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Engineering Innovative Solutions

TO: Calvert County Office of Planning & Zoning

FROM: Jamie Kendrick, Project Manager
James Bunch, Senior Transportation Planner for Travel Demand Forecasting

SUBJECT: Travel Demand Forecast for Calvert County Transportation Plan

DATE: July 8, 2019

Executive Summary

This memorandum describes the travel forecasting process, assumptions, and outputs for use in developing the Calvert County Transportation Plan. The primary purpose of the travel forecasting process for this project is to establish traffic growth rates to be used in analyzing roadway operations and assess the need for improvements to the road network. The foundation of the Calvert County travel forecast is the most recent Metropolitan Washington Council of Governments (MWCOG) travel forecasting model[1] using a 2017 base year and 2040 horizon year. SAI enhanced the model with additional zone and network details to capture traffic patterns/flows in and around Dunkirk, Prince Frederick, Lusby and Solomons and elsewhere to support the traffic operations analysis at the town center scale.

The adopted land use plan from the Calvert County Comprehensive Plan adopted in 2009 and the land use plan pending before the Board of County Commissioners as of July 1, 2019 were then input into the travel forecasting model to determine traffic volumes from the land use plans using three different rates of population growth. Summary measures relating to Average Annual Weekday Vehicle trips (AAWDT) from, to, and within Calvert County, total vehicle miles travelled, vehicle hours travelled, and volume-to-capacity are presented below.

Using the growth rate forecasted by the Maryland Department of Planning and MWCOG, it is forecast that at the *network level* (that is, all state roadways, and primary and secondary county roadways), sufficient capacity exists to support the projected countywide population in 2020; traffic volume would exceed road capacity on only 8.4 of 360 (2.3%) peak hour directional miles in the morning and on only five miles in the afternoon (1.4%). In these areas, certain intersections may have excess delay that requires mitigation. This will be determined during the traffic operations analysis.

[1] Version 2.3.75, Round 9.1 Cooperative Land Use adopted by the National Capital Region Transportation Planning Board in October 2018.

Part 1: Travel Demand Model Overview & Calvert County Enhancements

The travel demand forecast for this project uses the MWCOG travel model (for 2017 base year, and 2040 horizon. While Calvert and St. Mary's County are technically outside the MWCOG boundaries, since 2016 there has been an agreement with the Calvert-St. Mary's Metropolitan Planning Organization (C-SMMPO) to incorporate the MPOs transportation plans, programs and projects in the MWCOG regional air quality conformity analysis. Consequently, the MWCOG includes both counties in their regional networks and land use forecasts.

The MWCOG model region with Calvert County highlighted is shown in Figure 1. The model region includes the District of Columbia, neighboring parts of Maryland, Virginia, and Jefferson County in West Virginia. The 6,800-square-mile modeled area is divided into 3,722 transportation analysis zones (TAZs). Calvert County contains 46 TAZs.

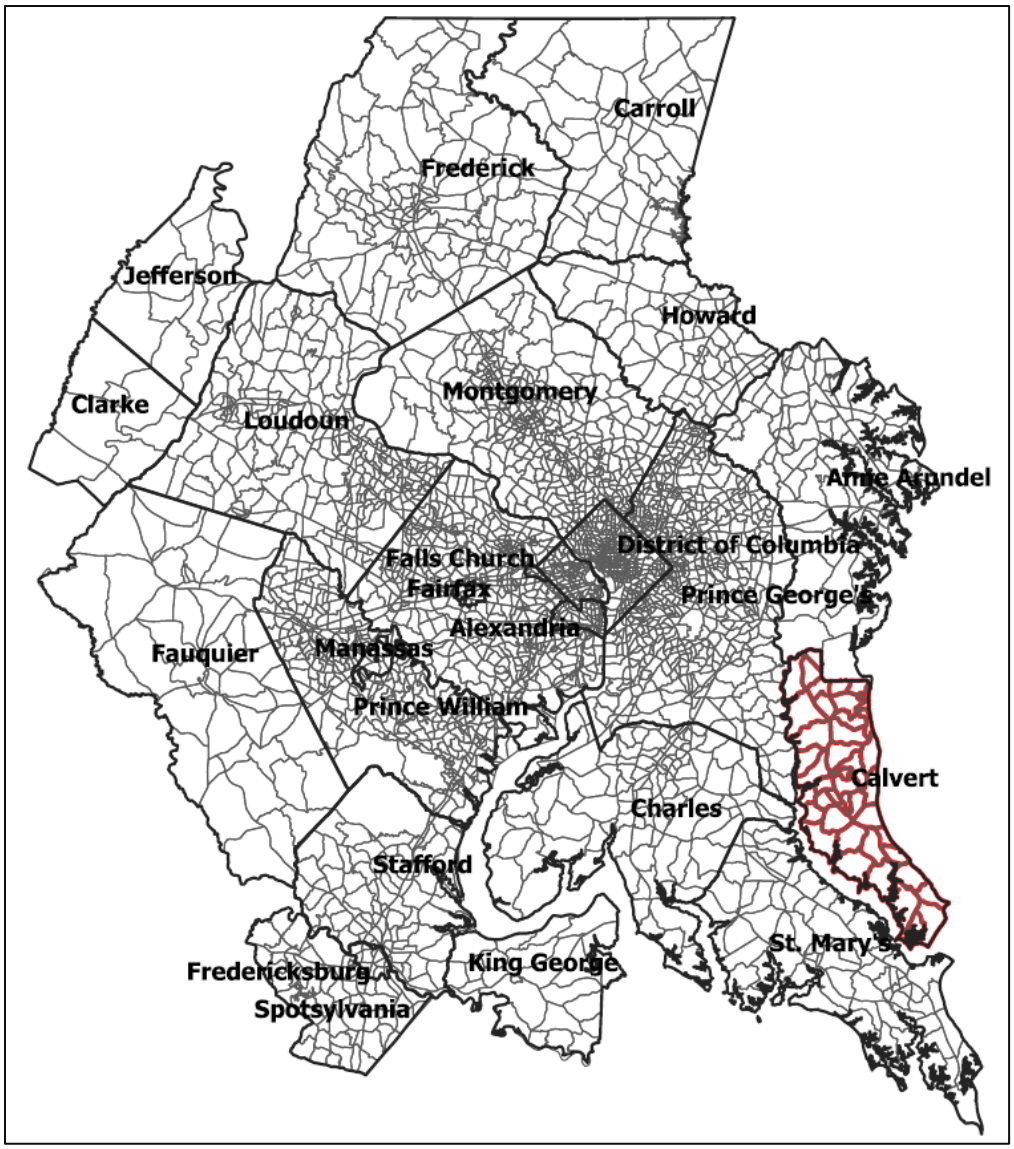

Figure 1. Transportation Analysis Zones in the MWCOG Travel Demand Model

The model is a traditional, trip-based, "four-step" travel demand forecasting model (Trip Generation, Trip Distribution, Mode Split, and Assignment) utilizing four feedback iterations to equilibrate trip distribution with congested travel times and costs. The major steps and feedback loops within the model are shown in Figure 2. Additional features incorporated into the standard process include estimation of motorized and non-motorized trips, time-of-day modeling, and utilization of detailed transit schedules from General Transit Feed Specification (GTFS) data. It was calibrated to the most recent transit ridership and other data in 2012 and validated to the 2010 U.S. Census data in 2013.[2] Highlights important to this Calvert County Forecasts are discussed below.

The last step in the model application process is traffic assignment. A multi-class user-equilibrium (UE) traffic assignment is utilized for each of the four feedback iterations and includes six user classes: single-occupant vehicle (SOV), high-occupant vehicle with two persons (HOV2), high-occupant vehicle with three+ persons (HOV3+), medium and heavy trucks, commercial vehicles, and airport passengers traveling to/from the three major commercial airports serving the region. Additionally, the model includes four time-of-day periods for traffic assignment: AM peak period (6 AM to 9 AM), Midday (9 AM to 3 PM), PM peak period (3 PM to 7 PM) and Overnight (7PM to 6AM).

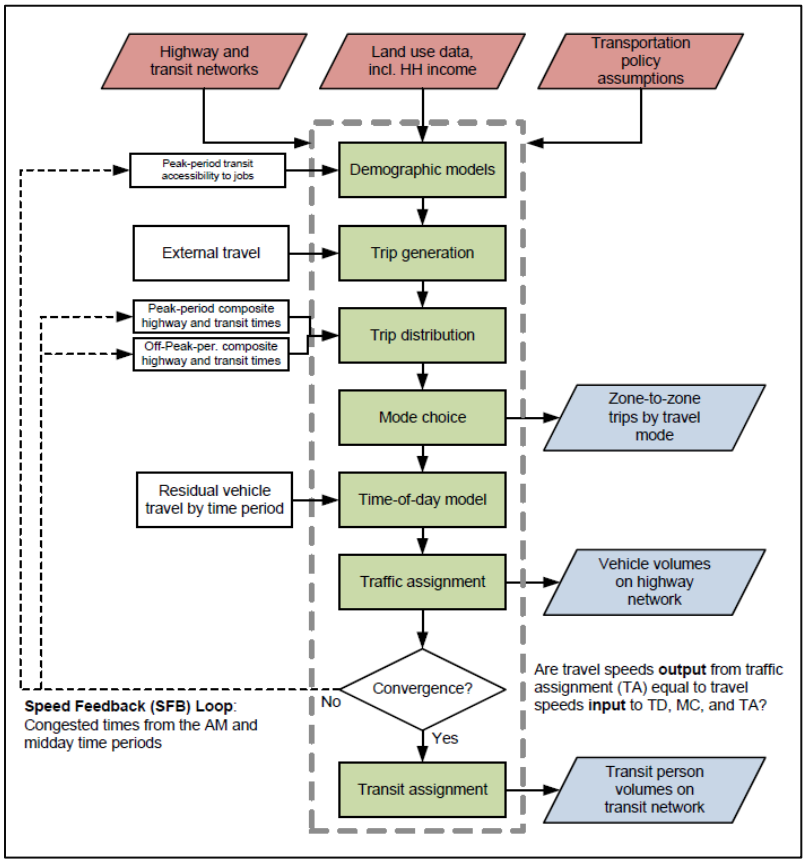

Figure 2. Four-Step Travel Demand Modeling Process

[2] For details on the MWCOG model see http://www.mwcog.org/transportation/activities/models/current.asp.

Subarea Analysis Process

For corridor or small area studies that do not anticipate major changes to the underlying travel patterns, mode-split, or distribution of traffic over different times of day, A post mode choice assignment process can be used since the overall vehicle trips and patterns will not change significantly from scenario to scenario. This process provides for adding details to represent local conditions and better represent/understand the effect of land use changes and the sensitivity of the road network to different rates of growth. As discussed above, the MWCOG model is primarily built to support planning efforts in a dynamic and growing region; Calvert County is in many respects an anomaly in the MWCOG model as growth rates and travel patterns are expected to remain very stable over the next twenty years. Calvert County's unique peninsular geography is also different than any other jurisdiction in the model. Finally, with Calvert and St. Mary's counties being "add-ons" to the regional model and not given as much attention to detail as the core MWCOG jurisdictions, it is even more important to enhance the model at the subarea level to yield valid outputs for the Calvert County Transportation Plan.

Consequently, a post mode choice assignment approach was therefore used for this effort in order to add the desired level of network detail. Post-processing using NCHRP 765 procedures was used in order to prepare the link and turning movement growth factors used for the peak hour operational analyses. This process is shown in Figure 3.

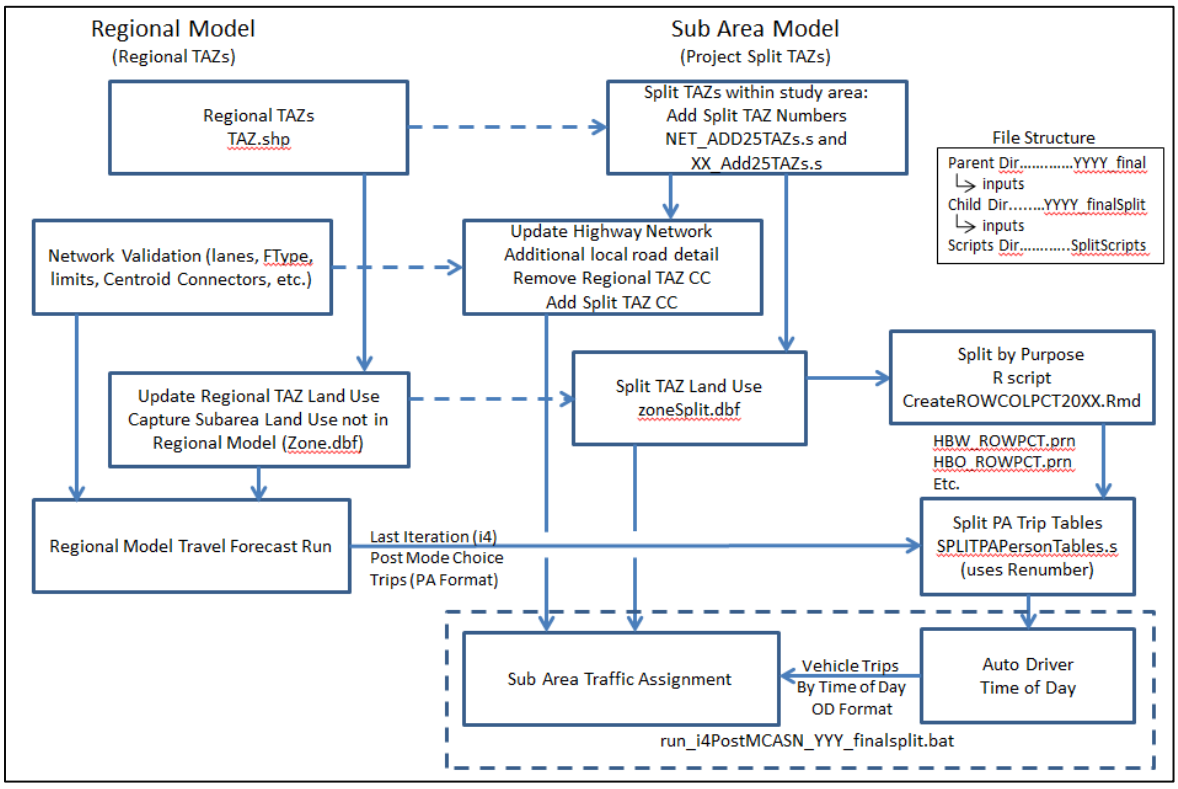

Figure 3. Subarea Assignment Process (MWCOG Base Model)

Revision of Traffic Analysis Zones

TAZs provide the origins and destinations for the travel calculations within the model structure. The core of the post-mode choice assignment approach is to ensure that TAZs reflect the land use patterns of the area that each contains, as land use acts as the basic unit for the number of trips, their purpose and time of day taken. The MWCOG model uses only 46 TAZs for Calvert County which are very large and designed to capture the regionally significant travel between Calvert County and the rest of the region; they are too large to reflect local travel in addition to regionally-oriented trips. For example, the Dunkirk Town Center is covered by only two TAZs which also contain the surrounding rural areas north of Hall Creek and southwest of MD 260. Solomon's and Lusby are represented by three TAZs (3323 – 3325) with all of the area from Chesapeake Ranch Estates to Drum Point being within one TAZ (3324).

To develop a better understanding of location-specific travel conditions and travel patterns, Calvert County was therefore further split into 64 TAZs (red boundaries). Splitting TAZs allows for more variance in population, household, and employment density assumptions. TAZs were split across logical boundaries to distinguish between town centers and rural areas. Figure 4 shows the original MWCOG TAZs and split TAZs developed within Calvert Count for this study.

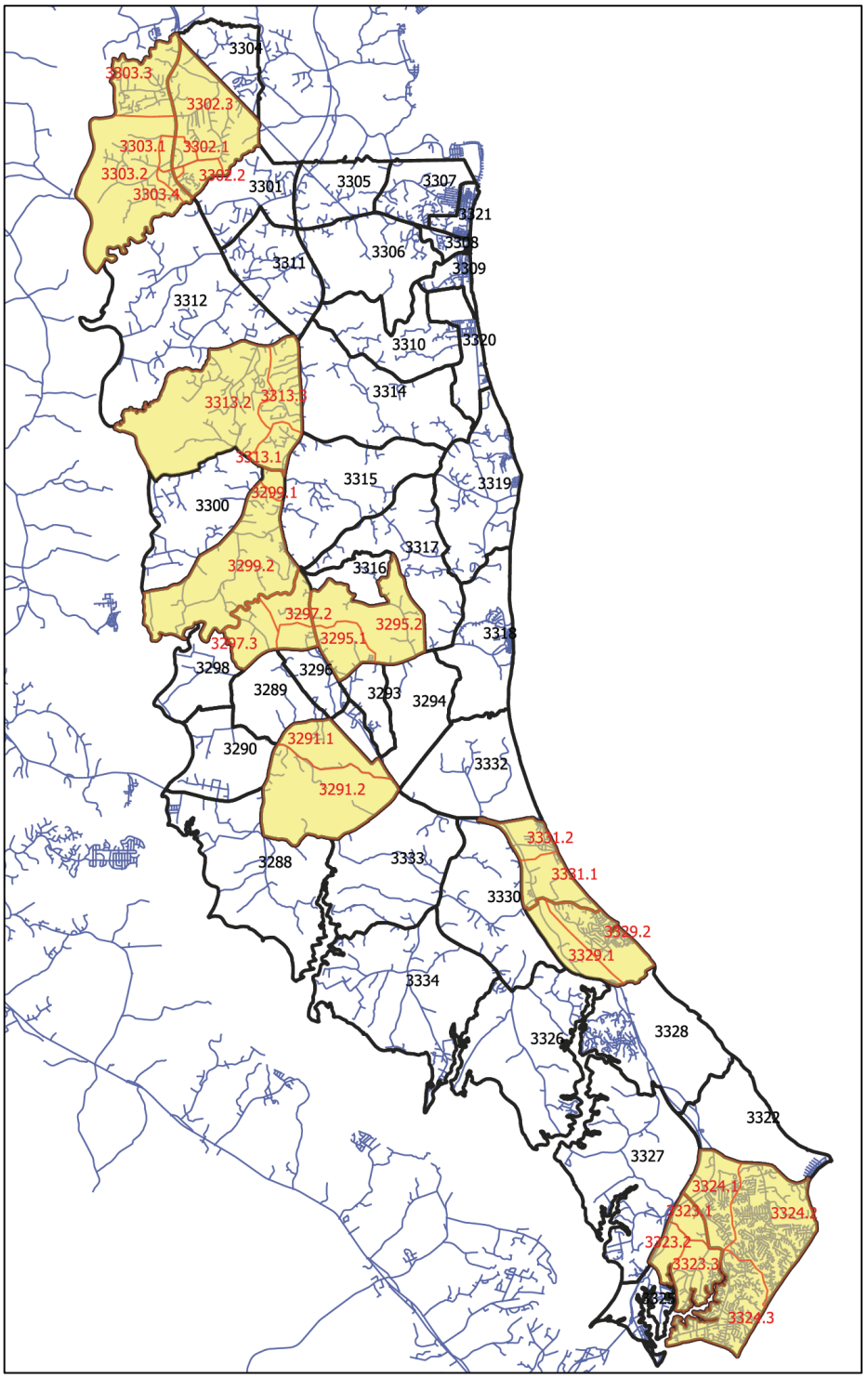

Figure 4. Existing TAZs (black) in MWCOG model with splits for Calvert County (red).

Increased Detail to the Road Network for Calvert County

In addition to refining the TAZs, additional roadway links (and in some cases validation of speed limits, turning lanes and other detail) were added to the travel demand model to first support the more detailed TAZ structure (new zone centroids and centroid connectors), and more relastic network loading in and around the town centers and activity centers. The additional network detail is shown in Figure 5 (and in Appendix 1) and includes:

Dunkirk
- Jewell Rd
- Brickhouse Rd
- Ward Rd
- Dunkirk Way
- Lyons Creek Rd
- Crown Dr
- Ferry Landing Rd
- Ashwood Rd

Brighton Woods/Huntingtown
- Briscoe Town Rd
- Mill Branch Rd
- Huntingtown Rd
- Cox Rd
- MD 524

Prince Frederick
- N. Prince Frederick Blvd
- Dorsey Rd extended
- Armory Rd
- Fariground Rd
- Old Field Ln
- German Chapel Rd

St. Leonard
- Ball Rd
- Long Beach Rd

Solomons/Lusby
- MD 760 to Ship Point
- Olivet Rd extended
- Thunderbird Dr
- Gunsmoke Trail
- Little Cove Point Rd

In addition to the network detail added to the 2017 network, the 2040 horizon-year network includes projects adopted as part of the financially-constrained regional long-range transportation plan and other locally-significant projects which are likely to be operational before the horizon year. The C-SMMPO constrained long-range plan increases the number of lanes across the Governor Thomas Johnson Bridge from 1 to 2 in each direction (total 4 lanes), and increasing the number of lanes on MD 2-4 through Frederick from 2 to 3 in each direction (total 6 lanes) from Stoakley Road to German Chapel Road; the model also assumes that the the unbuilt section of Fox Run Boulevard will be constructed and connect from MD 2-4 to MD 402/Dares Beach Rd.

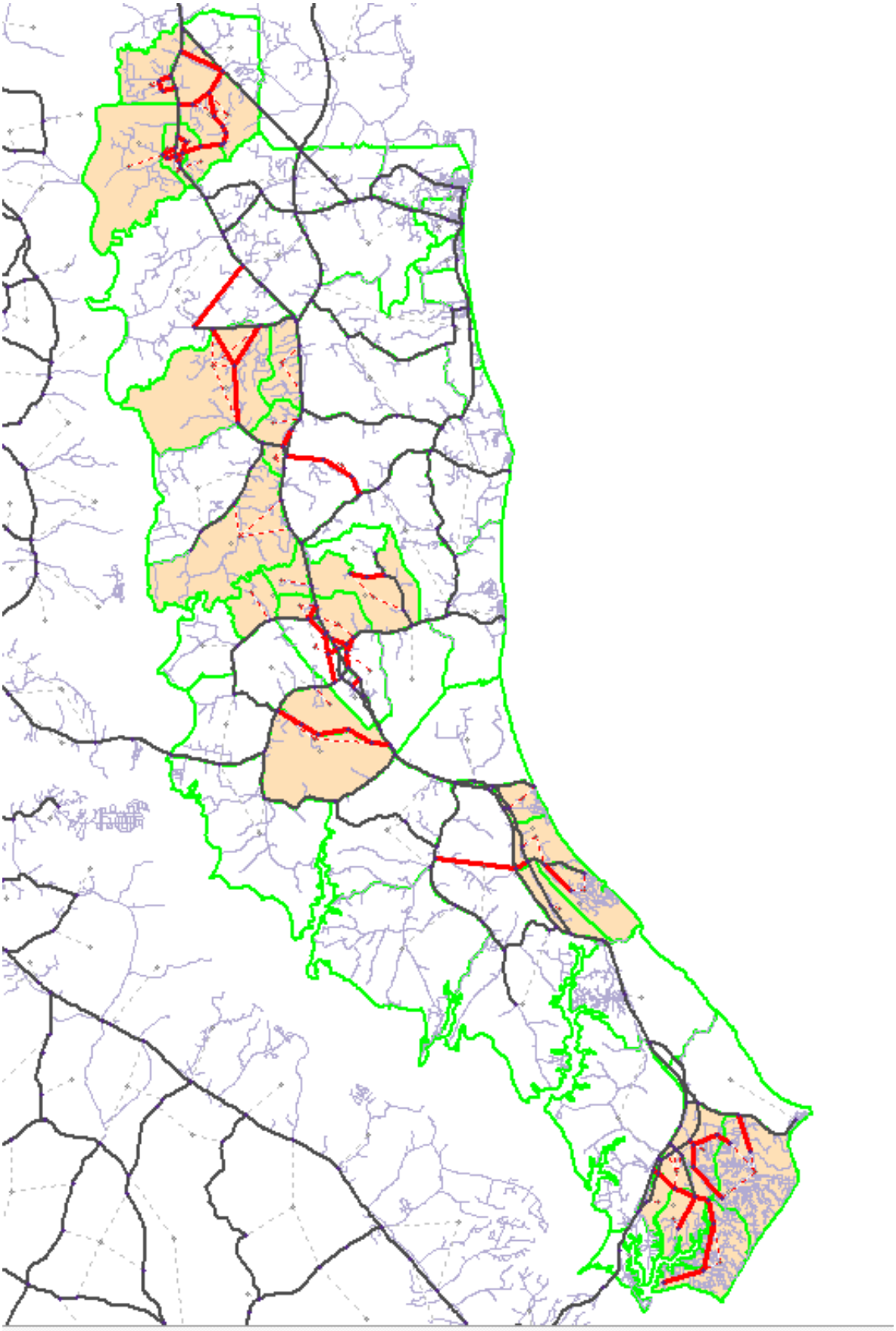

Figure 5. Red lines show the additional roadway links added to the MWCOG model. Additional detail can be found in Appendix

Land Use Plans & Growth Scenarios

The MWCOG Round 9.1 Cooperative Land Use Forecast (CLUF) was the baseline land use scenario for the travel demand forecast. The CLUF was refined by Department of Planning & Zoning to reflect the detailed zoning currently allowed in the town centers, local environmental conditions and growth management programs which constrain the amount of growth that can occur. Census information, detailed parcel data and current zoning were used to relate the CLUF to the split TAZs in order to yield baseline and future population, household and employment.

Using the higher level of land use detail and development capacity as applied to smaller TAZs, population, households and jobs were modeled to a 2040 horizon year using the town center boundaries in the 2019 comprehensive plan update. Population and employment were calculated as a function of households. Population was calculated by assigning 2.85 persons to each non-group household. Employment in Calvert County was calculated by adding the expected jobs relative to new households to the existing conditions total employment. The household to job ratio is fixed at 1:1, with 35% of all new jobs located in Calvert County (per 2018 LODES data). Geographic distribution of population, households and employment in 2040 is shown in Figures 6 – 8, respectively.

Scenario 1: Historical Growth

This scenario uses household growth rate between 2010 and 2017 as reported by the United States Census to project household growth until 2040. Based on these seven years, households can be expected to increase by 12.5% by 2040 to a total population of 101,737. This rate is slightly higher than the forecast by the Maryland Department of Planning which projects 100,450 residents by 2040.[3]

Scenario 2: Aggressive Growth

This scenario projects significantly a 50% growth in households throughout the county through 2040. This growth rate resembles market conditions like the period from the mid-1980s through 2010. During this time period, the county population increased from approximately 34,000 to approximately 88,000 residents.

Scenario 3: Hyper Growth

The scenario projects a maximum build-out by 2040 of all developable residential parcels even when including environmental constraints and growth management programs such as transferable development rates currently in place. A 91.8% household occupancy rate was applied to all buildable residential parcels. This would add approximately 75,000+ residents to Calvert County beyond the population forecast in scenario #1 (historical growth rate).

		2040 Horizon Year		
	2017 Baseline	**Scenario #1: Historical Growth**	**Scenario #2: Aggressive Growth**	**Scenario #3: Hyper Growth**
Households	33,064	35,198	50,642	61,478
Population	93,228	101,737	145,752	176,636
Employment	35,120	35,562	40,784	53,222

Table 1. Baseline and Forecast Household, Population and Employment Data.

[3] See county-by-county population projections at https://planning.maryland.gov/MSDC/Documents/popproj/TotalPopProj.pdf For information regarding MDP's population forecasting process, see https://planning.maryland.gov/MSDC/Documents/popproj/Overview-Population-Projections-Methodology.pdf

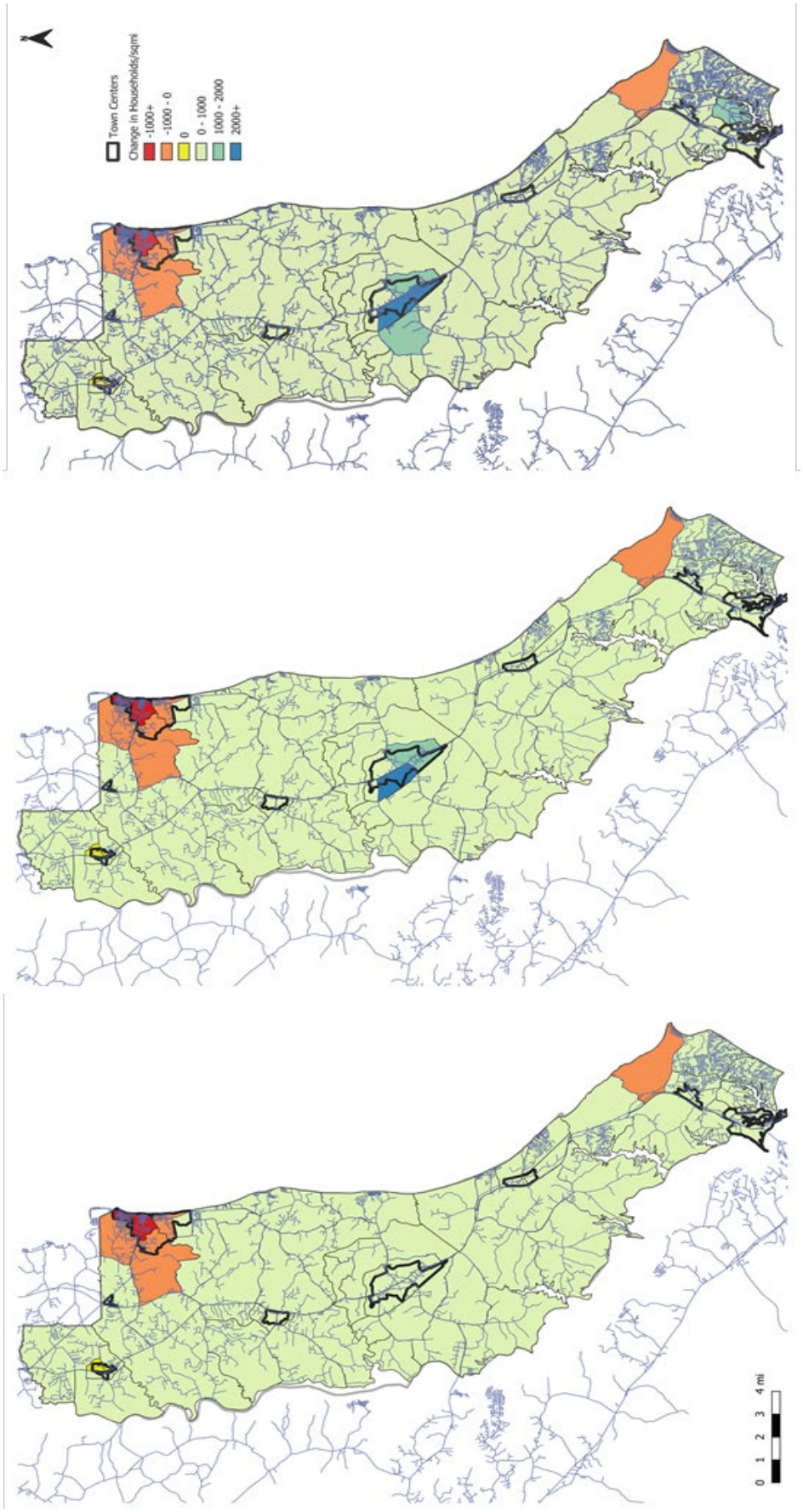

Figure 6. Change in Households by Growth Scenario

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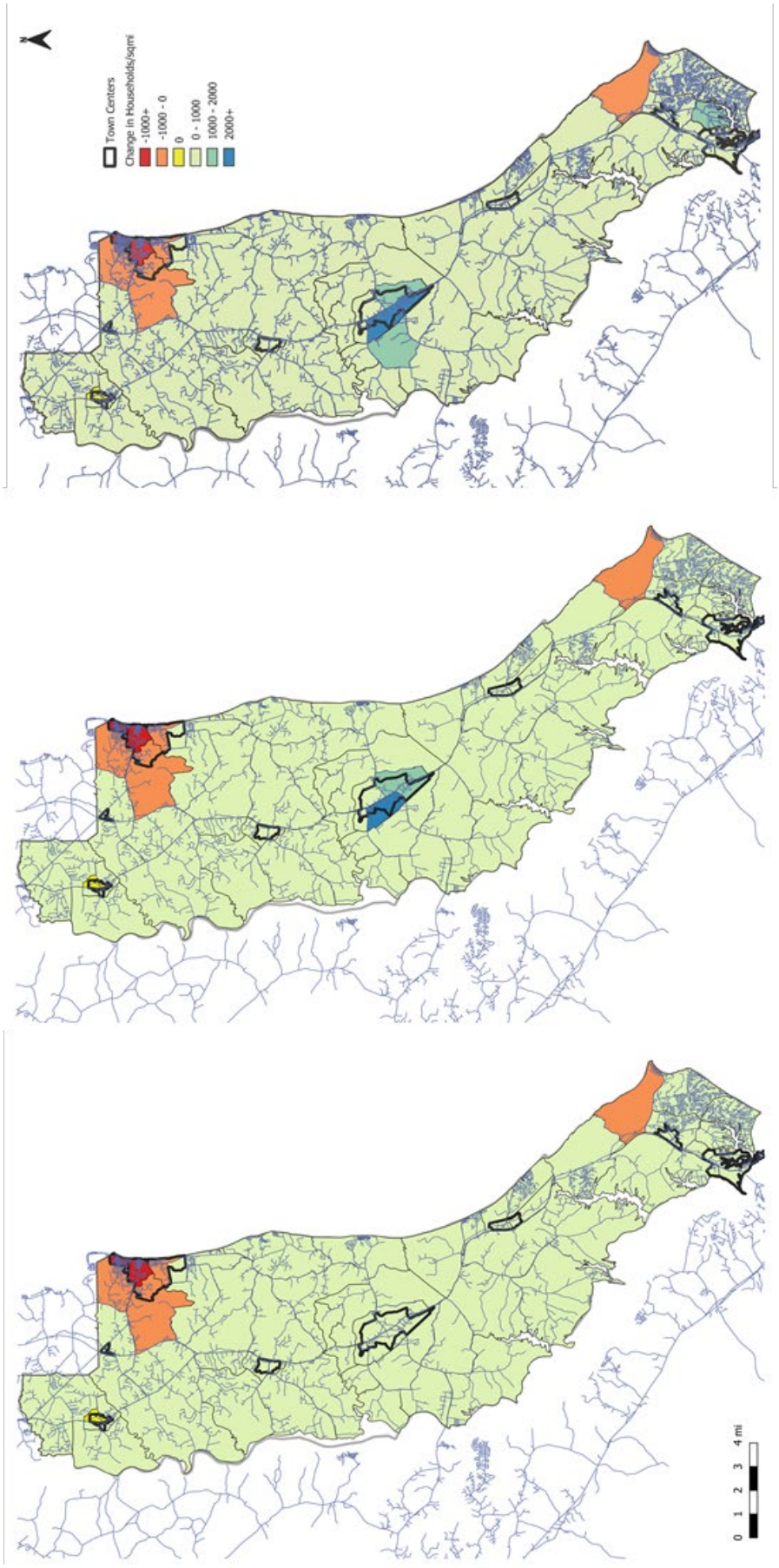

Figure 7. Change in Population by Growth Scenario

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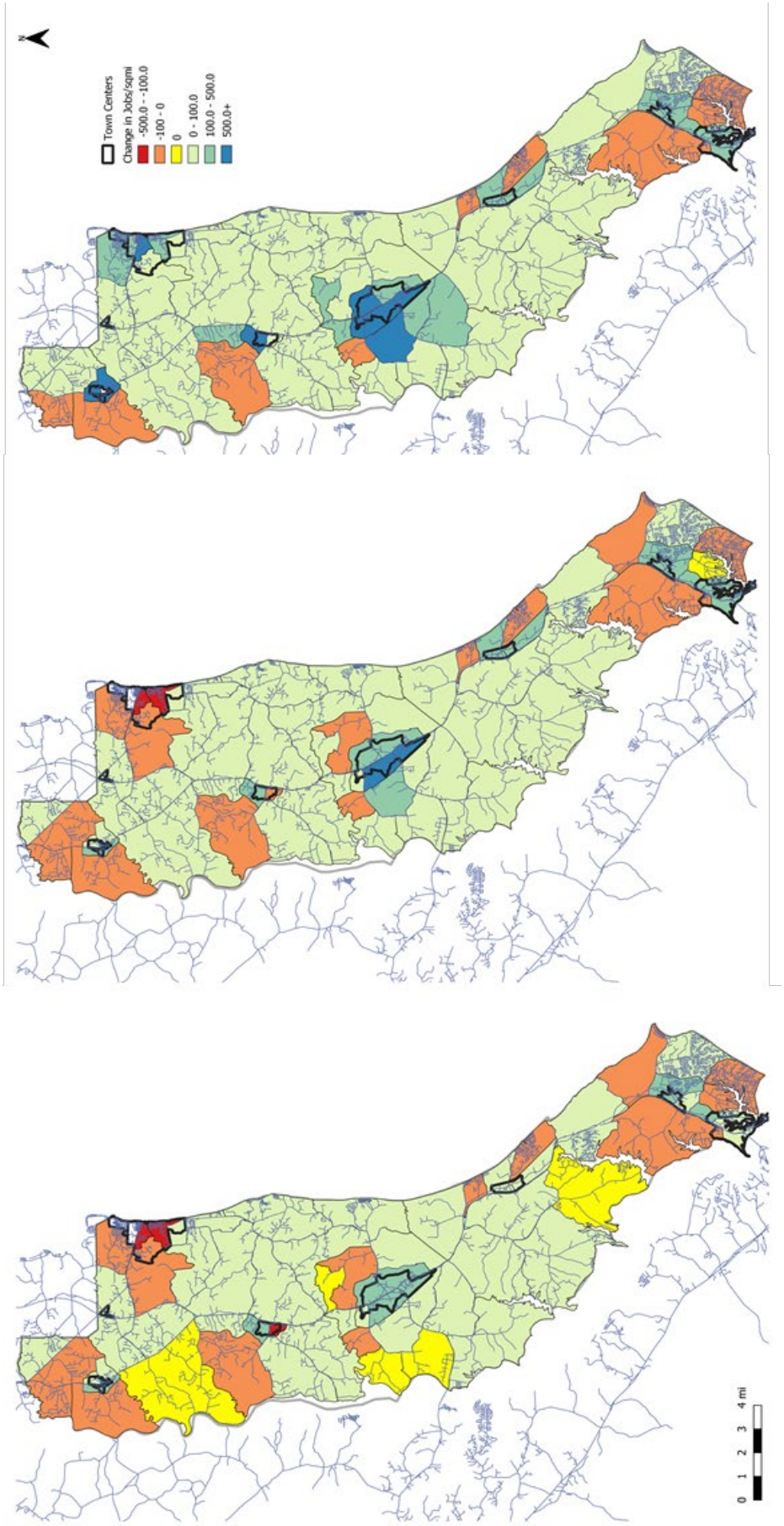

Figure 8. Change in Employment by Growth Scenario

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Travel Forecasting Outputs

Travel forecasts were carried out using the refined TAZs, additional road network details and growth scenarios described above. Key model outputs are described below. Additional assessments on *how* these volumes impact the AM and PM peak period congestion at various locations within the road system are part of a more detailed operational analysis (Level of Service, Volume to Capacity Ratio, etc.) and are shown in the Appendix. Potential mitigation measures for congested areas are also identified in the Appendix, however, the selection of specific mitigation measures should generally be left to the Town Center planning process.

Table 2 provides a summary of the different forecasts and the Average Annual Weekday Vehicle trips (AAWDT) from, to, and within Calvert County that for each growth scenario. The forecast ranges from the 2017 baseline of 270,335 AAWDT to 611,601 AAWDT in Scenario 3 (Maximum Household Growth)

Table 2 and the maps shown in Figures 10 - 11 also show how trips are assigned to the road network in 2017 and 2040 for all roads with volumes greater than 2,000 trips per day. (For 2040, the 2017 volumes are also overlaid so the change in volumes can be seen).

	Comparison of Calvert County Scenario Travel Forecasts (24 hour Volumes) by Scenario							
			2040					
		Calvert 2017	Historical Growth		Aggressive Growth		Hyper Growth Rate	
Loc	Desc	AAWDT	AAWDT	% diff	AAWDT	% diff	AAWDT	% diff
1	MD 4 @ Anne Arundel Co. Line	46293	51949	12.22%	54175	17.03%	62006	33.94%
2	MD 2 @ Anne Arundel Co. Line	20380	23384	14.74%	24140	18.45%	25937	27.27%
3	MD 4 @ Lyons Creek Rd	31406	35647	13.50%	37521	19.47%	48031	52.94%
4	Ward Rd @ Dunkirk	1754	1565	-10.78%	1848	5.36%	4015	128.91%
5	MD 4 @ W Mt Harmony	29464	34214	16.12%	36064	22.40%	45379	54.02%
6	MD 2/4 @ M.F. Bowen	45913	52817	15.04%	56655	23.40%	72148	57.14%
7	Stoakley Rd @ Prince Frederick Blvd	3209	3380	5.33%	4017	25.18%	6867	113.99%
8	Dares Beach Rd @ Arthur King Rd.	8357	10706	28.11%	11709	40.11%	18076	116.30%
9	Holloway Point Rd @ Prince Frederick Blvd	16387	20012	22.12%	23872	45.68%	31631	93.02%
10	MD 2/4 @ German Chapel Rd	36134	44609	23.45%	48531	34.31%	56469	56.28%
11	German Chapel Rd @ MD 2/4	1938	2337	20.59%	4549	134.73%	7939	309.65%
12	MD 231 Bridge	18243	21850	19.77%	24030	31.72%	28820	57.98%
13	MD 2/4 @ Calvert Cliffs Pkwy	35766	45049	25.95%	49053	37.15%	52995	48.17%
14	MD 497 @ Cove Pt Park	7094	8071	13.77%	9664	36.23%	10957	54.45%
15	MD 2/4 S. of Apple Lane	26290	36332	38.20%	41376	57.38%	45770	74.10%
16	MD 765 S. of Apple Lane	12595	14307	13.59%	19361	53.72%	21926	74.08%
17	MD 2/4 @ Thomas Johnson Bridge	30084	44368	47.48%	47265	57.11%	48928	62.64%

Table 2. Two Way Average Weekday Daily Traffic Forecasts By Scenario at Key Locations

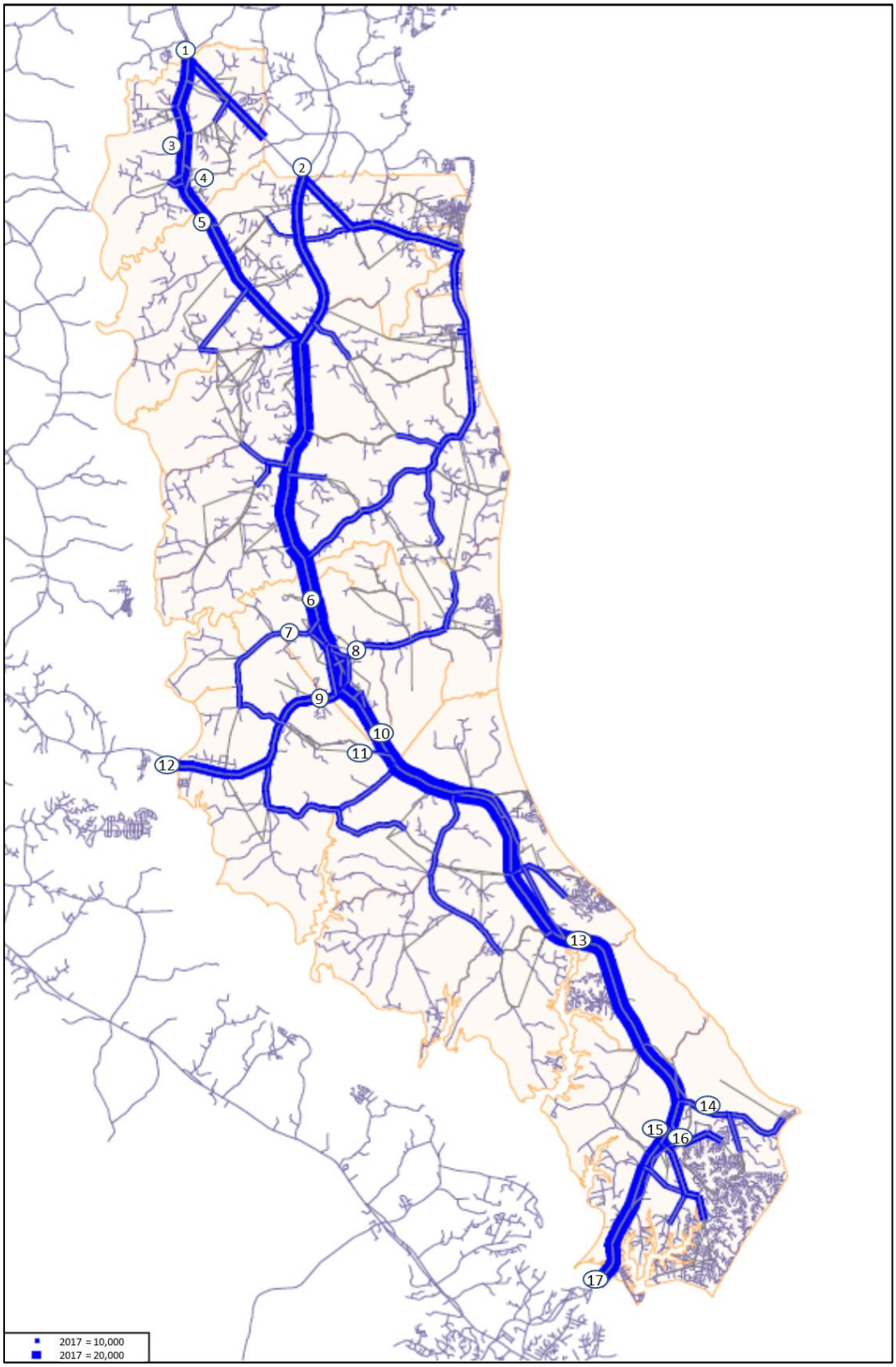


Figure 10. 2017 Average Annual Weekday Traffic plotted in bandwidth format. Location #s correspond to table above.

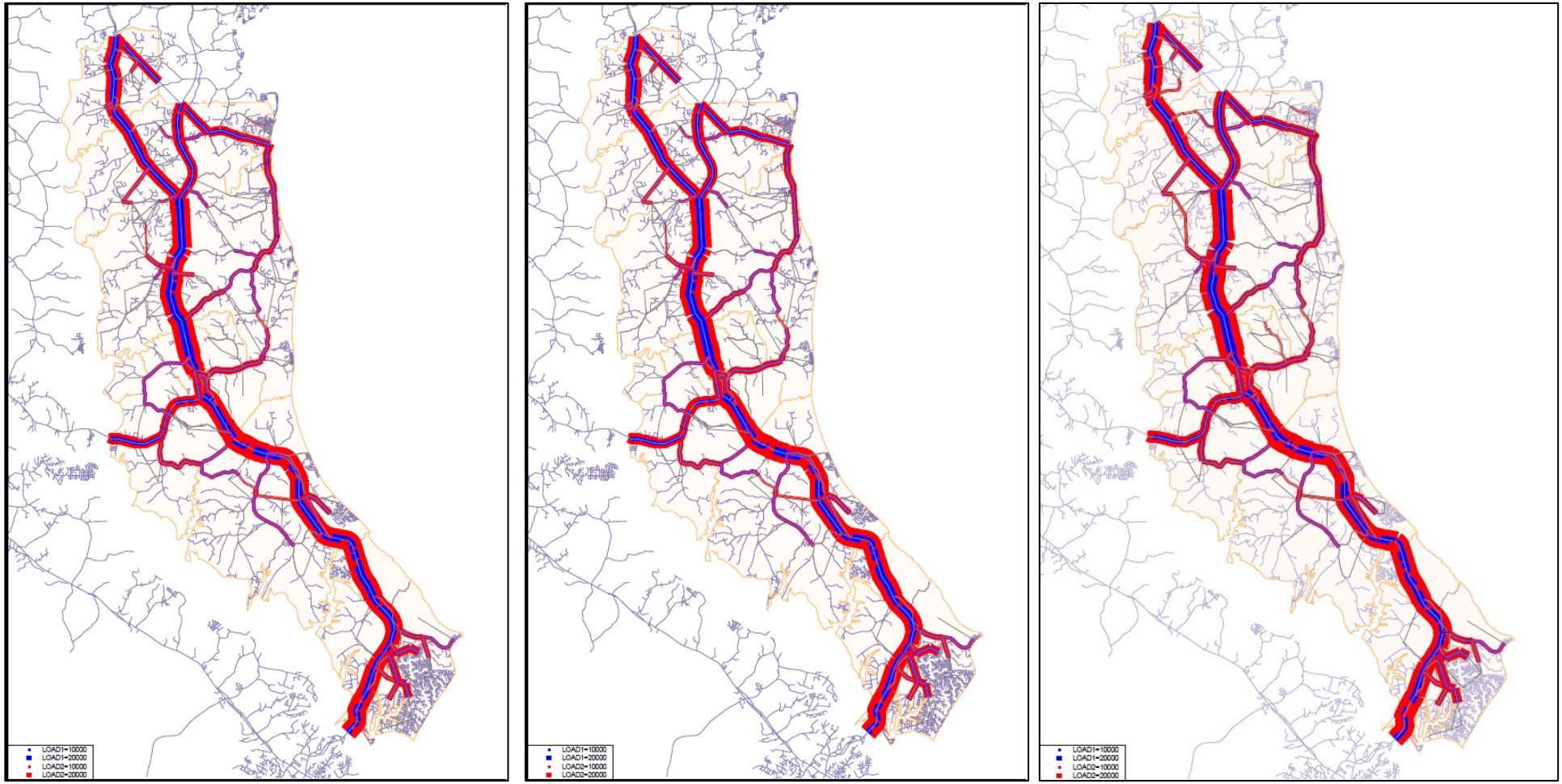


Figure 11. From left to right. 2040 Average Annual Weekday Traffic plotted in bandwidth format at the historic, aggressive and hyper growth rates. 2017 AAWDT (blue) is overlaid on the 2040 AAWDT (red) for comparative purposes.

- As can be seen in Table 3, the growth in AAWDT is not uniform throughout the County but depends on the relative location of where the trips start, where they are going, and the route used to get there. Trips entering and leaving the County grow in the north from 12% to 33% on Route 4, and 14% to 27% on Route 2; to 20% to 58% at the MD 231 bridge and 47% to 68% at the Governor Thomas Johnson Bridge.

- Table 2 also shows the two way Average Weekday Daily Traffic (AAWDT) at key entrances and exits to the County (yellow highlight) and around the Town Centers of concern along MD 2-4. These locations are also mapped in Figure 10.

- While the growth at the different locations varies significantly the overall traffic patterns found in the growth scenarios are very similar. Table 3 summarizes how these volumes impact the overall performance of the transportation network.

- While the Directional Route Miles is essentially the same in 2017 and 2040, the Vehicle Miles Traveled (VMT) on the network increases from 1,866,800 in 2017 to 2,918,800 in Scenario 3 (Hyper Growth). In the most likely forecast, Scenario 1 (Historical Growth Rate), VMT grows to 2,242,100.

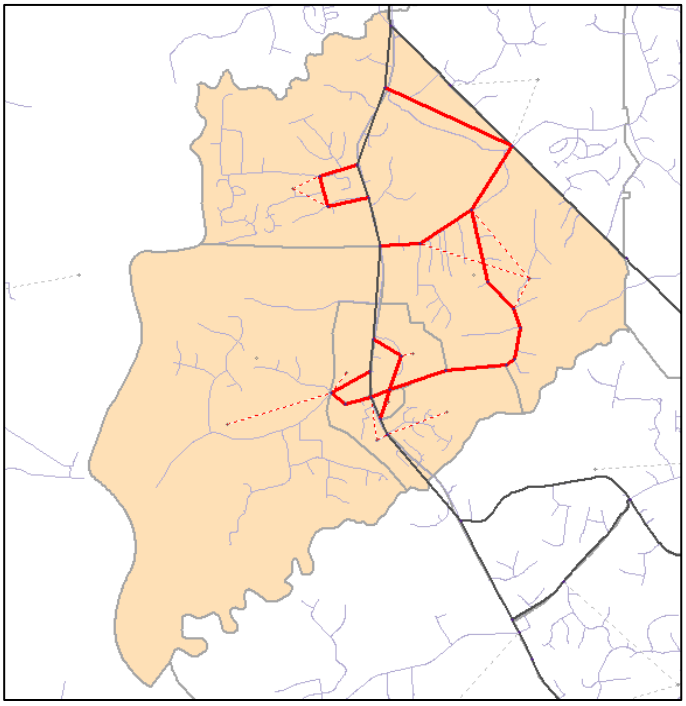
- Notwithstanding the increase in VMT relative to the very minor change in directional route miles, 82% of the roadway network is forecast to have low to some congestion (V/C lower than 0.79) under Scenario 1 (Historical Growth Rate). The percent of the network with a V/C above 1 is only 2.33% at the Historical Growth Rate. Segments of MD 2-4 comprise the areas where V/C exceeds 1.

Additional assessments on how these volumes impact the AM and PM peak period congestion at various locations within the road system are part of a more detailed operational analysis (Level of Service, Volume to Capacity Ratio, etc.) and are shown in Appendices 2 and 3. Potential mitigation measures for congested areas are also identified in the Appendix, however, the selection of specific mitigation measures is generally left to the town center planning process.

Calvert County Forecast Average Weekday Vehicle Trips				
Scenario	From Calvert	To Calvert	Within Calvert	Total
2017: Base Forecast	51,187	50,784	168,364	270,335
2040: Historical Growth Rate	59,199	58,377	185,260	302,836
2040: Aggressive Growth	65,074	64,346	230,821	360,241
2040: Hyper Growth	77,189	76,174	458,237	611,600
	2017	2040		
	Base	Historic Growth	Aggressive Growth	Hyper Growth
Directional Route Miles	360	360	360	360
Lane Miles	442	449	449	449
VMT (On Network)	1,866,796	2,242,136	2,461,453	2,918,797
Directional Route Miles by Congestion Level				
Low	260.1	247.9	236.4	204.1
(V/C < 0.45)	72.27%	68.88%	65.68%	56.71%
Some	77.5	56.9	63.6	68.6
(0.45>= V/C < 0.79)	21.53%	15.81%	17.67%	19.06%
Severe	17.7	46.8	45.0	50.7
(0.79>= V/C < 1.0)	4.92%	13.00%	12.50%	14.09%
Failure	3.9	8.4	14.9	37.6
(V/C>= 1.0)	1.08%	2.33%	4.14%	10.45%
Am Peak VMT*	356,310	438,876	471,069	541,645
Am Peak VHT*	9,459	13,667	16,135	22,197
Am Peak Speed (mph)	37.7	32.1	29.2	24.4
Pm Peak Directional Route Miles by Congestion Level				
Low	260.0	242.3	228.9	199.7
(V/C < 0.45)	72.24%	67.32%	63.60%	55.49%
Some	83.9	68.8	66.4	72.4
(0.45>= V/C < 0.79)	23.31%	19.12%	18.45%	20.12%
Severe	14.0	43.8	52.0	56.0
(0.79>= V/C < 1.0)	3.89%	12.17%	14.45%	15.56%
Failure	2.1	5.0	12.5	31.9
(V/C>= 1.0)	0.58%	1.39%	3.47%	8.86%
Pm Peak VMT*	513,712	632,378	685,595	800,598
Pm Peak VHT*	13,339	18,143	21,643	31,207
Pm Peak Speed (mph)	38.5	34.9	31.7	25.7
* VMT = Vehicle Miles Traveled				
* VHT = Vehicle Hours Traveled				

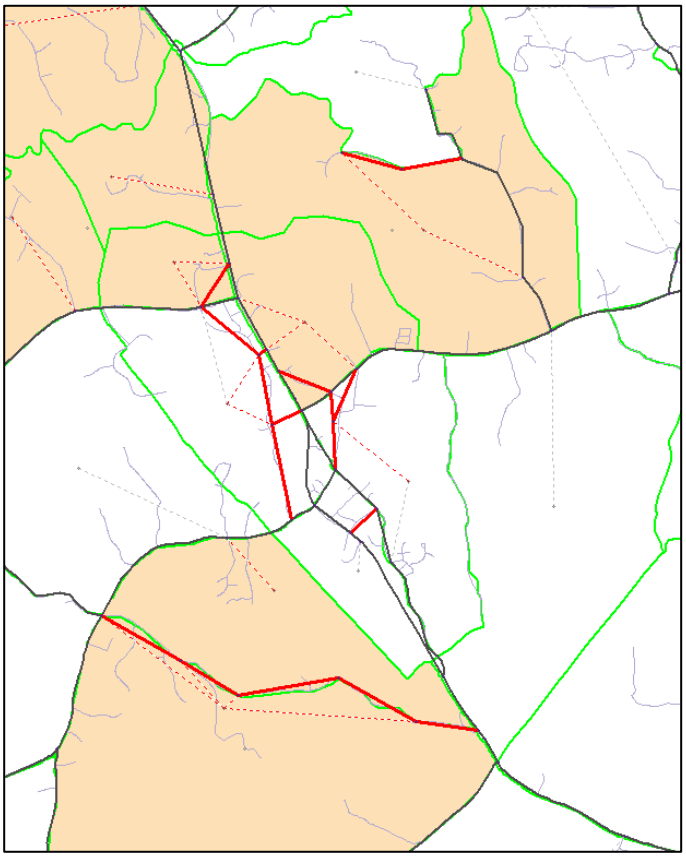
Table 3. Road Network Performance Measures for 2017 and 2040 Growth Scenarios

APPENDIX 1 – ADDITIONAL NETWORK DETAIL



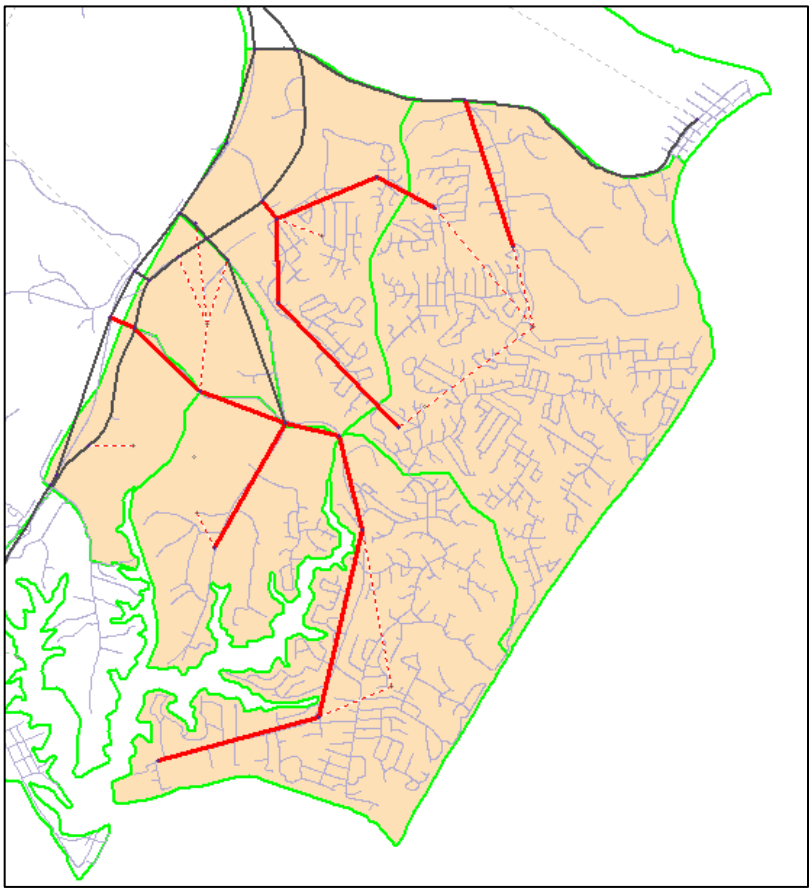
Huntingtown Area

- Briscoe Town Rd
- Mill Branch Rd
- Huntingtown Rd
- Cox Rd
- MD 521/MD 524



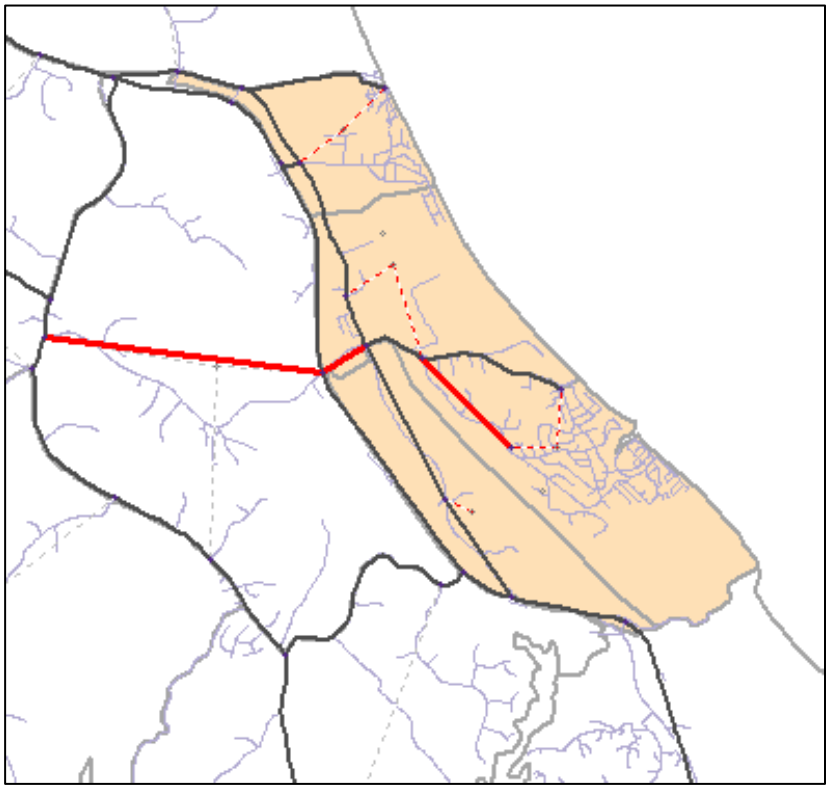
Prince Frederick Area

- N. Prince Frederick Blvd
- Dorsey Rd extended
- Armory Rd
- Fariground Rd
- Old Field Ln
- German Chapel Rd
- Fox Run Blvd.



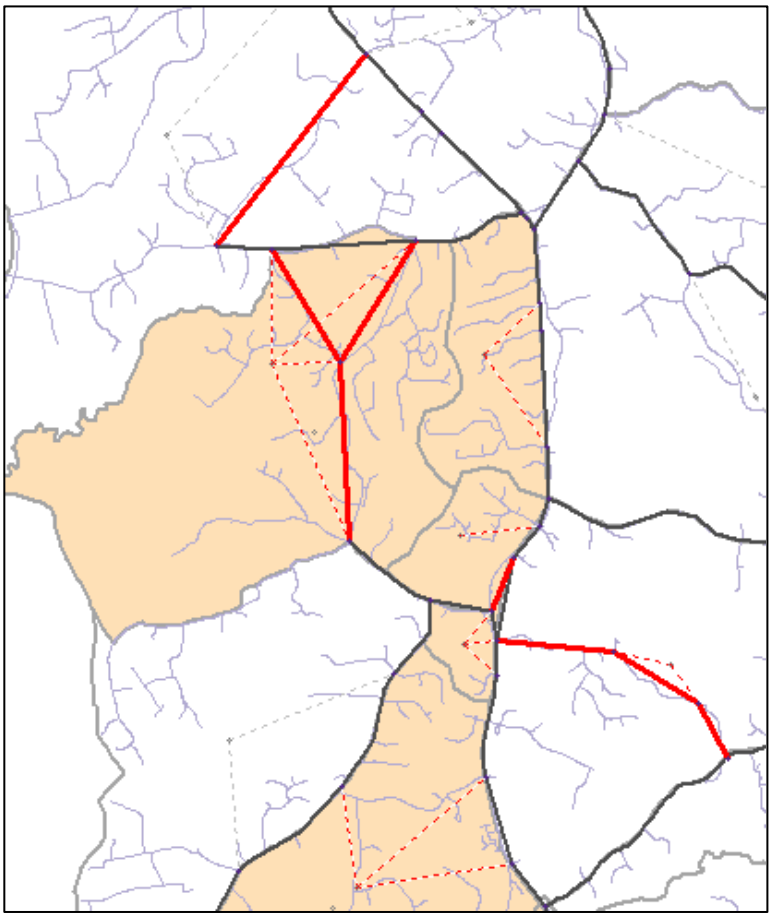
Solomons/Lusby

- MD 760 to Ship Point
- Olivet Rd extended
- Thunderbird Dr
- Gunsmoke Trail
- Little Cove Point Rd



St. Leonard Area

- Ball Rd
- Long Beach Rd



Dunkirk Area

- Jewell Rd
- Brickhouse Rd
- Ward Rd
- Dunkirk Way
- Lyons Creek Rd
- Crown Dr
- Ferry Landing Rd
- Ashwood Rd

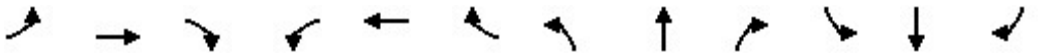
APPENDIX 2 – 2017 VOLUME-CAPACITY AND DELAY PER INTERSECTION

Intersection	Control	Approach	Existing - AM			Existing - PM		
			V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
MD 4 & Ward Rd.	Signalized	Overall	0.68	26.2	C	0.86	48.3	D
		EB	0.56	46.5	D	0.68	37.3	D
		WB	0.23	65.6	E	0.88	95.4	F
		NB	0.76	23.5	C	0.58	31.2	C
		SB	0.23	16.0	B	0.93	47.3	D
MD 2-4/MD 4 & MD 2	Signalized	Overall	0.82	39.2	D	0.84	28.4	C
		WB	0.90	84.5	F	0.90	44.9	D
		NB	0.81	37.8	D	0.83	49.7	D
		SB	0.64	12.3	B	0.68	6.0	A
MD 2-4 & MD 524/COX Road	Signalized	Overall	0.86	45.8	D	1.31	217.5	F
		EB	0.70	74.6	E	0.74	77.4	E
		WB	0.50	75.7	E	0.65	81.2	F
		NB	0.93	44.6	D	1.79	227.6	F
		SB	0.64	31.0	C	1.45	247.9	F
MD 2/4 & MD 263 Plum Point Rd.	Signalized	Overall	0.78	25.3	C	0.74	16.7	B
		WB	0.92	92.2	F	0.82	82.2	F
		NB	0.68	24.5	C	0.61	19.5	B
		SB	0.71	5.8	A	0.74	4.5	A
MD 2-4 & Stoakley/Hospital	Signalized	Overall	0.75	21.3	C	0.85	46.4	D
		EB	0.67	54.9	D	0.80	84.1	F
		WB	0.29	52.7	D	0.68	82.1	F
		NB	0.84	15.1	B	0.77	34.0	C
		SB	0.62	20.4	C	0.93	43.1	D
MD 2-4 & MD 402	Signalized	Overall	0.76	27.6	C	0.85	39.7	D
		EB	0.23	48.1	D	0.74	82.8	F
		WB	0.49	42.3	D	0.66	65.2	E
		NB	0.92	30.0	C	0.69	31.4	C
		SB	0.56	16.2	B	0.96	29.4	C
MD 2-4 & MD 231/Church St.	Signalized	Overall	0.56	26.2	C	0.70	32.9	C
		EB	0.61	35.8	D	0.77	44.2	D
		WB	0.31	50.8	D	0.63	80.3	F
		NB	0.69	25.0	C	0.65	30.5	C
		SB	0.31	19.1	B	0.70	23.3	C

Intersection	Control	Approach	Existing - AM			Existing - PM		
			V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
MD 508 Adelina Rd. & MD 231	Unsignalized	Overall	-	-	-	-	-	-
		EB	0.28	0.0	A	0.38	0.0	A
		WB[1]	0.33	1.2	A	0.37	9.6	A
		NB[1]	0.20	14.5	B	0.23	18.2	C
MD 2-4 & Sixes Rd.	Unsignalized	Overall	-	-	-	-	-	-
		EB[1]	1.01	185.6	F	9.60	Err	F
		NB[1]	0.60	0.2	B	0.46	0.5	E
		SB	0.28	0.0	A	0.78	0.8	A
MD 2-4 & MD 264	Signalized	Overall	0.61	11.7	B	0.73	11.6	B
		EB	0.71	39.9	D	0.73	65.9	E
		NB	0.43	1.0	A	0.34	1.1	A
		SB	0.40	17.4	B	0.69	11.1	B
MD 2/4 & Ball Rd./Calvert Beach Rd.	Signalized	Overall	0.67	23.8	C	0.78	38.6	D
		EB	0.38	52.9	D	0.56	74.2	E
		WB	0.50	18.9	B	0.76	61.3	E
		NB	0.68	23.2	C	0.60	29.8	C
		SB	0.38	20.7	C	0.78	36.1	D
MD 2-4 & MD 497 Cove Point Rd.	Signalized	Overall	0.51	12.9	B	0.72	24.7	C
		EB	0.45	20.6	C	0.00	24.3	C
		WB	0.20	22.2	C	0.45	25.8	C
		NB	0.50	13.2	B	0.70	16.6	B
		SB	0.45	8.7	A	1.12	31.8	C
MD 2-4 & Monticello Dr./Dowell Rd.	Unsignalized	Overall	-	-	-	-	-	-
		EB	0.04	19.1	C	0.04	13.2	B
		WB	0.10	12.1	B	0.22	17.9	C
		NB[1]	0.26	0.0	C	0.44	0.1	B
		SB[1]	0.55	0.4	B	0.34	1.7	C

1- These approaches are "free". The delay reported is for the main line left movements.

APPENDIX 3 – HCM DETAIL BY STUDY INTERSECTION



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	28	74	56	24	53	148	1670	97	21	462	67
Future Volume (vph)	173	28	74	56	24	53	148	1670	97	21	462	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1705	1583	3433	3174		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1705	1583	3433	3174		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	180	29	77	58	25	55	154	1740	101	22	481	70
RTOR Reduction (vph)	0	0	0	0	51	0	0	0	35	0	0	28
Lane Group Flow (vph)	90	119	77	58	29	0	154	1740	66	22	481	42
Turn Type	Split	NA	Free	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			Free						6			2
Actuated Green, G (s)	15.3	15.3	150.0	8.0	8.0		12.1	95.4	95.4	4.8	88.1	88.1
Effective Green, g (s)	18.8	18.8	150.0	11.0	11.0		14.1	97.4	97.4	6.8	90.1	90.1
Actuated g/C Ratio	0.13	0.13	1.00	0.07	0.07		0.09	0.65	0.65	0.05	0.60	0.60
Clearance Time (s)	7.5	7.5		7.0	7.0		6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	210	213	1583	251	232		322	2297	1027	155	2125	950
v/s Ratio Prot	0.05	c0.07		c0.02	0.01		c0.04	c0.49		0.01	0.14	
v/s Ratio Perm			0.05						0.04			0.03
v/c Ratio	0.43	0.56	0.05	0.23	0.13		0.48	0.76	0.06	0.14	0.23	0.04
Uniform Delay, d1	60.6	61.7	0.0	65.5	65.0		64.5	18.2	9.6	68.8	13.8	12.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	3.2	0.1	0.5	0.2		1.1	2.4	0.1	0.4	0.2	0.1
Delay (s)	62.0	64.9	0.1	66.0	65.2		65.6	20.5	9.7	69.2	14.1	12.4
Level of Service	E	E	A	E	E		E	C	A	E	B	B
Approach Delay (s)		46.5			65.6			23.5			16.0	
Approach LOS		D			E			C			B	

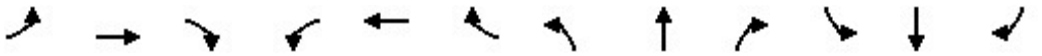
Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	418	54	1502	500	79	615
Future Volume (vph)	418	54	1502	500	79	615
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	7.0	7.0	5.5	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	445	57	1598	532	84	654
RTOR Reduction (vph)	0	0	0	230	0	0
Lane Group Flow (vph)	445	57	1598	302	84	654
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	4!		2		1	Free!
Permitted Phases		Free		2		
Actuated Green, G (s)	60.3	215.4	120.5	120.5	16.1	215.4
Effective Green, g (s)	60.3	215.4	120.5	120.5	16.1	215.4
Actuated g/C Ratio	0.28	1.00	0.56	0.56	0.07	1.00
Clearance Time (s)	6.0		7.0	7.0	5.5	
Vehicle Extension (s)	6.0		8.0	8.0	4.0	
Lane Grp Cap (vph)	495	1583	1979	885	132	3539
v/s Ratio Prot	c0.25		c0.45		c0.05	0.18
v/s Ratio Perm		0.04		0.19		
v/c Ratio	0.90	0.04	0.81	0.34	0.64	0.18
Uniform Delay, d1	74.6	0.0	38.1	25.8	96.8	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.7	0.0	3.3	1.0	10.8	0.1
Delay (s)	95.3	0.0	41.4	26.8	107.6	0.1
Level of Service	F	A	D	C	F	A
Approach Delay (s)	84.5		37.8			12.3
Approach LOS	F		D			B

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	215.4	Sum of lost time (s)	18.5
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	33	137	19	22	234	123	1692	17	66	1099	34
Future Volume (vph)	230	33	137	19	22	234	123	1692	17	66	1099	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1706	1583		1820	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1706	1583		1820	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	253	36	151	21	24	257	135	1859	19	73	1208	37
RTOR Reduction (vph)	0	0	133	0	0	195	0	0	8	0	0	17
Lane Group Flow (vph)	144	145	18	0	45	62	135	1859	11	73	1208	20
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3			6			2
Actuated Green, G (s)	20.2	20.2	20.2		12.9	12.9	17.3	93.3	93.3	12.6	88.6	88.6
Effective Green, g (s)	20.2	20.2	20.2		12.9	12.9	17.3	93.3	93.3	12.6	88.6	88.6
Actuated g/C Ratio	0.12	0.12	0.12		0.08	0.08	0.10	0.57	0.57	0.08	0.54	0.54
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	3.5	3.5	3.5		3.0	3.0	3.5	6.0	6.0	3.5	6.0	6.0
Lane Grp Cap (vph)	205	208	193		142	123	185	2001	895	135	1900	850
v/s Ratio Prot	c0.09	0.09			0.02		c0.08	c0.53		0.04	0.34	
v/s Ratio Perm			0.01			c0.04			0.01			0.01
v/c Ratio	0.70	0.70	0.10		0.32	0.50	0.73	0.93	0.01	0.54	0.64	0.02
Uniform Delay, d1	69.5	69.5	64.3		71.9	73.0	71.6	32.8	15.7	73.4	26.9	17.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	10.1	0.3		1.3	3.2	13.9	9.2	0.0	4.8	1.6	0.1
Delay (s)	80.3	79.6	64.5		73.2	76.1	85.4	42.0	15.7	78.3	28.5	18.0
Level of Service	F	E	E		E	E	F	D	B	E	C	B
Approach Delay (s)		74.6			75.7			44.6			31.0	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	165.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	321	66	1424	177	66	1200
Future Volume (vph)	321	66	1424	177	66	1200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	8.0	8.0	11.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	331	68	1468	182	68	1237
RTOR Reduction (vph)	0	46	0	49	0	0
Lane Group Flow (vph)	331	22	1468	133	68	1237
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4!		2 9		1	Free!
Permitted Phases		4		2 9		
Actuated Green, G (s)	37.5	37.5	111.9	111.9	10.0	183.4
Effective Green, g (s)	37.5	37.5	111.9	111.9	10.0	183.4
Actuated g/C Ratio	0.20	0.20	0.61	0.61	0.05	1.00
Clearance Time (s)	5.0	5.0			11.0	
Vehicle Extension (s)	4.0	4.0			3.5	
Lane Grp Cap (vph)	361	323	2159	965	96	3539
v/s Ratio Prot	c0.19		c0.41		0.04	0.35
v/s Ratio Perm		0.01		0.08		
v/c Ratio	0.92	0.07	0.68	0.14	0.71	0.35
Uniform Delay, d1	71.4	58.8	23.8	15.2	85.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.6	0.1	1.7	0.3	21.9	0.3
Delay (s)	99.1	59.0	25.6	15.5	107.1	0.3
Level of Service	F	E	C	B	F	A
Approach Delay (s)	92.2		24.5			5.8
Approach LOS	F		C			A

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	183.4	Sum of lost time (s)	32.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

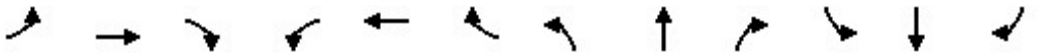
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	224	37	43	68	5	1	17	92	1433	239	48	142
Future Volume (vph)	224	37	43	68	5	1	17	92	1433	239	48	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	5.0		3.0	3.0	3.0		3.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00		0.97	0.95	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	0.97	1.00	0.95	0.96	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1681	1708	1583	1681	1695	1583		3433	3539	1583		1770
Flt Permitted	0.95	0.97	1.00	0.95	0.96	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1681	1708	1583	1681	1695	1583		3433	3539	1583		1770
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	40	47	74	5	1	18	100	1558	260	52	154
RTOR Reduction (vph)	0	0	41	0	0	1	0	0	0	123	0	0
Lane Group Flow (vph)	141	142	6	39	40	0	0	118	1558	137	0	206
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3			4				6		
Actuated Green, G (s)	12.0	12.0	12.0	6.8	6.8	6.8		8.5	58.0	58.0		17.2
Effective Green, g (s)	15.0	15.0	15.0	9.8	9.8	7.8		11.5	63.0	63.0		20.2
Actuated g/C Ratio	0.12	0.12	0.12	0.08	0.08	0.06		0.10	0.52	0.52		0.17
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	8.0	8.0		6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.5	2.5	2.5		2.0	5.0	5.0		2.0
Lane Grp Cap (vph)	210	213	197	137	138	102		328	1857	831		297
v/s Ratio Prot	c0.08	0.08		0.02	c0.02			0.03	c0.44			c0.12
v/s Ratio Perm			0.00			0.00				0.09		
v/c Ratio	0.67	0.67	0.03	0.28	0.29	0.00		0.36	0.84	0.17		0.69
Uniform Delay, d1	50.1	50.1	46.1	51.8	51.8	52.5		50.8	24.2	14.8		47.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.21	0.39	0.28		1.00
Incremental Delay, d2	6.5	6.0	0.0	0.8	0.8	0.0		0.2	3.7	0.3		5.6
Delay (s)	56.6	56.1	46.1	52.6	52.7	52.5		61.7	13.3	4.4		52.6
Level of Service	E	E	D	D	D	D		E	B	A		D
Approach Delay (s)		54.9			52.7				15.1			
Approach LOS		D			D				B			

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1197	184
Future Volume (vph)	1197	184
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	3.0	3.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1583
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	1301	200
RTOR Reduction (vph)	0	81
Lane Group Flow (vph)	1301	120
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	66.7	66.7
Effective Green, g (s)	71.7	71.7
Actuated g/C Ratio	0.60	0.60
Clearance Time (s)	8.0	8.0
Vehicle Extension (s)	5.0	5.0
Lane Grp Cap (vph)	2114	945
v/s Ratio Prot	0.37	
v/s Ratio Perm		0.08
v/c Ratio	0.62	0.13
Uniform Delay, d1	15.4	10.5
Progression Factor	1.00	1.00
Incremental Delay, d2	1.4	0.3
Delay (s)	16.7	10.8
Level of Service	B	B
Approach Delay (s)	20.4	
Approach LOS	C	

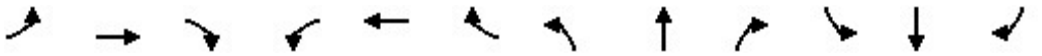
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	27	90	169	74	192	70	1668	210	117	1092	67
Future Volume (vph)	55	27	90	169	74	192	70	1668	210	117	1092	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	5.0	3.0	3.0	5.0	4.0	3.0	3.0	4.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.71	1.00	1.00	0.58	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1318	1863	1583	1084	1863	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	28	93	174	76	198	72	1720	216	121	1126	69
RTOR Reduction (vph)	0	0	85	0	0	170	0	0	67	0	0	30
Lane Group Flow (vph)	57	28	8	174	76	28	72	1720	149	121	1126	39
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Actuated Green, G (s)	16.0	9.1	9.1	27.8	15.9	15.9	9.0	60.2	60.2	13.5	64.7	64.7
Effective Green, g (s)	20.0	12.1	10.1	29.8	18.9	16.9	11.0	63.7	63.7	15.5	68.2	68.2
Actuated g/C Ratio	0.17	0.10	0.08	0.25	0.16	0.14	0.09	0.53	0.53	0.13	0.57	0.57
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5	6.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	253	187	133	358	293	222	162	1878	840	228	2011	899
v/s Ratio Prot	0.02	0.02		c0.06	0.04		0.04	c0.49		c0.07	0.32	
v/s Ratio Perm	0.02		0.00	c0.06		0.02			0.09			0.02
v/c Ratio	0.23	0.15	0.06	0.49	0.26	0.13	0.44	0.92	0.18	0.53	0.56	0.04
Uniform Delay, d1	43.1	49.3	50.6	37.6	44.4	45.1	51.6	25.7	14.6	48.8	16.4	11.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.36	0.90	0.46	1.17	0.66	1.00
Incremental Delay, d2	0.2	0.1	0.1	0.4	0.2	0.1	1.8	8.1	0.4	2.0	0.9	0.1
Delay (s)	43.2	49.4	50.6	38.0	44.6	45.2	71.9	31.1	7.1	59.3	11.8	11.5
Level of Service	D	D	D	D	D	D	E	C	A	E	B	B
Approach Delay (s)		48.1			42.3			30.0			16.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	351	129	145	46	85	21	369	1329	134	48	673	333
Future Volume (vph)	351	129	145	46	85	21	369	1329	134	48	673	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	1.0	4.0	4.0		4.0	3.0	5.5	4.0	3.0	5.5
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.65	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1033	1610	3287		3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1033	1610	3287		3433	5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	369	136	153	48	89	22	388	1399	141	51	708	351
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	69	0	0	203
Lane Group Flow (vph)	369	136	153	43	100	0	388	1399	72	51	708	148
Confl. Peds. (#/hr)	381		1477									
Confl. Bikes (#/hr)			132									
Turn Type	Split	NA	Free	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases			Free						6			2
Actuated Green, G (s)	18.3	18.3	120.0	8.9	8.9		17.6	60.4	60.4	6.9	49.7	49.7
Effective Green, g (s)	21.3	21.3	120.0	11.9	11.9		19.6	63.9	61.4	8.9	53.2	50.7
Actuated g/C Ratio	0.18	0.18	1.00	0.10	0.10		0.16	0.53	0.51	0.07	0.44	0.42
Clearance Time (s)	6.0	6.0		7.0	7.0		6.0	6.5	6.5	6.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	609	330	1033	159	325		560	2707	809	254	2254	668
v/s Ratio Prot	c0.11	0.07		0.03	c0.03		c0.11	c0.28		0.01	0.14	
v/s Ratio Perm			0.15						0.05			0.09
v/c Ratio	0.61	0.41	0.15	0.27	0.31		0.69	0.52	0.09	0.20	0.31	0.22
Uniform Delay, d1	45.5	43.8	0.0	50.0	50.2		47.4	18.1	15.0	52.2	21.6	22.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.15	0.56	1.17
Incremental Delay, d2	1.7	0.8	0.3	0.9	0.5		3.7	0.7	0.2	0.5	0.3	0.7
Delay (s)	47.2	44.6	0.3	51.0	50.8		51.1	18.8	15.2	60.5	12.4	26.6
Level of Service	D	D	A	D	D		D	B	B	E	B	C
Approach Delay (s)		35.8			50.8			25.0			19.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	454	11	83	525	17	111
Future Volume (Veh/h)	454	11	83	525	17	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	478	12	87	553	18	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			490		1205	478
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			490		1205	478
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		90	80
cM capacity (veh/h)			1073		187	587

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	478	12	87	553	135
Volume Left	0	0	87	0	18
Volume Right	0	12	0	0	117
cSH	1700	1700	1073	1700	678
Volume to Capacity	0.28	0.01	0.08	0.33	0.20
Queue Length 95th (ft)	0	0	7	0	18
Control Delay (s)	0.0	0.0	8.6	0.0	14.5
Lane LOS			A		B
Approach Delay (s)	0.0		1.2		14.5
Approach LOS					B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	41	36	1885	861	19
Future Volume (Veh/h)	40	41	36	1885	861	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	45	39	2049	936	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2038	468	957			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2038	468	957			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	7	92	95			
cM capacity (veh/h)	46	542	714			

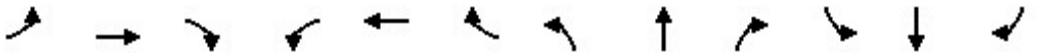
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	88	39	1024	1024	468	468	21
Volume Left	43	39	0	0	0	0	0
Volume Right	45	0	0	0	0	0	21
cSH	87	714	1700	1700	1700	1700	1700
Volume to Capacity	1.01	0.05	0.60	0.60	0.28	0.28	0.01
Queue Length 95th (ft)	145	4	0	0	0	0	0
Control Delay (s)	185.6	10.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B					
Approach Delay (s)	185.6	0.2			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	382	10	13	1443	693	98
Future Volume (vph)	382	10	13	1443	693	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.0	4.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	402	11	14	1519	729	103
RTOR Reduction (vph)	0	3	0	0	0	49
Lane Group Flow (vph)	402	8	14	1519	729	54
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4!		1	Free!	2 9	
Permitted Phases		4				2 9
Actuated Green, G (s)	38.6	38.6	2.8	120.5	62.6	62.6
Effective Green, g (s)	38.6	38.6	2.8	120.5	62.6	62.6
Actuated g/C Ratio	0.32	0.32	0.02	1.00	0.52	0.52
Clearance Time (s)	5.5	5.5	5.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	566	507	41	3539	1838	822
v/s Ratio Prot	c0.23		0.01	0.43	0.21	
v/s Ratio Perm		0.01				0.03
v/c Ratio	0.71	0.02	0.34	0.43	0.40	0.07
Uniform Delay, d1	36.0	28.0	57.9	0.0	17.5	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0	4.9	0.4	0.3	0.1
Delay (s)	40.2	28.0	62.9	0.4	17.8	14.5
Level of Service	D	C	E	A	B	B
Approach Delay (s)	39.9			1.0	17.4	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.5	Sum of lost time (s)	22.5
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

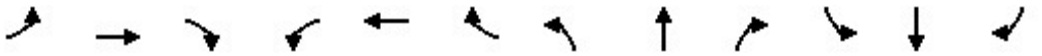
! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	28	85	87	20	197	42	1223	54	14	632	6
Future Volume (vph)	36	28	85	87	20	197	42	1223	54	14	632	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	4.0	5.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1811	1583		1790	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1811	1583		1790	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	29	89	92	21	207	44	1287	57	15	665	6
RTOR Reduction (vph)	0	0	80	0	0	0	0	0	26	0	0	3
Lane Group Flow (vph)	0	67	9	0	113	207	44	1287	31	15	665	3
Turn Type	Split	NA	Perm	Split	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2 9		1	6 9	
Permitted Phases			4			Free			2 9			6 9
Actuated Green, G (s)		12.1	12.1		15.7	124.9	7.7	66.9	66.9	3.2	62.4	62.4
Effective Green, g (s)		12.1	12.1		15.7	124.9	7.7	66.9	66.9	3.2	62.4	62.4
Actuated g/C Ratio		0.10	0.10		0.13	1.00	0.06	0.54	0.54	0.03	0.50	0.50
Clearance Time (s)		7.0	7.0		7.0		5.0			5.0		
Vehicle Extension (s)		4.0	4.0		4.0		3.0			5.0		
Lane Grp Cap (vph)		175	153		225	1583	109	1895	847	45	1768	790
v/s Ratio Prot		c0.04			c0.06		c0.02	c0.36		0.01	0.19	
v/s Ratio Perm			0.01			0.13			0.02			0.00
v/c Ratio		0.38	0.06		0.50	0.13	0.40	0.68	0.04	0.33	0.38	0.00
Uniform Delay, d1		52.9	51.2		51.0	0.0	56.4	21.2	13.7	59.8	19.3	15.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.9	0.2		2.4	0.2	2.4	1.3	0.0	8.9	0.4	0.0
Delay (s)		54.8	51.4		53.3	0.2	58.8	22.5	13.8	68.7	19.6	15.7
Level of Service		D	D		D	A	E	C	B	E	B	B
Approach Delay (s)		52.9			18.9			23.2			20.7	
Approach LOS		D			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	124.9	Sum of lost time (s)	35.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

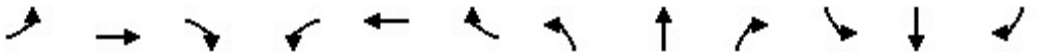
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	105	0	293	0	700	30	44	869	1
Future Volume (vph)	0	0	1	105	0	293	0	700	30	44	869	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			7.0	7.0		7.0		8.0	8.0	5.0	8.0	8.0
Lane Util. Factor			1.00	1.00		1.00		0.95	1.00	1.00	0.95	1.00
Frt			0.85	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1583	1770		1583		3539	1583	1770	3539	1583
Flt Permitted			1.00	0.76		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1583	1410		1583		3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	1	112	0	312	0	745	32	47	924	1
RTOR Reduction (vph)	0	0	1	0	0	257	0	0	18	0	0	0
Lane Group Flow (vph)	0	0	0	112	0	55	0	745	14	47	924	1
Turn Type	Perm		Perm	Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Actuated Green, G (s)			10.6	10.6		10.6		25.6	25.6	4.3	34.9	34.9
Effective Green, g (s)			10.6	10.6		10.6		25.6	25.6	4.3	34.9	34.9
Actuated g/C Ratio			0.18	0.18		0.18		0.42	0.42	0.07	0.58	0.58
Clearance Time (s)			7.0	7.0		7.0		8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)			3.0	3.0		3.0		5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)			277	247		277		1497	669	125	2041	913
v/s Ratio Prot								c0.21		0.03	c0.26	
v/s Ratio Perm			0.00	c0.08		0.03			0.01			0.00
v/c Ratio			0.00	0.45		0.20		0.50	0.02	0.38	0.45	0.00
Uniform Delay, d1			20.6	22.4		21.3		12.8	10.2	26.8	7.3	5.4
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	1.3		0.4		0.5	0.0	1.9	0.3	0.0
Delay (s)			20.6	23.7		21.7		13.3	10.2	28.7	7.7	5.4
Level of Service			C	C		C		B	B	C	A	A
Approach Delay (s)		20.6			22.2			13.2			8.7	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

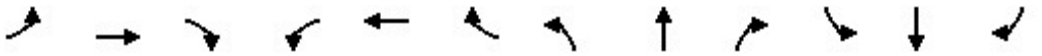
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	11	0	0	53	2	820	31	65	1737	6
Future Volume (Veh/h)	0	0	11	0	0	53	2	820	31	65	1737	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	12	0	0	57	2	882	33	70	1868	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								Raised			Raised	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2453	2927	934	1972	2900	441	1874			915		
vC1, stage 1 conf vol	2008	2008		886	886							
vC2, stage 2 conf vol	445	919		1086	2014							
vCu, unblocked vol	2453	2927	934	1972	2900	441	1874			915		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	96	100	100	90	99			91		
cM capacity (veh/h)	47	68	267	123	70	564	317			741		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	12	57	2	441	441	33	70	934	934	6
Volume Left	0	0	2	0	0	0	70	0	0	0
Volume Right	12	57	0	0	0	33	0	0	0	6
cSH	267	564	317	1700	1700	1700	741	1700	1700	1700
Volume to Capacity	0.04	0.10	0.01	0.26	0.26	0.02	0.09	0.55	0.55	0.00
Queue Length 95th (ft)	4	8	0	0	0	0	8	0	0	0
Control Delay (s)	19.1	12.1	16.4	0.0	0.0	0.0	10.4	0.0	0.0	0.0
Lane LOS	C	B	C				B			
Approach Delay (s)	19.1	12.1	0.0				0.4			
Approach LOS	C	B								

Intersection Summary					
Average Delay	0.6				
Intersection Capacity Utilization	58.0%	ICU Level of Service		B	
Analysis Period (min)	15				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	74	309	375	100	66	169	671	177	91	1840	164
Future Volume (vph)	148	74	309	375	100	66	169	671	177	91	1840	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1730	1583	3433	3327		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1730	1583	3433	3327		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	154	77	322	391	104	69	176	699	184	95	1917	171
RTOR Reduction (vph)	0	0	0	0	57	0	0	0	68	0	0	41
Lane Group Flow (vph)	89	142	322	391	116	0	176	699	116	95	1917	130
Turn Type	Split	NA	Free	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			Free						6			2
Actuated Green, G (s)	20.7	20.7	200.0	22.5	22.5		15.6	118.9	118.9	10.9	114.2	114.2
Effective Green, g (s)	24.2	24.2	200.0	26.0	26.0		17.6	120.9	120.9	12.9	116.2	116.2
Actuated g/C Ratio	0.12	0.12	1.00	0.13	0.13		0.09	0.60	0.60	0.06	0.58	0.58
Clearance Time (s)	7.5	7.5		7.5	7.5		6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	203	209	1583	446	432		302	2139	956	221	2056	919
v/s Ratio Prot	0.05	c0.08		c0.11	0.03		c0.05	0.20		0.03	c0.54	
v/s Ratio Perm			0.20						0.07			0.08
v/c Ratio	0.44	0.68	0.20	0.88	0.27		0.58	0.33	0.12	0.43	0.93	0.14
Uniform Delay, d1	81.6	84.2	0.0	85.4	78.4		87.7	19.5	16.9	90.0	38.3	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	8.5	0.3	17.3	0.3		2.9	0.4	0.3	1.3	9.3	0.3
Delay (s)	83.1	92.7	0.3	102.7	78.8		90.5	19.9	17.1	91.4	47.6	19.4
Level of Service	F	F	A	F	E		F	B	B	F	D	B
Approach Delay (s)		37.3			95.4			31.2			47.3	
Approach LOS		D			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	48.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	200.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	90	119	77	58	80	154	1740	101	22	481	70
v/c Ratio	0.43	0.56	0.05	0.23	0.28	0.48	0.74	0.09	0.10	0.23	0.07
Control Delay	66.2	71.3	0.1	68.0	28.1	69.1	20.8	1.1	66.9	14.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.2	71.3	0.1	68.0	28.1	69.1	20.8	1.1	66.9	14.9	0.1
Queue Length 50th (ft)	86	116	0	27	12	74	627	0	10	110	0
Queue Length 95th (ft)	144	185	0	52	41	111	780	14	26	159	0
Internal Link Dist (ft)		420			670		920			1029	
Turn Bay Length (ft)	250		150	350		250		200	375		
Base Capacity (vph)	257	261	1583	251	283	457	2355	1095	457	2127	1001
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.46	0.05	0.23	0.28	0.34	0.74	0.09	0.05	0.23	0.07

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	445	57	1598	532	84	654
v/c Ratio	0.90	0.04	0.81	0.48	0.64	0.18
Control Delay	96.5	0.0	44.1	3.6	120.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	96.5	0.0	44.1	3.6	120.1	0.1
Queue Length 50th (ft)	616	0	982	6	120	0
Queue Length 95th (ft)	793	0	1195	72	197	0
Internal Link Dist (ft)	670		1020			780
Turn Bay Length (ft)		430		600	550	
Base Capacity (vph)	577	1583	1979	1115	169	3539
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	0.77	0.04	0.81	0.48	0.50	0.18

Intersection Summary

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	144	145	151	45	257	135	1859	19	73	1208	37
v/c Ratio	0.70	0.69	0.46	0.32	0.81	0.73	0.93	0.02	0.54	0.64	0.04
Control Delay	86.7	86.1	13.1	75.5	34.6	93.2	42.7	0.1	87.3	31.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.7	86.1	13.1	75.5	34.6	93.2	42.7	0.1	87.3	31.2	0.1
Queue Length 50th (ft)	160	161	0	48	48	143	912	0	77	465	0
Queue Length 95th (ft)	234	236	67	87	146	220	#1402	0	132	691	0
Internal Link Dist (ft)		598		772			1042			1670	
Turn Bay Length (ft)	165		165		60	570		370			300
Base Capacity (vph)	220	223	338	330	461	216	2000	937	214	1899	895
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.65	0.45	0.14	0.56	0.63	0.93	0.02	0.34	0.64	0.04

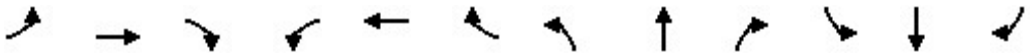
Intersection Summary

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

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	331	68	1468	182	68	1237
v/c Ratio	0.92	0.18	0.68	0.18	0.71	0.35
Control Delay	101.4	18.2	26.1	5.5	121.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.4	18.2	26.1	5.5	121.5	0.3
Queue Length 50th (ft)	404	10	623	27	85	0
Queue Length 95th (ft)	#588	58	701	64	#173	0
Internal Link Dist (ft)	970		808			1049
Turn Bay Length (ft)		265		250	220	
Base Capacity (vph)	387	391	2157	1014	96	3539
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	0.86	0.17	0.68	0.18	0.71	0.35

Intersection Summary

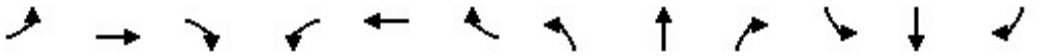
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	141	142	47	39	40	1	118	1558	260	206	1301	200
v/c Ratio	0.67	0.67	0.14	0.26	0.26	0.00	0.36	0.82	0.27	0.69	0.61	0.19
Control Delay	66.8	66.2	0.9	54.3	54.4	0.0	63.4	13.9	1.1	59.7	17.4	2.2
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	66.8	66.2	0.9	54.3	54.4	0.0	63.4	13.9	1.1	59.7	17.4	2.2
Queue Length 50th (ft)	111	112	0	30	30	0	48	134	0	149	325	0
Queue Length 95th (ft)	#200	#198	0	66	67	0	m75	#555	21	235	445	34
Internal Link Dist (ft)		432			432			1346			1420	
Turn Bay Length (ft)				250			225		325	300		600
Base Capacity (vph)	210	213	333	245	247	339	500	1894	967	303	2149	1040
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	0.67	0.67	0.14	0.16	0.16	0.00	0.24	0.82	0.27	0.68	0.61	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	57	28	93	174	76	198	72	1720	216	121	1126	69
v/c Ratio	0.21	0.16	0.38	0.49	0.26	0.51	0.39	0.90	0.24	0.53	0.54	0.07
Control Delay	36.1	52.6	7.8	41.9	47.9	11.3	73.1	31.0	3.4	63.6	12.0	0.9
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	36.1	52.6	7.8	41.9	47.9	11.3	73.1	31.0	3.4	63.6	12.0	0.9
Queue Length 50th (ft)	34	20	0	112	53	0	59	654	8	101	121	0
Queue Length 95th (ft)	68	50	22	174	101	69	108	#906	20	165	186	m3
Internal Link Dist (ft)		672			672			395			1495	
Turn Bay Length (ft)	200		225	250		250	350			250		350
Base Capacity (vph)	382	271	319	375	300	398	280	1908	919	267	2076	981
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	0.10	0.29	0.46	0.25	0.50	0.26	0.90	0.24	0.45	0.54	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	369	136	153	43	116	388	1399	141	51	708	351
v/c Ratio	0.61	0.41	0.15	0.27	0.34	0.69	0.51	0.16	0.18	0.31	0.40
Control Delay	49.5	46.9	0.3	53.6	44.6	54.2	19.8	3.5	59.3	13.1	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	46.9	0.3	53.6	44.6	54.2	19.8	3.5	59.3	13.1	4.6
Queue Length 50th (ft)	137	95	0	34	39	145	252	0	17	86	19
Queue Length 95th (ft)	178	149	0	73	69	201	349	36	m30	150	98
Internal Link Dist (ft)		1058			270		444			576	
Turn Bay Length (ft)	650		400	250		400		350	400		350
Base Capacity (vph)	772	419	1033	188	402	591	2759	895	572	2254	871
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.32	0.15	0.23	0.29	0.66	0.51	0.16	0.09	0.31	0.40

Intersection Summary

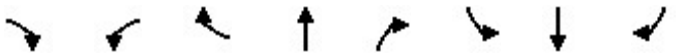
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	402	11	14	1519	729	103
v/c Ratio	0.69	0.02	0.14	0.43	0.39	0.12
Control Delay	42.9	24.4	59.4	0.4	17.6	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	24.4	59.4	0.4	17.6	3.4
Queue Length 50th (ft)	240	3	9	0	137	0
Queue Length 95th (ft)	434	19	34	0	246	29
Internal Link Dist (ft)	750			609	251	
Turn Bay Length (ft)		125	460			
Base Capacity (vph)	614	552	379	3539	2124	991
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	0.65	0.02	0.04	0.43	0.34	0.10

Intersection Summary

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	67	89	113	207	44	1287	57	15	665	6
v/c Ratio	0.38	0.32	0.50	0.13	0.31	0.67	0.06	0.11	0.38	0.01
Control Delay	67.0	4.7	64.1	0.2	69.2	23.1	1.1	68.2	21.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	4.7	64.1	0.2	69.2	23.1	1.1	68.2	21.1	0.0
Queue Length 50th (ft)	46	0	76	0	31	322	0	10	173	0
Queue Length 95th (ft)	127	9	190	0	94	606	9	44	267	0
Internal Link Dist (ft)	953		883			1750			738	
Turn Bay Length (ft)		135		300	460		530	560		485
Base Capacity (vph)	390	447	386	1583	458	2358	1083	458	2352	1081
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	0.20	0.29	0.13	0.10	0.55	0.05	0.03	0.28	0.01

Intersection Summary



Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1	112	312	745	32	47	924	1
v/c Ratio	0.00	0.44	0.57	0.48	0.04	0.19	0.47	0.00
Control Delay	0.0	28.8	7.6	14.9	0.1	28.0	8.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	28.8	7.6	14.9	0.1	28.0	8.8	0.0
Queue Length 50th (ft)	0	40	0	111	0	17	87	0
Queue Length 95th (ft)	0	82	55	180	0	47	152	0
Internal Link Dist (ft)				1526			1584	
Turn Bay Length (ft)		290	315		560	1000		500
Base Capacity (vph)	641	382	662	1548	773	248	1969	944
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	0.00	0.29	0.47	0.48	0.04	0.19	0.47	0.00

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	89	142	322	391	173	176	699	184	95	1917	171
v/c Ratio	0.44	0.68	0.20	0.88	0.35	0.58	0.33	0.18	0.43	0.93	0.18
Control Delay	87.7	100.2	0.3	105.6	51.2	95.3	20.6	3.3	95.5	47.9	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.7	100.2	0.3	105.6	51.2	95.3	20.6	3.3	95.5	47.9	9.4
Queue Length 50th (ft)	115	191	0	265	68	117	235	6	63	1203	42
Queue Length 95th (ft)	185	278	0	#355	113	160	300	46	97	#1494	92
Internal Link Dist (ft)		420			670		920			1029	
Turn Bay Length (ft)	250		150	350		250		200	375		
Base Capacity (vph)	235	242	1583	446	489	411	2139	1024	411	2057	961
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.59	0.20	0.88	0.35	0.43	0.33	0.18	0.23	0.93	0.18

Intersection Summary

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

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	698	90	844	689	169	1858
v/c Ratio	0.90	0.06	0.83	0.73	0.68	0.53
Control Delay	52.3	0.1	57.1	8.3	73.1	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	0.1	57.1	8.3	73.1	0.6
Queue Length 50th (ft)	583	0	410	0	157	0
Queue Length 95th (ft)	#888	0	#571	124	242	0
Internal Link Dist (ft)	670		1020			780
Turn Bay Length (ft)		430		600	550	
Base Capacity (vph)	887	1583	1014	945	386	3539
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	0.79	0.06	0.83	0.73	0.44	0.53

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	170	174	309	105	78	451	2088	46	412	2490	62
v/c Ratio	0.74	0.73	0.67	0.66	0.35	1.79	1.29	0.06	1.36	1.45	0.08
Control Delay	92.5	91.5	17.3	97.9	13.6	410.4	176.3	0.9	234.1	241.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.5	91.5	17.3	97.9	13.6	410.4	176.3	0.9	234.1	241.5	3.0
Queue Length 50th (ft)	201	205	26	119	0	~776	~1611	0	~623	~2053	0
Queue Length 95th (ft)	306	311	135	201	43	#1121	#1984	5	#950	#2458	19
Internal Link Dist (ft)		598		772			1042			1670	
Turn Bay Length (ft)	165		165		60	570		370			300
Base Capacity (vph)	335	345	543	364	388	252	1613	764	302	1714	807
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.50	0.57	0.29	0.20	1.79	1.29	0.06	1.36	1.45	0.08

Intersection Summary

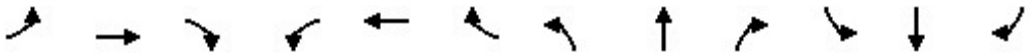
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	254	53	1371	427	73	1972
v/c Ratio	0.82	0.17	0.61	0.38	0.74	0.56
Control Delay	92.1	14.5	21.6	5.0	121.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.1	14.5	21.6	5.0	121.2	0.6
Queue Length 50th (ft)	295	0	490	50	87	0
Queue Length 95th (ft)	404	43	627	122	#191	0
Internal Link Dist (ft)	970		808			1049
Turn Bay Length (ft)		265		250	220	
Base Capacity (vph)	399	398	2239	1117	99	3539
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	0.64	0.13	0.61	0.38	0.74	0.56

Intersection Summary

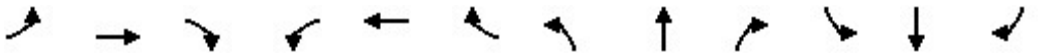
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	199	200	133	146	149	2	176	1615	87	58	1871	272
v/c Ratio	0.80	0.80	0.39	0.68	0.67	0.01	0.57	0.77	0.09	0.45	0.93	0.27
Control Delay	97.2	97.1	14.6	89.7	89.5	0.0	95.6	31.0	3.4	89.6	46.1	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	97.2	97.1	14.6	89.7	89.5	0.0	95.6	31.0	3.4	89.6	46.1	2.9
Queue Length 50th (ft)	240	241	7	175	180	0	108	1005	9	67	1085	0
Queue Length 95th (ft)	344	345	74	255	260	0	155	1109	13	119	#1390	50
Internal Link Dist (ft)		432			432			1346			1420	
Turn Bay Length (ft)				250			225		325	300		600
Base Capacity (vph)	275	277	364	275	280	329	352	2109	980	181	2005	1014
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	0.72	0.37	0.53	0.53	0.01	0.50	0.77	0.09	0.32	0.93	0.27

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	142	112	342	208	108	101	150	1416	114	110	1915	144
v/c Ratio	0.46	0.54	0.89	0.65	0.41	0.34	0.69	0.69	0.12	0.61	0.96	0.16
Control Delay	58.3	86.2	46.2	65.6	75.7	14.9	96.1	27.8	5.7	107.2	28.4	2.5
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	58.3	86.2	46.2	65.6	75.7	14.9	96.1	27.8	5.7	107.2	28.4	2.5
Queue Length 50th (ft)	134	126	111	205	116	0	176	574	3	130	962	8
Queue Length 95th (ft)	204	#228	#338	293	192	63	m252	740	m44	m149	#1392	m13
Internal Link Dist (ft)		672			672			395			1495	
Turn Bay Length (ft)	200		225	250		250	350			250		350
Base Capacity (vph)	408	206	383	363	266	296	265	2056	955	265	1987	928
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	0.54	0.89	0.57	0.41	0.34	0.57	0.69	0.12	0.42	0.96	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	404	134	414	114	232	256	1026	76	67	1937	463
v/c Ratio	0.77	0.47	0.26	0.63	0.61	0.65	0.34	0.08	0.30	0.70	0.48
Control Delay	83.8	75.2	0.4	91.9	78.7	83.8	19.8	1.6	86.6	23.3	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.8	75.2	0.4	91.9	78.7	83.8	19.8	1.6	86.6	23.3	9.1
Queue Length 50th (ft)	237	145	0	142	137	151	228	0	41	391	69
Queue Length 95th (ft)	301	222	0	225	189	198	276	16	m51	m517	m94
Internal Link Dist (ft)		1058			270		444			576	
Turn Bay Length (ft)	650		400	250		400		350	400		350
Base Capacity (vph)	553	300	1583	205	429	610	3006	954	610	2757	957
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.45	0.26	0.56	0.54	0.42	0.34	0.08	0.11	0.70	0.48

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	182	16	12	899	1762	413
v/c Ratio	0.71	0.07	0.14	0.25	0.68	0.34
Control Delay	72.1	26.7	70.7	0.2	12.8	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	26.7	70.7	0.2	12.8	4.4
Queue Length 50th (ft)	150	2	10	0	309	38
Queue Length 95th (ft)	255	25	36	0	683	131
Internal Link Dist (ft)	750			609	251	
Turn Bay Length (ft)		125	460			
Base Capacity (vph)	529	483	327	3539	2605	1221
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	0.03	0.04	0.25	0.68	0.34

Intersection Summary

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	92	123	185	70	89	891	87	81	1477	44
v/c Ratio	0.57	0.47	0.77	0.04	0.61	0.48	0.10	0.51	0.79	0.05
Control Delay	90.5	13.9	93.3	0.0	94.9	27.4	4.3	87.7	36.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.5	13.9	93.3	0.0	94.9	27.4	4.3	87.7	36.6	0.1
Queue Length 50th (ft)	104	0	208	0	102	332	0	91	698	0
Queue Length 95th (ft)	176	55	#346	0	172	445	33	158	908	0
Internal Link Dist (ft)	953		883			1750			738	
Turn Bay Length (ft)		135		300	460		530	560		485
Base Capacity (vph)	274	352	270	1583	319	1786	842	319	1880	881
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	0.34	0.35	0.69	0.04	0.28	0.50	0.10	0.25	0.79	0.05

Intersection Summary

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

Lane Group	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1	95	163	1	1069	146	235	1110	2
v/c Ratio	0.00	0.42	0.33	0.00	0.76	0.20	1.05	0.56	0.00
Control Delay	21.0	29.9	1.9	26.0	21.5	3.7	106.1	12.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	29.9	1.9	26.0	21.5	3.7	106.1	12.3	0.0
Queue Length 50th (ft)	0	33	0	0	176	0	~99	109	0
Queue Length 95th (ft)	4	73	2	4	275	32	#238	#304	0
Internal Link Dist (ft)	237				1526			1584	
Turn Bay Length (ft)		290	315	1000		560	1000		500
Base Capacity (vph)	458	346	600	224	1403	715	224	1995	955
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.27	0.27	0.00	0.76	0.20	1.05	0.56	0.00

Intersection Summary

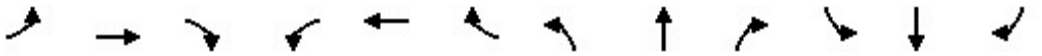
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	677	87	819	668	164	1802
Future Volume (vph)	677	87	819	668	164	1802
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	7.0	7.0	5.5	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	698	90	844	689	169	1858
RTOR Reduction (vph)	0	0	0	491	0	0
Lane Group Flow (vph)	698	90	844	198	169	1858
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	4!		2		1	Free!
Permitted Phases		Free		2		
Actuated Green, G (s)	62.1	141.0	40.5	40.5	19.9	141.0
Effective Green, g (s)	62.1	141.0	40.5	40.5	19.9	141.0
Actuated g/C Ratio	0.44	1.00	0.29	0.29	0.14	1.00
Clearance Time (s)	6.0		7.0	7.0	5.5	
Vehicle Extension (s)	6.0		8.0	8.0	4.0	
Lane Grp Cap (vph)	779	1583	1016	454	249	3539
v/s Ratio Prot	c0.39		c0.24		c0.10	0.52
v/s Ratio Perm		0.06		0.12		
v/c Ratio	0.90	0.06	0.83	0.44	0.68	0.53
Uniform Delay, d1	36.5	0.0	47.0	40.9	57.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	0.1	7.4	2.8	7.8	0.6
Delay (s)	50.6	0.1	54.5	43.8	65.3	0.6
Level of Service	D	A	D	D	E	A
Approach Delay (s)	44.9		49.7			6.0
Approach LOS	D		D			A

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	141.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	221	88	278	34	60	70	406	1879	41	371	2241	56
Future Volume (vph)	221	88	278	34	60	70	406	1879	41	371	2241	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1732	1583		1830	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.98	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1732	1583		1830	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	246	98	309	38	67	78	451	2088	46	412	2490	62
RTOR Reduction (vph)	0	0	245	0	0	71	0	0	25	0	0	32
Lane Group Flow (vph)	170	174	64	0	105	7	451	2088	21	412	2490	30
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3			6			2
Actuated Green, G (s)	24.1	24.1	24.1		15.5	15.5	25.1	80.3	80.3	30.1	85.3	85.3
Effective Green, g (s)	24.1	24.1	24.1		15.5	15.5	25.1	80.3	80.3	30.1	85.3	85.3
Actuated g/C Ratio	0.14	0.14	0.14		0.09	0.09	0.14	0.46	0.46	0.17	0.48	0.48
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	3.5	3.5	3.5		3.0	3.0	3.5	6.0	6.0	3.5	6.0	6.0
Lane Grp Cap (vph)	230	237	216		161	139	252	1614	722	302	1715	767
v/s Ratio Prot	c0.10	0.10			c0.06		c0.25	0.59		0.23	c0.70	
v/s Ratio Perm			0.04			0.00			0.01			0.02
v/c Ratio	0.74	0.73	0.30		0.65	0.05	1.79	1.29	0.03	1.36	1.45	0.04
Uniform Delay, d1	72.9	72.9	68.3		77.6	73.5	75.5	47.9	26.4	73.0	45.4	23.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.1	11.5	0.9		9.1	0.1	370.9	136.9	0.0	183.8	206.7	0.1
Delay (s)	85.0	84.4	69.2		86.8	73.7	446.3	184.7	26.4	256.8	252.0	23.9
Level of Service	F	F	E		F	E	F	F	C	F	F	C
Approach Delay (s)		77.4			81.2			227.6			247.9	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	217.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	176.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	239	50	1289	401	69	1854
Future Volume (vph)	239	50	1289	401	69	1854
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	8.0	8.0	11.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	254	53	1371	427	73	1972
RTOR Reduction (vph)	0	44	0	116	0	0
Lane Group Flow (vph)	254	9	1371	311	73	1972
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4!		2 9		1	Free!
Permitted Phases		4		2 9		
Actuated Green, G (s)	31.2	31.2	112.5	112.5	10.0	177.7
Effective Green, g (s)	31.2	31.2	112.5	112.5	10.0	177.7
Actuated g/C Ratio	0.18	0.18	0.63	0.63	0.06	1.00
Clearance Time (s)	5.0	5.0			11.0	
Vehicle Extension (s)	4.0	4.0			3.5	
Lane Grp Cap (vph)	310	277	2240	1002	99	3539
v/s Ratio Prot	c0.14		c0.39		0.04	0.56
v/s Ratio Perm		0.01		0.20		
v/c Ratio	0.82	0.03	0.61	0.31	0.74	0.56
Uniform Delay, d1	70.5	60.7	19.5	14.9	82.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.1	0.1	1.2	0.8	25.3	0.6
Delay (s)	86.7	60.8	20.7	15.6	107.9	0.6
Level of Service	F	E	C	B	F	A
Approach Delay (s)	82.2		19.5			4.5
Approach LOS	F		B			A

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	177.7	Sum of lost time (s)	32.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

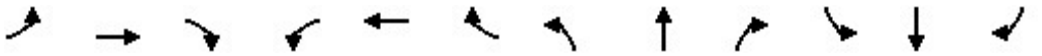
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	375	16	130	239	50	2	30	142	1583	85	7	50
Future Volume (vph)	375	16	130	239	50	2	30	142	1583	85	7	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	5.0		3.0	3.0	3.0		3.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00		0.97	0.95	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	0.96	1.00	0.95	0.97	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1681	1692	1583	1681	1713	1583		3433	3539	1583		1770
Flt Permitted	0.95	0.96	1.00	0.95	0.97	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1681	1692	1583	1681	1713	1583		3433	3539	1583		1770
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	383	16	133	244	51	2	31	145	1615	87	7	51
RTOR Reduction (vph)	0	0	107	0	0	2	0	0	0	36	0	0
Lane Group Flow (vph)	199	200	26	146	149	0	0	176	1615	51	0	58
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3			4				6		
Actuated Green, G (s)	23.6	23.6	23.6	20.2	20.2	20.2		13.2	101.1	101.1		9.1
Effective Green, g (s)	26.6	26.6	26.6	23.2	23.2	21.2		16.2	106.1	106.1		12.1
Actuated g/C Ratio	0.15	0.15	0.15	0.13	0.13	0.12		0.09	0.59	0.59		0.07
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	8.0	8.0		6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.5	2.5	2.5		2.0	5.0	5.0		2.0
Lane Grp Cap (vph)	248	250	233	216	220	186		308	2086	933		118
v/s Ratio Prot	c0.12	0.12		0.09	c0.09			c0.05	0.46			0.03
v/s Ratio Perm			0.02			0.00				0.03		
v/c Ratio	0.80	0.80	0.11	0.68	0.68	0.00		0.57	0.77	0.05		0.49
Uniform Delay, d1	74.2	74.1	66.4	74.8	74.8	70.1		78.6	27.9	15.7		81.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.14	0.95	0.99		1.00
Incremental Delay, d2	16.0	15.7	0.1	7.4	7.3	0.0		1.4	2.4	0.1		1.2
Delay (s)	90.1	89.8	66.5	82.2	82.1	70.1		90.8	28.9	15.5		82.2
Level of Service	F	F	E	F	F	E		F	C	B		F
Approach Delay (s)		84.1			82.1				34.1			
Approach LOS		F			F				C			

Intersection Summary			
HCM 2000 Control Delay	46.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1834	267
Future Volume (vph)	1834	267
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	3.0	3.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1583
Peak-hour factor, PHF	0.98	0.98
Adj. Flow (vph)	1871	272
RTOR Reduction (vph)	0	118
Lane Group Flow (vph)	1871	154
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	97.0	97.0
Effective Green, g (s)	102.0	102.0
Actuated g/C Ratio	0.57	0.57
Clearance Time (s)	8.0	8.0
Vehicle Extension (s)	5.0	5.0
Lane Grp Cap (vph)	2005	897
v/s Ratio Prot	c0.53	
v/s Ratio Perm		0.10
v/c Ratio	0.93	0.17
Uniform Delay, d1	35.9	18.7
Progression Factor	1.00	1.00
Incremental Delay, d2	9.5	0.4
Delay (s)	45.4	19.1
Level of Service	D	B
Approach Delay (s)	43.1	
Approach LOS	D	

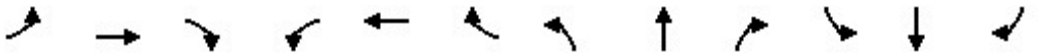
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	110	335	204	106	99	147	1388	112	108	1877	141
Future Volume (vph)	139	110	335	204	106	99	147	1388	112	108	1877	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	5.0	3.0	3.0	5.0	4.0	3.0	3.0	4.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.65	1.00	1.00	0.35	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1216	1863	1583	657	1863	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	142	112	342	208	108	101	150	1416	114	110	1915	144
RTOR Reduction (vph)	0	0	226	0	0	88	0	0	36	0	0	39
Lane Group Flow (vph)	142	112	116	208	108	13	150	1416	78	110	1915	105
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Actuated Green, G (s)	33.0	16.9	16.9	43.9	22.8	22.8	20.0	101.1	101.1	16.5	97.6	97.6
Effective Green, g (s)	37.0	19.9	17.9	45.9	25.8	23.8	22.0	104.6	104.6	18.5	101.1	101.1
Actuated g/C Ratio	0.21	0.11	0.10	0.25	0.14	0.13	0.12	0.58	0.58	0.10	0.56	0.56
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5	6.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	305	205	157	315	267	209	216	2056	919	181	1987	889
v/s Ratio Prot	0.05	0.06		c0.09	0.06		c0.08	c0.40		0.06	c0.54	
v/s Ratio Perm	0.05		0.07	c0.08		0.01			0.05			0.07
v/c Ratio	0.47	0.55	0.74	0.66	0.40	0.06	0.69	0.69	0.09	0.61	0.96	0.12
Uniform Delay, d1	61.8	75.8	78.8	57.0	70.1	68.4	75.8	26.3	16.6	77.3	37.7	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.06	0.94	0.91	1.31	0.50	0.28
Incremental Delay, d2	0.4	1.6	14.4	4.0	0.4	0.0	9.0	1.8	0.2	2.8	8.0	0.1
Delay (s)	62.2	77.4	93.2	61.0	70.5	68.4	89.3	26.5	15.3	103.8	26.9	5.4
Level of Service	E	E	F	E	E	E	F	C	B	F	C	A
Approach Delay (s)		82.8			65.2			31.4			29.4	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	384	127	393	126	158	45	243	975	72	64	1840	440
Future Volume (vph)	384	127	393	126	158	45	243	975	72	64	1840	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	1.0	4.0	4.0		4.0	3.0	5.5	4.0	3.0	5.5
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1610	3274		3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1610	3274		3433	5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	404	134	414	133	166	47	256	1026	76	67	1937	463
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	32	0	0	121
Lane Group Flow (vph)	404	134	414	114	220	0	256	1026	44	67	1937	342
Turn Type	Split	NA	Free	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases			Free						6			2
Actuated Green, G (s)	24.5	24.5	180.0	17.2	17.2		18.7	102.9	102.9	9.9	94.1	94.1
Effective Green, g (s)	27.5	27.5	180.0	20.2	20.2		20.7	106.4	103.9	11.9	97.6	95.1
Actuated g/C Ratio	0.15	0.15	1.00	0.11	0.11		0.11	0.59	0.58	0.07	0.54	0.53
Clearance Time (s)	6.0	6.0		7.0	7.0		6.0	6.5	6.5	6.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	524	284	1583	180	367		394	3005	913	226	2757	836
v/s Ratio Prot	c0.12	0.07		c0.07	0.07		c0.07	0.20		0.02	c0.38	
v/s Ratio Perm			0.26						0.03			0.22
v/c Ratio	0.77	0.47	0.26	0.63	0.60		0.65	0.34	0.05	0.30	0.70	0.41
Uniform Delay, d1	73.2	69.6	0.0	76.4	76.1		76.2	18.9	16.5	80.1	30.5	25.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.06	0.70	0.66
Incremental Delay, d2	6.9	1.2	0.4	7.1	2.8		3.7	0.3	0.1	0.7	1.0	1.0
Delay (s)	80.1	70.9	0.4	83.4	78.8		79.9	19.2	16.6	85.5	22.4	18.0
Level of Service	F	E	A	F	E		E	B	B	F	C	B
Approach Delay (s)		44.2			80.3			30.5			23.3	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	595	29	116	569	13	97
Future Volume (Veh/h)	595	29	116	569	13	97
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	654	32	127	625	14	107
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			686		1533	654
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			686		1533	654
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		87	77
cM capacity (veh/h)			908		110	467

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	654	32	127	625	121
Volume Left	0	0	127	0	14
Volume Right	0	32	0	0	107
cSH	1700	1700	908	1700	528
Volume to Capacity	0.38	0.02	0.14	0.37	0.23
Queue Length 95th (ft)	0	0	12	0	22
Control Delay (s)	0.0	0.0	9.6	0.0	18.2
Lane LOS			A		C
Approach Delay (s)	0.0		1.6		18.2
Approach LOS					C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	43	50	1477	2491	59
Future Volume (Veh/h)	24	43	50	1477	2491	59
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	26	46	53	1571	2650	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3542	1325	2713			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3542	1325	2713			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	69	64			
cM capacity (veh/h)	3	146	147			

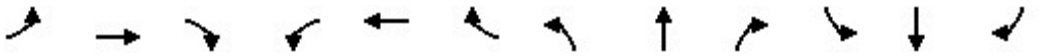
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	72	53	786	786	1325	1325	63
Volume Left	26	53	0	0	0	0	0
Volume Right	46	0	0	0	0	0	63
cSH	8	147	1700	1700	1700	1700	1700
Volume to Capacity	9.60	0.36	0.46	0.46	0.78	0.78	0.04
Queue Length 95th (ft)	Err	37	0	0	0	0	0
Control Delay (s)	Err	42.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	E					
Approach Delay (s)	Err	1.4			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	163.8		
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	180	16	12	890	1744	409
Future Volume (vph)	180	16	12	890	1744	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.0	4.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	182	16	12	899	1762	413
RTOR Reduction (vph)	0	11	0	0	0	60
Lane Group Flow (vph)	182	5	12	899	1762	353
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4!		1	Free!	2 9	
Permitted Phases		4				2 9
Actuated Green, G (s)	19.8	19.8	2.8	139.4	100.3	100.3
Effective Green, g (s)	19.8	19.8	2.8	139.4	100.3	100.3
Actuated g/C Ratio	0.14	0.14	0.02	1.00	0.72	0.72
Clearance Time (s)	5.5	5.5	5.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	251	224	35	3539	2546	1138
v/s Ratio Prot	c0.10		0.01	0.25	c0.50	
v/s Ratio Perm		0.00				0.22
v/c Ratio	0.73	0.02	0.34	0.25	0.69	0.31
Uniform Delay, d1	57.2	51.5	67.4	0.0	10.9	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.9	0.0	5.8	0.2	1.1	0.3
Delay (s)	67.1	51.5	73.2	0.2	12.0	7.4
Level of Service	E	D	E	A	B	A
Approach Delay (s)	65.9			1.1	11.1	
Approach LOS	E			A	B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	139.4	Sum of lost time (s)	22.5
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

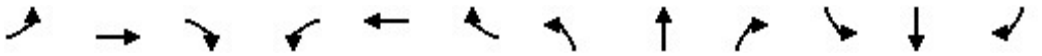
! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	55	114	112	60	65	83	829	81	75	1374	41
Future Volume (vph)	31	55	114	112	60	65	83	829	81	75	1374	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	4.0	5.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1830	1583		1804	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.98	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1830	1583		1804	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	33	59	123	120	65	70	89	891	87	81	1477	44
RTOR Reduction (vph)	0	0	112	0	0	0	0	0	41	0	0	21
Lane Group Flow (vph)	0	92	11	0	185	70	89	891	46	81	1477	23
Turn Type	Split	NA	Perm	Split	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2 9		1	6 9	
Permitted Phases			4			Free			2 9			6 9
Actuated Green, G (s)		15.0	15.0		22.6	168.3	14.1	88.5	88.5	15.2	89.6	89.6
Effective Green, g (s)		15.0	15.0		22.6	168.3	14.1	88.5	88.5	15.2	89.6	89.6
Actuated g/C Ratio		0.09	0.09		0.13	1.00	0.08	0.53	0.53	0.09	0.53	0.53
Clearance Time (s)		7.0	7.0		7.0		5.0			5.0		
Vehicle Extension (s)		4.0	4.0		4.0		3.0			5.0		
Lane Grp Cap (vph)		163	141		242	1583	148	1860	832	159	1884	842
v/s Ratio Prot		c0.05			c0.10		c0.05	0.25		0.05	c0.42	
v/s Ratio Perm			0.01			c0.04			0.03			0.01
v/c Ratio		0.56	0.08		0.76	0.04	0.60	0.48	0.05	0.51	0.78	0.03
Uniform Delay, d1		73.5	70.3		70.3	0.0	74.4	25.3	19.5	73.0	31.6	18.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.3	0.3		14.1	0.1	6.7	0.4	0.1	5.3	2.8	0.0
Delay (s)		78.9	70.6		84.4	0.1	81.1	25.7	19.5	78.3	34.3	18.7
Level of Service		E	E		F	A	F	C	B	E	C	B
Approach Delay (s)		74.2			61.3			29.8			36.1	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	168.3	Sum of lost time (s)	35.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

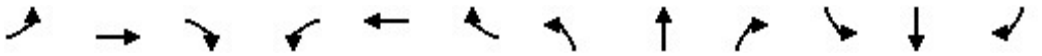
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	0	86	0	148	1	973	133	214	1010	2
Future Volume (vph)	0	1	0	86	0	148	1	973	133	214	1010	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0		7.0	5.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor		1.00		1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00		1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1863		1770		1583	1770	3539	1583	1770	3539	1583
Flt Permitted		1.00		0.76		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1863		1410		1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	1	0	95	0	163	1	1069	146	235	1110	2
RTOR Reduction (vph)	0	0	0	0	0	139	0	0	83	0	0	1
Lane Group Flow (vph)	0	1	0	95	0	24	1	1069	63	235	1110	1
Turn Type	Perm	NA	Perm	Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Actuated Green, G (s)		10.1		10.1		10.1	1.5	29.1	29.1	8.0	35.6	35.6
Effective Green, g (s)		10.1		10.1		10.1	1.5	29.1	29.1	8.0	35.6	35.6
Actuated g/C Ratio		0.15		0.15		0.15	0.02	0.43	0.43	0.12	0.53	0.53
Clearance Time (s)		7.0		7.0		7.0	5.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)		3.0		3.0		3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)		280		211		237	39	1532	685	210	1874	838
v/s Ratio Prot		0.00					0.00	c0.30		c0.13	0.31	
v/s Ratio Perm				c0.07		0.02			0.04			0.00
v/c Ratio		0.00		0.45		0.10	0.03	0.70	0.09	1.12	0.59	0.00
Uniform Delay, d1		24.3		26.0		24.6	32.1	15.5	11.3	29.6	10.8	7.4
Progression Factor		1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.0		1.5		0.2	0.3	1.8	0.1	97.7	0.8	0.0
Delay (s)		24.3		27.5		24.8	32.4	17.3	11.4	127.3	11.6	7.4
Level of Service		C		C		C	C	B	B	F	B	A
Approach Delay (s)		24.3			25.8			16.6			31.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	18	0	0	76	14	1441	79	122	1129	8
Future Volume (Veh/h)	0	0	18	0	0	76	14	1441	79	122	1129	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	19	0	0	78	14	1486	81	126	1164	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								Raised			Raised	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2187	3011	582	2367	2938	743	1172			1567		
vC1, stage 1 conf vol	1416	1416		1514	1514							
vC2, stage 2 conf vol	771	1595		853	1424							
vCu, unblocked vol	2187	3011	582	2367	2938	743	1172			1567		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	96	100	100	78	98			70		
cM capacity (veh/h)	61	28	456	75	71	358	592			417		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	19	78	14	743	743	81	126	582	582	8
Volume Left	0	0	14	0	0	0	126	0	0	0
Volume Right	19	78	0	0	0	81	0	0	0	8
cSH	456	358	592	1700	1700	1700	417	1700	1700	1700
Volume to Capacity	0.04	0.22	0.02	0.44	0.44	0.05	0.30	0.34	0.34	0.00
Queue Length 95th (ft)	3	20	2	0	0	0	31	0	0	0
Control Delay (s)	13.2	17.9	11.2	0.0	0.0	0.0	17.3	0.0	0.0	0.0
Lane LOS	B	C	B				C			
Approach Delay (s)	13.2	17.9	0.1				1.7			
Approach LOS	B	C								

Intersection Summary					
Average Delay	1.3				
Intersection Capacity Utilization	53.3%	ICU Level of Service		A	
Analysis Period (min)	15				