
Discovery Park
Traffic Impact Study
Lee's Summit, Missouri

June 20th, 2024



Prepared by:



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INTRODUCTION

The purpose of this traffic impact study is to update the 2023 Discover Park Traffic Impact Study (Olsson) and assess the potential impact on traffic based on the June 2024 site plan. This study is intended to be a supplement to the original study and not a standalone study. The site is located northwest of the intersection of I-470 and Douglas Street in Lee's Summit. The location of the development in relation to the street network is shown in Figure 1. A more detailed site map showing the development to the north of Colbern Road is included in the Appendix.

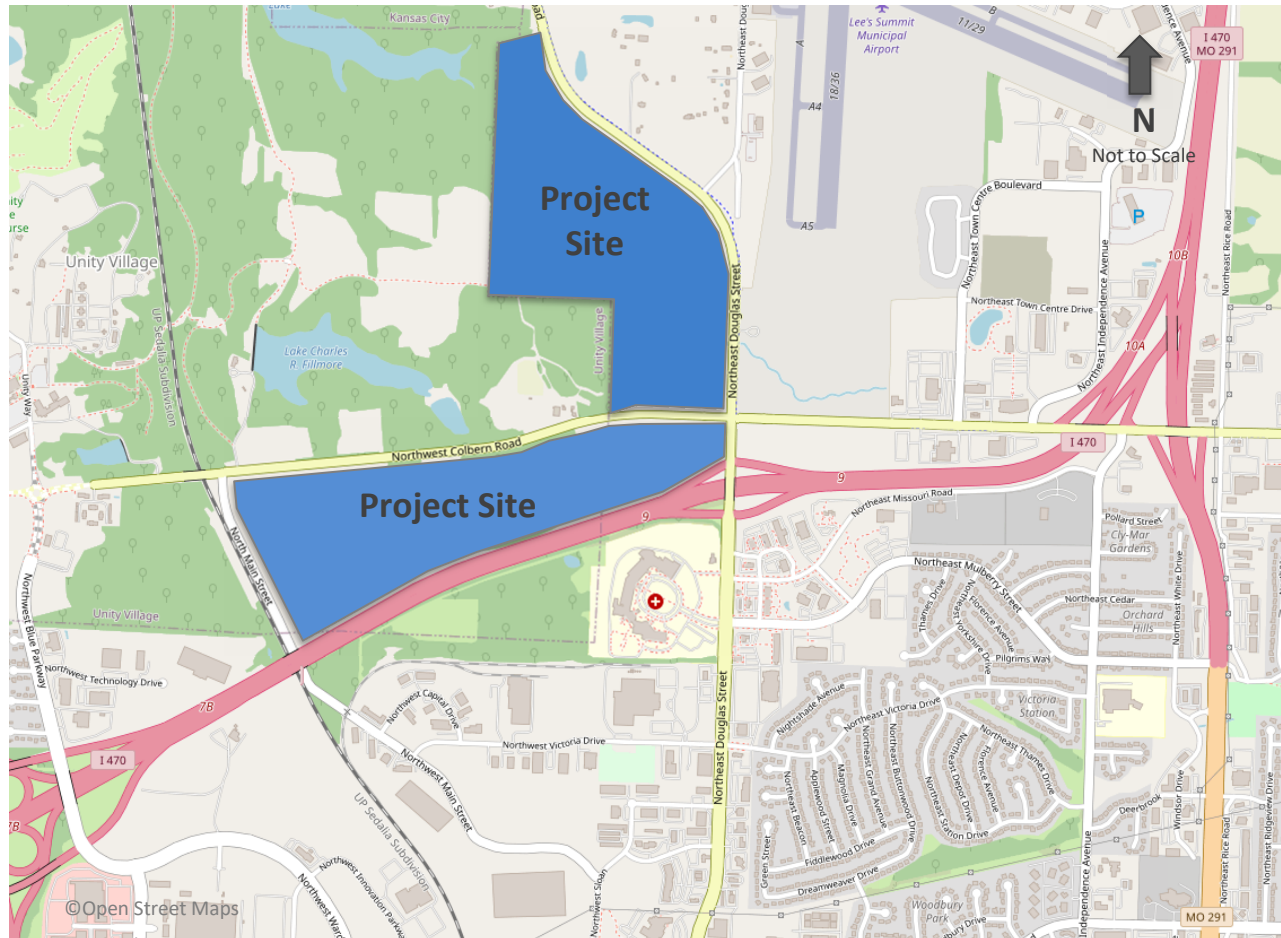


Figure 1 – Development Location

The site plan for the development is shown in Figure 2.



Figure 2 – Site Plan

EXISTING CONDITIONS

The site is in Lee's Summit, Missouri, in the northwest quadrant of the intersection I-470 and Colbern Road. The current land use of the planned development is undeveloped.

Street Network and Traffic Control

The development is generally bordered on the north by Colbern Road and Douglas St/Lee's Summit Road, on the west by Main Street, on the east by Douglas Street, and on the south by I-470. The street network used in this study includes the intersections of ...

Colbern Road is an east-west four-lane arterial roadway in the project vicinity with a posted speed limit of 45 miles per hour (mph). The roadway and lane configurations in the report and analysis are based on the 2022 reconstruction roadway plans.

Pryor Road is a north-south two-lane local roadway with a posted speed limit of 35 mph. The intersection of Colbern Road and Pryor Road is stop-controlled with Pryor Road stopping.

Missouri Highway 350 (M-350) is a grass median divided four-lane north-south state highway. The intersections of the M-350 northbound ramps and southbound ramps with Colbern Road are signalized.

Blue Parkway is a four-lane arterial with a 40 mph posted speed limit south of Colbern Road. North of Colbern Road, Blue Parkway serves as access to Unity Village. The intersection of Blue Parkway/Unity Drive and Colbern Road is a roundabout with through and shared through/right-turn lanes on the eastbound and northbound approaches. All other approaches are shared lanes.

I-470/M-291 is a four-lane divided interstate highway running north-south to the east of the project and east-west to the south of the project location. There are four northbound and southbound entrance and exit ramps intersecting Colbern Road—a signalized southbound off-ramp, a signalized northbound on-ramp/Independence Avenue, an unsignalized southbound on-ramp, and a signalized northbound on-ramp.

Douglas Street is a north-south arterial. North of Colbern Road, Douglas Street is a two-lane roadway with a two-way left-turn lane (TWLT) and a posted speed limit of 45 mph. Douglas Street becomes Lee's Summit Road at the intersection with the two-lane collector, Douglas Street, approximately half-a-mile north of Colbern Road. To the south of Colbern Road, Douglas Street is a four-lane median divided roadway. The intersection of Douglas Street/Lee's Summit Road (north-south) and Douglas Street (east-west) is a stop-controlled, T-intersection with Douglas Street stopping.

The intersection of Douglas Street and Colbern Road is signalized.

I-470 runs east-west parallel to Colbern Road south of the development. The east and westbound ramps and Douglas Street are signalized intersections.

Traffic Volumes

Intersections count data included the study analysis from the 2023 Olsson study include:

- Colbern Road and Main Street (count from 2019)
- Colbern Road and Blue Parkway/Unity Way (count from 2019)
- Douglas Street/Lee's Summit Road and Douglas Street (count from 2019)
- Colbern Road and Douglas Street (count from 2022)
- Douglas Street and I-470 Westbound Ramp (count from 2022)
- Douglas Street and I-470 Eastbound Ramp (count from 2022)
- Colbern Road and Pryor Road (count from 2022)
- Colbern Road and M-350 Northbound Ramp (count from 2022)
- Colbern Road and M-350 Southbound Ramp (count from 2022)

Trips from approved developments in the surrounding areas included in the existing conditions of the Olsson study were:

- Cable Dahmer KIA (December 2015)
- St. Michael Archangel Catholic High School (June 2016)
- Oakview Storage (March 2018)
- Aria/Summit Village North (April 2019)
- Automotive Detail Center (May 2020)
- Douglas Station Apartments (April 2021)
- Scannell LS (July 2021)
- Lot 1 Town Center (November 2021)

The expected site-generated traffic volumes of nearby approved developments were added to the existing morning peak hour and school/afternoon peak hour traffic scenarios in the 2023 Olsson study to create the existing plus site conditions for analysis as the sites were approved/under construction.

Additional traffic counts were collected to supplement the 2023 study at the following intersections:

- Colbern Road and I-470 Southbound Ramp
- Colbern Road and I-470 Northbound Ramp/Independence Ave
- Colbern Road and M-291 Southbound Ramp
- Colbern Road and M-291 Northbound Ramp

The turning movement traffic counts for the additional intersections were completed on Tuesday, April 16th, 2024, for the peak volume time periods. Morning traffic counts were conducted from 7:00 AM until 9:00 AM and afternoon traffic counts were from 4:00 PM until 6:00 PM. The morning peak period was determined to be from 7:15 AM until 8:15 AM and the afternoon peak period was determined to be from 4:30 PM until 5:30 PM.

An existing conditions scenario was created by balancing the peak hour traffic counts (2019, 2022, and 2024), the approved trips, and the Zone 1 trips (currently under construction) from the 2023 Olsson study. Traffic counts, an overview map, and site generated traffic volumes for the approved developments can be found in the Appendix.

The existing conditions traffic volumes are shown on Figure 3.

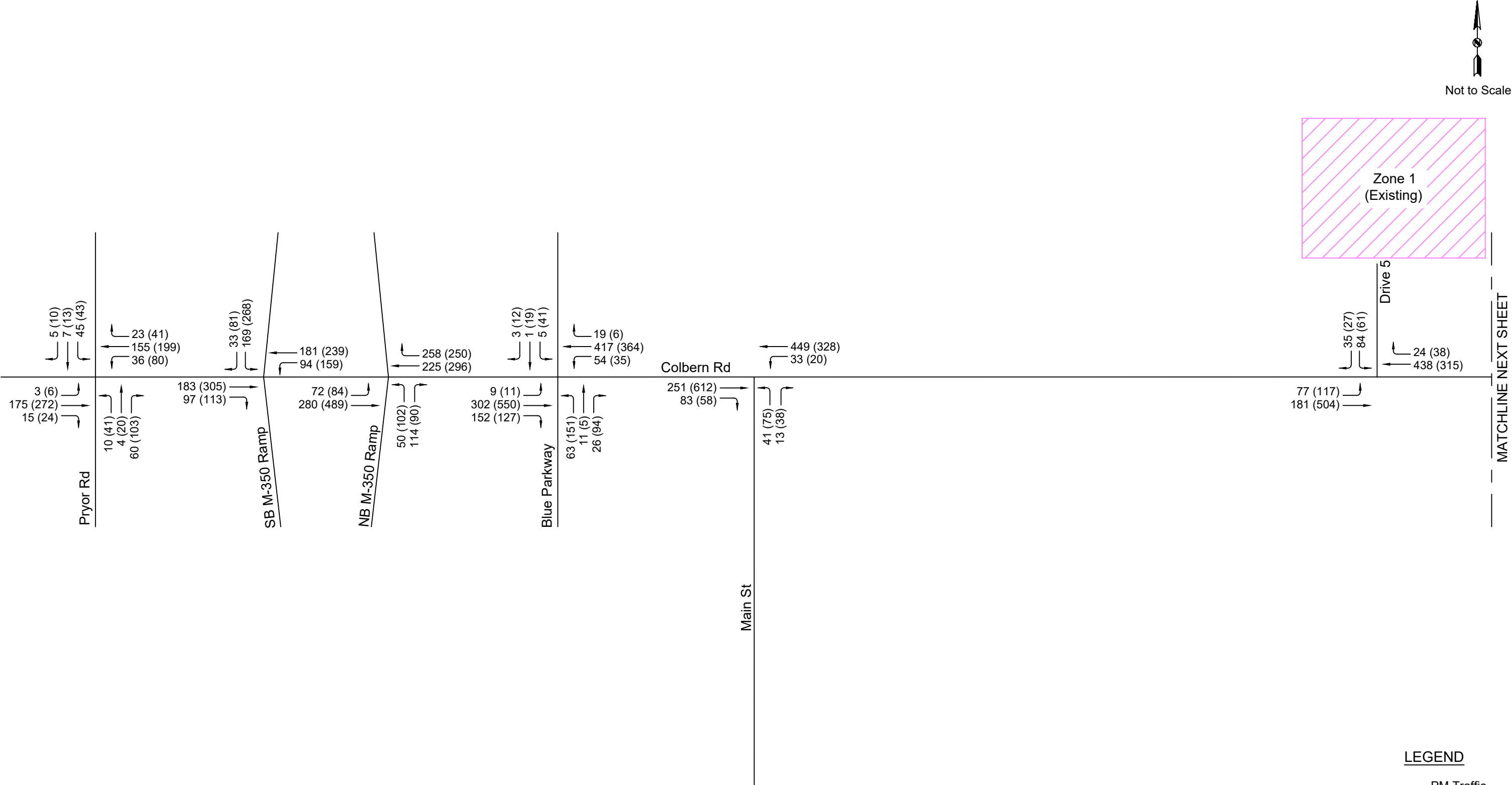
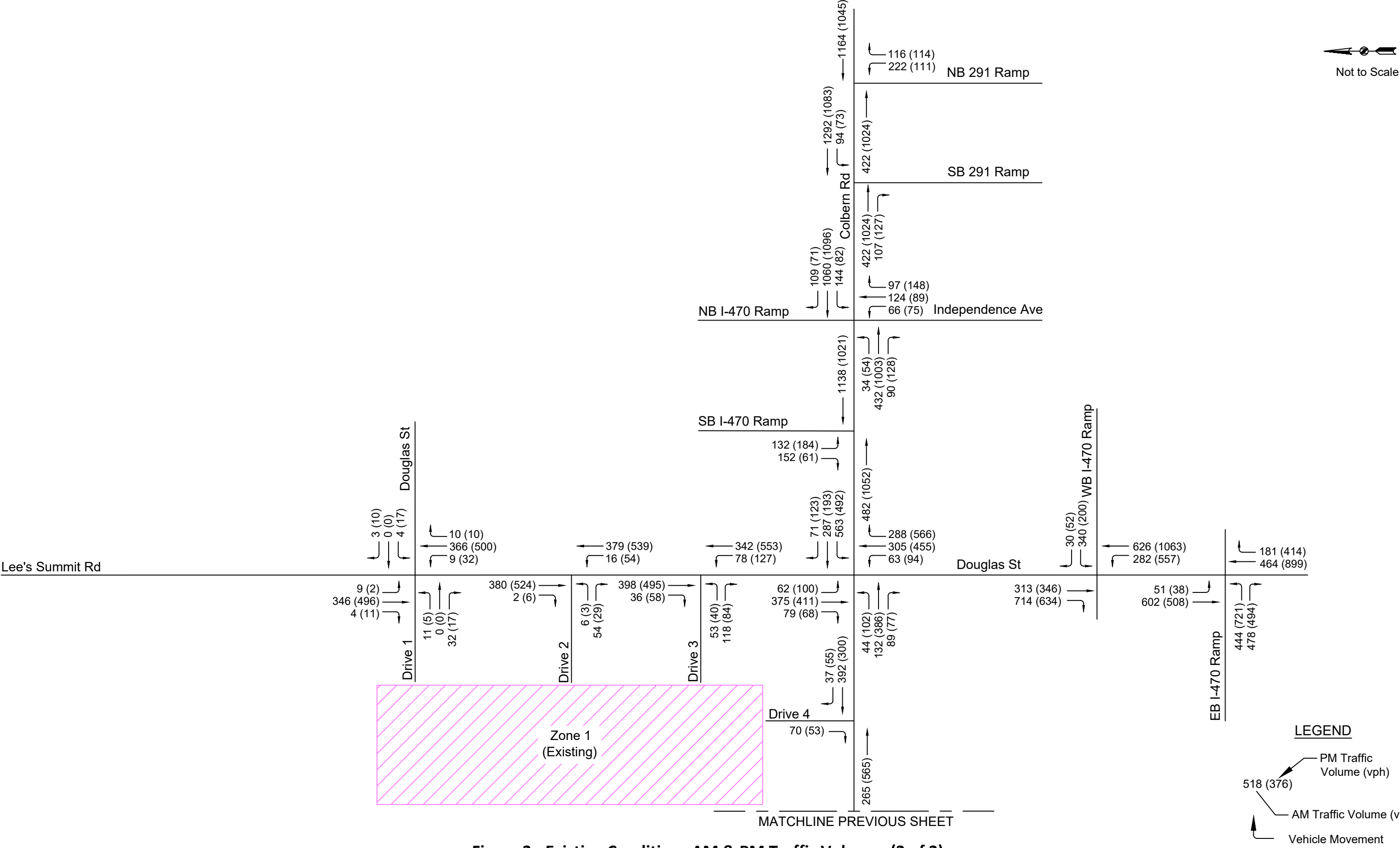


Figure 3 - Existing Conditions AM & PM Traffic Volumes (1 of 2)

LEGEND

- PM Traffic Volume (vph)
- AM Traffic Volume (vph)
- Vehicle Movement



PROPOSED CONDITIONS

The Discovery Park development is planned to consist of five zones with Zone 1 approved and currently under construction in the northwest quadrant of the intersection of Douglas Street and Colbern Road. Zones 2 through 4 will be a mix of residential, commercial, retail, and office space located south of Colbern Road. Zone 5 is planned as a mix of office, warehousing, and senior housing north of Zone 1. Zone 2 is planned for immediate construction, Zone 3 is for near-future construction, and Zones 4 and are planned for a later date.

A detailed breakdown of the number of units in each phase is included in the Trip Generation section of the report and in the site plan in the Appendix.

Access Plan

The site will be accessed via drives on Colbern Road, Douglas Street, and Main Street. There will be no access to the site from I-470.

Zone 1 will have three stop-controlled full-access drives on Douglas Street—Drive 1 (aligns with the existing east-west Douglas Street), Drive 2, and Drive 3. Zone 1 will have an additional two drives on Colbern Road—Drive 4 (a right-in/right-out (RIRO) access) and Drive 5 (a stop-controlled full access).

Zone 2 will be accessed by construction of a south leg of Drive 4 and Drive 5 on Colbern Road. Drive 4 will remain a RIRO access. There will be no access onto Douglas Street or I-470 from Zone 2.

Zone 3 access on Colbern Road will be from Drive 5, Drive 6 (full-access), and Drive 7 (¾-access). Zone 3 will have interconnectivity with Zone 2.

Zone 4 will be accessed via two stop-controlled drives on Main Street (Drive 9 and Drive 10) and two ¾-access on Colbern Road (Drive 7 and Drive 8). Zone 4 will connect and share internal streets with Zone 3.

Zone 5 will be accessed by two stop-controlled full-access drives (Drive 11 and Drive 12) from Douglas Street/Lee's Summit Road and will not have connectivity with Zone 1.

Sight Distance

Sight distance was not measured at the proposed accesses as part of this study as the roadway is currently under construction.

Trip Generation

The expected trip generation for the development was estimated using the 11th Edition of the Trip Generation Handbook published by the Institute of Transportation Engineers. The trip generation was based on Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 AM along with Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 PM criteria. Trips for the retail, restaurant, office, entertainment, and restaurant land uses were generated using the ITE land use code for shopping center to account for the internal trip capture. A detailed breakdown of the number of units in each phase is included in the Trip Generation section of the report and in

the developer plan in the Appendix. Estimates for the expected trips generated by the development are provided in Table 1.

Table 1 – Trip Generation					
ITE Land Use Code	Weekday Trips (vpd)	A.M.		P.M.	
		Trips In (vph)	Trips Out (vph)	Trips In (vph)	Trips Out (vph)
820 – Shopping Plaza(40-150k) – 84,000 sq ft Includes: <i>Sit-Down Restaurant – 31,600 sq ft</i> <i>High-Turnover Fast-Food Restaurant – 1,900 sq ft</i> <i>Supermarket – 15,300 sq ft</i> <i>Retail – 35,200 sq ft</i>	7,877	184	113	364	395
Zone 2 Total	7,877	184	113	364	395
220 – Multifamily Housing – 350 dwelling units	2,319	31	100	108	63
820 – Shopping Center(>150k) – 527,040 sq ft Includes: <i>Sit-Down Restaurant – 92,040 sq ft</i> <i>General Office – 250,000 sq ft</i> <i>Athletic Club – 100,000 sq ft</i> <i>Retail – 85,000 sq ft</i>	19,624	275	169	897	971
Zone 3 Total	21,943	306	269	1,005	1,034
Zone 3 Total with Internal Capture	n/a	275	242	905	931
820 – Shopping Center(>150k) – 369,500 sq ft Includes: <i>Discount Club – 156,000 sq ft</i> <i>Home Improvement Superstore – 121,000 sq ft</i> <i>Sit-Down Restaurant – 18,800 sq ft</i> <i>High-Turnover Fast-Food Restaurant – 9,200 sq ft</i> <i>Hotel – 105 Rooms</i> <i>Retail – 29,500 sq ft</i>	15,511	218	134	694	752
Zone 4 Total	15,511	218	134	694	752
110 – General Light Industrial – 25,000 sq ft	141	18	3	8	8
220 – Multifamily Housing – 400 dwelling units	2,639	35	112	122	71
255 – Continuing Care Retirement – 290 dwelling units	853	38	21	36	57
Zone 5 Total	3,636	91	136	166	136
Total Zones 2 - 5	49,134	728	609	2,103	2,180

Trip Distribution

The trip distribution followed the trip distribution established in the 2023 Discovery Park TIS (Olsson) and updated based on the additional intersection counts. The detailed distribution patterns can be found in the Appendix.

Trip distribution during the morning peak period:

- 15% to/from the north
- 35% to/from the south
- 15% to/from the east
- 35% to/from the west

Trip distribution during the afternoon peak period:

- 15% to/from the north
- 35% to/from the south
- 15% to/from the east
- 35% to/from the west

Existing Plus Site Traffic Volumes

The expected development site-generated traffic volumes were added to the existing conditions morning peak hour and afternoon peak hour traffic scenarios for the four development zones (Zones 2, 3, 4, and 5) and are shown on Figures 4 through 11.

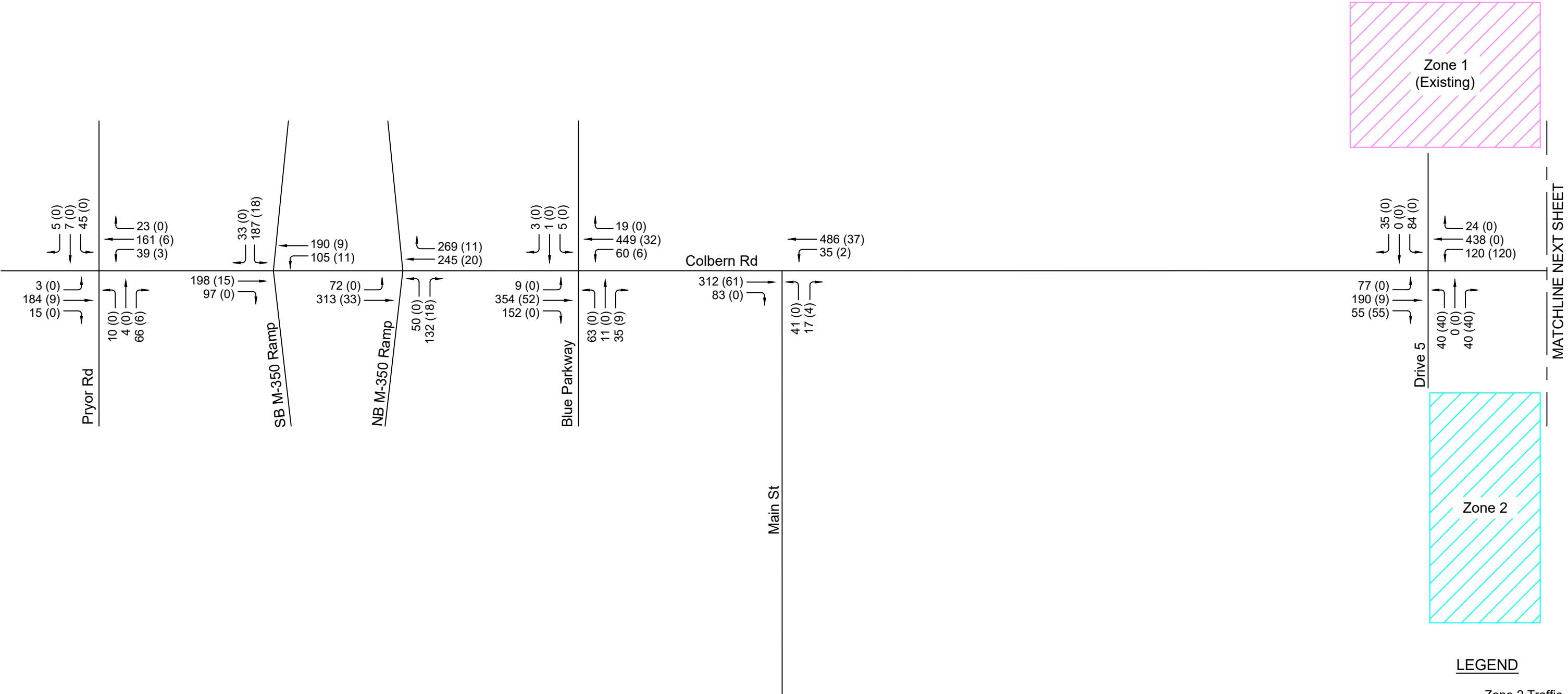
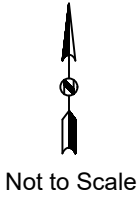
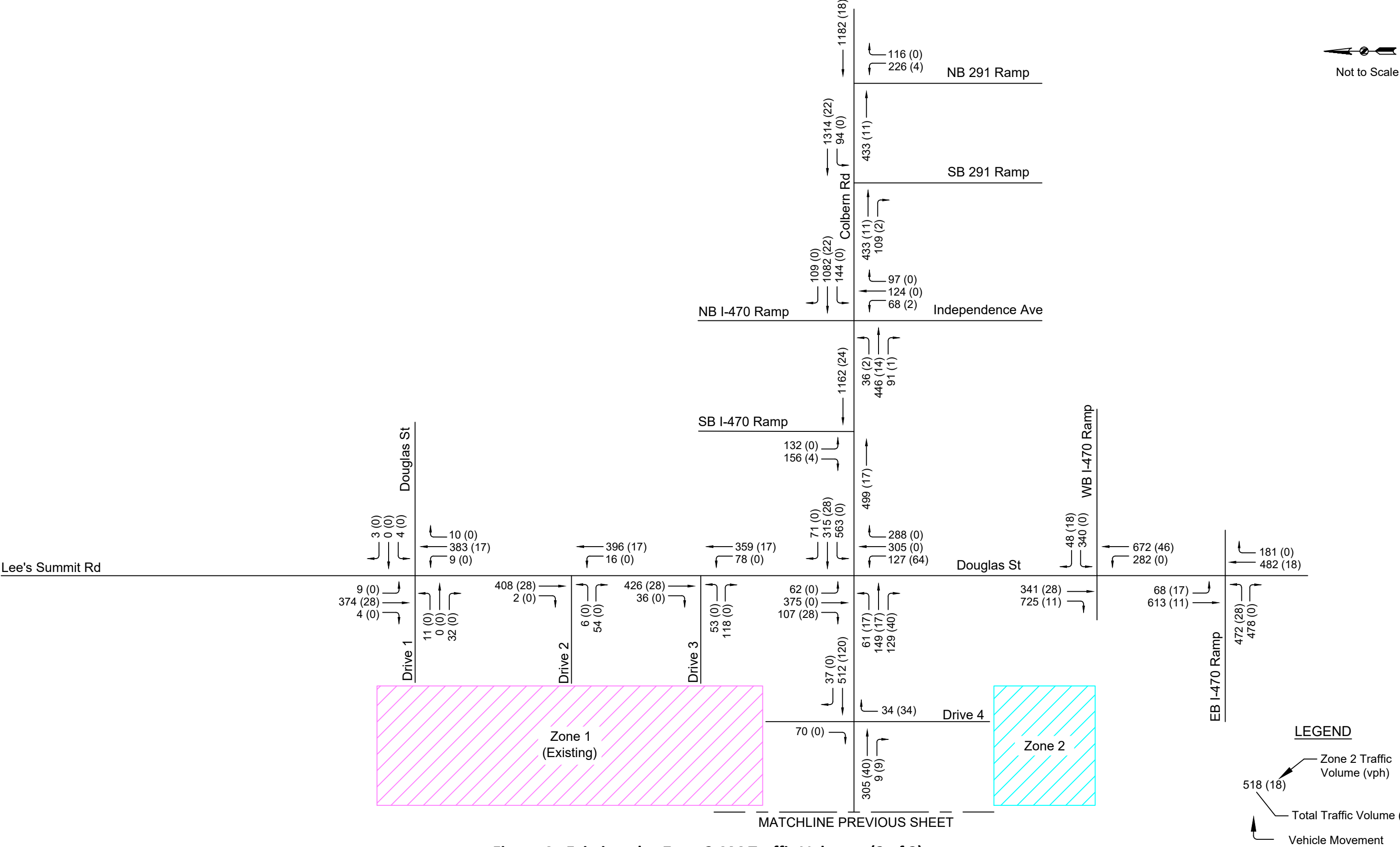
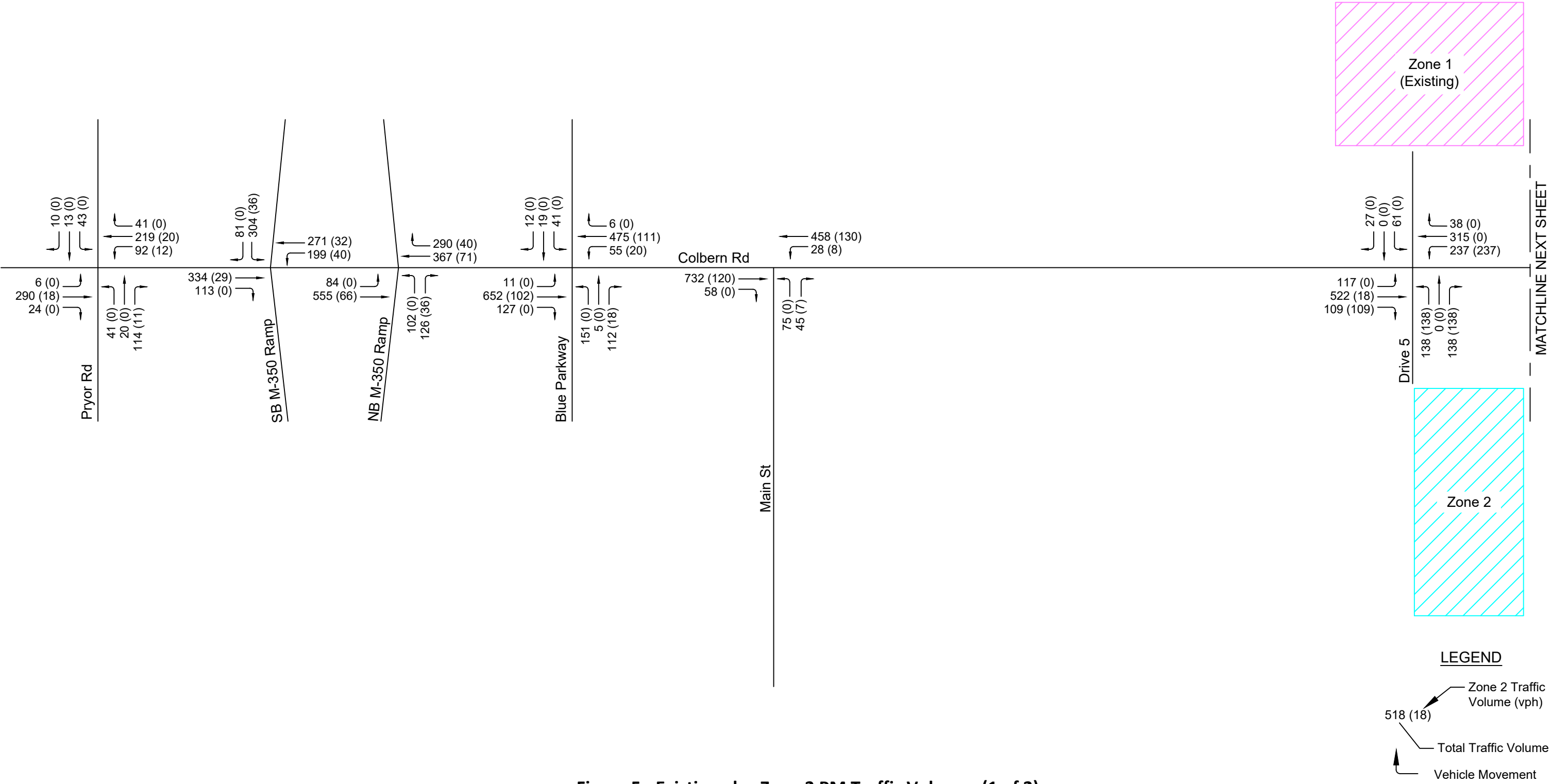
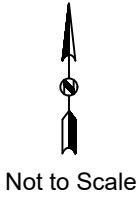
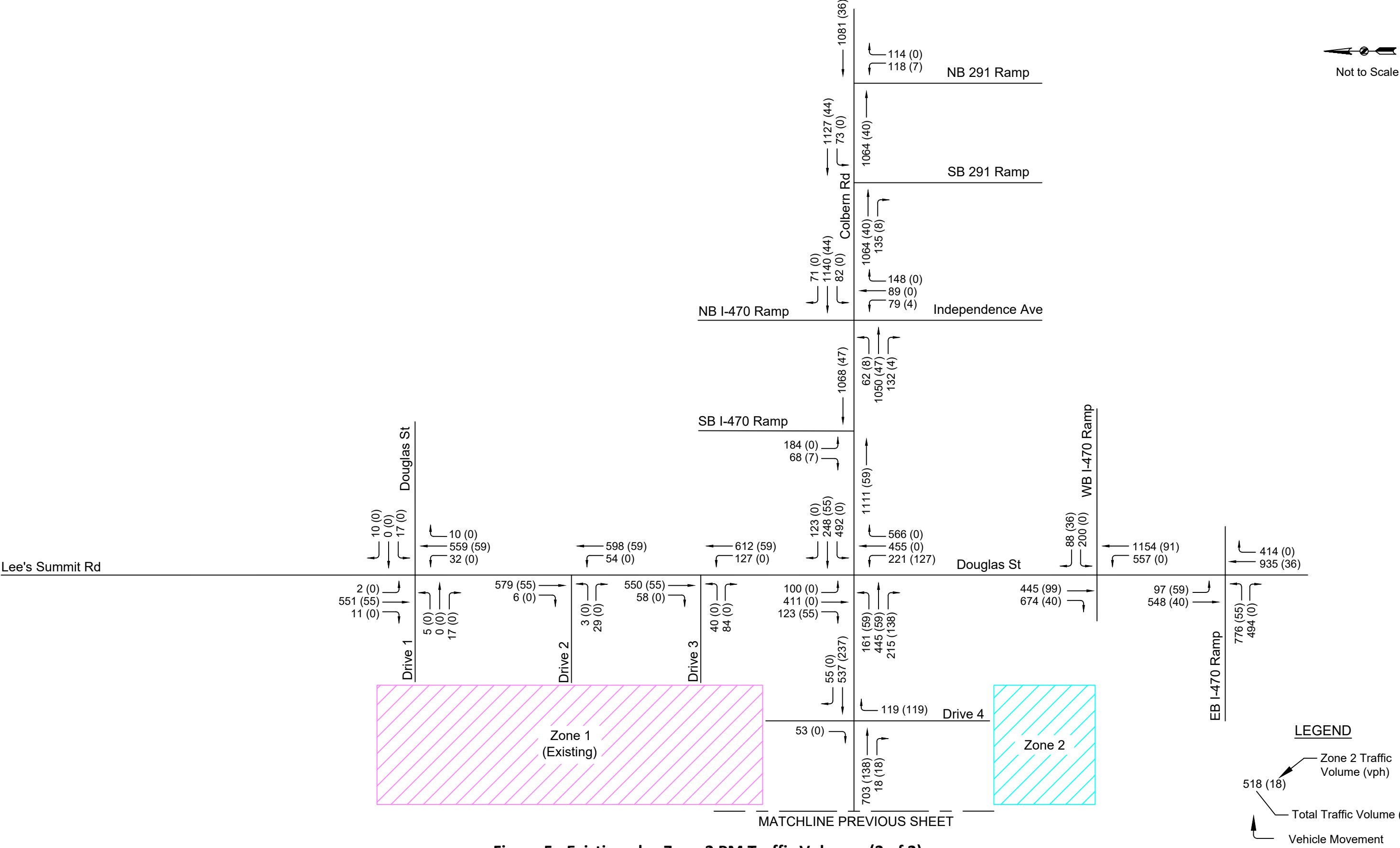


Figure 4 - Existing plus Zone 2 AM Traffic Volumes (1 of 2)







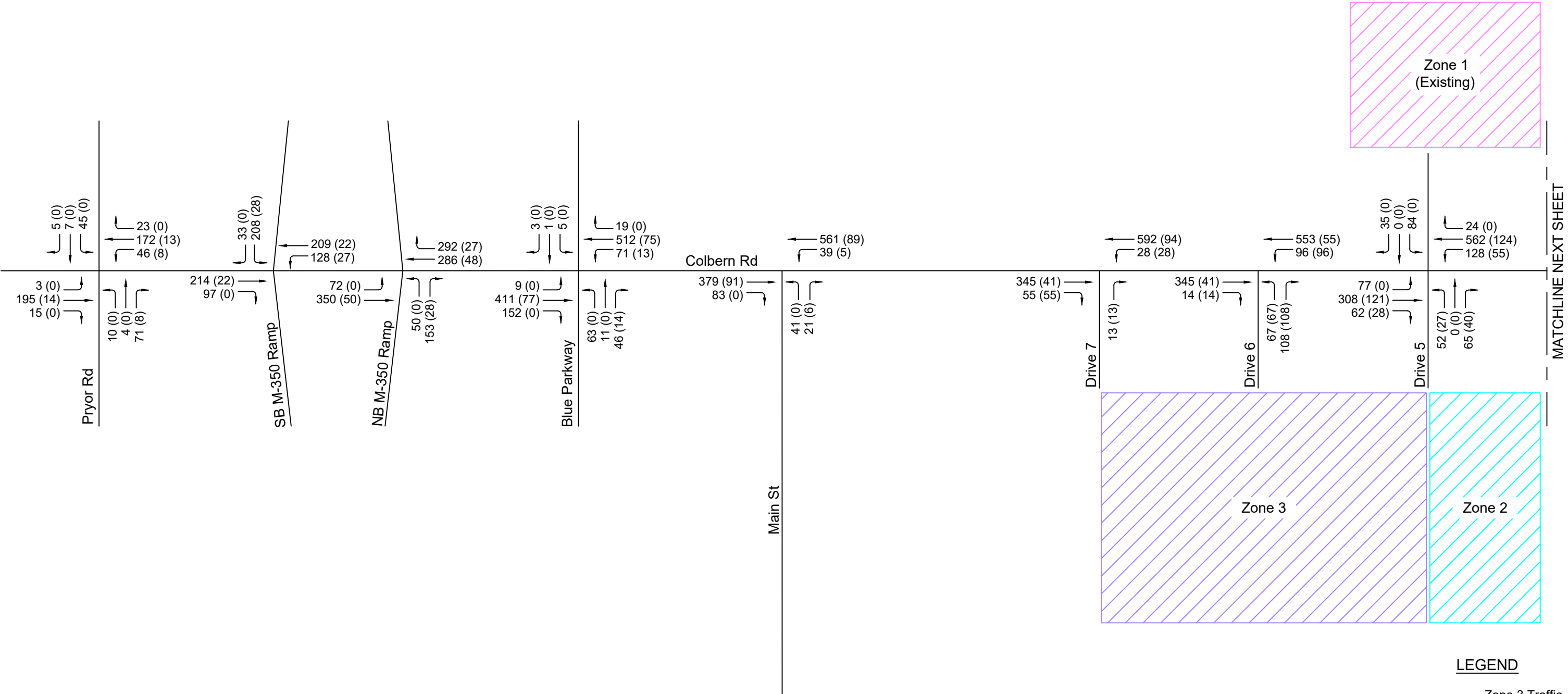
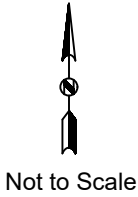
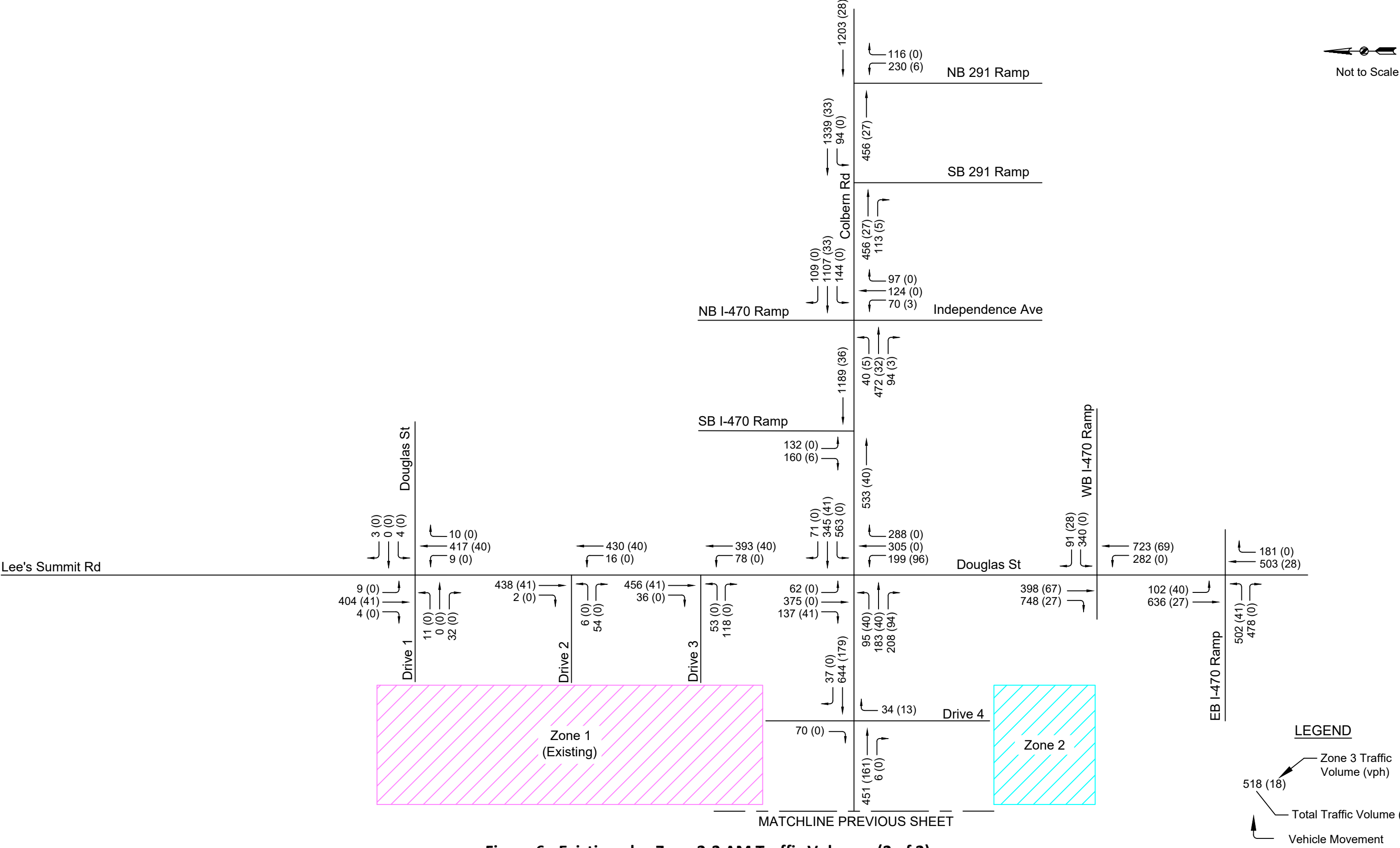


Figure 6 - Existing plus Zone 2-3 AM Traffic Volumes (1 of 2)

LEGEND

- Zone 3 Traffic Volume (vph)
- Total Traffic Volume (vph)
- Vehicle Movement



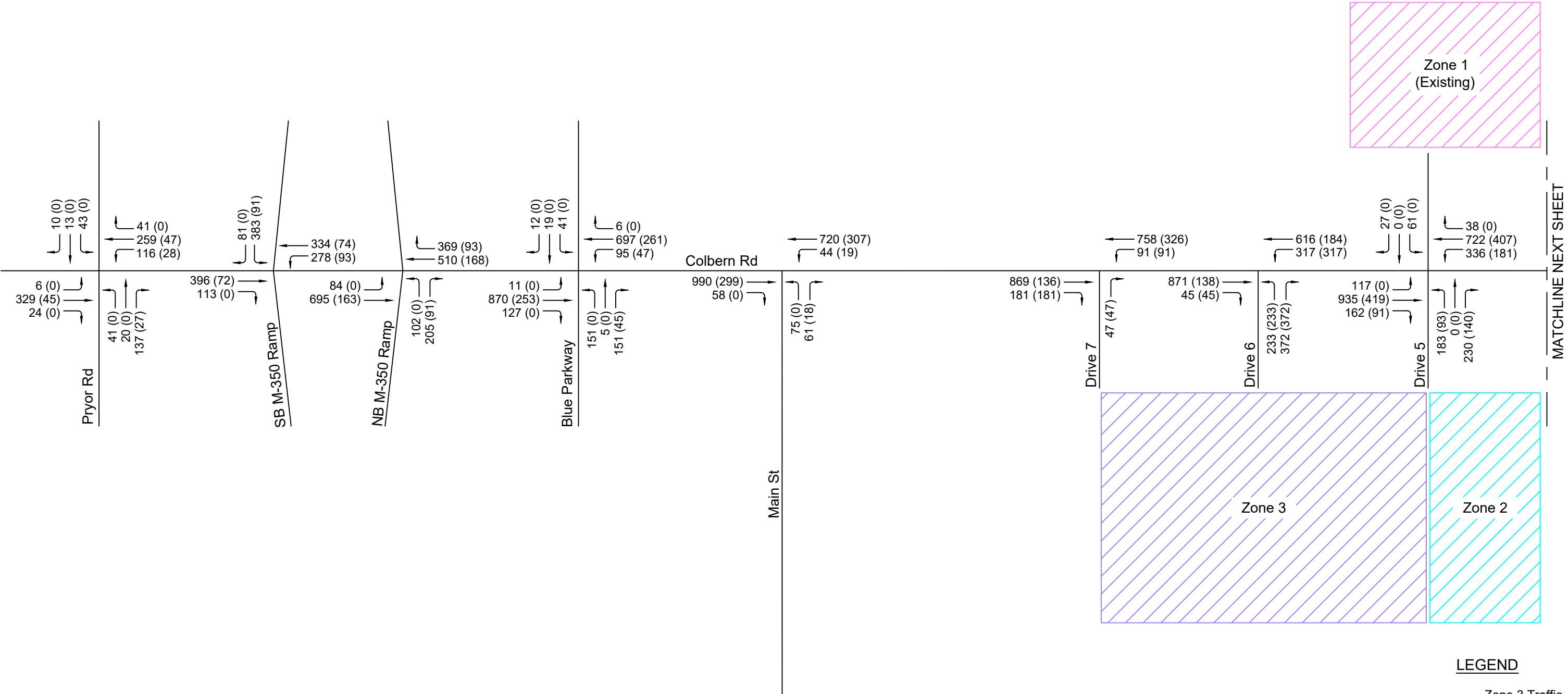
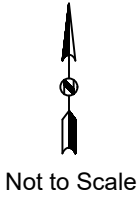
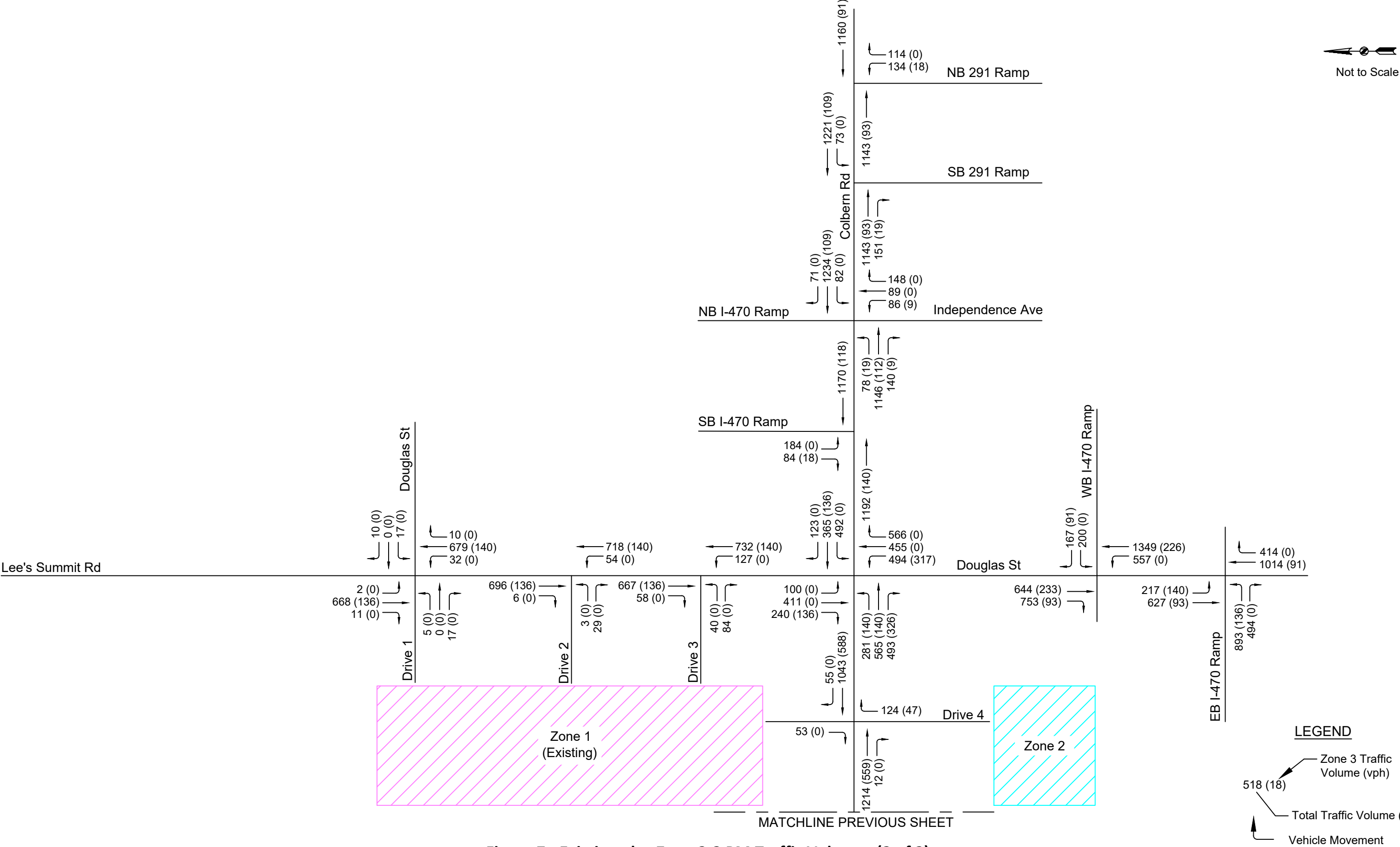
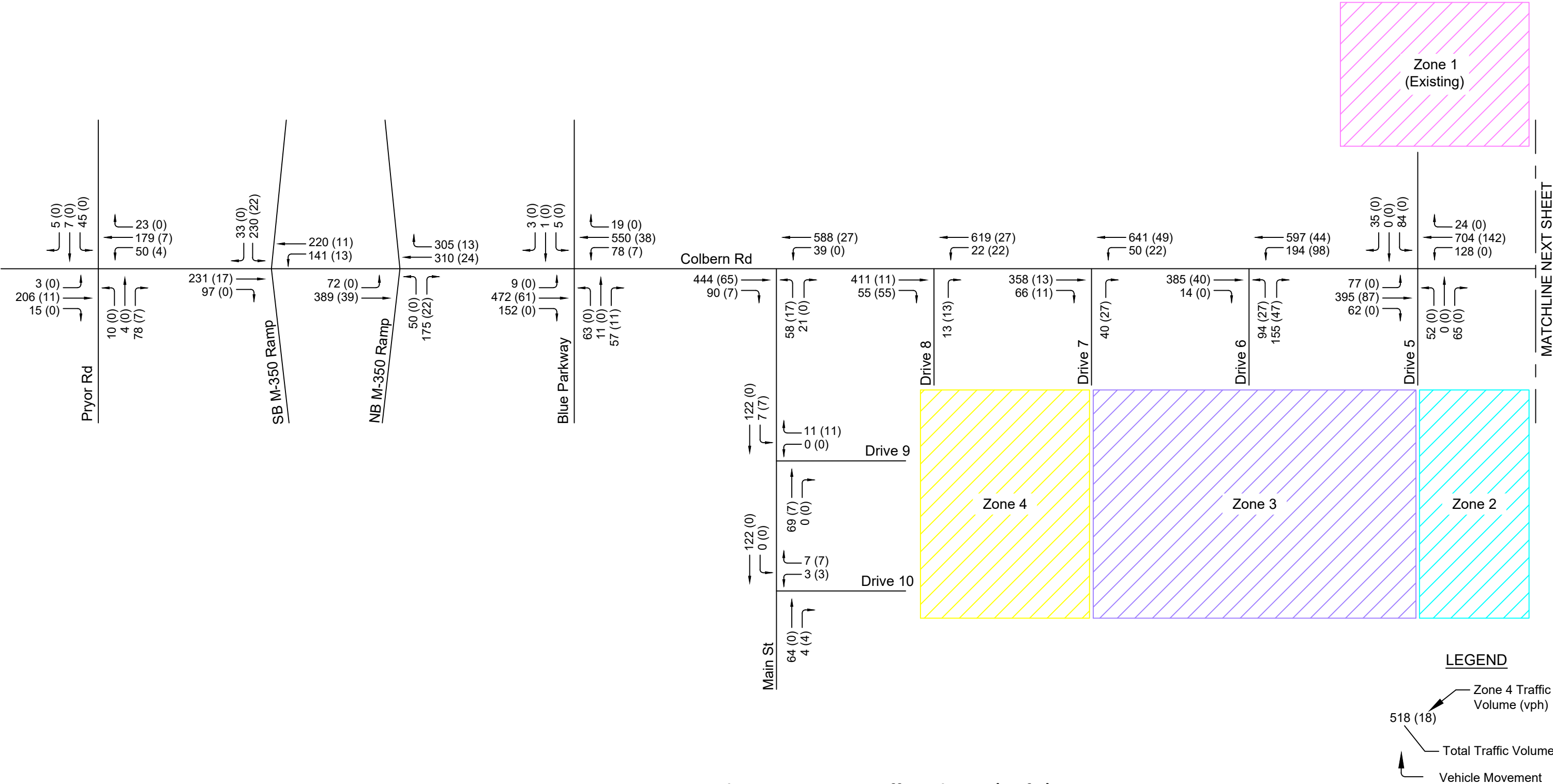
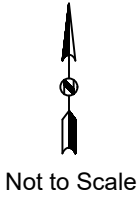


Figure 7 - Existing plus Zone 2-3 PM Traffic Volumes (1 of 2)

LEGEND

- Zone 3 Traffic Volume (vph)
- Total Traffic Volume (vph)
- Vehicle Movement





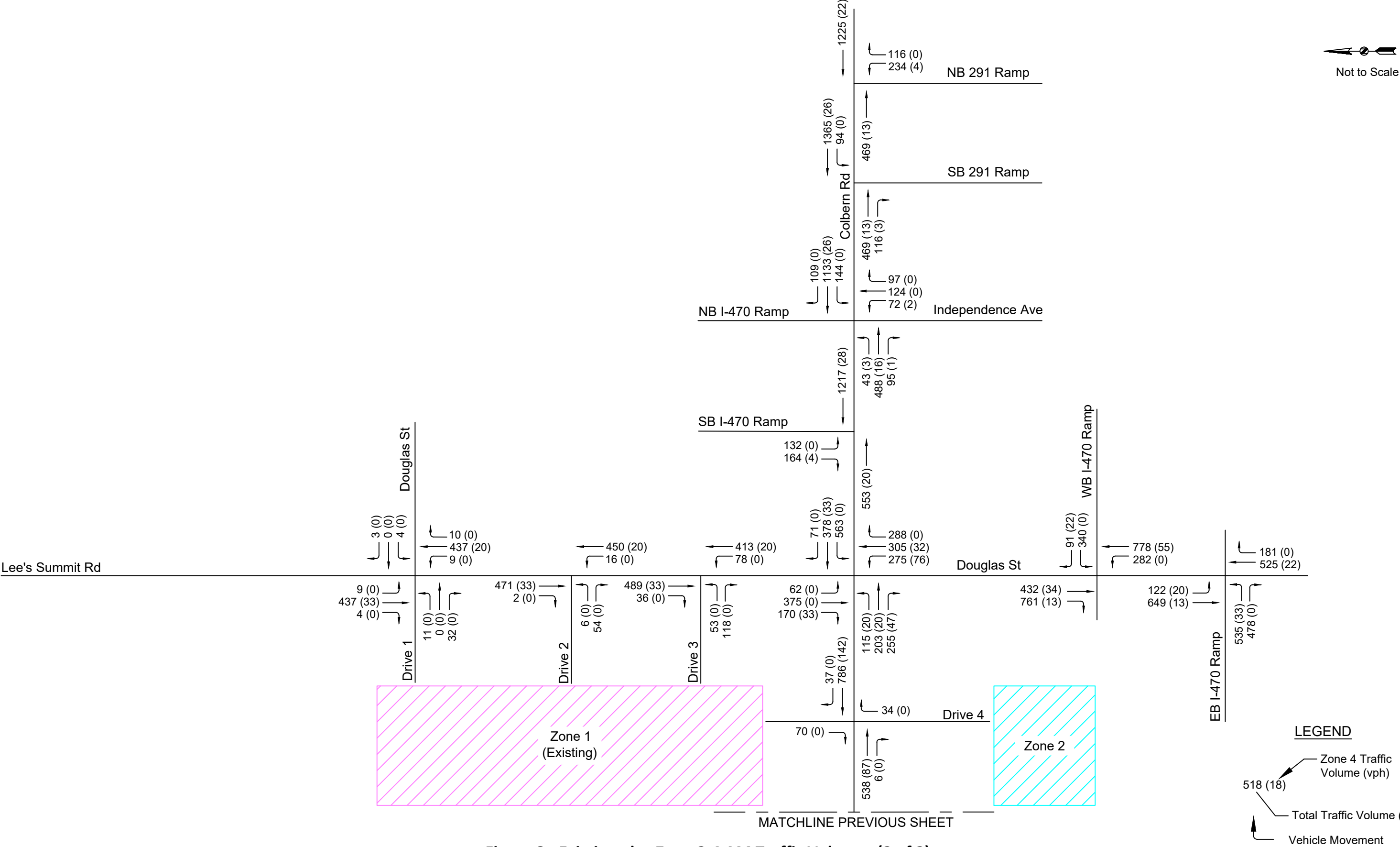


Figure 8 - Existing plus Zone 2-4 AM Traffic Volumes (2 of 2)

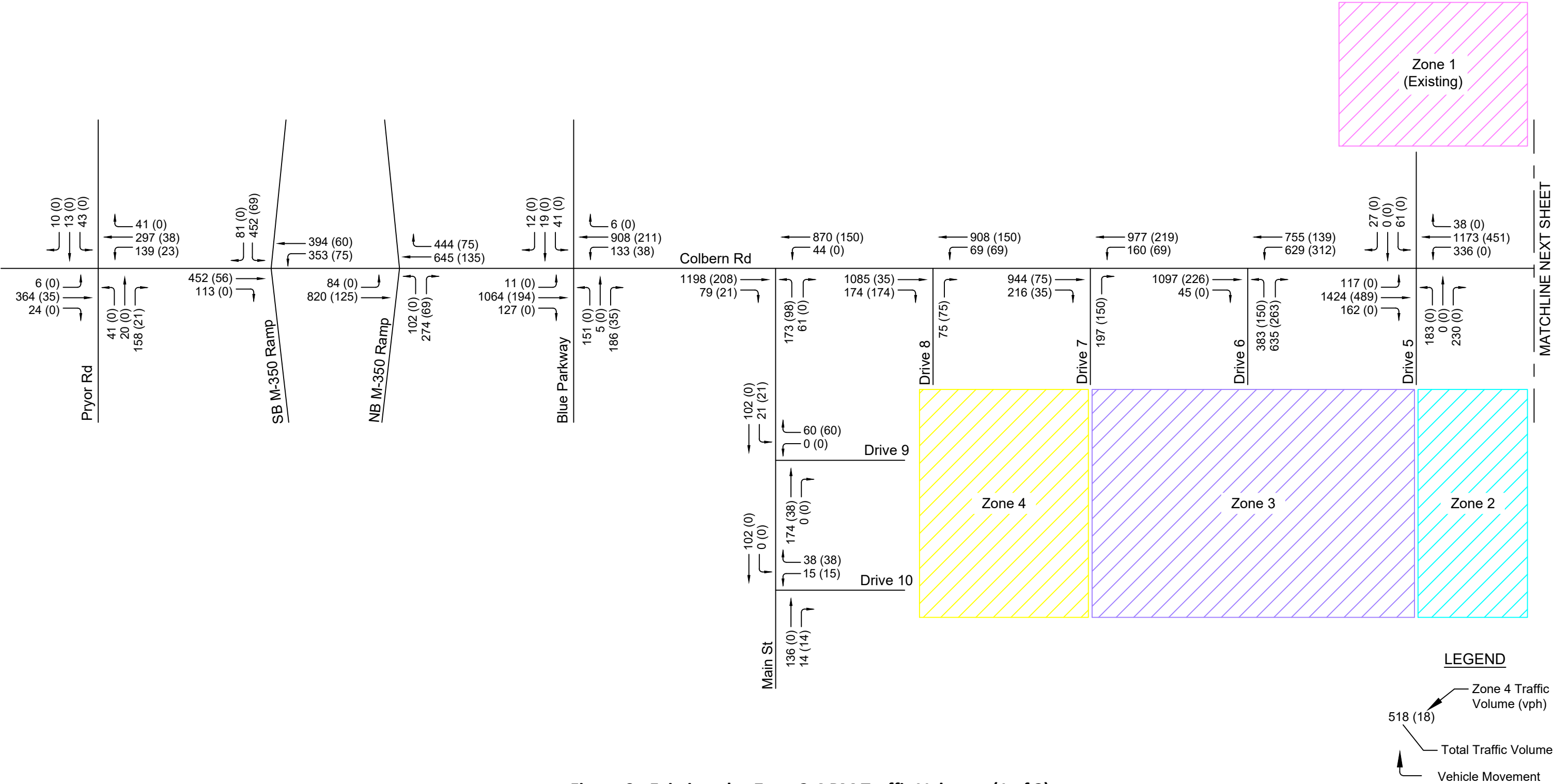
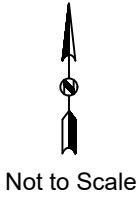
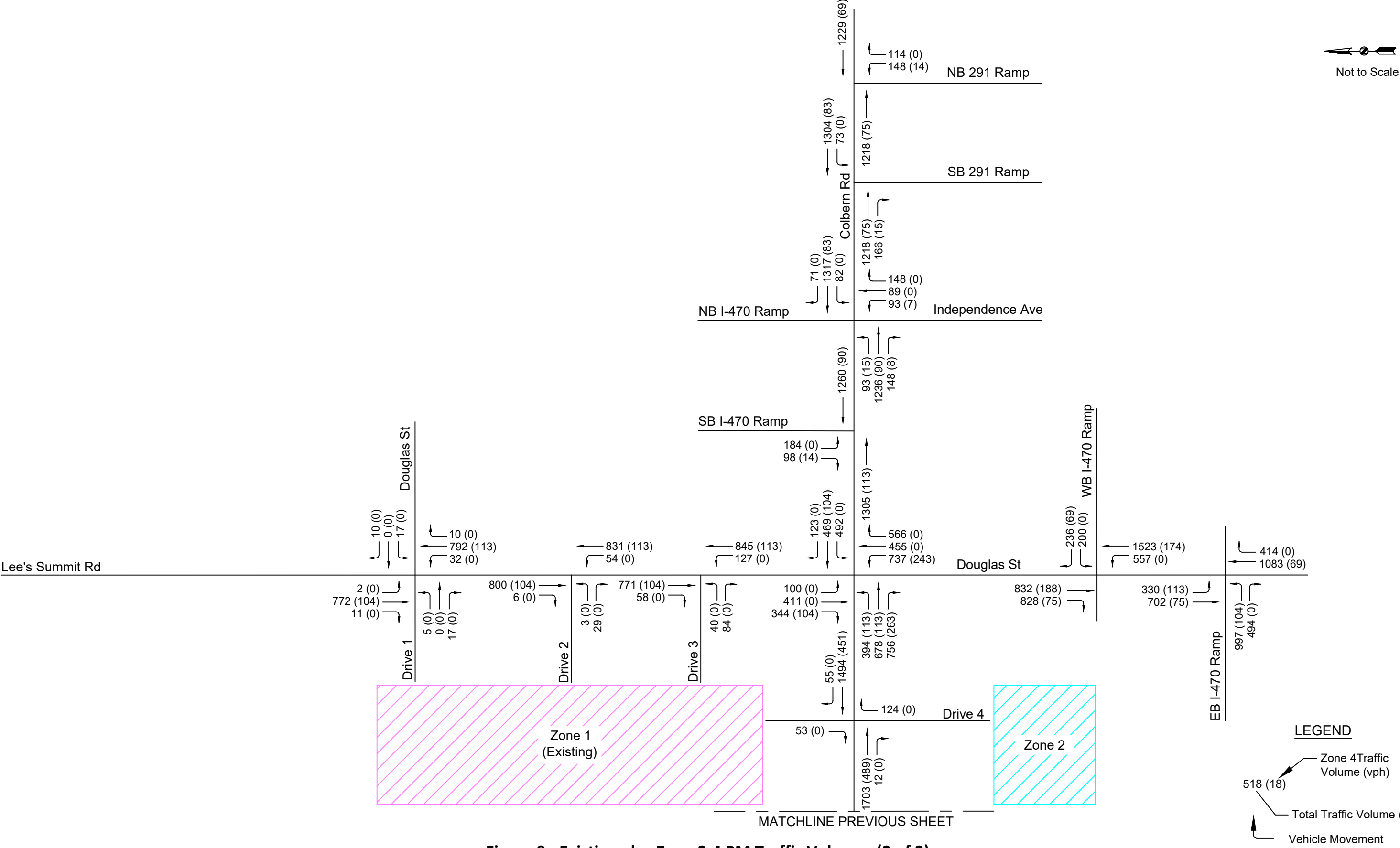
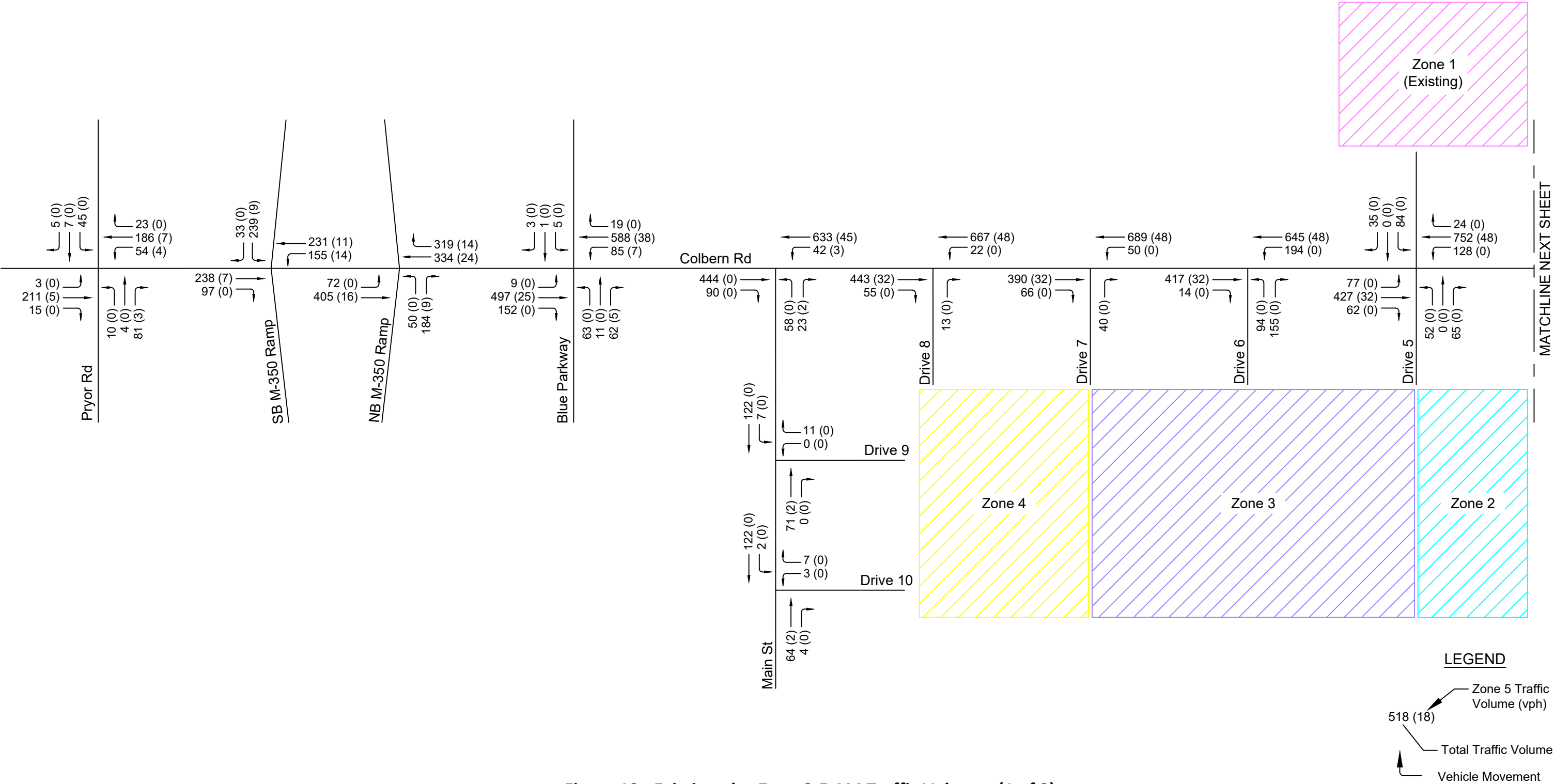
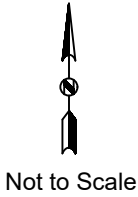


Figure 9 - Existing plus Zone 2-4 PM Traffic Volumes (1 of 2)





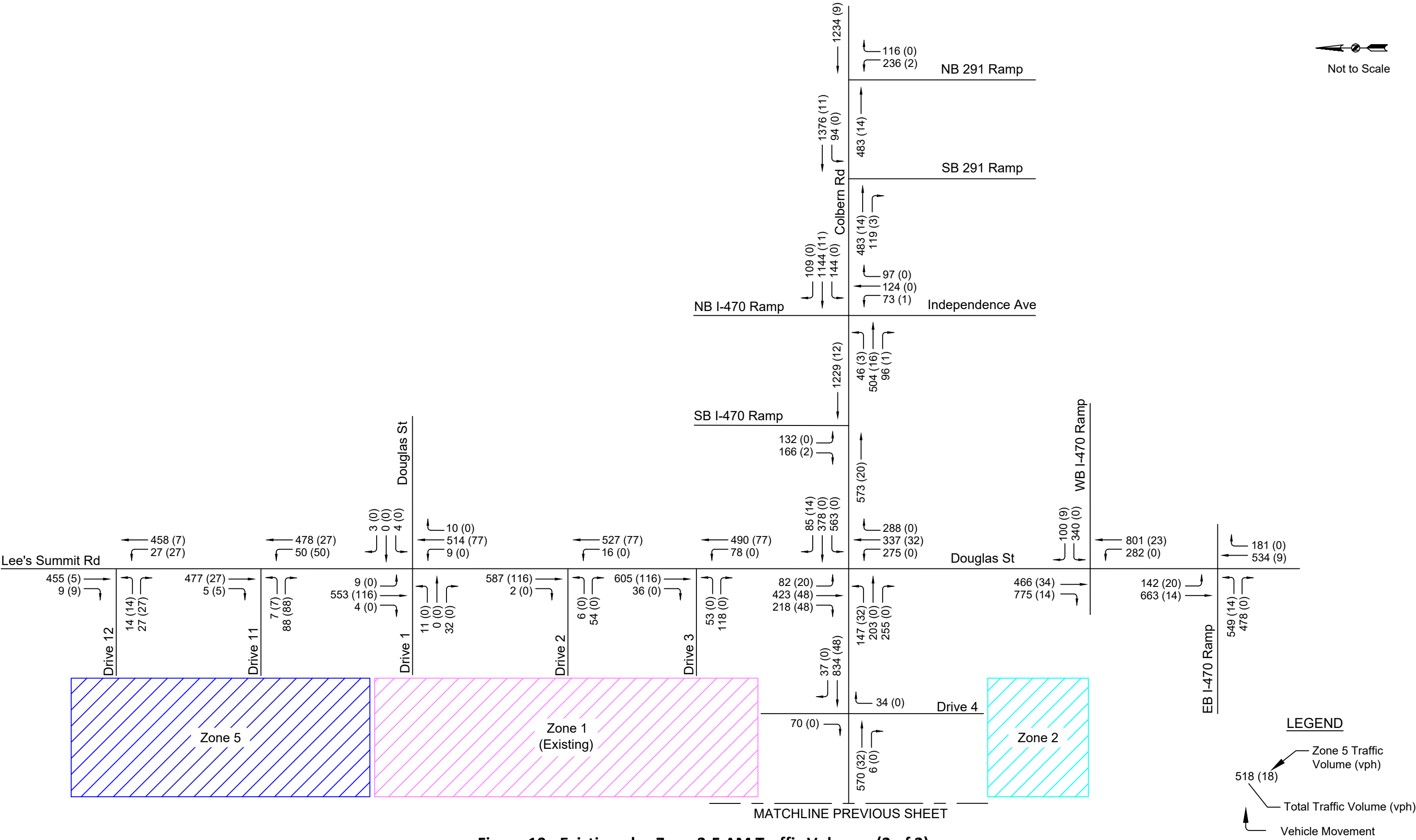
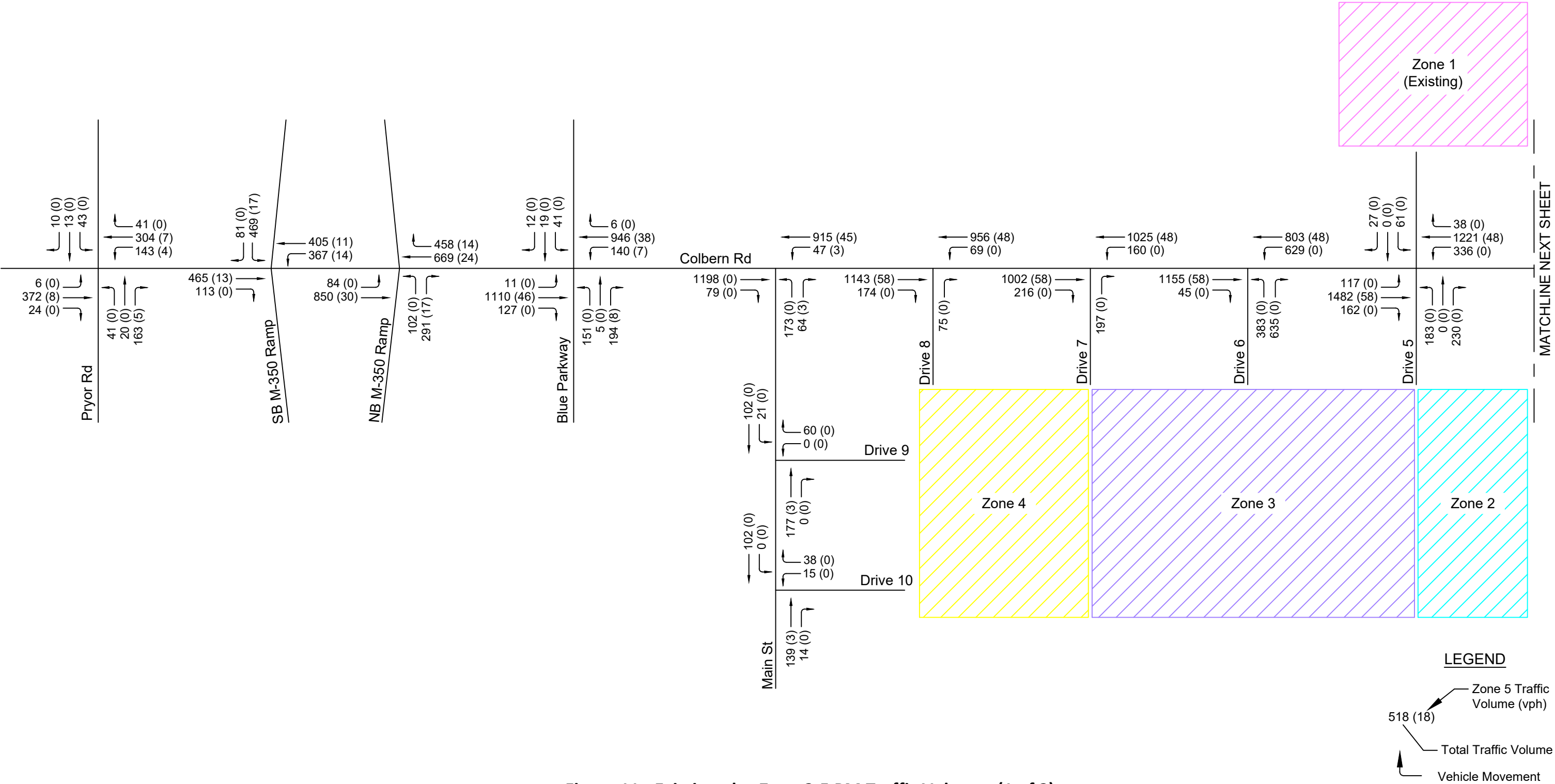
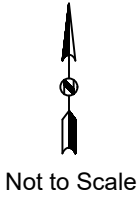
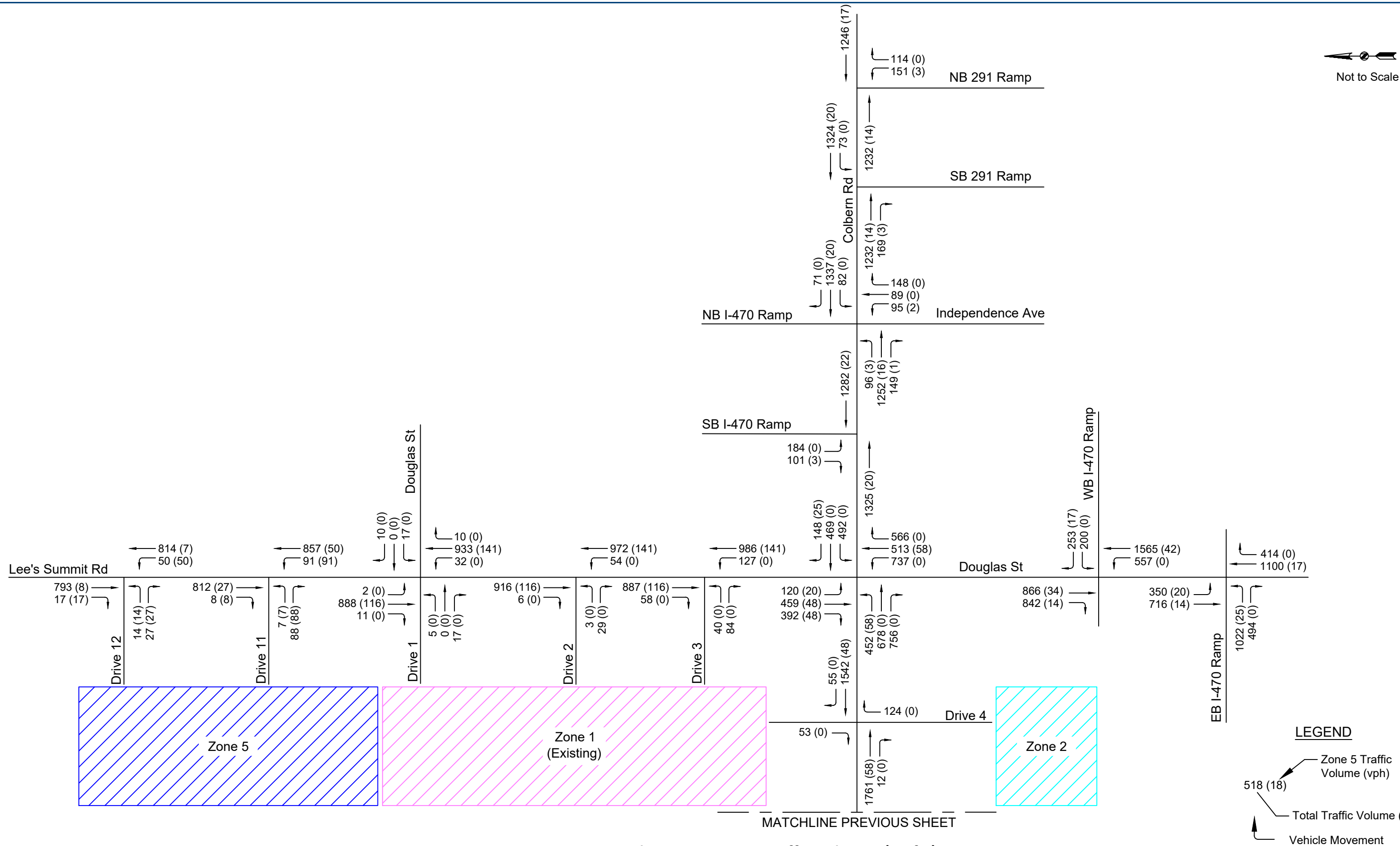


Figure 10 - Existing plus Zone 2-5 AM Traffic Volumes (2 of 2)





Signal Warrant Study

It may be considered justified to install a traffic signal at a location if one or more of the traffic signal warrants listed in the 2023 MUTCD are met. The traffic signal warrants are:

- 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 at Grade Crossing

Warrant 3 was evaluated at the analysis intersections as part of this study.

Warrant 3: Peak Hour

The peak hour warrant is satisfied if either of the two following conditions are met:

A: This condition is satisfied if any of the following conditions are met for a period of one hour during an average day:

1. The total stopped time delay experience by the traffic on one minor-street approach (one direction only) controlled by a stop sign equals or exceeds: 4 vehicles-hours for a one-lane approach or five vehicle hours for a two-lane approach and
2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes and
3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

(Condition A is not being examined in this study)

B: The peak hour warrant is satisfied if the vehicles per hour on both approaches of the major street and the vehicles on the higher volume approach of the minor street for one hour fall above the 2009 MUTCD Warrant 3 curve.

Warrant Analysis

Table 2 summarizes the results of the traffic signal warrant analysis. The raw data and graphs from the 2009 MUTCD are included in the Appendix.

Table 2 – Traffic Signal Warrant Analysis (Warrant 3: Peak Hour)

Intersection	Existing Conditions	Existing plus Zone 2	Existing plus Zone 2-3	Existing plus Zone 2-4	Existing plus Zone 2-5
Colbern Road and Drive 4	No	No	No	No	No
Colbern Road and Drive 5	No	Yes—PM peak hour	n/a	n/a	n/a
Colbern Road and Drive 6	No	No	Yes—AM & PM peak	n/a	n/a
Colbern Road and Drive 7	No	No	No	No	No
Colbern Road and Drive 8	No	No	No	No	No
Colbern Road and Main Street	No	No	Yes—AM & PM peak	n/a	n/a
Colbern Road and Pryor Road	No	No	No	Yes- PM peak hour	n/a
Main Street and Drive 9	No	No	No	No	No
Main Street and Drive 10	No	No	No	No	No
Lee’s Summit Road and Drive 11	No	No	No	No	No
Lee’s Summit Road and Drive 12	No	No	No	No	No

Traffic signals should not be installed based on Warrant 3: Peak Hour criteria alone, but this data can be used to act as a trigger for a traffic signal warrant analysis once construction is completed for the various zones.

The raw data and graphs from the 2023 MUTCD are included in the Appendix.

CAPACITY

The capacity analysis for the study intersections was completed using the methodology outlined in the Highway Capacity Manual, 6th Edition. The volume and capacity analysis was completed using Trafficware SYNCHRO software (latest version) and SIDRA software (latest version) for the following scenarios:

- Existing Conditions (peak hour counts, approved trips, and Zone 1 trips)
- Existing plus Zone 2
- Existing plus Zone 3
- Existing plus Zone 4
- Existing plus Zone 5

Level of Service (LOS) is defined as the measure of the quality of traffic flow and is graded from A to F where A is the best situation, F is the worst situation, and D is generally the minimum acceptable level of service. The criteria for determining level of service for signalized and unsignalized study intersections and access points are based on the average vehicle delay and is outlined in Table 3.

Table 3 – Intersection Level of Service		
Level of Service (LOS)	Average Control Delay (sec/veh)	
	Unsignalized	Signalized
A	< 10	< 10
B	< 15	< 20
C	< 25	< 35
D	< 35	< 55
E	< 50	< 80
F	≥ 50	≥ 80

Existing Conditions

Analysis was completed for existing conditions (peak hour counts, approved trips, and Zone 1 trips) using approved lane configurations from previous studies and Colbern Road design plans.

Colbern Road and Pryor Road

The through movements of Colbern Road are not stop-controlled and are therefore operating in a free-flow condition. Pryor Road lanes operate at a LOS C or better for the morning and afternoon peak periods and have sufficient capacity for queuing vehicles.

Colbern Road and M-350 Southbound Ramp

All approaches operate at a LOS B or above for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the intersection is a LOS A during the morning peak period and a LOS B during the afternoon peak period.

Colbern Road and M-350 Northbound Ramp

All approaches operate at a LOS A for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS A during the morning and afternoon peak periods.

Colbern Road and Blue Parkway/Unity Way

The overall LOS for the roundabout is a LOS A with all approaches operating at a LOS A. There is sufficient capacity for queuing vehicles.

Colbern Road and Main Street

The through movements of Colbern Road are not stop-controlled and are therefore operating in a free-flow condition. The northbound lanes operate at a LOS C or better and have sufficient capacity for queuing vehicles.

Douglas Street/Lee's Summit Road and Douglas Street/Drive 1

The through movements of Douglas Street/Lee's Summit Road are not stop-controlled and are therefore operating in a free-flow condition. All other movements operate at a LOS C or better and have sufficient capacity for queuing vehicles.

Douglas Street and Drive 2

The through movements of Douglas Street are not stop-controlled and are therefore operating in a free-flow condition. All other movements operate at a LOS B or better and have sufficient capacity for queuing vehicles.

Douglas Street and Drive 3

The through movements of Douglas Street are not stop-controlled and are therefore operating in a free-flow condition. All other movements operate at a LOS C or better and have sufficient capacity for queuing vehicles.

Colbern Road and Drive 4 (RIRO)

The through movements of Colbern Road are not stop-controlled and are therefore operating in a free-flow condition. All other movements operate at a LOS B or better and have sufficient capacity for queuing vehicles.

Colbern Road and Drive 5

The through movements of Colbern Road are not stop-controlled and are therefore operating in a free-flow condition. The southbound left-turn lane operates at a LOS C and all other movements operate at a LOS B or better for the morning and afternoon peak periods. The intersection has sufficient capacity for queuing vehicles.

Colbern Road and Douglas Street

All approaches operate at a LOS C or above for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning peak hours and a LOS C during the afternoon peak periods.

Colbern Road and I-470 Southbound Off-Ramp

All approaches operate at a LOS B or above for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and afternoon peak periods.

Colbern Road and I-470/M-291 Northbound On-Ramp/Independence Ave

All approaches operate at a LOS C or above for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and afternoon peak periods.

Colbern Road and M-291 Southbound Ramp

The through movements of Colbern Road are not stop-controlled and are therefore operating in a free-flow condition. All movements operate at a LOS A for the morning and afternoon peak periods.

Colbern Road and M-291 Northbound Ramp

All approaches operate at a LOS B or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and afternoon peak periods.

Douglas Street and I-470 Westbound Ramp

All approaches at this intersection operate at a LOS D or better and there is sufficient capacity for queuing vehicles. Overall, the signal operates at a LOS B for the morning and afternoon peak periods.

Douglas Street and I-470 Eastbound Ramp

All approaches operate at a LOS D or better for the peak periods, with an overall LOS B for the morning peak period and a LOS C for the afternoon peak period. There is sufficient capacity for queuing vehicles.

The results of the existing conditions analysis are shown for the morning and afternoon peak hours along with lane configuration and queue lengths on Figures 12 and 13.

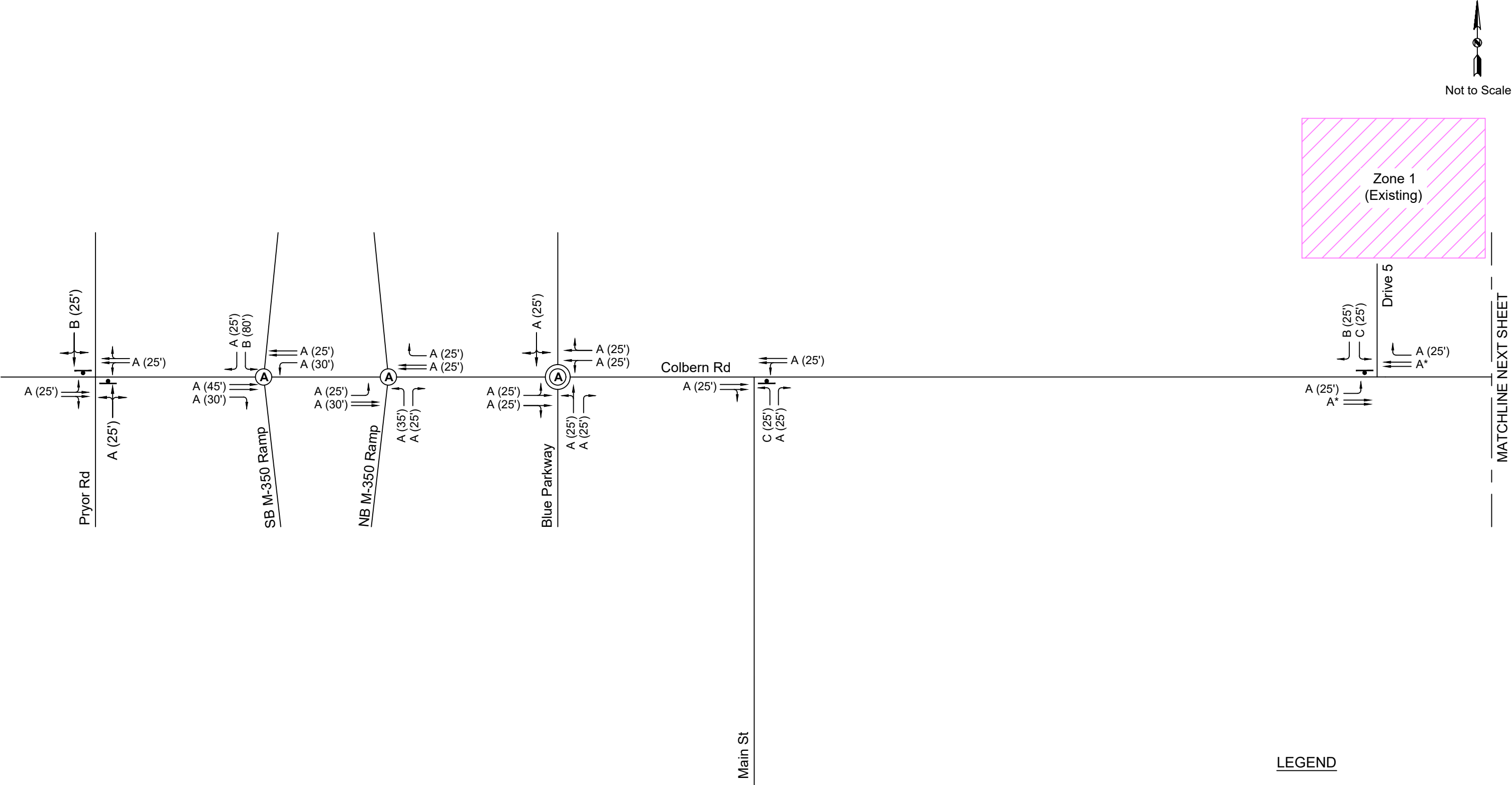


Figure 12 - Existing AM LOS (1 of 2)

LEGEND

Lane Configuration

Movement Level of Service

Signalized Intersection Level of Service

Roundabout Level of Service

Required Storage Length

Capacity Per Demand

New Lane Configuration

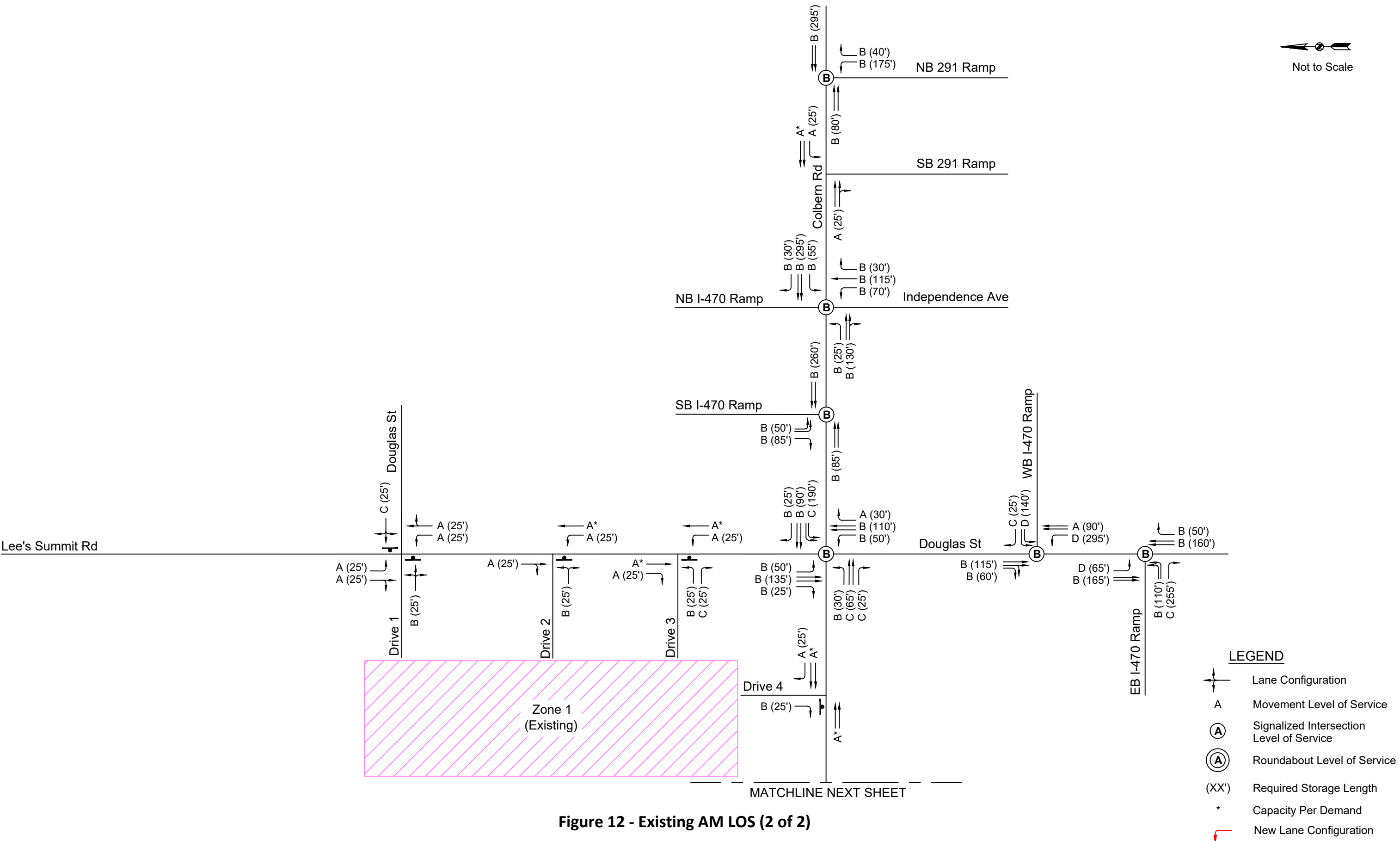


Figure 12 - Existing AM LOS (2 of 2)

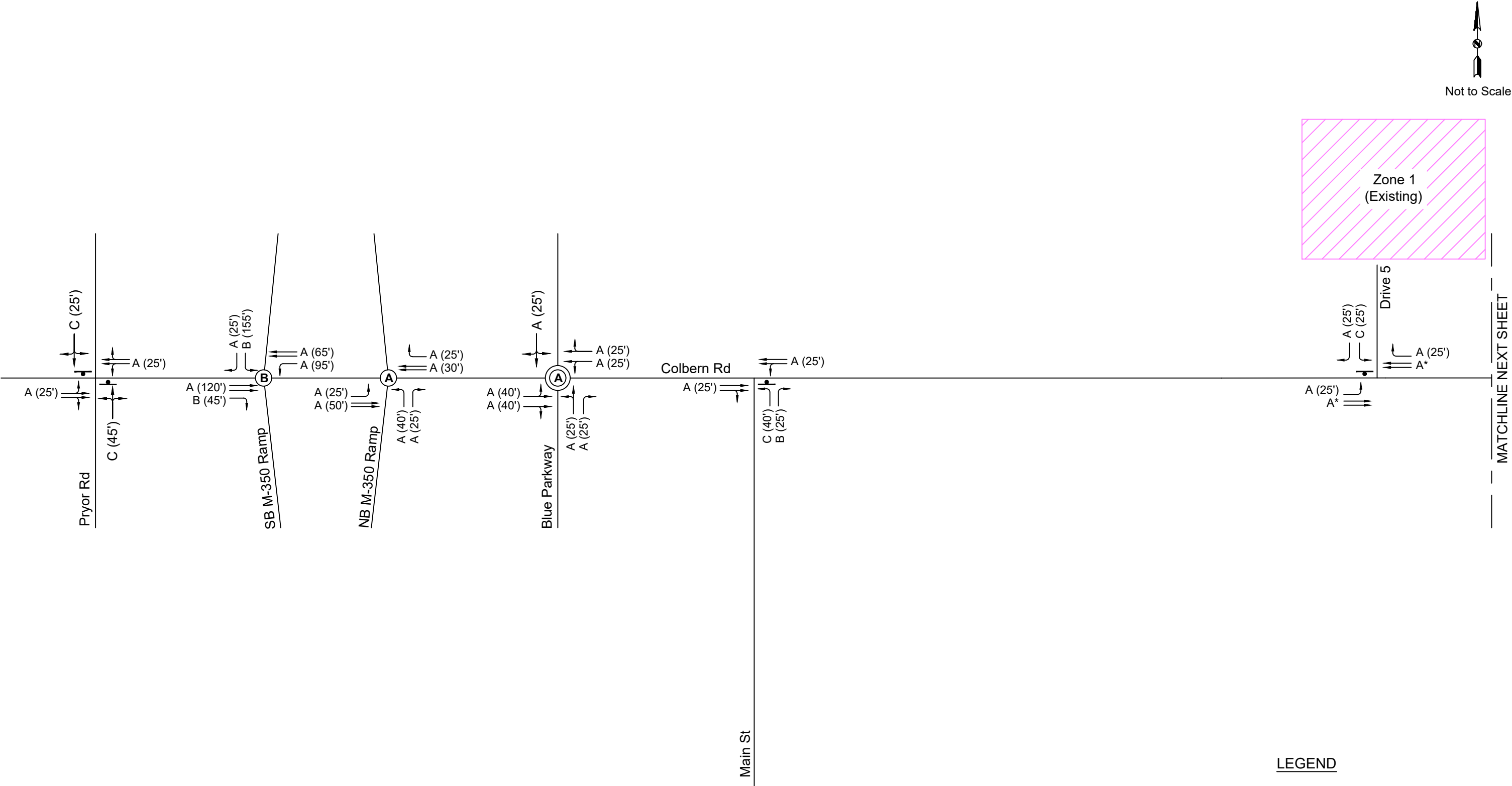
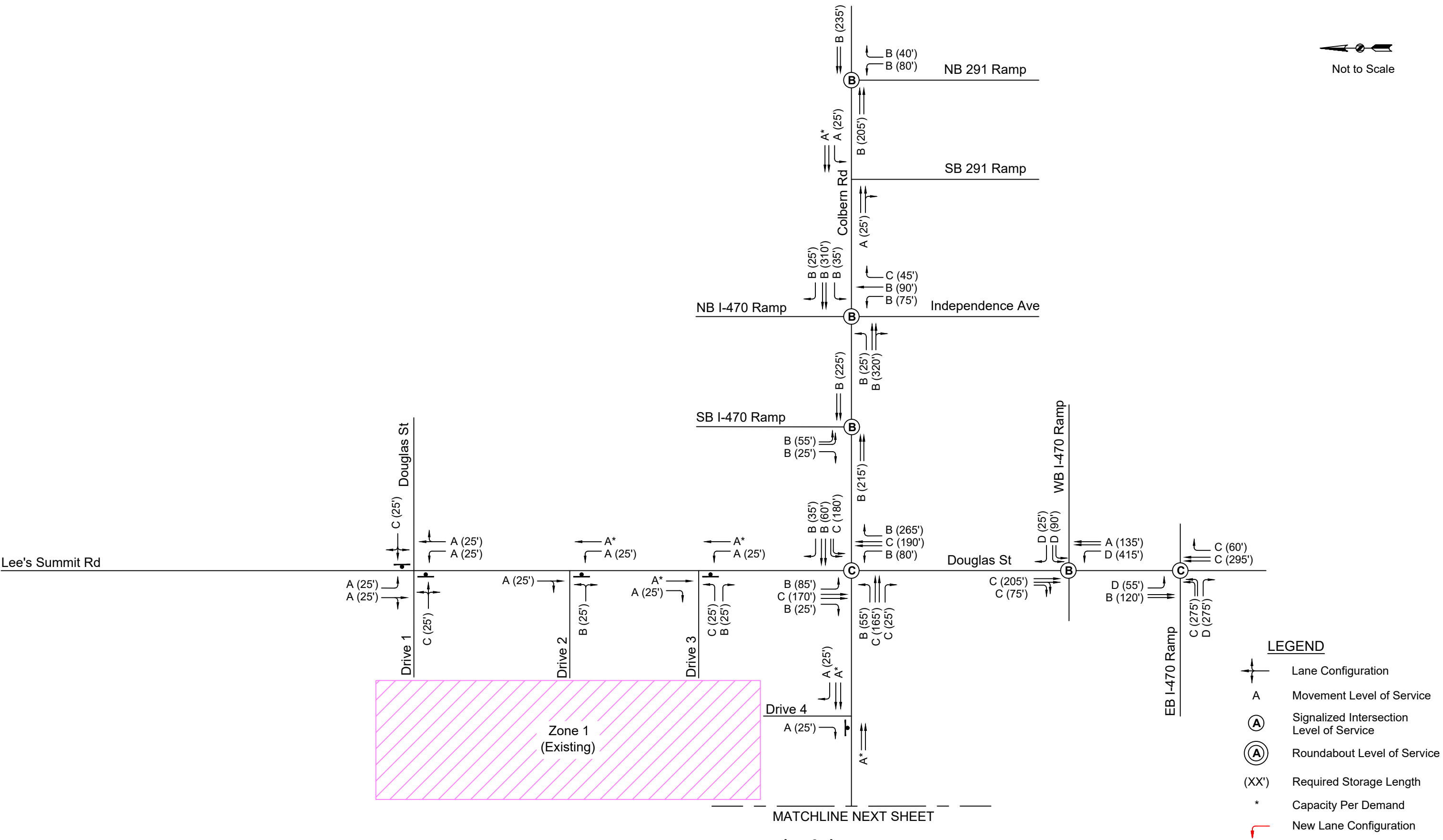


Figure 13 - Existing PM LOS (1 of 2)

LEGEND

	Lane Configuration		Roundabout Level of Service
A	Movement Level of Service	(XX')	Required Storage Length
	Signalized Intersection Level of Service	*	Capacity Per Demand
			New Lane Configuration



Existing Plus Zone 2 Conditions

Signal timings were optimized to account for the additional traffic. Unless noted, existing roadway and lane configurations were used in intersection analysis.

The additional traffic caused minimal changes to the individual lane movement LOS, the overall LOS, or intersection queueing. The following intersections remained at a LOS C or better for all movements and continued to have sufficient capacity for queueing vehicles:

- Colbern Road and Pryor Road
- Colbern Road and M-350 Southbound Ramp
- Colbern Road and M-350 Northbound Ramp
- Colbern Road and Blue Parkway/Unity Way
- Douglas Street/Lee's Summit Road and Douglas Street/Drive 1
- Douglas Street and Drive 2
- Douglas Street and Drive 3
- Colbern Road and I-470 Southbound Off-Ramp
- Colbern Road and I-470 Northbound On-Ramp/Independence Ave
- Colbern Road and M-291 Southbound Ramp
- Colbern Road and M-291 Northbound Ramp

Colbern Road and Main Street

The through movements of Colbern Road are not stop-controlled and continue operating in a free-flow condition. The additional development traffic causes the northbound left-turn lane to operate at a LOS E for the afternoon peak period and the expected delay is 39 seconds. The average control delay drops from a LOS D to LOS E at 35 seconds, so the LOS E is just outside the LOS D criteria by an additional 4 second delay. All other movements continue to operate at a LOS C or better and have sufficient capacity for queueing vehicles.

Colbern Road and Drive 4 (RIRO)

This intersection was analyzed with the south leg of the intersection as a stop-controlled RIRO intersection with a 250-foot eastbound right-turn lane and a 200-ft northbound right-turn only lane.

All movements operate at a LOS B or better and have sufficient capacity for queueing vehicles.

Colbern Road and Drive 5

The intersection was analyzed as a signalized intersection with the addition of a 250-foot eastbound right-turn lane, a 200-foot westbound left-turn lane, a 200-foot northbound left-turn lane, and a shared through/right-turn lane.

All approaches operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queueing vehicles. The overall LOS for the signal is a LOS B.

Colbern Road and Douglas Street

There is no significant change in the operations of this intersection from the existing conditions. The additional traffic causes northbound and southbound traffic movements to drop to a LOS D during the afternoon peak period. The LOS D is still within the acceptable criteria and the intersection has sufficient capacity for queuing vehicles for the morning and afternoon peak periods.

Douglas Street and I-470 Westbound Ramp

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS D or better; however, the northbound left-turn queue is approaching capacity during the afternoon peak period.

Douglas Street and I-470 Eastbound Ramp

The additional traffic causes the eastbound movement to drop to a LOS E during the afternoon peak period. The intersection has sufficient capacity for queuing vehicles for the morning and afternoon peak periods.

The results of the existing plus Zone 2 analysis for the morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 14 and 15.

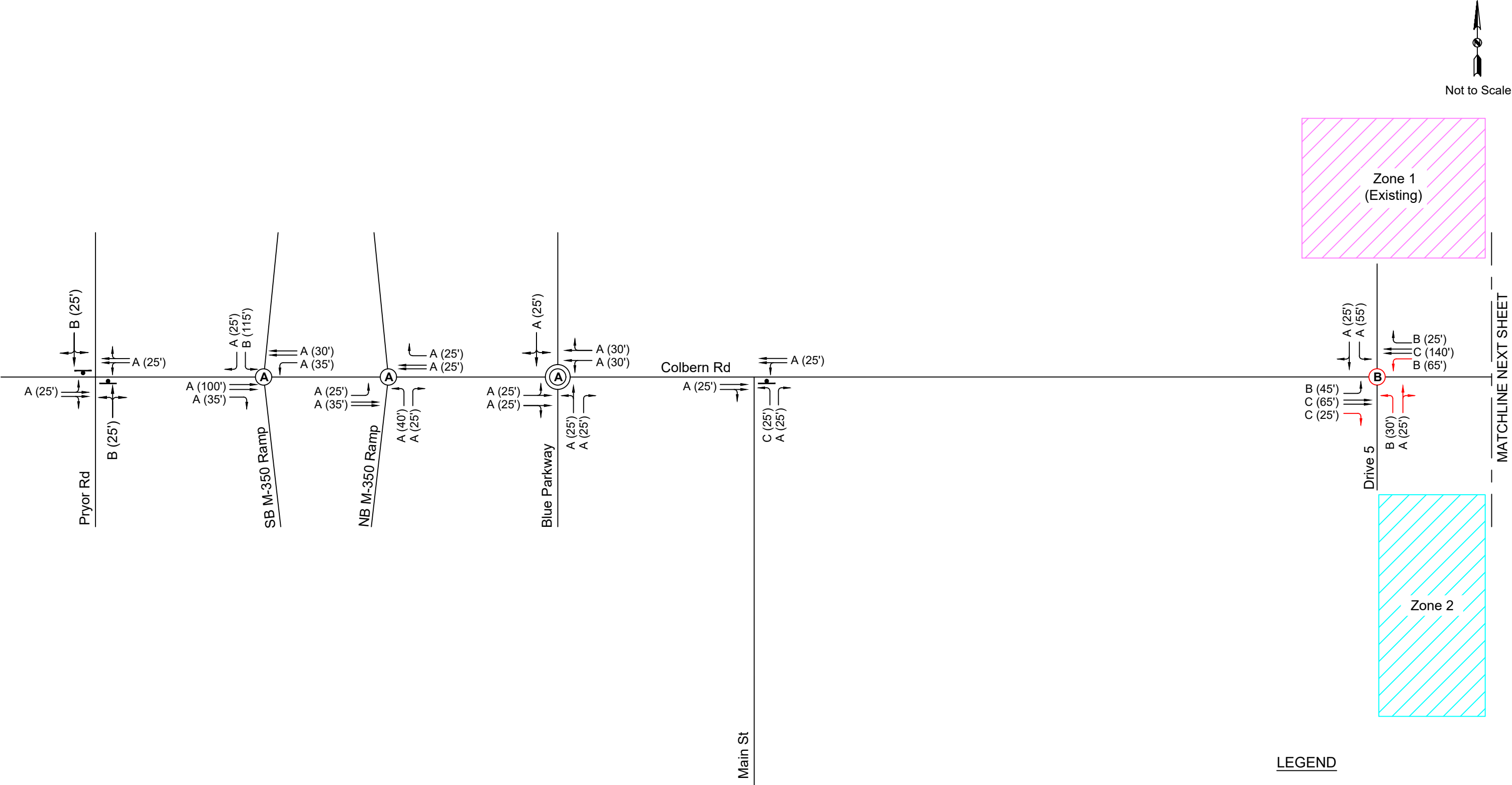


Figure 14 - Existing plus Zone 2 AM LOS (1 of 2)

A

Ⓐ

Ⓐ

Lane Configuration

Movement Level of Service

Signalized Intersection Level of Service

Ⓐ

(XX')

*

Roundabout Level of Service

Required Storage Length

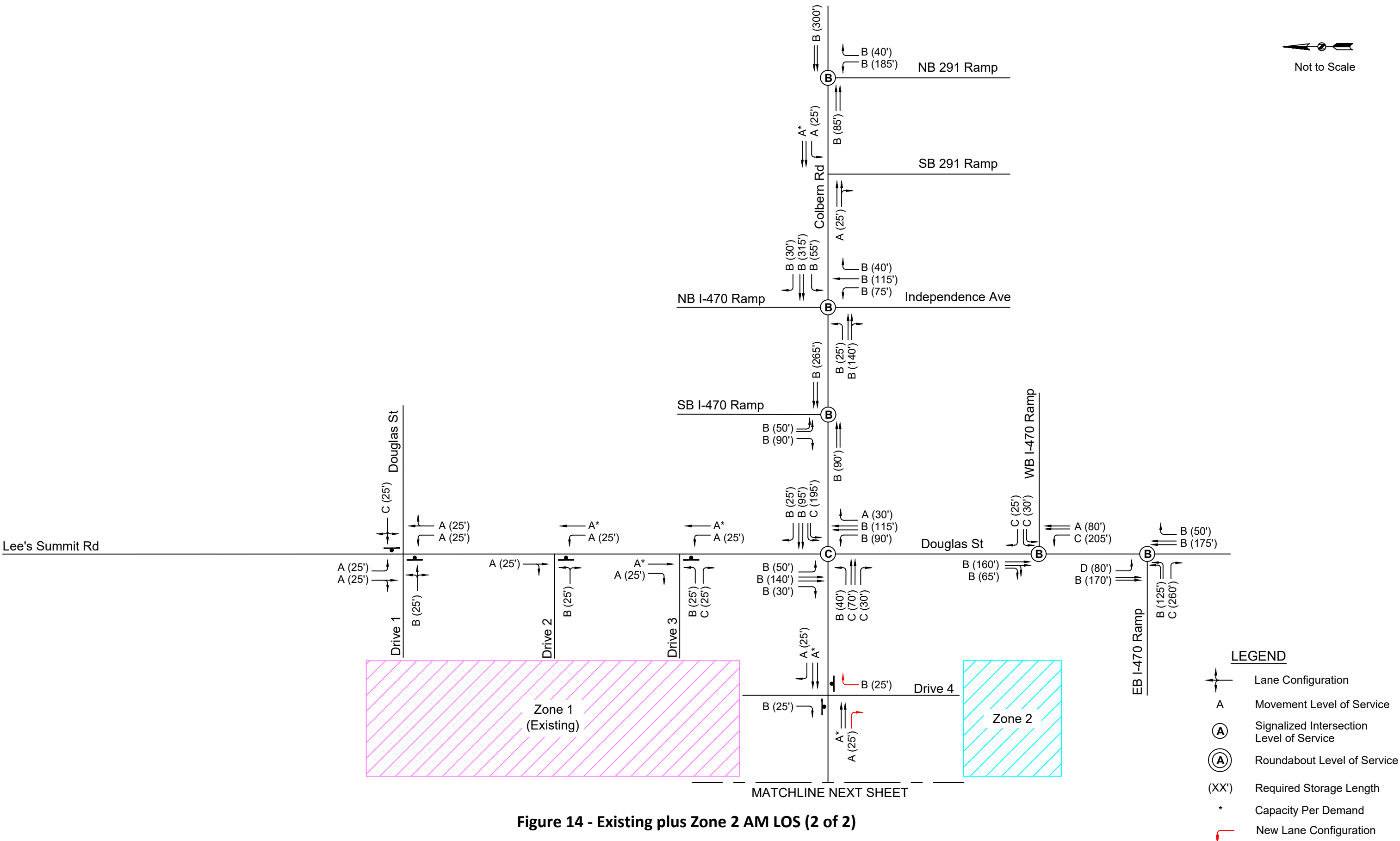
Capacity Per Demand

New Lane Configuration

Discovery Park
Lee's Summit, Missouri

26

McCURDY
ENGINEERS



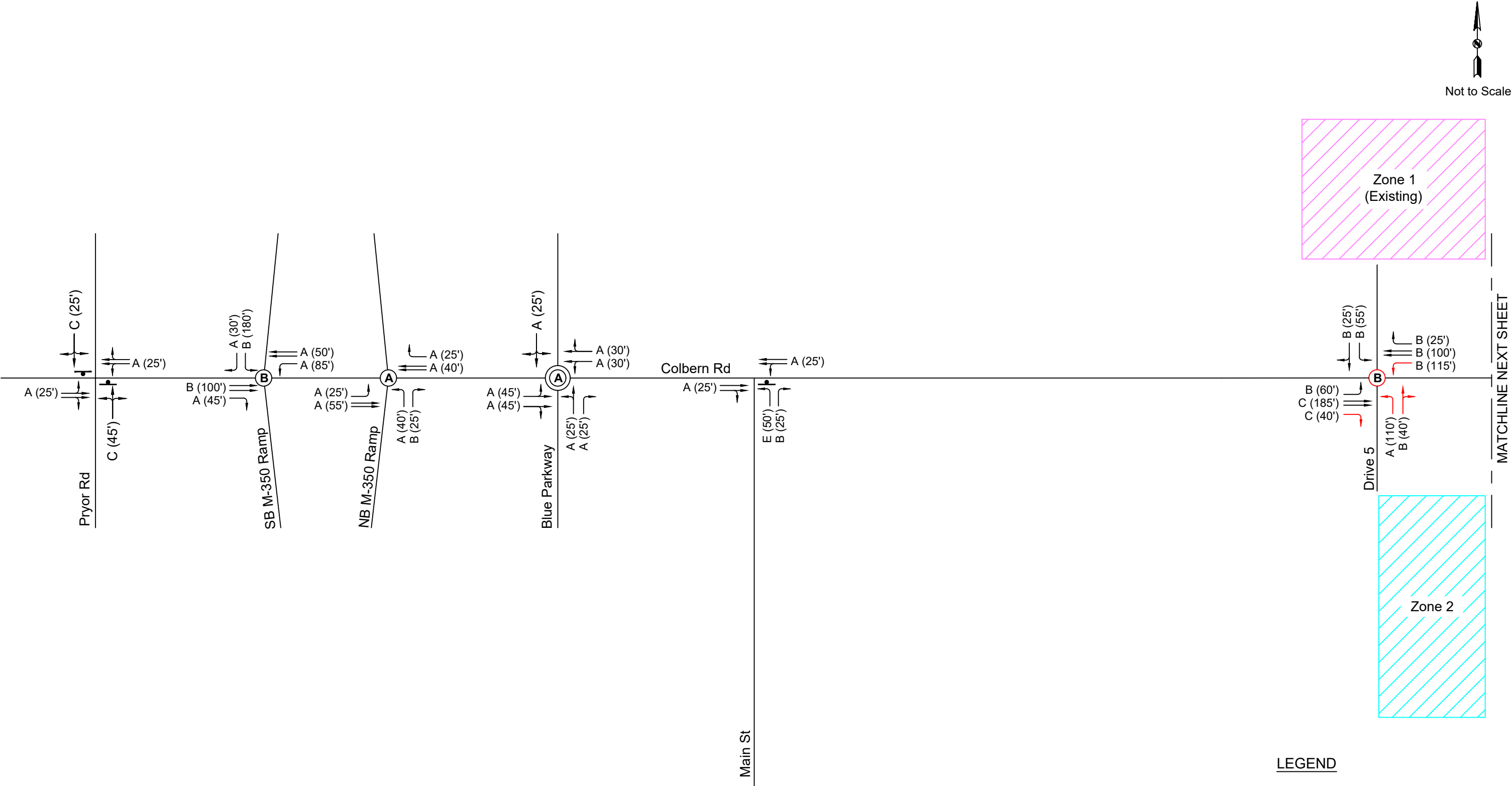


Figure 15 - Existing plus Zone 2 PM LOS (1 of 2)

LEGEND

	Lane Configuration		Roundabout Level of Service
A	Movement Level of Service	(XX')	Required Storage Length
	Signalized Intersection Level of Service	*	Capacity Per Demand
			New Lane Configuration

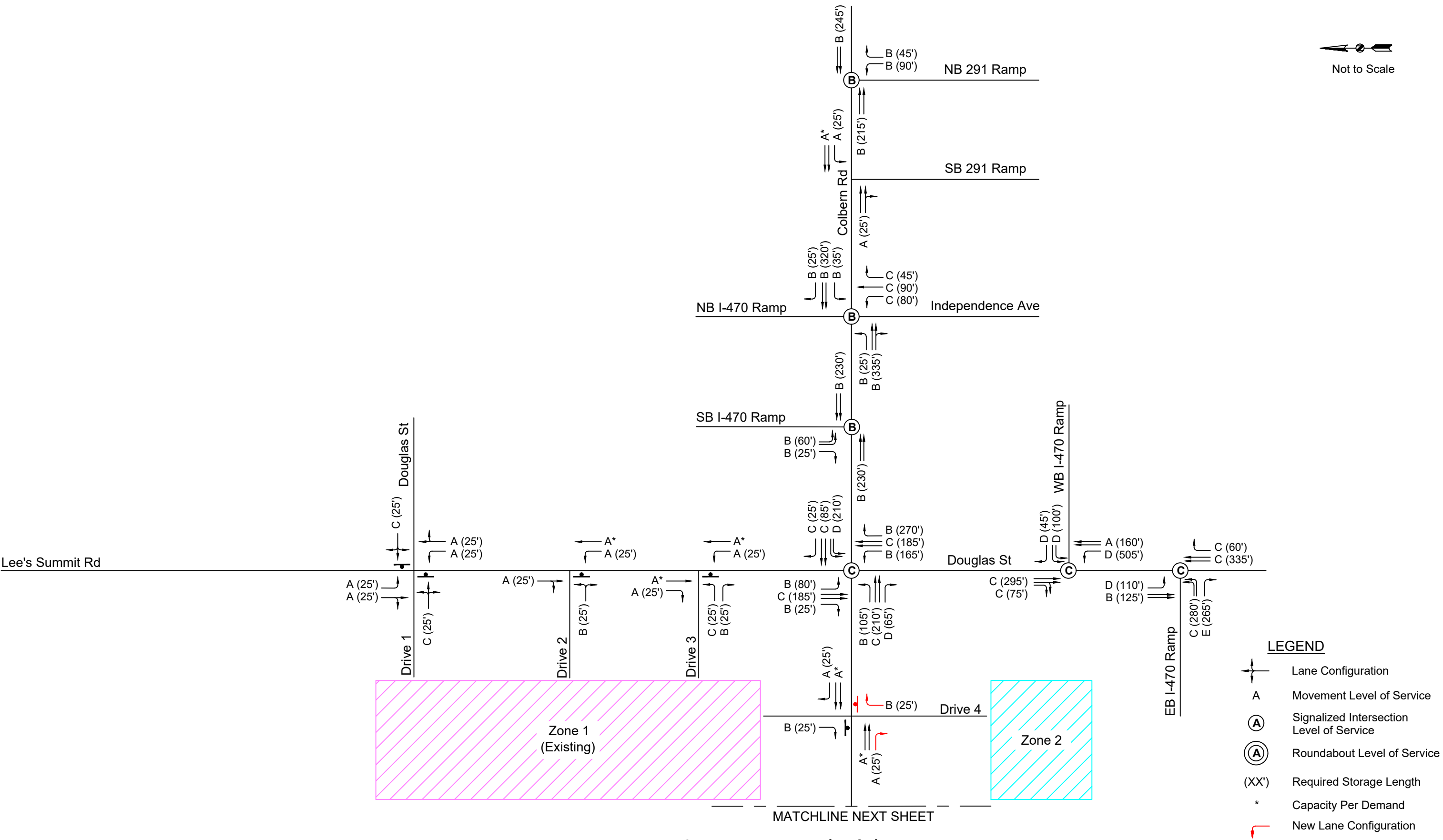


Figure 15 - Existing plus Zone 2 PM LOS (2 of 2)

Existing Plus Zone 2-3 Conditions

Signal timings were optimized to account for the additional traffic. Unless noted, roadway and lane configurations from the previous phase were used in intersection analysis.

The additional traffic caused minimal changes to the individual lane movement LOS, the overall LOS, or intersection queueing. The following intersections remained at a LOS C or better for all movements and continued to have sufficient capacity for queueing vehicles:

- Colbern Road and M-350 Southbound Ramp
- Colbern Road and M-350 Northbound Ramp
- Colbern Road and Blue Parkway/Unity Way
- Douglas Street/Lee's Summit Road and Douglas Street/Drive 1
- Douglas Street and Drive 2
- Douglas Street and Drive 3
- Douglas Street and Drive 4 (RIRO)
- Douglas Street and Drive 5
- Colbern Road and I-470 Southbound Off-Ramp
- Colbern Road and I-470 Northbound On-Ramp/Independence Ave
- Colbern Road and M-291 Southbound Ramp
- Colbern Road and M-291 Northbound Ramp

Colbern Road and Pryor Road

There is no significant change in the operations of this intersection from the existing conditions. The additional traffic causes the southbound lane to drop to a LOS D; however, this is still within the acceptable criteria and the intersection has sufficient capacity for queueing vehicles for the morning and afternoon peak periods.

Colbern Road and Main Street

This intersection was analyzed as signalized as it is expected to be warranted with this phase of development. All approaches at this intersection operate at a LOS B or above and the intersection has sufficient capacity for queueing vehicles.

Colbern Road and Drive 6

The intersection was analyzed as a signalized intersection with the addition of a 250-foot eastbound right-turn lane, a 200-foot westbound left-turn lane, a 200-foot northbound left-turn lane, and a right-turn lane.

All approaches operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queueing vehicles. The overall LOS for the signal is a LOS B.

Colbern Road and Drive 7 (3/4 access)

The intersection was analyzed as a ¾ access with a 250-foot eastbound right-turn lane, a 200-foot westbound left-turn lane, and a 200-ft northbound right-turn only lane.

All movements operate at a LOS B or better and have sufficient capacity for queuing vehicles.

Colbern Road and Douglas Street

The additional traffic causes the westbound dual-left turn to drop to a LOS E during the afternoon peak period. Various movements are approaching queuing capacity for the morning and afternoon peak periods.

Douglas Street and I-470 Westbound Ramp

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS D or better; however, the northbound left-turn queue is approach capacity during the afternoon peak period.

Douglas Street and I-470 Eastbound Ramp

The additional traffic causes the eastbound movement to drop to a LOS F and the southbound left-turns to a LOS E during the afternoon peak period. Some intersection queues are approaching capacity.

The results of the existing plus Zone 2-3 analysis for the morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 16 and 17.

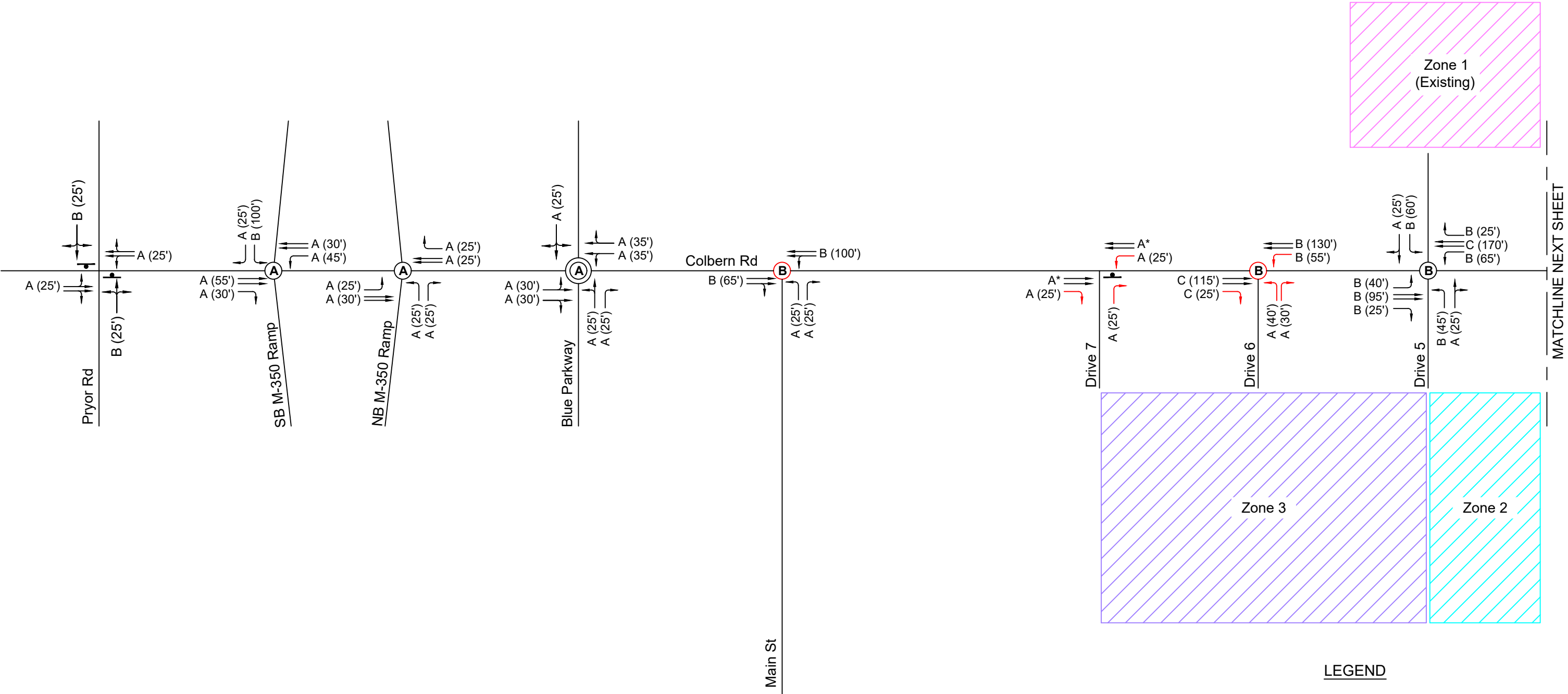
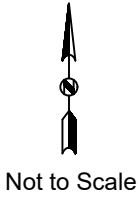


Figure 16 - Existing plus Zone 2-3 AM LOS (1 of 2)

LEGEND

- | | | | |
|---|--|-------|-----------------------------|
| | Lane Configuration | | Roundabout Level of Service |
| A | Movement Level of Service | (XX') | Required Storage Length |
| | Signalized Intersection Level of Service | * | Capacity Per Demand |
| | | | New Lane Configuration |

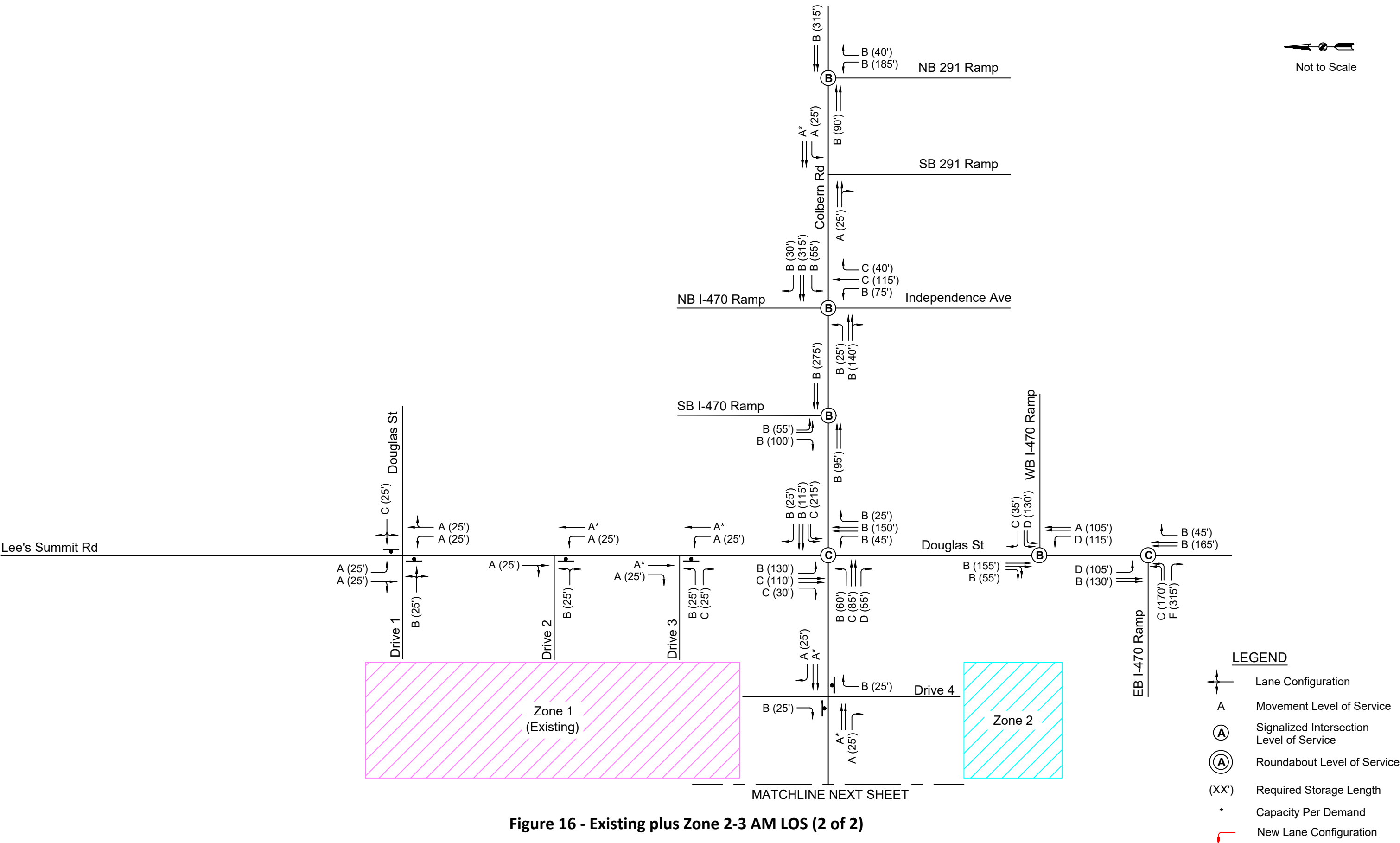


Figure 16 - Existing plus Zone 2-3 AM LOS (2 of 2)

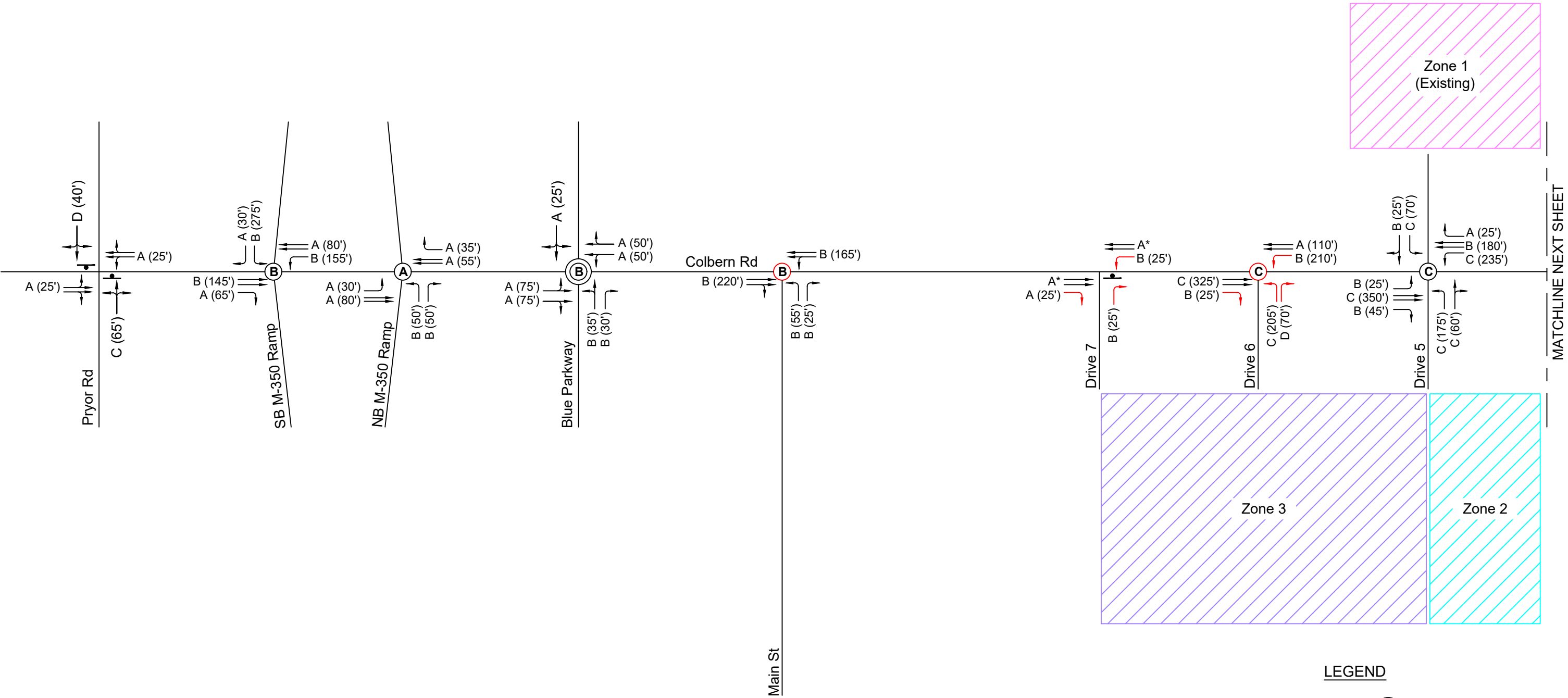
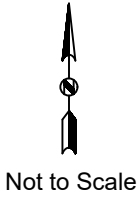
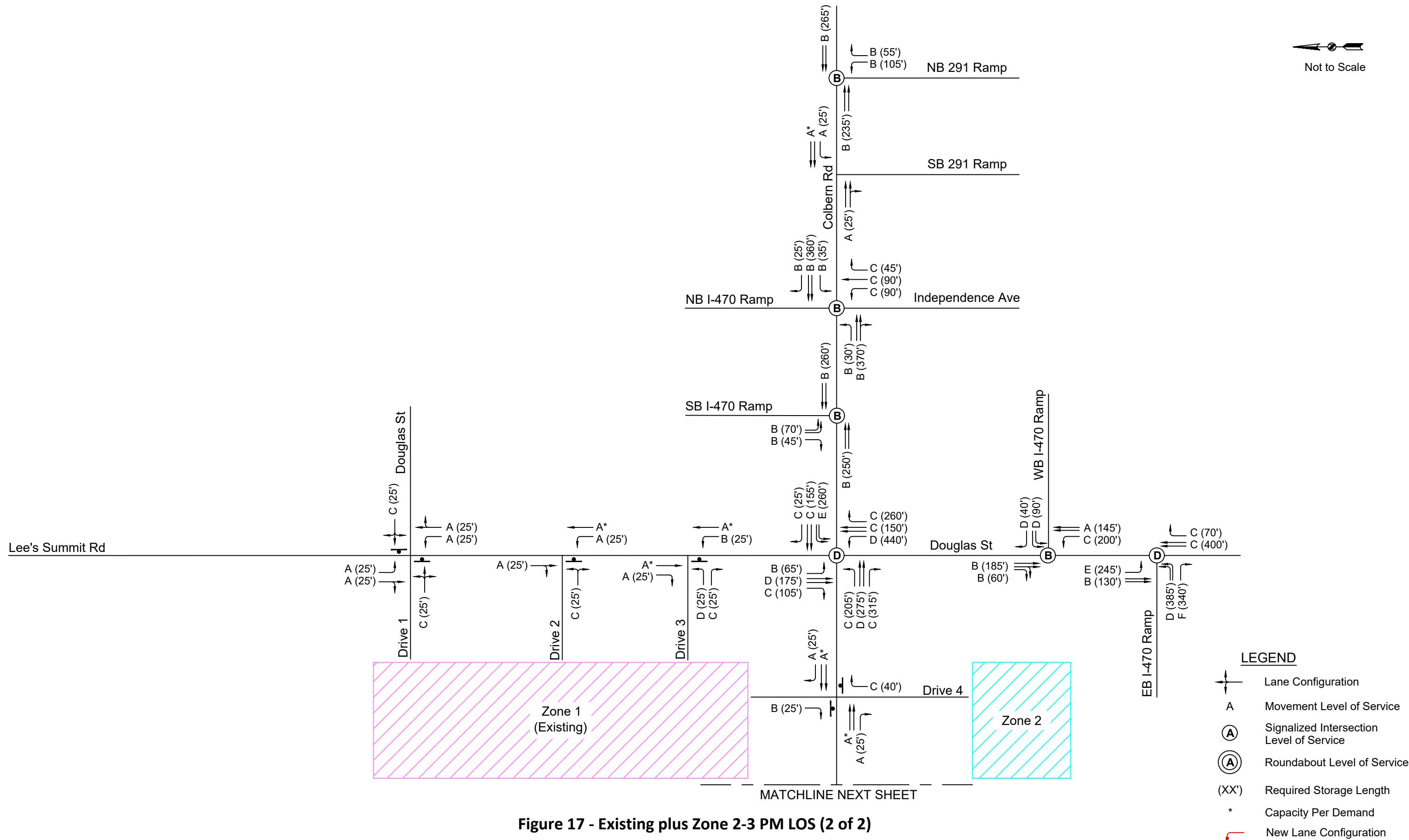


Figure 17 - Existing plus Zone 2-3 PM LOS (1 of 2)

LEGEND

- | | | | |
|---|--|-------|-----------------------------|
| | Lane Configuration | | Roundabout Level of Service |
| A | Movement Level of Service | (XX') | Required Storage Length |
| | Signalized Intersection Level of Service | * | Capacity Per Demand |
| | | | New Lane Configuration |



Existing Plus Zone 2-4 Conditions

Signal timings were optimized to account for the additional traffic. Unless noted, the previous phase roadway and lane configurations were used in intersection analysis.

The additional traffic caused minimal changes to the individual lane movement LOS, the overall LOS, or intersection queueing. The following intersections remained at a LOS C or better for all movements and continued to have sufficient capacity for queueing vehicles:

- Colbern Road and M-350 Southbound Ramp
- Colbern Road and M-350 Northbound Ramp
- Colbern Road and Blue Parkway/Unity Way
- Colbern Road and Main Street
- Douglas Street and Drive 2
- Douglas Street and Drive 3
- Colbern Road and Drive 7 (3/4 access)
- Colbern Road and I-470 Southbound Off-Ramp
- Colbern Road and I-470 Northbound On-Ramp/Independence Ave
- Colbern Road and M-291 Southbound Ramp
- Colbern Road and M-291 Northbound Ramp

Colbern Road and Pryor Road

During this phase the additional traffic on Colbern Road will cause the southbound lane to drop to a LOS E. All other movements continue to operate at a LOS D or better and have sufficient capacity for queueing vehicles. The expected delay for the southbound movement is 38.2 seconds. The maximum delay for LOS D is 35 seconds, so the movement is 3.2 seconds outside the LOS D criteria.

Installing a traffic signal to alleviate vehicle delay at the intersection is not recommended as the intersection traffic volumes are not likely to meet warrant criteria.

Douglas Street/Lee's Summit Road and Douglas Street/Drive 1

There is no significant change in the operations of this intersection from the existing conditions. The additional traffic causes the westbound lane to drop to a LOS D; however, this is still within the acceptable criteria and the intersection has sufficient capacity for queueing vehicles for the morning and afternoon peak periods.

Douglas Street and Drive 5

This intersection was analyzed with an additional westbound left-turn lane.

All movements operate at a LOS D or better and the intersection has sufficient capacity for queueing vehicles.

Colbern Road and Drive 6

This intersection was analyzed with an additional westbound left-turn lane, northbound left-turn lane, and northbound right turn-lane.

All movements are expected to operate at a LOS C or better and the intersection has sufficient capacity for queuing vehicles.

Colbern Road and Drive 8 (3/4 access)

The intersection was analyzed as a ¾ access with a 250-foot eastbound right-turn lane, a 200-foot westbound left-turn lane, and a 200-ft northbound right-turn only lane.

All movements operate at a LOS B or better and have sufficient capacity for queuing vehicles.

Main Street and Drive 9

This intersection was analyzed as a full access intersection with a westbound shared left/right-turn lane.

All movements operate at a LOS B or better and have sufficient capacity for queuing vehicles.

Main Street and Drive 10

This intersection was analyzed as a full access intersection with a westbound shared left/right-turn lane.

All movements operate at a LOS B or better and have sufficient capacity for queuing vehicles.

Colbern Road and Douglas Street

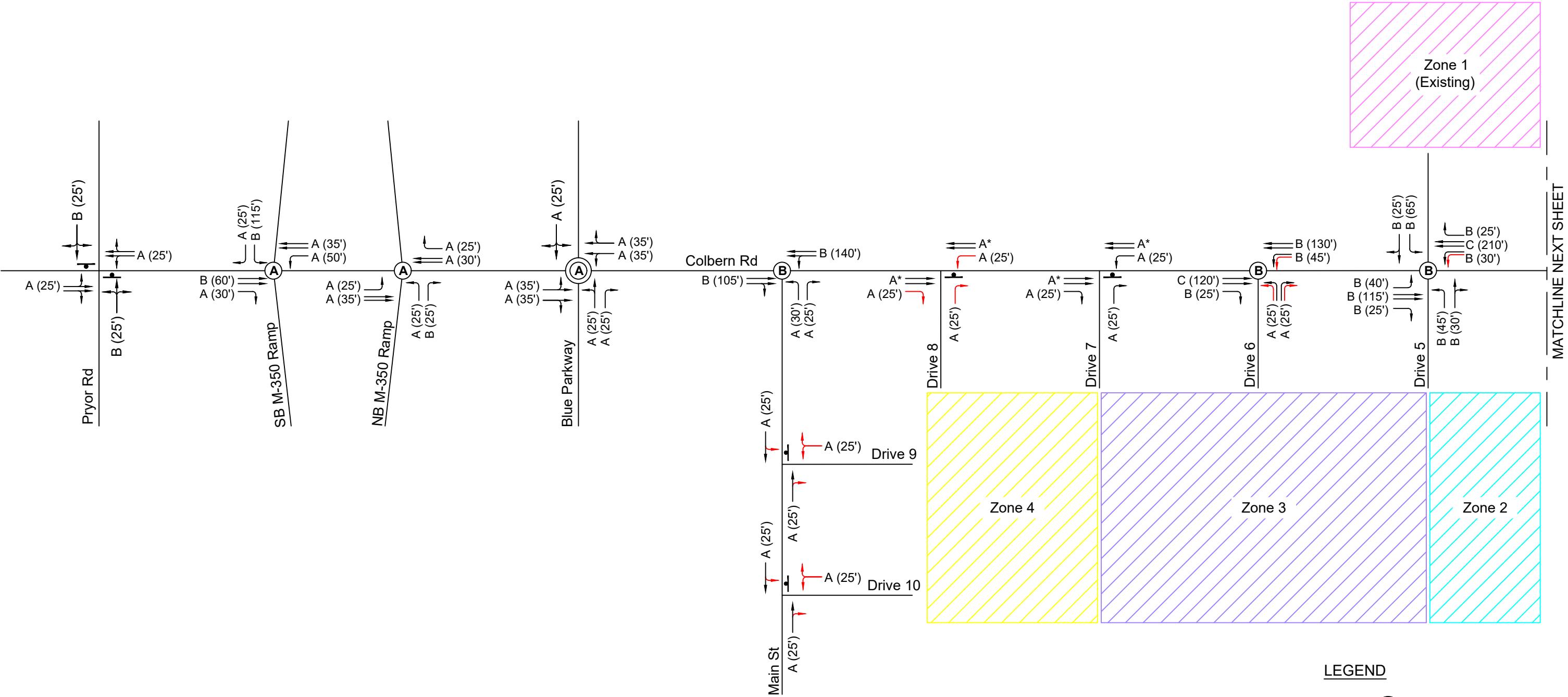
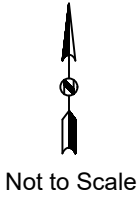
The intersection was analyzed with an additional northbound right-turn lane and left-turn lane and an additional eastbound right-turn lane and left-turn lane.

During the afternoon peak period the southbound left-turn and westbound left-turn lanes operate at a LOS E. All other movements during the morning and afternoon peak period operate at a LOS D or above and there is sufficient capacity for queueing vehicles.

Douglas Street and I-470 Ramps

The additional traffic causes multiple movements to drop below an acceptable LOS threshold and vehicle queue lengths exceed their available storage. A future study of this intersection with large scale improvements should be coordinated.

The results of the existing plus Zone 2-4 analysis for the morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 18 and 19.



LEGEND

- Lane Configuration
- Movement Level of Service
- Signalized Intersection Level of Service
- Roundabout Level of Service
- Required Storage Length
- Capacity Per Demand
- New Lane Configuration

Figure 18 - Existing plus Zone 2-4 AM LOS (1 of 2)

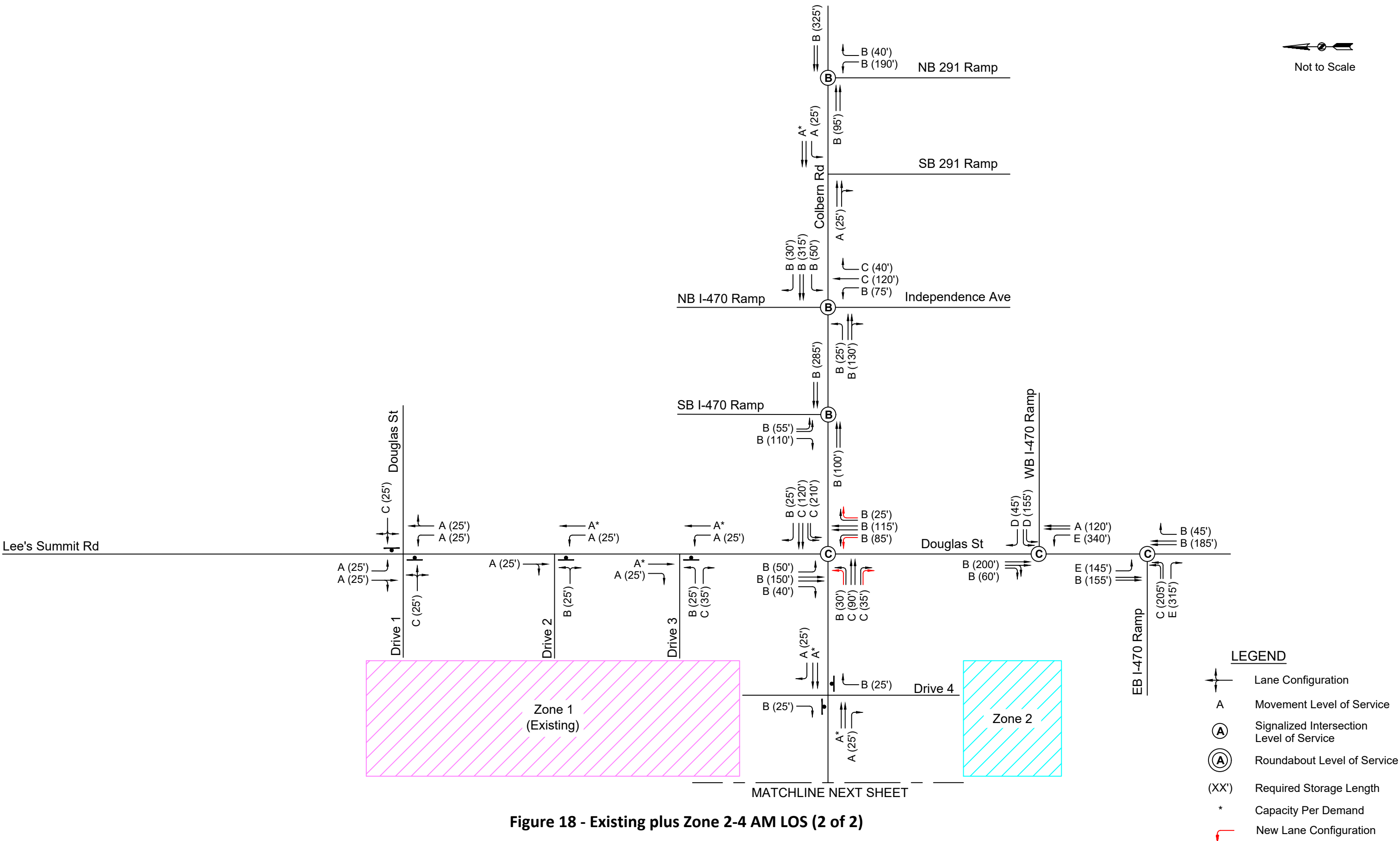


Figure 18 - Existing plus Zone 2-4 AM LOS (2 of 2)

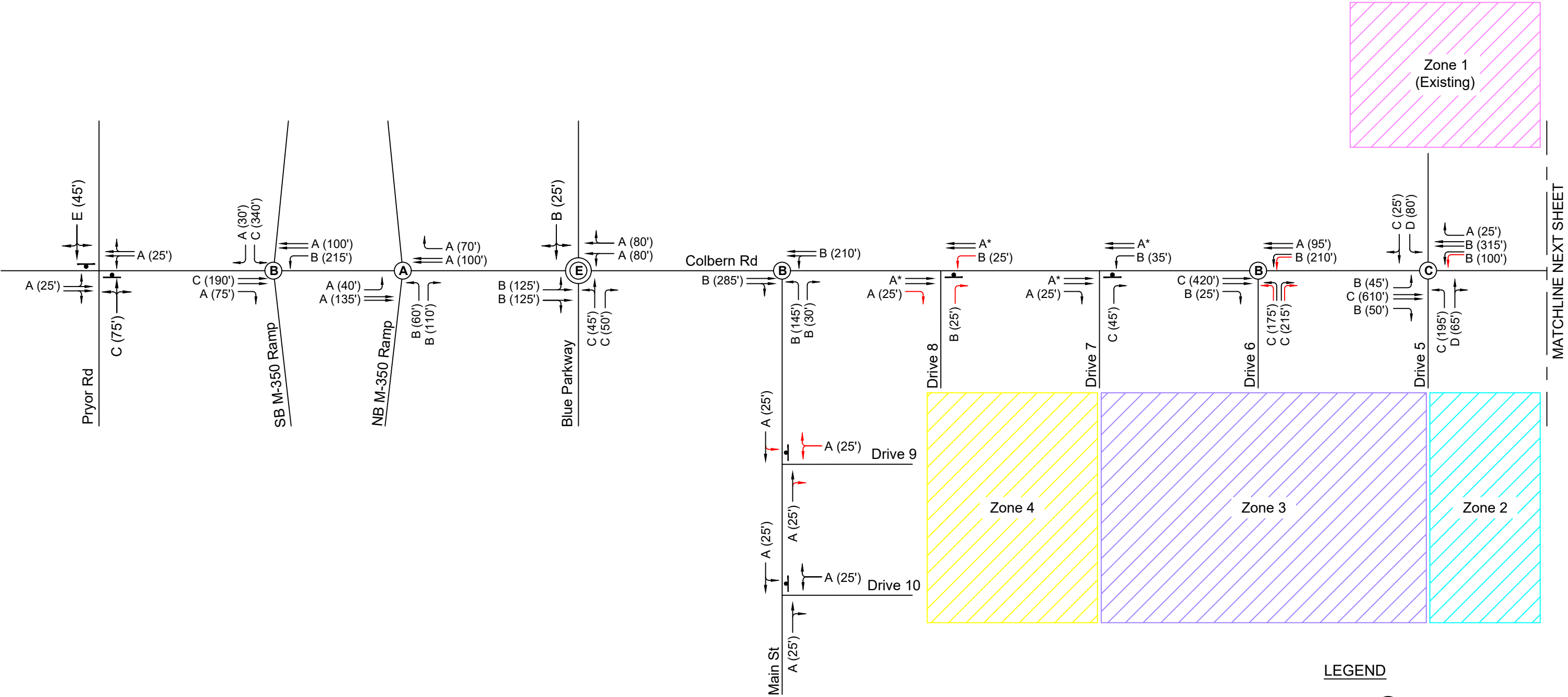
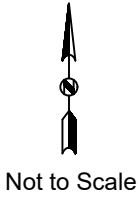
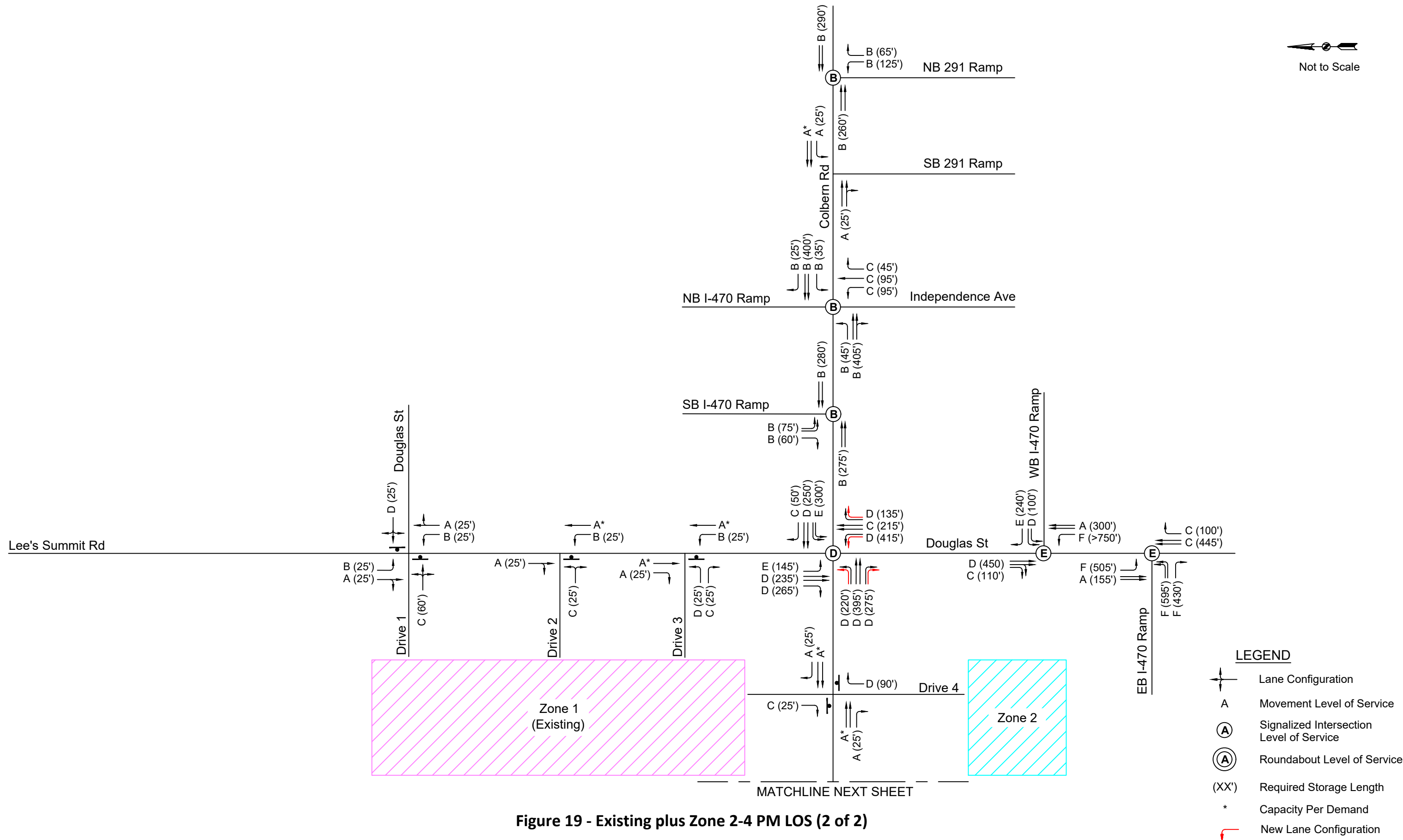


Figure 19 - Existing plus Zone 2-4 PM LOS (1 of 2)

LEGEND

- | | | | |
|---|--|-------|-----------------------------|
| | Lane Configuration | | Roundabout Level of Service |
| A | Movement Level of Service | (XX') | Required Storage Length |
| | Signalized Intersection Level of Service | * | Capacity Per Demand |
| | | | New Lane Configuration |



Existing Plus Zone 2-5 Conditions

Zone 5 is intended to provide a high-level overview of trips and provide recommendations for reserving right-of-way for future expansion as there are not definite land uses for Zone 5 yet. Signal timings were optimized to account for the additional traffic. Unless noted, the previous phase roadway and lane configurations were used in intersection analysis.

The additional traffic caused minimal changes to the individual lane movement LOS, the overall LOS, or intersection queueing. The following intersections remained at a LOS C or better for all movements and continued to have sufficient capacity for queueing vehicles:

- Colbern Road and M-350 Southbound Ramp
- Colbern Road and M-350 Northbound Ramp
- Colbern Road and Blue Parkway/Unity Way
- Colbern Road and Main Street
- Douglas Street and Drive 2
- Colbern Road and Drive 4 (RIRO)
- Colbern Road and Drive 6
- Colbern Road and Drive 7 (3/4 access)
- Colbern Road and Drive 8 (3/4 access)
- Main Street and Drive 9
- Main Street and Drive 10
- Colbern Road and I-470 Southbound Off-Ramp
- Colbern Road and I-470 Northbound On-Ramp/Independence Ave
- Colbern Road and M-291 Southbound Ramp
- Colbern Road and M-291 Northbound Ramp

Colbern Road and Pryor Road

There is no significant change in the operations of this intersection from the previous conditions. The southbound lane is a LOS E during the afternoon peak period. All other movements continue to operate at a LOS D or better and the intersection has sufficient capacity for queuing vehicles.

Douglas Street/Lee's Summit Road and Douglas Street/Drive 1

There is no significant change in the operations of this intersection from the previous conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Douglas Street and Drive 3

The additional through traffic on Douglas Street eastbound left-turn lane causes a drop to LOS E during the afternoon peak period. As this drive accesses the residential section of the development most of these trips would be vehicles that are familiar with peak hour characteristics and know to take an alternative route during the afternoon peak period. All other movements operate at a LOS D or better for the morning and afternoon peak periods and there is sufficient capacity for queuing vehicles.

Installing a traffic signal to alleviate vehicle delay at the intersection is not recommended as the intersection traffic volumes are not likely to meet warrant criteria.

Douglas Street and Drive 5

There is no significant change in the operations of this intersection from the previous conditions. All movements continue to operate at a LOS D or better and the intersection has sufficient capacity for queuing vehicles.

Douglas Street/Lee's Summit Road and Drive 11

This intersection was analyzed as a full access intersection with the northbound TWLT lane restriped for a left-turn lane and an eastbound shared left/right-turn lane.

All movements operate at a LOS C or better and have sufficient capacity for queuing vehicles.

Douglas Street/Lee's Summit Road and Drive 12

This intersection was analyzed as a full access intersection with the northbound TWLT lane restriped for a left-turn lane and an eastbound shared left/right-turn lane.

All movements operate at a LOS C or better and have sufficient capacity for queuing vehicles.

Colbern Road and Douglas Street

Multiple movements operate at a LOS E; however, there is expected to be sufficient capacity for queueing vehicles.

Douglas Street and I-470 Ramps

The overall and individual movements continue to decline with the additional traffic.

The results of the existing plus Zone 2-5 analysis for the morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 20 and 21.

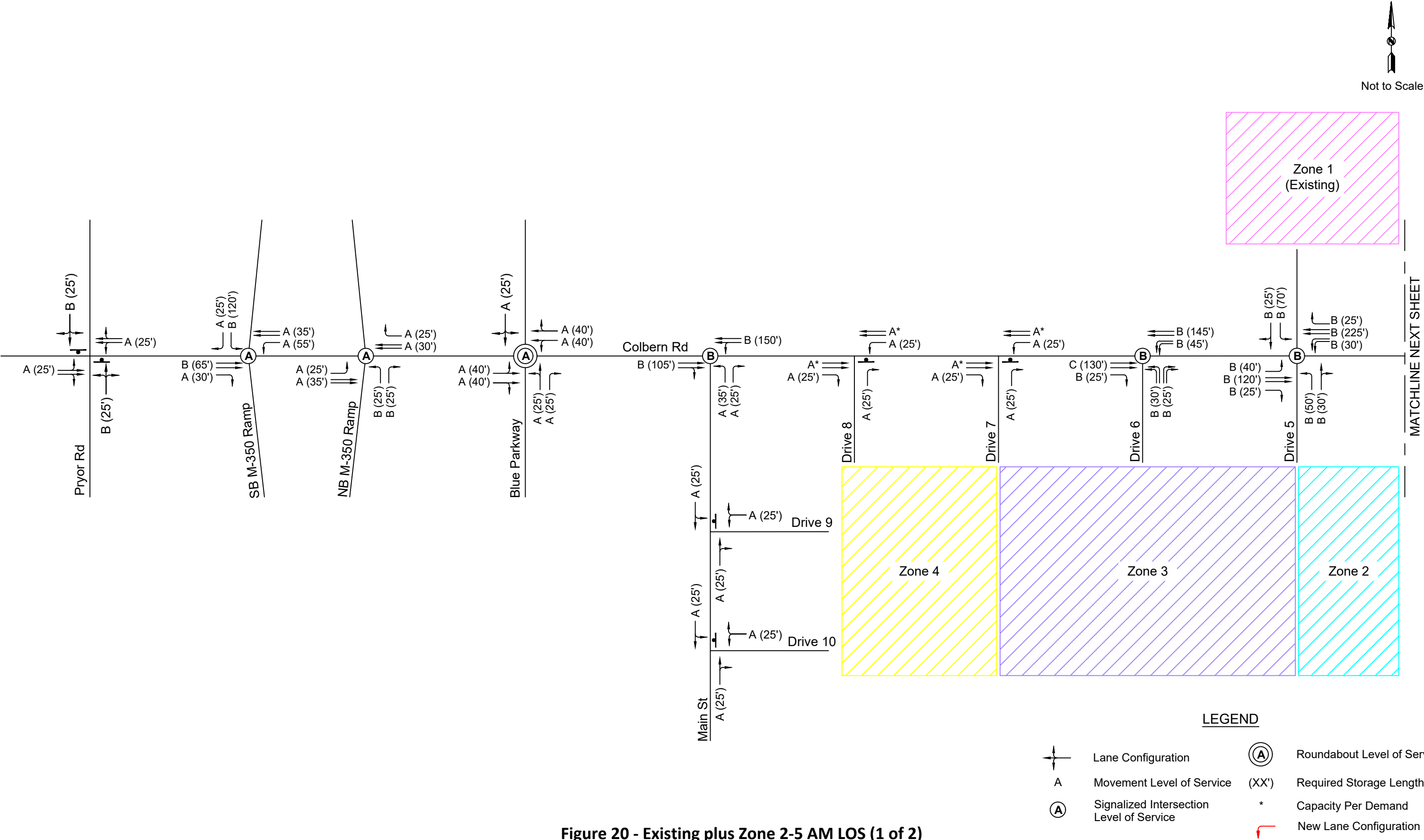


Figure 20 - Existing plus Zone 2-5 AM LOS (1 of 2)

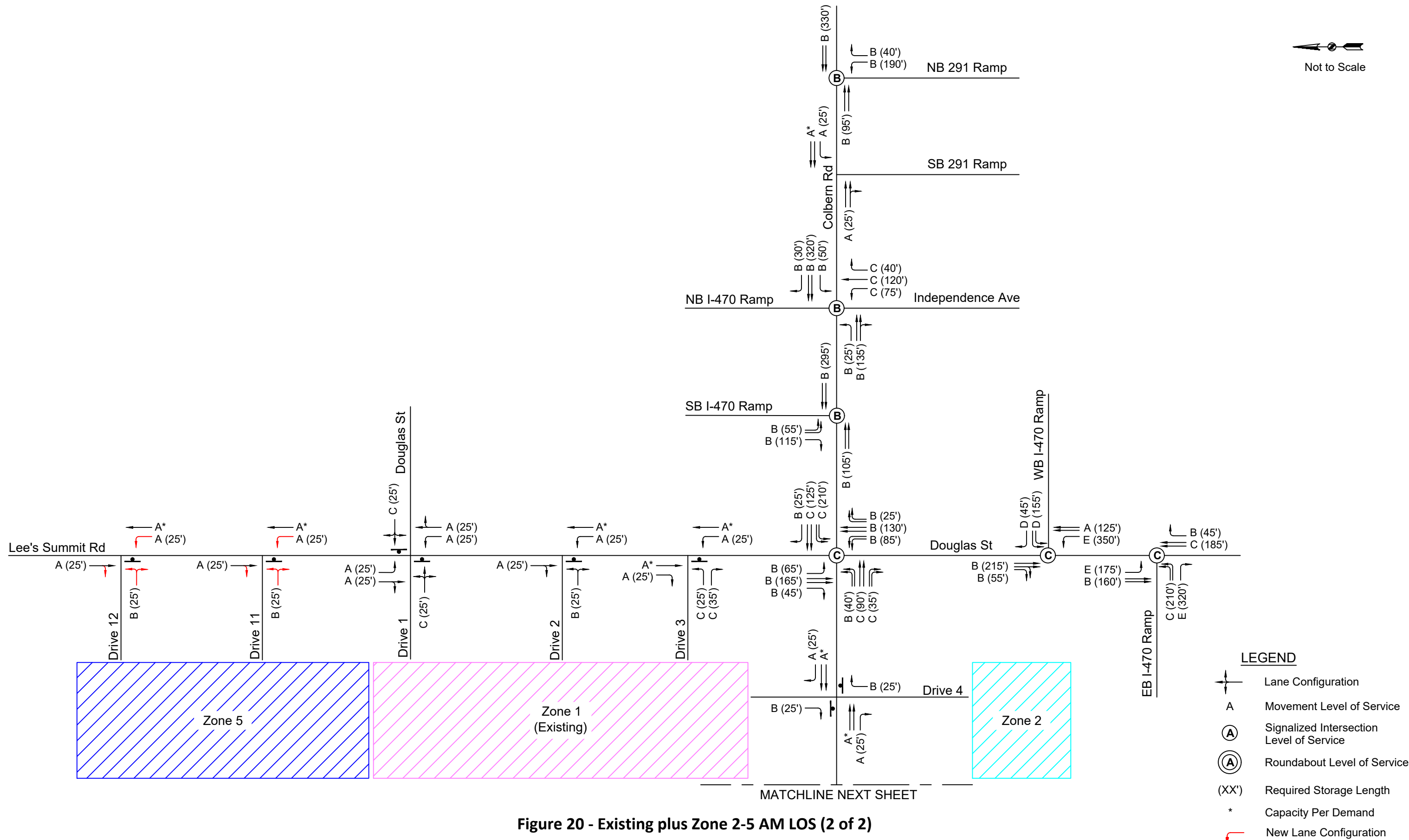
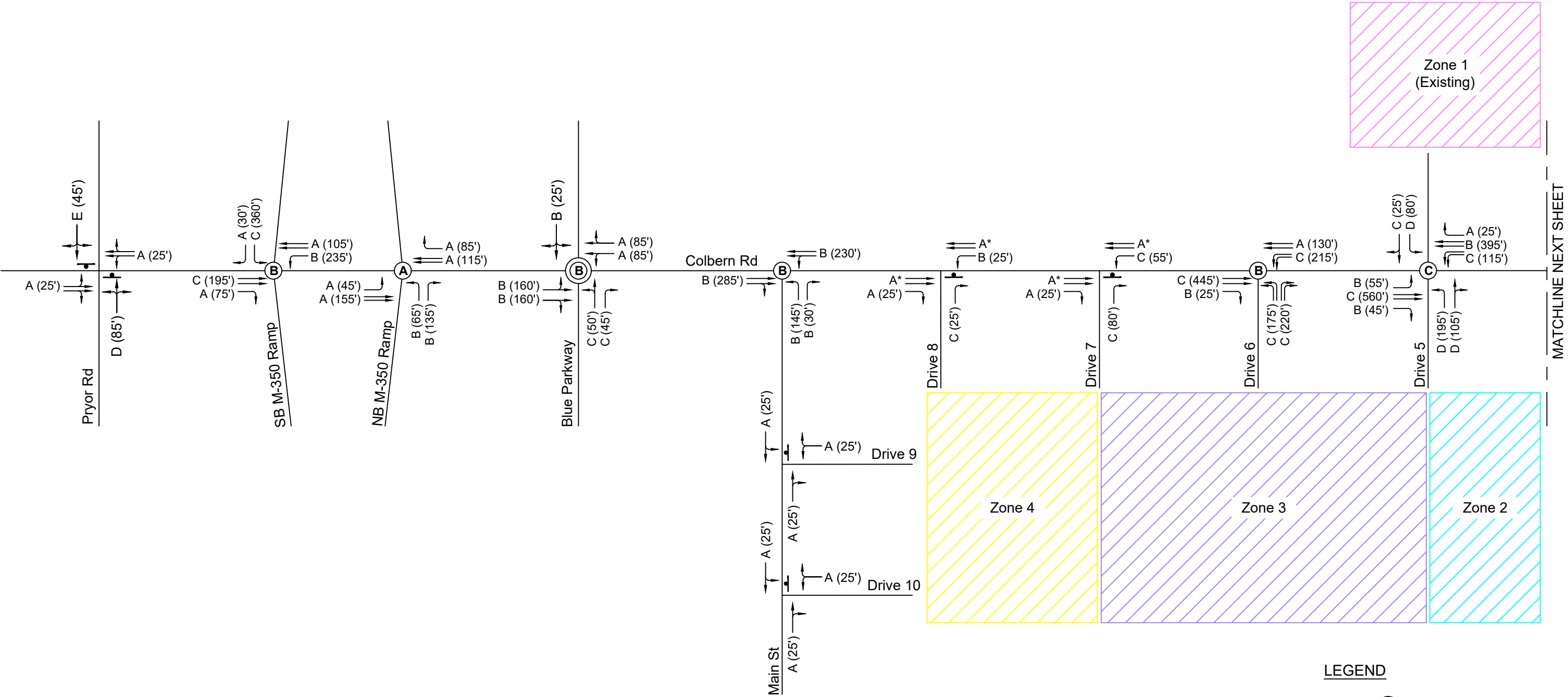
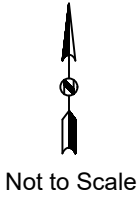


Figure 20 - Existing plus Zone 2-5 AM LOS (2 of 2)



LEGEND

- | | | | |
|---|--|-------|-----------------------------|
| | Lane Configuration | | Roundabout Level of Service |
| A | Movement Level of Service | (XX') | Required Storage Length |
| | Signalized Intersection Level of Service | * | Capacity Per Demand |
| | | | New Lane Configuration |

Figure 21 - Existing plus Zone 2-5 PM LOS (1 of 2)

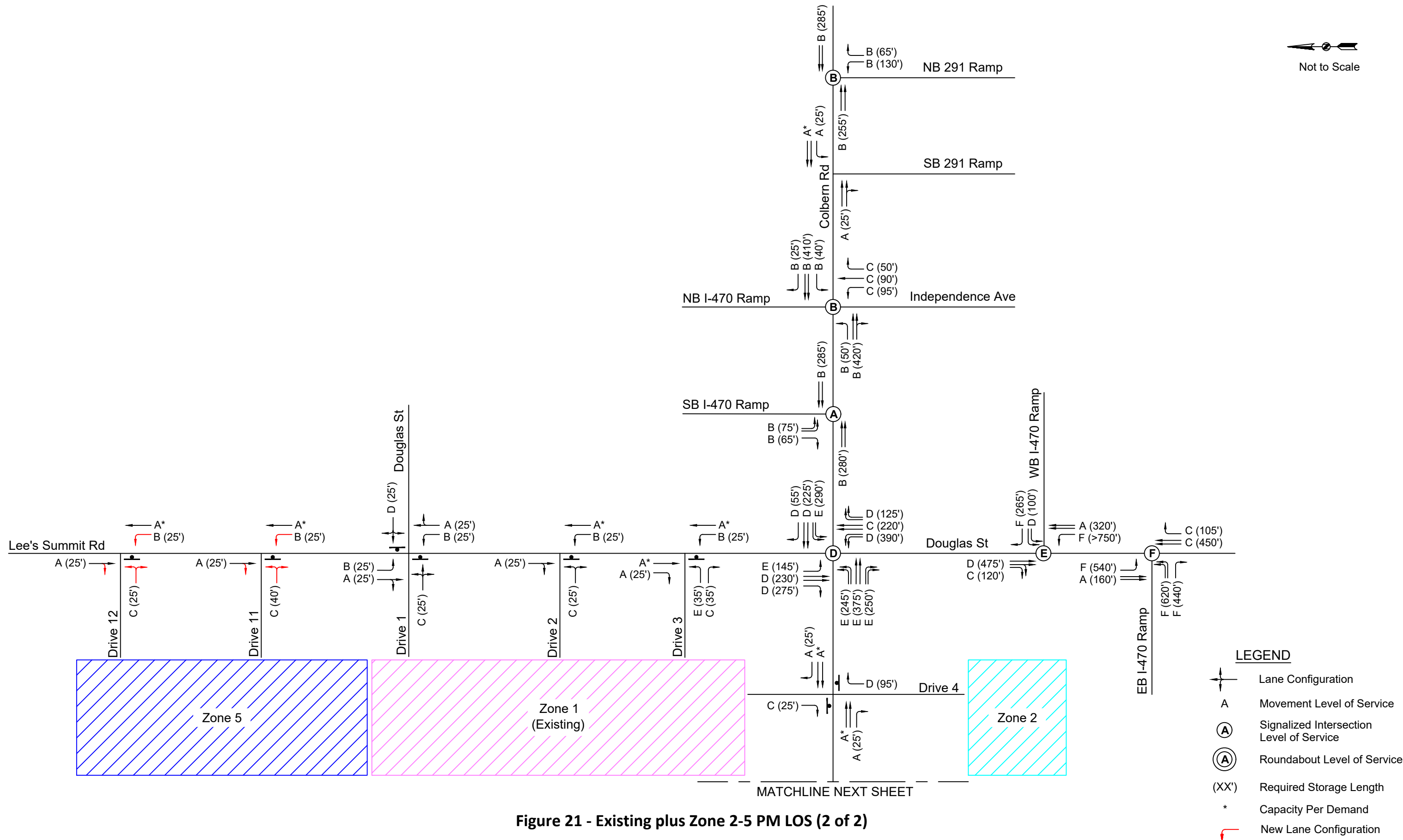


Figure 21 - Existing plus Zone 2-5 PM LOS (2 of 2)

RECOMMENDATIONS

This study documents the findings of the traffic analysis of the expected traffic for the Discovery Park Update development in Lee's Summit, Missouri. The study includes an analysis of:

- Existing Conditions (peak hour counts, approved trips, and Zone 1 trips)
- Existing plus Zone 2
- Existing plus Zone 3
- Existing plus Zone 4
- Existing plus Zone 5

Based on the results of the SYNCHRO analysis, SIDRA analysis, observations from the field, and engineering judgment, the following recommendations are made:

Zone 2 recommendations:

- *General:* Update traffic signal timings as necessary and reserve right-of-way for future roadway widening.
- *Colbern Road and Drive 4:* Construct an eastbound right-turn lane (250 feet of storage) and a northbound approach with a right-turn only lane (200 feet minimum of throat length). The northbound approach should be stop-controlled.
- *Colbern Road and Drive 5:* Signalize intersection. Construct an eastbound right-turn lane (250 feet of storage), a westbound left-turn lane (250 feet of storage), and a northbound approach with a left-turn lane (200 feet of storage) and a shared through/right-turn lane.

Zone 3 recommendations:

- *Colbern Road and Main Street:* Monitor traffic increase and signalize the intersection when Warrant 1: Eight-Hour Vehicular Volume or Warrant 2: Four-Hour Vehicular Volume is met.
- *Colbern Road and Drive 6:* Construct a signalized intersection with an eastbound right-turn lane (250 feet of storage), a westbound left-turn lane (250 feet of storage), and a northbound approach with a left-turn lane (200 feet of storage) and a right-turn lane.
- *Colbern Road and Drive 7:* Construct a stop-controlled intersection with an eastbound right-turn lane (250 feet of storage), a westbound left-turn lane (250 feet of storage), and a northbound approach with a right-turn only lane. The northbound approach should be stop-controlled.
- *Colbern Road and Drive 8:* Construct a stop-controlled intersection with an eastbound right-turn lane (250 feet of storage), a westbound left-turn lane (250 feet of storage), and a northbound approach with a right-turn only lane. The northbound approach should be stop-controlled.

Zone 4 recommendations:

- *Colbern Road and Drive 5:* Construct an additional westbound left-turn lane.
- *Colbern Road and Drive 6:* Construct an additional northbound left-turn lane and right-turn lane.
- *Colbern Road and Drive 8:* Construct a stop-controlled intersection with an eastbound right-turn lane (250 feet of storage), a westbound left-turn lane (250 feet of storage), and a northbound approach with a right-turn only lane. The northbound approach should be stop-controlled.
- *Main Street and Drive 9:* Construct a stop-controlled intersection with a westbound approach consisting of a shared left/right-turn lane.
- *Main Street and Drive 10:* Construct a stop-controlled intersection with a westbound approach consisting of a shared left/right-turn lane.
- *Colbern Road and Douglas Street:* Construct an additional left and right-turn lane northbound. Construct an additional left and right-turn lane eastbound. Modify signal as necessary.

Zone 5 recommendations:

- *Douglas Street and Drive 11:* Construct a stop-controlled intersection with an eastbound approach consisting of a shared left/right-turn lane. Restripe the TWLT northbound into a left-turn lane.
- *Douglas Street and Drive 12:* Construct a stop-controlled intersection with an eastbound approach consisting of a shared left/right-turn lane. Restripe the TWLT northbound for a left-turn lane.

The need for future roadway improvements should be reevaluated as additional development in the area occurs including conducting signal warrant studies before signalization. Right-of-way should be reserved throughout the design process for future roadway and intersection improvements.

APPENDIX

Colbern & Independence Ave / NB 470 Ramp
AM

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00	8	54	13	75	72	214	26	312	13	33	14	60	0	0	0	0	447
7:15	5	86	18	109	46	284	25	355	16	24	19	59	0	0	0	0	523
7:30	14	81	29	124	26	234	20	280	23	37	18	78	0	0	0	0	482
7:45	9	110	17	136	32	279	27	338	16	31	27	74	0	0	0	0	548
8:00	6	155	26	187	40	263	37	340	11	32	33	76	0	0	0	0	603
8:15	6	74	19	99	26	198	21	245	10	20	10	40	0	0	0	0	384
8:30	9	93	30	132	19	168	24	211	9	21	11	41	0	0	0	0	384
8:45	11	81	22	114	27	137	17	181	12	20	12	44	0	0	0	0	339
Total	68	734	174	976	288	1777	197	2262	110	218	144	472	0	0	0	0	3710

PHF																					Int. Total
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total	PHF	
7:15	5	86	18	109	0.74	46	284	25	355	0.92	16	24	19	59	0.92	0	0	0	0	#DIV/0!	523
7:30	14	81	29	124		26	234	20	280		23	37	18	78		0	0	0	0		482
7:45	9	110	17	136		32	279	27	338		16	31	27	74		0	0	0	0		548
8:00	6	155	26	187		40	263	37	340		11	32	33	76		0	0	0	0		603
Total	34	432	90	556		144	1060	109	1313		66	124	97	287		0	0	0	0		2156

Colbern & SB 470 Ramp
AM

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00	0	53	0	53	0	243	0	243	0	0	0	0	22	0	19	41	337
7:15	0	81	0	81	0	316	0	316	0	0	0	0	27	0	31	58	455
7:30	0	88	0	88	0	261	0	261	0	0	0	0	28	0	39	67	416
7:45	0	104	0	104	0	276	0	276	0	0	0	0	31	0	39	70	450
8:00	0	144	0	144	0	285	0	285	0	0	0	0	46	0	43	89	518
8:15	0	78	0	78	0	236	0	236	0	0	0	0	28	0	28	56	370
8:30	0	97	0	97	0	173	0	173	0	0	0	0	30	0	25	55	325
8:45	0	95	0	95	0	159	0	159	0	0	0	0	24	0	24	48	302
Total	0	740	0	740	0	1949	0	1949	0	0	0	0	236	0	248	484	3173

PHF																					Int. Total
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total	PHF	
7:15	0	81	0	81	0.72	0	316	0	316	0.90	0	0	0	0	#DIV/0!	27	0	31	58	0.8	455
7:30	0	88	0	88		0	261	0	261		0	0	0	0		28	0	39	67		416
7:45	0	104	0	104		0	276	0	276		0	0	0	0		31	0	39	70		450
8:00	0	144	0	144		0	285	0	285		0	0	0	0		46	0	43	89		518
Total	0	417	0	417		0	1138	0	1138		0	0	0	0		132	0	152	284		1839

Colbern & NB 291 Ramp
AM

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00	0	60	0	60	0	272	0	272	27	0	10	37	0	0	0	0	369
7:15	0	96	0	96	0	321	0	321	48	0	24	72	0	0	0	0	489
7:30	0	83	0	83	0	232	0	232	53	0	21	74	0	0	0	0	389
7:45	0	113	0	113	0	276	0	276	63	0	29	92	0	0	0	0	481
8:00	0	193	0	193	0	335	0	335	58	0	42	100	0	0	0	0	628
8:15	0	82	0	82	0	241	0	241	50	0	21	71	0	0	0	0	394
8:30	0	91	0	91	0	192	0	192	32	0	26	58	0	0	0	0	341
8:45	0	74	0	74	0	177	0	177	22	0	20	42	0	0	0	0	293
Total	0	792	0	792	0	2046	0	2046	353	0	193	546	0	0	0	0	3384

PHF																				Int. Total	
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total		PHF
7:15	0	96	0	96	0.63	0	321	0	321	0.87	48	0	24	72	0.85	0	0	0	0	#DIV/0!	489
7:30	0	83	0	83		0	232	0	232		53	0	21	74		0	0	0	0		389
7:45	0	113	0	113		0	276	0	276		63	0	29	92		0	0	0	0		481
8:00	0	193	0	193		0	335	0	335		58	0	42	100		0	0	0	0		628
Total	0	485	0	485		0	1164	0	1164		222	0	116	338		0	0	0	0		1987

Colbern & SB 291 Ramp
AM

Need to add through movements by balancing.

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00	0	0	6	6	10	0	0	10	0	0	0	0	0	0	0	0	16
7:15	0	0	12	12	16	0	0	16	0	0	0	0	0	0	0	0	28
7:30	0	0	13	13	11	0	0	11	0	0	0	0	0	0	0	0	24
7:45	0	0	12	12	23	0	0	23	0	0	0	0	0	0	0	0	35
8:45	0	0	18	18	44	0	0	44	0	0	0	0	0	0	0	0	62
9:45	0	0	13	13	15	0	0	15	0	0	0	0	0	0	0	0	28
10:45	0	0	13	13	12	0	0	12	0	0	0	0	0	0	0	0	25
11:45	0	0	20	20	17	0	0	17	0	0	0	0	0	0	0	0	37
Total	0	0	107	107	148	0	0	148	0	0	0	0	0	0	0	0	255

PHF																				Int. Total	
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total		PHF
7:15	0	0	12	12	0.76	16	0	0	16	0.53	0	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	28
7:30	0	0	13	13		11	0	0	11		0	0	0	0		0	0	0	0		24
7:45	0	0	12	12		23	0	0	23		0	0	0	0		0	0	0	0		35
8:00	0	0	18	18		44	0	0	44		0	0	0	0		0	0	0	0		62
Total	0	0	55	55		94	0	0	94		0	0	0	0		0	0	0	0		149

Colbern & Independence Ave / NB 470 Ramp
PM

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00 PM	15	225	33	273	28	106	13	147	21	30	28	79	0	0	0	0	499
4:15 PM	9	208	29	246	25	121	20	166	18	18	40	76	0	0	0	0	488
4:30 PM	17	270	36	323	20	141	22	183	19	24	37	80	0	0	0	0	586
4:45 PM	12	263	27	302	21	108	23	152	23	24	36	83	0	0	0	0	537
5:00 PM	17	250	45	312	24	114	12	150	16	29	46	91	0	0	0	0	553
5:15 PM	8	220	20	248	17	122	14	153	17	12	29	58	0	0	0	0	459
5:30 PM	6	251	24	281	11	111	15	137	17	21	18	56	0	0	0	0	474
5:45 PM	13	237	31	281	16	113	16	145	17	17	25	59	0	0	0	0	485
Total	97	1924	245	2266	162	936	135	1233	148	175	259	582	0	0	0	0	4081

PHF																					Int. Total
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total	PHF	
4:30 PM	17	270	36	323	0.92	20	141	22	183	0.87	19	24	37	80	0.86	0	0	0	0	#DIV/0!	586
4:45 PM	12	263	27	302		21	108	23	152		23	24	36	83		0	0	0	0		537
5:00 PM	17	250	45	312		24	114	12	150		16	29	46	91		0	0	0	0		553
5:15 PM	8	220	20	248		17	122	14	153		17	12	29	58		0	0	0	0		459
Total	54	1003	128	1185		82	485	71	638		75	89	148	312		0	0	0	0		2135

Colbern & SB 470 Ramp
PM

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00 PM	0	230	0	230	0	141	0	141	0	0	0	0	41	0	21	62	433
4:15 PM	0	207	0	207	0	133	0	133	0	0	0	0	39	0	13	52	392
4:30 PM	0	271	0	271	0	161	0	161	0	0	0	0	48	0	17	65	497
4:45 PM	0	261	0	261	0	123	0	123	0	0	0	0	60	0	13	73	457
5:00 PM	0	261	0	261	0	147	0	147	0	0	0	0	46	0	12	58	466
5:15 PM	0	228	0	228	0	139	0	139	0	0	0	0	30	0	19	49	416
5:30 PM	0	263	0	263	0	131	0	131	0	0	0	0	31	0	16	47	441
5:45 PM	0	208	0	208	0	127	0	127	0	0	0	0	51	0	21	72	407
Total	0	1929	0	1929	0	1102	0	1102	0	0	0	0	346	0	132	478	3509

PHF																					Int. Total
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total	PHF	
4:30 PM	0	271	0	271	0.94	0	161	0	161	0.89	0	0	0	0	#DIV/0!	48	0	17	65	0.84	497
4:45 PM	0	261	0	261		0	123	0	123		0	0	0	0		60	0	13	73		457
5:00 PM	0	261	0	261		0	147	0	147		0	0	0	0		46	0	12	58		466
5:15 PM	0	228	0	228		0	139	0	139		0	0	0	0		30	0	19	49		416
Total	0	1021	0	1021		0	570	0	570		0	0	0	0		184	0	61	245		1836

Colbern & NB 291 Ramp
PM

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00 PM	0	214	0	214	0	151	0	151	20	0	38	58	0	0	0	0	423
4:15 PM	0	212	0	212	0	151	0	151	26	0	33	59	0	0	0	0	422
4:30 PM	0	271	0	271	0	162	0	162	26	0	36	62	0	0	0	0	495
4:45 PM	0	271	0	271	0	156	0	156	21	0	28	49	0	0	0	0	476
5:00 PM	0	262	0	262	0	129	0	129	39	0	25	64	0	0	0	0	455
5:15 PM	0	241	0	241	0	135	0	135	25	0	25	50	0	0	0	0	426
5:30 PM	0	231	0	231	0	140	0	140	28	0	20	48	0	0	0	0	419
5:45 PM	0	221	0	221	0	131	0	131	27	0	18	45	0	0	0	0	397
Total	0	1923	0	1923	0	1155	0	1155	212	0	223	435	0	0	0	0	3513

PHF																					Int. Total
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total	PHF	
4:30 PM	0	271	0	271	0.96	0	162	0	162	0.90	26	0	36	62	0.88	0	0	0	0	#DIV/0!	495
4:45 PM	0	271	0	271		0	156	0	156		21	0	28	49		0	0	0	0		476
5:00 PM	0	262	0	262		0	129	0	129		39	0	25	64		0	0	0	0		455
5:15 PM	0	241	0	241		0	135	0	135		25	0	25	50		0	0	0	0		426
Total	0	1045	0	1045		0	582	0	582		111	0	114	225		0	0	0	0		1852

Colbern & SB 291 Ramp
PM

Time	Eastbound				Westbound				Northbound				Southbound				Int. Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00 PM	0	0	32	32	24	0	0	24	0	0	0	0	0	0	0	0	56
4:15 PM	0	0	34	34	25	0	0	25	0	0	0	0	0	0	0	0	59
4:30 PM	0	0	34	34	22	0	0	22	0	0	0	0	0	0	0	0	56
4:45 PM	0	0	35	35	23	0	0	23	0	0	0	0	0	0	0	0	58
5:00 PM	0	0	29	29	14	0	0	14	0	0	0	0	0	0	0	0	43
5:15 PM	0	0	29	29	14	0	0	14	0	0	0	0	0	0	0	0	43
5:30 PM	0	0	37	37	19	0	0	19	0	0	0	0	0	0	0	0	56
5:45 PM	0	0	30	30	20	0	0	20	0	0	0	0	0	0	0	0	50
Total	0	0	260	260	161	0	0	161	0	0	0	0	0	0	0	0	421

PHF																					Int. Total
Time	EB Left	EB Thru	EB Right	EB Total	PHF	WB Left	WB Thru	WB Right	WB Total	PHF	NB Left	NB Thru	NB Right	NB Total	PHF	SB Left	SB Thru	SB Right	SB Total	PHF	
4:30 PM	0	0	34	34	0.91	22	0	0	22	0.79	0	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	56
4:45 PM	0	0	35	35		23	0	0	23		0	0	0	0		0	0	0	0		58
5:00 PM	0	0	29	29		14	0	0	14		0	0	0	0		0	0	0	0		43
5:15 PM	0	0	29	29		14	0	0	14		0	0	0	0		0	0	0	0		43
Total	0	0	127	127		73	0	0	73		0	0	0	0		0	0	0	0		200

Discovery Park TIS Site Trip Generation

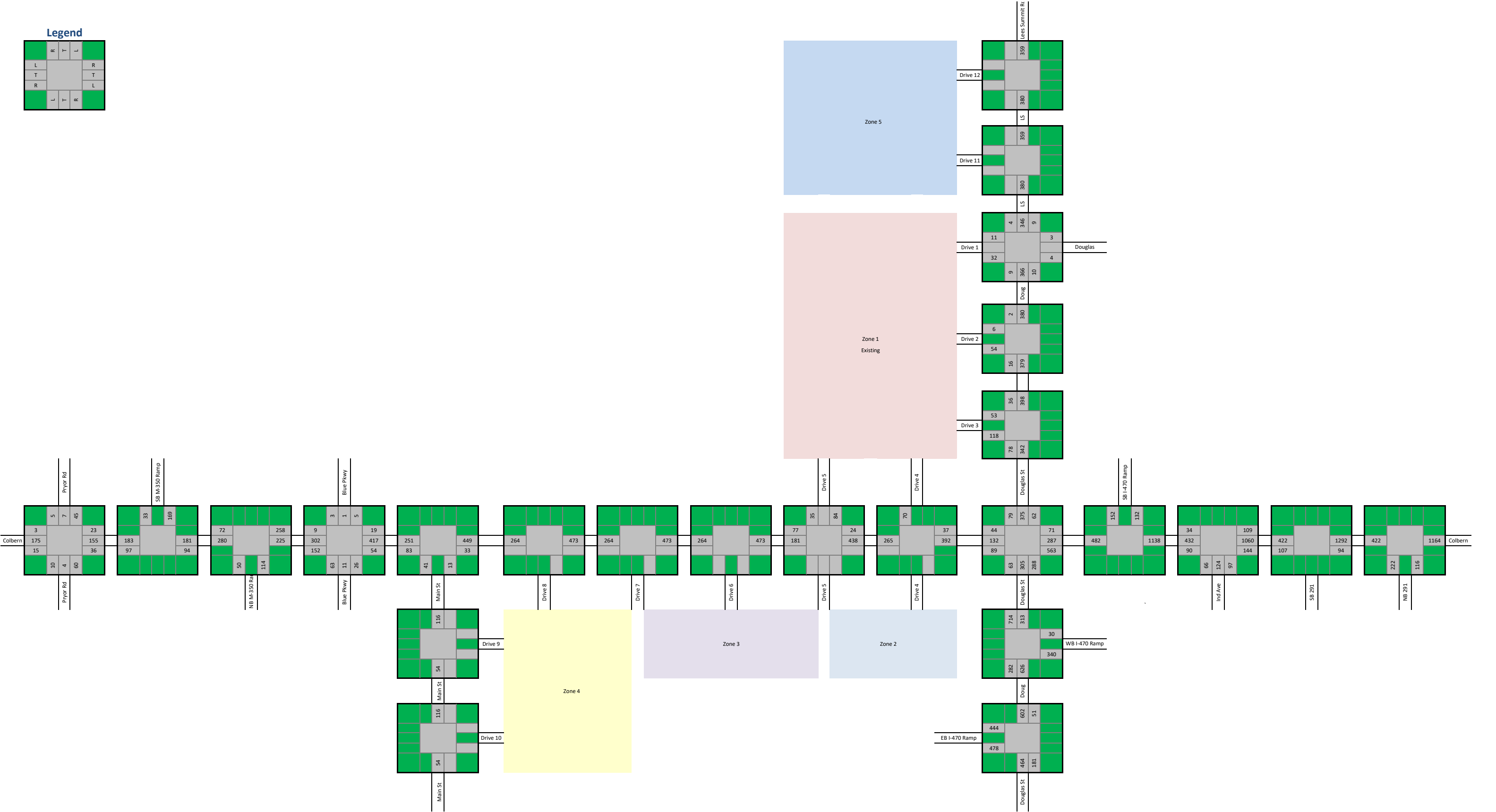
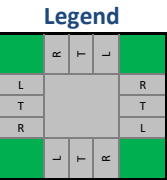
ITE Trip Generation Manual - 11th Edition

Highlighted text indicates trips used in Synchro and Warrant Analysis

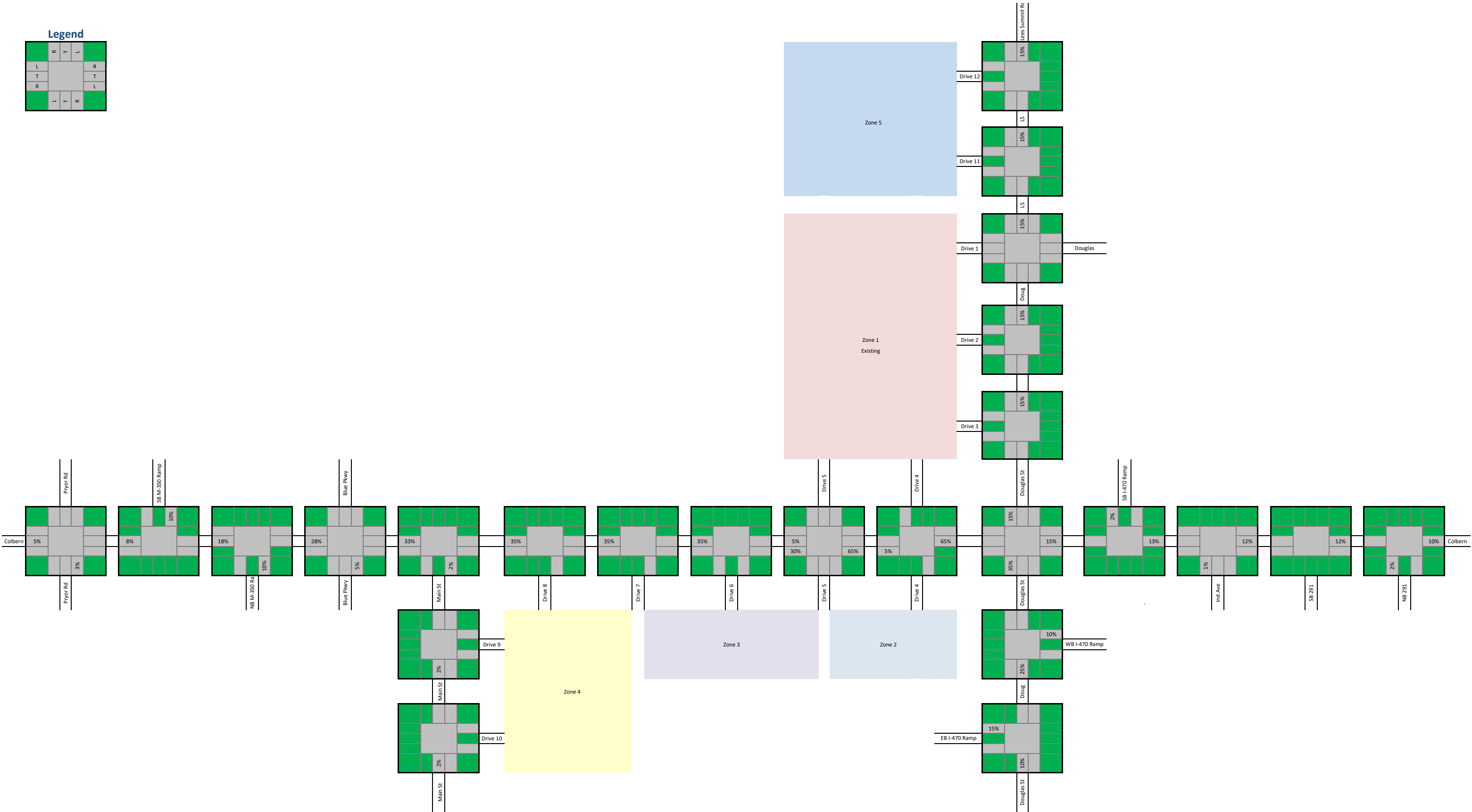
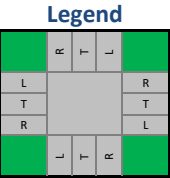
Land Use	ITE Code	Size	Units	Equation	Trips (Eq.)	Av. Rate	Trips (Av. Rate)	In%	Out%	Trips In	Trips Out
PHASE 1/ZONE 1											
From Discovery Park Traffic Impact Study, January 2023, Olsson											
Includes 2019, 2022, and 2024 counts as Existing plus Approved trips from nearby developments plus Phase I Discovery Park trips											
ZONE 2											
Shopping Plaza (40-150K)(with Supermarket)(Weekday)	821	84	1000 Sq Ft	$T=76.96(X)+1412.79$	7877	94.49	7937	50%	50%	3969	3968
Shopping Plaza (40-150K)(with Supermarket)(AM)	821	84	1000 Sq Ft	n/a	n/a	3.53	297	62%	38%	184	113
Shopping Plaza (40-150K)(with Supermarket)(PM)	821	84	1000 Sq Ft	$T=7.67(X)+118.86$	763	9.03	759	48%	52%	364	395
ZONE 3											
Shopping Center (>150K) (Weekday)	820	527	1000 Sq Ft	$T=26.11(X)+5863.73$	19624	37.01	19504	50%	50%	9812	9812
Multifamily Housing (Low-Rise)(Weekday)	220	350	Dwelling Units	$T=6.41(X)+75.31$	2319	6.74	2359	50%	50%	1160	1159
										10972	10971
								Internal Capture -10%		9875	9874
Shopping Center (>150k) (AM)	820	527	1000 Sq Ft	$T=0.59(X)+133.55$	444	0.84	443	62%	38%	275	169
Multifamily Housing (Low-Rise) (AM)	220	350	Dwelling Units	$T=0.31(X)+22.85$	131	0.4	140	24%	76%	31	100
										306	269
								Internal Capture -10%		275	242
Shopping Center (>150k) (PM)	820	527	1000 Sq Ft	$\ln(T)=0.72\ln(X)+3.02$	1868	3.4	1792	48%	52%	897	971
Multifamily Housing (Low-Rise)(PM)	220	350	Dwelling Units	$T=0.43(X)+20.55$	171	0.51	179	63%	37%	108	63
										1005	1034
								Internal Capture -10%		905	931
ZONE 4											
Shopping Center (>150K) (Weekday)	820	369.5	1000 Sq Ft	$T=26.11(X)+5863.73$	15511	37.01	13675	50%	50%	6838	6837
Shopping Center (>150k) (AM)	820	369.5	1000 Sq Ft	$T=0.59(X)+133.55$	352	0.84	310	62%	38%	218	134
Shopping Center (>150k) (PM)	820	369.5	1000 Sq Ft	$\ln(T)=0.72\ln(X)+3.02$	1446	3.4	1256	48%	52%	694	752
ZONE 5											
General Light Industrial (Weekday)	110	25	1000 Sq Ft	$T=3.76(X)+50.47$	144	4.87	122	50%	50%	72	72
Multifamily Housing (Low-Rise)(Weekday)	220	400	Dwelling Units	$T=6.41(X)+75.31$	2639	6.74	2696	50%	50%	1320	1319
Continuing Care Retirement Community	255	290	Dwelling Units	$T=2.28(X)+191.69$	853	2.47	716	50%	50%	427	426
										1819	1817
General Light Industrial (AM)	110	25	1000 Sq Ft	$T=0.68(X)+3.81$	21	0.74	19	88%	12%	18	3
Multifamily Housing (Low-Rise) (AM)	220	400	Dwelling Units	$T=0.31(X)+22.85$	147	0.4	160	24%	76%	35	112
Continuing Care Retirement Community	255	290	Dwelling Units	$T=0.13(X)+21.60$	59	0.15	44	65%	35%	38	21
										91	136
General Light Industrial (AM)	110	25	1000 Sq Ft	$\ln(T)=0.72\ln(X)+0.38$	15	0.65	16	50%	50%	8	8
Multifamily Housing (Low-Rise)(PM)	220	400	Dwelling Units	$T=0.43(X)+20.55$	193	0.51	204	63%	37%	122	71
Continuing Care Retirement Community	255	290	Dwelling Units	$T=0.13(X)+55.26$	93	0.19	55	39%	61%	36	57
										166	136

AM Existing Conditions

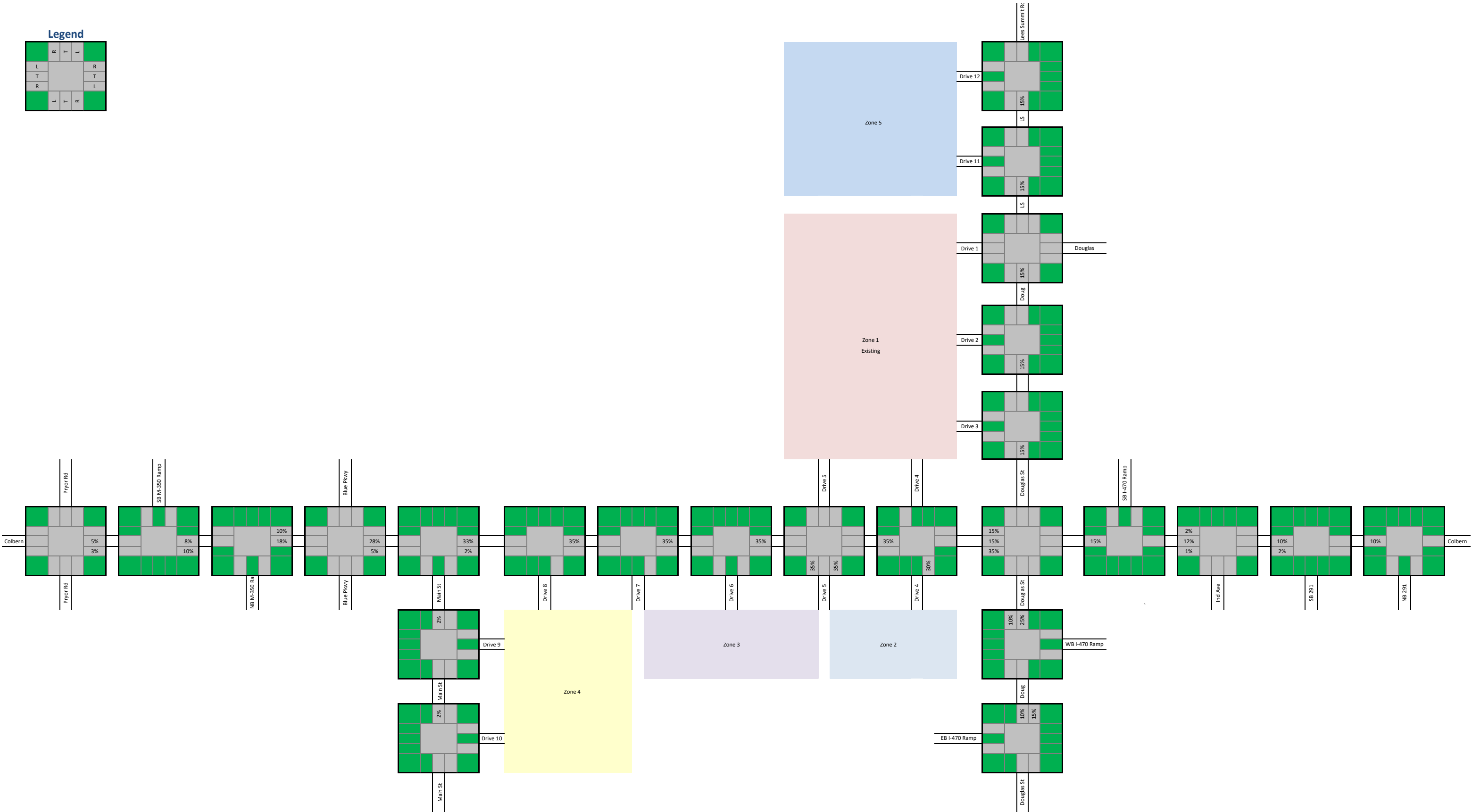
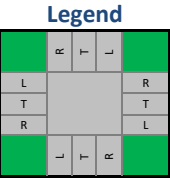
Includes peak hour counts (2019, 2022, 2024), Zone 1 trips (2023 Discovery Park TIS, Olsson), and Approved Trips (Various - see also Olsson TIS)



AM Distribution In - Zone 2



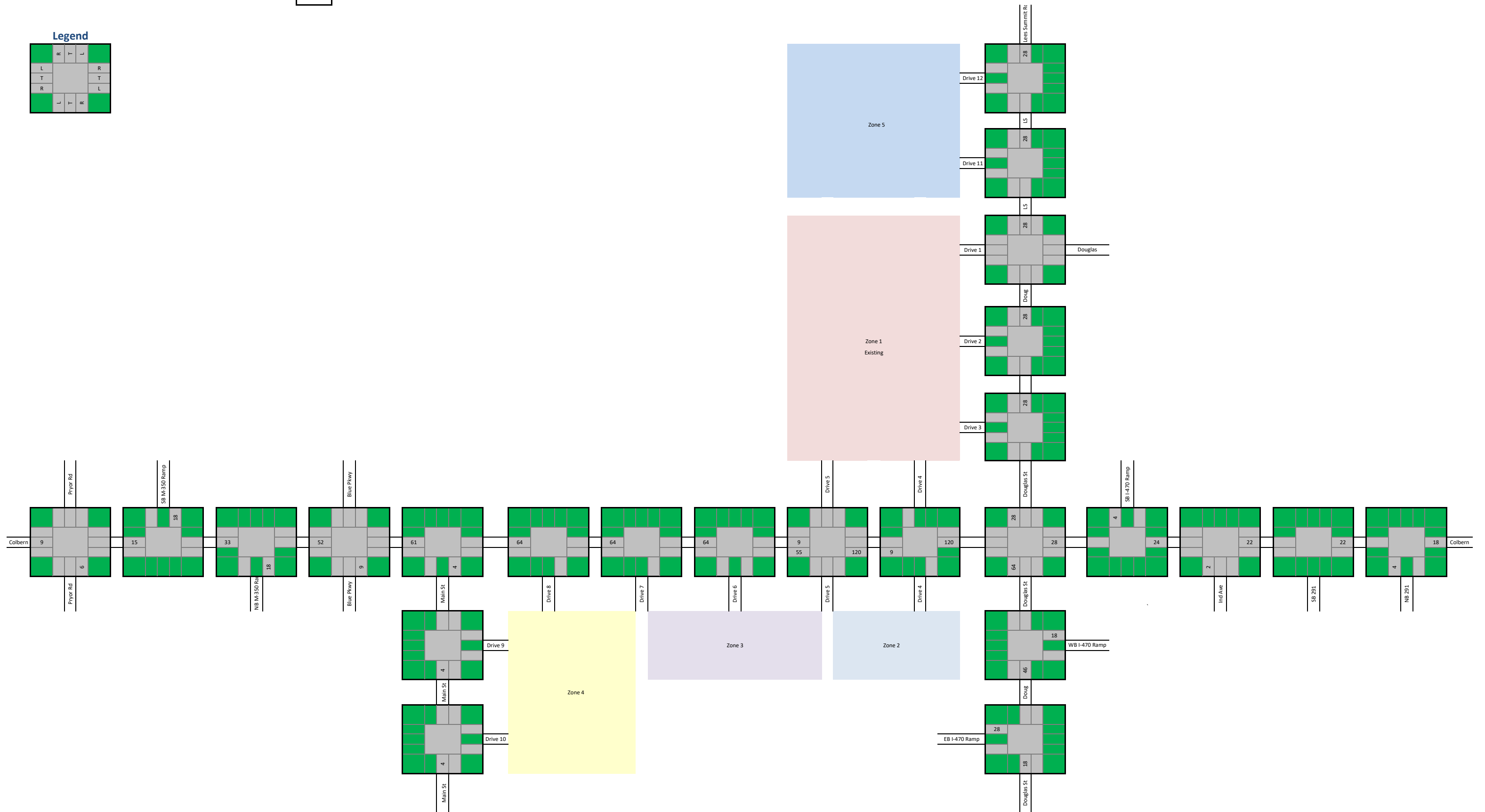
AM Distribution Out - Zone 2



Trips
184

184

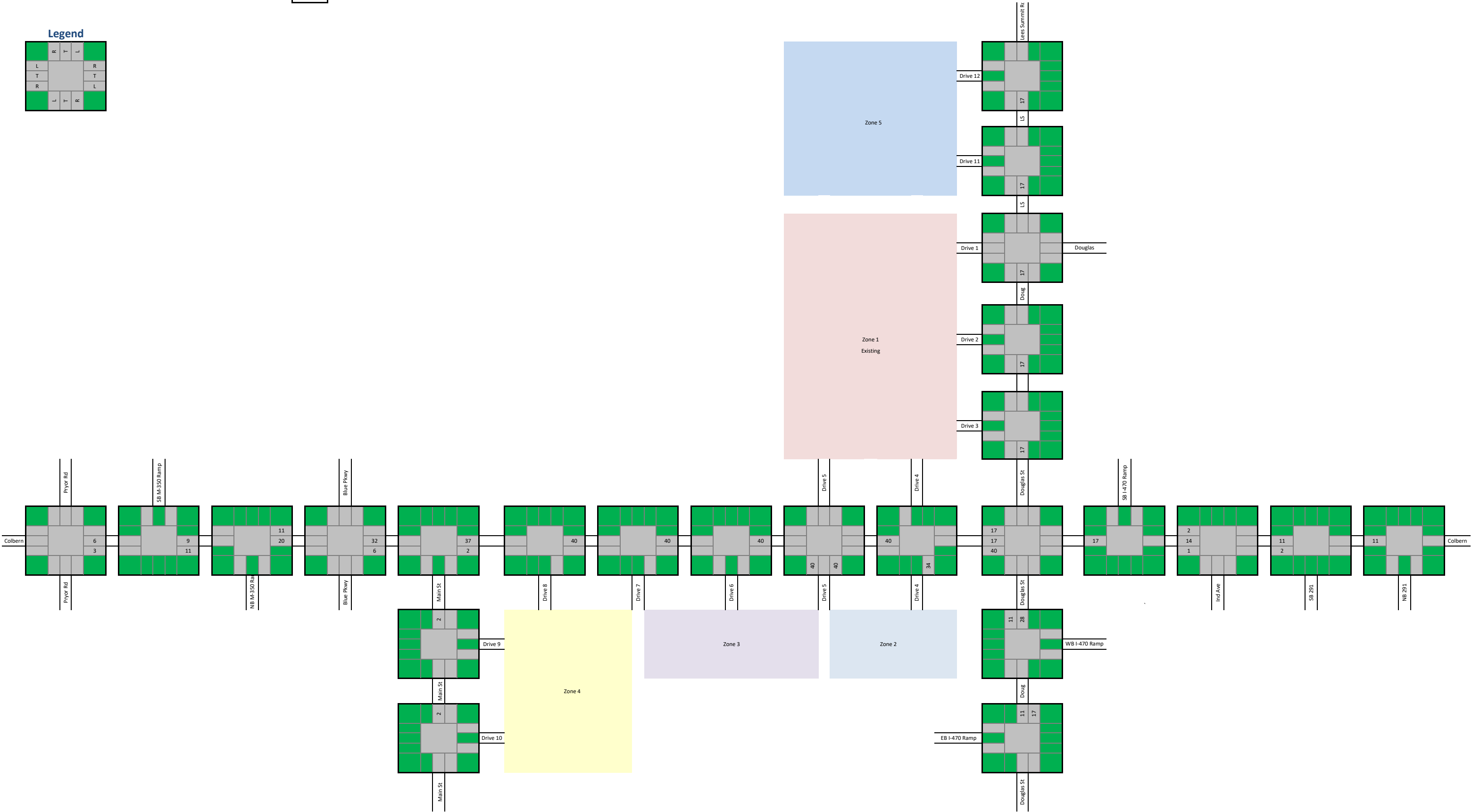
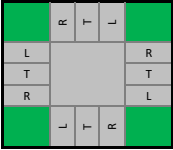
	R	T	L	
L				R
T				T
R				L
	L	T	R	



AM Trips Out - Zone 2

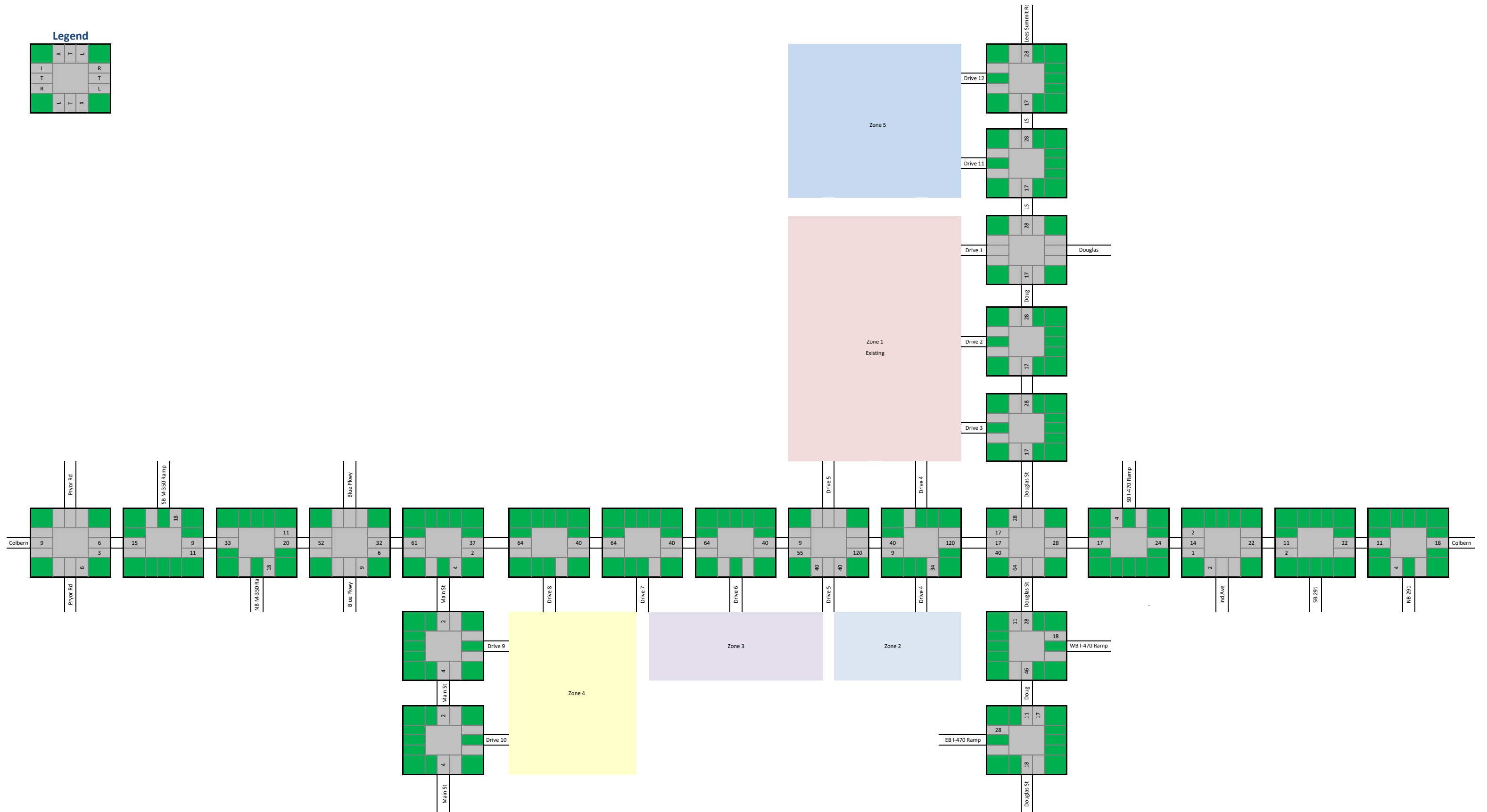
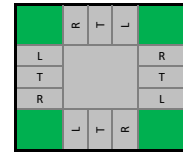
Trips
113

Legend



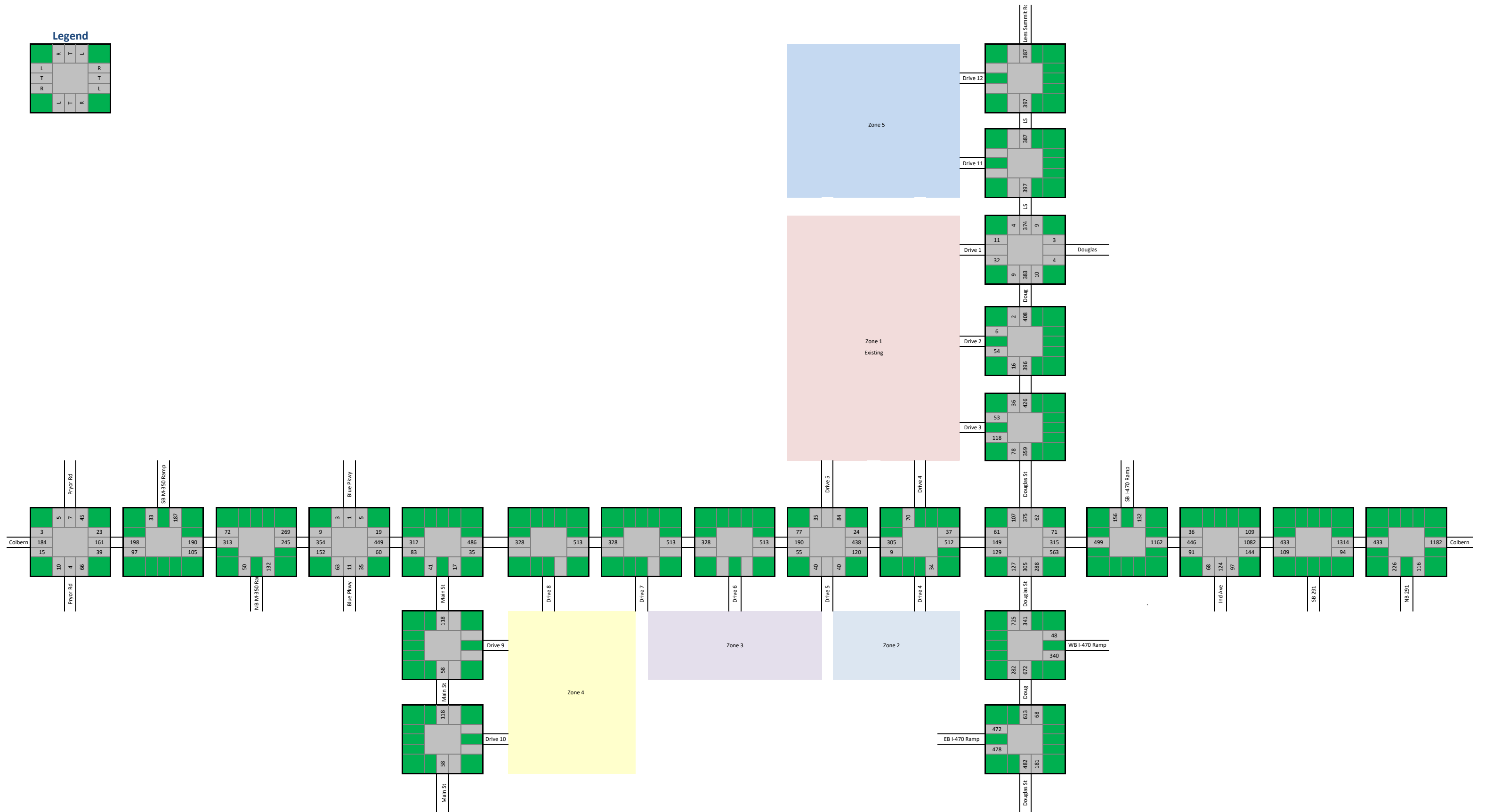
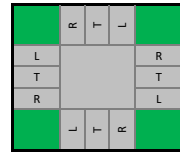
AM Total Trips - Zone 2

Legend



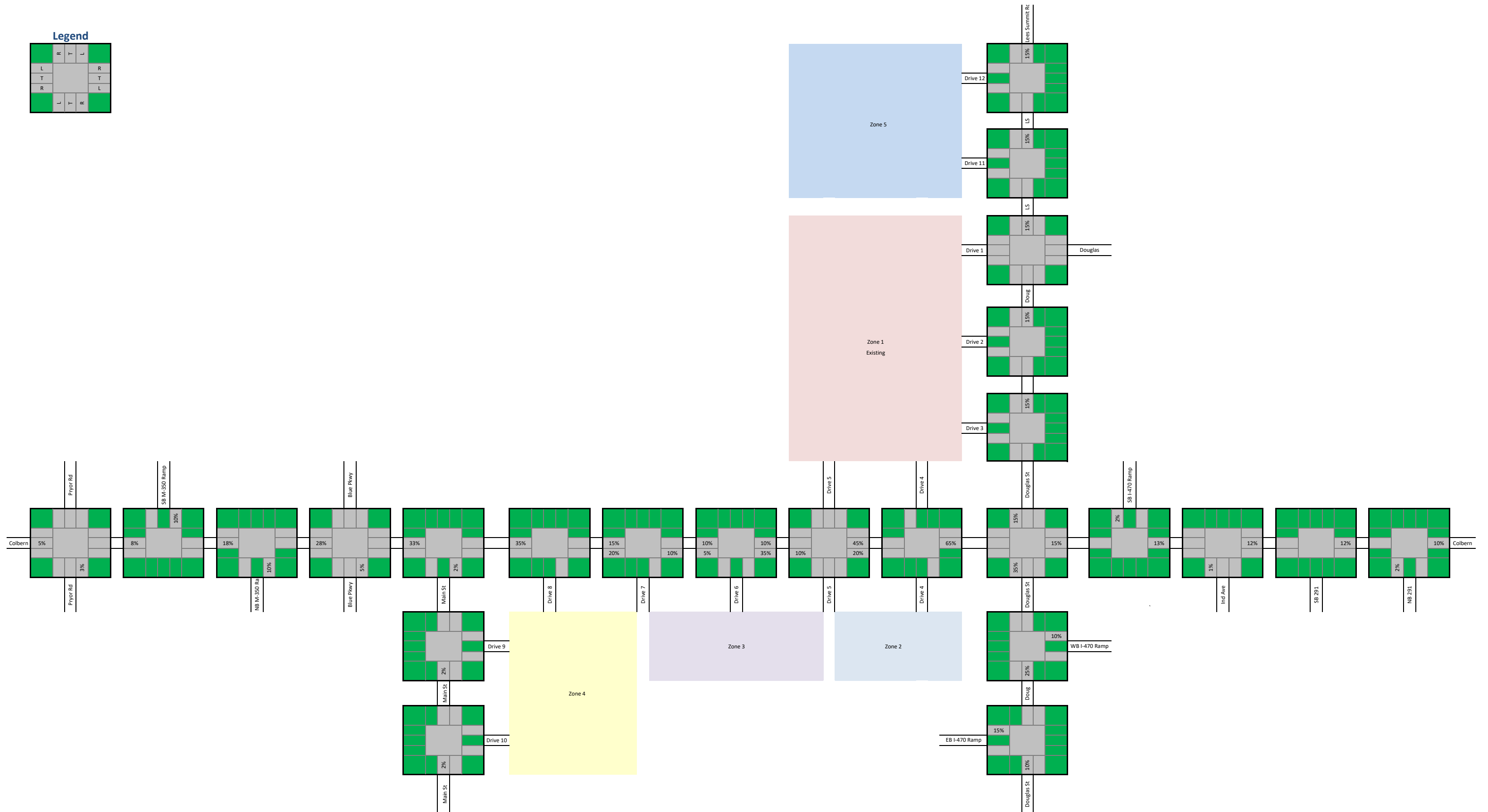
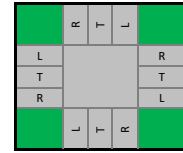
AM Existing plus Trips - Zone 2

Legend

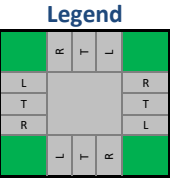


AM Distribution In - Zone 3

Legend



AM Distribution Out - Zone 3



Trips
275

275

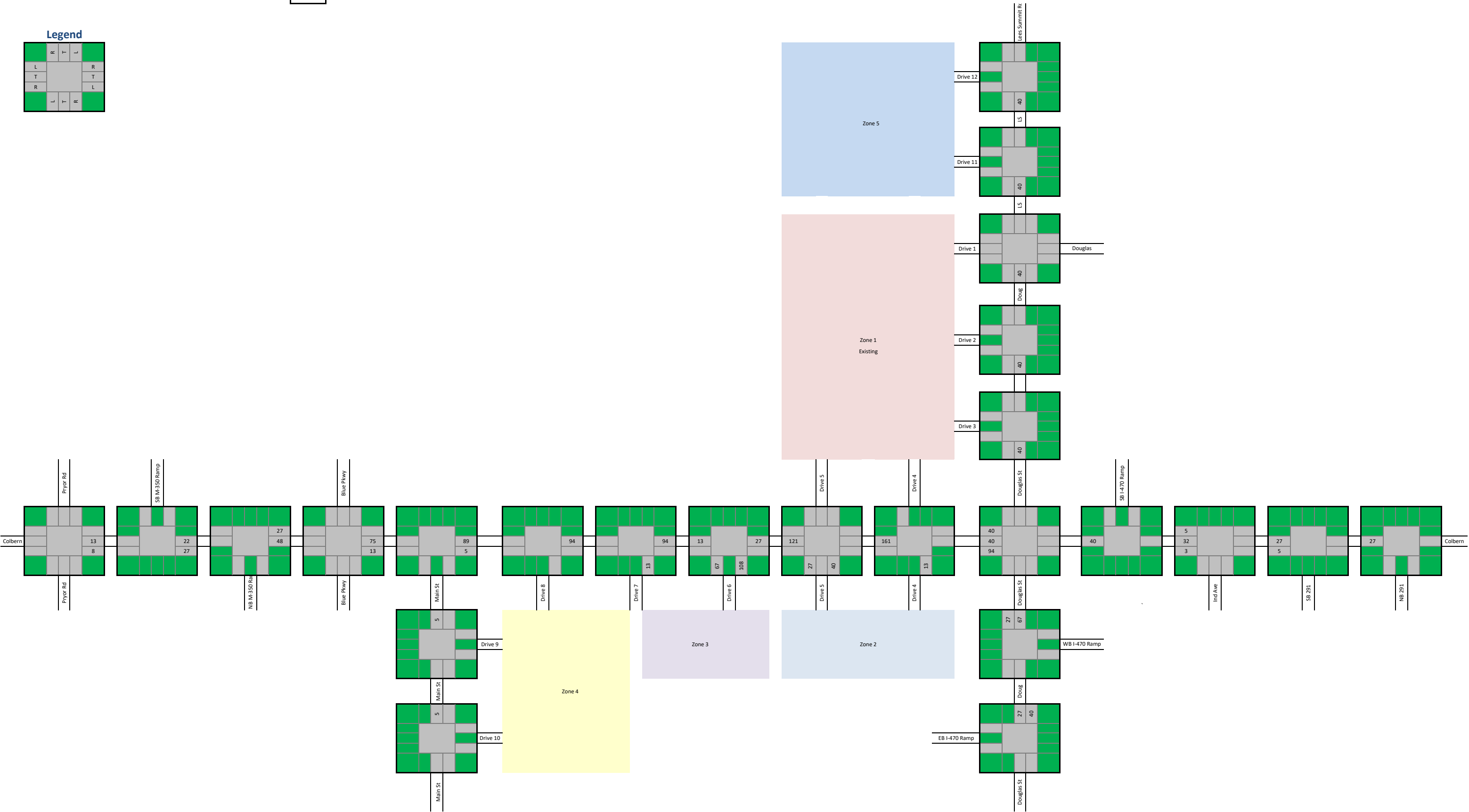
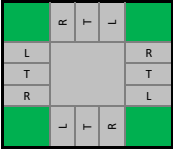
	R	T	L	
L				R
T				T
R				L
	L	T	R	



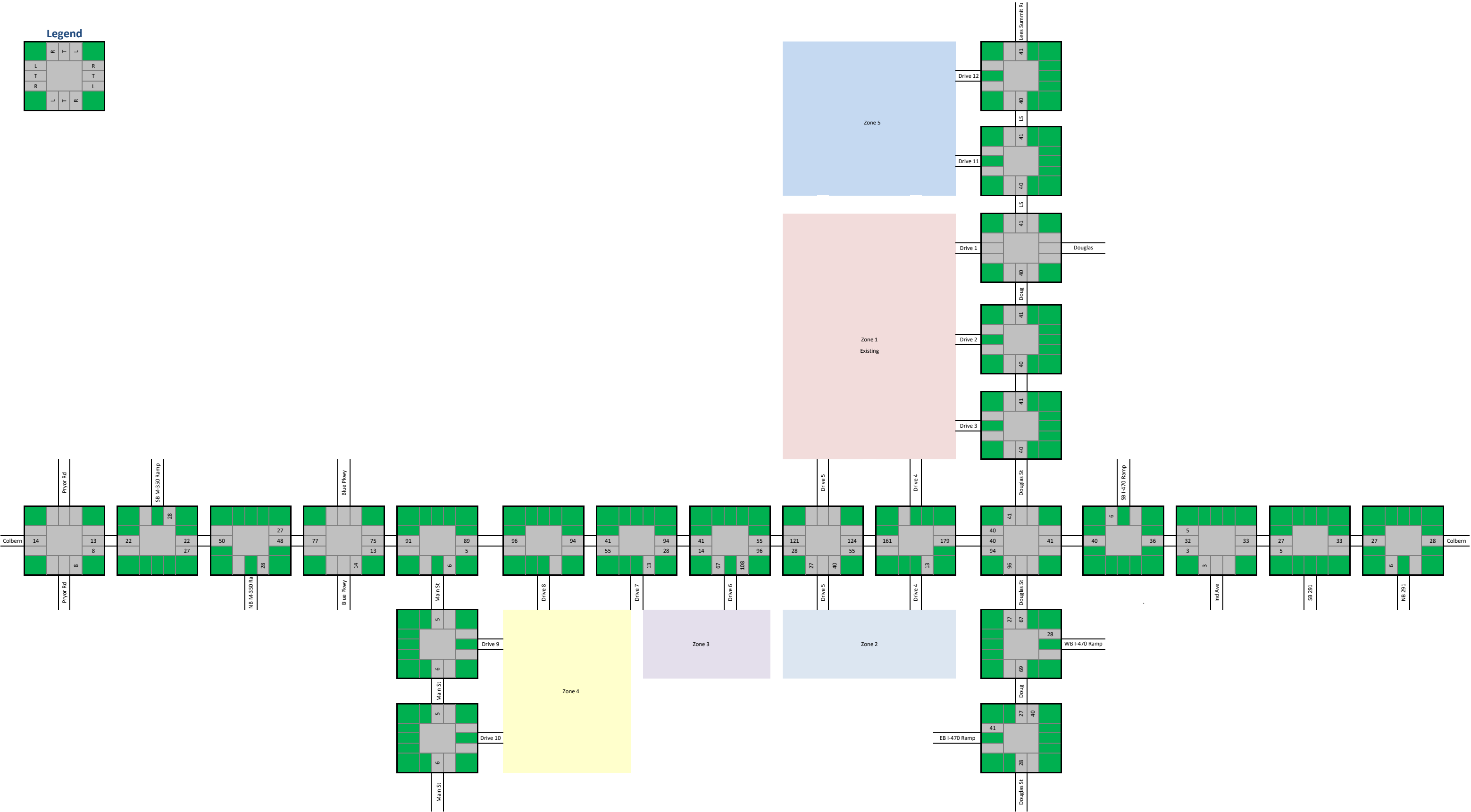
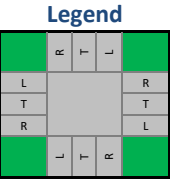
AM Trips Out - Zone 3

Trips
269

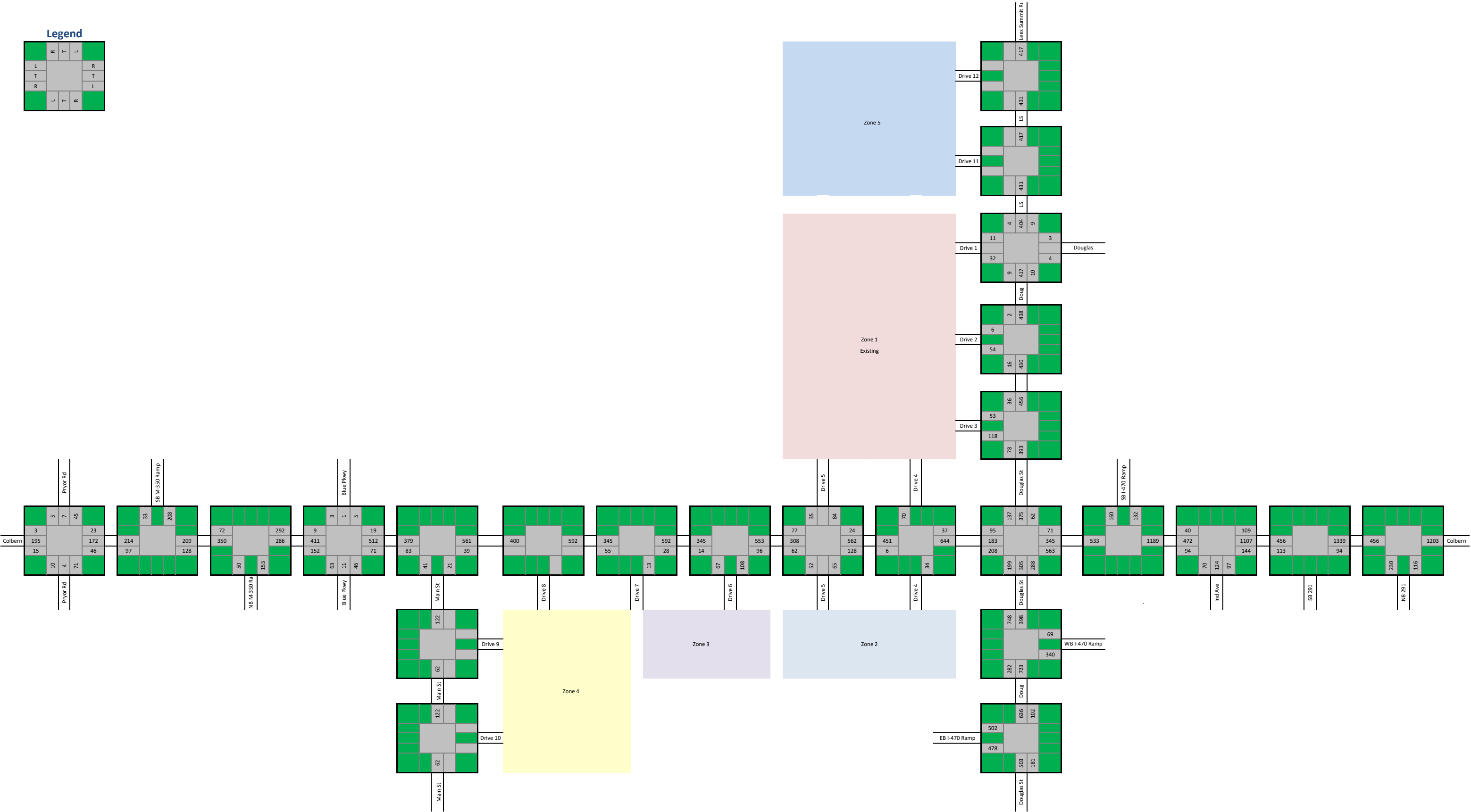
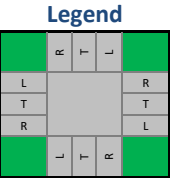
Legend



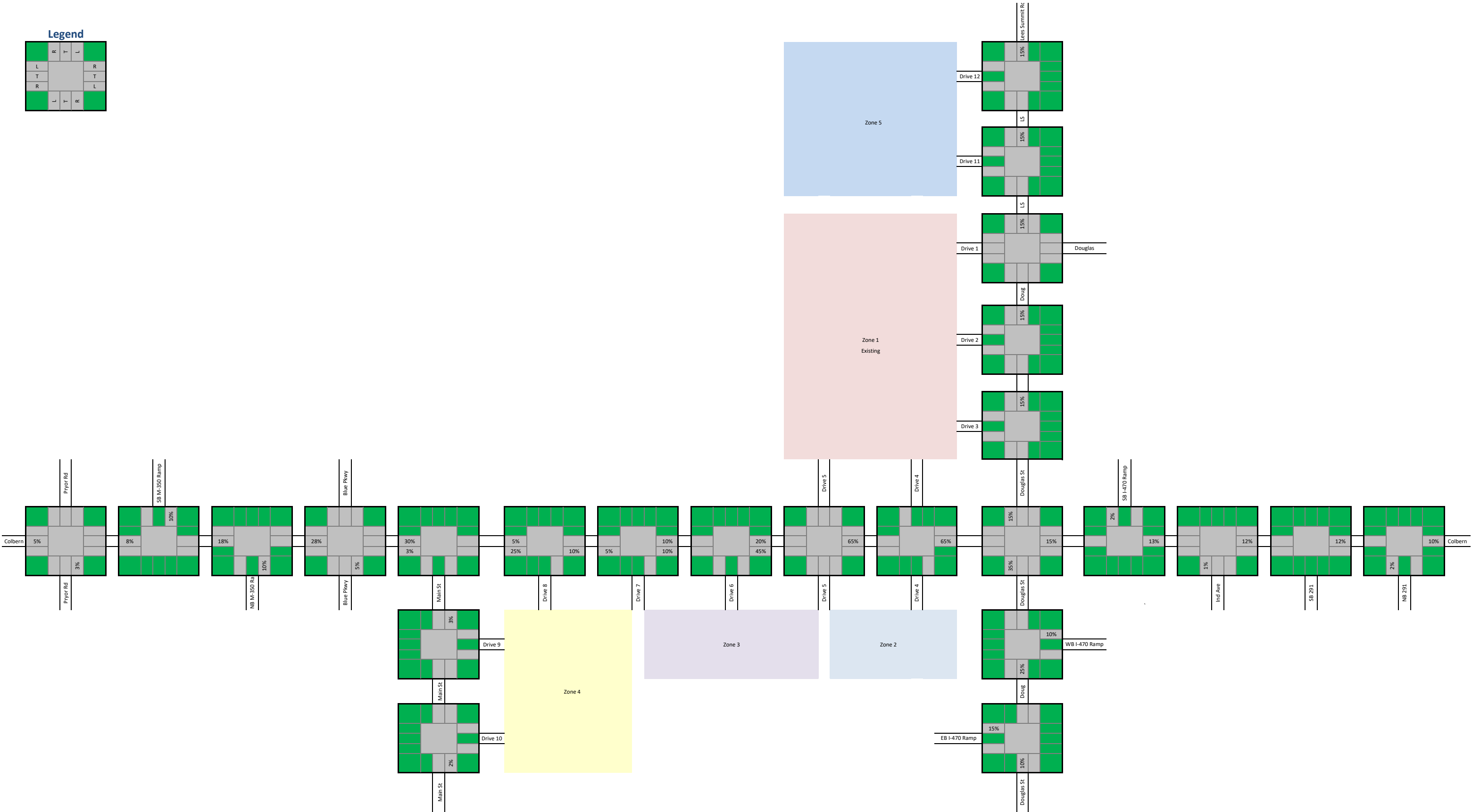
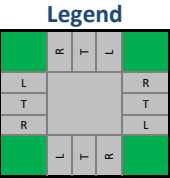
AM Total Trips - Zone 3



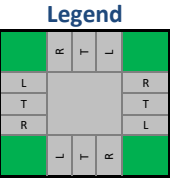
AM Ex + Trips Existing plus Trips - Zone 2 & 3



AM Distribution In - Zone 4



AM Distribution Out - Zone 4



Trips
218

	R	T	L	
L				R
T				T
R				L
	L	T	R	

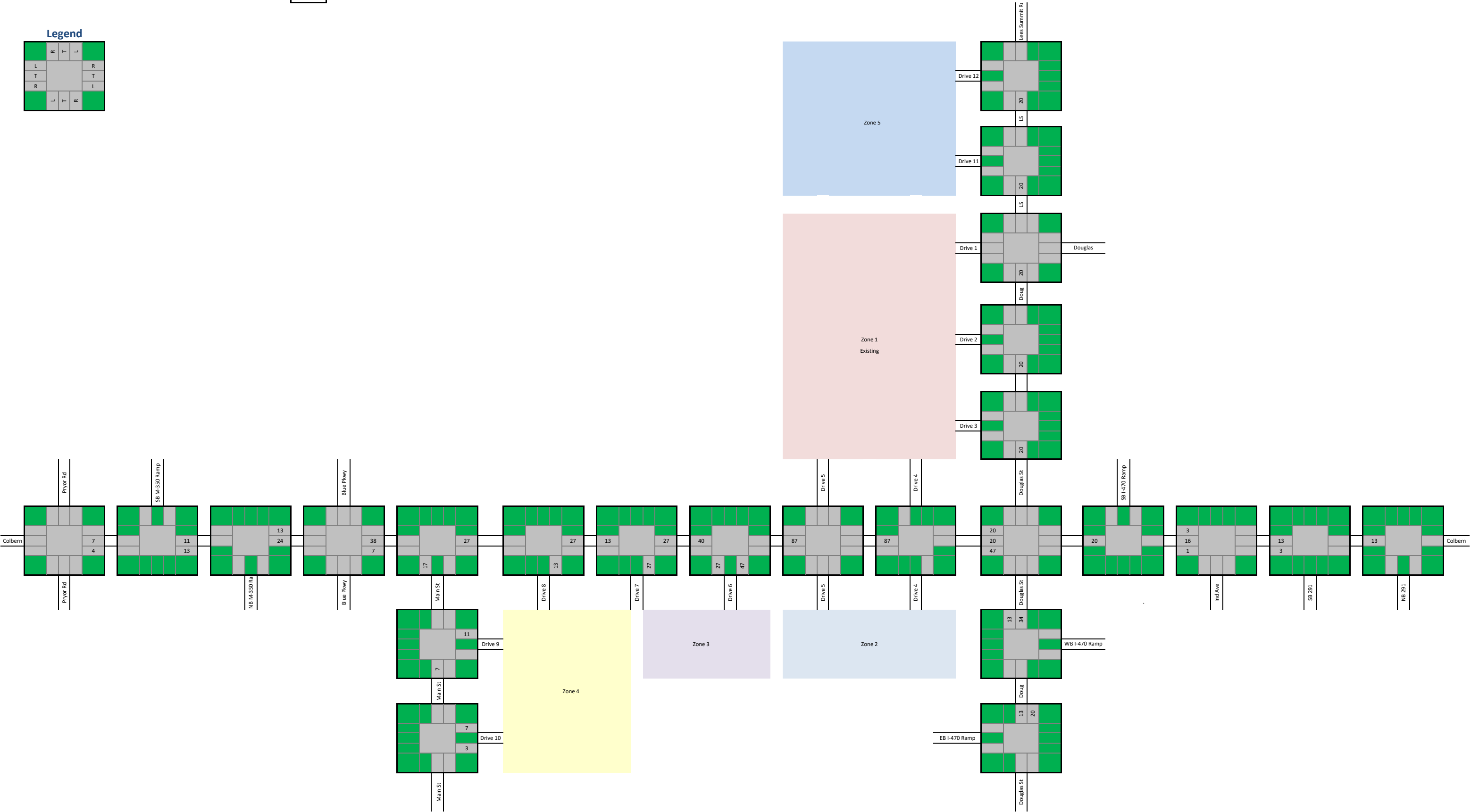


AM Trips Out - Zone 4

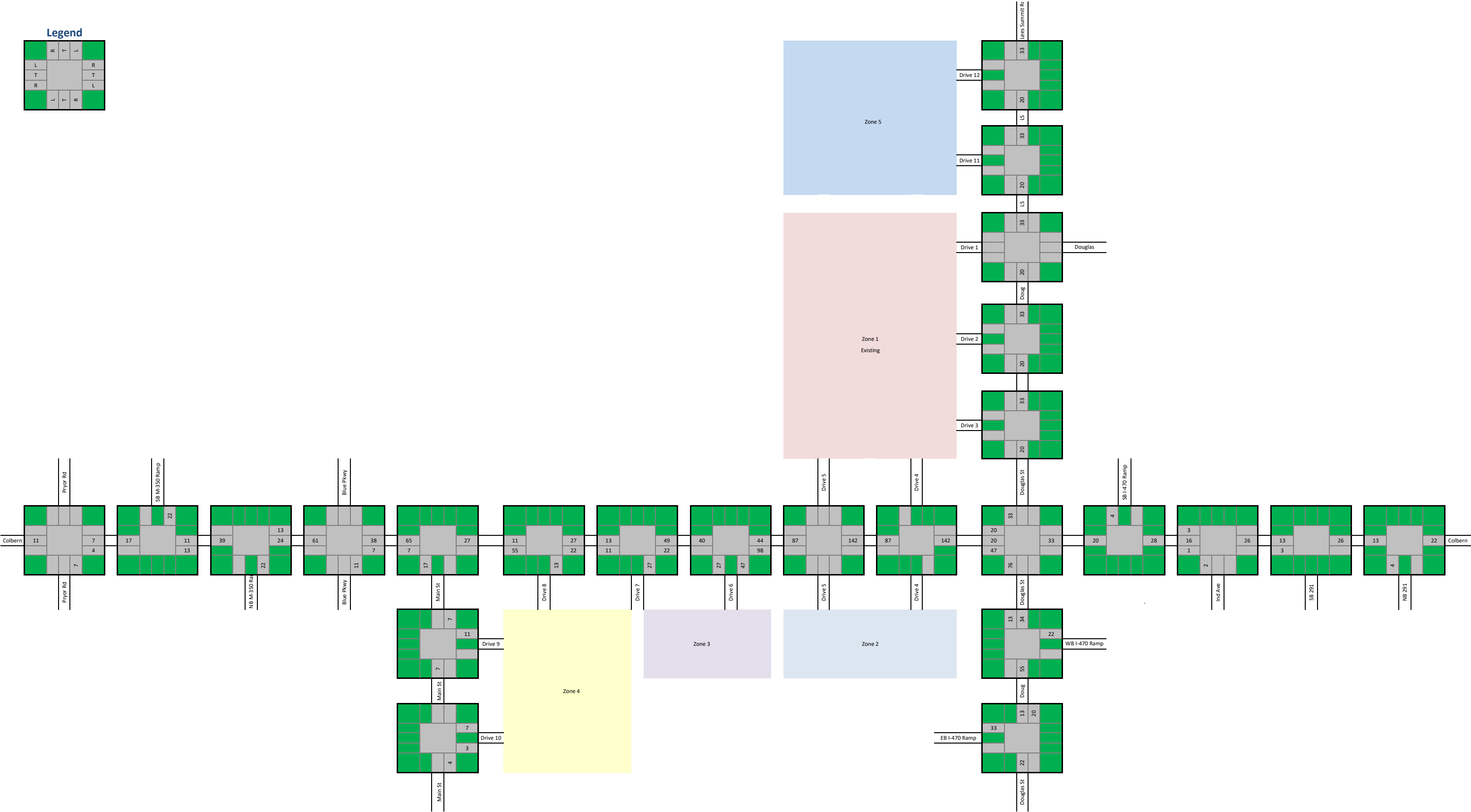
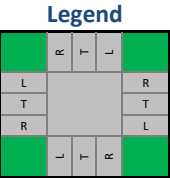
Trips
134

Legend

	R	T	L	
L				R
T				T
R				L
	L	T	R	



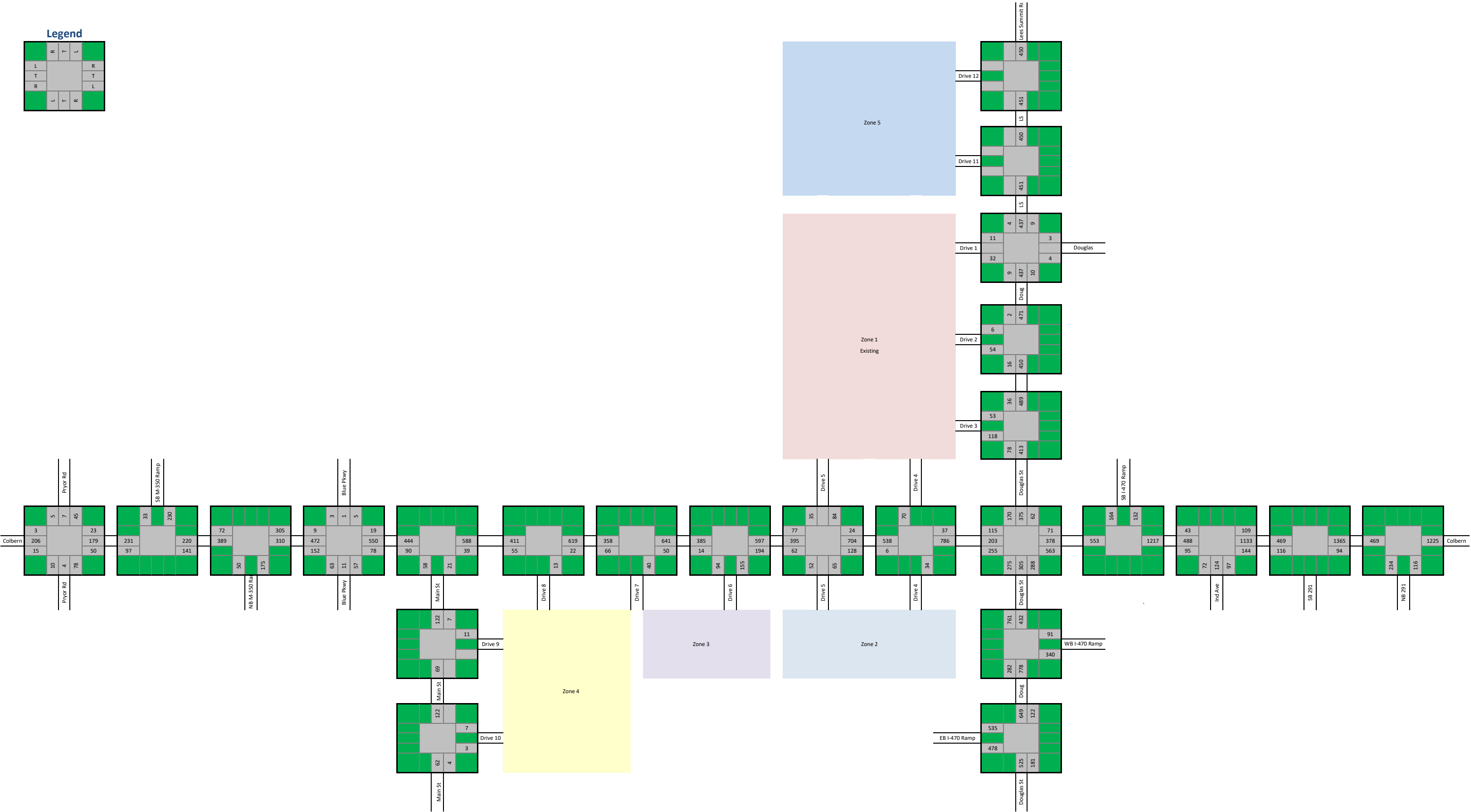
AM Total Trips - Zone 4



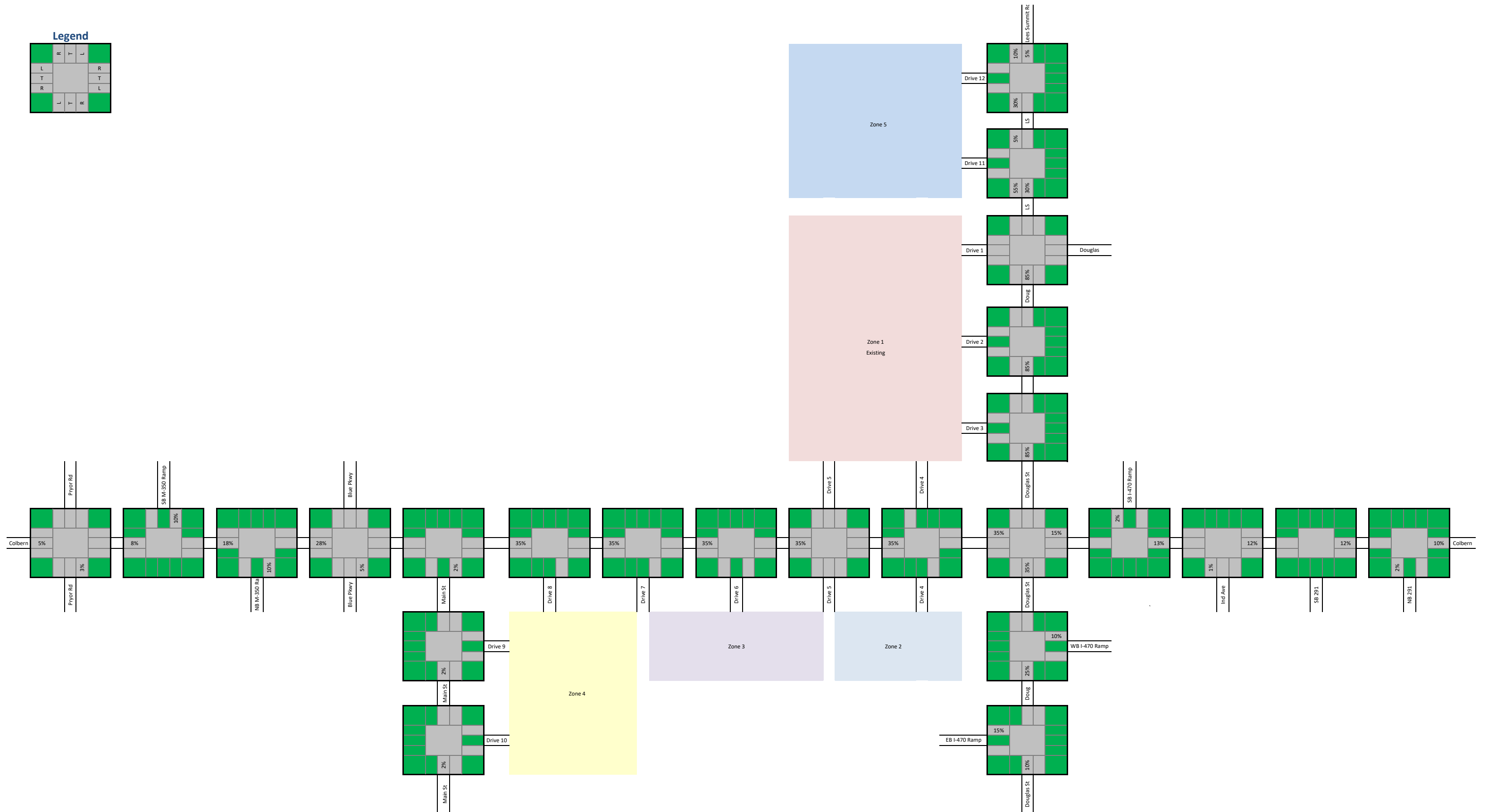
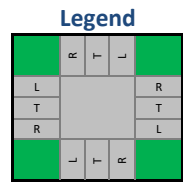
AM Ex + Trips Existing plus Trips - Zone 2-4

Legend

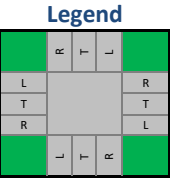
	R	T	L
L			R
T			T
R			L
	L	T	



AM Distribution In - Zone 5



AM Distribution Out - Zone 5



Trips

91

	R	T	L	
L				R
T				T
R				L
	L	T	R	



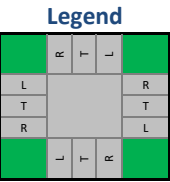
Trips

136

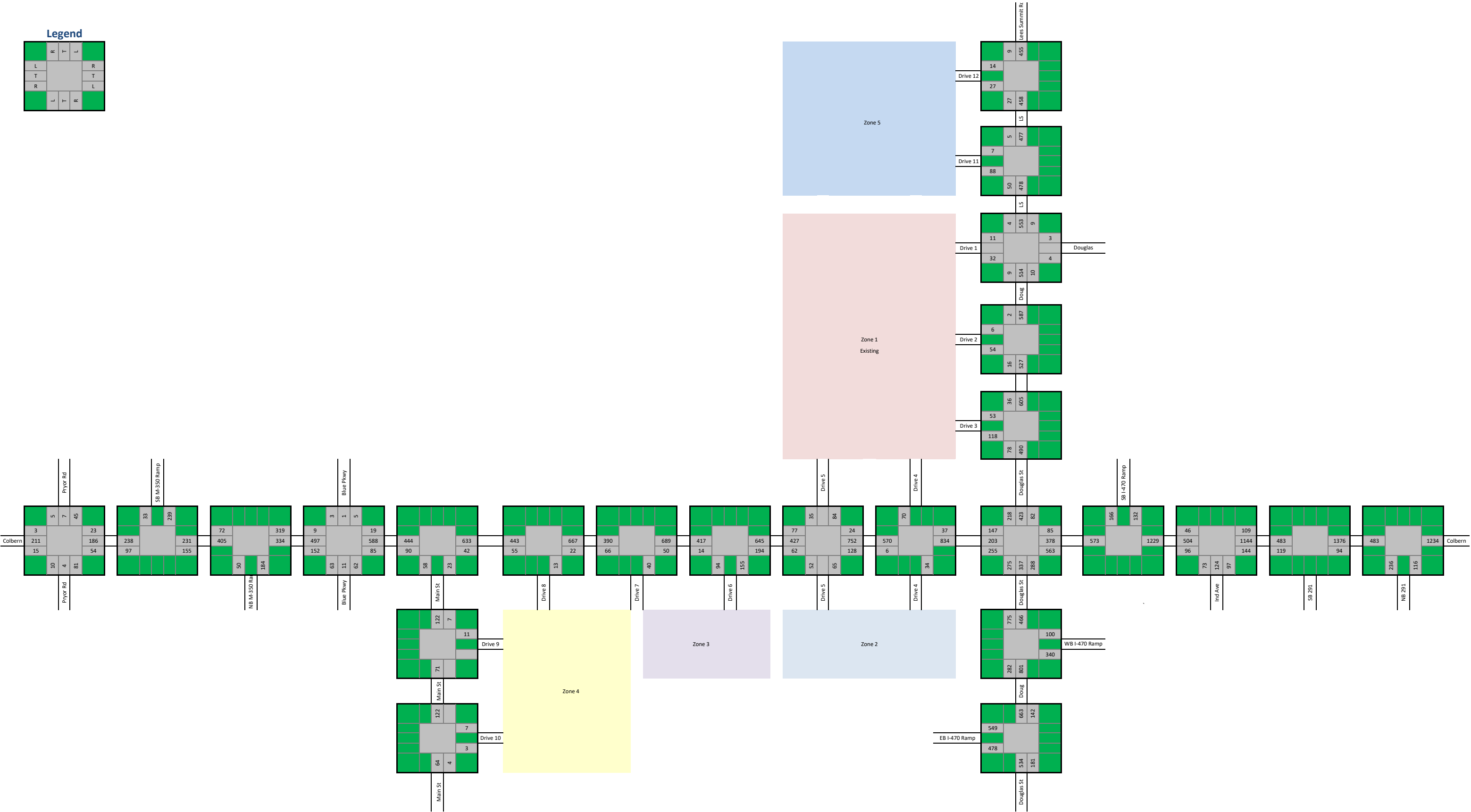
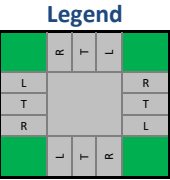
	R	T	L	
L				R
T				T
R				L
	L	T	R	



AM Total Trips - Zone 5

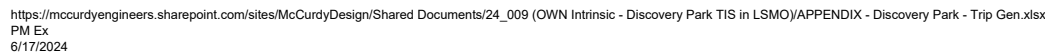


AM Ex + Trips Existing plus Trips - Zone 2-5



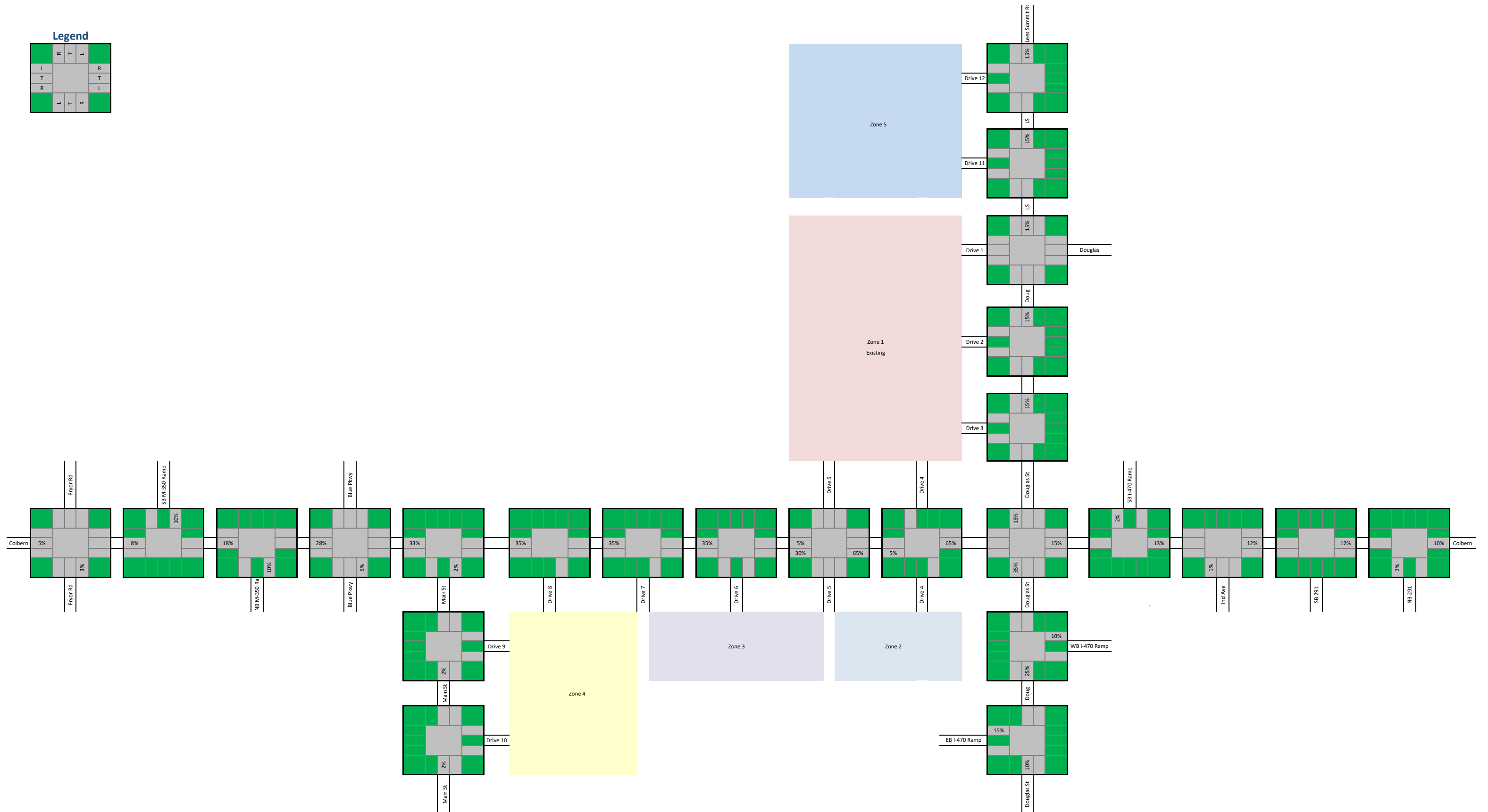
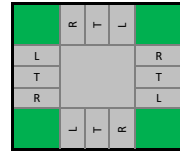
Includes peak hour counts (2019, 2022, 2024), Zone 1 trips (2023 Discovery Park TIS, Olsson), and Approved Trips (Various - see also Olsson TIS)

	R	T	L	
L				R
T				T
R				L
	L	T	R	



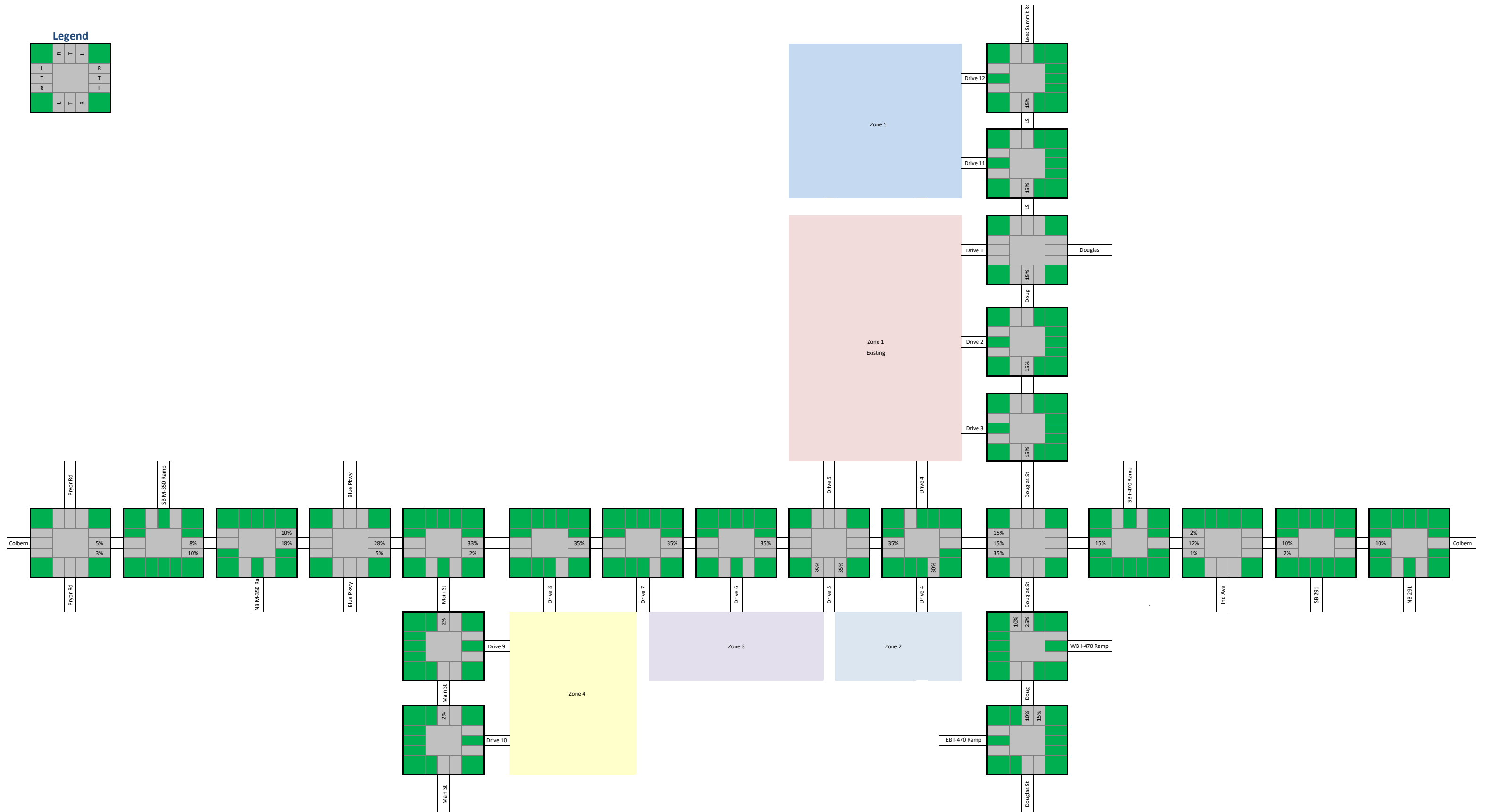
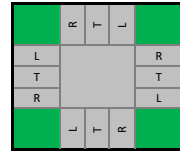
PM Distribution In - Zone 2

Legend



PM Distribution Out - Zone 2

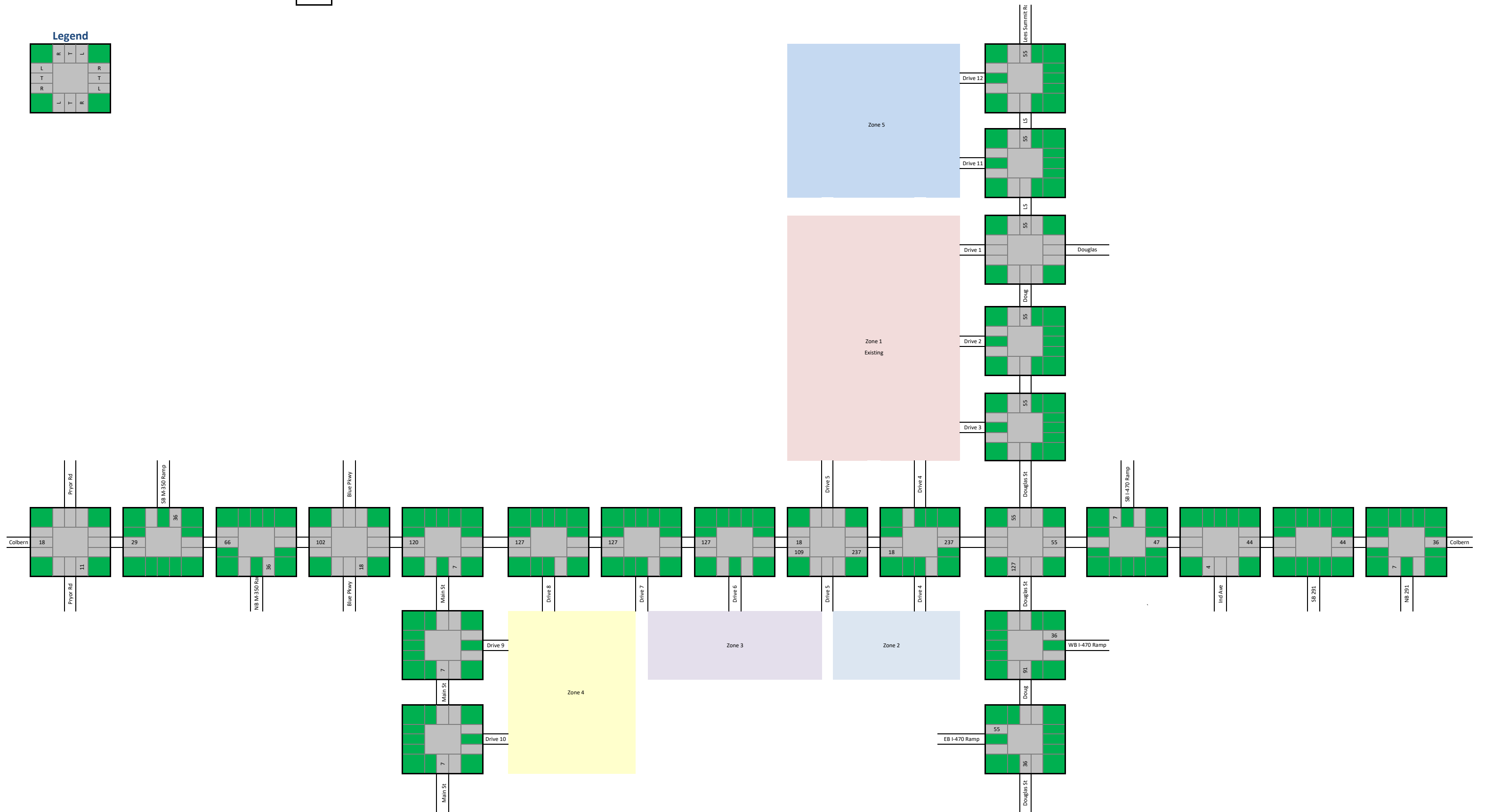
Legend



Trips
364

364

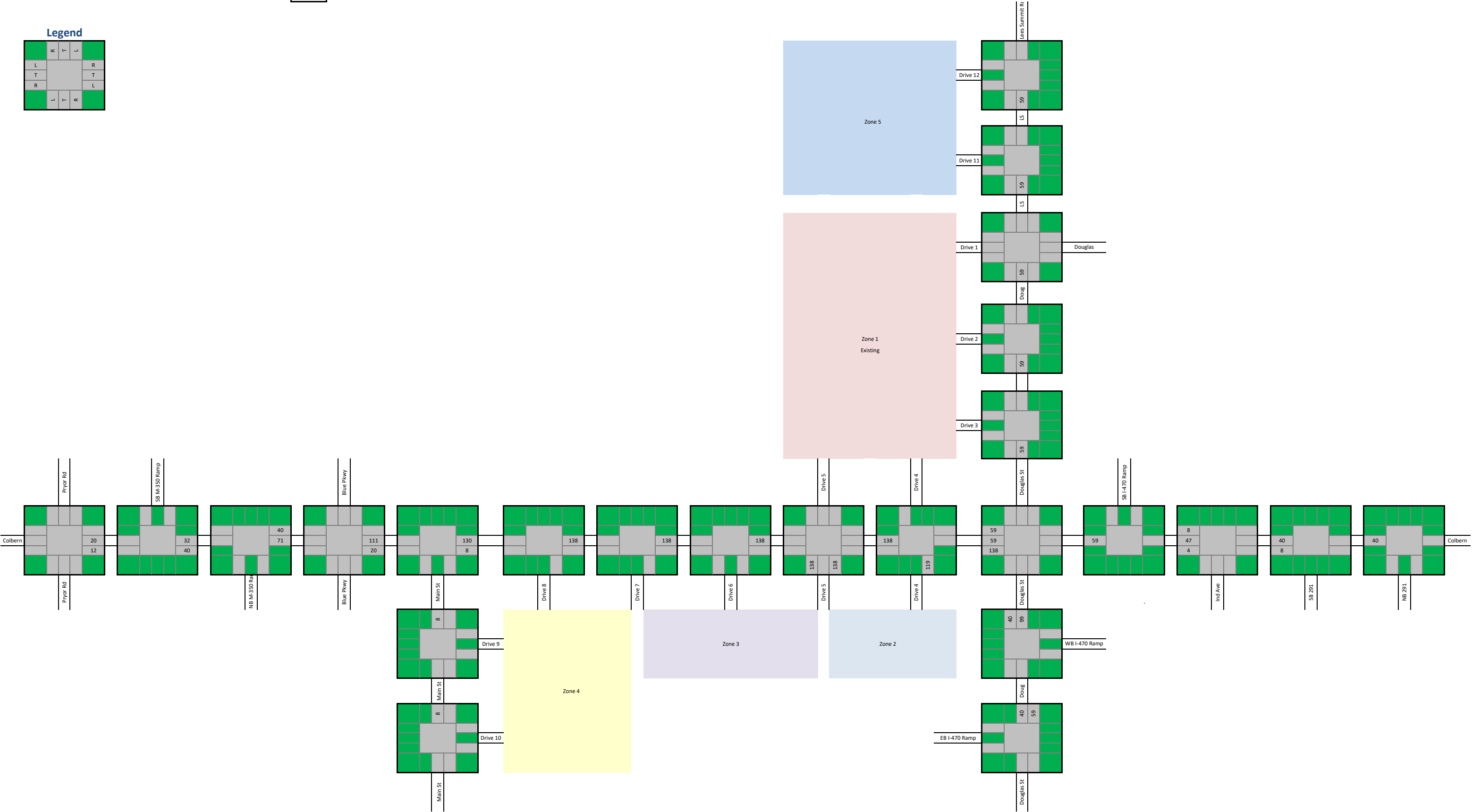
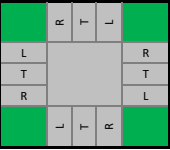
	R	T	L	
L				R
T				T
R				L
	L	T	R	



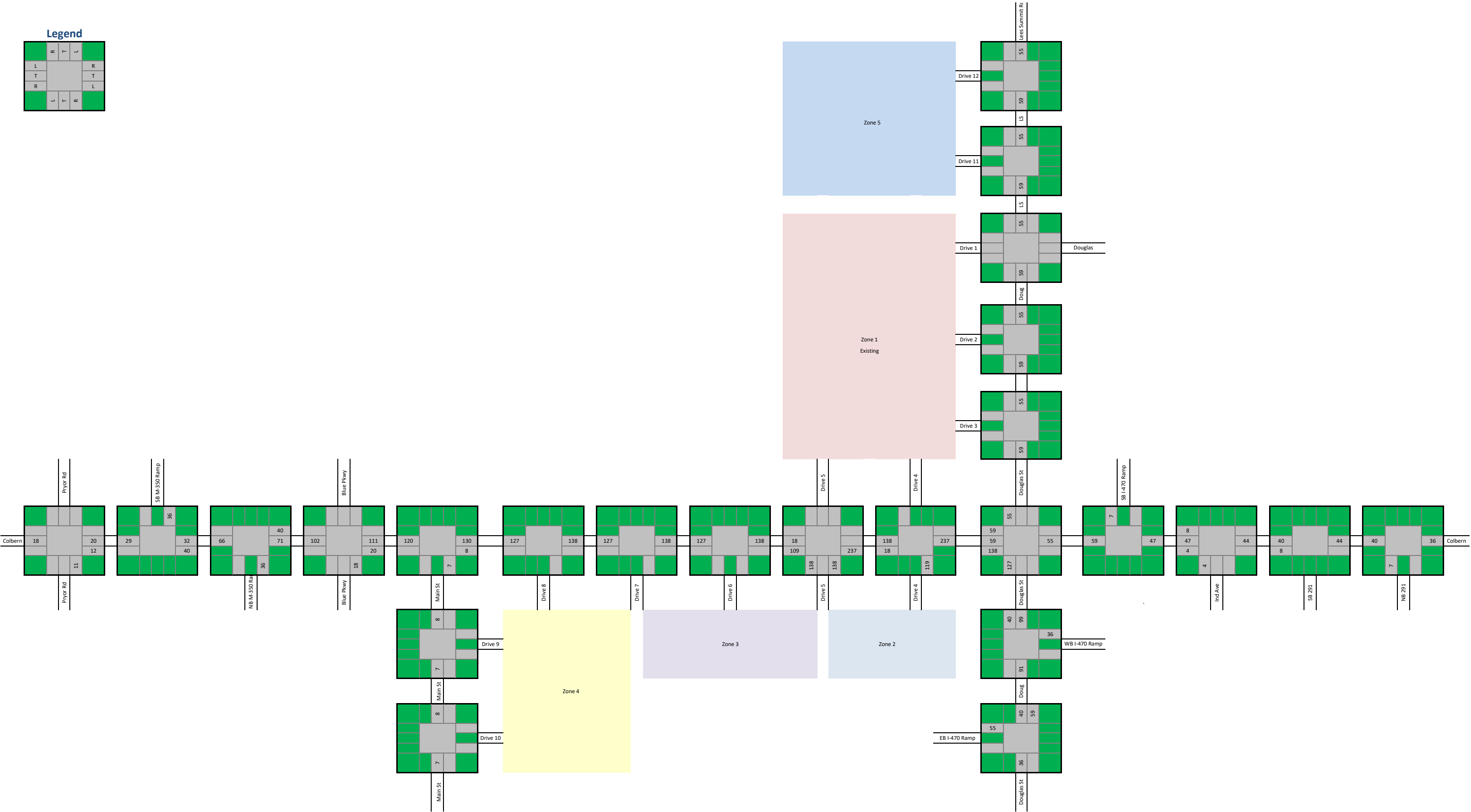
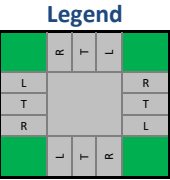
PM Trips Out - Zone 2

Trips
395

Legend

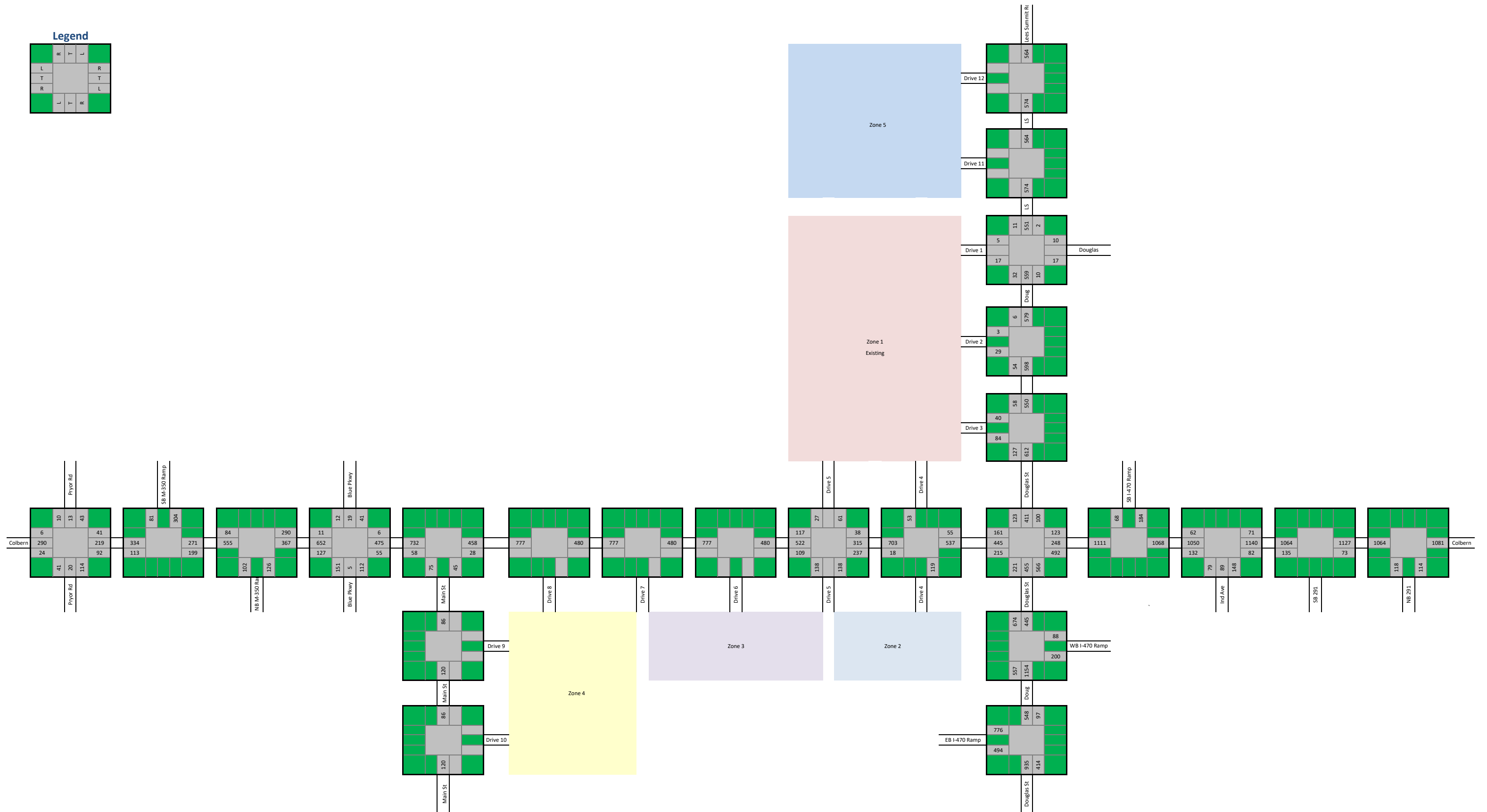
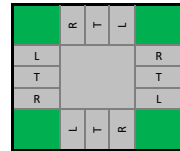


PM Total Trips - Zone 2



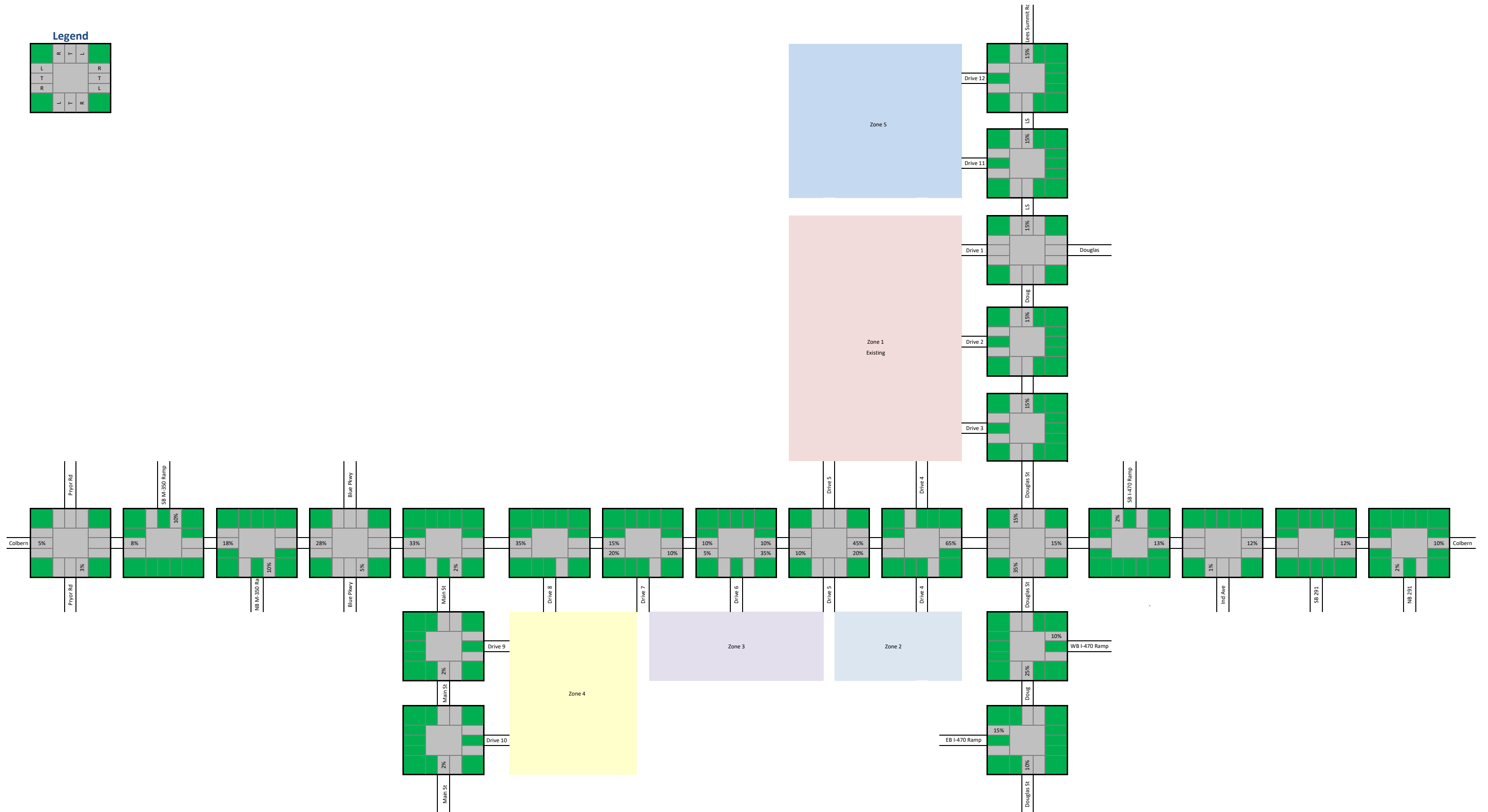
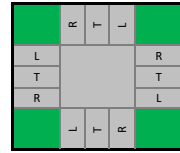
PM Existing plus Trips - Zone 2

Legend

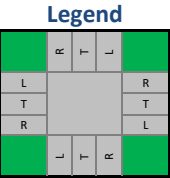


PM Distribution In - Zone 3

Legend



PM Distribution Out - Zone 3



Trips
905

	R	T	L	
L				R
T				T
R				L
	L	T	R	



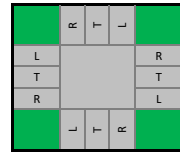
Trips
931

	R	T	L	
L				R
T				T
R				L
	L	T	R	

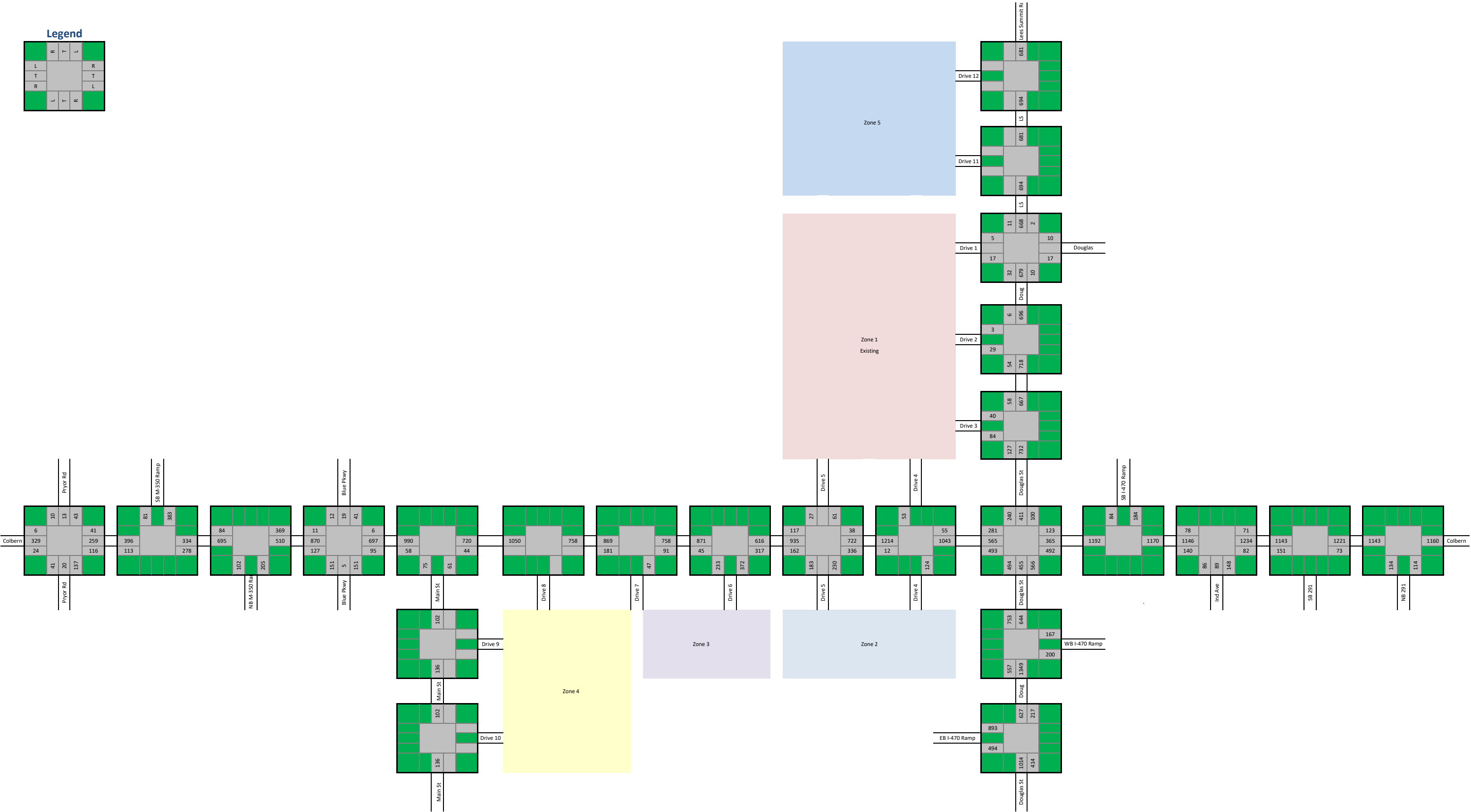
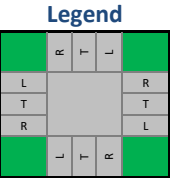


PM Total Trips - Zone 3

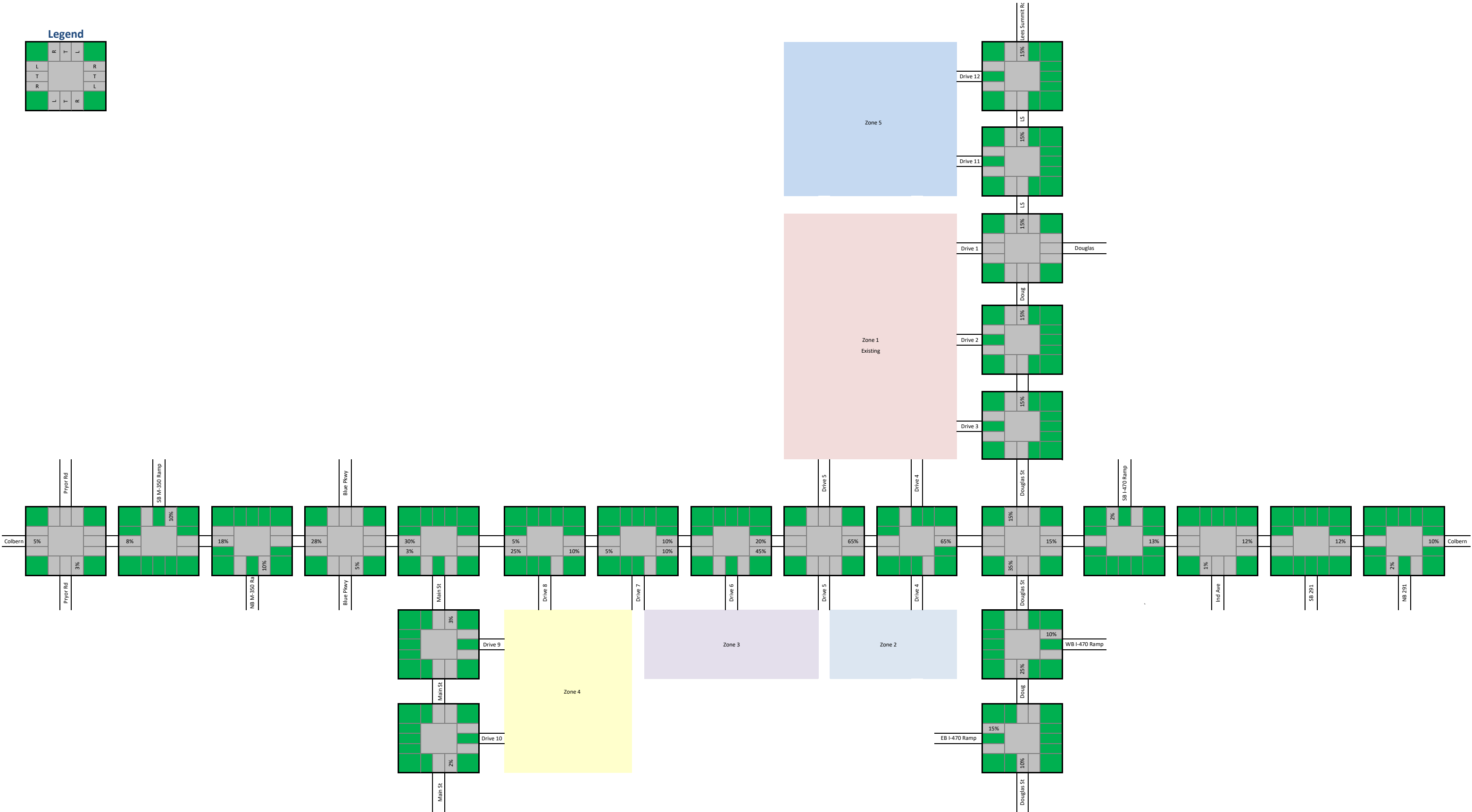
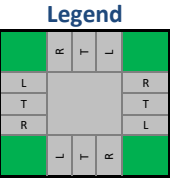
Legend



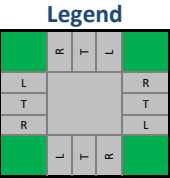
PM Ex + Trips Existing plus Trips - Zone 2 & 3



PM Distribution In - Zone 4



PM Distribution Out - Zone 4



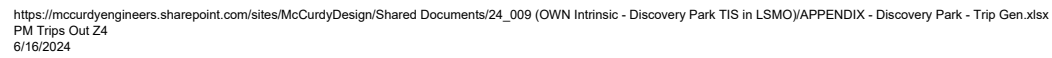
Trips
694

	R	T	L	
L				R
T				T
R				L
	L	T	R	

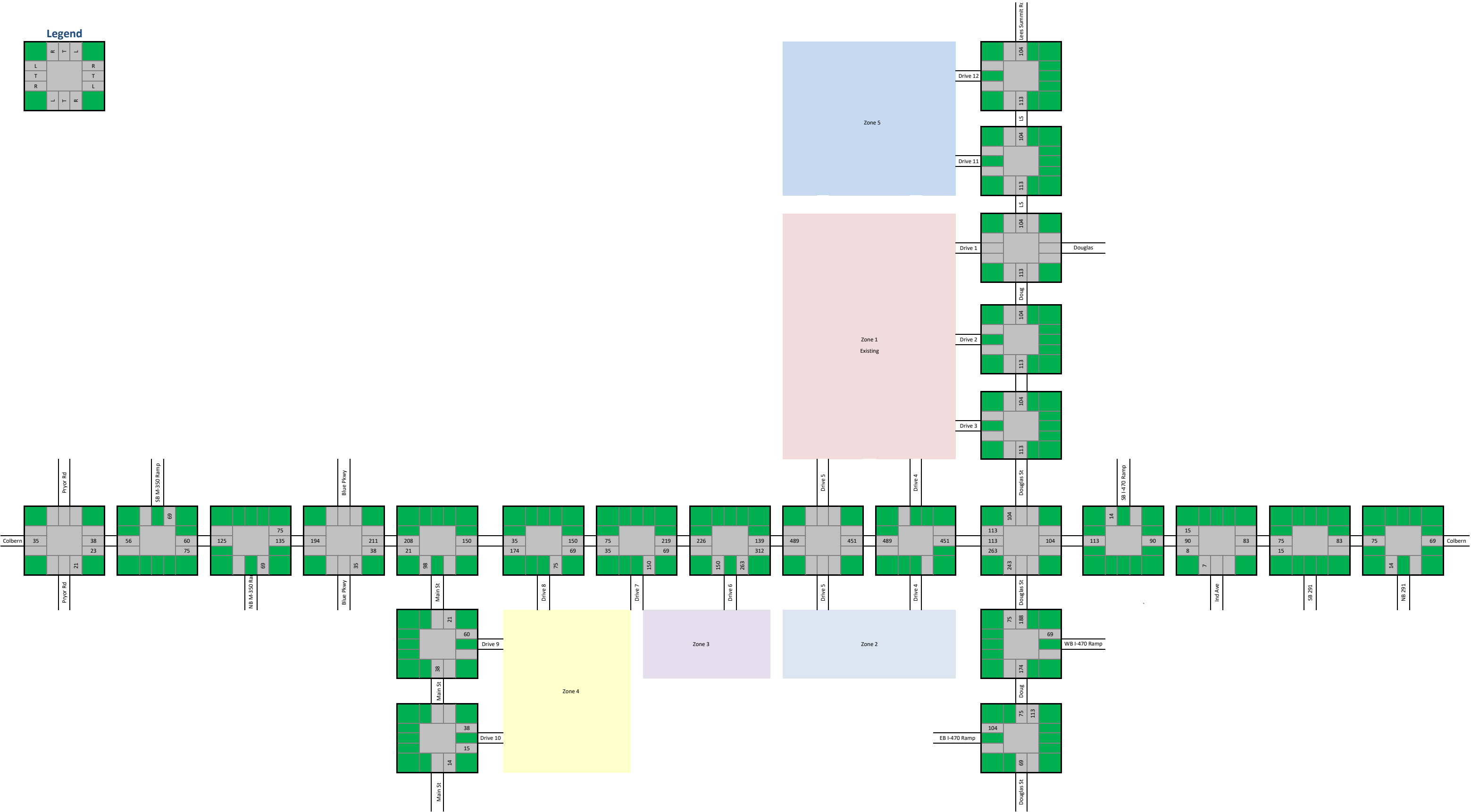
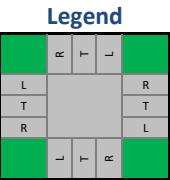


Trips
752

	R	T	L	
L				R
T				T
R				L
	L	T	R	

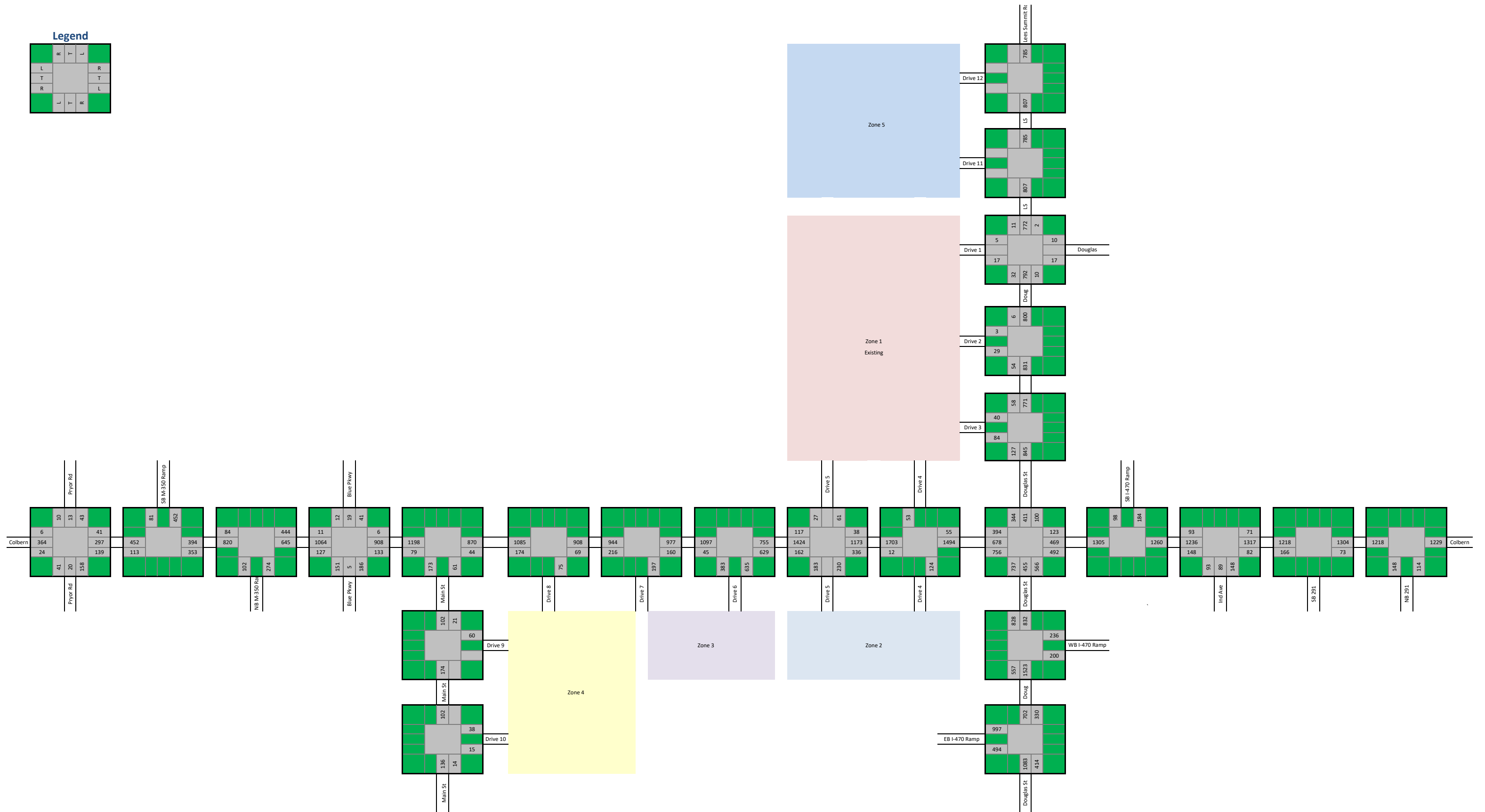
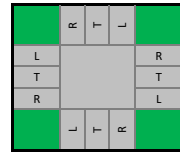


PM Total Trips - Zone 4

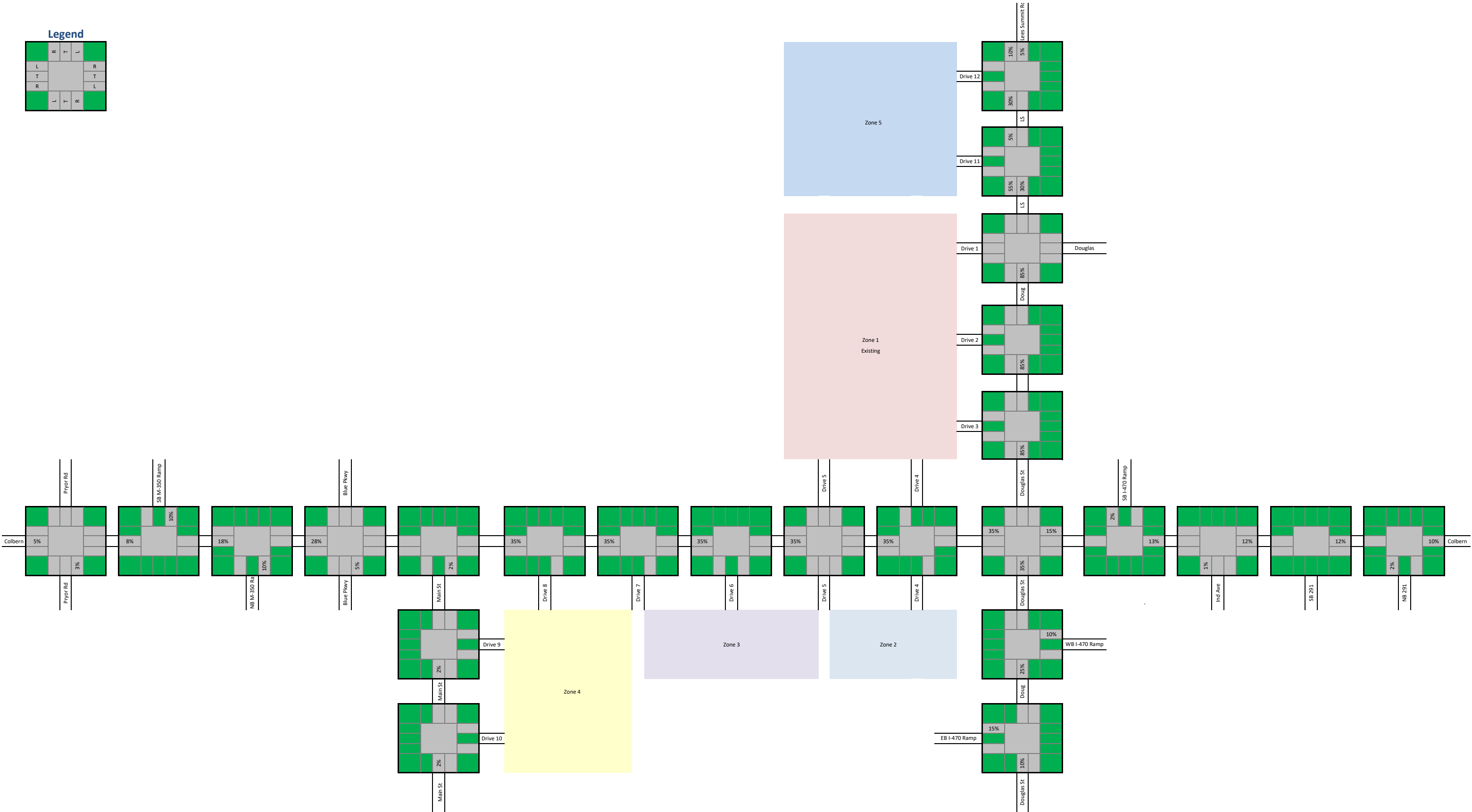
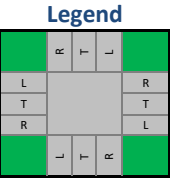


PM Ex + Trips Existing plus Trips - Zone 2-4

Legend

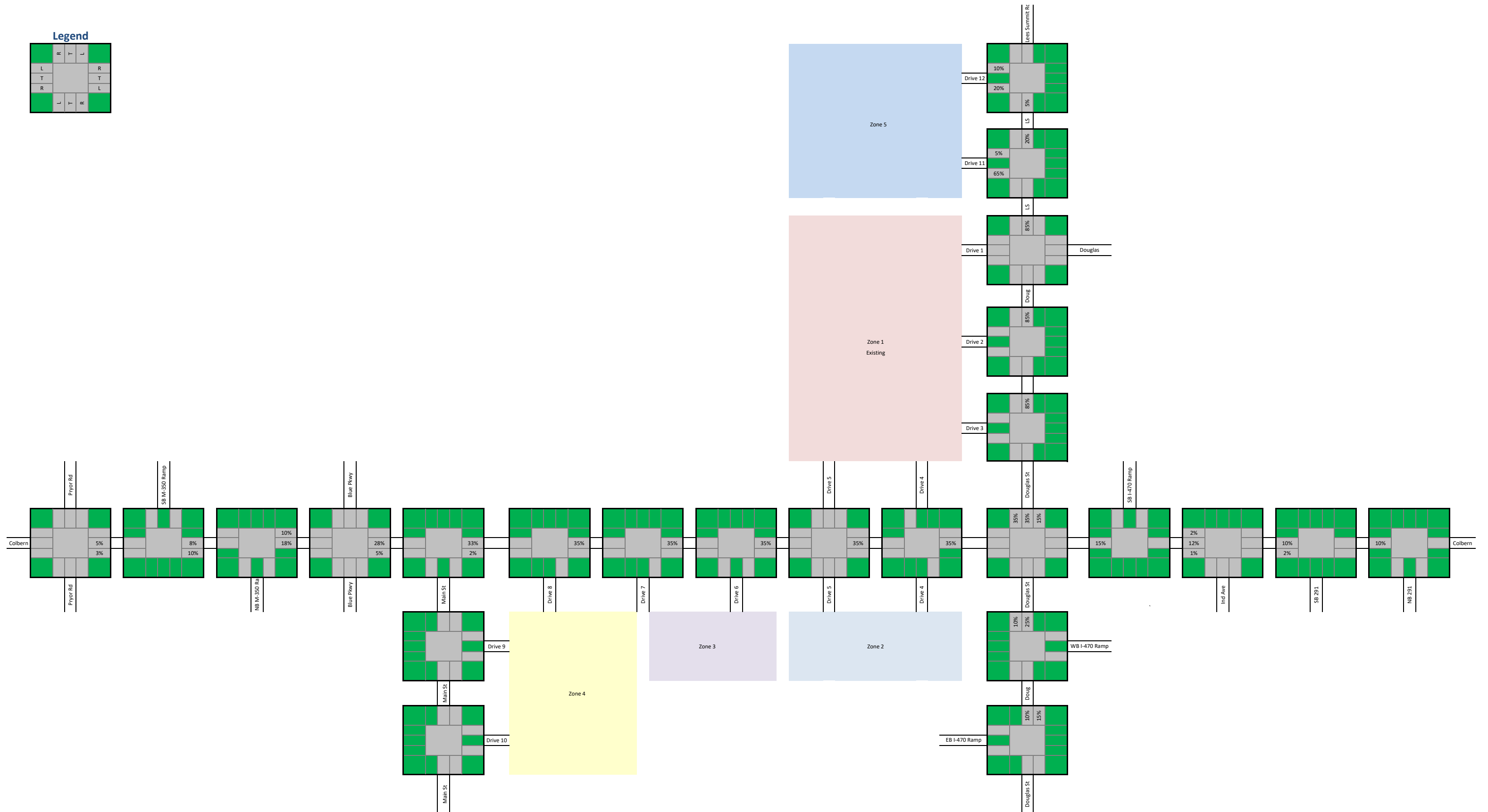
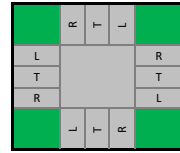


AM Distribution In - Zone 5



PM Distribution Out - Zone 5

Legend



Trips	166
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	R	T	L	
L				R
T				T
R				L
	L	T	R	



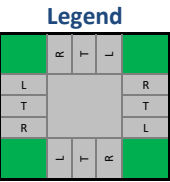
Trips

136

	R	T	L	
L				R
T				T
R				L
	L	T	R	

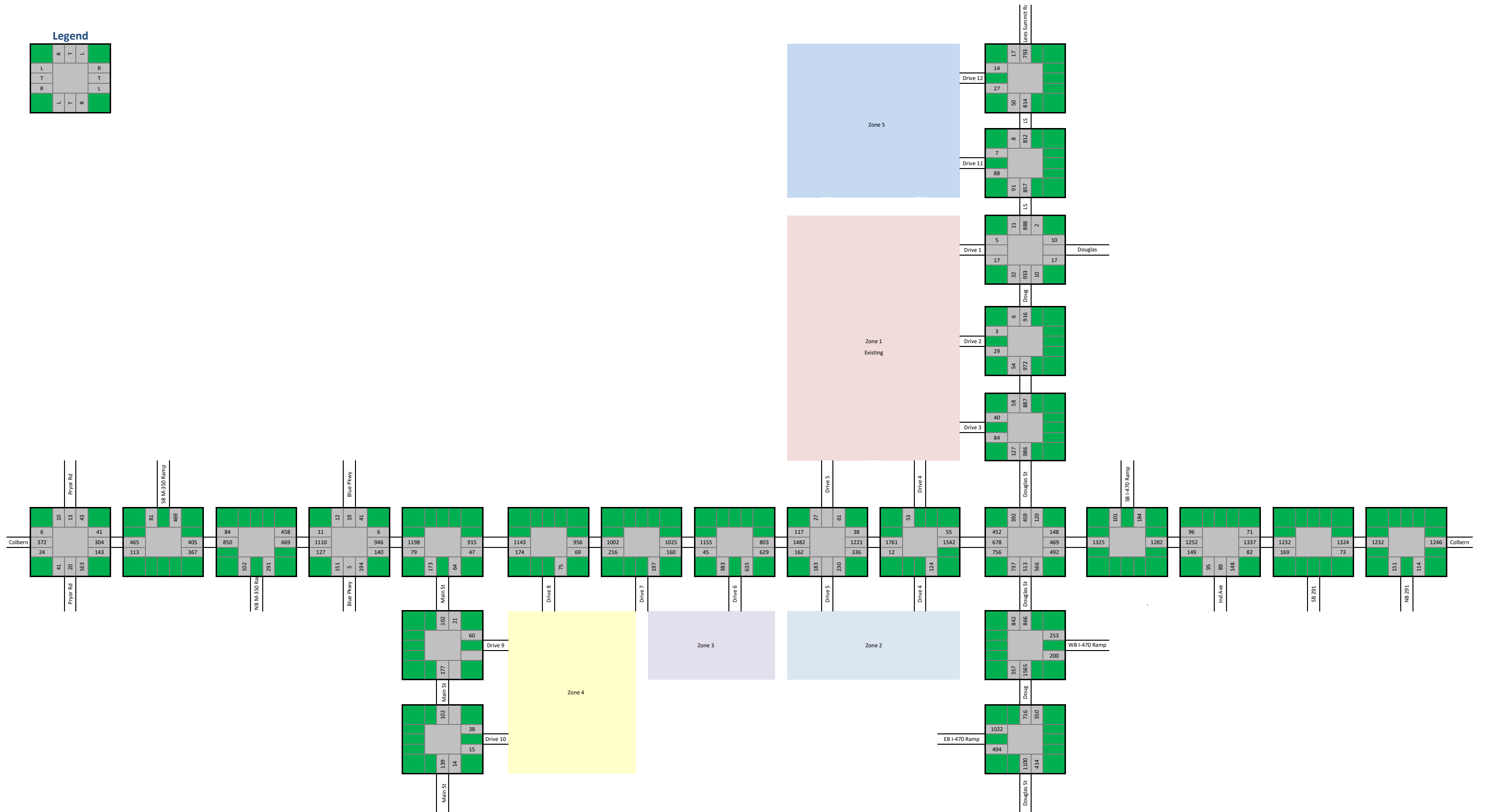
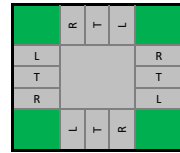


PM Total Trips - Zone 5



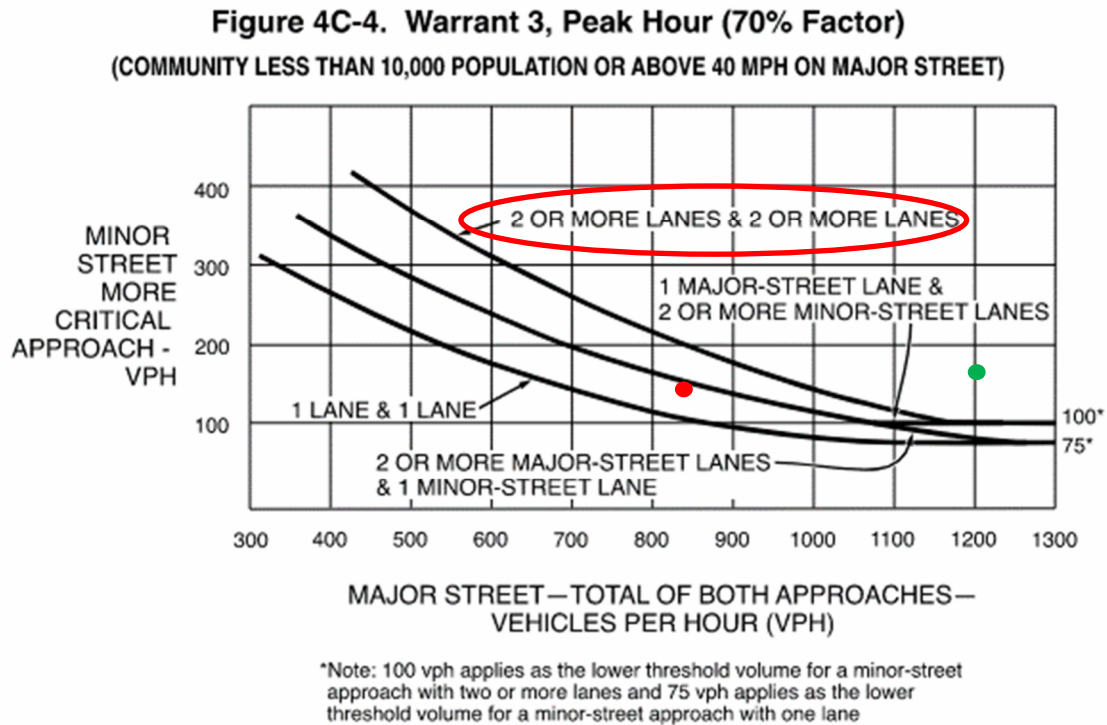
AM Ex + Trips Existing plus Trips - Zone 2-5

Legend



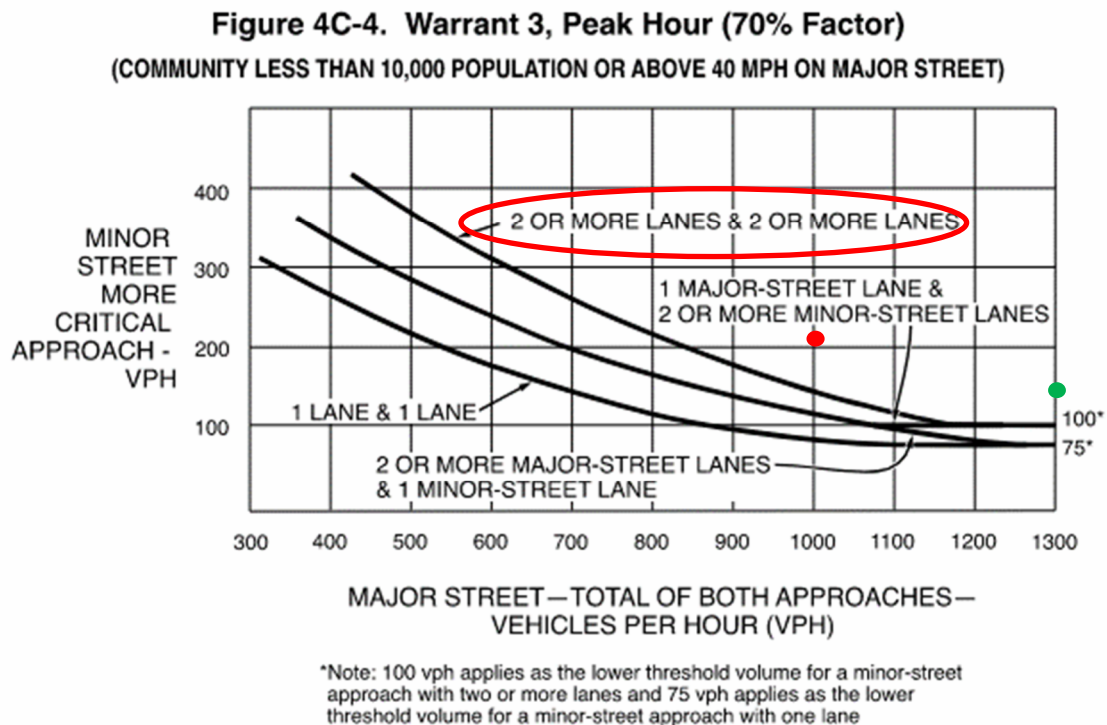
EXISTING PLUS ZONE 2

Colbern Road and Drive 5 – AM & PM

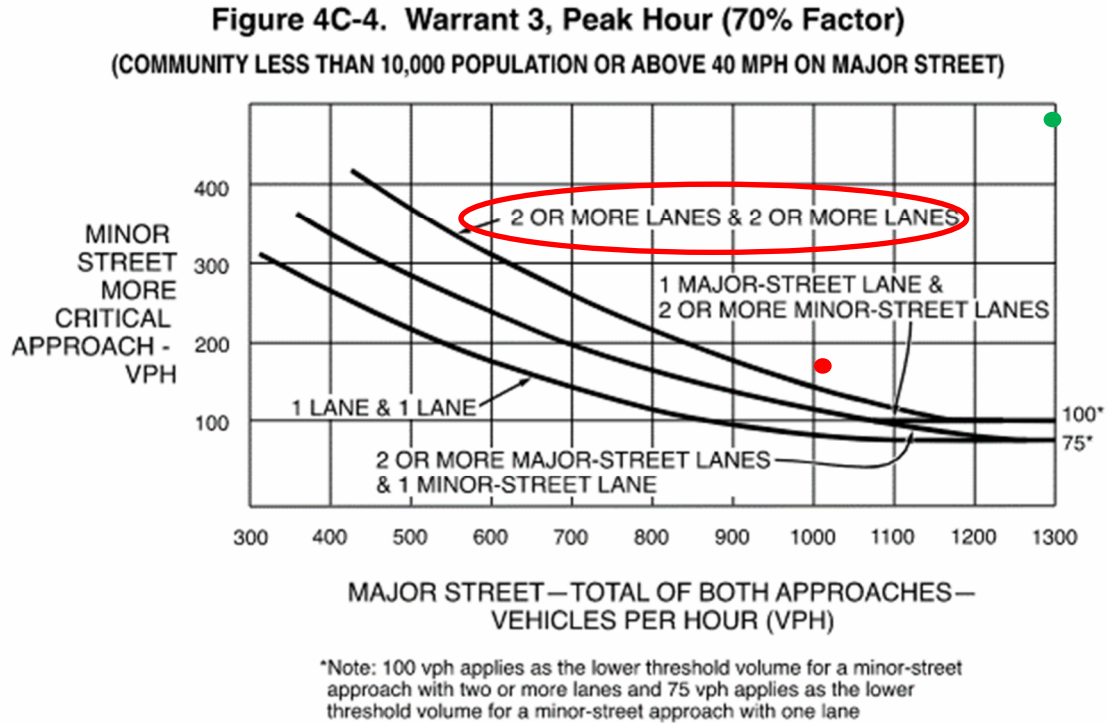


EXISTING PLUS ZONE 3

Colbern Road and Main St– AM & PM

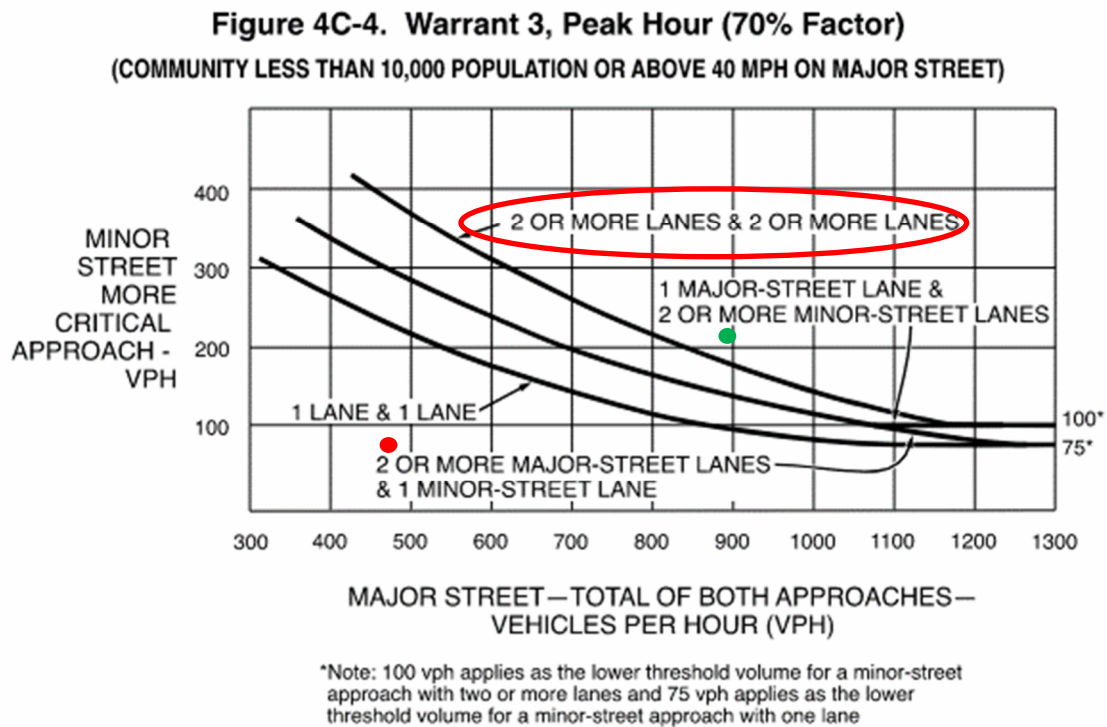


Colbern Road and Drive 6 – AM & PM



EXISTING PLUS ZONE 4

Colbern Road and Pryor Road– AM & PM



HCM 6th TWSC

3: Pryor Rd & Bannister Rd/Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	175	15	36	155	23	10	4	60	45	7	5
Future Vol, veh/h	3	175	15	36	155	23	10	4	60	45	7	5
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	190	16	39	168	25	11	4	65	49	8	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	193	0	0	206	0	0	370	475	103	362	471	97
Stage 1	-	-	-	-	-	-	204	204	-	259	259	-
Stage 2	-	-	-	-	-	-	166	271	-	103	212	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1378	-	-	1363	-	-	562	487	932	569	489	940
Stage 1	-	-	-	-	-	-	779	732	-	723	692	-
Stage 2	-	-	-	-	-	-	820	684	-	892	726	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1378	-	-	1363	-	-	538	470	932	512	472	940
Mov Cap-2 Maneuver	-	-	-	-	-	-	538	470	-	512	472	-
Stage 1	-	-	-	-	-	-	777	731	-	722	670	-
Stage 2	-	-	-	-	-	-	780	662	-	823	725	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.4			9.9			12.7		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	809	1378	-	-	1363	-	-	528				
HCM Lane V/C Ratio	0.099	0.002	-	-	0.029	-	-	0.117				
HCM Control Delay (s)	9.9	7.6	0	-	7.7	0.1	-	12.7				
HCM Lane LOS	A	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.4				

Queues

6: Colbern Rd & SB M-350 Ramp

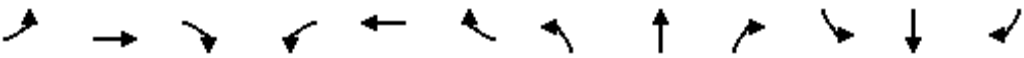
AM Existing (Counts + Approved Trips + Zone 1)

	→	↘	↙	←	↘	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	199	105	102	197	184	36
v/c Ratio	0.19	0.19	0.16	0.12	0.29	0.06
Control Delay	12.7	5.1	6.4	5.6	12.9	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	5.1	6.4	5.6	12.9	1.9
Queue Length 50th (ft)	17	0	9	9	31	0
Queue Length 95th (ft)	42	27	29	23	78	7
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	2821	1283	1064	3539	1649	1480
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	0.07	0.08	0.10	0.06	0.11	0.02
Intersection Summary						

HCM 6th Signalized Intersection Summary

6: Colbern Rd & SB M-350 Ramp

AM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↗	↑↑					↗		↗
Traffic Volume (veh/h)	0	183	97	94	181	0	0	0	0	169	0	33
Future Volume (veh/h)	0	183	97	94	181	0	0	0	0	169	0	33
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	199	0	102	197	0				184	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	684		651	1709	0				261	0	
Arrive On Green	0.00	0.19	0.00	0.10	0.48	0.00				0.15	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	199	0	102	197	0				184	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	1.2	0.0	1.0	0.7	0.0				2.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.2	0.0	1.0	0.7	0.0				2.4	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	684		651	1709	0				261	0	
V/C Ratio(X)	0.00	0.29		0.16	0.12	0.00				0.70	0.00	
Avail Cap(c_a), veh/h	0	3895		1537	6688	0				2616	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	8.4	0.0	6.4	3.4	0.0				9.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.1	0.0	0.0				3.5	0.0	0.0
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	0.0	0.3	0.0	0.2	0.1	0.0				0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	8.6	0.0	6.5	3.5	0.0				13.3	0.0	0.0
LnGrp LOS	A	A		A	A	A				B	A	
Approach Vol, veh/h		199			299						184	
Approach Delay, s/veh		8.6			4.5						13.3	
Approach LOS		A			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			7.0	9.2		8.0		16.1				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			14.5	26.5		35.5		45.5				
Max Q Clear Time (g_c+I1), s			3.0	3.2		4.4		2.7				
Green Ext Time (p_c), s			0.2	1.2		0.5		1.4				
Intersection Summary												
HCM 6th Ctrl Delay			8.1									
HCM 6th LOS			A									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	78	304	245	280	124	54
v/c Ratio	0.13	0.16	0.13	0.29	0.17	0.08
Control Delay	6.1	5.1	5.1	2.0	7.4	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	5.1	5.1	2.0	7.4	3.2
Queue Length 50th (ft)	6	12	9	0	10	0
Queue Length 95th (ft)	20	26	22	20	32	10
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	1118	3539	3539	1583	1770	1583
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	0.07	0.09	0.07	0.18	0.07	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	280	0	0	225	258	114	0	50	0	0	0
Future Volume (veh/h)	72	280	0	0	225	258	114	0	50	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	78	304	0	0	245	0	124	0	54			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	726	1196	0	0	1196		292	0	259			
Arrive On Green	0.34	0.34	0.00	0.00	0.34	0.00	0.16	0.00	0.16			
Sat Flow, veh/h	1135	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	78	304	0	0	245	0	124	0	54			
Grp Sat Flow(s),veh/h/ln	1135	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	0.9	1.1	0.0	0.0	0.9	0.0	1.1	0.0	0.5			
Cycle Q Clear(g_c), s	1.8	1.1	0.0	0.0	0.9	0.0	1.1	0.0	0.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	726	1196	0	0	1196		292	0	259			
V/C Ratio(X)	0.11	0.25	0.00	0.00	0.20		0.43	0.00	0.21			
Avail Cap(c_a), veh/h	3463	9767	0	0	9767		3115	0	2772			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.9	4.3	0.0	0.0	4.3	0.0	6.8	0.0	6.5			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.1	0.0	1.0	0.0	0.4			
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	0.1	0.1	0.0	0.0	0.1	0.0	0.3	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.0	4.4	0.0	0.0	4.3	0.0	7.8	0.0	6.9			
LnGrp LOS	A	A	A	A	A		A	A	A			
Approach Vol, veh/h	382			245			178					
Approach Delay, s/veh	4.6			4.3			7.5					
Approach LOS	A			A			A					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	7.4			10.6			10.6					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	31.5			49.5			49.5					
Max Q Clear Time (g_c+I1), s	3.1			3.8			2.9					
Green Ext Time (p_c), s	0.5			2.5			1.7					
Intersection Summary												
HCM 6th Ctrl Delay	5.1											
HCM 6th LOS	A											

HCM 6th TWSC
15: Main St & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

Intersection

Int Delay, s/veh 1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Vol, veh/h	251	83	33	449	41	13
Future Vol, veh/h	251	83	33	449	41	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	273	90	36	488	45	14

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	363
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1192
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1192
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	394	829	-	-	1192	-
HCM Lane V/C Ratio	0.113	0.017	-	-	0.03	-
HCM Control Delay (s)	15.3	9.4	-	-	8.1	0.1
HCM Lane LOS	C	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-

HCM 6th TWSC
18: Colbern Rd & Drive 5

AM Existing (Counts + Approved Trips + Zone 1)

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	77	181	438	24	84	35
Future Vol, veh/h	77	181	438	24	84	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	250	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	84	197	476	26	91	38
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	502	0	-	0	743	238
Stage 1	-	-	-	-	476	-
Stage 2	-	-	-	-	267	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1059	-	-	-	351	763
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	754	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1059	-	-	-	323	763
Mov Cap-2 Maneuver	-	-	-	-	323	-
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	754	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.6	0		17.4		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1059	-	-	-	323	763
HCM Lane V/C Ratio	0.079	-	-	-	0.283	0.05
HCM Control Delay (s)	8.7	-	-	-	20.5	10
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	-	1.1	0.2

HCM 6th TWSC
19: Colbern Rd & Drive 4

AM Existing (Counts + Approved Trips + Zone 1)

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Vol, veh/h	0	265	392	37	0	70
Future Vol, veh/h	0	265	392	37	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	288	426	40	0	76
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	213
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	792
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	792
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		10		
HCM LOS				B		
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	792		
HCM Lane V/C Ratio	-	-	-	0.096		
HCM Control Delay (s)	-	-	-	10		
HCM Lane LOS	-	-	-	B		
HCM 95th %tile Q(veh)	-	-	-	0.3		

Queues

21: Douglas St & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	48	143	97	612	312	77	68	332	313	67	408	86
v/c Ratio	0.10	0.34	0.28	0.68	0.26	0.12	0.17	0.29	0.28	0.15	0.37	0.11
Control Delay	12.1	33.4	2.0	28.4	19.0	1.5	15.1	21.2	1.4	14.9	22.6	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	33.4	2.0	28.4	19.0	1.5	15.1	21.2	1.4	14.9	22.6	1.7
Queue Length 50th (ft)	12	32	0	129	56	0	17	60	0	17	76	0
Queue Length 95th (ft)	29	63	1	187	86	9	47	108	26	46	134	13
Internal Link Dist (ft)	941			2187			1801			1236		
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	464	937	553	1253	1950	929	408	1139	1267	436	1103	789
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.15	0.18	0.49	0.16	0.08	0.17	0.29	0.25	0.15	0.37	0.11
Intersection Summary												

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

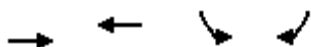
AM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	132	89	563	287	71	63	305	288	62	375	79
Future Volume (veh/h)	44	132	89	563	287	71	63	305	288	62	375	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	143	97	612	312	77	68	332	313	67	408	86
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	404	365	163	783	1012	451	438	1218	903	421	1217	613
Arrive On Green	0.04	0.10	0.10	0.23	0.28	0.28	0.05	0.34	0.34	0.05	0.34	0.34
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	48	143	97	612	312	77	68	332	313	67	408	86
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.2	2.5	3.8	10.9	4.5	2.4	1.6	4.4	7.0	1.5	5.6	2.3
Cycle Q Clear(g_c), s	1.2	2.5	3.8	10.9	4.5	2.4	1.6	4.4	7.0	1.5	5.6	2.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	365	163	783	1012	451	438	1218	903	421	1217	613
V/C Ratio(X)	0.12	0.39	0.60	0.78	0.31	0.17	0.16	0.27	0.35	0.16	0.34	0.14
Avail Cap(c_a), veh/h	474	1002	447	1343	2085	930	518	1218	903	475	1217	613
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.3	27.5	28.1	23.9	18.4	17.6	12.7	15.6	7.6	12.6	16.0	13.0
Incr Delay (d2), s/veh	0.1	0.7	3.5	1.7	0.2	0.2	0.2	0.6	1.1	0.2	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	0.5	1.0	1.5	4.4	1.8	0.8	0.6	1.8	2.2	0.6	2.2	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	28.2	31.6	25.6	18.6	17.8	12.8	16.2	8.6	12.8	16.8	13.5
LnGrp LOS	B	C	C	C	B	B	B	B	A	B	B	B
Approach Vol, veh/h		288			1001			713			561	
Approach Delay, s/veh		27.2			22.8			12.6			15.8	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	27.0	19.4	11.2	8.1	27.0	7.4	23.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	22.5	25.5	18.5	6.5	21.5	5.5	38.5				
Max Q Clear Time (g_c+I1), s	3.5	9.0	12.9	5.8	3.6	7.6	3.2	6.5				
Green Ext Time (p_c), s	0.0	2.8	1.9	0.9	0.0	2.5	0.0	2.4				
Intersection Summary												
HCM 6th Ctrl Delay			18.9									
HCM 6th LOS			B									

Queues

24: Colbern Rd & SB I-470 Ramp

AM Existing (Counts + Approved Trips + Zone 1)

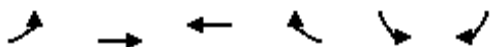


Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	513	1279	157	181
v/c Ratio	0.29	0.72	0.13	0.29
Control Delay	9.9	15.5	17.2	12.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.9	15.5	17.2	12.9
Queue Length 50th (ft)	60	201	21	30
Queue Length 95th (ft)	85	257	48	84
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	2978	2978	1252	623
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.43	0.13	0.29
Intersection Summary				

HCM 6th Signalized Intersection Summary

24: Colbern Rd & SB I-470 Ramp

AM Existing (Counts + Approved Trips + Zone 1)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	482	1138	0	132	152
Future Volume (veh/h)	0	482	1138	0	132	152
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	513	1279	0	157	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1776	1776	0	1264	
Arrive On Green	0.00	0.50	0.50	0.00	0.37	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	513	1279	0	157	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	5.7	18.8	0.0	2.0	0.0
Cycle Q Clear(g_c), s	0.0	5.7	18.8	0.0	2.0	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1776	1776	0	1264	
V/C Ratio(X)	0.00	0.29	0.72	0.00	0.12	
Avail Cap(c_a), veh/h	0	2998	2998	0	1264	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	9.8	13.1	0.0	14.1	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.6	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.9	6.5	0.0	0.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	9.9	13.7	0.0	14.3	0.0
LnGrp LOS	A	A	B	A	B	
Approach Vol, veh/h		513	1279		157	
Approach Delay, s/veh		9.9	13.7		14.3	
Approach LOS		A	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				38.0	29.0	38.0
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				56.5	24.5	56.5
Max Q Clear Time (g_c+I1), s				7.7	4.0	20.8
Green Ext Time (p_c), s				3.9	0.5	12.6
Intersection Summary						
HCM 6th Ctrl Delay			12.7			
HCM 6th LOS			B			

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

								
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	37	568	166	1218	125	77	144	113
v/c Ratio	0.16	0.44	0.36	0.72	0.15	0.14	0.24	0.19
Control Delay	7.7	16.0	9.4	17.7	4.0	24.2	24.8	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	16.0	9.4	17.7	4.0	24.2	24.8	5.3
Queue Length 50th (ft)	7	88	32	241	6	28	55	0
Queue Length 95th (ft)	17	130	54	291	29	67	113	29
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	233	2147	518	2441	1123	566	595	592
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.26	0.32	0.50	0.11	0.14	0.24	0.19
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	432	90	144	1060	109	66	124	97	0	0	0
Future Volume (veh/h)	34	432	90	144	1060	109	66	124	97	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	37	470	98	166	1218	0	77	144	113			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	247	1217	252	498	1629		562	591	501			
Arrive On Green	0.04	0.42	0.42	0.08	0.46	0.00	0.32	0.32	0.32			
Sat Flow, veh/h	1781	2931	607	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	37	284	284	166	1218	0	77	144	113			
Grp Sat Flow(s),veh/h/ln	1781	1777	1761	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	0.8	7.9	8.0	3.7	20.1	0.0	2.2	4.1	3.7			
Cycle Q Clear(g_c), s	0.8	7.9	8.0	3.7	20.1	0.0	2.2	4.1	3.7			
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	247	738	732	498	1629		562	591	501			
V/C Ratio(X)	0.15	0.38	0.39	0.33	0.75		0.14	0.24	0.23			
Avail Cap(c_a), veh/h	319	1085	1075	619	2419		562	591	501			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	12.4	14.5	14.5	10.6	15.9	0.0	17.4	18.1	18.0			
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.4	0.7	0.0	0.5	1.0	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			
%ile BackOfQ(50%),veh/ln	0.3	3.0	3.0	1.3	7.4	0.0	0.9	1.8	1.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	14.8	14.9	11.0	16.6	0.0	17.9	19.0	19.0			
LnGrp LOS	B	B	B	B	B		B	B	B			
Approach Vol, veh/h	605			1384			334					
Approach Delay, s/veh	14.7			15.9			18.8					
Approach LOS	B			B			B					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	27.0		10.2	34.1		7.1		37.2				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	22.5		10.5	43.5		5.5		48.5				
Max Q Clear Time (g_c+I1), s	6.1		5.7	10.0		2.8		22.1				
Green Ext Time (p_c), s	1.2		0.2	3.9		0.0		10.5				
Intersection Summary												
HCM 6th Ctrl Delay	16.0											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

	→	←	↖	↗
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	440	1293	252	132
v/c Ratio	0.25	0.73	0.38	0.19
Control Delay	10.5	17.0	21.0	4.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.5	17.0	21.0	4.9
Queue Length 50th (ft)	55	227	79	0
Queue Length 95th (ft)	79	292	175	36
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2604	2604	669	680
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.50	0.38	0.19
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

AM Existing (Counts + Approved Trips + Zone 1)

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	422	0	0	1164	222	116
Future Volume (veh/h)	422	0	0	1164	222	116
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	440	0	0	1293	252	132
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1740	0	0	1740	685	610
Arrive On Green	0.49	0.00	0.00	0.49	0.38	0.38
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	440	0	0	1293	252	132
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	5.2	0.0	0.0	20.9	7.3	4.0
Cycle Q Clear(g_c), s	5.2	0.0	0.0	20.9	7.3	4.0
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1740	0	0	1740	685	610
V/C Ratio(X)	0.25	0.00	0.00	0.74	0.37	0.22
Avail Cap(c_a), veh/h	2659	0	0	2659	685	610
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.6	0.0	0.0	14.6	15.8	14.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	1.5	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	7.5	3.0	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.7	0.0	0.0	15.3	17.3	15.6
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	440			1293	384	
Approach Delay, s/veh	10.7			15.3	16.7	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	32.0		39.5		39.5	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	27.5		53.5		53.5	
Max Q Clear Time (g_c+l1), s	9.3		7.2		22.9	
Green Ext Time (p_c), s	1.1		3.3		12.1	
Intersection Summary						
HCM 6th Ctrl Delay			14.6			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

AM Existing (Counts + Approved Trips + Zone 1)

						
Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	370	98	307	680	728	388
v/c Ratio	0.63	0.28	0.83	0.27	0.45	0.45
Control Delay	37.0	8.8	51.1	4.6	8.3	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	8.8	51.1	4.6	8.3	3.6
Queue Length 50th (ft)	92	0	150	52	59	0
Queue Length 95th (ft)	136	39	#294	88	114	56
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)			350			
Base Capacity (vph)	894	484	396	2551	1630	867
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	0.41	0.20	0.78	0.27	0.45	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

AM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	340	0	90	282	626	0	0	313	714
Future Volume (veh/h)	0	0	0	340	0	90	282	626	0	0	313	714
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				370	0	98	307	680	0	0	340	776
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				498	0	228	349	2642	0	0	919	1557
Arrive On Green				0.14	0.00	0.14	0.20	0.74	0.00	0.00	0.49	0.49
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				370	0	98	307	680	0	0	340	776
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				8.2	0.0	4.5	13.4	4.9	0.0	0.0	9.0	13.2
Cycle Q Clear(g_c), s				8.2	0.0	4.5	13.4	4.9	0.0	0.0	9.0	13.2
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				498	0	228	349	2642	0	0	919	1557
V/C Ratio(X)				0.74	0.00	0.43	0.88	0.26	0.00	0.00	0.37	0.50
Avail Cap(c_a), veh/h				928	0	426	412	2642	0	0	919	1557
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				32.8	0.0	31.2	31.3	3.3	0.0	0.0	12.7	13.7
Incr Delay (d2), s/veh				2.2	0.0	1.3	17.2	0.2	0.0	0.0	1.1	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
%ile BackOfQ(50%),veh/ln				3.5	0.0	1.8	7.2	1.3	0.0	0.0	3.8	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				35.0	0.0	32.5	48.5	3.5	0.0	0.0	13.8	14.9
LnGrp LOS				D	A	C	D	A	A	A	B	B
Approach Vol, veh/h					468			987			1116	
Approach Delay, s/veh					34.5			17.5			14.5	
Approach LOS					C			B			B	
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	64.0			20.2			43.8			16.0		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	59.5			18.5			36.5			21.5		
Max Q Clear Time (g_c+I1), s	6.9			15.4			15.2			10.2		
Green Ext Time (p_c), s	5.6			0.3			5.7			1.3		
Intersection Summary												
HCM 6th Ctrl Delay	19.3											
HCM 6th LOS	B											

Queues

36: Douglas St & EB I-470 Ramp

AM Existing (Counts + Approved Trips + Zone 1)

						
Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	483	520	504	197	55	654
v/c Ratio	0.42	0.83	0.33	0.25	0.31	0.35
Control Delay	17.8	27.1	17.4	4.5	36.1	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	27.1	17.4	4.5	36.1	11.5
Queue Length 50th (ft)	77	143	80	0	21	74
Queue Length 95th (ft)	110	253	158	46	62	162
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	2075	1012	1527	795	198	1875
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	0.23	0.51	0.33	0.25	0.28	0.35
Intersection Summary						

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

AM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	444	0	478	0	0	0	0	464	181	51	602	0
Future Volume (veh/h)	444	0	478	0	0	0	0	464	181	51	602	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	483	0	520				0	504	197	55	654	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1317	0	604				0	1367	610	83	1755	0
Arrive On Green	0.38	0.00	0.38				0.00	0.38	0.38	0.05	0.49	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	483	0	520				0	504	197	55	654	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	7.2	0.0	21.7				0.0	7.3	6.3	2.2	8.2	0.0
Cycle Q Clear(g_c), s	7.2	0.0	21.7				0.0	7.3	6.3	2.2	8.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1317	0	604				0	1367	610	83	1755	0
V/C Ratio(X)	0.37	0.00	0.86				0.00	0.37	0.32	0.67	0.37	0.00
Avail Cap(c_a), veh/h	1947	0	893				0	1367	610	186	1755	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.0	0.0	20.5				0.0	15.9	15.5	33.7	11.3	0.0
Incr Delay (d2), s/veh	0.2	0.0	5.8				0.0	0.8	1.4	8.9	0.6	0.0
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	2.7	0.0	8.3				0.0	2.9	2.4	1.1	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	0.0	26.3				0.0	16.6	16.9	42.6	11.9	0.0
LnGrp LOS	B	A	C				A	B	B	D	B	A
Approach Vol, veh/h	1003						701			709		
Approach Delay, s/veh	21.4						16.7			14.3		
Approach LOS	C						B			B		
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	7.8	32.2		31.9			40.0					
Change Period (Y+Rc), s	4.5	4.5		4.5			4.5					
Max Green Setting (Gmax), s	7.5	23.5		40.5			35.5					
Max Q Clear Time (g_c+I1), s	4.2	9.3		23.7			10.2					
Green Ext Time (p_c), s	0.0	3.5		3.7			4.8					
Intersection Summary												
HCM 6th Ctrl Delay	18.0											
HCM 6th LOS	B											

HCM 6th TWSC
40: Douglas St & Drive 3

AM Existing (Counts + Approved Trips + Zone 1)

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	118	78	342	398	36
Future Vol, veh/h	53	118	78	342	398	36
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	128	85	372	433	39
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	975	433	472	0	-	0
Stage 1	433	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	279	623	1090	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	583	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	257	623	1090	-	-	-
Mov Cap-2 Maneuver	388	-	-	-	-	-
Stage 1	603	-	-	-	-	-
Stage 2	583	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.4	1.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1090	-	388	623	-	-
HCM Lane V/C Ratio	0.078	-	0.148	0.206	-	-
HCM Control Delay (s)	8.6	-	15.9	12.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.5	0.8	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

AM Existing (Counts + Approved Trips + Zone 1)

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	54	16	379	380	2
Future Vol, veh/h	6	54	16	379	380	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	59	17	412	413	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	860	414	415	0	-	0
Stage 1	414	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	326	638	1144	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	645	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	321	638	1144	-	-	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	645	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.6	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1144	-	611	-	-	
HCM Lane V/C Ratio	0.015	-	0.107	-	-	
HCM Control Delay (s)	8.2	-	11.6	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

HCM 6th TWSC

44: Douglas St & Drive 1 & Lee's Summit Rd

AM Existing (Counts + Approved Trips + Zone 1)

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↖		↗	↖	
Traffic Vol, veh/h	11	1	32	4	1	3	9	366	10	9	346	4
Future Vol, veh/h	11	1	32	4	1	3	9	366	10	9	346	4
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	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	35	4	1	3	10	398	11	10	376	4
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	824	827	378	840	824	404	380	0	0	409	0	0
Stage 1	398	398	-	424	424	-	-	-	-	-	-	-
Stage 2	426	429	-	416	400	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	292	307	669	285	308	647	1178	-	-	1150	-	-
Stage 1	628	603	-	608	587	-	-	-	-	-	-	-
Stage 2	606	584	-	614	602	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	286	302	669	266	303	647	1178	-	-	1150	-	-
Mov Cap-2 Maneuver	286	302	-	266	303	-	-	-	-	-	-	-
Stage 1	623	598	-	603	582	-	-	-	-	-	-	-
Stage 2	597	579	-	576	597	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	13.1		15.6		0.2		0.2					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1178	-	-	491	348	1150	-	-				
HCM Lane V/C Ratio	0.008	-	-	0.097	0.025	0.009	-	-				
HCM Control Delay (s)	8.1	-	-	13.1	15.6	8.2	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0	-	-				

HCM 6th TWSC

3: Pryor Rd & Bannister Rd/Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

Intersection												
Int Delay, s/veh	5.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Vol, veh/h	6	272	24	80	199	41	41	20	103	43	19	10
Future Vol, veh/h	6	272	24	80	199	41	41	20	103	43	19	10
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	296	26	87	216	45	45	22	112	47	21	11
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	261	0	0	322	0	0	616	758	161	586	749	131
Stage 1	-	-	-	-	-	-	323	323	-	413	413	-
Stage 2	-	-	-	-	-	-	293	435	-	173	336	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1300	-	-	1235	-	-	375	335	855	394	339	894
Stage 1	-	-	-	-	-	-	663	649	-	587	592	-
Stage 2	-	-	-	-	-	-	691	579	-	812	640	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1300	-	-	1235	-	-	328	305	855	302	309	894
Mov Cap-2 Maneuver	-	-	-	-	-	-	328	305	-	302	309	-
Stage 1	-	-	-	-	-	-	658	644	-	583	543	-
Stage 2	-	-	-	-	-	-	602	531	-	677	636	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0.2		2.2			15.3			19			
HCM LOS						C			C			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	527	1300	-	-	1235	-	-	335				
HCM Lane V/C Ratio	0.338	0.005	-	-	0.07	-	-	0.234				
HCM Control Delay (s)	15.3	7.8	0	-	8.1	0.2	-	19				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.5	0	-	-	0.2	-	-	0.9				

Queues

6: Colbern Rd & SB M-350 Ramp

PM Existing (Counts + Approved Trips + Zone 1)

	→	↘	↙	←	↘	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	332	123	173	260	291	88
v/c Ratio	0.55	0.34	0.43	0.20	0.33	0.11
Control Delay	31.5	9.3	19.1	15.4	13.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	9.3	19.1	15.4	13.4	3.6
Queue Length 50th (ft)	72	3	53	40	72	0
Queue Length 95th (ft)	117	45	93	63	155	24
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	1191	609	508	2163	887	837
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	0.28	0.20	0.34	0.12	0.33	0.11
Intersection Summary						

HCM 6th Signalized Intersection Summary

6: Colbern Rd & SB M-350 Ramp

PM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	305	113	159	239	0	0	0	0	268	0	81
Future Volume (veh/h)	0	305	113	159	239	0	0	0	0	268	0	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	332	0	173	260	0				291	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	751		594	1716	0				400	0	
Arrive On Green	0.00	0.21	0.00	0.13	0.48	0.00				0.22	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	332	0	173	260	0				291	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	2.5	0.0	2.2	1.3	0.0				4.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	2.5	0.0	2.2	1.3	0.0				4.7	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	751		594	1716	0				400	0	
V/C Ratio(X)	0.00	0.44		0.29	0.15	0.00				0.73	0.00	
Avail Cap(c_a), veh/h	0	2828		1267	5137	0				2112	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	10.6	0.0	7.6	4.4	0.0				11.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.3	0.0	0.0				2.5	0.0	0.0
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	0.0	0.7	0.0	0.6	0.2	0.0				1.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	11.0	0.0	7.9	4.5	0.0				13.6	0.0	0.0
LnGrp LOS	A	B		A	A	A				B	A	
Approach Vol, veh/h		332			433						291	
Approach Delay, s/veh		11.0			5.8						13.6	
Approach LOS		B			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			8.4	11.0		11.4		19.4				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			15.5	24.5		36.5		44.5				
Max Q Clear Time (g_c+I1), s			4.2	4.5		6.7		3.3				
Green Ext Time (p_c), s			0.3	2.0		0.9		1.8				
Intersection Summary												
HCM 6th Ctrl Delay			9.6									
HCM 6th LOS			A									
Notes												

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

9: NB M-350 Ramp & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	91	532	322	272	111	98
v/c Ratio	0.17	0.29	0.17	0.28	0.20	0.17
Control Delay	6.5	5.9	5.4	1.9	9.5	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	5.9	5.4	1.9	9.5	3.6
Queue Length 50th (ft)	7	23	13	0	11	0
Queue Length 95th (ft)	24	46	28	20	36	17
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	1038	3539	3539	1583	1743	1560
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	0.09	0.15	0.09	0.17	0.06	0.06
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	489	0	0	296	250	102	0	90	0	0	0
Future Volume (veh/h)	84	489	0	0	296	250	102	0	90	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	91	532	0	0	322	0	111	0	98			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	715	1492	0	0	1492		294	0	262			
Arrive On Green	0.42	0.42	0.00	0.00	0.42	0.00	0.17	0.00	0.17			
Sat Flow, veh/h	1058	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	91	532	0	0	322	0	111	0	98			
Grp Sat Flow(s),veh/h/ln	1058	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	1.3	2.2	0.0	0.0	1.3	0.0	1.2	0.0	1.2			
Cycle Q Clear(g_c), s	2.6	2.2	0.0	0.0	1.3	0.0	1.2	0.0	1.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	715	1492	0	0	1492		294	0	262			
V/C Ratio(X)	0.13	0.36	0.00	0.00	0.22		0.38	0.00	0.37			
Avail Cap(c_a), veh/h	2734	8276	0	0	8276		2505	0	2229			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.8	4.3	0.0	0.0	4.0	0.0	8.1	0.0	8.1			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.1	0.0	0.8	0.0	0.9			
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	0.1	0.2	0.0	0.0	0.1	0.0	0.3	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.9	4.4	0.0	0.0	4.1	0.0	8.9	0.0	8.9			
LnGrp LOS	A	A	A	A	A		A	A	A			
Approach Vol, veh/h	623			322			209					
Approach Delay, s/veh	4.5			4.1			8.9					
Approach LOS	A			A			A					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	8.1			13.6			13.6					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	30.5			50.5			50.5					
Max Q Clear Time (g_c+I1), s	3.2			4.6			3.3					
Green Ext Time (p_c), s	0.6			4.6			2.3					
Intersection Summary												
HCM 6th Ctrl Delay	5.2											
HCM 6th LOS	A											

HCM 6th TWSC
15: Main St & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

Intersection								
Int Delay, s/veh	2.2							
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑			↑↑	↑	↑		
Traffic Vol, veh/h	612	58	20	328	75	38		
Future Vol, veh/h	612	58	20	328	75	38		
Conflicting Peds, #/hr	0	0	0	0	0	0		
Sign Control	Free	Free	Free	Free	Stop	Stop		
RT Channelized	-	None	-	None	-	None		
Storage Length	-	-	-	-	0	150		
Veh in Median Storage, #	0	-	-	0	0	-		
Grade, %	0	-	-	0	0	-		
Peak Hour Factor	92	92	92	92	92	92		
Heavy Vehicles, %	2	2	2	2	2	2		
Mvmt Flow	665	63	22	357	82	41		
Major/Minor	Major1		Major2		Minor1			
Conflicting Flow All	0	0	728	0	920	364		
Stage 1	-	-	-	-	697	-		
Stage 2	-	-	-	-	223	-		
Critical Hdwy	-	-	4.14	-	6.84	6.94		
Critical Hdwy Stg 1	-	-	-	-	5.84	-		
Critical Hdwy Stg 2	-	-	-	-	5.84	-		
Follow-up Hdwy	-	-	2.22	-	3.52	3.32		
Pot Cap-1 Maneuver	-	-	871	-	270	633		
Stage 1	-	-	-	-	455	-		
Stage 2	-	-	-	-	793	-		
Platoon blocked, %	-	-		-				
Mov Cap-1 Maneuver	-	-	871	-	262	633		
Mov Cap-2 Maneuver	-	-	-	-	262	-		
Stage 1	-	-	-	-	455	-		
Stage 2	-	-	-	-	768	-		
Approach	EB		WB		NB			
HCM Control Delay, s	0		0.6		20.2			
HCM LOS	C							
Minor Lane/Major Mvmt	NBLn1		NBLn2		EBT	EBR	WBL	WBT
Capacity (veh/h)	262		633		-	-	871	-
HCM Lane V/C Ratio	0.311		0.065		-	-	0.025	-
HCM Control Delay (s)	24.8		11.1		-	-	9.2	0.1
HCM Lane LOS	C		B		-	-	A	A
HCM 95th %tile Q(veh)	1.3		0.2		-	-	0.1	-

HCM 6th TWSC
18: Colbern Rd & Drive 5

PM Existing (Counts + Approved Trips + Zone 1)

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	117	504	315	38	61	27
Future Vol, veh/h	117	504	315	38	61	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	250	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	548	342	41	66	29
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	383	0	-	0	870	171
Stage 1	-	-	-	-	342	-
Stage 2	-	-	-	-	528	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1172	-	-	-	291	843
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1172	-	-	-	260	843
Mov Cap-2 Maneuver	-	-	-	-	260	-
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	556	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.6	0		19.2		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1172	-	-	-	260	843
HCM Lane V/C Ratio	0.109	-	-	-	0.255	0.035
HCM Control Delay (s)	8.4	-	-	-	23.5	9.4
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.4	-	-	-	1	0.1

HCM 6th TWSC
19: Colbern Rd & Drive 4

PM Existing (Counts + Approved Trips + Zone 1)

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Vol, veh/h	0	565	300	55	0	53
Future Vol, veh/h	0	565	300	55	0	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	614	326	60	0	58
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	163
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	853
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	853
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.5		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	853		
HCM Lane V/C Ratio	-	-	-	0.068		
HCM Control Delay (s)	-	-	-	9.5		
HCM Lane LOS	-	-	-	A		
HCM 95th %tile Q(veh)	-	-	-	0.2		

Queues

21: Douglas St & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	111	420	84	535	210	134	102	495	615	109	447	74
v/c Ratio	0.19	0.63	0.19	0.62	0.15	0.19	0.31	0.52	0.62	0.35	0.47	0.10
Control Delay	11.3	34.4	0.9	29.3	15.8	3.7	20.8	28.7	11.6	21.7	28.3	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	34.4	0.9	29.3	15.8	3.7	20.8	28.7	11.6	21.7	28.3	1.3
Queue Length 50th (ft)	28	100	0	122	35	0	32	111	140	34	100	0
Queue Length 95th (ft)	53	164	0	177	57	31	77	187	262	81	170	8
Internal Link Dist (ft)	941			2187			1801			1236		
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	571	858	521	1272	1917	919	338	954	1158	315	943	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.49	0.16	0.42	0.11	0.15	0.30	0.52	0.53	0.35	0.47	0.10
Intersection Summary												

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

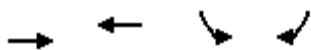
PM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	386	77	492	193	123	94	455	566	100	411	68
Future Volume (veh/h)	102	386	77	492	193	123	94	455	566	100	411	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	420	84	535	210	134	102	495	615	109	447	74
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	496	604	269	699	1092	487	393	1053	791	314	1058	575
Arrive On Green	0.06	0.17	0.17	0.20	0.31	0.31	0.06	0.30	0.30	0.06	0.30	0.30
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	111	420	84	535	210	134	102	495	615	109	447	74
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.8	7.5	3.1	9.9	2.9	4.3	2.6	7.7	20.0	2.8	6.8	2.1
Cycle Q Clear(g_c), s	2.8	7.5	3.1	9.9	2.9	4.3	2.6	7.7	20.0	2.8	6.8	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	496	604	269	699	1092	487	393	1053	791	314	1058	575
V/C Ratio(X)	0.22	0.70	0.31	0.76	0.19	0.27	0.26	0.47	0.78	0.35	0.42	0.13
Avail Cap(c_a), veh/h	520	948	423	1409	2117	944	460	1053	791	371	1058	575
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	26.4	24.5	25.4	17.2	17.7	15.0	19.4	13.8	15.2	19.0	14.4
Incr Delay (d2), s/veh	0.2	1.5	0.7	1.8	0.1	0.3	0.3	1.5	7.4	0.7	1.2	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	1.1	3.1	1.2	4.0	1.1	1.5	1.0	3.2	8.2	1.1	2.8	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.5	27.8	25.2	27.2	17.3	18.0	15.4	20.9	21.3	15.9	20.3	14.8
LnGrp LOS	B	C	C	C	B	B	B	C	C	B	C	B
Approach Vol, veh/h		615			879			1212			630	
Approach Delay, s/veh		25.1			23.4			20.6			18.9	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	24.5	18.2	16.0	8.8	24.6	8.9	25.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	20.0	27.5	18.0	6.8	19.7	5.3	40.2				
Max Q Clear Time (g_c+I1), s	4.8	22.0	11.9	9.5	4.6	8.8	4.8	6.3				
Green Ext Time (p_c), s	0.0	0.0	1.8	2.0	0.0	2.4	0.0	1.9				
Intersection Summary												
HCM 6th Ctrl Delay				21.8								
HCM 6th LOS				C								

Queues

24: Colbern Rd & SB I-470 Ramp

PM Existing (Counts + Approved Trips + Zone 1)

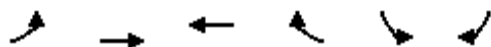


Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1119	1147	219	73
v/c Ratio	0.68	0.70	0.17	0.11
Control Delay	14.9	15.2	14.5	5.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.9	15.2	14.5	5.2
Queue Length 50th (ft)	158	164	26	0
Queue Length 95th (ft)	213	217	54	22
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	3278	3278	1327	657
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.34	0.35	0.17	0.11
Intersection Summary				

HCM 6th Signalized Intersection Summary

24: Colbern Rd & SB I-470 Ramp

PM Existing (Counts + Approved Trips + Zone 1)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	1052	1021	0	184	61
Future Volume (veh/h)	0	1052	1021	0	184	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	1119	1147	0	219	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1663	1663	0	1329	
Arrive On Green	0.00	0.47	0.47	0.00	0.38	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	1119	1147	0	219	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	14.9	15.5	0.0	2.5	0.0
Cycle Q Clear(g_c), s	0.0	14.9	15.5	0.0	2.5	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1663	1663	0	1329	
V/C Ratio(X)	0.00	0.67	0.69	0.00	0.16	
Avail Cap(c_a), veh/h	0	3345	3345	0	1329	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	12.6	12.8	0.0	12.3	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.1	5.3	0.0	0.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	13.1	13.3	0.0	12.6	0.0
LnGrp LOS	A	B	B	A	B	
Approach Vol, veh/h		1119	1147		219	
Approach Delay, s/veh		13.1	13.3		12.6	
Approach LOS		B	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				33.1	28.0	33.1
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				57.5	23.5	57.5
Max Q Clear Time (g_c+I1), s				16.9	4.5	17.5
Green Ext Time (p_c), s				10.7	0.7	11.1
Intersection Summary						
HCM 6th Ctrl Delay			13.1			
HCM 6th LOS			B			

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

								
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	59	1229	94	1260	82	87	103	172
v/c Ratio	0.24	0.74	0.36	0.70	0.10	0.17	0.19	0.30
Control Delay	8.2	19.1	10.3	16.9	3.6	26.3	26.4	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	19.1	10.3	16.9	3.6	26.3	26.4	6.3
Queue Length 50th (ft)	10	246	17	254	2	34	40	0
Queue Length 95th (ft)	23	320	32	306	21	75	87	43
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	257	2247	274	2326	1065	515	542	583
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.55	0.34	0.54	0.08	0.17	0.19	0.30
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	1003	128	82	1096	71	75	89	148	0	0	0
Future Volume (veh/h)	54	1003	128	82	1096	71	75	89	148	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	59	1090	139	94	1260	0	87	103	172			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	263	1452	185	283	1666		529	555	471			
Arrive On Green	0.05	0.46	0.46	0.06	0.47	0.00	0.30	0.30	0.30			
Sat Flow, veh/h	1781	3171	404	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	59	610	619	94	1260	0	87	103	172			
Grp Sat Flow(s),veh/h/ln	1781	1777	1798	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	1.2	20.5	20.6	1.9	21.1	0.0	2.6	3.0	6.2			
Cycle Q Clear(g_c), s	1.2	20.5	20.6	1.9	21.1	0.0	2.6	3.0	6.2			
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	263	814	823	283	1666		529	555	471			
V/C Ratio(X)	0.22	0.75	0.75	0.33	0.76		0.16	0.19	0.37			
Avail Cap(c_a), veh/h	337	1165	1179	363	2380		529	555	471			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	12.3	16.2	16.2	12.6	15.8	0.0	18.8	18.9	20.1			
Incr Delay (d2), s/veh	0.4	1.6	1.7	0.7	0.9	0.0	0.7	0.7	2.2			
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	0.4	7.8	7.9	0.7	7.8	0.0	1.1	1.3	2.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	17.8	17.9	13.3	16.7	0.0	19.5	19.7	22.3			
LnGrp LOS	B	B	B	B	B		B	B	C			
Approach Vol, veh/h	1288			1354			362					
Approach Delay, s/veh	17.6			16.5			20.9					
Approach LOS	B			B			C					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	26.0		8.7	37.7		8.0		38.4				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	21.5		7.5	47.5		6.5		48.5				
Max Q Clear Time (g_c+I1), s	8.2		3.9	22.6		3.2		23.1				
Green Ext Time (p_c), s	1.2		0.1	9.6		0.0		10.8				
Intersection Summary												
HCM 6th Ctrl Delay	17.5											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

	→	←	↶	↷
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1067	1161	126	130
v/c Ratio	0.65	0.70	0.18	0.19
Control Delay	14.6	15.7	16.0	5.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.6	15.7	16.0	5.6
Queue Length 50th (ft)	153	173	30	3
Queue Length 95th (ft)	205	231	78	38
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	3155	3155	691	688
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.34	0.37	0.18	0.19
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

PM Existing (Counts + Approved Trips + Zone 1)

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	1024	0	0	1045	111	114
Future Volume (veh/h)	1024	0	0	1045	111	114
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	1067	0	0	1161	126	130
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1662	0	0	1662	693	617
Arrive On Green	0.47	0.00	0.00	0.47	0.39	0.39
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	1067	0	0	1161	126	130
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	14.4	0.0	0.0	16.3	2.9	3.4
Cycle Q Clear(g_c), s	14.4	0.0	0.0	16.3	2.9	3.4
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1662	0	0	1662	693	617
V/C Ratio(X)	0.64	0.00	0.00	0.70	0.18	0.21
Avail Cap(c_a), veh/h	3190	0	0	3190	693	617
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	0.0	13.2	12.6	12.8
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.6	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	0.0	5.7	1.2	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.2	0.0	0.0	13.8	13.2	13.6
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	1067			1161	256	
Approach Delay, s/veh	13.2			13.8	13.4	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	29.0		33.9		33.9	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	24.5		56.5		56.5	
Max Q Clear Time (g_c+l1), s	5.4		16.4		18.3	
Green Ext Time (p_c), s	0.7		10.0		11.2	
Intersection Summary						
HCM 6th Ctrl Delay			13.5			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

PM Existing (Counts + Approved Trips + Zone 1)

						
Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	217	57	605	1155	721	344
v/c Ratio	0.50	0.22	0.88	0.43	0.62	0.49
Control Delay	37.6	8.0	38.4	4.2	19.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	8.0	38.4	4.2	19.5	6.0
Queue Length 50th (ft)	54	0	280	84	113	0
Queue Length 95th (ft)	88	24	#412	134	201	73
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)			350			
Base Capacity (vph)	749	402	804	2703	1170	695
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	0.14	0.75	0.43	0.62	0.49

Intersection Summary

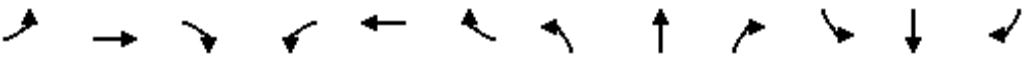
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

PM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↱		↰	↰	↱↱			↱↱	↰
Traffic Volume (veh/h)	0	0	0	200	0	52	557	1063	0	0	346	634
Future Volume (veh/h)	0	0	0	200	0	52	557	1063	0	0	346	634
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				217	0	57	605	1155	0	0	376	689
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				326	0	150	658	2816	0	0	685	1161
Arrive On Green				0.09	0.00	0.09	0.37	0.79	0.00	0.00	0.37	0.37
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				217	0	57	605	1155	0	0	376	689
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				4.8	0.0	2.7	25.8	7.9	0.0	0.0	12.7	14.0
Cycle Q Clear(g_c), s				4.8	0.0	2.7	25.8	7.9	0.0	0.0	12.7	14.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				326	0	150	658	2816	0	0	685	1161
V/C Ratio(X)				0.67	0.00	0.38	0.92	0.41	0.00	0.00	0.55	0.59
Avail Cap(c_a), veh/h				782	0	359	840	2816	0	0	685	1161
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				34.8	0.0	33.8	23.9	2.5	0.0	0.0	20.0	20.4
Incr Delay (d2), s/veh				2.3	0.0	1.6	12.9	0.4	0.0	0.0	3.1	2.2
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				2.1	0.0	1.1	12.5	1.6	0.0	0.0	5.8	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				37.1	0.0	35.4	36.8	3.0	0.0	0.0	23.1	22.6
LnGrp LOS				D	A	D	D	A	A	A	C	C
Approach Vol, veh/h					274			1760			1065	
Approach Delay, s/veh					36.8			14.6			22.8	
Approach LOS					D			B			C	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		67.5			33.9	33.6		12.0				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		63.0			37.5	21.0		18.0				
Max Q Clear Time (g_c+I1), s		9.9			27.8	16.0		6.8				
Green Ext Time (p_c), s		11.8			1.6	2.4		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				19.4								
HCM 6th LOS				B								
Notes												
User approved volume balancing among the lanes for turning movement.												

Queues

36: Douglas St & EB I-470 Ramp

PM Existing (Counts + Approved Trips + Zone 1)

						
Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	784	537	977	450	41	552
v/c Ratio	0.76	0.81	0.55	0.44	0.32	0.27
Control Delay	28.8	22.0	16.8	3.3	42.5	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	22.0	16.8	3.3	42.5	9.3
Queue Length 50th (ft)	169	115	176	0	19	61
Queue Length 95th (ft)	226	236	294	56	54	118
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	1483	836	1778	1019	129	2046
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	0.53	0.64	0.55	0.44	0.32	0.27
Intersection Summary						

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

PM Existing (Counts + Approved Trips + Zone 1)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	721	0	494	0	0	0	0	899	414	38	508	0
Future Volume (veh/h)	721	0	494	0	0	0	0	899	414	38	508	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	784	0	537				0	977	450	41	552	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1279	0	586				0	1532	684	66	1855	0
Arrive On Green	0.37	0.00	0.37				0.00	0.43	0.43	0.04	0.52	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	784	0	537				0	977	450	41	552	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	15.4	0.0	26.9				0.0	18.0	18.8	1.9	7.3	0.0
Cycle Q Clear(g_c), s	15.4	0.0	26.9				0.0	18.0	18.8	1.9	7.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1279	0	586				0	1532	684	66	1855	0
V/C Ratio(X)	0.61	0.00	0.92				0.00	0.64	0.66	0.63	0.30	0.00
Avail Cap(c_a), veh/h	1348	0	618				0	1532	684	118	1855	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.4	0.0	25.0				0.0	18.6	18.8	39.6	11.3	0.0
Incr Delay (d2), s/veh	0.8	0.0	18.0				0.0	2.0	4.9	9.4	0.4	0.0
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	6.1	0.0	12.4				0.0	7.4	7.4	1.0	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	43.0				0.0	20.6	23.7	49.0	11.7	0.0
LnGrp LOS	C	A	D				A	C	C	D	B	A
Approach Vol, veh/h	1321						1427			593		
Approach Delay, s/veh	30.6						21.6			14.3		
Approach LOS	C						C			B		
Timer - Assigned Phs	1	2	4		6							
Phs Duration (G+Y+Rc), s	7.6	40.4	35.3		48.0							
Change Period (Y+Rc), s	4.5	4.5	4.5		4.5							
Max Green Setting (Gmax), s	5.5	33.5	32.5		43.5							
Max Q Clear Time (g_c+l1), s	3.9	20.8	28.9		9.3							
Green Ext Time (p_c), s	0.0	6.9	1.9		4.2							
Intersection Summary												
HCM 6th Ctrl Delay	23.9											
HCM 6th LOS	C											

HCM 6th TWSC
40: Douglas St & Drive 3

PM Existing (Counts + Approved Trips + Zone 1)

Intersection

Int Delay, s/veh 2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	84	127	553	495	58
Future Vol, veh/h	40	84	127	553	495	58
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	91	138	601	538	63

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1415	538	601	0	-	0
Stage 1	538	-	-	-	-	-
Stage 2	877	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	151	543	976	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	130	543	976	-	-	-
Mov Cap-2 Maneuver	264	-	-	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	407	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	1.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	976	-	264	543	-	-
HCM Lane V/C Ratio	0.141	-	0.165	0.168	-	-
HCM Control Delay (s)	9.3	-	21.3	13	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.5	-	0.6	0.6	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

PM Existing (Counts + Approved Trips + Zone 1)

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	29	54	539	524	6
Future Vol, veh/h	3	29	54	539	524	6
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	32	59	586	570	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1278	574	577	0	-	0
Stage 1	574	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	183	518	996	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	172	518	996	-	-	-
Mov Cap-2 Maneuver	311	-	-	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.9	0.8		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	996	-	488	-	-	
HCM Lane V/C Ratio	0.059	-	0.071	-	-	
HCM Control Delay (s)	8.8	-	12.9	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-	

HCM 6th TWSC

44: Douglas St & Drive 1 & Lee's Summit Rd

PM Existing (Counts + Approved Trips + Zone 1)

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖		↗	↖	
Traffic Vol, veh/h	5	1	17	17	1	10	32	500	10	2	496	11
Future Vol, veh/h	5	1	17	17	1	10	32	500	10	2	496	11
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	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	18	18	1	11	35	543	11	2	539	12
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1174	1173	545	1178	1174	549	551	0	0	554	0	0
Stage 1	549	549	-	619	619	-	-	-	-	-	-	-
Stage 2	625	624	-	559	555	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	169	192	538	168	192	535	1019	-	-	1016	-	-
Stage 1	520	516	-	476	480	-	-	-	-	-	-	-
Stage 2	473	478	-	513	513	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	160	185	538	157	185	535	1019	-	-	1016	-	-
Mov Cap-2 Maneuver	160	185	-	157	185	-	-	-	-	-	-	-
Stage 1	502	515	-	460	464	-	-	-	-	-	-	-
Stage 2	446	462	-	493	512	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	16.5		24.8		0.5		0					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1019	-	-	337	212	1016	-	-				
HCM Lane V/C Ratio	0.034	-	-	0.074	0.144	0.002	-	-				
HCM Control Delay (s)	8.7	-	-	16.5	24.8	8.6	-	-				
HCM Lane LOS	A	-	-	C	C	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.5	0	-	-				

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Vol, veh/h	3	184	15	39	161	23	10	4	66	45	7	5
Future Vol, veh/h	3	184	15	39	161	23	10	4	66	45	7	5
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	200	16	42	175	25	11	4	72	49	8	5
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	200	0	0	216	0	0	390	498	108	380	494	100
Stage 1	-	-	-	-	-	-	214	214	-	272	272	-
Stage 2	-	-	-	-	-	-	176	284	-	108	222	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1370	-	-	1351	-	-	543	472	925	552	475	936
Stage 1	-	-	-	-	-	-	768	724	-	711	683	-
Stage 2	-	-	-	-	-	-	809	675	-	886	718	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1370	-	-	1351	-	-	518	455	925	491	457	936
Mov Cap-2 Maneuver	-	-	-	-	-	-	518	455	-	491	457	-
Stage 1	-	-	-	-	-	-	766	723	-	710	659	-
Stage 2	-	-	-	-	-	-	767	651	-	811	717	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0.1		1.4			10			13.1			
HCM LOS						B			B			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	804	1370	-	-	1351	-	-	508				
HCM Lane V/C Ratio	0.108	0.002	-	-	0.031	-	-	0.122				
HCM Control Delay (s)	10	7.6	0	-	7.8	0.1	-	13.1				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.4				

Queues

6: Colbern Rd & SB M-350 Ramp

AM Existing plus Zone 2

	→	↘	↙	←	↘	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	424	105	114	207	203	36
v/c Ratio	0.37	0.14	0.18	0.09	0.37	0.07
Control Delay	14.1	6.0	6.3	5.2	17.9	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	6.0	6.3	5.2	17.9	2.1
Queue Length 50th (ft)	46	5	12	11	44	0
Queue Length 95th (ft)	96	33	35	27	113	7
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	1632	1026	975	3278	1443	1304
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	0.26	0.10	0.12	0.06	0.14	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary 6: Colbern Rd & SB M-350 Ramp

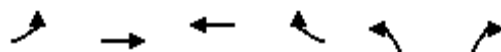
AM Existing plus Zone 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↗	↑↑					↗		↗
Traffic Volume (veh/h)	198	192	97	105	190	0	0	0	0	187	0	33
Future Volume (veh/h)	198	192	97	105	190	0	0	0	0	187	0	33
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	1870	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	215	209	0	114	207	0				203	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	0				2	0	2
Cap, veh/h	589	490		647	1954	0				282	0	
Arrive On Green	0.30	0.30	0.00	0.10	0.55	0.00				0.16	0.00	0.00
Sat Flow, veh/h	1175	1617	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	215	209	0	114	207	0				203	0	0
Grp Sat Flow(s), veh/h/ln	1175	1617	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	4.8	3.2	0.0	1.3	0.9	0.0				3.3	0.0	0.0
Cycle Q Clear(g_c), s	4.8	3.2	0.0	1.3	0.9	0.0				3.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	589	490		647	1954	0				282	0	
V/C Ratio(X)	0.36	0.43		0.18	0.11	0.00				0.72	0.00	
Avail Cap(c_a), veh/h	1204	1336		1304	5125	0				2107	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	9.2	8.6	0.0	6.0	3.3	0.0				12.3	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.6	0.0	0.1	0.0	0.0				3.4	0.0	0.0
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	0.9	0.8	0.0	0.3	0.1	0.0				1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	9.2	0.0	6.2	3.3	0.0				15.8	0.0	0.0
LnGrp LOS	A	A		A	A	A				B	A	
Approach Vol, veh/h		424			321						203	
Approach Delay, s/veh		9.4			4.3						15.8	
Approach LOS		A			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			7.6	13.9		9.4		21.5				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			14.5	25.5		36.5		44.5				
Max Q Clear Time (g_c+I1), s			3.3	6.8		5.3		2.9				
Green Ext Time (p_c), s			0.2	2.6		0.6		1.4				
Intersection Summary												
HCM 6th Ctrl Delay			9.0									
HCM 6th LOS			A									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

AM Existing plus Zone 2



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	78	340	266	292	143	136
v/c Ratio	0.15	0.20	0.16	0.32	0.23	0.21
Control Delay	6.9	6.1	6.0	2.2	8.4	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	6.1	6.0	2.2	8.4	3.0
Queue Length 50th (ft)	6	14	11	0	12	0
Queue Length 95th (ft)	20	31	24	21	37	17
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	1095	3539	3539	1583	1770	1583
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	0.07	0.10	0.08	0.18	0.08	0.09
Intersection Summary						

HCM 6th Signalized Intersection Summary 9: NB M-350 Ramp & Colbern Rd

AM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	313	0	0	245	269	132	0	125	0	0	0
Future Volume (veh/h)	72	313	0	0	245	269	132	0	125	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	78	340	0	0	266	0	143	0	136			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	689	1218	0	0	1218		354	0	315			
Arrive On Green	0.34	0.34	0.00	0.00	0.34	0.00	0.20	0.00	0.20			
Sat Flow, veh/h	1113	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	78	340	0	0	266	0	143	0	136			
Grp Sat Flow(s),veh/h/ln	1113	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	1.1	1.4	0.0	0.0	1.0	0.0	1.4	0.0	1.5			
Cycle Q Clear(g_c), s	2.1	1.4	0.0	0.0	1.0	0.0	1.4	0.0	1.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	689	1218	0	0	1218		354	0	315			
V/C Ratio(X)	0.11	0.28	0.00	0.00	0.22		0.40	0.00	0.43			
Avail Cap(c_a), veh/h	3056	8774	0	0	8774		2947	0	2623			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.3	4.7	0.0	0.0	4.6	0.0	6.9	0.0	6.9			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.1	0.0	0.7	0.0	0.9			
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	0.1	0.2	0.0	0.0	0.1	0.0	0.3	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.4	4.8	0.0	0.0	4.7	0.0	7.6	0.0	7.8			
LnGrp LOS	A	A	A	A	A		A	A	A			
Approach Vol, veh/h	418			266			279					
Approach Delay, s/veh	4.9			4.7			7.7					
Approach LOS	A			A			A					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	8.4			11.2			11.2					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	32.5			48.5			48.5					
Max Q Clear Time (g_c+I1), s	3.5			4.1			3.0					
Green Ext Time (p_c), s	0.9			2.8			1.9					
Intersection Summary												
HCM 6th Ctrl Delay	5.7											
HCM 6th LOS	A											

HCM 6th TWSC
15: Main St & Colbern Rd

AM Existing plus Zone 2

Intersection

Int Delay, s/veh 1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Vol, veh/h	312	83	35	486	41	17
Future Vol, veh/h	312	83	35	486	41	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	339	90	38	528	45	18

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	429
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1127
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1127
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	344	790	-	-	1127	-
HCM Lane V/C Ratio	0.13	0.023	-	-	0.034	-
HCM Control Delay (s)	17	9.7	-	-	8.3	0.2
HCM Lane LOS	C	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-

Queues

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	207	60	130	476	26	43	44	91	39
v/c Ratio	0.24	0.28	0.15	0.29	0.59	0.06	0.07	0.06	0.14	0.05
Control Delay	13.6	22.6	5.9	13.9	25.5	0.3	12.0	4.8	12.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	22.6	5.9	13.9	25.5	0.3	12.0	4.8	12.6	5.0
Queue Length 50th (ft)	20	36	0	32	89	0	9	0	20	0
Queue Length 95th (ft)	43	65	22	62	136	1	29	18	53	17
Internal Link Dist (ft)	678			724			763			589
Turn Bay Length (ft)	200		200	200		250				
Base Capacity (vph)	481	2040	943	530	1982	919	653	783	649	782
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.10	0.06	0.25	0.24	0.03	0.07	0.06	0.14	0.05
Intersection Summary										

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	190	55	120	438	24	40	1	40	84	1	35
Future Volume (veh/h)	77	190	55	120	438	24	40	1	40	84	1	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	207	60	130	476	26	43	1	43	91	1	38
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	688	307	437	756	337	784	18	772	779	20	770
Arrive On Green	0.06	0.19	0.19	0.08	0.21	0.21	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1368	36	1554	1362	41	1550
Grp Volume(v), veh/h	84	207	60	130	476	26	43	0	44	91	0	39
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1368	0	1591	1362	0	1591
Q Serve(g_s), s	2.1	3.0	1.9	3.4	7.2	0.8	1.0	0.0	0.9	2.2	0.0	0.8
Cycle Q Clear(g_c), s	2.1	3.0	1.9	3.4	7.2	0.8	1.7	0.0	0.9	3.0	0.0	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.97
Lane Grp Cap(c), veh/h	315	688	307	437	756	337	784	0	790	779	0	791
V/C Ratio(X)	0.27	0.30	0.20	0.30	0.63	0.08	0.05	0.00	0.06	0.12	0.00	0.05
Avail Cap(c_a), veh/h	578	2125	948	635	2065	921	784	0	790	779	0	791
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	20.5	20.1	16.9	21.2	18.7	8.2	0.0	7.7	8.5	0.0	7.7
Incr Delay (d2), s/veh	0.4	0.2	0.3	0.4	0.9	0.1	0.1	0.0	0.1	0.3	0.0	0.1
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	0.8	1.2	0.7	1.3	2.9	0.3	0.3	0.0	0.3	0.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	20.7	20.4	17.3	22.1	18.8	8.3	0.0	7.9	8.8	0.0	7.8
LnGrp LOS	B	C	C	B	C	B	A	A	A	A	A	A
Approach Vol, veh/h	351			632			87			130		
Approach Delay, s/veh	19.9			21.0			8.1			8.5		
Approach LOS	B			C			A			A		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	34.0		9.4	16.0		34.0	8.2	17.1				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	29.5		11.5	35.5		29.5	12.5	34.5				
Max Q Clear Time (g_c+I1), s	3.7		5.4	5.0		5.0	4.1	9.2				
Green Ext Time (p_c), s	0.3		0.1	1.6		0.4	0.1	3.4				
Intersection Summary												
HCM 6th Ctrl Delay	18.4											
HCM 6th LOS	B											

HCM 6th TWSC
19: Drive 4 & Colbern Rd

AM Existing plus Zone 2

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑			↑			↑
Traffic Vol, veh/h	0	305	9	0	512	37	0	0	34	0	0	70
Future Vol, veh/h	0	305	9	0	512	37	0	0	34	0	0	70
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	332	10	0	557	40	0	0	37	0	0	76
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	166	-	-	279
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	849	0	0	718
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	849	-	-	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			9.4			10.6		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1			EBT			EBR			WBT		
Capacity (veh/h)	849			-			-			-		
HCM Lane V/C Ratio	0.044			-			-			-		
HCM Control Delay (s)	9.4			-			-			-		
HCM Lane LOS	A			-			-			-		
HCM 95th %tile Q(veh)	0.1			-			-			-		

Queues

21: Douglas St & Colbern Rd

AM Existing plus Zone 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	66	162	140	612	342	77	138	332	313	67	408	116
v/c Ratio	0.15	0.38	0.40	0.69	0.29	0.13	0.34	0.28	0.27	0.15	0.41	0.16
Control Delay	12.5	33.6	6.0	29.5	19.3	1.4	17.3	21.4	1.5	15.3	24.7	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	33.6	6.0	29.5	19.3	1.4	17.3	21.4	1.5	15.3	24.7	3.7
Queue Length 50th (ft)	17	36	0	129	63	0	37	60	0	17	79	0
Queue Length 95th (ft)	37	69	27	192	94	9	87	111	27	48	140	29
Internal Link Dist (ft)	941			2187			1801			1236		
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	439	890	534	1190	1853	889	411	1180	1254	443	986	731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.18	0.26	0.51	0.18	0.09	0.34	0.28	0.25	0.15	0.41	0.16
Intersection Summary												

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

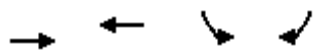
AM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	149	129	563	315	71	127	305	288	62	375	107
Future Volume (veh/h)	61	149	129	563	315	71	127	305	288	62	375	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	162	140	612	342	77	138	332	313	67	408	116
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	418	459	205	775	1070	477	431	1172	879	404	1089	569
Arrive On Green	0.05	0.13	0.13	0.22	0.30	0.30	0.08	0.33	0.33	0.05	0.31	0.31
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	66	162	140	612	342	77	138	332	313	67	408	116
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.7	2.8	5.8	11.4	5.1	2.4	3.5	4.7	7.5	1.6	6.1	3.5
Cycle Q Clear(g_c), s	1.7	2.8	5.8	11.4	5.1	2.4	3.5	4.7	7.5	1.6	6.1	3.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	418	459	205	775	1070	477	431	1172	879	404	1089	569
V/C Ratio(X)	0.16	0.35	0.68	0.79	0.32	0.16	0.32	0.28	0.36	0.17	0.37	0.20
Avail Cap(c_a), veh/h	469	964	430	1292	2006	895	492	1172	879	454	1089	569
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	27.1	28.4	24.9	18.4	17.5	14.4	16.9	8.4	13.7	18.5	15.1
Incr Delay (d2), s/veh	0.2	0.5	4.0	1.8	0.2	0.2	0.4	0.6	1.1	0.2	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	0.7	1.2	2.3	4.6	2.0	0.9	1.4	1.9	2.4	0.6	2.5	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.2	27.6	32.4	26.8	18.6	17.7	14.8	17.5	9.6	13.9	19.5	15.9
LnGrp LOS	B	C	C	C	B	B	B	B	A	B	B	B
Approach Vol, veh/h	368			1031			783			591		
Approach Delay, s/veh	27.2			23.4			13.9			18.2		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	27.0	19.8	13.3	9.7	25.4	8.1	25.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	22.5	25.5	18.5	7.5	20.5	5.5	38.5				
Max Q Clear Time (g_c+I1), s	3.6	9.5	13.4	7.8	5.5	8.1	3.7	7.1				
Green Ext Time (p_c), s	0.0	2.7	1.9	1.0	0.1	2.5	0.0	2.6				
Intersection Summary												
HCM 6th Ctrl Delay	20.1											
HCM 6th LOS	C											

Queues

24: Colbern Rd & SB I-470 Ramp

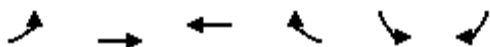
AM Existing plus Zone 2



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	531	1306	157	186
v/c Ratio	0.29	0.72	0.13	0.30
Control Delay	9.8	15.4	17.8	13.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.8	15.4	17.8	13.9
Queue Length 50th (ft)	63	207	22	33
Queue Length 95th (ft)	88	265	49	90
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	2919	2919	1228	610
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.45	0.13	0.30
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

AM Existing plus Zone 2



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	499	1162	0	132	156
Future Volume (veh/h)	0	499	1162	0	132	156
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	531	1306	0	157	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1801	1801	0	1247	
Arrive On Green	0.00	0.51	0.51	0.00	0.36	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	531	1306	0	157	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	5.9	19.5	0.0	2.1	0.0
Cycle Q Clear(g_c), s	0.0	5.9	19.5	0.0	2.1	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1801	1801	0	1247	
V/C Ratio(X)	0.00	0.29	0.73	0.00	0.13	
Avail Cap(c_a), veh/h	0	2957	2957	0	1247	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	9.7	13.1	0.0	14.5	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.6	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.0	6.8	0.0	0.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	9.8	13.6	0.0	14.7	0.0
LnGrp LOS	A	A	B	A	B	
Approach Vol, veh/h		531	1306		157	
Approach Delay, s/veh		9.8	13.6		14.7	
Approach LOS		A	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				38.9	29.0	38.9
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				56.5	24.5	56.5
Max Q Clear Time (g_c+I1), s				7.9	4.1	21.5
Green Ext Time (p_c), s				4.1	0.5	12.9
Intersection Summary						
HCM 6th Ctrl Delay			12.7			
HCM 6th LOS			B			

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing plus Zone 2

								
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	39	584	166	1244	125	79	144	113
v/c Ratio	0.17	0.44	0.36	0.72	0.15	0.14	0.24	0.19
Control Delay	7.9	16.0	9.3	17.7	4.0	24.7	25.2	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	16.0	9.3	17.7	4.0	24.7	25.2	5.3
Queue Length 50th (ft)	7	92	32	248	7	30	57	0
Queue Length 95th (ft)	18	134	54	301	29	69	113	29
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	229	2125	515	2413	1110	559	589	587
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.27	0.32	0.52	0.11	0.14	0.24	0.19
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	446	91	144	1082	109	68	124	97	0	0	0
Future Volume (veh/h)	36	446	91	144	1082	109	68	124	97	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	39	485	99	166	1244	0	79	144	113			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	245	1246	253	496	1650		555	582	494			
Arrive On Green	0.04	0.42	0.42	0.08	0.46	0.00	0.31	0.31	0.31			
Sat Flow, veh/h	1781	2942	597	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	39	292	292	166	1244	0	79	144	113			
Grp Sat Flow(s),veh/h/ln	1781	1777	1763	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	0.8	8.2	8.3	3.7	20.9	0.0	2.3	4.2	3.8			
Cycle Q Clear(g_c), s	0.8	8.2	8.3	3.7	20.9	0.0	2.3	4.2	3.8			
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	245	752	746	496	1650		555	582	494			
V/C Ratio(X)	0.16	0.39	0.39	0.33	0.75		0.14	0.25	0.23			
Avail Cap(c_a), veh/h	314	1070	1061	615	2385		555	582	494			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	12.5	14.4	14.4	10.5	16.0	0.0	17.9	18.6	18.4			
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.4	0.8	0.0	0.5	1.0	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			
%ile BackOfQ(50%),veh/ln	0.3	3.1	3.1	1.3	7.7	0.0	1.0	1.9	1.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	14.7	14.7	10.9	16.8	0.0	18.5	19.6	19.5			
LnGrp LOS	B	B	B	B	B		B	B	B			
Approach Vol, veh/h	623			1410			336					
Approach Delay, s/veh	14.6			16.1			19.3					
Approach LOS	B			B			B					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	27.0		10.2	35.1		7.2		38.0				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	22.5		10.5	43.5		5.5		48.5				
Max Q Clear Time (g_c+l1), s	6.2		5.7	10.3		2.8		22.9				
Green Ext Time (p_c), s	1.2		0.2	4.0		0.0		10.7				
Intersection Summary												
HCM 6th Ctrl Delay	16.2											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

AM Existing plus Zone 2



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	451	1313	257	132
v/c Ratio	0.25	0.74	0.39	0.20
Control Delay	10.4	17.0	21.7	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.4	17.0	21.7	5.1
Queue Length 50th (ft)	57	233	85	0
Queue Length 95th (ft)	81	298	181	37
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2570	2570	660	673
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.51	0.39	0.20
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

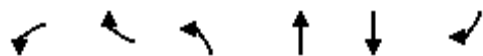
AM Existing plus Zone 2

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	433	0	0	1182	226	116
Future Volume (veh/h)	433	0	0	1182	226	116
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	451	0	0	1313	257	132
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1757	0	0	1757	679	604
Arrive On Green	0.49	0.00	0.00	0.49	0.38	0.38
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	451	0	0	1313	257	132
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	5.3	0.0	0.0	21.4	7.5	4.1
Cycle Q Clear(g_c), s	5.3	0.0	0.0	21.4	7.5	4.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1757	0	0	1757	679	604
V/C Ratio(X)	0.26	0.00	0.00	0.75	0.38	0.22
Avail Cap(c_a), veh/h	2633	0	0	2633	679	604
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.6	0.0	0.0	14.6	16.2	15.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.7	1.6	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	7.7	3.2	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.6	0.0	0.0	15.3	17.8	15.9
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	451			1313	389	
Approach Delay, s/veh	10.6			15.3	17.1	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	32.0		40.2		40.2	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	27.5		53.5		53.5	
Max Q Clear Time (g_c+I1), s	9.5		7.3		23.4	
Green Ext Time (p_c), s	1.1		3.4		12.3	
Intersection Summary						
HCM 6th Ctrl Delay			14.6			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	52	45	307	682	765	394
v/c Ratio	0.21	0.19	0.73	0.24	0.46	0.44
Control Delay	35.9	1.7	35.7	3.6	10.8	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	1.7	35.7	3.6	10.8	4.0
Queue Length 50th (ft)	12	0	138	55	87	0
Queue Length 95th (ft)	29	0	203	77	160	63
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)			350			
Base Capacity (vph)	248	506	601	2881	1658	897
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	0.21	0.09	0.51	0.24	0.46	0.44
Intersection Summary						

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↱		↰	↰	↰↱			↰↱	↰
Traffic Volume (veh/h)	0	0	0	48	0	41	282	627	0	0	341	725
Future Volume (veh/h)	0	0	0	48	0	41	282	627	0	0	341	725
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				52	0	45	307	682	0	0	371	788
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				216	0	99	365	2852	0	0	991	1680
Arrive On Green				0.06	0.00	0.06	0.21	0.80	0.00	0.00	0.53	0.53
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				52	0	45	307	682	0	0	371	788
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				1.0	0.0	1.8	11.0	3.1	0.0	0.0	7.8	10.4
Cycle Q Clear(g_c), s				1.0	0.0	1.8	11.0	3.1	0.0	0.0	7.8	10.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				216	0	99	365	2852	0	0	991	1680
V/C Ratio(X)				0.24	0.00	0.45	0.84	0.24	0.00	0.00	0.37	0.47
Avail Cap(c_a), veh/h				259	0	119	628	2852	0	0	991	1680
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				29.7	0.0	30.2	25.4	1.6	0.0	0.0	9.2	9.8
Incr Delay (d2), s/veh				0.6	0.0	3.2	5.2	0.2	0.0	0.0	1.1	0.9
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				0.4	0.0	0.8	4.9	0.4	0.0	0.0	3.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				30.3	0.0	33.4	30.7	1.8	0.0	0.0	10.3	10.7
LnGrp LOS				C	A	C	C	A	A	A	B	B
Approach Vol, veh/h					97			989			1159	
Approach Delay, s/veh					31.7			10.8			10.6	
Approach LOS					C			B			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		58.0			18.2	39.8		8.7				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		53.5			23.5	25.5		5.0				
Max Q Clear Time (g_c+I1), s		5.1			13.0	12.4		3.8				
Green Ext Time (p_c), s		5.6			0.7	4.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				11.6								
HCM 6th LOS				B								
Notes												
User approved volume balancing among the lanes for turning movement.												

Queues

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	513	520	524	197	74	666
v/c Ratio	0.46	0.84	0.37	0.26	0.37	0.35
Control Delay	19.2	27.8	19.4	4.8	36.9	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	27.8	19.4	4.8	36.9	11.3
Queue Length 50th (ft)	87	146	85	0	29	76
Queue Length 95th (ft)	123	258	173	48	78	167
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	1910	947	1410	749	243	1918
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	0.55	0.37	0.26	0.30	0.35
Intersection Summary						

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	472	0	478	0	0	0	0	482	181	68	613	0
Future Volume (veh/h)	472	0	478	0	0	0	0	482	181	68	613	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	513	0	520				0	524	197	74	666	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1306	0	599				0	1378	615	96	1783	0
Arrive On Green	0.38	0.00	0.38				0.00	0.39	0.39	0.05	0.50	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	513	0	520				0	524	197	74	666	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	8.1	0.0	22.7				0.0	7.9	6.5	3.1	8.6	0.0
Cycle Q Clear(g_c), s	8.1	0.0	22.7				0.0	7.9	6.5	3.1	8.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1306	0	599				0	1378	615	96	1783	0
V/C Ratio(X)	0.39	0.00	0.87				0.00	0.38	0.32	0.77	0.37	0.00
Avail Cap(c_a), veh/h	1780	0	816				0	1378	615	226	1783	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.0	0.0	21.5				0.0	16.4	16.0	34.9	11.4	0.0
Incr Delay (d2), s/veh	0.2	0.0	7.6				0.0	0.8	1.4	12.4	0.6	0.0
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	3.0	0.0	9.0				0.0	3.2	2.4	1.6	3.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	29.1				0.0	17.2	17.4	47.3	12.0	0.0
LnGrp LOS	B	A	C				A	B	B	D	B	A
Approach Vol, veh/h	1033						721			740		
Approach Delay, s/veh	23.2						17.3			15.6		
Approach LOS	C						B			B		
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	8.5	33.5		32.8			42.0					
Change Period (Y+Rc), s	4.5	4.5		4.5			4.5					
Max Green Setting (Gmax), s	9.5	23.5		38.5			37.5					
Max Q Clear Time (g_c+I1), s	5.1	9.9		24.7			10.6					
Green Ext Time (p_c), s	0.0	3.6		3.5			5.0					
Intersection Summary												
HCM 6th Ctrl Delay	19.2											
HCM 6th LOS	B											

HCM 6th TWSC
40: Douglas St & Drive 3

AM Existing plus Zone 2

Intersection

Int Delay, s/veh 2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	118	78	359	426	36
Future Vol, veh/h	53	118	78	359	426	36
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	128	85	390	463	39

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1023	463	502
Stage 1	463	-	-
Stage 2	560	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	261	599	1062
Stage 1	634	-	-
Stage 2	572	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	240	599	1062
Mov Cap-2 Maneuver	373	-	-
Stage 1	583	-	-
Stage 2	572	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1062	-	373	599	-	-
HCM Lane V/C Ratio	0.08	-	0.154	0.214	-	-
HCM Control Delay (s)	8.7	-	16.4	12.6	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.5	0.8	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

AM Existing plus Zone 2

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	54	16	396	408	2
Future Vol, veh/h	6	54	16	396	408	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	59	17	430	443	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	908	444	445	0	-	0
Stage 1	444	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	306	614	1115	-	-	-
Stage 1	646	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	301	614	1115	-	-	-
Mov Cap-2 Maneuver	427	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.9	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1115	-	588	-	-	
HCM Lane V/C Ratio	0.016	-	0.111	-	-	
HCM Control Delay (s)	8.3	-	11.9	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↵	↵		↵	↵	
Traffic Vol, veh/h	11	1	32	4	1	3	9	383	10	9	374	4
Future Vol, veh/h	11	1	32	4	1	3	9	383	10	9	374	4
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	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	35	4	1	3	10	416	11	10	407	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	873	876	409	889	873	422	411	0	0	427	0	0
Stage 1	429	429	-	442	442	-	-	-	-	-	-	-
Stage 2	444	447	-	447	431	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	271	287	642	264	289	632	1148	-	-	1132	-	-
Stage 1	604	584	-	594	576	-	-	-	-	-	-	-
Stage 2	593	573	-	591	583	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	265	282	642	246	284	632	1148	-	-	1132	-	-
Mov Cap-2 Maneuver	265	282	-	246	284	-	-	-	-	-	-	-
Stage 1	599	579	-	589	571	-	-	-	-	-	-	-
Stage 2	584	568	-	553	578	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	13.6		16.3			0.2			0.2			
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1148	-	-	464	326	1132	-	-				
HCM Lane V/C Ratio	0.009	-	-	0.103	0.027	0.009	-	-				
HCM Control Delay (s)	8.2	-	-	13.6	16.3	8.2	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0	-	-				

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	6	290	24	92	219	41	41	20	114	43	13	10
Future Vol, veh/h	6	290	24	92	219	41	41	20	114	43	13	10
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	315	26	100	238	45	45	22	124	47	14	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	283	0	0	341	0	0	668	825	171	644	816	142
Stage 1	-	-	-	-	-	-	342	342	-	461	461	-
Stage 2	-	-	-	-	-	-	326	483	-	183	355	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1276	-	-	1215	-	-	344	306	843	358	310	880
Stage 1	-	-	-	-	-	-	646	637	-	550	564	-
Stage 2	-	-	-	-	-	-	661	551	-	801	628	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1276	-	-	1215	-	-	301	274	843	264	278	880
Mov Cap-2 Maneuver	-	-	-	-	-	-	301	274	-	264	278	-
Stage 1	-	-	-	-	-	-	641	633	-	546	509	-
Stage 2	-	-	-	-	-	-	573	497	-	655	624	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			2.3			16.3			20.8		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	508	1276	-	-	1215	-	-	299				
HCM Lane V/C Ratio	0.374	0.005	-	-	0.082	-	-	0.24				
HCM Control Delay (s)	16.3	7.8	0	-	8.2	0.2	-	20.8				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.7	0	-	-	0.3	-	-	0.9				

Queues

6: Colbern Rd & SB M-350 Ramp

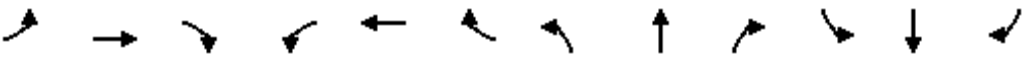
PM Existing plus Zone 2



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	352	123	216	293	330	88
v/c Ratio	0.44	0.28	0.39	0.16	0.62	0.16
Control Delay	19.4	8.0	10.1	7.4	21.1	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	8.0	10.1	7.4	21.1	4.8
Queue Length 50th (ft)	44	4	30	20	77	0
Queue Length 95th (ft)	98	41	82	50	177	26
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	1681	807	773	3093	1431	1297
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	0.21	0.15	0.28	0.09	0.23	0.07
Intersection Summary						

HCM 6th Signalized Intersection Summary 6: Colbern Rd & SB M-350 Ramp

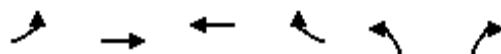
PM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖		↗
Traffic Volume (veh/h)	0	324	113	199	270	0	0	0	0	304	0	81
Future Volume (veh/h)	0	324	113	199	270	0	0	0	0	304	0	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	352	0	216	293	0				330	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	740		591	1718	0				443	0	
Arrive On Green	0.00	0.21	0.00	0.14	0.48	0.00				0.25	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	352	0	216	293	0				330	0	0
Grp Sat Flow(s), veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	2.9	0.0	3.0	1.6	0.0				5.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	2.9	0.0	3.0	1.6	0.0				5.7	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	740		591	1718	0				443	0	
V/C Ratio(X)	0.00	0.48		0.37	0.17	0.00				0.74	0.00	
Avail Cap(c_a), veh/h	0	2381		1214	4603	0				1989	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.7	0.0	8.3	4.9	0.0				11.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.4	0.0	0.0				2.5	0.0	0.0
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	0.0	0.9	0.0	0.8	0.3	0.0				2.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.2	0.0	8.6	4.9	0.0				14.1	0.0	0.0
LnGrp LOS	A	B		A	A	A				B	A	
Approach Vol, veh/h		352			509						330	
Approach Delay, s/veh		12.2			6.5						14.1	
Approach LOS		B			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			9.2	11.5		12.9		20.7				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			16.5	22.5		37.5		43.5				
Max Q Clear Time (g_c+I1), s			5.0	4.9		7.7		3.6				
Green Ext Time (p_c), s			0.5	2.1		1.0		2.1				
Intersection Summary												
HCM 6th Ctrl Delay			10.3									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

PM Existing plus Zone 2



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	91	603	399	315	111	137
v/c Ratio	0.17	0.31	0.21	0.31	0.21	0.24
Control Delay	6.5	5.8	5.4	1.9	10.3	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	5.8	5.4	1.9	10.3	3.8
Queue Length 50th (ft)	7	27	16	0	12	0
Queue Length 95th (ft)	24	54	36	22	39	23
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	963	3539	3539	1583	1733	1553
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	0.09	0.17	0.11	0.20	0.06	0.09
Intersection Summary						

HCM 6th Signalized Intersection Summary 9: NB M-350 Ramp & Colbern Rd

PM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	555	0	0	367	290	102	0	126	0	0	0
Future Volume (veh/h)	84	555	0	0	367	290	102	0	126	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	91	603	0	0	399	0	111	0	137			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	677	1583	0	0	1583		304	0	271			
Arrive On Green	0.45	0.45	0.00	0.00	0.45	0.00	0.17	0.00	0.17			
Sat Flow, veh/h	986	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	91	603	0	0	399	0	111	0	137			
Grp Sat Flow(s),veh/h/ln	986	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	1.5	2.7	0.0	0.0	1.6	0.0	1.3	0.0	1.8			
Cycle Q Clear(g_c), s	3.1	2.7	0.0	0.0	1.6	0.0	1.3	0.0	1.8			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	677	1583	0	0	1583		304	0	271			
V/C Ratio(X)	0.13	0.38	0.00	0.00	0.25		0.36	0.00	0.51			
Avail Cap(c_a), veh/h	2318	7500	0	0	7500		2392	0	2129			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.0	4.3	0.0	0.0	4.1	0.0	8.6	0.0	8.8			
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.1	0.0	0.7	0.0	1.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.1	0.3	0.0	0.0	0.2	0.0	0.4	0.0	0.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.1	4.5	0.0	0.0	4.1	0.0	9.3	0.0	10.3			
LnGrp LOS	A	A	A	A	A		A	A	B			
Approach Vol, veh/h	694			399			248					
Approach Delay, s/veh	4.6			4.1			9.9					
Approach LOS	A			A			A					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	8.5			14.9			14.9					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	31.5			49.5			49.5					
Max Q Clear Time (g_c+I1), s	3.8			5.1			3.6					
Green Ext Time (p_c), s	0.8			5.3			3.0					
Intersection Summary												
HCM 6th Ctrl Delay	5.4											
HCM 6th LOS	A											

HCM 6th TWSC
15: Main St & Colbern Rd

PM Existing plus Zone 2

Intersection

Int Delay, s/veh 2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Vol, veh/h	732	58	28	458	75	45
Future Vol, veh/h	732	58	28	458	75	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	796	63	30	498	82	49

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	859
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	778
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	778
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	28.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	185	573	-	-	778	-
HCM Lane V/C Ratio	0.441	0.085	-	-	0.039	-
HCM Control Delay (s)	39	11.9	-	-	9.8	0.2
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	2	0.3	-	-	0.1	-

Queues

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	127	567	118	258	342	41	150	151	66	30
v/c Ratio	0.26	0.65	0.25	0.61	0.29	0.07	0.27	0.20	0.13	0.04
Control Delay	12.2	29.1	6.2	18.9	19.9	2.5	18.6	4.3	17.5	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	29.1	6.2	18.9	19.9	2.5	18.6	4.3	17.5	7.4
Queue Length 50th (ft)	32	124	0	70	64	0	45	0	19	0
Queue Length 95th (ft)	59	185	37	115	97	11	107	38	54	18
Internal Link Dist (ft)	678			724			763			589
Turn Bay Length (ft)	200		200	200		250				
Base Capacity (vph)	520	1543	756	641	2208	1012	562	737	503	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.37	0.16	0.40	0.15	0.04	0.27	0.20	0.13	0.04
Intersection Summary										

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	522	109	237	315	38	138	1	138	61	1	27
Future Volume (veh/h)	117	522	109	237	315	38	138	1	138	61	1	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	567	118	258	342	41	150	1	150	66	1	29
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	460	830	370	422	1082	482	684	5	682	563	23	666
Arrive On Green	0.07	0.23	0.23	0.14	0.30	0.30	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1380	11	1576	1236	53	1540
Grp Volume(v), veh/h	127	567	118	258	342	41	150	0	151	66	0	30
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1380	0	1587	1236	0	1593
Q Serve(g_s), s	3.4	10.3	4.3	7.5	5.2	1.3	5.0	0.0	4.2	2.5	0.0	0.8
Cycle Q Clear(g_c), s	3.4	10.3	4.3	7.5	5.2	1.3	5.7	0.0	4.2	6.7	0.0	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.97
Lane Grp Cap(c), veh/h	460	830	370	422	1082	482	684	0	687	563	0	689
V/C Ratio(X)	0.28	0.68	0.32	0.61	0.32	0.08	0.22	0.00	0.22	0.12	0.00	0.04
Avail Cap(c_a), veh/h	573	1639	731	763	2345	1046	684	0	687	563	0	689
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	24.6	22.4	17.2	18.9	17.5	13.2	0.0	12.5	14.6	0.0	11.6
Incr Delay (d2), s/veh	0.3	1.0	0.5	1.4	0.2	0.1	0.7	0.0	0.7	0.4	0.0	0.1
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	1.3	4.2	1.6	3.0	2.1	0.5	1.6	0.0	1.5	0.7	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	25.6	22.9	18.6	19.0	17.6	14.0	0.0	13.3	15.1	0.0	11.7
LnGrp LOS	B	C	C	B	B	B	B	A	B	B	A	B
Approach Vol, veh/h	812			641			301			96		
Approach Delay, s/veh	23.6			18.8			13.6			14.0		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	35.0			14.5			21.0			35.0		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	30.5			23.5			32.5			30.5		
Max Q Clear Time (g_c+I1), s	7.7			9.5			12.3			8.7		
Green Ext Time (p_c), s	1.3			0.6			4.2			0.3		
Intersection Summary												
HCM 6th Ctrl Delay	19.8											
HCM 6th LOS	B											

HCM 6th TWSC
19: Drive 4 & Colbern Rd

PM Existing plus Zone 2

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗			↗			↗
Traffic Vol, veh/h	0	703	18	0	537	55	0	0	119	0	0	53
Future Vol, veh/h	0	703	18	0	537	55	0	0	119	0	0	53
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	764	20	0	584	60	0	0	129	0	0	58
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	382	-	-	292
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	616	0	0	704
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	616	-	-	704
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			12.4			10.6		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	616	-	-	-	-	704						
HCM Lane V/C Ratio	0.21	-	-	-	-	0.082						
HCM Control Delay (s)	12.4	-	-	-	-	10.6						
HCM Lane LOS	B	-	-	-	-	B						
HCM 95th %tile Q(veh)	0.8	-	-	-	-	0.3						

Queues

21: Douglas St & Colbern Rd

PM Existing plus Zone 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	175	484	234	535	270	134	240	495	615	109	447	134
v/c Ratio	0.35	0.73	0.48	0.69	0.23	0.21	0.58	0.41	0.59	0.30	0.50	0.19
Control Delay	17.2	43.0	8.4	38.2	22.2	2.7	24.5	27.1	11.1	19.6	33.4	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	43.0	8.4	38.2	22.2	2.7	24.5	27.1	11.1	19.6	33.4	2.9
Queue Length 50th (ft)	60	144	0	155	60	0	94	127	161	39	125	0
Queue Length 95th (ft)	101	208	63	210	89	24	161	185	267	78	185	26
Internal Link Dist (ft)	941			2187			1801			1236		
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	495	753	521	955	1464	751	455	1196	1111	370	896	703
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.64	0.45	0.56	0.18	0.18	0.53	0.41	0.55	0.29	0.50	0.19
Intersection Summary												

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

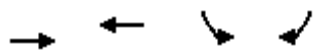
PM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	445	215	492	248	123	221	455	566	100	411	123
Future Volume (veh/h)	161	445	215	492	248	123	221	455	566	100	411	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	175	484	234	535	270	134	240	495	615	109	447	134
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	467	668	298	659	1046	467	453	1243	857	313	1027	591
Arrive On Green	0.08	0.19	0.19	0.19	0.29	0.29	0.12	0.35	0.35	0.06	0.29	0.29
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	175	484	234	535	270	134	240	495	615	109	447	134
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.7	10.8	11.9	12.5	4.9	5.5	7.8	8.9	24.6	3.3	8.6	4.9
Cycle Q Clear(g_c), s	5.7	10.8	11.9	12.5	4.9	5.5	7.8	8.9	24.6	3.3	8.6	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	467	668	298	659	1046	467	453	1243	857	313	1027	591
V/C Ratio(X)	0.37	0.72	0.78	0.81	0.26	0.29	0.53	0.40	0.72	0.35	0.44	0.23
Avail Cap(c_a), veh/h	467	822	367	1045	1597	712	547	1243	857	368	1027	591
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.2	32.2	32.6	32.7	22.7	22.9	17.7	20.7	14.5	16.3	24.4	18.1
Incr Delay (d2), s/veh	0.5	2.5	8.8	2.7	0.1	0.3	1.0	1.0	5.1	0.7	1.3	0.9
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	2.3	4.7	5.1	5.3	2.0	2.0	3.2	3.7	9.1	1.3	3.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.7	34.6	41.4	35.4	22.8	23.3	18.7	21.7	19.7	17.0	25.7	19.0
LnGrp LOS	B	C	D	D	C	C	B	C	B	B	C	B
Approach Vol, veh/h		893			939			1350			690	
Approach Delay, s/veh		33.3			30.0			20.2			23.0	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.4	34.0	20.6	20.4	14.5	28.9	11.6	29.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.5	29.5	25.5	19.5	14.5	22.5	7.1	37.9				
Max Q Clear Time (g_c+I1), s	5.3	26.6	14.5	13.9	9.8	10.6	7.7	7.5				
Green Ext Time (p_c), s	0.0	1.7	1.6	2.0	0.3	2.7	0.0	2.3				
Intersection Summary												
HCM 6th Ctrl Delay			26.1									
HCM 6th LOS			C									

Queues

24: Colbern Rd & SB I-470 Ramp

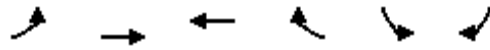
PM Existing plus Zone 2



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1182	1200	219	81
v/c Ratio	0.69	0.70	0.17	0.13
Control Delay	14.8	15.0	15.6	5.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	15.0	15.6	5.4
Queue Length 50th (ft)	171	176	27	0
Queue Length 95th (ft)	228	230	58	25
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	3195	3195	1284	643
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.38	0.17	0.13
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

PM Existing plus Zone 2



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	1111	1068	0	184	68
Future Volume (veh/h)	0	1111	1068	0	184	68
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	1182	1200	0	219	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1716	1716	0	1292	
Arrive On Green	0.00	0.48	0.48	0.00	0.37	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	1182	1200	0	219	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	16.2	16.6	0.0	2.7	0.0
Cycle Q Clear(g_c), s	0.0	16.2	16.6	0.0	2.7	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1716	1716	0	1292	
V/C Ratio(X)	0.00	0.69	0.70	0.00	0.17	
Avail Cap(c_a), veh/h	0	3251	3251	0	1292	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	12.6	12.7	0.0	13.2	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.6	5.7	0.0	1.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	13.1	13.2	0.0	13.4	0.0
LnGrp LOS	A	B	B	A	B	
Approach Vol, veh/h		1182	1200		219	
Approach Delay, s/veh		13.1	13.2		13.4	
Approach LOS		B	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				34.9	28.0	34.9
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				57.5	23.5	57.5
Max Q Clear Time (g_c+I1), s				18.2	4.7	18.6
Green Ext Time (p_c), s				11.6	0.7	11.8
Intersection Summary						
HCM 6th Ctrl Delay			13.2			
HCM 6th LOS			B			

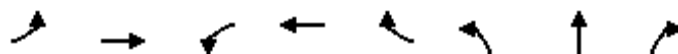
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

PM Existing plus Zone 2



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	67	1284	94	1310	82	92	103	172
v/c Ratio	0.28	0.75	0.37	0.74	0.10	0.19	0.20	0.31
Control Delay	8.6	18.6	10.2	18.3	3.4	27.6	27.6	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	18.6	10.2	18.3	3.4	27.6	27.6	6.6
Queue Length 50th (ft)	11	255	16	262	2	37	41	0
Queue Length 95th (ft)	24	333	31	316	20	80	88	44
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	246	2275	269	2353	1077	487	513	560
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.56	0.35	0.56	0.08	0.19	0.20	0.31
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

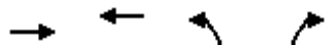
PM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	1050	132	82	1140	71	79	89	148	0	0	0
Future Volume (veh/h)	62	1050	132	82	1140	71	79	89	148	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	67	1141	143	94	1310	0	92	103	172			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	266	1515	190	281	1721		499	524	444			
Arrive On Green	0.05	0.48	0.48	0.06	0.48	0.00	0.28	0.28	0.28			
Sat Flow, veh/h	1781	3178	397	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	67	637	647	94	1310	0	92	103	172			
Grp Sat Flow(s),veh/h/ln	1781	1777	1799	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	1.3	21.4	21.5	1.9	22.0	0.0	2.9	3.1	6.4			
Cycle Q Clear(g_c), s	1.3	21.4	21.5	1.9	22.0	0.0	2.9	3.1	6.4			
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	266	847	858	281	1721		499	524	444			
V/C Ratio(X)	0.25	0.75	0.75	0.33	0.76		0.18	0.20	0.39			
Avail Cap(c_a), veh/h	334	1178	1193	360	2406		499	524	444			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	12.2	15.6	15.6	12.4	15.4	0.0	20.0	20.0	21.2			
Incr Delay (d2), s/veh	0.5	1.8	1.8	0.7	0.9	0.0	0.8	0.8	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.5	8.1	8.2	0.7	8.1	0.0	1.3	1.4	2.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	17.4	17.4	13.1	16.4	0.0	20.8	20.9	23.8			
LnGrp LOS	B	B	B	B	B		C	C	C			
Approach Vol, veh/h	1351			1404			367					
Approach Delay, s/veh	17.2			16.1			22.2					
Approach LOS	B			B			C					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	25.0		8.8	39.4		8.2		39.9				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	20.5		7.5	48.5		6.5		49.5				
Max Q Clear Time (g_c+I1), s	8.4		3.9	23.5		3.3		24.0				
Green Ext Time (p_c), s	1.1		0.1	10.3		0.0		11.4				
Intersection Summary												
HCM 6th Ctrl Delay	17.3											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

PM Existing plus Zone 2



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1108	1201	134	130
v/c Ratio	0.65	0.71	0.20	0.19
Control Delay	14.5	15.6	17.0	6.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.5	15.6	17.0	6.7
Queue Length 50th (ft)	162	182	34	6
Queue Length 95th (ft)	215	242	86	43
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	3093	3093	673	667
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.39	0.20	0.19
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

PM Existing plus Zone 2

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	1064	0	0	1081	118	114
Future Volume (veh/h)	1064	0	0	1081	118	114
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	1108	0	0	1201	134	130
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1702	0	0	1702	679	604
Arrive On Green	0.48	0.00	0.00	0.48	0.38	0.38
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	1108	0	0	1201	134	130
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	15.2	0.0	0.0	17.1	3.2	3.6
Cycle Q Clear(g_c), s	15.2	0.0	0.0	17.1	3.2	3.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1702	0	0	1702	679	604
V/C Ratio(X)	0.65	0.00	0.00	0.71	0.20	0.22
Avail Cap(c_a), veh/h	3124	0	0	3124	679	604
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	0.0	13.2	13.3	13.4
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.0	0.0	5.9	1.3	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.1	0.0	0.0	13.7	14.0	14.2
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	1108			1201	264	
Approach Delay, s/veh	13.1			13.7	14.1	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	29.0		35.3		35.3	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	24.5		56.5		56.5	
Max Q Clear Time (g_c+l1), s	5.6		17.2		19.1	
Green Ext Time (p_c), s	0.7		10.5		11.7	
Intersection Summary						
HCM 6th Ctrl Delay			13.5			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	217	96	605	1258	836	381
v/c Ratio	0.53	0.35	0.90	0.45	0.68	0.50
Control Delay	43.3	11.9	44.3	4.2	25.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	11.9	44.3	4.2	25.1	5.5
Queue Length 50th (ft)	62	0	324	101	186	0
Queue Length 95th (ft)	98	44	#505	157	292	75
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)			350			
Base Capacity (vph)	663	383	773	2772	1230	756
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	0.33	0.25	0.78	0.45	0.68	0.50

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↱		↰	↰	↱↱			↱↱	↰
Traffic Volume (veh/h)	0	0	0	200	0	88	557	1157	0	0	445	674
Future Volume (veh/h)	0	0	0	200	0	88	557	1157	0	0	445	674
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				217	0	96	605	1258	0	0	484	733
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				317	0	145	651	2874	0	0	735	1246
Arrive On Green				0.09	0.00	0.09	0.37	0.81	0.00	0.00	0.39	0.39
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				217	0	96	605	1258	0	0	484	733
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				5.5	0.0	5.3	29.5	9.5	0.0	0.0	19.1	16.5
Cycle Q Clear(g_c), s				5.5	0.0	5.3	29.5	9.5	0.0	0.0	19.1	16.5
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				317	0	145	651	2874	0	0	735	1246
V/C Ratio(X)				0.68	0.00	0.66	0.93	0.44	0.00	0.00	0.66	0.59
Avail Cap(c_a), veh/h				689	0	316	803	2874	0	0	735	1246
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				39.7	0.0	39.6	27.5	2.6	0.0	0.0	22.4	21.6
Incr Delay (d2), s/veh				2.6	0.0	5.0	15.1	0.5	0.0	0.0	4.6	2.0
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				2.4	0.0	2.2	14.7	2.0	0.0	0.0	9.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				42.4	0.0	44.7	42.6	3.0	0.0	0.0	27.0	23.7
LnGrp LOS				D	A	D	D	A	A	A	C	C
Approach Vol, veh/h					313			1863			1217	
Approach Delay, s/veh					43.1			15.9			25.0	
Approach LOS					D			B			C	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		77.5			37.5	40.0		12.8				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		73.0			40.7	27.8		18.0				
Max Q Clear Time (g_c+I1), s		11.5			31.5	21.1		7.5				
Green Ext Time (p_c), s		13.9			1.6	3.5		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				21.7								
HCM 6th LOS				C								
Notes												
User approved volume balancing among the lanes for turning movement.												

Queues

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	843	537	1016	450	105	596
v/c Ratio	0.81	0.81	0.63	0.47	0.55	0.29
Control Delay	33.7	23.5	22.0	3.7	47.5	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	23.5	22.0	3.7	47.5	9.7
Queue Length 50th (ft)	210	133	229	0	53	76
Queue Length 95th (ft)	276	264	334	59	109	123
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	1286	759	1607	964	221	2083
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	0.66	0.71	0.63	0.47	0.48	0.29
Intersection Summary						

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	776	0	494	0	0	0	0	935	414	97	548	0
Future Volume (veh/h)	776	0	494	0	0	0	0	935	414	97	548	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	843	0	537				0	1016	450	105	596	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1209	0	555				0	1510	674	134	1955	0
Arrive On Green	0.35	0.00	0.35				0.00	0.42	0.42	0.08	0.55	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	843	0	537				0	1016	450	105	596	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	18.9	0.0	30.0				0.0	20.7	20.5	5.2	8.2	0.0
Cycle Q Clear(g_c), s	18.9	0.0	30.0				0.0	20.7	20.5	5.2	8.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1209	0	555				0	1510	674	134	1955	0
V/C Ratio(X)	0.70	0.00	0.97				0.00	0.67	0.67	0.79	0.30	0.00
Avail Cap(c_a), veh/h	1209	0	555				0	1510	674	208	1955	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.1	0.0	28.8				0.0	20.8	20.8	40.9	10.9	0.0
Incr Delay (d2), s/veh	1.8	0.0	30.1				0.0	2.4	5.2	10.0	0.4	0.0
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	7.7	0.0	15.5				0.0	8.7	8.2	2.6	3.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	58.9				0.0	23.2	26.0	51.0	11.4	0.0
LnGrp LOS	C	A	E				A	C	C	D	B	A
Approach Vol, veh/h	1380						1466			701		
Approach Delay, s/veh	39.4						24.1			17.3		
Approach LOS	D						C			B		
Timer - Assigned Phs	1	2	4		6							
Phs Duration (G+Y+Rc), s	11.3	42.7	36.0		54.0							
Change Period (Y+Rc), s	4.5	4.5	4.5		4.5							
Max Green Setting (Gmax), s	10.5	34.5	31.5		49.5							
Max Q Clear Time (g_c+I1), s	7.2	22.7	32.0		10.2							
Green Ext Time (p_c), s	0.1	6.8	0.0		4.6							
Intersection Summary												
HCM 6th Ctrl Delay			28.7									
HCM 6th LOS			C									
Notes												

HCM 6th TWSC
40: Douglas St & Drive 3

PM Existing plus Zone 2

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	84	127	612	550	58
Future Vol, veh/h	40	84	127	612	550	58
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	91	138	665	598	63
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1539	598	661	0	-	0
Stage 1	598	-	-	-	-	-
Stage 2	941	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	127	502	927	-	-	-
Stage 1	549	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	108	502	927	-	-	-
Mov Cap-2 Maneuver	240	-	-	-	-	-
Stage 1	467	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	16.9	1.6		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	927	-	240	502	-	-
HCM Lane V/C Ratio	0.149	-	0.181	0.182	-	-
HCM Control Delay (s)	9.6	-	23.3	13.8	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.5	-	0.6	0.7	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

PM Existing plus Zone 2

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	29	54	598	579	6
Future Vol, veh/h	3	29	54	598	579	6
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	32	59	650	629	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1401	633	636	0	-	0
Stage 1	633	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	154	480	947	-	-	-
Stage 1	529	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	144	480	947	-	-	-
Mov Cap-2 Maneuver	283	-	-	-	-	-
Stage 1	496	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.6	0.7		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	947	-	451	-	-	
HCM Lane V/C Ratio	0.062	-	0.077	-	-	
HCM Control Delay (s)	9.1	-	13.6	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-	

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	5	1	17	17	1	10	32	679	10	2	668	11
Future Vol, veh/h	5	1	17	17	1	10	32	679	10	2	668	11
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	-	-	-	-	-	-	200	-	-	200	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	18	18	1	11	35	738	11	2	726	12
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1556	1555	732	1560	1556	744	738	0	0	749	0	0
Stage 1	736	736	-	814	814	-	-	-	-	-	-	-
Stage 2	820	819	-	746	742	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	92	113	421	91	113	415	868	-	-	860	-	-
Stage 1	411	425	-	372	391	-	-	-	-	-	-	-
Stage 2	369	389	-	405	422	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	86	108	421	84	108	415	868	-	-	860	-	-
Mov Cap-2 Maneuver	206	230	-	200	223	-	-	-	-	-	-	-
Stage 1	395	424	-	357	375	-	-	-	-	-	-	-
Stage 2	344	373	-	385	421	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	16.7		21.6		0.4		0					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	868	-	-	333	247	860	-	-				
HCM Lane V/C Ratio	0.04	-	-	0.075	0.123	0.003	-	-				
HCM Control Delay (s)	9.3	-	-	16.7	21.6	9.2	-	-				
HCM Lane LOS	A	-	-	C	C	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.4	0	-	-				

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	3	195	15	46	172	23	10	4	71	45	7	5
Future Vol, veh/h	3	195	15	46	172	23	10	4	71	45	7	5
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	212	16	50	187	25	11	4	77	49	8	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	212	0	0	228	0	0	424	538	114	414	534	106
Stage 1	-	-	-	-	-	-	226	226	-	300	300	-
Stage 2	-	-	-	-	-	-	198	312	-	114	234	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1356	-	-	1337	-	-	514	448	917	523	451	928
Stage 1	-	-	-	-	-	-	756	716	-	684	664	-
Stage 2	-	-	-	-	-	-	785	656	-	879	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1356	-	-	1337	-	-	486	427	917	459	430	928
Mov Cap-2 Maneuver	-	-	-	-	-	-	486	427	-	459	430	-
Stage 1	-	-	-	-	-	-	754	714	-	682	635	-
Stage 2	-	-	-	-	-	-	738	628	-	798	708	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.6			10.1			13.7		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	792	1356	-	-	1337	-	-	476				
HCM Lane V/C Ratio	0.117	0.002	-	-	0.037	-	-	0.13				
HCM Control Delay (s)	10.1	7.7	0	-	7.8	0.1	-	13.7				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.4				

Queues

6: Colbern Rd & SB M-350 Ramp

AM Existing plus Zone 2-3

	→	↘	↙	←	↘	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	233	105	139	227	226	36
v/c Ratio	0.29	0.24	0.25	0.14	0.45	0.07
Control Delay	15.1	5.9	7.4	6.0	15.9	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	5.9	7.4	6.0	15.9	1.9
Queue Length 50th (ft)	22	0	14	12	41	0
Queue Length 95th (ft)	52	29	41	29	99	7
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	2390	1103	919	3483	1573	1415
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	0.10	0.10	0.15	0.07	0.14	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary

6: Colbern Rd & SB M-350 Ramp

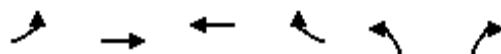
AM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑		↑
Traffic Volume (veh/h)	0	214	97	128	209	0	0	0	0	208	0	33
Future Volume (veh/h)	0	214	97	128	209	0	0	0	0	208	0	33
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	233	0	139	227	0				226	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	655		637	1698	0				318	0	
Arrive On Green	0.00	0.18	0.00	0.12	0.48	0.00				0.18	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	233	0	139	227	0				226	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	1.5	0.0	1.5	0.9	0.0				3.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.5	0.0	1.5	0.9	0.0				3.1	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	655		637	1698	0				318	0	
V/C Ratio(X)	0.00	0.36		0.22	0.13	0.00				0.71	0.00	
Avail Cap(c_a), veh/h	0	3327		1544	6179	0				2416	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.3	0.0	6.9	3.8	0.0				10.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.2	0.0	0.0				3.0	0.0	0.0
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	0.0	0.4	0.0	0.3	0.1	0.0				1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	9.6	0.0	7.1	3.8	0.0				13.1	0.0	0.0
LnGrp LOS	A	A		A	A	A				B	A	
Approach Vol, veh/h		233			366						226	
Approach Delay, s/veh		9.6			5.1						13.1	
Approach LOS		A			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			7.7	9.3		9.2		17.0				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			16.5	24.5		35.5		45.5				
Max Q Clear Time (g_c+I1), s			3.5	3.5		5.1		2.9				
Green Ext Time (p_c), s			0.3	1.4		0.7		1.6				
Intersection Summary												
HCM 6th Ctrl Delay			8.6									
HCM 6th LOS			A									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

AM Existing plus Zone 2-3



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	78	380	311	317	54	166
v/c Ratio	0.15	0.21	0.17	0.33	0.10	0.28
Control Delay	6.1	5.4	5.3	2.0	8.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	5.4	5.3	2.0	8.1	3.4
Queue Length 50th (ft)	5	14	11	0	4	0
Queue Length 95th (ft)	18	28	24	19	18	20
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	1049	3539	3539	1583	1770	1583
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	0.07	0.11	0.09	0.20	0.03	0.10
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

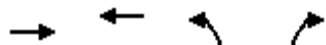
AM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	350	0	0	286	292	50	0	153	0	0	0
Future Volume (veh/h)	72	350	0	0	286	292	50	0	153	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	78	380	0	0	311	0	54	0	166			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	693	1313	0	0	1313		315	0	281			
Arrive On Green	0.37	0.37	0.00	0.00	0.37	0.00	0.18	0.00	0.18			
Sat Flow, veh/h	1068	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	78	380	0	0	311	0	54	0	166			
Grp Sat Flow(s),veh/h/ln	1068	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	1.1	1.5	0.0	0.0	1.2	0.0	0.5	0.0	1.9			
Cycle Q Clear(g_c), s	2.3	1.5	0.0	0.0	1.2	0.0	0.5	0.0	1.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	693	1313	0	0	1313		315	0	281			
V/C Ratio(X)	0.11	0.29	0.00	0.00	0.24		0.17	0.00	0.59			
Avail Cap(c_a), veh/h	2909	8684	0	0	8684		2917	0	2596			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.1	4.4	0.0	0.0	4.3	0.0	6.9	0.0	7.5			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.1	0.0	0.3	0.0	2.0			
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	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.2	4.5	0.0	0.0	4.4	0.0	7.2	0.0	9.5			
LnGrp LOS	A	A	A	A	A		A	A	A			
Approach Vol, veh/h	458			311			220					
Approach Delay, s/veh	4.6			4.4			8.9					
Approach LOS	A			A			A					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	8.0			11.8			11.8					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	32.5			48.5			48.5					
Max Q Clear Time (g_c+I1), s	3.9			4.3			3.2					
Green Ext Time (p_c), s	0.7			3.2			2.2					
Intersection Summary												
HCM 6th Ctrl Delay	5.5											
HCM 6th LOS	A											

Queues

15: Main St & Colbern Rd

AM Existing plus Zone 2-3



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	502	652	45	23
v/c Ratio	0.41	0.60	0.06	0.03
Control Delay	9.7	13.6	8.2	4.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.7	13.6	8.2	4.4
Queue Length 50th (ft)	37	63	6	0
Queue Length 95th (ft)	65	100	21	9
Internal Link Dist (ft)	1355	2860	865	
Turn Bay Length (ft)				150
Base Capacity (vph)	1549	1393	776	707
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	0.47	0.06	0.03
Intersection Summary				

HCM 6th Signalized Intersection Summary 15: Main St & Colbern Rd

AM Existing plus Zone 2-3

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	379	83	39	561	41	21
Future Volume (veh/h)	379	83	39	561	41	21
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	412	90	42	610	45	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	854	185	139	955	838	746
Arrive On Green	0.29	0.29	0.29	0.29	0.47	0.47
Sat Flow, veh/h	2998	629	115	3333	1781	1585
Grp Volume(v), veh/h	251	251	344	308	45	23
Grp Sat Flow(s),veh/h/ln	1777	1757	1746	1617	1781	1585
Q Serve(g_s), s	4.4	4.5	1.4	6.4	0.5	0.3
Cycle Q Clear(g_c), s	4.4	4.5	6.3	6.4	0.5	0.3
Prop In Lane		0.36	0.12		1.00	1.00
Lane Grp Cap(c), veh/h	522	516	619	475	838	746
V/C Ratio(X)	0.48	0.49	0.56	0.65	0.05	0.03
Avail Cap(c_a), veh/h	836	827	911	761	838	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.1	11.1	11.7	11.8	5.5	5.4
Incr Delay (d2), s/veh	0.7	0.7	0.8	1.5	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.4	2.1	2.0	0.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.8	11.8	12.5	13.3	5.6	5.5
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h	502			652	68	
Approach Delay, s/veh	11.8			12.9	5.6	
Approach LOS	B			B	A	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	22.5		15.7		15.7	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	18.0		18.0		18.0	
Max Q Clear Time (g_c+I1), s	2.5		6.5		8.4	
Green Ext Time (p_c), s	0.1		2.3		2.9	
Intersection Summary						
HCM 6th Ctrl Delay			12.0			
HCM 6th LOS			B			

Queues

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2-3

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	335	67	139	611	26	57	72	91	39
v/c Ratio	0.25	0.37	0.15	0.30	0.64	0.05	0.09	0.10	0.16	0.05
Control Delay	12.3	21.5	5.8	12.6	24.1	0.2	14.2	4.7	14.9	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	21.5	5.8	12.6	24.1	0.2	14.2	4.7	14.9	5.8
Queue Length 50th (ft)	19	58	0	32	114	0	14	0	22	0
Queue Length 95th (ft)	40	95	24	61	167	1	41	24	59	18
Internal Link Dist (ft)	678			724			763			589
Turn Bay Length (ft)	200		200	200		250				
Base Capacity (vph)	443	1901	884	622	2127	981	601	739	583	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.18	0.08	0.22	0.29	0.03	0.09	0.10	0.16	0.05
Intersection Summary										

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	308	62	128	562	24	52	1	65	84	1	35
Future Volume (veh/h)	77	308	62	128	562	24	52	1	65	84	1	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	335	67	139	611	26	57	1	71	91	1	38
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	849	379	437	929	414	721	10	710	687	19	703
Arrive On Green	0.06	0.24	0.24	0.08	0.26	0.26	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1368	22	1566	1328	41	1550
Grp Volume(v), veh/h	84	335	67	139	611	26	57	0	72	91	0	39
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1368	0	1588	1328	0	1591
Q Serve(g_s), s	2.0	4.8	2.0	3.5	9.3	0.7	1.5	0.0	1.6	2.6	0.0	0.8
Cycle Q Clear(g_c), s	2.0	4.8	2.0	3.5	9.3	0.7	2.3	0.0	1.6	4.1	0.0	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.97
Lane Grp Cap(c), veh/h	315	849	379	437	929	414	721	0	720	687	0	722
V/C Ratio(X)	0.27	0.39	0.18	0.32	0.66	0.06	0.08	0.00	0.10	0.13	0.00	0.05
Avail Cap(c_a), veh/h	542	1963	876	741	2198	980	721	0	720	687	0	722
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.3	19.4	18.3	15.3	20.0	16.8	9.9	0.0	9.5	10.7	0.0	9.3
Incr Delay (d2), s/veh	0.4	0.3	0.2	0.4	0.8	0.1	0.2	0.0	0.3	0.4	0.0	0.1
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	0.8	1.9	0.7	1.3	3.6	0.3	0.4	0.0	0.5	0.7	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	19.7	18.6	15.7	20.8	16.9	10.1	0.0	9.8	11.1	0.0	9.4
LnGrp LOS	B	B	B	B	C	B	B	A	A	B	A	A
Approach Vol, veh/h		486			776			129			130	
Approach Delay, s/veh		18.9			19.7			9.9			10.6	
Approach LOS		B			B			A			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		32.0	9.7	19.0		32.0	8.3	20.4				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		27.5	15.5	33.5		27.5	11.5	37.5				
Max Q Clear Time (g_c+I1), s		4.3	5.5	6.8		6.1	4.0	11.3				
Green Ext Time (p_c), s		0.5	0.2	2.5		0.4	0.1	4.6				
Intersection Summary												
HCM 6th Ctrl Delay			17.8									
HCM 6th LOS			B									

HCM 6th TWSC
19: Drive 4 & Colbern Rd

AM Existing plus Zone 2-3

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗			↗			↗
Traffic Vol, veh/h	0	451	6	0	644	37	0	0	34	0	0	70
Future Vol, veh/h	0	451	6	0	644	37	0	0	34	0	0	70
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	490	7	0	700	40	0	0	37	0	0	76
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	245	-	-	350
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	755	0	0	646
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	755	-	-	646
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			10			11.3		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	755	-	-	-	-	646						
HCM Lane V/C Ratio	0.049	-	-	-	-	0.118						
HCM Control Delay (s)	10	-	-	-	-	11.3						
HCM Lane LOS	B	-	-	-	-	B						
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.4						

Queues

21: Douglas St & Colbern Rd

AM Existing plus Zone 2-3

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	103	199	226	612	375	77	216	332	313	67	408	149
v/c Ratio	0.26	0.43	0.55	0.74	0.36	0.13	0.49	0.26	0.27	0.15	0.44	0.20
Control Delay	14.9	35.0	9.7	33.6	22.7	0.5	19.0	20.7	1.5	15.0	27.4	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	35.0	9.7	33.6	22.7	0.5	19.0	20.7	1.5	15.0	27.4	2.6
Queue Length 50th (ft)	30	48	0	142	76	0	64	62	0	18	89	0
Queue Length 95th (ft)	58	83	55	212	112	0	128	108	29	47	147	25
Internal Link Dist (ft)	941		2187				1801				1236	
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	405	822	548	996	1552	796	474	1266	1209	455	929	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.24	0.41	0.61	0.24	0.10	0.46	0.26	0.26	0.15	0.44	0.20
Intersection Summary												

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

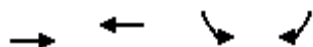
AM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	183	208	563	345	71	199	305	288	62	375	137
Future Volume (veh/h)	95	183	208	563	345	71	199	305	288	62	375	137
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	199	226	612	375	77	216	332	313	67	408	149
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	429	621	277	737	1177	525	441	1190	869	387	967	522
Arrive On Green	0.06	0.17	0.17	0.21	0.33	0.33	0.11	0.33	0.33	0.05	0.27	0.27
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	103	199	226	612	375	77	216	332	313	67	408	149
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.0	3.9	10.8	13.3	6.2	2.7	6.7	5.4	8.8	1.9	7.4	5.5
Cycle Q Clear(g_c), s	3.0	3.9	10.8	13.3	6.2	2.7	6.7	5.4	8.8	1.9	7.4	5.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	429	621	277	737	1177	525	441	1190	869	387	967	522
V/C Ratio(X)	0.24	0.32	0.82	0.83	0.32	0.15	0.49	0.28	0.36	0.17	0.42	0.29
Avail Cap(c_a), veh/h	475	812	362	986	1533	684	503	1190	869	416	967	522
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	28.4	31.3	29.6	19.7	18.5	17.5	19.2	10.0	15.8	23.6	19.6
Incr Delay (d2), s/veh	0.3	0.3	10.5	4.6	0.2	0.1	0.8	0.6	1.2	0.2	1.3	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.6	4.8	5.8	2.5	1.0	2.7	2.2	3.0	0.8	3.2	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	28.7	41.8	34.2	19.9	18.7	18.3	19.8	11.2	16.0	24.9	21.0
LnGrp LOS	B	C	D	C	B	B	B	B	B	B	C	C
Approach Vol, veh/h	528			1064			861			624		
Approach Delay, s/veh	31.9			28.0			16.3			23.0		
Approach LOS	C			C			B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.3	30.9	21.3	18.3	13.3	26.0	9.0	30.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	26.4	22.5	18.0	11.5	20.0	6.5	34.0				
Max Q Clear Time (g_c+I1), s	3.9	10.8	15.3	12.8	8.7	9.4	5.0	8.2				
Green Ext Time (p_c), s	0.0	3.0	1.5	0.9	0.2	2.4	0.0	2.8				
Intersection Summary												
HCM 6th Ctrl Delay	24.4											
HCM 6th LOS	C											

Queues

24: Colbern Rd & SB I-470 Ramp

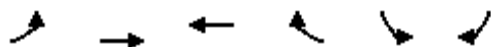
AM Existing plus Zone 2-3



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	567	1336	157	190
v/c Ratio	0.31	0.73	0.13	0.32
Control Delay	9.8	15.4	18.5	15.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.8	15.4	18.5	15.0
Queue Length 50th (ft)	67	216	23	38
Queue Length 95th (ft)	94	273	51	98
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	2872	2872	1208	598
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.47	0.13	0.32
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

AM Existing plus Zone 2-3



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	533	1189	0	132	160
Future Volume (veh/h)	0	533	1189	0	132	160
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	567	1336	0	157	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1827	1827	0	1228	
Arrive On Green	0.00	0.51	0.51	0.00	0.36	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	567	1336	0	157	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	6.4	20.2	0.0	2.1	0.0
Cycle Q Clear(g_c), s	0.0	6.4	20.2	0.0	2.1	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1827	1827	0	1228	
V/C Ratio(X)	0.00	0.31	0.73	0.00	0.13	
Avail Cap(c_a), veh/h	0	2912	2912	0	1228	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	9.7	13.0	0.0	15.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.6	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.2	7.0	0.0	0.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	9.8	13.6	0.0	15.2	0.0
LnGrp LOS	A	A	B	A	B	
Approach Vol, veh/h		567	1336		157	
Approach Delay, s/veh		9.8	13.6		15.2	
Approach LOS		A	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				40.0	29.0	40.0
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				56.5	24.5	56.5
Max Q Clear Time (g_c+I1), s				8.4	4.1	22.2
Green Ext Time (p_c), s				4.4	0.5	13.3
Intersection Summary						
HCM 6th Ctrl Delay			12.7			
HCM 6th LOS			B			

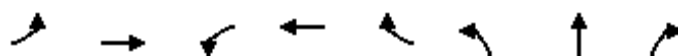
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing plus Zone 2-3



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	43	615	166	1272	125	81	144	113
v/c Ratio	0.18	0.45	0.36	0.73	0.15	0.15	0.26	0.20
Control Delay	7.5	15.5	8.9	17.6	4.1	25.7	26.3	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	15.5	8.9	17.6	4.1	25.7	26.3	7.1
Queue Length 50th (ft)	8	95	31	255	7	32	58	0
Queue Length 95th (ft)	18	139	52	311	30	72	115	37
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	252	2175	514	2415	1111	535	564	557
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.28	0.32	0.53	0.11	0.15	0.26	0.20
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

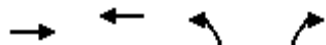
AM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	472	94	144	1107	109	70	124	97	0	0	0
Future Volume (veh/h)	40	472	94	144	1107	109	70	124	97	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	43	513	102	166	1272	0	81	144	113			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	250	1290	255	494	1683		532	559	474			
Arrive On Green	0.04	0.44	0.44	0.08	0.47	0.00	0.30	0.30	0.30			
Sat Flow, veh/h	1781	2957	585	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	43	307	308	166	1272	0	81	144	113			
Grp Sat Flow(s),veh/h/ln	1781	1777	1765	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	0.9	8.5	8.6	3.6	21.1	0.0	2.4	4.2	3.9			
Cycle Q Clear(g_c), s	0.9	8.5	8.6	3.6	21.1	0.0	2.4	4.2	3.9			
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	250	775	770	494	1683		532	559	474			
V/C Ratio(X)	0.17	0.40	0.40	0.34	0.76		0.15	0.26	0.24			
Avail Cap(c_a), veh/h	339	1099	1092	616	2396		532	559	474			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	12.2	13.8	13.9	10.0	15.5	0.0	18.5	19.2	19.0			
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.4	0.9	0.0	0.6	1.1	1.2			
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	0.3	3.2	3.2	1.3	7.8	0.0	1.0	1.9	1.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.5	14.2	14.2	10.4	16.4	0.0	19.1	20.3	20.2			
LnGrp LOS	B	B	B	B	B		B	C	C			
Approach Vol, veh/h	658			1438			338					
Approach Delay, s/veh	14.1			15.7			20.0					
Approach LOS	B			B			B					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	26.0		10.1	35.9		7.4		38.6				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	21.5		10.5	44.5		6.5		48.5				
Max Q Clear Time (g_c+I1), s	6.2		5.6	10.6		2.9		23.1				
Green Ext Time (p_c), s	1.2		0.2	4.2		0.0		10.9				
Intersection Summary												
HCM 6th Ctrl Delay	15.9											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

AM Existing plus Zone 2-3



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	475	1337	261	132
v/c Ratio	0.27	0.75	0.39	0.19
Control Delay	10.8	17.7	22.0	5.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.8	17.7	22.0	5.0
Queue Length 50th (ft)	63	247	89	0
Queue Length 95th (ft)	88	315	185	37
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2453	2453	666	678
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.19	0.55	0.39	0.19
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

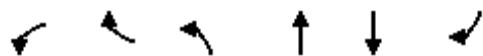
AM Existing plus Zone 2-3

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	456	0	0	1203	230	116
Future Volume (veh/h)	456	0	0	1203	230	116
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	475	0	0	1337	261	132
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1760	0	0	1760	683	608
Arrive On Green	0.50	0.00	0.00	0.50	0.38	0.38
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	475	0	0	1337	261	132
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	5.8	0.0	0.0	22.6	7.9	4.2
Cycle Q Clear(g_c), s	5.8	0.0	0.0	22.6	7.9	4.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1760	0	0	1760	683	608
V/C Ratio(X)	0.27	0.00	0.00	0.76	0.38	0.22
Avail Cap(c_a), veh/h	2511	0	0	2511	683	608
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	0.0	0.0	15.2	16.5	15.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.9	1.6	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	8.3	3.3	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.0	0.0	0.0	16.0	18.2	16.2
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	475			1337	393	
Approach Delay, s/veh	11.0			16.0	17.5	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	33.0		41.3		41.3	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	28.5		52.5		52.5	
Max Q Clear Time (g_c+I1), s	9.9		7.8		24.6	
Green Ext Time (p_c), s	1.2		3.6		12.2	
Intersection Summary						
HCM 6th Ctrl Delay			15.2			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2-3



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	370	75	307	786	840	406
v/c Ratio	0.65	0.23	0.76	0.31	0.54	0.47
Control Delay	38.9	9.6	42.8	4.7	13.6	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	9.6	42.8	4.7	13.6	4.2
Queue Length 50th (ft)	97	0	155	64	110	0
Queue Length 95th (ft)	141	35	234	105	209	65
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)			350			
Base Capacity (vph)	739	399	546	2576	1562	867
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	0.19	0.56	0.31	0.54	0.47
Intersection Summary						

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	340	0	69	282	723	0	0	398	748
Future Volume (veh/h)	0	0	0	340	0	69	282	723	0	0	398	748
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				370	0	75	307	786	0	0	433	813
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				483	0	221	354	2672	0	0	933	1581
Arrive On Green				0.14	0.00	0.14	0.20	0.75	0.00	0.00	0.50	0.50
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				370	0	75	307	786	0	0	433	813
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				8.6	0.0	3.6	13.9	5.9	0.0	0.0	12.5	14.4
Cycle Q Clear(g_c), s				8.6	0.0	3.6	13.9	5.9	0.0	0.0	12.5	14.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				483	0	221	354	2672	0	0	933	1581
V/C Ratio(X)				0.77	0.00	0.34	0.87	0.29	0.00	0.00	0.46	0.51
Avail Cap(c_a), veh/h				769	0	353	568	2672	0	0	933	1581
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				34.4	0.0	32.3	32.2	3.3	0.0	0.0	13.6	14.0
Incr Delay (d2), s/veh				2.6	0.0	0.9	8.1	0.3	0.0	0.0	1.7	1.2
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				3.7	0.0	1.4	6.6	1.5	0.0	0.0	5.3	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				37.0	0.0	33.2	40.3	3.6	0.0	0.0	15.2	15.2
LnGrp LOS				D	A	C	D	A	A	A	B	B
Approach Vol, veh/h					445			1093			1246	
Approach Delay, s/veh					36.4			13.9			15.2	
Approach LOS					D			B			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		67.0			21.0	46.0		16.1				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		62.5			26.5	31.5		18.5				
Max Q Clear Time (g_c+I1), s		7.9			15.9	16.4		10.6				
Green Ext Time (p_c), s		6.7			0.7	5.8		1.0				
Intersection Summary												
HCM 6th Ctrl Delay				18.1								
HCM 6th LOS				B								
Notes												
User approved volume balancing among the lanes for turning movement.												

Queues

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2-3



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	546	520	547	197	111	691
v/c Ratio	0.59	0.88	0.34	0.24	0.48	0.32
Control Delay	27.5	33.2	17.3	3.9	39.9	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	33.2	17.3	3.9	39.9	8.6
Queue Length 50th (ft)	119	144	96	0	53	82
Queue Length 95th (ft)	166	#312	163	43	102	129
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	1199	698	1629	835	371	2181
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	0.46	0.74	0.34	0.24	0.30	0.32

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 			 	
Traffic Volume (veh/h)	502	0	478	0	0	0	0	503	181	102	636	0
Future Volume (veh/h)	502	0	478	0	0	0	0	503	181	102	636	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	546	0	520				0	547	197	111	691	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1118	0	513				0	1554	693	143	2028	0
Arrive On Green	0.32	0.00	0.32				0.00	0.44	0.44	0.08	0.57	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	546	0	520				0	547	197	111	691	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	10.8	0.0	27.5				0.0	8.7	6.8	5.2	8.8	0.0
Cycle Q Clear(g_c), s	10.8	0.0	27.5				0.0	8.7	6.8	5.2	8.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1118	0	513				0	1554	693	143	2028	0
V/C Ratio(X)	0.49	0.00	1.01				0.00	0.35	0.28	0.78	0.34	0.00
Avail Cap(c_a), veh/h	1118	0	513				0	1554	693	346	2028	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.1	0.0	28.7				0.0	15.9	15.4	38.3	9.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	43.3				0.0	0.6	1.0	8.7	0.5	0.0
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	4.3	0.0	16.1				0.0	3.5	2.5	2.6	3.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	72.0				0.0	16.5	16.4	47.0	10.2	0.0
LnGrp LOS	C	A	F				A	B	B	D	B	A
Approach Vol, veh/h	1066						744			802		
Approach Delay, s/veh	47.1						16.5			15.3		
Approach LOS	D						B			B		
Timer - Assigned Phs	1	2	4		6							
Phs Duration (G+Y+Rc), s	11.3	41.7	32.0		53.0							
Change Period (Y+Rc), s	4.5	4.5	4.5		4.5							
Max Green Setting (Gmax), s	16.5	27.5	27.5		48.5							
Max Q Clear Time (g_c+I1), s	7.2	10.7	29.5		10.8							
Green Ext Time (p_c), s	0.2	4.1	0.0		5.5							
Intersection Summary												
HCM 6th Ctrl Delay	28.6											
HCM 6th LOS	C											

HCM 6th TWSC
40: Douglas St & Drive 3

AM Existing plus Zone 2-3

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	118	78	393	456	36
Future Vol, veh/h	53	118	78	393	456	36
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	128	85	427	496	39
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1093	496	535	0	-	0
Stage 1	496	-	-	-	-	-
Stage 2	597	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	237	574	1033	-	-	-
Stage 1	612	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	218	574	1033	-	-	-
Mov Cap-2 Maneuver	353	-	-	-	-	-
Stage 1	562	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	14.4	1.5		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1033	-	353	574	-	-
HCM Lane V/C Ratio	0.082	-	0.163	0.223	-	-
HCM Control Delay (s)	8.8	-	17.2	13.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	0.8	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

AM Existing plus Zone 2-3

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	54	16	430	438	2
Future Vol, veh/h	6	54	16	430	438	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	59	17	467	476	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	978	477	478	0	-	0
Stage 1	477	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	278	588	1084	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	274	588	1084	-	-	-
Mov Cap-2 Maneuver	404	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.2	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1084	-	562	-	-	
HCM Lane V/C Ratio	0.016	-	0.116	-	-	
HCM Control Delay (s)	8.4	-	12.2	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1	32	4	1	3	9	417	10	9	404	4
Future Vol, veh/h	11	1	32	4	1	3	9	417	10	9	404	4
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	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	35	4	1	3	10	453	11	10	439	4
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	942	945	441	958	942	459	443	0	0	464	0	0
Stage 1	461	461	-	479	479	-	-	-	-	-	-	-
Stage 2	481	484	-	479	463	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	243	262	616	237	263	602	1117	-	-	1097	-	-
Stage 1	581	565	-	568	555	-	-	-	-	-	-	-
Stage 2	566	552	-	568	564	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	238	257	616	220	258	602	1117	-	-	1097	-	-
Mov Cap-2 Maneuver	238	257	-	220	258	-	-	-	-	-	-	-
Stage 1	576	560	-	563	550	-	-	-	-	-	-	-
Stage 2	557	547	-	530	559	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	14.4		17.5		0.2		0.2					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1117	-	-	431	296	1097	-	-				
HCM Lane V/C Ratio	0.009	-	-	0.111	0.029	0.009	-	-				
HCM Control Delay (s)	8.3	-	-	14.4	17.5	8.3	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0	-	-				

Queues

48: Drive 6 & Colbern Rd

AM Existing plus Zone 2-3

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	375	15	104	601	73	117
v/c Ratio	0.53	0.05	0.28	0.47	0.08	0.14
Control Delay	26.0	11.4	14.8	16.2	10.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	11.4	14.8	16.2	10.9	3.2
Queue Length 50th (ft)	70	0	26	88	15	0
Queue Length 95th (ft)	112	13	53	126	40	26
Internal Link Dist (ft)	860			678	770	
Turn Bay Length (ft)		250	250			
Base Capacity (vph)	1807	815	533	2894	875	841
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	0.21	0.02	0.20	0.21	0.08	0.14
Intersection Summary						

HCM 6th Signalized Intersection Summary 48: Drive 6 & Colbern Rd

AM Existing plus Zone 2-3

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖	↗
Traffic Volume (veh/h)	345	14	96	553	67	108
Future Volume (veh/h)	345	14	96	553	67	108
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	375	15	104	601	73	117
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	622	278	326	1145	932	830
Arrive On Green	0.18	0.18	0.07	0.32	0.52	0.52
Sat Flow, veh/h	3647	1585	1781	3647	1781	1585
Grp Volume(v), veh/h	375	15	104	601	73	117
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1585
Q Serve(g_s), s	5.7	0.5	2.7	8.0	1.2	2.2
Cycle Q Clear(g_c), s	5.7	0.5	2.7	8.0	1.2	2.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	622	278	326	1145	932	830
V/C Ratio(X)	0.60	0.05	0.32	0.52	0.08	0.14
Avail Cap(c_a), veh/h	1921	857	645	3079	932	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	20.0	17.9	16.1	6.9	7.1
Incr Delay (d2), s/veh	0.9	0.1	0.6	0.4	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.2	1.1	3.0	0.4	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.1	20.1	18.5	16.5	7.1	7.5
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	390			705	190	
Approach Delay, s/veh	23.0			16.8	7.3	
Approach LOS	C			B	A	
Timer - Assigned Phs	2		3	4	8	
Phs Duration (G+Y+Rc), s	35.0		8.6	14.7	23.3	
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	
Max Green Setting (Gmax), s	30.5		14.5	31.5	50.5	
Max Q Clear Time (g_c+I1), s	4.2		4.7	7.7	10.0	
Green Ext Time (p_c), s	0.6		0.2	2.5	4.7	
Intersection Summary						
HCM 6th Ctrl Delay			17.3			
HCM 6th LOS			B			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑		↗
Traffic Vol, veh/h	345	55	28	592	0	13
Future Vol, veh/h	345	55	28	592	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	375	60	30	643	0	14
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	435	0	-	188
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	1121	-	0	822
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1121	-	-	822
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.4		9.5	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	822	-	-	1121	-	
HCM Lane V/C Ratio	0.017	-	-	0.027	-	
HCM Control Delay (s)	9.5	-	-	8.3	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

Intersection													
Int Delay, s/veh	6.5												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕			↕↕			↕			↕		
Traffic Vol, veh/h	6	329	24	116	259	41	41	20	137	43	13	10	
Future Vol, veh/h	6	329	24	116	259	41	41	20	137	43	13	10	
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	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	7	358	26	126	282	45	45	22	149	47	14	11	
Major/Minor	Major1		Major2			Minor1			Minor2				
Conflicting Flow All	327	0	0	384	0	0	785	964	192	761	955	164	
Stage 1	-	-	-	-	-	-	385	385	-	557	557	-	
Stage 2	-	-	-	-	-	-	400	579	-	204	398	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	1229	-	-	1171	-	-	283	254	817	295	257	852	
Stage 1	-	-	-	-	-	-	610	609	-	482	510	-	
Stage 2	-	-	-	-	-	-	597	499	-	779	601	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1229	-	-	1171	-	-	238	219	817	200	222	852	
Mov Cap-2 Maneuver	-	-	-	-	-	-	238	219	-	200	222	-	
Stage 1	-	-	-	-	-	-	606	605	-	479	443	-	
Stage 2	-	-	-	-	-	-	495	433	-	610	597	-	
Approach	EB		WB			NB			SB				
HCM Control Delay, s	0.1		2.5			19.6			27.5				
HCM LOS							C			D			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	459	1229	-	-	1171	-	-	231					
HCM Lane V/C Ratio	0.469	0.005	-	-	0.108	-	-	0.311					
HCM Control Delay (s)	19.6	7.9	0	-	8.4	0.3	-	27.5					
HCM Lane LOS	C	A	A	-	A	A	-	D					
HCM 95th %tile Q(veh)	2.5	0	-	-	0.4	-	-	1.3					

Queues

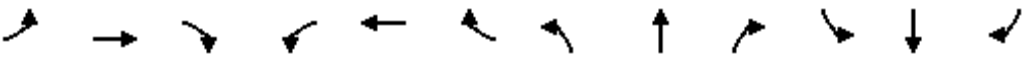
6: Colbern Rd & SB M-350 Ramp

PM Existing plus Zone 2-3

	→	↘	↙	←	↘	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	430	123	302	363	416	88
v/c Ratio	0.54	0.29	0.56	0.20	0.71	0.15
Control Delay	25.1	12.3	14.7	9.3	25.7	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	12.3	14.7	9.3	25.7	4.9
Queue Length 50th (ft)	67	11	56	32	122	0
Queue Length 95th (ft)	154	61	147	78	272	28
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	1227	603	732	2689	1180	1085
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	0.35	0.20	0.41	0.13	0.35	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary 6: Colbern Rd & SB M-350 Ramp

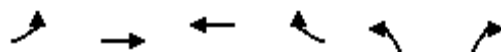
PM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑		↑
Traffic Volume (veh/h)	0	396	113	278	334	0	0	0	0	383	0	81
Future Volume (veh/h)	0	396	113	278	334	0	0	0	0	383	0	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	430	0	302	363	0				416	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	743		590	1767	0				519	0	
Arrive On Green	0.00	0.21	0.00	0.18	0.50	0.00				0.29	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	430	0	302	363	0				416	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	4.6	0.0	5.3	2.4	0.0				9.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.6	0.0	5.3	2.4	0.0				9.2	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	743		590	1767	0				519	0	
V/C Ratio(X)	0.00	0.58		0.51	0.21	0.00				0.80	0.00	
Avail Cap(c_a), veh/h	0	1625		1079	3625	0				1566	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	15.2	0.0	9.9	6.0	0.0				14.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.7	0.1	0.0				2.9	0.0	0.0
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	0.0	1.7	0.0	1.7	0.6	0.0				3.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	15.9	0.0	10.6	6.1	0.0				16.9	0.0	0.0
LnGrp LOS	A	B		B	A	A				B	A	
Approach Vol, veh/h		430			665						416	
Approach Delay, s/veh		15.9			8.1						16.9	
Approach LOS		B			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			12.3	13.4		16.9		25.7				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			19.5	19.5		37.5		43.5				
Max Q Clear Time (g_c+I1), s			7.3	6.6		11.2		4.4				
Green Ext Time (p_c), s			0.7	2.3		1.3		2.6				
Intersection Summary												
HCM 6th Ctrl Delay			12.7									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

PM Existing plus Zone 2-3



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	91	755	554	401	111	223
v/c Ratio	0.24	0.47	0.34	0.44	0.25	0.42
Control Delay	7.2	7.0	6.2	2.9	12.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	7.0	6.2	2.9	12.3	6.8
Queue Length 50th (ft)	8	37	25	3	14	6
Queue Length 95th (ft)	28	77	54	33	48	46
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	829	3539	3539	1583	1680	1511
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	0.11	0.21	0.16	0.25	0.07	0.15
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

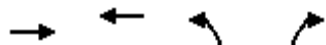
PM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	695	0	0	510	369	102	0	205	0	0	0
Future Volume (veh/h)	84	695	0	0	510	369	102	0	205	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	91	755	0	0	554	0	111	0	223			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	570	1696	0	0	1696		387	0	345			
Arrive On Green	0.48	0.48	0.00	0.00	0.48	0.00	0.22	0.00	0.22			
Sat Flow, veh/h	854	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	91	755	0	0	554	0	111	0	223			
Grp Sat Flow(s),veh/h/ln	854	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	2.2	4.2	0.0	0.0	2.8	0.0	1.5	0.0	3.8			
Cycle Q Clear(g_c), s	5.0	4.2	0.0	0.0	2.8	0.0	1.5	0.0	3.8			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	570	1696	0	0	1696		387	0	345			
V/C Ratio(X)	0.16	0.45	0.00	0.00	0.33		0.29	0.00	0.65			
Avail Cap(c_a), veh/h	1568	5849	0	0	5849		1965	0	1748			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	6.3	5.1	0.0	0.0	4.8	0.0	9.6	0.0	10.5			
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.1	0.0	0.4	0.0	2.0			
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	0.2	0.7	0.0	0.0	0.5	0.0	0.5	0.0	1.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	5.3	0.0	0.0	4.9	0.0	10.0	0.0	12.5			
LnGrp LOS	A	A	A	A	A		B	A	B			
Approach Vol, veh/h	846			554			334					
Approach Delay, s/veh	5.4			4.9			11.7					
Approach LOS	A			A			B					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	10.9			18.6			18.6					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	32.5			48.5			48.5					
Max Q Clear Time (g_c+I1), s	5.8			7.0			4.8					
Green Ext Time (p_c), s	1.1			7.0			4.3					
Intersection Summary												
HCM 6th Ctrl Delay	6.5											
HCM 6th LOS	A											

Queues

15: Main St & Colbern Rd

PM Existing plus Zone 2-3



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1139	831	82	66
v/c Ratio	0.70	0.64	0.12	0.10
Control Delay	15.1	14.6	15.0	5.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.1	14.6	15.0	5.3
Queue Length 50th (ft)	161	114	19	0
Queue Length 95th (ft)	217	162	54	24
Internal Link Dist (ft)	1355	2860	865	
Turn Bay Length (ft)				150
Base Capacity (vph)	3258	2617	686	654
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.35	0.32	0.12	0.10
Intersection Summary				

HCM 6th Signalized Intersection Summary 15: Main St & Colbern Rd

PM Existing plus Zone 2-3

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	990	58	44	720	75	61
Future Volume (veh/h)	990	58	44	720	75	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1076	63	48	783	82	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1544	90	100	1321	705	627
Arrive On Green	0.45	0.45	0.45	0.45	0.40	0.40
Sat Flow, veh/h	3505	200	72	3003	1781	1585
Grp Volume(v), veh/h	560	579	415	416	82	66
Grp Sat Flow(s),veh/h/ln	1777	1834	1374	1617	1781	1585
Q Serve(g_s), s	15.0	15.0	1.8	11.3	1.7	1.6
Cycle Q Clear(g_c), s	15.0	15.0	16.7	11.3	1.7	1.6
Prop In Lane		0.11	0.12		1.00	1.00
Lane Grp Cap(c), veh/h	804	830	689	732	705	627
V/C Ratio(X)	0.70	0.70	0.60	0.57	0.12	0.11
Avail Cap(c_a), veh/h	1721	1777	1419	1566	705	627
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.0	13.0	11.6	12.0	11.4	11.3
Incr Delay (d2), s/veh	1.1	1.1	0.9	0.7	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	5.4	3.4	3.6	0.7	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.1	14.1	12.5	12.7	11.7	11.6
LnGrp LOS	B	B	B	B	B	B
Approach Vol, veh/h	1139			831	148	
Approach Delay, s/veh	14.1			12.6	11.7	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	28.0		31.4		31.4	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	23.5		57.5		57.5	
Max Q Clear Time (g_c+l1), s	3.7		17.0		18.7	
Green Ext Time (p_c), s	0.4		9.9		6.9	
Intersection Summary						
HCM 6th Ctrl Delay			13.3			
HCM 6th LOS			B			

Queues

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2-3

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	127	1016	176	365	785	41	199	251	66	30
v/c Ratio	0.31	0.81	0.26	0.81	0.43	0.05	0.53	0.41	0.28	0.07
Control Delay	8.4	30.6	4.4	33.5	13.8	1.1	34.0	6.1	30.8	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	30.6	4.4	33.5	13.8	1.1	34.0	6.1	30.8	10.6
Queue Length 50th (ft)	24	254	0	131	135	0	95	0	29	0
Queue Length 95th (ft)	45	347	41	233	178	6	172	58	69	22
Internal Link Dist (ft)		678			724			763		589
Turn Bay Length (ft)	200		200	200		250				
Base Capacity (vph)	409	1398	732	543	2039	943	375	615	233	457
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.73	0.24	0.67	0.38	0.04	0.53	0.41	0.28	0.07
Intersection Summary										

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	935	162	336	722	38	183	1	230	61	1	27
Future Volume (veh/h)	117	935	162	336	722	38	183	1	230	61	1	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	1016	176	365	785	41	199	1	250	66	1	29
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	1280	571	432	1633	728	490	2	473	285	16	461
Arrive On Green	0.06	0.36	0.36	0.16	0.46	0.46	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1380	6	1580	1129	53	1540
Grp Volume(v), veh/h	127	1016	176	365	785	41	199	0	251	66	0	30
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1380	0	1586	1129	0	1593
Q Serve(g_s), s	2.8	19.3	6.0	9.3	11.5	1.1	9.1	0.0	9.9	3.9	0.0	1.0
Cycle Q Clear(g_c), s	2.8	19.3	6.0	9.3	11.5	1.1	10.1	0.0	9.9	13.8	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Lane Grp Cap(c), veh/h	409	1280	571	432	1633	728	490	0	475	285	0	477
V/C Ratio(X)	0.31	0.79	0.31	0.85	0.48	0.06	0.41	0.00	0.53	0.23	0.00	0.06
Avail Cap(c_a), veh/h	455	1536	685	654	2240	999	490	0	475	285	0	477
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.4	21.6	17.3	15.2	14.1	11.3	22.4	0.0	21.9	27.7	0.0	18.8
Incr Delay (d2), s/veh	0.4	2.5	0.3	6.4	0.2	0.0	2.5	0.0	4.2	1.9	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	7.9	2.1	4.0	4.3	0.4	3.1	0.0	4.1	1.2	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.8	24.0	17.6	21.6	14.3	11.3	24.9	0.0	26.1	29.6	0.0	19.1
LnGrp LOS	B	C	B	C	B	B	C	A	C	C	A	B
Approach Vol, veh/h	1319				1191		450				96	
Approach Delay, s/veh	21.9				16.5		25.6				26.3	
Approach LOS	C				B		C				C	
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	27.0		16.6		31.6		27.0		9.1		39.0	
Change Period (Y+Rc), s	4.5		4.5		4.5		4.5		4.5		4.5	
Max Green Setting (Gmax), s	22.5		21.5		32.5		22.5		6.6		47.4	
Max Q Clear Time (g_c+I1), s	12.1		11.3		21.3		15.8		4.8		13.5	
Green Ext Time (p_c), s	1.6		0.8		5.8		0.2		0.1		6.6	
Intersection Summary												
HCM 6th Ctrl Delay			20.5									
HCM 6th LOS			C									

HCM 6th TWSC
19: Drive 4 & Colbern Rd

PM Existing plus Zone 2-3

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗			↗			↗
Traffic Vol, veh/h	0	1214	12	0	1043	55	0	0	124	0	0	53
Future Vol, veh/h	0	1214	12	0	1043	55	0	0	124	0	0	53
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1320	13	0	1134	60	0	0	135	0	0	58
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	660	-	-	567
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	406	0	0	467
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	406	-	-	467
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			18.2			13.8		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	406	-	-	-	-	467						
HCM Lane V/C Ratio	0.332	-	-	-	-	0.123						
HCM Control Delay (s)	18.2	-	-	-	-	13.8						
HCM Lane LOS	C	-	-	-	-	B						
HCM 95th %tile Q(veh)	1.4	-	-	-	-	0.4						

Queues

21: Douglas St & Colbern Rd

PM Existing plus Zone 2-3

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	305	614	536	535	397	134	537	495	615	109	447	261
v/c Ratio	0.74	0.88	0.68	0.96	0.53	0.28	1.00	0.35	0.60	0.27	0.60	0.36
Control Delay	32.0	51.0	20.7	67.8	34.3	3.4	59.9	20.8	11.2	14.5	35.9	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	51.0	20.7	67.8	34.3	3.4	59.9	20.8	11.2	14.5	35.9	10.7
Queue Length 50th (ft)	120	179	195	157	106	0	~220	106	152	32	121	48
Queue Length 95th (ft)	#204	#271	314	#258	152	22	#437	148	260	61	172	105
Internal Link Dist (ft)	941		2187				1801				1236	
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	421	710	791	558	755	480	538	1399	1026	409	746	727
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.86	0.68	0.96	0.53	0.28	1.00	0.35	0.60	0.27	0.60	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

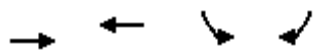
PM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	281	565	493	492	365	123	494	455	566	100	411	240
Future Volume (veh/h)	281	565	493	492	365	123	494	455	566	100	411	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	305	614	536	535	397	134	537	495	615	109	447	261
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	447	711	678	561	750	335	557	1360	864	322	746	572
Arrive On Green	0.15	0.20	0.20	0.16	0.21	0.21	0.23	0.38	0.38	0.06	0.21	0.21
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	305	614	536	535	397	134	537	495	615	109	447	261
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	11.9	15.0	18.0	13.8	8.9	6.6	20.5	9.0	26.0	3.3	10.2	11.3
Cycle Q Clear(g_c), s	11.9	15.0	18.0	13.8	8.9	6.6	20.5	9.0	26.0	3.3	10.2	11.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	447	711	678	561	750	335	557	1360	864	322	746	572
V/C Ratio(X)	0.68	0.86	0.79	0.95	0.53	0.40	0.96	0.36	0.71	0.34	0.60	0.46
Avail Cap(c_a), veh/h	447	711	678	561	750	335	557	1360	864	344	746	572
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	34.8	22.3	37.4	31.5	30.6	22.4	19.9	15.2	15.7	32.1	22.0
Incr Delay (d2), s/veh	4.2	10.8	6.3	27.0	0.7	0.8	29.1	0.8	5.0	0.6	3.5	2.6
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	5.3	7.4	10.4	7.8	3.8	2.5	13.0	3.8	9.7	1.3	4.7	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.0	45.6	28.6	64.3	32.2	31.4	51.5	20.7	20.2	16.3	35.7	24.6
LnGrp LOS	C	D	C	E	C	C	D	C	C	B	D	C
Approach Vol, veh/h	1455			1066			1647			817		
Approach Delay, s/veh	35.4			48.2			30.6			29.5		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.5	38.9	19.1	22.5	25.0	23.4	18.1	23.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.1	33.3	14.6	18.0	20.5	18.9	13.6	19.0				
Max Q Clear Time (g_c+I1), s	5.3	28.0	15.8	20.0	22.5	13.3	13.9	10.9				
Green Ext Time (p_c), s	0.0	2.7	0.0	0.0	0.0	1.9	0.0	1.9				
Intersection Summary												
HCM 6th Ctrl Delay	35.6											
HCM 6th LOS	D											

Queues

24: Colbern Rd & SB I-470 Ramp

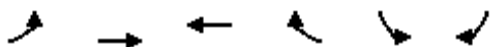
PM Existing plus Zone 2-3



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1268	1315	219	100
v/c Ratio	0.69	0.72	0.18	0.17
Control Delay	14.2	14.8	18.2	9.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.2	14.8	18.2	9.3
Queue Length 50th (ft)	191	203	31	8
Queue Length 95th (ft)	249	258	66	42
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	3012	3012	1196	597
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.42	0.44	0.18	0.17
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

PM Existing plus Zone 2-3



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	1192	1170	0	184	84
Future Volume (veh/h)	0	1192	1170	0	184	84
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	1268	1315	0	219	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1826	1826	0	1215	
Arrive On Green	0.00	0.51	0.51	0.00	0.35	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	1268	1315	0	219	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	18.0	19.1	0.0	2.9	0.0
Cycle Q Clear(g_c), s	0.0	18.0	19.1	0.0	2.9	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1826	1826	0	1215	
V/C Ratio(X)	0.00	0.69	0.72	0.00	0.18	
Avail Cap(c_a), veh/h	0	3057	3057	0	1215	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	12.3	12.5	0.0	15.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.2	6.6	0.0	1.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	12.8	13.1	0.0	15.3	0.0
LnGrp LOS	A	B	B	A	B	
Approach Vol, veh/h		1268	1315		219	
Approach Delay, s/veh		12.8	13.1		15.3	
Approach LOS		B	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				38.8	28.0	38.8
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				57.5	23.5	57.5
Max Q Clear Time (g_c+I1), s				20.0	4.9	21.1
Green Ext Time (p_c), s				12.7	0.7	13.2
Intersection Summary						
HCM 6th Ctrl Delay			13.1			
HCM 6th LOS			B			

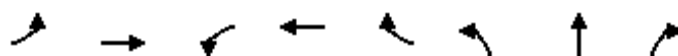
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

PM Existing plus Zone 2-3



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	85	1398	94	1418	82	100	103	172
v/c Ratio	0.36	0.77	0.40	0.77	0.10	0.22	0.21	0.32
Control Delay	10.1	18.5	11.5	18.7	3.3	29.3	29.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	18.5	11.5	18.7	3.3	29.3	29.2	6.8
Queue Length 50th (ft)	14	288	16	296	2	44	46	0
Queue Length 95th (ft)	29	370	32	356	20	86	88	44
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	242	2237	246	2274	1043	459	484	538
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.62	0.38	0.62	0.08	0.22	0.21	0.32
Intersection Summary								

HCM 6th Signalized Intersection Summary 27: Independence Ave/NB I-470 & Colbern Rd

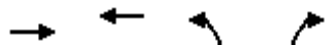
PM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1146	140	82	1234	71	86	89	148	0	0	0
Future Volume (veh/h)	78	1146	140	82	1234	71	86	89	148	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	85	1246	152	94	1418	0	100	103	172			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	259	1612	196	266	1802		467	490	416			
Arrive On Green	0.05	0.51	0.51	0.06	0.51	0.00	0.26	0.26	0.26			
Sat Flow, veh/h	1781	3190	388	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	85	692	706	94	1418	0	100	103	172			
Grp Sat Flow(s),veh/h/ln	1781	1777	1801	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	1.7	24.2	24.5	1.9	25.1	0.0	3.4	3.3	6.9			
Cycle Q Clear(g_c), s	1.7	24.2	24.5	1.9	25.1	0.0	3.4	3.3	6.9			
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	259	898	910	266	1802		467	490	416			
V/C Ratio(X)	0.33	0.77	0.78	0.35	0.79		0.21	0.21	0.41			
Avail Cap(c_a), veh/h	318	1147	1163	326	2304		467	490	416			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	13.0	15.4	15.4	12.9	15.5	0.0	22.1	22.1	23.4			
Incr Delay (d2), s/veh	0.7	2.5	2.6	0.8	1.4	0.0	1.0	1.0	3.0			
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	0.6	9.3	9.6	0.7	9.3	0.0	1.5	1.5	2.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.8	17.8	18.0	13.7	16.9	0.0	23.2	23.1	26.4			
LnGrp LOS	B	B	B	B	B		C	C	C			
Approach Vol, veh/h	1483			1512			375					
Approach Delay, s/veh	17.7			16.7			24.6					
Approach LOS	B			B			C					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	24.6		8.8	43.2		8.7		43.4				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	20.1		6.9	49.5		6.7		49.7				
Max Q Clear Time (g_c+I1), s	8.9		3.9	26.5		3.7		27.1				
Green Ext Time (p_c), s	1.1		0.0	11.1		0.0		11.8				
Intersection Summary												
HCM 6th Ctrl Delay	18.0											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

PM Existing plus Zone 2-3



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1191	1289	152	130
v/c Ratio	0.66	0.72	0.24	0.21
Control Delay	14.3	15.4	19.2	8.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.3	15.4	19.2	8.9
Queue Length 50th (ft)	180	203	43	11
Queue Length 95th (ft)	235	264	105	53
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2945	2945	638	627
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.40	0.44	0.24	0.21
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

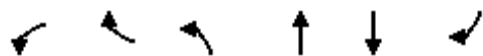
PM Existing plus Zone 2-3

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	1143	0	0	1160	134	114
Future Volume (veh/h)	1143	0	0	1160	134	114
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	1191	0	0	1289	152	130
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1785	0	0	1785	648	577
Arrive On Green	0.50	0.00	0.00	0.50	0.36	0.36
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	1191	0	0	1289	152	130
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	16.9	0.0	0.0	19.1	4.0	3.8
Cycle Q Clear(g_c), s	16.9	0.0	0.0	19.1	4.0	3.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1785	0	0	1785	648	577
V/C Ratio(X)	0.67	0.00	0.00	0.72	0.23	0.23
Avail Cap(c_a), veh/h	2983	0	0	2983	648	577
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.5	0.0	0.0	13.1	14.9	14.8
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.6	0.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	0.0	6.7	1.7	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.0	0.0	0.0	13.6	15.7	15.7
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	1191			1289	282	
Approach Delay, s/veh	13.0			13.6	15.7	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	29.0		38.3		38.3	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	24.5		56.5		56.5	
Max Q Clear Time (g_c+I1), s	6.0		18.9		21.1	
Green Ext Time (p_c), s	0.8		11.6		12.7	
Intersection Summary						
HCM 6th Ctrl Delay			13.6			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2-3



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	217	83	605	1221	798	366
v/c Ratio	0.50	0.30	0.74	0.45	0.49	0.42
Control Delay	37.3	11.1	34.7	4.4	12.1	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	11.1	34.7	4.4	12.1	3.7
Queue Length 50th (ft)	54	0	148	91	97	0
Queue Length 95th (ft)	88	38	194	145	182	58
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)			350			
Base Capacity (vph)	775	421	1068	2699	1619	871
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	0.28	0.20	0.57	0.45	0.49	0.42
Intersection Summary						

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	200	0	76	557	1123	0	0	411	660
Future Volume (veh/h)	0	0	0	200	0	76	557	1123	0	0	411	660
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				217	0	83	605	1221	0	0	447	717
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				331	0	152	741	2809	0	0	971	1646
Arrive On Green				0.10	0.00	0.10	0.21	0.79	0.00	0.00	0.52	0.52
Sat Flow, veh/h				3456	0	1585	3456	3647	0	0	1870	3170
Grp Volume(v), veh/h				217	0	83	605	1221	0	0	447	717
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1728	1777	0	0	1870	1585
Q Serve(g_s), s				4.8	0.0	4.0	13.2	8.7	0.0	0.0	11.9	11.1
Cycle Q Clear(g_c), s				4.8	0.0	4.0	13.2	8.7	0.0	0.0	11.9	11.1
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				331	0	152	741	2809	0	0	971	1646
V/C Ratio(X)				0.66	0.00	0.55	0.82	0.43	0.00	0.00	0.46	0.44
Avail Cap(c_a), veh/h				809	0	371	1114	2809	0	0	971	1646
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				34.5	0.0	34.1	29.6	2.6	0.0	0.0	12.0	11.8
Incr Delay (d2), s/veh				2.2	0.0	3.1	3.0	0.5	0.0	0.0	1.6	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
%ile BackOfQ(50%),veh/ln				2.1	0.0	1.6	5.6	1.8	0.0	0.0	4.9	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				36.7	0.0	37.2	32.5	3.1	0.0	0.0	13.6	12.6
LnGrp LOS				D	A	D	C	A	A	A	B	B
Approach Vol, veh/h					300			1826			1164	
Approach Delay, s/veh					36.8			12.9			13.0	
Approach LOS					D			B			B	
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	67.0			21.4			45.6			12.1		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	62.5			25.5			32.5			18.5		
Max Q Clear Time (g_c+I1), s	10.7			15.2			13.9			6.8		
Green Ext Time (p_c), s	12.9			1.8			6.0			0.8		
Intersection Summary												
HCM 6th Ctrl Delay	15.1											
HCM 6th LOS	B											

Queues

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2-3



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	971	537	1102	450	236	682
v/c Ratio	0.91	0.82	0.84	0.52	0.82	0.33
Control Delay	42.8	27.3	33.0	4.9	59.2	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	27.3	33.0	4.9	59.2	10.1
Queue Length 50th (ft)	269	160	301	5	130	97
Queue Length 95th (ft)	#383	#340	#399	67	#243	130
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	1094	666	1319	864	306	2077
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	0.89	0.81	0.84	0.52	0.77	0.33

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2-3

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	893	0	494	0	0	0	0	1014	414	217	627	0
Future Volume (veh/h)	893	0	494	0	0	0	0	1014	414	217	627	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	971	0	537				0	1102	450	236	682	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1094	0	502				0	1353	603	272	2073	0
Arrive On Green	0.32	0.00	0.32				0.00	0.38	0.38	0.15	0.58	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	971	0	537				0	1102	450	236	682	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	24.0	0.0	28.5				0.0	25.1	22.1	11.6	8.9	0.0
Cycle Q Clear(g_c), s	24.0	0.0	28.5				0.0	25.1	22.1	11.6	8.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1094	0	502				0	1353	603	272	2073	0
V/C Ratio(X)	0.89	0.00	1.07				0.00	0.81	0.75	0.87	0.33	0.00
Avail Cap(c_a), veh/h	1094	0	502				0	1353	603	307	2073	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.2	0.0	30.8				0.0	25.0	24.1	37.2	9.7	0.0
Incr Delay (d2), s/veh	9.0	0.0	60.1				0.0	5.5	8.2	20.6	0.4	0.0
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	11.0	0.0	18.8				0.0	11.1	9.3	6.5	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.3	0.0	90.9				0.0	30.5	32.3	57.9	10.1	0.0
LnGrp LOS	D	A	F				A	C	C	E	B	A
Approach Vol, veh/h	1508						1552			918		
Approach Delay, s/veh	57.0						31.0			22.4		
Approach LOS	E						C			C		
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	18.2	38.8		33.0		57.0						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	15.5	32.5		28.5		52.5						
Max Q Clear Time (g_c+I1), s	13.6	27.1		30.5		10.9						
Green Ext Time (p_c), s	0.1	3.9		0.0		5.5						
Intersection Summary												
HCM 6th Ctrl Delay	38.9											
HCM 6th LOS	D											

HCM 6th TWSC
40: Douglas St & Drive 3

PM Existing plus Zone 2-3

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	84	127	732	667	58
Future Vol, veh/h	40	84	127	732	667	58
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	91	138	796	725	63
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1797	725	788	0	-	0
Stage 1	725	-	-	-	-	-
Stage 2	1072	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	88	425	831	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	329	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	73	425	831	-	-	-
Mov Cap-2 Maneuver	198	-	-	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	329	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	19.8	1.5		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	831	-	198	425	-	-
HCM Lane V/C Ratio	0.166	-	0.22	0.215	-	-
HCM Control Delay (s)	10.2	-	28.2	15.8	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.6	-	0.8	0.8	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

PM Existing plus Zone 2-3

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	29	54	718	696	6
Future Vol, veh/h	3	29	54	718	696	6
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	32	59	780	757	7

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1659	761	764
Stage 1	761	-	-
Stage 2	898	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	107	405	849
Stage 1	461	-	-
Stage 2	398	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	100	405	849
Mov Cap-2 Maneuver	234	-	-
Stage 1	429	-	-
Stage 2	398	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	849	-	379	-	-
HCM Lane V/C Ratio	0.069	-	0.092	-	-
HCM Control Delay (s)	9.6	-	15.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.3	-	-

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	5	1	17	17	1	10	32	679	10	2	668	11
Future Vol, veh/h	5	1	17	17	1	10	32	679	10	2	668	11
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	-	-	-	-	-	-	200	-	-	200	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	18	18	1	11	35	738	11	2	726	12
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1556	1555	732	1560	1556	744	738	0	0	749	0	0
Stage 1	736	736	-	814	814	-	-	-	-	-	-	-
Stage 2	820	819	-	746	742	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	92	113	421	91	113	415	868	-	-	860	-	-
Stage 1	411	425	-	372	391	-	-	-	-	-	-	-
Stage 2	369	389	-	405	422	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	86	108	421	84	108	415	868	-	-	860	-	-
Mov Cap-2 Maneuver	206	230	-	200	223	-	-	-	-	-	-	-
Stage 1	395	424	-	357	375	-	-	-	-	-	-	-
Stage 2	344	373	-	385	421	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	16.7		21.6		0.4		0					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	868	-	-	333	247	860	-	-				
HCM Lane V/C Ratio	0.04	-	-	0.075	0.123	0.003	-	-				
HCM Control Delay (s)	9.3	-	-	16.7	21.6	9.2	-	-				
HCM Lane LOS	A	-	-	C	C	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.4	0	-	-				

Queues

48: Drive 6 & Colbern Rd

PM Existing plus Zone 2-3

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	947	49	345	670	253	404
v/c Ratio	0.79	0.09	0.77	0.32	0.49	0.54
Control Delay	30.4	6.5	29.6	8.4	29.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	6.5	29.6	8.4	29.8	6.0
Queue Length 50th (ft)	228	0	112	80	113	0
Queue Length 95th (ft)	322	23	208	107	201	70
Internal Link Dist (ft)	860			678	770	
Turn Bay Length (ft)		250	250			
Base Capacity (vph)	1391	652	557	2540	519	749
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	0.68	0.08	0.62	0.26	0.49	0.54
Intersection Summary						

HCM 6th Signalized Intersection Summary 48: Drive 6 & Colbern Rd

PM Existing plus Zone 2-3

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖	↗
Traffic Volume (veh/h)	871	45	317	616	233	372
Future Volume (veh/h)	871	45	317	616	233	372
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	947	49	345	670	253	404
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1205	538	436	1986	568	506
Arrive On Green	0.34	0.34	0.16	0.56	0.32	0.32
Sat Flow, veh/h	3647	1585	1781	3647	1781	1585
Grp Volume(v), veh/h	947	49	345	670	253	404
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1585
Q Serve(g_s), s	17.7	1.6	8.9	7.6	8.3	17.2
Cycle Q Clear(g_c), s	17.7	1.6	8.9	7.6	8.3	17.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1205	538	436	1986	568	506
V/C Ratio(X)	0.79	0.09	0.79	0.34	0.45	0.80
Avail Cap(c_a), veh/h	1520	678	674	2774	568	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	16.6	15.2	8.8	19.9	22.9
Incr Delay (d2), s/veh	2.2	0.1	3.5	0.1	2.5	12.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	0.5	3.6	2.6	3.7	7.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.1	16.7	18.7	8.9	22.4	35.4
LnGrp LOS	C	B	B	A	C	D
Approach Vol, veh/h	996			1015	657	
Approach Delay, s/veh	23.8			12.3	30.4	
Approach LOS	C			B	C	
Timer - Assigned Phs	2		3	4	8	
Phs Duration (G+Y+Rc), s	28.0		16.2	29.5	45.7	
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	
Max Green Setting (Gmax), s	23.5		21.5	31.5	57.5	
Max Q Clear Time (g_c+I1), s	19.2		10.9	19.7	9.6	
Green Ext Time (p_c), s	1.1		0.8	5.3	5.4	
Intersection Summary						
HCM 6th Ctrl Delay			21.0			
HCM 6th LOS			C			

Intersection

Int Delay, s/veh 0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑		↑
Traffic Vol, veh/h	869	181	91	758	0	47
Future Vol, veh/h	869	181	91	758	0	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	945	197	99	824	0	51

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1142
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	608
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	608
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	538	-	-	608	-
HCM Lane V/C Ratio	0.095	-	-	0.163	-
HCM Control Delay (s)	12.4	-	-	12.1	-
HCM Lane LOS	B	-	-	B	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	-

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	3	206	15	50	179	23	10	4	78	45	7	5
Future Vol, veh/h	3	206	15	50	179	23	10	4	78	45	7	5
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	224	16	54	195	25	11	4	85	49	8	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	220	0	0	240	0	0	448	566	120	436	562	110
Stage 1	-	-	-	-	-	-	238	238	-	316	316	-
Stage 2	-	-	-	-	-	-	210	328	-	120	246	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1346	-	-	1324	-	-	494	432	909	504	434	922
Stage 1	-	-	-	-	-	-	744	707	-	670	654	-
Stage 2	-	-	-	-	-	-	773	646	-	872	701	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1346	-	-	1324	-	-	466	410	909	436	412	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	466	410	-	436	412	-
Stage 1	-	-	-	-	-	-	742	705	-	668	623	-
Stage 2	-	-	-	-	-	-	723	616	-	783	699	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.6			10.2			14.2		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	786	1346	-	-	1324	-	-	454				
HCM Lane V/C Ratio	0.127	0.002	-	-	0.041	-	-	0.136				
HCM Control Delay (s)	10.2	7.7	0	-	7.8	0.1	-	14.2				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.5				

Queues

6: Colbern Rd & SB M-350 Ramp

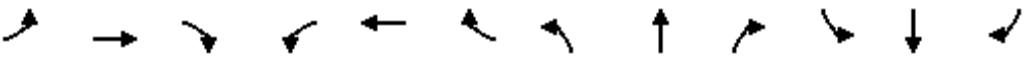
AM Existing plus Zone 2-4



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	251	105	153	239	250	36
v/c Ratio	0.31	0.24	0.28	0.15	0.48	0.07
Control Delay	15.7	6.0	7.9	6.3	16.5	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	6.0	7.9	6.3	16.5	1.8
Queue Length 50th (ft)	25	0	16	13	47	0
Queue Length 95th (ft)	58	29	47	32	112	7
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	2329	1077	901	3452	1529	1377
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	0.11	0.10	0.17	0.07	0.16	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary 6: Colbern Rd & SB M-350 Ramp

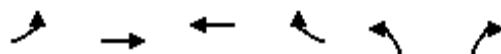
AM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑		↑
Traffic Volume (veh/h)	0	231	97	141	220	0	0	0	0	230	0	33
Future Volume (veh/h)	0	231	97	141	220	0	0	0	0	230	0	33
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	251	0	153	239	0				250	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	658		625	1688	0				350	0	
Arrive On Green	0.00	0.19	0.00	0.13	0.47	0.00				0.20	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	251	0	153	239	0				250	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	1.7	0.0	1.8	1.0	0.0				3.6	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.7	0.0	1.8	1.0	0.0				3.6	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	658		625	1688	0				350	0	
V/C Ratio(X)	0.00	0.38		0.24	0.14	0.00				0.71	0.00	
Avail Cap(c_a), veh/h	0	3177		1474	5900	0				2308	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.8	0.0	7.2	4.1	0.0				10.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.2	0.0	0.0				2.7	0.0	0.0
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	0.0	0.5	0.0	0.4	0.1	0.0				1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.2	0.0	7.4	4.1	0.0				13.0	0.0	0.0
LnGrp LOS	A	B		A	A	A				B	A	
Approach Vol, veh/h		251			392						250	
Approach Delay, s/veh		10.2			5.4						13.0	
Approach LOS		B			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			7.9	9.6		9.9		17.5				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			16.5	24.5		35.5		45.5				
Max Q Clear Time (g_c+I1), s			3.8	3.7		5.6		3.0				
Green Ext Time (p_c), s			0.3	1.5		0.7		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			8.9									
HCM 6th LOS			A									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

AM Existing plus Zone 2-4



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	78	423	337	332	54	190
v/c Ratio	0.15	0.23	0.18	0.34	0.10	0.31
Control Delay	6.0	5.4	5.2	2.0	8.4	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	5.4	5.2	2.0	8.4	3.5
Queue Length 50th (ft)	5	16	12	0	5	0
Queue Length 95th (ft)	18	33	26	20	19	22
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	1023	3539	3539	1583	1770	1583
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	0.08	0.12	0.10	0.21	0.03	0.12
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

AM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	389	0	0	310	305	50	0	175	0	0	0
Future Volume (veh/h)	72	389	0	0	310	305	50	0	175	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	78	423	0	0	337	0	54	0	190			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	678	1360	0	0	1360		330	0	293			
Arrive On Green	0.38	0.38	0.00	0.00	0.38	0.00	0.19	0.00	0.19			
Sat Flow, veh/h	1043	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	78	423	0	0	337	0	54	0	190			
Grp Sat Flow(s),veh/h/ln	1043	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	1.1	1.7	0.0	0.0	1.3	0.0	0.5	0.0	2.3			
Cycle Q Clear(g_c), s	2.5	1.7	0.0	0.0	1.3	0.0	0.5	0.0	2.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	678	1360	0	0	1360		330	0	293			
V/C Ratio(X)	0.12	0.31	0.00	0.00	0.25		0.16	0.00	0.65			
Avail Cap(c_a), veh/h	2659	8108	0	0	8108		2866	0	2551			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.2	4.5	0.0	0.0	4.4	0.0	7.1	0.0	7.9			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.0	2.4			
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	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.3	4.6	0.0	0.0	4.5	0.0	7.4	0.0	10.3			
LnGrp LOS	A	A	A	A	A		A	A	B			
Approach Vol, veh/h	501			337			244					
Approach Delay, s/veh	4.7			4.5			9.6					
Approach LOS	A			A			A					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	8.4			12.5			12.5					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	33.5			47.5			47.5					
Max Q Clear Time (g_c+I1), s	4.3			4.5			3.3					
Green Ext Time (p_c), s	0.8			3.5			2.4					
Intersection Summary												
HCM 6th Ctrl Delay	5.8											
HCM 6th LOS	A											

Queues

15: Main St & Colbern Rd

AM Existing plus Zone 2-4

	→	←	↶	↷
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	581	681	63	23
v/c Ratio	0.49	0.65	0.07	0.03
Control Delay	14.3	18.3	8.5	4.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.3	18.3	8.5	4.3
Queue Length 50th (ft)	67	93	10	0
Queue Length 95th (ft)	104	138	30	10
Internal Link Dist (ft)	1355	2860	865	
Turn Bay Length (ft)				150
Base Capacity (vph)	3442	3145	882	800
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.22	0.07	0.03
Intersection Summary				

HCM 6th Signalized Intersection Summary 15: Main St & Colbern Rd

AM Existing plus Zone 2-4

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	444	90	39	588	58	21
Future Volume (veh/h)	444	90	39	588	58	21
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	483	98	42	639	63	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	918	185	112	1000	915	814
Arrive On Green	0.31	0.31	0.31	0.31	0.51	0.51
Sat Flow, veh/h	3039	594	109	3294	1781	1585
Grp Volume(v), veh/h	290	291	356	325	63	23
Grp Sat Flow(s),veh/h/ln	1777	1763	1700	1617	1781	1585
Q Serve(g_s), s	6.9	7.0	2.0	8.9	0.9	0.4
Cycle Q Clear(g_c), s	6.9	7.0	9.0	8.9	0.9	0.4
Prop In Lane		0.34	0.12		1.00	1.00
Lane Grp Cap(c), veh/h	554	550	608	504	915	814
V/C Ratio(X)	0.52	0.53	0.59	0.65	0.07	0.03
Avail Cap(c_a), veh/h	1878	1863	1823	1709	915	814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	14.6	15.2	15.3	6.3	6.2
Incr Delay (d2), s/veh	0.8	0.8	0.9	1.4	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.5	3.2	3.0	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.4	15.4	16.1	16.7	6.5	6.2
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h	581			681	86	
Approach Delay, s/veh	15.4			16.4	6.4	
Approach LOS	B			B	A	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	31.0		20.6		20.6	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	26.5		54.5		54.5	
Max Q Clear Time (g_c+I1), s	2.9		9.0		11.0	
Green Ext Time (p_c), s	0.2		4.1		5.0	
Intersection Summary						
HCM 6th Ctrl Delay			15.3			
HCM 6th LOS			B			

Queues

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2-4

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	429	67	139	765	26	57	72	91	39
v/c Ratio	0.28	0.38	0.11	0.17	0.67	0.05	0.10	0.10	0.17	0.06
Control Delay	12.2	19.0	0.9	10.1	23.4	0.2	16.4	5.3	17.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	19.0	0.9	10.1	23.4	0.2	16.4	5.3	17.1	6.5
Queue Length 50th (ft)	19	75	0	15	151	0	15	0	25	0
Queue Length 95th (ft)	39	112	5	28	206	1	44	26	64	19
Internal Link Dist (ft)	678				724		763		589	
Turn Bay Length (ft)	200		200		200		250			
Base Capacity (vph)	314	1838	883	1133	2211	1016	564	698	547	681
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.23	0.08	0.12	0.35	0.03	0.10	0.10	0.17	0.06
Intersection Summary										

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	395	62	128	704	24	52	1	65	84	1	35
Future Volume (veh/h)	77	395	62	128	704	24	52	1	65	84	1	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	429	67	139	765	26	57	1	71	91	1	38
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	1069	477	845	1107	494	668	9	660	634	17	654
Arrive On Green	0.06	0.30	0.30	0.07	0.31	0.31	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1368	22	1566	1328	41	1550
Grp Volume(v), veh/h	84	429	67	139	765	26	57	0	72	91	0	39
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1368	0	1588	1328	0	1591
Q Serve(g_s), s	2.0	6.3	2.0	1.7	12.3	0.7	1.7	0.0	1.8	2.9	0.0	0.9
Cycle Q Clear(g_c), s	2.0	6.3	2.0	1.7	12.3	0.7	2.6	0.0	1.8	4.7	0.0	0.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.97
Lane Grp Cap(c), veh/h	301	1069	477	845	1107	494	668	0	670	634	0	671
V/C Ratio(X)	0.28	0.40	0.14	0.16	0.69	0.05	0.09	0.00	0.11	0.14	0.00	0.06
Avail Cap(c_a), veh/h	399	1880	838	1370	2261	1009	668	0	670	634	0	671
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	18.1	16.6	13.8	19.7	15.7	12.0	0.0	11.4	12.8	0.0	11.2
Incr Delay (d2), s/veh	0.5	0.2	0.1	0.1	0.8	0.0	0.3	0.0	0.3	0.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.4	0.7	0.6	4.8	0.3	0.5	0.0	0.6	0.9	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	18.4	16.8	13.8	20.5	15.8	12.2	0.0	11.7	13.3	0.0	11.3
LnGrp LOS	B	B	B	B	C	B	B	A	B	B	A	B
Approach Vol, veh/h	580			930			129			130		
Approach Delay, s/veh	17.7			19.4			12.0			12.7		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	32.0		9.1	24.1		32.0	8.4	24.8				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	27.5		14.5	34.5		27.5	7.5	41.5				
Max Q Clear Time (g_c+I1), s	4.6		3.7	8.3		6.7	4.0	14.3				
Green Ext Time (p_c), s	0.5		0.3	3.2		0.4	0.0	6.0				
Intersection Summary												
HCM 6th Ctrl Delay	17.8											
HCM 6th LOS	B											

HCM 6th TWSC
19: Drive 4 & Colbern Rd

AM Existing plus Zone 2-4

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗			↗			↗
Traffic Vol, veh/h	0	538	6	0	786	37	0	0	34	0	0	70
Future Vol, veh/h	0	538	6	0	786	37	0	0	34	0	0	70
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	585	7	0	854	40	0	0	37	0	0	76
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	293	-	-	427
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	703	0	0	576
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	703	-	-	576
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			10.4			12.2		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	703	-	-	-	-	576						
HCM Lane V/C Ratio	0.053	-	-	-	-	0.132						
HCM Control Delay (s)	10.4	-	-	-	-	12.2						
HCM Lane LOS	B	-	-	-	-	B						
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.5						

Queues

21: Douglas St & Colbern Rd

AM Existing plus Zone 2-4

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	221	265	612	411	77	299	332	313	67	408	185
v/c Ratio	0.16	0.44	0.43	0.71	0.38	0.14	0.38	0.28	0.16	0.15	0.43	0.24
Control Delay	12.2	34.0	6.7	31.8	21.9	1.5	16.7	22.4	1.1	16.3	26.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	34.0	6.7	31.8	21.9	1.5	16.7	22.4	1.1	16.3	26.6	3.9
Queue Length 50th (ft)	17	52	0	139	81	0	44	64	0	19	86	0
Queue Length 95th (ft)	30	90	34	206	117	9	84	114	16	50	146	40
Internal Link Dist (ft)	941			2187			1801			1236		
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	810	853	873	1096	1652	806	803	1177	2071	437	946	771
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.26	0.30	0.56	0.25	0.10	0.37	0.28	0.15	0.15	0.43	0.24
Intersection Summary												

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

AM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	203	244	563	378	71	275	305	288	62	375	170
Future Volume (veh/h)	115	203	244	563	378	71	275	305	288	62	375	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	125	221	0	612	411	77	299	332	0	67	408	185
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	737	371		776	929	414	884	1244		499	1112	603
Arrive On Green	0.07	0.10	0.00	0.22	0.26	0.26	0.09	0.35	0.00	0.05	0.31	0.31
Sat Flow, veh/h	3456	3554	2790	3456	3554	1585	3456	3554	2790	1781	3554	1585
Grp Volume(v), veh/h	125	221	0	612	411	77	299	332	0	67	408	185
Grp Sat Flow(s),veh/h/ln	1728	1777	1395	1728	1777	1585	1728	1777	1395	1781	1777	1585
Q Serve(g_s), s	1.7	4.0	0.0	11.2	6.5	2.5	3.8	4.5	0.0	1.6	6.0	5.5
Cycle Q Clear(g_c), s	1.7	4.0	0.0	11.2	6.5	2.5	3.8	4.5	0.0	1.6	6.0	5.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	737	371		776	929	414	884	1244		499	1112	603
V/C Ratio(X)	0.17	0.60		0.79	0.44	0.19	0.34	0.27		0.13	0.37	0.31
Avail Cap(c_a), veh/h	876	979		1261	1895	845	1010	1244		550	1112	603
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	28.7	0.0	24.5	20.7	19.2	13.4	15.6	0.0	12.6	17.9	14.6
Incr Delay (d2), s/veh	0.1	1.5	0.0	1.8	0.3	0.2	0.2	0.5	0.0	0.1	0.9	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.7	0.0	4.5	2.6	0.9	1.4	1.8	0.0	0.6	2.4	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.1	30.3	0.0	26.4	21.0	19.5	13.6	16.2	0.0	12.7	18.8	15.9
LnGrp LOS	B	C		C	C	B	B	B		B	B	B
Approach Vol, veh/h	346			1100			631			660		
Approach Delay, s/veh	25.2			23.9			15.0			17.4		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	28.0	19.6	11.5	10.6	25.5	9.0	22.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	23.5	24.5	18.5	8.5	20.5	7.2	35.8				
Max Q Clear Time (g_c+I1), s	3.6	6.5	13.2	6.0	5.8	8.0	3.7	8.5				
Green Ext Time (p_c), s	0.0	1.9	1.9	1.0	0.3	2.7	0.1	3.1				

Intersection Summary

HCM 6th Ctrl Delay 20.4

HCM 6th LOS C

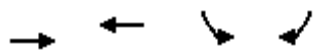
Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Queues

24: Colbern Rd & SB I-470 Ramp

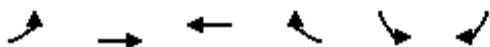
AM Existing plus Zone 2-4



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	588	1367	157	195
v/c Ratio	0.31	0.73	0.13	0.33
Control Delay	9.7	15.3	19.2	16.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.7	15.3	19.2	16.2
Queue Length 50th (ft)	71	224	23	42
Queue Length 95th (ft)	97	282	53	107
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	2818	2818	1185	585
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.21	0.49	0.13	0.33
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

AM Existing plus Zone 2-4



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	553	1217	0	132	164
Future Volume (veh/h)	0	553	1217	0	132	164
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	588	1367	0	157	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1854	1854	0	1209	
Arrive On Green	0.00	0.52	0.52	0.00	0.35	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	588	1367	0	157	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	6.6	20.9	0.0	2.2	0.0
Cycle Q Clear(g_c), s	0.0	6.6	20.9	0.0	2.2	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1854	1854	0	1209	
V/C Ratio(X)	0.00	0.32	0.74	0.00	0.13	
Avail Cap(c_a), veh/h	0	2866	2866	0	1209	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	9.6	13.0	0.0	15.5	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.6	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.3	7.3	0.0	0.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	9.7	13.6	0.0	15.7	0.0
LnGrp LOS	A	A	B	A	B	
Approach Vol, veh/h		588	1367		157	
Approach Delay, s/veh		9.7	13.6		15.7	
Approach LOS		A	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				41.0	29.0	41.0
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				56.5	24.5	56.5
Max Q Clear Time (g_c+I1), s				8.6	4.2	22.9
Green Ext Time (p_c), s				4.6	0.5	13.6
Intersection Summary						
HCM 6th Ctrl Delay			12.7			
HCM 6th LOS			B			

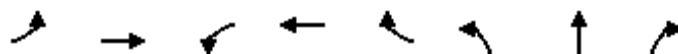
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing plus Zone 2-4



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	47	633	166	1302	125	84	144	113
v/c Ratio	0.19	0.43	0.37	0.72	0.15	0.16	0.27	0.21
Control Delay	7.3	13.9	8.6	16.9	3.9	26.7	27.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	13.9	8.6	16.9	3.9	26.7	27.3	7.3
Queue Length 50th (ft)	8	93	30	258	7	34	60	0
Queue Length 95th (ft)	18	129	50	313	29	74	116	37
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	253	2365	462	2471	1134	512	538	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.27	0.36	0.53	0.11	0.16	0.27	0.21
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing plus Zone 2-4

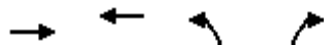
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	488	95	144	1133	109	72	124	97	0	0	0
Future Volume (veh/h)	43	488	95	144	1133	109	72	124	97	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	47	530	103	166	1302	0	84	144	113			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	255	1343	260	498	1722		508	533	452			
Arrive On Green	0.04	0.45	0.45	0.07	0.48	0.00	0.29	0.29	0.29			
Sat Flow, veh/h	1781	2969	575	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	47	316	317	166	1302	0	84	144	113			
Grp Sat Flow(s),veh/h/ln	1781	1777	1767	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	0.9	8.5	8.6	3.5	21.4	0.0	2.5	4.3	3.9			
Cycle Q Clear(g_c), s	0.9	8.5	8.6	3.5	21.4	0.0	2.5	4.3	3.9			
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	255	803	799	498	1722		508	533	452			
V/C Ratio(X)	0.18	0.39	0.40	0.33	0.76		0.17	0.27	0.25			
Avail Cap(c_a), veh/h	340	1194	1187	555	2447		508	533	452			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	11.8	13.1	13.1	9.5	15.1	0.0	19.3	19.9	19.8			
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.4	0.9	0.0	0.7	1.2	1.3			
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	0.3	3.2	3.2	1.2	7.8	0.0	1.1	2.0	1.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.2	13.4	13.5	9.9	15.9	0.0	20.0	21.1	21.1			
LnGrp LOS	B	B	B	A	B		B	C	C			
Approach Vol, veh/h	680			1468			341					
Approach Delay, s/veh	13.4			15.2			20.8					
Approach LOS	B			B			C					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	25.0		9.9	37.0		7.5		39.3				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	20.5		7.7	48.3		6.5		49.5				
Max Q Clear Time (g_c+I1), s	6.3		5.5	10.6		2.9		23.4				
Green Ext Time (p_c), s	1.2		0.1	4.4		0.0		11.4				
Intersection Summary												
HCM 6th Ctrl Delay	15.5											
HCM 6th LOS	B											

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Queues

31: NB 291 Ramp & Colbern Rd

AM Existing plus Zone 2-4



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	489	1361	266	132
v/c Ratio	0.27	0.75	0.40	0.20
Control Delay	10.8	17.8	22.5	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.8	17.8	22.5	5.1
Queue Length 50th (ft)	65	254	92	0
Queue Length 95th (ft)	91	325	189	37
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2430	2430	659	672
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.56	0.40	0.20
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

AM Existing plus Zone 2-4

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	469	0	0	1225	234	116
Future Volume (veh/h)	469	0	0	1225	234	116
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	489	0	0	1361	266	132
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1780	0	0	1780	676	601
Arrive On Green	0.50	0.00	0.00	0.50	0.38	0.38
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	489	0	0	1361	266	132
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	6.0	0.0	0.0	23.3	8.2	4.2
Cycle Q Clear(g_c), s	6.0	0.0	0.0	23.3	8.2	4.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1780	0	0	1780	676	601
V/C Ratio(X)	0.27	0.00	0.00	0.76	0.39	0.22
Avail Cap(c_a), veh/h	2484	0	0	2484	676	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	0.0	0.0	15.2	17.0	15.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.9	1.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	0.0	8.5	3.5	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.9	0.0	0.0	16.1	18.7	16.6
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	489			1361	398	
Approach Delay, s/veh	10.9			16.1	18.0	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	33.0		42.1		42.1	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	28.5		52.5		52.5	
Max Q Clear Time (g_c+I1), s	10.2		8.0		25.3	
Green Ext Time (p_c), s	1.2		3.7		12.3	
Intersection Summary						
HCM 6th Ctrl Delay			15.3			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2-4



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	370	99	307	846	884	413
v/c Ratio	0.66	0.29	0.87	0.32	0.52	0.45
Control Delay	42.9	9.5	61.7	4.8	12.1	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	9.5	61.7	4.8	12.1	3.3
Queue Length 50th (ft)	107	0	176	74	123	0
Queue Length 95th (ft)	153	42	#337	119	197	56
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)		400	350			
Base Capacity (vph)	787	439	368	2623	1703	920
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	0.47	0.23	0.83	0.32	0.52	0.45

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	340	0	91	282	778	0	0	432	761
Future Volume (veh/h)	0	0	0	340	0	91	282	778	0	0	432	761
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				370	0	99	307	846	0	0	470	827
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				480	0	220	343	2709	0	0	974	1650
Arrive On Green				0.14	0.00	0.14	0.19	0.76	0.00	0.00	0.52	0.52
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				370	0	99	307	846	0	0	470	827
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				9.4	0.0	5.2	15.3	6.8	0.0	0.0	14.7	15.4
Cycle Q Clear(g_c), s				9.4	0.0	5.2	15.3	6.8	0.0	0.0	14.7	15.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				480	0	220	343	2709	0	0	974	1650
V/C Ratio(X)				0.77	0.00	0.45	0.90	0.31	0.00	0.00	0.48	0.50
Avail Cap(c_a), veh/h				815	0	374	381	2709	0	0	974	1650
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				37.8	0.0	36.0	35.9	3.4	0.0	0.0	14.0	14.2
Incr Delay (d2), s/veh				2.7	0.0	1.4	21.5	0.3	0.0	0.0	1.7	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
%ile BackOfQ(50%),veh/ln				4.1	0.0	2.1	8.6	1.9	0.0	0.0	6.3	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				40.5	0.0	37.5	57.4	3.7	0.0	0.0	15.7	15.3
LnGrp LOS				D	A	D	E	A	A	A	B	B
Approach Vol, veh/h					469			1153			1297	
Approach Delay, s/veh					39.9			18.0			15.4	
Approach LOS					D			B			B	
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	74.0			22.0			52.0			17.2		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	69.5			19.5			45.5			21.5		
Max Q Clear Time (g_c+I1), s	8.8			17.3			17.4			11.4		
Green Ext Time (p_c), s	7.5			0.2			7.7			1.3		
Intersection Summary												
HCM 6th Ctrl Delay				20.4								
HCM 6th LOS				C								

Queues

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2-4



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	582	520	571	197	133	705
v/c Ratio	0.63	0.89	0.35	0.24	0.62	0.31
Control Delay	32.3	36.3	18.4	3.7	52.0	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	36.3	18.4	3.7	52.0	9.2
Queue Length 50th (ft)	151	174	112	0	74	91
Queue Length 95th (ft)	203	313	182	43	142	154
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	1265	722	1631	835	263	2239
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	0.46	0.72	0.35	0.24	0.51	0.31
Intersection Summary						

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 			 	
Traffic Volume (veh/h)	535	0	478	0	0	0	0	525	181	122	649	0
Future Volume (veh/h)	535	0	478	0	0	0	0	525	181	122	649	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	582	0	520				0	571	197	133	705	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1158	0	531				0	1556	694	164	2043	0
Arrive On Green	0.34	0.00	0.34				0.00	0.44	0.44	0.09	0.57	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	582	0	520				0	571	197	133	705	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	13.5	0.0	32.5				0.0	10.8	8.0	7.3	10.5	0.0
Cycle Q Clear(g_c), s	13.5	0.0	32.5				0.0	10.8	8.0	7.3	10.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1158	0	531				0	1556	694	164	2043	0
V/C Ratio(X)	0.50	0.00	0.98				0.00	0.37	0.28	0.81	0.35	0.00
Avail Cap(c_a), veh/h	1158	0	531				0	1556	694	240	2043	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.6	0.0	32.9				0.0	18.8	18.0	44.5	11.3	0.0
Incr Delay (d2), s/veh	0.3	0.0	33.6				0.0	0.7	1.0	12.3	0.5	0.0
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	5.5	0.0	17.0				0.0	4.5	3.1	3.8	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	66.6				0.0	19.5	19.1	56.9	11.7	0.0
LnGrp LOS	C	A	E				A	B	B	E	B	A
Approach Vol, veh/h	1102						768			838		
Approach Delay, s/veh	45.6						19.4			18.9		
Approach LOS	D						B			B		
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	13.7	48.3		38.0			62.0					
Change Period (Y+Rc), s	4.5	4.5		4.5			4.5					
Max Green Setting (Gmax), s	13.5	39.5		33.5			57.5					
Max Q Clear Time (g_c+I1), s	9.3	12.8		34.5			12.5					
Green Ext Time (p_c), s	0.1	4.9		0.0			5.8					
Intersection Summary												
HCM 6th Ctrl Delay	29.9											
HCM 6th LOS	C											

HCM 6th TWSC
40: Douglas St & Drive 3

AM Existing plus Zone 2-4

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	118	78	413	489	36
Future Vol, veh/h	53	118	78	413	489	36
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	128	85	449	532	39
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1151	532	571	0	-	0
Stage 1	532	-	-	-	-	-
Stage 2	619	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	219	547	1002	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	537	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	200	547	1002	-	-	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	537	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	14.9	1.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1002	-	337	547	-	-
HCM Lane V/C Ratio	0.085	-	0.171	0.234	-	-
HCM Control Delay (s)	8.9	-	17.9	13.6	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	0.9	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

AM Existing plus Zone 2-4

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	54	16	450	471	2
Future Vol, veh/h	6	54	16	450	471	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	59	17	489	512	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1036	513	514	0	-	0
Stage 1	513	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	256	561	1052	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	252	561	1052	-	-	-
Mov Cap-2 Maneuver	386	-	-	-	-	-
Stage 1	591	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.6	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1052	-	537	-	-	
HCM Lane V/C Ratio	0.017	-	0.121	-	-	
HCM Control Delay (s)	8.5	-	12.6	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-	

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↵	↵		↵	↵	
Traffic Vol, veh/h	11	1	32	4	1	3	9	437	10	9	437	4
Future Vol, veh/h	11	1	32	4	1	3	9	437	10	9	437	4
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	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	35	4	1	3	10	475	11	10	475	4
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1000	1003	477	1016	1000	481	479	0	0	486	0	0
Stage 1	497	497	-	501	501	-	-	-	-	-	-	-
Stage 2	503	506	-	515	499	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	222	242	588	216	243	585	1083	-	-	1077	-	-
Stage 1	555	545	-	552	543	-	-	-	-	-	-	-
Stage 2	551	540	-	543	544	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	217	238	588	200	239	585	1083	-	-	1077	-	-
Mov Cap-2 Maneuver	217	238	-	200	239	-	-	-	-	-	-	-
Stage 1	550	540	-	547	538	-	-	-	-	-	-	-
Stage 2	542	535	-	505	539	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	15.1		18.6		0.2		0.2					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1083	-	-	403	273	1077	-	-				
HCM Lane V/C Ratio	0.009	-	-	0.119	0.032	0.009	-	-				
HCM Control Delay (s)	8.4	-	-	15.1	18.6	8.4	-	-				
HCM Lane LOS	A	-	-	C	C	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0	-	-				

Queues

48: Drive 6 & Colbern Rd

AM Existing plus Zone 2-4

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	418	15	211	649	102	168
v/c Ratio	0.58	0.04	0.29	0.46	0.07	0.12
Control Delay	26.0	10.7	12.9	14.8	11.0	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	10.7	12.9	14.8	11.0	2.6
Queue Length 50th (ft)	75	0	25	91	10	0
Queue Length 95th (ft)	118	13	43	130	25	17
Internal Link Dist (ft)	860			678	770	
Turn Bay Length (ft)		250	350			250
Base Capacity (vph)	1947	877	1014	2963	1560	1358
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	0.21	0.02	0.21	0.22	0.07	0.12
Intersection Summary						

HCM 6th Signalized Intersection Summary 48: Drive 6 & Colbern Rd

AM Existing plus Zone 2-4

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘↗	↑↑	↘↗	↘↗
Traffic Volume (veh/h)	385	14	194	597	94	155
Future Volume (veh/h)	385	14	194	597	94	155
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	418	15	211	649	102	168
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	684	305	704	1264	1692	1366
Arrive On Green	0.19	0.19	0.09	0.36	0.49	0.49
Sat Flow, veh/h	3647	1585	3456	3647	3456	2790
Grp Volume(v), veh/h	418	15	211	649	102	168
Grp Sat Flow(s),veh/h/ln	1777	1585	1728	1777	1728	1395
Q Serve(g_s), s	6.3	0.4	2.7	8.4	0.9	1.9
Cycle Q Clear(g_c), s	6.3	0.4	2.7	8.4	0.9	1.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	684	305	704	1264	1692	1366
V/C Ratio(X)	0.61	0.05	0.30	0.51	0.06	0.12
Avail Cap(c_a), veh/h	2107	940	1208	3206	1692	1366
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.5	19.2	16.5	14.8	7.8	8.1
Incr Delay (d2), s/veh	0.9	0.1	0.2	0.3	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.2	1.0	3.0	0.3	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.4	19.2	16.8	15.1	7.9	8.2
LnGrp LOS	C	B	B	B	A	A
Approach Vol, veh/h	433			860	270	
Approach Delay, s/veh	22.3			15.5	8.1	
Approach LOS	C			B	A	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		33.0	9.5	15.7		25.2
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s		28.5	13.5	34.5		52.5
Max Q Clear Time (g_c+I1), s		3.9	4.7	8.3		10.4
Green Ext Time (p_c), s		1.0	0.4	2.9		5.2
Intersection Summary						
HCM 6th Ctrl Delay			16.1			
HCM 6th LOS			B			

HCM 6th TWSC
50: Drive 7 & Colbern Rd

AM Existing plus Zone 2-4

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘	↑↑		↗
Traffic Vol, veh/h	358	66	50	641	0	40
Future Vol, veh/h	358	66	50	641	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	389	72	54	697	0	43
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	461	0	-	195
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	1096	-	0	814
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1096	-	-	814
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		9.7	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	814	-	-	1096	-	
HCM Lane V/C Ratio	0.053	-	-	0.05	-	
HCM Control Delay (s)	9.7	-	-	8.5	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-	

HCM 6th TWSC
52: Drive 8 & Colbern Rd

AM Existing plus Zone 2-4

Intersection

Int Delay, s/veh 0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑		↑
Traffic Vol, veh/h	411	55	22	619	0	13
Future Vol, veh/h	411	55	22	619	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	447	60	24	673	0	14

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	507
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1054
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1054
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	779	-	-	1054	-
HCM Lane V/C Ratio	0.018	-	-	0.023	-
HCM Control Delay (s)	9.7	-	-	8.5	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

HCM 6th TWSC
54: Main St & Drive 9

AM Existing plus Zone 2-4

Intersection

Int Delay, s/veh 0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	69	0	7	122
Future Vol, veh/h	0	11	69	0	7	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	12	75	0	8	133

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	224	75	0
Stage 1	75	-	-
Stage 2	149	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	764	986	-
Stage 1	948	-	-
Stage 2	879	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	759	986	-
Mov Cap-2 Maneuver	759	-	-
Stage 1	948	-	-
Stage 2	874	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	986	1524
HCM Lane V/C Ratio	-	-	0.012	0.005
HCM Control Delay (s)	-	-	8.7	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 6th TWSC
56: Main St & Drive 10

AM Existing plus Zone 2-4

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	7	62	4	0	122
Future Vol, veh/h	3	7	62	4	0	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	8	67	4	0	133
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	202	69	0	0	71	0
Stage 1	69	-	-	-	-	-
Stage 2	133	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	787	994	-	-	1529	-
Stage 1	954	-	-	-	-	-
Stage 2	893	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	787	994	-	-	1529	-
Mov Cap-2 Maneuver	787	-	-	-	-	-
Stage 1	954	-	-	-	-	-
Stage 2	893	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 921		1529	-	
HCM Lane V/C Ratio	-	- 0.012		-	-	
HCM Control Delay (s)	-	- 9		0	-	
HCM Lane LOS	-	- A		A	-	
HCM 95th %tile Q(veh)	-	- 0		0	-	

Intersection												
Int Delay, s/veh	8.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	364	24	139	297	41	41	20	158	43	13	10
Future Vol, veh/h	6	364	24	139	297	41	41	20	158	43	13	10
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	396	26	151	323	45	45	22	172	47	14	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	368	0	0	422	0	0	894	1093	211	871	1084	184
Stage 1	-	-	-	-	-	-	423	423	-	648	648	-
Stage 2	-	-	-	-	-	-	471	670	-	223	436	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1187	-	-	1134	-	-	236	213	794	245	216	827
Stage 1	-	-	-	-	-	-	579	586	-	425	464	-
Stage 2	-	-	-	-	-	-	542	454	-	759	578	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1187	-	-	1134	-	-	190	176	794	151	178	827
Mov Cap-2 Maneuver	-	-	-	-	-	-	190	176	-	151	178	-
Stage 1	-	-	-	-	-	-	574	581	-	422	386	-
Stage 2	-	-	-	-	-	-	429	378	-	568	573	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			2.8			24.8			38.2		
HCM LOS							C			E		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	414	1187	-	-	1134	-	-	178				
HCM Lane V/C Ratio	0.575	0.005	-	-	0.133	-	-	0.403				
HCM Control Delay (s)	24.8	8.1	0	-	8.7	0.4	-	38.2				
HCM Lane LOS	C	A	A	-	A	A	-	E				
HCM 95th %tile Q(veh)	3.5	0	-	-	0.5	-	-	1.8				

Queues

6: Colbern Rd & SB M-350 Ramp

PM Existing plus Zone 2-4

	→	↘	↙	←	↘	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	491	123	384	428	491	88
v/c Ratio	0.63	0.31	0.73	0.24	0.78	0.14
Control Delay	31.2	15.8	21.7	10.9	30.7	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	15.8	21.7	10.9	30.7	4.8
Queue Length 50th (ft)	102	18	98	51	186	0
Queue Length 95th (ft)	190	71	212	100	339	27
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	993	496	678	2389	980	915
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	0.49	0.25	0.57	0.18	0.50	0.10
Intersection Summary						

HCM 6th Signalized Intersection Summary

6: Colbern Rd & SB M-350 Ramp

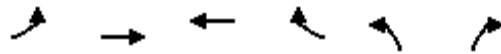
PM Existing plus Zone 2-4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑		↑
Traffic Volume (veh/h)	0	452	113	353	394	0	0	0	0	452	0	81
Future Volume (veh/h)	0	452	113	353	394	0	0	0	0	452	0	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	491	0	384	428	0				491	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	737		589	1798	0				577	0	
Arrive On Green	0.00	0.21	0.00	0.21	0.51	0.00				0.32	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	491	0	384	428	0				491	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	6.7	0.0	8.4	3.6	0.0				13.6	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	0.0	8.4	3.6	0.0				13.6	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	737		589	1798	0				577	0	
V/C Ratio(X)	0.00	0.67		0.65	0.24	0.00				0.85	0.00	
Avail Cap(c_a), veh/h	0	1240		931	2982	0				1226	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	19.3	0.0	12.1	7.4	0.0				16.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.0	0.0	1.2	0.1	0.0				3.6	0.0	0.0
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	0.0	2.6	0.0	2.9	1.1	0.0				5.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	20.4	0.0	13.3	7.4	0.0				20.3	0.0	0.0
LnGrp LOS	A	C		B	A	A				C	A	
Approach Vol, veh/h		491			812						491	
Approach Delay, s/veh		20.4			10.2						20.3	
Approach LOS		C			B						C	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			15.8	15.5		21.7		31.3				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			21.5	18.5		36.5		44.5				
Max Q Clear Time (g_c+I1), s			10.4	8.7		15.6		5.6				
Green Ext Time (p_c), s			0.9	2.3		1.6		3.2				
Intersection Summary												
HCM 6th Ctrl Delay			15.8									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

PM Existing plus Zone 2-4



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	91	891	701	483	111	298
v/c Ratio	0.27	0.52	0.41	0.51	0.23	0.57
Control Delay	9.1	8.4	7.5	4.5	14.1	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	8.4	7.5	4.5	14.1	13.2
Queue Length 50th (ft)	10	57	42	15	18	30
Queue Length 95th (ft)	39	132	99	66	60	109
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	672	3420	3420	1541	1466	1332
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	0.14	0.26	0.20	0.31	0.08	0.22
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

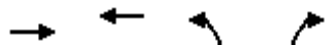
PM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	820	0	0	645	444	102	0	274	0	0	0
Future Volume (veh/h)	84	820	0	0	645	444	102	0	274	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	91	891	0	0	701	0	111	0	298			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	474	1774	0	0	1774		460	0	409			
Arrive On Green	0.50	0.50	0.00	0.00	0.50	0.00	0.26	0.00	0.26			
Sat Flow, veh/h	745	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	91	891	0	0	701	0	111	0	298			
Grp Sat Flow(s),veh/h/ln	745	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	3.2	6.2	0.0	0.0	4.6	0.0	1.8	0.0	6.4			
Cycle Q Clear(g_c), s	7.8	6.2	0.0	0.0	4.6	0.0	1.8	0.0	6.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	474	1774	0	0	1774		460	0	409			
V/C Ratio(X)	0.19	0.50	0.00	0.00	0.40		0.24	0.00	0.73			
Avail Cap(c_a), veh/h	1077	4646	0	0	4646		1561	0	1389			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	8.2	6.2	0.0	0.0	5.8	0.0	10.9	0.0	12.6			
Incr Delay (d2), s/veh	0.2	0.2	0.0	0.0	0.1	0.0	0.3	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.4	1.4	0.0	0.0	1.0	0.0	0.6	0.0	2.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	6.4	0.0	0.0	5.9	0.0	11.2	0.0	15.1			
LnGrp LOS	A	A	A	A	A		B	A	B			
Approach Vol, veh/h	982			701			409					
Approach Delay, s/veh	6.6			5.9			14.0					
Approach LOS	A			A			B					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	14.1			23.0			23.0					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	32.5			48.5			48.5					
Max Q Clear Time (g_c+I1), s	8.4			9.8			6.6					
Green Ext Time (p_c), s	1.4			8.7			5.7					
Intersection Summary												
HCM 6th Ctrl Delay	7.8											
HCM 6th LOS	A											

Queues

15: Main St & Colbern Rd

PM Existing plus Zone 2-4



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1388	994	188	66
v/c Ratio	0.73	0.68	0.32	0.12
Control Delay	14.6	14.2	22.5	7.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.6	14.2	22.5	7.0
Queue Length 50th (ft)	219	151	60	0
Queue Length 95th (ft)	283	206	145	30
Internal Link Dist (ft)	1355	2860	865	
Turn Bay Length (ft)				150
Base Capacity (vph)	2873	2227	592	573
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.45	0.32	0.12
Intersection Summary				

HCM 6th Signalized Intersection Summary 15: Main St & Colbern Rd

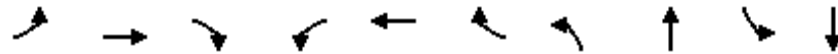
PM Existing plus Zone 2-4

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1198	79	44	870	173	61
Future Volume (veh/h)	1198	79	44	870	173	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1302	86	48	946	188	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1766	116	88	1490	616	548
Arrive On Green	0.52	0.52	0.52	0.52	0.35	0.35
Sat Flow, veh/h	3478	223	57	2941	1781	1585
Grp Volume(v), veh/h	682	706	489	505	188	66
Grp Sat Flow(s),veh/h/ln	1777	1830	1296	1617	1781	1585
Q Serve(g_s), s	20.3	20.4	3.8	14.7	5.2	1.9
Cycle Q Clear(g_c), s	20.3	20.4	24.2	14.7	5.2	1.9
Prop In Lane		0.12	0.10		1.00	1.00
Lane Grp Cap(c), veh/h	927	955	734	844	616	548
V/C Ratio(X)	0.74	0.74	0.67	0.60	0.31	0.12
Avail Cap(c_a), veh/h	1503	1548	1176	1368	616	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.6	12.6	11.1	11.3	16.3	15.2
Incr Delay (d2), s/veh	1.2	1.1	1.1	0.7	1.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	7.3	4.3	4.7	2.2	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.8	13.8	12.1	12.0	17.5	15.6
LnGrp LOS	B	B	B	B	B	B
Approach Vol, veh/h	1388			994	254	
Approach Delay, s/veh	13.8			12.0	17.0	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	28.0		40.0		40.0	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	23.5		57.5		57.5	
Max Q Clear Time (g_c+I1), s	7.2		22.4		26.2	
Green Ext Time (p_c), s	0.7		13.1		8.7	
Intersection Summary						
HCM 6th Ctrl Delay			13.4			
HCM 6th LOS			B			

Queues

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2-4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	127	1548	176	365	1275	41	199	251	66	30
v/c Ratio	0.53	0.88	0.21	0.64	0.64	0.04	0.62	0.45	0.37	0.08
Control Delay	13.9	28.1	4.9	20.3	15.5	1.1	41.9	7.0	37.9	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	28.1	4.9	20.3	15.5	1.1	41.9	7.0	37.9	11.9
Queue Length 50th (ft)	23	399	13	51	248	0	105	0	32	0
Queue Length 95th (ft)	42	#608	50	96	313	7	#191	62	77	24
Internal Link Dist (ft)		678			724			763		589
Turn Bay Length (ft)	200		200	200		250				
Base Capacity (vph)	240	1799	869	841	2317	1059	323	563	180	396
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.86	0.20	0.43	0.55	0.04	0.62	0.45	0.37	0.08

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	1424	162	336	1173	38	183	1	230	61	1	27
Future Volume (veh/h)	117	1424	162	336	1173	38	183	1	230	61	1	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	1548	176	365	1275	41	199	1	250	66	1	29
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	298	1798	802	528	1899	847	412	2	398	210	13	388
Arrive On Green	0.06	0.51	0.51	0.08	0.53	0.53	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1380	6	1580	1129	53	1540
Grp Volume(v), veh/h	127	1548	176	365	1275	41	199	0	251	66	0	30
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1380	0	1586	1129	0	1593
Q Serve(g_s), s	2.7	32.6	5.3	4.1	22.2	1.1	11.0	0.0	12.0	4.7	0.0	1.2
Cycle Q Clear(g_c), s	2.7	32.6	5.3	4.1	22.2	1.1	12.2	0.0	12.0	16.7	0.0	1.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Lane Grp Cap(c), veh/h	298	1798	802	528	1899	847	412	0	399	210	0	401
V/C Ratio(X)	0.43	0.86	0.22	0.69	0.67	0.05	0.48	0.00	0.63	0.31	0.00	0.07
Avail Cap(c_a), veh/h	305	1936	863	986	2493	1112	412	0	399	210	0	401
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.9	18.5	11.7	18.0	14.4	9.5	29.0	0.0	28.4	35.8	0.0	24.4
Incr Delay (d2), s/veh	1.0	4.0	0.1	1.6	0.5	0.0	4.0	0.0	7.3	3.9	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	13.1	1.8	1.8	8.2	0.3	4.0	0.0	5.2	1.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	22.5	11.9	19.6	14.9	9.5	33.0	0.0	35.7	39.7	0.0	24.7
LnGrp LOS	B	C	B	B	B	A	C	A	D	D	A	C
Approach Vol, veh/h		1851			1681			450			96	
Approach Delay, s/veh		20.8			15.8			34.5			35.0	
Approach LOS		C			B			C			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.0	11.7	47.7		26.0	9.3	50.1				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		21.5	18.5	46.5		21.5	5.1	59.9				
Max Q Clear Time (g_c+I1), s		14.2	6.1	34.6		18.7	4.7	24.2				
Green Ext Time (p_c), s		1.3	1.1	8.6		0.1	0.0	12.8				
Intersection Summary												
HCM 6th Ctrl Delay			20.6									
HCM 6th LOS			C									

HCM 6th TWSC
19: Drive 4 & Colbern Rd

PM Existing plus Zone 2-4

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗			↗			↗
Traffic Vol, veh/h	0	1703	12	0	1494	55	0	0	124	0	0	53
Future Vol, veh/h	0	1703	12	0	1494	55	0	0	124	0	0	53
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1851	13	0	1624	60	0	0	135	0	0	58
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	926	-	-	812
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	271	0	0	322
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	271	-	-	322
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			30.7			18.6		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	271	-	-	-	-	322						
HCM Lane V/C Ratio	0.497	-	-	-	-	0.179						
HCM Control Delay (s)	30.7	-	-	-	-	18.6						
HCM Lane LOS	D	-	-	-	-	C						
HCM 95th %tile Q(veh)	2.6	-	-	-	-	0.6						

Queues

21: Douglas St & Colbern Rd

PM Existing plus Zone 2-4

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	428	737	822	535	510	134	801	495	615	109	447	374
v/c Ratio	0.75	0.89	0.54	0.88	0.59	0.27	0.89	0.42	0.38	0.60	0.73	0.57
Control Delay	55.9	58.2	18.3	63.8	43.0	7.5	55.8	32.6	10.0	64.9	54.1	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	58.2	18.3	63.8	43.0	7.5	55.8	32.6	10.0	64.9	54.1	24.9
Queue Length 50th (ft)	162	291	210	209	185	0	308	157	86	82	174	168
Queue Length 95th (ft)	216	#393	273	#300	247	49	#414	213	135	141	233	262
Internal Link Dist (ft)	941		2187				1801				1236	
Turn Bay Length (ft)	200	200		200	200		160	200		290	200	
Base Capacity (vph)	650	857	1529	628	869	491	919	1178	1648	224	616	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.86	0.54	0.85	0.59	0.27	0.87	0.42	0.37	0.49	0.73	0.54

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

PM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	394	678	756	492	469	123	737	455	566	100	411	344
Future Volume (veh/h)	394	678	756	492	469	123	737	455	566	100	411	344
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	428	737	0	535	510	134	801	495	0	109	447	374
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	505	829		600	926	413	878	1274		136	641	518
Arrive On Green	0.15	0.23	0.00	0.17	0.26	0.26	0.25	0.36	0.00	0.08	0.18	0.18
Sat Flow, veh/h	3456	3554	2790	3456	3554	1585	3456	3554	2790	1781	3554	1585
Grp Volume(v), veh/h	428	737	0	535	510	134	801	495	0	109	447	374
Grp Sat Flow(s),veh/h/ln	1728	1777	1395	1728	1777	1585	1728	1777	1395	1781	1777	1585
Q Serve(g_s), s	13.7	22.8	0.0	17.2	14.1	7.8	25.6	11.8	0.0	6.8	13.4	20.5
Cycle Q Clear(g_c), s	13.7	22.8	0.0	17.2	14.1	7.8	25.6	11.8	0.0	6.8	13.4	20.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	505	829		600	926	413	878	1274		136	641	518
V/C Ratio(X)	0.85	0.89		0.89	0.55	0.32	0.91	0.39		0.80	0.70	0.72
Avail Cap(c_a), veh/h	679	892		654	926	413	958	1274		234	641	518
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.2	42.1	0.0	45.9	36.3	33.9	41.1	27.2	0.0	51.6	43.6	33.7
Incr Delay (d2), s/veh	7.5	10.5	0.0	13.7	0.7	0.5	12.1	0.9	0.0	10.4	6.2	8.5
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	6.4	11.1	0.0	8.5	6.2	3.0	12.2	5.1	0.0	3.4	6.4	10.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.7	52.6	0.0	59.6	37.0	34.4	53.2	28.1	0.0	62.0	49.8	42.1
LnGrp LOS	D	D		E	D	C	D	C		E	D	D
Approach Vol, veh/h	1165			1179			1296			930		
Approach Delay, s/veh	53.4			46.9			43.6			48.2		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.2	45.2	24.2	31.0	33.4	25.0	21.1	34.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	14.9	37.1	21.5	28.5	31.5	20.5	22.3	27.7				
Max Q Clear Time (g_c+I1), s	8.8	13.8	19.2	24.8	27.6	22.5	15.7	16.1				
Green Ext Time (p_c), s	0.1	3.4	0.5	1.7	1.3	0.0	0.9	3.0				

Intersection Summary

HCM 6th Ctrl Delay 47.9

HCM 6th LOS D

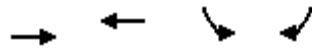
Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Queues

24: Colbern Rd & SB I-470 Ramp

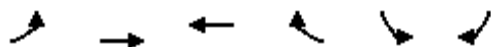
PM Existing plus Zone 2-4



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1388	1416	219	117
v/c Ratio	0.72	0.73	0.20	0.21
Control Delay	13.8	14.1	20.4	13.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.8	14.1	20.4	13.3
Queue Length 50th (ft)	213	220	34	17
Queue Length 95th (ft)	274	277	71	60
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	2968	2968	1107	550
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.47	0.48	0.20	0.21
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

PM Existing plus Zone 2-4



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	1305	1260	0	184	98
Future Volume (veh/h)	0	1305	1260	0	184	98
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	1388	1416	0	219	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1932	1932	0	1126	
Arrive On Green	0.00	0.54	0.54	0.00	0.33	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	1388	1416	0	219	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	20.2	20.9	0.0	3.1	0.0
Cycle Q Clear(g_c), s	0.0	20.2	20.9	0.0	3.1	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1932	1932	0	1126	
V/C Ratio(X)	0.00	0.72	0.73	0.00	0.19	
Avail Cap(c_a), veh/h	0	3011	3011	0	1126	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	11.8	11.9	0.0	16.7	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.8	7.0	0.0	1.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	12.3	12.5	0.0	17.1	0.0
LnGrp LOS	A	B	B	A	B	
Approach Vol, veh/h		1388	1416		219	
Approach Delay, s/veh		12.3	12.5		17.1	
Approach LOS		B	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				42.0	27.0	42.0
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				58.5	22.5	58.5
Max Q Clear Time (g_c+I1), s				22.2	5.1	22.9
Green Ext Time (p_c), s				14.3	0.7	14.7
Intersection Summary						
HCM 6th Ctrl Delay			12.7			
HCM 6th LOS			B			

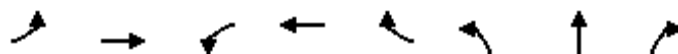
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

PM Existing plus Zone 2-4



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	101	1504	94	1514	82	108	103	172
v/c Ratio	0.41	0.79	0.40	0.79	0.09	0.26	0.23	0.34
Control Delay	12.1	18.2	11.5	19.0	3.3	31.6	31.2	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	18.2	11.5	19.0	3.3	31.6	31.2	7.3
Queue Length 50th (ft)	16	313	15	320	2	51	49	0
Queue Length 95th (ft)	43	403	34	398	20	95	91	45
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	279	2273	248	2243	1030	418	440	505
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.66	0.38	0.67	0.08	0.26	0.23	0.34
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

PM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	1236	148	82	1317	71	93	89	148	0	0	0
Future Volume (veh/h)	93	1236	148	82	1317	71	93	89	148	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	101	1343	161	94	1514	0	108	103	172			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	257	1697	202	258	1882		426	447	379			
Arrive On Green	0.06	0.53	0.53	0.06	0.53	0.00	0.24	0.24	0.24			
Sat Flow, veh/h	1781	3198	381	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	101	743	761	94	1514	0	108	103	172			
Grp Sat Flow(s),veh/h/ln	1781	1777	1802	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	1.9	26.1	26.6	1.8	27.0	0.0	3.8	3.4	7.2			
Cycle Q Clear(g_c), s	1.9	26.1	26.6	1.8	27.0	0.0	3.8	3.4	7.2			
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	257	943	956	258	1882		426	447	379			
V/C Ratio(X)	0.39	0.79	0.80	0.36	0.80		0.25	0.23	0.45			
Avail Cap(c_a), veh/h	351	1168	1184	322	2272		426	447	379			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	13.7	14.6	14.8	13.2	14.9	0.0	23.9	23.7	25.2			
Incr Delay (d2), s/veh	1.0	2.9	3.1	0.9	1.8	0.0	1.4	1.2	3.9			
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	0.7	10.0	10.3	0.7	10.0	0.0	1.7	1.6	3.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	17.6	17.9	14.1	16.8	0.0	25.3	24.9	29.1			
LnGrp LOS	B	B	B	B	B		C	C	C			
Approach Vol, veh/h	1605			1608			383					
Approach Delay, s/veh	17.6			16.6			26.9					
Approach LOS	B			B			C					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	23.0		8.8	45.6		8.9		45.5				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	18.5		7.1	50.9		8.5		49.5				
Max Q Clear Time (g_c+I1), s	9.2		3.8	28.6		3.9		29.0				
Green Ext Time (p_c), s	1.0		0.1	12.0		0.1		12.0				
Intersection Summary												
HCM 6th Ctrl Delay	18.1											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

PM Existing plus Zone 2-4



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1269	1366	168	130
v/c Ratio	0.68	0.73	0.27	0.22
Control Delay	14.2	15.3	21.4	11.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.2	15.3	21.4	11.4
Queue Length 50th (ft)	199	223	52	16
Queue Length 95th (ft)	256	287	124	64
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2819	2819	611	595
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.48	0.27	0.22
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

PM Existing plus Zone 2-4

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	1218	0	0	1229	148	114
Future Volume (veh/h)	1218	0	0	1229	148	114
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	1269	0	0	1366	168	130
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1853	0	0	1853	623	555
Arrive On Green	0.52	0.00	0.00	0.52	0.35	0.35
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	1269	0	0	1366	168	130
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	18.6	0.0	0.0	20.9	4.7	4.1
Cycle Q Clear(g_c), s	18.6	0.0	0.0	20.9	4.7	4.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1853	0	0	1853	623	555
V/C Ratio(X)	0.68	0.00	0.00	0.74	0.27	0.23
Avail Cap(c_a), veh/h	2868	0	0	2868	623	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.5	0.0	0.0	13.0	16.3	16.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.6	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	0.0	7.3	2.0	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.9	0.0	0.0	13.6	17.4	17.1
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	1269			1366	298	
Approach Delay, s/veh	12.9			13.6	17.3	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	29.0		41.0		41.0	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	24.5		56.5		56.5	
Max Q Clear Time (g_c+I1), s	6.7		20.6		22.9	
Green Ext Time (p_c), s	0.8		12.5		13.6	
Intersection Summary						
HCM 6th Ctrl Delay			13.7			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2-4



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	217	257	605	1655	1246	558
v/c Ratio	0.39	0.83	1.49	0.63	0.80	0.59
Control Delay	38.6	52.2	261.3	7.6	25.9	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	52.2	261.3	7.6	25.9	5.5
Queue Length 50th (ft)	62	118	~541	240	348	20
Queue Length 95th (ft)	97	#236	#752	299	447	107
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)		400	350			
Base Capacity (vph)	636	346	407	2641	1562	943
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	0.34	0.74	1.49	0.63	0.80	0.59

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	200	0	236	557	1523	0	0	832	828
Future Volume (veh/h)	0	0	0	200	0	236	557	1523	0	0	832	828
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				217	0	257	605	1655	0	0	751	1002
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				620	0	284	402	2596	0	0	860	1458
Arrive On Green				0.18	0.00	0.18	0.23	0.73	0.00	0.00	0.46	0.46
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				217	0	257	605	1655	0	0	751	1002
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				5.5	0.0	15.8	22.5	23.5	0.0	0.0	36.2	24.9
Cycle Q Clear(g_c), s				5.5	0.0	15.8	22.5	23.5	0.0	0.0	36.2	24.9
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				620	0	284	402	2596	0	0	860	1458
V/C Ratio(X)				0.35	0.00	0.90	1.51	0.64	0.00	0.00	0.87	0.69
Avail Cap(c_a), veh/h				627	0	287	402	2596	0	0	860	1458
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				35.9	0.0	40.1	38.7	6.8	0.0	0.0	24.3	21.3
Incr Delay (d2), s/veh				0.3	0.0	29.5	240.6	1.2	0.0	0.0	11.9	2.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.3	0.0	8.4	36.5	7.6	0.0	0.0	18.0	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				36.2	0.0	69.6	279.2	8.0	0.0	0.0	36.2	23.9
LnGrp LOS				D	A	E	F	A	A	A	D	C
Approach Vol, veh/h					474			2260			1753	
Approach Delay, s/veh					54.3			80.6			29.2	
Approach LOS					D			F			C	
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	77.4			27.0			50.4			22.4		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	72.9			22.5			45.9			18.1		
Max Q Clear Time (g_c+I1), s	25.5			24.5			38.2			17.8		
Green Ext Time (p_c), s	21.0			0.0			5.4			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	57.7											
HCM 6th LOS	E											

Queues

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2-4



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1084	537	1177	450	359	763
v/c Ratio	1.14	0.89	0.75	0.49	1.28	0.34
Control Delay	112.9	39.8	29.6	5.7	188.2	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	112.9	39.8	29.6	5.7	188.2	9.5
Queue Length 50th (ft)	~461	222	357	27	~321	119
Queue Length 95th (ft)	#591	#430	442	98	#504	152
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	951	605	1560	912	281	2268
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	1.14	0.89	0.75	0.49	1.28	0.34

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2-4

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	997	0	494	0	0	0	0	1083	414	330	702	0
Future Volume (veh/h)	997	0	494	0	0	0	0	1083	414	330	702	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	1084	0	537				0	1177	450	359	763	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	958	0	439				0	1567	699	283	2278	0
Arrive On Green	0.28	0.00	0.28				0.00	0.44	0.44	0.16	0.64	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	1084	0	537				0	1177	450	359	763	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	30.5	0.0	30.5				0.0	30.5	24.4	17.5	10.8	0.0
Cycle Q Clear(g_c), s	30.5	0.0	30.5				0.0	30.5	24.4	17.5	10.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	958	0	439				0	1567	699	283	2278	0
V/C Ratio(X)	1.13	0.00	1.22				0.00	0.75	0.64	1.27	0.34	0.00
Avail Cap(c_a), veh/h	958	0	439				0	1567	699	283	2278	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.8	0.0	39.8				0.0	25.7	24.0	46.3	9.0	0.0
Incr Delay (d2), s/veh	72.3	0.0	118.8				0.0	3.4	4.5	145.0	0.4	0.0
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	22.3	0.0	26.2				0.0	13.2	9.8	19.1	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	112.1	0.0	158.5				0.0	29.1	28.5	191.3	9.4	0.0
LnGrp LOS	F	A	F				A	C	C	F	A	A
Approach Vol, veh/h	1621						1627			1122		
Approach Delay, s/veh	127.5						28.9			67.6		
Approach LOS	F						C			E		
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	22.0	53.0		35.0			75.0					
Change Period (Y+Rc), s	4.5	4.5		4.5			4.5					
Max Green Setting (Gmax), s	17.5	48.5		30.5			70.5					
Max Q Clear Time (g_c+I1), s	19.5	32.5		32.5			12.8					
Green Ext Time (p_c), s	0.0	9.3		0.0			6.5					
Intersection Summary												
HCM 6th Ctrl Delay	75.4											
HCM 6th LOS	E											

HCM 6th TWSC
40: Douglas St & Drive 3

PM Existing plus Zone 2-4

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	84	127	845	771	58
Future Vol, veh/h	40	84	127	845	771	58
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	91	138	918	838	63
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2032	838	901	0	-	0
Stage 1	838	-	-	-	-	-
Stage 2	1194	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	63	366	754	-	-	-
Stage 1	424	-	-	-	-	-
Stage 2	287	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	51	366	754	-	-	-
Mov Cap-2 Maneuver	166	-	-	-	-	-
Stage 1	346	-	-	-	-	-
Stage 2	287	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	23.3	1.4		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	754	-	166	366	-	-
HCM Lane V/C Ratio	0.183	-	0.262	0.249	-	-
HCM Control Delay (s)	10.8	-	34.2	18.1	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.7	-	1	1	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

PM Existing plus Zone 2-4

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	29	54	831	800	6
Future Vol, veh/h	3	29	54	831	800	6
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	32	59	903	870	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1895	874	877	0	-	0
Stage 1	874	-	-	-	-	-
Stage 2	1021	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	77	349	770	-	-	-
Stage 1	408	-	-	-	-	-
Stage 2	348	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	71	349	770	-	-	-
Mov Cap-2 Maneuver	198	-	-	-	-	-
Stage 1	377	-	-	-	-	-
Stage 2	348	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	17.4	0.6		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	770	-	326	-	-	
HCM Lane V/C Ratio	0.076	-	0.107	-	-	
HCM Control Delay (s)	10.1	-	17.4	-	-	
HCM Lane LOS	B	-	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.4	-	-	

HCM 6th TWSC
44: Douglas St & Drive 1 & Lee's Summit Rd

PM Existing plus Zone 2-4

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↵	↵		↵	↵	
Traffic Vol, veh/h	5	1	17	17	1	10	32	792	10	2	772	11
Future Vol, veh/h	5	1	17	17	1	10	32	792	10	2	772	11
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	-	-	-	-	-	-	200	-	-	200	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	18	18	1	11	35	861	11	2	839	12
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1792	1791	845	1796	1792	867	851	0	0	872	0	0
Stage 1	849	849	-	937	937	-	-	-	-	-	-	-
Stage 2	943	942	-	859	855	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	63	81	363	62	81	352	788	-	-	773	-	-
Stage 1	356	377	-	318	343	-	-	-	-	-	-	-
Stage 2	315	342	-	351	375	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	59	77	363	56	77	352	788	-	-	773	-	-
Mov Cap-2 Maneuver	169	194	-	162	187	-	-	-	-	-	-	-
Stage 1	340	376	-	304	328	-	-	-	-	-	-	-
Stage 2	291	327	-	331	374	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	19		26		0.4		0					
HCM LOS	C		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	788	-	-	282	202	773	-	-				
HCM Lane V/C Ratio	0.044	-	-	0.089	0.151	0.003	-	-				
HCM Control Delay (s)	9.8	-	-	19	26	9.7	-	-				
HCM Lane LOS	A	-	-	C	D	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.5	0	-	-				

Queues

48: Drive 6 & Colbern Rd

PM Existing plus Zone 2-4

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1192	49	684	821	416	690
v/c Ratio	0.81	0.07	0.77	0.34	0.54	0.50
Control Delay	29.3	5.2	27.9	6.5	36.4	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	5.2	27.9	6.5	36.4	17.1
Queue Length 50th (ft)	331	0	144	92	122	151
Queue Length 95th (ft)	417	21	210	118	174	211
Internal Link Dist (ft)	860			678	770	
Turn Bay Length (ft)		250	350			250
Base Capacity (vph)	1683	779	996	2728	769	1470
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	0.71	0.06	0.69	0.30	0.54	0.47
Intersection Summary						

HCM 6th Signalized Intersection Summary 48: Drive 6 & Colbern Rd

PM Existing plus Zone 2-4

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘↙	↑↑	↘↙	↗↖
Traffic Volume (veh/h)	1097	45	629	755	383	635
Future Volume (veh/h)	1097	45	629	755	383	635
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1192	49	684	821	416	690
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1503	671	831	2255	878	1143
Arrive On Green	0.42	0.42	0.16	0.63	0.25	0.25
Sat Flow, veh/h	3647	1585	3456	3647	3456	2790
Grp Volume(v), veh/h	1192	49	684	821	416	690
Grp Sat Flow(s),veh/h/ln	1777	1585	1728	1777	1728	1395
Q Serve(g_s), s	23.5	1.5	8.4	8.9	8.2	15.7
Cycle Q Clear(g_c), s	23.5	1.5	8.4	8.9	8.2	15.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1503	671	831	2255	878	1143
V/C Ratio(X)	0.79	0.07	0.82	0.36	0.47	0.60
Avail Cap(c_a), veh/h	1915	854	1256	3104	878	1143
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	13.9	15.3	7.0	25.5	18.7
Incr Delay (d2), s/veh	1.8	0.0	2.8	0.1	1.8	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.5	3.1	2.9	3.5	5.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.0	13.9	18.0	7.1	27.4	21.1
LnGrp LOS	C	B	B	A	C	C
Approach Vol, veh/h	1241			1505	1106	
Approach Delay, s/veh	21.7			12.1	23.4	
Approach LOS	C			B	C	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		25.0	17.1	38.7		55.7
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s		20.5	22.5	43.5		70.5
Max Q Clear Time (g_c+l1), s		17.7	10.4	25.5		10.9
Green Ext Time (p_c), s		1.4	2.2	8.6		7.2
Intersection Summary						
HCM 6th Ctrl Delay			18.4			
HCM 6th LOS			B			

Intersection						
Int Delay, s/veh	2.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑		↗
Traffic Vol, veh/h	944	216	160	977	0	197
Future Vol, veh/h	944	216	160	977	0	197
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1026	235	174	1062	0	214
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1261	0	-	513
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	547	-	0	506
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	547	-	-	506
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.1		17.2	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	506	-	-	547	-	
HCM Lane V/C Ratio	0.423	-	-	0.318	-	
HCM Control Delay (s)	17.2	-	-	14.6	-	
HCM Lane LOS	C	-	-	B	-	
HCM 95th %tile Q(veh)	2.1	-	-	1.4	-	

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑		↗
Traffic Vol, veh/h	1085	174	69	908	0	75
Future Vol, veh/h	1085	174	69	908	0	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1179	189	75	987	0	82
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1368	0	-	590
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	498	-	0	451
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	498	-	-	451
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1		14.7	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	451	-	-	498	-	
HCM Lane V/C Ratio	0.181	-	-	0.151	-	
HCM Control Delay (s)	14.7	-	-	13.5	-	
HCM Lane LOS	B	-	-	B	-	
HCM 95th %tile Q(veh)	0.7	-	-	0.5	-	

HCM 6th TWSC
54: Main St & Drive 9

PM Existing plus Zone 2-4

Intersection						
Int Delay, s/veh	2.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	60	174	0	21	102
Future Vol, veh/h	0	60	174	0	21	102
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, %	2	2	2	2	2	2
Mvmt Flow	0	65	189	0	23	111
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	346	189	0	0	189	0
Stage 1	189	-	-	-	-	-
Stage 2	157	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	651	853	-	-	1385	-
Stage 1	843	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	639	853	-	-	1385	-
Mov Cap-2 Maneuver	639	-	-	-	-	-
Stage 1	843	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.6	0		1.3		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 853		1385	-	
HCM Lane V/C Ratio	-	- 0.076		0.016	-	
HCM Control Delay (s)	-	- 9.6		7.6	0	
HCM Lane LOS	-	- A		A	A	
HCM 95th %tile Q(veh)	-	- 0.2		0.1	-	

HCM 6th TWSC
56: Main St & Drive 10

PM Existing plus Zone 2-4

Intersection

Int Delay, s/veh 1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	38	136	14	0	102
Future Vol, veh/h	15	38	136	14	0	102
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, %	2	2	2	2	2	2
Mvmt Flow	16	41	148	15	0	111

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	267	156	0
Stage 1	156	-	-
Stage 2	111	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	722	890	-
Stage 1	872	-	-
Stage 2	914	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	722	890	-
Mov Cap-2 Maneuver	722	-	-
Stage 1	872	-	-
Stage 2	914	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	835	1416
HCM Lane V/C Ratio	-	-	0.069	-
HCM Control Delay (s)	-	-	9.6	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 6th TWSC

3: Pryor Rd & Bannister Rd/Colbern Rd

AM Existing plus Zone 2-5

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	3	211	15	54	186	23	10	4	81	45	7	5
Future Vol, veh/h	3	211	15	54	186	23	10	4	81	45	7	5
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	229	16	59	202	25	11	4	88	49	8	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	227	0	0	245	0	0	466	588	123	456	584	114
Stage 1	-	-	-	-	-	-	243	243	-	333	333	-
Stage 2	-	-	-	-	-	-	223	345	-	123	251	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1339	-	-	1318	-	-	480	420	905	488	422	917
Stage 1	-	-	-	-	-	-	739	703	-	654	642	-
Stage 2	-	-	-	-	-	-	759	635	-	868	698	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1339	-	-	1318	-	-	451	397	905	419	399	917
Mov Cap-2 Maneuver	-	-	-	-	-	-	451	397	-	419	399	-
Stage 1	-	-	-	-	-	-	737	701	-	652	609	-
Stage 2	-	-	-	-	-	-	707	603	-	776	696	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.7			10.3			14.6		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	780	1339	-	-	1318	-	-	437				
HCM Lane V/C Ratio	0.132	0.002	-	-	0.045	-	-	0.142				
HCM Control Delay (s)	10.3	7.7	0	-	7.9	0.1	-	14.6				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.5				

Queues

6: Colbern Rd & SB M-350 Ramp

AM Existing plus Zone 2-5

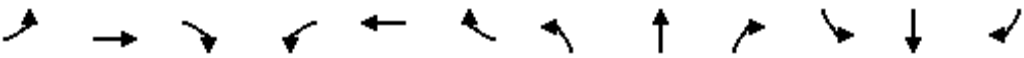


Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	259	105	168	251	260	36
v/c Ratio	0.32	0.24	0.30	0.15	0.49	0.07
Control Delay	16.1	6.1	8.3	6.4	16.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	6.1	8.3	6.4	16.9	1.8
Queue Length 50th (ft)	26	0	19	14	50	0
Queue Length 95th (ft)	62	30	53	35	119	7
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	2295	1063	895	3433	1504	1356
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	0.11	0.10	0.19	0.07	0.17	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary

6: Colbern Rd & SB M-350 Ramp

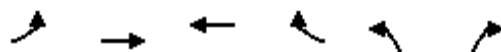
AM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑		↑
Traffic Volume (veh/h)	0	238	97	155	231	0	0	0	0	239	0	33
Future Volume (veh/h)	0	238	97	155	231	0	0	0	0	239	0	33
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	259	0	168	251	0				260	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	663		625	1693	0				363	0	
Arrive On Green	0.00	0.19	0.00	0.13	0.48	0.00				0.20	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	259	0	168	251	0				260	0	0
Grp Sat Flow(s), veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	1.8	0.0	2.0	1.1	0.0				3.8	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.8	0.0	2.0	1.1	0.0				3.8	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	663		625	1693	0				363	0	
V/C Ratio(X)	0.00	0.39		0.27	0.15	0.00				0.72	0.00	
Avail Cap(c_a), veh/h	0	3093		1437	5744	0				2246	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	10.0	0.0	7.3	4.2	0.0				10.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.2	0.0	0.0				2.6	0.0	0.0
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	0.0	0.5	0.0	0.5	0.2	0.0				1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.4	0.0	7.6	4.2	0.0				13.1	0.0	0.0
LnGrp LOS	A	B		A	A	A				B	A	
Approach Vol, veh/h		259			419						260	
Approach Delay, s/veh		10.4			5.5						13.1	
Approach LOS		B			A						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			8.2	9.8		10.2		17.9				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			16.5	24.5		35.5		45.5				
Max Q Clear Time (g_c+I1), s			4.0	3.8		5.8		3.1				
Green Ext Time (p_c), s			0.3	1.6		0.8		1.8				
Intersection Summary												
HCM 6th Ctrl Delay			9.0									
HCM 6th LOS			A									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

AM Existing plus Zone 2-5



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	78	440	363	347	54	200
v/c Ratio	0.15	0.24	0.20	0.35	0.10	0.33
Control Delay	6.0	5.4	5.2	2.0	8.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	5.4	5.2	2.0	8.7	3.6
Queue Length 50th (ft)	5	16	13	0	5	0
Queue Length 95th (ft)	19	35	29	21	20	24
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	997	3539	3539	1583	1770	1583
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	0.08	0.12	0.10	0.22	0.03	0.13
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

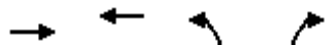
AM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	405	0	0	334	319	50	0	184	0	0	0
Future Volume (veh/h)	72	405	0	0	334	319	50	0	184	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	78	440	0	0	363	0	54	0	200			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	659	1380	0	0	1380		345	0	307			
Arrive On Green	0.39	0.39	0.00	0.00	0.39	0.00	0.19	0.00	0.19			
Sat Flow, veh/h	1019	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	78	440	0	0	363	0	54	0	200			
Grp Sat Flow(s),veh/h/ln	1019	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	1.2	1.9	0.0	0.0	1.5	0.0	0.5	0.0	2.5			
Cycle Q Clear(g_c), s	2.7	1.9	0.0	0.0	1.5	0.0	0.5	0.0	2.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	659	1380	0	0	1380		345	0	307			
V/C Ratio(X)	0.12	0.32	0.00	0.00	0.26		0.16	0.00	0.65			
Avail Cap(c_a), veh/h	2464	7676	0	0	7676		2855	0	2540			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.4	4.6	0.0	0.0	4.5	0.0	7.2	0.0	8.0			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.0	2.3			
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	0.1	0.2	0.0	0.0	0.2	0.0	0.1	0.0	0.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.5	4.7	0.0	0.0	4.6	0.0	7.4	0.0	10.4			
LnGrp LOS	A	A	A	A	A		A	A	B			
Approach Vol, veh/h	518			363			254					
Approach Delay, s/veh	4.8			4.6			9.7					
Approach LOS	A			A			A					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	8.7			12.9			12.9					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	34.5			46.5			46.5					
Max Q Clear Time (g_c+I1), s	4.5			4.7			3.5					
Green Ext Time (p_c), s	0.8			3.7			2.6					
Intersection Summary												
HCM 6th Ctrl Delay	5.9											
HCM 6th LOS	A											

Queues

15: Main St & Colbern Rd

AM Existing plus Zone 2-5



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	581	730	63	25
v/c Ratio	0.47	0.66	0.07	0.03
Control Delay	13.7	18.0	9.3	4.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.7	18.0	9.3	4.7
Queue Length 50th (ft)	67	102	10	0
Queue Length 95th (ft)	103	149	32	11
Internal Link Dist (ft)	1355	2860	865	
Turn Bay Length (ft)				150
Base Capacity (vph)	3342	3067	857	779
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.24	0.07	0.03
Intersection Summary				

HCM 6th Signalized Intersection Summary 15: Main St & Colbern Rd

AM Existing plus Zone 2-5

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	444	90	39	633	58	23
Future Volume (veh/h)	444	90	39	633	58	23
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	483	98	42	688	63	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	963	194	110	1063	895	797
Arrive On Green	0.33	0.33	0.33	0.33	0.50	0.50
Sat Flow, veh/h	3039	594	105	3337	1781	1585
Grp Volume(v), veh/h	290	291	382	348	63	25
Grp Sat Flow(s),veh/h/ln	1777	1763	1740	1617	1781	1585
Q Serve(g_s), s	6.9	7.0	2.2	9.7	1.0	0.4
Cycle Q Clear(g_c), s	6.9	7.0	9.4	9.7	1.0	0.4
Prop In Lane		0.34	0.11		1.00	1.00
Lane Grp Cap(c), veh/h	581	576	644	528	895	797
V/C Ratio(X)	0.50	0.50	0.59	0.66	0.07	0.03
Avail Cap(c_a), veh/h	1836	1822	1807	1671	895	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.3	14.3	15.0	15.2	6.8	6.6
Incr Delay (d2), s/veh	0.7	0.7	0.9	1.4	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.5	3.5	3.3	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.9	15.0	15.9	16.6	6.9	6.7
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h	581			730	88	
Approach Delay, s/veh	15.0			16.3	6.9	
Approach LOS	B			B	A	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	31.0		21.7		21.7	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	26.5		54.5		54.5	
Max Q Clear Time (g_c+I1), s	3.0		9.0		11.7	
Green Ext Time (p_c), s	0.2		4.1		5.5	
Intersection Summary						
HCM 6th Ctrl Delay			15.1			
HCM 6th LOS			B			

Queues

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2-5

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	464	67	139	817	26	57	72	91	39
v/c Ratio	0.29	0.39	0.11	0.17	0.69	0.04	0.10	0.11	0.17	0.06
Control Delay	11.7	18.4	0.8	9.6	22.9	0.1	17.3	5.6	18.1	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	18.4	0.8	9.6	22.9	0.1	17.3	5.6	18.1	6.9
Queue Length 50th (ft)	18	80	0	15	160	0	16	0	26	0
Queue Length 95th (ft)	38	118	4	27	217	0	46	27	67	20
Internal Link Dist (ft)	678				724				763	
Turn Bay Length (ft)	200		200		200		250			
Base Capacity (vph)	310	1893	906	1133	2266	1039	544	676	528	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.25	0.07	0.12	0.36	0.03	0.10	0.11	0.17	0.06
Intersection Summary										

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

AM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	427	62	128	752	24	52	1	65	84	1	35
Future Volume (veh/h)	77	427	62	128	752	24	52	1	65	84	1	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	464	67	139	817	26	57	1	71	91	1	38
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	1135	506	854	1172	523	643	9	633	609	16	627
Arrive On Green	0.06	0.32	0.32	0.07	0.33	0.33	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1368	22	1566	1328	41	1550
Grp Volume(v), veh/h	84	464	67	139	817	26	57	0	72	91	0	39
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1368	0	1588	1328	0	1591
Q Serve(g_s), s	2.0	6.7	2.0	1.7	13.1	0.7	1.7	0.0	1.9	3.0	0.0	1.0
Cycle Q Clear(g_c), s	2.0	6.7	2.0	1.7	13.1	0.7	2.7	0.0	1.9	4.9	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.97
Lane Grp Cap(c), veh/h	301	1135	506	854	1172	523	643	0	642	609	0	643
V/C Ratio(X)	0.28	0.41	0.13	0.16	0.70	0.05	0.09	0.00	0.11	0.15	0.00	0.06
Avail Cap(c_a), veh/h	398	1925	859	1376	2305	1028	643	0	642	609	0	643
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.3	17.5	15.8	13.1	19.1	15.0	12.7	0.0	12.2	13.7	0.0	11.9
Incr Delay (d2), s/veh	0.5	0.2	0.1	0.1	0.8	0.0	0.3	0.0	0.4	0.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.6	0.7	0.6	5.1	0.3	0.5	0.0	0.7	0.9	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	17.7	16.0	13.2	19.9	15.0	13.0	0.0	12.5	14.2	0.0	12.1
LnGrp LOS	B	B	B	B	B	B	B	A	B	B	A	B
Approach Vol, veh/h	615			982			129			130		
Approach Delay, s/veh	17.1			18.8			12.7			13.6		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	31.0		9.1	25.4		31.0	8.4	26.1				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	26.5		14.5	35.5		26.5	7.5	42.5				
Max Q Clear Time (g_c+I1), s	4.7		3.7	8.7		6.9	4.0	15.1				
Green Ext Time (p_c), s	0.5		0.3	3.5		0.4	0.0	6.5				
Intersection Summary												
HCM 6th Ctrl Delay	17.5											
HCM 6th LOS	B											

HCM 6th TWSC
19: Drive 4 & Colbern Rd

AM Existing plus Zone 2-5

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗			↗			↗
Traffic Vol, veh/h	0	570	6	0	834	37	0	0	34	0	0	70
Future Vol, veh/h	0	570	6	0	834	37	0	0	34	0	0	70
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	620	7	0	907	40	0	0	37	0	0	76
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	310	-	-	454
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	686	0	0	553
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	686	-	-	553
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			10.5			12.5		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	686	-	-	-	-	553						
HCM Lane V/C Ratio	0.054	-	-	-	-	0.138						
HCM Control Delay (s)	10.5	-	-	-	-	12.5						
HCM Lane LOS	B	-	-	-	-	B						
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.5						

Queues

21: Douglas St & Colbern Rd

AM Existing plus Zone 2-5

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	221	277	612	411	92	299	366	313	89	460	237
v/c Ratio	0.20	0.44	0.44	0.71	0.40	0.17	0.40	0.31	0.17	0.21	0.49	0.29
Control Delay	12.5	34.0	6.6	31.8	22.7	2.5	16.9	22.9	1.1	16.8	27.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	34.0	6.6	31.8	22.7	2.5	16.9	22.9	1.1	16.8	27.4	3.6
Queue Length 50th (ft)	21	52	0	139	82	0	44	72	0	25	99	0
Queue Length 95th (ft)	37	90	35	206	122	17	84	126	16	62	165	43
Internal Link Dist (ft)	941			2187			1801			1236		
Turn Bay Length (ft)	200		200	200		200	160		200	290		200
Base Capacity (vph)	881	853	882	1096	1559	768	758	1163	2062	423	946	837
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.26	0.31	0.56	0.26	0.12	0.39	0.31	0.15	0.21	0.49	0.28
Intersection Summary												

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

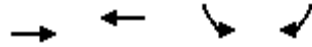
AM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	203	255	563	378	85	275	337	288	82	423	218
Future Volume (veh/h)	147	203	255	563	378	85	275	337	288	82	423	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	160	221	0	612	411	92	299	366	0	89	460	237
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	738	370		775	916	409	833	1221		487	1115	609
Arrive On Green	0.07	0.10	0.00	0.22	0.26	0.26	0.09	0.34	0.00	0.06	0.31	0.31
Sat Flow, veh/h	3456	3554	2790	3456	3554	1585	3456	3554	2790	1781	3554	1585
Grp Volume(v), veh/h	160	221	0	612	411	92	299	366	0	89	460	237
Grp Sat Flow(s),veh/h/ln	1728	1777	1395	1728	1777	1585	1728	1777	1395	1781	1777	1585
Q Serve(g_s), s	2.2	4.0	0.0	11.2	6.5	3.1	3.8	5.1	0.0	2.1	6.9	7.3
Cycle Q Clear(g_c), s	2.2	4.0	0.0	11.2	6.5	3.1	3.8	5.1	0.0	2.1	6.9	7.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	738	370		775	916	409	833	1221		487	1115	609
V/C Ratio(X)	0.22	0.60		0.79	0.45	0.23	0.36	0.30		0.18	0.41	0.39
Avail Cap(c_a), veh/h	966	978		1259	1786	797	958	1221		536	1115	609
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	28.8	0.0	24.6	20.9	19.7	13.5	16.2	0.0	12.8	18.2	15.0
Incr Delay (d2), s/veh	0.1	1.5	0.0	1.8	0.3	0.3	0.3	0.6	0.0	0.2	1.1	1.9
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	0.8	1.7	0.0	4.5	2.6	1.1	1.4	2.0	0.0	0.8	2.8	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	30.3	0.0	26.4	21.3	19.9	13.8	16.8	0.0	13.0	19.3	16.9
LnGrp LOS	B	C		C	C	B	B	B		B	B	B
Approach Vol, veh/h	381			1115			665			786		
Approach Delay, s/veh	24.5			24.0			15.4			17.9		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.6	27.6	19.6	11.5	10.6	25.6	9.2	21.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.9	23.1	24.5	18.5	8.5	20.5	9.2	33.8				
Max Q Clear Time (g_c+I1), s	4.1	7.1	13.2	6.0	5.8	9.3	4.2	8.5				
Green Ext Time (p_c), s	0.0	2.1	1.9	1.0	0.3	3.0	0.2	3.1				
Intersection Summary												
HCM 6th Ctrl Delay	20.5											
HCM 6th LOS	C											

Queues

24: Colbern Rd & SB I-470 Ramp

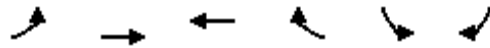
AM Existing plus Zone 2-5



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	610	1381	157	198
v/c Ratio	0.32	0.73	0.13	0.34
Control Delay	9.7	15.3	19.6	16.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.7	15.3	19.6	16.8
Queue Length 50th (ft)	74	227	24	45
Queue Length 95th (ft)	101	286	53	111
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	2794	2794	1175	579
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.49	0.13	0.34
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

AM Existing plus Zone 2-5



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	573	1229	0	132	166
Future Volume (veh/h)	0	573	1229	0	132	166
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	610	1381	0	157	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1866	1866	0	1200	
Arrive On Green	0.00	0.53	0.53	0.00	0.35	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	610	1381	0	157	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	6.9	21.3	0.0	2.2	0.0
Cycle Q Clear(g_c), s	0.0	6.9	21.3	0.0	2.2	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1866	1866	0	1200	
V/C Ratio(X)	0.00	0.33	0.74	0.00	0.13	
Avail Cap(c_a), veh/h	0	2846	2846	0	1200	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	9.6	13.0	0.0	15.7	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.6	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	7.4	0.0	0.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	9.7	13.6	0.0	16.0	0.0
LnGrp LOS	A	A	B	A	B	
Approach Vol, veh/h		610	1381		157	
Approach Delay, s/veh		9.7	13.6		16.0	
Approach LOS		A	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				41.5	29.0	41.5
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				56.5	24.5	56.5
Max Q Clear Time (g_c+I1), s				8.9	4.2	23.3
Green Ext Time (p_c), s				4.8	0.5	13.7
Intersection Summary						
HCM 6th Ctrl Delay			12.7			
HCM 6th LOS			B			

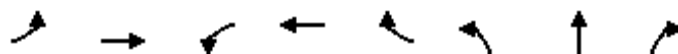
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

AM Existing plus Zone 2-5



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	50	652	166	1315	125	85	144	113
v/c Ratio	0.21	0.44	0.37	0.73	0.15	0.17	0.27	0.21
Control Delay	7.5	14.1	8.6	17.0	4.0	26.9	27.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	14.1	8.6	17.0	4.0	26.9	27.5	7.3
Queue Length 50th (ft)	8	97	30	262	7	35	60	0
Queue Length 95th (ft)	19	134	50	318	29	75	116	37
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	252	2356	454	2461	1130	509	536	536
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.28	0.37	0.53	0.11	0.17	0.27	0.21
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

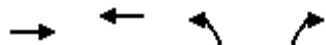
AM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (veh/h)	46	504	96	144	1144	109	73	124	97	0	0	0
Future Volume (veh/h)	46	504	96	144	1144	109	73	124	97	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	50	548	104	166	1315	0	85	144	113			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	255	1362	258	492	1731		504	529	448			
Arrive On Green	0.04	0.46	0.46	0.07	0.49	0.00	0.28	0.28	0.28			
Sat Flow, veh/h	1781	2982	564	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	50	326	326	166	1315	0	85	144	113			
Grp Sat Flow(s),veh/h/ln	1781	1777	1769	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	1.0	8.8	8.9	3.5	21.8	0.0	2.6	4.3	4.0			
Cycle Q Clear(g_c), s	1.0	8.8	8.9	3.5	21.8	0.0	2.6	4.3	4.0			
Prop In Lane	1.00		0.32	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	255	811	808	492	1731		504	529	448			
V/C Ratio(X)	0.20	0.40	0.40	0.34	0.76		0.17	0.27	0.25			
Avail Cap(c_a), veh/h	337	1184	1179	549	2427		504	529	448			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	11.9	13.1	13.1	9.5	15.1	0.0	19.6	20.2	20.1			
Incr Delay (d2), s/veh	0.4	0.3	0.3	0.4	0.9	0.0	0.7	1.3	1.3			
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	0.4	3.3	3.3	1.2	8.0	0.0	1.1	2.0	1.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	13.4	13.4	9.9	16.0	0.0	20.3	21.5	21.4			
LnGrp LOS	B	B	B	A	B		C	C	C			
Approach Vol, veh/h	702			1481			342					
Approach Delay, s/veh	13.4			15.4			21.2					
Approach LOS	B			B			C					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	25.0		9.9	37.6		7.7		39.8				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	20.5		7.7	48.3		6.5		49.5				
Max Q Clear Time (g_c+I1), s	6.3		5.5	10.9		3.0		23.8				
Green Ext Time (p_c), s	1.2		0.1	4.6		0.0		11.5				
Intersection Summary												
HCM 6th Ctrl Delay	15.6											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

AM Existing plus Zone 2-5



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	503	1371	268	132
v/c Ratio	0.28	0.75	0.41	0.20
Control Delay	10.7	17.7	22.9	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.7	17.7	22.9	5.1
Queue Length 50th (ft)	67	258	96	0
Queue Length 95th (ft)	93	328	190	37
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2409	2409	654	668
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.21	0.57	0.41	0.20
Intersection Summary				

HCM 6th Signalized Intersection Summary

31: NB 291 Ramp & Colbern Rd

AM Existing plus Zone 2-5

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	483	0	0	1234	236	116
Future Volume (veh/h)	483	0	0	1234	236	116
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	503	0	0	1371	268	132
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1788	0	0	1788	673	599
Arrive On Green	0.50	0.00	0.00	0.50	0.38	0.38
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	503	0	0	1371	268	132
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	6.2	0.0	0.0	23.6	8.3	4.3
Cycle Q Clear(g_c), s	6.2	0.0	0.0	23.6	8.3	4.3
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1788	0	0	1788	673	599
V/C Ratio(X)	0.28	0.00	0.00	0.77	0.40	0.22
Avail Cap(c_a), veh/h	2472	0	0	2472	673	599
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	0.0	0.0	15.2	17.2	15.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.0	1.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	0.0	8.6	3.5	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.9	0.0	0.0	16.2	19.0	16.8
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	503			1371	400	
Approach Delay, s/veh	10.9			16.2	18.2	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	33.0		42.5		42.5	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	28.5		52.5		52.5	
Max Q Clear Time (g_c+I1), s	10.3		8.2		25.6	
Green Ext Time (p_c), s	1.2		3.8		12.4	
Intersection Summary						
HCM 6th Ctrl Delay			15.4			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2-5



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	370	109	307	871	928	421
v/c Ratio	0.66	0.31	0.89	0.33	0.54	0.45
Control Delay	42.9	9.4	66.3	4.8	12.5	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	9.4	66.3	4.8	12.5	3.2
Queue Length 50th (ft)	107	0	179	77	135	0
Queue Length 95th (ft)	153	44	#349	124	213	54
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)		400	350			
Base Capacity (vph)	787	447	349	2623	1715	929
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	0.47	0.24	0.88	0.33	0.54	0.45

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

AM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	340	0	100	282	801	0	0	466	775
Future Volume (veh/h)	0	0	0	340	0	100	282	801	0	0	466	775
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				370	0	109	307	871	0	0	507	842
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				481	0	221	341	2708	0	0	975	1652
Arrive On Green				0.14	0.00	0.14	0.19	0.76	0.00	0.00	0.52	0.52
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				370	0	109	307	871	0	0	507	842
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				9.4	0.0	5.8	15.4	7.0	0.0	0.0	16.2	15.8
Cycle Q Clear(g_c), s				9.4	0.0	5.8	15.4	7.0	0.0	0.0	16.2	15.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				481	0	221	341	2708	0	0	975	1652
V/C Ratio(X)				0.77	0.00	0.49	0.90	0.32	0.00	0.00	0.52	0.51
Avail Cap(c_a), veh/h				815	0	374	361	2708	0	0	975	1652
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				37.8	0.0	36.3	36.0	3.4	0.0	0.0	14.3	14.2
Incr Delay (d2), s/veh				2.6	0.0	1.7	23.7	0.3	0.0	0.0	2.0	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
%ile BackOfQ(50%),veh/ln				4.1	0.0	2.3	8.8	1.9	0.0	0.0	7.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				40.5	0.0	38.0	59.7	3.7	0.0	0.0	16.3	15.4
LnGrp LOS				D	A	D	E	A	A	A	B	B
Approach Vol, veh/h					479			1178			1349	
Approach Delay, s/veh					39.9			18.3			15.7	
Approach LOS					D			B			B	
Timer - Assigned Phs	2			5			6			8		
Phs Duration (G+Y+Rc), s	74.0			22.0			52.0			17.2		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	69.5			18.5			46.5			21.5		
Max Q Clear Time (g_c+I1), s	9.0			17.4			18.2			11.4		
Green Ext Time (p_c), s	7.8			0.1			8.2			1.3		
Intersection Summary												
HCM 6th Ctrl Delay				20.6								
HCM 6th LOS				C								

Queues

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2-5



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	597	520	580	197	154	721
v/c Ratio	0.64	0.89	0.36	0.24	0.68	0.32
Control Delay	32.3	36.9	19.0	3.7	55.0	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	36.9	19.0	3.7	55.0	9.4
Queue Length 50th (ft)	156	180	118	0	86	96
Queue Length 95th (ft)	209	319	185	43	#171	157
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	1258	714	1597	822	261	2227
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	0.47	0.73	0.36	0.24	0.59	0.32

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

AM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	549	0	478	0	0	0	0	534	181	142	663	0
Future Volume (veh/h)	549	0	478	0	0	0	0	534	181	142	663	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	597	0	520				0	580	197	154	721	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	1158	0	531				0	1513	675	186	2043	0
Arrive On Green	0.34	0.00	0.34				0.00	0.43	0.43	0.10	0.57	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	597	0	520				0	580	197	154	721	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	13.9	0.0	32.5				0.0	11.2	8.2	8.5	10.8	0.0
Cycle Q Clear(g_c), s	13.9	0.0	32.5				0.0	11.2	8.2	8.5	10.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1158	0	531				0	1513	675	186	2043	0
V/C Ratio(X)	0.52	0.00	0.98				0.00	0.38	0.29	0.83	0.35	0.00
Avail Cap(c_a), veh/h	1158	0	531				0	1513	675	240	2043	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.7	0.0	32.9				0.0	19.7	18.8	43.9	11.3	0.0
Incr Delay (d2), s/veh	0.4	0.0	33.6				0.0	0.7	1.1	16.8	0.5	0.0
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	5.7	0.0	17.0				0.0	4.7	3.1	4.6	4.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	0.0	66.6				0.0	20.4	19.9	60.7	11.8	0.0
LnGrp LOS	C	A	E				A	C	B	E	B	A
Approach Vol, veh/h	1117						777			875		
Approach Delay, s/veh	45.5						20.3			20.4		
Approach LOS	D						C			C		
Timer - Assigned Phs	1	2	4		6							
Phs Duration (G+Y+Rc), s	14.9	47.1	38.0		62.0							
Change Period (Y+Rc), s	4.5	4.5	4.5		4.5							
Max Green Setting (Gmax), s	13.5	39.5	33.5		57.5							
Max Q Clear Time (g_c+I1), s	10.5	13.2	34.5		12.8							
Green Ext Time (p_c), s	0.1	4.9	0.0		5.9							
Intersection Summary												
HCM 6th Ctrl Delay			30.5									
HCM 6th LOS			C									
Notes												

HCM 6th TWSC
40: Douglas St & Drive 3

AM Existing plus Zone 2-5

Intersection

Int Delay, s/veh 2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	118	78	490	605	36
Future Vol, veh/h	53	118	78	490	605	36
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	0	150	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	128	85	533	658	39

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1361	658	697
Stage 1	658	-	-
Stage 2	703	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	163	464	899
Stage 1	515	-	-
Stage 2	491	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	148	464	899
Mov Cap-2 Maneuver	286	-	-
Stage 1	466	-	-
Stage 2	491	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.2	1.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	899	-	286	464	-	-
HCM Lane V/C Ratio	0.094	-	0.201	0.276	-	-
HCM Control Delay (s)	9.4	-	20.7	15.7	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.7	1.1	-	-

HCM 6th TWSC
41: Douglas St & Drive 2

AM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	54	16	527	587	2
Future Vol, veh/h	6	54	16	527	587	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	59	17	573	638	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1246	639	640	0	-	0
Stage 1	639	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	192	476	944	-	-	-
Stage 1	526	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	189	476	944	-	-	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	517	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	14.2	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	944	-	455	-	-	
HCM Lane V/C Ratio	0.018	-	0.143	-	-	
HCM Control Delay (s)	8.9	-	14.2	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-	

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖		↗	↖	
Traffic Vol, veh/h	11	1	32	4	1	3	9	514	10	9	553	4
Future Vol, veh/h	11	1	32	4	1	3	9	514	10	9	553	4
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	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	35	4	1	3	10	559	11	10	601	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1210	1213	603	1226	1210	565	605	0	0	570	0	0
Stage 1	623	623	-	585	585	-	-	-	-	-	-	-
Stage 2	587	590	-	641	625	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	159	182	499	155	183	524	973	-	-	1002	-	-
Stage 1	474	478	-	497	498	-	-	-	-	-	-	-
Stage 2	496	495	-	463	477	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	155	178	499	141	179	524	973	-	-	1002	-	-
Mov Cap-2 Maneuver	155	178	-	141	179	-	-	-	-	-	-	-
Stage 1	469	473	-	492	493	-	-	-	-	-	-	-
Stage 2	487	490	-	425	472	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	18.6		23.6			0.1			0.1			
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	973	-	-	313	202	1002	-	-				
HCM Lane V/C Ratio	0.01	-	-	0.153	0.043	0.01	-	-				
HCM Control Delay (s)	8.7	-	-	18.6	23.6	8.6	-	-				
HCM Lane LOS	A	-	-	C	C	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	0	-	-				

Queues

48: Drive 6 & Colbern Rd

AM Existing plus Zone 2-5

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	453	15	211	701	102	168
v/c Ratio	0.60	0.04	0.29	0.48	0.07	0.13
Control Delay	26.0	10.4	12.8	14.9	11.5	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	10.4	12.8	14.9	11.5	2.7
Queue Length 50th (ft)	83	0	25	100	10	0
Queue Length 95th (ft)	127	13	43	141	27	17
Internal Link Dist (ft)	860			678	770	
Turn Bay Length (ft)		250	350			250
Base Capacity (vph)	1922	866	996	2925	1540	1343
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	0.24	0.02	0.21	0.24	0.07	0.13
Intersection Summary						

HCM 6th Signalized Intersection Summary 48: Drive 6 & Colbern Rd

AM Existing plus Zone 2-5

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖↗	↑↑	↖↗	↖↗
Traffic Volume (veh/h)	417	14	194	645	94	155
Future Volume (veh/h)	417	14	194	645	94	155
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	453	15	211	701	102	168
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	725	324	697	1298	1667	1346
Arrive On Green	0.20	0.20	0.08	0.37	0.48	0.48
Sat Flow, veh/h	3647	1585	3456	3647	3456	2790
Grp Volume(v), veh/h	453	15	211	701	102	168
Grp Sat Flow(s),veh/h/ln	1777	1585	1728	1777	1728	1395
Q Serve(g_s), s	6.9	0.4	2.7	9.2	0.9	2.0
Cycle Q Clear(g_c), s	6.9	0.4	2.7	9.2	0.9	2.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	725	324	697	1298	1667	1346
V/C Ratio(X)	0.62	0.05	0.30	0.54	0.06	0.12
Avail Cap(c_a), veh/h	2076	926	1193	3159	1667	1346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	18.9	16.4	14.8	8.1	8.4
Incr Delay (d2), s/veh	0.9	0.1	0.2	0.4	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.2	1.0	3.4	0.3	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.3	18.9	16.6	15.2	8.2	8.6
LnGrp LOS	C	B	B	B	A	A
Approach Vol, veh/h	468			912	270	
Approach Delay, s/veh	22.2			15.5	8.5	
Approach LOS	C			B	A	
Timer - Assigned Phs	2		3	4	8	
Phs Duration (G+Y+Rc), s	33.0		9.5	16.6	26.1	
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	
Max Green Setting (Gmax), s	28.5		13.5	34.5	52.5	
Max Q Clear Time (g_c+l1), s	4.0		4.7	8.9	11.2	
Green Ext Time (p_c), s	1.0		0.4	3.2	5.7	
Intersection Summary						
HCM 6th Ctrl Delay			16.3			
HCM 6th LOS			B			

HCM 6th TWSC
50: Drive 7 & Colbern Rd

AM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑		↑
Traffic Vol, veh/h	390	66	50	689	0	40
Future Vol, veh/h	390	66	50	689	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	424	72	54	749	0	43
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	496	0	-	212
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	1064	-	0	793
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1064	-	-	793
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		9.8	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	793	-	-	1064	-	
HCM Lane V/C Ratio	0.055	-	-	0.051	-	
HCM Control Delay (s)	9.8	-	-	8.6	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-	

HCM 6th TWSC
52: Drive 8 & Colbern Rd

AM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘	↑↑		↗
Traffic Vol, veh/h	443	55	22	667	0	13
Future Vol, veh/h	443	55	22	667	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	482	60	24	725	0	14
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	542	0	-	241
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	1023	-	0	760
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1023	-	-	760
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		9.8	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	760	-	-	1023	-	
HCM Lane V/C Ratio	0.019	-	-	0.023	-	
HCM Control Delay (s)	9.8	-	-	8.6	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

HCM 6th TWSC
54: Main St & Drive 9

AM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	71	0	7	122
Future Vol, veh/h	0	11	71	0	7	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	12	77	0	8	133
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	226	77	0	0	77	0
Stage 1	77	-	-	-	-	-
Stage 2	149	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	762	984	-	-	1522	-
Stage 1	946	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	757	984	-	-	1522	-
Mov Cap-2 Maneuver	757	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.7	0		0.4		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 984		1522	-	
HCM Lane V/C Ratio	-	- 0.012		0.005	-	
HCM Control Delay (s)	-	- 8.7		7.4	0	
HCM Lane LOS	-	- A		A	A	
HCM 95th %tile Q(veh)	-	- 0		0	-	

HCM 6th TWSC
56: Main St & Drive 10

AM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	7	64	4	0	122
Future Vol, veh/h	3	7	64	4	0	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	8	70	4	0	133
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	205	72	0	0	74	0
Stage 1	72	-	-	-	-	-
Stage 2	133	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	783	990	-	-	1526	-
Stage 1	951	-	-	-	-	-
Stage 2	893	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	783	990	-	-	1526	-
Mov Cap-2 Maneuver	783	-	-	-	-	-
Stage 1	951	-	-	-	-	-
Stage 2	893	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 917		1526	-	
HCM Lane V/C Ratio	-	- 0.012		-	-	
HCM Control Delay (s)	-	- 9		0	-	
HCM Lane LOS	-	- A		A	-	
HCM 95th %tile Q(veh)	-	- 0		0	-	

HCM 6th TWSC
60: Lee's Summit Rd & Drive 11

AM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	88	50	478	477	5
Future Vol, veh/h	7	88	50	478	477	5
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	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	96	54	520	518	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1149	521	523	0	-	0
Stage 1	521	-	-	-	-	-
Stage 2	628	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	219	555	1043	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	532	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	208	555	1043	-	-	-
Mov Cap-2 Maneuver	345	-	-	-	-	-
Stage 1	565	-	-	-	-	-
Stage 2	532	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.4	0.8		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1043	-	531	-	-	
HCM Lane V/C Ratio	0.052	-	0.194	-	-	
HCM Control Delay (s)	8.6	-	13.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-	

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Vol, veh/h	6	372	24	143	304	41	41	20	163	43	13	10
Future Vol, veh/h	6	372	24	143	304	41	41	20	163	43	13	10
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	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	404	26	155	330	45	45	22	177	47	14	11
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	375	0	0	430	0	0	913	1116	215	890	1107	188
Stage 1	-	-	-	-	-	-	431	431	-	663	663	-
Stage 2	-	-	-	-	-	-	482	685	-	227	444	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1180	-	-	1126	-	-	228	206	790	237	209	822
Stage 1	-	-	-	-	-	-	573	581	-	417	457	-
Stage 2	-	-	-	-	-	-	534	447	-	755	574	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1180	-	-	1126	-	-	182	169	790	143	171	822
Mov Cap-2 Maneuver	-	-	-	-	-	-	182	169	-	143	171	-
Stage 1	-	-	-	-	-	-	568	576	-	414	377	-
Stage 2	-	-	-	-	-	-	418	369	-	559	569	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0.1		2.8			26.2			40.8			
HCM LOS						D			E			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	407	1180	-	-	1126	-	-	170				
HCM Lane V/C Ratio	0.598	0.006	-	-	0.138	-	-	0.422				
HCM Control Delay (s)	26.2	8.1	0	-	8.7	0.4	-	40.8				
HCM Lane LOS	D	A	A	-	A	A	-	E				
HCM 95th %tile Q(veh)	3.8	0	-	-	0.5	-	-	1.9				

Queues

6: Colbern Rd & SB M-350 Ramp

PM Existing plus Zone 2-5



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	505	123	399	440	510	88
v/c Ratio	0.66	0.31	0.76	0.24	0.80	0.14
Control Delay	32.6	16.2	23.9	11.2	32.3	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	16.2	23.9	11.2	32.3	4.8
Queue Length 50th (ft)	113	19	109	55	210	0
Queue Length 95th (ft)	195	71	#234	102	357	27
Internal Link Dist (ft)	473			897		
Turn Bay Length (ft)		50	325			250
Base Capacity (vph)	955	480	657	2297	942	884
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	0.53	0.26	0.61	0.19	0.54	0.10

Intersection Summary

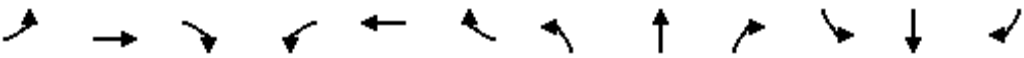
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

6: Colbern Rd & SB M-350 Ramp

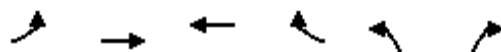
PM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑		↑
Traffic Volume (veh/h)	0	465	113	367	405	0	0	0	0	469	0	81
Future Volume (veh/h)	0	465	113	367	405	0	0	0	0	469	0	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
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	0	1870	1870	1870	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	505	0	399	440	0				510	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	0	2
Cap, veh/h	0	737		586	1799	0				592	0	
Arrive On Green	0.00	0.21	0.00	0.22	0.51	0.00				0.33	0.00	0.00
Sat Flow, veh/h	0	3647	1585	1781	3647	0				1781	0	1585
Grp Volume(v), veh/h	0	505	0	399	440	0				510	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	0				1781	0	1585
Q Serve(g_s), s	0.0	7.3	0.0	9.3	3.9	0.0				14.9	0.0	0.0
Cycle Q Clear(g_c), s	0.0	7.3	0.0	9.3	3.9	0.0				14.9	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	737		586	1799	0				592	0	
V/C Ratio(X)	0.00	0.69		0.68	0.24	0.00				0.86	0.00	
Avail Cap(c_a), veh/h	0	1178		883	2833	0				1165	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	20.4	0.0	12.7	7.8	0.0				17.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	1.4	0.1	0.0				3.8	0.0	0.0
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	0.0	2.9	0.0	3.3	1.2	0.0				6.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	21.6	0.0	14.1	7.8	0.0				21.3	0.0	0.0
LnGrp LOS	A	C		B	A	A				C	A	
Approach Vol, veh/h		505			839						510	
Approach Delay, s/veh		21.6			10.8						21.3	
Approach LOS		C			B						C	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			16.7	16.1		23.1		32.8				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			21.5	18.5		36.5		44.5				
Max Q Clear Time (g_c+I1), s			11.3	9.3		16.9		5.9				
Green Ext Time (p_c), s			1.0	2.2		1.6		3.3				
Intersection Summary												
HCM 6th Ctrl Delay			16.6									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues

9: NB M-350 Ramp & Colbern Rd

PM Existing plus Zone 2-5



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	91	924	727	498	111	316
v/c Ratio	0.29	0.54	0.42	0.53	0.22	0.60
Control Delay	10.0	9.2	8.2	5.1	14.5	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	9.2	8.2	5.1	14.5	14.9
Queue Length 50th (ft)	11	67	49	19	19	38
Queue Length 95th (ft)	44	152	114	84	64	133
Internal Link Dist (ft)		897	897			
Turn Bay Length (ft)	325			50		
Base Capacity (vph)	622	3347	3347	1515	1427	1297
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	0.15	0.28	0.22	0.33	0.08	0.24
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: NB M-350 Ramp & Colbern Rd

PM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (veh/h)	84	850	0	0	669	458	102	0	291	0	0	0
Future Volume (veh/h)	84	850	0	0	669	458	102	0	291	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	91	924	0	0	727	0	111	0	316			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	0	2			
Cap, veh/h	456	1783	0	0	1783		477	0	424			
Arrive On Green	0.50	0.50	0.00	0.00	0.50	0.00	0.27	0.00	0.27			
Sat Flow, veh/h	728	3647	0	0	3647	1585	1781	0	1585			
Grp Volume(v), veh/h	91	924	0	0	727	0	111	0	316			
Grp Sat Flow(s),veh/h/ln	728	1777	0	0	1777	1585	1781	0	1585			
Q Serve(g_s), s	3.5	6.8	0.0	0.0	5.0	0.0	1.9	0.0	7.1			
Cycle Q Clear(g_c), s	8.5	6.8	0.0	0.0	5.0	0.0	1.9	0.0	7.1			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	456	1783	0	0	1783		477	0	424			
V/C Ratio(X)	0.20	0.52	0.00	0.00	0.41		0.23	0.00	0.75			
Avail Cap(c_a), veh/h	977	4325	0	0	4325		1529	0	1360			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	8.7	6.5	0.0	0.0	6.1	0.0	11.2	0.0	13.1			
Incr Delay (d2), s/veh	0.2	0.2	0.0	0.0	0.1	0.0	0.2	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.4	1.6	0.0	0.0	1.2	0.0	0.6	0.0	2.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.0	6.8	0.0	0.0	6.2	0.0	11.4	0.0	15.7			
LnGrp LOS	A	A	A	A	A		B	A	B			
Approach Vol, veh/h	1015			727			427					
Approach Delay, s/veh	7.0			6.2			14.6					
Approach LOS	A			A			B					
Timer - Assigned Phs	2			4			8					
Phs Duration (G+Y+Rc), s	14.9			24.1			24.1					
Change Period (Y+Rc), s	4.5			4.5			4.5					
Max Green Setting (Gmax), s	33.5			47.5			47.5					
Max Q Clear Time (g_c+I1), s	9.1			10.5			7.0					
Green Ext Time (p_c), s	1.4			9.1			5.9					
Intersection Summary												
HCM 6th Ctrl Delay	8.2											
HCM 6th LOS	A											

Queues

15: Main St & Colbern Rd

PM Existing plus Zone 2-5

				
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1388	1046	188	70
v/c Ratio	0.73	0.72	0.32	0.12
Control Delay	14.6	15.4	22.5	6.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.6	15.4	22.5	6.9
Queue Length 50th (ft)	219	166	60	0
Queue Length 95th (ft)	283	226	145	30
Internal Link Dist (ft)	1355	2860	865	
Turn Bay Length (ft)				150
Base Capacity (vph)	2873	2198	592	575
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.48	0.32	0.12
Intersection Summary				

HCM 6th Signalized Intersection Summary 15: Main St & Colbern Rd

PM Existing plus Zone 2-5

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1198	79	47	915	173	64
Future Volume (veh/h)	1198	79	47	915	173	64
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1302	86	51	995	188	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1779	117	89	1489	611	544
Arrive On Green	0.53	0.53	0.53	0.53	0.34	0.34
Sat Flow, veh/h	3478	223	59	2917	1781	1585
Grp Volume(v), veh/h	682	706	513	533	188	70
Grp Sat Flow(s),veh/h/ln	1777	1830	1274	1617	1781	1585
Q Serve(g_s), s	20.3	20.4	4.4	16.0	5.3	2.1
Cycle Q Clear(g_c), s	20.3	20.4	24.8	16.0	5.3	2.1
Prop In Lane		0.12	0.10		1.00	1.00
Lane Grp Cap(c), veh/h	934	962	727	850	611	544
V/C Ratio(X)	0.73	0.73	0.71	0.63	0.31	0.13
Avail Cap(c_a), veh/h	1491	1536	1153	1357	611	544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.5	12.5	11.2	11.5	16.5	15.5
Incr Delay (d2), s/veh	1.1	1.1	1.3	0.8	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	7.3	4.6	5.1	2.2	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	13.6	12.5	12.3	17.8	16.0
LnGrp LOS	B	B	B	B	B	B
Approach Vol, veh/h	1388			1046	258	
Approach Delay, s/veh	13.6			12.4	17.3	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	28.0		40.5		40.5	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	23.5		57.5		57.5	
Max Q Clear Time (g_c+I1), s	7.3		22.4		26.8	
Green Ext Time (p_c), s	0.7		13.1		9.2	
Intersection Summary						
HCM 6th Ctrl Delay			13.5			
HCM 6th LOS			B			

Queues

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2-5

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	127	1611	176	365	1327	41	199	251	66	30
v/c Ratio	0.50	0.88	0.20	0.74	0.70	0.05	0.60	0.48	0.36	0.07
Control Delay	14.4	27.5	3.9	28.3	19.1	1.4	42.4	13.1	38.7	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	27.5	3.9	28.3	19.1	1.4	42.4	13.1	38.7	11.8
Queue Length 50th (ft)	25	448	10	62	302	0	114	33	35	1
Queue Length 95th (ft)	55	560	42	111	396	8	191	104	77	24
Internal Link Dist (ft)	678				724				763	
Turn Bay Length (ft)	200		200		200		250			
Base Capacity (vph)	290	1909	919	518	1969	909	332	523	185	406
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.84	0.19	0.70	0.67	0.05	0.60	0.48	0.36	0.07
Intersection Summary										

HCM 6th Signalized Intersection Summary

18: Drive 5 & Colbern Rd

PM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	1482	162	336	1221	38	183	1	230	61	1	27
Future Volume (veh/h)	117	1482	162	336	1221	38	183	1	230	61	1	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	1611	176	365	1327	41	199	1	250	66	1	29
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	281	1866	832	481	1947	868	409	2	402	207	13	391
Arrive On Green	0.05	0.53	0.53	0.07	0.55	0.55	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1380	6	1580	1129	53	1540
Grp Volume(v), veh/h	127	1611	176	365	1327	41	199	0	251	66	0	30
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1380	0	1586	1129	0	1593
Q Serve(g_s), s	2.8	36.4	5.5	4.4	24.9	1.1	11.8	0.0	13.0	5.1	0.0	1.3
Cycle Q Clear(g_c), s	2.8	36.4	5.5	4.4	24.9	1.1	13.2	0.0	13.0	18.1	0.0	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Lane Grp Cap(c), veh/h	281	1866	832	481	1947	868	409	0	403	207	0	405
V/C Ratio(X)	0.45	0.86	0.21	0.76	0.68	0.05	0.49	0.00	0.62	0.32	0.00	0.07
Avail Cap(c_a), veh/h	377	2018	900	616	2045	912	409	0	403	207	0	405
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	19.1	11.7	19.9	15.1	9.7	31.2	0.0	30.5	38.5	0.0	26.2
Incr Delay (d2), s/veh	1.1	3.9	0.1	4.1	0.9	0.0	4.1	0.0	7.1	4.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	14.7	1.9	2.2	9.5	0.4	4.3	0.0	5.6	1.6	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	23.0	11.8	24.0	16.0	9.7	35.3	0.0	37.6	42.6	0.0	26.6
LnGrp LOS	B	C	B	C	B	A	D	A	D	D	A	C
Approach Vol, veh/h	1914			1733			450			96		
Approach Delay, s/veh	21.4			17.5			36.6			37.6		
Approach LOS	C			B			D			D		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	28.0			11.4			53.1			28.0		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	23.5			10.5			52.5			23.5		
Max Q Clear Time (g_c+I1), s	15.2			6.4			38.4			20.1		
Green Ext Time (p_c), s	1.4			0.5			10.1			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	21.8											
HCM 6th LOS	C											

HCM 6th TWSC
19: Drive 4 & Colbern Rd

PM Existing plus Zone 2-5

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗			↗			↗
Traffic Vol, veh/h	0	1761	12	0	1542	55	0	0	124	0	0	53
Future Vol, veh/h	0	1761	12	0	1542	55	0	0	124	0	0	53
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	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1914	13	0	1676	60	0	0	135	0	0	58
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	957	-	-	838
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	258	0	0	309
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	258	-	-	309
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			33.3			19.3		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	258	-	-	-	-	309						
HCM Lane V/C Ratio	0.522	-	-	-	-	0.186						
HCM Control Delay (s)	33.3	-	-	-	-	19.3						
HCM Lane LOS	D	-	-	-	-	C						
HCM 95th %tile Q(veh)	2.8	-	-	-	-	0.7						

Queues

21: Douglas St & Colbern Rd

PM Existing plus Zone 2-5

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	491	737	822	535	510	161	801	558	615	130	499	426
v/c Ratio	0.85	0.93	0.56	0.94	0.65	0.34	0.93	0.49	0.39	0.62	0.76	0.61
Control Delay	56.8	59.7	17.4	68.5	41.9	7.6	56.1	31.2	9.2	56.8	49.0	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	59.7	17.4	68.5	41.9	7.6	56.1	31.2	9.2	56.8	49.0	22.6
Queue Length 50th (ft)	165	256	187	185	166	0	271	160	72	84	168	165
Queue Length 95th (ft)	#242	#371	250	#286	224	53	#386	220	121	143	228	271
Internal Link Dist (ft)	941		2187				1801				1236	
Turn Bay Length (ft)	200	200		200	200		160	200		290	200	
Base Capacity (vph)	598	792	1476	572	783	475	866	1131	1594	256	657	702
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.93	0.56	0.94	0.65	0.34	0.92	0.49	0.39	0.51	0.76	0.61

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

21: Douglas St & Colbern Rd

PM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	452	678	756	492	469	148	737	513	566	120	459	392
Future Volume (veh/h)	452	678	756	492	469	148	737	513	566	120	459	392
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	491	737	0	535	510	161	801	558	0	130	499	426
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	559	795		580	817	364	861	1229		160	664	553
Arrive On Green	0.16	0.22	0.00	0.17	0.23	0.23	0.25	0.35	0.00	0.09	0.19	0.19
Sat Flow, veh/h	3456	3554	2790	3456	3554	1585	3456	3554	2790	1781	3554	1585
Grp Volume(v), veh/h	491	737	0	535	510	161	801	558	0	130	499	426
Grp Sat Flow(s),veh/h/ln	1728	1777	1395	1728	1777	1585	1728	1777	1395	1781	1777	1585
Q Serve(g_s), s	14.5	21.2	0.0	15.9	13.5	9.1	23.6	12.7	0.0	7.5	13.9	19.5
Cycle Q Clear(g_c), s	14.5	21.2	0.0	15.9	13.5	9.1	23.6	12.7	0.0	7.5	13.9	19.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	559	795		580	817	364	861	1229		160	664	553
V/C Ratio(X)	0.88	0.93		0.92	0.62	0.44	0.93	0.45		0.81	0.75	0.77
Avail Cap(c_a), veh/h	606	800		580	817	364	878	1229		260	664	553
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.7	39.7	0.0	42.8	36.1	34.4	38.3	26.5	0.0	46.6	40.1	30.3
Incr Delay (d2), s/veh	13.2	16.6	0.0	20.6	1.5	0.8	16.0	1.2	0.0	9.4	7.7	10.0
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	7.1	10.9	0.0	8.4	6.0	3.6	11.8	5.5	0.0	3.7	6.7	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.9	56.3	0.0	63.3	37.6	35.3	54.3	27.7	0.0	56.0	47.8	40.3
LnGrp LOS	E	E		E	D	D	D	C		E	D	D
Approach Vol, veh/h		1228			1206			1359			1055	
Approach Delay, s/veh		56.1			48.7			43.4			45.8	
Approach LOS		E			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.9	40.6	22.0	27.9	30.5	24.0	21.4	28.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	15.2	30.8	17.5	23.5	26.5	19.5	18.3	22.7				
Max Q Clear Time (g_c+I1), s	9.5	14.7	17.9	23.2	25.6	21.5	16.5	15.5				
Green Ext Time (p_c), s	0.1	3.4	0.0	0.2	0.3	0.0	0.4	2.3				

Intersection Summary

HCM 6th Ctrl Delay 48.5

HCM 6th LOS D

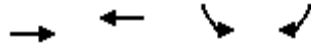
Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Queues

24: Colbern Rd & SB I-470 Ramp

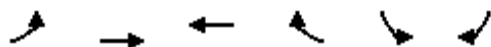
PM Existing plus Zone 2-5



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1410	1440	219	120
v/c Ratio	0.72	0.73	0.20	0.22
Control Delay	13.7	14.1	21.1	14.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.7	14.1	21.1	14.4
Queue Length 50th (ft)	218	226	36	20
Queue Length 95th (ft)	280	284	74	64
Internal Link Dist (ft)	2187	970	1784	
Turn Bay Length (ft)				200
Base Capacity (vph)	2919	2919	1089	540
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.49	0.20	0.22
Intersection Summary				

HCM 6th Signalized Intersection Summary 24: Colbern Rd & SB I-470 Ramp

PM Existing plus Zone 2-5



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (veh/h)	0	1325	1282	0	184	101
Future Volume (veh/h)	0	1325	1282	0	184	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h	0	1410	1440	0	219	0
Peak Hour Factor	0.94	0.94	0.89	0.89	0.84	0.84
Percent Heavy Veh, %	0	2	2	0	2	2
Cap, veh/h	0	1952	1952	0	1112	
Arrive On Green	0.00	0.55	0.55	0.00	0.32	0.00
Sat Flow, veh/h	0	3741	3741	0	3456	1585
Grp Volume(v), veh/h	0	1410	1440	0	219	0
Grp Sat Flow(s),veh/h/ln	0	1777	1777	0	1728	1585
Q Serve(g_s), s	0.0	20.7	21.5	0.0	3.2	0.0
Cycle Q Clear(g_c), s	0.0	20.7	21.5	0.0	3.2	0.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	1952	1952	0	1112	
V/C Ratio(X)	0.00	0.72	0.74	0.00	0.20	
Avail Cap(c_a), veh/h	0	2974	2974	0	1112	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	11.8	11.9	0.0	17.2	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.6	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.0	7.2	0.0	1.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	12.3	12.5	0.0	17.6	0.0
LnGrp LOS	A	B	B	A	B	
Approach Vol, veh/h		1410	1440		219	
Approach Delay, s/veh		12.3	12.5		17.6	
Approach LOS		B	B		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				42.9	27.0	42.9
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				58.5	22.5	58.5
Max Q Clear Time (g_c+I1), s				22.7	5.2	23.5
Green Ext Time (p_c), s				14.6	0.7	14.9
Intersection Summary						
HCM 6th Ctrl Delay			12.8			
HCM 6th LOS			B			

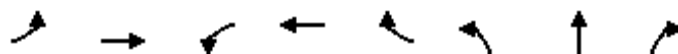
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues

27: Independence Ave/NB I-470 & Colbern Rd

PM Existing plus Zone 2-5



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	104	1523	94	1537	82	110	103	172
v/c Ratio	0.44	0.80	0.41	0.81	0.09	0.25	0.23	0.34
Control Delay	13.6	19.0	12.6	19.9	3.3	31.0	30.6	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	19.0	12.6	19.9	3.3	31.0	30.6	8.1
Queue Length 50th (ft)	17	325	16	339	2	53	49	4
Queue Length 95th (ft)	47	417	36	409	20	94	89	49
Internal Link Dist (ft)		970		1130			688	
Turn Bay Length (ft)	250		250		125	200		
Base Capacity (vph)	253	2215	232	2200	1011	433	455	510
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.69	0.41	0.70	0.08	0.25	0.23	0.34
Intersection Summary								

HCM 6th Signalized Intersection Summary

27: Independence Ave/NB I-470 & Colbern Rd

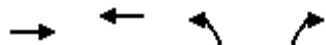
PM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (veh/h)	96	1252	149	82	1337	71	95	89	148	0	0	0
Future Volume (veh/h)	96	1252	149	82	1337	71	95	89	148	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
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	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	104	1361	162	94	1537	0	110	103	172			
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	249	1698	201	250	1880		436	458	388			
Arrive On Green	0.06	0.53	0.53	0.05	0.53	0.00	0.24	0.24	0.24			
Sat Flow, veh/h	1781	3201	379	1781	3554	1585	1781	1870	1585			
Grp Volume(v), veh/h	104	752	771	94	1537	0	110	103	172			
Grp Sat Flow(s),veh/h/ln	1781	1777	1802	1781	1777	1585	1781	1870	1585			
Q Serve(g_s), s	2.0	27.4	28.0	1.8	28.6	0.0	4.0	3.5	7.3			
Cycle Q Clear(g_c), s	2.0	27.4	28.0	1.8	28.6	0.0	4.0	3.5	7.3			
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	249	943	956	250	1880		436	458	388			
V/C Ratio(X)	0.42	0.80	0.81	0.38	0.82		0.25	0.22	0.44			
Avail Cap(c_a), veh/h	316	1127	1143	297	2209		436	458	388			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	14.7	15.2	15.3	14.0	15.6	0.0	24.2	24.0	25.5			
Incr Delay (d2), s/veh	1.1	3.5	3.7	0.9	2.2	0.0	1.4	1.1	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			
%ile BackOfQ(50%),veh/ln	0.8	10.7	11.1	0.7	10.8	0.0	1.8	1.7	3.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	18.7	19.0	14.9	17.7	0.0	25.6	25.2	29.1			
LnGrp LOS	B	B	B	B	B		C	C	C			
Approach Vol, veh/h	1627			1631			385					
Approach Delay, s/veh	18.6			17.6			27.0					
Approach LOS	B			B			C					
Timer - Assigned Phs	2		3	4		7		8				
Phs Duration (G+Y+Rc), s	24.0		8.9	46.8		9.0		46.6				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	19.5		6.5	50.5		7.5		49.5				
Max Q Clear Time (g_c+I1), s	9.3		3.8	30.0		4.0		30.6				
Green Ext Time (p_c), s	1.1		0.0	11.6		0.1		11.6				
Intersection Summary												
HCM 6th Ctrl Delay	19.1											
HCM 6th LOS	B											

Queues

31: NB 291 Ramp & Colbern Rd

PM Existing plus Zone 2-5



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1283	1384	172	130
v/c Ratio	0.68	0.73	0.29	0.22
Control Delay	13.6	14.7	22.0	11.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.6	14.7	22.0	11.6
Queue Length 50th (ft)	194	220	54	16
Queue Length 95th (ft)	251	283	129	64
Internal Link Dist (ft)	1200	780	698	
Turn Bay Length (ft)				
Base Capacity (vph)	2903	2903	593	580
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.48	0.29	0.22
Intersection Summary				

HCM 6th Signalized Intersection Summary 31: NB 291 Ramp & Colbern Rd

PM Existing plus Zone 2-5

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (veh/h)	1232	0	0	1246	151	114
Future Volume (veh/h)	1232	0	0	1246	151	114
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	0	0	1870	1870	1870
Adj Flow Rate, veh/h	1283	0	0	1384	172	130
Peak Hour Factor	0.96	0.96	0.90	0.90	0.88	0.88
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1887	0	0	1887	604	538
Arrive On Green	0.53	0.00	0.00	0.53	0.34	0.34
Sat Flow, veh/h	3741	0	0	3741	1781	1585
Grp Volume(v), veh/h	1283	0	0	1384	172	130
Grp Sat Flow(s),veh/h/ln	1777	0	0	1777	1781	1585
Q Serve(g_s), s	18.4	0.0	0.0	20.7	4.9	4.1
Cycle Q Clear(g_c), s	18.4	0.0	0.0	20.7	4.9	4.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1887	0	0	1887	604	538
V/C Ratio(X)	0.68	0.00	0.00	0.73	0.28	0.24
Avail Cap(c_a), veh/h	2950	0	0	2950	604	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.9	0.0	0.0	12.5	16.7	16.5
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.6	1.2	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	0.0	7.1	2.1	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.4	0.0	0.0	13.1	17.9	17.5
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	1283			1384	302	
Approach Delay, s/veh	12.4			13.1	17.8	
Approach LOS	B			B	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	28.0		41.3		41.3	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	23.5		57.5		57.5	
Max Q Clear Time (g_c+I1), s	6.9		20.4		22.7	
Green Ext Time (p_c), s	0.8		12.9		14.0	
Intersection Summary						
HCM 6th Ctrl Delay			13.2			
HCM 6th LOS			B			

Queues

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2-5



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	217	275	605	1701	1289	567
v/c Ratio	0.38	0.87	1.49	0.65	0.83	0.60
Control Delay	38.3	57.0	265.5	8.0	27.7	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	57.0	265.5	8.0	27.7	5.8
Queue Length 50th (ft)	62	131	~541	252	370	25
Queue Length 95th (ft)	97	#265	#752	316	474	116
Internal Link Dist (ft)				1200	1801	
Turn Bay Length (ft)		400	350			
Base Capacity (vph)	632	344	405	2624	1554	940
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	0.34	0.80	1.49	0.65	0.83	0.60

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

33: Douglas St & WB I-470 Ramp

PM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	200	0	253	557	1565	0	0	866	842
Future Volume (veh/h)	0	0	0	200	0	253	557	1565	0	0	866	842
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
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				1870	0	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				217	0	275	605	1701	0	0	767	1031
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	2	2	0	0	2	2
Cap, veh/h				625	0	287	401	2591	0	0	858	1455
Arrive On Green				0.18	0.00	0.18	0.22	0.73	0.00	0.00	0.46	0.46
Sat Flow, veh/h				3456	0	1585	1781	3647	0	0	1870	3170
Grp Volume(v), veh/h				217	0	275	605	1701	0	0	767	1031
Grp Sat Flow(s),veh/h/ln				1728	0	1585	1781	1777	0	0	1870	1585
Q Serve(g_s), s				5.5	0.0	17.2	22.5	24.9	0.0	0.0	37.6	26.1
Cycle Q Clear(g_c), s				5.5	0.0	17.2	22.5	24.9	0.0	0.0	37.6	26.1
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				625	0	287	401	2591	0	0	858	1455
V/C Ratio(X)				0.35	0.00	0.96	1.51	0.66	0.00	0.00	0.89	0.71
Avail Cap(c_a), veh/h				625	0	287	401	2591	0	0	858	1455
HCM Platoon Ratio				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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				35.8	0.0	40.6	38.8	7.0	0.0	0.0	24.8	21.7
Incr Delay (d2), s/veh				0.3	0.0	41.8	241.9	1.3	0.0	0.0	13.7	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
%ile BackOfQ(50%),veh/ln				2.3	0.0	9.9	36.6	8.0	0.0	0.0	19.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				36.1	0.0	82.4	280.6	8.4	0.0	0.0	38.5	24.6
LnGrp LOS				D	A	F	F	A	A	A	D	C
Approach Vol, veh/h					492			2306			1798	
Approach Delay, s/veh					62.0			79.8			30.5	
Approach LOS					E			E			C	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		77.4			27.0	50.4		22.6				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		72.9			22.5	45.9		18.1				
Max Q Clear Time (g_c+I1), s		26.9			24.5	39.6		19.2				
Green Ext Time (p_c), s		21.7			0.0	4.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				58.6								
HCM 6th LOS				E								
Notes												
User approved volume balancing among the lanes for turning movement.												

Queues

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2-5



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1111	537	1196	450	380	778
v/c Ratio	1.17	0.90	0.77	0.50	1.35	0.34
Control Delay	123.7	41.4	30.0	5.9	217.1	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.7	41.4	30.0	5.9	217.1	9.6
Queue Length 50th (ft)	~481	228	366	30	~352	122
Queue Length 95th (ft)	#612	#439	453	102	#539	156
Internal Link Dist (ft)			3091			1200
Turn Bay Length (ft)	515	515		200	100	
Base Capacity (vph)	951	600	1560	908	281	2268
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	1.17	0.90	0.77	0.50	1.35	0.34

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

36: Douglas St & EB I-470 Ramp

PM Existing plus Zone 2-5

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1022	0	494	0	0	0	0	1100	414	350	716	0
Future Volume (veh/h)	1022	0	494	0	0	0	0	1100	414	350	716	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
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	1870	0	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	1111	0	537				0	1196	450	380	778	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2				0	2	2	2	2	0
Cap, veh/h	958	0	439				0	1567	699	283	2278	0
Arrive On Green	0.28	0.00	0.28				0.00	0.44	0.44	0.16	0.64	0.00
Sat Flow, veh/h	3456	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	1111	0	537				0	1196	450	380	778	0
Grp Sat Flow(s),veh/h/ln	1728	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	30.5	0.0	30.5				0.0	31.2	24.4	17.5	11.1	0.0
Cycle Q Clear(g_c), s	30.5	0.0	30.5				0.0	31.2	24.4	17.5	11.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	958	0	439				0	1567	699	283	2278	0
V/C Ratio(X)	1.16	0.00	1.22				0.00	0.76	0.64	1.34	0.34	0.00
Avail Cap(c_a), veh/h	958	0	439				0	1567	699	283	2278	0
HCM Platoon Ratio	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.8	0.0	39.8				0.0	25.9	24.0	46.3	9.1	0.0
Incr Delay (d2), s/veh	83.5	0.0	118.8				0.0	3.6	4.5	175.3	0.4	0.0
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	23.8	0.0	26.2				0.0	13.6	9.8	21.5	4.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	123.3	0.0	158.5				0.0	29.5	28.5	221.5	9.5	0.0
LnGrp LOS	F	A	F				A	C	C	F	A	A
Approach Vol, veh/h	1648						1646			1158		
Approach Delay, s/veh	134.8						29.2			79.1		
Approach LOS	F						C			E		
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	22.0	53.0		35.0		75.0						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	17.5	48.5		30.5		70.5						
Max Q Clear Time (g_c+I1), s	19.5	33.2		32.5		13.1						
Green Ext Time (p_c), s	0.0	9.2		0.0		6.7						
Intersection Summary												
HCM 6th Ctrl Delay	81.3											
HCM 6th LOS	F											

HCM 6th TWSC
41: Douglas St & Drive 2

PM Existing plus Zone 2-5

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	29	54	972	916	6
Future Vol, veh/h	3	29	54	972	916	6
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	32	59	1057	996	7

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2175	1000	1003	0	-	0
Stage 1	1000	-	-	-	-	-
Stage 2	1175	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	51	295	690	-	-	-
Stage 1	356	-	-	-	-	-
Stage 2	293	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	47	295	690	-	-	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	325	-	-	-	-	-
Stage 2	293	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	690	-	274	-	-
HCM Lane V/C Ratio	0.085	-	0.127	-	-
HCM Control Delay (s)	10.7	-	20	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.4	-	-

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	17	17	1	10	32	933	10	2	888	11
Future Vol, veh/h	5	1	17	17	1	10	32	933	10	2	888	11
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	-	-	-	-	-	-	200	-	-	200	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	18	18	1	11	35	1014	11	2	965	12
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2071	2070	971	2075	2071	1020	977	0	0	1025	0	0
Stage 1	975	975	-	1090	1090	-	-	-	-	-	-	-
Stage 2	1096	1095	-	985	981	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	40	54	307	39	54	287	706	-	-	677	-	-
Stage 1	303	330	-	261	291	-	-	-	-	-	-	-
Stage 2	259	290	-	299	328	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	51	307	35	51	287	706	-	-	677	-	-
Mov Cap-2 Maneuver	135	160	-	128	153	-	-	-	-	-	-	-
Stage 1	288	329	-	248	276	-	-	-	-	-	-	-
Stage 2	236	276	-	279	327	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	22.3		32.5		0.3		0					
HCM LOS	C		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	706	-	-	233	161	677	-	-				
HCM Lane V/C Ratio	0.049	-	-	0.107	0.189	0.003	-	-				
HCM Control Delay (s)	10.4	-	-	22.3	32.5	10.3	-	-				
HCM Lane LOS	B	-	-	C	D	B	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0.7	0	-	-				

Queues

48: Drive 6 & Colbern Rd

PM Existing plus Zone 2-5

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1255	49	684	873	416	690
v/c Ratio	0.83	0.07	0.79	0.36	0.55	0.51
Control Delay	29.6	5.0	29.9	6.6	37.2	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	5.0	29.9	6.6	37.2	18.2
Queue Length 50th (ft)	351	0	150	99	124	160
Queue Length 95th (ft)	441	20	215	128	174	218
Internal Link Dist (ft)	860			678	770	
Turn Bay Length (ft)		250	350			250
Base Capacity (vph)	1692	782	944	2681	756	1414
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	0.74	0.06	0.72	0.33	0.55	0.49
Intersection Summary						

HCM 6th Signalized Intersection Summary 48: Drive 6 & Colbern Rd

PM Existing plus Zone 2-5

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖↗	↑↑	↖↗	↖↗
Traffic Volume (veh/h)	1155	45	629	803	383	635
Future Volume (veh/h)	1155	45	629	803	383	635
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1255	49	684	873	416	690
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1552	692	818	2299	848	1121
Arrive On Green	0.44	0.44	0.16	0.65	0.25	0.25
Sat Flow, veh/h	3647	1585	3456	3647	3456	2790
Grp Volume(v), veh/h	1255	49	684	873	416	690
Grp Sat Flow(s),veh/h/ln	1777	1585	1728	1777	1728	1395
Q Serve(g_s), s	25.7	1.5	9.0	9.6	8.6	16.4
Cycle Q Clear(g_c), s	25.7	1.5	9.0	9.6	8.6	16.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1552	692	818	2299	848	1121
V/C Ratio(X)	0.81	0.07	0.84	0.38	0.49	0.62
Avail Cap(c_a), veh/h	1893	844	1168	2999	848	1121
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.5	13.7	17.0	6.9	27.0	19.9
Incr Delay (d2), s/veh	2.3	0.0	3.7	0.1	2.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	0.5	3.5	3.1	3.7	5.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.7	13.7	20.8	7.0	29.1	22.4
LnGrp LOS	C	B	C	A	C	C
Approach Vol, veh/h	1304			1557	1106	
Approach Delay, s/veh	22.4			13.1	24.9	
Approach LOS	C			B	C	
Timer - Assigned Phs	2		3	4	8	
Phs Duration (G+Y+Rc), s	25.0		17.6	41.0	58.5	
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	
Max Green Setting (Gmax), s	20.5		21.5	44.5	70.5	
Max Q Clear Time (g_c+I1), s	18.4		11.0	27.7	11.6	
Green Ext Time (p_c), s	1.1		2.0	8.8	7.8	
Intersection Summary						
HCM 6th Ctrl Delay			19.4			
HCM 6th LOS			B			

Intersection

Int Delay, s/veh 2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑		↑
Traffic Vol, veh/h	1002	216	160	1025	0	197
Future Vol, veh/h	1002	216	160	1025	0	197
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1089	235	174	1114	0	214

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1324
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	518
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	518
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	18.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	482	-	-	518	-
HCM Lane V/C Ratio	0.444	-	-	0.336	-
HCM Control Delay (s)	18.3	-	-	15.4	-
HCM Lane LOS	C	-	-	C	-
HCM 95th %tile Q(veh)	2.2	-	-	1.5	-

HCM 6th TWSC
52: Drive 8 & Colbern Rd

PM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘	↑↑		↗
Traffic Vol, veh/h	1143	174	69	956	0	75
Future Vol, veh/h	1143	174	69	956	0	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1242	189	75	1039	0	82
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1431	0	-	621
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	471	-	0	430
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	471	-	-	430
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.9		15.3	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	430	-	-	471	-	
HCM Lane V/C Ratio	0.19	-	-	0.159	-	
HCM Control Delay (s)	15.3	-	-	14.1	-	
HCM Lane LOS	C	-	-	B	-	
HCM 95th %tile Q(veh)	0.7	-	-	0.6	-	

HCM 6th TWSC
54: Main St & Drive 9

PM Existing plus Zone 2-5

Intersection

Int Delay, s/veh 2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	60	177	0	21	102
Future Vol, veh/h	0	60	177	0	21	102
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, %	2	2	2	2	2	2
Mvmt Flow	0	65	192	0	23	111

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	349	192	0
Stage 1	192	-	-
Stage 2	157	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	648	850	-
Stage 1	841	-	-
Stage 2	871	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	636	850	-
Mov Cap-2 Maneuver	636	-	-
Stage 1	841	-	-
Stage 2	855	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	850	1381
HCM Lane V/C Ratio	-	-	0.077	0.017
HCM Control Delay (s)	-	-	9.6	7.7
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1

HCM 6th TWSC
40: Douglas St & Drive 3

PM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	84	127	986	887	58
Future Vol, veh/h	40	84	127	986	887	58
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	0	150	-	-	250
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	91	138	1072	964	63
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2312	964	1027	0	-	0
Stage 1	964	-	-	-	-	-
Stage 2	1348	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 42	310	676	-	-	-
Stage 1	370	-	-	-	-	-
Stage 2	242	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 33	310	676	-	-	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	295	-	-	-	-	-
Stage 2	242	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	28.5	1.3		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	676	-	136	310	-	-
HCM Lane V/C Ratio	0.204	-	0.32	0.295	-	-
HCM Control Delay (s)	11.7	-	43.4	21.4	-	-
HCM Lane LOS	B	-	E	C	-	-
HCM 95th %tile Q(veh)	0.8	-	1.3	1.2	-	-
Notes						
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

HCM 6th TWSC
56: Main St & Drive 10

PM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	38	139	14	0	102
Future Vol, veh/h	15	38	139	14	0	102
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, %	2	2	2	2	2	2
Mvmt Flow	16	41	151	15	0	111
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	270	159	0	0	166	0
Stage 1	159	-	-	-	-	-
Stage 2	111	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	719	886	-	-	1412	-
Stage 1	870	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	719	886	-	-	1412	-
Mov Cap-2 Maneuver	719	-	-	-	-	-
Stage 1	870	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.7	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	831	1412	-	
HCM Lane V/C Ratio	-	-	0.069	-	-	
HCM Control Delay (s)	-	-	9.7	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

HCM 6th TWSC
59: Lee's Summit Rd & Drive 12

PM Existing plus Zone 2-5

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	27	50	814	793	17
Future Vol, veh/h	14	27	50	814	793	17
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	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	29	54	885	862	18
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1864	871	880	0	-	0
Stage 1	871	-	-	-	-	-
Stage 2	993	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	80	350	768	-	-	-
Stage 1	410	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	74	350	768	-	-	-
Mov Cap-2 Maneuver	202	-	-	-	-	-
Stage 1	381	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	20.3	0.6		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	768	-	280	-	-	
HCM Lane V/C Ratio	0.071	-	0.159	-	-	
HCM Control Delay (s)	10	-	20.3	-	-	
HCM Lane LOS	B	-	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	

HCM 6th TWSC
60: Lee's Summit Rd & Drive 11

PM Existing plus Zone 2-5

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	88	91	857	812	8
Future Vol, veh/h	7	88	91	857	812	8
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	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	96	99	932	883	9

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2018	888	892
Stage 1	888	-	-
Stage 2	1130	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	64	343	760
Stage 1	402	-	-
Stage 2	308	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	56	343	760
Mov Cap-2 Maneuver	175	-	-
Stage 1	350	-	-
Stage 2	308	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.5	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	760	-	320	-	-
HCM Lane V/C Ratio	0.13	-	0.323	-	-
HCM Control Delay (s)	10.4	-	21.5	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.4	-	1.4	-	-

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern AM Existing (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	68	3.0	68	3.0	0.080	4.3	LOS A	0.3	7.3	0.39	0.28	0.39	31.5
8	T1	All MCs	12	3.0	12	3.0	0.080	4.3	LOS A	0.3	7.3	0.39	0.28	0.39	32.1
18	R2	All MCs	28	3.0	28	3.0	0.030	4.1	LOS A	0.1	2.7	0.40	0.27	0.40	33.9
Approach			109	3.0	109	3.0	0.080	4.2	LOS A	0.3	7.3	0.39	0.27	0.39	32.1
East: Colbern Rd															
1	L2	All MCs	59	3.0	59	3.0	0.215	4.8	LOS A	1.0	24.5	0.24	0.10	0.24	32.8
6	T1	All MCs	453	3.0	453	3.0	0.215	4.7	LOS A	1.0	24.5	0.23	0.10	0.23	33.8
16	R2	All MCs	21	3.0	21	3.0	0.215	4.6	LOS A	0.9	23.8	0.22	0.09	0.22	33.8
Approach			533	3.0	533	3.0	0.215	4.7	LOS A	1.0	24.5	0.23	0.10	0.23	33.7
North: Unity Way															
7	L2	All MCs	5	3.0	5	3.0	0.012	4.6	LOS A	0.0	1.0	0.48	0.35	0.48	32.0
4	T1	All MCs	1	3.0	1	3.0	0.012	4.6	LOS A	0.0	1.0	0.48	0.35	0.48	32.6
14	R2	All MCs	3	3.0	3	3.0	0.012	4.6	LOS A	0.0	1.0	0.48	0.35	0.48	32.4
Approach			10	3.0	10	3.0	0.012	4.6	LOS A	0.0	1.0	0.48	0.35	0.48	32.2
West: Colbern Rd															
5	L2	All MCs	10	3.0	10	3.0	0.199	4.5	LOS A	0.9	22.4	0.19	0.07	0.19	33.4
2	T1	All MCs	328	3.0	328	3.0	0.199	4.5	LOS A	0.9	22.4	0.19	0.07	0.19	34.1
12	R2	All MCs	165	3.0	165	3.0	0.199	4.4	LOS A	0.8	21.7	0.18	0.07	0.18	33.9
Approach			503	3.0	503	3.0	0.199	4.4	LOS A	0.9	22.4	0.19	0.07	0.19	34.0
All Vehicles			1154	3.0	1154	3.0	0.215	4.5	LOS A	1.0	24.5	0.23	0.11	0.23	33.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern PM Existing (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back [Veh.	Of Queue Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	164	3.0	164	3.0	0.225	7.3	LOS A	0.8	21.1	0.57	0.50	0.57	30.0
8	T1	All MCs	5	3.0	5	3.0	0.225	7.3	LOS A	0.8	21.1	0.57	0.50	0.57	30.6
18	R2	All MCs	102	3.0	102	3.0	0.148	6.9	LOS A	0.5	13.5	0.57	0.50	0.57	32.6
Approach			272	3.0	272	3.0	0.225	7.1	LOS A	0.8	21.1	0.57	0.50	0.57	30.9
East: Colbern Rd															
1	L2	All MCs	38	3.0	38	3.0	0.194	5.0	LOS A	0.8	20.9	0.33	0.19	0.33	32.8
6	T1	All MCs	396	3.0	396	3.0	0.194	4.9	LOS A	0.8	20.9	0.32	0.18	0.32	33.8
16	R2	All MCs	7	3.0	7	3.0	0.194	4.8	LOS A	0.8	20.4	0.32	0.18	0.32	33.7
Approach			440	3.0	440	3.0	0.194	4.9	LOS A	0.8	20.9	0.33	0.18	0.33	33.7
North: Unity Way															
7	L2	All MCs	45	3.0	45	3.0	0.099	5.5	LOS A	0.3	8.6	0.51	0.43	0.51	31.6
4	T1	All MCs	21	3.0	21	3.0	0.099	5.5	LOS A	0.3	8.6	0.51	0.43	0.51	32.2
14	R2	All MCs	13	3.0	13	3.0	0.099	5.5	LOS A	0.3	8.6	0.51	0.43	0.51	32.0
Approach			78	3.0	78	3.0	0.099	5.5	LOS A	0.3	8.6	0.51	0.43	0.51	31.8
West: Colbern Rd															
5	L2	All MCs	12	3.0	12	3.0	0.306	5.8	LOS A	1.5	38.6	0.28	0.13	0.28	32.8
2	T1	All MCs	598	3.0	598	3.0	0.306	5.7	LOS A	1.5	38.6	0.28	0.13	0.28	33.5
12	R2	All MCs	138	3.0	138	3.0	0.306	5.6	LOS A	1.5	37.6	0.27	0.12	0.27	33.3
Approach			748	3.0	748	3.0	0.306	5.7	LOS A	1.5	38.6	0.27	0.12	0.27	33.4
All Vehicles			1538	3.0	1538	3.0	0.306	5.7	LOS A	1.5	38.6	0.35	0.22	0.35	32.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern AM Zone 2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	68	3.0	68	3.0	0.083	4.4	LOS A	0.3	7.5	0.41	0.30	0.41	31.4
8	T1	All MCs	12	3.0	12	3.0	0.083	4.4	LOS A	0.3	7.5	0.41	0.30	0.41	32.0
18	R2	All MCs	35	3.0	35	3.0	0.038	4.3	LOS A	0.1	3.5	0.42	0.30	0.42	33.8
Approach			115	3.0	115	3.0	0.083	4.4	LOS A	0.3	7.5	0.41	0.30	0.41	32.2
East: Colbern Rd															
1	L2	All MCs	63	3.0	63	3.0	0.226	4.9	LOS A	1.0	26.0	0.24	0.10	0.24	32.7
6	T1	All MCs	475	3.0	475	3.0	0.226	4.8	LOS A	1.0	26.0	0.23	0.10	0.23	33.7
16	R2	All MCs	21	3.0	21	3.0	0.226	4.7	LOS A	1.0	25.3	0.23	0.10	0.23	33.7
Approach			559	3.0	559	3.0	0.226	4.8	LOS A	1.0	26.0	0.23	0.10	0.23	33.6
North: Unity Way															
7	L2	All MCs	5	3.0	5	3.0	0.012	4.7	LOS A	0.0	1.0	0.49	0.36	0.49	32.0
4	T1	All MCs	1	3.0	1	3.0	0.012	4.7	LOS A	0.0	1.0	0.49	0.36	0.49	32.6
14	R2	All MCs	3	3.0	3	3.0	0.012	4.7	LOS A	0.0	1.0	0.49	0.36	0.49	32.4
Approach			10	3.0	10	3.0	0.012	4.7	LOS A	0.0	1.0	0.49	0.36	0.49	32.2
West: Colbern Rd															
5	L2	All MCs	10	3.0	10	3.0	0.213	4.7	LOS A	1.0	24.4	0.20	0.08	0.20	33.3
2	T1	All MCs	363	3.0	363	3.0	0.213	4.6	LOS A	1.0	24.4	0.20	0.08	0.20	34.0
12	R2	All MCs	165	3.0	165	3.0	0.213	4.5	LOS A	0.9	23.7	0.19	0.07	0.19	33.8
Approach			538	3.0	538	3.0	0.213	4.6	LOS A	1.0	24.4	0.20	0.08	0.20	33.9
All Vehicles			1222	3.0	1222	3.0	0.226	4.7	LOS A	1.0	26.0	0.24	0.11	0.24	33.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern PM Zone 2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back [Veh.	Of Queue Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	164	3.0	164	3.0	0.241	7.9	LOS A	0.9	22.3	0.60	0.54	0.60	29.8
8	T1	All MCs	5	3.0	5	3.0	0.241	7.9	LOS A	0.9	22.3	0.60	0.54	0.60	30.3
18	R2	All MCs	115	3.0	115	3.0	0.180	7.7	LOS A	0.6	16.4	0.60	0.55	0.60	32.2
Approach			285	3.0	285	3.0	0.241	7.8	LOS A	0.9	22.3	0.60	0.54	0.60	30.7
East: Colbern Rd															
1	L2	All MCs	52	3.0	52	3.0	0.235	5.4	LOS A	1.0	26.4	0.35	0.20	0.35	32.5
6	T1	All MCs	474	3.0	474	3.0	0.235	5.3	LOS A	1.0	26.4	0.34	0.19	0.34	33.5
16	R2	All MCs	7	3.0	7	3.0	0.235	5.2	LOS A	1.0	25.7	0.33	0.18	0.33	33.5
Approach			533	3.0	533	3.0	0.235	5.3	LOS A	1.0	26.4	0.34	0.19	0.34	33.4
North: Unity Way															
7	L2	All MCs	45	3.0	45	3.0	0.107	6.1	LOS A	0.4	9.3	0.54	0.48	0.54	31.4
4	T1	All MCs	21	3.0	21	3.0	0.107	6.1	LOS A	0.4	9.3	0.54	0.48	0.54	31.9
14	R2	All MCs	13	3.0	13	3.0	0.107	6.1	LOS A	0.4	9.3	0.54	0.48	0.54	31.7
Approach			78	3.0	78	3.0	0.107	6.1	LOS A	0.4	9.3	0.54	0.48	0.54	31.6
West: Colbern Rd															
5	L2	All MCs	12	3.0	12	3.0	0.340	6.2	LOS A	1.7	44.5	0.32	0.15	0.32	32.6
2	T1	All MCs	671	3.0	671	3.0	0.340	6.1	LOS A	1.7	44.5	0.31	0.15	0.31	33.3
12	R2	All MCs	138	3.0	138	3.0	0.340	6.0	LOS A	1.7	43.4	0.30	0.14	0.30	33.1
Approach			821	3.0	821	3.0	0.340	6.1	LOS A	1.7	44.5	0.31	0.15	0.31	33.2
All Vehicles			1716	3.0	1716	3.0	0.340	6.1	LOS A	1.7	44.5	0.38	0.24	0.38	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern AM Zone 3 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	68	3.0	68	3.0	0.089	4.8	LOS A	0.3	8.0	0.45	0.35	0.45	31.3
8	T1	All MCs	12	3.0	12	3.0	0.089	4.8	LOS A	0.3	8.0	0.45	0.35	0.45	31.8
18	R2	All MCs	50	3.0	50	3.0	0.060	4.9	LOS A	0.2	5.4	0.47	0.37	0.47	33.5
Approach			130	3.0	130	3.0	0.089	4.8	LOS A	0.3	8.0	0.46	0.36	0.46	32.1
East: Colbern Rd															
1	L2	All MCs	77	3.0	77	3.0	0.264	5.3	LOS A	1.2	31.9	0.25	0.11	0.25	32.5
6	T1	All MCs	557	3.0	557	3.0	0.264	5.2	LOS A	1.2	31.9	0.24	0.10	0.24	33.5
16	R2	All MCs	21	3.0	21	3.0	0.264	5.1	LOS A	1.2	31.0	0.24	0.10	0.24	33.6
Approach			654	3.0	654	3.0	0.264	5.2	LOS A	1.2	31.9	0.24	0.10	0.24	33.4
North: Unity Way															
7	L2	All MCs	5	3.0	5	3.0	0.014	5.1	LOS A	0.0	1.1	0.52	0.40	0.52	31.8
4	T1	All MCs	1	3.0	1	3.0	0.014	5.1	LOS A	0.0	1.1	0.52	0.40	0.52	32.4
14	R2	All MCs	3	3.0	3	3.0	0.014	5.1	LOS A	0.0	1.1	0.52	0.40	0.52	32.2
Approach			10	3.0	10	3.0	0.014	5.1	LOS A	0.0	1.1	0.52	0.40	0.52	32.0
West: Colbern Rd															
5	L2	All MCs	10	3.0	10	3.0	0.250	5.1	LOS A	1.2	29.7	0.24	0.10	0.24	33.1
2	T1	All MCs	447	3.0	447	3.0	0.250	5.0	LOS A	1.2	29.7	0.23	0.10	0.23	33.8
12	R2	All MCs	165	3.0	165	3.0	0.250	4.9	LOS A	1.1	28.8	0.22	0.09	0.22	33.6
Approach			622	3.0	622	3.0	0.250	5.0	LOS A	1.2	29.7	0.23	0.10	0.23	33.7
All Vehicles			1416	3.0	1416	3.0	0.264	5.1	LOS A	1.2	31.9	0.26	0.13	0.26	33.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern PM Zone 3 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back [Veh.	Of Queue Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	164	3.0	164	3.0	0.313	11.1	LOS B	1.2	29.6	0.67	0.70	0.78	28.6
8	T1	All MCs	5	3.0	5	3.0	0.313	11.1	LOS B	1.2	29.6	0.67	0.70	0.78	29.1
18	R2	All MCs	164	3.0	164	3.0	0.338	12.8	LOS B	1.3	33.4	0.71	0.75	0.86	30.0
Approach			334	3.0	334	3.0	0.338	11.9	LOS B	1.3	33.4	0.69	0.73	0.82	29.3
East: Colbern Rd															
1	L2	All MCs	103	3.0	103	3.0	0.382	7.1	LOS A	2.0	50.9	0.41	0.23	0.41	31.7
6	T1	All MCs	758	3.0	758	3.0	0.382	6.9	LOS A	2.0	50.9	0.40	0.22	0.40	32.7
16	R2	All MCs	7	3.0	7	3.0	0.382	6.8	LOS A	1.9	49.7	0.39	0.22	0.39	32.7
Approach			867	3.0	867	3.0	0.382	6.9	LOS A	2.0	50.9	0.40	0.23	0.40	32.6
North: Unity Way															
7	L2	All MCs	45	3.0	45	3.0	0.148	8.7	LOS A	0.5	12.0	0.63	0.63	0.63	30.3
4	T1	All MCs	21	3.0	21	3.0	0.148	8.7	LOS A	0.5	12.0	0.63	0.63	0.63	30.8
14	R2	All MCs	13	3.0	13	3.0	0.148	8.7	LOS A	0.5	12.0	0.63	0.63	0.63	30.6
Approach			78	3.0	78	3.0	0.148	8.7	LOS A	0.5	12.0	0.63	0.63	0.63	30.5
West: Colbern Rd															
5	L2	All MCs	12	3.0	12	3.0	0.477	8.4	LOS A	2.8	72.6	0.45	0.25	0.45	31.6
2	T1	All MCs	946	3.0	946	3.0	0.477	8.2	LOS A	2.8	72.6	0.44	0.24	0.44	32.3
12	R2	All MCs	138	3.0	138	3.0	0.477	8.0	LOS A	2.8	71.1	0.43	0.23	0.43	32.1
Approach			1096	3.0	1096	3.0	0.477	8.2	LOS A	2.8	72.6	0.44	0.24	0.44	32.3
All Vehicles			2375	3.0	2375	3.0	0.477	8.3	LOS A	2.8	72.6	0.47	0.32	0.49	31.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern AM Zone 4 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back [Veh.	Of Queue Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph	
South: Blue Parkway																
3	L2	All MCs	68	3.0	68	3.0	0.095	5.2	LOS A	0.3	8.4	0.48	0.39	0.48	31.1	
8	T1	All MCs	12	3.0	12	3.0	0.095	5.2	LOS A	0.3	8.4	0.48	0.39	0.48	31.7	
18	R2	All MCs	62	3.0	62	3.0	0.079	5.4	LOS A	0.3	7.1	0.50	0.41	0.50	33.3	
Approach			142	3.0	142	3.0	0.095	5.3	LOS A	0.3	8.4	0.49	0.40	0.49	32.1	
East: Colbern Rd																
1	L2	All MCs	85	3.0	85	3.0	0.284	5.5	LOS A	1.4	35.1	0.26	0.11	0.26	32.4	
6	T1	All MCs	598	3.0	598	3.0	0.284	5.4	LOS A	1.4	35.1	0.25	0.11	0.25	33.4	
16	R2	All MCs	21	3.0	21	3.0	0.284	5.3	LOS A	1.3	34.2	0.24	0.10	0.24	33.5	
Approach			703	3.0	703	3.0	0.284	5.4	LOS A	1.4	35.1	0.25	0.11	0.25	33.3	
North: Unity Way																
7	L2	All MCs	5	3.0	5	3.0	0.014	5.4	LOS A	0.0	1.2	0.53	0.43	0.53	31.7	
4	T1	All MCs	1	3.0	1	3.0	0.014	5.4	LOS A	0.0	1.2	0.53	0.43	0.53	32.3	
14	R2	All MCs	3	3.0	3	3.0	0.014	5.4	LOS A	0.0	1.2	0.53	0.43	0.53	32.1	
Approach			10	3.0	10	3.0	0.014	5.4	LOS A	0.0	1.2	0.53	0.43	0.53	31.9	
West: Colbern Rd																
5	L2	All MCs	10	3.0	10	3.0	0.278	5.4	LOS A	1.3	34.1	0.26	0.11	0.26	33.0	
2	T1	All MCs	513	3.0	513	3.0	0.278	5.4	LOS A	1.3	34.1	0.25	0.11	0.25	33.7	
12	R2	All MCs	165	3.0	165	3.0	0.278	5.2	LOS A	1.3	33.2	0.24	0.10	0.24	33.4	
Approach			688	3.0	688	3.0	0.278	5.3	LOS A	1.3	34.1	0.25	0.11	0.25	33.6	
All Vehicles			1543	3.0	1543	3.0	0.284	5.3	LOS A	1.4	35.1	0.27	0.14	0.27	33.3	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern PM Zone 4 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back [Veh.	Of Queue Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	164	3.0	164	3.0	0.432	18.0	LOS C	1.7	43.5	0.79	0.87	1.07	26.4
8	T1	All MCs	5	3.0	5	3.0	0.432	18.0	LOS C	1.7	43.5	0.79	0.87	1.07	26.8
18	R2	All MCs	202	3.0	202	3.0	0.456	16.9	LOS C	1.8	47.0	0.78	0.86	1.08	28.4
Approach			372	3.0	372	3.0	0.456	17.4	LOS C	1.8	47.0	0.78	0.87	1.08	27.4
East: Colbern Rd															
1	L2	All MCs	145	3.0	145	3.0	0.502	8.9	LOS A	3.1	78.3	0.48	0.27	0.48	30.9
6	T1	All MCs	987	3.0	987	3.0	0.502	8.7	LOS A	3.1	78.3	0.47	0.26	0.47	31.9
16	R2	All MCs	7	3.0	7	3.0	0.502	8.5	LOS A	3.0	76.8	0.46	0.26	0.46	32.0
Approach			1138	3.0	1138	3.0	0.502	8.7	LOS A	3.1	78.3	0.47	0.26	0.47	31.8
North: Unity Way															
7	L2	All MCs	45	3.0	45	3.0	0.191	11.8	LOS B	0.6	14.8	0.72	0.72	0.72	29.1
4	T1	All MCs	21	3.0	21	3.0	0.191	11.8	LOS B	0.6	14.8	0.72	0.72	0.72	29.6
14	R2	All MCs	13	3.0	13	3.0	0.191	11.8	LOS B	0.6	14.8	0.72	0.72	0.72	29.4
Approach			78	3.0	78	3.0	0.191	11.8	LOS B	0.6	14.8	0.72	0.72	0.72	29.3
West: Colbern Rd															
5	L2	All MCs	12	3.0	12	3.0	0.592	10.8	LOS B	4.9	124.9	0.59	0.39	0.66	30.6
2	T1	All MCs	1157	3.0	1157	3.0	0.592	10.6	LOS B	4.9	124.9	0.58	0.37	0.64	31.3
12	R2	All MCs	138	3.0	138	3.0	0.592	10.4	LOS B	4.5	115.9	0.56	0.35	0.61	31.1
Approach			1307	3.0	1307	3.0	0.592	10.6	LOS B	4.9	124.9	0.57	0.37	0.63	31.2
All Vehicles			2895	3.0	2895	3.0	0.592	10.8	LOS B	4.9	124.9	0.57	0.40	0.63	30.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern AM Zone 5 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	68	3.0	68	3.0	0.097	5.3	LOS A	0.3	8.6	0.49	0.41	0.49	31.1
8	T1	All MCs	12	3.0	12	3.0	0.097	5.3	LOS A	0.3	8.6	0.49	0.41	0.49	31.6
18	R2	All MCs	67	3.0	67	3.0	0.089	5.6	LOS A	0.3	8.0	0.51	0.43	0.51	33.2
Approach			148	3.0	148	3.0	0.097	5.5	LOS A	0.3	8.6	0.50	0.42	0.50	32.0
East: Colbern Rd															
1	L2	All MCs	92	3.0	92	3.0	0.304	5.7	LOS A	1.5	38.5	0.26	0.11	0.26	32.3
6	T1	All MCs	639	3.0	639	3.0	0.304	5.6	LOS A	1.5	38.5	0.25	0.11	0.25	33.3
16	R2	All MCs	21	3.0	21	3.0	0.304	5.5	LOS A	1.5	37.5	0.25	0.11	0.25	33.4
Approach			752	3.0	752	3.0	0.304	5.6	LOS A	1.5	38.5	0.26	0.11	0.26	33.2
North: Unity Way															
7	L2	All MCs	5	3.0	5	3.0	0.015	5.6	LOS A	0.0	1.2	0.54	0.45	0.54	31.6
4	T1	All MCs	1	3.0	1	3.0	0.015	5.6	LOS A	0.0	1.2	0.54	0.45	0.54	32.2
14	R2	All MCs	3	3.0	3	3.0	0.015	5.6	LOS A	0.0	1.2	0.54	0.45	0.54	32.0
Approach			10	3.0	10	3.0	0.015	5.6	LOS A	0.0	1.2	0.54	0.45	0.54	31.8
West: Colbern Rd															
5	L2	All MCs	10	3.0	10	3.0	0.291	5.6	LOS A	1.4	36.2	0.27	0.12	0.27	32.9
2	T1	All MCs	540	3.0	540	3.0	0.291	5.5	LOS A	1.4	36.2	0.27	0.12	0.27	33.6
12	R2	All MCs	165	3.0	165	3.0	0.291	5.4	LOS A	1.4	35.2	0.26	0.11	0.26	33.4
Approach			715	3.0	715	3.0	0.291	5.5	LOS A	1.4	36.2	0.26	0.12	0.26	33.5
All Vehicles			1625	3.0	1625	3.0	0.304	5.5	LOS A	1.5	38.5	0.28	0.14	0.28	33.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

MOVEMENT SUMMARY

 Site: 101 [Blue Parkway & Colbern PM Zone 5 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand [Total	Flows HV]	Arrival [Total	Flows HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: Blue Parkway															
3	L2	All MCs	164	3.0	164	3.0	0.455	19.6	LOS C	1.8	45.7	0.81	0.89	1.11	26.0
8	T1	All MCs	5	3.0	5	3.0	0.455	19.6	LOS C	1.8	45.7	0.81	0.89	1.11	26.3
18	R2	All MCs	211	3.0	211	3.0	0.499	19.1	LOS C	2.0	52.4	0.80	0.90	1.16	27.6
Approach			380	3.0	380	3.0	0.499	19.3	LOS C	2.0	52.4	0.80	0.90	1.14	26.8
East: Colbern Rd															
1	L2	All MCs	152	3.0	152	3.0	0.523	9.2	LOS A	3.3	84.4	0.50	0.28	0.50	30.7
6	T1	All MCs	1028	3.0	1028	3.0	0.523	9.0	LOS A	3.3	84.4	0.49	0.27	0.49	31.7
16	R2	All MCs	7	3.0	7	3.0	0.523	8.9	LOS A	3.2	82.8	0.48	0.27	0.48	31.8
Approach			1187	3.0	1187	3.0	0.523	9.0	LOS A	3.3	84.4	0.49	0.27	0.49	31.6
North: Unity Way															
7	L2	All MCs	45	3.0	45	3.0	0.201	12.5	LOS B	0.6	15.4	0.74	0.74	0.74	28.9
4	T1	All MCs	21	3.0	21	3.0	0.201	12.5	LOS B	0.6	15.4	0.74	0.74	0.74	29.3
14	R2	All MCs	13	3.0	13	3.0	0.201	12.5	LOS B	0.6	15.4	0.74	0.74	0.74	29.2
Approach			78	3.0	78	3.0	0.201	12.5	LOS B	0.6	15.4	0.74	0.74	0.74	29.0
West: Colbern Rd															
5	L2	All MCs	12	3.0	12	3.0	0.619	11.6	LOS B	6.1	157.0	0.62	0.45	0.77	30.3
2	T1	All MCs	1207	3.0	1207	3.0	0.619	11.3	LOS B	6.1	157.0	0.61	0.44	0.75	31.0
12	R2	All MCs	138	3.0	138	3.0	0.619	11.1	LOS B	5.8	149.7	0.60	0.42	0.72	30.8
Approach			1357	3.0	1357	3.0	0.619	11.3	LOS B	6.1	157.0	0.61	0.44	0.75	31.0
All Vehicles			3002	3.0	3002	3.0	0.619	11.5	LOS B	6.1	157.0	0.59	0.44	0.69	30.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).