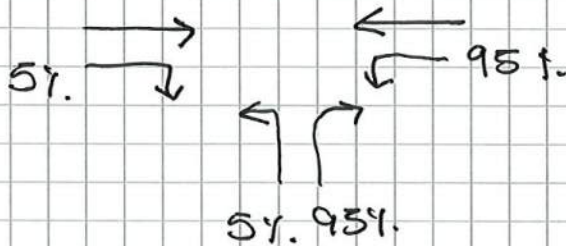
AAST DATA FROM REFLICA

$$\begin{array}{r} 3740 \\ \hline 3540 \end{array}$$

$$\begin{array}{r} 4430 \\ \hline 4030 \end{array}$$

EPDS MILL RD @
MILLER RD

$$\begin{array}{r} 792 \\ \hline 598 \end{array}$$



ASSUMED DISTIN

$$\begin{array}{l} 51. (792) = 40 \text{ EBR} \\ 95. (792) = 752 \text{ WBL} \end{array}$$

$$\begin{array}{l} 3540 - 40 = 3500 \text{ EBT} \\ 4430 - 752 = 3678 \text{ WBT} \end{array}$$

$$\begin{array}{l} 51. (598) = 30 \text{ NBL} \\ 95. (598) = 568 \text{ NBR} \end{array}$$

→ EXCEL TOD CALCS.

$$\text{WBT} : \frac{752}{752 + 3678} = 17.1\% \text{ WBL} \rightarrow 83\% \text{ WBT}$$

$$\text{EBT/NBR} : \frac{3500}{3500 + 568} = 86\% \text{ EBT} \rightarrow 14\% \text{ NBR}$$

$$\text{WBT/NBL} : \frac{3678}{3678 + 30} = 99\% \text{ WBT} \rightarrow 1\% \text{ NBL}$$

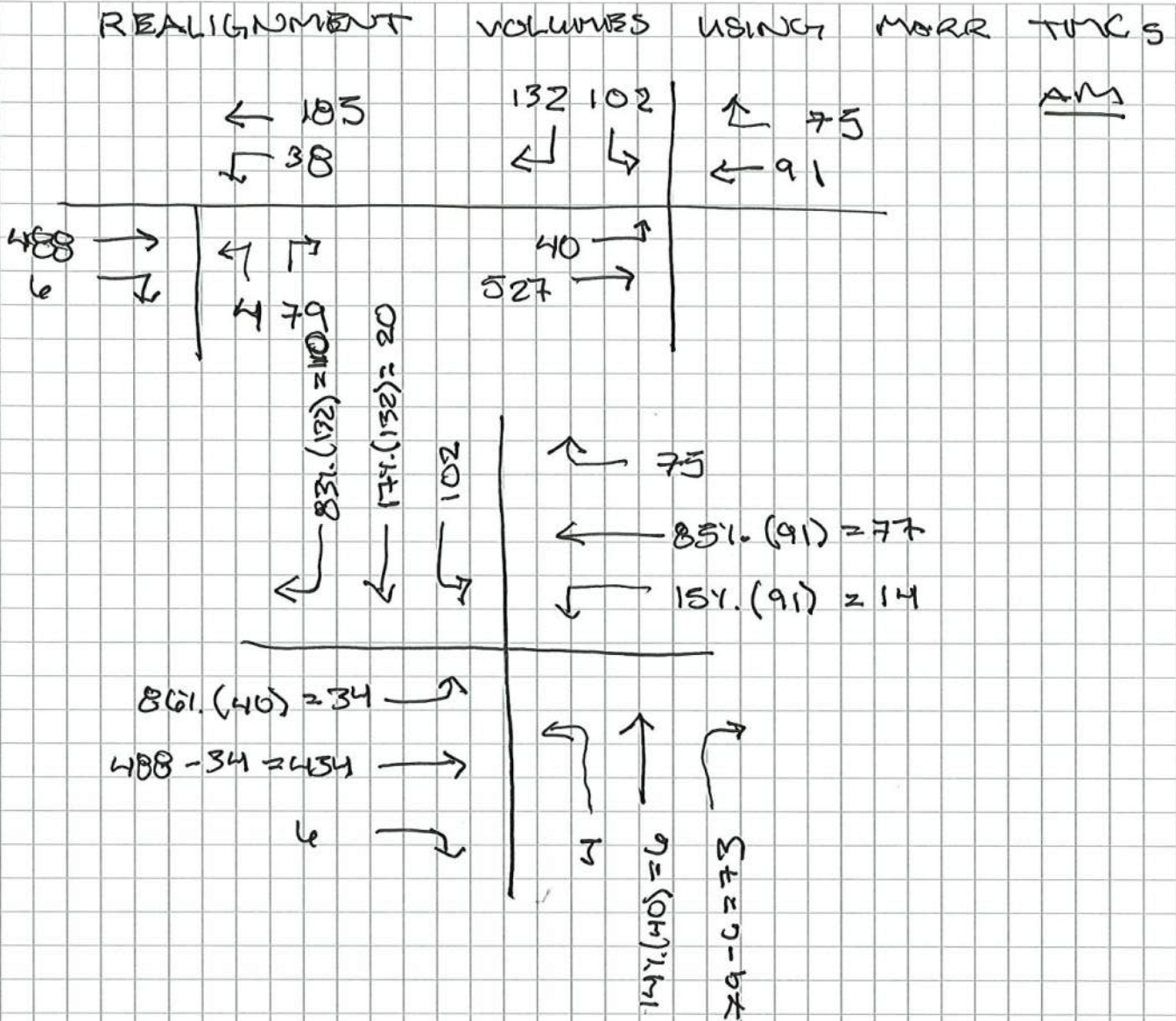
From TDOT Count Station : 75000110								EBT	EBR	WBL	WBT	NBL	NBR
								3500	40	752	3678	30	568
0:00-1:00	7	4	1	3	15	0.35%		12	0	3	13	0	2
1:00-2:00	5	2	1	0	8	0.19%		7	0	1	7	0	1
2:00-3:00	1	0	4	2	7	0.16%		6	0	1	6	0	1
3:00-4:00	0	5	5	4	14	0.33%		11	0	2	12	0	2
4:00-5:00	4	10	10	19	43	1.00%		35	0	8	37	0	6
5:00-6:00	18	38	47	53	156	3.64%		127	1	27	134	1	21
6:00-7:00	67	78	86	103	334	7.79%		273	3	59	286	2	44
7:00-8:00	96	108	128	87	419	9.77%		342	4	73	359	3	56
8:00-9:00	48	68	39	59	214	4.99%		175	2	38	184	1	28
9:00-10:00	42	39	44	42	167	3.89%		136	2	29	143	1	22
10:00-11:00	52	40	52	41	185	4.31%		151	2	32	159	1	25
11:00-12:00	38	44	44	46	172	4.01%		140	2	30	148	1	23
12:00-13:00	61	54	52	48	215	5.01%		175	2	38	184	2	28
13:00-14:00	57	43	46	60	206	4.80%		168	2	36	177	1	27
14:00-15:00	58	69	73	66	266	6.20%		217	2	47	228	2	35
15:00-16:00	83	77	92	97	349	8.14%		285	3	61	299	2	46
16:00-17:00	102	91	95	82	370	8.63%		302	3	65	317	3	49
17:00-18:00	95	96	102	91	384	8.96%		313	4	67	329	3	51
18:00-19:00	92	73	79	57	301	7.02%		246	3	53	258	2	40
19:00-20:00	48	58	40	43	189	4.41%		154	2	33	162	1	25
20:00-21:00	39	38	27	20	124	2.89%		101	1	22	106	1	16
21:00-22:00	28	19	18	14	79	1.84%		64	1	14	68	1	10
22:00-23:00	9	13	13	9	44	1.03%		36	0	8	38	0	6
23:00-24:00	7	6	10	4	27	0.63%		22	0	5	23	0	4
Total:					4288	1	3498	39	752	3677	28	568	

Intersection 1 - Marr TMC's		
	EB	WB
AM	567	223
PM	258	376

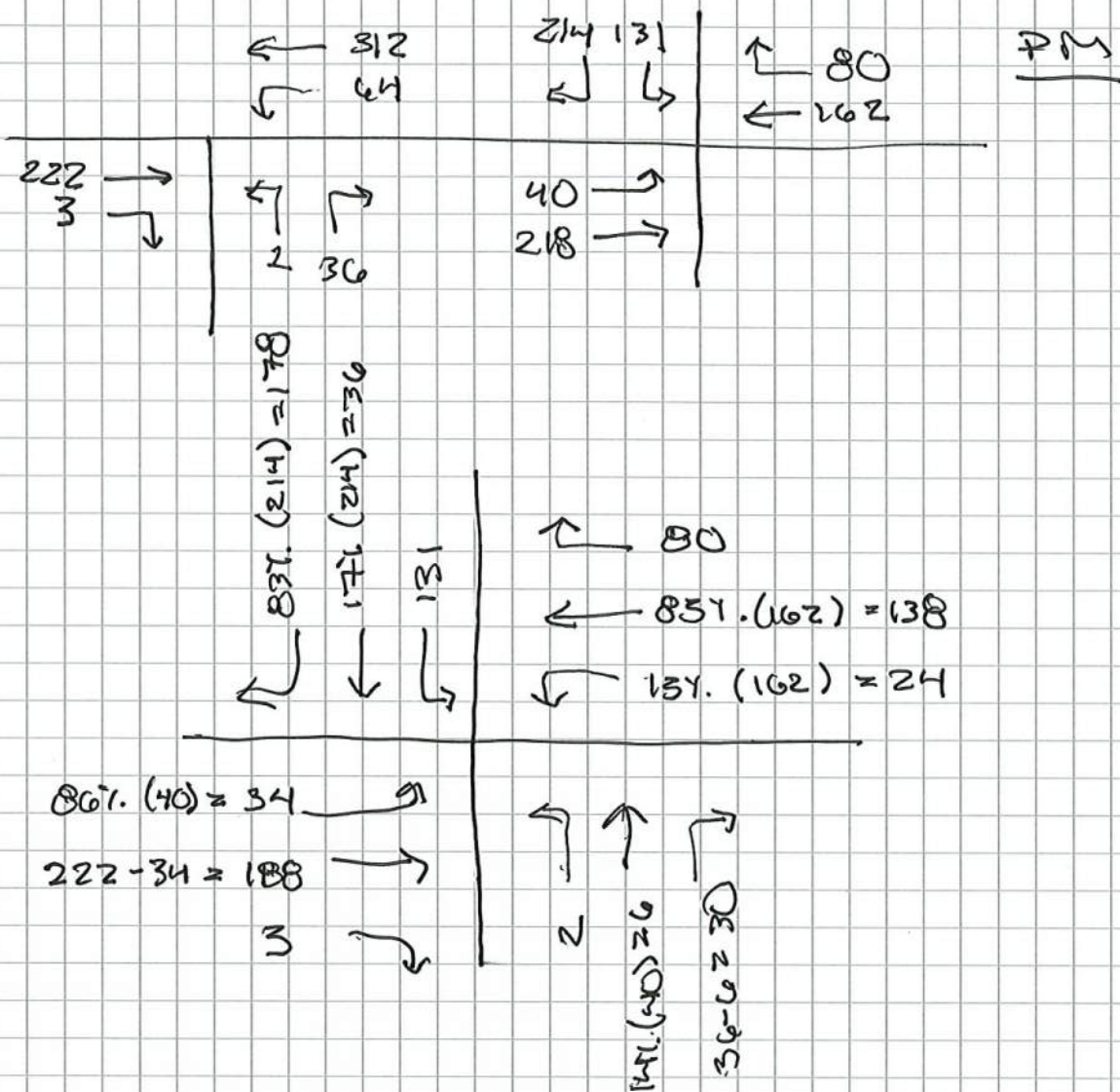
Miller Road Peak TMCs	
WBL	WBT
38	185
64	312
EBT	NBR
488	79
222	36
EBR*	NBL*
6	4
3	2

*Based on vol proportions

Final TMCs at Epps Mill Road/Miller Road					
EBT	EBR	WBL	WBT	NBL	NBR
488	6	38	185	4	79
222	3	64	312	2	36



REALIGNMENT VOLUMES WANG MAZ2 TMC S



INTERSECTION VOLUME WORKSHEET
INTERSECTION 1 (With TDOT Realignment)
Epps Mill Rd at Miller Road/I-24 EB Ramps

AM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				Epps Mill Rd <u>Westbound</u>				Miller Road <u>Northbound</u>				I-24 EB Ramps <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 AM Volumes	0	34	454	6	0	14	77	75	0	4	6	73	1	102	20	110
Existing Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	12	17	0	0	1	8	4	0	0	2	3	1	6	2	11
Heavy Vehicle %	2	35	4	2	2	7	10	5	2	2	33	4	100	6	10	10
Background Traffic																
Annual Growth Rate (Build-Out)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor (Build-Out)	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips (Build-Out)	0	3	37	0	0	1	6	6	0	0	0	6	0	8	2	9
Annual Growth Rate (Horizon)	4.0%	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Growth Factor (Horizon)	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316
Growth Trips (Horizon)	0	11	143	2	0	4	24	24	0	1	2	23	0	32	6	35
No-Build 2026 AM Volumes	0	37	491	6	0	15	83	81	0	4	6	79	1	110	22	119
No-Build 2031 AM Volumes	0	45	597	8	0	18	101	99	0	5	8	96	1	134	26	145
Project Traffic																
Trip Distribution IN			10%											35%		
Trip Distribution OUT							(10%)	(35%)								
Project Trips	0	0	13	0	0	0	4	14	0	0	0	0	0	45	0	0
Build 2026 AM Volumes	0	37	504	6	0	15	87	95	0	4	6	79	1	155	22	119
Build 2031 AM Volumes	0	45	610	8	0	18	105	113	0	5	8	96	1	179	26	145

Project Spring Traffic Impact Study

INTERSECTION VOLUME WORKSHEET
INTERSECTION 1 (With TDOT Realignment)
Epps Mill Rd at Miller Road/I-24 EB Ramps

PM PEAK HOUR

	Epps Mill Rd <u>Eastbound</u>				Epps Mill Rd <u>Westbound</u>				Miller Road <u>Northbound</u>				I-24 EB Ramps <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Existing Traffic																
Existing 2024 PM Volumes	0	34	188	3	0	24	138	80	0	2	6	30	2	131	36	178
Existing Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Heavy Vehicles	0	7	13	0	0	2	13	1	0	0	1	2	2	4	3	15
Heavy Vehicle %	2	21	7	2	2	8	9	2	2	2	17	7	100	3	8	8
Background Traffic																
Annual Growth Rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Growth Factor	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082	1.082
Growth Trips	0	3	15	0	0	2	11	7	0	0	0	2	0	11	3	15
Annual Growth Rate (Horizon)	4.0%	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Growth Factor (Horizon)	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316	1.316
Growth Trips (Horizon)	0	11	59	1	0	8	44	25	0	1	2	9	1	41	11	56
No-Build 2026 PM Volumes	0	37	203	3	0	26	149	87	0	2	6	32	2	142	39	193
No-Build 2031 PM Volumes	0	45	247	4	0	32	182	105	0	3	8	39	3	172	47	234
Project Traffic																
Trip Distribution IN			10%											35%		
Trip Distribution OUT							(10%)	(35%)								
Project Trips	0	0	7	0	0	0	15	51	0	0	0	0	0	23	0	0
Build 2026 PM Volumes	0	37	210	3	0	26	164	138	0	2	6	32	2	165	39	193
Build 2031 PM Volumes	0	45	254	4	0	32	197	156	0	3	8	39	3	195	47	234

Project Spring Traffic Impact Study

Notes: The proportions of traffic entering/exiting Miller Road were estimated using online data from Replica and assumed that 95% of traffic leaving Miller Road turned right onto Epps Mill Road. These proportions were then applied to count data collected at Intersection 1.

Capacity Reports

HCM 7th TWSC
1: Epps Mill Road & I-24 EB Off-Ramp

Project Spring
Existing AM

Intersection						
Int Delay, s/veh	3.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	567	91	0	103	132
Future Vol, veh/h	0	567	91	0	103	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	4	10	2	7	10
Mvmt Flow	0	637	102	0	116	148
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	739	102
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	637	-
Critical Hdwy	-	-	-	-	6.47	6.3
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	-	-	-	-	3.563	3.39
Pot Cap-1 Maneuver	0	-	-	0	377	931
Stage 1	0	-	-	0	910	-
Stage 2	0	-	-	0	517	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	377	931
Mov Cap-2 Maneuver	-	-	-	-	377	-
Stage 1	-	-	-	-	910	-
Stage 2	-	-	-	-	517	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0	0		13.59		
HCM LOS				B		
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	377	931		
HCM Lane V/C Ratio	-	-	0.307	0.159		
HCM Control Delay (s/veh)	-	-	18.7	9.6		
HCM Lane LOS	-	-	C	A		
HCM 95th %tile Q(veh)	-	-	1.3	0.6		

HCM 7th TWSC
2: Epps Mill Road & I-24 EB On-Ramp

Project Spring
Existing AM

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	41	629	91	75	0	0
Future Vol, veh/h	41	629	91	75	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	4	10	2	2	2
Mvmt Flow	46	707	102	84	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	102	0	-	0	901	-
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	799	-
Critical Hdwy	4.12	-	-	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	-
Pot Cap-1 Maneuver	1490	-	-	0	309	0
Stage 1	-	-	-	0	922	0
Stage 2	-	-	-	0	443	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1490	-	-	-	293	-
Mov Cap-2 Maneuver	-	-	-	-	293	-
Stage 1	-	-	-	-	875	-
Stage 2	-	-	-	-	443	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.46	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	110	-	-	-		
HCM Lane V/C Ratio	0.031	-	-	-		
HCM Control Delay (s/veh)	7.5	0	-	0		
HCM Lane LOS	A	A	-	A		
HCM 95th %tile Q(veh)	0.1	-	-	-		

**Southbound left movement does not exist, but was included in order to run Synchro analysis.*

HCM 7th TWSC
3: I-24 WB Off-Ramp/I-24 WB On-Ramp & Epps Mill Road

Project Spring
Existing AM

Intersection												
Int Delay, s/veh	6.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱			
Traffic Vol, veh/h	404	219	0	0	140	219	18	2	85	0	0	0
Future Vol, veh/h	404	219	0	0	140	219	18	2	85	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	50	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	4	5	2	2	7	2	17	100	2	2	2	2
Mvmt Flow	487	264	0	0	169	264	22	2	102	0	0	0

Major/Minor	Major1			Major2			Minor1			
Conflicting Flow All	433	0	-	-	-	-	0	1406	1670	264
Stage 1	-	-	-	-	-	-	-	1237	1237	-
Stage 2	-	-	-	-	-	-	-	169	433	-
Critical Hdwy	4.14	-	-	-	-	-	-	6.57	7.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.57	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	5.57	6.5	-
Follow-up Hdwy	2.236	-	-	-	-	-	-	3.653	4.9	3.318
Pot Cap-1 Maneuver	1116	-	0	0	-	-	-	142	57	775
Stage 1	-	-	0	0	-	-	-	255	163	-
Stage 2	-	-	0	0	-	-	-	826	445	-
Platoon blocked, %		-			-	-				
Mov Cap-1 Maneuver	1116	-	-	-	-	-	-	70	0	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	70	0	-
Stage 1	-	-	-	-	-	-	-	125	0	-
Stage 2	-	-	-	-	-	-	-	826	0	-

Approach	EB			WB			NB		
HCM Control Delay, s/v	6.93			0			24.01		
HCM LOS							C		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	70	775	953	-	-	-
HCM Lane V/C Ratio	0.346	0.132	0.436	-	-	-
HCM Control Delay (s/veh)	82	10.4	10.7	0	-	-
HCM Lane LOS	F	B	B	A	-	-
HCM 95th %tile Q(veh)	1.3	0.5	2.3	-	-	-

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Existing AM

Intersection

Int Delay, s/veh 0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	1	259	2	5	168
Future Vol, veh/h	18	1	259	2	5	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	21	1	301	2	6	195

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	509	302	0
Stage 1	302	-	-
Stage 2	207	-	-
Critical Hdwy	6.46	6.22	-
Critical Hdwy Stg 1	5.46	-	-
Critical Hdwy Stg 2	5.46	-	-
Follow-up Hdwy	3.554	3.318	-
Pot Cap-1 Maneuver	517	737	-
Stage 1	741	-	-
Stage 2	818	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	514	737	-
Mov Cap-2 Maneuver	514	-	-
Stage 1	741	-	-
Stage 2	814	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.2	0	0.23
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	522	52
HCM Lane V/C Ratio	-	-	0.042	0.005
HCM Control Delay (s/veh)	-	-	12.2	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road

Project Spring
Existing AM

Intersection						
Int Delay, s/veh	6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	129	38	97	129	63	122
Future Vol, veh/h	129	38	97	129	63	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	5	8	2	3	10	7
Mvmt Flow	152	45	114	152	74	144

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	526	146	218	0	-	0
Stage 1	146	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Critical Hdwy	6.45	6.28	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.372	2.218	-	-	-
Pot Cap-1 Maneuver	507	886	1352	-	-	-
Stage 1	874	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	460	886	1352	-	-	-
Mov Cap-2 Maneuver	460	-	-	-	-	-
Stage 1	794	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v16.17		3.39	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	773	-	517	-	-
HCM Lane V/C Ratio	0.084	-	0.38	-	-
HCM Control Delay (s/veh)	7.9	0	16.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.8	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	13	217	1	16	84
Future Vol, veh/h	3	13	217	1	16	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	3	15	252	1	19	98
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	388	253	0	0	253	0
Stage 1	253	-	-	-	-	-
Stage 2	135	-	-	-	-	-
Critical Hdwy	6.73	6.43	-	-	4.12	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.507	-	-	2.218	-
Pot Cap-1 Maneuver	560	737	-	-	1312	-
Stage 1	722	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	551	737	-	-	1312	-
Mov Cap-2 Maneuver	551	-	-	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v10.34		0	1.25			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	693	288	-	
HCM Lane V/C Ratio	-	-	0.027	0.014	-	
HCM Control Delay (s/veh)	-	-	10.3	7.8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Intersection

Int Delay, s/veh 5.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	258	162	0	133	214
Future Vol, veh/h	0	258	162	0	133	214
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	8	6	2	5	6
Mvmt Flow	0	307	193	0	158	255

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	0 500 193
Stage 1	-	-	- 193 -
Stage 2	-	-	- 307 -
Critical Hdwy	-	-	- 6.45 6.26
Critical Hdwy Stg 1	-	-	- 5.45 -
Critical Hdwy Stg 2	-	-	- 5.45 -
Follow-up Hdwy	-	-	- 3.545 3.354
Pot Cap-1 Maneuver	0	-	0 525 839
Stage 1	0	-	0 833 -
Stage 2	0	-	0 739 -
Platoon blocked, %	-	-	
Mov Cap-1 Maneuver	-	-	- 525 839
Mov Cap-2 Maneuver	-	-	- 525 -
Stage 1	-	-	- 833 -
Stage 2	-	-	- 739 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	12.55
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	525	839
HCM Lane V/C Ratio	-	-	0.302	0.304
HCM Control Delay (s/veh)	-	-	14.8	11.2
HCM Lane LOS	-	-	B	B
HCM 95th %tile Q(veh)	-	-	1.3	1.3

HCM 7th TWSC
2: Epps Mill Road & I-24 EB On-Ramp

Project Spring
Existing PM

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	42	349	162	80	0	0
Future Vol, veh/h	42	349	162	80	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	8	6	2	2	2
Mvmt Flow	50	415	193	95	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	193	0	-	0	708	-
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	515	-
Critical Hdwy	4.12	-	-	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	-
Pot Cap-1 Maneuver	1380	-	-	0	401	0
Stage 1	-	-	-	0	840	0
Stage 2	-	-	-	0	599	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1380	-	-	-	382	-
Mov Cap-2 Maneuver	-	-	-	-	382	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	599	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.83	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	193	-	-	-		
HCM Lane V/C Ratio	0.036	-	-	-		
HCM Control Delay (s/veh)	7.7	0	-	0		
HCM Lane LOS	A	A	-	A		
HCM 95th %tile Q(veh)	0.1	-	-	-		

**Southbound left movement does not exist, but was included in order to run Synchro analysis.*

HCM 7th TWSC
3: I-24 WB Off-Ramp/I-24 WB On-Ramp & Epps Mill Road

Project Spring
Existing PM

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱			
Traffic Vol, veh/h	131	225	0	0	220	149	23	0	81	0	0	0
Future Vol, veh/h	131	225	0	0	220	149	23	0	81	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	50	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	11	2	2	2	7	2	9	2	6	2	2	2
Mvmt Flow	156	268	0	0	262	177	27	0	96	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	439	0	-	-	-	0	842	1019	268
Stage 1	-	-	-	-	-	-	580	580	-
Stage 2	-	-	-	-	-	-	262	439	-
Critical Hdwy	4.21	-	-	-	-	-	6.49	6.52	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.49	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.49	5.52	-
Follow-up Hdwy	2.299	-	-	-	-	-	3.581	4.018	3.354
Pot Cap-1 Maneuver	1074	-	0	0	-	-	325	237	761
Stage 1	-	-	0	0	-	-	546	500	-
Stage 2	-	-	0	0	-	-	766	578	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1074	-	-	-	-	-	270	0	761
Mov Cap-2 Maneuver	-	-	-	-	-	-	270	0	-
Stage 1	-	-	-	-	-	-	453	0	-
Stage 2	-	-	-	-	-	-	766	0	-

Approach	EB	WB	NB
HCM Control Delay, s/v	3.28	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	270	761	662	-	-	-
HCM Lane V/C Ratio	0.101	0.127	0.145	-	-	-
HCM Control Delay (s/veh)	19.8	10.4	8.9	0	-	-
HCM Lane LOS	C	B	A	A	-	-
HCM 95th %tile Q(veh)	0.3	0.4	0.5	-	-	-

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Existing PM

Intersection

Int Delay, s/veh 0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	169	6	1	331
Future Vol, veh/h	4	4	169	6	1	331
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	5	2	2	3
Mvmt Flow	4	4	184	7	1	360

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	549	187	0
Stage 1	187	-	-
Stage 2	362	-	-
Critical Hdwy	6.65	6.45	-
Critical Hdwy Stg 1	5.65	-	-
Critical Hdwy Stg 2	5.65	-	-
Follow-up Hdwy	3.725	3.525	-
Pot Cap-1 Maneuver	460	799	-
Stage 1	793	-	-
Stage 2	657	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	459	799	-
Mov Cap-2 Maneuver	459	-	-
Stage 1	793	-	-
Stage 2	656	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v11.27		0	0.02
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	583	5
HCM Lane V/C Ratio	-	-	0.015	0.001
HCM Control Delay (s/veh)	-	-	11.3	7.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	105	58	85	212	126
Future Vol, veh/h	85	105	58	85	212	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	12	7	2	6
Mvmt Flow	92	114	63	92	230	137
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	517	299	367	0	-	0
Stage 1	299	-	-	-	-	-
Stage 2	218	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.22	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.308	-	-	-
Pot Cap-1 Maneuver	513	734	1138	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	811	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	483	734	1138	-	-	-
Mov Cap-2 Maneuver	483	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	811	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s/v14.22		3.39		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	730	-	595	-	-	
HCM Lane V/C Ratio	0.055	-	0.347	-	-	
HCM Control Delay (s/veh)	8.3	0	14.2	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	1.5	-	-	

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	2	6	137	1	12	303
Future Vol, veh/h	2	6	137	1	12	303
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	33	7	2	8	2
Mvmt Flow	2	6	147	1	13	326

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	499	148	0
Stage 1	148	-	-
Stage 2	352	-	-
Critical Hdwy	6.42	6.53	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.597	-
Pot Cap-1 Maneuver	531	823	-
Stage 1	880	-	-
Stage 2	712	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	525	823	-
Mov Cap-2 Maneuver	525	-	-
Stage 1	880	-	-
Stage 2	704	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v10.05		0	0.29
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	721	69
HCM Lane V/C Ratio	-	-	0.012	0.009
HCM Control Delay (s/veh)	-	-	10.1	7.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	3.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	613	98	0	111	143
Future Vol, veh/h	0	613	98	0	111	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	4	10	2	7	10
Mvmt Flow	0	689	110	0	125	161
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	799	110
Stage 1	-	-	-	-	110	-
Stage 2	-	-	-	-	689	-
Critical Hdwy	-	-	-	-	6.47	6.3
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	-	-	-	-	3.563	3.39
Pot Cap-1 Maneuver	0	-	-	0	348	922
Stage 1	0	-	-	0	902	-
Stage 2	0	-	-	0	489	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	348	922
Mov Cap-2 Maneuver	-	-	-	-	348	-
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	489	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0	0		14.66		
HCM LOS	B					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	348	922		
HCM Lane V/C Ratio	-	-	0.359	0.174		
HCM Control Delay (s/veh)	-	-	21	9.7		
HCM Lane LOS	-	-	C	A		
HCM 95th %tile Q(veh)	-	-	1.6	0.6		

HCM 7th TWSC
2: Epps Mill Road & I-24 EB On-Ramp

Project Spring
No-Build AM

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	44	681	98	81	0	0
Future Vol, veh/h	44	681	98	81	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	4	10	2	2	2
Mvmt Flow	49	765	110	91	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	110	0	-	0	974	-
Stage 1	-	-	-	-	110	-
Stage 2	-	-	-	-	864	-
Critical Hdwy	4.12	-	-	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	-
Pot Cap-1 Maneuver	1480	-	-	0	279	0
Stage 1	-	-	-	0	914	0
Stage 2	-	-	-	0	413	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1480	-	-	-	263	-
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	413	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.46	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	109	-	-	-		
HCM Lane V/C Ratio	0.033	-	-	-		
HCM Control Delay (s/veh)	7.5	0	-	0		
HCM Lane LOS	A	A	-	A		
HCM 95th %tile Q(veh)	0.1	-	-	-		

**Southbound left movement does not exist, but was included in order to run Synchro analysis.*

HCM 7th TWSC
3: I-24 WB Off-Ramp/I-24 WB On-Ramp & Epps Mill Road

Project Spring
No-Build AM

Intersection												
Int Delay, s/veh	7.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱			
Traffic Vol, veh/h	437	237	0	0	151	237	19	2	92	0	0	0
Future Vol, veh/h	437	237	0	0	151	237	19	2	92	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	50	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	4	5	2	2	7	2	17	100	2	2	2	2
Mvmt Flow	527	286	0	0	182	286	23	2	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	467	0	-	-	-	0	1520	1806	286
Stage 1	-	-	-	-	-	-	1339	1339	-
Stage 2	-	-	-	-	-	-	182	467	-
Critical Hdwy	4.14	-	-	-	-	-	6.57	7.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.57	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.57	6.5	-
Follow-up Hdwy	2.236	-	-	-	-	-	3.653	4.9	3.318
Pot Cap-1 Maneuver	1084	-	0	0	-	-	121	46	753
Stage 1	-	-	0	0	-	-	227	142	-
Stage 2	-	-	0	0	-	-	814	427	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1084	-	-	-	-	-	51	0	753
Mov Cap-2 Maneuver	-	-	-	-	-	-	51	0	-
Stage 1	-	-	-	-	-	-	96	0	-
Stage 2	-	-	-	-	-	-	814	0	-

Approach	EB			WB			NB		
HCM Control Delay, s/v	7.4			0			33.08		
HCM LOS							D		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	51	753	912	-	-	-
HCM Lane V/C Ratio	0.497	0.147	0.486	-	-	-
HCM Control Delay (s/veh)	131.6	10.6	11.4	0	-	-
HCM Lane LOS	F	B	B	A	-	-
HCM 95th %tile Q(veh)	1.9	0.5	2.7	-	-	-

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
No-Build AM

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	1	280	2	5	182
Future Vol, veh/h	19	1	280	2	5	182
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	22	1	326	2	6	212

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	550	327	0	0	328	0
Stage 1	327	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.46	6.22	-	-	4.3	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	-	-	2.38	-
Pot Cap-1 Maneuver	489	715	-	-	1137	-
Stage 1	722	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	486	715	-	-	1137	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	800	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v12.64		0	0.22
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	494	48
HCM Lane V/C Ratio	-	-	0.047	0.005
HCM Control Delay (s/veh)	-	-	12.6	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	6.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	41	105	140	68	132
Future Vol, veh/h	140	41	105	140	68	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	5	8	2	3	10	7
Mvmt Flow	165	48	124	165	80	155

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	569	158	235	0	-	0
Stage 1	158	-	-	-	-	-
Stage 2	412	-	-	-	-	-
Critical Hdwy	6.45	6.28	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.372	2.218	-	-	-
Pot Cap-1 Maneuver	478	872	1332	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	429	872	1332	-	-	-
Mov Cap-2 Maneuver	429	-	-	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	662	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v18.09		3.42	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	771	-	485	-	-
HCM Lane V/C Ratio	0.093	-	0.439	-	-
HCM Control Delay (s/veh)	8	0	18.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	2.2	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	14	235	1	17	91
Future Vol, veh/h	3	14	235	1	17	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	3	16	273	1	20	106

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	419	274	0	0	274
Stage 1	274	-	-	-	-
Stage 2	145	-	-	-	-
Critical Hdwy	6.73	6.43	-	-	4.12
Critical Hdwy Stg 1	5.73	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-
Follow-up Hdwy	3.797	3.507	-	-	2.218
Pot Cap-1 Maneuver	536	717	-	-	1289
Stage 1	706	-	-	-	-
Stage 2	811	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	527	717	-	-	1289
Mov Cap-2 Maneuver	527	-	-	-	-
Stage 1	706	-	-	-	-
Stage 2	798	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.5	0	1.23
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	674	283
HCM Lane V/C Ratio	-	-	0.029	0.015
HCM Control Delay (s/veh)	-	-	10.5	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 7th TWSC
1: Epps Mill Road & I-24 EB Off-Ramp

Project Spring
No-Build PM

Intersection						
Int Delay, s/veh	6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↗
Traffic Vol, veh/h	0	279	175	0	144	232
Future Vol, veh/h	0	279	175	0	144	232
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	8	6	2	5	6
Mvmt Flow	0	332	208	0	171	276
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	540	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	332	-
Critical Hdwy	-	-	-	-	6.45	6.26
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	-	-	3.545	3.354
Pot Cap-1 Maneuver	0	-	-	0	497	822
Stage 1	0	-	-	0	819	-
Stage 2	0	-	-	0	720	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	497	822
Mov Cap-2 Maneuver	-	-	-	-	497	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	720	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0	0		13.27		
HCM LOS	B					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	497	822		
HCM Lane V/C Ratio	-	-	0.345	0.336		
HCM Control Delay (s/veh)	-	-	16	11.6		
HCM Lane LOS	-	-	C	B		
HCM 95th %tile Q(veh)	-	-	1.5	1.5		

HCM 7th TWSC
2: Epps Mill Road & I-24 EB On-Ramp

Project Spring
No-Build PM

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	378	175	87	0	0
Future Vol, veh/h	45	378	175	87	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	8	6	2	2	2
Mvmt Flow	54	450	208	104	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	208	0	-	0	765	-
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	557	-
Critical Hdwy	4.12	-	-	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	-
Pot Cap-1 Maneuver	1363	-	-	0	371	0
Stage 1	-	-	-	0	827	0
Stage 2	-	-	-	0	574	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1363	-	-	-	352	-
Mov Cap-2 Maneuver	-	-	-	-	352	-
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	574	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.82	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	191	-	-	-		
HCM Lane V/C Ratio	0.039	-	-	-		
HCM Control Delay (s/veh)	7.8	0	-	0		
HCM Lane LOS	A	A	-	A		
HCM 95th %tile Q(veh)	0.1	-	-	-		

**Southbound left movement does not exist, but was included in order to run Synchro analysis.*

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱			
Traffic Vol, veh/h	142	243	0	0	238	161	25	0	88	0	0	0
Future Vol, veh/h	142	243	0	0	238	161	25	0	88	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	50	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	11	2	2	2	7	2	9	2	6	2	2	2
Mvmt Flow	169	289	0	0	283	192	30	0	105	0	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	475	0	- - - 0 911 1102 289
Stage 1	-	-	- - - 627 627 -
Stage 2	-	-	- - - 283 475 -
Critical Hdwy	4.21	-	- - - 6.49 6.52 6.26
Critical Hdwy Stg 1	-	-	- - - 5.49 5.52 -
Critical Hdwy Stg 2	-	-	- - - 5.49 5.52 -
Follow-up Hdwy	2.299	-	- - - 3.581 4.018 3.354
Pot Cap-1 Maneuver	1042	-	0 0 - - 296 212 740
Stage 1	-	-	0 0 - - 519 476 -
Stage 2	-	-	0 0 - - 749 557 -
Platoon blocked, %	-	-	- -
Mov Cap-1 Maneuver	1042	-	- - - 239 0 740
Mov Cap-2 Maneuver	-	-	- - - 239 0 -
Stage 1	-	-	- - - 419 0 -
Stage 2	-	-	- - - 749 0 -

Approach	EB	WB	NB
HCM Control Delay, s/v	3.37	0	13.22
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	239	740	664	-	-	-
HCM Lane V/C Ratio	0.125	0.141	0.162	-	-	-
HCM Control Delay (s/veh)	22.2	10.7	9.1	0	-	-
HCM Lane LOS	C	B	A	A	-	-
HCM 95th %tile Q(veh)	0.4	0.5	0.6	-	-	-

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
No-Build PM

Intersection

Int Delay, s/veh 0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	183	6	1	358
Future Vol, veh/h	4	4	183	6	1	358
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	5	2	2	3
Mvmt Flow	4	4	199	7	1	389

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	593	202	0
Stage 1	202	-	-
Stage 2	391	-	-
Critical Hdwy	6.65	6.45	-
Critical Hdwy Stg 1	5.65	-	-
Critical Hdwy Stg 2	5.65	-	-
Follow-up Hdwy	3.725	3.525	-
Pot Cap-1 Maneuver	432	784	-
Stage 1	780	-	-
Stage 2	636	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	432	784	-
Mov Cap-2 Maneuver	432	-	-
Stage 1	780	-	-
Stage 2	635	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v11.57		0	0.02
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	557	5
HCM Lane V/C Ratio	-	-	0.016	0.001
HCM Control Delay (s/veh)	-	-	11.6	7.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road

Project Spring
No-Build PM

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	92	114	63	92	229	136
Future Vol, veh/h	92	114	63	92	229	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	12	7	2	6
Mvmt Flow	100	124	68	100	249	148

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	560	323	397	0	-	0
Stage 1	323	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.22	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.308	-	-	-
Pot Cap-1 Maneuver	485	711	1110	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	453	711	1110	-	-	-
Mov Cap-2 Maneuver	453	-	-	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	795	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v15.44		3.44	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	732	-	567	-	-
HCM Lane V/C Ratio	0.062	-	0.395	-	-
HCM Control Delay (s/veh)	8.5	0	15.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.9	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	6	148	1	13	328
Future Vol, veh/h	2	6	148	1	13	328
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	33	7	2	8	2
Mvmt Flow	2	6	159	1	14	353
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	540	160	0	0	160	0
Stage 1	160	-	-	-	-	-
Stage 2	381	-	-	-	-	-
Critical Hdwy	6.42	6.53	-	-	4.18	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.597	-	-	2.272	-
Pot Cap-1 Maneuver	503	811	-	-	1383	-
Stage 1	869	-	-	-	-	-
Stage 2	691	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	496	811	-	-	1383	-
Mov Cap-2 Maneuver	496	-	-	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v10.21		0		0.29		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	700	69	-	
HCM Lane V/C Ratio	-	-	0.012	0.01	-	
HCM Control Delay (s/veh)	-	-	10.2	7.6	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Intersection

Int Delay, s/veh 5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	626	102	0	156	143
Future Vol, veh/h	0	626	102	0	156	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	4	10	2	7	10
Mvmt Flow	0	703	115	0	175	161

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	0 818 115
Stage 1	-	-	- 115 -
Stage 2	-	-	- 703 -
Critical Hdwy	-	-	- 6.47 6.3
Critical Hdwy Stg 1	-	-	- 5.47 -
Critical Hdwy Stg 2	-	-	- 5.47 -
Follow-up Hdwy	-	-	- 3.563 3.39
Pot Cap-1 Maneuver	0	-	0 339 917
Stage 1	0	-	0 898 -
Stage 2	0	-	0 482 -
Platoon blocked, %	-	-	
Mov Cap-1 Maneuver	-	-	- 339 917
Mov Cap-2 Maneuver	-	-	- 339 -
Stage 1	-	-	- 898 -
Stage 2	-	-	- 482 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	18.48
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	339	917
HCM Lane V/C Ratio	-	-	0.517	0.175
HCM Control Delay (s/veh)	-	-	26.5	9.8
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	2.8	0.6

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	44	739	102	95	0	0
Future Vol, veh/h	44	739	102	95	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	4	10	2	2	2
Mvmt Flow	49	830	115	107	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	115	0	-	0	1044	-
Stage 1	-	-	-	-	115	-
Stage 2	-	-	-	-	929	-
Critical Hdwy	4.12	-	-	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	-
Pot Cap-1 Maneuver	1474	-	-	0	254	0
Stage 1	-	-	-	0	910	0
Stage 2	-	-	-	0	384	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1474	-	-	-	238	-
Mov Cap-2 Maneuver	-	-	-	-	238	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	384	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.42	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	101	-	-	-		
HCM Lane V/C Ratio	0.034	-	-	-		
HCM Control Delay (s/veh)	7.5	0	-	0		
HCM Lane LOS	A	A	-	A		
HCM 95th %tile Q(veh)	0.1	-	-	-		

**Southbound left movement does not exist, but was included in order to run Synchro analysis.*

HCM 7th TWSC
3: I-24 WB Off-Ramp/I-24 WB On-Ramp & Epps Mill Road

Project Spring
Build AM

Intersection												
Int Delay, s/veh	8.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱			
Traffic Vol, veh/h	437	295	0	0	169	251	19	2	137	0	0	0
Future Vol, veh/h	437	295	0	0	169	251	19	2	137	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	50	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	4	5	2	2	7	2	17	100	2	2	2	2
Mvmt Flow	527	355	0	0	204	302	23	2	165	0	0	0

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	506	0	-	-	-	0	1612 1914 355
Stage 1	-	-	-	-	-	-	1408 1408 -
Stage 2	-	-	-	-	-	-	204 506 -
Critical Hdwy	4.14	-	-	-	-	-	6.57 7.5 6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.57 6.5 -
Critical Hdwy Stg 2	-	-	-	-	-	-	5.57 6.5 -
Follow-up Hdwy	2.236	-	-	-	-	-	3.653 4.9 3.318
Pot Cap-1 Maneuver	1048	-	0	0	-	-	106 38 689
Stage 1	-	-	0	0	-	-	210 130 -
Stage 2	-	-	0	0	-	-	796 408 -
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1048	-	-	-	-	-	40 0 689
Mov Cap-2 Maneuver	-	-	-	-	-	-	40 0 -
Stage 1	-	-	-	-	-	-	78 0 -
Stage 2	-	-	-	-	-	-	796 0 -

Approach	EB	WB	NB
HCM Control Delay, s/v	7.07	0	36.36
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	40	689	841	-	-	-
HCM Lane V/C Ratio	0.64	0.24	0.502	-	-	-
HCM Control Delay (s/veh)	196.1	11.9	11.8	0	-	-
HCM Lane LOS	F	B	B	A	-	-
HCM 95th %tile Q(veh)	2.3	0.9	2.9	-	-	-

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Build AM

Intersection

Int Delay, s/veh 0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	1	284	2	5	195
Future Vol, veh/h	19	1	284	2	5	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	22	1	330	2	6	227

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	570	331	0
Stage 1	331	-	-
Stage 2	238	-	-
Critical Hdwy	6.46	6.22	-
Critical Hdwy Stg 1	5.46	-	-
Critical Hdwy Stg 2	5.46	-	-
Follow-up Hdwy	3.554	3.318	-
Pot Cap-1 Maneuver	476	710	-
Stage 1	718	-	-
Stage 2	792	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	474	710	-
Mov Cap-2 Maneuver	474	-	-
Stage 1	718	-	-
Stage 2	787	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v12.85		0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	482	45
HCM Lane V/C Ratio	-	-	0.048	0.005
HCM Control Delay (s/veh)	-	-	12.9	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build AM

Intersection												
Int Delay, s/veh	13.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	140	102	41	4	33	4	105	140	13	13	68	132
Future Vol, veh/h	140	102	41	4	33	4	105	140	13	13	68	132
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	90	-	-	-	-	-	335	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	5	2	8	2	2	2	2	3	2	2	10	7
Mvmt Flow	165	120	48	5	39	5	124	165	15	15	80	155

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	619	615	158	590	685	172	235	0	0	180	0	0
Stage 1	188	188	-	419	419	-	-	-	-	-	-	-
Stage 2	431	427	-	171	266	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.52	6.28	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.018	3.372	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	396	406	872	419	371	871	1332	-	-	1396	-	-
Stage 1	807	744	-	611	590	-	-	-	-	-	-	-
Stage 2	597	585	-	831	689	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	319	360	872	261	329	871	1332	-	-	1396	-	-
Mov Cap-2 Maneuver	400	426	-	364	398	-	-	-	-	-	-	-
Stage 1	798	736	-	548	529	-	-	-	-	-	-	-
Stage 2	493	525	-	650	681	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v33.49		14.55	3.25	0.46
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	720	-	-	445 364 422	1396	-	-
HCM Lane V/C Ratio	0.093	-	-	0.748 0.013 0.103	0.011	-	-
HCM Control Delay (s/veh)	8	0	-	33.5 15 14.5	7.6	-	-
HCM Lane LOS	A	A	-	D C B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	6.2 0 0.3	0	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	
Traffic Vol, veh/h	3	14	248	1	17	95
Future Vol, veh/h	3	14	248	1	17	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	3	16	288	1	20	110

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	439	289	0
Stage 1	289	-	-
Stage 2	150	-	-
Critical Hdwy	6.73	6.43	-
Critical Hdwy Stg 1	5.73	-	-
Critical Hdwy Stg 2	5.73	-	-
Follow-up Hdwy	3.797	3.507	-
Pot Cap-1 Maneuver	521	703	-
Stage 1	694	-	-
Stage 2	807	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	513	703	-
Mov Cap-2 Maneuver	513	-	-
Stage 1	694	-	-
Stage 2	794	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v10.63		0	1.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	660	273
HCM Lane V/C Ratio	-	-	0.03	0.016
HCM Control Delay (s/veh)	-	-	10.6	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	6.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	286	190	0	167	232
Future Vol, veh/h	0	286	190	0	167	232
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	8	6	2	5	6
Mvmt Flow	0	340	226	0	199	276
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	567	226
Stage 1	-	-	-	-	226	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	-	-	-	-	6.45	6.26
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	-	-	3.545	3.354
Pot Cap-1 Maneuver	0	-	-	0	480	803
Stage 1	0	-	-	0	804	-
Stage 2	0	-	-	0	714	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	480	803
Mov Cap-2 Maneuver	-	-	-	-	480	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	714	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0	0		14.27		
HCM LOS	B					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	480	803		
HCM Lane V/C Ratio	-	-	0.414	0.344		
HCM Control Delay (s/veh)	-	-	17.7	11.8		
HCM Lane LOS	-	-	C	B		
HCM 95th %tile Q(veh)	-	-	2	1.5		

HCM 7th TWSC
2: Epps Mill Road & I-24 EB On-Ramp

Project Spring
Build PM

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	407	190	138	0	0
Future Vol, veh/h	45	407	190	138	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	8	6	2	2	2
Mvmt Flow	54	485	226	164	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	226	0	0 818
Stage 1	-	-	- 226
Stage 2	-	-	- 592
Critical Hdwy	4.12	-	- 6.42
Critical Hdwy Stg 1	-	-	- 5.42
Critical Hdwy Stg 2	-	-	- 5.42
Follow-up Hdwy	2.218	-	- 3.518
Pot Cap-1 Maneuver	1342	-	0 346 0
Stage 1	-	-	0 811 0
Stage 2	-	-	0 553 0
Platoon blocked, %	-	-	
Mov Cap-1 Maneuver	1342	-	- 327
Mov Cap-2 Maneuver	-	-	- 327
Stage 1	-	-	- 767
Stage 2	-	-	- 553

Approach	EB	WB	SB
HCM Control Delay, s/v	0.78	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	179	-	-	-
HCM Lane V/C Ratio	0.04	-	-	-
HCM Control Delay (s/veh)	7.8	0	-	0
HCM Lane LOS	A	A	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-

**Southbound left movement does not exist, but was included in order to run Synchro analysis.*

HCM 7th TWSC
3: I-24 WB Off-Ramp/I-24 WB On-Ramp & Epps Mill Road

Project Spring
Build PM

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱			
Traffic Vol, veh/h	142	272	0	0	303	212	25	0	111	0	0	0
Future Vol, veh/h	142	272	0	0	303	212	25	0	111	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	50	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	11	2	2	2	7	2	9	2	6	2	2	2
Mvmt Flow	169	324	0	0	361	252	30	0	132	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	613	0	-	-	-	0	1023	1275	324
Stage 1	-	-	-	-	-	-	662	662	-
Stage 2	-	-	-	-	-	-	361	613	-
Critical Hdwy	4.21	-	-	-	-	-	6.49	6.52	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.49	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.49	5.52	-
Follow-up Hdwy	2.299	-	-	-	-	-	3.581	4.018	3.354
Pot Cap-1 Maneuver	924	-	0	0	-	-	253	167	708
Stage 1	-	-	0	0	-	-	500	459	-
Stage 2	-	-	0	0	-	-	690	483	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	924	-	-	-	-	-	197	0	708
Mov Cap-2 Maneuver	-	-	-	-	-	-	197	0	-
Stage 1	-	-	-	-	-	-	389	0	-
Stage 2	-	-	-	-	-	-	690	0	-

Approach	EB	WB	NB
HCM Control Delay, s/v	3.35	0	14.05
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	197	708	617	-	-	-
HCM Lane V/C Ratio	0.151	0.187	0.183	-	-	-
HCM Control Delay (s/veh)	26.5	11.2	9.8	0	-	-
HCM Lane LOS	D	B	A	A	-	-
HCM 95th %tile Q(veh)	0.5	0.7	0.7	-	-	-

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Build PM

Intersection

Int Delay, s/veh 0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	198	6	1	365
Future Vol, veh/h	4	4	198	6	1	365
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	5	2	2	3
Mvmt Flow	4	4	215	7	1	397

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	617	218	0
Stage 1	218	-	-
Stage 2	399	-	-
Critical Hdwy	6.65	6.45	-
Critical Hdwy Stg 1	5.65	-	-
Critical Hdwy Stg 2	5.65	-	-
Follow-up Hdwy	3.725	3.525	-
Pot Cap-1 Maneuver	418	767	-
Stage 1	766	-	-
Stage 2	631	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	418	767	-
Mov Cap-2 Maneuver	418	-	-
Stage 1	766	-	-
Stage 2	630	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v11.77		0	0.02
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	541	5
HCM Lane V/C Ratio	-	-	0.016	0.001
HCM Control Delay (s/veh)	-	-	11.8	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build PM

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Vol, veh/h	92	52	114	15	116	15	63	92	7	7	229	136
Future Vol, veh/h	92	52	114	15	116	15	63	92	7	7	229	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	90	-	-	-	-	-	335	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	2	5	2	2	2	12	7	2	2	2	6
Mvmt Flow	100	57	124	16	126	16	68	100	8	8	249	148

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	638	583	323	533	653	104	397	0	0	108	0	0
Stage 1	338	338	-	241	241	-	-	-	-	-	-	-
Stage 2	300	245	-	292	412	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.52	6.25	7.12	6.52	6.22	4.22	-	-	4.12	-	-
Critical Hdwy Stg 1	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.018	3.345	3.518	4.018	3.318	2.308	-	-	2.218	-	-
Pot Cap-1 Maneuver	385	424	711	457	387	951	1110	-	-	1483	-	-
Stage 1	670	641	-	763	706	-	-	-	-	-	-	-
Stage 2	703	704	-	716	594	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	253	394	711	312	360	951	1110	-	-	1483	-	-
Mov Cap-2 Maneuver	377	474	-	387	425	-	-	-	-	-	-	-
Stage 1	667	637	-	713	660	-	-	-	-	-	-	-
Stage 2	522	657	-	536	591	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v20.88		16.34	3.29	0.14
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	690	-	-	502 387 453	1483	-	-
HCM Lane V/C Ratio	0.062	-	-	0.559 0.042 0.314	0.005	-	-
HCM Control Delay (s/veh)	8.5	0	-	20.9 14.7 16.5	7.4	-	-
HCM Lane LOS	A	A	-	C B C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.4 0.1 1.3	0	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	6	155	1	13	343
Future Vol, veh/h	2	6	155	1	13	343
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	33	7	2	8	2
Mvmt Flow	2	6	167	1	14	369

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	564	167	0	0	168
Stage 1	167	-	-	-	-
Stage 2	397	-	-	-	-
Critical Hdwy	6.42	6.53	-	-	4.18
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.597	-	-	2.272
Pot Cap-1 Maneuver	487	802	-	-	1374
Stage 1	862	-	-	-	-
Stage 2	679	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	481	802	-	-	1374
Mov Cap-2 Maneuver	481	-	-	-	-
Stage 1	862	-	-	-	-
Stage 2	671	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.3	0	0.28
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	687	66
HCM Lane V/C Ratio	-	-	0.013	0.01
HCM Control Delay (s/veh)	-	-	10.3	7.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	333	5	44	304	15	235
v/c Ratio	0.81	0.01	0.08	0.38	0.02	0.25
Control Delay (s/veh)	44.9	15.8	17.4	14.8	13.0	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	44.9	15.8	17.4	14.8	13.0	6.8
Queue Length 50th (ft)	170	2	16	84	3	25
Queue Length 95th (ft)	229	7	28	192	16	80
Internal Link Dist (ft)	1982		300	1252		2807
Turn Bay Length (ft)		90			335	
Base Capacity (vph)	464	401	857	808	608	954
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.01	0.05	0.38	0.02	0.25
Intersection Summary						

HCM 7th Signalized Intersection Summary

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build AM - Signal

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	102	41	4	33	4	105	140	13	13	68	132
Future Volume (veh/h)	140	102	41	4	33	4	105	140	13	13	68	132
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1870	1781	1870	1870	1870	1870	1856	1870	1870	1752	1796
Adj Flow Rate, veh/h	165	120	48	5	39	5	124	165	15	15	80	155
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	5	2	8	2	2	2	2	3	2	2	10	7
Cap, veh/h	238	141	54	349	483	62	351	449	39	714	304	588
Arrive On Green	0.24	0.24	0.24	0.01	0.30	0.30	0.57	0.57	0.57	0.57	0.57	0.57
Sat Flow, veh/h	742	587	224	1781	1625	208	518	788	68	1204	533	1033
Grp Volume(v), veh/h	333	0	0	5	0	44	304	0	0	15	0	235
Grp Sat Flow(s),veh/h/ln	1553	0	0	1781	0	1833	1373	0	0	1204	0	1566
Q Serve(g_s), s	18.0	0.0	0.0	0.2	0.0	1.6	7.3	0.0	0.0	0.0	0.0	6.8
Cycle Q Clear(g_c), s	18.6	0.0	0.0	0.2	0.0	1.6	14.2	0.0	0.0	0.7	0.0	6.8
Prop In Lane	0.50		0.14	1.00		0.11	0.41		0.05	1.00		0.66
Lane Grp Cap(c), veh/h	434	0	0	349	0	545	838	0	0	714	0	892
V/C Ratio(X)	0.77	0.00	0.00	0.01	0.00	0.08	0.36	0.00	0.00	0.02	0.00	0.26
Avail Cap(c_a), veh/h	525	0	0	546	0	855	838	0	0	714	0	892
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	0.0	24.1	0.0	22.8	11.6	0.0	0.0	8.5	0.0	9.8
Incr Delay (d2), s/veh	5.5	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.0	0.1	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	0.0	0.0	0.1	0.0	0.7	3.2	0.0	0.0	0.1	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.5	0.0	0.0	24.1	0.0	22.8	12.9	0.0	0.0	8.5	0.0	10.5
LnGrp LOS	D			C			C			B		
Approach Vol, veh/h	333			49			304			250		
Approach Delay, s/veh	38.5			23.0			12.9			10.4		
Approach LOS	D			C			B			B		
Timer - Assigned Phs	2			4			6			7		
Phs Duration (G+Y+Rc), s	57.2			32.8			57.2			5.1		
Change Period (Y+Rc), s	6.0			6.0			6.0			4.5		
Max Green Setting (Gmax), s	36.0			42.0			36.0			10.5		
Max Q Clear Time (g_c+I1), s	8.8			3.6			16.2			2.2		
Green Ext Time (p_c), s	1.3			0.2			1.5			0.0		
Intersection Summary												
HCM 7th Control Delay, s/veh			21.9									
HCM 7th LOS			C									



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	281	16	142	176	8	397
v/c Ratio	0.79	0.05	0.30	0.22	0.01	0.37
Control Delay (s/veh)	42.2	19.0	24.0	11.5	12.0	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	42.2	19.0	24.0	11.5	12.0	11.5
Queue Length 50th (ft)	127	7	62	37	2	84
Queue Length 95th (ft)	195	16	78	116	11	237
Internal Link Dist (ft)	1982		300	1252		2807
Turn Bay Length (ft)		90			335	
Base Capacity (vph)	460	338	859	808	767	1073
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.05	0.17	0.22	0.01	0.37
Intersection Summary						

HCM 7th Signalized Intersection Summary

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build PM - Signal

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	52	114	15	116	15	63	92	7	7	229	136
Future Volume (veh/h)	92	52	114	15	116	15	63	92	7	7	229	136
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1870	1826	1870	1870	1870	1722	1796	1870	1870	1870	1811
Adj Flow Rate, veh/h	100	57	124	16	126	16	68	100	8	8	249	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	2	5	2	2	2	12	7	2	2	2	6
Cap, veh/h	154	80	142	304	458	58	293	410	31	769	643	382
Arrive On Green	0.21	0.21	0.21	0.02	0.28	0.28	0.59	0.59	0.59	0.59	0.59	0.59
Sat Flow, veh/h	470	376	668	1781	1627	207	406	700	53	1286	1099	653
Grp Volume(v), veh/h	281	0	0	16	0	142	176	0	0	8	0	397
Grp Sat Flow(s),veh/h/ln	1515	0	0	1781	0	1833	1159	0	0	1286	0	1753
Q Serve(g_s), s	13.9	0.0	0.0	0.6	0.0	5.4	2.5	0.0	0.0	0.0	0.0	10.9
Cycle Q Clear(g_c), s	16.1	0.0	0.0	0.6	0.0	5.4	13.4	0.0	0.0	0.3	0.0	10.9
Prop In Lane	0.36		0.44	1.00		0.11	0.39		0.05	1.00		0.37
Lane Grp Cap(c), veh/h	377	0	0	304	0	516	734	0	0	769	0	1026
V/C Ratio(X)	0.75	0.00	0.00	0.05	0.00	0.28	0.24	0.00	0.00	0.01	0.00	0.39
Avail Cap(c_a), veh/h	506	0	0	480	0	855	734	0	0	769	0	1026
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.0	0.0	0.0	25.3	0.0	25.2	9.8	0.0	0.0	7.8	0.0	10.0
Incr Delay (d2), s/veh	4.1	0.0	0.0	0.1	0.0	0.3	0.8	0.0	0.0	0.0	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	0.0	0.3	0.0	2.4	1.4	0.0	0.0	0.1	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.1	0.0	0.0	25.4	0.0	25.5	10.6	0.0	0.0	7.8	0.0	11.1
LnGrp LOS	D			C			C			B		
Approach Vol, veh/h	281			158			176			405		
Approach Delay, s/veh	38.1			25.5			10.6			11.0		
Approach LOS	D			C			B			B		
Timer - Assigned Phs	2			4			6			7		
Phs Duration (G+Y+Rc), s	58.7			31.3			58.7			6.1		
Change Period (Y+Rc), s	6.0			6.0			6.0			4.5		
Max Green Setting (Gmax), s	36.0			42.0			36.0			10.5		
Max Q Clear Time (g_c+I1), s	12.9			7.4			15.4			2.6		
Green Ext Time (p_c), s	2.1			0.9			0.9			0.0		
Intersection Summary												
HCM 7th Control Delay, s/veh	20.7											
HCM 7th LOS	C											

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

No-Build AM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	42	559	17	184	4	96	125	25	134
v/c Ratio	0.09	0.60	0.06	0.25	0.01	0.26	0.36	0.05	0.19
Control Delay (s/veh)	9.9	20.7	3.6	11.6	21.8	10.4	27.5	26.2	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	9.9	20.7	3.6	11.6	21.8	10.4	27.5	26.2	4.6
Queue Length 50th (ft)	10	190	5	61	2	3	53	10	0
Queue Length 95th (ft)	25	368	3	117	9	43	95	34	38
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	460	924	293	732	359	363	349	495	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.60	0.06	0.25	0.01	0.26	0.36	0.05	0.19
Intersection Summary									

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
No-Build AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	491	6	15	83	81	4	6	79	111	22	119
Future Volume (veh/h)	37	491	6	15	83	81	4	6	79	111	22	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1381	1841	1870	1796	1752	1826	1870	1411	1841	1811	1752	1752
Adj Flow Rate, veh/h	42	552	7	17	93	91	4	7	89	125	25	134
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	35	4	2	7	10	5	2	33	4	6	10	10
Cap, veh/h	439	852	11	307	368	360	321	17	212	325	419	409
Arrive On Green	0.04	0.47	0.47	0.01	0.15	0.15	0.01	0.19	0.19	0.06	0.24	0.24
Sat Flow, veh/h	1316	1814	23	1711	813	796	1781	88	1121	1725	1752	1485
Grp Volume(v), veh/h	42	0	559	17	0	184	4	0	96	125	25	134
Grp Sat Flow(s),veh/h/ln	1316	0	1837	1711	0	1609	1781	0	1209	1725	1752	1485
Q Serve(g_s), s	1.5	0.0	20.9	0.5	0.0	9.1	0.2	0.0	6.3	5.0	1.0	6.5
Cycle Q Clear(g_c), s	1.5	0.0	20.9	0.5	0.0	9.1	0.2	0.0	6.3	5.0	1.0	6.5
Prop In Lane	1.00		0.01	1.00		0.49	1.00		0.93	1.00		1.00
Lane Grp Cap(c), veh/h	439	0	863	307	0	728	321	0	228	325	419	409
V/C Ratio(X)	0.10	0.00	0.65	0.06	0.00	0.25	0.01	0.00	0.42	0.38	0.06	0.33
Avail Cap(c_a), veh/h	479	0	863	369	0	728	411	0	228	325	419	409
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.99	0.00	0.99	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	18.2	15.0	0.0	24.8	29.3	0.0	32.2	27.9	26.4	26.0
Incr Delay (d2), s/veh	0.1	0.0	3.8	0.1	0.0	0.8	0.0	0.0	5.6	0.7	0.3	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	9.2	0.2	0.0	3.9	0.1	0.0	2.2	2.2	0.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.7	0.0	21.9	15.1	0.0	25.6	29.3	0.0	37.8	28.6	26.7	28.1
LnGrp LOS	B		C	B		C	C		D	C	C	C
Approach Vol, veh/h	601				201				100		284	
Approach Delay, s/veh	21.3				24.7				37.4		28.2	
Approach LOS	C				C				D		C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	48.3	6.5	27.5	9.3	46.7	11.0	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	39.0	5.0	17.0	6.0	38.0	5.0	17.0				
Max Q Clear Time (g_c+I1), s	2.5	22.9	2.2	8.5	3.5	11.1	7.0	8.3				
Green Ext Time (p_c), s	0.0	3.4	0.0	0.3	0.0	1.1	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			24.9									
HCM 7th LOS			C									

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

No-Build AM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	527	286	182	286	25	111
v/c Ratio	0.55	0.19	0.18	0.28	0.18	0.45
Control Delay (s/veh)	3.8	1.1	12.1	2.6	40.4	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	3.8	1.1	12.1	2.6	40.4	13.8
Queue Length 50th (ft)	18	8	48	0	13	0
Queue Length 95th (ft)	20	12	97	32	34	39
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	1095	1478	1030	1038	310	421
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.19	0.18	0.28	0.08	0.26
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
No-Build AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	437	237	0	0	151	237	19	2	92	0	0	0
Future Volume (veh/h)	437	237	0	0	151	237	19	2	92	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1841	1826	0	0	1796	1870	1648	418	1870			
Adj Flow Rate, veh/h	527	286	0	0	182	286	23	2	111			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	4	5	0	0	7	2	17	100	2			
Cap, veh/h	828	1416	0	0	951	840	33	3	144			
Arrive On Green	0.30	1.00	0.00	0.00	0.53	0.53	0.09	0.09	0.09			
Sat Flow, veh/h	1753	1826	0	0	1796	1585	368	32	1585			
Grp Volume(v), veh/h	527	286	0	0	182	286	25	0	111			
Grp Sat Flow(s),veh/h/ln	1753	1826	0	0	1796	1585	400	0	1585			
Q Serve(g_s), s	12.5	0.0	0.0	0.0	4.8	9.3	5.5	0.0	6.2			
Cycle Q Clear(g_c), s	12.5	0.0	0.0	0.0	4.8	9.3	5.5	0.0	6.2			
Prop In Lane	1.00		0.00	0.00		1.00	0.92		1.00			
Lane Grp Cap(c), veh/h	828	1416	0	0	951	840	36	0	144			
V/C Ratio(X)	0.64	0.20	0.00	0.00	0.19	0.34	0.69	0.00	0.77			
Avail Cap(c_a), veh/h	1157	1416	0	0	951	840	84	0	335			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.81	0.81	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.6	0.0	0.0	0.0	11.1	12.1	39.7	0.0	40.0			
Incr Delay (d2), s/veh	0.7	0.3	0.0	0.0	0.4	1.1	20.6	0.0	8.4			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.5	0.1	0.0	0.0	1.9	3.4	0.7	0.0	2.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.3	0.0	0.0	11.5	13.2	60.2	0.0	48.3			
LnGrp LOS	A	A			B	B	E		D			
Approach Vol, veh/h	813			468			136					
Approach Delay, s/veh	3.5			12.6			50.5					
Approach LOS	A			B			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	75.8			22.1			53.7			14.2		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	59.0			33.0			20.0			19.0		
Max Q Clear Time (g_c+I1), s	2.0			14.5			11.3			8.2		
Green Ext Time (p_c), s	1.9			1.7			1.4			0.3		
Intersection Summary												
HCM 7th Control Delay, s/veh	11.0											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
No-Build AM with TDOT

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	19	1	280	2	5	182
Future Vol, veh/h	19	1	280	2	5	182
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	22	1	326	2	6	212
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	550	327	0	0	328	0
Stage 1	327	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.46	6.22	-	-	4.3	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	-	-	2.38	-
Pot Cap-1 Maneuver	489	715	-	-	1137	-
Stage 1	722	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	486	715	-	-	1137	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v12.64		0	0.22			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	494	48	-	
HCM Lane V/C Ratio	-	-	0.047	0.005	-	
HCM Control Delay (s/veh)	-	-	12.6	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road

Project Spring
No-Build AM with TDOT

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	41	105	140	68	132
Future Vol, veh/h	140	41	105	140	68	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	500	0	150	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	5	8	2	3	10	7
Mvmt Flow	165	48	124	165	80	155
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	492	80	235	0	-	0
Stage 1	80	-	-	-	-	-
Stage 2	412	-	-	-	-	-
Critical Hdwy	6.45	6.28	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.372	2.218	-	-	-
Pot Cap-1 Maneuver	531	964	1332	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	482	964	1332	-	-	-
Mov Cap-2 Maneuver	550	-	-	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s/v	13.1	3.42		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1332	-	550	964	-	-
HCM Lane V/C Ratio	0.093	-	0.299	0.05	-	-
HCM Control Delay (s/veh)	8	-	14.3	8.9	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	1.2	0.2	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	14	235	1	17	91
Future Vol, veh/h	3	14	235	1	17	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	3	16	273	1	20	106

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	419	274	0
Stage 1	274	-	-
Stage 2	145	-	-
Critical Hdwy	6.73	6.43	-
Critical Hdwy Stg 1	5.73	-	-
Critical Hdwy Stg 2	5.73	-	-
Follow-up Hdwy	3.797	3.507	-
Pot Cap-1 Maneuver	536	717	-
Stage 1	706	-	-
Stage 2	811	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	527	717	-
Mov Cap-2 Maneuver	527	-	-
Stage 1	706	-	-
Stage 2	798	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.5	0	1.23
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	674	283
HCM Lane V/C Ratio	-	-	0.029	0.015
HCM Control Delay (s/veh)	-	-	10.5	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

No-Build AM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	42	559	17	184	4	96	125	25	134
v/c Ratio	0.09	0.60	0.06	0.25	0.01	0.26	0.36	0.05	0.19
Control Delay (s/veh)	9.9	20.7	3.6	11.6	21.8	10.4	27.5	26.2	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	9.9	20.7	3.6	11.6	21.8	10.4	27.5	26.2	4.6
Queue Length 50th (ft)	10	190	5	61	2	3	53	10	0
Queue Length 95th (ft)	25	368	3	117	9	43	95	34	38
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	460	924	293	732	359	363	349	495	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.60	0.06	0.25	0.01	0.26	0.36	0.05	0.19
Intersection Summary									

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
No-Build AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	491	6	15	83	81	4	6	79	111	22	119
Future Volume (veh/h)	37	491	6	15	83	81	4	6	79	111	22	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1381	1841	1870	1796	1752	1826	1870	1411	1841	1811	1752	1752
Adj Flow Rate, veh/h	42	552	7	17	93	91	4	7	89	125	25	134
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	35	4	2	7	10	5	2	33	4	6	10	10
Cap, veh/h	439	852	11	307	368	360	321	17	212	325	419	409
Arrive On Green	0.04	0.47	0.47	0.01	0.15	0.15	0.01	0.19	0.19	0.06	0.24	0.24
Sat Flow, veh/h	1316	1814	23	1711	813	796	1781	88	1121	1725	1752	1485
Grp Volume(v), veh/h	42	0	559	17	0	184	4	0	96	125	25	134
Grp Sat Flow(s),veh/h/ln	1316	0	1837	1711	0	1609	1781	0	1209	1725	1752	1485
Q Serve(g_s), s	1.5	0.0	20.9	0.5	0.0	9.1	0.2	0.0	6.3	5.0	1.0	6.5
Cycle Q Clear(g_c), s	1.5	0.0	20.9	0.5	0.0	9.1	0.2	0.0	6.3	5.0	1.0	6.5
Prop In Lane	1.00		0.01	1.00		0.49	1.00		0.93	1.00		1.00
Lane Grp Cap(c), veh/h	439	0	863	307	0	728	321	0	228	325	419	409
V/C Ratio(X)	0.10	0.00	0.65	0.06	0.00	0.25	0.01	0.00	0.42	0.38	0.06	0.33
Avail Cap(c_a), veh/h	479	0	863	369	0	728	411	0	228	325	419	409
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.99	0.00	0.99	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	18.2	15.0	0.0	24.8	29.3	0.0	32.2	27.9	26.4	26.0
Incr Delay (d2), s/veh	0.1	0.0	3.8	0.1	0.0	0.8	0.0	0.0	5.6	0.7	0.3	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	9.2	0.2	0.0	3.9	0.1	0.0	2.2	2.2	0.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.7	0.0	21.9	15.1	0.0	25.6	29.3	0.0	37.8	28.6	26.7	28.1
LnGrp LOS	B		C	B		C	C		D	C	C	C
Approach Vol, veh/h	601				201				100		284	
Approach Delay, s/veh	21.3				24.7				37.4		28.2	
Approach LOS	C				C				D		C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	48.3	6.5	27.5	9.3	46.7	11.0	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	39.0	5.0	17.0	6.0	38.0	5.0	17.0				
Max Q Clear Time (g_c+I1), s	2.5	22.9	2.2	8.5	3.5	11.1	7.0	8.3				
Green Ext Time (p_c), s	0.0	3.4	0.0	0.3	0.0	1.1	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			24.9									
HCM 7th LOS			C									

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

No-Build AM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	527	286	182	286	25	111
v/c Ratio	0.55	0.19	0.18	0.28	0.18	0.45
Control Delay (s/veh)	3.8	1.1	12.1	2.6	40.4	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	3.8	1.1	12.1	2.6	40.4	13.8
Queue Length 50th (ft)	18	8	48	0	13	0
Queue Length 95th (ft)	20	12	97	32	34	39
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	1095	1478	1030	1038	310	421
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.19	0.18	0.28	0.08	0.26
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
No-Build AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	437	237	0	0	151	237	19	2	92	0	0	0
Future Volume (veh/h)	437	237	0	0	151	237	19	2	92	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1841	1826	0	0	1796	1870	1648	418	1870			
Adj Flow Rate, veh/h	527	286	0	0	182	286	23	2	111			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	4	5	0	0	7	2	17	100	2			
Cap, veh/h	828	1416	0	0	951	840	33	3	144			
Arrive On Green	0.30	1.00	0.00	0.00	0.53	0.53	0.09	0.09	0.09			
Sat Flow, veh/h	1753	1826	0	0	1796	1585	368	32	1585			
Grp Volume(v), veh/h	527	286	0	0	182	286	25	0	111			
Grp Sat Flow(s),veh/h/ln	1753	1826	0	0	1796	1585	400	0	1585			
Q Serve(g_s), s	12.5	0.0	0.0	0.0	4.8	9.3	5.5	0.0	6.2			
Cycle Q Clear(g_c), s	12.5	0.0	0.0	0.0	4.8	9.3	5.5	0.0	6.2			
Prop In Lane	1.00		0.00	0.00		1.00	0.92		1.00			
Lane Grp Cap(c), veh/h	828	1416	0	0	951	840	36	0	144			
V/C Ratio(X)	0.64	0.20	0.00	0.00	0.19	0.34	0.69	0.00	0.77			
Avail Cap(c_a), veh/h	1157	1416	0	0	951	840	84	0	335			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.81	0.81	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.6	0.0	0.0	0.0	11.1	12.1	39.7	0.0	40.0			
Incr Delay (d2), s/veh	0.7	0.3	0.0	0.0	0.4	1.1	20.6	0.0	8.4			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.5	0.1	0.0	0.0	1.9	3.4	0.7	0.0	2.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.3	0.0	0.0	11.5	13.2	60.2	0.0	48.3			
LnGrp LOS	A	A			B	B	E		D			
Approach Vol, veh/h	813			468			136					
Approach Delay, s/veh	3.5			12.6			50.5					
Approach LOS	A			B			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	75.8			22.1			53.7			14.2		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	59.0			33.0			20.0			19.0		
Max Q Clear Time (g_c+I1), s	2.0			14.5			11.3			8.2		
Green Ext Time (p_c), s	1.9			1.7			1.4			0.3		
Intersection Summary												
HCM 7th Control Delay, s/veh	11.0											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
No-Build AM with TDOT

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	19	1	280	2	5	182
Future Vol, veh/h	19	1	280	2	5	182
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	22	1	326	2	6	212
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	550	327	0	0	328	0
Stage 1	327	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.46	6.22	-	-	4.3	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	-	-	2.38	-
Pot Cap-1 Maneuver	489	715	-	-	1137	-
Stage 1	722	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	486	715	-	-	1137	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v12.64		0	0.22			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	494	48	-	
HCM Lane V/C Ratio	-	-	0.047	0.005	-	
HCM Control Delay (s/veh)	-	-	12.6	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	41	105	140	68	132
Future Vol, veh/h	140	41	105	140	68	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	500	0	150	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	5	8	2	3	10	7
Mvmt Flow	165	48	124	165	80	155

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	492	80	235	0	-	0
Stage 1	80	-	-	-	-	-
Stage 2	412	-	-	-	-	-
Critical Hdwy	6.45	6.28	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.372	2.218	-	-	-
Pot Cap-1 Maneuver	531	964	1332	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	482	964	1332	-	-	-
Mov Cap-2 Maneuver	550	-	-	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	662	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13.1	3.42	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1332	-	550	964	-	-
HCM Lane V/C Ratio	0.093	-	0.299	0.05	-	-
HCM Control Delay (s/veh)	8	-	14.3	8.9	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	1.2	0.2	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	14	235	1	17	91
Future Vol, veh/h	3	14	235	1	17	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	3	16	273	1	20	106

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	419	274	0
Stage 1	274	-	-
Stage 2	145	-	-
Critical Hdwy	6.73	6.43	-
Critical Hdwy Stg 1	5.73	-	-
Critical Hdwy Stg 2	5.73	-	-
Follow-up Hdwy	3.797	3.507	-
Pot Cap-1 Maneuver	536	717	-
Stage 1	706	-	-
Stage 2	811	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	527	717	-
Mov Cap-2 Maneuver	527	-	-
Stage 1	706	-	-
Stage 2	798	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.5	0	1.23
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	674	283
HCM Lane V/C Ratio	-	-	0.029	0.015
HCM Control Delay (s/veh)	-	-	10.5	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

No-Build PM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	44	246	31	281	2	45	171	46	230
v/c Ratio	0.11	0.30	0.06	0.40	0.01	0.15	0.38	0.08	0.29
Control Delay (s/veh)	12.6	19.4	10.5	15.8	21.5	15.5	26.0	25.1	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	12.6	19.4	10.5	15.8	21.5	15.5	26.0	25.1	3.5
Queue Length 50th (ft)	13	105	8	45	1	4	76	19	0
Queue Length 95th (ft)	29	153	19	88	5	31	119	48	36
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	454	826	512	697	318	291	457	573	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.30	0.06	0.40	0.01	0.15	0.37	0.08	0.27

Intersection Summary

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
No-Build PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	203	3	26	149	87	2	6	32	144	39	193
Future Volume (veh/h)	37	203	3	26	149	87	2	6	32	144	39	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1589	1796	1870	1781	1767	1870	1870	1648	1796	1856	1781	1781
Adj Flow Rate, veh/h	44	242	4	31	177	104	2	7	38	171	46	230
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	21	7	2	8	9	2	2	17	7	3	8	8
Cap, veh/h	410	818	14	530	478	281	264	38	205	436	471	452
Arrive On Green	0.04	0.46	0.46	0.01	0.15	0.15	0.00	0.17	0.17	0.10	0.26	0.26
Sat Flow, veh/h	1513	1762	29	1697	1043	613	1781	223	1208	1767	1781	1510
Grp Volume(v), veh/h	44	0	246	31	0	281	2	0	45	171	46	230
Grp Sat Flow(s),veh/h/ln	1513	0	1791	1697	0	1656	1781	0	1431	1767	1781	1510
Q Serve(g_s), s	1.5	0.0	8.5	1.0	0.0	15.3	0.1	0.0	2.7	7.6	2.0	12.6
Cycle Q Clear(g_c), s	1.5	0.0	8.5	1.0	0.0	15.3	0.1	0.0	2.7	7.6	2.0	12.6
Prop In Lane	1.00		0.02	1.00		0.37	1.00		0.84	1.00		1.00
Lane Grp Cap(c), veh/h	410	0	831	530	0	758	264	0	243	436	471	452
V/C Ratio(X)	0.11	0.00	0.30	0.06	0.00	0.37	0.01	0.00	0.19	0.39	0.10	0.51
Avail Cap(c_a), veh/h	523	0	831	566	0	758	349	0	243	495	471	452
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.00	0.98	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	0.0	16.6	14.0	0.0	29.5	34.3	0.0	35.6	28.3	27.8	28.9
Incr Delay (d2), s/veh	0.1	0.0	0.9	0.0	0.0	1.4	0.0	0.0	1.7	0.6	0.4	4.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	3.6	0.4	0.0	7.0	0.0	0.0	1.0	3.3	0.9	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.6	0.0	17.5	14.1	0.0	30.9	34.3	0.0	37.2	28.8	28.2	33.0
LnGrp LOS	B		B	B		C	C		D	C	C	C
Approach Vol, veh/h	290			312			47			447		
Approach Delay, s/veh	17.1			29.2			37.1			30.9		
Approach LOS	B			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	52.4	6.3	32.4	9.5	51.8	15.7	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	41.0	5.0	25.0	11.0	35.0	13.0	17.0				
Max Q Clear Time (g_c+I1), s	3.0	10.5	2.1	14.6	3.5	17.3	9.6	4.7				
Green Ext Time (p_c), s	0.0	1.5	0.0	0.7	0.0	1.6	0.1	0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh	27.0											
HCM 7th LOS	C											

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

No-Build PM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	169	289	283	192	30	105
v/c Ratio	0.21	0.19	0.23	0.17	0.21	0.46
Control Delay (s/veh)	1.9	1.6	7.6	1.5	45.8	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	1.9	1.6	7.6	1.5	45.8	15.6
Queue Length 50th (ft)	11	19	65	0	18	0
Queue Length 95th (ft)	19	30	109	20	43	41
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	854	1553	1214	1143	347	402
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.19	0.23	0.17	0.09	0.26
Intersection Summary						

HCM 7th Signalized Intersection Summary 3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
No-Build PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	243	0	0	238	161	25	0	88	0	0	0
Future Volume (veh/h)	142	243	0	0	238	161	25	0	88	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1737	1870	0	0	1796	1870	1767	1870	1811			
Adj Flow Rate, veh/h	169	289	0	0	283	192	30	0	105			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	11	2	0	0	7	2	9	2	6			
Cap, veh/h	688	1481	0	0	1220	1077	157	0	135			
Arrive On Green	0.10	1.00	0.00	0.00	0.68	0.68	0.09	0.00	0.09			
Sat Flow, veh/h	1654	1870	0	0	1796	1585	1781	0	1535			
Grp Volume(v), veh/h	169	289	0	0	283	192	30	0	105			
Grp Sat Flow(s),veh/h/ln	1654	1870	0	0	1796	1585	1781	0	1535			
Q Serve(g_s), s	3.0	0.0	0.0	0.0	6.0	4.4	1.6	0.0	6.7			
Cycle Q Clear(g_c), s	3.0	0.0	0.0	0.0	6.0	4.4	1.6	0.0	6.7			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	688	1481	0	0	1220	1077	157	0	135			
V/C Ratio(X)	0.25	0.20	0.00	0.00	0.23	0.18	0.19	0.00	0.78			
Avail Cap(c_a), veh/h	832	1481	0	0	1220	1077	374	0	322			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.95	0.95	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.6	0.0	0.0	0.0	6.1	5.8	42.3	0.0	44.6			
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.0	0.4	0.4	0.6	0.0	9.2			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.7	0.1	0.0	0.0	2.2	1.4	0.7	0.0	2.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	3.8	0.3	0.0	0.0	6.5	6.2	42.9	0.0	53.8			
LnGrp LOS	A	A			A	A	D		D			
Approach Vol, veh/h	458			475			135					
Approach Delay, s/veh	1.6			6.4			51.4					
Approach LOS	A			A			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	85.2			11.2			73.9			14.8		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	67.0			14.0			47.0			21.0		
Max Q Clear Time (g_c+I1), s	2.0			5.0			8.0			8.7		
Green Ext Time (p_c), s	1.9			0.3			2.5			0.3		
Intersection Summary												
HCM 7th Control Delay, s/veh	10.0											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
No-Build PM with TDOT

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	4	4	183	6	1	358
Future Vol, veh/h	4	4	183	6	1	358
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	5	2	2	3
Mvmt Flow	4	4	199	7	1	389
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	593	202	0	0	205	0
Stage 1	202	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.12	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.218	-
Pot Cap-1 Maneuver	432	784	-	-	1366	-
Stage 1	780	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	432	784	-	-	1366	-
Mov Cap-2 Maneuver	432	-	-	-	-	-
Stage 1	780	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v11.57		0	0.02			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	557	5	-	
HCM Lane V/C Ratio	-	-	0.016	0.001	-	
HCM Control Delay (s/veh)	-	-	11.6	7.6	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	92	114	63	92	229	136
Future Vol, veh/h	92	114	63	92	229	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	500	0	150	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	12	7	2	6
Mvmt Flow	100	124	68	100	249	148
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	486	249	397	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.22	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.308	-	-	-
Pot Cap-1 Maneuver	535	783	1110	-	-	-
Stage 1	786	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	502	783	1110	-	-	-
Mov Cap-2 Maneuver	577	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s/v11.39		3.44		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1110	-	577	783	-	-
HCM Lane V/C Ratio	0.062	-	0.173	0.158	-	-
HCM Control Delay (s/veh)	8.5	-	12.5	10.5	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.6	0.6	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	6	148	1	13	328
Future Vol, veh/h	2	6	148	1	13	328
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	33	7	2	8	2
Mvmt Flow	2	6	159	1	14	353
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	540	160	0	0	160	0
Stage 1	160	-	-	-	-	-
Stage 2	381	-	-	-	-	-
Critical Hdwy	6.42	6.53	-	-	4.18	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.597	-	-	2.272	-
Pot Cap-1 Maneuver	503	811	-	-	1383	-
Stage 1	869	-	-	-	-	-
Stage 2	691	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	496	811	-	-	1383	-
Mov Cap-2 Maneuver	496	-	-	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v10.21		0		0.29		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	700	69	-	
HCM Lane V/C Ratio	-	-	0.012	0.01	-	
HCM Control Delay (s/veh)	-	-	10.2	7.6	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

Build AM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	42	573	17	205	4	96	175	25	134
v/c Ratio	0.09	0.62	0.06	0.28	0.01	0.26	0.50	0.05	0.19
Control Delay (s/veh)	9.9	21.0	3.9	11.7	21.8	10.4	31.1	26.2	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	9.9	21.0	3.9	11.7	21.8	10.4	31.1	26.2	4.6
Queue Length 50th (ft)	10	197	5	71	2	3	76	10	0
Queue Length 95th (ft)	25	382	2	132	9	43	130	34	38
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	445	924	281	734	359	363	349	495	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.62	0.06	0.28	0.01	0.26	0.50	0.05	0.19
Intersection Summary									

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
Build AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	504	6	15	87	95	4	6	79	156	22	119
Future Volume (veh/h)	37	504	6	15	87	95	4	6	79	156	22	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1381	1841	1870	1796	1752	1826	1870	1411	1841	1811	1752	1752
Adj Flow Rate, veh/h	42	566	7	17	98	107	4	7	89	175	25	134
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	35	4	2	7	10	5	2	33	4	6	10	10
Cap, veh/h	422	852	11	298	347	378	321	17	212	325	419	409
Arrive On Green	0.04	0.47	0.47	0.01	0.15	0.15	0.01	0.19	0.19	0.06	0.24	0.24
Sat Flow, veh/h	1316	1814	22	1711	766	836	1781	88	1121	1725	1752	1485
Grp Volume(v), veh/h	42	0	573	17	0	205	4	0	96	175	25	134
Grp Sat Flow(s),veh/h/ln	1316	0	1837	1711	0	1601	1781	0	1209	1725	1752	1485
Q Serve(g_s), s	1.5	0.0	21.6	0.5	0.0	10.2	0.2	0.0	6.3	5.0	1.0	6.5
Cycle Q Clear(g_c), s	1.5	0.0	21.6	0.5	0.0	10.2	0.2	0.0	6.3	5.0	1.0	6.5
Prop In Lane	1.00		0.01	1.00		0.52	1.00		0.93	1.00		1.00
Lane Grp Cap(c), veh/h	422	0	863	298	0	725	321	0	228	325	419	409
V/C Ratio(X)	0.10	0.00	0.66	0.06	0.00	0.28	0.01	0.00	0.42	0.54	0.06	0.33
Avail Cap(c_a), veh/h	462	0	863	360	0	725	411	0	228	325	419	409
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.99	0.00	0.99	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	0.0	18.4	15.2	0.0	25.3	29.3	0.0	32.2	30.6	26.4	26.0
Incr Delay (d2), s/veh	0.1	0.0	4.0	0.1	0.0	1.0	0.0	0.0	5.6	1.8	0.3	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	9.6	0.2	0.0	4.5	0.1	0.0	2.2	1.3	0.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.9	0.0	22.4	15.2	0.0	26.3	29.3	0.0	37.8	32.4	26.7	28.1
LnGrp LOS	B		C	B		C	C		D	C	C	C
Approach Vol, veh/h	615				222				100		334	
Approach Delay, s/veh	21.8				25.4				37.4		30.2	
Approach LOS	C				C				D		C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	48.3	6.5	27.5	9.3	46.7	11.0	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	39.0	5.0	17.0	6.0	38.0	5.0	17.0				
Max Q Clear Time (g_c+I1), s	2.5	23.6	2.2	8.5	3.5	12.2	7.0	8.3				
Green Ext Time (p_c), s	0.0	3.4	0.0	0.3	0.0	1.2	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			25.9									
HCM 7th LOS			C									

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

Build AM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	527	355	204	302	25	165
v/c Ratio	0.58	0.26	0.22	0.31	0.17	0.54
Control Delay (s/veh)	4.4	1.8	13.4	2.8	39.5	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	4.4	1.8	13.4	2.8	39.5	13.5
Queue Length 50th (ft)	19	10	55	0	13	0
Queue Length 95th (ft)	39	28	114	35	34	44
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	1048	1391	946	984	310	464
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.26	0.22	0.31	0.08	0.36
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
Build AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	437	295	0	0	169	251	19	2	137	0	0	0
Future Volume (veh/h)	437	295	0	0	169	251	19	2	137	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1841	1826	0	0	1796	1870	1648	418	1870			
Adj Flow Rate, veh/h	527	355	0	0	204	302	23	2	165			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	4	5	0	0	7	2	17	100	2			
Cap, veh/h	783	1351	0	0	860	759	47	4	201			
Arrive On Green	0.33	1.00	0.00	0.00	0.48	0.48	0.13	0.13	0.13			
Sat Flow, veh/h	1753	1826	0	0	1796	1585	368	32	1585			
Grp Volume(v), veh/h	527	355	0	0	204	302	25	0	165			
Grp Sat Flow(s),veh/h/ln	1753	1826	0	0	1796	1585	400	0	1585			
Q Serve(g_s), s	13.9	0.0	0.0	0.0	6.0	11.0	5.2	0.0	9.1			
Cycle Q Clear(g_c), s	13.9	0.0	0.0	0.0	6.0	11.0	5.2	0.0	9.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.92		1.00			
Lane Grp Cap(c), veh/h	783	1351	0	0	860	759	51	0	201			
V/C Ratio(X)	0.67	0.26	0.00	0.00	0.24	0.40	0.49	0.00	0.82			
Avail Cap(c_a), veh/h	1085	1351	0	0	860	759	84	0	335			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.78	0.78	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.9	0.0	0.0	0.0	13.8	15.1	36.6	0.0	38.3			
Incr Delay (d2), s/veh	0.8	0.4	0.0	0.0	0.7	1.6	7.2	0.0	8.1			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.9	0.1	0.0	0.0	2.5	4.1	0.6	0.0	3.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.7	0.4	0.0	0.0	14.5	16.7	43.9	0.0	46.4			
LnGrp LOS	A	A			B	B	D		D			
Approach Vol, veh/h	882			506			190					
Approach Delay, s/veh	4.1			15.8			46.0					
Approach LOS	A			B			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	72.6			23.5			49.1			17.4		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	59.0			33.0			20.0			19.0		
Max Q Clear Time (g_c+I1), s	2.0			15.9			13.0			11.1		
Green Ext Time (p_c), s	2.4			1.6			1.3			0.4		
Intersection Summary												
HCM 7th Control Delay, s/veh	12.9											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Build AM with TDOT

Intersection

Int Delay, s/veh 0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	1	284	2	5	195
Future Vol, veh/h	19	1	284	2	5	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	22	1	330	2	6	227

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	570	331	0
Stage 1	331	-	-
Stage 2	238	-	-
Critical Hdwy	6.46	6.22	-
Critical Hdwy Stg 1	5.46	-	-
Critical Hdwy Stg 2	5.46	-	-
Follow-up Hdwy	3.554	3.318	-
Pot Cap-1 Maneuver	476	710	-
Stage 1	718	-	-
Stage 2	792	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	474	710	-
Mov Cap-2 Maneuver	474	-	-
Stage 1	718	-	-
Stage 2	787	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v12.85		0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	482	45
HCM Lane V/C Ratio	-	-	0.048	0.005
HCM Control Delay (s/veh)	-	-	12.9	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build AM with TDOT

Intersection												
Int Delay, s/veh	9.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	140	102	41	4	33	4	105	140	13	13	68	132
Future Vol, veh/h	140	102	41	4	33	4	105	140	13	13	68	132
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	90	-	-	150	-	-	335	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	5	2	8	2	2	2	2	3	2	2	10	7
Mvmt Flow	165	120	48	5	39	5	124	165	15	15	80	155

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	542	538	80	590	685	172	235	0	0	180	0	0
Stage 1	111	111	-	419	419	-	-	-	-	-	-	-
Stage 2	431	427	-	171	266	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.52	6.28	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.018	3.372	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	447	450	964	419	371	871	1332	-	-	1396	-	-
Stage 1	887	804	-	611	590	-	-	-	-	-	-	-
Stage 2	597	585	-	831	689	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	356	404	964	259	332	871	1332	-	-	1396	-	-
Mov Cap-2 Maneuver	356	404	-	259	332	-	-	-	-	-	-	-
Stage 1	878	795	-	555	535	-	-	-	-	-	-	-
Stage 2	499	531	-	663	681	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v19.87		16.76	3.25	0.46
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1332	-	-	356	485	259	356	1396	-	-
HCM Lane V/C Ratio	0.093	-	-	0.462	0.347	0.018	0.122	0.011	-	-
HCM Control Delay (s/veh)	8	-	-	23.5	16.3	19.2	16.5	7.6	-	-
HCM Lane LOS	A	-	-	C	C	C	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.3	1.5	0.1	0.4	0	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	3	14	248	1	17	95
Future Vol, veh/h	3	14	248	1	17	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	3	16	288	1	20	110
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	439	289	0	0	290	0
Stage 1	289	-	-	-	-	-
Stage 2	150	-	-	-	-	-
Critical Hdwy	6.73	6.43	-	-	4.12	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.507	-	-	2.218	-
Pot Cap-1 Maneuver	521	703	-	-	1272	-
Stage 1	694	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	513	703	-	-	1272	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v10.63		0	1.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	660	273	-	
HCM Lane V/C Ratio	-	-	0.03	0.016	-	
HCM Control Delay (s/veh)	-	-	10.6	7.9	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

Build PM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	44	254	31	359	2	45	199	46	230
v/c Ratio	0.13	0.31	0.06	0.52	0.01	0.15	0.44	0.08	0.28
Control Delay (s/veh)	12.9	19.7	10.6	16.7	21.5	15.5	26.9	25.0	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	12.9	19.7	10.6	16.7	21.5	15.5	26.9	25.0	3.5
Queue Length 50th (ft)	13	109	8	78	1	4	90	19	0
Queue Length 95th (ft)	29	157	18	102	5	31	137	48	36
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	391	818	503	693	318	291	461	581	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.31	0.06	0.52	0.01	0.15	0.43	0.08	0.27
Intersection Summary									

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
Build PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	210	3	26	164	138	2	6	32	167	39	193
Future Volume (veh/h)	37	210	3	26	164	138	2	6	32	167	39	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1589	1796	1870	1781	1767	1870	1870	1648	1796	1856	1781	1781
Adj Flow Rate, veh/h	44	250	4	31	195	164	2	7	38	199	46	230
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	21	7	2	8	9	2	2	17	7	3	8	8
Cap, veh/h	355	796	13	508	395	332	264	38	205	459	493	471
Arrive On Green	0.04	0.45	0.45	0.02	0.30	0.30	0.00	0.17	0.17	0.11	0.28	0.28
Sat Flow, veh/h	1513	1763	28	1697	887	746	1781	223	1208	1767	1781	1510
Grp Volume(v), veh/h	44	0	254	31	0	359	2	0	45	199	46	230
Grp Sat Flow(s),veh/h/ln	1513	0	1791	1697	0	1632	1781	0	1431	1767	1781	1510
Q Serve(g_s), s	1.6	0.0	9.1	1.0	0.0	18.1	0.1	0.0	2.7	8.9	1.9	12.4
Cycle Q Clear(g_c), s	1.6	0.0	9.1	1.0	0.0	18.1	0.1	0.0	2.7	8.9	1.9	12.4
Prop In Lane	1.00		0.02	1.00		0.46	1.00		0.84	1.00		1.00
Lane Grp Cap(c), veh/h	355	0	809	508	0	727	264	0	243	459	493	471
V/C Ratio(X)	0.12	0.00	0.31	0.06	0.00	0.49	0.01	0.00	0.19	0.43	0.09	0.49
Avail Cap(c_a), veh/h	468	0	809	544	0	727	349	0	243	495	493	471
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.96	0.00	0.96	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.6	0.0	17.5	14.6	0.0	25.8	34.3	0.0	35.6	27.8	26.8	27.9
Incr Delay (d2), s/veh	0.2	0.0	1.0	0.0	0.0	2.3	0.0	0.0	1.7	0.6	0.4	3.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	3.9	0.4	0.0	7.9	0.0	0.0	1.0	3.8	0.9	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.8	0.0	18.5	14.6	0.0	28.1	34.3	0.0	37.2	28.4	27.2	31.5
LnGrp LOS	B		B	B		C	C		D	C	C	C
Approach Vol, veh/h	298			390			47			475		
Approach Delay, s/veh	18.1			27.0			37.1			29.8		
Approach LOS	B			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	51.2	6.3	33.7	9.5	50.5	17.0	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	41.0	5.0	25.0	11.0	35.0	13.0	17.0				
Max Q Clear Time (g_c+I1), s	3.0	11.1	2.1	14.4	3.6	20.1	10.9	4.7				
Green Ext Time (p_c), s	0.0	1.6	0.0	0.7	0.0	2.0	0.1	0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh	26.3											
HCM 7th LOS	C											

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

Build PM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	169	324	361	252	30	132
v/c Ratio	0.24	0.22	0.31	0.22	0.21	0.52
Control Delay (s/veh)	2.1	1.7	8.9	1.6	45.4	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	2.1	1.7	8.9	1.6	45.4	15.4
Queue Length 50th (ft)	10	21	88	0	18	0
Queue Length 95th (ft)	18	33	146	23	42	45
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	762	1476	1159	1121	347	424
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.22	0.31	0.22	0.09	0.31
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
Build PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	272	0	0	303	212	25	0	111	0	0	0
Future Volume (veh/h)	142	272	0	0	303	212	25	0	111	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1737	1870	0	0	1796	1870	1767	1870	1811			
Adj Flow Rate, veh/h	169	324	0	0	361	252	30	0	132			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	11	2	0	0	7	2	9	2	6			
Cap, veh/h	593	1447	0	0	1183	1044	190	0	164			
Arrive On Green	0.11	1.00	0.00	0.00	0.66	0.66	0.11	0.00	0.11			
Sat Flow, veh/h	1654	1870	0	0	1796	1585	1781	0	1535			
Grp Volume(v), veh/h	169	324	0	0	361	252	30	0	132			
Grp Sat Flow(s),veh/h/ln	1654	1870	0	0	1796	1585	1781	0	1535			
Q Serve(g_s), s	3.2	0.0	0.0	0.0	8.6	6.5	1.5	0.0	8.4			
Cycle Q Clear(g_c), s	3.2	0.0	0.0	0.0	8.6	6.5	1.5	0.0	8.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	593	1447	0	0	1183	1044	190	0	164			
V/C Ratio(X)	0.29	0.22	0.00	0.00	0.31	0.24	0.16	0.00	0.81			
Avail Cap(c_a), veh/h	734	1447	0	0	1183	1044	374	0	322			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.94	0.94	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.4	0.0	0.0	0.0	7.3	6.9	40.6	0.0	43.7			
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.0	0.7	0.5	0.4	0.0	9.0			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.8	0.1	0.0	0.0	3.2	2.1	0.7	0.0	3.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.7	0.3	0.0	0.0	8.0	7.5	41.0	0.0	52.7			
LnGrp LOS	A	A			A	A	D		D			
Approach Vol, veh/h	493			613			162					
Approach Delay, s/veh	1.8			7.8			50.5					
Approach LOS	A			A			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	83.3			11.5			71.9			16.7		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	67.0			14.0			47.0			21.0		
Max Q Clear Time (g_c+I1), s	2.0			5.2			10.6			10.4		
Green Ext Time (p_c), s	2.2			0.3			3.4			0.4		
Intersection Summary												
HCM 7th Control Delay, s/veh	10.9											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Build PM with TDOT

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	198	6	1	365
Future Vol, veh/h	4	4	198	6	1	365
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	5	2	2	3
Mvmt Flow	4	4	215	7	1	397
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	617	218	0	0	222	0
Stage 1	218	-	-	-	-	-
Stage 2	399	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.12	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.218	-
Pot Cap-1 Maneuver	418	767	-	-	1347	-
Stage 1	766	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	418	767	-	-	1347	-
Mov Cap-2 Maneuver	418	-	-	-	-	-
Stage 1	766	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v11.77		0		0.02		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	541	5	-	
HCM Lane V/C Ratio	-	-	0.016	0.001	-	
HCM Control Delay (s/veh)	-	-	11.8	7.7	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build PM with TDOT

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	92	52	114	15	116	15	63	92	7	7	229	136
Future Vol, veh/h	92	52	114	15	116	15	63	92	7	7	229	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	90	-	-	150	-	-	335	-	150
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	2	5	2	2	2	12	7	2	2	2	6
Mvmt Flow	100	57	124	16	126	16	68	100	8	8	249	148

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	564	509	249	533	653	104	397	0	0	108	0	0
Stage 1	264	264	-	241	241	-	-	-	-	-	-	-
Stage 2	300	245	-	292	412	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.52	6.25	7.12	6.52	6.22	4.22	-	-	4.12	-	-
Critical Hdwy Stg 1	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.018	3.345	3.518	4.018	3.318	2.308	-	-	2.218	-	-
Pot Cap-1 Maneuver	432	467	783	457	387	951	1110	-	-	1483	-	-
Stage 1	734	690	-	763	706	-	-	-	-	-	-	-
Stage 2	703	704	-	716	594	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	284	436	783	321	361	951	1110	-	-	1483	-	-
Mov Cap-2 Maneuver	399	504	-	397	426	-	-	-	-	-	-	-
Stage 1	731	686	-	716	663	-	-	-	-	-	-	-
Stage 2	525	660	-	550	591	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v14.03		16.29	3.29	0.14
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1110	-	-	399	667	397	454	1483	-	-
HCM Lane V/C Ratio	0.062	-	-	0.251	0.27	0.041	0.313	0.005	-	-
HCM Control Delay (s/veh)	8.5	-	-	17	12.4	14.4	16.5	7.4	-	-
HCM Lane LOS	A	-	-	C	B	B	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1	1.1	0.1	1.3	0	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	6	155	1	13	343
Future Vol, veh/h	2	6	155	1	13	343
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	33	7	2	8	2
Mvmt Flow	2	6	167	1	14	369

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	564	167	0	0	168
Stage 1	167	-	-	-	-
Stage 2	397	-	-	-	-
Critical Hdwy	6.42	6.53	-	-	4.18
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.597	-	-	2.272
Pot Cap-1 Maneuver	487	802	-	-	1374
Stage 1	862	-	-	-	-
Stage 2	679	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	481	802	-	-	1374
Mov Cap-2 Maneuver	481	-	-	-	-
Stage 1	862	-	-	-	-
Stage 2	671	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.3	0	0.28
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	687	66
HCM Lane V/C Ratio	-	-	0.013	0.01
HCM Control Delay (s/veh)	-	-	10.3	7.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Queues

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring

Build AM with TDOT - Signal



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	165	168	5	44	124	180	15	80	155
v/c Ratio	0.53	0.43	0.03	0.25	0.16	0.16	0.02	0.10	0.18
Control Delay (s/veh)	30.1	26.4	21.5	37.9	9.8	12.1	10.5	17.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.1	26.4	21.5	37.9	9.8	12.1	10.5	17.8	0.5
Queue Length 50th (ft)	80	71	2	21	30	44	3	27	0
Queue Length 95th (ft)	105	129	9	49	62	112	13	60	0
Internal Link Dist (ft)		2232		300		1110		2949	
Turn Bay Length (ft)	500		90		150		335		150
Base Capacity (vph)	413	564	248	370	765	1093	746	818	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.30	0.02	0.12	0.16	0.16	0.02	0.10	0.18

Intersection Summary

HCM 7th Signalized Intersection Summary

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build AM with TDOT - Signal

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	102	41	4	33	4	105	140	13	13	68	132
Future Volume (veh/h)	140	102	41	4	33	4	105	140	13	13	68	132
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1870	1781	1870	1870	1870	1870	1856	1870	1870	1752	1796
Adj Flow Rate, veh/h	165	120	48	5	39	5	124	165	15	15	80	155
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	5	2	8	2	2	2	2	3	2	2	10	7
Cap, veh/h	353	240	96	199	144	18	703	873	79	675	846	735
Arrive On Green	0.18	0.31	0.31	0.01	0.09	0.09	0.06	0.52	0.52	0.02	0.48	0.48
Sat Flow, veh/h	1739	1271	508	1781	1625	208	1781	1676	152	1781	1752	1522
Grp Volume(v), veh/h	165	0	168	5	0	44	124	0	180	15	80	155
Grp Sat Flow(s),veh/h/ln	1739	0	1779	1781	0	1833	1781	0	1828	1781	1752	1522
Q Serve(g_s), s	7.3	0.0	6.9	0.2	0.0	2.0	3.1	0.0	4.7	0.4	2.2	5.3
Cycle Q Clear(g_c), s	7.3	0.0	6.9	0.2	0.0	2.0	3.1	0.0	4.7	0.4	2.2	5.3
Prop In Lane	1.00		0.29	1.00		0.11	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	353	0	335	199	0	162	703	0	952	675	846	735
V/C Ratio(X)	0.47	0.00	0.50	0.03	0.00	0.27	0.18	0.00	0.19	0.02	0.09	0.21
Avail Cap(c_a), veh/h	535	0	553	366	0	367	783	0	952	822	846	735
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.95	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	27.4	37.0	0.0	38.3	10.3	0.0	11.5	11.3	12.6	13.4
Incr Delay (d2), s/veh	0.9	0.0	1.1	0.1	0.0	0.9	0.1	0.0	0.4	0.0	0.2	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	2.8	0.1	0.0	0.9	1.0	0.0	1.7	0.1	0.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.0	0.0	28.5	37.0	0.0	39.2	10.5	0.0	11.9	11.3	12.8	14.0
LnGrp LOS	C		C	D		D	B		B	B	B	B
Approach Vol, veh/h	333					49		304		250		
Approach Delay, s/veh	28.7					39.0		11.3		13.5		
Approach LOS	C					D		B		B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	49.5	15.6	14.0	7.6	52.9	6.6	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	9.0	20.0	19.0	18.0	9.0	20.0	9.0	28.0				
Max Q Clear Time (g_c+l1), s	5.1	7.3	9.3	4.0	2.4	6.7	2.2	8.9				
Green Ext Time (p_c), s	0.1	0.6	0.3	0.1	0.0	0.6	0.0	0.8				
Intersection Summary												
HCM 7th Control Delay, s/veh			19.5									
HCM 7th LOS			B									

Queues

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring

Build PM with TDOT - Signal



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	100	181	16	142	68	108	8	249	148
v/c Ratio	0.32	0.38	0.06	0.59	0.12	0.11	0.01	0.28	0.18
Control Delay (s/veh)	25.7	14.6	21.5	45.5	10.6	12.3	10.4	19.0	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.7	14.6	21.5	45.5	10.6	12.3	10.4	19.0	2.3
Queue Length 50th (ft)	42	31	6	74	16	25	2	93	0
Queue Length 95th (ft)	76	97	20	130	39	72	9	168	25
Internal Link Dist (ft)		2232		300		1110		2949	
Turn Bay Length (ft)	500		90		150		335		150
Base Capacity (vph)	334	499	309	289	576	1009	762	889	822
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.36	0.05	0.49	0.12	0.11	0.01	0.28	0.18
Intersection Summary									

HCM 7th Signalized Intersection Summary

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build PM with TDOT - Signal

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	52	114	15	116	15	63	92	7	7	229	136
Future Volume (veh/h)	92	52	114	15	116	15	63	92	7	7	229	136
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1870	1826	1870	1870	1870	1722	1796	1870	1870	1870	1811
Adj Flow Rate, veh/h	100	57	124	16	126	16	68	100	8	8	249	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	2	5	2	2	2	12	7	2	2	2	6
Cap, veh/h	238	81	177	176	164	21	554	902	72	759	962	789
Arrive On Green	0.07	0.16	0.16	0.02	0.10	0.10	0.05	0.55	0.55	0.01	0.51	0.51
Sat Flow, veh/h	1739	524	1141	1781	1627	207	1640	1641	131	1781	1870	1535
Grp Volume(v), veh/h	100	0	181	16	0	142	68	0	108	8	249	148
Grp Sat Flow(s),veh/h/ln	1739	0	1665	1781	0	1833	1640	0	1773	1781	1870	1535
Q Serve(g_s), s	4.5	0.0	9.3	0.7	0.0	6.8	1.7	0.0	2.6	0.2	6.7	4.7
Cycle Q Clear(g_c), s	4.5	0.0	9.3	0.7	0.0	6.8	1.7	0.0	2.6	0.2	6.7	4.7
Prop In Lane	1.00		0.69	1.00		0.11	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	238	0	259	176	0	185	554	0	974	759	962	789
V/C Ratio(X)	0.42	0.00	0.70	0.09	0.00	0.77	0.12	0.00	0.11	0.01	0.26	0.19
Avail Cap(c_a), veh/h	323	0	296	321	0	285	644	0	974	919	962	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	0.0	36.0	35.3	0.0	39.4	9.4	0.0	9.7	10.2	12.3	11.8
Incr Delay (d2), s/veh	1.1	0.0	5.8	0.2	0.0	6.5	0.1	0.0	0.2	0.0	0.7	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	4.1	0.3	0.0	3.4	0.5	0.0	0.9	0.1	2.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.3	0.0	41.8	35.6	0.0	46.0	9.5	0.0	10.0	10.2	12.9	12.3
LnGrp LOS	C		D	D		D	A		A	B	B	B
Approach Vol, veh/h	281		158			176			405			
Approach Delay, s/veh	38.8		44.9			9.8			12.6			
Approach LOS	D		D			A			B			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.1	52.3	12.6	15.1	6.9	55.5	7.6	20.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	9.0	32.0	11.0	14.0	9.0	32.0	9.0	16.0				
Max Q Clear Time (g_c+I1), s	3.7	8.7	6.5	8.8	2.2	4.6	2.7	11.3				
Green Ext Time (p_c), s	0.0	1.6	0.1	0.3	0.0	0.4	0.0	0.4				
Intersection Summary												
HCM 7th Control Delay, s/veh	24.3											
HCM 7th LOS	C											

Turn Lane Warrants

HSAM Turn Lane Warrants

#	Movement	Scenario	TOD	Facility Type	Speed	Laneage/Site Properties	Three or Four Leg	Major Road Volume (veh/hr)	Major Road Volume (veh/hr/ln)	Left-Turn Volume	Limiting Left-Turn Volume	Left-Turn Warranted	Advancing Volume	Right-Turn Volume	Limiting Right-Turn Volume	Right-Turn Warranted
5	NBR	Build 2026	AM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	#N/A	#N/A	50	50	#N/A	258	13	26	No
5	NBR	Build 2026	PM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	#N/A	#N/A	50	50	#N/A	162	7	38	No
5	NBR	Build Horizon 2031	AM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	#N/A	#N/A	50	50	#N/A	311	13	23	No
5	NBR	Build Horizon 2031	PM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	#N/A	#N/A	50	50	#N/A	195	7	33	No
5	SBL	Build 2026	AM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	471	236	13	50	Yes	213			No
5	SBL	Build 2026	PM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	534	267	7	110	Yes	372			No
5	SBL	Build Horizon 2031	AM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	568	284	13	50	Yes	257			No
5	SBL	Build Horizon 2031	PM	2-lane roadway	55	Two-Lane Highway in Rural Area	Four	647	324	7	110	Yes	452			No

Signal Warrants

Manchester Pike at Epps Mill Road/Site Driveway A (Intersection 5)
Build Conditions (with Right-Turns)

City/County:	Rutherford County		85th-percentile speed on the major street exceeds 40 mph? (Y or N)	Y	Analyzed by: Kimley-Horn
State:	Tennessee		Isolated community with a population of less than 10,000? (Y or N)	N	
Date:	1/17/2025		Apply 56% warrant to Warrant 1, Combination Warrant? (Y or N)	N	
Major Street:	Manchester Pike	(NB+SB)	Approach Lanes - Major? (1 or 2)	1	
Minor Street 1:	Epps Mill Road	(EB)	Approach Lanes - Minor 1? (1 or 2)	1	
Minor Street 2:	Site Driveway	(WB)	Approach Lanes - Minor 2? (1 or 2)	2	

Right-Turn % Applied:				100%	100%	100%	
24-Hour Volume Summary				Major Street	Minor Street 1	Minor Street 2	Minor Street (Max)
				Total of Both Approaches	Higher Volume Approach	Higher Volume Approach	Higher Volume Approach
12:00 AM	TO	01:00 AM	0	2	11	11	
01:00 AM	TO	02:00 AM	0	1	9	9	
02:00 AM	TO	03:00 AM	0	2	7	7	
03:00 AM	TO	04:00 AM	0	2	3	3	
04:00 AM	TO	05:00 AM	2	6	1	6	
05:00 AM	TO	06:00 AM	4	14	1	14	
06:00 AM	TO	07:00 AM	453	185	17	185	
07:00 AM	TO	08:00 AM	461	246	19	246	
08:00 AM	TO	09:00 AM	290	146	17	146	
09:00 AM	TO	10:00 AM	260	105	18	105	
10:00 AM	TO	11:00 AM	299	94	18	94	
11:00 AM	TO	12:00 PM	308	145	29	145	
12:00 PM	TO	01:00 PM	334	164	38	164	
01:00 PM	TO	02:00 PM	353	159	40	159	
02:00 PM	TO	03:00 PM	337	166	42	166	
03:00 PM	TO	04:00 PM	445	215	122	215	
04:00 PM	TO	05:00 PM	515	220	69	220	
05:00 PM	TO	06:00 PM	490	211	58	211	
06:00 PM	TO	07:00 PM	2	6	17	17	
07:00 PM	TO	08:00 PM	2	5	9	9	
08:00 PM	TO	09:00 PM	2	5	9	9	
09:00 PM	TO	10:00 PM	2	6	12	12	
10:00 PM	TO	11:00 PM	2	8	13	13	
11:00 PM	TO	12:00 AM	2	6	19	19	
Source: MUTCD, 2009 Edition							
Created By: Kimley-Horn and Associates, Inc.							

Warrant 1, Condition A	
70%	
Major Street	Minor Street
0% 8%	
0% 6%	
0% 5%	
0% 2%	
1% 4%	
1% 10%	
129% 132%	
132% 176%	
83% 104%	
74% 75%	
85% 67%	
88% 104%	
95% 117%	
101% 114%	
96% 119%	
127% 154%	
147% 157%	
140% 151%	
1% 12%	
1% 6%	
1% 6%	
1% 9%	
1% 9%	
1% 14%	
Threshold	
350	140
Summary	
TOTAL 6	
Met? NO	

Warrant 1, Condition B	
70%	
Major Street	Minor Street
0% 16%	
0% 13%	
0% 10%	
0% 4%	
0% 9%	
1% 20%	
86% 264%	
88% 351%	
55% 209%	
50% 150%	
57% 134%	
59% 207%	
64% 234%	
67% 227%	
64% 237%	
85% 307%	
98% 314%	
93% 301%	
0% 24%	
0% 13%	
0% 13%	
0% 17%	
0% 19%	
0% 27%	
Threshold	
525	70
Summary	
TOTAL 0	
Met? NO	

Warrant 1, Combination Warrant			
80%		80%	
Major Street	Minor Street	Major Street	Minor Street
0% 7%		0% 14%	
0% 6%		0% 11%	
0% 4%		0% 9%	
0% 2%		0% 4%	
1% 4%		0% 8%	
1% 9%		1% 18%	
113% 116%		76% 231%	
115% 154%		77% 308%	
73% 91%		48% 183%	
65% 66%		43% 131%	
75% 59%		50% 118%	
77% 91%		51% 181%	
84% 103%		56% 205%	
88% 99%		59% 199%	
84% 104%		56% 208%	
111% 134%		74% 269%	
129% 138%		86% 275%	
123% 132%		82% 264%	
1% 11%		0% 21%	
1% 6%		0% 11%	
1% 6%		0% 11%	
1% 8%		0% 15%	
1% 8%		0% 16%	
1% 12%		0% 24%	
Threshold		Threshold	
400	160	600	80
Summary		Summary	
TOTAL 5		TOTAL 0	
TOTAL 0		Met? NO	

Warrant 2	
70%	
Figure 4C-1	
4%	
3%	
3%	
1%	
2%	
5%	
98%	
133%	
55%	
40%	
35%	
56%	
66%	
67%	
67%	
111%	
138%	
124%	
6%	
3%	
3%	
5%	
5%	
7%	
MUTCD Figure 4C-1 and 4C-2	
Summary	
TOTAL 4	
Met? YES	

Warrant 3, Condition A		
70%		
Minor Delay	Minor Volume	Total Intrscn

COMMENTS/NOTES:	COMMENTS/NOTES:

Horizon Year Analyses

(For TDOT Reference Only)

Horizon Year LOS Summary - With TDOT Improvements

#	Name	Movement	No-Build Horizon AM		No-Build Horizon PM		Build Horizon AM		Build Horizon PM	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Miller Road/I-24 EB Ramps & Epps Mill Road	EBL	B	13.1	B	15.9	B	13.3	B	17.8
		EBT	A	0.0	A	0.0	A	0.0	A	0.0
		EBR	C	27.7	B	19.9	C	28.7	C	21.0
		WBL	B	17.2	B	15.2	B	17.5	B	15.9
		WBT	A	0.0	A	0.0	A	0.0	A	0.0
		WBR	C	27.0	C	28.0	C	27.6	C	32.1
		NBL	C	29.2	C	34.1	C	29.2	C	34.1
		NBT	A	0.0	A	0.0	A	0.0	A	0.0
		NBR	D	40.7	D	38.0	D	40.7	D	38.0
		SBL	C	31.4	C	28.4	D	38.4	C	28.0
		SBT	C	27.0	C	27.3	C	27.0	C	26.4
		SBR	C	29.3	C	33.7	C	29.3	C	32.1
		Intersection	C	28.6	C	27.0	C	30.1	C	28.2
3	I-24 WB Off Ramp/I-24 WB On Ramp & Epps Mill Road	EBL	A	7.9	A	4.7	B	10.1	A	5.8
		EBT	A	0.3	A	0.4	A	0.4	A	0.4
		EBR	A	0.0	A	0.0	A	0.0	A	0.0
		WBL	A	0.0	A	0.0	A	0.0	A	0.0
		WBT	B	16.9	A	8.1	C	20.8	A	9.8
		WBR	C	20.5	A	7.6	C	25.9	A	9.1
		NBL	E	62.9	D	41.5	D	45.0	D	39.7
		NBT	A	0.0	A	0.0	A	0.0	A	0.0
		NBR	D	47.0	D	52.6	D	48.9	D	51.7
		Intersection	B	14.2	B	10.7	B	16.9	B	11.8
4	Manchester Pike & Hughes Road	SBL	A	8.4	A	7.7	A	8.4	A	7.8
		WB	B	14.3	B	12.6	B	14.5	B	12.8
5	Manchester Pike & Epps Mill Road/Site Driveway A	NBL	A	8.2	A	8.8	A	8.2	A	8.8
		SBL	--	--	--	--	A	7.7	A	7.5
		EB	C	15.4	B	12.5	C	22.0	C	16.2
		WB	--	--	--	--	C	16.2	C	18.9
6	Manchester Pike & Cobb Road	SBL	A	8.0	A	7.7	A	8.0	A	7.7
		WB	B	11.1	B	10.8	B	11.3	B	10.9

Horizon Year Queue Summary - With TDOT Improvements

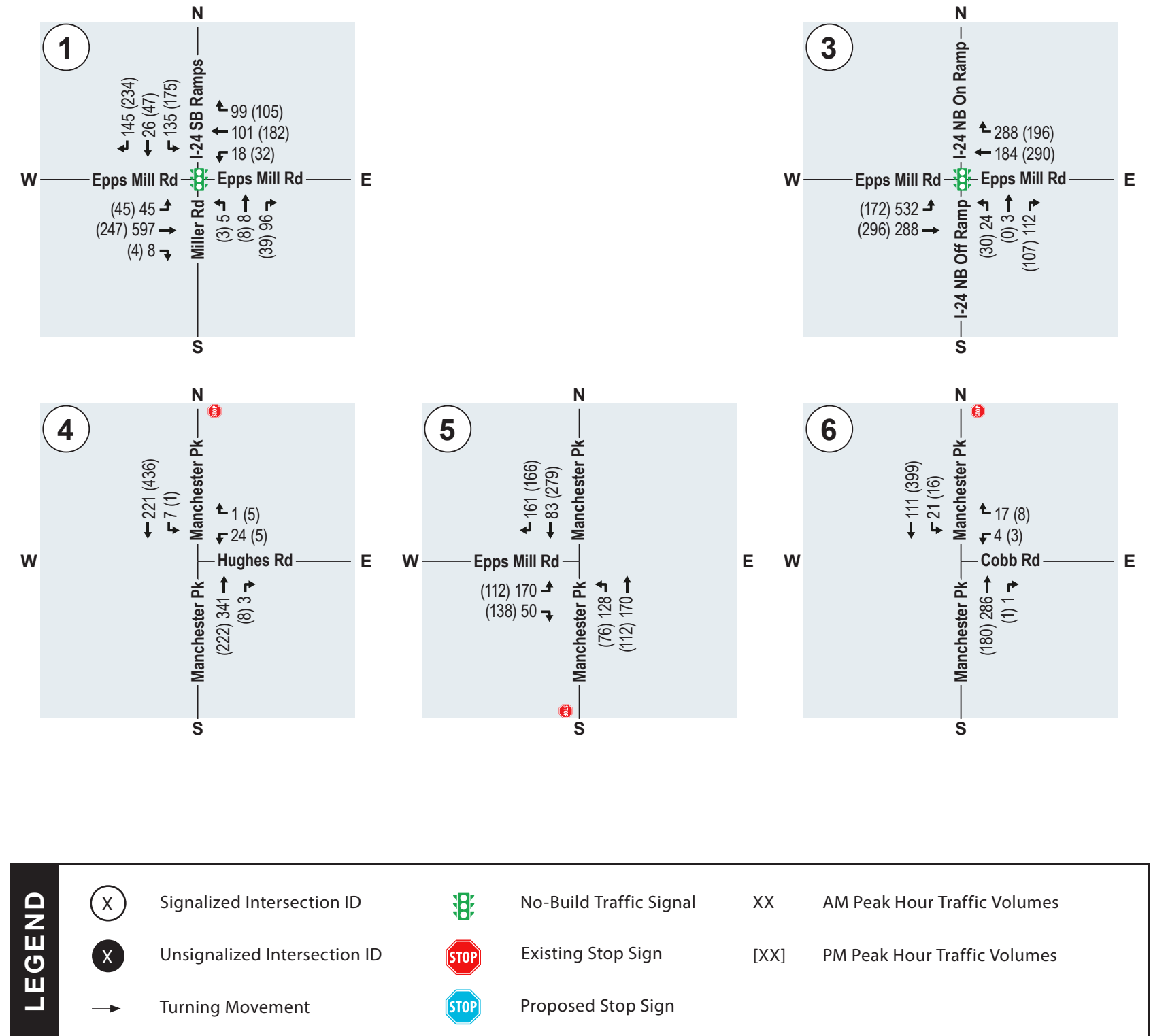
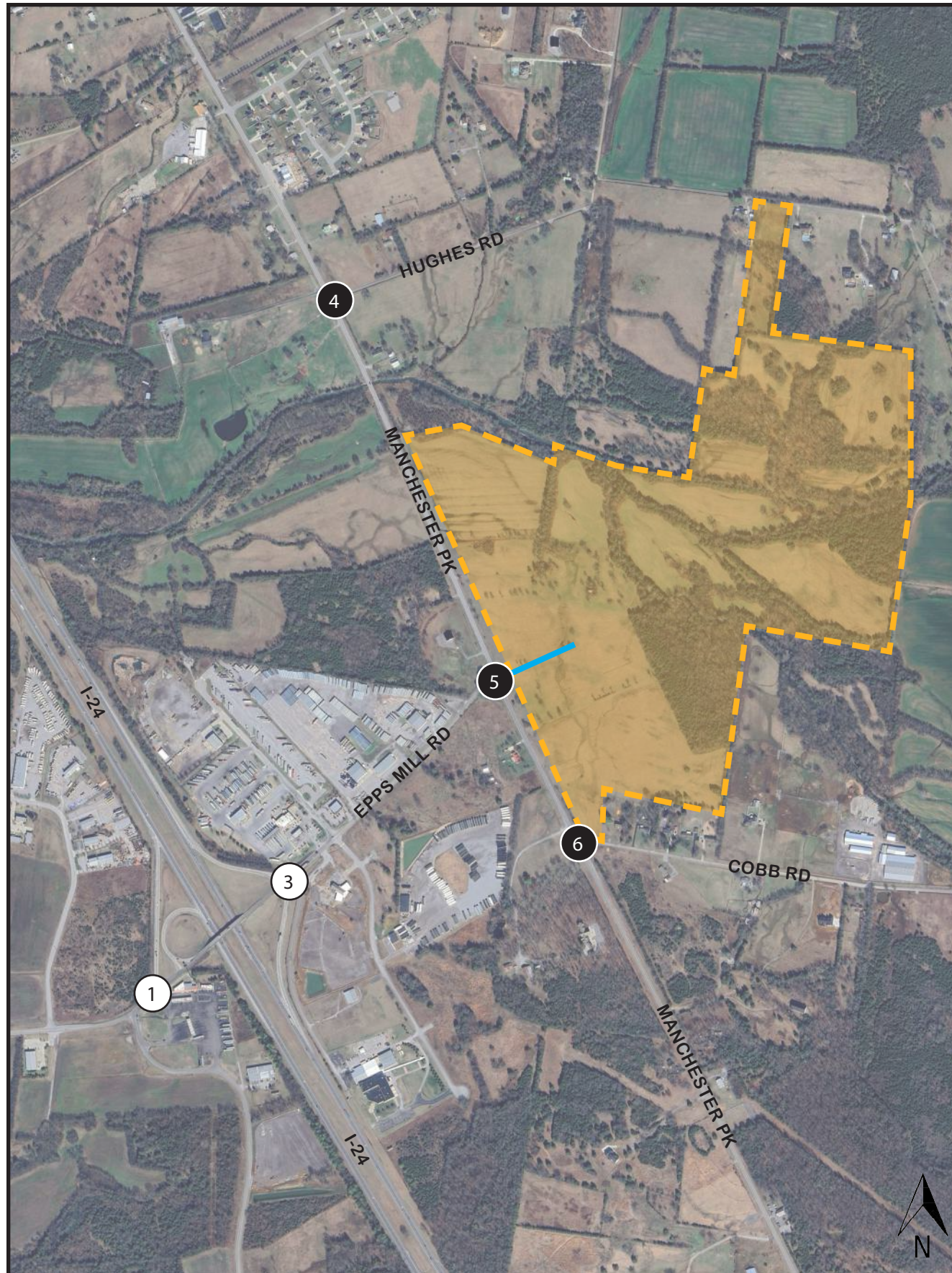
#	Name	Movement	No-Build Horizon AM		No-Build Horizon PM		Build Horizon AM		Build Horizon PM	
			Storage	Queue	Storage	Queue	Storage	Queue	Storage	Queue
1	Miller Road/I-24 EB Ramps & Epps Mill Road	EBL	160	29	160	34	160	29	160	34
		EBT		#540		187		#559		192
		WBL	150	7	150	22	150	6	150	21
		WBT		0		105		0		120
		NBL	185	11	185	8	185	11	185	8
		NBT		48		35		48		35
		SBL	250	114	250	142	250	#164	250	162
		SBT		37		56		37		56
		SBR	250	41	250	37	250	41	250	37
3	I-24 WB Off Ramp/I-24 WB On Ramp & Epps Mill Road	EBL	500	34	500	23	500	51	500	23
		EBT		20		37		33		40
		WBT		148		142		165		185
		WBR	200	43	200	23	200	43	200	25
		NBT		41		48		41		48
		NBR	265	41	265	44	265	46	265	47
4	Manchester Pike & Hughes Road	WBL		5		3		5		3
		SBL		0		0		0		0
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL	500	50	500	23	500	80	500	38
		EBR		5		20		43		35
		WBL					90	0	90	5
		WBR						10		40
		NBL	150	10	150	8	150	10	150	8
		SBL					335	0	335	0
		SBR	150		150		150		150	
6	Manchester Pike & Cobb Road	WBL		3		3		3		3
		SBL		3		0		3		0

Horizon Year LOS Summary - With TDOT Improvements - Signal

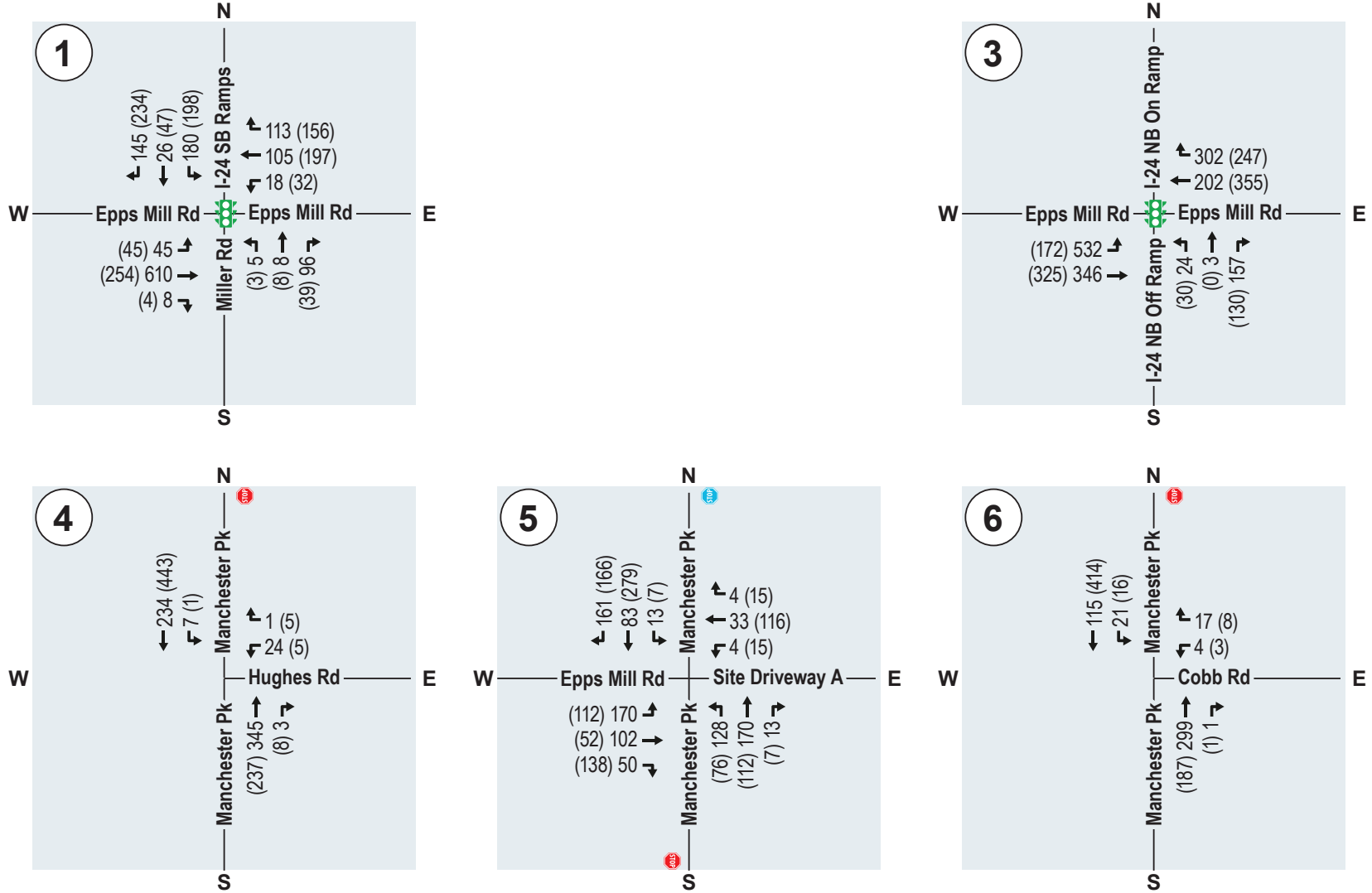
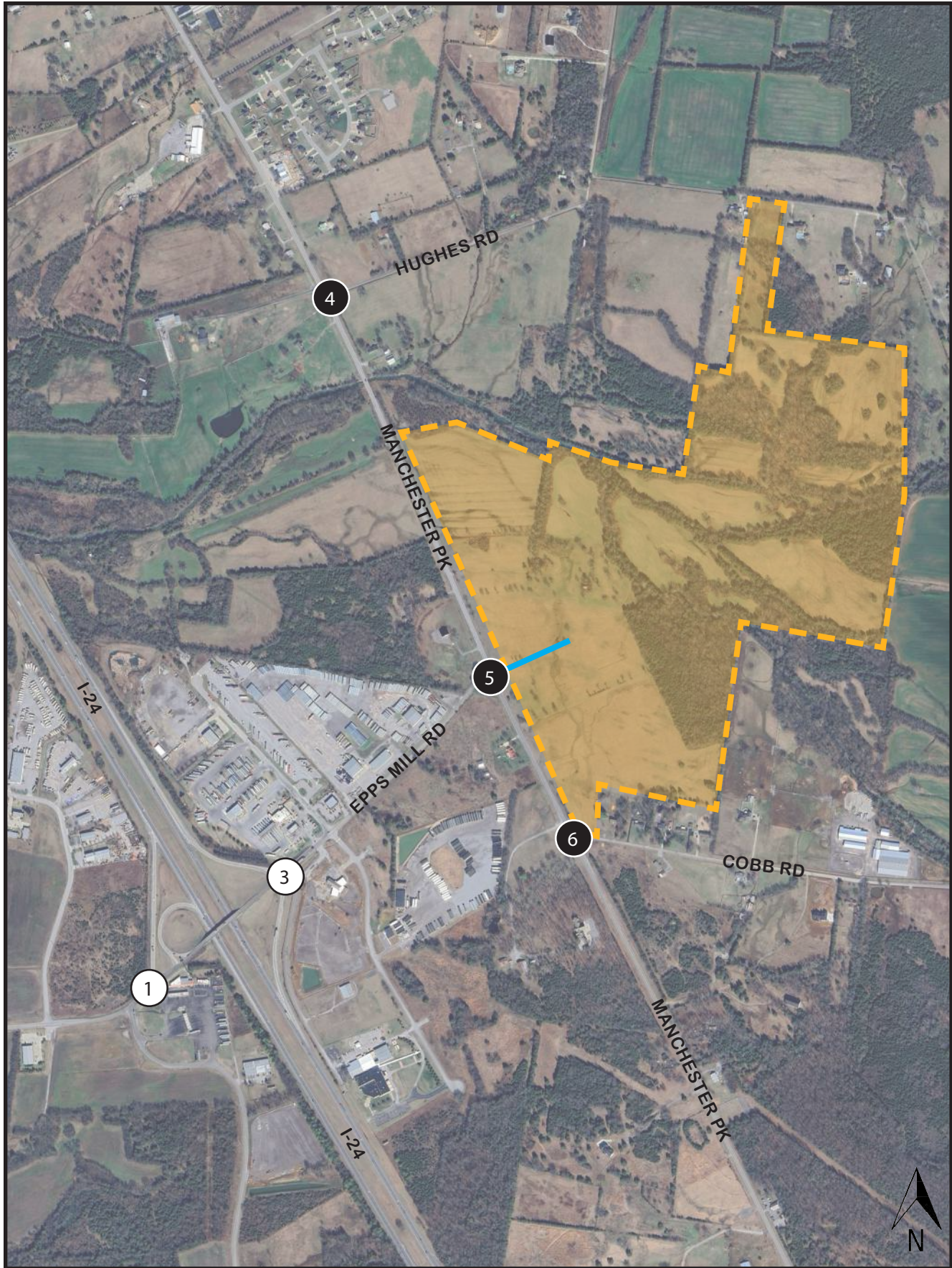
#	Name	Movement	Build Horizon AM		Build Horizon PM	
			LOS	Delay	LOS	Delay
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL	C	28.0	C	32.0
		EBT	A	0.0	A	0.0
		EBR	C	26.7	D	54.1
		WBL	D	37.0	C	31.4
		WBT	A	0.0	A	0.0
		WBR	D	39.2	D	41.0
		NBL	B	11.4	B	11.1
		NBT	A	0.0	A	0.0
		NBR	B	13.2	B	11.5
		SBL	B	12.7	B	11.7
		SBT	B	14.5	B	15.4
		SBR	B	16.3	B	14.5
		Intersection	B	19.6	C	26.2

Horizon Year Queue Summary - With TDOT Improvements - Signal

#	Name	Movement	Build Horizon AM		Build Horizon PM	
			Storage	Queue	Storage	Queue
5	Manchester Pike & Epps Mill Road/Site Driveway A	EBL	500	119	500	90
		EBT		126		104
		WBL	90	8	90	20
		WBT		49		130
		NBL	150	76	150	46
		NBT		137		86
		SBL	335	13	335	9
		SBT		73		206
		SBR	150	11	150	41



LEGEND		Signalized Intersection ID		No-Build Traffic Signal	XX	AM Peak Hour Traffic Volumes
		Unsignalized Intersection ID		Existing Stop Sign	[XX]	PM Peak Hour Traffic Volumes
		Turning Movement		Proposed Stop Sign		



LEGEND		Signalized Intersection ID		No-Build Traffic Signal	XX	AM Peak Hour Traffic Volumes
		Unsignalized Intersection ID		Existing Stop Sign	[XX]	PM Peak Hour Traffic Volumes
		Turning Movement		Proposed Stop Sign		

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

No-Build Horizon AM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	51	680	20	224	6	117	152	29	163
v/c Ratio	0.12	0.74	0.10	0.31	0.02	0.31	0.44	0.06	0.23
Control Delay (s/veh)	10.1	25.3	3.5	9.1	21.8	10.2	29.5	26.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	10.1	25.3	3.5	9.1	21.8	10.2	29.5	26.2	4.4
Queue Length 50th (ft)	13	256	4	81	2	4	65	12	0
Queue Length 95th (ft)	29	#540	7	0	11	48	114	37	41
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	430	924	195	732	358	378	344	495	711
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.74	0.10	0.31	0.02	0.31	0.44	0.06	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
No-Build Horizon AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	597	8	18	101	99	5	8	96	135	26	145
Future Volume (veh/h)	45	597	8	18	101	99	5	8	96	135	26	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1381	1841	1870	1796	1752	1826	1870	1411	1841	1811	1752	1752
Adj Flow Rate, veh/h	51	671	9	20	113	111	6	9	108	152	29	163
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	35	4	2	7	10	5	2	33	4	6	10	10
Cap, veh/h	410	846	11	230	364	358	319	18	211	302	415	411
Arrive On Green	0.04	0.47	0.47	0.01	0.15	0.15	0.01	0.19	0.19	0.06	0.24	0.24
Sat Flow, veh/h	1316	1812	24	1711	811	797	1781	93	1117	1725	1752	1485
Grp Volume(v), veh/h	51	0	680	20	0	224	6	0	117	152	29	163
Grp Sat Flow(s),veh/h/ln	1316	0	1836	1711	0	1608	1781	0	1210	1725	1752	1485
Q Serve(g_s), s	1.9	0.0	28.2	0.6	0.0	11.2	0.2	0.0	7.8	5.0	1.2	8.0
Cycle Q Clear(g_c), s	1.9	0.0	28.2	0.6	0.0	11.2	0.2	0.0	7.8	5.0	1.2	8.0
Prop In Lane	1.00		0.01	1.00		0.50	1.00		0.92	1.00		1.00
Lane Grp Cap(c), veh/h	410	0	858	230	0	722	319	0	229	302	415	411
V/C Ratio(X)	0.12	0.00	0.79	0.09	0.00	0.31	0.02	0.00	0.51	0.50	0.07	0.40
Avail Cap(c_a), veh/h	445	0	858	287	0	722	404	0	229	302	415	411
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.00	0.98	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.0	0.0	20.3	17.0	0.0	25.9	29.1	0.0	32.8	30.0	26.7	26.4
Incr Delay (d2), s/veh	0.1	0.0	7.4	0.2	0.0	1.1	0.0	0.0	8.0	1.3	0.3	2.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	13.0	0.2	0.0	5.0	0.1	0.0	2.8	0.8	0.5	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.1	0.0	27.7	17.2	0.0	27.0	29.2	0.0	40.7	31.4	27.0	29.3
LnGrp LOS	B		C	B		C	C		D	C	C	C
Approach Vol, veh/h	731			244			123			344		
Approach Delay, s/veh	26.7			26.2			40.2			30.0		
Approach LOS	C			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	48.0	6.7	27.3	9.6	46.4	11.0	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	39.0	5.0	17.0	6.0	38.0	5.0	17.0				
Max Q Clear Time (g_c+I1), s	2.6	30.2	2.2	10.0	3.9	13.2	7.0	9.8				
Green Ext Time (p_c), s	0.0	3.1	0.0	0.4	0.0	1.4	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh	28.6											
HCM 7th LOS	C											

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

No-Build Horizon AM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	641	347	222	347	33	135
v/c Ratio	0.69	0.25	0.26	0.37	0.24	0.49
Control Delay (s/veh)	5.7	1.4	17.6	3.7	41.4	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	5.7	1.4	17.6	3.7	41.4	13.5
Queue Length 50th (ft)	29	9	66	0	18	0
Queue Length 95th (ft)	34	20	148	43	41	41
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	1031	1392	853	940	302	440
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.25	0.26	0.37	0.11	0.31
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
No-Build Horizon AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	532	288	0	0	184	288	24	3	112	0	0	0
Future Volume (veh/h)	532	288	0	0	184	288	24	3	112	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1841	1826	0	0	1796	1870	1648	418	1870			
Adj Flow Rate, veh/h	641	347	0	0	222	347	29	4	135			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	4	5	0	0	7	2	17	100	2			
Cap, veh/h	821	1386	0	0	792	699	38	5	171			
Arrive On Green	0.42	1.00	0.00	0.00	0.44	0.44	0.11	0.11	0.11			
Sat Flow, veh/h	1753	1826	0	0	1796	1585	352	49	1585			
Grp Volume(v), veh/h	641	347	0	0	222	347	33	0	135			
Grp Sat Flow(s),veh/h/ln	1753	1826	0	0	1796	1585	400	0	1585			
Q Serve(g_s), s	18.7	0.0	0.0	0.0	7.1	14.1	7.2	0.0	7.5			
Cycle Q Clear(g_c), s	18.7	0.0	0.0	0.0	7.1	14.1	7.2	0.0	7.5			
Prop In Lane	1.00		0.00	0.00		1.00	0.88		1.00			
Lane Grp Cap(c), veh/h	821	1386	0	0	792	699	43	0	171			
V/C Ratio(X)	0.78	0.25	0.00	0.00	0.28	0.50	0.76	0.00	0.79			
Avail Cap(c_a), veh/h	1023	1386	0	0	792	699	85	0	335			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.67	0.67	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.8	0.0	0.0	0.0	16.1	18.0	39.0	0.0	39.2			
Incr Delay (d2), s/veh	2.1	0.3	0.0	0.0	0.9	2.5	23.8	0.0	7.9			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.4	0.1	0.0	0.0	3.0	5.4	1.0	0.0	3.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.9	0.3	0.0	0.0	16.9	20.5	62.9	0.0	47.0			
LnGrp LOS	A	A			B	C	E		D			
Approach Vol, veh/h	988			569			168					
Approach Delay, s/veh	5.2			19.1			50.1					
Approach LOS	A			B			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	74.3			28.6			45.7			15.7		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	59.0			33.0			20.0			19.0		
Max Q Clear Time (g_c+I1), s	2.0			20.7			16.1			9.5		
Green Ext Time (p_c), s	2.4			1.9			1.0			0.4		
Intersection Summary												
HCM 7th Control Delay, s/veh	14.2											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
No-Build Horizon AM with TDOT

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	1	341	3	7	221
Future Vol, veh/h	24	1	341	3	7	221
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	28	1	397	3	8	257
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	672	398	0	0	400	0
Stage 1	398	-	-	-	-	-
Stage 2	273	-	-	-	-	-
Critical Hdwy	6.46	6.22	-	-	4.3	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	-	-	2.38	-
Pot Cap-1 Maneuver	415	651	-	-	1068	-
Stage 1	670	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	412	651	-	-	1068	-
Mov Cap-2 Maneuver	412	-	-	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v	14.26	0		0.26		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	418	55	-	
HCM Lane V/C Ratio	-	-	0.07	0.008	-	
HCM Control Delay (s/veh)	-	-	14.3	8.4	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road

Project Spring
No-Build Horizon AM with TDOT

Intersection						
Int Delay, s/veh	5.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	170	50	128	170	83	161
Future Vol, veh/h	170	50	128	170	83	161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	500	0	150	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	5	8	2	3	10	7
Mvmt Flow	200	59	151	200	98	189
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	599	98	287	0	-	0
Stage 1	98	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Critical Hdwy	6.45	6.28	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.372	2.218	-	-	-
Pot Cap-1 Maneuver	460	942	1275	-	-	-
Stage 1	919	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	405	942	1275	-	-	-
Mov Cap-2 Maneuver	491	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s/v15.41		3.52		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1275	-	491	942	-	-
HCM Lane V/C Ratio	0.118	-	0.407	0.062	-	-
HCM Control Delay (s/veh)	8.2	-	17.3	9.1	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	2	0.2	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	17	286	1	21	111
Future Vol, veh/h	4	17	286	1	21	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	5	20	333	1	24	129
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	511	333	0	0	334	0
Stage 1	333	-	-	-	-	-
Stage 2	178	-	-	-	-	-
Critical Hdwy	6.73	6.43	-	-	4.12	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.507	-	-	2.218	-
Pot Cap-1 Maneuver	472	663	-	-	1226	-
Stage 1	662	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	462	663	-	-	1226	-
Mov Cap-2 Maneuver	462	-	-	-	-	-
Stage 1	662	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v11.13		0		1.27		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	612	286	-	
HCM Lane V/C Ratio	-	-	0.04	0.02	-	
HCM Control Delay (s/veh)	-	-	11.1	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-	

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

No-Build Horizon PM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	54	299	38	342	4	56	208	56	279
v/c Ratio	0.15	0.37	0.08	0.50	0.01	0.19	0.46	0.10	0.33
Control Delay (s/veh)	13.1	20.6	10.7	17.6	21.7	15.6	27.2	25.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	13.1	20.6	10.7	17.6	21.7	15.6	27.2	25.1	3.4
Queue Length 50th (ft)	16	132	10	80	2	5	95	23	0
Queue Length 95th (ft)	34	187	22	105	8	35	142	56	37
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	399	816	461	682	316	298	460	583	888
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.37	0.08	0.50	0.01	0.19	0.45	0.10	0.31

Intersection Summary

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
No-Build Horizon PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	247	4	32	182	105	3	8	39	175	47	234
Future Volume (veh/h)	45	247	4	32	182	105	3	8	39	175	47	234
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1589	1796	1870	1781	1767	1870	1870	1648	1796	1856	1781	1781
Adj Flow Rate, veh/h	54	294	5	38	217	125	4	10	46	208	56	279
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	21	7	2	8	9	2	2	17	7	3	8	8
Cap, veh/h	368	782	13	469	460	265	259	44	200	455	496	479
Arrive On Green	0.04	0.44	0.44	0.02	0.29	0.29	0.01	0.17	0.17	0.11	0.28	0.28
Sat Flow, veh/h	1513	1761	30	1697	1052	606	1781	256	1179	1767	1781	1510
Grp Volume(v), veh/h	54	0	299	38	0	342	4	0	56	208	56	279
Grp Sat Flow(s),veh/h/ln	1513	0	1791	1697	0	1658	1781	0	1436	1767	1781	1510
Q Serve(g_s), s	1.9	0.0	11.1	1.2	0.0	16.9	0.2	0.0	3.4	9.3	2.3	15.5
Cycle Q Clear(g_c), s	1.9	0.0	11.1	1.2	0.0	16.9	0.2	0.0	3.4	9.3	2.3	15.5
Prop In Lane	1.00		0.02	1.00		0.37	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	368	0	795	469	0	725	259	0	244	455	496	479
V/C Ratio(X)	0.15	0.00	0.38	0.08	0.00	0.47	0.02	0.00	0.23	0.46	0.11	0.58
Avail Cap(c_a), veh/h	475	0	795	499	0	725	339	0	244	484	496	479
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.96	0.00	0.96	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.7	0.0	18.6	15.1	0.0	25.9	34.1	0.0	35.8	27.7	26.9	28.6
Incr Delay (d2), s/veh	0.2	0.0	1.4	0.1	0.0	2.1	0.0	0.0	2.2	0.7	0.5	5.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	4.8	0.5	0.0	7.5	0.1	0.0	1.3	4.0	1.1	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.9	0.0	19.9	15.2	0.0	28.0	34.1	0.0	38.0	28.4	27.3	33.7
LnGrp LOS	B		B	B		C	C		D	C	C	C
Approach Vol, veh/h	353				380				60		543	
Approach Delay, s/veh	19.3				26.7				37.8		31.0	
Approach LOS	B				C				D		C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.3	50.4	6.5	33.8	9.9	49.8	17.4	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	41.0	5.0	25.0	11.0	35.0	13.0	17.0				
Max Q Clear Time (g_c+I1), s	3.2	13.1	2.2	17.5	3.9	18.9	11.3	5.4				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.8	0.0	1.9	0.1	0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh			27.0									
HCM 7th LOS			C									

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
No-Build Horizon PM with TDOT

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	205	352	345	233	36	127
v/c Ratio	0.28	0.24	0.30	0.21	0.25	0.51
Control Delay (s/veh)	2.4	1.9	9.1	1.6	46.3	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	2.4	1.9	9.1	1.6	46.3	15.3
Queue Length 50th (ft)	13	24	84	0	22	0
Queue Length 95th (ft)	23	37	142	23	48	44
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	771	1474	1146	1104	347	420
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.24	0.30	0.21	0.10	0.30
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
No-Build Horizon PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	296	0	0	290	196	30	0	107	0	0	0
Future Volume (veh/h)	172	296	0	0	290	196	30	0	107	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1737	1870	0	0	1796	1870	1767	1870	1811			
Adj Flow Rate, veh/h	205	352	0	0	345	233	36	0	127			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	11	2	0	0	7	2	9	2	6			
Cap, veh/h	620	1452	0	0	1172	1034	185	0	159			
Arrive On Green	0.13	1.00	0.00	0.00	0.65	0.65	0.10	0.00	0.10			
Sat Flow, veh/h	1654	1870	0	0	1796	1585	1781	0	1535			
Grp Volume(v), veh/h	205	352	0	0	345	233	36	0	127			
Grp Sat Flow(s),veh/h/ln	1654	1870	0	0	1796	1585	1781	0	1535			
Q Serve(g_s), s	4.0	0.0	0.0	0.0	8.3	6.0	1.8	0.0	8.1			
Cycle Q Clear(g_c), s	4.0	0.0	0.0	0.0	8.3	6.0	1.8	0.0	8.1			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	620	1452	0	0	1172	1034	185	0	159			
V/C Ratio(X)	0.33	0.24	0.00	0.00	0.29	0.23	0.19	0.00	0.80			
Avail Cap(c_a), veh/h	746	1452	0	0	1172	1034	374	0	322			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.92	0.92	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.4	0.0	0.0	0.0	7.5	7.1	41.0	0.0	43.8			
Incr Delay (d2), s/veh	0.3	0.4	0.0	0.0	0.6	0.5	0.5	0.0	8.8			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	0.1	0.0	0.0	3.1	2.0	0.8	0.0	3.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.7	0.4	0.0	0.0	8.1	7.6	41.5	0.0	52.6			
LnGrp LOS	A	A			A	A	D		D			
Approach Vol, veh/h	557			578			163					
Approach Delay, s/veh	1.9			7.9			50.2					
Approach LOS	A			A			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	83.6			12.4			71.3			16.4		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	67.0			14.0			47.0			21.0		
Max Q Clear Time (g_c+I1), s	2.0			6.0			10.3			10.1		
Green Ext Time (p_c), s	2.4			0.3			3.2			0.4		
Intersection Summary												
HCM 7th Control Delay, s/veh	10.7											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
No-Build Horizon PM with TDOT

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	222	8	1	436
Future Vol, veh/h	5	5	222	8	1	436
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	5	2	2	3
Mvmt Flow	5	5	241	9	1	474
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	722	246	0	0	250	0
Stage 1	246	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.12	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.218	-
Pot Cap-1 Maneuver	362	740	-	-	1316	-
Stage 1	744	-	-	-	-	-
Stage 2	580	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	361	740	-	-	1316	-
Mov Cap-2 Maneuver	361	-	-	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v12.59		0	0.02			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	485	4	-	
HCM Lane V/C Ratio	-	-	0.022	0.001	-	
HCM Control Delay (s/veh)	-	-	12.6	7.7	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road

Project Spring
No-Build Horizon PM with TDOT

Intersection						
Int Delay, s/veh	4.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	112	138	76	112	279	166
Future Vol, veh/h	112	138	76	112	279	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	500	0	150	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	12	7	2	6
Mvmt Flow	122	150	83	122	303	180

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	590	303	484	0	-	0
Stage 1	303	-	-	-	-	-
Stage 2	287	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.22	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.308	-	-	-
Pot Cap-1 Maneuver	465	729	1029	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	428	729	1029	-	-	-
Mov Cap-2 Maneuver	521	-	-	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.46	3.56	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1029	-	521	729	-	-
HCM Lane V/C Ratio	0.08	-	0.234	0.206	-	-
HCM Control Delay (s/veh)	8.8	-	14	11.2	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.9	0.8	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	8	180	1	16	399
Future Vol, veh/h	3	8	180	1	16	399
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	33	7	2	8	2
Mvmt Flow	3	9	194	1	17	429
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	658	194	0	0	195	0
Stage 1	194	-	-	-	-	-
Stage 2	463	-	-	-	-	-
Critical Hdwy	6.42	6.53	-	-	4.18	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.597	-	-	2.272	-
Pot Cap-1 Maneuver	429	774	-	-	1343	-
Stage 1	839	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	422	774	-	-	1343	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	839	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v10.82		0		0.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	631	69	-	
HCM Lane V/C Ratio	-	-	0.019	0.013	-	
HCM Control Delay (s/veh)	-	-	10.8	7.7	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

Build Horizon AM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	51	694	20	245	6	117	202	29	163
v/c Ratio	0.12	0.75	0.11	0.33	0.02	0.31	0.59	0.06	0.23
Control Delay (s/veh)	10.2	26.0	3.7	8.7	21.8	10.2	34.5	26.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	10.2	26.0	3.7	8.7	21.8	10.2	34.5	26.2	4.4
Queue Length 50th (ft)	13	265	3	91	2	4	89	12	0
Queue Length 95th (ft)	29	#559	6	0	11	48	#164	37	41
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	414	924	184	733	358	378	344	495	711
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.75	0.11	0.33	0.02	0.31	0.59	0.06	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
Build Horizon AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	610	8	18	105	113	5	8	96	180	26	145
Future Volume (veh/h)	45	610	8	18	105	113	5	8	96	180	26	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1381	1841	1870	1796	1752	1826	1870	1411	1841	1811	1752	1752
Adj Flow Rate, veh/h	51	685	9	20	118	127	6	9	108	202	29	163
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	35	4	2	7	10	5	2	33	4	6	10	10
Cap, veh/h	394	847	11	221	346	373	319	18	211	302	415	411
Arrive On Green	0.04	0.47	0.47	0.01	0.15	0.15	0.01	0.19	0.19	0.06	0.24	0.24
Sat Flow, veh/h	1316	1813	24	1711	772	831	1781	93	1117	1725	1752	1485
Grp Volume(v), veh/h	51	0	694	20	0	245	6	0	117	202	29	163
Grp Sat Flow(s),veh/h/ln	1316	0	1836	1711	0	1602	1781	0	1210	1725	1752	1485
Q Serve(g_s), s	1.9	0.0	29.1	0.6	0.0	12.3	0.2	0.0	7.8	5.0	1.2	8.0
Cycle Q Clear(g_c), s	1.9	0.0	29.1	0.6	0.0	12.3	0.2	0.0	7.8	5.0	1.2	8.0
Prop In Lane	1.00		0.01	1.00		0.52	1.00		0.92	1.00		1.00
Lane Grp Cap(c), veh/h	394	0	858	221	0	719	319	0	229	302	415	411
V/C Ratio(X)	0.13	0.00	0.81	0.09	0.00	0.34	0.02	0.00	0.51	0.67	0.07	0.40
Avail Cap(c_a), veh/h	429	0	858	278	0	719	404	0	229	302	415	411
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.1	0.0	20.5	17.3	0.0	26.4	29.1	0.0	32.8	32.8	26.7	26.4
Incr Delay (d2), s/veh	0.1	0.0	8.1	0.2	0.0	1.2	0.0	0.0	8.0	5.6	0.3	2.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	13.6	0.2	0.0	5.5	0.1	0.0	2.8	2.3	0.5	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.3	0.0	28.7	17.5	0.0	27.6	29.2	0.0	40.7	38.4	27.0	29.3
LnGrp LOS	B		C	B		C	C		D	D	C	C
Approach Vol, veh/h	745			265			123			394		
Approach Delay, s/veh	27.6			26.9			40.2			33.8		
Approach LOS	C			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	48.0	6.7	27.3	9.6	46.4	11.0	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	39.0	5.0	17.0	6.0	38.0	5.0	17.0				
Max Q Clear Time (g_c+I1), s	2.6	31.1	2.2	10.0	3.9	14.3	7.0	9.8				
Green Ext Time (p_c), s	0.0	2.9	0.0	0.4	0.0	1.5	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh	30.1											
HCM 7th LOS	C											

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

Build Horizon AM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	641	417	243	364	33	189
v/c Ratio	0.71	0.30	0.29	0.39	0.23	0.58
Control Delay (s/veh)	6.1	1.8	18.8	4.0	40.7	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.1	1.8	18.8	4.0	40.7	13.3
Queue Length 50th (ft)	30	12	74	0	18	0
Queue Length 95th (ft)	51	33	165	43	41	46
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	1011	1387	831	934	302	483
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.30	0.29	0.39	0.11	0.39
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
Build Horizon AM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	532	346	0	0	202	302	24	3	157	0	0	0
Future Volume (veh/h)	532	346	0	0	202	302	24	3	157	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1841	1826	0	0	1796	1870	1648	418	1870			
Adj Flow Rate, veh/h	641	417	0	0	243	364	29	4	189			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	4	5	0	0	7	2	17	100	2			
Cap, veh/h	786	1322	0	0	698	616	50	7	226			
Arrive On Green	0.45	1.00	0.00	0.00	0.39	0.39	0.14	0.14	0.14			
Sat Flow, veh/h	1753	1826	0	0	1796	1585	352	49	1585			
Grp Volume(v), veh/h	641	417	0	0	243	364	33	0	189			
Grp Sat Flow(s),veh/h/ln	1753	1826	0	0	1796	1585	400	0	1585			
Q Serve(g_s), s	20.4	0.0	0.0	0.0	8.6	16.4	6.9	0.0	10.4			
Cycle Q Clear(g_c), s	20.4	0.0	0.0	0.0	8.6	16.4	6.9	0.0	10.4			
Prop In Lane	1.00		0.00	0.00		1.00	0.88		1.00			
Lane Grp Cap(c), veh/h	786	1322	0	0	698	616	57	0	226			
V/C Ratio(X)	0.82	0.32	0.00	0.00	0.35	0.59	0.58	0.00	0.84			
Avail Cap(c_a), veh/h	957	1322	0	0	698	616	85	0	335			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.63	0.63	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	7.1	0.0	0.0	0.0	19.4	21.8	36.1	0.0	37.6			
Incr Delay (d2), s/veh	3.0	0.4	0.0	0.0	1.4	4.1	9.0	0.0	11.3			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	0.1	0.0	0.0	3.7	6.6	0.8	0.0	4.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.1	0.4	0.0	0.0	20.8	25.9	45.0	0.0	48.9			
LnGrp LOS	B	A			C	C	D		D			
Approach Vol, veh/h	1058			607			222					
Approach Delay, s/veh	6.3			23.9			48.3					
Approach LOS	A			C			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	71.2			30.2			41.0			18.8		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	59.0			33.0			20.0			19.0		
Max Q Clear Time (g_c+I1), s	2.0			22.4			18.4			12.4		
Green Ext Time (p_c), s	3.0			1.8			0.5			0.4		
Intersection Summary												
HCM 7th Control Delay, s/veh	16.9											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Build Horizon AM with TDOT

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	1	345	3	7	234
Future Vol, veh/h	24	1	345	3	7	234
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	2	4	2	20	8
Mvmt Flow	28	1	401	3	8	272
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	691	403	0	0	405	0
Stage 1	403	-	-	-	-	-
Stage 2	288	-	-	-	-	-
Critical Hdwy	6.46	6.22	-	-	4.3	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	-	-	2.38	-
Pot Cap-1 Maneuver	404	648	-	-	1063	-
Stage 1	666	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	401	648	-	-	1063	-
Mov Cap-2 Maneuver	401	-	-	-	-	-
Stage 1	666	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v	14.53	0		0.24		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	407	52	-	
HCM Lane V/C Ratio	-	-	0.071	0.008	-	
HCM Control Delay (s/veh)	-	-	14.5	8.4	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build Horizon AM with TDOT

Intersection												
Int Delay, s/veh	9.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	170	102	50	4	33	4	128	170	13	13	83	161
Future Vol, veh/h	170	102	50	4	33	4	128	170	13	13	83	161
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	90	-	-	150	-	-	335	-	150
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	5	2	8	2	2	2	2	3	2	2	10	7
Mvmt Flow	200	120	59	5	39	5	151	200	15	15	98	189

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	649	645	98	697	826	208	287	0	0	215	0	0
Stage 1	128	128	-	509	509	-	-	-	-	-	-	-
Stage 2	521	516	-	188	318	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.52	6.28	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.018	3.372	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	379	391	942	355	307	833	1275	-	-	1355	-	-
Stage 1	868	790	-	547	538	-	-	-	-	-	-	-
Stage 2	533	534	-	814	654	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	296	341	942	210	268	833	1275	-	-	1355	-	-
Mov Cap-2 Maneuver	359	394	-	317	343	-	-	-	-	-	-	-
Stage 1	859	781	-	482	475	-	-	-	-	-	-	-
Stage 2	429	471	-	638	646	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v22.04		16.17	3.38	0.39
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1275	-	-	359	488	317	367	1355	-	-
HCM Lane V/C Ratio	0.118	-	-	0.557	0.367	0.015	0.119	0.011	-	-
HCM Control Delay (s/veh)	8.2	-	-	26.9	16.6	16.5	16.1	7.7	-	-
HCM Lane LOS	A	-	-	D	C	C	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	3.2	1.7	0	0.4	0	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	17	299	1	21	115
Future Vol, veh/h	4	17	299	1	21	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	33	23	2	2	2	11
Mvmt Flow	5	20	348	1	24	134
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	531	348	0	0	349	0
Stage 1	348	-	-	-	-	-
Stage 2	183	-	-	-	-	-
Critical Hdwy	6.73	6.43	-	-	4.12	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.507	-	-	2.218	-
Pot Cap-1 Maneuver	459	650	-	-	1210	-
Stage 1	651	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	449	650	-	-	1210	-
Mov Cap-2 Maneuver	449	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v11.27		0	1.24			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	599	278	-	
HCM Lane V/C Ratio	-	-	0.041	0.02	-	
HCM Control Delay (s/veh)	-	-	11.3	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-	

Queues

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring

Build Horizon PM with TDOT



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	54	307	38	421	4	56	236	56	279
v/c Ratio	0.18	0.38	0.08	0.62	0.01	0.19	0.51	0.10	0.33
Control Delay (s/veh)	13.6	20.8	10.7	19.3	21.7	15.6	28.4	25.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	13.6	20.8	10.7	19.3	21.7	15.6	28.4	25.1	3.4
Queue Length 50th (ft)	16	136	10	75	2	5	110	23	0
Queue Length 95th (ft)	34	192	21	120	8	35	162	56	37
Internal Link Dist (ft)		459		1071		243		560	
Turn Bay Length (ft)	160		150		185		250		250
Base Capacity (vph)	340	812	450	681	316	298	463	587	891
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.38	0.08	0.62	0.01	0.19	0.51	0.10	0.31

Intersection Summary

HCM 7th Signalized Intersection Summary

1: Miller Road/I-24 SB Ramps & Epps Mill Road

Project Spring
Build Horizon PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	254	4	32	197	156	3	8	39	198	47	234
Future Volume (veh/h)	45	254	4	32	197	156	3	8	39	198	47	234
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1589	1796	1870	1781	1767	1870	1870	1648	1796	1856	1781	1781
Adj Flow Rate, veh/h	54	302	5	38	235	186	4	10	46	236	56	279
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	21	7	2	8	9	2	2	17	7	3	8	8
Cap, veh/h	298	761	13	448	389	308	259	44	200	476	517	497
Arrive On Green	0.04	0.43	0.43	0.02	0.29	0.29	0.01	0.17	0.17	0.13	0.29	0.29
Sat Flow, veh/h	1513	1762	29	1697	913	723	1781	256	1179	1767	1781	1510
Grp Volume(v), veh/h	54	0	307	38	0	421	4	0	56	236	56	279
Grp Sat Flow(s),veh/h/ln	1513	0	1791	1697	0	1636	1781	0	1436	1767	1781	1510
Q Serve(g_s), s	2.0	0.0	11.8	1.2	0.0	22.2	0.2	0.0	3.4	10.5	2.3	15.2
Cycle Q Clear(g_c), s	2.0	0.0	11.8	1.2	0.0	22.2	0.2	0.0	3.4	10.5	2.3	15.2
Prop In Lane	1.00		0.02	1.00		0.44	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	298	0	773	448	0	696	259	0	244	476	517	497
V/C Ratio(X)	0.18	0.00	0.40	0.08	0.00	0.60	0.02	0.00	0.23	0.50	0.11	0.56
Avail Cap(c_a), veh/h	405	0	773	478	0	696	339	0	244	484	517	497
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.5	0.0	19.5	15.8	0.0	28.5	34.1	0.0	35.8	27.2	26.0	27.6
Incr Delay (d2), s/veh	0.3	0.0	1.5	0.1	0.0	3.6	0.0	0.0	2.2	0.8	0.4	4.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	5.1	0.5	0.0	9.8	0.1	0.0	1.3	4.5	1.0	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.8	0.0	21.0	15.9	0.0	32.1	34.1	0.0	38.0	28.0	26.4	32.1
LnGrp LOS	B		C	B		C	C		D	C	C	C
Approach Vol, veh/h	361			459			60			571		
Approach Delay, s/veh	20.5			30.8			37.8			29.9		
Approach LOS	C			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.3	49.2	6.5	35.0	9.9	48.6	18.6	23.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	41.0	5.0	25.0	11.0	35.0	13.0	17.0				
Max Q Clear Time (g_c+I1), s	3.2	13.8	2.2	17.2	4.0	24.2	12.5	5.4				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.8	0.0	2.0	0.0	0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh	28.2											
HCM 7th LOS	C											

Queues

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring

Build Horizon PM with TDOT



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	205	387	423	294	36	155
v/c Ratio	0.31	0.26	0.37	0.26	0.24	0.56
Control Delay (s/veh)	2.6	1.9	10.0	1.7	45.8	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	2.6	1.9	10.0	1.7	45.8	15.1
Queue Length 50th (ft)	13	25	109	0	22	0
Queue Length 95th (ft)	23	40	185	25	48	47
Internal Link Dist (ft)		1071	2232		607	
Turn Bay Length (ft)	500			200		265
Base Capacity (vph)	712	1471	1143	1123	347	442
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.37	0.26	0.10	0.35
Intersection Summary						

HCM 7th Signalized Intersection Summary

3: I-24 NB Off Ramp/I-24 NB On Ramp & Epps Mill Road

Project Spring
Build Horizon PM with TDOT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	325	0	0	355	247	30	0	130	0	0	0
Future Volume (veh/h)	172	325	0	0	355	247	30	0	130	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1737	1870	0	0	1796	1870	1767	1870	1811			
Adj Flow Rate, veh/h	205	387	0	0	423	294	36	0	155			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	11	2	0	0	7	2	9	2	6			
Cap, veh/h	535	1417	0	0	1134	1001	218	0	188			
Arrive On Green	0.13	1.00	0.00	0.00	0.63	0.63	0.12	0.00	0.12			
Sat Flow, veh/h	1654	1870	0	0	1796	1585	1781	0	1535			
Grp Volume(v), veh/h	205	387	0	0	423	294	36	0	155			
Grp Sat Flow(s),veh/h/ln	1654	1870	0	0	1796	1585	1781	0	1535			
Q Serve(g_s), s	4.3	0.0	0.0	0.0	11.4	8.4	1.8	0.0	9.9			
Cycle Q Clear(g_c), s	4.3	0.0	0.0	0.0	11.4	8.4	1.8	0.0	9.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	535	1417	0	0	1134	1001	218	0	188			
V/C Ratio(X)	0.38	0.27	0.00	0.00	0.37	0.29	0.17	0.00	0.83			
Avail Cap(c_a), veh/h	657	1417	0	0	1134	1001	374	0	322			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.4	0.0	0.0	0.0	8.9	8.3	39.3	0.0	42.8			
Incr Delay (d2), s/veh	0.4	0.4	0.0	0.0	0.9	0.7	0.4	0.0	8.8			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.1	0.2	0.0	0.0	4.4	2.9	0.8	0.0	4.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.8	0.4	0.0	0.0	9.8	9.1	39.7	0.0	51.7			
LnGrp LOS	A	A			A	A	D		D			
Approach Vol, veh/h	592			717			191					
Approach Delay, s/veh	2.3			9.5			49.4					
Approach LOS	A			A			D					
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	81.8			12.6			69.1			18.2		
Change Period (Y+Rc), s	6.0			6.0			6.0			6.0		
Max Green Setting (Gmax), s	67.0			14.0			47.0			21.0		
Max Q Clear Time (g_c+I1), s	2.0			6.3			13.4			11.9		
Green Ext Time (p_c), s	2.7			0.3			4.1			0.4		
Intersection Summary												
HCM 7th Control Delay, s/veh	11.8											
HCM 7th LOS	B											

HCM 7th TWSC
4: Manchester Pike & Hughes Road

Project Spring
Build Horizon PM with TDOT

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	237	8	1	443
Future Vol, veh/h	5	5	237	8	1	443
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	5	2	2	3
Mvmt Flow	5	5	258	9	1	482
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	746	262	0	0	266	0
Stage 1	262	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.12	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.218	-
Pot Cap-1 Maneuver	350	724	-	-	1298	-
Stage 1	731	-	-	-	-	-
Stage 2	575	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	349	724	-	-	1298	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v12.82		0	0.02			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	471	4	-	
HCM Lane V/C Ratio	-	-	0.023	0.001	-	
HCM Control Delay (s/veh)	-	-	12.8	7.8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 7th TWSC
5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build Horizon PM with TDOT

Intersection												
Int Delay, s/veh	7.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	112	52	138	15	116	15	76	112	7	7	279	166
Future Vol, veh/h	112	52	138	15	116	15	76	112	7	7	279	166
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	90	-	-	150	-	-	335	-	150
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	2	5	2	2	2	12	7	2	2	2	6
Mvmt Flow	122	57	150	16	126	16	83	122	8	8	303	180

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	668	613	303	638	790	126	484	0	0	129	0	0
Stage 1	318	318	-	291	291	-	-	-	-	-	-	-
Stage 2	350	295	-	347	499	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.52	6.25	7.12	6.52	6.22	4.22	-	-	4.12	-	-
Critical Hdwy Stg 1	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.018	3.345	3.518	4.018	3.318	2.308	-	-	2.218	-	-
Pot Cap-1 Maneuver	367	408	729	390	323	925	1029	-	-	1456	-	-
Stage 1	687	653	-	717	672	-	-	-	-	-	-	-
Stage 2	660	669	-	669	544	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	224	373	729	251	295	925	1029	-	-	1456	-	-
Mov Cap-2 Maneuver	349	456	-	329	368	-	-	-	-	-	-	-
Stage 1	683	650	-	660	618	-	-	-	-	-	-	-
Stage 2	475	616	-	483	541	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/v	16.2		18.86		3.43		0.12	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1029	-	-	349	627	329	396	1456	-	-
HCM Lane V/C Ratio	0.08	-	-	0.348	0.329	0.05	0.36	0.005	-	-
HCM Control Delay (s/veh)	8.8	-	-	20.7	13.5	16.5	19.1	7.5	-	-
HCM Lane LOS	A	-	-	C	B	C	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.5	1.4	0.2	1.6	0	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	8	187	1	16	414
Future Vol, veh/h	3	8	187	1	16	414
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	33	7	2	8	2
Mvmt Flow	3	9	201	1	17	445
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	681	202	0	0	202	0
Stage 1	202	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Critical Hdwy	6.42	6.53	-	-	4.18	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.597	-	-	2.272	-
Pot Cap-1 Maneuver	416	767	-	-	1335	-
Stage 1	832	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	409	767	-	-	1335	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	612	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v10.93		0		0.29		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	619	67	-	
HCM Lane V/C Ratio	-	-	0.019	0.013	-	
HCM Control Delay (s/veh)	-	-	10.9	7.7	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	200	179	5	44	151	215	15	98	189
v/c Ratio	0.59	0.43	0.03	0.25	0.21	0.20	0.02	0.12	0.23
Control Delay (s/veh)	28.9	22.4	20.8	37.9	10.6	13.1	11.2	18.7	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.9	22.4	20.8	37.9	10.6	13.1	11.2	18.7	1.7
Queue Length 50th (ft)	91	65	2	21	39	56	4	35	0
Queue Length 95th (ft)	119	126	8	49	76	137	13	73	11
Internal Link Dist (ft)	2232		300		1110		2949		
Turn Bay Length (ft)	500	90		150		335		150	
Base Capacity (vph)	418	566	247	370	736	1069	708	789	828
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.32	0.02	0.12	0.21	0.20	0.02	0.12	0.23
Intersection Summary									

HCM 7th Signalized Intersection Summary

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build Horizon AM with TDOT - Signal

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	102	50	4	33	4	128	170	13	13	83	161
Future Volume (veh/h)	170	102	50	4	33	4	128	170	13	13	83	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1870	1781	1870	1870	1870	1870	1856	1870	1870	1752	1796
Adj Flow Rate, veh/h	200	120	59	5	39	5	151	200	15	15	98	189
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	5	2	8	2	2	2	2	3	2	2	10	7
Cap, veh/h	384	244	120	198	144	18	658	857	64	620	796	692
Arrive On Green	0.21	0.34	0.34	0.01	0.09	0.09	0.07	0.50	0.50	0.02	0.45	0.45
Sat Flow, veh/h	1739	1184	582	1781	1625	208	1781	1705	128	1781	1752	1522
Grp Volume(v), veh/h	200	0	179	5	0	44	151	0	215	15	98	189
Grp Sat Flow(s),veh/h/ln	1739	0	1766	1781	0	1833	1781	0	1833	1781	1752	1522
Q Serve(g_s), s	8.9	0.0	7.2	0.2	0.0	2.0	4.0	0.0	5.9	0.4	2.9	7.0
Cycle Q Clear(g_c), s	8.9	0.0	7.2	0.2	0.0	2.0	4.0	0.0	5.9	0.4	2.9	7.0
Prop In Lane	1.00		0.33	1.00		0.11	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	384	0	365	198	0	162	658	0	922	620	796	692
V/C Ratio(X)	0.52	0.00	0.49	0.03	0.00	0.27	0.23	0.00	0.23	0.02	0.12	0.27
Avail Cap(c_a), veh/h	535	0	549	365	0	367	719	0	922	768	796	692
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.00	0.93	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	0.0	25.7	37.0	0.0	38.3	11.2	0.0	12.6	12.7	14.2	15.3
Incr Delay (d2), s/veh	1.0	0.0	1.0	0.1	0.0	0.9	0.2	0.0	0.6	0.0	0.3	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	2.8	0.1	0.0	0.9	1.3	0.0	2.2	0.1	1.1	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.0	0.0	26.7	37.0	0.0	39.2	11.4	0.0	13.2	12.7	14.5	16.3
LnGrp LOS	C		C	D		D	B		B	B	B	B
Approach Vol, veh/h	379					49		366		302		
Approach Delay, s/veh	27.4					39.0		12.4		15.5		
Approach LOS	C					D		B		B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.9	46.9	17.2	14.0	7.6	51.3	6.6	24.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	9.0	20.0	19.0	18.0	9.0	20.0	9.0	28.0				
Max Q Clear Time (g_c+I1), s	6.0	9.0	10.9	4.0	2.4	7.9	2.2	9.2				
Green Ext Time (p_c), s	0.1	0.8	0.3	0.1	0.0	0.7	0.0	0.9				
Intersection Summary												
HCM 7th Control Delay, s/veh			19.6									
HCM 7th LOS			B									



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	122	207	16	142	83	130	8	303	180
v/c Ratio	0.35	0.39	0.06	0.59	0.18	0.14	0.01	0.37	0.23
Control Delay (s/veh)	25.5	13.4	21.2	45.5	11.1	12.9	10.6	21.0	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.5	13.4	21.2	45.5	11.1	12.9	10.6	21.0	4.0
Queue Length 50th (ft)	51	32	6	74	21	32	2	120	0
Queue Length 95th (ft)	90	104	20	130	46	86	9	206	41
Internal Link Dist (ft)		2232		300		1110		2949	
Turn Bay Length (ft)	500		90		150		335		150
Base Capacity (vph)	361	535	327	289	486	951	705	821	773
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.39	0.05	0.49	0.17	0.14	0.01	0.37	0.23
Intersection Summary									

HCM 7th Signalized Intersection Summary

5: Manchester Pike & Epps Mill Road/Site Driveway A

Project Spring
Build Horizon PM with TDOT - Signal

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	112	52	138	15	116	15	76	112	7	7	279	166
Future Volume (veh/h)	112	52	138	15	116	15	76	112	7	7	279	166
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1870	1826	1870	1870	1870	1722	1796	1870	1870	1870	1811
Adj Flow Rate, veh/h	122	57	150	16	126	16	83	122	8	8	303	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	2	5	2	2	2	12	7	2	2	2	6
Cap, veh/h	281	67	177	209	195	25	480	867	57	705	901	739
Arrive On Green	0.08	0.15	0.15	0.06	0.12	0.12	0.05	0.52	0.52	0.01	0.48	0.48
Sat Flow, veh/h	1739	456	1199	1781	1627	207	1640	1667	109	1781	1870	1535
Grp Volume(v), veh/h	122	0	207	16	0	142	83	0	130	8	303	180
Grp Sat Flow(s),veh/h/ln	1739	0	1655	1781	0	1833	1640	0	1777	1781	1870	1535
Q Serve(g_s), s	5.4	0.0	11.0	0.7	0.0	6.7	2.3	0.0	3.4	0.2	9.0	6.2
Cycle Q Clear(g_c), s	5.4	0.0	11.0	0.7	0.0	6.7	2.3	0.0	3.4	0.2	9.0	6.2
Prop In Lane	1.00		0.72	1.00		0.11	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	281	0	244	209	0	220	480	0	924	705	901	739
V/C Ratio(X)	0.43	0.00	0.85	0.08	0.00	0.65	0.17	0.00	0.14	0.01	0.34	0.24
Avail Cap(c_a), veh/h	348	0	294	288	0	285	564	0	924	865	901	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.95	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	0.0	37.4	31.3	0.0	37.8	11.0	0.0	11.2	11.7	14.4	13.7
Incr Delay (d2), s/veh	1.0	0.0	16.8	0.2	0.0	3.2	0.2	0.0	0.3	0.0	1.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	5.5	0.3	0.0	3.2	0.7	0.0	1.2	0.1	3.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.0	0.0	54.1	31.4	0.0	41.0	11.1	0.0	11.5	11.7	15.4	14.5
LnGrp LOS	C		D	C		D	B		B	B	B	B
Approach Vol, veh/h	329			158			213			491		
Approach Delay, s/veh	45.9			40.0			11.4			15.0		
Approach LOS	D			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.4	49.3	13.5	16.8	6.9	52.8	11.0	19.3				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	9.0	32.0	11.0	14.0	9.0	32.0	9.0	16.0				
Max Q Clear Time (g_c+I1), s	4.3	11.0	7.4	8.7	2.2	5.4	2.7	13.0				
Green Ext Time (p_c), s	0.1	2.0	0.1	0.3	0.0	0.6	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh	26.2											
HCM 7th LOS	C											

Scoping Documentation

RUTHERFORD COUNTY, TN - PLANNING & ENGINEERING DEPARTMENT

TRAFFIC IMPACT STUDY (TIS) MEMORANDUM OF UNDERSTANDING (MOU) & AGREEMENT

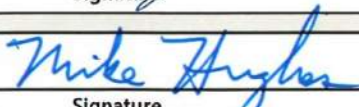
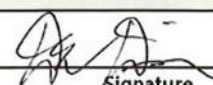
CONTACT INFO (Identify primary point of contact)			
DEVELOPER/OWNER		CIVIL CONSULTANT	
PRIMARY CONTACT		PRIMARY CONTACT	
Contact Name:	Jeff Konieczny	Contact Name:	Robert Arts
Company:	Hamilton Development Company	Company:	Kimley-Horn and Associates, Inc.
Address:	1 Music Circle South, Suite 110, Nashville, TN 37203	Address:	10 Lea Ave #400, Nashville, TN 37210
Email:	jeff@hamilton-devco.com	Email:	Robert.Arts@kimley-horn.com
Phone:	303-408-7817	Phone:	615-564-2872
DEVELOPERS TIS CONSULTANT CONTACT INFO: <i>complete if study was completed by Developer's consultant.</i>			
Contact Name:	Kennedy Adams	Company:	Kimley-Horn and Associates, Inc.
Address:	10 Lea Ave #400, Nashville, TN 37210		
Email:	Kennedy.Adams@kimley-horn.com	Phone:	615-314-5662

INDICATE THE LEVEL OF TIS REVIEW TO BE PERFORMED BY 3RD PARTY CONSULTANT AND CORRESPONDING FEE (SUBJECT TO STAFF CONFIRMATION):

Traffic Access Study _____

Traffic Impact Study X

TRANSPORTATION IMPACT STUDY – MEMORANDUM OF UNDERSTANDING (MOU)	
This MOU acknowledges that the transportation impact study for the following project will be prepared in accordance with the latest version of the Rutherford County Land Development Regulations	
PROJECT INFORMATION:	
Name:	Project Spring
Address:	8808 Manchester Pike
Description:	East of Manchester Pike and south of Hughes Road
Existing Land Use (be specific):	RM - Medium Density Residential
Proposed Land Use (be specific):	HI - Heavy Industrial
Reason for Request: (Planned Unit Development, Site Plan, Rezoning)	Rezoning
Potential Development Yield (number of residential units; building square footage, projected number of employees, hours of operations):	256,860 SF of manufacturing warehouse Note: One heavy vehicle trip expected per week so unlikely to have a major impact on trip generation.
Attach a site map and a trip generation table with a description of the proposed land uses, ITE rates, estimated daily, morning, midday and afternoon peak hour volumes (ins/outs/totals), proposed trip credits, etc.	
Attach a conceptual development plan showing all access points and adjacent streets.	

Project Buildout Year: 2026		Ambient or CMP Growth Rate (% Per Year): 4.0	
STUDY INTERSECTIONS: *use additional pages as necessary			
1. Epps Mill Road at I-24 EB Off-Ramp	9.		
2. Epps Mill Road at I-24 EB On-Ramp	10.		
3. Epps Mill Road at I-24 NB On/Off-Ramp	11.		
4. Manchester Pike at Cobb Road	12.		
5. Manchester Pike at Epps Mill Road	13.		
6. Manchester Pike at Hughes Road	14.		
7.	15.		
8.	16.		
TRANSIT AND LAND USE DATA			
	YES	(indicate ___% of total trips)	NO
Transit Usage	☐	%	☒
Existing Active Land Use	☐	%	☒
Previous Land Use	☐	%	☒
Internal Trip	☐	%	☒
Pass-By Trip	☐	%	☒
3RD PARTY TRAFFIC CONSULTANT CONTACT INFO:			
		☒ NEEL SCHAFFER	☐
NEEL SCHAFFER - GREGORY JUDY, P.E., PTOE			
201 E. Main Street, Suite 325			
Murfreesboro, TN 37130			
greg.judy@neel-schaffer.com	615-217-0500		
MEMORANDUM OF UNDERSTANDING SIGN OFF:			
APPLICANT:			
Jeff Konieczny			12/17/24
Name		Signature	Date
*As applicant, I agree to pay 100% of the review fee. Paid to Neel-Schaffer, Inc. I understand that no work will commence until FULL payment is received and that it is NON-REFUNDABLE.			
3RD PARTY TRAFFIC CONSULTANT:			
Gregory Judy, P.E., PTOE			12/17/2024
Name		Signature	Date
COUNTY ENGINEER:			
Mike Hughes, P.E.			12-19-2024
Name		Signature	Date
PLANNING DIRECTOR:			
Doug Demosi			12-19-24
Name		Signature	Date

Questions may be submitted and the completed form shall be emailed for review to: County Planning Director and County Engineer: ddemosi@rutherfordcountyttn.gov; mhughes@rutherfordcountyttn.gov.

Project Spring Scoping Summary

We have a project located [east of Manchester Pike and south of Hughes Road](#) in Murfreesboro, TN. Please see some notes for our assumptions listed below. Supporting documentation is also attached.

Trip Generation

- Existing Uses (To Be Removed)
 - None
- Proposed Uses (To Be Added)
 - Manufacturing Warehouse (ITE 140) – 256,860 s.f.
- Internal Capture Reductions
 - No reduction proposed
- Pass-By Reductions
 - No reduction proposed
- Alternative Mode Reductions
 - No reduction proposed

Build Out Year

- 2026

Growth Rate

- 4%

Background Developments

- None

Study Intersections

- Manchester Pike at Hughes Road
- Manchester Pike at Epps Mill Road
- Manchester Pike at Cobb Road
- Epps Mill Road at I-24 WB On/Off-Ramp
- Epps Mill Road at I-24 EB On-Ramp
- Epps Mill Road at I-24 EB Off-Ramp

Site access:

- One full movement driveway along Manchester Pike
- Secondary access for emergency use only

Study Scenarios

- Existing AM
- Existing PM
- No-Build AM
- No-Build PM
- Build AM
- Build PM

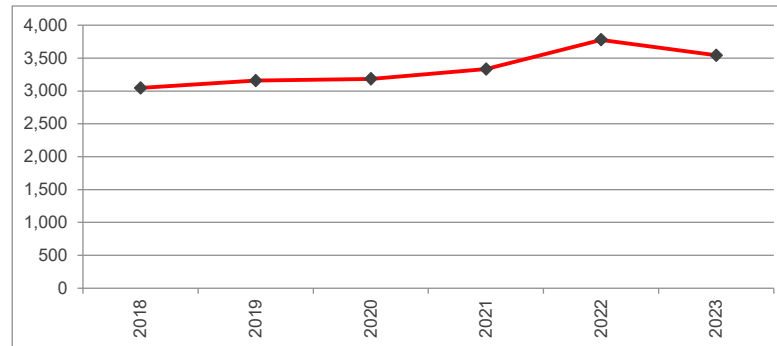
Additional Notes:

- Signal warrant
 - Manchester Pike at Epps Mill Road
- One heavy vehicle trip expected per week so unlikely to have a major impact on trip generation.
- Two (2) Scenarios to be analyzed:
 - Without TDOT improvements, Existing Epps Mill Rd alignment, Temporary access road
 - Future TDOT realignment at Epps Mill Rd/Manchester Hwy, Permanent access road
- Future TIS Update (TBD) with addition of HQ building and Warehouse Expansion

Growth Rate Calculations - Project Spring

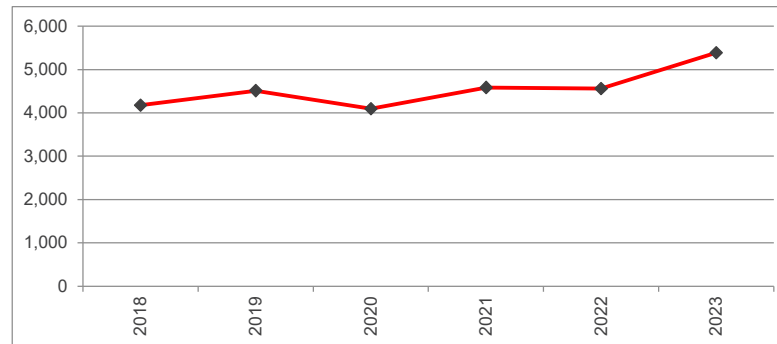
Station	75000111		
Route			
Location	Epp Mills Rd west of Manchester Pk, east of i-24		
Count Type	Count Year	AADT	Annual Growth Rate
Actual	2018	3,047	
Estimated	2019	3,160	3.7%
	2020	3,185	0.8%
	2021	3,334	4.7%
	2022	3,778	13.3%
	2023	3,543	-6.2%

	AADT
5 Year Growth Rate	3.1%
Average 1 Year Growth Rate	3.3%



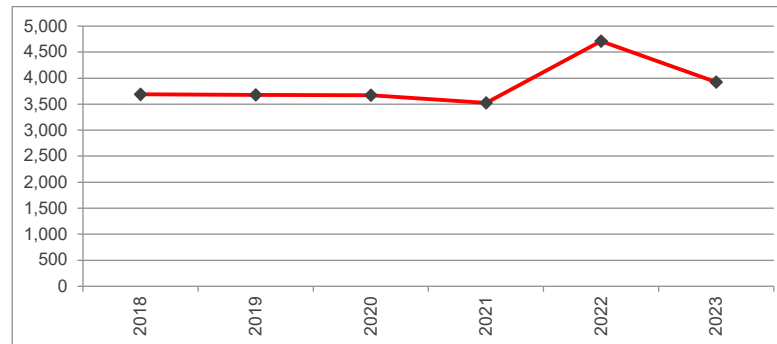
Station	75000182		
Route			
Location	Manchester Pk north of Hughes Rd, south of E Gum Rd		
Count Type	Count Year	AADT	Annual Growth Rate
	2018	4,177	
	2019	4,511	8.0%
	2020	4,094	-9.2%
	2021	4,585	12.0%
	2022	4,562	-0.5%
	2023	5,386	18.1%

	AADT
5 Year Growth Rate	5.2%
Average 1 Year Growth Rate	5.7%



Station	75000110		
Route			
Location	Epp Mills Rd west of i-24, east of Darcy Ln		
Count Type	Count Year	AADT	Annual Growth Rate
	2018	3,687	
	2019	3,675	-0.3%
	2020	3,672	-0.1%
	2021	3,523	-4.1%
	2022	4,710	33.7%
	2023	3,924	-16.7%

	AADT
5 Year Growth Rate	1.3%
Average 1 Year Growth Rate	2.5%

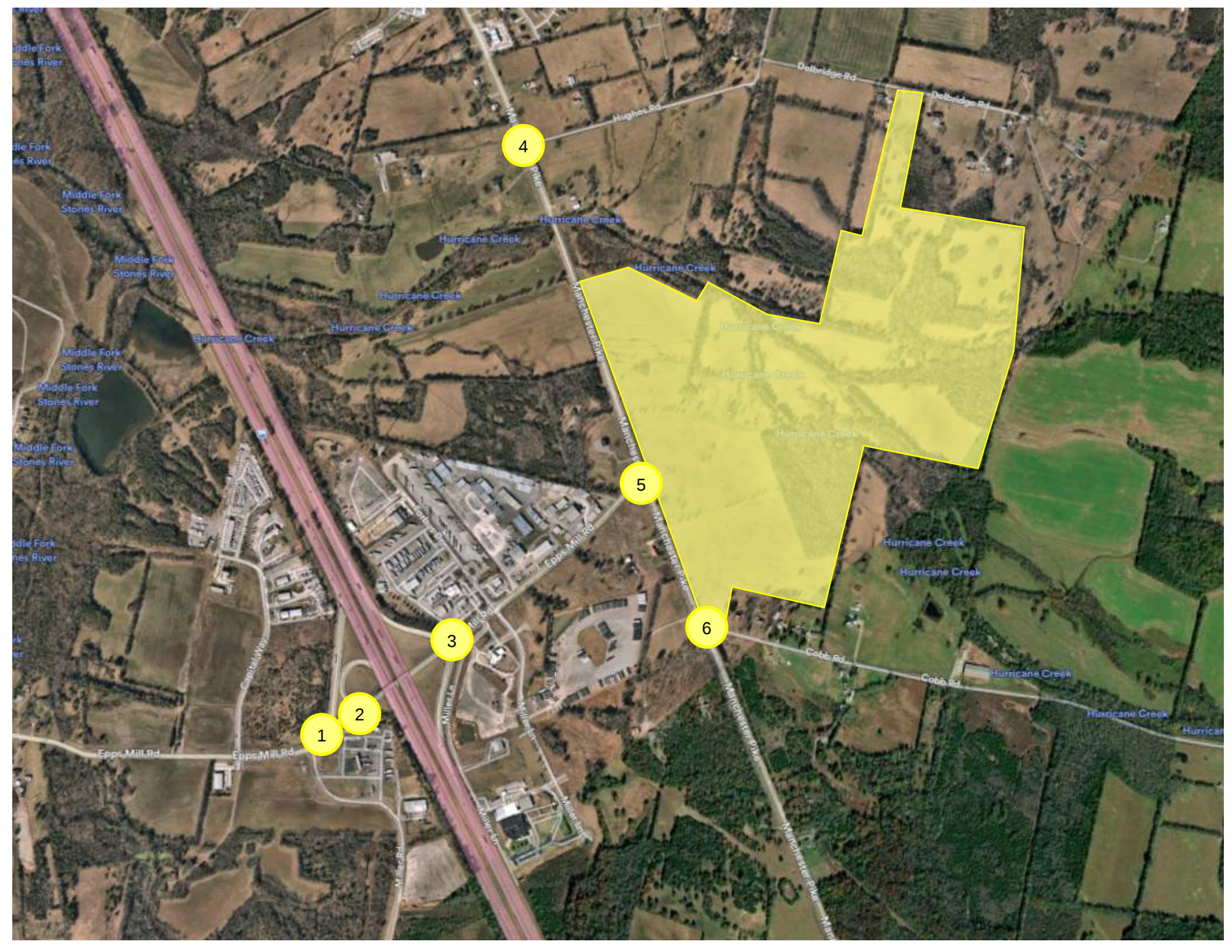


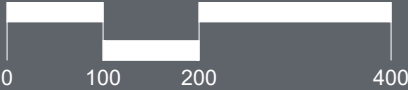
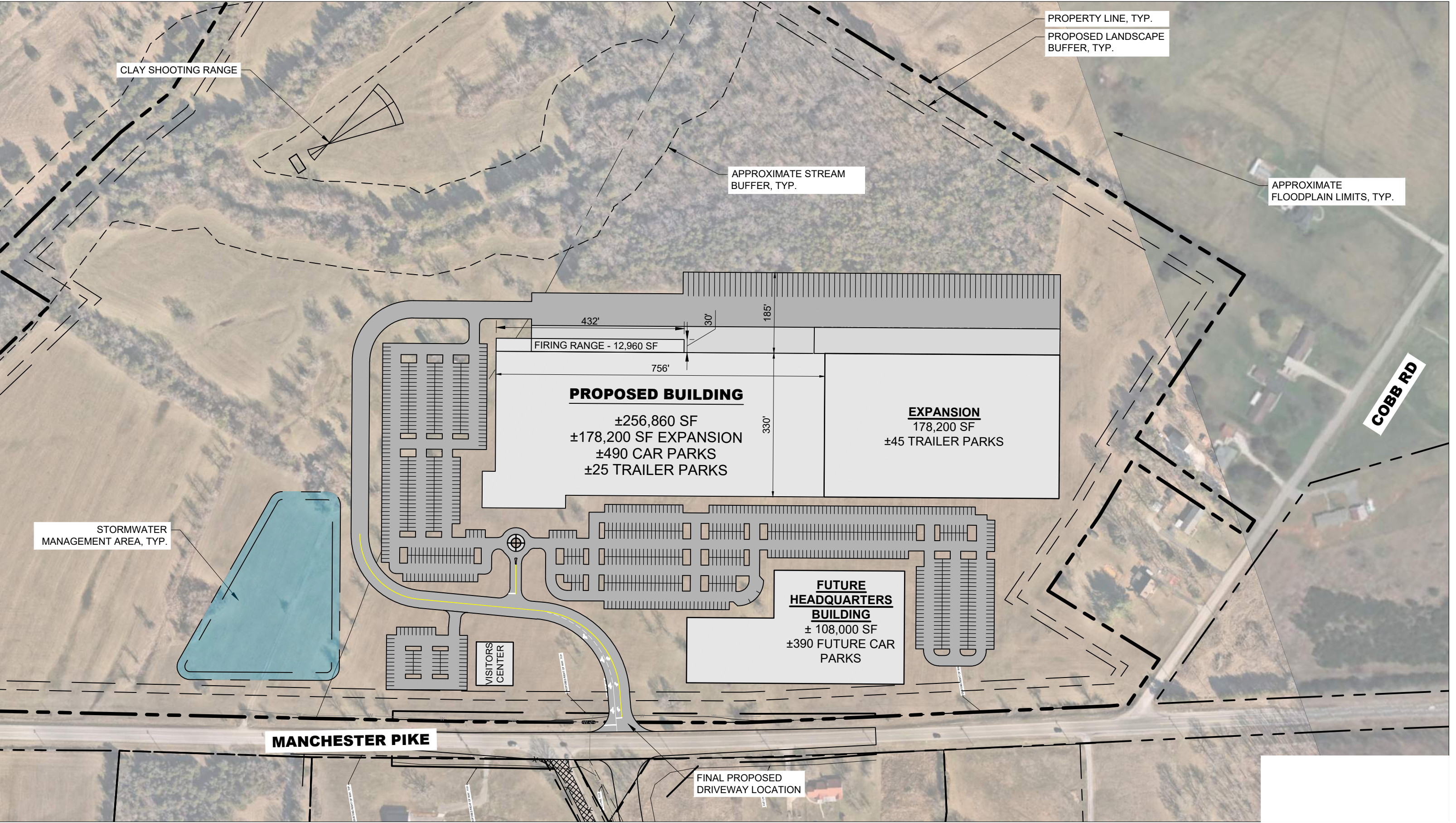
Average of Sites

	AADT
5 Year Growth Rate	3.2%
Average 1 Year Growth Rate	3.8%

Proposed Trip Generation - Project Spring													
ITE Code	Land Use	Setting/Location	Density	Daily			AM Peak Hour			PM Peak Hour			
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	
140	Manufacturing Warehouse	General Urban/Suburban	256,860	s.f.	1,170	585	585	166	126	40	206	64	142
GROSS PROPOSED TRIPS					1,170	585	585	166	126	40	206	64	142
DRIVEWAY VOLUMES					1,170	585	585	166	126	40	206	64	142

Notes: Because applicant team states that development will generate little to no heavy vehicles (tractor-trailers), trip generation excludes separate estimation and distribution for trucks.





PROJECT SPRING - DISTRIBUTION

