

MEMORANDUM



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To: Richard Brockmyer
Montgomery County Planning Department

CC: Kwesi Woodroffe, Maryland State Highway Administration
Deepak Somarajan, Montgomery County Department of Transportation
Abbey Oklak, Kimco Development Corporation
Heather Dlhopsky, Wire Gill

From: Michael J. Workosky, PTP, TOPS, TSOS
Brant T. McKinney
Wells + Associates, Inc.

Date: February 10, 2025

Re: Pike Center
Supplemental Analysis and Access Study;
Montgomery County, Maryland

**Exhibit 38
H-155**

Introduction

This memorandum summarizes a supplemental analysis and access study for Pike Center. The project is located on the east side of Rockville Pike (MD Route 355) and north of Bou Avenue in Montgomery County, Maryland. It is being submitted pursuant to an email received on February 3rd, 2025 sent by M-NCPPC and MCDOT requesting findings and guidance on additional supplemental analysis to precede the resubmission of a full LATR study which is being prepared forthwith and will be submitted prior to a Planning Board hearing in April of 2025.

The existing retail shopping center of approximately 81,000 square feet (S.F.) and commercial uses is proposed to be redeveloped with up to 290 mid-rise and 470 high-rise apartment dwelling units and up to 90,000 S.F. of retail space (including a supermarket). The proposed development is expected to occur in two phases with phase one expected to be built in 2034 and phase two in 2039.

The purpose of the study is to update the capacity and queuing analyses to reflect new traffic signal timing and phasing information provided by Montgomery County Department of Transportation (MCDOT) and the Maryland State Highway Administration (SHA) for all conditions and to investigate potential changes that would restrict access at various locations serving the site.

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The study is based on the Local Area Transportation Review (LATR) study, dated October 21, 2024 and supplemental analyses prepared in December 2024 for both phase 1 and phase 2 conditions.

Note that the previous versions of the LATR studies provided as well as any supplemental materials have been prepared in accordance with the 2024 LATR Guidelines. At the time of Preliminary/Site Plan, the analysis will be reevaluated in accordance with the 2025 LATR Guidelines.

Traffic Volumes, Forecasts, and Lane Use

A summary of the existing, background, site generated traffic assignments and total future traffic volumes from the aforementioned LATR study were used for this study. In addition, these volumes were adjusted to reflect the potential changes in access for both phase 1 (2034) and phase 2 (2039) conditions. All report figures that include the site plans, traffic forecasts, and associated lane use changes are attached to this document.

Existing and Background Conditions Capacity and Queuing Analysis

Subsequent to the most recent update to the LATR, updated traffic signal timing and phasing information was provided by MCDOT for the study intersections. These have been incorporated into the existing and background analysis scenarios and are summarized on the attached tables. Please note that several illegal left turn movements were observed and counted at one of the study intersections. These vehicles were omitted from the analysis due to the illegality of the maneuver.

The results for both existing and background conditions are consistent with those presented in the previously prepared and submitted studies, and indicate that all of the intersections within the Orange Policy Area currently operate within applicable thresholds with overall delays below 71 seconds per vehicle. These conditions are expected to continue under background conditions in both 2034 and 2039. A summary of the capacity analysis and queuing tables are attached to this document. Detailed capacity analyses are contained in the Appendix.

Future Conditions Capacity and Queuing Analysis

The future conditions analysis under the currently proposed site access scheme were reevaluated based on the updated traffic signal timings and phasings. The results indicate that all of the intersections within the Orange Policy Area would continue to operate within applicable thresholds with overall delays below 71 seconds per vehicle without further improvements in

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both 2034 and 2039. The queuing results are also consistent with those provided in previous studies.

Site Access Modifications

The following summarizes the previous assumptions and potential access changes evaluated as part of this study:

Intersection 2 – Rockville Pike/Pike Center Driveway. This intersection is currently signalized with full movement access. No changes are proposed at this location.

Intersection 6 – Chapman Avenue/Pike Center Driveway North. This intersection is currently an unsignalized full movement access point and was assumed to be restricted to service vehicles only exiting the site onto Chapman Avenue in future conditions. No vehicular access to the parking garage would be provided.

Intersection 7 – Chapman Avenue/Rollins Avenue/Site Driveway. This intersection would provide full movements and was assumed to be signalized under direction by M-NCPPC and MCDOT staff since the eastbound and westbound side-street approaches were forecasted to operate at near or beyond capacity during the PM peak hour under stop control. In addition, the new traffic signal was assumed to be coordinated with the existing traffic signal at Bou Avenue to the south and utilize the same cycle length given the proximity of the intersection. A review of the peak hour volume warrants indicates that the peak hour volume warrant is met under phase 2 conditions during the PM peak hour. While the peak hour warrant is met during this condition, careful consideration should be given to decide whether a signal is necessary at this location due to the proximity of adjacent signals, a review of the four-hour, eight-hour and other traffic signal warrants, and the potential for other access management scenarios which could alleviate the heightened side-street movement volumes.

Intersection 10 – Bou Avenue/Pike Center Driveway. This intersection is proposed to be modified to restrict access to right-in/right-out only and operate under stop sign control.

Intersection 18 – Rockville Pike/Rollins Avenue Extended. This intersection was assumed to remain as previously proposed and provide right-in/right-out access only.

It is noted that although other combinations of potential access restrictions were discussed, this scheme presents the most restrictive access to the site and was chosen for evaluation.

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Capacity and Queuing Analysis Summary

Capacity and queuing analyses were prepared for phase 1 and phase 2 conditions based on the HCM 2000 Edition methodology for signalized and unsignalized intersections. The queuing analyses are based on five (5) SimTraffic runs in accordance with SHA procedures.

The congestion standard (HCM delay based) for intersections within the Orange North Bethesda Policy Area is an overall average vehicle delay of 71 seconds per vehicle.

The results of the analyses are summarized on attached Tables and described below. Detailed capacity analyses are contained in the Appendix.

1. The overall results of the analysis indicate that all the study intersections in the Orange Policy Area would continue to operate within the 71 second per vehicle delay standard with the modified access scheme under both phase 1 and phase 2 conditions, without additional road improvements.
2. Only minor changes in overall delay would be realized at most off-site intersections when comparing the original and modified conditions, with most intersections experiencing fewer than five (5) seconds of increased delay. The most significant increase in delay would be realized at the Rockville Pike/Bou Avenue intersection, with an increase of over 10 seconds during the PM peak hour in phase 2.
3. The modified access scheme would increase site traffic movements primarily at the Rockville Pike site driveway (intersection 2) and Chapman Drive site driveway (intersection 7) given the restrictions at intersections 6 and 10. This would likely necessitate the need for a new traffic signal at intersection 7 in phase 1.
4. Overall delays at the Rockville Pike/Site Driveway intersection (intersection 2) would increase by approximately 10 seconds in phase 1 during the PM peak hour under the modified access scheme, with the southbound left increasing by more than 30 seconds. This also impacts the southbound queue, resulting in an increase of approximately 80 feet (or three [3] vehicles) that would just exceed the vehicle storage area. This is due to the left turn restriction at the Bou Avenue driveway. Thus, while the overall intersection would function at overall acceptable levels of service, the modified access would impact the southbound left turn movement until future conditions in phase 2 are realized.
5. Given the significant increases in traffic volume, a traffic signal would likely be required at the Chapman Avenue/Rollins Avenue/Site Driveway intersection (intersection 7) in phase 1. The traffic signal would require split phasing to accommodate the forecasts and was assumed to be coordinated with the Bou Avenue signal.

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6. The exiting traffic movements at the Bou Avenue/Site Driveway intersection (intersection 10) would continue to operate at acceptable levels of service during all analysis periods assuming right-in/right-out only access. Note that while there would be a reduction in delay and queuing for exiting traffic when compared to unrestricted conditions, the previously prepared analysis forecasted acceptable levels of service for this approach during both peak hours and for both phases 1 and 2. Allowing left turns to and from the site at this location would reduce the delay and pressure at the main driveway on Rockville Pike and on Chapman Avenue, and provide for less circuitous routes for retail patrons and residents, primarily during non-peak periods.
7. The results of the queuing analyses are provided for both phase 1 and phase 2 conditions. The overall results are similar to those provided in previous studies for the off-site intersections. It is noted that the queue for key movements serving the site at both the Rockville Pike and Chapman Avenue intersections would increase due to the increase in site traffic created by the modified access plan that concentrates traffic at these locations.

Summary

The results of the supplemental traffic analysis and access study that incorporates updated traffic signal timing and phasing information indicate that all of the study intersections in the Orange Policy Area currently operate within acceptable thresholds (with overall delays of less than 71 seconds) during both the AM and PM peak hours, and would continue to do so under future conditions with the site redevelopment without additional roadway improvements. These conditions are expected to be realized under buildout conditions in phases 1 and 2 under both the current access scheme or with the modified access scheme that restricts access at the north driveway on Chapman Avenue and the full-movement driveway on Bou Avenue.

The potential turn restrictions would increase the concentration of site traffic at the main driveways on Rockville Pike and on Chapman Avenue, and likely require the need for a traffic signal at the Chapman Avenue driveway in phase 1 in order to maintain adequate traffic operations and effectively manage queuing.

While the results show that overall levels of service could be maintained at the study intersections, restricting access at these select locations creates more circuitous routes for retail patrons and residents that would be inconvenienced even during non-peak periods when congestion levels and queuing are lower. Thus, unrestricted access to the site would provide a better disbursement of traffic over the roadway network and more opportune routes for patrons and residents.

Questions regarding this document should be directed to Wells + Associates.

REPORT FIGURES

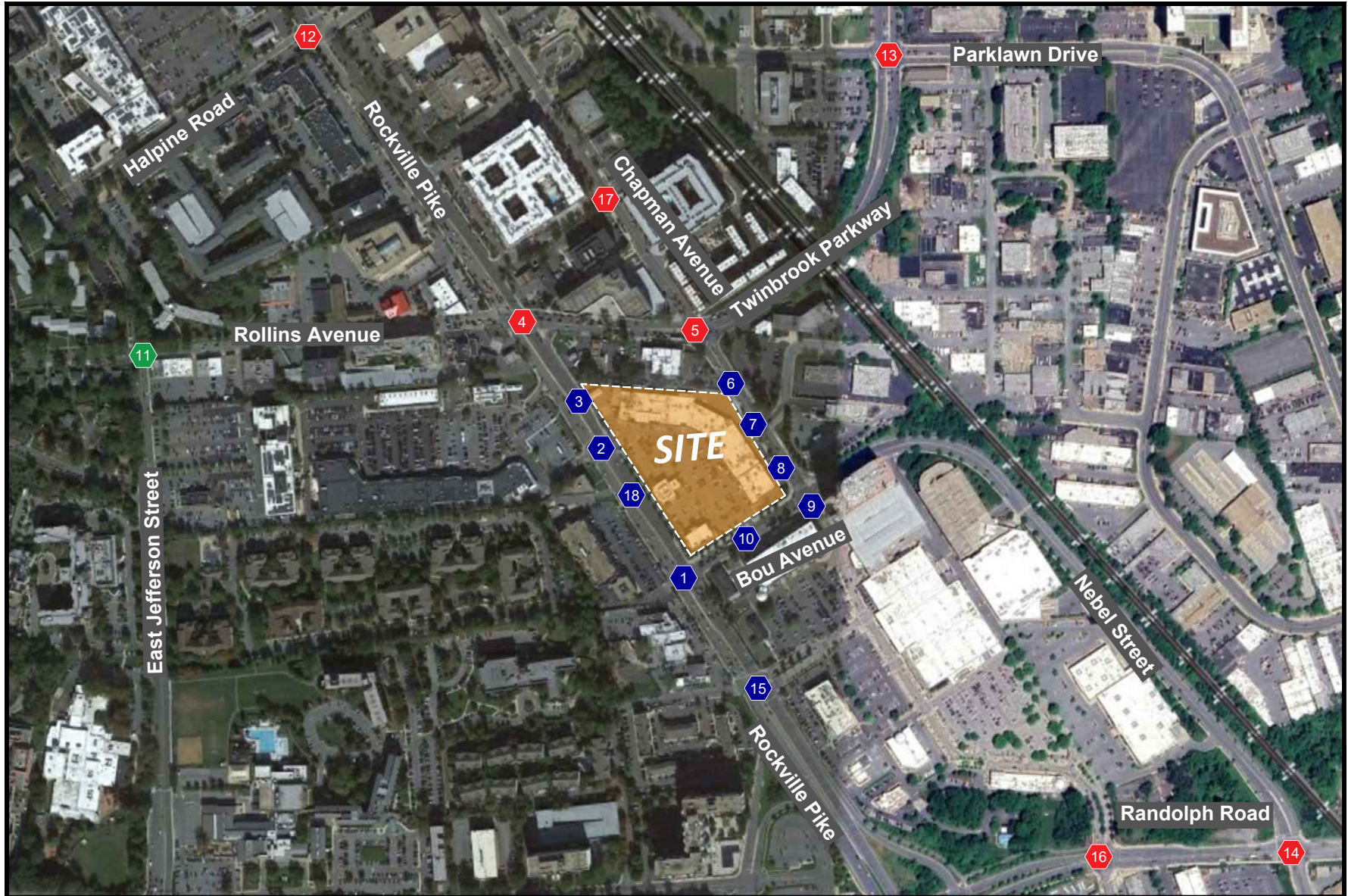


Figure 1-1
Site Location and Study Intersections

- Orange Policy Area Study Intersection
- Red Policy Area Study Intersection
- City of Rockville Study Intersection



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Pike Center
Montgomery County, Maryland

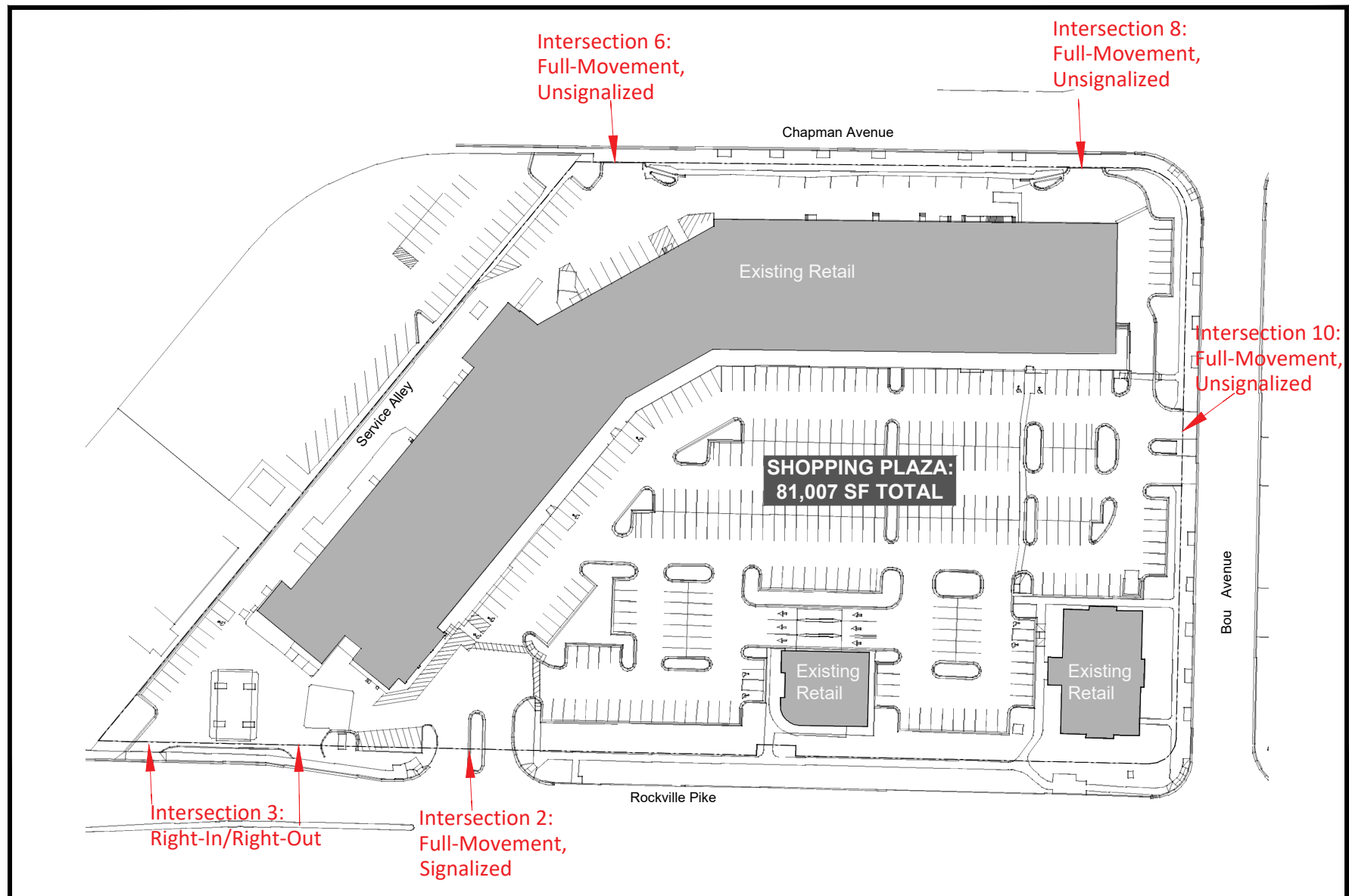


Figure 1-2
Existing Site Plan and Access



Pike Center
Montgomery County, Maryland

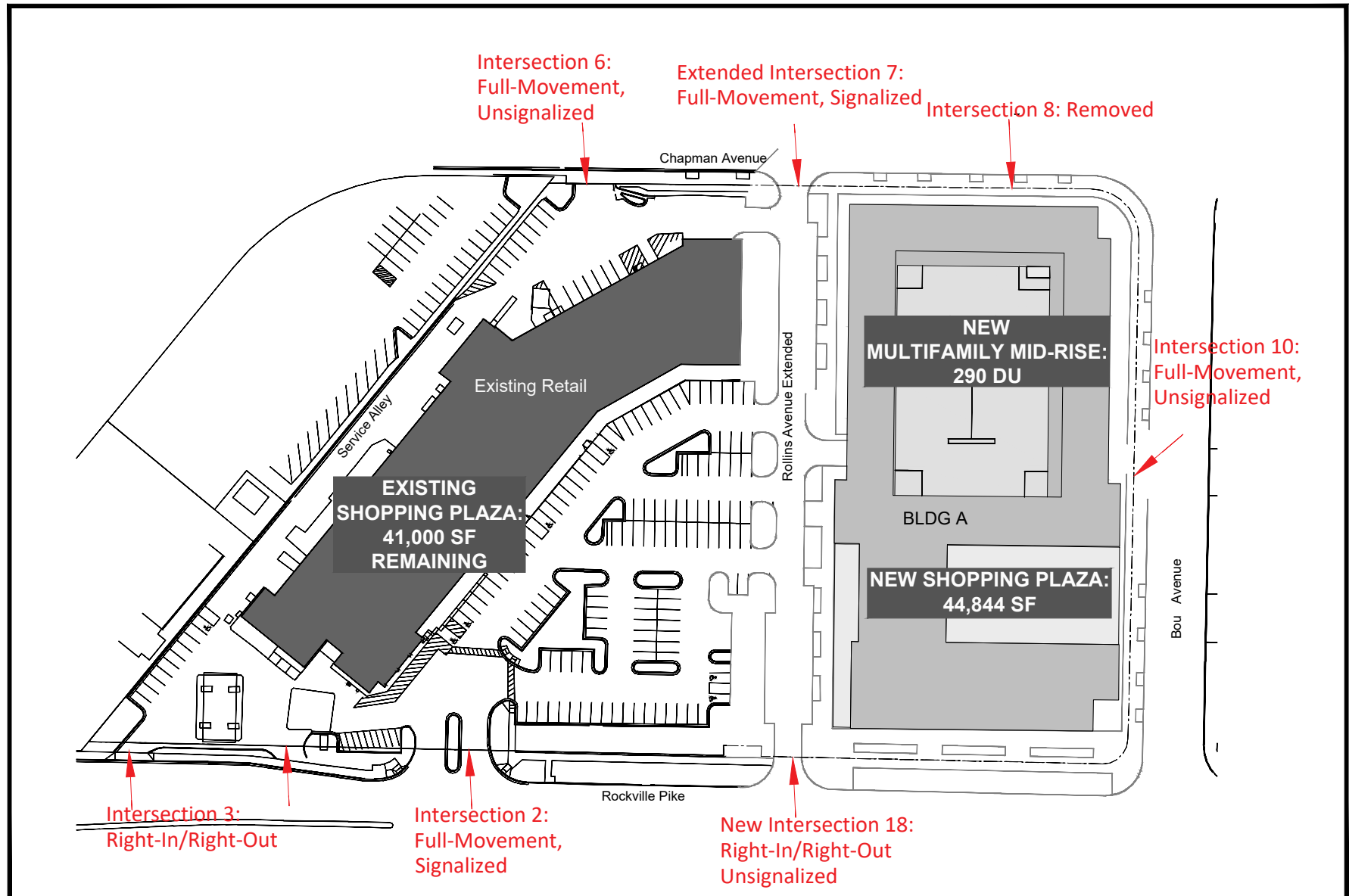


Figure 2-1
Phase 1 Concept Plan
Plan Provided by VIKI



Pike Center
Montgomery County, Maryland

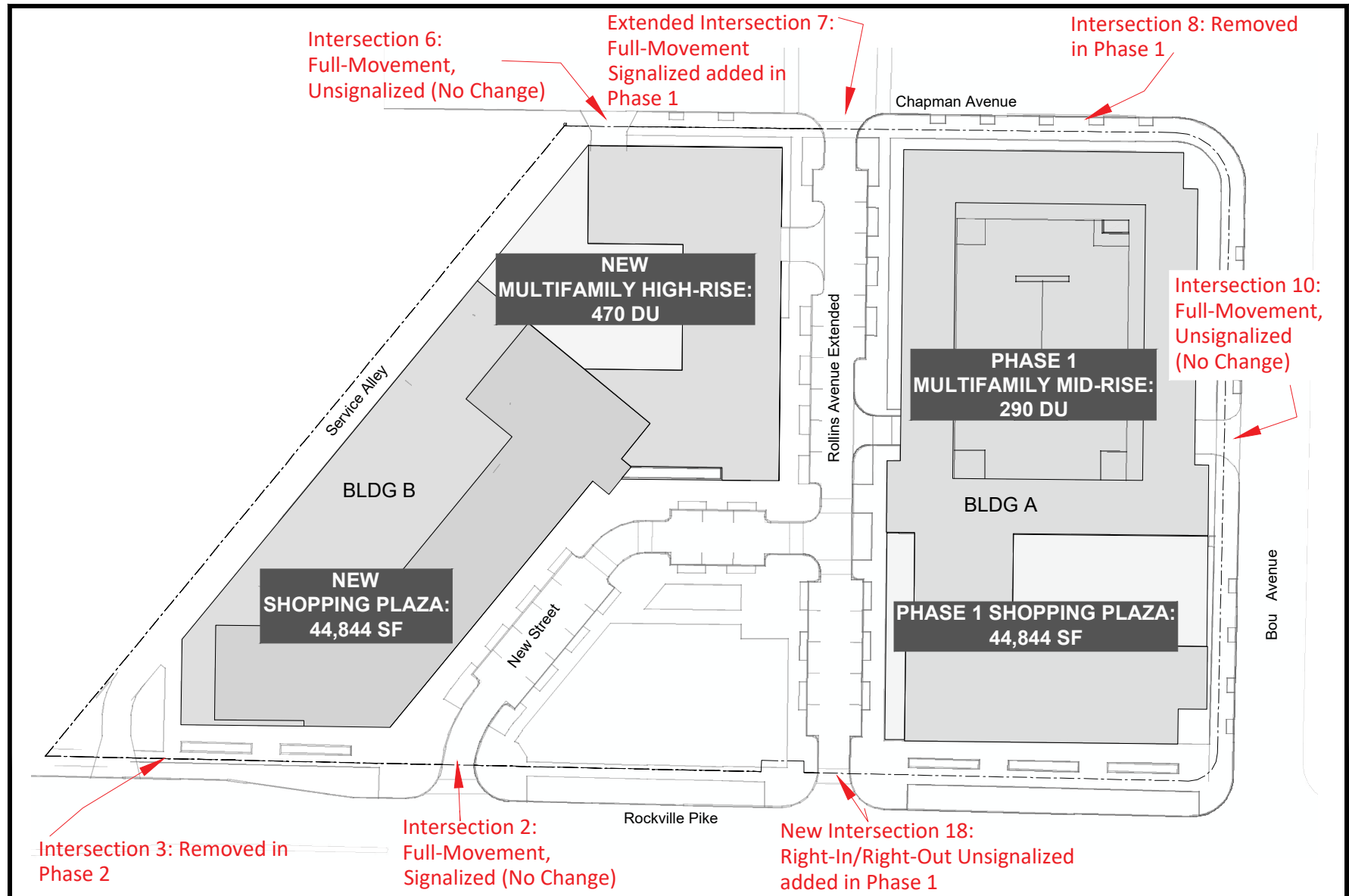


Figure 2-2
Phase 2 Concept Plan
Plan Provided by VIKA

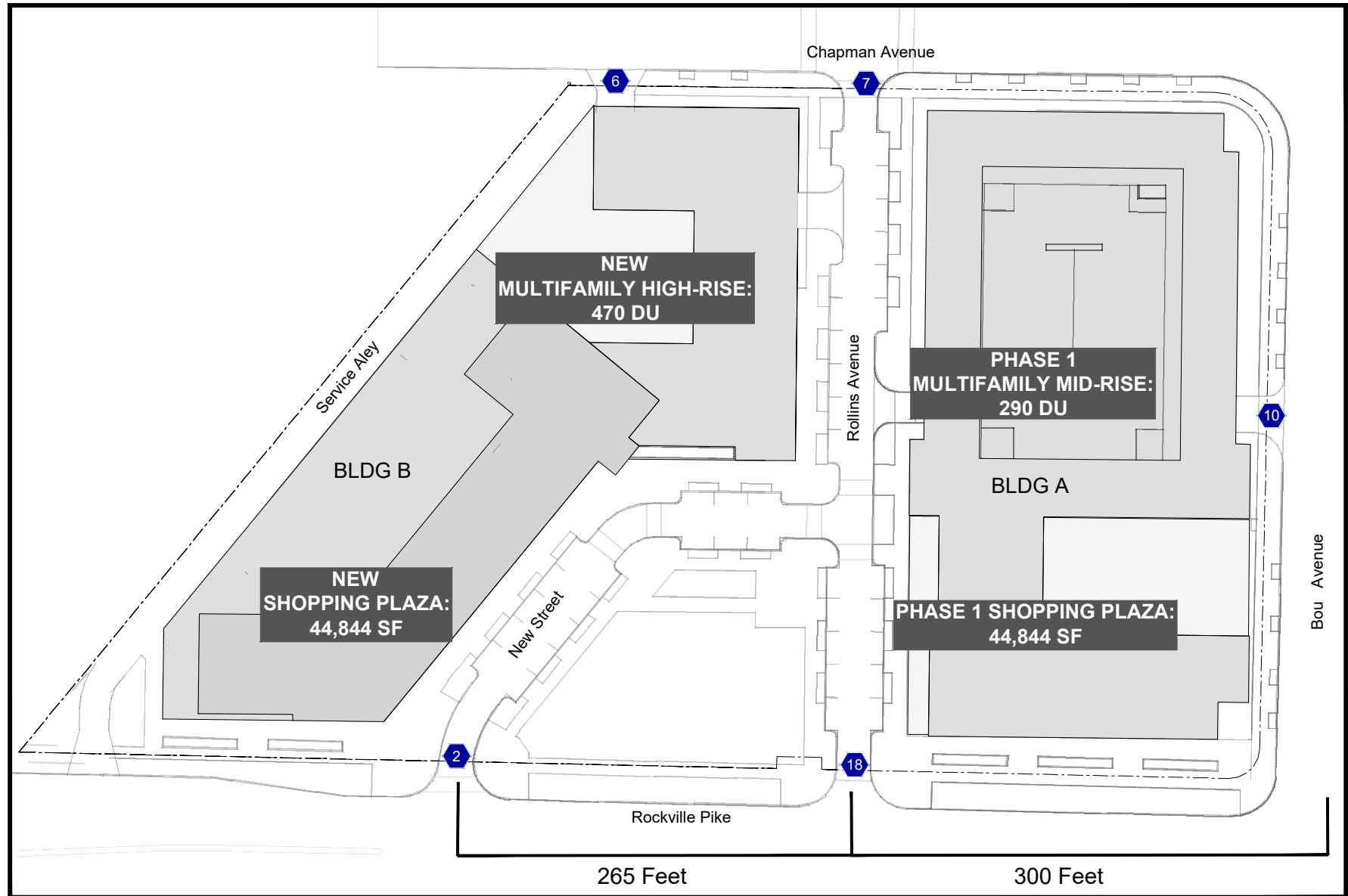


Figure 2-3

Proposed Driveway Spacing
Plan Provided by VIKa



Study Intersection



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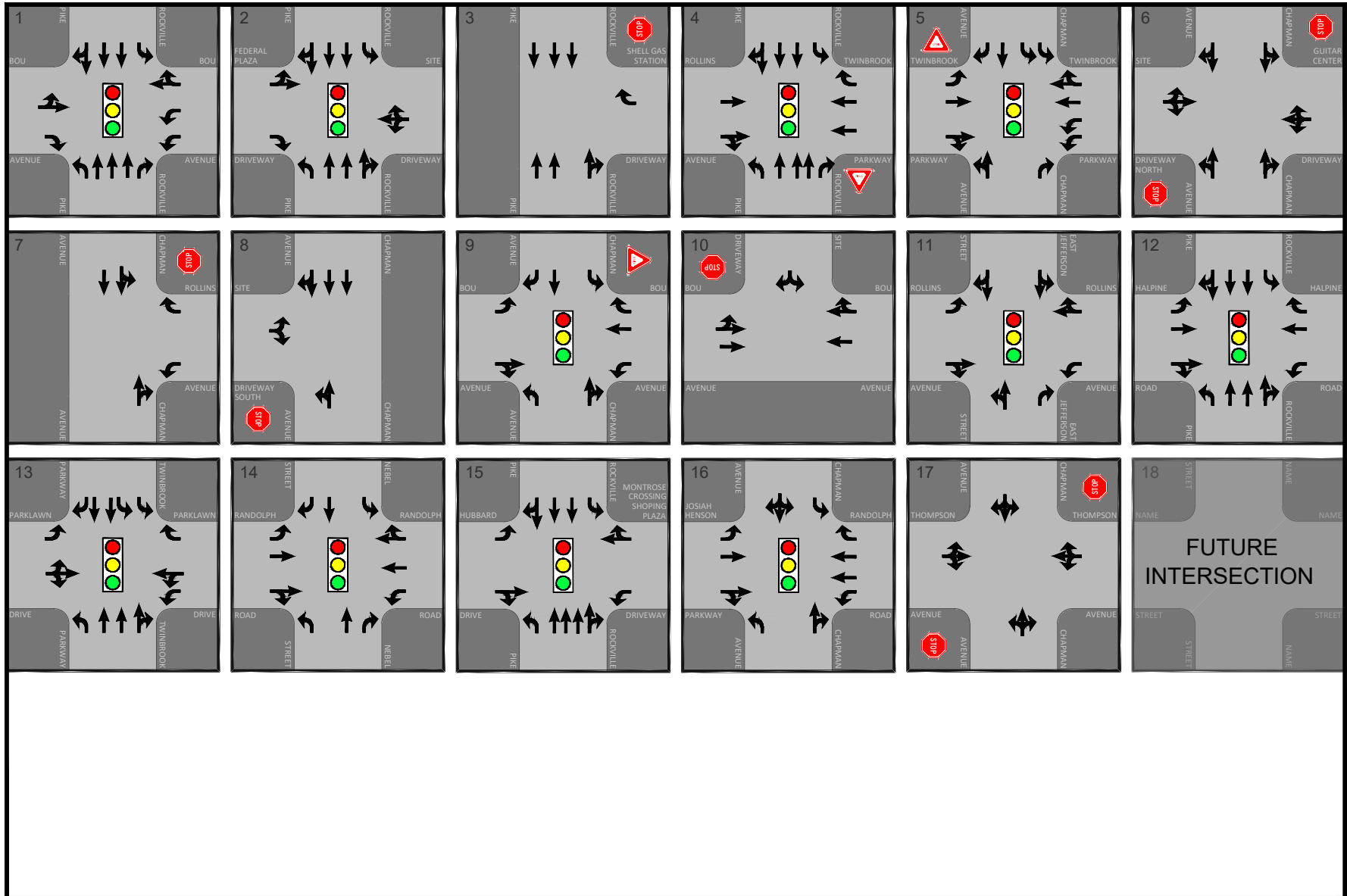


Figure 2-4
Existing Lane Use and Traffic Control



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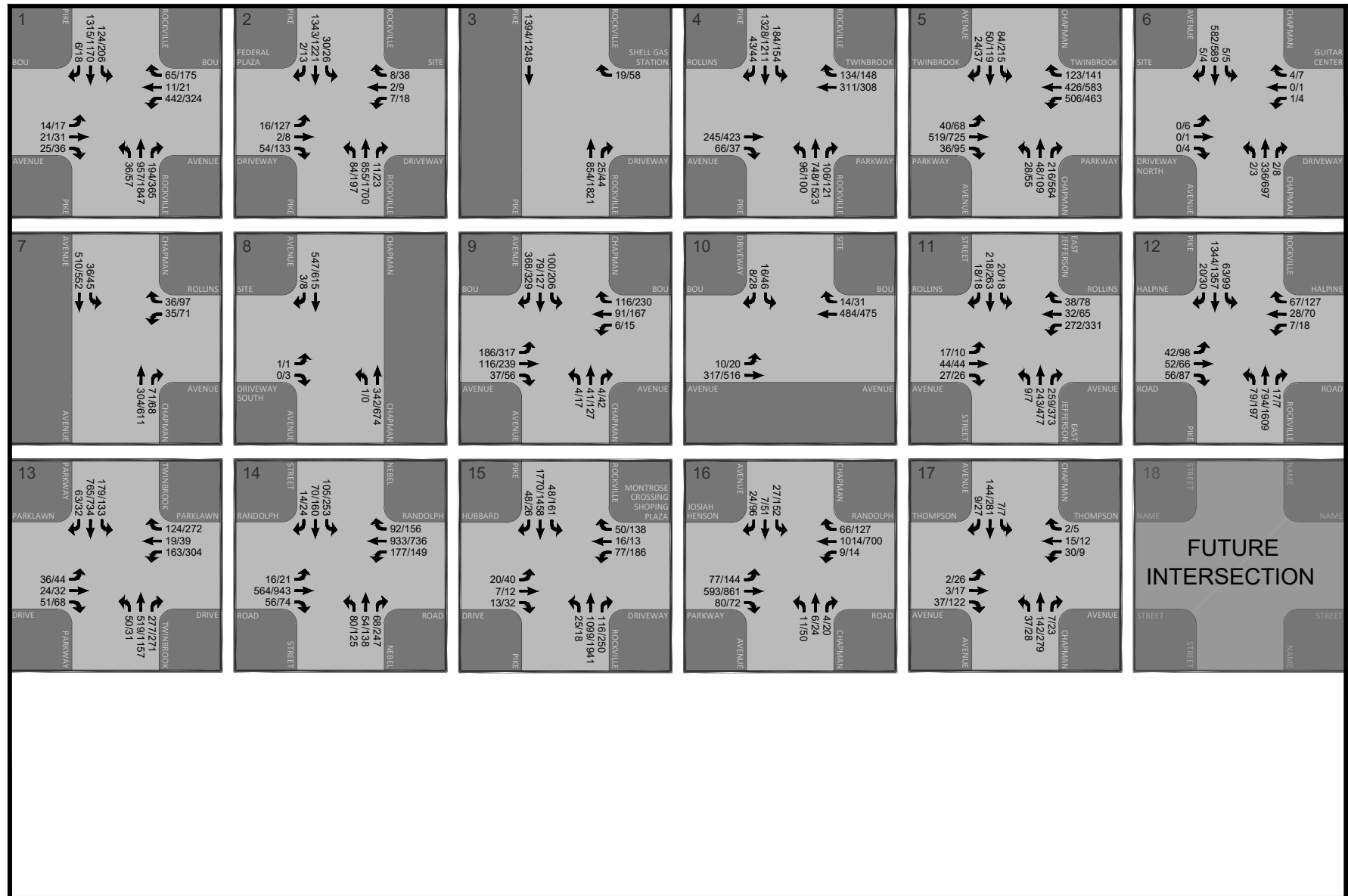


Figure 2-5
Existing Traffic Counts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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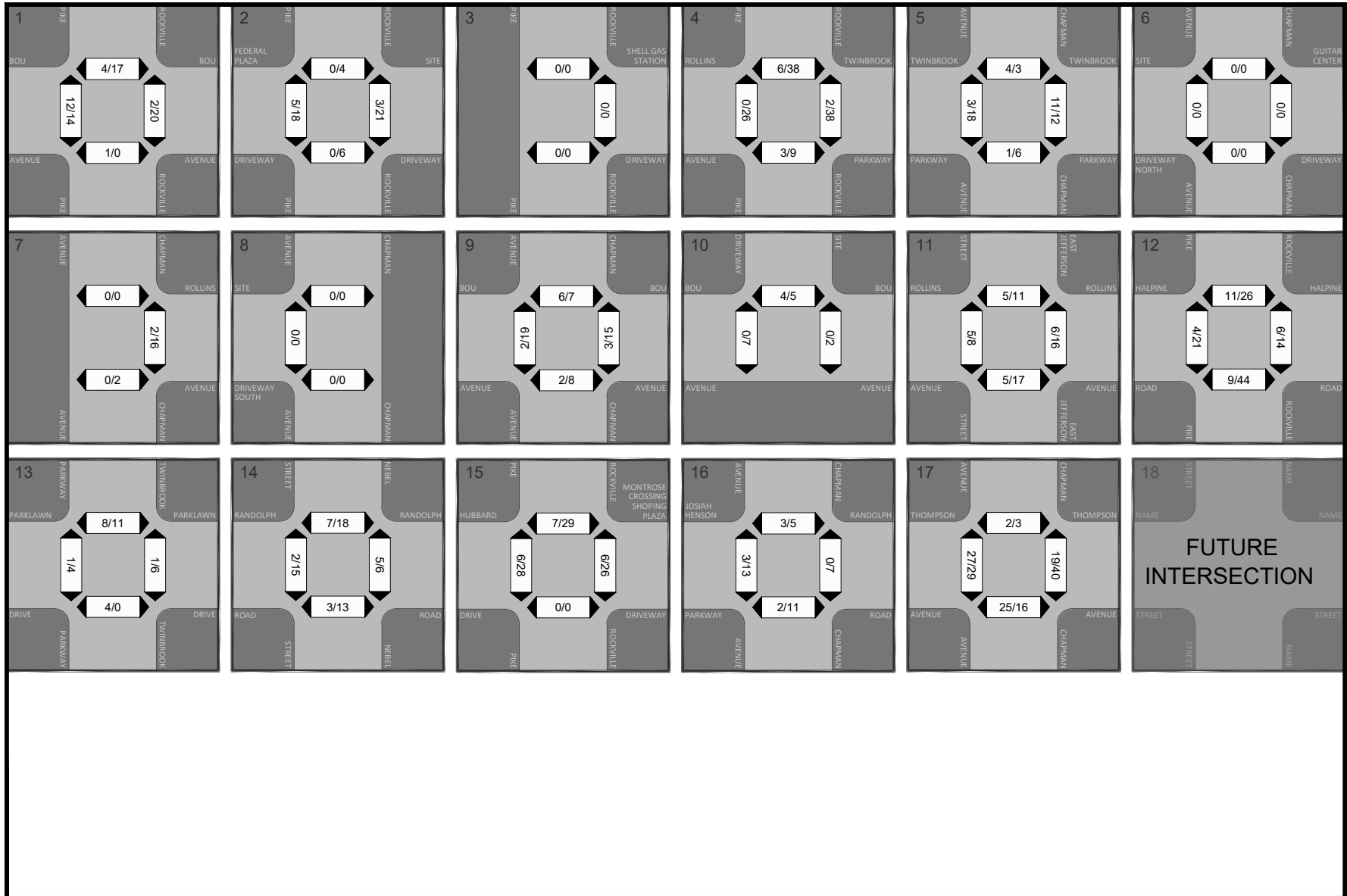


Figure 2-6
Existing Pedestrian Counts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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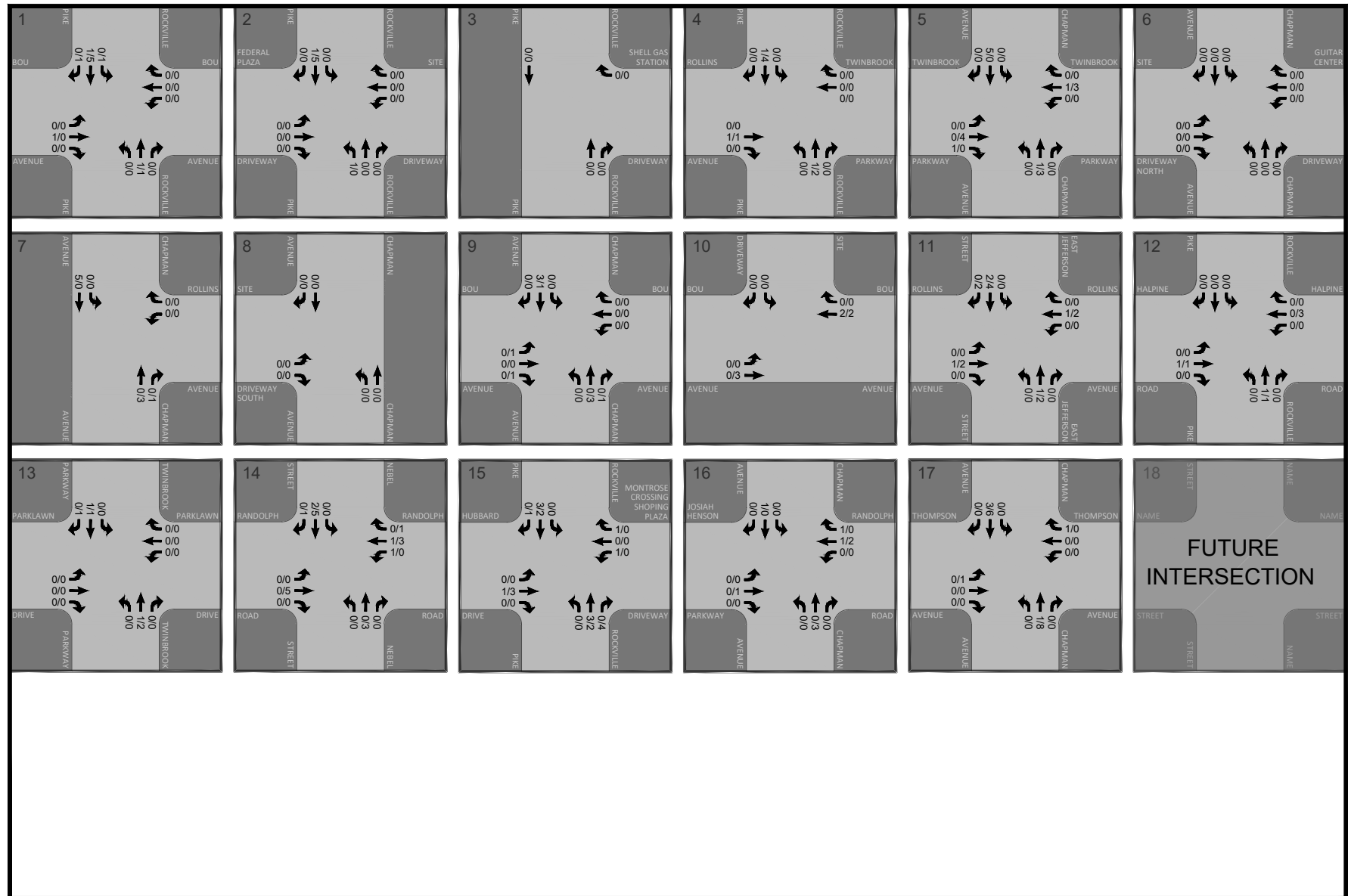


Figure 2-7
Existing Bicycle Counts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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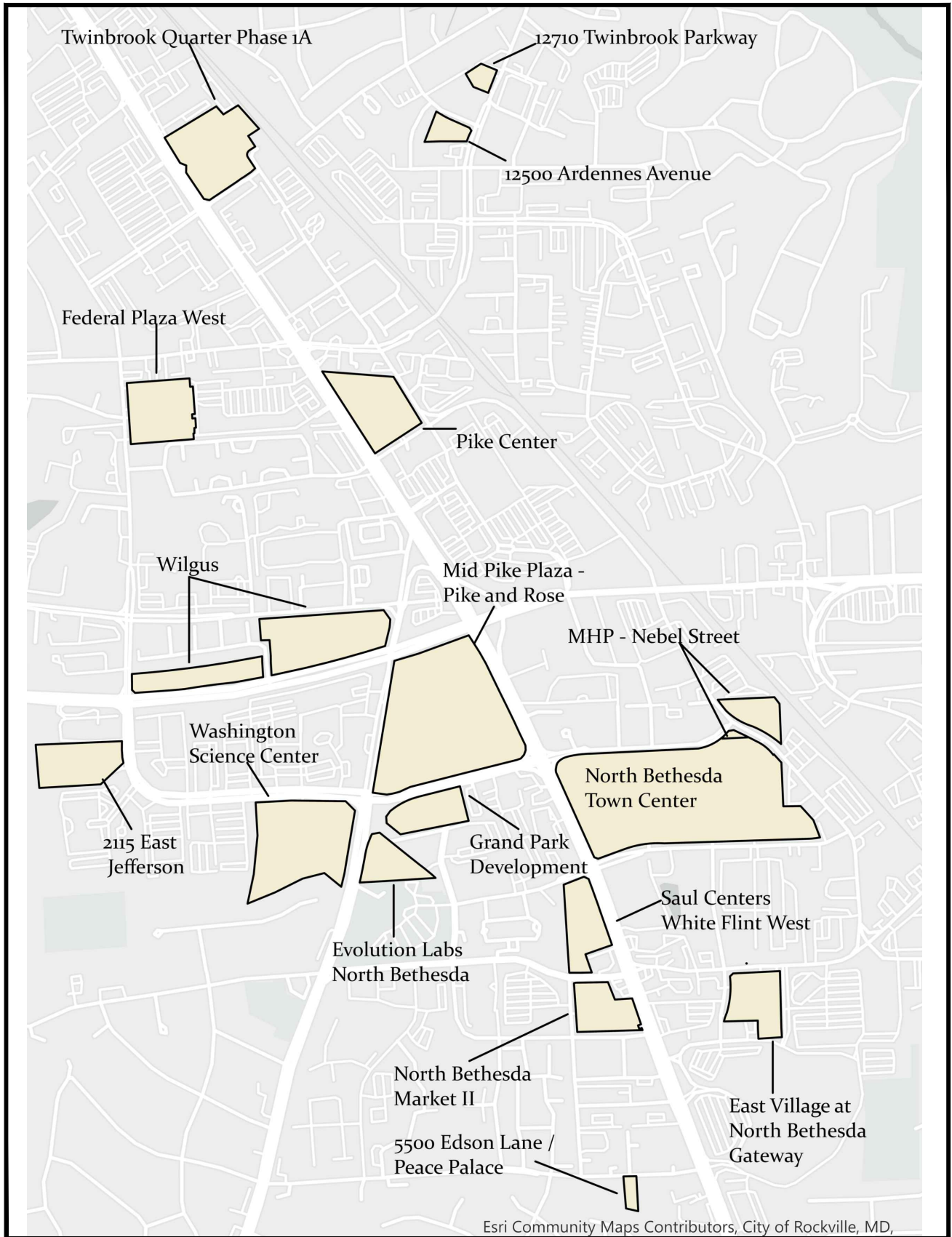


Figure 3-1

Pipeline Development Locations

Source: MCATLAS, "Pipelines"



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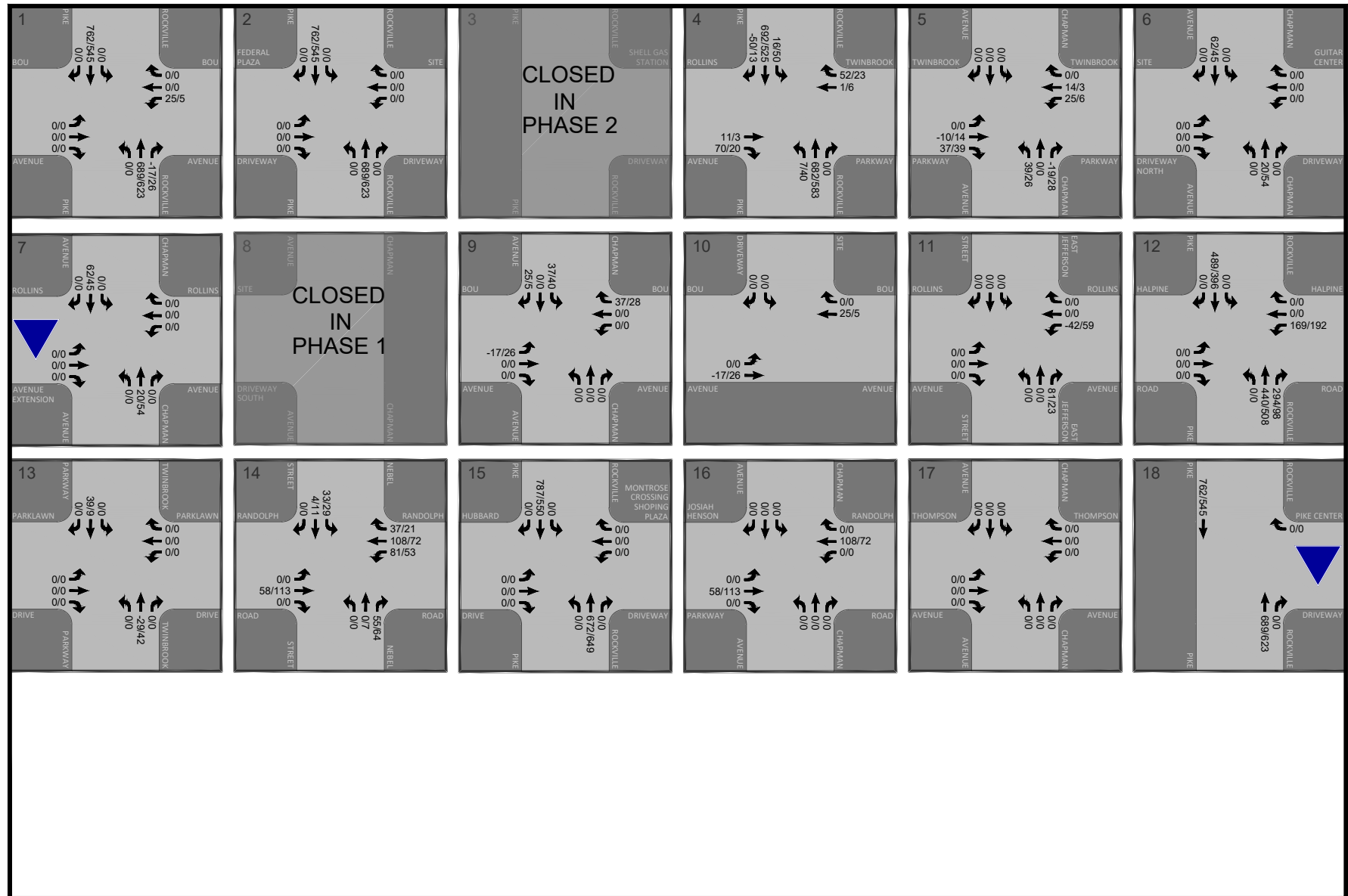


Figure 3-2
Pipeline Trip Assignments

Added Leg in Phase 1
AM PEAK HOUR
PM PEAK HOUR
000 / 000



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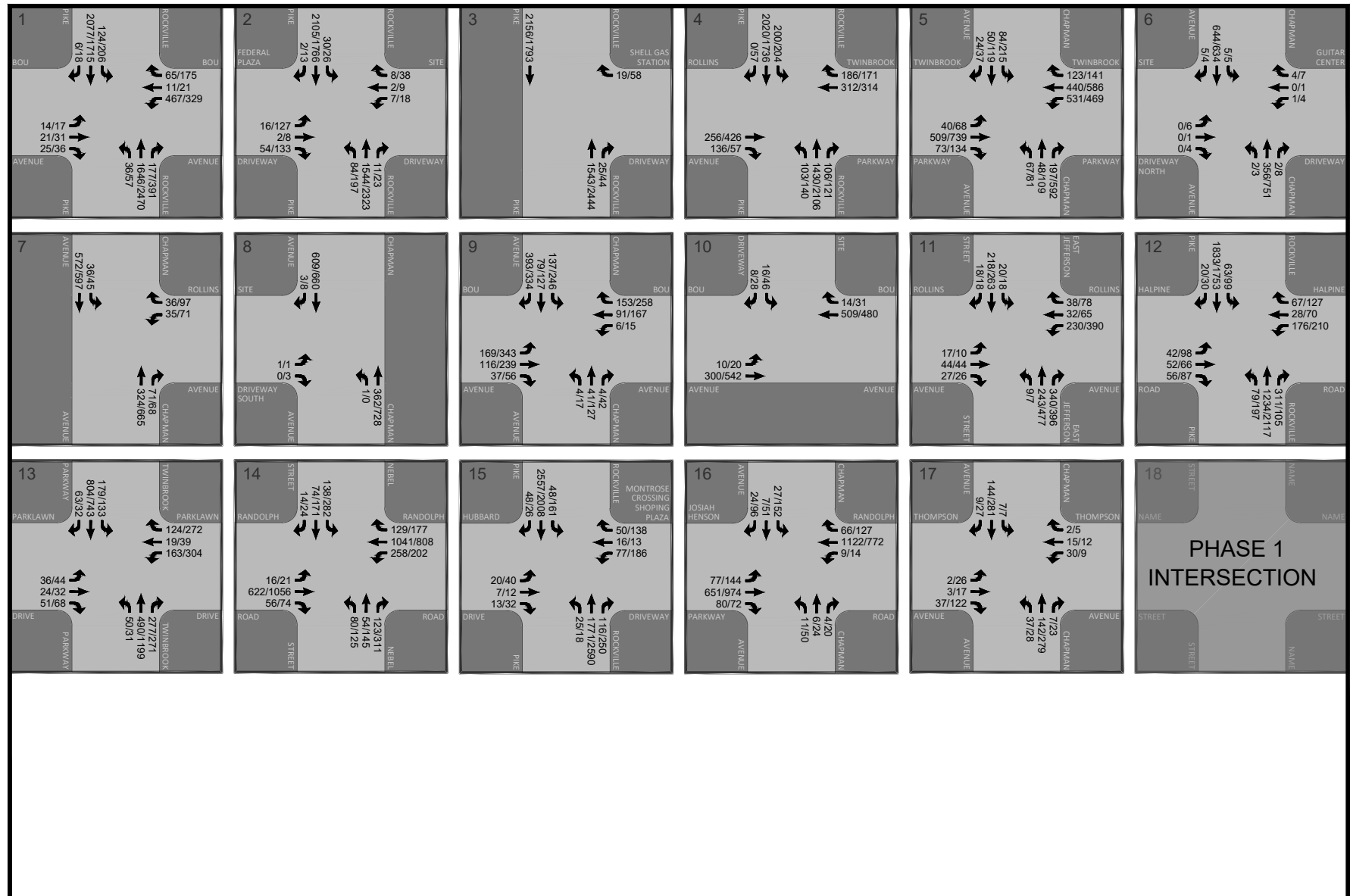


Figure 3-3
Background Traffic Volumes

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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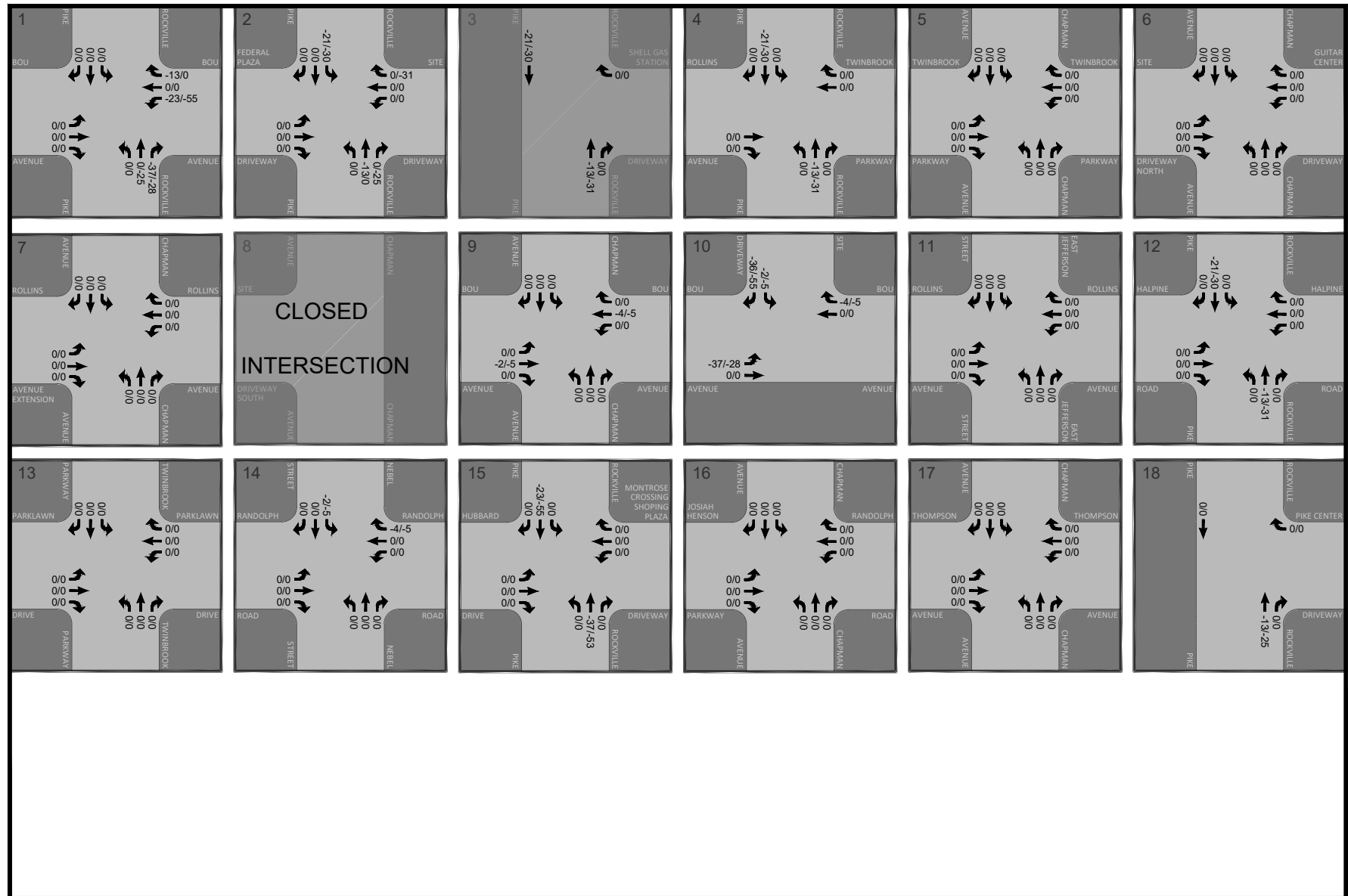


Figure 3-4
Existing Site Trips Removed

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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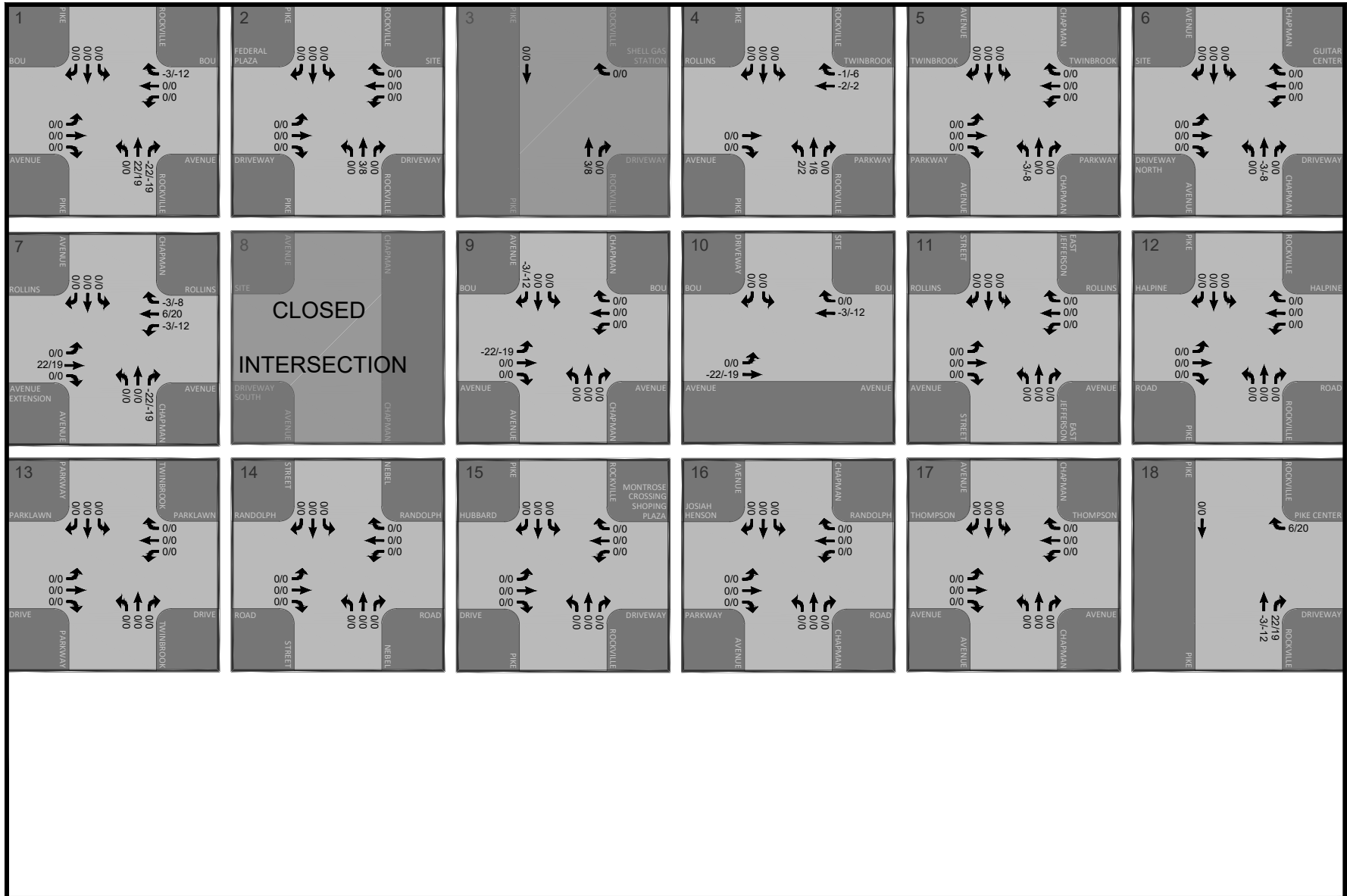


Figure 3-5
Phase 1 Diverted Trips

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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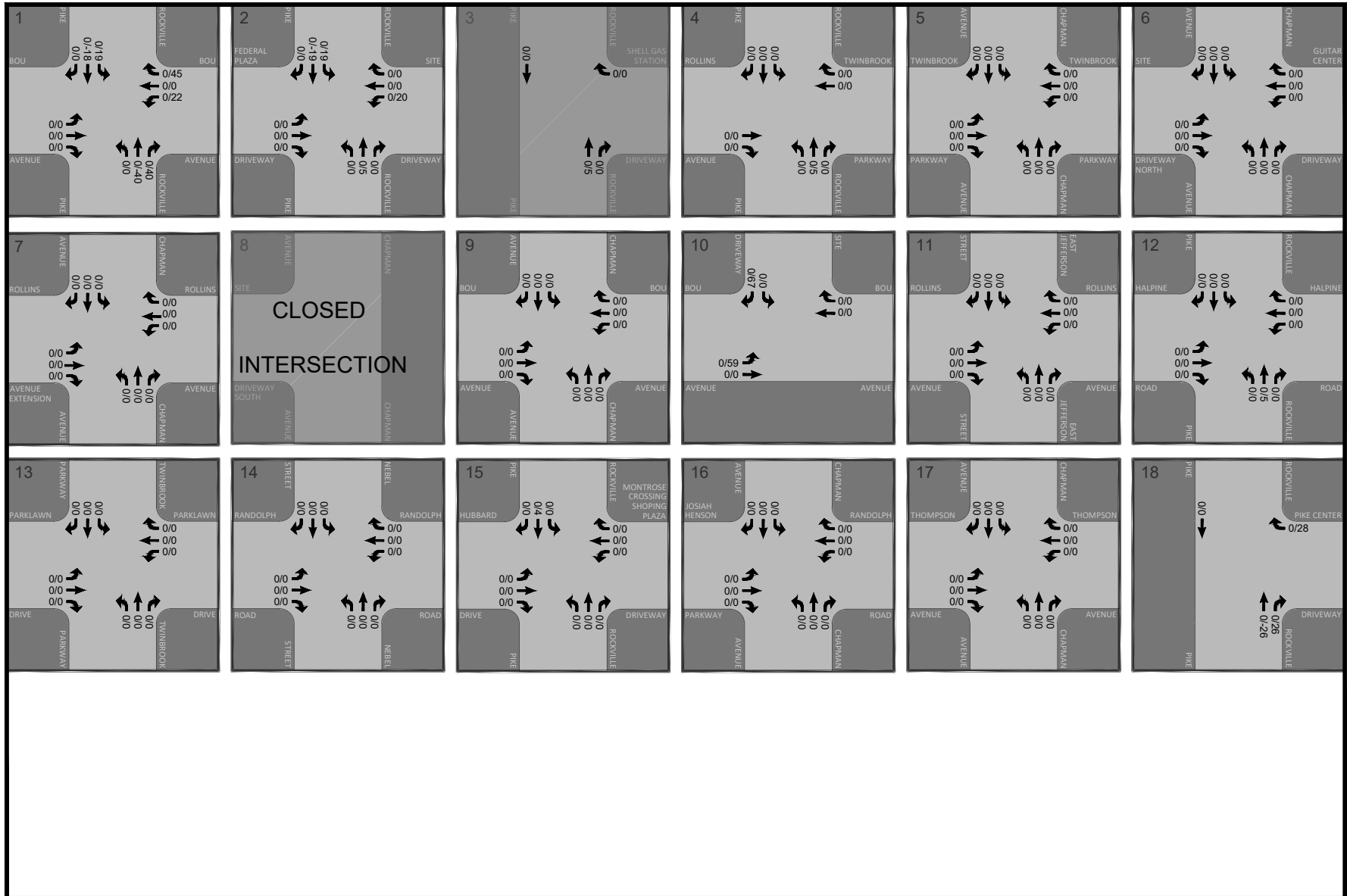


Figure 3-6
Phase 1 Pass-By Trips

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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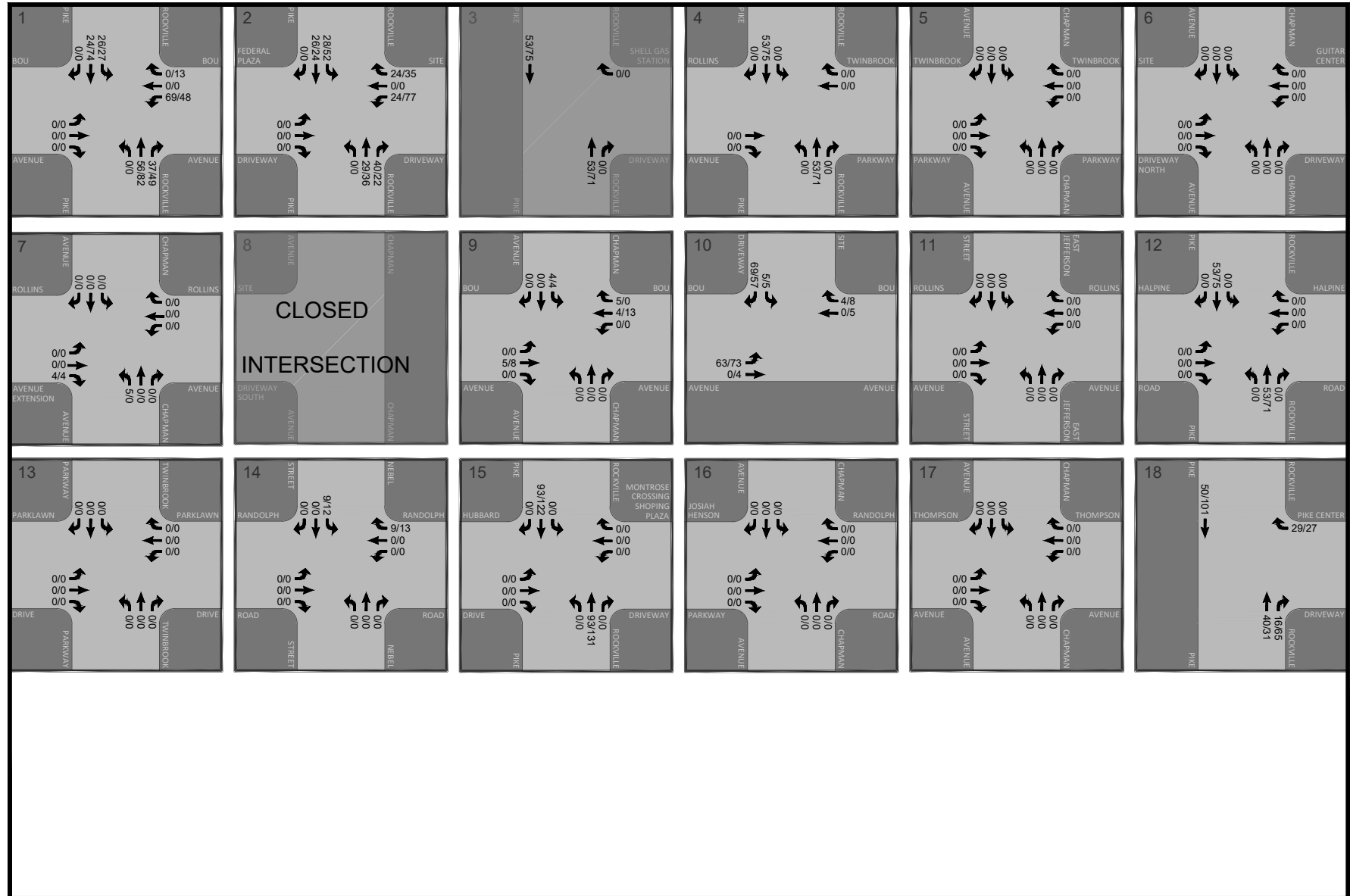


Figure 3-7
Phase 1 Site Access Trips

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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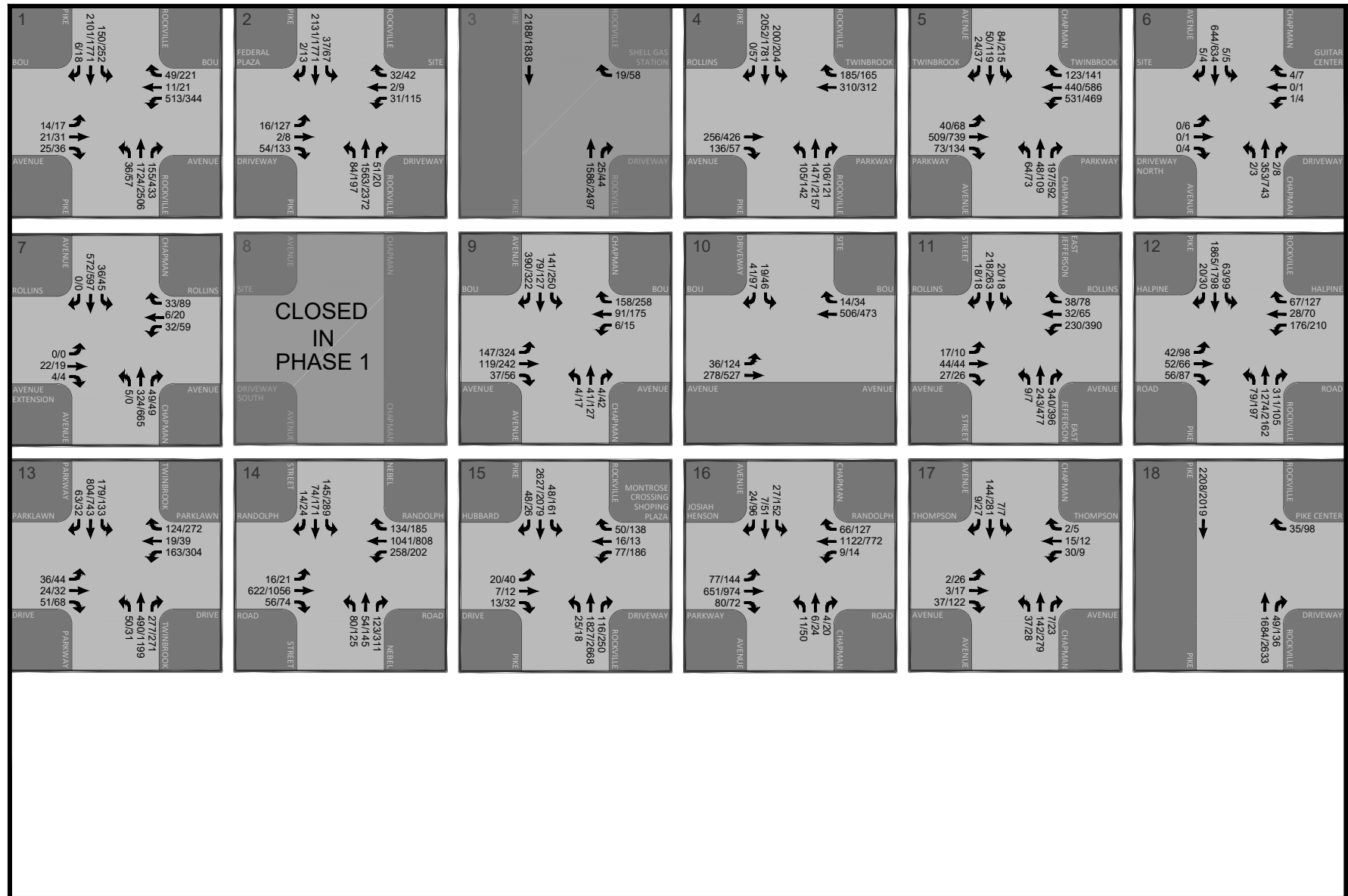


Figure 3-8

Phase 1 Total Future Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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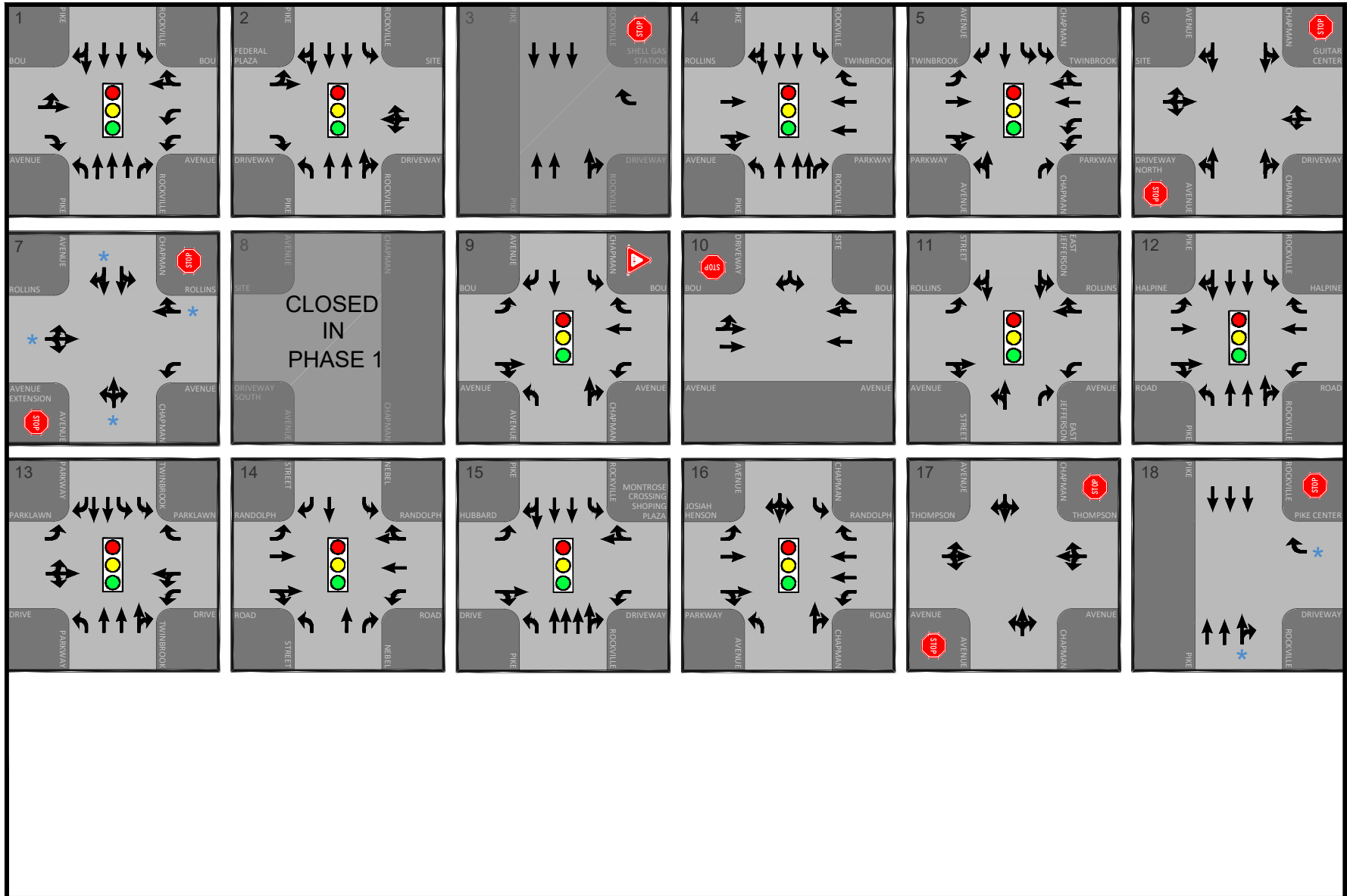


Figure 3-9

Phase 1 Lane Use and Traffic Control

* Added Movement(s) in Phase 1



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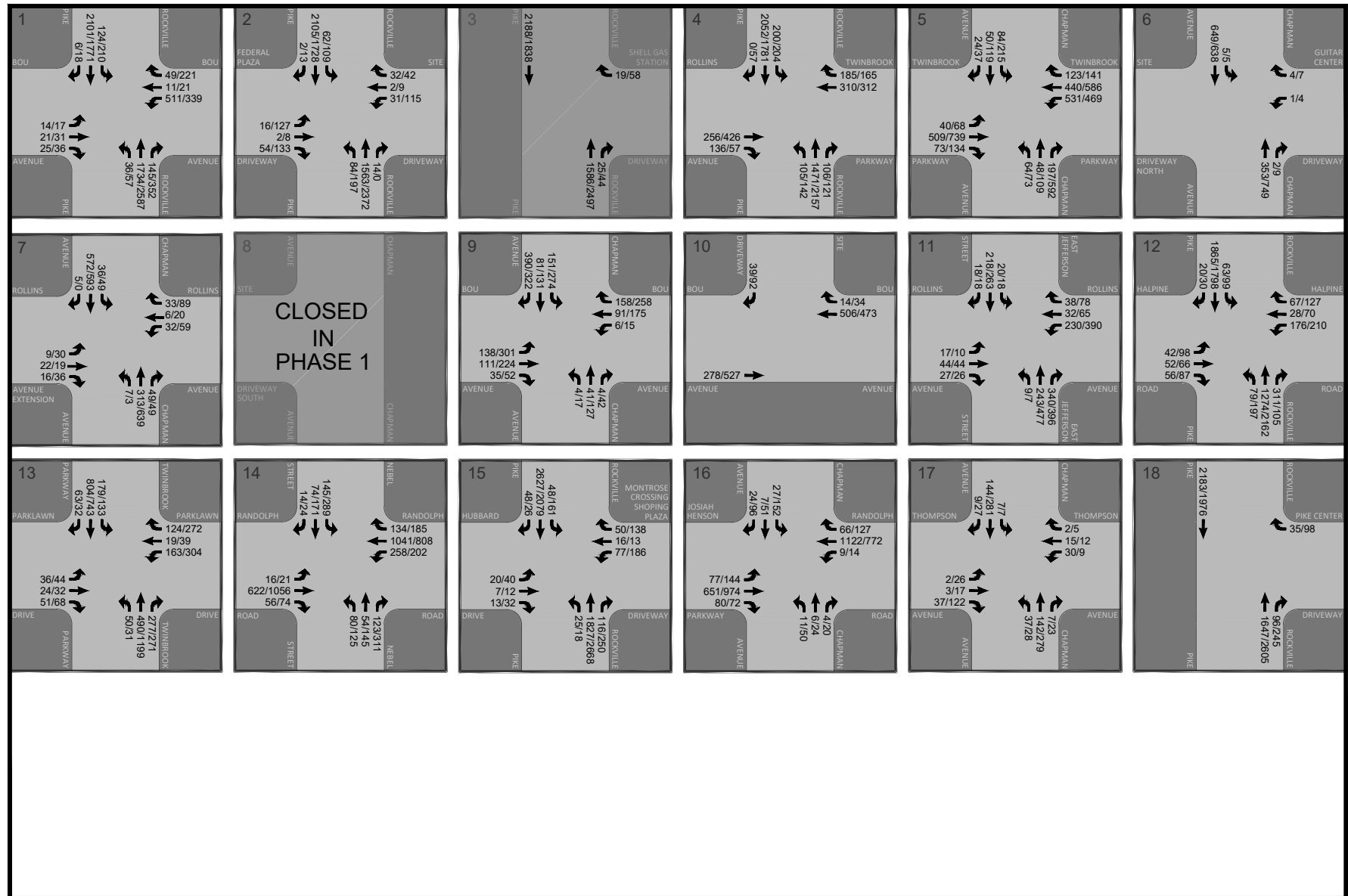


Figure 3-10

Phase 1 Total Future Traffic Forecasts
Restricted Movements

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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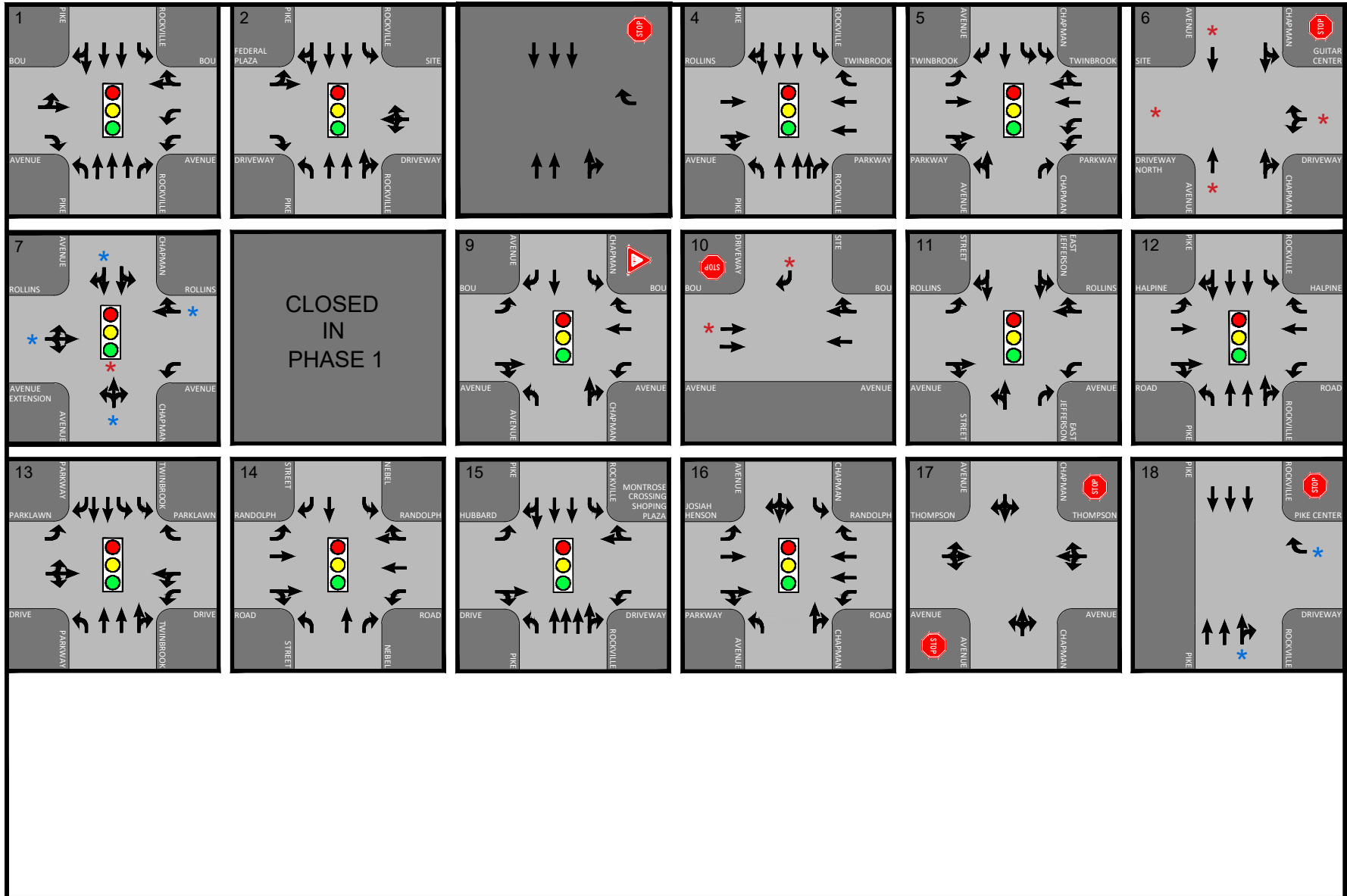


Figure 3-11

Phase 1 Restricted Access Lane Use and Traffic Control

- * Added Movement(s) in Phase 1
- * Restricted Access Scenario Modification(s)



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000 / 000 AM PEAK HOUR PM PEAK HOUR



Montgomery County, Maryland

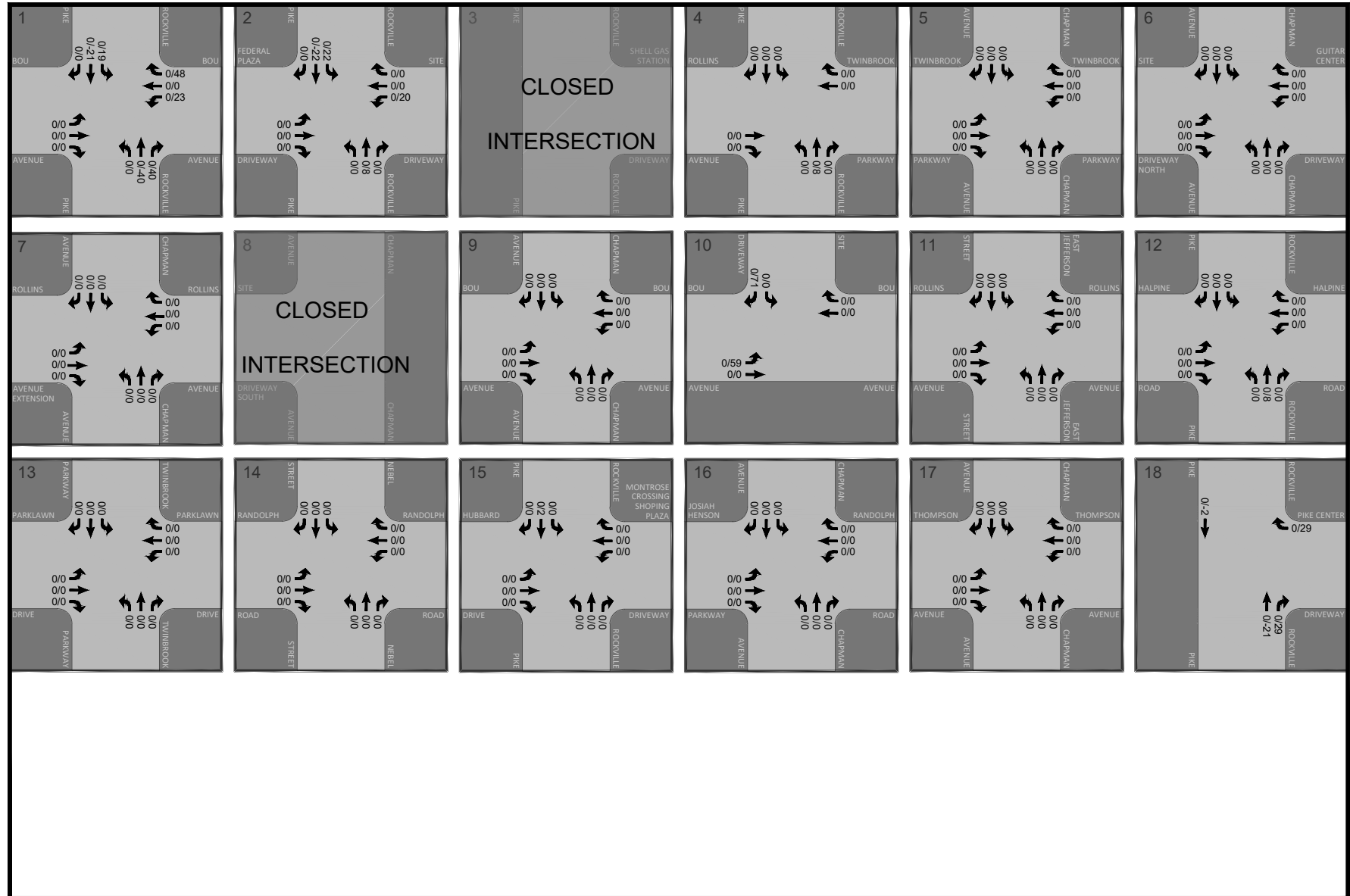


Figure 3-13
Phase 2 Pass-By Trips

AM PEAK HOUR
PM PEAK HOUR
000 / 000

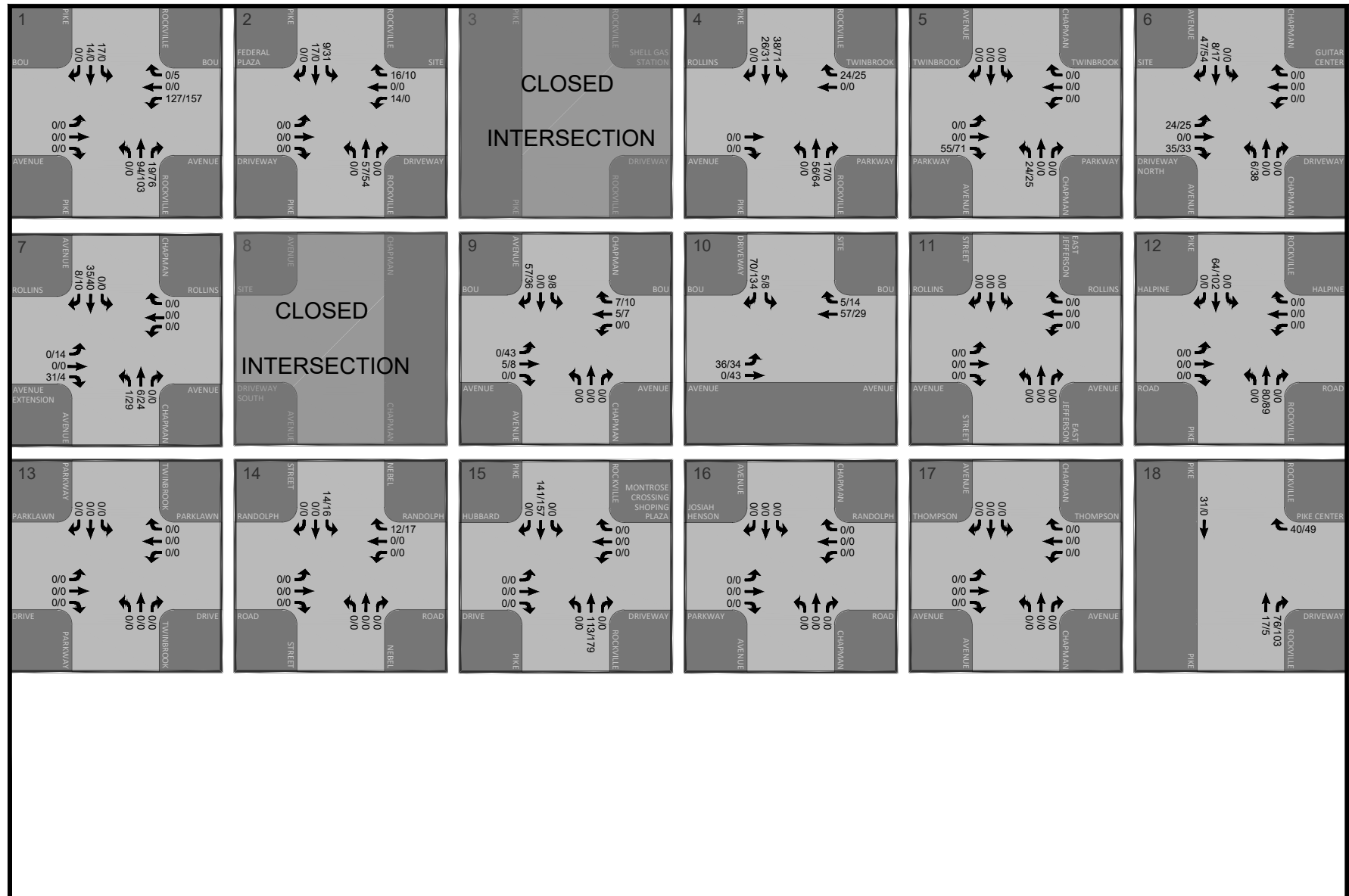


Figure 3-14
Phase 2 Site Access Trips

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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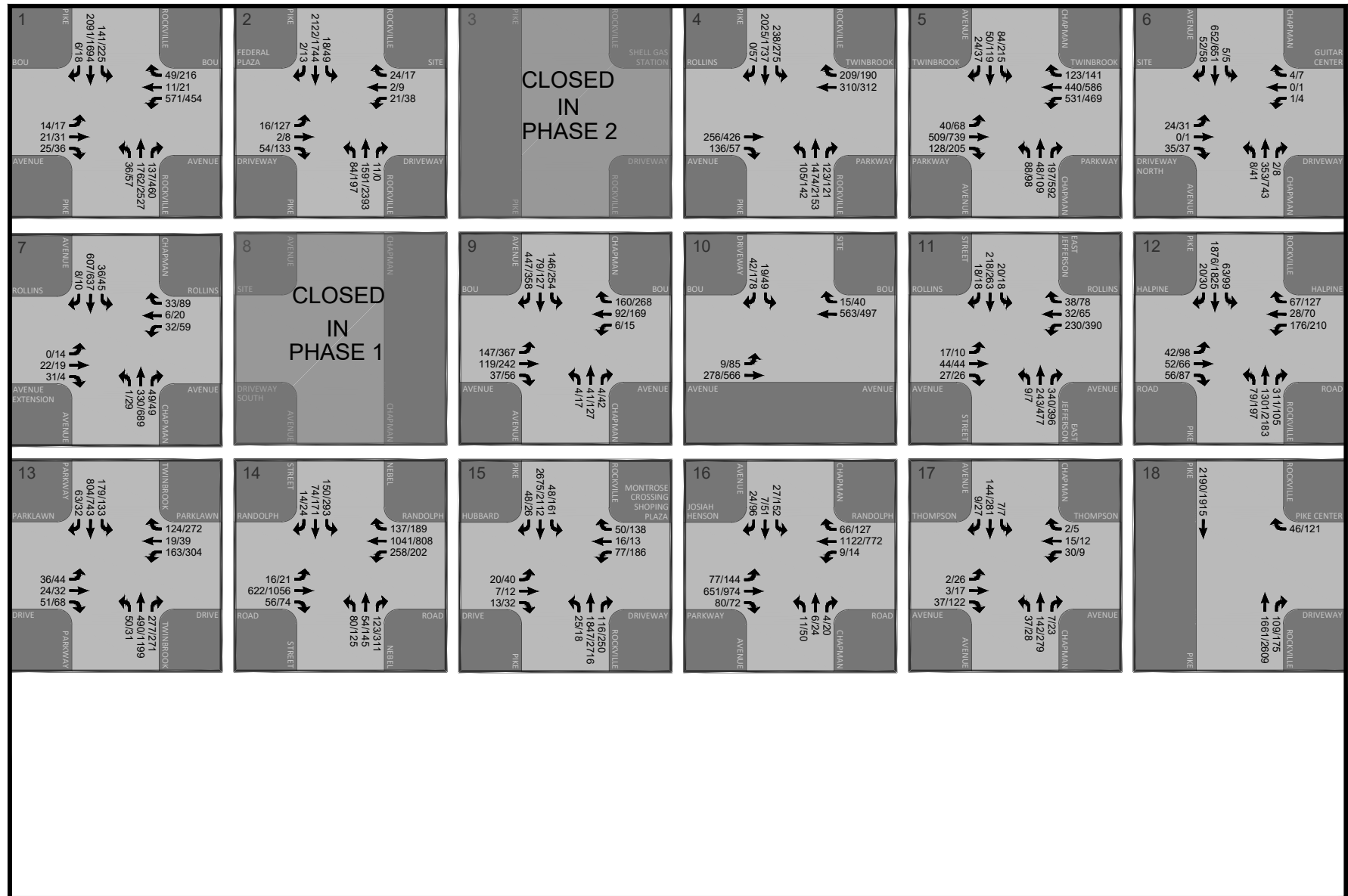


Figure 3-15

Phase 2 Total Future Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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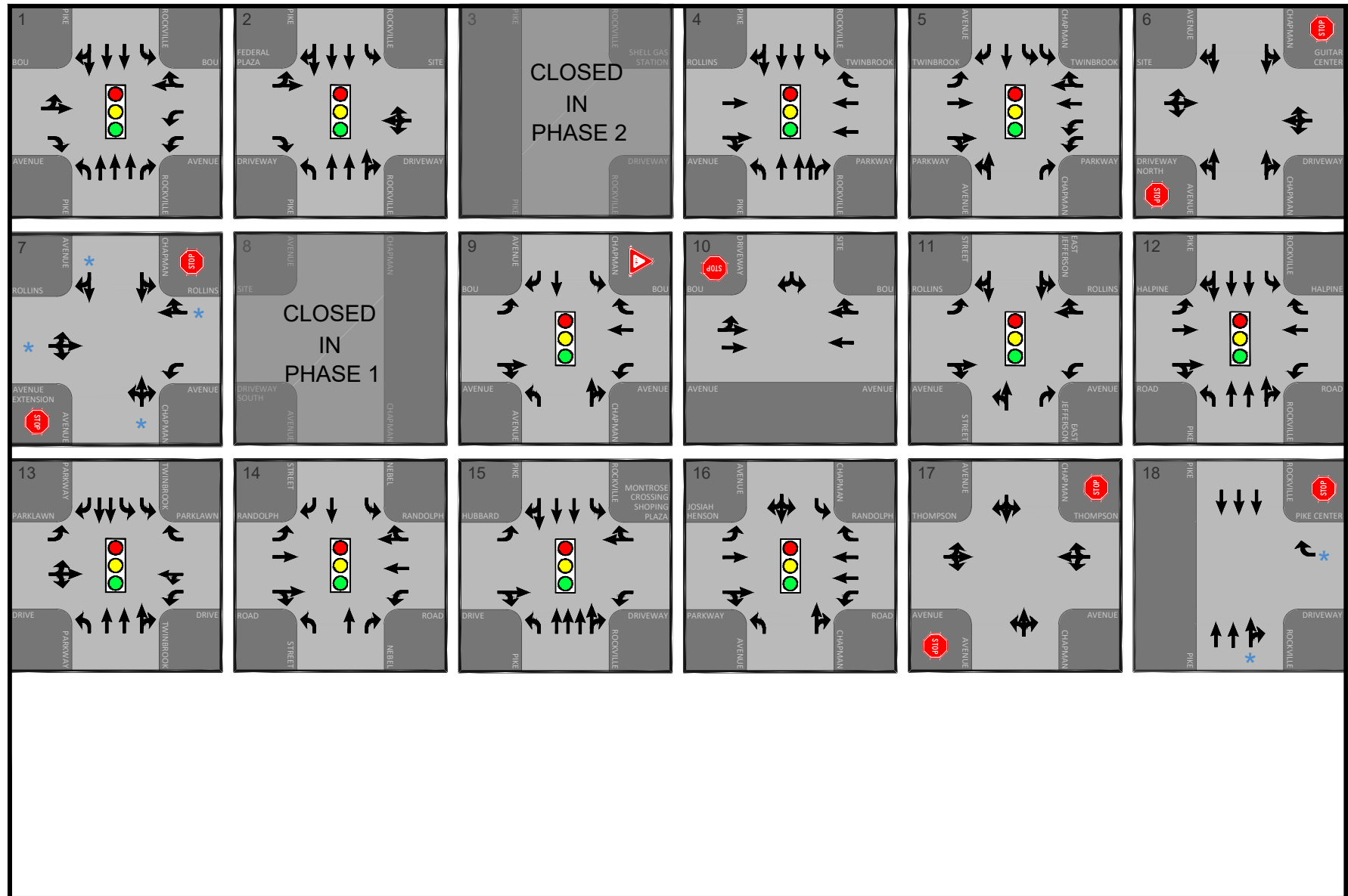


Figure 3-16

Phase 2 Lane Use and Traffic Control

* Added Movement(s) in Phase 1



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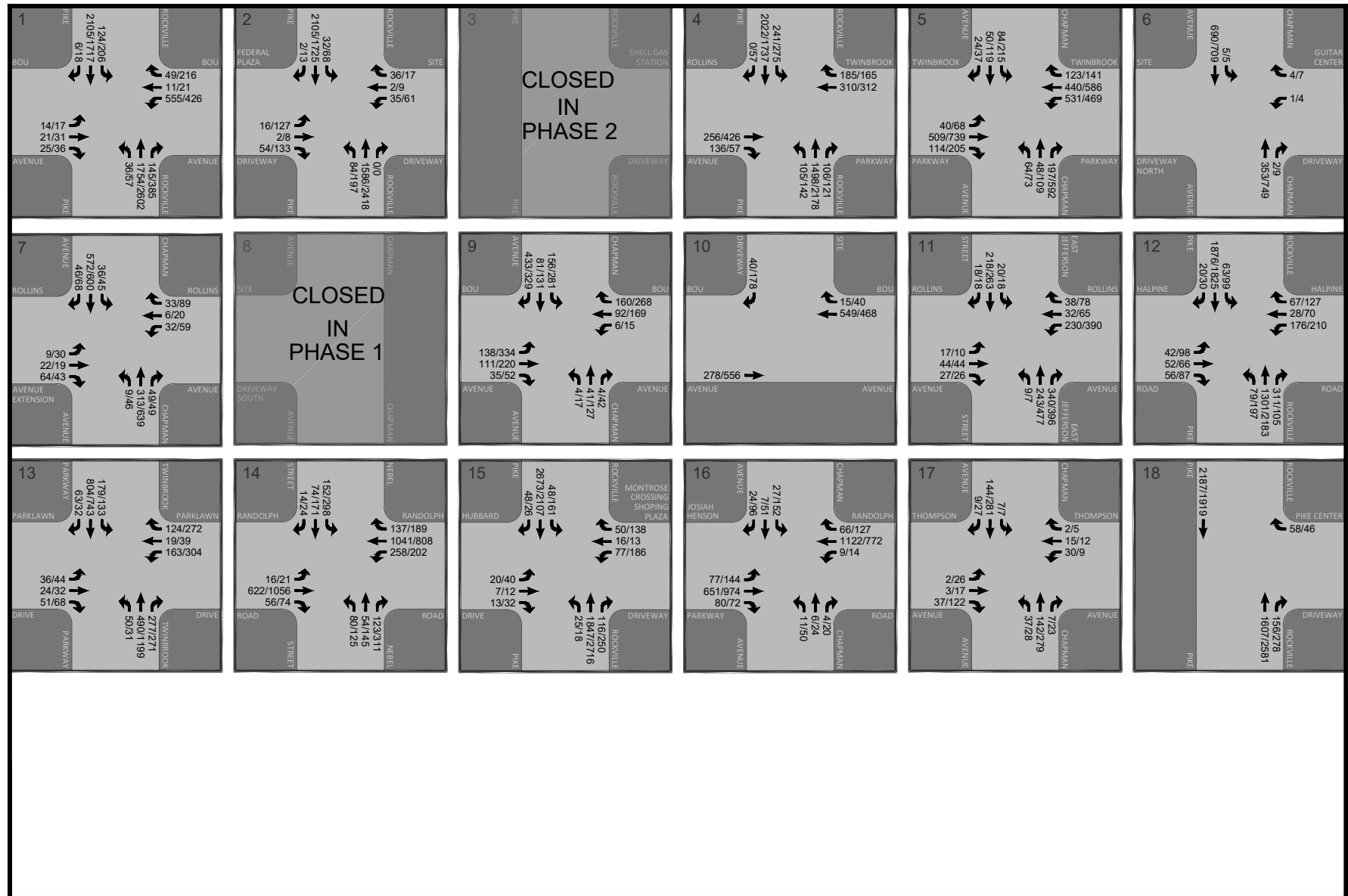


Figure 3-17

Phase 2 Total Future Traffic Forecasts
Restricted Movements

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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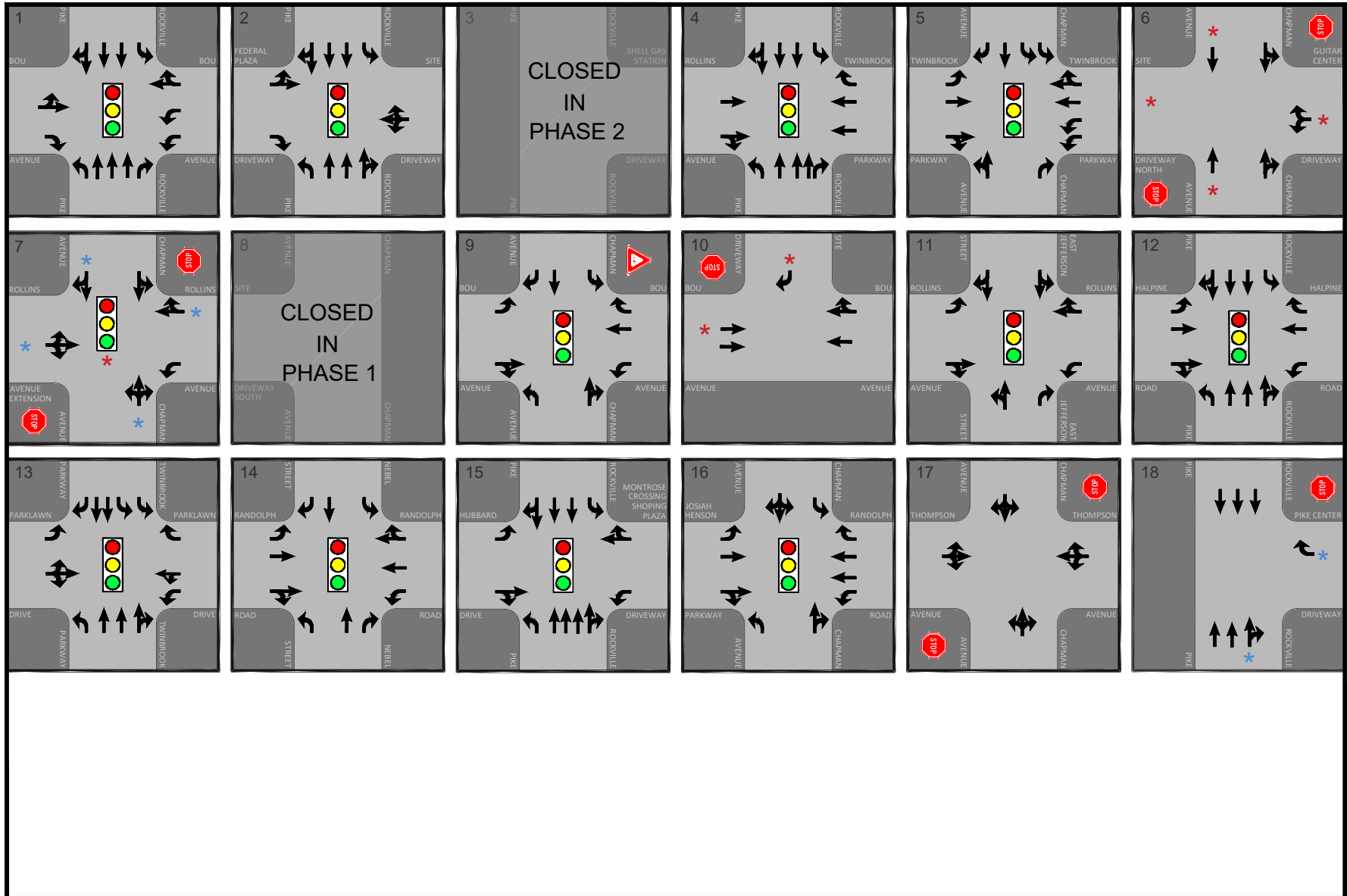


Figure 3-18

Phase 2 Restricted Access Lane Use and Traffic Control

- * Added Movement(s) in Phase 1
- * Restricted Access Scenario Modification(s)



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REPORT TABLES

Table 3-3
Pike Center
Pipeline Development Trip Generation ⁽¹⁾

Land Use				LUC				Amount				Unit				ITE Trip Generation						2023 LATR Trip Generation Rate Adjustment Factors / Mode Split Adjustments				
																AM Peak Hour			PM Peak Hour			ADT	AM Peak Hour		PM Peak Hour	
																In	Out	Total	In	Out	Total		Auto Driver (Vehicle Trips)	Total Person Trips	Auto Driver (Vehicle Trips)	Total Person Trips
1. 12710 Twinbrook Parkway ⁽²⁾				Twinbrook				Net New Trips				-15	-7	-22	9	11	20	119	-16	-30	16	31				
2. 12500 Ardennes Avenue ⁽²⁾				Twinbrook				Net New Trips				-21	58	37	43	-7	36	663	30	67	30	67				
3.Twinbrook Quarter Phase 1A ⁽⁴⁾				Rockville City				Net New Trips				461	265	726	148	293	441	3,195	662	1,010	413	615				
4. Federal Plaza West ⁽³⁾				North Bethesda				Net New Trips				14	133	147	71	36	107	1,236	129	237	99	179				
5. Wilgus ⁽³⁾				North Bethesda				Net New Trips				78	177	255	220	158	378	4,523	207	386	301	565				
6. 2115 East Jefferson ⁽³⁾				North Bethesda				Net New Trips				-173	4	-169	-7	-150	-157	-840	-149	-216	-138	-197				
7. Washington Science Center ⁽³⁾				North Bethesda				Net New Trips				15	3	18	3	13	16	123	15	23	15	22				
8. East Village at North Bethesda Gateway ⁽⁵⁾				White Flint				Total To use				-70	85	16	105	-18	87	782	11	51	62	147				
9. MHP-Nebel Street ⁽⁵⁾				White Flint				Net New Trips				7	23	30	20	13	32	366	47	91	51	99				
10. Mid Pike Plaza - Pike and Rose ⁽³⁾				North Bethesda				Total to Use				697	415	1,112	446	718	1,164	11,780	907	1,548	938	1,617				
11. Grand Park Development ⁽³⁾				North Bethesda				Net New Trips				108	316	424	91	-56	35	4,863	318	683	-9	170				
12. Evolution Labs North Bethesda ⁽³⁾				North Bethesda				Net New Trips				538	118	656	99	522	621	7,129	538	862	509	816				
13. North Bethesda Town Center ⁽⁵⁾				White Flint				Net New Trips				932	414	1,345	488	936	1,424	13,465	1,038	1,850	1,090	1,957				
14. Saul Centers White Flint West ⁽³⁾				North Bethesda				Net New Trips				245	201	446	151	270	421	3,525	392	644	371	606				
15. North Bethesda Market II ⁽³⁾				North Bethesda				Net New Trips				-81	188	107	184	-33	151	2,575	62	193	93	251				
16. 5500 Edson Lane / Peace Palace ⁽⁵⁾				White Flint				Net New Trips				13	2	14	3	12	15	96	13	19	13	20				
Total Pipeline Development Net New Trips ⁽⁶⁾												2,748	2,394	5,142	2,073	2,718	4,791	53,600	4,204	7,418	3,853	6,965				

Notes:
(1) Trip Generation based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition.
(2) Twinbrook Policy Area
(3) North Bethesda Policy Area
(4) Rockville City Policy Area
(5) White Flint Policy Area
(6) "*" Indicates ITE Trip Generation lacks weekday ADT data for specific land use code
(7) Land Use Code does not have Weekday AM Values Present
(8) Pipeline Trip Generation reflects the most recent data available in regards to built and unbuilt projects

Table 3-3b
Pike Center
Pipeline Development LATR Trip Generation ⁽¹⁾

Land Use	LUC	LATR Trip Generation					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
1. 12710 Twinbrook Parkway ⁽²⁾	Twinbrook	-11	-5	-16	7	9	16
2. 12500 Ardennes Avenue ⁽²⁾	Twinbrook	-17	47	30	36	-6	30
3. Twinbrook Quarter Phase 1A ⁽⁴⁾	Rockville City	420	242	662	139	274	413
4. Federal Plaza West ⁽³⁾	North Bethesda	12	117	129	66	33	99
5. Wilgus ⁽³⁾	North Bethesda	63	144	207	175	126	301
6. 2115 East Jefferson ⁽³⁾	North Bethesda	-153	4	-149	-6	-132	-138
7. Washington Science Center ⁽³⁾	North Bethesda	13	3	15	3	12	15
8. East Village at North Bethesda Gateway ⁽⁵⁾	White Flint	-49	60	11	74	-13	62
9. MHP-Nebel Street ⁽⁵⁾	White Flint	11	36	47	31	20	51
10. Mid Pike Plaza - Pike and Rose ⁽³⁾	North Bethesda	569	338	907	359	579	938
11. Grand Park Development ⁽³⁾	North Bethesda	81	237	318	-24	15	-9
12. Evolution Labs North Bethesda ⁽³⁾	North Bethesda	441	97	538	81	428	509
13. North Bethesda Town Center ⁽⁵⁾	White Flint	719	319	1,038	373	716	1,090
14. Saul Centers White Flint West ⁽³⁾	North Bethesda	215	177	392	133	238	371
15. North Bethesda Market II ⁽³⁾	North Bethesda	-47	109	62	114	-21	93
16. 5500 Edson Lane / Peace Palace ⁽⁵⁾	White Flint	11	1	13	2	11	13
Total Pipeline Development Net New Trips ⁽⁸⁾		2,278	1,925	4,204	1,563	2,290	3,853

Notes:

(1) Trip Generation based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition.

(2) Twinbrook Policy Area

(3) North Bethesda Policy Area

(4) Rockville City Policy Area

(5) White Flint Policy Area

(6) "*" Indicates ITE Trip Generation lacks weekday ADT data for specific land use code

(7) Land Use Code does not have Weekday AM Values Present

(8) Pipeline Trip Generation reflects the most recent data available in regards to built and unbuilt projects

Table 3-6

Pike Center

Phase 1 Trip Generation ⁽¹⁾

Land Use	LUC	Amount	Unit	ITE Trip Generation						Montgomery County Trip Generation			
				AM Peak Hour			PM Peak Hour			AM Peak Hour		PM Peak Hour	
				In	Out	Total	In	Out	Total	Auto Driver	Person Trips	Auto Driver	Person Trips
Existing Uses													
Shopping Plaza -No Supermarket (40-150K)	821	81,007	SF	87	53	140	206	214	420	99	192	298	578
<i>Pass-By Reduction (40% Weekday PM Peak)</i>							(82)	(86)	(168)			(119)	(231)
Existing Total:							<u>124</u>	<u>128</u>	<u>252</u>			<u>179</u>	<u>347</u>
Phase 1 Development Plan													
Existing Development (To Be Demolished)													
Shopping Plaza -No Supermarket (40-150K)		40,007	SF										
Remainder		41,000	SF										
New Development (To Be Built)													
New Shopping Plaza -Yes Supermarket (40-150K)	821	<u>44,844</u>	SF										
Remainder still in operation		<u>41,000</u>	SF										
Total Phase 1 Development													
Multifamily Housing (Mid-Rise)	221	290	DU	27	89	116	69	44	113	96	178	94	175
Shopping Plaza -Yes Supermarket (40-150K)	821	85,844	SF	188	115	303	373	404	777	215	417	552	1,070
<i>Pass-By Reduction (40% Weekday PM Peak)</i>							(149)	(162)	(311)			(221)	(428)
Retail Subtotal:							<u>224</u>	<u>243</u>	<u>466</u>			<u>331</u>	<u>642</u>
<i>Phase 1 Total Trips (with Pass-by)</i>				<u>215</u>	<u>204</u>	<u>419</u>	<u>293</u>	<u>287</u>	<u>580</u>	<u>311</u>	<u>595</u>	<u>425</u>	<u>817</u>
<i>Phase 1 Total Trips</i>				<u>215</u>	<u>204</u>	<u>419</u>	<u>442</u>	<u>449</u>	<u>891</u>	<u>311</u>	<u>595</u>	<u>646</u>	<u>1,245</u>
Phase 1 New Trips (with Pass-by)				128	151	279	169	159	328	212	403	246	470
Phase 1 Net New Trips				128	151	279	236	235	471	212	403	348	667

Notes: (1) Trip Generation based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition.

Pass-by Site Trips

Land Use	LUC	Amount	Unit	PM Peak Hour		
				In	Out	Auto Driver Total
Existing Uses						
Shopping Plaza -No Supermarket (40-150K)	821	81,007	SF	146	152	298
<i>Pass-By Reduction (40% Weekday PM Peak)</i>				(58)	(61)	(119)
Existing Total:				<u>88</u>	<u>91</u>	<u>179</u>
Total Phase 1 Development						
Multifamily Housing (Mid-Rise)	221	290	DU	57	37	94
Shopping Plaza -Yes Supermarket (40-150K)	821	85,844	SF	265	287	552
<i>Pass-By Reduction (40% Weekday PM Peak)</i>				(106)	(115)	(221)
Retail Subtotal:				<u>159</u>	<u>172</u>	<u>331</u>
<i>Phase 1 Total Pass-by Site Trips</i>				<u>216</u>	<u>209</u>	<u>425</u>

Table 3-7
Pike Center
Phase 2 Trip Generation ⁽¹⁾

Land Use	LUC	Amount	Unit	ITE Trip Generation						Montgomery County Trip Generation			
				AM Peak Hour			PM Peak Hour			AM Peak Hour		PM Peak Hour	
				In	Out	Total	In	Out	Total	Auto Driver	Person Trips	Auto Driver	Person Trips
Existing Uses													
Shopping Plaza -No Supermarket (40-150K)	821	81,007	SF	87	53	140	206	214	420	99	192	298	578
<i>Pass-By Reduction (40% Weekday PM Peak)</i>							(82)	(86)	(168)			(119)	(231)
Existing Total:							<u>124</u>	<u>128</u>	<u>252</u>			<u>179</u>	<u>347</u>
Existing Phase 1 Development													
Total Shopping Plaza -Yes Supermarket (40-150K) - (Phase 1)	821	85,844	SF										
Remainder from Phase 1 (To Be Demolished)		41,000	SF										
Phase 1 remainder still in operation		<u>44,844</u>	SF										
New Retail Development (To Be Built)													
New Shopping Plaza -No Supermarket (40-150K)	821	<u>45,156</u>	SF										
Total Buildout Retail													
Shopping Plaza -Yes Supermarket (40-150K)	821	90,000	SF	197	121	318	388	421	809	226	438	575	1,114
<i>Pass-By Reduction (40% Weekday PM Peak)</i>							(155)	(168)	(324)			(230)	(446)
Retail Subtotal:							<u>233</u>	<u>253</u>	<u>485</u>			<u>345</u>	<u>668</u>
Existing Phase 1 Development													
Multifamily Housing (Mid-Rise) - (Phase 1)	221	290	DU	27	89	116	69	44	113	96	178	94	175
New Residential Development (To Be Built)													
Multifamily Housing (High-Rise)	222	470	DU	32	90	122	90	55	145	101	188	121	225
<i>Phase 2 Total Trips (with Pass-by)</i>				<u>256</u>	<u>300</u>	<u>556</u>	<u>392</u>	<u>352</u>	<u>744</u>	<u>423</u>	<u>804</u>	<u>560</u>	<u>1,068</u>
<i>Phase 2 Total Trips</i>				<u>256</u>	<u>300</u>	<u>556</u>	<u>547</u>	<u>521</u>	<u>1,068</u>	<u>423</u>	<u>804</u>	<u>790</u>	<u>1,514</u>
Phase 2 New Trips (with Pass-by)				169	247	416	268	224	492	324	612	381	722
Phase 2 Net New Trips				169	247	416	341	307	648	324	612	492	936

Notes: (1) Trip Generation based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition.

Land Use	LUC	Amount	Unit	PM Peak Hour		
				In	Out	Auto Driver Total
Existing Uses						
Shopping Plaza -No Supermarket (40-150K)	821	81,007	SF	146	152	298
<i>Pass-By Reduction (40% Weekday PM Peak)</i>				(58)	(61)	(119)
Existing Total:				<u>88</u>	<u>91</u>	<u>179</u>
Total Buildout Retail						
Shopping Plaza -Yes Supermarket (40-150K)	821	90,000	SF	276	299	575
<i>Pass-By Reduction (40% Weekday PM Peak)</i>				(110)	(120)	(230)
Retail Subtotal:				<u>166</u>	<u>179</u>	<u>345</u>
Existing Phase 1 Development						
Multifamily Housing (Mid-Rise) - (Phase 1)	221	290	DU	57	37	94
New Residential Development (To Be Built)						
Multifamily Housing (High-Rise)	222	470	DU	75	46	121
<i>Phase 2 Total Trips</i>				<u>298</u>	<u>262</u>	<u>560</u>

Table 3-8
Pike Center
Total Future Conditions Levels of Service Summary¹

Approach/ Lane Group	Delay Threshold (sec)	Existing Conditions		2034 Future Conditions without Development		2034 Phase 1 Future Conditions with Development		2034 Phase 1 Future Conditions with Development - Access Restricted		2039 Phase 2 Future Conditions with Development		2039 Phase 2 Future Conditions with Development - Access Restricted	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
		Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)
1. Rockville Pike / Bou Avenue -- Orange Policy Area													
EBLT	71	279.8	455.2	279.8	455.2	279.8	455.2	279.8	455.2	279.8	455.2	279.8	455.2
EBR	71	65.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5
WBL	71	65.5	61.3	67.6	61.2	72.3	60.7	72.0	60.7	87.3	65.4	82.0	63.9
WBTR	71	50.8	54.9	50.6	54.7	49.9	54.5	49.9	54.7	49.8	52.9	49.8	53.2
NBL	71	91.5	108.7	97.5	104.7	99.0	104.3	99.0	104.2	99.0	102.8	99.0	102.9
NBT	71	22.2	18.6	28.8	66.0	30.7	79.6	30.9	92.7	31.6	96.8	31.4	108.4
NBR	71	9.4	5.4	11.3	14.6	11.9	16.1	11.6	15.9	11.4	17.1	11.7	16.9
SBL	71	15.1	54.3	28.9	58.6	35.0	97.2	32.3	64.4	32.2	71.7	30.6	61.3
SBTR	71	14.1	14.7	15.9	12.9	17.6	16.5	17.7	16.5	15.2	15.6	15.7	16.2
Overall	71	28.4	29.6	29.3	48.4	31.7	56.9	31.7	62.3	33.2	63.9	32.5	69.7
2. Rockville Pike / Pike Center Driveway / Federal Plaza Driveway -- Orange Policy Area													
EBLT	71.0	73.4	79.7	73.4	79.7	70.8	77.5	70.8	77.5	71.7	79.0	68.4	79.5
EBR	71.0	69.0	55.2	69.0	55.2	67.6	53.9	67.6	53.9	68.6	55.3	65.8	54.9
WBLTR	71.0	69.8	55.6	69.8	55.6	72.6	94.1	72.6	94.1	70.5	58.0	70.5	60.2
NBL	71.0	8.3	34.9	37.1	75.7	36.5	74.8	35.8	68.8	35.6	70.5	38.6	68.8
NBTR	71.0	0.5	1.0	0.3	2.2	0.4	3.2	0.4	3.6	0.4	2.6	0.5	3.3
SBL	71.0	1.0	2.2	1.4	25.5	1.5	38.1	1.7	70.0	0.9	31.6	1.2	38.4
SBTR	71.0	1.7	2.2	2.5	3.1	2.6	3.3	2.6	3.1	2.3	2.3	2.4	2.3
Overall	71.0	4.0	9.4	3.9	10.3	4.7	13.1	4.8	14.1	4.3	10.0	4.8	10.7
3. Rockville Pike/ Shell Gas Station Driveway - Unsignalized -- Orange Policy Area													
WBR	71.0	9.9	9.3	10.9	10.1	10.5	10.5	10.6	10.7	CLOSED			
Overall	71.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1				
4. Rockville Pike / Twinbrook Pkwy / Rollins Ave -- Red Policy Area													
EBT	71.0	65.9	63.2	63.5	62.6	63.5	62.6	63.5	62.6	61.1	62.6	63.5	62.6
WBT	71.0	56.9	30.2	43.4	30.1	44.7	29.6	44.7	29.6	41.8	31.3	44.7	29.6
WBR	71.0	57.8	31.2	50.8	32.8	51.9	31.9	51.9	31.9	52.4	36.2	51.9	31.9
NBL	71.0	10.9	5.2	46.5	37.0	48.1	40.8	48.1	40.9	49.3	32.8	43.6	32.3
NBT	71.0	2.9	6.5	3.7	15.1	5.2	17.7	5.2	17.4	3.5	19.9	3.7	20.5
NBR	71.0	0.4	0.2	0.2	6.6	0.2	7.8	0.3	8.2	0.3	7.1	0.3	8.3
SBL	71.0	5.6	36.0	36.9	46.3	39.2	45.4	39.2	45.4	62.2	51.4	64.5	51.5
SBT	71.0	6.8	19.4	9.3	39.1	9.4	39.8	9.4	39.8	10.1	39.5	9.1	39.5
Overall	71.0	18.3	20.5	17.7	30.5	18.3	31.7	18.3	31.6	19.2	32.9	19.0	32.9
5. Chapman Ave / Twinbrook Pkwy -- Red Policy Area													
EBL	71.0	12.3	58.0	17.0	59.1	17.2	59.5	17.2	59.3	19.5	57.7	19.2	57.7
EBTR	71.0	16.8	78.9	20.1	90.3	20.0	90.6	20.0	90.5	24.0	107.0	23.2	107.1
WBL	71.0	58.1	71.6	59.0	72.7	58.6	73.2	58.6	73.2	59.3	73.2	58.6	73.2
WBTR	71.0	20.2	36.2	22.8	37.0	22.7	37.6	22.7	37.6	24.1	37.6	22.7	37.6
NBLT	71.0	71.6	46.8	72.9	47.1	73.0	46.8	73.0	46.8	73.7	47.8	73.0	46.8
NBR	71.0	36.4	38.1	33.0	39.7	33.1	39.7	33.1	39.7	31.7	39.7	33.1	39.7
SBL	71.0	68.4	67.5	68.4	67.5	68.4	67.5	68.4	67.5	68.4	67.5	68.4	67.5
SBT	71.0	70.2	71.2	70.2	71.2	70.2	71.2	70.2	71.2	70.2	71.2	70.2	71.2
SBR	71.0	65.5	59.7	65.5	59.7	65.5	59.7	65.5	59.7	65.5	59.7	65.5	59.7
Overall	71.0	35.5	57.5	37.6	61.2	37.4	61.5	37.4	61.5	39.0	66.7	38.0	66.8
6. Chapman Ave / Pike Center Driveway North - Unsignalized -- Orange Policy Area**													
EBLTR/CLOSED	71.0	0.0	22.4	0.0	25.0	0.0	24.8	-	-	22.8	33.3	-	-
WBLTR/WBLR	71.0	11.1	18.6	11.4	20.4	11.4	20.2	11.4	18.3	11.9	24.8	11.5	21.0
NBLTR/NBTR	71.0	0.1	0.1	0.2	0.1	0.2	0.1	-	-	0.6	1.6	-	-
SBLTR/SBLT	71.0	0.1	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3
Overall	71.0	0.1	0.4	0.1	0.4	0.1	0.4	0.1	0.2	1.4	2.1	0.1	0.2

Table 3-8
Pike Center
Total Future Conditions Levels of Service Summary¹

Approach/ Lane Group	Delay Threshold (sec)	Existing Conditions		2034 Future Conditions without Development		2034 Phase 1 Future Conditions with Development		2034 Phase 1 Future Conditions with Development - Access Restricted		2039 Phase 2 Future Conditions with Development		2039 Phase 2 Future Conditions with Development - Access Restricted	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
		Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)
7. Chapman Ave / Rollins Ave - Unsignalized/Signalized -- Orange Policy Area **													
EBLTR	71.0	-	-	-	-	22.6	40.9	21.1	25.7	17.8	194.2	18.5	26.0
WBL	71.0	16.1	33.3	17.2	40.3	21.1	64.5	18.7	25.7	23.5	118.6	20.0	26.1
WBR/WBTR	71.0	11.1	17.2	11.3	18.7	13.0	29.5	18.0	24.7	13.3	38.2	19.2	25.2
NBTR/NBLTR	71.0	-	-	-	-	0.2	-	6.0	10.9	0.0	0.9	7.5	14.0
SBLT/SBLTR	71.0	1.7	2.3	1.6	2.3	1.2	1.9	5.8	7.4	1.2	1.9	7.5	7.7
Overall	71.0	1.3	3.2	1.3	3.4	2.1	5.6	7.3	11.8	2.3	11.8	9.1	13.1
8. Chapman Ave / Pike Center Driveway South - Unsignalized -- Orange Policy Area													
EBLR	71.0	35.4	21.1	42.5	27.5	CLOSED							
NBLT	71.0	0.1	-	0.1	-								
Overall	71.0	0.1	0.1	0.1	0.1								
9. Chapman Ave / Bou Ave -- Orange Policy Area**													
EBL	71.0	10.0	12.2	9.9	13.4	9.6	12.5	9.5	11.9	9.6	13.5	9.5	12.6
EBTR	71.0	8.8	9.7	8.8	9.7	8.9	9.7	8.8	9.5	8.9	9.7	8.8	9.5
WBL	71.0	18.9	19.7	18.8	19.9	18.7	19.8	18.7	19.7	18.8	19.9	18.7	19.7
WBT	71.0	20.5	22.8	20.4	23.3	20.3	23.1	20.3	23.0	20.4	23.1	20.3	22.9
WBR	71.0	19.6	21.0	19.8	21.5	19.8	21.3	19.7	21.2	19.8	21.5	19.7	21.3
NBL	71.0	19.1	19.8	19.1	20.0	18.9	19.8	18.9	19.8	19.0	20.0	18.9	19.8
NBTR	71.0	19.6	21.9	19.6	22.2	19.4	21.9	19.4	21.9	19.5	22.1	19.4	21.9
SBL	71.0	22.6	33.4	24.4	46.7	24.4	42.2	24.9	49.7	24.8	44.2	25.2	53.5
SBT	71.0	20.6	22.2	20.6	22.5	20.4	22.2	20.4	22.3	20.5	22.4	20.4	22.3
SBR	71.0	9.8	9.5	10.0	9.6	10.0	9.4	10.0	9.5	10.4	9.6	10.3	9.5
Overall	71.0	13.9	17.4	14.5	19.7	14.6	19.0	14.8	20.5	14.6	19.3	14.8	21.1
10. Bou Ave / Pike Center Driveway - Unsignalized -- Orange Policy Area**													
EBLT/EBT	71.0	0.9	1.1	0.9	1.0	2.7	4.5	-	-	0.9	3.4	-	-
SBLR/SBR	71.0	13.9	16.4	14.1	16.8	13.1	19.8	10.4	10.7	13.2	19.9	10.7	11.7
Overall	71.0	0.5	1.3	0.5	1.3	1.3	3.2	0.5	0.9	1.0	3.9	0.5	1.7
11. E Jefferson St / Rollins Ave -- City of Rockville													
EBL	71.0	37.0	36.8	37.0	36.8	37.0	36.8	37.0	36.8	37.0	36.8	37.0	36.8
EBTR	71.0	38.3	38.4	38.3	38.4	38.3	38.4	38.3	38.4	38.3	38.4	38.3	38.4
WBL	71.0	47.3	49.4	42.6	61.4	43.8	61.4	43.8	61.4	43.8	61.4	43.8	61.4
WBTR	71.0	27.5	26.8	28.8	25.5	28.9	25.5	28.9	25.5	28.9	25.5	28.9	25.5
NBLT	71.0	10.7	15.2	9.9	16.5	9.8	16.5	9.8	16.5	9.8	16.5	9.8	16.5
NBR	71.0	2.9	3.0	3.0	3.1	3.0	3.1	3.0	3.1	3.0	3.1	3.0	3.1
SBLTR	71.0	9.5	10.7	8.7	11.5	8.6	11.5	8.6	11.5	8.6	11.5	8.6	11.5
Overall	71.0	20.0	20.4	16.9	24.1	17.1	24.1	17.1	24.1	17.1	24.1	17.1	24.1
12. Rockville Pike / Halpine Rd -- Red Policy Area													
EBL	71.0	70.4	71.4	51.3	51.8	51.3	51.8	51.3	51.8	51.3	51.8	51.3	51.8
EBTR	71.0	65.5	58.6	50.2	47.5	50.2	47.5	50.2	47.5	50.2	47.5	50.2	47.5
WBL	71.0	64.4	58.3	75.4	83.6	75.4	83.6	75.4	83.6	75.4	83.6	75.4	83.6
WBT	71.0	65.7	60.4	50.0	48.3	50.0	48.3	50.0	48.3	50.0	48.3	50.0	48.3
WBR	71.0	63.9	57.6	49.6	47.0	49.6	47.0	49.6	47.0	49.6	47.0	49.6	47.0
NBL	71.0	5.5	27.0	34.8	71.5	33.8	71.3	33.7	71.3	33.5	77.1	34.0	77.5
NBTR	71.0	4.2	3.6	16.1	13.0	18.4	13.9	18.5	13.9	20.7	12.0	20.4	11.7
SBL	71.0	3.7	10.3	11.5	35.0	11.8	35.5	11.8	35.5	12.0	35.8	12.0	35.8
SBTR	71.0	7.3	14.4	18.9	28.3	19.1	28.9	19.1	28.9	19.2	29.2	19.2	29.2
Overall	71.0	11.9	16.1	22.4	27.5	23.4	28.0	23.4	28.0	24.2	27.4	24.2	27.3

Table 3-8
Pike Center
Total Future Conditions Levels of Service Summary¹

Approach/ Lane Group	Delay Threshold (sec)	Existing Conditions		2034 Future Conditions without Development		2034 Phase 1 Future Conditions with Development		2034 Phase 1 Future Conditions with Development - Access Restricted		2039 Phase 2 Future Conditions with Development		2039 Phase 2 Future Conditions with Development - Access Restricted	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
		Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)	Delay (s)
13. Twinbrook Pkwy / Parklawn Dr -- Red Policy Area													
EBL	71.0	69.1	67.2	69.1	67.2	69.1	67.2	69.1	67.2	69.1	67.2	69.1	67.2
EBLTR	71.0	70.1	71.4	70.1	71.4	70.1	71.4	70.1	71.4	70.1	71.4	70.1	71.4
WBL	71.0	72.1	69.4	72.1	69.4	72.1	69.4	72.1	69.4	72.1	69.4	72.1	69.4
WBLT	71.0	71.3	69.2	71.3	69.2	71.3	69.2	71.3	69.2	71.3	69.2	71.3	69.2
WBR	71.0	49.0	46.2	49.0	46.3	49.0	46.3	49.0	46.3	49.0	46.3	49.0	46.3
NBL	71.0	5.6	13.2	4.8	13.1	4.8	12.9	4.8	12.9	4.3	12.9	4.8	12.9
NBTR	71.0	7.7	22.7	5.6	22.8	5.5	22.4	5.5	22.4	4.8	22.5	5.5	22.5
SBL	71.0	9.0	16.7	8.9	17.2	8.9	17.2	8.9	17.2	8.9	17.2	8.9	17.2
SBT	71.0	15.2	20.9	15.5	21.0	15.5	21.0	15.5	21.0	15.5	21.0	15.5	21.0
SBR	71.0	11.4	15.7	11.4	15.7	11.4	15.7	11.4	15.7	11.4	15.7	11.4	15.7
Overall	71.0	20.8	31.2	20.2	31.2	20.2	31.0	20.2	31.0	20.0	31.0	20.2	31.0
14. Nebel St / Randolph Rd -- Red Policy Area													
EBL	71.0	12.3	18.2	17.0	23.0	17.3	23.1	17.4	23.1	17.5	23.1	17.6	23.1
EBTR	71.0	14.3	32.2	19.7	48.5	20.0	48.5	20.1	48.5	20.2	48.5	20.4	48.5
WBL	71.0	9.6	31.3	16.2	85.0	16.5	85.0	16.6	85.0	16.6	85.0	16.8	85.0
WBTR	71.0	15.8	30.5	22.7	33.3	23.0	33.5	23.2	33.5	23.3	33.6	23.5	33.6
NBL	71.0	55.2	43.3	50.5	42.7	50.8	42.8	50.8	42.9	50.8	42.8	50.8	42.9
NBT	71.0	66.2	56.0	60.1	55.6	60.3	55.7	60.3	55.8	60.3	55.7	60.3	55.8
NBR	71.0	70.5	98.4	72.6	160.2	73.4	161.8	73.4	163.4	73.4	161.8	73.4	163.4
SBL	71.0	52.8	37.4	44.2	38.4	43.6	39.0	43.4	39.4	43.3	39.3	43.1	39.8
SBT	71.0	64.9	49.0	56.0	48.1	55.5	48.1	55.3	48.1	55.2	48.1	55.0	48.1
SBR	71.0	61.5	44.7	53.6	43.6	53.2	43.6	53.0	43.6	53.0	43.6	52.8	43.6
Overall	71.0	22.8	39.9	27.5	55.5	27.8	55.7	27.9	55.9	28.0	55.7	28.1	55.9
15. Rockville Pike / Hubbard Dr / Plaza Driveway -- Orange Policy Area													
EBL	71.0	62.2	54.2	62.2	54.2	62.2	54.2	62.2	54.2	62.2	54.2	62.2	54.2
EBTR	71.0	60.6	51.0	60.6	51.0	60.6	51.0	60.6	51.0	60.6	51.0	60.6	51.0
WBL	71.0	70.9	76.1	70.9	76.1	70.9	76.1	70.9	76.1	70.9	76.1	70.9	76.1
WBTR	71.0	61.6	52.1	61.6	52.1	61.6	52.1	61.6	52.1	61.6	52.1	61.6	52.1
NBL	71.0	6.3	11.3	13.8	13.8	14.7	14.5	14.7	14.4	15.4	14.8	15.4	14.8
NBTR	71.0	7.3	20.9	8.6	26.6	8.7	27.6	8.7	27.6	8.7	28.3	8.7	28.3
SBL	71.0	1.3	68.0	3.9	74.9	5.7	74.6	5.7	74.9	5.7	70.3	5.8	71.5
SBTR	71.0	3.9	10.2	3.6	7.0	3.9	7.2	3.9	7.1	4.0	7.5	4.0	7.3
Overall	71.0	8.5	23.1	8.0	23.5	8.2	23.9	8.2	23.9	8.2	24.2	8.2	24.2
16. Chapman Ave / Randolph Rd / Josiah Henson Pkwy -- Red Policy Area													
EBL	71.0	6.3	11.1	7.4	11.7	7.4	11.7	7.4	11.7	7.4	11.7	7.4	11.7
EBTR	71.0	7.3	16.9	7.5	18.0	7.5	18.0	7.5	18.0	7.5	18.0	7.5	18.0
WBL	71.0	2.1	8.5	1.6	7.9	1.6	8.1	1.5	8.1	1.5	8.0	1.5	8.0
WBT	71.0	7.7	10.0	4.7	9.4	4.5	9.3	4.4	9.3	4.4	9.3	4.3	9.3
WBR	71.0	5.3	2.4	1.0	1.9	0.9	1.9	0.9	1.9	0.9	1.9	0.9	1.9
NBL	71.0	73.2	72.4	73.2	72.4	73.2	72.4	73.2	72.4	73.2	72.4	73.2	72.4
NBTR	71.0	71.7	68.6	71.7	68.6	71.7	68.6	71.7	68.6	71.7	68.6	71.7	68.6
SBL	71.0	69.8	62.5	69.8	62.5	69.8	62.5	69.8	62.5	69.8	62.5	69.8	62.5
SBLTR	71.0	72.7	71.2	72.7	71.2	72.7	71.2	72.7	71.2	72.7	71.2	72.7	71.2
Overall	71.0	10.0	22.3	8.2	22.0	8.1	22.0	8.1	22.0	8.1	22.0	8.0	22.0
17. Chapman Ave / Thompson Ave - Unsignalized -- Red Policy Area													
EBLTR	71.0	11.5	20.2	11.5	20.3	11.5	20.3	11.5	20.3	11.5	20.3	11.5	20.3
WBLTR	71.0	16.7	25.1	16.7	25.0	16.7	25.0	16.7	25.0	16.7	25.0	16.7	25.0
NBLTR	71.0	1.9	1.0	1.9	1.0	1.9	1.0	1.9	1.0	1.9	1.0	1.9	1.0
SBLTR	71.0	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2
Overall	71.0	3.8	5.3	3.8	5.3	3.8	5.3	3.8	5.3	3.8	5.3	3.8	5.3
18. Rockville Pike (MD 355) / Rollins Ave Extension - Unsignalized -- Orange Policy Area													
WBR	71.0	Future				10.1	12.6	10.1	12.7	10.3	12.8	10.4	13.4
Overall	71.0					0.1	0.3	0.1	0.3	0.1	0.3	0.2	0.4

Notes:

1. Capacity analysis based on Highway Capacity Manual 2000 methodology, using Synchro 11 unless otherwise noted.

2. **Bold** roadways indicate N/S direction.

** Intersections have had restricted movements added in Phases 1 & 2

Table 3-9
Pike Center
Total Future Conditions Queuing Summary¹

Approach/ Lane Group	Storage Length (ft)	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2034 Phase 1 Future Conditions with Development - Access Restricted				2039 Phase 2 Future Conditions with Development				2039 Phase 2 Future Conditions with Development - Access Restricted			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile
1. Rockville Pike / Bou Avenue – Orange Policy Area																									
EBLT	71	40	88	73	146	37	82	66	137	40	90	68	140	36	82	68	137	32	71	66	126	31	69	57	120
EBR	90	25	63	39	83	25	63	38	82	28	69	39	84	25	64	41	84	26	68	42	101	22	60	40	93
WBL	206	155	241	118	193	158	241	109	181	160	238	121	201	163	241	126	199	174	252	156	235	171	237	147	225
WBL	206	166	255	138	219	169	255	133	220	171	248	152	239	172	243	161	241	187	262	185	261	180	246	175	242
WBTR	100	71	198	101	191	64	168	104	194	52	152	127	217	46	133	139	217	59	175	147	239	42	130	138	226
NBL	160	33	78	57	134	43	118	78	182	45	110	82	190	43	111	74	174	43	112	75	185	50	137	73	179
NBT	420	101	189	193	307	170	291	368	528	178	291	382	528	189	314	381	519	208	350	387	517	225	380	377	522
NBT	420	84	169	163	287	164	287	368	540	174	294	385	535	182	309	388	533	193	327	391	526	208	367	377	532
NBT	420	76	163	148	248	163	280	379	553	178	293	399	552	184	315	405	551	190	326	404	537	193	347	389	549
NBR	420	62	134	120	222	60	119	227	456	53	121	240	464	53	115	210	448	48	108	224	430	55	131	228	451
SBL	160	55	112	178	302	71	138	186	310	98	183	178	240	77	143	161	233	85	156	177	240	79	148	177	235
SBT	517/198	67	133	124	239	133	235	143	276	155	242	213	284	148	227	191	269	143	222	204	279	149	227	208	275
SBT	517/198	84	157	116	191	157	259	131	210	172	249	167	238	165	243	171	242	165	243	163	238	167	247	177	241
SBR	517/198	89	162	125	202	164	271	139	220	176	251	168	237	173	249	174	243	169	246	169	240	173	254	181	236
2. Rockville Pike / Pike Center Driveway / Federal Plaza Driveway – Orange Policy Area																									
EBLT	84	42	103	140	190	41	101	140	192	29	87	138	186	36	103	137	193	18	53	94	149	18	52	94	153
EBR	150	46	81	72	100	45	83	70	104	42	80	71	102	45	83	75	97	49	98	92	152	57	110	101	156
WBLTR	48	12	38	39	84	11	36	44	91	49	100	96	131	44	87	98	132	38	79	40	66	49	95	45	69
NBL	125	52	112	89	177	66	125	121	216	76	145	139	231	76	137	128	218	70	130	130	225	76	146	110	194
NBT	517/295	10	54	14	67	13	60	41	164	15	72	62	184	18	84	64	175	20	92	53	166	28	107	54	154
NBT	517/295	6	43	15	49	6	35	38	161	8	41	65	155	9	56	60	134	7	43	48	127	13	72	49	118
NBR	517/295	9	50	28	72	7	34	36	83	13	48	79	156	14	56	87	156	10	43	60	117	16	63	71	126
SBL	110	15	44	23	61	19	51	24	62	27	66	76	177	41	83	90	158	14	43	55	138	26	68	83	193
SBT	180	4	22	20	62	9	40	23	73	15	63	145	260	14	60	99	212	12	45	104	264	14	61	125	285
SBT	180	9	34	15	51	25	76	27	73	30	88	63	147	24	74	59	149	25	71	58	162	33	87	60	158
SBR	180	14	46	26	69	34	92	40	88	47	109	70	148	122	41	59	135	37	92	63	145	45	104	58	141
3. Rockville Pike/ Shell Gas Station Driveway - Unsignalized – Orange Policy Area																									
WBR	73	14	37	27	57	13	37	38	78	15	38	40	80	15	40	38	81	CLOSED							
NBT	180	-	-	-	-	0	7	5	39	-	-	10	54	0	8	5	34								
NBT	180	-	-	-	-	1	11	11	59	-	-	15	73	-	-	10	58								
NBR	180	0	6	-	-	1	17	16	69	0	4	24	90	1	10	15	75								
SBT	261	-	-	0	3	0	0	0	3	-	-	197	430	0	4	11	56								
SBT	261	-	-	-	-	0	0	0	10	-	-	46	199	0	4	4	29								
SBT	261	-	-	-	-	-	-	-	-	-	-	27	141	-	-	3	29								
4. Rockville Pike / Twinbrook Pkwy / Rollins Ave -- Red Policy Area																									
EBT	1311	72	142	148	237	127	260	160	262	105	208	227	530	108	207	161	260	117	240	293	739	127	252	391	950
EBTR	1311	109	188	170	257	186	323	188	291	174	287	255	555	173	279	195	300	187	318	328	780	203	334	418	982
WBT	563	107	186	104	183	114	204	112	208	121	218	125	232	118	213	111	199	113	211	137	261	123	216	119	227
WBT	563	112	209	98	191	148	280	122	260	154	301	135	280	139	278	115	254	149	304	164	349	143	273	120	260
WBR	65	84	171	78	166	116	207	106	200	120	208	101	200	112	204	98	191	128	219	116	209	112	203	102	195
NBL	130	38	88	29	81	62	131	58	146	62	127	77	182	64	137	53	135	60	127	73	187	60	126	54	134
NBT	261	36	86	82	146	46	113	182	272	57	126	203	295	63	143	173	259	55	132	204	296	65	141	175	263
NBT	261	30	80	94	160	45	122	202	286	66	139	217	303	69	156	191	279	63	144	220	311	65	146	199	287
NBT	261	30	81	110	177	62	144	216	300	88	165	224	306	89	177	200	289	82	158	232	328	84	170	206	301
NBR	280	-	-	-	-	-	21	136	-	-	25	146	-	-	23	142	1	32	59	232	1	33	36	180	-
SBL	350	71	140	83	173	143	238	143	331	136	245	312	611	133	225	157	277	171	292	255	490	176	289	220	456
SBT	1192	70	147	249	390	121	209	365	527	130	232	692	1298	131	215	381	575	119	211	462	845	123	232	423	761
SBT	1192	55	134	224	364	128	223	349	498	129	234	636	1191	131	225	363	555	120	212	434	788	125	217	386	634
SBR	1192	47	117	196	336	128	290	328	485	123	238	567	1054	125	233	347	544	119	212	395	690	116	210	351	545
5. Chapman Ave / Twinbrook Pkwy -- Red Policy Area																									
EBL	130	10	49	78	212	11	55	87	224	11	55	66	194	15	75	77	215	19	90	77	215	13	59	85	228
EBT	563	86	196	289	414	102	202	344	506	100	214	316	477	100	201	354	526	131	278	410	605	128	240	361	559
EBTR	563	120	238	310	443	143	256	377	565	140	269	344	523	135	258	386	590	178	345	460	677	177	308	409	635
WBL	240	194	350	217	349	196	351	214	341	197	348	205	332	198	360	223	348	184	350	195	317	196	356	202	325
WBL	240	280	402	273	405	285	411	266	397	276	408	253	376	289	407	274	414	289	410	256	370	287	413	248	375
WBTR	1295	180	452	256	533	201	465	242	561	198	467	205	404	191	503	272	608	202	489	227	477	187	466	211	470
WBTR	1295	164	358	237	440	191	358	240	475	207	402	215	361	186	379	256	507	211	415	238	425	188	373	210	357
NBL	60	192	122	128	216	96	174	135	223	101	192	132	215	99	179	134	221	106	194	142	224	85	160	124	208
NBR	199	106	190	203	234	99	175	199	248	104	196	199	239	100	179	203	241	105	188	202	238	97	187	197	246
SBL	85	21	69	74	151	16	60	76	155	17	59	77	159	16	58	73	148	18	63	69	146	15	53	76	151
SBT	541	54	105	107	177	53	103	107	180	54	110	110	186	49	97	106	171	55	108	109	174	55	100	112	178
SBT	300	44	95	94	168	48	97	97	176	42	85	105	189	48	100	98	173	48	106	100	192	42	87	93	159
SBR	-	-	-	-	-	-	-	-	-	-	-	2	42	-	-	-	-	-	-	-	-	-	-	-	-
6. Chapman Ave / Pike Center Driveway North - Unsignalized – Orange Policy Area**																									
EBLTR/CLOSED	39	-	-	12	39	-	-	20	60	-	-	14	44	-	-	-	-	30	58	56	98	-	-	-	-
WBLTR	45	3	17	9	27	4	18	12	43	4	21	11	37	4	20	9	31	4	17	11	36	3	15	8	28
NBLTR																									

Table 3-9
Pike Center
Total Future Conditions Queuing Summary¹

Approach/ Lane Group	Storage Length (ft)	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2034 Phase 1 Future Conditions with Development - Access Restricted				2039 Phase 2 Future Conditions with Development				2039 Phase 2 Future Conditions with Development - Access Restricted			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile
7. Chapman Ave / Rollins Ave - Unsignalized/Signalized – Orange Policy Area**																									
EBLTR	228	-	-	-	-	-	-	-	-	20	47	17	45	28	56	51	99	29	58	33	66	40	67	39	62
WBL	60	21	48	42	92	20	48	76	150	18	44	48	111	17	39	31	68	17	43	33	76	18	43	29	62
WBR/WBTR	60	20	44	69	138	22	44	50	112	24	49	60	113	22	48	47	87	26	52	62	117	22	49	48	91
NBTR/NBLTR	128	5	32	97	192	2	18	82	184	3	24	83	188	62	125	139	179	2	21	120	253	76	154	185	258
SB/L	130	20	67	54	135	18	65	91	182	14	51	71	170	43	111	113	194	14	51	32	92	46	116	85	165
SBT/SBTR	130	49	145	-	-	61	163	-	-	32	115	7	51	97	185	-	-	12	62	-	-	94	186	92	173
8. Chapman Ave / Pike Center Driveway South - Unsignalized – Orange Policy Area																									
EBLR	35	1	10	3	18	2	15	5	21	CLOSED															
NBLT	53	19	60	100	193	19	64	90	181																
SBT	128	19	71	78	166	33	98	115	189																
SBT	128	12	50	17	63	9	39	18	67																
SBTR	128	103	182	68	152	112	183	60	143																
9. Chapman Ave / Bou Ave – Orange Policy Area**																									
EBL	218	60	119	119	209	55	109	115	205	49	100	89	157	47	93	104	186	52	107	127	222	45	100	177	283
EBTR	218	41	97	80	156	40	92	75	153	41	96	69	131	35	87	62	132	44	101	77	147	39	95	70	143
WBL	270	4	21	9	31	4	19	8	30	4	19	9	33	4	21	12	62	5	24	10	34	4	22	8	31
WBT	823	42	86	74	140	39	82	71	142	39	81	74	144	44	96	109	287	44	92	79	140	43	92	77	144
WBR	823	-	-	30	155	-	-	33	192	-	-	32	167	-	-	171	530	-	-	5	56	-	-	63	265
NBL	40	2	15	16	60	2	13	14	54	2	13	12	45	4	19	15	56	1	11	13	46	2	13	24	79
NBTR	137	25	64	97	197	23	62	93	188	24	63	95	189	23	64	103	197	26	69	100	196	24	62	139	252
SB/L	53	44	82	60	80	52	83	63	80	52	83	65	84	53	84	66	89	66	121	97	140	75	130	107	140
SBT	53	34	71	43	74	36	72	44	77	37	74	45	80	35	73	49	84	37	78	52	105	36	85	56	107
SBTR	53	50	72	51	70	52	71	48	71	61	91	59	91	64	87	59	89	100	148	87	142	101	145	85	140
10. Bou Ave / Pike Center Driveway - Unsignalized – Orange Policy Area**																									
EBLT/EBT	50	4	24	17	63	7	33	16	56	16	57	47	102	0	5	1	13	5	27	40	95	-	-	35	105
EBT	206	1	14	6	58	2	19	3	40	2	26	22	110	0	4	0	0	0	0	17	99	0	7	51	193
WBT	218	15	68	0	7	15	67	1	10	25	99	1	11	28	99	5	46	25	102	9	44	41	136	7	46
WBTR	218	22	87	7	45	23	85	6	37	35	118	16	69	44	131	28	109	38	125	32	107	53	154	31	110
SB/LR	316	17	44	35	67	17	43	35	71	32	63	55	97	26	56	46	83	34	61	63	94	25	57	54	90
11. E Jefferson St / Rollins Ave – City of Rockville																									
EBL	483	14	44	9	32	15	44	8	29	14	42	9	31	11	36	8	32	13	39	9	32	15	44	8	31
EBTR	483	44	86	44	90	48	91	44	84	53	103	42	81	46	91	43	82	45	91	44	85	53	102	49	94
WBL	1311	171	314	211	364	170	306	245	408	162	302	258	448	156	284	242	419	153	271	249	458	169	303	254	460
WBTR	1311	40	108	84	191	45	124	89	211	45	119	92	241	42	110	81	211	41	111	90	215	37	103	91	251
NBLT	301	73	150	170	297	66	131	174	297	65	130	167	305	67	141	165	319	64	131	176	305	66	131	170	304
NBR	301	29	62	57	152	40	87	61	161	37	80	52	136	38	85	65	193	36	82	70	192	43	91	65	168
SB/L	323	61	118	82	148	55	108	91	173	54	110	82	144	54	106	84	146	54	107	89	167	62	113	85	153
SBTR	323	13	44	27	80	12	38	32	108	21	65	40	103	20	63	42	107	12	41	33	107	14	49	33	100
12. Rockville Pike / Halpine Rd – Red Policy Area																									
EBL	250	36	82	87	161	36	75	80	155	41	85	82	153	37	83	78	143	37	79	87	163	38	89	79	146
EBT	834	38	82	44	91	41	85	40	86	36	82	47	101	34	76	45	94	39	84	43	91	41	91	45	94
EBTR	834	36	76	56	110	38	81	52	105	37	76	64	133	37	68	55	104	35	77	52	98	36	77	53	103
WBL	502	7	27	17	47	167	299	223	393	161	273	268	481	165	275	223	377	153	252	250	385	162	256	206	329
WBT	502	27	69	60	119	25	82	55	118	25	67	95	320	24	62	50	115	24	64	91	244	24	63	57	128
WBR	450	58	111	105	184	56	111	102	176	49	98	110	253	56	112	105	184	54	106	114	212	60	114	103	187
NBL	120	46	85	122	203	70	165	128	197	72	163	128	205	74	174	133	209	75	177	133	206	65	151	132	202
NBT	1192	55	109	86	215	181	293	106	232	189	300	119	261	199	313	125	282	204	320	117	257	201	327	111	246
NBT	1192	65	129	63	151	219	342	93	221	222	349	101	245	236	363	102	288	243	374	87	199	236	372	81	188
NBTR	1192	63	140	61	133	246	372	93	197	264	392	94	209	273	402	78	158	282	418	84	172	266	409	74	156
SB/L	125	49	162	90	207	56	177	94	223	55	171	130	273	53	164	112	249	64	192	119	252	60	189	118	254
SBT	455	253	419	321	504	361	523	398	557	323	494	456	701	312	487	422	639	315	386	327	371	317	392	327	385
SBT	455	186	336	237	392	279	432	312	467	276	445	392	635	262	435	364	575	250	362	285	383	259	367	278	371
SBTR	455	66	160	110	234	158	288	196	338	160	294	254	489	149	291	218	372	154	282	208	343	158	288	194	311

Table 3-9
Pike Center
Total Future Conditions Queuing Summary¹

Approach/ Lane Group	Storage Length (ft)	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2034 Phase 1 Future Conditions with Development - Access Restricted				2039 Phase 2 Future Conditions with Development				2039 Phase 2 Future Conditions with Development - Access Restricted					
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile		
13. Twinbrook Pkwy / Parklawn Dr -- Red Policy Area																											
EBL	449	31	71	36	78	36	77	38	82	33	69	35	77	34	74	32	75	29	68	39	81	30	73	34	71		
EBLTR	449	47	101	62	124	48	98	70	139	48	96	63	125	44	93	67	138	47	95	57	117	51	106	64	125		
WBL	160	66	118	115	193	67	127	119	192	72	129	116	201	64	117	119	195	67	125	112	195	71	132	123	206		
WBLTR	896	76	132	142	217	82	140	148	228	85	141	148	224	77	134	141	228	81	145	155	229	85	158	164	259		
WBR	896	92	161	183	305	94	167	175	287	87	155	185	295	87	163	182	303	90	163	176	283	85	159	186	298		
NBL	160	23	51	17	46	22	53	16	44	21	48	18	55	22	53	16	53	26	60	15	39	23	56	15	52		
NBT	1295	39	98	136	225	38	104	143	228	34	87	141	235	32	84	139	220	37	93	136	218	34	88	142	223		
NBT	1295	55	114	164	249	66	241	168	253	53	107	166	255	50	103	161	245	55	115	160	240	53	108	165	241		
NBTR	500	88	177	237	354	87	172	243	350	87	177	242	361	76	159	233	343	85	176	239	344	79	160	236	342		
SBL	210	7	54	9	59	10	67	9	58	5	37	9	56	4	37	10	60	7	50	10	59	7	45	13	71		
SBL	414	65	123	74	134	75	152	71	135	69	122	77	141	68	129	76	139	74	132	78	139	72	133	78	146		
SBT	414	155	273	198	332	178	315	194	321	174	307	198	330	160	289	192	310	174	304	190	312	172	297	192	312		
SBT	414	111	235	152	277	124	259	147	275	129	260	149	278	113	235	145	267	123	258	144	265	119	241	143	269		
SBR	135	12	32	7	25	14	54	8	26	13	36	12	65	10	30	10	50	12	33	8	26	13	35	10	31		
14. Nebel St / Randolph Rd -- Red Policy Area																											
EBL	140	13	49	19	74	11	50	19	77	15	59	17	67	12	47	21	73	18	70	19	69	14	58	24	87		
EBT	605	111	187	200	345	144	243	280	488	136	235	317	556	136	236	294	519	139	232	295	516	137	235	279	478		
EBTR	605	101	186	216	354	135	231	290	493	129	230	325	559	129	230	305	530	126	218	302	515	126	225	287	482		
WBL	120	83	168	102	185	125	198	131	195	120	196	130	194	126	194	138	195	113	191	138	193	118	194	135	195		
WBT	1105	158	285	201	339	239	416	263	421	226	408	257	416	237	407	270	433	219	354	241	351	225	361	241	350		
WBT	1105	155	272	202	332	232	400	265	415	220	393	259	407	233	401	280	432	210	339	246	351	211	342	239	349		
NBL	150	52	105	67	139	41	93	100	233	46	100	99	228	43	93	116	252	43	93	54	125	48	103	60	129		
NBT	561	41	88	112	224	39	90	370	758	42	98	326	615	46	92	354	629	42	89	60	135	44	97	70	147		
NBR	561	69	130	247	433	109	179	469	712	109	184	405	563	107	185	417	582	104	166	155	167	101	167	154	170		
SBL	175	74	146	142	243	94	172	154	261	92	172	150	250	95	177	157	263	94	171	149	250	100	184	151	254		
SBT	1627	65	128	115	216	58	124	128	243	66	135	121	227	65	142	126	240	71	141	114	226	66	140	116	219		
SBR	1627	13	41	20	53	15	44	19	60	12	39	14	45	13	43	19	52	13	41	18	54	15	45	16	49		
15. Rockville Pike / Hubbard Dr / Plaza Driveway -- Orange Policy Area																											
EBL	151	15	45	31	74	15	46	35	82	13	39	86	232	13	42	59	158	15	45	36	87	15	42	38	99		
EBTR	151	8	28	18	49	9	31	15	41	8	25	22	57	11	37	24	64	12	36	19	50	10	35	18	49		
WBL	139	64	119	145	225	65	132	144	230	72	134	182	366	68	133	188	352	66	122	124	223	67	130	135	215		
WBLTR	139	39	84	82	153	41	88	146	252	43	86	251	457	42	88	242	426	43	94	135	225	39	87	119	210		
NBL	580	15	42	7	24	15	41	54	328	16	43	106	509	17	46	102	504	14	39	76	430	15	42	12	35		
NBT	1550	101	177	272	378	147	244	587	1163	160	263	890	1683	156	270	1109	1927	167	286	926	1432	200	297	235	284		
NBT	1550	62	143	235	341	126	227	564	1132	137	230	865	1673	133	250	1093	1927	134	247	919	1454	137	261	232	274		
NBT	1550	37	93	180	295	106	202	517	1070	127	231	830	1647	120	231	1060	1912	126	233	899	1471	122	233	237	276		
NBTR	1550	66	139	212	353	61	136	468	1039	69	155	790	1642	53	118	1022	1920	54	124	886	1473	60	138	236	278		
SBL	160	26	69	101	180	28	74	110	196	24	64	97	191	27	62	111	200	28	70	103	190	27	70	97	191		
SBT	420	87	193	67	156	98	195	106	212	120	233	119	235	112	240	114	242	125	240	113	242	122	258	105	237		
SBT	420	95	209	80	157	113	212	113	214	129	247	138	240	125	252	126	247	135	248	127	245	134	269	122	238		
SBTR	420	104	220	93	172	125	232	123	219	140	252	146	247	134	264	126	237	146	258	137	249	146	283	126	229		
16. Chapman Ave / Randolph Rd / Josiah Henson Pkwy -- Red Policy Area																											
EBL	330	34	68	64	122	33	67	65	117	37	73	71	131	35	71	73	150	39	72	68	145	37	75	69	127		
EBT	533	53	131	159	275	56	136	179	304	59	136	189	321	67	153	188	313	64	149	182	315	67	146	188	321		
EBTR	533	42	111	144	263	45	114	161	292	45	121	173	307	46	118	174	306	50	130	158	294	47	127	170	299		
WBL	165	6	39	13	52	5	30	11	46	2	15	8	29	6	38	11	40	6	38	8	29	6	44	9	31		
WBT	605	68	210	76	183	44	166	72	186	46	160	72	187	51	180	65	167	52	188	67	178	52	177	68	172		
WBT	605	73	222	84	194	49	185	81	199	45	169	84	198	49	179	76	181	52	186	70	187	48	173	74	177		
WBR	200	13	87	17	67	10	78	20	93	7	67	16	76	10	68	13	49	9	69	17	77	7	56	13	62		
NBL	200	8	30	50	101	11	37	49	98	10	35	45	97	14	40	50	102	12	39	47	96	11	37	50	102		
NBTR	382	12	39	41	85	12	42	42	87	12	39	37	85	9	34	37	79	14	41	37	75	12	37	35	77		
SBL	233	20	53	89	151	18	49	91	153	18	46	89	150	18	47	89	153	19	47	88	153	15	43	88	146		
SBLTR	233	40	84	139	211	38	82	139	213	43	94	139	212	39	82	138	210	41	83	133	210	38	79	137	218		
17. Chapman Ave / Thompson Ave - Unsignalized -- Red Policy Area																											
EBLTR	419	22	47	50	85	23	50	52	92	21	42	52	89	23	47	52	96	25	50	53	92	24	50	53	91		
WBLTR	343	26	50	19	44	27	50	18	44	26	50	17	42	25	52	17	43	25	48	18	42	23	47	18	43		
NBLTR	541	10	36	15	52	11	39	17	58	13	44	19	59	8	32	16	52	12	45	19	62	11	42	14	53		
SBLTR	424	2	16	6	28	2	13	6	31	2	15	8	32	2	14	7	34	3	19	11	47	3	18	11	43		
18. Rockville Pike (MD 355) / Rollins Ave Extension - Unsignalized																											
WBR	179										23	51	59	114	26	55	49	93	28	57	56	99	31	55	60	101	
NBT	198										2	17	1	11	1	25	2	26	1	18	4	39	0	8	2	25	
NBT	198										1	11	1	17	1	30	5	51	2	23	6	58	1	14	3	34	
NBTR	198										16	81	4	38	1	13	5	49	2	25	2	29	0	6	3	35	
SBT	295										24	98	240	429	11	72	111	308	11	76	188	99	17	102	208	407	
SBT	295										34	114	59	218	23	102	70	247	19	43	90	70	245	30	129	77	252
SB																											

APPENDIX A
EXISTING CONDITIONS
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Existing AM

01/21/2025

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	14	21	25	442	11	65	36	957	194	124	1315	6		
Future Volume (vph)	14	21	25	442	11	65	36	957	194	124	1315	6		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12		
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0			
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91			
Frpb, ped/bikes		1.00	1.00	1.00	0.98		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			
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00			
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)		1698	1478	3204	1490		1711	4916	1531	1766	5081			
Flt Permitted		0.28	1.00	0.95	1.00		0.95	1.00	1.00	0.26	1.00			
Satd. Flow (perm)		487	1478	3204	1490		1711	4916	1531	490	5081			
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)	15	22	26	460	11	68	38	997	202	129	1370	6		
RTOR Reduction (vph)	0	0	24	0	55	0	0	0	110	0	0	0		
Lane Group Flow (vph)	0	37	2	460	24	0	38	997	92	129	1376	0		
Confl. Peds. (#/hr)	4					4	5		9	9		5		
Confl. Bikes (#/hr)			1											
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA			
Protected Phases		3	3	4	4		1	5	5	6	2			
Permitted Phases	3									2				
Actuated Green, G (s)		10.0	10.0	28.0	28.0		7.6	68.5	68.5	80.4	80.4			
Effective Green, g (s)		10.0	10.0	28.0	28.0		7.6	68.5	68.5	80.4	80.4			
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.05	0.46	0.46	0.54	0.54			
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0			
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2			
Lane Grp Cap (vph)		32	98	598	278		86	2244	699	424	2723			
v/s Ratio Prot			0.00	c0.14	0.02		0.02	c0.20	0.06	0.04	c0.27			
v/s Ratio Perm		c0.08								0.12				
v/c Ratio		1.16	0.02	0.77	0.09		0.44	0.44	0.13	0.30	0.51			
Uniform Delay, d1		70.0	65.4	57.9	50.4		69.1	27.8	23.6	23.3	22.1			
Progression Factor		1.00	1.00	1.00	1.00		1.27	0.78	0.38	0.63	0.61			
Incremental Delay, d2		209.8	0.1	7.6	0.4		3.5	0.6	0.4	0.4	0.6			
Delay (s)		279.8	65.5	65.5	50.8		91.5	22.2	9.4	15.1	14.1			
Level of Service		F	E	E	D		F	C	A	B	B			
Approach Delay (s)		191.4			63.4			22.2			14.2			
Approach LOS		F			E			C			B			
Intersection Summary														
HCM 2000 Control Delay			28.4			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio			0.62											
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5					
Intersection Capacity Utilization			64.0%			ICU Level of Service			B					
Analysis Period (min)			15											
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	16	2	54	7	2	8	84	855	11	30	1343	2
Future Volume (vph)	16	2	54	7	2	8	84	855	11	30	1343	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1662	1478		1920		1710	4904		1649	4745	
Flt Permitted		0.74	1.00		0.86		0.17	1.00		0.30	1.00	
Satd. Flow (perm)		1278	1478		1680		300	4904		527	4745	
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)	17	2	56	7	2	8	88	891	11	31	1399	2
RTOR Reduction (vph)	0	0	54	0	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	2	0	9	0	88	902	0	31	1401	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		6.5	6.5		6.5		129.4	122.9		123.6	120.0	
Effective Green, g (s)		6.5	6.5		6.5		129.4	122.9		123.6	120.0	
Actuated g/C Ratio		0.04	0.04		0.04		0.86	0.82		0.82	0.80	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		55	64		72		319	4018		461	3796	
v/s Ratio Prot			0.00				c0.01	0.18		0.00	c0.30	
v/s Ratio Perm		c0.01			0.01		0.23			0.05		
v/c Ratio		0.35	0.04		0.13		0.28	0.22		0.07	0.37	
Uniform Delay, d1		69.7	68.8		69.0		1.9	3.0		2.4	4.3	
Progression Factor		1.00	1.00		1.00		4.16	0.13		0.42	0.33	
Incremental Delay, d2		3.8	0.2		0.8		0.4	0.1		0.1	0.3	
Delay (s)		73.4	69.0		69.8		8.3	0.5		1.0	1.7	
Level of Service		E	E		E		A	A		A	A	
Approach Delay (s)		70.1			69.8			1.2			1.7	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.0				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			52.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Existing AM
01/21/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			   			   	
Traffic Volume (veh/h)	0	19	854	25	0	1394	
Future Volume (Veh/h)	0	19	854	25	0	1394	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	
Hourly flow rate (vph)	0	24	1081	32	0	1765	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.89	0.96			0.96		
vC, conflicting volume	1685	376			1113		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1043	216			982		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	97			100		
cM capacity (veh/h)	199	759			673		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	432	432	248	588	588	588
Volume Left	0	0	0	0	0	0	0
Volume Right	24	0	0	32	0	0	0
cSH	759	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.25	0.25	0.15	0.35	0.35	0.35
Queue Length 95th (ft)	2	0	0	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.9	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			30.3%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↑	
Traffic Volume (vph)	0	245	66	0	311	134	96	748	106	184	1328	43
Future Volume (vph)	0	245	66	0	311	134	96	748	106	184	1328	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		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	
Frt		0.97			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3183			3539	1583	1652	4746	1794	1709	4893	
Flt Permitted		1.00			1.00	1.00	0.16	1.00	1.00	0.33	1.00	
Satd. Flow (perm)		3183			3539	1583	273	4746	1794	591	4893	
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)	0	250	67	0	317	137	98	763	108	188	1355	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0	1	0
Lane Group Flow (vph)	0	317	0	0	317	137	98	763	70	188	1398	0
Confl. Peds. (#/hr)	13		9	9		13			4	4		
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		21.6			21.6	21.6	106.3	97.3	97.3	110.5	99.4	
Effective Green, g (s)		21.6			21.6	21.6	106.3	97.3	97.3	110.5	99.4	
Actuated g/C Ratio		0.14			0.14	0.14	0.71	0.65	0.65	0.74	0.66	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		458			509	227	276	3078	1163	518	3242	
v/s Ratio Prot		c0.10			0.09	0.09	0.02	0.16	0.04	c0.03	c0.29	
v/s Ratio Perm							0.23			0.24		
v/c Ratio		0.69			0.62	0.60	0.36	0.25	0.06	0.36	0.43	
Uniform Delay, d1		61.0			60.4	60.2	7.5	11.0	9.6	6.0	11.9	
Progression Factor		1.00			0.90	0.88	1.31	0.25	0.04	0.83	0.54	
Incremental Delay, d2		4.8			2.6	5.1	1.1	0.2	0.1	0.6	0.4	
Delay (s)		65.9			56.9	57.8	10.9	2.9	0.4	5.6	6.8	
Level of Service		E			E	E	B	A	A	A	A	
Approach Delay (s)		65.9			57.2			3.4			6.7	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			18.3		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			64.7%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	519	36	506	426	123	28	48	216	84	50	24
Future Volume (vph)	40	519	36	506	426	123	28	48	216	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3268		3319	3282			1707	1478	3204	1739	1443
Flt Permitted	0.44	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	762	3268		3319	3282			1707	1478	3204	1739	1443
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)	41	535	37	522	439	127	29	49	223	87	52	25
RTOR Reduction (vph)	0	2	0	0	7	0	0	0	151	0	0	23
Lane Group Flow (vph)	41	570	0	522	559	0	0	78	72	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	79.2	73.7		29.6	97.8			12.2	48.3	10.0	10.0	10.0
Effective Green, g (s)	79.2	73.7		29.6	97.8			12.2	48.3	10.0	10.0	10.0
Actuated g/C Ratio	0.53	0.49		0.20	0.65			0.08	0.32	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	434	1605		654	2139			138	475	213	115	96
v/s Ratio Prot	0.00	c0.17		c0.16	0.17			c0.05	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.09	0.36		0.80	0.26			0.57	0.15	0.41	0.45	0.02
Uniform Delay, d1	17.1	23.5		57.4	10.9			66.3	36.2	67.2	67.4	65.4
Progression Factor	0.71	0.69		0.90	1.82			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.6		6.4	0.3			5.2	0.1	1.3	2.8	0.1
Delay (s)	12.3	16.8		58.1	20.2			71.6	36.4	68.4	70.2	65.5
Level of Service	B	B		E	C			E	D	E	E	E
Approach Delay (s)		16.5			38.4			45.5			68.5	
Approach LOS		B			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			35.5			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			65.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	2	336	2	5	582	5
Future Volume (Veh/h)	0	0	0	1	0	4	2	336	2	5	582	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	3	425	3	6	737	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								471			256	
pX, platoon unblocked												
vC, conflicting volume	976	1186	372	813	1188	214	743			428		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	976	1186	372	813	1188	214	743			428		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			99		
cM capacity (veh/h)	203	186	626	268	185	791	860			1128		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	6	216	216	374	374						
Volume Left	0	1	3	0	6	0						
Volume Right	0	5	0	3	0	6						
cSH	1700	597	860	1700	1128	1700						
Volume to Capacity	0.00	0.01	0.00	0.13	0.01	0.22						
Queue Length 95th (ft)	0	1	0	0	0	0						
Control Delay (s)	0.0	11.1	0.2	0.0	0.2	0.0						
Lane LOS	A	B	A		A							
Approach Delay (s)	0.0	11.1	0.1		0.1							
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			29.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Existing AM
01/21/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	35	36	304	71	36	510
Future Volume (Veh/h)	35	36	304	71	36	510
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	36	37	313	73	37	526
Pedestrians	11					3
Lane Width (ft)	12.0					10.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			287			440
pX, platoon unblocked	0.99	0.99			0.99	
vC, conflicting volume	698	364			397	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	690	353			387	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	94			97	
cM capacity (veh/h)	360	629			1145	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	36	37	386	212	351	
Volume Left	36	0	0	37	0	
Volume Right	0	37	73	0	0	
cSH	360	629	1700	1145	1700	
Volume to Capacity	0.10	0.06	0.23	0.03	0.21	
Queue Length 95th (ft)	8	5	0	3	0	
Control Delay (s)	16.1	11.1	0.0	1.7	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	13.6		0.0	0.6		
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			50.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Existing AM
01/21/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					  	
Traffic Volume (veh/h)	1	0	1	342	547	3
Future Volume (Veh/h)	1	0	1	342	547	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63
Hourly flow rate (vph)	2	0	2	543	868	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.94					
vC, conflicting volume	1418	292	873			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1412	292	873			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	120	705	768			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	2	545	347	347	179	
Volume Left	2	2	0	0	0	
Volume Right	0	0	0	0	5	
cSH	120	768	1700	1700	1700	
Volume to Capacity	0.02	0.00	0.20	0.20	0.11	
Queue Length 95th (ft)	1	0	0	0	0	
Control Delay (s)	35.4	0.1	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	35.4	0.1	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			28.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

Existing AM

9: Chapman Ave & Bou Ave

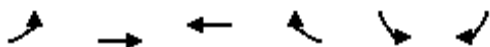
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	116	37	6	91	116	4	41	4	100	79	368
Future Volume (vph)	186	116	37	6	91	116	4	41	4	100	79	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1661		1630	1739	1433	1648	1713		1632	1739	1478
Flt Permitted	0.57	1.00		0.66	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	982	1661		1124	1739	1433	1220	1713		1248	1739	1478
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)	196	122	39	6	96	122	4	43	4	105	83	387
RTOR Reduction (vph)	0	14	0	0	0	84	0	3	0	0	0	174
Lane Group Flow (vph)	196	147	0	6	96	38	4	44	0	105	83	213
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	43.3	43.3		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.3
Effective Green, g (s)	43.3	43.3		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.3
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	651	912		349	540	445	371	521		380	529	812
v/s Ratio Prot	c0.05	0.09			0.06			0.03			0.05	c0.14
v/s Ratio Perm	c0.11			0.01		0.03	0.00			0.08		
v/c Ratio	0.30	0.16		0.02	0.18	0.09	0.01	0.08		0.28	0.16	0.26
Uniform Delay, d1	9.3	8.8		18.8	19.8	19.2	19.1	19.6		20.8	20.0	9.3
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	0.7	0.0		0.1	0.7	0.4	0.0	0.1		1.8	0.6	0.5
Delay (s)	10.0	8.8		18.9	20.5	19.6	19.1	19.6		22.6	20.6	9.8
Level of Service	B	A		B	C	B	B	B		C	C	A
Approach Delay (s)		9.5			20.0			19.6			13.7	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.9									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			78.8									Sum of lost time (s) 17.0
Intersection Capacity Utilization			57.6%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Existing AM
01/21/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	10	317	484	14	16	8
Future Volume (Veh/h)	10	317	484	14	16	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	337	515	15	17	9
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	537				720	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	537				720	276
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	99
cM capacity (veh/h)	1020				356	714
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	123	225	343	187	26	
Volume Left	11	0	0	0	17	
Volume Right	0	0	0	15	9	
cSH	1020	1700	1700	1700	431	
Volume to Capacity	0.01	0.13	0.20	0.11	0.06	
Queue Length 95th (ft)	1	0	0	0	5	
Control Delay (s)	0.9	0.0	0.0	0.0	13.9	
Lane LOS	A				B	
Approach Delay (s)	0.3		0.0		13.9	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			27.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	272	32	38	9	243	259	20	218	18
Future Volume (vph)	17	44	27	272	32	38	9	243	259	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3112	
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)	18	48	29	296	35	41	10	264	282	22	237	20
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	67	0	4	0
Lane Group Flow (vph)	18	50	0	296	43	0	0	274	215	0	275	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2			6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		17.6	17.6			47.1	64.7		47.1	
Effective Green, g (s)	6.3	6.3		17.6	17.6			47.1	64.7		47.1	
Actuated g/C Ratio	0.07	0.07		0.21	0.21			0.55	0.76		0.55	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		354	336			985	1148		1724	
v/s Ratio Prot	0.01	c0.03		c0.17	0.03				0.04			
v/s Ratio Perm								c0.15	0.10		0.09	
v/c Ratio	0.14	0.40		0.84	0.13			0.28	0.19		0.16	
Uniform Delay, d1	36.8	37.6		32.3	27.5			10.0	2.8		9.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		15.0	0.1			0.7	0.0		0.2	
Delay (s)	37.0	38.3		47.3	27.5			10.7	2.9		9.5	
Level of Service	D	D		D	C			B	A		A	
Approach Delay (s)		38.1			43.2			6.7			9.5	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			20.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			60.2%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	7	28	67	79	794	17	63	1344	20
Future Volume (vph)	42	52	56	7	28	67	79	794	17	63	1344	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4898		1709	4903	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.16	1.00		0.32	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	284	4898		578	4903	
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)	44	54	58	7	29	70	82	827	18	66	1400	21
RTOR Reduction (vph)	0	53	0	0	0	64	0	1	0	0	1	0
Lane Group Flow (vph)	44	59	0	7	29	6	82	844	0	66	1420	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	12.1	12.1		12.1	12.1	12.1	122.3	113.4		118.5	111.5	
Effective Green, g (s)	12.1	12.1		12.1	12.1	12.1	122.3	113.4		118.5	111.5	
Actuated g/C Ratio	0.08	0.08		0.08	0.08	0.08	0.82	0.76		0.79	0.74	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	110	256		98	150	127	316	3702		509	3644	
v/s Ratio Prot		0.02			0.02	0.00	c0.02	0.17		0.01	c0.29	
v/s Ratio Perm	c0.03			0.01			0.20			0.10		
v/c Ratio	0.40	0.23		0.07	0.19	0.04	0.26	0.23		0.13	0.39	
Uniform Delay, d1	65.5	64.6		63.8	64.4	63.6	3.3	5.4		3.4	7.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.39	0.74		1.00	1.00	
Incremental Delay, d2	4.9	1.0		0.6	1.3	0.3	0.9	0.1		0.2	0.3	
Delay (s)	70.4	65.5		64.4	65.7	63.9	5.5	4.2		3.7	7.3	
Level of Service	E	E		E	E	E	A	A		A	A	
Approach Delay (s)		66.9			64.4			4.3			7.1	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.9									
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			64.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	519	277	179	765	63
Future Volume (vph)	36	24	51	163	19	124	50	519	277	179	765	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4476		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.31	1.00		0.29	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	536	4476		979	3303	1437
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)	38	26	54	173	20	132	53	552	295	190	814	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	36	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	811	0	190	814	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	387	2688		785	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.18		c0.01	c0.25	
v/s Ratio Perm							0.08			0.15		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.30		0.24	0.40	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.3	14.6		8.8	14.6	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.53	0.51		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	5.6	7.7		9.0	15.2	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			7.5			13.8	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				27.5		
Intersection Capacity Utilization			57.7%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	564	56	177	933	92	80	54	68	105	70	14
Future Volume (vph)	16	564	56	177	933	92	80	54	68	105	70	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		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
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3249		1768	3487		1711	1801	1531	1766	1863	1583
Flt Permitted	0.23	1.00		0.34	1.00		0.71	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	403	3249		631	3487		1276	1801	1531	1171	1863	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)	17	594	59	186	982	97	84	57	72	111	74	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	653	0	186	1079	0	84	57	72	111	74	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	88.3	85.6		102.9	94.2		25.7	13.3	13.3	29.5	15.2	15.2
Effective Green, g (s)	88.3	85.6		102.9	94.2		25.7	13.3	13.3	29.5	15.2	15.2
Actuated g/C Ratio	0.59	0.57		0.69	0.63		0.17	0.09	0.09	0.20	0.10	0.10
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	259	1854		518	2189		254	159	135	287	188	160
v/s Ratio Prot	0.00	0.20		c0.03	c0.31		0.03	0.03	c0.05	c0.04	0.04	0.01
v/s Ratio Perm	0.04			0.22			0.03			0.04		
v/c Ratio	0.07	0.35		0.36	0.49		0.33	0.36	0.53	0.39	0.39	0.09
Uniform Delay, d1	13.2	17.3		9.2	15.0		54.2	64.3	65.4	51.7	63.1	61.2
Progression Factor	0.92	0.80		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.5		0.4	0.8		1.0	1.9	5.1	1.2	1.9	0.3
Delay (s)	12.3	14.3		9.6	15.8		55.2	66.2	70.5	52.8	64.9	61.5
Level of Service	B	B		A	B		E	E	E	D	E	E
Approach Delay (s)		14.2			14.9			63.3			58.0	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			22.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			60.4%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1099	116	48	1770	48
Future Volume (vph)	20	7	13	77	16	50	25	1099	116	48	1770	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1710	6068		1709	4883	
Flt Permitted	0.71	1.00		0.74	1.00		0.09	1.00		0.19	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		169	6068		335	4883	
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)	20	7	13	79	16	51	26	1121	118	49	1806	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	8	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1231	0	49	1854	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.73		0.78	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		179	4401		325	3603	
v/s Ratio Prot		0.01			0.01		0.00	0.20		c0.01	c0.38	
v/s Ratio Perm	0.02			c0.06			0.10			0.11		
v/c Ratio	0.15	0.05		0.54	0.13		0.15	0.28		0.15	0.51	
Uniform Delay, d1	61.0	60.3		63.7	60.9		5.5	7.1		3.8	8.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.23	0.42	
Incremental Delay, d2	1.2	0.3		7.2	0.7		0.8	0.2		0.4	0.4	
Delay (s)	62.2	60.6		70.9	61.6		6.3	7.3		1.3	3.9	
Level of Service	E	E		E	E		A	A		A	A	
Approach Delay (s)		61.4			66.6			7.2			3.8	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.5										
HCM 2000 Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		150.0								18.5		
Intersection Capacity Utilization		69.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	593	80	9	1014	66	11	6	4	27	7	24
Future Volume (vph)	77	593	80	9	1014	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3222		1645	3303	1428	1711	1675		1681	1545	
Flt Permitted	0.19	1.00		0.36	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	336	3222		620	3303	1428	1711	1675		1681	1545	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	682	92	10	1166	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	4	0	0	0	23	0	5	0	0	0	0
Lane Group Flow (vph)	89	770	0	10	1166	53	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Confl. Bikes (#/hr)												1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		107.5	104.7	104.7	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		107.5	104.7	104.7	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.72	0.70	0.70	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	338	2369		463	2305	996	58	56		98	90	
v/s Ratio Prot	c0.01	c0.24		0.00	c0.35		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.19			0.02		0.04						
v/c Ratio	0.26	0.33		0.02	0.51	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	5.7	6.9		6.1	10.6	7.1	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.34	0.65	0.74	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.4		0.0	0.7	0.1	2.7	1.4		2.2	4.5	
Delay (s)	6.3	7.3		2.1	7.7	5.3	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.2			7.5			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay			10.0									
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			150.0							23.0		
Intersection Capacity Utilization			56.0%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Existing AM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		9			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	93	90	96	100	96			99		
cM capacity (veh/h)	360	385	647	339	384	832	1200			1350		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	602	361	1200	1350								
Volume to Capacity	0.08	0.15	0.04	0.01								
Queue Length 95th (ft)	6	13	3	0								
Control Delay (s)	11.5	16.7	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.5	16.7	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	10943	11040	11022	10882	11089	10995
Vehs Exited	10631	10705	10754	10572	10773	10686
Starting Vehs	0	0	0	0	0	0
Ending Vehs	312	335	268	310	316	301
Travel Distance (mi)	6531	6592	6599	6490	6635	6569
Travel Time (hr)	370.4	376.4	370.0	366.4	378.1	372.3
Total Delay (hr)	158.5	163.0	155.6	155.4	162.4	159.0
Total Stops	12492	12695	12526	12435	12713	12571
Fuel Used (gal)	259.9	262.8	261.3	257.1	264.8	261.2

Interval #0 Information Seed

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2195	2270	2157	2182	2312	2224
Vehs Exited	1868	1926	1850	1898	2005	1911
Starting Vehs	0	0	0	0	0	0
Ending Vehs	327	344	307	284	307	307
Travel Distance (mi)	1227	1257	1186	1226	1288	1237
Travel Time (hr)	68.3	70.8	63.8	68.0	72.2	68.6
Total Delay (hr)	28.8	30.5	25.6	28.4	30.6	28.8
Total Stops	2218	2460	2175	2283	2477	2317
Fuel Used (gal)	48.0	49.3	45.9	47.7	51.0	48.4

Interval #1 Information 1

Start Time 7:00
End Time 7:15
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2083	2238	2209	2111	2203	2168
Vehs Exited	2118	2210	2232	2099	2224	2175
Starting Vehs	327	344	307	284	307	307
Ending Vehs	292	372	284	296	286	295
Travel Distance (mi)	1279	1347	1372	1280	1358	1327
Travel Time (hr)	73.1	76.5	77.0	72.0	77.1	75.1
Total Delay (hr)	31.4	32.8	32.5	30.2	32.9	32.0
Total Stops	2473	2636	2579	2427	2535	2528
Fuel Used (gal)	51.7	54.0	54.5	50.5	54.1	53.0

Interval #2 Information 2

Start Time 7:15
End Time 7:30
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2205	2191	2224	2152	2174	2188
Vehs Exited	2170	2285	2187	2149	2162	2194
Starting Vehs	292	372	284	296	286	295
Ending Vehs	327	278	321	299	298	294
Travel Distance (mi)	1326	1380	1355	1306	1301	1334
Travel Time (hr)	75.7	77.5	77.0	74.6	73.3	75.6
Total Delay (hr)	32.7	32.9	32.9	32.3	30.9	32.3
Total Stops	2621	2533	2610	2548	2446	2555
Fuel Used (gal)	53.1	54.6	53.8	51.6	51.6	52.9

Interval #3 Information 3

Start Time 7:30
End Time 7:45
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2245	2178	2235	2159	2160	2195
Vehs Exited	2264	2127	2237	2191	2163	2197
Starting Vehs	327	278	321	299	298	294
Ending Vehs	308	329	319	267	295	294
Travel Distance (mi)	1359	1297	1374	1307	1334	1334
Travel Time (hr)	76.8	73.4	77.6	73.7	75.9	75.5
Total Delay (hr)	32.6	31.1	32.8	31.1	32.4	32.0
Total Stops	2586	2447	2599	2460	2498	2516
Fuel Used (gal)	54.1	51.5	54.8	52.2	53.3	53.2

Interval #4 Information 4

Start Time 7:45
End Time 8:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2215	2163	2197	2278	2240	2220
Vehs Exited	2211	2157	2248	2235	2219	2215
Starting Vehs	308	329	319	267	295	294
Ending Vehs	312	335	268	310	316	301
Travel Distance (mi)	1339	1310	1313	1371	1353	1337
Travel Time (hr)	76.6	78.2	74.5	78.0	79.5	77.4
Total Delay (hr)	33.1	35.7	31.9	33.4	35.5	33.9
Total Stops	2594	2619	2563	2717	2757	2644
Fuel Used (gal)	53.0	53.4	52.2	55.2	54.7	53.7

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	B28	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	LT	R	T	L	L	TR	L	T	T	T	R	L
Maximum Queue (ft)	106	69	5	222	228	200	113	270	243	238	178	167
Average Queue (ft)	40	25	0	155	166	71	33	101	84	76	62	55
95th Queue (ft)	88	63	4	241	255	198	78	189	169	163	134	112
Link Distance (ft)	71		241	206	206			420	420	420	420	
Upstream Blk Time (%)	6	1		5	7	0						
Queuing Penalty (veh)	0	0		12	18	0						
Storage Bay Dist (ft)		90				100	160					160
Storage Blk Time (%)	6	1			36	0		2				0
Queuing Penalty (veh)	1	0			27	1		1				0

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	194	209	219
Average Queue (ft)	67	84	89
95th Queue (ft)	133	157	162
Link Distance (ft)	517	517	517
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	B25	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	T	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	136	83	12	61	151	113	82	95	53	39	49	70
Average Queue (ft)	42	46	0	12	52	10	6	9	15	4	9	14
95th Queue (ft)	103	81	8	38	112	54	43	50	44	22	34	46
Link Distance (ft)	84		213	48		517	517	517		180	180	180
Upstream Blk Time (%)	5	1		3								
Queuing Penalty (veh)	0	0		0								
Storage Bay Dist (ft)		150			125				110			
Storage Blk Time (%)	5	1			1	0						
Queuing Penalty (veh)	3	0			2	0						

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	37	9
Average Queue (ft)	14	0
95th Queue (ft)	37	6
Link Distance (ft)	73	180
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	L	T	T
Maximum Queue (ft)	163	229	215	269	180	116	118	113	121	163	212	207
Average Queue (ft)	72	109	107	112	84	38	36	30	30	71	70	55
95th Queue (ft)	142	188	186	209	171	88	86	80	81	140	147	134
Link Distance (ft)	1311	1311	563	563			261	261	261		1192	1192
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (ft)					65	130				350		
Storage Blk Time (%)				16	15	0	0		0			
Queuing Penalty (veh)				22	23	0	0		0			

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	177
Average Queue (ft)	47
95th Queue (ft)	117
Link Distance (ft)	1192
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	112	258	302	310	380	638	501	161	201	116	133	123
Average Queue (ft)	10	86	120	194	280	180	164	60	106	21	54	44
95th Queue (ft)	49	196	238	350	402	452	358	122	190	69	105	95
Link Distance (ft)		563	563			1295	1295	199	199		541	
Upstream Blk Time (%)								0	1			
Queuing Penalty (veh)								0	2			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)		3		0	20	1				1	5	
Queuing Penalty (veh)		1		1	43	4				1	6	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	LT	TR	LT	TR
Maximum Queue (ft)	22	9	18	63	169
Average Queue (ft)	3	1	1	3	15
95th Queue (ft)	17	8	8	26	81
Link Distance (ft)	45	130	130	199	199
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Chapman Ave & Rollins Ave

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	LT	T
Maximum Queue (ft)	65	45	77	101	161
Average Queue (ft)	21	20	5	20	49
95th Queue (ft)	48	44	32	67	145
Link Distance (ft)	60	60	128	130	130
Upstream Blk Time (%)	0	0	0	0	3
Queuing Penalty (veh)	0	0	0	0	9
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Chapman Ave & Pike Center South

Movement	EB	NB	SB	SB	SB
Directions Served	LR	LT	T	T	TR
Maximum Queue (ft)	24	90	122	78	145
Average Queue (ft)	1	19	19	12	103
95th Queue (ft)	10	60	71	50	182
Link Distance (ft)	35	53	128	128	128
Upstream Blk Time (%)	0	1	0		10
Queuing Penalty (veh)	0	3	0		18
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	L	TR	L	T	R
Maximum Queue (ft)	170	134	32	117	32	100	67	69	76
Average Queue (ft)	60	41	4	42	2	25	44	34	50
95th Queue (ft)	119	97	21	86	15	64	82	71	72
Link Distance (ft)	218	218		823		137	53	53	53
Upstream Blk Time (%)	0						12	8	21
Queuing Penalty (veh)	0						22	15	38
Storage Bay Dist (ft)			270		40				
Storage Blk Time (%)					0	4			
Queuing Penalty (veh)					0	0			

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	54	30	127	140	51
Average Queue (ft)	4	1	15	22	17
95th Queue (ft)	24	14	68	87	44
Link Distance (ft)		206	218	218	316
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			

Intersection: 11: East Jefferson Street & Rollins Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	61	112	356	171	198	74	137	67
Average Queue (ft)	14	44	171	40	73	29	61	13
95th Queue (ft)	44	86	314	108	150	62	118	44
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	111	116	108	37	94	150	104	133	160	181	224	466
Average Queue (ft)	36	38	36	7	27	58	46	55	65	63	49	253
95th Queue (ft)	82	82	76	27	69	111	85	109	129	140	162	419
Link Distance (ft)		834	834	502	502			1192	1192	1192		455
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)							0	1			0	19
Queuing Penalty (veh)							0	1			0	12

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	384	205
Average Queue (ft)	186	66
95th Queue (ft)	336	160
Link Distance (ft)	455	455
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Dirve

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	99	152	135	160	185	65	129	140	236	111	145	318
Average Queue (ft)	31	47	66	76	92	23	39	55	88	7	65	155
95th Queue (ft)	71	101	118	132	161	51	98	114	177	54	123	273
Link Distance (ft)	449	449		896	896		1295	1295			414	414
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			0	0			0				0	
Queuing Penalty (veh)			0	0			0				0	

Intersection: 13: Twinbrook Parkway & Parklawn Dirve

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	270	44
Average Queue (ft)	111	12
95th Queue (ft)	235	32
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	3	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	81	217	232	159	310	297	132	127	160	181	164	60
Average Queue (ft)	13	111	101	83	158	155	52	41	69	74	65	13
95th Queue (ft)	49	187	186	168	285	272	105	88	130	146	128	41
Link Distance (ft)		605	605		1105	1105		561	561		1627	1627
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	4		1	11		1	0		0	0	
Queuing Penalty (veh)	0	1		4	19		0	0		0	0	

Intersection: 15: Rockville Pike - 355 & Hubbard Dirve/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	60	49	147	112	64	190	170	146	165	100	244	252
Average Queue (ft)	15	8	64	39	15	101	62	37	66	26	87	95
95th Queue (ft)	45	28	119	84	42	177	143	93	139	69	193	209
Link Distance (ft)	151	151	139	139		1550	1550	1550	1550		420	420
Upstream Blk Time (%)			0	0								0
Queuing Penalty (veh)			0	0								0
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)											2	
Queuing Penalty (veh)											1	

Intersection: 15: Rockville Pike - 355 & Hubbard Dirve/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	262
Average Queue (ft)	104
95th Queue (ft)	220
Link Distance (ft)	420
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	86	181	162	57	309	327	183	37	48	66	104
Average Queue (ft)	34	53	42	6	68	73	13	8	12	20	40
95th Queue (ft)	68	131	111	39	210	222	87	30	39	53	84
Link Distance (ft)		533	533		605	605			382	233	233
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	330			165			200	200			
Storage Blk Time (%)				0	2	1					
Queuing Penalty (veh)				0	0	1					

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	52	57	59	32
Average Queue (ft)	22	26	10	2
95th Queue (ft)	47	50	36	16
Link Distance (ft)	419	343	541	424
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

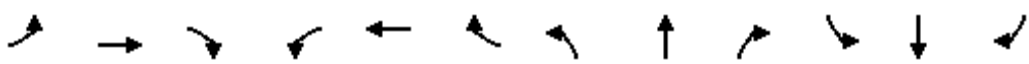
Network wide Queuing Penalty: 318

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Existing PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖↗	↖		↖	↑↑↑	↗	↖	↑↑↑	
Traffic Volume (vph)	17	31	36	324	21	175	57	1847	365	206	1170	18
Future Volume (vph)	17	31	36	324	21	175	57	1847	365	206	1170	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		0.98	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1682	1478	3204	1430		1711	4916	1531	1770	5063	
Flt Permitted		0.27	1.00	0.95	1.00		0.95	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		466	1478	3204	1430		1711	4916	1531	118	5063	
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	0.92
Adj. Flow (vph)	18	32	37	334	22	180	59	1904	376	212	1206	20
RTOR Reduction (vph)	0	0	35	0	149	0	0	0	138	0	1	0
Lane Group Flow (vph)	0	50	2	334	53	0	59	1904	238	212	1225	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Confl. Bikes (#/hr)			1			1			1			
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	25.5	25.5		9.3	72.0	72.0	81.2	81.2	
Effective Green, g (s)		10.0	10.0	25.5	25.5		9.3	72.0	72.0	81.2	81.2	
Actuated g/C Ratio		0.07	0.07	0.17	0.17		0.06	0.48	0.48	0.54	0.54	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		31	98	544	243		106	2359	734	262	2740	
v/s Ratio Prot			0.00	c0.10	0.04		0.03	c0.39	0.16	c0.10	0.24	
v/s Ratio Perm		c0.11								c0.34		
v/c Ratio		1.61	0.03	0.61	0.22		0.56	0.81	0.32	0.81	0.45	
Uniform Delay, d1		70.0	65.4	57.7	53.6		68.3	33.1	24.0	47.6	20.8	
Progression Factor		1.00	1.00	1.00	1.00		1.52	0.49	0.19	0.81	0.68	
Incremental Delay, d2		385.2	0.1	3.6	1.3		5.1	2.5	1.0	15.7	0.5	
Delay (s)		455.2	65.5	61.3	54.9		108.7	18.6	5.4	54.3	14.7	
Level of Service		F	E	E	D		F	B	A	D	B	
Approach Delay (s)		289.5			58.9			18.8			20.5	
Approach LOS		F			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			29.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			78.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	8	133	18	9	38	197	1700	23	26	1221	13
Future Volume (vph)	127	8	133	18	9	38	197	1700	23	26	1221	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1654	1478		1893		1709	4901		1651	4734	
Flt Permitted		0.70	1.00		0.88		0.17	1.00		0.10	1.00	
Satd. Flow (perm)		1214	1478		1689		306	4901		179	4734	
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)	132	8	139	19	9	40	205	1771	24	27	1272	14
RTOR Reduction (vph)	0	0	118	0	34	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	140	21	0	34	0	205	1794	0	27	1285	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		22.4	22.4		22.4		115.6	106.7		104.2	100.3	
Effective Green, g (s)		22.4	22.4		22.4		115.6	106.7		104.2	100.3	
Actuated g/C Ratio		0.15	0.15		0.15		0.77	0.71		0.69	0.67	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		181	220		252		332	3486		162	3165	
v/s Ratio Prot			0.01				c0.04	0.37		0.00	0.27	
v/s Ratio Perm		c0.12			0.02		c0.43			0.11		
v/c Ratio		0.77	0.09		0.13		0.62	0.51		0.17	0.41	
Uniform Delay, d1		61.4	55.0		55.4		6.7	9.9		7.8	11.3	
Progression Factor		1.00	1.00		1.00		4.89	0.07		0.22	0.16	
Incremental Delay, d2		18.4	0.2		0.2		2.1	0.3		0.5	0.4	
Delay (s)		79.7	55.2		55.6		34.9	1.0		2.2	2.2	
Level of Service		E	E		E		C	A		A	A	
Approach Delay (s)		67.5			55.6			4.5			2.2	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.4				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			67.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Existing PM
01/21/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	58	1821	44	0	1248	
Future Volume (Veh/h)	0	58	1821	44	0	1248	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	0	66	2069	50	0	1418	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.90	0.83			0.83		
vC, conflicting volume	2567	715			2119		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1370	0			1644		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	93			100		
cM capacity (veh/h)	124	904			325		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	828	828	464	473	473	473
Volume Left	0	0	0	0	0	0	0
Volume Right	66	0	0	50	0	0	0
cSH	904	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.49	0.49	0.27	0.28	0.28	0.28
Queue Length 95th (ft)	6	0	0	0	0	0	0
Control Delay (s)	9.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.3	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			46.4%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↱	
Traffic Volume (vph)	0	423	37	0	308	148	100	1523	121	154	1211	44
Future Volume (vph)	0	423	37	0	308	148	100	1523	121	154	1211	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		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	
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3255			3539	1583	1650	4746	1794	1711	4880	
Flt Permitted		1.00			1.00	1.00	0.18	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		3255			3539	1583	314	4746	1794	204	4880	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	427	37	0	311	149	101	1538	122	156	1223	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	49	0	2	0
Lane Group Flow (vph)	0	464	0	0	311	149	101	1538	73	156	1265	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		28.3			28.3	28.3	98.7	89.3	89.3	104.7	92.3	
Effective Green, g (s)		28.3			28.3	28.3	98.7	89.3	89.3	104.7	92.3	
Actuated g/C Ratio		0.19			0.19	0.19	0.66	0.60	0.60	0.70	0.62	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		614			667	298	290	2825	1068	266	3002	
v/s Ratio Prot		c0.14			0.09	0.09	0.02	0.32	0.04	c0.05	0.26	
v/s Ratio Perm							0.21			c0.36		
v/c Ratio		0.76			0.47	0.50	0.35	0.54	0.07	0.59	0.42	
Uniform Delay, d1		57.6			54.1	54.5	10.0	18.2	12.8	12.3	15.0	
Progression Factor		1.00			0.55	0.54	0.43	0.32	0.01	2.64	1.27	
Incremental Delay, d2		5.6			0.6	1.6	0.9	0.7	0.1	3.5	0.4	
Delay (s)		63.2			30.2	31.2	5.2	6.5	0.2	36.0	19.4	
Level of Service		E			C	C	A	A	A	D	B	
Approach Delay (s)		63.2			30.5			6.0			21.2	
Approach LOS		E			C			A			C	
Intersection Summary												
HCM 2000 Control Delay		20.5		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		150.0		Sum of lost time (s)					20.0			
Intersection Capacity Utilization		75.3%		ICU Level of Service					D			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	725	95	463	583	141	55	109	564	215	119	37
Future Volume (vph)	68	725	95	463	583	141	55	109	564	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3235		3319	3305			1710	1478	3204	1739	1421
Flt Permitted	0.37	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	635	3235		3319	3305			1710	1478	3204	1739	1421
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)	70	747	98	477	601	145	57	112	581	222	123	38
RTOR Reduction (vph)	0	7	0	0	12	0	0	0	56	0	0	34
Lane Group Flow (vph)	70	838	0	477	734	0	0	169	525	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	53.0	45.5		25.3	63.3			38.2	70.0	16.5	16.5	16.5
Effective Green, g (s)	53.0	45.5		25.3	63.3			38.2	70.0	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.25	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	275	981		559	1394			435	689	352	191	156
v/s Ratio Prot	0.01	c0.26		c0.14	0.22			0.10	c0.36	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.25	0.85		0.85	0.53			0.39	0.76	0.63	0.64	0.03
Uniform Delay, d1	32.8	49.1		60.5	32.2			46.2	33.1	63.8	63.9	59.6
Progression Factor	1.76	1.42		1.00	1.08			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	9.0		11.2	1.3			0.6	5.0	3.7	7.2	0.1
Delay (s)	58.0	78.9		71.6	36.2			46.8	38.1	67.5	71.2	59.7
Level of Service	E	E		E	D			D	D	E	E	E
Approach Delay (s)		77.3			50.0			40.1			67.9	
Approach LOS		E			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			57.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			88.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1	4	4	1	7	3	697	8	5	589	4
Future Volume (Veh/h)	6	1	4	4	1	7	3	697	8	5	589	4
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	1	4	4	1	8	3	774	9	6	654	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							471			256		
pX, platoon unblocked												
vC, conflicting volume	1070	1457	329	1128	1454	392	658				783	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1070	1457	329	1128	1454	392	658				783	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	96	99	99	97	99	99	100				99	
cM capacity (veh/h)	171	127	667	156	128	607	926				831	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	13	390	396	333	331						
Volume Left	7	4	3	0	6	0						
Volume Right	4	8	0	9	0	4						
cSH	219	279	926	1700	831	1700						
Volume to Capacity	0.05	0.05	0.00	0.23	0.01	0.19						
Queue Length 95th (ft)	4	4	0	0	1	0						
Control Delay (s)	22.4	18.6	0.1	0.0	0.3	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	22.4	18.6	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay				0.4								
Intersection Capacity Utilization				31.6%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Existing PM
01/21/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	71	97	611	68	45	552
Future Volume (Veh/h)	71	97	611	68	45	552
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	73	100	630	70	46	569
Pedestrians	18					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			287			440
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	1060	683			718	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1022	613			651	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	75			95	
cM capacity (veh/h)	199	394			843	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	73	100	700	236	379	
Volume Left	73	0	0	46	0	
Volume Right	0	100	70	0	0	
cSH	199	394	1700	843	1700	
Volume to Capacity	0.37	0.25	0.41	0.05	0.22	
Queue Length 95th (ft)	40	25	0	4	0	
Control Delay (s)	33.3	17.2	0.0	2.3	0.0	
Lane LOS	D	C		A		
Approach Delay (s)	24.0		0.0	0.9		
Approach LOS	C					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			60.3%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Existing PM
01/21/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					  	
Traffic Volume (veh/h)	1	3	0	674	615	8
Future Volume (Veh/h)	1	3	0	674	615	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	1	4	0	899	820	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.83					
vC, conflicting volume	1724	279	831			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1771	279	831			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	62	718	797			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	5	899	328	328	175	
Volume Left	1	0	0	0	0	
Volume Right	4	0	0	0	11	
cSH	229	797	1700	1700	1700	
Volume to Capacity	0.02	0.00	0.19	0.19	0.10	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	21.1	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	21.1	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			45.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

Existing PM

9: Chapman Ave & Bou Ave

01/21/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	317	239	56	15	167	230	17	127	42	206	127	329
Future Volume (vph)	317	239	56	15	167	230	17	127	42	206	127	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1679		1640	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.52	1.00		0.57	1.00	1.00	0.67	1.00		0.65	1.00	1.00
Satd. Flow (perm)	899	1679		990	1739	1422	1158	1660		1105	1739	1478
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)	330	249	58	16	174	240	18	132	44	215	132	343
RTOR Reduction (vph)	0	11	0	0	0	166	0	15	0	0	0	153
Lane Group Flow (vph)	330	296	0	16	174	74	18	161	0	215	132	190
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.1	44.1		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.1
Effective Green, g (s)	44.1	44.1		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.1
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	629	930		304	535	437	349	500		333	524	818
v/s Ratio Prot	c0.09	0.18			0.10			0.10			0.08	0.13
v/s Ratio Perm	c0.20			0.02		0.05	0.02			c0.19		
v/c Ratio	0.52	0.32		0.05	0.33	0.17	0.05	0.32		0.65	0.25	0.23
Uniform Delay, d1	10.2	9.6		19.4	21.2	20.1	19.7	21.5		24.1	21.0	9.1
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	2.0	0.1		0.3	1.6	0.8	0.1	0.4		9.3	1.2	0.4
Delay (s)	12.2	9.7		19.7	22.8	21.0	19.8	21.9		33.4	22.2	9.5
Level of Service	B	A		B	C	C	B	C		C	C	A
Approach Delay (s)		11.0			21.7			21.7			19.4	
Approach LOS		B			C			C			B	

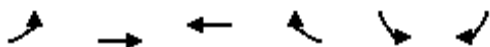
Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	17.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Existing PM
01/21/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	20	516	475	31	46	28
Future Volume (Veh/h)	20	516	475	31	46	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	532	490	32	47	29
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	529				821	269
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	529				821	269
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				85	96
cM capacity (veh/h)	1027				304	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	198	355	327	195	76	
Volume Left	21	0	0	0	47	
Volume Right	0	0	0	32	29	
cSH	1027	1700	1700	1700	391	
Volume to Capacity	0.02	0.21	0.19	0.11	0.19	
Queue Length 95th (ft)	2	0	0	0	18	
Control Delay (s)	1.1	0.0	0.0	0.0	16.4	
Lane LOS	A				C	
Approach Delay (s)	0.4		0.0		16.4	
Approach LOS					C	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			40.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	331	65	78	7	477	373	18	263	18
Future Volume (vph)	10	44	26	331	65	78	7	477	373	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1599			1799	1499		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1599			1792	1499		3098	
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)	10	46	27	345	68	81	7	497	389	19	274	19
RTOR Reduction (vph)	0	25	0	0	52	0	0	0	92	0	4	0
Lane Group Flow (vph)	10	48	0	345	97	0	0	504	297	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	6.2	6.2		19.7	19.7			45.1	64.8		45.1	
Effective Green, g (s)	6.2	6.2		19.7	19.7			45.1	64.8		45.1	
Actuated g/C Ratio	0.07	0.07		0.23	0.23			0.53	0.76		0.53	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		396	370			950	1142		1643	
v/s Ratio Prot	0.01	c0.03		c0.20	0.06				0.06			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.87	0.26			0.53	0.26		0.19	
Uniform Delay, d1	36.7	37.6		31.4	26.7			13.0	3.0		10.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		18.0	0.1			2.1	0.0		0.3	
Delay (s)	36.8	38.4		49.4	26.8			15.2	3.0		10.7	
Level of Service	D	D		D	C			B	A		B	
Approach Delay (s)		38.2			42.6			9.9			10.7	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			69.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	18	70	127	197	1609	7	99	1357	30
Future Volume (vph)	98	66	87	18	70	127	197	1609	7	99	1357	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1710	4912		1710	4894	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.13	1.00		0.11	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	236	4912		204	4894	
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)	103	69	92	19	74	134	207	1694	7	104	1428	32
RTOR Reduction (vph)	0	80	0	0	0	116	0	0	0	0	1	0
Lane Group Flow (vph)	103	81	0	19	74	18	207	1701	0	104	1459	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	19.7	19.7		19.7	19.7	19.7	118.3	102.6		106.1	95.9	
Effective Green, g (s)	19.7	19.7		19.7	19.7	19.7	118.3	102.6		106.1	95.9	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.79	0.68		0.71	0.64	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	166	413		154	244	207	352	3359		246	3128	
v/s Ratio Prot		0.03			0.04	0.01	c0.07	0.35		0.03	0.30	
v/s Ratio Perm	c0.08			0.02			c0.40			0.27		
v/c Ratio	0.62	0.20		0.12	0.30	0.09	0.59	0.51		0.42	0.47	
Uniform Delay, d1	61.6	58.1		57.5	58.9	57.2	9.3	11.5		7.8	13.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.54	0.27		1.00	1.00	
Incremental Delay, d2	9.8	0.5		0.8	1.5	0.4	3.5	0.5		2.4	0.5	
Delay (s)	71.4	58.6		58.3	60.4	57.6	27.0	3.6		10.3	14.4	
Level of Service	E	E		E	E	E	C	A		B	B	
Approach Delay (s)		63.6			58.6			6.1			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			16.1									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			150.0									Sum of lost time (s) 17.5
Intersection Capacity Utilization			73.7%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1157	271	133	734	32
Future Volume (vph)	44	32	68	304	39	272	31	1157	271	133	734	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4571		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	529	4571		351	3303	1428
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)	47	34	72	323	41	289	33	1231	288	141	781	34
RTOR Reduction (vph)	0	47	0	0	0	141	0	20	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	148	33	1499	0	141	781	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4	1	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Effective Green, g (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	127	119		253	256	396	342	2416		371	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.10	0.00	c0.33		0.02	c0.24	
v/s Ratio Perm							0.05			0.21		0.01
v/c Ratio	0.33	0.54		0.72	0.71	0.37	0.10	0.62		0.38	0.43	0.02
Uniform Delay, d1	65.7	66.8		60.1	60.1	45.6	14.8	24.8		16.0	20.2	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.89	0.88		1.00	1.00	1.00
Incremental Delay, d2	1.5	4.6		9.2	9.1	0.6	0.1	0.8		0.7	0.8	0.1
Delay (s)	67.2	71.4		69.4	69.2	46.2	13.2	22.7		16.7	20.9	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.2			59.1			22.5			20.1	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.2									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			69.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	943	74	149	736	156	125	138	247	253	160	24
Future Volume (vph)	21	943	74	149	736	156	125	138	247	253	160	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3249		1770	3425		1683	1801	1531	1762	1863	1583
Flt Permitted	0.23	1.00		0.11	1.00		0.65	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	398	3249		211	3425		1153	1801	1531	839	1863	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)	22	993	78	157	775	164	132	145	260	266	168	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1071	0	157	939	0	132	145	260	266	168	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	66.7	62.5		80.8	70.6		41.6	27.2	27.2	56.2	35.3	35.3
Effective Green, g (s)	66.7	62.5		80.8	70.6		41.6	27.2	27.2	56.2	35.3	35.3
Actuated g/C Ratio	0.44	0.42		0.54	0.47		0.28	0.18	0.18	0.37	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	212	1353		241	1612		370	326	277	452	438	372
v/s Ratio Prot	0.00	c0.33		c0.05	c0.27		0.03	0.08	c0.17	c0.09	0.09	0.02
v/s Ratio Perm	0.04			0.30			0.06			0.13		
v/c Ratio	0.10	0.79		0.65	0.58		0.36	0.44	0.94	0.59	0.38	0.07
Uniform Delay, d1	24.3	38.1		25.1	29.0		42.5	54.7	60.6	35.0	48.2	44.6
Progression Factor	0.74	0.73		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	4.4		6.2	1.5		0.8	1.3	37.8	2.3	0.8	0.1
Delay (s)	18.2	32.2		31.3	30.5		43.3	56.0	98.4	37.4	49.0	44.7
Level of Service	B	C		C	C		D	E	F	D	D	D
Approach Delay (s)		31.9			30.6			73.4			42.0	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			39.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			82.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	1941	250	161	1458	26
Future Volume (vph)	40	12	32	186	13	138	18	1941	250	161	1458	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1709	6035		1711	4895	
Flt Permitted	0.54	1.00		0.73	1.00		0.14	1.00		0.04	1.00	
Satd. Flow (perm)	927	1589		1354	1496		255	6035		76	4895	
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)	42	12	33	194	14	144	19	2022	260	168	1519	27
RTOR Reduction (vph)	0	27	0	0	118	0	0	14	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	40	0	19	2268	0	168	1545	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Effective Green, g (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.62	0.59		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	168	289		246	272		207	3568		224	3237	
v/s Ratio Prot		0.01			0.03		0.00	0.38		c0.08	0.32	
v/s Ratio Perm	0.05			c0.14			0.05			c0.47		
v/c Ratio	0.25	0.07		0.79	0.15		0.09	0.64		0.75	0.48	
Uniform Delay, d1	52.6	50.8		58.6	51.6		10.9	20.1		43.6	12.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.23	0.77	
Incremental Delay, d2	1.6	0.2		17.5	0.5		0.4	0.9		14.4	0.5	
Delay (s)	54.2	51.0		76.1	52.1		11.3	20.9		68.0	10.2	
Level of Service	D	D		E	D		B	C		E	B	
Approach Delay (s)		52.5			65.3			20.9			15.8	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		23.1					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		150.0					Sum of lost time (s)		18.5			
Intersection Capacity Utilization		89.0%					ICU Level of Service		E			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	861	72	14	700	127	50	24	20	152	51	96
Future Volume (vph)	144	861	72	14	700	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3252		1649	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.30	1.00		0.26	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	524	3252		460	3303	1432	1711	1665		1681	1573	
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)	150	897	75	15	729	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	3	0	0	0	53	0	20	0	0	0	0
Lane Group Flow (vph)	150	969	0	15	729	79	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Effective Green, g (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Actuated g/C Ratio	0.67	0.61		0.57	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	437	1990		288	1829	793	108	105		253	236	
v/s Ratio Prot	c0.03	c0.30		0.00	0.22		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.20			0.03		0.06						
v/c Ratio	0.34	0.49		0.05	0.40	0.10	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.5	16.1		13.9	19.1	15.8	67.9	66.9		59.1	60.6	
Progression Factor	1.00	1.00		0.61	0.49	0.14	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.9		0.1	0.6	0.2	4.6	1.7		3.4	10.6	
Delay (s)	11.1	16.9		8.5	10.0	2.4	72.4	68.6		62.5	71.2	
Level of Service	B	B		A	B	A	E	E		E	E	
Approach Delay (s)		16.2			8.8			70.6			67.2	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.3				HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		150.0				Sum of lost time (s)		23.0				
Intersection Capacity Utilization		65.4%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Existing PM
01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			1	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		8			7			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	775	830	430	942	833	366	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	759	816	430	931	819	342	394			353		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	93	76	92	95	99	97			99		
cM capacity (veh/h)	238	250	545	133	250	637	1067			1097		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	411	207	1067	1097								
Volume to Capacity	0.43	0.14	0.03	0.01								
Queue Length 95th (ft)	52	11	2	0								
Control Delay (s)	20.2	25.1	1.0	0.2								
Lane LOS	C	D	A	A								
Approach Delay (s)	20.2	25.1	1.0	0.2								
Approach LOS	C	D										
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			51.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	15661	15916	15784	15506	15939	15763
Vehs Exited	15156	15353	15244	15008	15406	15235
Starting Vehs	0	0	0	0	0	0
Ending Vehs	505	563	540	498	533	518
Travel Distance (mi)	9095	9248	9115	8964	9236	9132
Travel Time (hr)	649.6	682.5	647.8	623.3	650.3	650.7
Total Delay (hr)	351.0	379.8	348.9	329.2	347.9	351.3
Total Stops	22816	23663	22855	22135	22943	22884
Fuel Used (gal)	401.6	414.7	404.4	392.8	406.9	404.1

Interval #0 Information Seed

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3155	3187	3072	3105	3300	3158
Vehs Exited	2580	2623	2588	2571	2745	2620
Starting Vehs	0	0	0	0	0	0
Ending Vehs	575	564	484	534	555	530
Travel Distance (mi)	1645	1689	1630	1617	1717	1660
Travel Time (hr)	110.9	116.8	107.8	108.3	118.7	112.5
Total Delay (hr)	57.1	61.6	54.7	55.3	62.7	58.3
Total Stops	3986	4219	3899	3948	4326	4078
Fuel Used (gal)	70.1	73.3	70.0	68.9	74.1	71.3

Interval #1 Information 1

Start Time 5:00
End Time 5:15
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3125	3235	3195	3063	3220	3165
Vehs Exited	3161	3218	3090	3072	3236	3157
Starting Vehs	575	564	484	534	555	530
Ending Vehs	539	581	589	525	539	545
Travel Distance (mi)	1889	1903	1836	1835	1941	1881
Travel Time (hr)	135.4	145.8	128.1	130.5	134.7	134.9
Total Delay (hr)	73.4	83.4	67.7	70.1	71.3	73.2
Total Stops	4694	5084	4565	4677	4705	4738
Fuel Used (gal)	83.6	86.9	80.4	81.2	85.6	83.5

Interval #2 Information 2

Start Time 5:15
End Time 5:30
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3194	3187	3191	3147	3188	3177
Vehs Exited	3184	3190	3195	3157	3185	3182
Starting Vehs	539	581	589	525	539	545
Ending Vehs	549	578	585	515	542	547
Travel Distance (mi)	1872	1924	1892	1830	1900	1884
Travel Time (hr)	141.1	144.5	138.1	123.6	139.3	137.3
Total Delay (hr)	79.6	81.3	76.2	63.6	77.2	75.6
Total Stops	4953	5028	4931	4379	4899	4835
Fuel Used (gal)	85.2	86.9	85.6	79.4	85.3	84.5

Interval #3 Information 3

Start Time 5:30
End Time 5:45
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3054	3200	3189	3121	3133	3139
Vehs Exited	3065	3247	3217	3112	3183	3163
Starting Vehs	549	578	585	515	542	547
Ending Vehs	538	531	557	524	492	524
Travel Distance (mi)	1851	1907	1876	1867	1857	1872
Travel Time (hr)	133.7	143.9	138.8	134.6	131.1	136.4
Total Delay (hr)	72.7	81.4	77.2	73.4	70.3	75.0
Total Stops	4641	4816	4813	4720	4513	4702
Fuel Used (gal)	82.2	86.3	84.7	83.4	82.3	83.8

Interval #4 Information 4

Start Time 5:45
End Time 6:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3133	3107	3137	3070	3098	3106
Vehs Exited	3166	3075	3154	3096	3057	3109
Starting Vehs	538	531	557	524	492	524
Ending Vehs	505	563	540	498	533	518
Travel Distance (mi)	1838	1825	1881	1814	1821	1836
Travel Time (hr)	128.5	131.5	135.0	126.3	126.5	129.6
Total Delay (hr)	68.2	72.1	73.2	66.7	66.4	69.3
Total Stops	4542	4516	4647	4411	4500	4530
Fuel Used (gal)	80.5	81.3	83.7	79.8	79.7	81.0

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	B28	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	LT	R	T	L	L	TR	L	T	T	T	R	L
Maximum Queue (ft)	150	71	116	204	218	197	199	379	375	334	275	309
Average Queue (ft)	73	39	16	118	138	101	57	193	163	148	120	178
95th Queue (ft)	146	83	89	193	219	191	134	307	287	248	222	302
Link Distance (ft)	71		241	206	206			420	420	420	420	
Upstream Blk Time (%)	29	4		0	2	0		0	0	0		
Queuing Penalty (veh)	0	0		1	5	0		0	0	0		
Storage Bay Dist (ft)		90				100	160					160
Storage Blk Time (%)	29	4			21	11	0	21				20
Queuing Penalty (veh)	10	2			41	18	1	12				78

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	301	246	245
Average Queue (ft)	124	116	125
95th Queue (ft)	239	191	202
Link Distance (ft)	517	517	517
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)	1		
Queuing Penalty (veh)	3		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	B25	WB	B24	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	LTR	T	L	T	T	TR	L	T	T
Maximum Queue (ft)	168	84	228	103	29	219	123	71	89	74	97	82
Average Queue (ft)	140	72	58	39	1	89	14	15	28	23	20	15
95th Queue (ft)	190	100	162	84	15	177	67	49	72	61	62	51
Link Distance (ft)	84		213	48	171		517	517	517		180	180
Upstream Blk Time (%)	34	8	1	15								
Queuing Penalty (veh)	0	0	0	0								
Storage Bay Dist (ft)		150				125				110		
Storage Blk Time (%)	34	8				4	0				0	
Queuing Penalty (veh)	46	11				23	0				0	

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	SB
Directions Served	TR
Maximum Queue (ft)	90
Average Queue (ft)	26
95th Queue (ft)	69
Link Distance (ft)	180
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	SB
Directions Served	R	T
Maximum Queue (ft)	70	4
Average Queue (ft)	27	0
95th Queue (ft)	57	3
Link Distance (ft)	73	261
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	L	T	T
Maximum Queue (ft)	280	288	202	248	180	128	188	187	205	271	420	383
Average Queue (ft)	148	170	104	98	78	29	82	94	110	83	249	224
95th Queue (ft)	237	257	183	191	166	81	146	160	177	173	390	364
Link Distance (ft)	1311	1311	563	563			261	261	261		1192	1192
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					65	130				350		
Storage Blk Time (%)				8	11	0	2				2	
Queuing Penalty (veh)				12	17	0	2				3	

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	348
Average Queue (ft)	196
95th Queue (ft)	336
Link Distance (ft)	1192
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	200	430	451	310	375	622	554	209	224	179	203	217
Average Queue (ft)	78	289	310	217	273	256	237	128	203	74	107	94
95th Queue (ft)	212	414	443	349	405	533	440	216	234	151	177	168
Link Distance (ft)		563	563			1295	1295	199	199		541	
Upstream Blk Time (%)			0					4	39			
Queuing Penalty (veh)			0					15	137			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)	0	57		7	29	5				4	28	
Queuing Penalty (veh)	0	39		20	84	21				11	73	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	50	26	100	144	151	16
Average Queue (ft)	12	9	7	120	13	0
95th Queue (ft)	39	27	43	180	73	11
Link Distance (ft)	39	45	130	130	199	199
Upstream Blk Time (%)	5	2	0	25	0	
Queuing Penalty (veh)	0	0	1	87	0	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: Chapman Ave & Rollins Ave

Movement	WB	WB	B50	B50	B51	NB	SB	SB
Directions Served	L	R	T	T	T	TR	LT	T
Maximum Queue (ft)	122	131	31	143	33	146	144	90
Average Queue (ft)	42	69	1	29	3	97	54	10
95th Queue (ft)	92	138	19	131	30	192	135	54
Link Distance (ft)	60	60	146	146	315	128	130	130
Upstream Blk Time (%)	8	30		7		17	3	0
Queuing Penalty (veh)	0	0		0		112	8	0
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 8: Chapman Ave & Pike Center South

Movement	EB	NB	SB	SB	SB
Directions Served	LR	LT	T	T	TR
Maximum Queue (ft)	34	183	144	104	142
Average Queue (ft)	3	100	78	17	68
95th Queue (ft)	18	193	166	63	152
Link Distance (ft)	35	53	128	128	128
Upstream Blk Time (%)	4	32	11	0	3
Queuing Penalty (veh)	0	214	23	0	5
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	B35	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	T	L	T	R
Maximum Queue (ft)	224	170	46	176	247	89	206	89	69	68	77
Average Queue (ft)	119	80	9	74	30	16	97	8	60	43	51
95th Queue (ft)	209	156	31	140	155	60	197	53	80	74	70
Link Distance (ft)	218	218		823	823		137	285	53	53	53
Upstream Blk Time (%)	1						7		44	13	19
Queuing Penalty (veh)	4						21		91	26	38
Storage Bay Dist (ft)			270			40					
Storage Blk Time (%)						1	29				
Queuing Penalty (veh)						2	5				

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	94	104	11	100	98
Average Queue (ft)	17	6	0	7	35
95th Queue (ft)	63	58	7	45	67
Link Distance (ft)		206	218	218	316
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		1			
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	2	0			
Queuing Penalty (veh)	5	0			

Intersection: 11: East Jefferson Street & Rollins Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	40	132	398	268	314	255	180	131
Average Queue (ft)	9	44	211	84	170	57	82	27
95th Queue (ft)	32	90	364	191	297	152	148	80
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)					2	0		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	194	114	142	63	139	232	194	300	238	179	225	477
Average Queue (ft)	87	44	56	17	60	105	122	86	63	61	90	321
95th Queue (ft)	161	91	110	47	119	184	203	215	151	133	207	504
Link Distance (ft)		834	834	502	502			1192	1192	1192		455
Upstream Blk Time (%)												2
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)	0						21	0			1	28
Queuing Penalty (veh)	0						115	1			3	28

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	427	289
Average Queue (ft)	237	110
95th Queue (ft)	392	234
Link Distance (ft)	455	455
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	97	177	233	263	361	64	236	261	341	103	166	376
Average Queue (ft)	36	62	115	142	183	17	136	164	237	9	74	198
95th Queue (ft)	78	124	193	217	305	46	225	249	354	59	134	332
Link Distance (ft)	449	449		896	896		1295	1295			414	414
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			3	9			5					
Queuing Penalty (veh)			6	14			2					

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	299	34
Average Queue (ft)	152	7
95th Queue (ft)	277	25
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	7	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	121	393	386	159	408	390	219	320	484	284	266	61
Average Queue (ft)	19	200	216	102	201	202	67	112	247	142	115	20
95th Queue (ft)	74	345	354	185	339	332	139	224	433	243	216	53
Link Distance (ft)		605	605		1105	1105		561	561		1627	1627
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	18		5	19		0	5		7	2	
Queuing Penalty (veh)	0	4		18	28		1	7		11	5	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	B31	B31	NB	NB	NB	NB	NB	SB
Directions Served	L	TR	L	TR	T	T	L	T	T	T	TR	L
Maximum Queue (ft)	103	78	218	196	94	17	38	406	371	333	382	193
Average Queue (ft)	31	18	145	82	7	1	7	272	235	180	212	101
95th Queue (ft)	74	49	225	153	42	10	24	378	341	295	353	180
Link Distance (ft)	151	151	139	139	149	149		1550	1550	1550	1550	
Upstream Blk Time (%)			20	3	0							
Queuing Penalty (veh)			0	0	0							
Storage Bay Dist (ft)							580					160
Storage Blk Time (%)												4
Queuing Penalty (veh)												20

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	226	180	200
Average Queue (ft)	67	80	93
95th Queue (ft)	156	157	172
Link Distance (ft)	420	420	420
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)	0		
Queuing Penalty (veh)	1		

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	B45
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR	T
Maximum Queue (ft)	159	326	322	89	255	263	141	118	108	182	229	5
Average Queue (ft)	64	159	144	13	76	84	17	50	41	89	139	0
95th Queue (ft)	122	275	263	52	183	194	67	101	85	151	211	3
Link Distance (ft)		533	533		605	605			382	233	233	472
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	330			165			200	200				
Storage Blk Time (%)		0		0	1	1						
Queuing Penalty (veh)		0		0	0	1						

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	119	43	79	50
Average Queue (ft)	50	19	15	6
95th Queue (ft)	85	44	52	28
Link Distance (ft)	419	343	541	424
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1596

APPENDIX B
BACKGROUND
CONDITIONS
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	21	25	467	11	65	36	1646	177	124	2077	6
Future Volume (vph)	14	21	25	467	11	65	36	1646	177	124	2077	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.98		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	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1698	1478	3204	1490		1711	4916	1531	1770	5083	
Flt Permitted		0.28	1.00	0.95	1.00		0.95	1.00	1.00	0.07	1.00	
Satd. Flow (perm)		487	1478	3204	1490		1711	4916	1531	140	5083	
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)	15	22	26	486	11	68	38	1715	184	129	2164	6
RTOR Reduction (vph)	0	0	24	0	55	0	0	0	77	0	0	0
Lane Group Flow (vph)	0	37	2	486	24	0	38	1715	107	129	2170	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	28.2	28.2		7.6	68.4	68.4	80.2	80.2	
Effective Green, g (s)		10.0	10.0	28.2	28.2		7.6	68.4	68.4	80.2	80.2	
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.05	0.46	0.46	0.53	0.53	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		32	98	602	280		86	2241	698	280	2717	
v/s Ratio Prot			0.00	c0.15	0.02		0.02	c0.35	0.07	0.06	c0.43	
v/s Ratio Perm		c0.08								0.19		
v/c Ratio		1.16	0.02	0.81	0.08		0.44	0.77	0.15	0.46	0.80	
Uniform Delay, d1		70.0	65.4	58.3	50.3		69.1	34.1	23.9	42.9	28.3	
Progression Factor		1.00	1.00	1.00	1.00		1.36	0.77	0.46	0.65	0.49	
Incremental Delay, d2		209.8	0.1	9.3	0.4		3.3	2.4	0.4	1.0	2.1	
Delay (s)		279.8	65.5	67.6	50.6		97.5	28.8	11.3	28.9	15.9	
Level of Service		F	E	E	D		F	C	B	C	B	
Approach Delay (s)		191.4			65.2			28.5			16.6	
Approach LOS		F			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			29.3			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			79.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	16	2	54	7	2	8	84	1544	11	30	2105	2
Future Volume (vph)	16	2	54	7	2	8	84	1544	11	30	2105	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1662	1478		1920		1711	4909		1651	4745	
Flt Permitted		0.74	1.00		0.86		0.06	1.00		0.14	1.00	
Satd. Flow (perm)		1278	1478		1680		109	4909		243	4745	
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)	17	2	56	7	2	8	88	1608	11	31	2193	2
RTOR Reduction (vph)	0	0	54	0	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	2	0	9	0	88	1619	0	31	2195	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		6.5	6.5		6.5		131.5	122.9		121.0	117.4	
Effective Green, g (s)		6.5	6.5		6.5		131.5	122.9		121.0	117.4	
Actuated g/C Ratio		0.04	0.04		0.04		0.88	0.82		0.81	0.78	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		55	64		72		192	4022		229	3713	
v/s Ratio Prot			0.00				c0.03	0.33		0.00	c0.46	
v/s Ratio Perm		c0.01			0.01		0.37			0.11		
v/c Ratio		0.35	0.04		0.13		0.46	0.40		0.14	0.59	
Uniform Delay, d1		69.7	68.8		69.0		7.3	3.7		2.9	6.6	
Progression Factor		1.00	1.00		1.00		4.90	0.04		0.39	0.28	
Incremental Delay, d2		3.8	0.2		0.8		1.2	0.2		0.2	0.6	
Delay (s)		73.4	69.0		69.8		37.1	0.3		1.4	2.5	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		70.1			69.8			2.2			2.4	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			3.9				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			67.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Background Future AM

01/21/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	19	1543	25	0	2156	
Future Volume (Veh/h)	0	19	1543	25	0	2156	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	
Hourly flow rate (vph)	0	24	1953	32	0	2729	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.76	0.91			0.91		
vC, conflicting volume	2879	667			1985		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1588	297			1743		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	96			100		
cM capacity (veh/h)	75	637			325		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	781	781	423	910	910	910
Volume Left	0	0	0	0	0	0	0
Volume Right	24	0	0	32	0	0	0
cSH	637	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.46	0.46	0.25	0.54	0.54	0.54
Queue Length 95th (ft)	3	0	0	0	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.9	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			45.0%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↱	
Traffic Volume (vph)	0	256	136	0	312	186	103	1430	106	200	2020	0
Future Volume (vph)	0	256	136	0	312	186	103	1430	106	200	2020	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			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	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3106			3539	1583	1652	4746	1794	1711	4916	
Flt Permitted		1.00			1.00	1.00	0.05	1.00	1.00	0.13	1.00	
Satd. Flow (perm)		3106			3539	1583	95	4746	1794	229	4916	
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)	0	261	139	0	318	190	105	1459	108	204	2061	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0	0	0
Lane Group Flow (vph)	0	400	0	0	318	190	105	1459	64	204	2061	0
Confl. Peds. (#/hr)	13		9	9		13			4			
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		26.5			26.5	26.5	101.0	89.1	89.1	106.0	91.6	
Effective Green, g (s)		26.5			26.5	26.5	101.0	89.1	89.1	106.0	91.6	
Actuated g/C Ratio		0.18			0.18	0.18	0.67	0.59	0.59	0.71	0.61	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		548			625	279	187	2819	1065	304	3002	
v/s Ratio Prot		c0.13			0.09	0.12	0.04	0.31	0.04	c0.06	c0.42	
v/s Ratio Perm							0.33			0.41		
v/c Ratio		0.73			0.51	0.68	0.56	0.52	0.06	0.67	0.69	
Uniform Delay, d1		58.4			55.9	57.8	23.2	17.9	12.8	12.5	19.6	
Progression Factor		1.00			0.76	0.76	1.81	0.17	0.01	2.54	0.42	
Incremental Delay, d2		5.2			0.9	7.1	4.5	0.7	0.1	5.1	1.1	
Delay (s)		63.5			43.4	50.8	46.5	3.7	0.2	36.9	9.3	
Level of Service		E			D	D	D	A	A	D	A	
Approach Delay (s)		63.5			46.2			6.2			11.8	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			17.7		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			77.9%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	73	531	440	123	67	48	197	84	50	24
Future Volume (vph)	40	509	73	531	440	123	67	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3235		3319	3286			1689	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3235		3319	3286			1689	1478	3204	1739	1443
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)	41	525	75	547	454	127	69	49	203	87	52	25
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	131	0	0	23
Lane Group Flow (vph)	41	595	0	547	574	0	0	118	72	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	74.4	68.8		30.8	94.0			15.9	53.2	10.0	10.0	10.0
Effective Green, g (s)	74.4	68.8		30.8	94.0			15.9	53.2	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.46		0.21	0.63			0.11	0.35	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	405	1483		681	2059			179	524	213	115	96
v/s Ratio Prot	0.00	c0.18		c0.16	0.17			c0.07	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.10	0.40		0.80	0.28			0.66	0.14	0.41	0.45	0.02
Uniform Delay, d1	19.5	26.9		56.7	12.7			64.4	32.8	67.2	67.4	65.4
Progression Factor	0.87	0.72		0.93	1.78			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8		6.5	0.3			8.5	0.1	1.3	2.8	0.1
Delay (s)	17.0	20.1		59.0	22.8			72.9	33.0	68.4	70.2	65.5
Level of Service	B	C		E	C			E	C	E	E	E
Approach Delay (s)		19.9			40.3			47.6			68.5	
Approach LOS		B			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			37.6			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			67.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	2	356	2	5	644	5
Future Volume (Veh/h)	0	0	0	1	0	4	2	356	2	5	644	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	3	451	3	6	815	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								471			256	
pX, platoon unblocked												
vC, conflicting volume	1066	1290	410	878	1292	227	821			454		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1066	1290	410	878	1292	227	821			454		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			99		
cM capacity (veh/h)	174	161	590	241	160	776	804			1103		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	6	228	228	414	414						
Volume Left	0	1	3	0	6	0						
Volume Right	0	5	0	3	0	6						
cSH	1700	566	804	1700	1103	1700						
Volume to Capacity	0.05	0.01	0.00	0.13	0.01	0.24						
Queue Length 95th (ft)	0	1	0	0	0	0						
Control Delay (s)	0.0	11.4	0.2	0.0	0.2	0.0						
Lane LOS	A	B	A		A							
Approach Delay (s)	0.0	11.4	0.1		0.1							
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			31.5%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Background Future AM

01/21/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	35	36	324	71	36	572
Future Volume (Veh/h)	35	36	324	71	36	572
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	36	37	334	73	37	590
Pedestrians	11					3
Lane Width (ft)	12.0					10.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			287			440
pX, platoon unblocked	1.00	1.00			1.00	
vC, conflicting volume	750	384			418	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	750	384			417	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	94			97	
cM capacity (veh/h)	332	606			1126	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	36	37	407	234	393	
Volume Left	36	0	0	37	0	
Volume Right	0	37	73	0	0	
cSH	332	606	1700	1126	1700	
Volume to Capacity	0.11	0.06	0.24	0.03	0.23	
Queue Length 95th (ft)	9	5	0	3	0	
Control Delay (s)	17.2	11.3	0.0	1.6	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	14.2		0.0	0.6		
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			52.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Background Future AM

01/21/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	1	362	609	3
Future Volume (Veh/h)	1	0	1	362	609	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.85
Hourly flow rate (vph)	2	0	2	575	967	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.94					
vC, conflicting volume	1548	324	971			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1551	324	971			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	98	671	706			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	2	577	387	387	197	
Volume Left	2	2	0	0	0	
Volume Right	0	0	0	0	4	
cSH	98	706	1700	1700	1700	
Volume to Capacity	0.02	0.00	0.23	0.23	0.12	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	42.5	0.1	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	42.5	0.1	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			29.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Background Future AM

01/21/2025

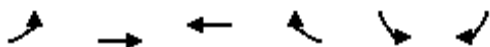
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	116	37	6	91	153	4	41	4	137	79	393
Future Volume (vph)	169	116	37	6	91	153	4	41	4	137	79	393
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1661		1630	1739	1433	1648	1713		1632	1739	1478
Flt Permitted	0.57	1.00		0.66	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	983	1661		1124	1739	1433	1220	1713		1248	1739	1478
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)	178	122	39	6	96	161	4	43	4	144	83	414
RTOR Reduction (vph)	0	14	0	0	0	111	0	3	0	0	0	187
Lane Group Flow (vph)	178	147	0	6	96	50	4	44	0	144	83	227
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	43.2	43.2		24.6	24.6	24.6	24.0	24.0		24.0	24.0	43.1
Effective Green, g (s)	43.2	43.2		24.6	24.6	24.6	24.0	24.0		24.0	24.0	43.1
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	649	911		351	543	447	372	522		380	530	809
v/s Ratio Prot	0.05	0.09			0.06			0.03			0.05	c0.15
v/s Ratio Perm	c0.10			0.01		0.04	0.00			c0.12		
v/c Ratio	0.27	0.16		0.02	0.18	0.11	0.01	0.08		0.38	0.16	0.28
Uniform Delay, d1	9.2	8.8		18.7	19.7	19.3	19.1	19.5		21.5	20.0	9.5
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	0.6	0.0		0.1	0.7	0.5	0.0	0.1		2.9	0.6	0.5
Delay (s)	9.9	8.8		18.8	20.4	19.8	19.1	19.6		24.4	20.6	10.0
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.4			20.0			19.5			14.6	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.5									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			78.7									Sum of lost time (s) 17.0
Intersection Capacity Utilization			59.1%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Background Future AM

01/21/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	10	300	509	14	16	8
Future Volume (Veh/h)	10	300	509	14	16	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	319	541	15	17	9
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	563				737	289
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563				737	289
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	99
cM capacity (veh/h)	998				348	700
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	117	213	361	195	26	
Volume Left	11	0	0	0	17	
Volume Right	0	0	0	15	9	
cSH	998	1700	1700	1700	421	
Volume to Capacity	0.01	0.13	0.21	0.11	0.06	
Queue Length 95th (ft)	1	0	0	0	5	
Control Delay (s)	0.9	0.0	0.0	0.0	14.1	
Lane LOS	A				B	
Approach Delay (s)	0.3		0.0		14.1	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			26.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Future Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3113	
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)	18	48	29	250	35	41	10	264	370	22	237	20
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	88	0	4	0
Lane Group Flow (vph)	18	50	0	250	43	0	0	274	282	0	275	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		16.1	16.1			48.6	64.7		48.6	
Effective Green, g (s)	6.3	6.3		16.1	16.1			48.6	64.7		48.6	
Actuated g/C Ratio	0.07	0.07		0.19	0.19			0.57	0.76		0.57	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		324	307			1016	1148		1779	
v/s Ratio Prot	0.01	c0.03		c0.15	0.03				0.05			
v/s Ratio Perm								c0.15	0.14		0.09	
v/c Ratio	0.14	0.40		0.77	0.14			0.27	0.25		0.15	
Uniform Delay, d1	36.8	37.6		32.7	28.7			9.2	3.0		8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		9.9	0.1			0.7	0.0		0.2	
Delay (s)	37.0	38.3		42.6	28.8			9.9	3.0		8.7	
Level of Service	D	D		D	C			A	A		A	
Approach Delay (s)		38.1			39.4			5.9			8.7	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			16.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			63.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	176	28	67	79	1234	311	63	1833	20
Future Volume (vph)	42	52	56	176	28	67	79	1234	311	63	1833	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4744		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.07	1.00		0.12	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	118	4744		211	4907	
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)	44	54	58	183	29	70	82	1285	324	66	1909	21
RTOR Reduction (vph)	0	47	0	0	0	57	0	20	0	0	0	0
Lane Group Flow (vph)	44	65	0	183	29	13	82	1589	0	66	1930	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	28.7	28.7		28.7	28.7	28.7	106.9	96.1		100.7	93.0	
Effective Green, g (s)	28.7	28.7		28.7	28.7	28.7	106.9	96.1		100.7	93.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19	0.19	0.71	0.64		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	262	607		234	356	302	198	3039		218	3042	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	c0.33		0.02	c0.39	
v/s Ratio Perm	0.03			c0.15			0.26			0.19		
v/c Ratio	0.17	0.11		0.78	0.08	0.04	0.41	0.52		0.30	0.63	
Uniform Delay, d1	50.7	50.1		57.7	49.8	49.5	13.6	14.6		9.8	17.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.36	1.07		1.00	1.00	
Incremental Delay, d2	0.6	0.2		17.8	0.2	0.1	2.6	0.6		1.6	1.0	
Delay (s)	51.3	50.2		75.4	50.0	49.6	34.8	16.1		11.5	18.9	
Level of Service	D	D		E	D	D	C	B		B	B	
Approach Delay (s)		50.5			66.4			17.0			18.6	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay		22.4										
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		73.5%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	507	4466		1017	3303	1437
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)	38	26	54	173	20	132	53	521	295	190	855	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	38	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	778	0	190	855	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	370	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.45	0.37		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	4.8	5.6		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			5.6			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				27.5		
Intersection Capacity Utilization			58.8%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	622	56	258	1041	129	80	54	123	138	74	14
Future Volume (vph)	16	622	56	258	1041	129	80	54	123	138	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		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
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3254		1768	3475		1711	1801	1531	1767	1863	1583
Flt Permitted	0.17	1.00		0.29	1.00		0.71	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	303	3254		532	3475		1272	1801	1531	1053	1863	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)	17	655	59	272	1096	136	84	57	129	145	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	714	0	272	1232	0	84	57	129	145	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	76.2	73.5		94.6	85.9		30.8	18.8	18.8	41.0	23.9	23.9
Effective Green, g (s)	76.2	73.5		94.6	85.9		30.8	18.8	18.8	41.0	23.9	23.9
Actuated g/C Ratio	0.51	0.49		0.63	0.57		0.21	0.13	0.13	0.27	0.16	0.16
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	178	1594		459	1990		296	225	191	369	296	252
v/s Ratio Prot	0.00	0.22		c0.06	c0.35		0.02	0.03	c0.08	c0.04	0.04	0.01
v/s Ratio Perm	0.05			0.31			0.04			0.06		
v/c Ratio	0.10	0.45		0.59	0.62		0.28	0.25	0.68	0.39	0.26	0.06
Uniform Delay, d1	19.4	25.0		14.2	21.2		49.8	59.3	62.7	43.2	55.3	53.5
Progression Factor	0.87	0.75		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		2.1	1.5		0.7	0.8	9.9	0.9	0.7	0.1
Delay (s)	17.0	19.7		16.2	22.7		50.5	60.1	72.6	44.2	56.0	53.6
Level of Service	B	B		B	C		D	E	E	D	E	D
Approach Delay (s)		19.7			21.5			63.1			48.6	
Approach LOS		B			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			27.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			66.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1771	116	48	2557	48
Future Volume (vph)	20	7	13	77	16	50	25	1771	116	48	2557	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6113		1711	4893	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.08	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6113		142	4893	
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)	20	7	13	79	16	51	26	1807	118	49	2609	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	4	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1921	0	49	2657	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.73		0.78	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4433		183	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.31		c0.01	c0.54	
v/s Ratio Perm	0.02			c0.06			0.18			0.20		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.43		0.27	0.74	
Uniform Delay, d1	61.0	60.3		63.7	60.9		11.2	8.3		4.7	11.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.61	0.25	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.0	0.8	
Delay (s)	62.2	60.6		70.9	61.6		13.8	8.6		3.9	3.6	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.6			3.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.0										
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		150.0								18.5		
Intersection Capacity Utilization		79.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Future Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3229		1646	3303	1428	1711	1675		1681	1545	
Flt Permitted	0.16	1.00		0.33	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	282	3229		577	3303	1428	1711	1675		1681	1545	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	748	92	10	1290	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	23	0	5	0	0	0	0
Lane Group Flow (vph)	89	837	0	10	1290	53	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Confl. Bikes (#/hr)												1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.71	0.70	0.70	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	302	2374		431	2296	992	58	56		98	90	
v/s Ratio Prot	c0.02	c0.26		0.00	c0.39		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.21			0.02		0.04						
v/c Ratio	0.29	0.35		0.02	0.56	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	6.7	7.1		6.2	11.4	7.2	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.25	0.33	0.13	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.0	0.9	0.1	2.7	1.4		2.2	4.5	
Delay (s)	7.4	7.5		1.6	4.7	1.0	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.5			4.5			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		8.2			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			23.0				
Intersection Capacity Utilization		59.0%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Background Future AM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		9			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	93	90	96	100	96			99		
cM capacity (veh/h)	360	385	647	339	384	832	1200			1350		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	602	361	1200	1350								
Volume to Capacity	0.08	0.15	0.04	0.01								
Queue Length 95th (ft)	6	13	3	0								
Control Delay (s)	11.5	16.7	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.5	16.7	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	13363	13401	13145	13195	13392	13304
Vehs Exited	12975	13024	12735	12787	12972	12893
Starting Vehs	0	0	0	0	0	0
Ending Vehs	388	377	410	408	420	391
Travel Distance (mi)	8545	8597	8357	8463	8533	8499
Travel Time (hr)	509.3	512.4	496.0	498.6	510.7	505.4
Total Delay (hr)	237.7	238.7	230.6	229.9	239.5	235.3
Total Stops	16536	16534	16285	16034	16578	16400
Fuel Used (gal)	349.3	350.6	339.8	344.0	347.3	346.2

Interval #0 Information Seed

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2640	2649	2645	2617	2680	2646
Vehs Exited	2219	2225	2211	2223	2284	2233
Starting Vehs	0	0	0	0	0	0
Ending Vehs	421	424	434	394	396	402
Travel Distance (mi)	1567	1585	1566	1557	1565	1568
Travel Time (hr)	89.5	90.7	91.6	86.2	89.6	89.5
Total Delay (hr)	40.0	40.6	42.2	36.8	40.2	40.0
Total Stops	2923	2907	2991	2694	2959	2896
Fuel Used (gal)	62.5	62.5	62.6	60.9	62.1	62.1

Interval #1 Information 1

Start Time 7:00
End Time 7:15
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2649	2680	2600	2637	2641	2640
Vehs Exited	2637	2653	2661	2661	2658	2655
Starting Vehs	421	424	434	394	396	402
Ending Vehs	433	451	373	370	379	392
Travel Distance (mi)	1719	1739	1673	1711	1709	1710
Travel Time (hr)	103.9	102.4	97.0	100.5	100.5	100.9
Total Delay (hr)	49.2	47.2	43.9	46.2	46.1	46.5
Total Stops	3340	3240	3169	3238	3201	3237
Fuel Used (gal)	70.9	70.5	67.7	69.6	69.5	69.6

Interval #2 Information 2

Start Time 7:15
End Time 7:30
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2732	2664	2560	2700	2628	2649
Vehs Exited	2711	2675	2500	2597	2573	2611
Starting Vehs	433	451	373	370	379	392
Ending Vehs	454	440	433	473	434	441
Travel Distance (mi)	1781	1729	1645	1714	1703	1714
Travel Time (hr)	108.3	102.4	96.5	103.2	102.2	102.5
Total Delay (hr)	51.9	47.3	44.1	48.9	48.0	48.0
Total Stops	3545	3295	3119	3299	3332	3317
Fuel Used (gal)	73.6	70.7	65.9	70.3	68.7	69.8

Interval #3 Information 3

Start Time 7:30
End Time 7:45
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2688	2784	2625	2598	2732	2685
Vehs Exited	2733	2796	2656	2681	2719	2715
Starting Vehs	454	440	433	473	434	441
Ending Vehs	409	428	402	390	447	408
Travel Distance (mi)	1770	1811	1710	1728	1771	1758
Travel Time (hr)	105.4	111.0	102.6	104.4	107.2	106.1
Total Delay (hr)	48.9	53.2	48.3	49.2	51.0	50.1
Total Stops	3354	3598	3344	3378	3505	3431
Fuel Used (gal)	72.6	74.7	70.1	71.4	72.9	72.3

Interval #4 Information 4

Start Time 7:45
End Time 8:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2654	2624	2715	2643	2711	2664
Vehs Exited	2675	2675	2707	2625	2738	2680
Starting Vehs	409	428	402	390	447	408
Ending Vehs	388	377	410	408	420	391
Travel Distance (mi)	1709	1733	1762	1753	1784	1748
Travel Time (hr)	102.1	105.9	108.3	104.3	111.3	106.4
Total Delay (hr)	47.8	50.4	52.1	48.7	54.3	50.7
Total Stops	3374	3494	3662	3425	3581	3504
Fuel Used (gal)	69.8	72.2	73.5	71.8	74.1	72.3

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	L	TR	L	T	T	T	R	L	T
Maximum Queue (ft)	105	70	227	233	199	182	377	384	383	151	170	290
Average Queue (ft)	37	25	158	169	64	43	170	164	163	60	71	133
95th Queue (ft)	82	63	241	255	168	118	291	287	280	119	138	235
Link Distance (ft)	71		206	206			420	420	420	420		517
Upstream Blk Time (%)	5	1	5	8	0		0		0			
Queuing Penalty (veh)	0	0	12	20	0		0		0			
Storage Bay Dist (ft)		90			100	160					160	
Storage Blk Time (%)	5	1		37	0		18				1	5
Queuing Penalty (veh)	1	0		28	0		6				4	7

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	302	303
Average Queue (ft)	157	164
95th Queue (ft)	259	271
Link Distance (ft)	517	517
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	B25	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	T	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	126	82	8	53	144	127	68	60	63	72	102	122
Average Queue (ft)	41	45	0	11	66	13	6	7	19	9	25	34
95th Queue (ft)	101	83	5	36	125	60	35	34	51	40	76	92
Link Distance (ft)	84		213	48		517	517	517		180	180	180
Upstream Blk Time (%)	4	1		2								0
Queuing Penalty (veh)	0	0		0								0
Storage Bay Dist (ft)		150			125				110			
Storage Blk Time (%)	4	1			2	0				0		
Queuing Penalty (veh)	2	0			10	0				0		

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	NB	NB	NB	SB	SB
Directions Served	R	T	T	TR	T	T
Maximum Queue (ft)	49	11	18	28	49	53
Average Queue (ft)	13	0	1	1	0	0
95th Queue (ft)	37	7	11	17	0	0
Link Distance (ft)	73	180	180	180	261	261
Upstream Blk Time (%)						0
Queuing Penalty (veh)						0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	L	T	T
Maximum Queue (ft)	323	376	246	324	180	154	141	176	213	250	276	304
Average Queue (ft)	127	186	114	148	116	62	46	45	62	143	121	128
95th Queue (ft)	260	323	204	280	207	131	113	122	144	238	209	223
Link Distance (ft)	1311	1311	563	563			261	261	261		1192	1192
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)					65	130				350		
Storage Blk Time (%)				15	24	3	1		0			
Queuing Penalty (veh)				27	38	14	1		0			

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	479
Average Queue (ft)	128
95th Queue (ft)	290
Link Distance (ft)	1192
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	131	245	299	310	380	574	504	200	200	111	125	115
Average Queue (ft)	11	102	143	196	285	201	191	96	99	16	53	48
95th Queue (ft)	55	202	256	351	411	465	358	174	175	60	103	97
Link Distance (ft)		563	563			1295	1295	199	199		541	
Upstream Blk Time (%)								1	1			
Queuing Penalty (veh)								2	1			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)		7		1	20	0				0	6	
Queuing Penalty (veh)		3		2	43	2				0	7	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	LT	TR	LT	TR
Maximum Queue (ft)	22	35	30	26	169
Average Queue (ft)	4	2	1	1	16
95th Queue (ft)	18	17	9	14	83
Link Distance (ft)	45	130	130	199	199
Upstream Blk Time (%)					0
Queuing Penalty (veh)					1
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Chapman Ave & Rollins Ave

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	LT	T
Maximum Queue (ft)	67	48	38	106	162
Average Queue (ft)	20	22	2	18	61
95th Queue (ft)	48	44	18	65	163
Link Distance (ft)	60	60	128	130	130
Upstream Blk Time (%)	1	0		0	3
Queuing Penalty (veh)	0	0		0	11
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Chapman Ave & Pike Center South

Movement	EB	NB	SB	SB	SB
Directions Served	LR	LT	T	T	TR
Maximum Queue (ft)	30	96	135	71	146
Average Queue (ft)	2	19	33	9	112
95th Queue (ft)	15	64	98	39	183
Link Distance (ft)	35	53	128	128	128
Upstream Blk Time (%)	0	1	1		11
Queuing Penalty (veh)	0	3	1		23
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	L	TR	L	T	R
Maximum Queue (ft)	135	129	28	104	31	96	67	67	74
Average Queue (ft)	55	40	4	39	2	23	52	36	52
95th Queue (ft)	109	92	19	82	13	62	83	72	71
Link Distance (ft)	218	218		823		137	53	53	53
Upstream Blk Time (%)						0	16	8	24
Queuing Penalty (veh)						0	33	16	48
Storage Bay Dist (ft)			270		40				
Storage Blk Time (%)					0	4			
Queuing Penalty (veh)					0	0			

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	58	46	121	128	52
Average Queue (ft)	7	2	15	23	17
95th Queue (ft)	33	19	67	85	43
Link Distance (ft)		206	218	218	316
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	0	0			
Queuing Penalty (veh)	1	0			

Intersection: 11: East Jefferson Street & Rollins Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	56	129	338	190	180	116	138	52
Average Queue (ft)	15	48	170	45	66	40	55	12
95th Queue (ft)	44	91	306	124	131	87	108	38
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	98	105	108	342	107	151	194	308	336	356	225	475
Average Queue (ft)	36	41	38	167	25	56	70	181	219	246	56	361
95th Queue (ft)	75	85	81	299	82	111	165	293	342	372	177	523
Link Distance (ft)		834	834	502	502			1192	1192	1192		455
Upstream Blk Time (%)				1								3
Queuing Penalty (veh)				0								0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)							1	18			0	26
Queuing Penalty (veh)							4	14			1	17

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	448	335
Average Queue (ft)	279	158
95th Queue (ft)	432	288
Link Distance (ft)	455	455
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	100	129	153	161	214	80	144	381	228	165	237	383
Average Queue (ft)	36	48	67	82	94	22	38	66	87	10	75	178
95th Queue (ft)	77	98	127	140	167	53	104	241	172	67	152	315
Link Distance (ft)	449	449		896	896		1295	1295			414	414
Upstream Blk Time (%)								0			0	0
Queuing Penalty (veh)								0			0	0
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			0	1			0					
Queuing Penalty (veh)			0	0			0					

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	330	93
Average Queue (ft)	124	14
95th Queue (ft)	259	54
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	4	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	76	284	266	160	441	446	112	130	216	203	162	56
Average Queue (ft)	11	144	135	125	239	232	41	39	109	94	58	15
95th Queue (ft)	50	243	231	198	416	400	93	90	179	172	124	44
Link Distance (ft)		605	605		1105	1105		561	561		1627	1627
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	8		8	17			0		1	0	
Queuing Penalty (veh)	0	1		40	43			0		1	0	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	B31	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	T	L	T	T	T	TR	L	T
Maximum Queue (ft)	68	50	171	122	4	56	303	280	248	166	106	234
Average Queue (ft)	15	9	65	41	0	15	147	126	106	61	28	98
95th Queue (ft)	46	31	132	88	3	41	244	227	202	136	74	195
Link Distance (ft)	151	151	139	139	149		1550	1550	1550	1550		420
Upstream Blk Time (%)			1	0								
Queuing Penalty (veh)			0	0								
Storage Bay Dist (ft)						580					160	
Storage Blk Time (%)												1
Queuing Penalty (veh)												1

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	254	292
Average Queue (ft)	113	125
95th Queue (ft)	212	232
Link Distance (ft)	420	420
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	87	197	159	62	304	320	177	50	60	68	106
Average Queue (ft)	33	56	45	5	44	49	10	11	12	18	38
95th Queue (ft)	67	136	114	30	166	185	78	37	42	49	82
Link Distance (ft)		533	533		605	605			382	233	233
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	330			165			200	200			
Storage Blk Time (%)					1	1					
Queuing Penalty (veh)					0	1					

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	66	57	54	32
Average Queue (ft)	23	27	11	2
95th Queue (ft)	50	50	39	13
Link Distance (ft)	419	343	541	424
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 493

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖↗	↖		↖	↖↗↘	↗	↖	↖↗↘	
Traffic Volume (vph)	17	31	36	329	21	175	57	2470	391	206	1715	18
Future Volume (vph)	17	31	36	329	21	175	57	2470	391	206	1715	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		0.98	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1682	1478	3204	1431		1711	4916	1531	1770	5071	
Flt Permitted		0.27	1.00	0.95	1.00		0.95	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		466	1478	3204	1431		1711	4916	1531	118	5071	
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)	18	32	37	339	22	180	59	2546	403	212	1768	19
RTOR Reduction (vph)	0	0	35	0	149	0	0	0	111	0	0	0
Lane Group Flow (vph)	0	50	2	339	53	0	59	2546	292	212	1787	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Confl. Bikes (#/hr)			1			1			1			
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	25.7	25.7		9.3	71.7	71.7	81.0	81.0	
Effective Green, g (s)		10.0	10.0	25.7	25.7		9.3	71.7	71.7	81.0	81.0	
Actuated g/C Ratio		0.07	0.07	0.17	0.17		0.06	0.48	0.48	0.54	0.54	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		31	98	548	245		106	2349	731	263	2738	
v/s Ratio Prot			0.00	c0.11	0.04		0.03	c0.52	0.19	c0.10	0.35	
v/s Ratio Perm		c0.11								0.34		
v/c Ratio		1.61	0.03	0.62	0.22		0.56	1.08	0.40	0.81	0.65	
Uniform Delay, d1		70.0	65.4	57.6	53.5		68.3	39.1	25.3	59.8	24.5	
Progression Factor		1.00	1.00	1.00	1.00		1.47	0.58	0.54	0.75	0.49	
Incremental Delay, d2		385.2	0.1	3.6	1.2		4.0	43.2	1.0	13.6	1.0	
Delay (s)		455.2	65.5	61.2	54.7		104.7	66.0	14.6	58.6	12.9	
Level of Service		F	E	E	D		F	E	B	E	B	
Approach Delay (s)		289.5			58.8			59.8			17.7	
Approach LOS		F			E			E			B	
Intersection Summary												
HCM 2000 Control Delay			48.4			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			90.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	8	133	18	9	38	197	2323	23	26	1766	13
Future Volume (vph)	127	8	133	18	9	38	197	2323	23	26	1766	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1654	1478		1893		1711	4905		1652	4738	
Flt Permitted		0.70	1.00		0.88		0.07	1.00		0.04	1.00	
Satd. Flow (perm)		1214	1478		1689		134	4905		74	4738	
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)	132	8	139	19	9	40	205	2420	24	27	1840	14
RTOR Reduction (vph)	0	0	118	0	34	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	140	21	0	34	0	205	2443	0	27	1854	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		22.4	22.4		22.4		115.6	106.7		98.8	94.9	
Effective Green, g (s)		22.4	22.4		22.4		115.6	106.7		98.8	94.9	
Actuated g/C Ratio		0.15	0.15		0.15		0.77	0.71		0.66	0.63	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		181	220		252		268	3489		89	2997	
v/s Ratio Prot			0.01				c0.08	0.50		0.01	0.39	
v/s Ratio Perm		c0.12			0.02		c0.51			0.19		
v/c Ratio		0.77	0.09		0.13		0.76	0.70		0.30	0.62	
Uniform Delay, d1		61.4	55.0		55.4		32.7	12.5		11.8	16.6	
Progression Factor		1.00	1.00		1.00		2.28	0.17		2.02	0.14	
Incremental Delay, d2		18.4	0.2		0.2		1.2	0.1		1.6	0.8	
Delay (s)		79.7	55.2		55.6		75.7	2.2		25.5	3.1	
Level of Service		E	E		E		E	A		C	A	
Approach Delay (s)		67.5			55.6			7.9			3.4	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			79.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Background Future PM

01/21/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	58	2444	44	0	1793	
Future Volume (Veh/h)	0	58	2444	44	0	1793	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	0	66	2777	50	0	2038	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.84	0.71			0.71		
vC, conflicting volume	3481	951			2827		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1244	0			2141		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	91			100		
cM capacity (veh/h)	139	769			177		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	1111	1111	605	679	679	679
Volume Left	0	0	0	0	0	0	0
Volume Right	66	0	0	50	0	0	0
cSH	769	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.65	0.65	0.36	0.40	0.40	0.40
Queue Length 95th (ft)	7	0	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.1	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			58.5%		ICU Level of Service		B
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↑↱	
Traffic Volume (vph)	0	426	57	0	314	171	140	2106	121	204	1736	57
Future Volume (vph)	0	426	57	0	314	171	140	2106	121	204	1736	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		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	
Frt		0.98			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3231			3539	1583	1652	4746	1794	1711	4882	
Flt Permitted		1.00			1.00	1.00	0.08	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		3231			3539	1583	131	4746	1794	84	4882	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	317	173	141	2127	122	206	1754	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	39	0	2	0
Lane Group Flow (vph)	0	488	0	0	317	173	141	2127	83	206	1810	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.7			29.7	29.7	97.1	82.3	82.3	103.5	85.5	
Effective Green, g (s)		29.7			29.7	29.7	97.1	82.3	82.3	103.5	85.5	
Actuated g/C Ratio		0.20			0.20	0.20	0.65	0.55	0.55	0.69	0.57	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		639			700	313	234	2603	984	253	2782	
v/s Ratio Prot		c0.15			0.09	0.11	0.06	0.45	0.05	c0.10	0.37	
v/s Ratio Perm							0.33			c0.46		
v/c Ratio		0.76			0.45	0.55	0.60	0.82	0.08	0.81	0.65	
Uniform Delay, d1		56.8			53.0	54.2	21.5	27.7	16.0	47.3	22.0	
Progression Factor		1.00			0.56	0.56	1.53	0.46	0.41	0.69	1.74	
Incremental Delay, d2		5.7			0.6	2.3	4.0	2.4	0.1	13.7	0.8	
Delay (s)		62.6			30.1	32.8	37.0	15.1	6.6	46.3	39.1	
Level of Service		E			C	C	D	B	A	D	D	
Approach Delay (s)		62.6			31.1			16.0			39.9	
Approach LOS		E			C			B			D	
Intersection Summary												
HCM 2000 Control Delay			30.5		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				20.0			
Intersection Capacity Utilization			89.8%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	134	469	586	141	81	109	592	215	119	37
Future Volume (vph)	68	739	134	469	586	141	81	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3213		3319	3305			1702	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	629	3213		3319	3305			1702	1478	3204	1739	1421
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)	70	762	138	484	604	145	84	112	610	222	123	38
RTOR Reduction (vph)	0	10	0	0	12	0	0	0	55	0	0	34
Lane Group Flow (vph)	70	890	0	484	737	0	0	196	555	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Effective Green, g (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	269	955		562	1377			442	698	352	191	156
v/s Ratio Prot	0.01	c0.28		c0.15	0.22			0.12	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	0.93		0.86	0.54			0.44	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.4	51.2		60.6	32.8			46.4	33.4	63.8	63.9	59.6
Progression Factor	1.76	1.46		1.00	1.08			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	15.7		11.9	1.4			0.7	6.3	3.7	7.2	0.1
Delay (s)	59.1	90.3		72.7	37.0			47.1	39.7	67.5	71.2	59.7
Level of Service	E	F		E	D			D	D	E	E	E
Approach Delay (s)		88.0			51.0			41.5			67.9	
Approach LOS		F			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			61.2			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1	4	4	1	7	3	751	8	5	634	4
Future Volume (Veh/h)	6	1	4	4	1	7	3	751	8	5	634	4
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	1	4	4	1	8	3	834	9	6	704	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							471			256		
pX, platoon unblocked												
vC, conflicting volume	1150	1567	354	1213	1564	422	708				843	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1150	1567	354	1213	1564	422	708				843	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	95	99	99	97	99	99	100				99	
cM capacity (veh/h)	149	109	642	135	109	581	887				789	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	13	420	426	358	356						
Volume Left	7	4	3	0	6	0						
Volume Right	4	8	0	9	0	4						
cSH	192	247	887	1700	789	1700						
Volume to Capacity	0.06	0.05	0.00	0.25	0.01	0.21						
Queue Length 95th (ft)	5	4	0	0	1	0						
Control Delay (s)	25.0	20.4	0.1	0.0	0.3	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	25.0	20.4	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			33.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Background Future PM

01/21/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	71	97	665	68	45	597
Future Volume (Veh/h)	71	97	665	68	45	597
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	73	100	686	70	46	615
Pedestrians	18					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			287			440
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1138	739			774	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099	657			695	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	58	72			94	
cM capacity (veh/h)	173	362			795	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	73	100	756	251	410	
Volume Left	73	0	0	46	0	
Volume Right	0	100	70	0	0	
cSH	173	362	1700	795	1700	
Volume to Capacity	0.42	0.28	0.44	0.06	0.24	
Queue Length 95th (ft)	48	28	0	5	0	
Control Delay (s)	40.3	18.7	0.0	2.3	0.0	
Lane LOS	E	C		A		
Approach Delay (s)	27.8		0.0	0.9		
Approach LOS	D					
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			61.3%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Background Future PM

01/21/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	0	728	704	8
Future Volume (Veh/h)	1	3	0	728	704	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	1	4	0	971	939	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.80					
vC, conflicting volume	1916	318	950			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2016	318	950			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	41	677	719			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	5	971	376	376	199	
Volume Left	1	0	0	0	0	
Volume Right	4	0	0	0	11	
cSH	165	719	1700	1700	1700	
Volume to Capacity	0.03	0.00	0.22	0.22	0.12	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	27.5	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	27.5	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			48.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Background Future PM

01/21/2025

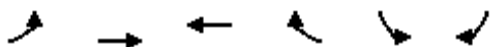
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	239	56	15	167	258	17	127	42	246	127	334
Future Volume (vph)	343	239	56	15	167	258	17	127	42	246	127	334
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1679		1641	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.51	1.00		0.57	1.00	1.00	0.67	1.00		0.63	1.00	1.00
Satd. Flow (perm)	880	1679		977	1739	1422	1152	1660		1081	1739	1478
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)	373	260	61	16	182	280	18	138	46	267	138	363
RTOR Reduction (vph)	0	11	0	0	0	194	0	15	0	0	0	161
Lane Group Flow (vph)	373	310	0	16	182	86	18	169	0	267	138	202
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Effective Green, g (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Actuated g/C Ratio	0.56	0.56		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.56
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	627	933		299	532	435	345	498		324	521	822
v/s Ratio Prot	c0.11	0.18			0.10			0.10			0.08	0.14
v/s Ratio Perm	c0.22			0.02		0.06	0.02			c0.25		
v/c Ratio	0.59	0.33		0.05	0.34	0.20	0.05	0.34		0.82	0.26	0.25
Uniform Delay, d1	10.6	9.7		19.6	21.5	20.5	19.9	21.8		26.0	21.3	9.1
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	2.8	0.1		0.3	1.7	1.0	0.1	0.4		20.6	1.2	0.4
Delay (s)	13.4	9.7		19.9	23.3	21.5	20.0	22.2		46.7	22.5	9.6
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		11.7			22.1			22.0			24.8	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.7									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			80.0							17.0		
Intersection Capacity Utilization			80.7%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Background Future PM

01/21/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔↔	
Traffic Volume (veh/h)	20	542	480	31	46	28
Future Volume (Veh/h)	20	542	480	31	46	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	559	495	32	47	29
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	534				840	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	534				840	272
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				84	96
cM capacity (veh/h)	1023				296	721
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	207	373	330	197	76	
Volume Left	21	0	0	0	47	
Volume Right	0	0	0	32	29	
cSH	1023	1700	1700	1700	382	
Volume to Capacity	0.02	0.22	0.19	0.12	0.20	
Queue Length 95th (ft)	2	0	0	0	18	
Control Delay (s)	1.0	0.0	0.0	0.0	16.8	
Lane LOS	A				C	
Approach Delay (s)	0.4		0.0		16.8	
Approach LOS					C	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			40.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	412	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	98	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	315	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.0		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			71.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2117	105	99	1753	30
Future Volume (vph)	98	66	87	210	70	127	197	2117	105	99	1753	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4871		1711	4899	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	96	4871		90	4899	
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)	103	69	92	221	74	134	207	2228	111	104	1845	32
RTOR Reduction (vph)	0	72	0	0	0	105	0	3	0	0	1	0
Lane Group Flow (vph)	103	89	0	221	74	29	207	2336	0	104	1876	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Effective Green, g (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.70	0.58		0.61	0.53	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	275	684		255	404	344	282	2844		188	2609	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.48		0.05	0.38	
v/s Ratio Perm	0.08			c0.19			0.42			0.29		
v/c Ratio	0.37	0.13		0.87	0.18	0.08	0.73	0.82		0.55	0.72	
Uniform Delay, d1	50.0	47.3		56.6	47.8	46.8	42.7	24.9		29.1	26.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.48	0.44		1.00	1.00	
Incremental Delay, d2	1.8	0.2		27.0	0.5	0.2	8.0	1.9		5.9	1.7	
Delay (s)	51.8	47.5		83.6	48.3	47.0	71.5	13.0		35.0	28.3	
Level of Service	D	D		F	D	D	E	B		C	C	
Approach Delay (s)		49.2			66.1			17.8			28.6	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			27.5									C
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0							17.5		
Intersection Capacity Utilization			96.9%								F	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		326	3303	1428
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)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	139	0	19	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	150	33	1545	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4	1	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Effective Green, g (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	127	119		253	256	396	338	2419		357	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.10	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.72	0.71	0.38	0.10	0.64		0.39	0.44	0.02
Uniform Delay, d1	65.7	66.8		60.1	60.1	45.7	14.9	25.2		16.4	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.88	0.88		1.00	1.00	1.00
Incremental Delay, d2	1.5	4.6		9.2	9.1	0.6	0.1	0.7		0.7	0.8	0.1
Delay (s)	67.2	71.4		69.4	69.2	46.3	13.1	22.8		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.2			59.1			22.6			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.2									C
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0							27.5		
Intersection Capacity Utilization			70.6%									C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1056	74	202	808	177	125	145	311	282	171	24
Future Volume (vph)	21	1056	74	202	808	177	125	145	311	282	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3254		1770	3422		1684	1801	1531	1763	1863	1583
Flt Permitted	0.19	1.00		0.06	1.00		0.64	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	336	3254		116	3422		1141	1801	1531	822	1863	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)	22	1112	78	213	851	186	132	153	327	297	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1190	0	213	1037	0	132	153	327	297	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	62.3	58.1		79.5	69.3		42.3	28.0	28.0	57.5	36.7	36.7
Effective Green, g (s)	62.3	58.1		79.5	69.3		42.3	28.0	28.0	57.5	36.7	36.7
Actuated g/C Ratio	0.42	0.39		0.53	0.46		0.28	0.19	0.19	0.38	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	176	1260		231	1580		373	336	285	459	455	387
v/s Ratio Prot	0.00	0.37		c0.09	0.30		0.03	0.08	c0.21	c0.10	0.10	0.02
v/s Ratio Perm	0.05			c0.39			0.07			0.15		
v/c Ratio	0.12	0.94		0.92	0.66		0.35	0.46	1.15	0.65	0.40	0.06
Uniform Delay, d1	27.0	44.4		46.7	31.2		42.0	54.2	61.0	34.9	47.4	43.5
Progression Factor	0.84	0.78		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	13.8		38.4	2.1		0.8	1.3	99.2	3.5	0.8	0.1
Delay (s)	23.0	48.5		85.0	33.3		42.7	55.6	160.2	38.4	48.1	43.6
Level of Service	C	D		F	C		D	E	F	D	D	D
Approach Delay (s)		48.0			42.1			108.7			42.1	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			55.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			90.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2590	250	161	2008	26
Future Volume (vph)	40	12	32	186	13	138	18	2590	250	161	2008	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6071		1711	4901	
Flt Permitted	0.54	1.00		0.73	1.00		0.06	1.00		0.04	1.00	
Satd. Flow (perm)	927	1589		1354	1496		112	6071		76	4901	
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)	42	12	33	194	14	144	19	2698	260	168	2092	27
RTOR Reduction (vph)	0	27	0	0	118	0	0	9	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	40	0	19	2949	0	168	2118	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Effective Green, g (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.62	0.59		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	168	289		246	272		123	3589		224	3241	
v/s Ratio Prot		0.01			0.03		0.01	c0.49		c0.08	0.43	
v/s Ratio Perm	0.05			c0.14			0.09			0.47		
v/c Ratio	0.25	0.07		0.79	0.15		0.15	0.82		0.75	0.65	
Uniform Delay, d1	52.6	50.8		58.6	51.6		12.6	24.4		46.5	15.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.33	0.41	
Incremental Delay, d2	1.6	0.2		17.5	0.5		1.2	2.2		12.9	0.9	
Delay (s)	54.2	51.0		76.1	52.1		13.8	26.6		74.9	7.0	
Level of Service	D	D		E	D		B	C		E	A	
Approach Delay (s)		52.5			65.3			26.5			12.0	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		23.5					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		150.0					Sum of lost time (s)		18.5			
Intersection Capacity Utilization		98.3%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Future Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3257		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.27	1.00		0.22	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	470	3257		386	3303	1432	1711	1665		1681	1573	
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)	150	1015	75	15	804	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	48	0	20	0	0	0	0
Lane Group Flow (vph)	150	1088	0	15	804	84	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Effective Green, g (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Actuated g/C Ratio	0.67	0.61		0.57	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	405	1993		247	1829	793	108	105		253	236	
v/s Ratio Prot	c0.03	c0.33		0.00	0.24		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.03		0.06						
v/c Ratio	0.37	0.55		0.06	0.44	0.11	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.9	17.0		14.2	19.7	15.8	67.9	66.9		59.1	60.6	
Progression Factor	1.00	1.00		0.55	0.44	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.1		0.1	0.6	0.2	4.6	1.7		3.4	10.6	
Delay (s)	11.7	18.0		7.9	9.4	1.9	72.4	68.6		62.5	71.2	
Level of Service	B	B		A	A	A	E	E		E	E	
Approach Delay (s)		17.3			8.3			70.6			67.2	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.0				HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		150.0				Sum of lost time (s)		23.0				
Intersection Capacity Utilization		68.5%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Background Future PM

01/21/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			6	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		8			7			5			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	830	366	394			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	93	76	93	95	99	97			99		
cM capacity (veh/h)	235	251	545	133	250	624	1067			1097		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	409	207	1067	1097								
Volume to Capacity	0.43	0.13	0.03	0.01								
Queue Length 95th (ft)	53	11	2	0								
Control Delay (s)	20.3	25.0	1.0	0.2								
Lane LOS	C	D	A	A								
Approach Delay (s)	20.3	25.0	1.0	0.2								
Approach LOS	C	D										
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			51.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	17460	17474	17629	17499	17354	17478
Vehs Exited	16594	16593	16799	16703	16655	16670
Starting Vehs	0	0	0	0	0	0
Ending Vehs	866	881	830	796	699	801
Travel Distance (mi)	10521	10418	10656	10551	10531	10536
Travel Time (hr)	1046.2	959.7	919.9	933.1	912.3	954.3
Total Delay (hr)	707.2	623.4	576.8	592.8	572.7	614.6
Total Stops	30369	29495	28656	29784	28748	29403
Fuel Used (gal)	533.9	511.8	506.4	506.7	502.6	512.3

Interval #0 Information Seed

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3559	3510	3511	3504	3494	3515
Vehs Exited	2831	2856	2855	2847	2798	2838
Starting Vehs	0	0	0	0	0	0
Ending Vehs	728	654	656	657	696	677
Travel Distance (mi)	1900	1871	1902	1885	1889	1890
Travel Time (hr)	139.3	128.4	137.2	132.6	139.8	135.5
Total Delay (hr)	78.1	68.1	76.2	72.2	79.2	74.7
Total Stops	4983	4549	4842	4794	4966	4834
Fuel Used (gal)	83.9	80.5	83.8	82.1	84.2	82.9

Interval #1 Information 1

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3481	3516	3433	3507	3456	3480
Vehs Exited	3417	3492	3463	3414	3439	3448
Starting Vehs	728	654	656	657	696	677
Ending Vehs	792	678	626	750	713	698
Travel Distance (mi)	2140	2167	2172	2145	2154	2155
Travel Time (hr)	187.8	175.6	174.4	180.1	187.0	181.0
Total Delay (hr)	118.6	105.7	104.7	110.5	117.4	111.4
Total Stops	6095	5935	5481	6006	5920	5880
Fuel Used (gal)	102.6	100.9	100.5	100.7	103.1	101.5

Interval #2 Information 2

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3439	3515	3527	3470	3490	3487
Vehs Exited	3475	3443	3498	3478	3485	3477
Starting Vehs	792	678	626	750	713	698
Ending Vehs	756	750	655	742	718	722
Travel Distance (mi)	2194	2146	2153	2135	2164	2159
Travel Time (hr)	222.2	183.8	180.0	194.0	184.9	193.0
Total Delay (hr)	151.4	114.7	110.4	125.0	114.9	123.3
Total Stops	6624	6096	5659	6272	5857	6107
Fuel Used (gal)	112.3	102.4	100.8	103.7	102.8	104.4

Interval #3 Information 3

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3541	3545	3571	3514	3509	3537
Vehs Exited	3466	3416	3517	3451	3523	3474
Starting Vehs	756	750	655	742	718	722
Ending Vehs	831	879	709	805	704	777
Travel Distance (mi)	2175	2119	2213	2182	2191	2176
Travel Time (hr)	231.7	215.7	198.4	209.7	195.6	210.2
Total Delay (hr)	161.8	147.2	127.1	139.4	125.1	140.1
Total Stops	6427	6504	6054	6222	6011	6237
Fuel Used (gal)	114.3	108.9	106.9	108.7	106.5	109.1

Interval #4 Information 4

Start Time 5:45
End Time 6:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3440	3388	3587	3504	3405	3461
Vehs Exited	3405	3386	3466	3513	3410	3433
Starting Vehs	831	879	709	805	704	777
Ending Vehs	866	881	830	796	699	801
Travel Distance (mi)	2111	2115	2216	2204	2134	2156
Travel Time (hr)	265.2	256.1	230.0	216.8	205.1	234.7
Total Delay (hr)	197.4	187.7	158.4	145.7	136.2	165.1
Total Stops	6240	6411	6620	6490	5994	6351
Fuel Used (gal)	120.7	119.2	114.4	111.5	106.0	114.4

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	B28	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	LT	R	T	L	L	TR	L	T	T	T	R	L
Maximum Queue (ft)	143	71	122	206	231	200	200	454	465	456	451	330
Average Queue (ft)	66	38	14	109	133	104	78	368	368	379	227	186
95th Queue (ft)	137	82	89	181	220	194	182	528	540	553	456	310
Link Distance (ft)	71		241	206	206			420	420	420	420	
Upstream Blk Time (%)	25	4	1	1	2	0		10	8	23	5	
Queuing Penalty (veh)	0	0	0	1	6	0		71	56	158	34	
Storage Bay Dist (ft)		90				100	160					160
Storage Blk Time (%)	25	4			20	16		48				20
Queuing Penalty (veh)	9	2			39	25		27				117

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	353	251	258
Average Queue (ft)	143	131	139
95th Queue (ft)	276	210	220
Link Distance (ft)	517	517	517
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)	2		
Queuing Penalty (veh)	4		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	B25	WB	B24	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	LTR	T	L	T	T	TR	L	T	T
Maximum Queue (ft)	173	84	217	110	40	244	307	358	96	76	108	116
Average Queue (ft)	140	70	58	44	2	121	41	38	36	24	23	27
95th Queue (ft)	192	104	159	91	18	216	164	161	83	62	73	73
Link Distance (ft)	84		213	48	171		517	517	517		180	180
Upstream Blk Time (%)	37	8	0	19								
Queuing Penalty (veh)	0	0	0	0								
Storage Bay Dist (ft)		150				125				110		
Storage Blk Time (%)	37	8				13	0			0	0	
Queuing Penalty (veh)	49	10				99	0			1	0	

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	SB
Directions Served	TR
Maximum Queue (ft)	112
Average Queue (ft)	40
95th Queue (ft)	88
Link Distance (ft)	180
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	NB	NB	NB	SB	SB
Directions Served	R	T	T	TR	T	T
Maximum Queue (ft)	88	85	140	133	5	16
Average Queue (ft)	38	5	11	16	0	0
95th Queue (ft)	78	39	59	69	3	10
Link Distance (ft)	73	180	180	180	261	261
Upstream Blk Time (%)	6		0	0		
Queuing Penalty (veh)	0		0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	291	331	259	344	180	237	285	288	284	260	464	580
Average Queue (ft)	160	188	112	122	106	58	182	202	216	21	143	365
95th Queue (ft)	262	291	208	260	200	146	272	286	300	136	331	527
Link Distance (ft)	1311	1311	563	563			261	261	261			1192
Upstream Blk Time (%)						0	2	3	6	0		
Queuing Penalty (veh)						0	14	23	47	0		
Storage Bay Dist (ft)					65	130				280	350	
Storage Blk Time (%)				10	20	1	25		6	0		11
Queuing Penalty (veh)				17	32	10	34		7	1		23

Intersection: 4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	543	533
Average Queue (ft)	349	328
95th Queue (ft)	498	485
Link Distance (ft)	1192	1192
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	200	493	582	310	380	613	546	213	223	180	220	225
Average Queue (ft)	87	344	377	214	266	242	240	135	199	76	107	97
95th Queue (ft)	224	506	565	341	397	561	475	223	248	155	180	176
Link Distance (ft)		563	563			1295	1295	199	199		541	
Upstream Blk Time (%)		0	1					6	34			
Queuing Penalty (veh)		0	5					21	130			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)	0	61		5	24	3				6	29	
Queuing Penalty (veh)	2	42		15	72	14				17	76	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	EB	B39	WB	B40	NB	NB	SB	SB
Directions Served	LTR	T	LTR	T	LT	TR	LT	TR
Maximum Queue (ft)	65	21	46	23	106	144	203	149
Average Queue (ft)	20	3	12	1	8	116	47	17
95th Queue (ft)	60	31	43	19	46	183	160	110
Link Distance (ft)	39	120	45	126	130	130	199	199
Upstream Blk Time (%)	15	0	7	0	0	19	1	0
Queuing Penalty (veh)	0	0	0	0	1	71	5	1
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 7: Chapman Ave & Rollins Ave

Movement	WB	WB	B50	B50	B51	B51	NB	SB	SB
Directions Served	L	R	T	T	T	T	TR	LT	T
Maximum Queue (ft)	131	131	160	42	135	66	147	158	116
Average Queue (ft)	76	50	59	4	40	21	82	91	12
95th Queue (ft)	150	112	205	26	194	147	184	182	60
Link Distance (ft)	60	60	146	146	315	315	128	130	130
Upstream Blk Time (%)	48	13	23		6	4	11	18	0
Queuing Penalty (veh)	0	0	0		0	0	81	59	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 8: Chapman Ave & Pike Center South

Movement	EB	NB	SB	SB	SB
Directions Served	LR	LT	T	T	TR
Maximum Queue (ft)	37	198	152	116	141
Average Queue (ft)	5	90	115	18	60
95th Queue (ft)	21	181	189	67	143
Link Distance (ft)	35	53	128	128	128
Upstream Blk Time (%)	15	23	38	0	2
Queuing Penalty (veh)	0	167	84	0	4
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	B35	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	T	L	T	R
Maximum Queue (ft)	228	195	45	189	305	89	208	80	70	72	66
Average Queue (ft)	115	75	8	71	33	14	93	6	63	44	48
95th Queue (ft)	205	153	30	142	192	54	188	44	80	77	71
Link Distance (ft)	218	218		823	823		137	285	53	53	53
Upstream Blk Time (%)	1	0					5		61	13	17
Queuing Penalty (veh)	2	0					14		143	30	41
Storage Bay Dist (ft)			270			40					
Storage Blk Time (%)						1	27				
Queuing Penalty (veh)						2	5				

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	86	80	23	73	93
Average Queue (ft)	16	3	1	6	35
95th Queue (ft)	56	40	10	37	71
Link Distance (ft)		206	218	218	316
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		0			
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	1	0			
Queuing Penalty (veh)	4	0			

Intersection: 11: East Jefferson Street & Rollins Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	39	105	436	320	314	257	216	174
Average Queue (ft)	8	44	245	89	174	61	91	32
95th Queue (ft)	29	84	408	211	297	161	173	108
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)					1	0		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	202	117	143	440	142	195	190	289	330	253	225	484
Average Queue (ft)	80	40	52	223	55	102	128	106	93	93	94	398
95th Queue (ft)	155	86	105	393	118	176	197	232	221	197	223	557
Link Distance (ft)		834	834	502	502			1192	1192	1192		455
Upstream Blk Time (%)				0								9
Queuing Penalty (veh)				0								0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)	0						24	2			2	34
Queuing Penalty (veh)	0						170	4			14	34

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	467	366
Average Queue (ft)	312	196
95th Queue (ft)	467	338
Link Distance (ft)	455	455
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	107	172	223	306	315	59	249	264	338	116	170	368
Average Queue (ft)	38	70	119	148	175	16	143	168	243	9	71	194
95th Queue (ft)	82	139	192	228	287	44	228	253	350	58	135	321
Link Distance (ft)	449	449		896	896		1295	1295			414	414
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			3	9			6				0	
Queuing Penalty (veh)			6	14			2				0	

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	308	44
Average Queue (ft)	147	8
95th Queue (ft)	275	26
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	6	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	139	550	562	160	472	469	225	560	591	268	288	86
Average Queue (ft)	19	280	290	131	263	265	100	370	469	154	128	19
95th Queue (ft)	77	488	493	195	421	415	233	758	712	261	243	60
Link Distance (ft)		605	605		1105	1105		561	561		1627	1627
Upstream Blk Time (%)		0	0					34	39			
Queuing Penalty (veh)		0	0					0	0			
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	31		23	21		6	13		8	3	
Queuing Penalty (veh)	0	6		95	42		9	17		14	8	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	B31	B31	NB	NB	NB	NB	NB	SB
Directions Served	L	TR	L	TR	T	T	L	T	T	T	TR	L
Maximum Queue (ft)	108	62	210	222	89	168	460	1041	1036	1000	987	194
Average Queue (ft)	35	15	144	146	12	38	54	587	564	517	468	110
95th Queue (ft)	82	41	230	252	62	140	328	1163	1132	1070	1039	196
Link Distance (ft)	151	151	139	139	149	149		1550	1550	1550	1550	
Upstream Blk Time (%)	0		21	41	1	11		3	2	2	2	
Queuing Penalty (veh)	0		0	0	0	0		0	0	0	0	
Storage Bay Dist (ft)							580					160
Storage Blk Time (%)							0	17				5
Queuing Penalty (veh)							0	3				36

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	280	273	257
Average Queue (ft)	106	113	123
95th Queue (ft)	212	214	219
Link Distance (ft)	420	420	420
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)	2		
Queuing Penalty (veh)	3		

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	B45
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR	T
Maximum Queue (ft)	164	367	351	94	282	306	180	128	115	175	244	4
Average Queue (ft)	65	179	161	11	72	81	20	49	42	91	139	0
95th Queue (ft)	117	304	292	46	186	199	93	98	87	153	213	3
Link Distance (ft)		533	533		605	605			382	233	233	472
Upstream Blk Time (%)		0										1
Queuing Penalty (veh)		0										1
Storage Bay Dist (ft)	330			165			200	200				
Storage Blk Time (%)		0		0	1	1						
Queuing Penalty (veh)		0		0	0	1						

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	132	46	90	56
Average Queue (ft)	52	18	17	6
95th Queue (ft)	92	44	58	31
Link Distance (ft)	419	343	541	424
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 2507

APPENDIX C
PHASE 1 CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖↗	↖		↖	↑↑↑	↗	↖	↑↑↑	
Traffic Volume (vph)	14	21	25	513	11	49	36	1724	155	150	2101	6
Future Volume (vph)	14	21	25	513	11	49	36	1724	155	150	2101	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.99		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	
Frt		1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1698	1478	3204	1501		1711	4916	1531	1770	5083	
Flt Permitted		0.28	1.00	0.95	1.00		0.95	1.00	1.00	0.07	1.00	
Satd. Flow (perm)		487	1478	3204	1501		1711	4916	1531	123	5083	
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)	15	22	26	534	11	51	38	1796	161	156	2189	6
RTOR Reduction (vph)	0	0	24	0	41	0	0	0	65	0	0	0
Lane Group Flow (vph)	0	37	2	534	21	0	38	1796	96	156	2195	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	28.9	28.9		7.6	67.6	67.6	79.5	79.5	
Effective Green, g (s)		10.0	10.0	28.9	28.9		7.6	67.6	67.6	79.5	79.5	
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.05	0.45	0.45	0.53	0.53	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		32	98	617	289		86	2215	689	273	2693	
v/s Ratio Prot			0.00	c0.17	0.01		0.02	c0.37	0.06	0.07	c0.43	
v/s Ratio Perm		c0.08								0.23		
v/c Ratio		1.16	0.02	0.87	0.07		0.44	0.81	0.14	0.57	0.82	
Uniform Delay, d1		70.0	65.4	58.7	49.6		69.1	35.7	24.1	45.9	29.2	
Progression Factor		1.00	1.00	1.00	1.00		1.38	0.77	0.48	0.71	0.52	
Incremental Delay, d2		209.8	0.1	13.7	0.3		3.3	3.1	0.4	2.4	2.4	
Delay (s)		279.8	65.5	72.3	49.9		99.0	30.7	11.9	35.0	17.6	
Level of Service		F	E	E	D		F	C	B	C	B	
Approach Delay (s)		191.4			70.0			30.5			18.8	
Approach LOS		F			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			31.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			81.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	54	31	2	32	84	1563	51	37	2131	2
Future Volume (vph)	16	2	54	31	2	32	84	1563	51	37	2131	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1662	1478		1908		1711	4886		1651	4746	
Flt Permitted		0.70	1.00		0.84		0.06	1.00		0.13	1.00	
Satd. Flow (perm)		1222	1478		1638		104	4886		221	4746	
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)	17	2	56	32	2	33	88	1628	53	39	2220	2
RTOR Reduction (vph)	0	0	53	0	27	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	19	3	0	40	0	88	1680	0	39	2222	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		8.0	8.0		8.0		129.2	120.1		120.8	115.9	
Effective Green, g (s)		8.0	8.0		8.0		129.2	120.1		120.8	115.9	
Actuated g/C Ratio		0.05	0.05		0.05		0.86	0.80		0.81	0.77	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		65	78		87		187	3912		224	3667	
v/s Ratio Prot			0.00				c0.03	0.34		0.01	c0.47	
v/s Ratio Perm		0.02			c0.02		0.38			0.13		
v/c Ratio		0.29	0.04		0.45		0.47	0.43		0.17	0.61	
Uniform Delay, d1		68.3	67.4		68.9		8.5	4.5		3.0	7.3	
Progression Factor		1.00	1.00		1.00		4.14	0.05		0.39	0.27	
Incremental Delay, d2		2.5	0.2		3.7		1.2	0.2		0.3	0.6	
Delay (s)		70.8	67.6		72.6		36.5	0.4		1.5	2.6	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		68.4			72.6			2.2			2.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.7				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			70.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Total Future AM Phase 1
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	19	1586	25	0	2188	
Future Volume (Veh/h)	0	19	1586	25	0	2188	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	
Hourly flow rate (vph)	0	24	2008	32	0	2770	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.76	0.90			0.90		
vC, conflicting volume	2947	685			2040		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1540	248			1758		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	96			100		
cM capacity (veh/h)	81	674			316		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	803	803	434	923	923	923
Volume Left	0	0	0	0	0	0	0
Volume Right	24	0	0	32	0	0	0
cSH	674	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.47	0.47	0.26	0.54	0.54	0.54
Queue Length 95th (ft)	3	0	0	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.5	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			45.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 1

4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	256	136	0	310	185	105	1471	106	200	2052	0
Future Volume (vph)	0	256	136	0	310	185	105	1471	106	200	2052	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			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	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3106			3539	1583	1652	4746	1794	1711	4916	
Flt Permitted		1.00			1.00	1.00	0.05	1.00	1.00	0.12	1.00	
Satd. Flow (perm)		3106			3539	1583	89	4746	1794	215	4916	
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)	0	261	139	0	316	189	107	1501	108	204	2094	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0	0	0
Lane Group Flow (vph)	0	400	0	0	316	189	107	1501	64	204	2094	0
Confl. Peds. (#/hr)	13		9	9		13			4			4
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		26.5			26.5	26.5	100.9	88.8	88.8	106.1	91.4	
Effective Green, g (s)		26.5			26.5	26.5	100.9	88.8	88.8	106.1	91.4	
Actuated g/C Ratio		0.18			0.18	0.18	0.67	0.59	0.59	0.71	0.61	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		548			625	279	185	2809	1062	298	2995	
v/s Ratio Prot		c0.13			0.09	0.12	0.05	0.32	0.04	c0.07	c0.43	
v/s Ratio Perm							0.34			0.42		
v/c Ratio		0.73			0.51	0.68	0.58	0.53	0.06	0.68	0.70	
Uniform Delay, d1		58.4			55.8	57.8	26.8	18.3	12.9	13.7	19.9	
Progression Factor		1.00			0.79	0.78	1.61	0.24	0.01	2.45	0.42	
Incremental Delay, d2		5.2			0.9	6.8	5.0	0.7	0.1	5.6	1.1	
Delay (s)		63.5			44.7	51.9	48.1	5.2	0.2	39.2	9.4	
Level of Service		E			D	D	D	A	A	D	A	
Approach Delay (s)		63.5			47.4			7.5			12.0	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay		18.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		78.6%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	73	531	440	123	64	48	197	84	50	24
Future Volume (vph)	40	509	73	531	440	123	64	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3235		3319	3286			1690	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3235		3319	3286			1690	1478	3204	1739	1443
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)	41	525	75	547	454	127	66	49	203	87	52	25
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	131	0	0	23
Lane Group Flow (vph)	41	595	0	547	574	0	0	115	72	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	74.6	69.0		30.8	94.2			15.7	53.0	10.0	10.0	10.0
Effective Green, g (s)	74.6	69.0		30.8	94.2			15.7	53.0	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.46		0.21	0.63			0.10	0.35	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	406	1488		681	2063			176	522	213	115	96
v/s Ratio Prot	0.00	c0.18		c0.16	0.17			c0.07	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.10	0.40		0.80	0.28			0.65	0.14	0.41	0.45	0.02
Uniform Delay, d1	19.4	26.8		56.7	12.6			64.5	33.0	67.2	67.4	65.4
Progression Factor	0.88	0.72		0.92	1.78			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7		6.5	0.3			8.4	0.1	1.3	2.8	0.1
Delay (s)	17.2	20.0		58.6	22.7			73.0	33.1	68.4	70.2	65.5
Level of Service	B	C		E	C			E	C	E	E	E
Approach Delay (s)		19.8			40.1			47.5			68.5	
Approach LOS		B			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			37.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			67.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	2	353	2	5	644	5
Future Volume (Veh/h)	0	0	0	1	0	4	2	353	2	5	644	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	3	447	3	6	815	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							471			256		
pX, platoon unblocked												
vC, conflicting volume	1064	1286	410	874	1288	225	821				450	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1064	1286	410	874	1288	225	821				450	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	99	100				99	
cM capacity (veh/h)	175	162	590	242	161	778	804				1107	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	6	226	226	414	414						
Volume Left	0	1	3	0	6	0						
Volume Right	0	5	0	3	0	6						
cSH	1700	568	804	1700	1107	1700						
Volume to Capacity	0.00	0.01	0.00	0.13	0.01	0.24						
Queue Length 95th (ft)	0	1	0	0	0	0						
Control Delay (s)	0.0	11.4	0.2	0.0	0.2	0.0						
Lane LOS	A	B	A		A							
Approach Delay (s)	0.0	11.4	0.1		0.1							
Approach LOS	A	B										
Intersection Summary												
Average Delay				0.1								
Intersection Capacity Utilization				31.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future AM Phase 1
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	22	4	32	6	33	5	324	49	36	572	0
Future Volume (Veh/h)	0	22	4	32	6	33	5	324	49	36	572	0
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	23	4	33	6	34	5	334	51	37	590	0
Pedestrians					11						3	
Lane Width (ft)					12.0						10.0	
Walking Speed (ft/s)					3.5						3.5	
Percent Blockage					1						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								287			440	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1074	1070	295	765	1044	374	590			396		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1061	1058	295	744	1031	341	590			364		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	89	99	87	97	95	99			97		
cM capacity (veh/h)	154	207	701	256	214	628	982			1146		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	27	33	40	390	332	295						
Volume Left	0	33	0	5	37	0						
Volume Right	4	0	34	51	0	0						
cSH	231	256	487	982	1146	1700						
Volume to Capacity	0.12	0.13	0.08	0.01	0.03	0.17						
Queue Length 95th (ft)	10	11	7	0	3	0						
Control Delay (s)	22.6	21.1	13.0	0.2	1.2	0.0						
Lane LOS	C	C	B	A	A							
Approach Delay (s)	22.6	16.7		0.2	0.6							
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			50.2%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Total Future AM Phase 1
02/07/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑↑↑	
Traffic Volume (veh/h)	0	0	0	345	613	0
Future Volume (Veh/h)	0	0	0	345	613	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	406	721	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.95					
vC, conflicting volume	1127	240	721			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1107	240	721			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	194	761	877			
Direction, Lane #	NB 1	SB 1	SB 2	SB 3		
Volume Total	406	240	240	240		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	1700	1700		
Volume to Capacity	0.24	0.14	0.14	0.14		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS						
Approach Delay (s)	0.0	0.0				
Approach LOS						
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	21.5%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future AM Phase 1

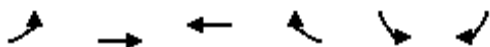
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	119	37	6	91	158	4	41	4	141	79	390
Future Volume (vph)	147	119	37	6	91	158	4	41	4	141	79	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1662		1630	1739	1433	1648	1713		1633	1739	1478
Flt Permitted	0.57	1.00		0.65	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	982	1662		1121	1739	1433	1220	1713		1248	1739	1478
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)	155	125	39	6	96	166	4	43	4	148	83	411
RTOR Reduction (vph)	0	14	0	0	0	114	0	3	0	0	0	186
Lane Group Flow (vph)	155	150	0	6	96	52	4	44	0	148	83	225
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	42.9	42.9		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.9
Effective Green, g (s)	42.9	42.9		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.9
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.31	0.31		0.31	0.31	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	646	909		350	543	447	373	524		382	532	808
v/s Ratio Prot	0.04	0.09			0.06			0.03			0.05	c0.15
v/s Ratio Perm	c0.09			0.01		0.04	0.00			c0.12		
v/c Ratio	0.24	0.16		0.02	0.18	0.12	0.01	0.08		0.39	0.16	0.28
Uniform Delay, d1	9.1	8.8		18.6	19.6	19.2	18.9	19.4		21.4	19.8	9.5
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	0.5	0.0		0.1	0.7	0.5	0.0	0.1		2.9	0.6	0.5
Delay (s)	9.6	8.9		18.7	20.3	19.8	18.9	19.4		24.4	20.4	10.0
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.2			19.9			19.4			14.7	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.6									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			78.4									Sum of lost time (s) 17.0
Intersection Capacity Utilization			59.0%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future AM Phase 1
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	36	278	506	14	19	41
Future Volume (Veh/h)	36	278	506	14	19	41
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	38	296	538	15	20	44
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	560				776	288
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560				776	288
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				94	94
cM capacity (veh/h)	1000				319	702
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	137	197	359	194	64	
Volume Left	38	0	0	0	20	
Volume Right	0	0	0	15	44	
cSH	1000	1700	1700	1700	510	
Volume to Capacity	0.04	0.12	0.21	0.11	0.13	
Queue Length 95th (ft)	3	0	0	0	11	
Control Delay (s)	2.7	0.0	0.0	0.0	13.1	
Lane LOS	A				B	
Approach Delay (s)	1.1		0.0		13.1	
Approach LOS					B	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			38.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Future Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3113	
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)	18	48	29	250	35	41	10	264	370	22	237	20
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	88	0	4	0
Lane Group Flow (vph)	18	50	0	250	43	0	0	274	282	0	275	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8	
Effective Green, g (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8	
Actuated g/C Ratio	0.07	0.07		0.19	0.19			0.57	0.76		0.57	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		320	303			1020	1148		1787	
v/s Ratio Prot	0.01	c0.03		c0.15	0.03				0.05			
v/s Ratio Perm								c0.15	0.14		0.09	
v/c Ratio	0.14	0.40		0.78	0.14			0.27	0.25		0.15	
Uniform Delay, d1	36.8	37.6		32.9	28.8			9.1	3.0		8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		10.9	0.1			0.6	0.0		0.2	
Delay (s)	37.0	38.3		43.8	28.9			9.8	3.0		8.6	
Level of Service	D	D		D	C			A	A		A	
Approach Delay (s)		38.1			40.3			5.9			8.6	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			17.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			63.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike- 355 & Halpine Road

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	176	28	67	79	1274	311	63	1865	20
Future Volume (vph)	42	52	56	176	28	67	79	1274	311	63	1865	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4748		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.06	1.00		0.11	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	112	4748		199	4907	
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)	44	54	58	183	29	70	82	1327	324	66	1943	21
RTOR Reduction (vph)	0	47	0	0	0	57	0	19	0	0	0	0
Lane Group Flow (vph)	44	65	0	183	29	13	82	1632	0	66	1964	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	28.7	28.7		28.7	28.7	28.7	106.9	96.1		100.7	93.0	
Effective Green, g (s)	28.7	28.7		28.7	28.7	28.7	106.9	96.1		100.7	93.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19	0.19	0.71	0.64		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	262	607		234	356	302	194	3041		211	3042	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	c0.34		0.02	c0.40	
v/s Ratio Perm	0.03			c0.15			0.27			0.19		
v/c Ratio	0.17	0.11		0.78	0.08	0.04	0.42	0.54		0.31	0.65	
Uniform Delay, d1	50.7	50.1		57.7	49.8	49.5	14.3	14.8		10.0	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.17	1.21		1.00	1.00	
Incremental Delay, d2	0.6	0.2		17.8	0.2	0.1	2.7	0.6		1.8	1.1	
Delay (s)	51.3	50.2		75.4	50.0	49.6	33.8	18.4		11.8	19.1	
Level of Service	D	D		E	D	D	C	B		B	B	
Approach Delay (s)		50.5			66.4			19.1			18.9	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay		23.4										
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		74.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	507	4466		1017	3303	1437
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)	38	26	54	173	20	132	53	521	295	190	855	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	38	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	778	0	190	855	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	370	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.45	0.36		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	4.8	5.5		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			5.5			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.2									
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			58.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	622	56	258	1041	134	80	54	123	145	74	14
Future Volume (vph)	16	622	56	258	1041	134	80	54	123	145	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		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
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3254		1768	3473		1711	1801	1531	1767	1863	1583
Flt Permitted	0.17	1.00		0.28	1.00		0.71	1.00	1.00	0.55	1.00	1.00
Satd. Flow (perm)	299	3254		530	3473		1272	1801	1531	1021	1863	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)	17	655	59	272	1096	141	84	57	129	153	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	714	0	272	1237	0	84	57	129	153	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	75.7	73.0		94.2	85.5		30.5	18.6	18.6	42.1	24.4	24.4
Effective Green, g (s)	75.7	73.0		94.2	85.5		30.5	18.6	18.6	42.1	24.4	24.4
Actuated g/C Ratio	0.50	0.49		0.63	0.57		0.20	0.12	0.12	0.28	0.16	0.16
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	175	1583		458	1979		293	223	189	374	303	257
v/s Ratio Prot	0.00	0.22		c0.06	c0.36		0.02	0.03	c0.08	c0.05	0.04	0.01
v/s Ratio Perm	0.05			0.31			0.04			0.07		
v/c Ratio	0.10	0.45		0.59	0.63		0.29	0.26	0.68	0.41	0.26	0.06
Uniform Delay, d1	19.7	25.3		14.4	21.5		50.1	59.4	62.9	42.6	54.9	53.1
Progression Factor	0.87	0.76		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		2.1	1.5		0.7	0.8	10.5	1.0	0.6	0.1
Delay (s)	17.3	20.0		16.5	23.0		50.8	60.3	73.4	43.6	55.5	53.2
Level of Service	B	C		B	C		D	E	E	D	E	D
Approach Delay (s)		20.0			21.9			63.6			48.0	
Approach LOS		B			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			27.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			66.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1827	116	48	2627	48
Future Volume (vph)	20	7	13	77	16	50	25	1827	116	48	2627	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6115		1711	4894	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.07	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6115		132	4894	
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)	20	7	13	79	16	51	26	1864	118	49	2681	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	4	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1978	0	49	2729	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.73		0.78	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4435		176	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.32		c0.01	c0.56	
v/s Ratio Perm	0.02			c0.06			0.18			0.21		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.45		0.28	0.76	
Uniform Delay, d1	61.0	60.3		63.7	60.9		12.1	8.4		4.8	11.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.96	0.26	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.0	0.9	
Delay (s)	62.2	60.6		70.9	61.6		14.7	8.7		5.7	3.9	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.8			3.9	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.2										
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		150.0								18.5		
Intersection Capacity Utilization		81.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future AM Phase 1
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Future Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3229		1646	3303	1428	1711	1675		1681	1549	
Flt Permitted	0.16	1.00		0.33	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	282	3229		577	3303	1428	1711	1675		1681	1549	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	748	92	10	1290	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	23	0	5	0	0	0	0
Lane Group Flow (vph)	89	837	0	10	1290	53	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.71	0.70	0.70	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	302	2374		431	2296	992	58	56		98	90	
v/s Ratio Prot	c0.02	c0.26		0.00	c0.39		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.21			0.02		0.04						
v/c Ratio	0.29	0.35		0.02	0.56	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	6.7	7.1		6.2	11.4	7.2	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.25	0.32	0.12	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.0	0.9	0.1	2.7	1.4		2.2	4.5	
Delay (s)	7.4	7.5		1.6	4.5	0.9	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.5			4.3			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay	8.1			HCM 2000 Level of Service			A					
HCM 2000 Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	150.0			Sum of lost time (s)			23.0					
Intersection Capacity Utilization	59.0%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
17: Chapman Ave/Chapman Road & Thompson Ave

Total Future AM Phase 1
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		9			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	93	90	96	100	96			99		
cM capacity (veh/h)	360	385	647	339	384	832	1200			1350		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	602	361	1200	1350								
Volume to Capacity	0.08	0.15	0.04	0.01								
Queue Length 95th (ft)	6	13	3	0								
Control Delay (s)	11.5	16.7	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.5	16.7	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

Total Future AM Phase 1
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	35	1684	49	0	2208	
Future Volume (Veh/h)	0	35	1684	49	0	2208	
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)	0	38	1830	53	0	2400	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.79	0.68			0.68		
vC, conflicting volume	2656	636			1883		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	407	0			672		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	95			100		
cM capacity (veh/h)	449	741			625		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	38	732	732	419	800	800	800
Volume Left	0	0	0	0	0	0	0
Volume Right	38	0	0	53	0	0	0
cSH	741	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.43	0.43	0.25	0.47	0.47	0.47
Queue Length 95th (ft)	4	0	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.1	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			46.0%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

20: Driveway & Rollins Ave Extension

Total Future AM Phase 1
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	22	36	1	6	0	40	0	3	0	0	0
Future Volume (Veh/h)	0	22	36	1	6	0	40	0	3	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	39	1	7	0	43	0	3	0	0	0
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	7			63			52	52	44	56	72	7
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			63			52	52	44	56	72	7
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			95	100	100	100	100	100
cM capacity (veh/h)	1614			1540			946	838	1027	939	818	1075
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	63	8	46	0								
Volume Left	0	1	43	0								
Volume Right	39	0	3	0								
cSH	1614	1540	951	1700								
Volume to Capacity	0.00	0.00	0.05	0.00								
Queue Length 95th (ft)	0	0	4	0								
Control Delay (s)	0.0	0.9	9.0	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.9	9.0	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay				3.6								
Intersection Capacity Utilization				13.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

34: Pike Center/Driveway

Total Future AM Phase 1

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	100	0	42	0	0	118	37	0	0
Future Volume (Veh/h)	0	0	0	100	0	42	0	0	118	37	0	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	109	0	46	0	0	128	40	0	0
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	190	208	0	144	144	64	0				128	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	190	208	0	144	144	64	0				128	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	87	100	95	100				97	
cM capacity (veh/h)	719	670	1085	808	727	1000	1623				1458	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	155	128	40								
Volume Left	0	109	0	40								
Volume Right	0	46	128	0								
cSH	1700	857	1700	1458								
Volume to Capacity	0.00	0.18	0.08	0.03								
Queue Length 95th (ft)	0	16	0	2								
Control Delay (s)	0.0	10.1	0.0	7.5								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	10.1	0.0	7.5								
Approach LOS	A	B										
Intersection Summary												
Average Delay				5.8								
Intersection Capacity Utilization				23.5%	ICU Level of Service				A			
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	13573	13862	13602	13680	13743	13688
Vehs Exited	13181	13440	13118	13237	13345	13264
Starting Vehs	0	0	0	0	0	0
Ending Vehs	392	422	484	443	398	414
Travel Distance (mi)	8871	8985	8827	8837	8971	8898
Travel Time (hr)	532.8	549.3	526.0	525.1	540.3	534.7
Total Delay (hr)	247.4	259.7	242.4	241.1	252.5	248.6
Total Stops	17147	18074	16926	16807	17374	17267
Fuel Used (gal)	363.0	368.4	358.2	358.0	365.3	362.6

Interval #0 Information Seed

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2768	2771	2779	2741	2805	2767
Vehs Exited	2321	2342	2325	2302	2376	2335
Starting Vehs	0	0	0	0	0	0
Ending Vehs	447	429	454	439	429	432
Travel Distance (mi)	1651	1638	1666	1642	1669	1653
Travel Time (hr)	95.4	100.8	97.9	94.7	97.7	97.3
Total Delay (hr)	42.7	48.0	44.6	42.1	44.5	44.4
Total Stops	3060	3365	3114	3061	3139	3151
Fuel Used (gal)	66.0	67.0	66.9	65.5	67.1	66.5

Interval #1 Information 1

Start Time 7:00
End Time 7:15
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2743	2730	2736	2730	2705	2726
Vehs Exited	2736	2723	2792	2757	2650	2730
Starting Vehs	447	429	454	439	429	432
Ending Vehs	454	436	398	412	484	422
Travel Distance (mi)	1841	1805	1835	1773	1826	1816
Travel Time (hr)	112.4	106.7	110.6	103.7	112.1	109.1
Total Delay (hr)	53.2	48.9	51.8	46.8	53.5	50.8
Total Stops	3656	3492	3556	3247	3648	3519
Fuel Used (gal)	75.9	72.9	74.9	71.7	74.2	73.9

Interval #2 Information 2

Start Time 7:15
End Time 7:30
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2726	2803	2643	2724	2736	2719
Vehs Exited	2730	2788	2593	2667	2814	2719
Starting Vehs	454	436	398	412	484	422
Ending Vehs	450	451	448	469	406	428
Travel Distance (mi)	1832	1844	1742	1771	1839	1806
Travel Time (hr)	112.3	112.8	103.5	105.5	111.4	109.1
Total Delay (hr)	53.2	53.1	47.2	48.5	52.4	50.9
Total Stops	3637	3689	3361	3370	3432	3496
Fuel Used (gal)	76.1	75.5	70.5	71.3	75.4	73.7

Interval #3 Information 3

Start Time 7:30
End Time 7:45
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2673	2819	2706	2737	2822	2747
Vehs Exited	2699	2813	2729	2774	2760	2755
Starting Vehs	450	451	448	469	406	428
Ending Vehs	424	457	425	432	468	430
Travel Distance (mi)	1790	1884	1791	1821	1865	1830
Travel Time (hr)	109.9	116.5	106.6	109.6	113.7	111.3
Total Delay (hr)	52.0	55.5	49.0	51.0	53.5	52.2
Total Stops	3436	3828	3406	3516	3735	3579
Fuel Used (gal)	74.2	77.7	72.9	74.7	76.4	75.2

Interval #4 Information 4

Start Time 7:45
End Time 8:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2663	2739	2738	2748	2675	2709
Vehs Exited	2695	2774	2679	2737	2745	2727
Starting Vehs	424	457	425	432	468	430
Ending Vehs	392	422	484	443	398	414
Travel Distance (mi)	1756	1813	1793	1829	1771	1793
Travel Time (hr)	102.8	112.5	107.3	111.5	105.5	107.9
Total Delay (hr)	46.4	54.2	49.8	52.6	48.5	50.3
Total Stops	3358	3700	3489	3613	3420	3514
Fuel Used (gal)	70.9	75.3	72.8	74.8	72.3	73.2

Queuing and Blocking Report
Pike Center Total Future AM Phase 1

Total Future AM Phase 1
02/07/2025

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	B28	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	LT	R	T	L	L	TR	L	T	T	T	R	L
Maximum Queue (ft)	132	70	12	225	226	200	163	392	388	397	176	195
Average Queue (ft)	40	28	0	160	171	52	45	178	174	178	53	98
95th Queue (ft)	90	69	6	238	248	152	110	291	294	293	121	183
Link Distance (ft)	71		317	204	204			414	414	414	414	
Upstream Blk Time (%)	6	0		7	11	0		0	0	0		0
Queuing Penalty (veh)	0	0		19	29	0		1	1	1		0
Storage Bay Dist (ft)		90				100	160					160
Storage Blk Time (%)	6	0			43	0		20				2
Queuing Penalty (veh)	1	0			26	1		7				15

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	228	222	228
Average Queue (ft)	155	172	176
95th Queue (ft)	242	249	251
Link Distance (ft)	198	198	198
Upstream Blk Time (%)	5	10	14
Queuing Penalty (veh)	39	75	100
Storage Bay Dist (ft)			
Storage Blk Time (%)	13		
Queuing Penalty (veh)	20		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	WB	B24	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	T	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	114	79	114	59	186	153	84	79	81	118	125	135
Average Queue (ft)	29	42	49	3	76	15	8	13	27	15	30	47
95th Queue (ft)	87	80	100	26	145	72	41	48	66	63	88	109
Link Distance (ft)	85		50	218		295	295	295		180	180	180
Upstream Blk Time (%)	3	1	23								0	0
Queuing Penalty (veh)	0	0	0								0	0
Storage Bay Dist (ft)		150			125				110			
Storage Blk Time (%)	3	1			4	0			0	0		
Queuing Penalty (veh)	2	0			22	0			2	0		

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	49	6
Average Queue (ft)	15	0
95th Queue (ft)	38	4
Link Distance (ft)	54	180
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	L	T	T
Maximum Queue (ft)	262	328	292	347	180	158	172	189	203	288	329	311
Average Queue (ft)	105	174	121	154	120	62	57	66	88	136	130	129
95th Queue (ft)	208	287	218	301	208	127	126	139	165	245	232	234
Link Distance (ft)	1311	1311	563	563			261	261	261		1192	1192
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					65	130				350		
Storage Blk Time (%)				15	30	2	1			0	0	
Queuing Penalty (veh)				28	46	8	1			0	0	

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	333
Average Queue (ft)	123
95th Queue (ft)	238
Link Distance (ft)	1192
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	136	258	328	310	380	647	600	203	202	104	133	101
Average Queue (ft)	11	100	140	197	276	198	207	101	104	17	54	42
95th Queue (ft)	55	214	269	348	408	467	402	192	196	59	110	85
Link Distance (ft)		563	563			1327	1327	200	200		541	
Upstream Blk Time (%)								2	2			
Queuing Penalty (veh)								3	3			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)		9		1	21	1				1	6	
Queuing Penalty (veh)		4		2	46	4				1	7	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	LT	TR	LT	TR
Maximum Queue (ft)	30	44	51	70	110
Average Queue (ft)	4	2	4	3	8
95th Queue (ft)	21	14	30	28	53
Link Distance (ft)	61	134	134	200	200
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	LT	TR
Maximum Queue (ft)	60	61	63	65	88	150
Average Queue (ft)	20	18	24	3	14	32
95th Queue (ft)	47	44	49	24	51	115
Link Distance (ft)	228	71	71	139	134	134
Upstream Blk Time (%)		0	0			1
Queuing Penalty (veh)		0	0			3
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: Chapman Ave & Pike Center South

Movement	NB	SB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	138	139	53	156
Average Queue (ft)	41	34	4	90
95th Queue (ft)	97	99	27	173
Link Distance (ft)	57	139	139	139
Upstream Blk Time (%)	5	0		5
Queuing Penalty (veh)	18	1		10
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	L	TR	L	T	R
Maximum Queue (ft)	126	133	28	101	27	87	68	70	74
Average Queue (ft)	49	41	4	39	2	24	52	37	61
95th Queue (ft)	100	96	19	81	13	63	83	74	91
Link Distance (ft)	221	221		823		137	57	57	57
Upstream Blk Time (%)							15	5	19
Queuing Penalty (veh)							31	10	38
Storage Bay Dist (ft)			270		40				
Storage Blk Time (%)					0	5			
Queuing Penalty (veh)					0	0			

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	82	69	164	172	79
Average Queue (ft)	16	2	25	35	32
95th Queue (ft)	57	26	99	118	63
Link Distance (ft)		204	221	221	77
Upstream Blk Time (%)			0	0	1
Queuing Penalty (veh)			0	0	1
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	2	0			
Queuing Penalty (veh)	2	0			

Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	52	146	338	198	171	99	136	94
Average Queue (ft)	14	53	162	45	65	37	54	21
95th Queue (ft)	42	103	302	119	130	80	110	65
Link Distance (ft)	979	979	1311	1311	438	438	287	287
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	108	105	113	312	92	116	194	304	365	388	224	532
Average Queue (ft)	41	36	37	161	25	49	72	189	222	264	55	323
95th Queue (ft)	85	82	76	273	67	98	163	300	349	392	171	494
Link Distance (ft)		558	558	474	474			1192	1192	1192		696
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)							1	18			0	25
Queuing Penalty (veh)							3	14			0	16

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	508	312
Average Queue (ft)	276	160
95th Queue (ft)	445	294
Link Distance (ft)	696	696
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Dirve

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	82	121	145	157	198	60	130	126	237	80	136	394
Average Queue (ft)	33	48	72	85	87	21	34	53	87	5	69	174
95th Queue (ft)	69	96	129	141	155	48	87	107	177	37	122	307
Link Distance (ft)	444	444		907	907		1327	1327			414	414
Upstream Blk Time (%)	0											
Queuing Penalty (veh)	0											
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			0	1			0					
Queuing Penalty (veh)			0	1			0					

Intersection: 13: Twinbrook Parkway & Parklawn Dirve

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	326	55
Average Queue (ft)	129	13
95th Queue (ft)	260	36
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	3	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	116	278	266	160	492	485	132	138	238	220	176	48
Average Queue (ft)	15	136	129	120	226	220	46	42	109	92	66	12
95th Queue (ft)	59	235	230	196	408	393	100	98	184	172	135	39
Link Distance (ft)		605	605		1099	1099		455	455		1627	1627
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	8		8	18		0	0		1	0	
Queuing Penalty (veh)	0	1		40	46		0	0		1	0	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	63	38	171	117	66	336	284	271	217	98	325	329
Average Queue (ft)	13	8	72	43	16	160	137	127	69	24	120	129
95th Queue (ft)	39	25	134	86	43	263	230	231	155	64	233	247
Link Distance (ft)	400	400	353	353		1536	1536	1536	1536		414	414
Upstream Blk Time (%)											0	0
Queuing Penalty (veh)											1	1
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)											3	
Queuing Penalty (veh)											2	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	330
Average Queue (ft)	140
95th Queue (ft)	252
Link Distance (ft)	414
Upstream Blk Time (%)	0
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	87	184	186	25	273	305	121	46	56	57	116
Average Queue (ft)	37	59	45	2	46	45	7	10	12	18	43
95th Queue (ft)	73	136	121	15	160	169	67	35	39	46	94
Link Distance (ft)		525	525		605	605			382	233	233
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	330			165			200	200			
Storage Blk Time (%)					1	1					
Queuing Penalty (veh)					0	1					

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	42	61	68	27
Average Queue (ft)	21	26	13	2
95th Queue (ft)	42	50	44	15
Link Distance (ft)	404	248	541	363
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	T	T	T
Maximum Queue (ft)	77	38	16	206	207	204
Average Queue (ft)	23	2	1	16	24	34
95th Queue (ft)	51	17	11	81	98	114
Link Distance (ft)	179	198	198	295	295	295
Upstream Blk Time (%)				0	0	0
Queuing Penalty (veh)				1	1	1
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 20: Driveway & Rollins Ave Extension

Movement	EB	NB
Directions Served	LTR	LTR
Maximum Queue (ft)	6	65
Average Queue (ft)	0	24
95th Queue (ft)	4	48
Link Distance (ft)	179	50
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 34: Pike Center/Driveway

Movement	WB	NB	SB
Directions Served	LTR	TR	LTR
Maximum Queue (ft)	67	57	42
Average Queue (ft)	38	13	8
95th Queue (ft)	60	41	33
Link Distance (ft)	36	77	50
Upstream Blk Time (%)	8	0	0
Queuing Penalty (veh)	0	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 760

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	31	36	344	21	221	57	2506	433	252	1771	18
Future Volume (vph)	17	31	36	344	21	221	57	2506	433	252	1771	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1683	1478	3204	1426		1711	4916	1531	1770	5071	
Flt Permitted		0.27	1.00	0.95	1.00		0.95	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		466	1478	3204	1426		1711	4916	1531	120	5071	
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)	18	32	37	355	22	228	59	2584	446	260	1826	19
RTOR Reduction (vph)	0	0	35	0	188	0	0	0	122	0	0	0
Lane Group Flow (vph)	0	50	2	355	62	0	59	2584	324	260	1845	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Confl. Bikes (#/hr)			1			1			1			
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	26.6	26.6		9.3	70.8	70.8	80.1	80.1	
Effective Green, g (s)		10.0	10.0	26.6	26.6		9.3	70.8	70.8	80.1	80.1	
Actuated g/C Ratio		0.07	0.07	0.18	0.18		0.06	0.47	0.47	0.53	0.53	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		31	98	568	252		106	2320	722	263	2707	
v/s Ratio Prot			0.00	c0.11	0.04		0.03	c0.53	0.21	c0.12	0.36	
v/s Ratio Perm		c0.11								0.41		
v/c Ratio		1.61	0.03	0.62	0.25		0.56	1.11	0.45	0.99	0.68	
Uniform Delay, d1		70.0	65.4	57.1	53.1		68.3	39.6	26.5	61.7	25.6	
Progression Factor		1.00	1.00	1.00	1.00		1.47	0.61	0.56	0.82	0.60	
Incremental Delay, d2		385.2	0.1	3.6	1.5		3.8	55.4	1.2	46.5	1.1	
Delay (s)		455.2	65.5	60.7	54.5		104.3	79.6	16.1	97.2	16.5	
Level of Service		F	E	E	D		F	E	B	F	B	
Approach Delay (s)		289.5			58.2			70.9			26.5	
Approach LOS		F			E			E			C	
Intersection Summary												
HCM 2000 Control Delay			56.9			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			94.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	127	8	133	115	9	42	197	2372	20	67	1771	13
Future Volume (vph)	127	8	133	115	9	42	197	2372	20	67	1771	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		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	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1656	1478		1953		1711	4907		1652	4738	
Flt Permitted		0.66	1.00		0.59		0.07	1.00		0.04	1.00	
Satd. Flow (perm)		1149	1478		1184		131	4907		74	4738	
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)	132	8	139	120	9	44	205	2471	21	70	1845	14
RTOR Reduction (vph)	0	0	117	0	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	140	22	0	165	0	205	2492	0	70	1859	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		24.0	24.0		24.0		114.0	102.0		100.7	93.7	
Effective Green, g (s)		24.0	24.0		24.0		114.0	102.0		100.7	93.7	
Actuated g/C Ratio		0.16	0.16		0.16		0.76	0.68		0.67	0.62	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		183	236		189		260	3336		123	2959	
v/s Ratio Prot			0.02				c0.08	0.51		0.03	0.39	
v/s Ratio Perm		0.12			c0.14		c0.52			0.35		
v/c Ratio		0.77	0.09		0.87		0.79	0.75		0.57	0.63	
Uniform Delay, d1		60.3	53.7		61.5		34.1	15.6		18.6	17.4	
Progression Factor		1.00	1.00		1.00		2.04	0.17		1.79	0.14	
Incremental Delay, d2		17.2	0.2		32.6		5.2	0.5		4.8	0.8	
Delay (s)		77.5	53.9		94.1		74.8	3.2		38.1	3.3	
Level of Service		E	D		F		E	A		D	A	
Approach Delay (s)		65.7			94.1			8.6			4.5	
Approach LOS		E			F			A			A	
Intersection Summary												
HCM 2000 Control Delay			13.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			81.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Total Future PM Phase 1
02/06/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	58	2497	44	0	1838	
Future Volume (Veh/h)	0	58	2497	44	0	1838	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	0	66	2838	50	0	2089	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.80	0.66			0.66		
vC, conflicting volume	3559	971			2888		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1087	0			2075		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	91			100		
cM capacity (veh/h)	168	721			176		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	1135	1135	618	696	696	696
Volume Left	0	0	0	0	0	0	0
Volume Right	66	0	0	50	0	0	0
cSH	721	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.67	0.67	0.36	0.41	0.41	0.41
Queue Length 95th (ft)	8	0	0	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.5	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			59.5%		ICU Level of Service		B
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 1

4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	426	57	0	312	165	142	2157	121	204	1781	57
Future Volume (vph)	0	426	57	0	312	165	142	2157	121	204	1781	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		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	
Frt		0.98			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3231			3539	1583	1652	4746	1794	1711	4883	
Flt Permitted		1.00			1.00	1.00	0.07	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		3231			3539	1583	120	4746	1794	84	4883	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	315	167	143	2179	122	206	1799	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0	2	0
Lane Group Flow (vph)	0	488	0	0	315	167	143	2179	84	206	1855	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.7			29.7	29.7	97.2	82.2	82.2	103.4	85.3	
Effective Green, g (s)		29.7			29.7	29.7	97.2	82.2	82.2	103.4	85.3	
Actuated g/C Ratio		0.20			0.20	0.20	0.65	0.55	0.55	0.69	0.57	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		639			700	313	230	2600	983	254	2776	
v/s Ratio Prot		c0.15			0.09	0.11	0.06	c0.46	0.05	c0.10	0.38	
v/s Ratio Perm							0.34			c0.46		
v/c Ratio		0.76			0.45	0.53	0.62	0.84	0.09	0.81	0.67	
Uniform Delay, d1		56.8			53.0	53.9	25.9	28.3	16.1	47.5	22.5	
Progression Factor		1.00			0.55	0.56	1.41	0.53	0.48	0.68	1.73	
Incremental Delay, d2		5.7			0.6	2.0	4.4	2.6	0.1	13.1	0.9	
Delay (s)		62.6			29.6	31.9	40.8	17.7	7.8	45.4	39.8	
Level of Service		E			C	C	D	B	A	D	D	
Approach Delay (s)		62.6			30.4			18.5			40.4	
Approach LOS		E			C			B			D	
Intersection Summary												
HCM 2000 Control Delay			31.7		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				20.0			
Intersection Capacity Utilization			90.8%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	134	469	586	141	73	109	592	215	119	37
Future Volume (vph)	68	739	134	469	586	141	73	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3213		3319	3305			1704	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	629	3213		3319	3305			1704	1478	3204	1739	1421
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)	70	762	138	484	604	145	75	112	610	222	123	38
RTOR Reduction (vph)	0	10	0	0	12	0	0	0	55	0	0	34
Lane Group Flow (vph)	70	890	0	484	737	0	0	187	555	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Effective Green, g (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	269	955		562	1377			443	698	352	191	156
v/s Ratio Prot	0.01	c0.28		c0.15	0.22			0.11	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	0.93		0.86	0.54			0.42	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.4	51.2		60.6	32.8			46.1	33.4	63.8	63.9	59.6
Progression Factor	1.77	1.46		1.01	1.10			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	15.7		11.9	1.4			0.7	6.3	3.7	7.2	0.1
Delay (s)	59.5	90.6		73.2	37.6			46.8	39.7	67.5	71.2	59.7
Level of Service	E	F		E	D			D	D	E	E	E
Approach Delay (s)		88.3			51.5			41.3			67.9	
Approach LOS		F			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			61.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Total Future PM Phase 1
02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1	4	4	1	7	3	743	8	5	634	4
Future Volume (Veh/h)	6	1	4	4	1	7	3	743	8	5	634	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	1	4	4	1	8	3	826	9	6	704	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage veh)												
Upstream signal (ft)	471								256			
pX, platoon unblocked												
vC, conflicting volume	1146	1559	354	1205	1556	418	708			835		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1146	1559	354	1205	1556	418	708			835		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	99	97	99	99	100			99		
cM capacity (veh/h)	150	110	642	137	110	584	887			794		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	13	416	422	358	356						
Volume Left	7	4	3	0	6	0						
Volume Right	4	8	0	9	0	4						
cSH	194	250	887	1700	794	1700						
Volume to Capacity	0.06	0.05	0.00	0.25	0.01	0.21						
Queue Length 95th (ft)	5	4	0	0	1	0						
Control Delay (s)	24.8	20.2	0.1	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	24.8	20.2	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			32.9%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future PM Phase 1
02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	19	4	59	20	89	0	665	49	45	597	0
Future Volume (Veh/h)	0	19	4	59	20	89	0	665	49	45	597	0
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	20	4	61	21	92	0	686	51	46	615	0
Pedestrians					18							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					2							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								287			440	
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1521	1462	308	1143	1436	730	615			755		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1523	1458	308	1101	1429	639	615			668		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	81	99	48	81	75	100			94		
cM capacity (veh/h)	44	107	688	118	111	368	961			808		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	24	61	113	737	354	308						
Volume Left	0	61	0	0	46	0						
Volume Right	4	0	92	51	0	0						
cSH	124	118	257	961	808	1700						
Volume to Capacity	0.19	0.52	0.44	0.00	0.06	0.18						
Queue Length 95th (ft)	17	60	53	0	5	0						
Control Delay (s)	40.9	64.5	29.5	0.0	1.9	0.0						
Lane LOS	E	F	D		A							
Approach Delay (s)	40.9	41.8		0.0	1.0							
Approach LOS	E	E										
Intersection Summary												
Average Delay			5.6									
Intersection Capacity Utilization			67.3%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Total Future PM Phase 1
02/06/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑↑↑	
Traffic Volume (veh/h)	0	0	0	728	664	0
Future Volume (Veh/h)	0	0	0	728	664	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	856	781	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.82					
vC, conflicting volume	1637	260	781			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1666	260	781			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	72	738	832			
Direction, Lane #	NB 1	SB 1	SB 2	SB 3		
Volume Total	856	260	260	260		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	1700	1700		
Volume to Capacity	0.50	0.15	0.15	0.15		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS						
Approach Delay (s)	0.0	0.0				
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			41.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future PM Phase 1

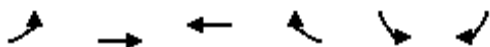
02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	324	242	56	15	175	258	17	127	42	250	127	322
Future Volume (vph)	324	242	56	15	175	258	17	127	42	250	127	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1680		1640	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.51	1.00		0.57	1.00	1.00	0.67	1.00		0.65	1.00	1.00
Satd. Flow (perm)	881	1680		987	1739	1422	1158	1660		1105	1739	1478
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)	338	252	58	16	182	269	18	132	44	260	132	335
RTOR Reduction (vph)	0	10	0	0	0	186	0	15	0	0	0	149
Lane Group Flow (vph)	338	300	0	16	182	83	18	161	0	260	132	186
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.2	44.2		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.2
Effective Green, g (s)	44.2	44.2		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.2
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	624	931		303	534	437	348	499		332	523	819
v/s Ratio Prot	c0.10	0.18			0.10			0.10			0.08	0.13
v/s Ratio Perm	c0.20			0.02		0.06	0.02			c0.24		
v/c Ratio	0.54	0.32		0.05	0.34	0.19	0.05	0.32		0.78	0.25	0.23
Uniform Delay, d1	10.3	9.6		19.4	21.4	20.3	19.8	21.6		25.5	21.1	9.0
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	2.2	0.1		0.3	1.7	1.0	0.1	0.4		16.7	1.2	0.4
Delay (s)	12.5	9.7		19.8	23.1	21.3	19.8	21.9		42.2	22.2	9.4
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		11.1			21.9			21.7			23.5	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.0									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			79.7							17.0		
Intersection Capacity Utilization			79.8%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future PM Phase 1
02/06/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	124	527	473	34	46	97
Future Volume (Veh/h)	124	527	473	34	46	97
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	128	543	488	35	47	100
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	530				1040	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530				1040	270
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				76	86
cM capacity (veh/h)	1027				196	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	309	362	325	198	147	
Volume Left	128	0	0	0	47	
Volume Right	0	0	0	35	100	
cSH	1027	1700	1700	1700	389	
Volume to Capacity	0.12	0.21	0.19	0.12	0.38	
Queue Length 95th (ft)	11	0	0	0	43	
Control Delay (s)	4.5	0.0	0.0	0.0	19.8	
Lane LOS	A				C	
Approach Delay (s)	2.1		0.0		19.8	
Approach LOS					C	
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			51.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	412	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	98	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	315	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.0		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0				Sum of lost time (s)		14.0			
Intersection Capacity Utilization			71.0%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike- 355 & Halpine Road

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2162	105	99	1798	30
Future Volume (vph)	98	66	87	210	70	127	197	2162	105	99	1798	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4872		1711	4899	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	87	4872		90	4899	
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)	103	69	92	221	74	134	207	2276	111	104	1893	32
RTOR Reduction (vph)	0	72	0	0	0	105	0	3	0	0	1	0
Lane Group Flow (vph)	103	89	0	221	74	29	207	2384	0	104	1924	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Effective Green, g (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.70	0.58		0.61	0.53	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	275	684		255	404	344	277	2845		188	2609	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.49		0.05	0.39	
v/s Ratio Perm	0.08			c0.19			0.42			0.29		
v/c Ratio	0.37	0.13		0.87	0.18	0.08	0.75	0.84		0.55	0.74	
Uniform Delay, d1	50.0	47.3		56.6	47.8	46.8	44.9	25.4		29.6	27.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.40	0.47		1.00	1.00	
Incremental Delay, d2	1.8	0.2		27.0	0.5	0.2	8.6	2.1		5.9	1.9	
Delay (s)	51.8	47.5		83.6	48.3	47.0	71.3	13.9		35.5	28.9	
Level of Service	D	D		F	D	D	E	B		D	C	
Approach Delay (s)		49.2			66.1			18.5			29.2	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			28.0									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0								17.5	
Intersection Capacity Utilization			97.7%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		326	3303	1428
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)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	139	0	19	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	150	33	1545	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Effective Green, g (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	127	119		253	256	396	338	2419		357	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.10	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.72	0.71	0.38	0.10	0.64		0.39	0.44	0.02
Uniform Delay, d1	65.7	66.8		60.1	60.1	45.7	14.9	25.2		16.4	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.86	0.86		1.00	1.00	1.00
Incremental Delay, d2	1.5	4.6		9.2	9.1	0.6	0.1	0.7		0.7	0.8	0.1
Delay (s)	67.2	71.4		69.4	69.2	46.3	12.9	22.4		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.2			59.1			22.2			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.0									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0							27.5		
Intersection Capacity Utilization			70.6%									ICU Level of Service C
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1056	74	202	808	185	125	145	311	289	171	24
Future Volume (vph)	21	1056	74	202	808	185	125	145	311	289	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3254		1770	3418		1684	1801	1531	1763	1863	1583
Flt Permitted	0.19	1.00		0.06	1.00		0.64	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	330	3254		116	3418		1141	1801	1531	821	1863	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)	22	1112	78	213	851	195	132	153	327	304	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1190	0	213	1046	0	132	153	327	304	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	62.3	58.1		79.5	69.3		42.2	27.9	27.9	57.5	36.7	36.7
Effective Green, g (s)	62.3	58.1		79.5	69.3		42.2	27.9	27.9	57.5	36.7	36.7
Actuated g/C Ratio	0.42	0.39		0.53	0.46		0.28	0.19	0.19	0.38	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	174	1260		231	1579		372	334	284	459	455	387
v/s Ratio Prot	0.00	0.37		c0.09	0.31		0.03	0.08	c0.21	c0.10	0.10	0.02
v/s Ratio Perm	0.05			c0.39			0.07			0.15		
v/c Ratio	0.13	0.94		0.92	0.66		0.35	0.46	1.15	0.66	0.40	0.06
Uniform Delay, d1	27.1	44.4		46.7	31.3		42.0	54.3	61.0	35.0	47.4	43.5
Progression Factor	0.84	0.78		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	13.8		38.4	2.2		0.8	1.4	100.7	3.9	0.8	0.1
Delay (s)	23.1	48.5		85.0	33.5		42.8	55.7	161.8	39.0	48.1	43.6
Level of Service	C	D		F	C		D	E	F	D	D	D
Approach Delay (s)		48.0			42.2			109.6			42.4	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			55.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			90.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2668	250	161	2079	26
Future Volume (vph)	40	12	32	186	13	138	18	2668	250	161	2079	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6074		1711	4901	
Flt Permitted	0.54	1.00		0.73	1.00		0.06	1.00		0.04	1.00	
Satd. Flow (perm)	927	1589		1354	1496		99	6074		76	4901	
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)	42	12	33	194	14	144	19	2779	260	168	2166	27
RTOR Reduction (vph)	0	27	0	0	118	0	0	9	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	40	0	19	3030	0	168	2192	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Effective Green, g (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.62	0.59		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	168	289		246	272		115	3591		224	3241	
v/s Ratio Prot		0.01			0.03		0.01	c0.50		c0.08	c0.45	
v/s Ratio Perm	0.05			c0.14			0.10			0.47		
v/c Ratio	0.25	0.07		0.79	0.15		0.17	0.84		0.75	0.68	
Uniform Delay, d1	52.6	50.8		58.6	51.6		13.1	25.0		47.0	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.32	0.40	
Incremental Delay, d2	1.6	0.2		17.5	0.5		1.4	2.6		12.6	0.9	
Delay (s)	54.2	51.0		76.1	52.1		14.5	27.6		74.6	7.2	
Level of Service	D	D		E	D		B	C		E	A	
Approach Delay (s)		52.5			65.3			27.5			12.0	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		23.9					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		150.0					Sum of lost time (s)		18.5			
Intersection Capacity Utilization		99.5%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Future Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3257		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.27	1.00		0.22	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	470	3257		386	3303	1432	1711	1665		1681	1573	
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)	150	1015	75	15	804	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	48	0	20	0	0	0	0
Lane Group Flow (vph)	150	1088	0	15	804	84	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Effective Green, g (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Actuated g/C Ratio	0.67	0.61		0.57	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	405	1993		247	1829	793	108	105		253	236	
v/s Ratio Prot	c0.03	c0.33		0.00	0.24		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.03		0.06						
v/c Ratio	0.37	0.55		0.06	0.44	0.11	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.9	17.0		14.2	19.7	15.8	67.9	66.9		59.1	60.6	
Progression Factor	1.00	1.00		0.56	0.44	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.1		0.1	0.6	0.2	4.6	1.7		3.4	10.6	
Delay (s)	11.7	18.0		8.1	9.3	1.9	72.4	68.6		62.5	71.2	
Level of Service	B	B		A	A	A	E	E		E	E	
Approach Delay (s)		17.3			8.3			70.6			67.2	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.0				HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		150.0				Sum of lost time (s)		23.0				
Intersection Capacity Utilization		68.5%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
17: Chapman Ave/Chapman Road & Thompson Ave

Total Future PM Phase 1
02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians	66			56			51			6		
Lane Width (ft)	16.0			16.0			12.0			12.0		
Walking Speed (ft/s)	3.5			3.5			3.5			3.5		
Percent Blockage	8			7			5			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	638											
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	830	366	394			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	93	76	93	95	99	97			99		
cM capacity (veh/h)	235	251	545	133	250	624	1067			1097		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	409	207	1067	1097								
Volume to Capacity	0.43	0.13	0.03	0.01								
Queue Length 95th (ft)	53	11	2	0								
Control Delay (s)	20.3	25.0	1.0	0.2								
Lane LOS	C	D	A	A								
Approach Delay (s)	20.3	25.0	1.0	0.2								
Approach LOS	C	D										
Intersection Summary												
Average Delay				5.3								
Intersection Capacity Utilization				51.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

Total Future PM Phase 1
02/06/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	98	2633	136	0	2019	
Future Volume (Veh/h)	0	98	2633	136	0	2019	
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)	0	107	2862	148	0	2195	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.65	0.53			0.53		
vC, conflicting volume	3668	1028			3010		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	745	0			1709		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	82			100		
cM capacity (veh/h)	229	579			196		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	107	1145	1145	720	732	732	732
Volume Left	0	0	0	0	0	0	0
Volume Right	107	0	0	148	0	0	0
cSH	579	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.18	0.67	0.67	0.42	0.43	0.43	0.43
Queue Length 95th (ft)	17	0	0	0	0	0	0
Control Delay (s)	12.6	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.6	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			66.6%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

20: Driveway & Rollins Ave Extension

Total Future PM Phase 1
02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	19	106	0	20	0	95	0	6	0	0	8
Future Volume (Veh/h)	0	19	106	0	20	0	95	0	6	0	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	115	0	22	0	103	0	7	0	0	9
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	22			136			110	100	78	108	158	22
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	22			136			110	100	78	108	158	22
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			88	100	99	100	100	99
cM capacity (veh/h)	1593			1448			862	790	982	865	734	1055
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	136	22	110	9								
Volume Left	0	0	103	0								
Volume Right	115	0	7	9								
cSH	1593	1448	868	1055								
Volume to Capacity	0.00	0.00	0.13	0.01								
Queue Length 95th (ft)	0	0	11	1								
Control Delay (s)	0.0	0.0	9.7	8.4								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	9.7	8.4								
Approach LOS			A	A								
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			26.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: Pike Center/Driveway

Total Future PM Phase 1

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	233	0	100	0	0	248	106	0	0
Future Volume (Veh/h)	0	0	0	233	0	100	0	0	248	106	0	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	253	0	109	0	0	270	115	0	0
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	474	500	0	365	365	135	0			270		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	474	500	0	365	365	135	0			270		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	54	100	88	100			91		
cM capacity (veh/h)	411	431	1085	551	513	914	1623			1293		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	362	270	115								
Volume Left	0	253	0	115								
Volume Right	0	109	270	0								
cSH	1700	626	1700	1293								
Volume to Capacity	0.00	0.58	0.16	0.09								
Queue Length 95th (ft)	0	93	0	7								
Control Delay (s)	0.0	18.3	0.0	8.1								
Lane LOS	A	C		A								
Approach Delay (s)	0.0	18.3	0.0	8.1								
Approach LOS	A	C										
Intersection Summary												
Average Delay				10.1								
Intersection Capacity Utilization				50.2%	ICU Level of Service				A			
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	18175	18235	18234	18206	18131	18199
Vehs Exited	17112	17166	17132	17114	17128	17130
Starting Vehs	0	0	0	0	0	0
Ending Vehs	1063	1069	1102	1092	1003	1053
Travel Distance (mi)	10778	10736	10782	10838	10826	10792
Travel Time (hr)	1016.3	1377.7	1244.4	1141.8	1080.0	1172.0
Total Delay (hr)	665.1	1026.4	892.7	788.3	727.5	820.0
Total Stops	32556	36018	34427	35083	32249	34069
Fuel Used (gal)	530.6	614.5	584.0	560.4	547.2	567.4

Interval #0 Information Seed

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3596	3745	3758	3580	3641	3667
Vehs Exited	2922	2931	2997	2909	2961	2940
Starting Vehs	0	0	0	0	0	0
Ending Vehs	674	814	761	671	680	707
Travel Distance (mi)	1961	1989	2004	1916	1992	1972
Travel Time (hr)	140.1	159.7	146.2	136.4	142.4	145.0
Total Delay (hr)	76.6	95.0	81.1	74.2	78.0	81.0
Total Stops	5084	5934	5241	4884	5054	5239
Fuel Used (gal)	85.4	90.8	88.7	83.2	87.2	87.1

Interval #1 Information 1

Start Time 5:00
End Time 5:15
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3553	3713	3636	3657	3651	3641
Vehs Exited	3548	3607	3553	3511	3567	3559
Starting Vehs	674	814	761	671	680	707
Ending Vehs	679	920	844	817	764	793
Travel Distance (mi)	2184	2224	2253	2228	2202	2218
Travel Time (hr)	175.0	228.0	215.1	188.4	183.7	198.1
Total Delay (hr)	103.6	155.0	142.0	115.8	111.9	125.7
Total Stops	6065	7568	7096	6796	6354	6779
Fuel Used (gal)	100.8	114.6	111.3	105.2	102.8	106.9

Interval #2 Information 2

Start Time 5:15
End Time 5:30
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3748	3688	3708	3701	3585	3677
Vehs Exited	3581	3552	3498	3498	3550	3534
Starting Vehs	679	920	844	817	764	793
Ending Vehs	846	1056	1054	1020	799	952
Travel Distance (mi)	2250	2225	2191	2211	2240	2223
Travel Time (hr)	194.8	271.0	261.3	236.9	215.5	235.9
Total Delay (hr)	121.5	198.2	189.6	164.3	142.7	163.3
Total Stops	6677	7393	7524	7700	6661	7192
Fuel Used (gal)	106.3	124.5	120.5	115.5	111.4	115.6

Interval #3 Information 3

Start Time 5:30
End Time 5:45
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3713	3587	3481	3584	3591	3591
Vehs Exited	3619	3498	3587	3593	3577	3575
Starting Vehs	846	1056	1054	1020	799	952
Ending Vehs	940	1145	948	1011	813	962
Travel Distance (mi)	2250	2135	2181	2243	2204	2203
Travel Time (hr)	230.5	338.6	291.5	269.0	248.5	275.6
Total Delay (hr)	157.2	268.5	220.3	195.8	176.7	203.7
Total Stops	7359	7357	7149	7653	6859	7273
Fuel Used (gal)	115.5	137.2	128.1	123.6	118.1	124.5

Interval #4 Information 4

Start Time	5:45
End Time	6:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3565	3502	3651	3684	3663	3615
Vehs Exited	3442	3578	3497	3603	3473	3520
Starting Vehs	940	1145	948	1011	813	962
Ending Vehs	1063	1069	1102	1092	1003	1053
Travel Distance (mi)	2134	2163	2152	2240	2188	2175
Travel Time (hr)	275.9	380.4	330.2	311.1	289.8	317.5
Total Delay (hr)	206.2	309.7	259.8	238.1	218.2	246.4
Total Stops	7371	7766	7417	8050	7321	7585
Fuel Used (gal)	122.6	147.5	135.4	132.9	127.7	133.2

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	B28	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	LT	R	T	L	L	TR	L	T	T	T	R	L
Maximum Queue (ft)	132	71	75	210	225	200	200	452	470	451	446	198
Average Queue (ft)	68	39	15	121	152	127	82	382	385	399	240	178
95th Queue (ft)	140	84	92	201	239	217	190	528	535	552	464	240
Link Distance (ft)	71		317	204	204			414	414	414	414	
Upstream Blk Time (%)	25	5		1	3	1		11	9	26	6	35
Queuing Penalty (veh)	0	0		2	10	0		75	61	187	44	0
Storage Bay Dist (ft)		90				100	160					160
Storage Blk Time (%)	25	5			25	24	0	50				70
Queuing Penalty (veh)	9	2			61	41	3	29				414

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	251	231	231
Average Queue (ft)	213	167	168
95th Queue (ft)	284	238	237
Link Distance (ft)	198	198	198
Upstream Blk Time (%)	60	8	9
Queuing Penalty (veh)	402	52	62
Storage Bay Dist (ft)			
Storage Blk Time (%)	28		
Queuing Penalty (veh)	71		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	B25	WB	B24	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	LTR	T	L	T	T	TR	L	T	T
Maximum Queue (ft)	176	85	94	124	193	245	290	229	228	179	199	188
Average Queue (ft)	138	71	40	96	46	139	62	65	79	76	145	63
95th Queue (ft)	186	102	99	131	130	231	184	155	156	177	260	147
Link Distance (ft)	85		63	50	218		295	295	295		180	180
Upstream Blk Time (%)	35	6	12	56	0		0	0	0	0	50	1
Queuing Penalty (veh)	0	0	0	0	0		1	0	0	0	306	3
Storage Bay Dist (ft)		150				125				110		
Storage Blk Time (%)	35	6				23	1			3	59	
Queuing Penalty (veh)	47	8				184	3			16	40	

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	SB
Directions Served	TR
Maximum Queue (ft)	188
Average Queue (ft)	70
95th Queue (ft)	148
Link Distance (ft)	180
Upstream Blk Time (%)	1
Queuing Penalty (veh)	4
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	B22	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	TR	T	T	T
Maximum Queue (ft)	110	38	116	150	165	315	283	243
Average Queue (ft)	40	2	10	15	24	197	46	27
95th Queue (ft)	80	15	54	73	90	430	199	141
Link Distance (ft)	54	181	180	180	180	261	261	261
Upstream Blk Time (%)	13			0	0	43	0	0
Queuing Penalty (veh)	0			0	1	263	2	0
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	510	517	298	336	180	244	290	286	280	260	465	1139
Average Queue (ft)	227	255	125	135	101	77	203	217	224	25	312	692
95th Queue (ft)	530	555	232	280	200	182	295	303	306	146	611	1298
Link Distance (ft)	1311	1311	563	563			261	261	261			1192
Upstream Blk Time (%)						0	3	4	5	0		8
Queuing Penalty (veh)						0	22	30	46	0		58
Storage Bay Dist (ft)					65	130				280	350	
Storage Blk Time (%)				11	21	3	28		5	0	0	54
Queuing Penalty (veh)				18	33	24	39		7	1	1	110

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1121	1165
Average Queue (ft)	636	567
95th Queue (ft)	1191	1054
Link Distance (ft)	1192	1192
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	8	3
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	200	492	546	310	377	513	443	211	221	186	243	231
Average Queue (ft)	66	316	344	205	253	205	215	132	199	77	110	105
95th Queue (ft)	194	477	523	332	376	404	361	215	239	159	186	189
Link Distance (ft)		563	563			1327	1327	200	200		541	
Upstream Blk Time (%)		0	1					4	34			
Queuing Penalty (veh)		1	4					16	129			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)	0	59		5	19	3				5	29	0
Queuing Penalty (veh)	1	40		15	57	14				14	76	0

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	SB
Directions Served	R
Maximum Queue (ft)	64
Average Queue (ft)	2
95th Queue (ft)	42
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	300
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	50	56	107	152	167	127
Average Queue (ft)	14	11	10	115	21	7
95th Queue (ft)	44	37	54	188	93	64
Link Distance (ft)	45	61	134	134	200	200
Upstream Blk Time (%)	7	1	0	18	0	0
Queuing Penalty (veh)	0	0	0	69	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	B50	B50	B57	B57	NB	SB	SB
Directions Served	LTR	L	TR	T	T	T	T	LTR	LT	TR
Maximum Queue (ft)	55	130	128	101	77	6	5	160	164	123
Average Queue (ft)	17	48	60	13	3	0	0	83	71	7
95th Queue (ft)	45	111	113	80	30	4	3	188	170	51
Link Distance (ft)	228	71	71	148	148	319	319	139	134	134
Upstream Blk Time (%)		18	17	4	0			9	9	0
Queuing Penalty (veh)		0	0	0	0			67	28	1
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 8: Chapman Ave & Pike Center South

Movement	NB	SB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	195	158	97	145
Average Queue (ft)	121	102	12	57
95th Queue (ft)	206	189	55	140
Link Distance (ft)	57	139	139	139
Upstream Blk Time (%)	43	24		1
Queuing Penalty (veh)	302	52		3
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	B35	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	T	L	T	R
Maximum Queue (ft)	204	151	51	186	265	80	209	95	91	74	79
Average Queue (ft)	89	69	9	74	32	12	95	6	65	45	59
95th Queue (ft)	157	131	33	144	167	45	189	46	84	80	91
Link Distance (ft)	221	221		823	823		137	285	57	57	57
Upstream Blk Time (%)	0						6		54	7	14
Queuing Penalty (veh)	0						19		119	15	32
Storage Bay Dist (ft)			270			40					
Storage Blk Time (%)						2	29				
Queuing Penalty (veh)						3	5				

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	99	197	30	135	102
Average Queue (ft)	47	22	1	16	55
95th Queue (ft)	102	110	11	69	97
Link Distance (ft)		204	221	221	77
Upstream Blk Time (%)		0		0	6
Queuing Penalty (veh)		1		0	14
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	5	0			
Queuing Penalty (veh)	14	0			

Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	42	103	499	346	377	240	165	134
Average Queue (ft)	9	42	258	92	167	52	82	40
95th Queue (ft)	31	81	448	241	305	136	144	103
Link Distance (ft)	979	979	1311	1311	438	438	287	287
Upstream Blk Time (%)					0	0		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	182	147	169	478	422	342	194	331	358	280	225	715
Average Queue (ft)	82	47	64	268	95	110	128	119	101	94	130	456
95th Queue (ft)	153	101	133	481	320	253	205	261	245	209	273	701
Link Distance (ft)		558	558	474	474			1192	1192	1192		696
Upstream Blk Time (%)				17	3							5
Queuing Penalty (veh)				0	0							0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)		0			3	0	28	3			2	43
Queuing Penalty (veh)		0			3	0	203	6			11	43

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	659	529
Average Queue (ft)	392	254
95th Queue (ft)	635	489
Link Distance (ft)	696	696
Upstream Blk Time (%)	2	1
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	118	150	230	263	351	87	260	272	351	96	172	364
Average Queue (ft)	35	63	116	148	185	18	141	166	242	9	77	198
95th Queue (ft)	77	125	201	224	295	55	235	255	361	56	141	330
Link Distance (ft)	444	444		907	907		1327	1327			414	414
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			2	9			6				0	
Queuing Penalty (veh)			4	14			2				0	

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	304	89
Average Queue (ft)	149	12
95th Queue (ft)	278	65
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	6	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	121	556	555	160	463	434	225	492	479	270	274	74
Average Queue (ft)	17	317	325	130	257	259	99	326	405	150	121	14
95th Queue (ft)	67	556	559	194	416	407	228	615	563	250	227	45
Link Distance (ft)		605	605		1099	1099		455	455		1627	1627
Upstream Blk Time (%)		1	0					35	41			
Queuing Penalty (veh)		3	2					0	0			
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	35		20	19		7	16		8	3	
Queuing Penalty (veh)	0	7		82	38		10	19		14	8	

Queuing and Blocking Report
Pike Center Total Future PM Phase 1

Total Future PM Phase 1
02/07/2025

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	216	75	359	385	729	1564	1557	1557	1551	199	292	282
Average Queue (ft)	86	22	182	251	106	890	865	830	790	97	119	138
95th Queue (ft)	232	57	366	457	509	1683	1673	1647	1642	191	235	240
Link Distance (ft)	400	400	353	353		1536	1536	1536	1536		414	414
Upstream Blk Time (%)	1		12	40		10	14	19	16			
Queuing Penalty (veh)	0		0	0		0	0	0	0			
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)						39				4	3	
Queuing Penalty (veh)						7				27	5	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	274
Average Queue (ft)	146
95th Queue (ft)	247
Link Distance (ft)	414
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	B45
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR	T
Maximum Queue (ft)	184	347	332	38	260	259	179	127	130	164	248	9
Average Queue (ft)	71	189	173	8	72	84	16	45	37	89	139	0
95th Queue (ft)	131	321	307	29	187	198	76	97	85	150	212	4
Link Distance (ft)		525	525		605	605			382	233	233	472
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	330			165			200	200				
Storage Blk Time (%)		0			1	1						
Queuing Penalty (veh)		1			0	1						

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	115	47	84	51
Average Queue (ft)	52	17	19	8
95th Queue (ft)	89	42	59	32
Link Distance (ft)	404	248	541	363
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	147	26	27	100	314	310	252
Average Queue (ft)	59	1	1	4	240	59	42
95th Queue (ft)	114	11	17	38	429	218	173
Link Distance (ft)	179	198	198	198	295	295	295
Upstream Blk Time (%)	0			0	28	0	0
Queuing Penalty (veh)	0			0	192	2	1
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 20: Driveway & Rollins Ave Extension

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	32	66	29
Average Queue (ft)	2	32	7
95th Queue (ft)	17	52	27
Link Distance (ft)	179	50	104
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Pike Center/Driveway

Movement	WB	NB	SB
Directions Served	LTR	TR	LTR
Maximum Queue (ft)	88	68	54
Average Queue (ft)	53	17	23
95th Queue (ft)	72	50	53
Link Distance (ft)	36	77	50
Upstream Blk Time (%)	25	0	2
Queuing Penalty (veh)	0	0	2
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 4624

APPENDIX D
PHASE 1 RESTRICTED
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	21	25	511	11	49	36	1734	145	124	2101	6
Future Volume (vph)	14	21	25	511	11	49	36	1734	145	124	2101	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.99		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	
Frt		1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1698	1478	3204	1501		1711	4916	1531	1770	5083	
Flt Permitted		0.28	1.00	0.95	1.00		0.95	1.00	1.00	0.07	1.00	
Satd. Flow (perm)		487	1478	3204	1501		1711	4916	1531	123	5083	
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)	15	22	26	532	11	51	38	1806	151	129	2189	6
RTOR Reduction (vph)	0	0	24	0	41	0	0	0	64	0	0	0
Lane Group Flow (vph)	0	37	2	532	21	0	38	1806	87	129	2195	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	28.9	28.9		7.6	67.6	67.6	79.5	79.5	
Effective Green, g (s)		10.0	10.0	28.9	28.9		7.6	67.6	67.6	79.5	79.5	
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.05	0.45	0.45	0.53	0.53	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		32	98	617	289		86	2215	689	273	2693	
v/s Ratio Prot			0.00	c0.17	0.01		0.02	c0.37	0.06	0.06	c0.43	
v/s Ratio Perm		c0.08								0.19		
v/c Ratio		1.16	0.02	0.86	0.07		0.44	0.82	0.13	0.47	0.82	
Uniform Delay, d1		70.0	65.4	58.6	49.6		69.1	35.8	24.0	45.3	29.2	
Progression Factor		1.00	1.00	1.00	1.00		1.38	0.77	0.47	0.69	0.52	
Incremental Delay, d2		209.8	0.1	13.4	0.3		3.3	3.2	0.4	1.1	2.4	
Delay (s)		279.8	65.5	72.0	49.9		99.0	30.9	11.6	32.3	17.7	
Level of Service		F	E	E	D		F	C	B	C	B	
Approach Delay (s)		191.4			69.7			30.7			18.5	
Approach LOS		F			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			31.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			81.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	16	2	54	31	2	32	84	1563	14	62	2105	2
Future Volume (vph)	16	2	54	31	2	32	84	1563	14	62	2105	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1661	1478		1907		1711	4907		1651	4745	
Flt Permitted		0.70	1.00		0.84		0.06	1.00		0.13	1.00	
Satd. Flow (perm)		1221	1478		1637		108	4907		230	4745	
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)	17	2	56	32	2	33	88	1628	15	65	2193	2
RTOR Reduction (vph)	0	0	53	0	27	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	3	0	40	0	88	1643	0	65	2195	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		8.0	8.0		8.0		128.8	119.7		121.2	115.9	
Effective Green, g (s)		8.0	8.0		8.0		128.8	119.7		121.2	115.9	
Actuated g/C Ratio		0.05	0.05		0.05		0.86	0.80		0.81	0.77	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		65	78		87		189	3915		236	3666	
v/s Ratio Prot			0.00				c0.03	0.33		0.01	c0.46	
v/s Ratio Perm		0.02			c0.02		0.37			0.21		
v/c Ratio		0.29	0.04		0.45		0.47	0.42		0.28	0.60	
Uniform Delay, d1		68.3	67.4		68.9		7.7	4.6		3.0	7.2	
Progression Factor		1.00	1.00		1.00		4.49	0.05		0.38	0.27	
Incremental Delay, d2		2.5	0.2		3.7		1.2	0.2		0.5	0.6	
Delay (s)		70.8	67.6		72.6		35.8	0.4		1.7	2.6	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		68.4			72.6			2.2			2.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.8				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			70.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Total Future AM Phase 1 Restricted
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	19	1586	25	0	2188	
Future Volume (Veh/h)	0	19	1586	25	0	2188	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	
Hourly flow rate (vph)	0	24	2008	32	0	2770	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.76	0.90			0.90		
vC, conflicting volume	2947	685			2040		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1555	258			1765		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	96			100		
cM capacity (veh/h)	79	666			314		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	803	803	434	923	923	923
Volume Left	0	0	0	0	0	0	0
Volume Right	24	0	0	32	0	0	0
cSH	666	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.47	0.47	0.26	0.54	0.54	0.54
Queue Length 95th (ft)	3	0	0	0	0	0	0
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.6	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			45.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 1 Restricted

4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↑	
Traffic Volume (vph)	0	256	136	0	310	185	105	1471	106	200	2052	0
Future Volume (vph)	0	256	136	0	310	185	105	1471	106	200	2052	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			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	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3106			3539	1583	1652	4746	1794	1711	4916	
Flt Permitted		1.00			1.00	1.00	0.05	1.00	1.00	0.12	1.00	
Satd. Flow (perm)		3106			3539	1583	89	4746	1794	215	4916	
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)	0	261	139	0	316	189	107	1501	108	204	2094	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0	0	0
Lane Group Flow (vph)	0	400	0	0	316	189	107	1501	64	204	2094	0
Confl. Peds. (#/hr)	13		9	9		13			4			4
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		26.5			26.5	26.5	100.9	88.8	88.8	106.1	91.4	
Effective Green, g (s)		26.5			26.5	26.5	100.9	88.8	88.8	106.1	91.4	
Actuated g/C Ratio		0.18			0.18	0.18	0.67	0.59	0.59	0.71	0.61	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		548			625	279	185	2809	1062	298	2995	
v/s Ratio Prot		c0.13			0.09	0.12	0.05	0.32	0.04	c0.07	c0.43	
v/s Ratio Perm							0.34			0.42		
v/c Ratio		0.73			0.51	0.68	0.58	0.53	0.06	0.68	0.70	
Uniform Delay, d1		58.4			55.8	57.8	26.8	18.3	12.9	13.7	19.9	
Progression Factor		1.00			0.79	0.78	1.61	0.24	0.01	2.45	0.42	
Incremental Delay, d2		5.2			0.9	6.8	5.0	0.7	0.1	5.6	1.1	
Delay (s)		63.5			44.7	51.9	48.1	5.2	0.3	39.2	9.4	
Level of Service		E			D	D	D	A	A	D	A	
Approach Delay (s)		63.5			47.4			7.5			12.0	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			18.3		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			78.6%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	73	531	440	123	64	48	197	84	50	24
Future Volume (vph)	40	509	73	531	440	123	64	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3235		3319	3286			1690	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3235		3319	3286			1690	1478	3204	1739	1443
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)	41	525	75	547	454	127	66	49	203	87	52	25
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	131	0	0	23
Lane Group Flow (vph)	41	595	0	547	574	0	0	115	72	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	74.6	69.0		30.8	94.2			15.7	53.0	10.0	10.0	10.0
Effective Green, g (s)	74.6	69.0		30.8	94.2			15.7	53.0	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.46		0.21	0.63			0.10	0.35	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	406	1488		681	2063			176	522	213	115	96
v/s Ratio Prot	0.00	c0.18		c0.16	0.17			c0.07	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.10	0.40		0.80	0.28			0.65	0.14	0.41	0.45	0.02
Uniform Delay, d1	19.4	26.8		56.7	12.6			64.5	33.0	67.2	67.4	65.4
Progression Factor	0.88	0.72		0.92	1.78			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7		6.5	0.3			8.4	0.1	1.3	2.8	0.1
Delay (s)	17.2	20.0		58.6	22.7			73.0	33.1	68.4	70.2	65.5
Level of Service	B	C		E	C			E	C	E	E	E
Approach Delay (s)		19.8			40.1			47.5			68.5	
Approach LOS		B			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			37.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			67.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Total Future AM Phase 1 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	0	353	2	5	649	0
Future Volume (Veh/h)	0	0	0	1	0	4	0	353	2	5	649	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	0	447	3	6	822	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							184			256		
pX, platoon unblocked												
vC, conflicting volume	1062	1284	411	872	1282	225	822				450	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1062	1284	411	872	1282	225	822				450	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	99	100				99	
cM capacity (veh/h)	176	163	590	244	163	778	803				1107	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	6	298	152	280	548							
Volume Left	1	0	0	6	0							
Volume Right	5	0	3	0	0							
cSH	570	1700	1700	1107	1700							
Volume to Capacity	0.01	0.18	0.09	0.01	0.32							
Queue Length 95th (ft)	1	0	0	0	0							
Control Delay (s)	11.4	0.0	0.0	0.2	0.0							
Lane LOS	B				A							
Approach Delay (s)	11.4	0.0	0.1									
Approach LOS	B											
Intersection Summary												
Average Delay	0.1											
Intersection Capacity Utilization	31.4%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	22	16	32	6	33	7	313	49	36	572	5
Future Volume (vph)	9	22	16	32	6	33	7	313	49	36	572	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	12
Total Lost time (s)		4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00			0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.95		1.00	0.87			0.98			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1762		1770	1602			1819			3288	
Flt Permitted		0.99		0.95	1.00			0.99			0.92	
Satd. Flow (perm)		1762		1770	1602			1801			3039	
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)	9	23	16	33	6	34	7	323	51	37	590	5
RTOR Reduction (vph)	0	15	0	0	31	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	33	0	33	9	0	0	376	0	0	632	0
Confl. Peds. (#/hr)						3			11	11		
Confl. Bikes (#/hr)						1						
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		2.4		3.6	3.6			22.7			22.7	
Effective Green, g (s)		2.4		3.6	3.6			22.7			22.7	
Actuated g/C Ratio		0.06		0.09	0.09			0.54			0.54	
Clearance Time (s)		4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		100		150	136			968			1634	
v/s Ratio Prot		c0.02		c0.02	0.01							
v/s Ratio Perm								c0.21			0.21	
v/c Ratio		0.33		0.22	0.07			0.39			0.39	
Uniform Delay, d1		19.1		18.0	17.8			5.7			5.7	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.9		0.7	0.2			0.3			0.2	
Delay (s)		21.1		18.7	18.0			6.0			5.8	
Level of Service		C		B	B			A			A	
Approach Delay (s)		21.1			18.3			6.0			5.8	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.3			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			42.2			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			49.3%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 8: Chapman Ave & Pike Center South

Total Future AM Phase 1 Restricted
02/07/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑↑↑	
Traffic Volume (veh/h)	0	0	0	345	618	0
Future Volume (Veh/h)	0	0	0	345	618	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	406	727	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				111	176	
pX, platoon unblocked	0.95					
vC, conflicting volume	1133	242	727			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1115	242	727			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	193	758	872			
Direction, Lane #	NB 1	SB 1	SB 2	SB 3		
Volume Total	406	242	242	242		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	1700	1700		
Volume to Capacity	0.24	0.14	0.14	0.14		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS						
Approach Delay (s)	0.0	0.0				
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			21.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future AM Phase 1 Restricted

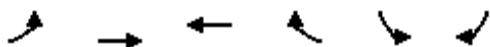
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	111	35	6	91	158	4	41	4	151	81	390
Future Volume (vph)	138	111	35	6	91	158	4	41	4	151	81	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1661		1630	1739	1433	1648	1713		1633	1739	1478
Flt Permitted	0.57	1.00		0.66	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	982	1661		1131	1739	1433	1218	1713		1248	1739	1478
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)	145	117	37	6	96	166	4	43	4	159	85	411
RTOR Reduction (vph)	0	15	0	0	0	114	0	3	0	0	0	186
Lane Group Flow (vph)	145	139	0	6	96	52	4	44	0	159	85	225
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	42.8	42.8		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.8
Effective Green, g (s)	42.8	42.8		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.8
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.31	0.31		0.31	0.31	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	645	907		353	544	448	373	525		382	533	807
v/s Ratio Prot	0.04	0.08			0.06			0.03			0.05	c0.15
v/s Ratio Perm	c0.09			0.01		0.04	0.00			c0.13		
v/c Ratio	0.22	0.15		0.02	0.18	0.12	0.01	0.08		0.42	0.16	0.28
Uniform Delay, d1	9.0	8.8		18.6	19.6	19.2	18.9	19.3		21.6	19.8	9.5
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	0.5	0.0		0.1	0.7	0.5	0.0	0.1		3.3	0.6	0.5
Delay (s)	9.5	8.8		18.7	20.3	19.7	18.9	19.4		24.9	20.4	10.0
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.2			19.9			19.4			15.0	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.8									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			78.3									Sum of lost time (s) 17.0
Intersection Capacity Utilization			59.0%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future AM Phase 1 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	278	506	14	0	39
Future Volume (Veh/h)	0	278	506	14	0	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	296	538	15	0	41
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	560				700	288
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560				700	288
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	94
cM capacity (veh/h)	1000				371	702
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	148	148	359	194	41	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	15	41	
cSH	1700	1700	1700	1700	702	
Volume to Capacity	0.09	0.09	0.21	0.11	0.06	
Queue Length 95th (ft)	0	0	0	0	5	
Control Delay (s)	0.0	0.0	0.0	0.0	10.4	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		10.4	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			25.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future AM Phase 1 Restricted
02/07/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18	
Future Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11	
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0		
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95		
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00		
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99		
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00		
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362		
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92		
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3113		
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)	18	48	29	250	35	41	10	264	370	22	237	20	
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	88	0	4	0	
Lane Group Flow (vph)	18	50	0	250	43	0	0	274	282	0	275	0	
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7	
Confl. Bikes (#/hr)			1			1			1			1	
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA		
Protected Phases	4	4		3	3			2	3		6		
Permitted Phases							2		2	6			
Actuated Green, G (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8		
Effective Green, g (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8		
Actuated g/C Ratio	0.07	0.07		0.19	0.19			0.57	0.76		0.57		
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0		
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0		
Lane Grp Cap (vph)	126	124		320	303			1020	1148		1787		
v/s Ratio Prot	0.01	c0.03		c0.15	0.03				0.05				
v/s Ratio Perm								c0.15	0.14		0.09		
v/c Ratio	0.14	0.40		0.78	0.14			0.27	0.25		0.15		
Uniform Delay, d1	36.8	37.6		32.9	28.8			9.1	3.0		8.5		
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d2	0.2	0.8		10.9	0.1			0.6	0.0		0.2		
Delay (s)	37.0	38.3		43.8	28.9			9.8	3.0		8.6		
Level of Service	D	D		D	C			A	A		A		
Approach Delay (s)		38.1			40.3			5.9			8.6		
Approach LOS		D			D			A			A		
Intersection Summary													
HCM 2000 Control Delay			17.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.40										
Actuated Cycle Length (s)			85.0									Sum of lost time (s)	14.0
Intersection Capacity Utilization			63.6%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike- 355 & Halpine Road

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	176	28	67	79	1274	311	63	1865	20
Future Volume (vph)	42	52	56	176	28	67	79	1274	311	63	1865	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4748		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.06	1.00		0.11	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	112	4748		199	4907	
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)	44	54	58	183	29	70	82	1327	324	66	1943	21
RTOR Reduction (vph)	0	47	0	0	0	57	0	19	0	0	0	0
Lane Group Flow (vph)	44	65	0	183	29	13	82	1632	0	66	1964	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	28.7	28.7		28.7	28.7	28.7	106.9	96.1		100.7	93.0	
Effective Green, g (s)	28.7	28.7		28.7	28.7	28.7	106.9	96.1		100.7	93.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19	0.19	0.71	0.64		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	262	607		234	356	302	194	3041		211	3042	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	c0.34		0.02	c0.40	
v/s Ratio Perm	0.03			c0.15			0.27			0.19		
v/c Ratio	0.17	0.11		0.78	0.08	0.04	0.42	0.54		0.31	0.65	
Uniform Delay, d1	50.7	50.1		57.7	49.8	49.5	14.3	14.8		10.0	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.16	1.21		1.00	1.00	
Incremental Delay, d2	0.6	0.2		17.8	0.2	0.1	2.7	0.6		1.8	1.1	
Delay (s)	51.3	50.2		75.4	50.0	49.6	33.7	18.5		11.8	19.1	
Level of Service	D	D		E	D	D	C	B		B	B	
Approach Delay (s)		50.5			66.4			19.2			18.9	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			23.4									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			74.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	507	4466		1017	3303	1437
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)	38	26	54	173	20	132	53	521	295	190	855	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	38	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	778	0	190	855	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	370	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.45	0.36		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	4.8	5.5		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			5.5			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay		20.2										
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		150.0								27.5		
Intersection Capacity Utilization		58.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	622	56	258	1041	134	80	54	123	147	74	14
Future Volume (vph)	16	622	56	258	1041	134	80	54	123	147	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		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
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3254		1768	3473		1711	1801	1531	1767	1863	1583
Flt Permitted	0.17	1.00		0.28	1.00		0.71	1.00	1.00	0.54	1.00	1.00
Satd. Flow (perm)	298	3254		529	3473		1272	1801	1531	1012	1863	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)	17	655	59	272	1096	141	84	57	129	155	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	714	0	272	1237	0	84	57	129	155	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	75.5	72.8		94.0	85.3		30.5	18.6	18.6	42.5	24.6	24.6
Effective Green, g (s)	75.5	72.8		94.0	85.3		30.5	18.6	18.6	42.5	24.6	24.6
Actuated g/C Ratio	0.50	0.49		0.63	0.57		0.20	0.12	0.12	0.28	0.16	0.16
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	174	1579		457	1974		293	223	189	376	305	259
v/s Ratio Prot	0.00	0.22		c0.06	c0.36		0.02	0.03	c0.08	c0.05	0.04	0.01
v/s Ratio Perm	0.05			0.31			0.04			0.07		
v/c Ratio	0.10	0.45		0.60	0.63		0.29	0.26	0.68	0.41	0.26	0.06
Uniform Delay, d1	19.8	25.5		14.5	21.7		50.1	59.4	62.9	42.4	54.7	52.9
Progression Factor	0.87	0.76		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		2.1	1.5		0.7	0.8	10.5	1.0	0.6	0.1
Delay (s)	17.4	20.1		16.6	23.2		50.8	60.3	73.4	43.4	55.3	53.0
Level of Service	B	C		B	C		D	E	E	D	E	D
Approach Delay (s)		20.1			22.0			63.6			47.7	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			27.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			67.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1827	116	48	2625	48
Future Volume (vph)	20	7	13	77	16	50	25	1827	116	48	2625	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6115		1711	4894	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.07	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6115		132	4894	
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)	20	7	13	79	16	51	26	1864	118	49	2679	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	4	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1978	0	49	2727	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.73		0.78	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4435		176	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.32		c0.01	c0.56	
v/s Ratio Perm	0.02			c0.06			0.18			0.21		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.45		0.28	0.76	
Uniform Delay, d1	61.0	60.3		63.7	60.9		12.1	8.4		4.8	11.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.96	0.26	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.0	0.9	
Delay (s)	62.2	60.6		70.9	61.6		14.7	8.7		5.7	3.9	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.8			3.9	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.2										
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		150.0								18.5		
Intersection Capacity Utilization		81.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 1 Restricted

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Future Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3229		1646	3303	1428	1711	1675		1681	1549	
Flt Permitted	0.16	1.00		0.33	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	282	3229		577	3303	1428	1711	1675		1681	1549	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	748	92	10	1290	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	23	0	5	0	0	0	0
Lane Group Flow (vph)	89	837	0	10	1290	53	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.71	0.70	0.70	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	302	2374		431	2296	992	58	56		98	90	
v/s Ratio Prot	c0.02	c0.26		0.00	c0.39		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.21			0.02		0.04						
v/c Ratio	0.29	0.35		0.02	0.56	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	6.7	7.1		6.2	11.4	7.2	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.24	0.31	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.0	0.9	0.1	2.7	1.4		2.2	4.5	
Delay (s)	7.4	7.5		1.5	4.4	0.9	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.5			4.2			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		8.1			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			23.0				
Intersection Capacity Utilization		59.0%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 17: Chapman Ave/Chapman Road & Thompson Ave

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		9			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	93	90	96	100	96			99		
cM capacity (veh/h)	360	385	647	339	384	832	1200			1350		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	602	361	1200	1350								
Volume to Capacity	0.08	0.15	0.04	0.01								
Queue Length 95th (ft)	6	13	3	0								
Control Delay (s)	11.5	16.7	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.5	16.7	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 18: Rockville Pike - 355 & Rollins Ave Extension

Total Future AM Phase 1 Restricted
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	35	1647	96	0	2183	
Future Volume (Veh/h)	0	35	1647	96	0	2183	
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)	0	38	1790	104	0	2373	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.78	0.68			0.68		
vC, conflicting volume	2633	649			1894		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	392	0			672		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	95			100		
cM capacity (veh/h)	456	738			623		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	38	716	716	462	791	791	791
Volume Left	0	0	0	0	0	0	0
Volume Right	38	0	0	104	0	0	0
cSH	738	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.42	0.42	0.27	0.47	0.47	0.47
Queue Length 95th (ft)	4	0	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.1	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			45.5%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

20: Driveway & Rollins Ave Extension

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	22	53	1	6	4	29	0	7	2	0	0
Future Volume (Veh/h)	0	22	53	1	6	4	29	0	7	2	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	58	1	7	4	32	0	8	2	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	302											
pX, platoon unblocked												
vC, conflicting volume	11			82			64	66	53	72	93	9
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			82			64	66	53	72	93	9
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	1608			1515			930	824	1014	911	797	1073
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	82	12	40	2								
Volume Left	0	1	32	2								
Volume Right	58	4	8	0								
cSH	1608	1515	945	911								
Volume to Capacity	0.00	0.00	0.04	0.00								
Queue Length 95th (ft)	0	0	3	0								
Control Delay (s)	0.0	0.6	9.0	9.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.6	9.0	9.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay				2.8								
Intersection Capacity Utilization				14.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis 34: Pike Center/Driveway

Total Future AM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	69	0	36	0	0	4	54	0	0
Future Volume (Veh/h)	0	0	0	69	0	36	0	0	4	54	0	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	75	0	39	0	0	4	59	0	0
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	159	122	0	120	120	2	0				4	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	159	122	0	120	120	2	0				4	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	91	100	96	100				96	
cM capacity (veh/h)	756	740	1085	832	742	1082	1623				1618	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	114	4	59								
Volume Left	0	75	0	59								
Volume Right	0	39	4	0								
cSH	1700	903	1700	1618								
Volume to Capacity	0.00	0.13	0.00	0.04								
Queue Length 95th (ft)	0	11	0	3								
Control Delay (s)	0.0	9.6	0.0	7.3								
Lane LOS	A	A		A								
Approach Delay (s)	0.0	9.6	0.0	7.3								
Approach LOS	A	A										
Intersection Summary												
Average Delay				8.6								
Intersection Capacity Utilization				22.3%	ICU Level of Service				A			
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	13486	13632	13614	13340	13460	13513
Vehs Exited	13073	13166	13153	12903	13027	13064
Starting Vehs	0	0	0	0	0	0
Ending Vehs	413	466	461	437	433	436
Travel Distance (mi)	8848	8935	8819	8693	8802	8819
Travel Time (hr)	530.3	537.4	533.1	519.5	532.2	530.5
Total Delay (hr)	246.9	250.8	249.8	239.8	248.5	247.1
Total Stops	17354	17631	17562	16970	17511	17409
Fuel Used (gal)	360.4	364.1	359.9	352.5	358.5	359.1

Interval #0 Information Seed

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2722	2710	2653	2677	2657	2683
Vehs Exited	2289	2278	2229	2280	2227	2260
Starting Vehs	0	0	0	0	0	0
Ending Vehs	433	432	424	397	430	412
Travel Distance (mi)	1643	1609	1571	1609	1619	1610
Travel Time (hr)	96.3	95.8	90.8	91.8	94.9	93.9
Total Delay (hr)	44.1	44.6	40.5	40.1	43.1	42.5
Total Stops	3086	3175	2920	2935	3128	3046
Fuel Used (gal)	66.1	64.6	62.4	63.9	64.8	64.3

Interval #1 Information 1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2742	2764	2681	2651	2674	2701
Vehs Exited	2733	2736	2685	2629	2690	2691
Starting Vehs	433	432	424	397	430	412
Ending Vehs	442	460	420	419	414	425
Travel Distance (mi)	1818	1851	1802	1778	1795	1809
Travel Time (hr)	112.6	112.5	111.5	106.5	107.7	110.1
Total Delay (hr)	54.2	53.1	53.8	49.3	49.8	52.1
Total Stops	3765	3691	3712	3507	3502	3635
Fuel Used (gal)	75.0	76.1	74.4	72.2	73.2	74.2

Interval #2 Information 2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2666	2661	2707	2649	2752	2680
Vehs Exited	2633	2720	2678	2637	2709	2674
Starting Vehs	442	460	420	419	414	425
Ending Vehs	475	401	449	431	457	435
Travel Distance (mi)	1789	1814	1767	1785	1827	1796
Travel Time (hr)	106.0	107.7	106.0	107.0	112.5	107.8
Total Delay (hr)	48.5	49.2	49.1	49.6	53.4	50.0
Total Stops	3465	3524	3468	3537	3723	3542
Fuel Used (gal)	72.3	73.9	72.3	72.6	74.8	73.2

Interval #3 Information 3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2708	2678	2782	2645	2649	2694
Vehs Exited	2743	2667	2811	2693	2659	2715
Starting Vehs	475	401	449	431	457	435
Ending Vehs	440	412	420	383	447	413
Travel Distance (mi)	1816	1774	1852	1750	1750	1789
Travel Time (hr)	107.9	104.0	114.3	106.2	105.9	107.6
Total Delay (hr)	49.5	47.0	54.3	49.7	49.4	50.0
Total Stops	3518	3371	3807	3423	3493	3516
Fuel Used (gal)	74.3	71.3	76.3	71.6	71.3	73.0

Interval #4 Information 4

Start Time 7:45
End Time 8:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2648	2819	2791	2718	2728	2735
Vehs Exited	2675	2765	2750	2664	2742	2721
Starting Vehs	440	412	420	383	447	413
Ending Vehs	413	466	461	437	433	436
Travel Distance (mi)	1783	1886	1826	1771	1811	1815
Travel Time (hr)	107.6	117.5	110.6	108.0	111.1	111.0
Total Delay (hr)	50.6	56.9	52.1	51.0	52.8	52.7
Total Stops	3520	3870	3655	3568	3665	3652
Fuel Used (gal)	72.8	78.1	74.5	72.4	74.4	74.4

Queuing and Blocking Report
Pike Center Total Future AM Phase 1

Total Future AM Phase 1 Restricted
02/07/2025

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	B28	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	LT	R	T	L	L	TR	L	T	T	T	R	L
Maximum Queue (ft)	118	71	8	206	218	192	185	384	378	384	157	180
Average Queue (ft)	36	25	0	163	172	46	43	189	182	184	53	77
95th Queue (ft)	82	64	4	241	243	133	111	314	309	315	115	143
Link Distance (ft)	71		317	194	194			414	414	414	414	
Upstream Blk Time (%)	5	1		10	15	0		0	0	0		0
Queuing Penalty (veh)	0	0		28	40	0		2	2	2		0
Storage Bay Dist (ft)		90				100	160					160
Storage Blk Time (%)	5	1			48	1	0	20				0
Queuing Penalty (veh)	1	0			29	2	0	7				1

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	214	233	223
Average Queue (ft)	148	165	173
95th Queue (ft)	227	243	249
Link Distance (ft)	198	198	198
Upstream Blk Time (%)	4	9	11
Queuing Penalty (veh)	32	63	82
Storage Bay Dist (ft)			
Storage Blk Time (%)	11		
Queuing Penalty (veh)	13		

Queuing and Blocking Report
Pike Center Total Future AM Phase 1

Total Future AM Phase 1 Restricted
02/07/2025

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	B25	WB	B24	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	LTR	T	L	T	T	TR	L	T	T
Maximum Queue (ft)	137	84	8	104	38	172	163	104	102	100	111	106
Average Queue (ft)	36	45	0	44	2	76	18	9	14	41	14	24
95th Queue (ft)	103	83	4	87	18	137	84	56	56	83	60	74
Link Distance (ft)	85		63	50	218		295	295	295		180	180
Upstream Blk Time (%)	5	0		17								
Queuing Penalty (veh)	0	0		0								
Storage Bay Dist (ft)		150				125				110		
Storage Blk Time (%)	5	0				3	0			0	0	
Queuing Penalty (veh)	3	0				17	0			0	0	

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	SB
Directions Served	TR
Maximum Queue (ft)	122
Average Queue (ft)	41
95th Queue (ft)	99
Link Distance (ft)	180
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	NB	NB	SB	SB
Directions Served	R	T	TR	T	T
Maximum Queue (ft)	49	15	24	6	6
Average Queue (ft)	15	0	1	0	0
95th Queue (ft)	40	8	10	4	4
Link Distance (ft)	54	180	180	261	261
Upstream Blk Time (%)	1				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	L	T	T
Maximum Queue (ft)	246	302	262	360	180	162	194	226	223	250	267	305
Average Queue (ft)	108	173	118	139	112	64	63	69	89	133	131	131
95th Queue (ft)	207	279	213	278	204	137	143	156	177	225	215	225
Link Distance (ft)	1311	1311	563	563			261	261	261		1192	1192
Upstream Blk Time (%)								0	0			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (ft)					65	130				350		
Storage Blk Time (%)				15	24	2	2		0			
Queuing Penalty (veh)				27	37	9	2		0			

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	343
Average Queue (ft)	125
95th Queue (ft)	233
Link Distance (ft)	1192
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	170	264	316	310	380	718	544	200	206	99	114	130
Average Queue (ft)	15	100	135	198	289	191	186	99	100	16	49	48
95th Queue (ft)	75	201	258	360	407	503	379	179	179	58	97	100
Link Distance (ft)		563	563			1327	1327	203	203		541	
Upstream Blk Time (%)						0		0	1			
Queuing Penalty (veh)						0		1	1			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)		7		1	21	1				0	5	
Queuing Penalty (veh)		3		1	47	4				0	5	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	T	TR	LT	T
Maximum Queue (ft)	26	5	39	63	193
Average Queue (ft)	4	0	1	4	32
95th Queue (ft)	20	5	13	31	126
Link Distance (ft)	61	134	134	203	203
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	LT	TR
Maximum Queue (ft)	72	48	55	157	145	166
Average Queue (ft)	28	17	22	62	43	97
95th Queue (ft)	56	39	48	125	111	185
Link Distance (ft)	228	71	71	139	134	134
Upstream Blk Time (%)		0	0	0	0	5
Queuing Penalty (veh)		0	0	2	1	16
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: Chapman Ave & Pike Center South

Movement	NB	SB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	118	128	65	156
Average Queue (ft)	43	29	4	106
95th Queue (ft)	96	97	27	184
Link Distance (ft)	57	139	139	139
Upstream Blk Time (%)	4	1		7
Queuing Penalty (veh)	14	1		15
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	L	TR	L	T	R
Maximum Queue (ft)	113	121	32	130	28	107	77	70	80
Average Queue (ft)	47	35	4	44	4	23	53	35	64
95th Queue (ft)	93	87	21	96	19	64	84	73	87
Link Distance (ft)	221	221		823		137	57	57	57
Upstream Blk Time (%)						0	13	4	21
Queuing Penalty (veh)						0	26	9	44
Storage Bay Dist (ft)			270		40				
Storage Blk Time (%)					0	4			
Queuing Penalty (veh)					0	0			

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	T	T	T	TR	R
Maximum Queue (ft)	6	6	150	168	66
Average Queue (ft)	0	0	28	44	26
95th Queue (ft)	5	4	99	131	56
Link Distance (ft)		194	221	221	79
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)	50				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	43	113	324	168	183	116	135	98
Average Queue (ft)	11	46	156	42	67	38	54	20
95th Queue (ft)	36	91	284	110	141	85	106	63
Link Distance (ft)	979	979	1311	1311	438	438	287	287
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Pike Center Total Future AM Phase 1

Total Future AM Phase 1 Restricted
02/07/2025

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	99	95	81	310	77	145	194	323	368	396	224	544
Average Queue (ft)	37	34	37	165	24	56	74	199	236	273	53	312
95th Queue (ft)	83	76	68	275	62	112	174	313	363	402	164	487
Link Distance (ft)		558	558	474	474			1192	1192	1192		696
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)							2	20				24
Queuing Penalty (veh)							7	16				15

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	498	315
Average Queue (ft)	262	149
95th Queue (ft)	435	291
Link Distance (ft)	696	696
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	95	128	133	150	210	75	117	133	214	67	145	352
Average Queue (ft)	34	44	64	77	87	22	32	50	76	4	68	160
95th Queue (ft)	74	93	117	134	163	53	84	103	159	37	129	289
Link Distance (ft)	444	444		907	907		1327	1327			414	414
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			0	0								
Queuing Penalty (veh)			0	0								

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	273	39
Average Queue (ft)	113	10
95th Queue (ft)	235	30
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	3	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	106	299	265	160	454	447	118	109	228	208	206	68
Average Queue (ft)	12	136	129	126	237	233	43	46	107	95	65	13
95th Queue (ft)	47	236	230	194	407	401	93	92	185	177	142	43
Link Distance (ft)		605	605		1099	1099		455	455		1627	1627
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	9		6	18					1	1	
Queuing Penalty (veh)	0	1		30	46					1	1	

Queuing and Blocking Report
Pike Center Total Future AM Phase 1

Total Future AM Phase 1 Restricted
02/07/2025

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	73	59	166	120	70	340	322	307	203	81	344	348
Average Queue (ft)	13	11	68	42	17	156	133	120	53	27	112	125
95th Queue (ft)	42	37	133	88	46	270	250	231	118	62	240	252
Link Distance (ft)	400	400	353	353		1536	1536	1536	1536		414	414
Upstream Blk Time (%)											0	0
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)											3	
Queuing Penalty (veh)											2	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	376
Average Queue (ft)	134
95th Queue (ft)	264
Link Distance (ft)	414
Upstream Blk Time (%)	0
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	93	196	182	81	299	305	179	57	47	57	107
Average Queue (ft)	35	67	46	6	51	49	10	14	9	18	39
95th Queue (ft)	71	153	118	38	180	179	68	40	34	47	82
Link Distance (ft)		525	525		605	605			382	233	233
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	330			165			200	200			
Storage Blk Time (%)				0	1	1					
Queuing Penalty (veh)				0	0	1					

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	56	71	47	33
Average Queue (ft)	23	25	8	2
95th Queue (ft)	47	52	32	14
Link Distance (ft)	404	248	541	363
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	69	39	70	20	136	181	174
Average Queue (ft)	26	1	2	1	11	23	32
95th Queue (ft)	55	25	30	13	72	102	116
Link Distance (ft)	179	198	198	198	295	295	295
Upstream Blk Time (%)		0	0		0	0	0
Queuing Penalty (veh)		0	0		0	1	0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 20: Driveway & Rollins Ave Extension

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	65	24
Average Queue (ft)	26	2
95th Queue (ft)	52	13
Link Distance (ft)	50	104
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 34: Pike Center/Driveway

Movement	WB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	63	30
Average Queue (ft)	35	2
95th Queue (ft)	56	13
Link Distance (ft)	36	50
Upstream Blk Time (%)	6	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 717

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Total Future PM Phase 1 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗	↘	↗↘	↗		↘	↗↗↘	↘	↘	↗↗↘	
Traffic Volume (vph)	17	31	36	339	21	221	57	2587	352	210	1771	18
Future Volume (vph)	17	31	36	339	21	221	57	2587	352	210	1771	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1683	1478	3204	1426		1711	4916	1531	1770	5071	
Flt Permitted		0.27	1.00	0.95	1.00		0.95	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		466	1478	3204	1426		1711	4916	1531	120	5071	
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)	18	32	37	349	22	228	59	2667	363	216	1826	19
RTOR Reduction (vph)	0	0	35	0	188	0	0	0	96	0	0	0
Lane Group Flow (vph)	0	50	2	349	62	0	59	2667	267	216	1845	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Confl. Bikes (#/hr)			1			1			1			
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	26.4	26.4		9.3	71.1	71.1	80.3	80.3	
Effective Green, g (s)		10.0	10.0	26.4	26.4		9.3	71.1	71.1	80.3	80.3	
Actuated g/C Ratio		0.07	0.07	0.18	0.18		0.06	0.47	0.47	0.54	0.54	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		31	98	563	250		106	2330	725	262	2714	
v/s Ratio Prot			0.00	c0.11	0.04		0.03	c0.54	0.17	c0.10	0.36	
v/s Ratio Perm		c0.11								0.34		
v/c Ratio		1.61	0.03	0.62	0.25		0.56	1.14	0.37	0.82	0.68	
Uniform Delay, d1		70.0	65.4	57.2	53.3		68.3	39.5	25.1	60.1	25.5	
Progression Factor		1.00	1.00	1.00	1.00		1.47	0.61	0.60	0.81	0.60	
Incremental Delay, d2		385.2	0.1	3.5	1.5		3.8	68.6	0.9	15.8	1.2	
Delay (s)		455.2	65.5	60.7	54.7		104.2	92.7	15.9	64.4	16.5	
Level of Service		F	E	E	D		F	F	B	E	B	
Approach Delay (s)		289.5			58.2			83.9			21.5	
Approach LOS		F			E			F			C	
Intersection Summary												
HCM 2000 Control Delay			62.3			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			93.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	127	8	133	115	9	42	197	2372	0	109	1728	13
Future Volume (vph)	127	8	133	115	9	42	197	2372	0	109	1728	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		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	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1656	1478		1953		1711	4916		1652	4737	
Flt Permitted		0.66	1.00		0.59		0.08	1.00		0.04	1.00	
Satd. Flow (perm)		1149	1478		1184		143	4916		74	4737	
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)	132	8	139	120	9	44	205	2471	0	114	1800	14
RTOR Reduction (vph)	0	0	117	0	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	140	22	0	165	0	205	2471	0	114	1814	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		24.0	24.0		24.0		113.0	98.3		105.0	94.3	
Effective Green, g (s)		24.0	24.0		24.0		113.0	98.3		105.0	94.3	
Actuated g/C Ratio		0.16	0.16		0.16		0.75	0.66		0.70	0.63	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		183	236		189		261	3221		164	2977	
v/s Ratio Prot			0.02				c0.08	0.50		0.05	0.38	
v/s Ratio Perm		0.12			c0.14		c0.52			0.44		
v/c Ratio		0.77	0.09		0.87		0.79	0.77		0.70	0.61	
Uniform Delay, d1		60.3	53.7		61.5		30.9	17.9		37.4	16.8	
Progression Factor		1.00	1.00		1.00		2.09	0.17		1.61	0.14	
Incremental Delay, d2		17.2	0.2		32.6		4.3	0.5		9.9	0.8	
Delay (s)		77.5	53.9		94.1		68.8	3.6		70.0	3.1	
Level of Service		E	D		F		E	A		E	A	
Approach Delay (s)		65.7			94.1			8.6			7.1	
Approach LOS		E			F			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				17.0		
Intersection Capacity Utilization			82.8%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Total Future PM Phase 1 Restricted
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	58	2497	44	0	1838	
Future Volume (Veh/h)	0	58	2497	44	0	1838	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	0	66	2838	50	0	2089	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.78	0.65			0.65		
vC, conflicting volume	3559	971			2888		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1005	0			2005		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	91			100		
cM capacity (veh/h)	185	701			182		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	1135	1135	618	696	696	696
Volume Left	0	0	0	0	0	0	0
Volume Right	66	0	0	50	0	0	0
cSH	701	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.67	0.67	0.36	0.41	0.41	0.41
Queue Length 95th (ft)	8	0	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.7	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			59.5%		ICU Level of Service		B
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 1 Restricted

4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 				  		  	
Traffic Volume (vph)	0	426	57	0	312	165	142	2157	121	204	1781	57
Future Volume (vph)	0	426	57	0	312	165	142	2157	121	204	1781	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5		7.5	7.0	5.5	5.5	7.0	5.5
Lane Util. Factor		0.95			0.95		1.00	1.00	0.91	1.00	1.00	0.91
Frpb, ped/bikes		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
Frt		0.98			1.00		0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3231			3539		1583	1652	4746	1794	1711	4883
Flt Permitted		1.00			1.00		1.00	0.07	1.00	1.00	0.05	1.00
Satd. Flow (perm)		3231			3539		1583	120	4746	1794	84	4883
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	315	167	143	2179	122	206	1799	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0	2	0
Lane Group Flow (vph)	0	488	0	0	315	167	143	2179	84	206	1855	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA		Prot	pm+pt	NA	Prot	pm+pt	NA
Protected Phases		4			8		8	1	6	6	5	2
Permitted Phases								6			2	
Actuated Green, G (s)		29.7			29.7		29.7	97.2	82.2	82.2	103.4	85.3
Effective Green, g (s)		29.7			29.7		29.7	97.2	82.2	82.2	103.4	85.3
Actuated g/C Ratio		0.20			0.20		0.20	0.65	0.55	0.55	0.69	0.57
Clearance Time (s)		7.5			7.5		7.5	7.0	5.5	5.5	7.0	5.5
Vehicle Extension (s)		4.0			4.0		4.0	4.0	0.2	0.2	4.0	0.2
Lane Grp Cap (vph)		639			700		313	230	2600	983	254	2776
v/s Ratio Prot		c0.15			0.09		0.11	0.06	c0.46	0.05	c0.10	0.38
v/s Ratio Perm								0.34			c0.46	
v/c Ratio		0.76			0.45		0.53	0.62	0.84	0.09	0.81	0.67
Uniform Delay, d1		56.8			53.0		53.9	25.9	28.3	16.1	47.5	22.5
Progression Factor		1.00			0.55		0.56	1.42	0.52	0.50	0.68	1.73
Incremental Delay, d2		5.7			0.6		2.0	4.3	2.5	0.1	13.1	0.9
Delay (s)		62.6			29.6		31.9	40.9	17.4	8.2	45.4	39.8
Level of Service		E			C		C	D	B	A	D	D
Approach Delay (s)		62.6			30.4				18.3			40.4
Approach LOS		E			C				B			D
Intersection Summary												
HCM 2000 Control Delay			31.6		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			90.8%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future PM Phase 1 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	134	469	586	141	73	109	592	215	119	37
Future Volume (vph)	68	739	134	469	586	141	73	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3213		3319	3305			1704	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	629	3213		3319	3305			1704	1478	3204	1739	1421
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)	70	762	138	484	604	145	75	112	610	222	123	38
RTOR Reduction (vph)	0	10	0	0	12	0	0	0	55	0	0	34
Lane Group Flow (vph)	70	890	0	484	737	0	0	187	555	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Effective Green, g (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	269	955		562	1377			443	698	352	191	156
v/s Ratio Prot	0.01	c0.28		c0.15	0.22			0.11	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	0.93		0.86	0.54			0.42	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.4	51.2		60.6	32.8			46.1	33.4	63.8	63.9	59.6
Progression Factor	1.76	1.46		1.01	1.10			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	15.7		11.9	1.4			0.7	6.3	3.7	7.2	0.1
Delay (s)	59.3	90.5		73.2	37.6			46.8	39.7	67.5	71.2	59.7
Level of Service	E	F		E	D			D	D	E	E	E
Approach Delay (s)		88.3			51.5			41.3			67.9	
Approach LOS		F			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			61.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	4	0	7	0	749	9	5	638	0
Future Volume (Veh/h)	0	0	0	4	0	7	0	749	9	5	638	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	4	0	8	0	832	10	6	709	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							184			256		
pX, platoon unblocked												
vC, conflicting volume	1145	1563	354	1204	1558	421	709				842	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1145	1563	354	1204	1558	421	709				842	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	97	100	99	100				99	
cM capacity (veh/h)	151	110	642	139	111	581	886				789	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	12	555	287	242	473							
Volume Left	4	0	0	6	0							
Volume Right	8	0	10	0	0							
cSH	282	1700	1700	789	1700							
Volume to Capacity	0.04	0.33	0.17	0.01	0.28							
Queue Length 95th (ft)	3	0	0	1	0							
Control Delay (s)	18.3	0.0	0.0	0.3	0.0							
Lane LOS	C				A							
Approach Delay (s)	18.3	0.0	0.1									
Approach LOS	C											
Intersection Summary												
Average Delay				0.2								
Intersection Capacity Utilization				31.1%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	19	36	59	20	89	3	639	49	49	593	0
Future Volume (vph)	30	19	36	59	20	89	3	639	49	49	593	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	12
Total Lost time (s)		4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.94		1.00	0.88			0.99			1.00	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1727		1770	1635			1838			3288	
Flt Permitted		0.98		0.95	1.00			1.00			0.87	
Satd. Flow (perm)		1727		1770	1635			1835			2867	
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)	31	20	37	61	21	92	3	659	51	51	611	0
RTOR Reduction (vph)	0	33	0	0	83	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	55	0	61	30	0	0	710	0	0	662	0
Confl. Peds. (#/hr)									18	18		
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		6.0		6.1	6.1			33.5			33.5	
Effective Green, g (s)		6.0		6.1	6.1			33.5			33.5	
Actuated g/C Ratio		0.10		0.10	0.10			0.57			0.57	
Clearance Time (s)		4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		175		182	168			1040			1625	
v/s Ratio Prot		c0.03		c0.03	0.02							
v/s Ratio Perm								c0.39			0.23	
v/c Ratio		0.31		0.34	0.18			0.68			0.41	
Uniform Delay, d1		24.6		24.6	24.2			9.0			7.2	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.0		1.1	0.5			1.9			0.2	
Delay (s)		25.7		25.7	24.7			10.9			7.4	
Level of Service		C		C	C			B			A	
Approach Delay (s)		25.7			25.1			10.9			7.4	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			11.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			59.1			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			68.6%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 8: Chapman Ave & Pike Center South

Total Future PM Phase 1 Restricted
02/07/2025

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑↑↑	
Traffic Volume (veh/h)	0	0	0	728	669	0
Future Volume (Veh/h)	0	0	0	728	669	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	856	787	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				111	176	
pX, platoon unblocked	0.83					
vC, conflicting volume	1643	262	787			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1671	262	787			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	72	736	828			
Direction, Lane #	NB 1	SB 1	SB 2	SB 3		
Volume Total	856	262	262	262		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	1700	1700		
Volume to Capacity	0.50	0.15	0.15	0.15		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS						
Approach Delay (s)	0.0	0.0				
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			41.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future PM Phase 1 Restricted

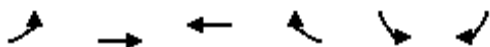
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	301	224	52	15	175	258	17	127	42	274	131	322
Future Volume (vph)	301	224	52	15	175	258	17	127	42	274	131	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1679		1640	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.51	1.00		0.58	1.00	1.00	0.67	1.00		0.65	1.00	1.00
Satd. Flow (perm)	882	1679		1008	1739	1422	1154	1660		1105	1739	1478
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)	314	233	54	16	182	269	18	132	44	285	136	335
RTOR Reduction (vph)	0	11	0	0	0	186	0	15	0	0	0	149
Lane Group Flow (vph)	314	276	0	16	182	83	18	161	0	285	136	186
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.1	44.1		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.1
Effective Green, g (s)	44.1	44.1		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.1
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	623	930		310	535	437	347	500		333	524	818
v/s Ratio Prot	c0.09	0.16			0.10			0.10			0.08	0.13
v/s Ratio Perm	c0.19			0.02		0.06	0.02			c0.26		
v/c Ratio	0.50	0.30		0.05	0.34	0.19	0.05	0.32		0.86	0.26	0.23
Uniform Delay, d1	10.1	9.5		19.4	21.3	20.3	19.7	21.5		26.2	21.1	9.1
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	1.8	0.1		0.3	1.7	1.0	0.1	0.4		23.5	1.2	0.4
Delay (s)	11.9	9.5		19.7	23.0	21.2	19.8	21.9		49.7	22.3	9.5
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		10.8			21.9			21.7			26.9	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			20.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			79.6			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			79.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future PM Phase 1 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	527	473	34	0	92
Future Volume (Veh/h)	0	527	473	34	0	92
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	543	488	35	0	95
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	530				784	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530				784	270
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	87
cM capacity (veh/h)	1027				328	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	272	272	325	198	95	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	35	95	
cSH	1700	1700	1700	1700	723	
Volume to Capacity	0.16	0.16	0.19	0.12	0.13	
Queue Length 95th (ft)	0	0	0	0	11	
Control Delay (s)	0.0	0.0	0.0	0.0	10.7	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		10.7	
Approach LOS					B	
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			26.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	412	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	98	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	315	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.0		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			71.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike- 355 & Halpine Road

Total Future PM Phase 1 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2162	105	99	1798	30
Future Volume (vph)	98	66	87	210	70	127	197	2162	105	99	1798	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4872		1711	4899	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	87	4872		90	4899	
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)	103	69	92	221	74	134	207	2276	111	104	1893	32
RTOR Reduction (vph)	0	72	0	0	0	105	0	3	0	0	1	0
Lane Group Flow (vph)	103	89	0	221	74	29	207	2384	0	104	1924	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Effective Green, g (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.70	0.58		0.61	0.53	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	275	684		255	404	344	277	2845		188	2609	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.49		0.05	0.39	
v/s Ratio Perm	0.08			c0.19			0.42			0.29		
v/c Ratio	0.37	0.13		0.87	0.18	0.08	0.75	0.84		0.55	0.74	
Uniform Delay, d1	50.0	47.3		56.6	47.8	46.8	44.9	25.4		29.6	27.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.40	0.47		1.00	1.00	
Incremental Delay, d2	1.8	0.2		27.0	0.5	0.2	8.6	2.1		5.9	1.9	
Delay (s)	51.8	47.5		83.6	48.3	47.0	71.3	13.9		35.5	28.9	
Level of Service	D	D		F	D	D	E	B		D	C	
Approach Delay (s)		49.2			66.1			18.5			29.2	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			28.0									
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			97.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future PM Phase 1 Restricted
02/07/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		326	3303	1428
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)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	139	0	19	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	150	33	1545	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Effective Green, g (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	127	119		253	256	396	338	2419		357	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.10	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.72	0.71	0.38	0.10	0.64		0.39	0.44	0.02
Uniform Delay, d1	65.7	66.8		60.1	60.1	45.7	14.9	25.2		16.4	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.86	0.86		1.00	1.00	1.00
Incremental Delay, d2	1.5	4.6		9.2	9.1	0.6	0.1	0.7		0.7	0.8	0.1
Delay (s)	67.2	71.4		69.4	69.2	46.3	12.9	22.4		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.2			59.1			22.2			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			27.5			
Intersection Capacity Utilization			70.6%			ICU Level of Service			C			
Analysis Period (min)			15									

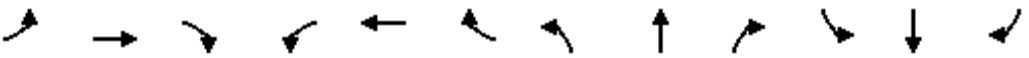
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future PM Phase 1 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1056	74	202	808	185	125	145	311	294	171	24
Future Volume (vph)	21	1056	74	202	808	185	125	145	311	294	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3254		1770	3418		1684	1801	1531	1763	1863	1583
Flt Permitted	0.19	1.00		0.06	1.00		0.64	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	330	3254		116	3418		1141	1801	1531	819	1863	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)	22	1112	78	213	851	195	132	153	327	309	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1190	0	213	1046	0	132	153	327	309	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	62.3	58.1		79.5	69.3		42.1	27.8	27.8	57.5	36.7	36.7
Effective Green, g (s)	62.3	58.1		79.5	69.3		42.1	27.8	27.8	57.5	36.7	36.7
Actuated g/C Ratio	0.42	0.39		0.53	0.46		0.28	0.19	0.19	0.38	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	174	1260		231	1579		372	333	283	459	455	387
v/s Ratio Prot	0.00	0.37		c0.09	0.31		0.03	0.08	c0.21	c0.10	0.10	0.02
v/s Ratio Perm	0.05			c0.39			0.07			0.15		
v/c Ratio	0.13	0.94		0.92	0.66		0.35	0.46	1.16	0.67	0.40	0.06
Uniform Delay, d1	27.1	44.4		46.7	31.3		42.1	54.4	61.1	35.2	47.4	43.5
Progression Factor	0.84	0.78		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	13.8		38.4	2.2		0.8	1.4	102.3	4.2	0.8	0.1
Delay (s)	23.1	48.5		85.0	33.5		42.9	55.8	163.4	39.4	48.1	43.6
Level of Service	C	D		F	C		D	E	F	D	D	D
Approach Delay (s)		48.0			42.2			110.5			42.7	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			55.9			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			90.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2668	250	161	2074	26
Future Volume (vph)	40	12	32	186	13	138	18	2668	250	161	2074	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6074		1711	4901	
Flt Permitted	0.54	1.00		0.73	1.00		0.06	1.00		0.04	1.00	
Satd. Flow (perm)	927	1589		1354	1496		100	6074		76	4901	
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)	42	12	33	194	14	144	19	2779	260	168	2160	27
RTOR Reduction (vph)	0	27	0	0	118	0	0	9	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	40	0	19	3030	0	168	2186	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Effective Green, g (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.62	0.59		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	168	289		246	272		116	3591		224	3241	
v/s Ratio Prot		0.01			0.03		0.01	c0.50		c0.08	c0.45	
v/s Ratio Perm	0.05			c0.14			0.10			0.47		
v/c Ratio	0.25	0.07		0.79	0.15		0.16	0.84		0.75	0.67	
Uniform Delay, d1	52.6	50.8		58.6	51.6		13.0	25.0		47.0	15.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.33	0.40	
Incremental Delay, d2	1.6	0.2		17.5	0.5		1.4	2.6		12.6	0.9	
Delay (s)	54.2	51.0		76.1	52.1		14.4	27.6		74.9	7.1	
Level of Service	D	D		E	D		B	C		E	A	
Approach Delay (s)		52.5			65.3			27.5			12.0	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		23.9					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		150.0					Sum of lost time (s)		18.5			
Intersection Capacity Utilization		99.5%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 1 Restricted

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Future Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3257		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.27	1.00		0.22	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	470	3257		386	3303	1432	1711	1665		1681	1573	
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)	150	1015	75	15	804	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	48	0	20	0	0	0	0
Lane Group Flow (vph)	150	1088	0	15	804	84	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Effective Green, g (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Actuated g/C Ratio	0.67	0.61		0.57	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	405	1993		247	1829	793	108	105		253	236	
v/s Ratio Prot	c0.03	c0.33		0.00	0.24		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.03		0.06						
v/c Ratio	0.37	0.55		0.06	0.44	0.11	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.9	17.0		14.2	19.7	15.8	67.9	66.9		59.1	60.6	
Progression Factor	1.00	1.00		0.56	0.44	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.1		0.1	0.6	0.2	4.6	1.7		3.4	10.6	
Delay (s)	11.7	18.0		8.1	9.3	1.9	72.4	68.6		62.5	71.2	
Level of Service	B	B		A	A	A	E	E		E	E	
Approach Delay (s)		17.3			8.3			70.6			67.2	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.0										
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		150.0								23.0		
Intersection Capacity Utilization		68.5%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			6	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		8			7			5			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	830	366	394			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	93	76	93	95	99	97			99		
cM capacity (veh/h)	235	251	545	133	250	624	1067			1097		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	409	207	1067	1097								
Volume to Capacity	0.43	0.13	0.03	0.01								
Queue Length 95th (ft)	53	11	2	0								
Control Delay (s)	20.3	25.0	1.0	0.2								
Lane LOS	C	D	A	A								
Approach Delay (s)	20.3	25.0	1.0	0.2								
Approach LOS	C	D										
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			51.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

Total Future PM Phase 1 Restricted
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	98	2605	245	0	1976	
Future Volume (Veh/h)	0	98	2605	245	0	1976	
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)	0	107	2832	266	0	2148	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.65	0.53			0.53		
vC, conflicting volume	3681	1077			3098		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	847	0			1864		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	81			100		
cM capacity (veh/h)	194	577			170		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	107	1133	1133	832	716	716	716
Volume Left	0	0	0	0	0	0	0
Volume Right	107	0	0	266	0	0	0
cSH	577	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.19	0.67	0.67	0.49	0.42	0.42	0.42
Queue Length 95th (ft)	17	0	0	0	0	0	0
Control Delay (s)	12.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.7	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			68.5%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

20: Driveway & Rollins Ave Extension

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	19	111	0	20	0	50	0	7	2	0	8
Future Volume (Veh/h)	32	19	111	0	20	0	50	0	7	2	0	8
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	21	121	0	22	0	54	0	8	2	0	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	302											
pX, platoon unblocked												
vC, conflicting volume	22			142			182	174	82	182	234	22
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	22			142			182	174	82	182	234	22
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			93	100	99	100	100	99
cM capacity (veh/h)	1593			1441			759	704	978	761	652	1055
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	177	22	62	11								
Volume Left	35	0	54	2								
Volume Right	121	0	8	9								
cSH	1593	1441	782	986								
Volume to Capacity	0.02	0.00	0.08	0.01								
Queue Length 95th (ft)	2	0	6	1								
Control Delay (s)	1.6	0.0	10.0	8.7								
Lane LOS	A		B	A								
Approach Delay (s)	1.6	0.0	10.0	8.7								
Approach LOS			B	A								
Intersection Summary												
Average Delay				3.7								
Intersection Capacity Utilization				32.8%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis 34: Pike Center/Driveway

Total Future PM Phase 1 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	128	0	57	0	0	67	111	0	0
Future Volume (Veh/h)	0	0	0	128	0	57	0	0	67	111	0	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	139	0	62	0	0	73	121	0	0
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	340	315	0	278	278	36	0			73		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	340	315	0	278	278	36	0			73		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	78	100	94	100			92		
cM capacity (veh/h)	542	553	1085	633	580	1036	1623			1527		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	201	73	121								
Volume Left	0	139	0	121								
Volume Right	0	62	73	0								
cSH	1700	719	1700	1527								
Volume to Capacity	0.00	0.28	0.04	0.08								
Queue Length 95th (ft)	0	29	0	6								
Control Delay (s)	0.0	11.9	0.0	7.6								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	11.9	0.0	7.6								
Approach LOS	A	B										
Intersection Summary												
Average Delay				8.4								
Intersection Capacity Utilization				30.1%	ICU Level of Service				A			
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	17799	18258	17909	18087	17969	17999
Vehs Exited	16920	17343	17046	17164	17062	17110
Starting Vehs	0	0	0	0	0	0
Ending Vehs	879	915	863	923	907	888
Travel Distance (mi)	10658	10971	10797	10900	10802	10825
Travel Time (hr)	1258.0	1174.1	1152.7	1185.8	1339.7	1222.1
Total Delay (hr)	910.3	815.8	800.2	830.4	987.8	868.9
Total Stops	31920	33928	32660	32859	33354	32939
Fuel Used (gal)	585.6	575.0	563.6	577.5	607.9	581.9

Interval #0 Information Seed

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3538	3663	3659	3615	3667	3625
Vehs Exited	2823	2907	2896	2920	2942	2899
Starting Vehs	0	0	0	0	0	0
Ending Vehs	715	756	763	695	725	721
Travel Distance (mi)	1906	1977	1978	1985	1967	1963
Travel Time (hr)	140.9	156.7	149.5	148.6	153.4	149.8
Total Delay (hr)	79.3	92.4	85.3	84.3	89.5	86.1
Total Stops	5011	5663	5502	5350	5321	5362
Fuel Used (gal)	83.9	90.4	87.4	88.1	89.0	87.8

Interval #1 Information 1

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3575	3673	3588	3606	3737	3630
Vehs Exited	3447	3632	3509	3454	3534	3517
Starting Vehs	715	756	763	695	725	721
Ending Vehs	843	797	842	847	928	846
Travel Distance (mi)	2150	2280	2213	2221	2254	2224
Travel Time (hr)	205.1	207.9	200.1	203.9	229.4	209.3
Total Delay (hr)	135.2	133.5	128.0	131.4	156.3	136.9
Total Stops	6320	6858	6682	6905	7072	6760
Fuel Used (gal)	106.9	111.1	107.0	109.3	114.5	109.8

Interval #2 Information 2

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3709	3678	3553	3673	3494	3615
Vehs Exited	3599	3563	3472	3575	3482	3535
Starting Vehs	843	797	842	847	928	846
Ending Vehs	953	912	923	945	940	927
Travel Distance (mi)	2257	2229	2205	2237	2179	2221
Travel Time (hr)	266.6	232.3	233.7	238.3	289.9	252.1
Total Delay (hr)	193.0	159.3	162.0	165.3	218.7	179.7
Total Stops	7176	7168	7084	6916	6961	7058
Fuel Used (gal)	124.4	115.2	114.8	117.3	127.5	119.8

Interval #3 Information 3

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3508	3580	3565	3606	3551	3559
Vehs Exited	3554	3570	3548	3649	3542	3571
Starting Vehs	953	912	923	945	940	927
Ending Vehs	907	922	940	902	949	913
Travel Distance (mi)	2159	2224	2177	2240	2193	2199
Travel Time (hr)	307.8	269.4	268.4	282.6	322.0	290.0
Total Delay (hr)	237.0	196.8	196.8	209.2	250.2	218.0
Total Stops	6799	7154	6790	6919	6900	6907
Fuel Used (gal)	131.4	124.1	122.9	128.3	135.4	128.4

Interval #4 Information 4

Start Time 5:45
End Time 6:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3469	3664	3544	3587	3520	3552
Vehs Exited	3497	3671	3621	3566	3562	3583
Starting Vehs	907	922	940	902	949	913
Ending Vehs	879	915	863	923	907	888
Travel Distance (mi)	2186	2260	2223	2217	2208	2219
Travel Time (hr)	337.6	307.8	300.9	312.4	345.0	320.8
Total Delay (hr)	265.9	233.9	228.2	240.2	273.0	248.2
Total Stops	6614	7085	6602	6769	7100	6829
Fuel Used (gal)	139.0	134.3	131.4	134.3	141.5	136.1

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	B28	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	LT	R	T	L	L	TR	L	T	T	T	R	L
Maximum Queue (ft)	140	71	66	207	233	194	199	452	474	461	452	198
Average Queue (ft)	68	41	6	126	161	139	74	381	388	405	210	161
95th Queue (ft)	137	84	36	199	241	217	174	519	533	551	448	233
Link Distance (ft)	71		317	194	194			414	414	414	414	
Upstream Blk Time (%)	25	5		1	10	3		11	9	27	7	8
Queuing Penalty (veh)	0	0		3	29	0		79	62	195	47	0
Storage Bay Dist (ft)		90				100	160					160
Storage Blk Time (%)	25	5			26	32	0	49				34
Queuing Penalty (veh)	9	2			63	54	0	28				200

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	239	236	233
Average Queue (ft)	191	171	174
95th Queue (ft)	269	242	243
Link Distance (ft)	198	198	198
Upstream Blk Time (%)	24	7	9
Queuing Penalty (veh)	157	47	62
Storage Bay Dist (ft)			
Storage Blk Time (%)	17		
Queuing Penalty (veh)	36		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	EB	EB	B25	WB	B24	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	LTR	T	L	T	T	TR	L	T	T
Maximum Queue (ft)	174	85	90	124	169	245	263	201	206	176	216	191
Average Queue (ft)	137	75	42	98	49	128	64	60	87	90	99	59
95th Queue (ft)	193	97	100	132	133	218	175	134	156	158	212	149
Link Distance (ft)	85		63	50	218		295	295	295		180	180
Upstream Blk Time (%)	39	8	16	55			0	0	0	0	5	0
Queuing Penalty (veh)	0	0	0	0			0	0	1	0	29	2
Storage Bay Dist (ft)		150				125				110		
Storage Blk Time (%)	39	8				16	1			16	11	
Queuing Penalty (veh)	52	11				129	2			91	12	

Intersection: 2: Rockville Pike - 355 & Federal Plaza/Pike Center

Movement	SB
Directions Served	TR
Maximum Queue (ft)	181
Average Queue (ft)	59
95th Queue (ft)	135
Link Distance (ft)	180
Upstream Blk Time (%)	0
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Rockville Pike - 355 & Gas Station

Movement	WB	B22	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	TR	T	T	T
Maximum Queue (ft)	106	34	53	101	130	111	58	69
Average Queue (ft)	38	2	5	10	15	11	4	3
95th Queue (ft)	81	24	34	58	75	56	29	29
Link Distance (ft)	54	181	180	180	180	261	261	261
Upstream Blk Time (%)	9			0	0			
Queuing Penalty (veh)	0			0	0			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	T	TR	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	302	325	246	340	180	204	257	280	270	207	465	675
Average Queue (ft)	161	195	111	115	98	53	173	191	200	23	157	381
95th Queue (ft)	260	300	199	254	191	135	259	279	289	142	377	575
Link Distance (ft)	1311	1311	563	563			261	261	261			1192
Upstream Blk Time (%)						0	1	2	3	0		
Queuing Penalty (veh)						0	7	15	24	0		
Storage Bay Dist (ft)					65	130				280	350	
Storage Blk Time (%)				8	20	2	24		3	0	0	14
Queuing Penalty (veh)			14	31	17	34		3	1	0		28

Intersection: 4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	677	650
Average Queue (ft)	363	347
95th Queue (ft)	555	544
Link Distance (ft)	1192	1192
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	200	486	570	310	379	744	684	221	222	158	184	211
Average Queue (ft)	77	354	386	223	274	272	256	134	203	73	106	98
95th Queue (ft)	215	526	590	348	414	608	507	221	241	148	171	173
Link Distance (ft)		563	563			1327	1327	203	203		541	
Upstream Blk Time (%)		0	3					4	32			
Queuing Penalty (veh)		0	12					14	121			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)	0	63		12	29	7				6	28	
Queuing Penalty (veh)	0	43		36	84	32				16	73	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	T	TR	LT	T
Maximum Queue (ft)	43	47	151	201	198
Average Queue (ft)	9	3	119	53	39
95th Queue (ft)	31	23	189	166	143
Link Distance (ft)	61	134	134	203	203
Upstream Blk Time (%)	0		18	2	1
Queuing Penalty (veh)	0		67	6	5
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	B50	NB	SB	SB
Directions Served	LTR	L	TR	T	LTR	LT	TR
Maximum Queue (ft)	131	95	109	7	163	167	159
Average Queue (ft)	51	31	47	0	139	113	92
95th Queue (ft)	99	68	87	4	179	194	182
Link Distance (ft)	228	71	71	148	139	134	134
Upstream Blk Time (%)		2	4		25	21	4
Queuing Penalty (veh)		0	0		184	69	13
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 8: Chapman Ave & Pike Center South

Movement	NB	SB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	210	162	82	150
Average Queue (ft)	153	112	11	66
95th Queue (ft)	225	194	45	150
Link Distance (ft)	57	139	139	139
Upstream Blk Time (%)	70	26		2
Queuing Penalty (veh)	482	59		5
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
Pike Center Total Future PM Phase 1

Total Future PM Phase 1 Restricted
02/07/2025

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	B35	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	T	L	T	R
Maximum Queue (ft)	218	166	112	388	546	89	209	119	101	70	81
Average Queue (ft)	104	62	12	109	171	15	103	8	66	49	59
95th Queue (ft)	186	132	62	287	530	56	197	61	89	84	89
Link Distance (ft)	221	221		823	823		137	285	57	57	57
Upstream Blk Time (%)	0						7	0	59	9	16
Queuing Penalty (veh)	1						20	0	131	20	35
Storage Bay Dist (ft)			270			40					
Storage Blk Time (%)				1		1	31				
Queuing Penalty (veh)				0		2	5				

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	T	T	T	TR	R
Maximum Queue (ft)	24	6	126	161	92
Average Queue (ft)	1	0	5	28	46
95th Queue (ft)	13	0	46	109	83
Link Distance (ft)		194	221	221	79
Upstream Blk Time (%)			0	0	6
Queuing Penalty (veh)			0	0	7
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	44	102	499	343	393	363	172	132
Average Queue (ft)	8	43	242	81	165	65	84	42
95th Queue (ft)	32	82	419	211	319	193	146	107
Link Distance (ft)	979	979	1311	1311	438	438	287	287
Upstream Blk Time (%)					1	0		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Pike Center Total Future PM Phase 1

Total Future PM Phase 1 Restricted
02/07/2025

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	171	120	142	396	191	219	194	338	502	247	225	694
Average Queue (ft)	78	45	55	223	50	105	133	125	102	78	112	422
95th Queue (ft)	143	94	104	377	115	184	209	282	288	158	249	639
Link Distance (ft)		558	558	474	474			1192	1192	1192		696
Upstream Blk Time (%)				0								0
Queuing Penalty (veh)				0								0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)							31	3			2	35
Queuing Penalty (veh)							225	6			10	35

Intersection: 12: Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	606	408
Average Queue (ft)	364	218
95th Queue (ft)	575	372
Link Distance (ft)	696	696
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	106	184	226	265	384	92	234	250	330	126	169	359
Average Queue (ft)	32	67	119	141	182	16	139	161	233	10	76	192
95th Queue (ft)	75	138	195	228	303	53	220	245	343	60	139	310
Link Distance (ft)	444	444		907	907		1327	1327			414	414
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			4	10			5			0	0	
Queuing Penalty (veh)			7	16			2			0	0	

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	295	86
Average Queue (ft)	145	10
95th Queue (ft)	267	50
Link Distance (ft)	414	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	6	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	140	553	570	160	465	461	225	486	491	290	306	66
Average Queue (ft)	21	294	305	138	270	280	116	354	417	157	126	19
95th Queue (ft)	73	519	530	195	433	432	252	629	582	263	240	52
Link Distance (ft)		605	605		1099	1099		455	455		1627	1627
Upstream Blk Time (%)		0	0					40	49			
Queuing Penalty (veh)		0	1					0	0			
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	33		22	21		7	18		9	4	
Queuing Penalty (veh)	0	7		88	41		10	22		15	12	

Queuing and Blocking Report
Pike Center Total Future PM Phase 1

Total Future PM Phase 1 Restricted
02/07/2025

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	171	92	348	363	730	1583	1581	1589	1585	199	289	280
Average Queue (ft)	59	24	188	243	102	1109	1093	1060	1022	111	114	126
95th Queue (ft)	158	64	352	426	504	1927	1927	1912	1920	200	242	247
Link Distance (ft)	400	400	353	353		1536	1536	1536	1536		414	414
Upstream Blk Time (%)			6	23		22	32	38	32			
Queuing Penalty (veh)			0	0		0	0	0	0			
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)						49				6	2	
Queuing Penalty (veh)						9				41	4	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	272
Average Queue (ft)	126
95th Queue (ft)	237
Link Distance (ft)	414
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	B45
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR	T
Maximum Queue (ft)	216	350	334	61	243	245	91	126	103	176	242	9
Average Queue (ft)	73	188	174	11	65	76	13	50	37	89	138	0
95th Queue (ft)	150	313	306	40	167	181	49	102	79	153	210	7
Link Distance (ft)		525	525		605	605			382	233	233	472
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	330			165			200	200				
Storage Blk Time (%)		0			1	1						
Queuing Penalty (veh)		0			0	1						

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	129	48	70	74
Average Queue (ft)	52	17	16	7
95th Queue (ft)	96	43	52	34
Link Distance (ft)	404	248	541	363
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	120	55	108	102	312	320	256
Average Queue (ft)	49	2	5	5	111	70	37
95th Queue (ft)	93	26	51	49	308	247	149
Link Distance (ft)	179	198	198	198	295	295	295
Upstream Blk Time (%)		0	0	0	3	0	0
Queuing Penalty (veh)		0	0	0	22	2	0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 20: Driveway & Rollins Ave Extension

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	31	56	35
Average Queue (ft)	1	26	7
95th Queue (ft)	13	49	29
Link Distance (ft)	179	50	104
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Pike Center/Driveway

Movement	WB	NB	SB
Directions Served	LTR	TR	LTR
Maximum Queue (ft)	74	27	44
Average Queue (ft)	45	3	10
95th Queue (ft)	66	17	34
Link Distance (ft)	36	79	50
Upstream Blk Time (%)	14		0
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 3700

APPENDIX E
PHASE 2 CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 2

1: Rockville Pike - 355 & Bou Ave

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖↗	↖		↖	↑↑↑	↗	↖	↑↑↑	
Traffic Volume (vph)	14	21	25	571	11	49	36	1762	137	141	2091	6
Future Volume (vph)	14	21	25	571	11	49	36	1762	137	141	2091	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.99		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	
Frt		1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1698	1478	3204	1501		1711	4916	1531	1770	5083	
Flt Permitted		0.28	1.00	0.95	1.00		0.95	1.00	1.00	0.07	1.00	
Satd. Flow (perm)		487	1478	3204	1501		1711	4916	1531	123	5083	
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)	15	22	26	595	11	51	38	1835	143	147	2178	6
RTOR Reduction (vph)	0	0	24	0	41	0	0	0	64	0	0	0
Lane Group Flow (vph)	0	37	2	595	21	0	38	1835	79	147	2184	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	29.0	29.0		7.6	67.5	67.5	79.4	79.4	
Effective Green, g (s)		10.0	10.0	29.0	29.0		7.6	67.5	67.5	79.4	79.4	
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.05	0.45	0.45	0.53	0.53	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		32	98	619	290		86	2212	688	273	2690	
v/s Ratio Prot			0.00	c0.19	0.01		0.02	c0.37	0.05	0.07	c0.43	
v/s Ratio Perm		c0.08								0.22		
v/c Ratio		1.16	0.02	0.96	0.07		0.44	0.83	0.12	0.54	0.81	
Uniform Delay, d1		70.0	65.4	59.9	49.5		69.1	36.2	23.9	46.4	29.1	
Progression Factor		1.00	1.00	1.00	1.00		1.38	0.78	0.46	0.66	0.44	
Incremental Delay, d2		209.8	0.1	27.4	0.3		3.3	3.5	0.3	1.7	2.4	
Delay (s)		279.8	65.5	87.3	49.8		99.0	31.6	11.4	32.2	15.2	
Level of Service		F	E	F	D		F	C	B	C	B	
Approach Delay (s)		191.4			83.8			31.4			16.3	
Approach LOS		F			F			C			B	
Intersection Summary												
HCM 2000 Control Delay			33.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			82.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/New Street

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	16	2	54	21	2	24	84	1591	11	18	2122	2
Future Volume (vph)	16	2	54	21	2	24	84	1591	11	18	2122	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1662	1478		1904		1711	4910		1651	4746	
Flt Permitted		0.82	1.00		0.85		0.06	1.00		0.13	1.00	
Satd. Flow (perm)		1419	1478		1649		106	4910		230	4746	
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)	17	2	56	22	2	25	88	1657	11	19	2210	2
RTOR Reduction (vph)	0	0	53	0	24	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	3	0	25	0	88	1668	0	19	2212	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		6.9	6.9		6.9		131.1	122.6		120.5	117.0	
Effective Green, g (s)		6.9	6.9		6.9		131.1	122.6		120.5	117.0	
Actuated g/C Ratio		0.05	0.05		0.05		0.87	0.82		0.80	0.78	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		65	67		75		190	4013		217	3701	
v/s Ratio Prot			0.00				c0.03	0.34		0.00	c0.47	
v/s Ratio Perm		0.01			c0.02		0.38			0.07		
v/c Ratio		0.29	0.04		0.34		0.46	0.42		0.09	0.60	
Uniform Delay, d1		69.2	68.4		69.3		7.9	3.8		3.0	6.8	
Progression Factor		1.00	1.00		0.98		4.34	0.05		0.26	0.27	
Incremental Delay, d2		2.5	0.2		2.6		1.1	0.2		0.1	0.5	
Delay (s)		71.7	68.6		70.5		35.6	0.4		0.9	2.3	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		69.4			70.5			2.2			2.3	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.3				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			69.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↑	
Traffic Volume (vph)	0	256	136	0	310	209	105	1474	123	238	2025	0
Future Volume (vph)	0	256	136	0	310	209	105	1474	123	238	2025	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			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	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3106			3539	1583	1652	4746	1794	1711	4916	
Flt Permitted		1.00			1.00	1.00	0.05	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		3106			3539	1583	94	4746	1794	200	4916	
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)	0	261	139	0	316	213	107	1504	126	243	2066	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	54	0	0	0
Lane Group Flow (vph)	0	400	0	0	316	213	107	1504	72	243	2066	0
Confl. Peds. (#/hr)	13		9	9		13			4	4		
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		27.8			27.8	27.8	97.3	85.2	85.2	107.1	90.1	
Effective Green, g (s)		27.8			27.8	27.8	97.3	85.2	85.2	107.1	90.1	
Actuated g/C Ratio		0.19			0.19	0.19	0.65	0.57	0.57	0.71	0.60	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		575			655	293	186	2695	1018	314	2952	
v/s Ratio Prot		0.13			0.09	c0.13	0.05	0.32	0.04	c0.09	c0.42	
v/s Ratio Perm							0.33			c0.46		
v/c Ratio		0.70			0.48	0.73	0.58	0.56	0.07	0.77	0.70	
Uniform Delay, d1		57.1			54.7	57.5	25.1	20.5	14.6	24.2	20.6	
Progression Factor		1.00			0.75	0.75	1.77	0.13	0.01	2.17	0.43	
Incremental Delay, d2		3.9			0.7	9.0	4.8	0.8	0.1	9.7	1.1	
Delay (s)		61.1			41.8	52.4	49.3	3.5	0.3	62.2	10.1	
Level of Service		E			D	D	D	A	A	E	B	
Approach Delay (s)		61.1			46.1			6.1			15.6	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			19.2		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			78.1%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	128	531	440	123	88	48	197	84	50	24
Future Volume (vph)	40	509	128	531	440	123	88	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3194		3319	3286			1684	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3194		3319	3286			1684	1478	3204	1739	1443
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)	41	525	132	547	454	127	91	49	203	87	52	25
RTOR Reduction (vph)	0	10	0	0	8	0	0	0	128	0	0	23
Lane Group Flow (vph)	41	647	0	547	573	0	0	140	75	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	72.5	66.8		30.8	91.9			17.9	55.2	10.0	10.0	10.0
Effective Green, g (s)	72.5	66.8		30.8	91.9			17.9	55.2	10.0	10.0	10.0
Actuated g/C Ratio	0.48	0.45		0.21	0.61			0.12	0.37	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	397	1422		681	2013			200	543	213	115	96
v/s Ratio Prot	0.00	c0.20		c0.16	0.17			c0.08	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.10	0.46		0.80	0.28			0.70	0.14	0.41	0.45	0.02
Uniform Delay, d1	20.5	28.9		56.7	13.6			63.5	31.6	67.2	67.4	65.4
Progression Factor	0.95	0.80		0.93	1.74			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.9		6.5	0.3			10.2	0.1	1.3	2.8	0.1
Delay (s)	19.5	24.0		59.3	24.1			73.7	31.7	68.4	70.2	65.5
Level of Service	B	C		E	C			E	C	E	E	E
Approach Delay (s)		23.8			41.2			48.8			68.5	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			39.0			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			68.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	0	35	1	0	4	8	353	2	5	652	52
Future Volume (Veh/h)	24	0	35	1	0	4	8	353	2	5	652	52
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	30	0	44	1	0	5	10	447	3	6	825	66
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							467			256		
pX, platoon unblocked												
vC, conflicting volume	1118	1340	446	937	1372	225	891				450	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1118	1340	446	937	1372	225	891				450	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	81	100	92	99	100	99	99				99	
cM capacity (veh/h)	158	149	560	199	142	778	757				1107	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	74	6	234	226	418	478						
Volume Left	30	1	10	0	6	0						
Volume Right	44	5	0	3	0	66						
cSH	276	524	757	1700	1107	1700						
Volume to Capacity	0.27	0.01	0.01	0.13	0.01	0.28						
Queue Length 95th (ft)	26	1	1	0	0	0						
Control Delay (s)	22.8	11.9	0.6	0.0	0.2	0.0						
Lane LOS	C	B	A		A							
Approach Delay (s)	22.8	11.9	0.3		0.1							
Approach LOS	C	B										
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				36.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	22	31	32	6	33	1	330	49	36	607	8
Future Volume (Veh/h)	0	22	31	32	6	33	1	330	49	36	607	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	23	32	33	6	34	1	340	51	37	626	8
Pedestrians					11						3	
Lane Width (ft)					12.0						10.0	
Walking Speed (ft/s)					3.5						3.5	
Percent Blockage					1						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								283			440	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1112	1108	317	809	1086	380	634			402		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1099	1095	317	787	1073	343	634			367		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	88	95	85	97	95	100			97		
cM capacity (veh/h)	144	197	679	227	203	624	945			1139		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	55	33	40	392	350	321						
Volume Left	0	33	0	1	37	0						
Volume Right	32	0	34	51	0	8						
cSH	335	227	476	945	1139	1700						
Volume to Capacity	0.16	0.15	0.08	0.00	0.03	0.19						
Queue Length 95th (ft)	14	13	7	0	3	0						
Control Delay (s)	17.8	23.5	13.3	0.0	1.2	0.0						
Lane LOS	C	C	B	A	A							
Approach Delay (s)	17.8	17.9		0.0	0.6							
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			57.5%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future AM Phase 2

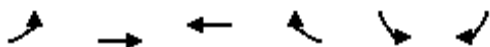
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	119	37	6	92	160	4	41	4	146	79	447
Future Volume (vph)	147	119	37	6	92	160	4	41	4	146	79	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1662		1630	1739	1433	1648	1713		1633	1739	1478
Flt Permitted	0.57	1.00		0.65	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	982	1662		1121	1739	1433	1220	1713		1248	1739	1478
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)	155	125	39	6	97	168	4	43	4	154	83	471
RTOR Reduction (vph)	0	14	0	0	0	116	0	3	0	0	0	213
Lane Group Flow (vph)	155	150	0	6	97	52	4	44	0	154	83	258
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	43.0	43.0		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.0
Effective Green, g (s)	43.0	43.0		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.0
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.31	0.31		0.31	0.31	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	647	910		349	542	447	372	523		381	531	809
v/s Ratio Prot	0.04	0.09			0.06			0.03			0.05	c0.17
v/s Ratio Perm	c0.09			0.01		0.04	0.00			c0.12		
v/c Ratio	0.24	0.16		0.02	0.18	0.12	0.01	0.08		0.40	0.16	0.32
Uniform Delay, d1	9.1	8.8		18.7	19.7	19.3	19.0	19.4		21.6	19.9	9.7
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	0.5	0.0		0.1	0.7	0.5	0.0	0.1		3.2	0.6	0.6
Delay (s)	9.6	8.9		18.8	20.4	19.8	19.0	19.5		24.8	20.5	10.4
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.2			20.0			19.5			14.7	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.6									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			78.5									Sum of lost time (s) 17.0
Intersection Capacity Utilization			62.5%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future AM Phase 2
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	9	278	563	15	19	42
Future Volume (Veh/h)	9	278	563	15	19	42
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	296	599	16	20	45
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	283			
pX, platoon unblocked						
vC, conflicting volume	622				782	318
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	622				782	318
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	93
cM capacity (veh/h)	948				325	670
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	109	197	399	216	65	
Volume Left	10	0	0	0	20	
Volume Right	0	0	0	16	45	
cSH	948	1700	1700	1700	505	
Volume to Capacity	0.01	0.12	0.23	0.13	0.13	
Queue Length 95th (ft)	1	0	0	0	11	
Control Delay (s)	0.9	0.0	0.0	0.0	13.2	
Lane LOS	A				B	
Approach Delay (s)	0.3		0.0		13.2	
Approach LOS					B	
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			27.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Future Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3113	
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)	18	48	29	250	35	41	10	264	370	22	237	20
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	88	0	4	0
Lane Group Flow (vph)	18	50	0	250	43	0	0	274	282	0	275	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8	
Effective Green, g (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8	
Actuated g/C Ratio	0.07	0.07		0.19	0.19			0.57	0.76		0.57	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		320	303			1020	1148		1787	
v/s Ratio Prot	0.01	c0.03		c0.15	0.03				0.05			
v/s Ratio Perm								c0.15	0.14		0.09	
v/c Ratio	0.14	0.40		0.78	0.14			0.27	0.25		0.15	
Uniform Delay, d1	36.8	37.6		32.9	28.8			9.1	3.0		8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		10.9	0.1			0.6	0.0		0.2	
Delay (s)	37.0	38.3		43.8	28.9			9.8	3.0		8.6	
Level of Service	D	D		D	C			A	A		A	
Approach Delay (s)		38.1			40.3			5.9			8.6	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			17.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			63.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	176	28	67	79	1301	311	63	1876	20
Future Volume (vph)	42	52	56	176	28	67	79	1301	311	63	1876	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4751		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.06	1.00		0.11	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	110	4751		191	4907	
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)	44	54	58	183	29	70	82	1355	324	66	1954	21
RTOR Reduction (vph)	0	47	0	0	0	57	0	19	0	0	0	0
Lane Group Flow (vph)	44	65	0	183	29	13	82	1660	0	66	1975	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	28.7	28.7		28.7	28.7	28.7	106.8	96.0		100.8	93.0	
Effective Green, g (s)	28.7	28.7		28.7	28.7	28.7	106.8	96.0		100.8	93.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19	0.19	0.71	0.64		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	262	607		234	356	302	193	3040		207	3042	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	c0.35		0.02	c0.40	
v/s Ratio Perm	0.03			c0.15			0.27			0.20		
v/c Ratio	0.17	0.11		0.78	0.08	0.04	0.42	0.55		0.32	0.65	
Uniform Delay, d1	50.7	50.1		57.7	49.8	49.5	14.6	14.9		10.1	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.12	1.34		1.00	1.00	
Incremental Delay, d2	0.6	0.2		17.8	0.2	0.1	2.7	0.6		1.9	1.1	
Delay (s)	51.3	50.2		75.4	50.0	49.6	33.5	20.7		12.0	19.2	
Level of Service	D	D		E	D	D	C	C		B	B	
Approach Delay (s)		50.5			66.4			21.3			19.0	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			24.2									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			74.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	507	4466		1017	3303	1437
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)	38	26	54	173	20	132	53	521	295	190	855	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	38	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	778	0	190	855	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	370	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.40	0.31		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	4.3	4.8		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			4.8			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.0									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			150.0							27.5		
Intersection Capacity Utilization			58.8%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	622	56	258	1041	137	80	54	123	150	74	14
Future Volume (vph)	16	622	56	258	1041	137	80	54	123	150	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		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
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3254		1768	3472		1711	1801	1531	1767	1863	1583
Flt Permitted	0.17	1.00		0.28	1.00		0.71	1.00	1.00	0.54	1.00	1.00
Satd. Flow (perm)	296	3254		529	3472		1272	1801	1531	1008	1863	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)	17	655	59	272	1096	144	84	57	129	158	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	714	0	272	1240	0	84	57	129	158	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	75.4	72.7		93.9	85.2		30.5	18.6	18.6	42.7	24.7	24.7
Effective Green, g (s)	75.4	72.7		93.9	85.2		30.5	18.6	18.6	42.7	24.7	24.7
Actuated g/C Ratio	0.50	0.48		0.63	0.57		0.20	0.12	0.12	0.28	0.16	0.16
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	173	1577		456	1972		293	223	189	378	306	260
v/s Ratio Prot	0.00	0.22		c0.06	c0.36		0.02	0.03	c0.08	c0.05	0.04	0.01
v/s Ratio Perm	0.05			0.31			0.04			0.07		
v/c Ratio	0.10	0.45		0.60	0.63		0.29	0.26	0.68	0.42	0.25	0.06
Uniform Delay, d1	19.9	25.5		14.5	21.8		50.1	59.4	62.9	42.3	54.6	52.8
Progression Factor	0.87	0.76		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		2.1	1.5		0.7	0.8	10.5	1.0	0.6	0.1
Delay (s)	17.5	20.2		16.6	23.3		50.8	60.3	73.4	43.3	55.2	53.0
Level of Service	B	C		B	C		D	E	E	D	E	D
Approach Delay (s)		20.1			22.1			63.6			47.6	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			28.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			67.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1847	116	48	2675	48
Future Volume (vph)	20	7	13	77	16	50	25	1847	116	48	2675	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6116		1711	4894	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.07	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6116		128	4894	
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)	20	7	13	79	16	51	26	1885	118	49	2730	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	4	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1999	0	49	2778	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.73		0.78	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4436		173	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.33		c0.01	c0.57	
v/s Ratio Perm	0.02			c0.06			0.18			0.21		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.45		0.28	0.77	
Uniform Delay, d1	61.0	60.3		63.7	60.9		12.8	8.4		4.9	11.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.96	0.26	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.0	0.9	
Delay (s)	62.2	60.6		70.9	61.6		15.4	8.7		5.7	4.0	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.8			4.1	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.2										
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		82.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Future Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3229		1646	3303	1428	1711	1675		1681	1549	
Flt Permitted	0.16	1.00		0.33	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	282	3229		577	3303	1428	1711	1675		1681	1549	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	748	92	10	1290	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	23	0	5	0	0	0	0
Lane Group Flow (vph)	89	837	0	10	1290	53	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.71	0.70	0.70	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	302	2374		431	2296	992	58	56		98	90	
v/s Ratio Prot	c0.02	c0.26		0.00	c0.39		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.21			0.02		0.04						
v/c Ratio	0.29	0.35		0.02	0.56	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	6.7	7.1		6.2	11.4	7.2	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.24	0.31	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.0	0.9	0.1	2.7	1.4		2.2	4.5	
Delay (s)	7.4	7.5		1.5	4.4	0.9	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.5			4.2			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay	8.1			HCM 2000 Level of Service			A					
HCM 2000 Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	150.0			Sum of lost time (s)			23.0					
Intersection Capacity Utilization	59.0%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
17: Chapman Ave/Chapman Road & Thompson Ave

Total Future AM Phase 2
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians	71			19			50			2		
Lane Width (ft)	16.0			16.0			12.0			12.0		
Walking Speed (ft/s)	3.5			3.5			3.5			3.5		
Percent Blockage	9			2			5			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	638											
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247				190	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247				190	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	93	90	96	100	96				99	
cM capacity (veh/h)	360	385	647	339	384	832	1200				1350	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	602	361	1200	1350								
Volume to Capacity	0.08	0.15	0.04	0.01								
Queue Length 95th (ft)	6	13	3	0								
Control Delay (s)	11.5	16.7	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.5	16.7	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay				3.8								
Intersection Capacity Utilization				41.9%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

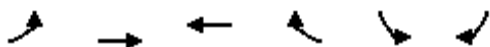
Total Future AM Phase 2
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			   			  	
Traffic Volume (veh/h)	0	46	1661	109	0	2190	
Future Volume (Veh/h)	0	46	1661	109	0	2190	
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)	0	50	1805	118	0	2380	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.77	0.67			0.67		
vC, conflicting volume	2657	661			1923		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	397	0			665		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	93			100		
cM capacity (veh/h)	447	729			618		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	50	722	722	479	793	793	793
Volume Left	0	0	0	0	0	0	0
Volume Right	50	0	0	118	0	0	0
cSH	729	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.42	0.42	0.28	0.47	0.47	0.47
Queue Length 95th (ft)	6	0	0	0	0	0	0
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.3	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			45.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

19: Rollins Ave Extension & New Street

Total Future AM Phase 2
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	0	98	46	30	0	0
Future Volume (Veh/h)	0	98	46	30	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	107	50	33	0	0
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	83				174	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	83				174	66
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1514				816	997
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	107	83	0			
Volume Left	0	0	0			
Volume Right	0	33	0			
cSH	1514	1700	1700			
Volume to Capacity	0.00	0.05	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			8.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

20: Driveway & Rollins Ave Extension

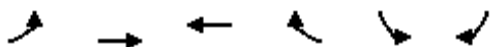
Total Future AM Phase 2
02/07/2025

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	63	24	6	36	40	2
Future Volume (Veh/h)	63	24	6	36	40	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	26	7	39	43	2
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			94			81
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			94			81
tC, single (s)			4.1			6.2
tC, 2 stage (s)						
tF (s)			2.2			3.3
p0 queue free %			100			100
cM capacity (veh/h)			1500			979
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	94	46	45			
Volume Left	0	7	43			
Volume Right	26	0	2			
cSH	1700	1500	861			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	1.2	9.4			
Lane LOS			A			
Approach Delay (s)	0.0	1.2	9.4			
Approach LOS			A			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			17.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

24: Rollins Ave Extension

Total Future AM Phase 2
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	41	24	12	3	28	30
Future Volume (Veh/h)	41	24	12	3	28	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	26	13	3	30	33
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	16				130	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	16				130	14
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	97
cM capacity (veh/h)	1602				839	1065
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	71	16	63			
Volume Left	45	0	30			
Volume Right	0	3	33			
cSH	1602	1700	944			
Volume to Capacity	0.03	0.01	0.07			
Queue Length 95th (ft)	2	0	5			
Control Delay (s)	4.7	0.0	9.1			
Lane LOS	A		A			
Approach Delay (s)	4.7	0.0	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			20.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

34: Pike Center/Driveway

Total Future AM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	75	0	42	0	0	41	51	0	0
Future Volume (Veh/h)	0	0	0	75	0	42	0	0	41	51	0	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	82	0	46	0	0	45	55	0	0
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	178	155	0	132	132	22	0				45	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178	155	0	132	132	22	0				45	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	90	100	96	100				96	
cM capacity (veh/h)	729	711	1085	817	732	1054	1623				1563	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	128	45	55								
Volume Left	0	82	0	55								
Volume Right	0	46	45	0								
cSH	1700	889	1700	1563								
Volume to Capacity	0.00	0.14	0.03	0.04								
Queue Length 95th (ft)	0	13	0	3								
Control Delay (s)	0.0	9.7	0.0	7.4								
Lane LOS	A	A		A								
Approach Delay (s)	0.0	9.7	0.0	7.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.2								
Intersection Capacity Utilization				22.9%	ICU Level of Service				A			
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	13780	13618	13719	13585	13725	13690
Vehs Exited	13401	13205	13356	13181	13301	13289
Starting Vehs	0	0	0	0	0	0
Ending Vehs	379	413	363	404	424	385
Travel Distance (mi)	7367	7220	7308	7265	7359	7304
Travel Time (hr)	483.8	475.1	491.8	479.7	494.0	484.9
Total Delay (hr)	245.3	241.4	255.9	245.5	255.8	248.8
Total Stops	17180	16856	17359	16780	17669	17175
Fuel Used (gal)	322.1	317.5	323.5	318.7	324.3	321.2

Interval #0 Information Seed

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2753	2711	2754	2755	2682	2732
Vehs Exited	2316	2317	2392	2336	2250	2322
Starting Vehs	0	0	0	0	0	0
Ending Vehs	437	394	362	419	432	396
Travel Distance (mi)	1369	1329	1359	1350	1286	1339
Travel Time (hr)	87.5	84.9	90.6	86.3	80.7	86.0
Total Delay (hr)	43.5	42.2	47.1	43.0	39.3	43.0
Total Stops	3100	2983	3357	3064	2953	3088
Fuel Used (gal)	58.7	57.5	59.9	58.3	55.2	57.9

Interval #1 Information 1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2775	2785	2764	2705	2767	2756
Vehs Exited	2792	2786	2704	2753	2823	2773
Starting Vehs	437	394	362	419	432	396
Ending Vehs	420	393	422	371	376	390
Travel Distance (mi)	1505	1521	1492	1487	1543	1510
Travel Time (hr)	100.5	102.4	101.4	97.9	105.0	101.5
Total Delay (hr)	51.7	53.2	53.4	50.1	55.1	52.7
Total Stops	3570	3676	3605	3400	3705	3590
Fuel Used (gal)	66.1	67.7	66.6	65.7	68.5	66.9

Interval #2 Information 2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2742	2660	2814	2723	2775	2735
Vehs Exited	2763	2623	2836	2673	2730	2723
Starting Vehs	420	393	422	371	376	390
Ending Vehs	399	430	400	421	421	406
Travel Distance (mi)	1509	1439	1530	1480	1526	1497
Travel Time (hr)	98.1	94.8	104.9	97.6	104.6	100.0
Total Delay (hr)	49.1	48.2	55.3	49.9	55.2	51.6
Total Stops	3470	3339	3666	3418	3715	3517
Fuel Used (gal)	66.1	63.2	68.3	64.9	67.8	66.0

Interval #3 Information 3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2745	2728	2668	2712	2689	2707
Vehs Exited	2756	2767	2690	2727	2703	2726
Starting Vehs	399	430	400	421	421	406
Ending Vehs	388	391	378	406	407	383
Travel Distance (mi)	1490	1479	1442	1478	1469	1471
Travel Time (hr)	98.7	96.6	94.5	98.6	97.2	97.1
Total Delay (hr)	50.4	48.5	48.0	50.8	49.6	49.5
Total Stops	3524	3411	3258	3432	3470	3424
Fuel Used (gal)	65.5	64.8	63.0	65.2	64.5	64.6

Interval #4 Information 4

Start Time 7:45
End Time 8:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2765	2734	2719	2690	2812	2740
Vehs Exited	2774	2712	2734	2692	2795	2737
Starting Vehs	388	391	378	406	407	383
Ending Vehs	379	413	363	404	424	385
Travel Distance (mi)	1493	1452	1485	1470	1535	1487
Travel Time (hr)	99.0	96.5	100.3	99.3	106.4	100.3
Total Delay (hr)	50.5	49.2	52.2	51.6	56.6	52.0
Total Stops	3516	3447	3473	3466	3826	3540
Fuel Used (gal)	65.6	64.3	65.8	64.7	68.4	65.8

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	L	TR	L	T	T	T	R	L	T
Maximum Queue (ft)	94	86	228	233	200	178	429	405	393	157	183	211
Average Queue (ft)	32	26	174	187	59	43	208	193	190	48	85	143
95th Queue (ft)	71	68	252	262	175	112	350	327	326	108	156	222
Link Distance (ft)	102		207	207			420	420	420	420		200
Upstream Blk Time (%)	0	0	8	14	0		0	0	0		0	3
Queuing Penalty (veh)	0	0	26	42	0		2	1	2		0	20
Storage Bay Dist (ft)		90			100	160					160	
Storage Blk Time (%)	1	0		46	1	0	24				1	10
Queuing Penalty (veh)	0	0		28	3	0	9				6	14

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	226	217
Average Queue (ft)	165	169
95th Queue (ft)	243	246
Link Distance (ft)	200	200
Upstream Blk Time (%)	7	9
Queuing Penalty (veh)	47	66
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/New Street

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	B3
Directions Served	LT	R	LTR	L	T	T	TR	L	T	T	TR	T
Maximum Queue (ft)	73	117	111	171	185	98	65	53	67	88	105	21
Average Queue (ft)	18	49	38	70	20	7	10	14	12	25	37	1
95th Queue (ft)	53	98	79	130	92	43	43	43	45	71	92	9
Link Distance (ft)	112		74		294	294	294		186	186	186	255
Upstream Blk Time (%)	0	1	5									
Queuing Penalty (veh)	0	0	1									
Storage Bay Dist (ft)		150		125				110				
Storage Blk Time (%)	0	1		3	0				0			
Queuing Penalty (veh)	0	0		15	0				0			

Intersection: 2: Rockville Pike - 355 & Federal Plaza/New Street

Movement	B3
Directions Served	T
Maximum Queue (ft)	22
Average Queue (ft)	1
95th Queue (ft)	10
Link Distance (ft)	255
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	B3	B3
Directions Served	T	TR	T	T	R	L	T	T	T	R	T	T
Maximum Queue (ft)	311	362	296	378	180	168	212	216	203	49	23	27
Average Queue (ft)	117	187	113	149	128	60	55	63	82	1	1	1
95th Queue (ft)	240	318	211	304	219	127	132	144	158	32	15	18
Link Distance (ft)	1311	1311	563	563			255	255	255		186	186
Upstream Blk Time (%)							0	0	0	0		
Queuing Penalty (veh)							1	1	1	0		
Storage Bay Dist (ft)					65	130					280	
Storage Blk Time (%)				14	32	1	1		0	0		
Queuing Penalty (veh)				30	50	6	1		0	0		

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	B3	SB	SB	SB	SB
Directions Served	T	L	T	T	TR
Maximum Queue (ft)	29	339	294	336	302
Average Queue (ft)	1	171	119	120	119
95th Queue (ft)	19	292	211	212	212
Link Distance (ft)	186		1192	1192	1192
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		350			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		3	0		

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	170	329	420	310	380	646	540	209	202	99	133	135
Average Queue (ft)	19	131	178	184	289	202	211	106	105	18	55	48
95th Queue (ft)	90	278	345	350	410	489	415	194	188	63	108	106
Link Distance (ft)		563	563			1314	1314	200	200		541	
Upstream Blk Time (%)								1	1			
Queuing Penalty (veh)								2	2			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)		14		0	22	1				1	7	
Queuing Penalty (veh)		6		1	49	4				1	8	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	75	22	59	26	47	43
Average Queue (ft)	30	4	5	2	2	3
95th Queue (ft)	58	17	33	16	19	25
Link Distance (ft)	67	67	130	130	200	200
Upstream Blk Time (%)	1		0			
Queuing Penalty (veh)	0		0			
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	NB	B8	SB	SB
Directions Served	LTR	L	TR	LTR	T	LT	TR
Maximum Queue (ft)	63	58	65	52	77	72	112
Average Queue (ft)	29	17	26	2	15	14	12
95th Queue (ft)	58	43	52	21	50	51	62
Link Distance (ft)	58	94	94	128	40	130	130
Upstream Blk Time (%)	3		0	0	1		0
Queuing Penalty (veh)	2		0	0	2		1
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB	B8	B8	B8
Directions Served	L	TR	L	T	L	TR	L	T	R	T	T	T
Maximum Queue (ft)	140	155	35	128	28	93	120	105	137	66	7	181
Average Queue (ft)	52	44	5	44	1	26	66	37	100	5	0	67
95th Queue (ft)	107	101	24	92	11	69	121	78	148	30	5	171
Link Distance (ft)	221	221		821		143	40	40	40	128	128	128
Upstream Blk Time (%)							22	9	26			3
Queuing Penalty (veh)							48	20	58			7
Storage Bay Dist (ft)			270		40							
Storage Blk Time (%)					0	4						
Queuing Penalty (veh)					0	0						

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	54	6	160	181	73
Average Queue (ft)	5	0	25	38	34
95th Queue (ft)	27	0	102	125	61
Link Distance (ft)		207	221	221	70
Upstream Blk Time (%)			0	0	1
Queuing Penalty (veh)			0	0	1
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	55	118	302	187	188	118	125	78
Average Queue (ft)	13	45	153	41	64	36	54	12
95th Queue (ft)	39	91	271	111	131	82	107	41
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	98	111	108	300	82	133	194	352	391	442	225	349
Average Queue (ft)	37	39	35	153	24	54	75	204	243	282	64	315
95th Queue (ft)	79	84	77	252	64	106	177	320	374	418	192	386
Link Distance (ft)		337	337	329	329			1192	1192	1192		315
Upstream Blk Time (%)				0								16
Queuing Penalty (veh)				0								0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)							1	19				28
Queuing Penalty (veh)							3	15				17

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	334	315
Average Queue (ft)	250	154
95th Queue (ft)	362	282
Link Distance (ft)	315	315
Upstream Blk Time (%)	2	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Dirve

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	83	116	157	169	199	81	128	146	227	144	172	340
Average Queue (ft)	29	47	67	81	90	26	37	55	85	7	74	174
95th Queue (ft)	68	95	125	145	163	60	93	115	176	50	132	304
Link Distance (ft)	354	354		496	496		1314	1314			410	410
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			0	0			0				0	
Queuing Penalty (veh)			0	0			0				0	

Intersection: 13: Twinbrook Parkway & Parklawn Dirve

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	308	43
Average Queue (ft)	123	12
95th Queue (ft)	258	33
Link Distance (ft)	410	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	5	
Queuing Penalty (veh)	3	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	139	277	249	160	296	299	118	119	156	210	188	57
Average Queue (ft)	18	139	126	113	219	210	43	42	104	94	71	13
95th Queue (ft)	70	232	218	191	354	339	93	89	166	171	141	41
Link Distance (ft)		605	605		276	276		139	139		1627	1627
Upstream Blk Time (%)					8	6	0	0	10			
Queuing Penalty (veh)					0	0	0	0	0			
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	10		8	17		0	0		1	0	
Queuing Penalty (veh)	0	2		40	43		0	0		1	0	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	68	50	143	134	56	336	290	285	173	109	293	313
Average Queue (ft)	15	12	66	43	14	167	134	126	54	28	125	135
95th Queue (ft)	45	36	122	94	39	286	247	233	124	70	240	248
Link Distance (ft)	179	179	167	167		1110	1110	1110	1110		420	420
Upstream Blk Time (%)			0	0							0	0
Queuing Penalty (veh)			0	0							0	1
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)											4	
Queuing Penalty (veh)											2	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	311
Average Queue (ft)	146
95th Queue (ft)	258
Link Distance (ft)	420
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	83	191	174	84	326	284	133	54	55	60	99
Average Queue (ft)	39	64	50	6	52	52	9	12	14	19	41
95th Queue (ft)	72	149	130	38	188	186	69	39	41	47	83
Link Distance (ft)		372	372		605	605			382	233	233
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	330			165			200	200			
Storage Blk Time (%)					1	1					
Queuing Penalty (veh)					0	1					

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	64	60	66	42
Average Queue (ft)	25	25	12	3
95th Queue (ft)	50	48	45	19
Link Distance (ft)	198	143	541	205
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	77	27	68	60	161	172	182
Average Queue (ft)	28	1	2	2	11	19	25
95th Queue (ft)	57	18	23	25	76	93	104
Link Distance (ft)	84	200	200	200	294	294	294
Upstream Blk Time (%)	0					0	0
Queuing Penalty (veh)	0					0	0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 19: Rollins Ave Extension & New Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 20: Driveway & Rollins Ave Extension

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	18	60
Average Queue (ft)	0	24
95th Queue (ft)	6	50
Link Distance (ft)	96	71
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 24: Rollins Ave Extension

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	17	71
Average Queue (ft)	1	29
95th Queue (ft)	10	55
Link Distance (ft)	96	64
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 34: Pike Center/Driveway

Movement	WB	NB	SB
Directions Served	LTR	TR	LTR
Maximum Queue (ft)	74	40	43
Average Queue (ft)	37	4	6
95th Queue (ft)	56	20	28
Link Distance (ft)	33	70	71
Upstream Blk Time (%)	8		0
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 715

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 2

1: Rockville Pike - 355 & Bou Ave

02/07/2025

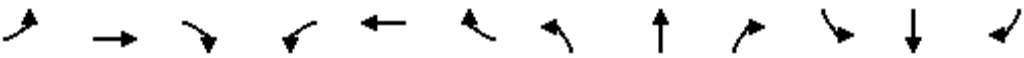
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖↗	↖		↖	↑↑↑	↗	↖	↑↑↑	
Traffic Volume (vph)	17	31	36	454	21	216	57	2527	460	225	1694	18
Future Volume (vph)	17	31	36	454	21	216	57	2527	460	225	1694	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1683	1478	3204	1432		1711	4916	1531	1770	5070	
Flt Permitted		0.27	1.00	0.95	1.00		0.95	1.00	1.00	0.07	1.00	
Satd. Flow (perm)		466	1478	3204	1432		1711	4916	1531	124	5070	
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)	18	32	37	468	22	223	59	2605	474	232	1746	19
RTOR Reduction (vph)	0	0	35	0	181	0	0	0	132	0	0	0
Lane Group Flow (vph)	0	50	2	468	64	0	59	2605	342	232	1765	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	28.4	28.4		9.3	69.1	69.1	78.3	78.3	
Effective Green, g (s)		10.0	10.0	28.4	28.4		9.3	69.1	69.1	78.3	78.3	
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.06	0.46	0.46	0.52	0.52	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		31	98	606	271		106	2264	705	262	2646	
v/s Ratio Prot			0.00	c0.15	0.04		0.03	c0.53	0.22	c0.11	0.35	
v/s Ratio Perm		c0.11								0.36		
v/c Ratio		1.61	0.03	0.77	0.24		0.56	1.15	0.49	0.89	0.67	
Uniform Delay, d1		70.0	65.4	57.7	51.6		68.3	40.5	28.1	60.7	26.3	
Progression Factor		1.00	1.00	1.00	1.00		1.45	0.63	0.56	0.78	0.55	
Incremental Delay, d2		385.2	0.1	7.6	1.3		3.7	71.1	1.4	24.4	1.1	
Delay (s)		455.2	65.5	65.4	52.9		102.8	96.8	17.1	71.7	15.6	
Level of Service		F	E	E	D		F	F	B	E	B	
Approach Delay (s)		289.5			61.1			84.9			22.2	
Approach LOS		F			E			F			C	
Intersection Summary												
HCM 2000 Control Delay			63.9			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			96.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/New Street

Total Future PM Phase 2

02/07/2025

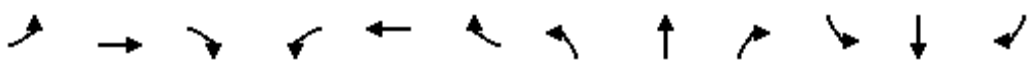
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	127	8	133	38	9	17	197	2393	0	49	1744	13
Future Volume (vph)	127	8	133	38	9	17	197	2393	0	49	1744	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		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	
Frt		1.00	0.85		0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1654	1478		1958		1711	4916		1652	4738	
Flt Permitted		0.71	1.00		0.61		0.08	1.00		0.04	1.00	
Satd. Flow (perm)		1230	1478		1231		139	4916		73	4738	
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)	132	8	139	40	9	18	205	2493	0	51	1817	14
RTOR Reduction (vph)	0	0	118	0	9	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	140	21	0	58	0	205	2493	0	51	1831	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		22.3	22.3		22.3		115.7	104.8		101.1	95.2	
Effective Green, g (s)		22.3	22.3		22.3		115.7	104.8		101.1	95.2	
Actuated g/C Ratio		0.15	0.15		0.15		0.77	0.70		0.67	0.63	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		182	219		183		269	3434		111	3007	
v/s Ratio Prot			0.01				c0.08	0.51		0.02	0.39	
v/s Ratio Perm		c0.11			0.05		c0.51			0.29		
v/c Ratio		0.77	0.09		0.31		0.76	0.73		0.46	0.61	
Uniform Delay, d1		61.4	55.1		57.0		31.3	13.8		14.4	16.3	
Progression Factor		1.00	1.00		1.00		2.14	0.16		2.03	0.10	
Incremental Delay, d2		17.6	0.2		1.0		3.7	0.4		2.3	0.7	
Delay (s)		79.0	55.3		58.0		70.5	2.6		31.6	2.3	
Level of Service		E	E		E		E	A		C	A	
Approach Delay (s)		67.2			58.0			7.8			3.1	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			77.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	426	57	0	312	190	142	2153	121	275	1737	57
Future Volume (vph)	0	426	57	0	312	190	142	2153	121	275	1737	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		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	
Frt		0.98			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3231			3539	1583	1652	4746	1794	1711	4883	
Flt Permitted		1.00			1.00	1.00	0.08	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		3231			3539	1583	139	4746	1794	86	4883	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	315	192	143	2175	122	278	1755	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	42	0	2	0
Lane Group Flow (vph)	0	488	0	0	315	192	143	2175	80	278	1811	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.7			29.7	29.7	91.6	76.6	76.6	107.3	85.3	
Effective Green, g (s)		29.7			29.7	29.7	91.6	76.6	76.6	107.3	85.3	
Actuated g/C Ratio		0.20			0.20	0.20	0.61	0.51	0.51	0.72	0.57	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		639			700	313	236	2423	916	318	2776	
v/s Ratio Prot		c0.15			0.09	0.12	0.06	0.46	0.04	c0.14	c0.37	
v/s Ratio Perm							0.31			c0.49		
v/c Ratio		0.76			0.45	0.61	0.61	0.90	0.09	0.87	0.65	
Uniform Delay, d1		56.8			53.0	54.9	19.6	33.2	18.8	50.3	22.2	
Progression Factor		1.00			0.58	0.59	1.49	0.47	0.37	0.69	1.74	
Incremental Delay, d2		5.7			0.6	3.6	3.5	4.2	0.1	16.6	0.8	
Delay (s)		62.6			31.3	36.2	32.8	19.9	7.1	51.4	39.5	
Level of Service		E			C	D	C	B	A	D	D	
Approach Delay (s)		62.6			33.2			20.0			41.1	
Approach LOS		E			C			B			D	
Intersection Summary												
HCM 2000 Control Delay		32.9			HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)					20.0		
Intersection Capacity Utilization		94.6%			ICU Level of Service					F		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	205	469	586	141	98	109	592	215	119	37
Future Volume (vph)	68	739	205	469	586	141	98	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3176		3319	3305			1698	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	629	3176		3319	3305			1698	1478	3204	1739	1421
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)	70	762	211	484	604	145	101	112	610	222	123	38
RTOR Reduction (vph)	0	17	0	0	12	0	0	0	55	0	0	34
Lane Group Flow (vph)	70	956	0	484	737	0	0	213	555	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Effective Green, g (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	269	944		562	1377			441	698	352	191	156
v/s Ratio Prot	0.01	c0.30		c0.15	0.22			0.13	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	1.01		0.86	0.54			0.48	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.4	52.7		60.6	32.8			47.0	33.4	63.8	63.9	59.6
Progression Factor	1.72	1.45		1.01	1.10			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	30.7		11.9	1.4			0.8	6.3	3.7	7.2	0.1
Delay (s)	57.7	107.0		73.2	37.6			47.8	39.7	67.5	71.2	59.7
Level of Service	E	F		E	D			D	D	E	E	E
Approach Delay (s)		103.7			51.5			41.8			67.9	
Approach LOS		F			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			66.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			93.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Total Future PM Phase 2
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	1	37	4	1	7	41	743	8	5	651	58
Future Volume (Veh/h)	31	1	37	4	1	7	41	743	8	5	651	58
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	34	1	41	4	1	8	46	826	9	6	723	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (ft)	467								256			
pX, platoon unblocked												
vC, conflicting volume	1280	1694	394	1338	1722	418	787	835				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1280	1694	394	1338	1722	418	787	835				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	70	99	93	96	99	99	94	99				
cM capacity (veh/h)	114	86	606	98	83	584	828	794				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	76	13	459	422	368	426						
Volume Left	34	4	46	0	6	0						
Volume Right	41	8	0	9	0	64						
cSH	202	195	828	1700	794	1700						
Volume to Capacity	0.38	0.07	0.06	0.25	0.01	0.25						
Queue Length 95th (ft)	41	5	4	0	1	0						
Control Delay (s)	33.3	24.8	1.6	0.0	0.2	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	33.3	24.8	0.8		0.1							
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			58.0%	ICU Level of Service				B				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	19	4	59	20	89	29	689	49	45	637	10
Future Volume (Veh/h)	14	19	4	59	20	89	29	689	49	45	637	10
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)	14	20	4	61	21	92	30	710	51	46	657	10
Pedestrians	18											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	3.5											
Percent Blockage	2											
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							283			440		
pX, platoon unblocked	0.83	0.83		0.83	0.83	0.83				0.83		
vC, conflicting volume	1652	1593	334	1248	1572	754	667			779		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1684	1612	334	1196	1588	598	667			629		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	50	74	99	28	73	75	97			94		
cM capacity (veh/h)	28	76	662	84	79	362	919			772		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	38	61	113	791	374	338						
Volume Left	14	61	0	30	46	0						
Volume Right	4	0	92	51	0	10						
cSH	49	84	218	919	772	1700						
Volume to Capacity	0.77	0.72	0.52	0.03	0.06	0.20						
Queue Length 95th (ft)	78	88	67	3	5	0						
Control Delay (s)	194.2	118.6	38.2	0.9	1.9	0.0						
Lane LOS	F	F	E	A	A							
Approach Delay (s)	194.2	66.3		0.9	1.0							
Approach LOS	F	F										
Intersection Summary												
Average Delay	11.8											
Intersection Capacity Utilization	78.4%			ICU Level of Service			D					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future PM Phase 2

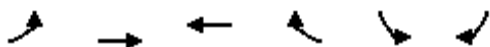
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	367	242	56	15	169	268	17	127	42	254	127	358
Future Volume (vph)	367	242	56	15	169	268	17	127	42	254	127	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1680		1640	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.52	1.00		0.57	1.00	1.00	0.67	1.00		0.64	1.00	1.00
Satd. Flow (perm)	893	1680		987	1739	1422	1158	1660		1103	1739	1478
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)	382	252	58	16	176	279	18	132	44	265	132	373
RTOR Reduction (vph)	0	10	0	0	0	194	0	15	0	0	0	166
Lane Group Flow (vph)	382	300	0	16	176	85	18	161	0	265	132	207
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Effective Green, g (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Actuated g/C Ratio	0.56	0.56		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.56
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	632	934		302	532	435	347	498		330	521	822
v/s Ratio Prot	c0.11	0.18			0.10			0.10			0.08	0.14
v/s Ratio Perm	c0.23			0.02		0.06	0.02			c0.24		
v/c Ratio	0.60	0.32		0.05	0.33	0.20	0.05	0.32		0.80	0.25	0.25
Uniform Delay, d1	10.6	9.6		19.6	21.4	20.5	19.9	21.7		25.8	21.2	9.2
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	2.9	0.1		0.3	1.7	1.0	0.1	0.4		18.4	1.2	0.5
Delay (s)	13.5	9.7		19.9	23.1	21.5	20.0	22.1		44.2	22.4	9.6
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		11.8			22.0			21.9			23.7	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.3									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			80.0							17.0		
Intersection Capacity Utilization			82.5%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future PM Phase 2
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	85	566	497	40	49	178
Future Volume (Veh/h)	85	566	497	40	49	178
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	88	584	512	41	51	184
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	283			
pX, platoon unblocked						
vC, conflicting volume	560				1008	284
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560				1008	284
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				76	74
cM capacity (veh/h)	1000				215	707
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	283	389	341	212	235	
Volume Left	88	0	0	0	51	
Volume Right	0	0	0	41	184	
cSH	1000	1700	1700	1700	472	
Volume to Capacity	0.09	0.23	0.20	0.12	0.50	
Queue Length 95th (ft)	7	0	0	0	68	
Control Delay (s)	3.4	0.0	0.0	0.0	19.9	
Lane LOS	A				C	
Approach Delay (s)	1.4		0.0		19.9	
Approach LOS					C	
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			57.0%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	412	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	98	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	315	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.0		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			71.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2183	105	99	1825	30
Future Volume (vph)	98	66	87	210	70	127	197	2183	105	99	1825	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4873		1711	4899	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	84	4873		90	4899	
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)	103	69	92	221	74	134	207	2298	111	104	1921	32
RTOR Reduction (vph)	0	72	0	0	0	105	0	3	0	0	1	0
Lane Group Flow (vph)	103	89	0	221	74	29	207	2406	0	104	1952	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Effective Green, g (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.70	0.58		0.61	0.53	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	275	684		255	404	344	275	2845		188	2609	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.49		0.05	0.40	
v/s Ratio Perm	0.08			c0.19			0.43			0.29		
v/c Ratio	0.37	0.13		0.87	0.18	0.08	0.75	0.85		0.55	0.75	
Uniform Delay, d1	50.0	47.3		56.6	47.8	46.8	45.6	25.6		29.9	27.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.51	0.39		1.00	1.00	
Incremental Delay, d2	1.8	0.2		27.0	0.5	0.2	8.1	2.0		5.9	2.0	
Delay (s)	51.8	47.5		83.6	48.3	47.0	77.1	12.0		35.8	29.2	
Level of Service	D	D		F	D	D	E	B		D	C	
Approach Delay (s)		49.2			66.1			17.2			29.6	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			27.4									
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			98.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		326	3303	1428
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)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	139	0	19	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	150	33	1545	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Effective Green, g (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	127	119		253	256	396	338	2419		357	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.10	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.72	0.71	0.38	0.10	0.64		0.39	0.44	0.02
Uniform Delay, d1	65.7	66.8		60.1	60.1	45.7	14.9	25.2		16.4	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.87		1.00	1.00	1.00
Incremental Delay, d2	1.5	4.6		9.2	9.1	0.6	0.1	0.7		0.7	0.8	0.1
Delay (s)	67.2	71.4		69.4	69.2	46.3	12.9	22.5		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.2			59.1			22.3			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.0									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0									Sum of lost time (s) 27.5
Intersection Capacity Utilization			70.6%									ICU Level of Service C
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1056	74	202	808	189	125	145	311	293	171	24
Future Volume (vph)	21	1056	74	202	808	189	125	145	311	293	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3254		1770	3416		1684	1801	1531	1763	1863	1583
Flt Permitted	0.19	1.00		0.06	1.00		0.64	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	327	3254		116	3416		1141	1801	1531	821	1863	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)	22	1112	78	213	851	199	132	153	327	308	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1190	0	213	1050	0	132	153	327	308	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	62.3	58.1		79.5	69.3		42.2	27.9	27.9	57.5	36.7	36.7
Effective Green, g (s)	62.3	58.1		79.5	69.3		42.2	27.9	27.9	57.5	36.7	36.7
Actuated g/C Ratio	0.42	0.39		0.53	0.46		0.28	0.19	0.19	0.38	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	172	1260		231	1578		372	334	284	459	455	387
v/s Ratio Prot	0.00	0.37		c0.09	0.31		0.03	0.08	c0.21	c0.10	0.10	0.02
v/s Ratio Perm	0.05			c0.39			0.07			0.15		
v/c Ratio	0.13	0.94		0.92	0.67		0.35	0.46	1.15	0.67	0.40	0.06
Uniform Delay, d1	27.1	44.4		46.7	31.3		42.0	54.3	61.0	35.1	47.4	43.5
Progression Factor	0.84	0.78		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	13.8		38.4	2.2		0.8	1.4	100.7	4.2	0.8	0.1
Delay (s)	23.1	48.5		85.0	33.6		42.8	55.7	161.8	39.3	48.1	43.6
Level of Service	C	D		F	C		D	E	F	D	D	D
Approach Delay (s)		48.0			42.3			109.6			42.6	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			55.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			90.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2716	250	161	2112	26
Future Volume (vph)	40	12	32	186	13	138	18	2716	250	161	2112	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6076		1711	4901	
Flt Permitted	0.54	1.00		0.73	1.00		0.05	1.00		0.04	1.00	
Satd. Flow (perm)	927	1589		1354	1496		94	6076		76	4901	
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)	42	12	33	194	14	144	19	2829	260	168	2200	27
RTOR Reduction (vph)	0	27	0	0	118	0	0	9	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	40	0	19	3080	0	168	2226	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Effective Green, g (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.62	0.59		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	168	289		246	272		112	3592		224	3241	
v/s Ratio Prot		0.01			0.03		0.01	c0.51		c0.08	c0.45	
v/s Ratio Perm	0.05			c0.14			0.10			0.47		
v/c Ratio	0.25	0.07		0.79	0.15		0.17	0.86		0.75	0.69	
Uniform Delay, d1	52.6	50.8		58.6	51.6		13.3	25.4		47.2	15.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.23	0.41	
Incremental Delay, d2	1.6	0.2		17.5	0.5		1.5	2.9		12.3	0.9	
Delay (s)	54.2	51.0		76.1	52.1		14.8	28.3		70.3	7.5	
Level of Service	D	D		E	D		B	C		E	A	
Approach Delay (s)		52.5			65.3			28.2			11.9	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		24.2										
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		100.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Future Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3257		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.27	1.00		0.22	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	470	3257		386	3303	1432	1711	1665		1681	1573	
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)	150	1015	75	15	804	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	48	0	20	0	0	0	0
Lane Group Flow (vph)	150	1088	0	15	804	84	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Effective Green, g (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Actuated g/C Ratio	0.67	0.61		0.57	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	405	1993		247	1829	793	108	105		253	236	
v/s Ratio Prot	c0.03	c0.33		0.00	0.24		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.03		0.06						
v/c Ratio	0.37	0.55		0.06	0.44	0.11	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.9	17.0		14.2	19.7	15.8	67.9	66.9		59.1	60.6	
Progression Factor	1.00	1.00		0.55	0.44	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.1		0.1	0.6	0.2	4.6	1.7		3.4	10.6	
Delay (s)	11.7	18.0		8.0	9.3	1.9	72.4	68.6		62.5	71.2	
Level of Service	B	B		A	A	A	E	E		E	E	
Approach Delay (s)		17.3			8.3			70.6			67.2	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay			22.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			23.0			
Intersection Capacity Utilization			68.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 17: Chapman Ave/Chapman Road & Thompson Ave

Total Future PM Phase 2
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians	66			56			51			6		
Lane Width (ft)	16.0			16.0			12.0			12.0		
Walking Speed (ft/s)	3.5			3.5			3.5			3.5		
Percent Blockage	8			7			5			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	638											
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	830	366	394			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	93	76	93	95	99	97			99		
cM capacity (veh/h)	235	251	545	133	250	624	1067			1097		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	409	207	1067	1097								
Volume to Capacity	0.43	0.13	0.03	0.01								
Queue Length 95th (ft)	53	11	2	0								
Control Delay (s)	20.3	25.0	1.0	0.2								
Lane LOS	C	D	A	A								
Approach Delay (s)	20.3	25.0	1.0	0.2								
Approach LOS	C	D										
Intersection Summary												
Average Delay				5.3								
Intersection Capacity Utilization				51.4%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

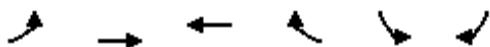
Total Future PM Phase 2
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	121	2609	175	0	1915	
Future Volume (Veh/h)	0	121	2609	175	0	1915	
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)	0	132	2836	190	0	2082	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.66	0.55			0.55		
vC, conflicting volume	3625	1040			3026		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	837	0			1796		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	78			100		
cM capacity (veh/h)	201	591			185		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	132	1134	1134	757	694	694	694
Volume Left	0	0	0	0	0	0	0
Volume Right	132	0	0	190	0	0	0
cSH	591	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.22	0.67	0.67	0.45	0.41	0.41	0.41
Queue Length 95th (ft)	21	0	0	0	0	0	0
Control Delay (s)	12.8	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.8	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			68.5%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

19: Rollins Ave Extension & New Street

Total Future PM Phase 2
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	0	174	126	0	21	0
Future Volume (Veh/h)	0	174	126	0	21	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	189	137	0	23	0
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	137				326	137
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	137				326	137
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1447				668	911
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	189	137	23			
Volume Left	0	0	23			
Volume Right	0	0	0			
cSH	1447	1700	668			
Volume to Capacity	0.00	0.08	0.03			
Queue Length 95th (ft)	0	0	3			
Control Delay (s)	0.0	0.0	10.6			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			19.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

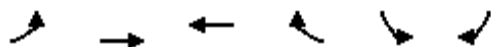
20: Driveway & Rollins Ave Extension

Total Future PM Phase 2
02/07/2025

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	129	66	86	83	39	0
Future Volume (Veh/h)	129	66	86	83	39	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	140	72	93	90	42	0
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			212		452	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			212		452	176
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		92	100
cM capacity (veh/h)			1358		527	867
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	212	183	42			
Volume Left	0	93	42			
Volume Right	72	0	0			
cSH	1700	1358	527			
Volume to Capacity	0.12	0.07	0.08			
Queue Length 95th (ft)	0	6	6			
Control Delay (s)	0.0	4.3	12.4			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.3	12.4			
Approach LOS			B			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			33.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 24: Rollins Ave Extension

Total Future PM Phase 2
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	96	33	31	28	4	138
Future Volume (vph)	96	33	31	28	4	138
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	104	36	34	30	4	150
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	140	64	154			
Volume Left (vph)	104	0	4			
Volume Right (vph)	0	30	150			
Hadj (s)	0.18	-0.25	-0.55			
Departure Headway (s)	4.5	4.1	3.8			
Degree Utilization, x	0.17	0.07	0.16			
Capacity (veh/h)	778	824	894			
Control Delay (s)	8.4	7.5	7.6			
Approach Delay (s)	8.4	7.5	7.6			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.9			
Level of Service			A			
Intersection Capacity Utilization			29.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

34: Pike Center/Driveway

Total Future PM Phase 2

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	112	0	70	0	0	61	131	75	0
Future Volume (Veh/h)	0	0	0	112	0	70	0	0	61	131	75	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	122	0	76	0	0	66	142	82	0
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	475	432	82	399	399	33	82				66	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	475	432	82	399	399	33	82				66	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	77	100	93	100				91	
cM capacity (veh/h)	431	469	978	522	489	1041	1515				1536	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	198	66	224								
Volume Left	0	122	0	142								
Volume Right	0	76	66	0								
cSH	1700	645	1700	1536								
Volume to Capacity	0.00	0.31	0.04	0.09								
Queue Length 95th (ft)	0	32	0	8								
Control Delay (s)	0.0	13.0	0.0	5.1								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	13.0	0.0	5.1								
Approach LOS	A	B										
Intersection Summary												
Average Delay				7.6								
Intersection Capacity Utilization				35.0%	ICU Level of Service				A			
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	18047	18011	17910	17851	18110	17989
Vehs Exited	17166	17033	17122	17029	17286	17129
Starting Vehs	0	0	0	0	0	0
Ending Vehs	881	978	788	822	824	851
Travel Distance (mi)	8921	8806	8919	8786	8922	8871
Travel Time (hr)	1185.7	1223.3	1078.2	1158.2	1253.5	1179.8
Total Delay (hr)	892.3	934.8	785.2	869.0	960.1	888.3
Total Stops	33275	33718	31557	31592	31941	32418
Fuel Used (gal)	539.8	542.7	513.0	528.9	554.8	535.8

Interval #0 Information Seed

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3710	3678	3681	3580	3666	3663
Vehs Exited	3023	2987	2967	2942	2974	2979
Starting Vehs	0	0	0	0	0	0
Ending Vehs	687	691	714	638	692	680
Travel Distance (mi)	1638	1645	1665	1611	1613	1635
Travel Time (hr)	139.2	139.8	143.3	131.0	143.5	139.4
Total Delay (hr)	85.7	86.1	88.6	78.4	90.8	85.9
Total Stops	5394	5500	5533	5076	5451	5391
Fuel Used (gal)	79.9	80.0	81.3	77.7	80.3	79.8

SimTraffic Simulation Summary
Pike Center Total Future PM Phase 2

Total Future PM Phase 2
02/07/2025

Interval #1 Information 1

Start Time 5:00
End Time 5:15
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3632	3651	3609	3600	3674	3631
Vehs Exited	3480	3545	3618	3475	3556	3535
Starting Vehs	687	691	714	638	692	680
Ending Vehs	839	797	705	763	810	773
Travel Distance (mi)	1855	1822	1858	1771	1827	1827
Travel Time (hr)	209.2	200.2	184.4	190.9	215.0	200.0
Total Delay (hr)	148.2	140.8	123.5	132.6	154.9	140.0
Total Stops	6804	6750	6568	6501	6695	6667
Fuel Used (gal)	103.8	100.7	97.4	97.1	104.4	100.7

Interval #2 Information 2

Start Time 5:15
End Time 5:30
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3639	3556	3575	3511	3571	3572
Vehs Exited	3729	3460	3481	3443	3621	3544
Starting Vehs	839	797	705	763	810	773
Ending Vehs	749	893	799	831	760	802
Travel Distance (mi)	1848	1755	1776	1765	1839	1797
Travel Time (hr)	241.9	244.7	205.4	238.7	259.9	238.1
Total Delay (hr)	180.8	187.1	147.2	180.7	199.4	179.0
Total Stops	7071	6625	6304	6263	6508	6552
Fuel Used (gal)	111.6	109.2	101.0	107.8	115.3	109.0

Interval #3 Information 3

Start Time 5:30
End Time 5:45
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3503	3565	3510	3572	3637	3557
Vehs Exited	3395	3486	3496	3581	3617	3516
Starting Vehs	749	893	799	831	760	802
Ending Vehs	857	972	813	822	780	834
Travel Distance (mi)	1770	1783	1823	1833	1825	1807
Travel Time (hr)	272.6	292.0	252.8	282.8	290.2	278.1
Total Delay (hr)	214.5	233.4	192.8	222.3	230.1	218.6
Total Stops	6855	7245	6449	6780	6529	6770
Fuel Used (gal)	115.7	119.9	112.2	120.2	121.7	117.9

Interval #4 Information 4

Start Time 5:45
End Time 6:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3563	3561	3535	3588	3562	3558
Vehs Exited	3539	3555	3560	3588	3518	3552
Starting Vehs	857	972	813	822	780	834
Ending Vehs	881	978	788	822	824	851
Travel Distance (mi)	1809	1801	1797	1806	1817	1806
Travel Time (hr)	322.8	346.5	292.3	314.8	344.9	324.3
Total Delay (hr)	263.2	287.3	233.1	255.1	284.9	264.7
Total Stops	7151	7598	6703	6972	6758	7036
Fuel Used (gal)	128.7	132.9	121.1	126.2	133.1	128.4

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	L	TR	L	T	T	T	R	L	T
Maximum Queue (ft)	132	102	225	237	200	200	462	472	461	453	199	241
Average Queue (ft)	66	42	156	185	147	75	387	391	404	224	177	204
95th Queue (ft)	126	101	235	261	239	185	517	526	537	430	240	279
Link Distance (ft)	102		207	207			420	420	420	420		200
Upstream Blk Time (%)	17	2	3	9	1		9	8	22	5	24	43
Queuing Penalty (veh)	0	0	9	29	0		64	55	158	33	0	275
Storage Bay Dist (ft)		90			100	160					160	
Storage Blk Time (%)	22	4		38	24	1	50				55	21
Queuing Penalty (veh)	8	2		90	54	5	29				310	46

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	230	233
Average Queue (ft)	163	169
95th Queue (ft)	238	240
Link Distance (ft)	200	200
Upstream Blk Time (%)	5	8
Queuing Penalty (veh)	35	50
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/New Street

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	B3
Directions Served	LT	R	LTR	L	T	T	TR	L	T	T	TR	T
Maximum Queue (ft)	135	135	55	258	256	220	162	186	243	212	198	261
Average Queue (ft)	94	92	40	130	53	48	60	55	104	58	63	86
95th Queue (ft)	149	152	66	225	166	127	117	138	264	162	145	321
Link Distance (ft)	112				294	294	294		186	186	186	255
Upstream Blk Time (%)	15	15	0	0	0	0		0	26	1	1	15
Queuing Penalty (veh)	0	0	0	0	4	0		0	153	5	4	91
Storage Bay Dist (ft)		150		125				110				
Storage Blk Time (%)	15	15		17	1			1	30			
Queuing Penalty (veh)	19	20		134	1			3	15			

Intersection: 2: Rockville Pike - 355 & Federal Plaza/New Street

Movement	B3	B3
Directions Served	T	T
Maximum Queue (ft)	180	174
Average Queue (ft)	28	13
95th Queue (ft)	153	98
Link Distance (ft)	255	255
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	2	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	B3	B3
Directions Served	T	TR	T	T	R	L	T	T	T	R	T	T
Maximum Queue (ft)	664	696	366	430	180	255	294	305	306	255	73	130
Average Queue (ft)	293	328	137	164	116	73	204	220	232	59	4	9
95th Queue (ft)	739	780	261	349	209	187	296	311	328	232	31	61
Link Distance (ft)	1311	1311	563	563			255	255	255		186	186
Upstream Blk Time (%)				0		0	4	6	8	0		0
Queuing Penalty (veh)				0		0	32	49	66	0		0
Storage Bay Dist (ft)					65	130					280	
Storage Blk Time (%)				15	27	4	30		8	0		
Queuing Penalty (veh)				29	42	29	42		9	1		

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	B3	SB	SB	SB	SB
Directions Served	T	L	T	T	TR
Maximum Queue (ft)	136	464	788	755	680
Average Queue (ft)	17	255	462	434	395
95th Queue (ft)	79	490	845	788	690
Link Distance (ft)	186		1192	1192	1192
Upstream Blk Time (%)	0		1	0	0
Queuing Penalty (veh)	0		9	0	0
Storage Bay Dist (ft)		350			
Storage Blk Time (%)		4	23		
Queuing Penalty (veh)		24	63		

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	200	574	611	309	370	593	539	214	224	171	193	269
Average Queue (ft)	77	410	460	195	256	227	238	142	202	69	109	100
95th Queue (ft)	215	605	677	317	370	477	425	224	238	146	174	192
Link Distance (ft)		563	563			1314	1314	200	200		541	
Upstream Blk Time (%)		1	12					6	34			
Queuing Penalty (veh)		5	50					25	132			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)	0	62		5	22	5				4	28	0
Queuing Penalty (veh)	1	42		14	64	24				10	75	0

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	98	51	139	144	97	53
Average Queue (ft)	56	11	34	113	6	3
95th Queue (ft)	98	36	102	185	44	24
Link Distance (ft)	67	67	130	130	200	200
Upstream Blk Time (%)	37	0	1	18	0	
Queuing Penalty (veh)	0	0	5	71	0	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	NB	B8	SB
Directions Served	LTR	L	TR	LTR	T	LT
Maximum Queue (ft)	69	99	117	215	157	136
Average Queue (ft)	33	33	62	120	69	32
95th Queue (ft)	66	76	117	253	146	92
Link Distance (ft)	58	94	94	128	40	130
Upstream Blk Time (%)	8	1	20	14	16	0
Queuing Penalty (veh)	3	0	0	109	124	1
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	B35	SB	SB	SB	B8
Directions Served	L	TR	L	T	R	L	TR	T	L	T	R	T
Maximum Queue (ft)	235	185	48	166	79	87	221	108	134	116	130	160
Average Queue (ft)	127	77	10	79	5	13	100	9	97	52	87	49
95th Queue (ft)	222	147	34	140	56	46	196	73	140	105	142	140
Link Distance (ft)	221	221		821	821		143	285	40	40	40	128
Upstream Blk Time (%)	2	0					8	0	59	16	22	3
Queuing Penalty (veh)	6	0					22	1	138	37	50	6
Storage Bay Dist (ft)			270			40						
Storage Blk Time (%)						2	32					
Queuing Penalty (veh)						4	5					

Intersection: 9: Chapman Ave & Bou Ave

Movement	B8	B8
Directions Served	T	T
Maximum Queue (ft)	48	122
Average Queue (ft)	2	23
95th Queue (ft)	17	80
Link Distance (ft)	128	128
Upstream Blk Time (%)		0
Queuing Penalty (veh)		1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	98	186	90	157	96
Average Queue (ft)	40	17	9	32	63
95th Queue (ft)	95	99	44	107	94
Link Distance (ft)		207	221	221	70
Upstream Blk Time (%)		0		0	15
Queuing Penalty (veh)		2		0	28
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	5	0			
Queuing Penalty (veh)	13	1			

Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	35	104	533	356	316	276	220	172
Average Queue (ft)	9	44	249	90	176	70	89	33
95th Queue (ft)	32	85	458	215	305	192	167	107
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)					2	1		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	212	107	128	355	264	253	194	325	307	240	225	366
Average Queue (ft)	87	43	52	250	91	114	133	117	87	84	119	327
95th Queue (ft)	163	91	98	385	244	212	206	257	199	172	252	371
Link Distance (ft)		337	337	329	329			1192	1192	1192		315
Upstream Blk Time (%)				18	3	0						31
Queuing Penalty (veh)				0	0	0						0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)	0				3	0	29	2			3	40
Queuing Penalty (veh)	0				3	0	213	4			18	40

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	342	336
Average Queue (ft)	285	208
95th Queue (ft)	383	343
Link Distance (ft)	315	315
Upstream Blk Time (%)	7	2
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	100	160	229	278	373	56	239	256	344	111	170	355
Average Queue (ft)	39	57	112	155	176	15	136	160	239	10	78	190
95th Queue (ft)	81	117	195	229	283	39	218	240	344	59	139	312
Link Distance (ft)	354	354		496	496		1314	1314			410	410
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			2	10			5				0	
Queuing Penalty (veh)			4	16			1				0	

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	296	35
Average Queue (ft)	144	8
95th Queue (ft)	265	26
Link Distance (ft)	410	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	6	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	140	565	550	160	303	325	143	150	178	283	328	78
Average Queue (ft)	19	295	302	138	241	246	54	60	155	149	114	18
95th Queue (ft)	69	516	515	193	351	351	125	135	167	250	226	54
Link Distance (ft)		605	605		276	276		139	139		1627	1627
Upstream Blk Time (%)		0	0		13	10	2	3	80			
Queuing Penalty (veh)		0	0		0	0	0	0	0			
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	31		29	19		2	3		7	2	
Queuing Penalty (veh)	0	6		115	39		3	4		12	6	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	124	76	206	200	729	1146	1150	1150	1164	199	322	300
Average Queue (ft)	36	19	124	135	76	926	919	899	886	103	113	127
95th Queue (ft)	87	50	223	225	430	1432	1454	1471	1473	190	242	245
Link Distance (ft)	179	179	167	167		1110	1110	1110	1110		420	420
Upstream Blk Time (%)	0		12	36		19	29	52	47			
Queuing Penalty (veh)	0		0	0		0	0	0	0			
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)						48				7	2	
Queuing Penalty (veh)						9				48	4	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	302
Average Queue (ft)	137
95th Queue (ft)	249
Link Distance (ft)	420
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	B45
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR	T
Maximum Queue (ft)	254	356	323	41	281	290	139	117	87	174	238	8
Average Queue (ft)	68	182	158	8	67	70	17	47	37	88	133	0
95th Queue (ft)	145	315	294	29	178	187	77	96	75	153	210	5
Link Distance (ft)		372	372		605	605			382	233	233	472
Upstream Blk Time (%)	0	0	0							0	0	
Queuing Penalty (veh)	0	0	0							0	0	
Storage Bay Dist (ft)	330			165			200	200				
Storage Blk Time (%)		0			1	1						
Queuing Penalty (veh)		1			0	1						

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	121	50	106	76
Average Queue (ft)	53	18	19	11
95th Queue (ft)	92	42	62	47
Link Distance (ft)	198	143	541	205
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	97	104	157	58	311	314	291
Average Queue (ft)	56	4	6	2	188	70	34
95th Queue (ft)	99	39	58	29	395	245	153
Link Distance (ft)	84	200	200	200	294	294	294
Upstream Blk Time (%)	5		0		15	0	0
Queuing Penalty (veh)	6		0		96	1	1
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 19: Rollins Ave Extension & New Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	45	49	53
Average Queue (ft)	1	6	14
95th Queue (ft)	18	30	42
Link Distance (ft)	84	53	261
Upstream Blk Time (%)	0	1	
Queuing Penalty (veh)	0	2	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 20: Driveway & Rollins Ave Extension

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	45	67	69
Average Queue (ft)	2	13	26
95th Queue (ft)	20	44	56
Link Distance (ft)	53	96	71
Upstream Blk Time (%)	1	0	0
Queuing Penalty (veh)	2	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 24: Rollins Ave Extension

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	97	52	74
Average Queue (ft)	38	27	40
95th Queue (ft)	67	50	66
Link Distance (ft)	96	58	64
Upstream Blk Time (%)	2	0	1
Queuing Penalty (veh)	2	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Pike Center/Driveway

Movement	WB	NB	SB
Directions Served	LTR	TR	LTR
Maximum Queue (ft)	65	11	78
Average Queue (ft)	43	0	22
95th Queue (ft)	61	5	61
Link Distance (ft)	33	70	71
Upstream Blk Time (%)	22		1
Queuing Penalty (veh)	0		2
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 3834

APPENDIX F
PHASE 2 RESTRICTED
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Total Future AM Phase 2 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗	↘	↗↘	↗		↘	↗↗↘	↘	↘	↗↗↘	
Traffic Volume (vph)	14	21	25	555	11	49	36	1754	145	124	2105	6
Future Volume (vph)	14	21	25	555	11	49	36	1754	145	124	2105	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.99		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	
Frt		1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1698	1478	3204	1501		1711	4916	1531	1770	5083	
Flt Permitted		0.28	1.00	0.95	1.00		0.95	1.00	1.00	0.07	1.00	
Satd. Flow (perm)		487	1478	3204	1501		1711	4916	1531	123	5083	
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)	15	22	26	578	11	51	38	1827	151	129	2193	6
RTOR Reduction (vph)	0	0	24	0	41	0	0	0	64	0	0	0
Lane Group Flow (vph)	0	37	2	578	21	0	38	1827	87	129	2199	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	29.0	29.0		7.6	67.5	67.5	79.4	79.4	
Effective Green, g (s)		10.0	10.0	29.0	29.0		7.6	67.5	67.5	79.4	79.4	
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.05	0.45	0.45	0.53	0.53	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		32	98	619	290		86	2212	688	273	2690	
v/s Ratio Prot			0.00	c0.18	0.01		0.02	c0.37	0.06	0.06	c0.43	
v/s Ratio Perm		c0.08								0.19		
v/c Ratio		1.16	0.02	0.93	0.07		0.44	0.83	0.13	0.47	0.82	
Uniform Delay, d1		70.0	65.4	59.6	49.5		69.1	36.1	24.1	45.8	29.3	
Progression Factor		1.00	1.00	1.00	1.00		1.38	0.77	0.47	0.65	0.45	
Incremental Delay, d2		209.8	0.1	22.4	0.3		3.3	3.4	0.4	1.1	2.4	
Delay (s)		279.8	65.5	82.0	49.8		99.0	31.4	11.7	30.6	15.7	
Level of Service		F	E	F	D		F	C	B	C	B	
Approach Delay (s)		191.4			78.9			31.2			16.5	
Approach LOS		F			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			32.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			82.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/New Street

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	54	35	2	36	84	1586	0	32	2105	2
Future Volume (vph)	16	2	54	35	2	36	84	1586	0	32	2105	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		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	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1662	1478		1907		1711	4916		1651	4745	
Flt Permitted		0.67	1.00		0.84		0.06	1.00		0.13	1.00	
Satd. Flow (perm)		1163	1478		1639		105	4916		227	4745	
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)	17	2	56	36	2	38	88	1652	0	33	2193	2
RTOR Reduction (vph)	0	0	52	0	28	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	4	0	48	0	88	1652	0	33	2195	0
Confl. Peds. (#/hr)	1					1	3		7	7		3
Confl. Bikes (#/hr)			1			1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		9.8	9.8		9.8		127.5	118.3		118.9	114.0	
Effective Green, g (s)		9.8	9.8		9.8		127.5	118.3		118.9	114.0	
Actuated g/C Ratio		0.07	0.07		0.07		0.85	0.79		0.79	0.76	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		75	96		107		187	3877		226	3606	
v/s Ratio Prot			0.00				c0.03	0.34		0.00	c0.46	
v/s Ratio Perm		0.02			c0.03		0.37			0.11		
v/c Ratio		0.25	0.04		0.45		0.47	0.43		0.15	0.61	
Uniform Delay, d1		66.6	65.7		67.5		8.9	5.0		3.4	8.0	
Progression Factor		1.00	1.00		1.00		4.19	0.06		0.28	0.23	
Incremental Delay, d2		1.8	0.2		3.0		1.2	0.2		0.2	0.6	
Delay (s)		68.4	65.8		70.5		38.6	0.5		1.2	2.4	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		66.5			70.5			2.4			2.4	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.8				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			70.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↱	
Traffic Volume (vph)	0	256	136	0	310	185	105	1498	106	241	2022	0
Future Volume (vph)	0	256	136	0	310	185	105	1498	106	241	2022	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			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	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3106			3539	1583	1652	4746	1794	1711	4916	
Flt Permitted		1.00			1.00	1.00	0.06	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		3106			3539	1583	98	4746	1794	192	4916	
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)	0	261	139	0	316	189	107	1529	108	246	2063	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	46	0	0	0
Lane Group Flow (vph)	0	400	0	0	316	189	107	1529	62	246	2063	0
Confl. Peds. (#/hr)	13		9	9		13			4	4		
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		26.5			26.5	26.5	97.7	85.6	85.6	109.3	91.4	
Effective Green, g (s)		26.5			26.5	26.5	97.7	85.6	85.6	109.3	91.4	
Actuated g/C Ratio		0.18			0.18	0.18	0.65	0.57	0.57	0.73	0.61	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		548			625	279	189	2708	1023	321	2995	
v/s Ratio Prot		c0.13			0.09	0.12	0.05	0.32	0.03	c0.09	c0.42	
v/s Ratio Perm							0.32			c0.47		
v/c Ratio		0.73			0.51	0.68	0.57	0.56	0.06	0.77	0.69	
Uniform Delay, d1		58.4			55.8	57.8	22.7	20.4	14.3	26.1	19.7	
Progression Factor		1.00			0.79	0.78	1.73	0.14	0.01	2.12	0.41	
Incremental Delay, d2		5.2			0.9	6.8	4.3	0.8	0.1	9.0	1.1	
Delay (s)		63.5			44.7	51.9	43.6	3.7	0.3	64.5	9.1	
Level of Service		E			D	D	D	A	A	E	A	
Approach Delay (s)		63.5			47.4			5.9			15.0	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			19.0		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			78.0%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future AM Phase 2 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	114	531	440	123	64	48	197	84	50	24
Future Volume (vph)	40	509	114	531	440	123	64	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3203		3319	3286			1690	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3203		3319	3286			1690	1478	3204	1739	1443
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)	41	525	118	547	454	127	66	49	203	87	52	25
RTOR Reduction (vph)	0	8	0	0	7	0	0	0	131	0	0	23
Lane Group Flow (vph)	41	635	0	547	574	0	0	115	72	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	74.6	69.0		30.8	94.2			15.7	53.0	10.0	10.0	10.0
Effective Green, g (s)	74.6	69.0		30.8	94.2			15.7	53.0	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.46		0.21	0.63			0.10	0.35	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	406	1473		681	2063			176	522	213	115	96
v/s Ratio Prot	0.00	c0.20		c0.16	0.17			c0.07	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.10	0.43		0.80	0.28			0.65	0.14	0.41	0.45	0.02
Uniform Delay, d1	19.4	27.3		56.7	12.6			64.5	33.0	67.2	67.4	65.4
Progression Factor	0.98	0.82		0.92	1.78			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8		6.5	0.3			8.4	0.1	1.3	2.8	0.1
Delay (s)	19.2	23.2		58.6	22.7			73.0	33.1	68.4	70.2	65.5
Level of Service	B	C		E	C			E	C	E	E	E
Approach Delay (s)		23.0			40.1			47.5			68.5	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			38.0			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			67.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

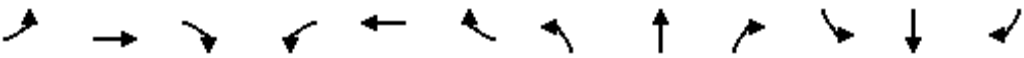
Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	0	353	2	5	690	0
Future Volume (Veh/h)	0	0	0	1	0	4	0	353	2	5	690	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	0	447	3	6	873	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)							184			256		
pX, platoon unblocked												
vC, conflicting volume	1114	1335	436	897	1334	225	873				450	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1114	1335	436	897	1334	225	873				450	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	99	100				99	
cM capacity (veh/h)	161	152	568	234	152	778	768				1107	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	6	298	152	297	582							
Volume Left	1	0	0	6	0							
Volume Right	5	0	3	0	0							
cSH	561	1700	1700	1107	1700							
Volume to Capacity	0.01	0.18	0.09	0.01	0.34							
Queue Length 95th (ft)	1	0	0	0	0							
Control Delay (s)	11.5	0.0	0.0	0.2	0.0							
Lane LOS	B				A							
Approach Delay (s)	11.5	0.0	0.1									
Approach LOS	B											
Intersection Summary												
Average Delay	0.1											
Intersection Capacity Utilization	32.6%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Volume (vph)	9	22	64	32	6	33	9	313	49	36	572	46
Future Volume (vph)	9	22	64	32	6	33	9	313	49	36	572	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	12
Total Lost time (s)		4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00			0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.91		1.00	0.87			0.98			0.99	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1686		1770	1602			1819			3258	
Flt Permitted		1.00		0.95	1.00			0.98			0.92	
Satd. Flow (perm)		1686		1770	1602			1791			3014	
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)	9	23	66	33	6	34	9	323	51	37	590	47
RTOR Reduction (vph)	0	58	0	0	31	0	0	6	0	0	6	0
Lane Group Flow (vph)	0	40	0	33	9	0	0	377	0	0	668	0
Confl. Peds. (#/hr)						3			11	11		
Confl. Bikes (#/hr)						1						
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		5.3		3.8	3.8			22.5			22.5	
Effective Green, g (s)		5.3		3.8	3.8			22.5			22.5	
Actuated g/C Ratio		0.12		0.08	0.08			0.50			0.50	
Clearance Time (s)		4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		198		149	134			893			1503	
v/s Ratio Prot		c0.02		c0.02	0.01							
v/s Ratio Perm								0.21			c0.22	
v/c Ratio		0.20		0.22	0.07			0.42			0.44	
Uniform Delay, d1		18.0		19.3	19.0			7.2			7.3	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.8	0.2			0.3			0.2	
Delay (s)		18.5		20.0	19.2			7.5			7.5	
Level of Service		B		C	B			A			A	
Approach Delay (s)		18.5			19.6			7.5			7.5	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.1			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			45.1			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			51.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future AM Phase 2 Restricted

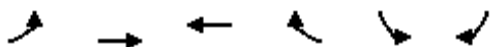
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	111	35	6	92	160	4	41	4	156	81	433
Future Volume (vph)	138	111	35	6	92	160	4	41	4	156	81	433
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1661		1630	1739	1433	1648	1713		1633	1739	1478
Flt Permitted	0.57	1.00		0.66	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	982	1661		1131	1739	1433	1218	1713		1248	1739	1478
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)	145	117	37	6	97	168	4	43	4	164	85	456
RTOR Reduction (vph)	0	15	0	0	0	115	0	3	0	0	0	207
Lane Group Flow (vph)	145	139	0	6	97	53	4	44	0	164	85	249
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	42.8	42.8		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.8
Effective Green, g (s)	42.8	42.8		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.8
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.31	0.31		0.31	0.31	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	645	907		353	544	448	373	525		382	533	807
v/s Ratio Prot	0.04	0.08			0.06			0.03			0.05	c0.17
v/s Ratio Perm	c0.09			0.01		0.04	0.00			c0.13		
v/c Ratio	0.22	0.15		0.02	0.18	0.12	0.01	0.08		0.43	0.16	0.31
Uniform Delay, d1	9.0	8.8		18.6	19.6	19.2	18.9	19.3		21.7	19.8	9.7
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	0.5	0.0		0.1	0.7	0.5	0.0	0.1		3.5	0.6	0.6
Delay (s)	9.5	8.8		18.7	20.3	19.7	18.9	19.4		25.2	20.4	10.3
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.2			19.9			19.4			15.0	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.8									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			78.3									Sum of lost time (s) 17.0
Intersection Capacity Utilization			61.6%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future AM Phase 2 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	278	549	15	0	40
Future Volume (Veh/h)	0	278	549	15	0	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	296	584	16	0	43
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	283			
pX, platoon unblocked						
vC, conflicting volume	607				747	311
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	607				747	311
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	94
cM capacity (veh/h)	961				346	678
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	148	148	389	211	43	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	16	43	
cSH	1700	1700	1700	1700	678	
Volume to Capacity	0.09	0.09	0.23	0.12	0.06	
Queue Length 95th (ft)	0	0	0	0	5	
Control Delay (s)	0.0	0.0	0.0	0.0	10.7	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		10.7	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			26.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Future Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3113	
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)	18	48	29	250	35	41	10	264	370	22	237	20
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	88	0	4	0
Lane Group Flow (vph)	18	50	0	250	43	0	0	274	282	0	275	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8	
Effective Green, g (s)	6.3	6.3		15.9	15.9			48.8	64.7		48.8	
Actuated g/C Ratio	0.07	0.07		0.19	0.19			0.57	0.76		0.57	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		320	303			1020	1148		1787	
v/s Ratio Prot	0.01	c0.03		c0.15	0.03				0.05			
v/s Ratio Perm								c0.15	0.14		0.09	
v/c Ratio	0.14	0.40		0.78	0.14			0.27	0.25		0.15	
Uniform Delay, d1	36.8	37.6		32.9	28.8			9.1	3.0		8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		10.9	0.1			0.6	0.0		0.2	
Delay (s)	37.0	38.3		43.8	28.9			9.8	3.0		8.6	
Level of Service	D	D		D	C			A	A		A	
Approach Delay (s)		38.1			40.3			5.9			8.6	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			17.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			63.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 						 			 	
Traffic Volume (vph)	42	52	56	176	28	67	79	1301	311	63	1876	20
Future Volume (vph)	42	52	56	176	28	67	79	1301	311	63	1876	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4751		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.06	1.00		0.11	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	110	4751		191	4907	
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)	44	54	58	183	29	70	82	1355	324	66	1954	21
RTOR Reduction (vph)	0	47	0	0	0	57	0	19	0	0	0	0
Lane Group Flow (vph)	44	65	0	183	29	13	82	1660	0	66	1975	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	28.7	28.7		28.7	28.7	28.7	106.8	96.0		100.8	93.0	
Effective Green, g (s)	28.7	28.7		28.7	28.7	28.7	106.8	96.0		100.8	93.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19	0.19	0.71	0.64		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	262	607		234	356	302	193	3040		207	3042	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	c0.35		0.02	c0.40	
v/s Ratio Perm	0.03			c0.15			0.27			0.20		
v/c Ratio	0.17	0.11		0.78	0.08	0.04	0.42	0.55		0.32	0.65	
Uniform Delay, d1	50.7	50.1		57.7	49.8	49.5	14.6	14.9		10.1	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.16	1.33		1.00	1.00	
Incremental Delay, d2	0.6	0.2		17.8	0.2	0.1	2.7	0.6		1.9	1.1	
Delay (s)	51.3	50.2		75.4	50.0	49.6	34.0	20.4		12.0	19.2	
Level of Service	D	D		E	D	D	C	C		B	B	
Approach Delay (s)		50.5			66.4			21.1			19.0	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		24.2										
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		74.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	507	4466		1017	3303	1437
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)	38	26	54	173	20	132	53	521	295	190	855	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	38	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	778	0	190	855	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	370	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.44	0.36		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	4.8	5.5		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			5.4			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				27.5		
Intersection Capacity Utilization			58.8%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	622	56	258	1041	137	80	54	123	152	74	14
Future Volume (vph)	16	622	56	258	1041	137	80	54	123	152	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		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
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3254		1768	3472		1711	1801	1531	1767	1863	1583
Flt Permitted	0.17	1.00		0.28	1.00		0.71	1.00	1.00	0.54	1.00	1.00
Satd. Flow (perm)	295	3254		527	3472		1272	1801	1531	1000	1863	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)	17	655	59	272	1096	144	84	57	129	160	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	714	0	272	1240	0	84	57	129	160	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	75.1	72.4		93.7	85.0		30.5	18.6	18.6	43.1	24.9	24.9
Effective Green, g (s)	75.1	72.4		93.7	85.0		30.5	18.6	18.6	43.1	24.9	24.9
Actuated g/C Ratio	0.50	0.48		0.62	0.57		0.20	0.12	0.12	0.29	0.17	0.17
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	172	1570		455	1967		293	223	189	380	309	262
v/s Ratio Prot	0.00	0.22		c0.06	c0.36		0.02	0.03	c0.08	c0.05	0.04	0.01
v/s Ratio Perm	0.05			0.31			0.04			0.07		
v/c Ratio	0.10	0.45		0.60	0.63		0.29	0.26	0.68	0.42	0.25	0.06
Uniform Delay, d1	20.0	25.7		14.6	21.9		50.1	59.4	62.9	42.0	54.4	52.7
Progression Factor	0.87	0.76		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		2.1	1.5		0.7	0.8	10.5	1.0	0.6	0.1
Delay (s)	17.6	20.4		16.8	23.5		50.8	60.3	73.4	43.1	55.0	52.8
Level of Service	B	C		B	C		D	E	E	D	E	D
Approach Delay (s)		20.3			22.3			63.6			47.3	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay		28.1			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			25.5				
Intersection Capacity Utilization		67.4%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1847	116	48	2673	48
Future Volume (vph)	20	7	13	77	16	50	25	1847	116	48	2673	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6116		1711	4894	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.07	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6116		128	4894	
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)	20	7	13	79	16	51	26	1885	118	49	2728	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	4	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1999	0	49	2776	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.73		0.78	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4436		173	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.33		c0.01	c0.57	
v/s Ratio Perm	0.02			c0.06			0.18			0.21		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.45		0.28	0.77	
Uniform Delay, d1	61.0	60.3		63.7	60.9		12.7	8.4		4.9	11.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.98	0.26	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.0	0.9	
Delay (s)	62.2	60.6		70.9	61.6		15.4	8.7		5.8	4.0	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.8			4.1	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.2										
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		150.0								18.5		
Intersection Capacity Utilization		82.1%								E		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 2 Restricted

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Future Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3229		1646	3303	1428	1711	1675		1681	1549	
Flt Permitted	0.16	1.00		0.33	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	282	3229		577	3303	1428	1711	1675		1681	1549	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	748	92	10	1290	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	23	0	5	0	0	0	0
Lane Group Flow (vph)	89	837	0	10	1290	53	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		107.1	104.3	104.3	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.71	0.70	0.70	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	302	2374		431	2296	992	58	56		98	90	
v/s Ratio Prot	c0.02	c0.26		0.00	c0.39		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.21			0.02		0.04						
v/c Ratio	0.29	0.35		0.02	0.56	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	6.7	7.1		6.2	11.4	7.2	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.24	0.30	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.0	0.9	0.1	2.7	1.4		2.2	4.5	
Delay (s)	7.4	7.5		1.5	4.3	0.9	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.5			4.1			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		8.0			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			23.0				
Intersection Capacity Utilization		59.0%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 17: Chapman Ave/Chapman Road & Thompson Ave

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		9			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	93	90	96	100	96			99		
cM capacity (veh/h)	360	385	647	339	384	832	1200			1350		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	602	361	1200	1350								
Volume to Capacity	0.08	0.15	0.04	0.01								
Queue Length 95th (ft)	6	13	3	0								
Control Delay (s)	11.5	16.7	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.5	16.7	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

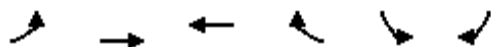
Total Future AM Phase 2 Restricted
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	58	1607	156	0	2187	
Future Volume (Veh/h)	0	58	1607	156	0	2187	
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)	0	63	1747	170	0	2377	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.78	0.67			0.67		
vC, conflicting volume	2624	667			1917		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	281	0			670		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	91			100		
cM capacity (veh/h)	534	731			618		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	63	699	699	519	792	792	792
Volume Left	0	0	0	0	0	0	0
Volume Right	63	0	0	170	0	0	0
cSH	731	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.41	0.41	0.31	0.47	0.47	0.47
Queue Length 95th (ft)	7	0	0	0	0	0	0
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.4	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			45.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

19: Rollins Ave Extension & New Street

Total Future AM Phase 2 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	0	135	58	56	0	0
Future Volume (Veh/h)	0	135	58	56	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	147	63	61	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			401			
pX, platoon unblocked						
vC, conflicting volume	124				240	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	124				240	94
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1463				748	963
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	147	124	0			
Volume Left	0	0	0			
Volume Right	0	61	0			
cSH	1463	1700	1700			
Volume to Capacity	0.00	0.07	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			10.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

20: Driveway & Rollins Ave Extension

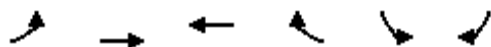
Total Future AM Phase 2 Restricted
02/07/2025

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↱	↘↗	
Traffic Volume (veh/h)	80	20	9	74	40	7
Future Volume (Veh/h)	80	20	9	74	40	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	22	10	80	43	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				280		
pX, platoon unblocked						
vC, conflicting volume				109	198	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				109	198	98
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				99	95	99
cM capacity (veh/h)				1481	785	958
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	109	90	51			
Volume Left	0	10	43			
Volume Right	22	0	8			
cSH	1700	1481	808			
Volume to Capacity	0.06	0.01	0.06			
Queue Length 95th (ft)	0	1	5			
Control Delay (s)	0.0	0.9	9.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay				2.3		
Intersection Capacity Utilization				21.1%	ICU Level of Service	A
Analysis Period (min)				15		

HCM Unsignalized Intersection Capacity Analysis

24: Rollins Ave Extension

Total Future AM Phase 2 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	58	29	15	39	50	68
Future Volume (Veh/h)	58	29	15	39	50	68
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	32	16	42	54	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			139			
pX, platoon unblocked						
vC, conflicting volume	58				195	37
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	58				195	37
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				93	93
cM capacity (veh/h)	1546				761	1035
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	95	58	128			
Volume Left	63	0	54			
Volume Right	0	42	74			
cSH	1546	1700	899			
Volume to Capacity	0.04	0.03	0.14			
Queue Length 95th (ft)	3	0	12			
Control Delay (s)	5.0	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	5.0	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			6.1			
Intersection Capacity Utilization		25.0%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 34: Pike Center/Driveway

Total Future AM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	70	0	47	0	0	5	87	0	0
Future Volume (Veh/h)	0	0	0	70	0	47	0	0	5	87	0	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	76	0	51	0	0	5	95	0	0
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	244	195	0	192	192	2	0				5	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	244	195	0	192	192	2	0				5	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	90	100	95	100				94	
cM capacity (veh/h)	646	659	1085	733	661	1082	1623				1616	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	127	5	95								
Volume Left	0	76	0	95								
Volume Right	0	51	5	0								
cSH	1700	842	1700	1616								
Volume to Capacity	0.00	0.15	0.00	0.06								
Queue Length 95th (ft)	0	13	0	5								
Control Delay (s)	0.0	10.0	0.0	7.4								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	10.0	0.0	7.4								
Approach LOS	A	B										
Intersection Summary												
Average Delay				8.7								
Intersection Capacity Utilization				24.9%	ICU Level of Service			A				
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	13722	13857	13728	13714	13670	13738
Vehs Exited	13368	13466	13355	13330	13273	13360
Starting Vehs	0	0	0	0	0	0
Ending Vehs	354	391	373	384	397	372
Travel Distance (mi)	6318	6382	6396	6386	6323	6361
Travel Time (hr)	456.5	465.2	461.1	469.6	459.8	462.4
Total Delay (hr)	249.5	256.4	251.6	260.9	252.8	254.3
Total Stops	17530	17952	17656	17981	17722	17771
Fuel Used (gal)	296.7	301.8	301.0	302.2	297.6	299.9

Interval #0 Information Seed

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2860	2728	2768	2742	2688	2756
Vehs Exited	2448	2345	2391	2365	2335	2375
Starting Vehs	0	0	0	0	0	0
Ending Vehs	412	383	377	377	353	373
Travel Distance (mi)	1218	1152	1197	1180	1166	1183
Travel Time (hr)	90.5	79.9	82.8	94.4	84.4	86.4
Total Delay (hr)	50.6	42.4	43.8	55.8	46.3	47.8
Total Stops	3456	3093	3138	3544	3306	3301
Fuel Used (gal)	57.1	53.0	55.1	57.4	54.6	55.4

Interval #1 Information 1

Start Time 7:00
End Time 7:15
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2686	2790	2783	2757	2659	2732
Vehs Exited	2764	2810	2759	2768	2655	2749
Starting Vehs	412	383	377	377	353	373
Ending Vehs	334	363	401	366	357	356
Travel Distance (mi)	1282	1335	1300	1278	1259	1291
Travel Time (hr)	92.8	101.2	95.4	90.4	89.4	93.8
Total Delay (hr)	50.5	57.5	52.6	48.7	48.3	51.5
Total Stops	3635	4004	3644	3498	3496	3650
Fuel Used (gal)	60.3	64.1	61.5	59.7	59.3	61.0

Interval #2 Information 2

Start Time 7:15
End Time 7:30
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2707	2759	2718	2706	2778	2732
Vehs Exited	2691	2782	2722	2691	2766	2729
Starting Vehs	334	363	401	366	357	356
Ending Vehs	350	340	397	381	369	359
Travel Distance (mi)	1245	1290	1280	1306	1311	1287
Travel Time (hr)	89.3	93.1	91.6	92.8	97.5	92.9
Total Delay (hr)	48.6	50.9	49.7	50.1	54.6	50.8
Total Stops	3490	3610	3483	3623	3646	3569
Fuel Used (gal)	58.4	61.0	60.3	60.8	62.2	60.5

Interval #3 Information 3

Start Time 7:30
End Time 7:45
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2746	2816	2708	2707	2740	2743
Vehs Exited	2704	2763	2743	2730	2766	2741
Starting Vehs	350	340	397	381	369	359
Ending Vehs	392	393	362	358	343	362
Travel Distance (mi)	1275	1304	1303	1288	1291	1292
Travel Time (hr)	90.8	94.4	95.2	93.7	94.4	93.7
Total Delay (hr)	49.1	51.6	52.5	51.5	52.2	51.4
Total Stops	3432	3528	3757	3551	3558	3561
Fuel Used (gal)	59.7	61.6	62.0	60.8	60.8	61.0

Interval #4 Information 4

Start Time 7:45
End Time 8:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2723	2764	2751	2802	2805	2760
Vehs Exited	2761	2766	2740	2776	2751	2757
Starting Vehs	392	393	362	358	343	362
Ending Vehs	354	391	373	384	397	372
Travel Distance (mi)	1298	1301	1316	1334	1296	1309
Travel Time (hr)	93.1	96.6	96.2	98.3	94.1	95.6
Total Delay (hr)	50.7	53.9	53.0	54.8	51.4	52.8
Total Stops	3517	3717	3634	3765	3716	3665
Fuel Used (gal)	61.2	62.1	62.1	63.4	60.8	61.9

Queuing and Blocking Report
Pike Center Total Future AM Phase 2

Total Future AM Phase 2 Restricted
02/07/2025

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	L	TR	L	T	T	T	R	L	T
Maximum Queue (ft)	90	89	208	220	196	199	438	431	422	191	194	216
Average Queue (ft)	31	22	171	180	42	50	225	208	193	55	79	149
95th Queue (ft)	69	60	237	246	130	137	380	367	347	131	148	227
Link Distance (ft)	102		197	197			420	420	420	420		200
Upstream Blk Time (%)	0	0	12	19	0		2	1	1		0	4
Queuing Penalty (veh)	0	0	35	57	0		9	5	5		0	33
Storage Bay Dist (ft)		90			100	160					160	
Storage Blk Time (%)	0	1		50	1		27				1	12
Queuing Penalty (veh)	0	0		30	2		10				7	15

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	226	230
Average Queue (ft)	167	173
95th Queue (ft)	247	254
Link Distance (ft)	200	200
Upstream Blk Time (%)	9	11
Queuing Penalty (veh)	68	83
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/New Street

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	B3
Directions Served	LT	R	LTR	L	T	T	TR	L	T	T	TR	T
Maximum Queue (ft)	76	133	123	197	190	158	121	100	108	121	128	10
Average Queue (ft)	18	57	49	76	28	13	16	26	14	33	45	0
95th Queue (ft)	52	110	95	146	107	72	63	68	61	87	104	6
Link Distance (ft)	112		74		294	294	294		186	186	186	255
Upstream Blk Time (%)	0	2	9		0				0	0	0	
Queuing Penalty (veh)	0	0	5		0				0	0	0	
Storage Bay Dist (ft)		150		125				110				
Storage Blk Time (%)	0	2		4	1			0	0			
Queuing Penalty (veh)	0	0		19	1			1	0			

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	B3	B3
Directions Served	T	TR	T	T	R	L	T	T	T	R	T	T
Maximum Queue (ft)	337	372	253	325	180	172	192	219	236	51	9	14
Average Queue (ft)	127	203	123	143	112	60	65	65	84	1	0	0
95th Queue (ft)	252	334	216	273	203	126	141	146	170	33	6	6
Link Distance (ft)	1311	1311	563	563			255	255	255		186	186
Upstream Blk Time (%)							0	0	0	0		
Queuing Penalty (veh)							0	0	1	0		
Storage Bay Dist (ft)					65	130					280	
Storage Blk Time (%)				15	28	2	1		0	0		
Queuing Penalty (veh)				28	44	10	1		0	0		

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	324	344	314	301
Average Queue (ft)	176	123	125	116
95th Queue (ft)	289	232	217	210
Link Distance (ft)		1192	1192	1192
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	350			
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	0	0		

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	87	264	345	310	379	603	488	192	212	92	121	109
Average Queue (ft)	13	128	177	196	287	187	188	85	97	15	55	42
95th Queue (ft)	59	240	308	356	413	466	373	160	187	53	100	87
Link Distance (ft)		563	563			1314	1314	205	205		541	
Upstream Blk Time (%)								0	1			
Queuing Penalty (veh)								0	2			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)		14		1	21	1				0	7	
Queuing Penalty (veh)		6		3	46	3				0	8	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	WB	NB	SB	SB
Directions Served	LTR	TR	LT	T
Maximum Queue (ft)	26	82	73	210
Average Queue (ft)	3	4	6	41
95th Queue (ft)	15	36	40	146
Link Distance (ft)	67	130	205	205
Upstream Blk Time (%)		0		0
Queuing Penalty (veh)		0		1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	NB	B8	SB	SB
Directions Served	LTR	L	TR	LTR	T	LT	TR
Maximum Queue (ft)	70	54	60	199	70	148	163
Average Queue (ft)	40	18	22	76	14	46	94
95th Queue (ft)	67	43	49	154	47	116	186
Link Distance (ft)	58	94	94	128	40	130	130
Upstream Blk Time (%)	4			2	1	1	5
Queuing Penalty (veh)	3			7	4	2	17
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB	B8	B8	B8
Directions Served	L	TR	L	T	L	TR	L	T	R	T	T	T
Maximum Queue (ft)	124	138	39	128	25	77	116	110	142	94	4	180
Average Queue (ft)	45	39	4	43	2	24	75	36	101	13	0	69
95th Queue (ft)	100	95	22	92	13	62	130	85	145	56	2	171
Link Distance (ft)	221	221		821		143	40	40	40	128	128	128
Upstream Blk Time (%)							26	8	26	0		3
Queuing Penalty (veh)							57	19	58	0		7
Storage Bay Dist (ft)			270		40							
Storage Blk Time (%)					0	4						
Queuing Penalty (veh)					0	0						

Intersection: 10: Bou Ave & Pike Center

Movement	EB	WB	WB	SB
Directions Served	T	T	TR	R
Maximum Queue (ft)	11	195	210	71
Average Queue (ft)	0	41	53	25
95th Queue (ft)	7	136	154	57
Link Distance (ft)	197	221	221	70
Upstream Blk Time (%)		0	0	2
Queuing Penalty (veh)		0	0	2
Storage Bay Dist (ft)				
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	61	131	354	172	162	139	133	90
Average Queue (ft)	15	53	169	37	66	43	62	14
95th Queue (ft)	44	102	303	103	131	91	113	49
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	104	108	94	287	94	135	194	370	407	414	224	359
Average Queue (ft)	38	41	36	162	24	60	65	201	236	266	60	317
95th Queue (ft)	89	91	77	256	63	114	151	327	372	409	189	392
Link Distance (ft)		337	337	329	329			1192	1192	1192		315
Upstream Blk Time (%)												18
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)							0	19				29
Queuing Penalty (veh)							2	15				18

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	334	327
Average Queue (ft)	259	158
95th Queue (ft)	367	288
Link Distance (ft)	315	315
Upstream Blk Time (%)	3	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Pike Center Total Future AM Phase 2

Total Future AM Phase 2 Restricted
02/07/2025

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	108	138	146	180	195	83	124	137	218	111	169	342
Average Queue (ft)	30	51	71	85	85	23	34	53	79	7	72	172
95th Queue (ft)	73	106	132	158	159	56	88	108	160	45	133	297
Link Distance (ft)	354	354		496	496		1314	1314			410	410
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			0	1			0				0	
Queuing Penalty (veh)			0	1			0				0	

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	277	48
Average Queue (ft)	119	13
95th Queue (ft)	241	35
Link Distance (ft)	410	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	4	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	117	276	253	160	309	317	127	116	156	216	184	60
Average Queue (ft)	14	137	126	118	225	211	48	44	101	100	66	15
95th Queue (ft)	58	235	225	194	361	342	103	97	167	184	140	45
Link Distance (ft)		605	605		276	276		139	139		1627	1627
Upstream Blk Time (%)					7	5	0	0	9			
Queuing Penalty (veh)					0	0	0	0	0			
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	8		6	17		0	0		2	0	
Queuing Penalty (veh)	0	1		32	45		0	0		2	0	

Queuing and Blocking Report
Pike Center Total Future AM Phase 2

Total Future AM Phase 2 Restricted
02/07/2025

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	52	58	157	116	68	249	242	247	215	96	349	366
Average Queue (ft)	15	10	67	39	15	200	137	122	60	27	122	134
95th Queue (ft)	42	35	130	87	42	297	261	233	138	70	258	269
Link Distance (ft)	179	179	167	167		227	227	227	227		420	420
Upstream Blk Time (%)			0	0		9	2	2	0		0	0
Queuing Penalty (veh)			0	0		0	0	0	0		0	0
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)						9					4	
Queuing Penalty (veh)						2					2	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	350
Average Queue (ft)	146
95th Queue (ft)	283
Link Distance (ft)	420
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	87	174	198	81	275	281	130	54	52	56	88
Average Queue (ft)	37	67	47	6	52	48	7	11	12	15	38
95th Queue (ft)	75	146	127	44	177	173	56	37	37	43	79
Link Distance (ft)		372	372		605	605			382	233	233
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	330			165			200	200			
Storage Blk Time (%)				0	1	1					
Queuing Penalty (veh)				0	0	1					

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	58	52	77	37
Average Queue (ft)	24	23	11	3
95th Queue (ft)	50	47	42	18
Link Distance (ft)	198	143	541	205
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	72	17	34	12	241	256	258
Average Queue (ft)	31	0	1	0	17	30	40
95th Queue (ft)	55	8	14	6	102	129	145
Link Distance (ft)	84	200	200	200	294	294	294
Upstream Blk Time (%)	0				0	0	0
Queuing Penalty (veh)	0				1	3	2
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 19: Rollins Ave Extension & New Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 20: Driveway & Rollins Ave Extension

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	29	62
Average Queue (ft)	1	26
95th Queue (ft)	12	50
Link Distance (ft)	96	71
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 24: Rollins Ave Extension

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	61	20	78
Average Queue (ft)	5	1	37
95th Queue (ft)	27	9	64
Link Distance (ft)	96	58	64
Upstream Blk Time (%)	0	0	1
Queuing Penalty (veh)	0	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Pike Center/Driveway

Movement	WB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	60	43
Average Queue (ft)	36	8
95th Queue (ft)	54	32
Link Distance (ft)	33	71
Upstream Blk Time (%)	8	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 846

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Total Future PM Phase 2 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	31	36	426	21	216	57	2602	385	206	1717	18
Future Volume (vph)	17	31	36	426	21	216	57	2602	385	206	1717	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1683	1478	3204	1431		1711	4916	1531	1770	5071	
Flt Permitted		0.27	1.00	0.95	1.00		0.95	1.00	1.00	0.07	1.00	
Satd. Flow (perm)		466	1478	3204	1431		1711	4916	1531	123	5071	
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)	18	32	37	439	22	223	59	2682	397	212	1770	19
RTOR Reduction (vph)	0	0	35	0	181	0	0	0	107	0	0	0
Lane Group Flow (vph)	0	50	2	439	64	0	59	2682	290	212	1789	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Turn Type	Perm	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases		3	3	4	4		1	5	5	6	2	
Permitted Phases	3									2		
Actuated Green, G (s)		10.0	10.0	28.0	28.0		9.3	69.5	69.5	78.7	78.7	
Effective Green, g (s)		10.0	10.0	28.0	28.0		9.3	69.5	69.5	78.7	78.7	
Actuated g/C Ratio		0.07	0.07	0.19	0.19		0.06	0.46	0.46	0.52	0.52	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		31	98	598	267		106	2277	709	262	2660	
v/s Ratio Prot			0.00	c0.14	0.04		0.03	c0.55	0.19	c0.10	0.35	
v/s Ratio Perm		c0.11								0.33		
v/c Ratio		1.61	0.03	0.73	0.24		0.56	1.18	0.41	0.81	0.67	
Uniform Delay, d1		70.0	65.4	57.5	51.9		68.3	40.2	26.7	59.9	26.2	
Progression Factor		1.00	1.00	1.00	1.00		1.45	0.63	0.59	0.78	0.58	
Incremental Delay, d2		385.2	0.1	6.4	1.3		3.7	83.0	1.0	14.3	1.2	
Delay (s)		455.2	65.5	63.9	53.2		102.9	108.4	16.9	61.3	16.2	
Level of Service		F	E	E	D		F	F	B	E	B	
Approach Delay (s)		289.5			60.0			96.7			21.0	
Approach LOS		F			E			F			C	
Intersection Summary												
HCM 2000 Control Delay			69.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			95.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/New Street

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	8	133	61	9	17	197	2418	0	68	1725	13
Future Volume (vph)	127	8	133	61	9	17	197	2418	0	68	1725	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		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	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1654	1478		1969		1711	4916		1652	4737	
Flt Permitted		0.69	1.00		0.57		0.08	1.00		0.04	1.00	
Satd. Flow (perm)		1195	1478		1170		143	4916		73	4737	
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)	132	8	139	64	9	18	205	2519	0	71	1797	14
RTOR Reduction (vph)	0	0	118	0	6	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	140	21	0	85	0	205	2519	0	71	1811	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA	Prot	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4	4		8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		22.8	22.8		22.8		115.2	102.0		103.3	95.1	
Effective Green, g (s)		22.8	22.8		22.8		115.2	102.0		103.3	95.1	
Actuated g/C Ratio		0.15	0.15		0.15		0.77	0.68		0.69	0.63	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		181	224		177		267	3342		136	3003	
v/s Ratio Prot			0.01				c0.08	0.51		0.03	0.38	
v/s Ratio Perm		c0.12			0.07		c0.51			0.33		
v/c Ratio		0.77	0.09		0.48		0.77	0.75		0.52	0.60	
Uniform Delay, d1		61.1	54.7		58.2		30.3	15.8		19.2	16.3	
Progression Factor		1.00	1.00		1.00		2.15	0.18		1.86	0.10	
Incremental Delay, d2		18.4	0.2		2.1		3.4	0.4		2.8	0.7	
Delay (s)		79.5	54.9		60.2		68.8	3.3		38.4	2.3	
Level of Service		E	D		E		E	A		D	A	
Approach Delay (s)		67.2			60.2			8.2			3.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			77.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	426	57	0	312	165	142	2178	121	275	1737	57
Future Volume (vph)	0	426	57	0	312	165	142	2178	121	275	1737	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	16	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		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	
Frt		0.98			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3231			3539	1583	1652	4746	1794	1711	4883	
Flt Permitted		1.00			1.00	1.00	0.08	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		3231			3539	1583	139	4746	1794	86	4883	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	315	167	143	2200	122	278	1755	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	41	0	2	0
Lane Group Flow (vph)	0	488	0	0	315	167	143	2200	81	278	1811	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.7			29.7	29.7	91.6	76.6	76.6	107.3	85.3	
Effective Green, g (s)		29.7			29.7	29.7	91.6	76.6	76.6	107.3	85.3	
Actuated g/C Ratio		0.20			0.20	0.20	0.61	0.51	0.51	0.72	0.57	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		639			700	313	236	2423	916	318	2776	
v/s Ratio Prot		c0.15			0.09	0.11	0.06	c0.46	0.05	c0.14	c0.37	
v/s Ratio Perm							0.31			0.49		
v/c Ratio		0.76			0.45	0.53	0.61	0.91	0.09	0.87	0.65	
Uniform Delay, d1		56.8			53.0	53.9	19.6	33.5	18.8	50.4	22.2	
Progression Factor		1.00			0.55	0.56	1.47	0.48	0.43	0.69	1.74	
Incremental Delay, d2		5.7			0.6	2.0	3.3	4.3	0.1	16.6	0.8	
Delay (s)		62.6			29.6	31.9	32.3	20.5	8.3	51.5	39.5	
Level of Service		E			C	C	C	C	A	D	D	
Approach Delay (s)		62.6			30.4			20.6			41.1	
Approach LOS		E			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			32.9		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				20.0			
Intersection Capacity Utilization			95.1%		ICU Level of Service				F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future PM Phase 2 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	205	469	586	141	73	109	592	215	119	37
Future Volume (vph)	68	739	205	469	586	141	73	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3176		3319	3305			1704	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	629	3176		3319	3305			1704	1478	3204	1739	1421
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)	70	762	211	484	604	145	75	112	610	222	123	38
RTOR Reduction (vph)	0	17	0	0	12	0	0	0	55	0	0	34
Lane Group Flow (vph)	70	956	0	484	737	0	0	187	555	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Effective Green, g (s)	52.1	44.6		25.4	62.5			39.0	70.9	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	269	944		562	1377			443	698	352	191	156
v/s Ratio Prot	0.01	c0.30		c0.15	0.22			0.11	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	1.01		0.86	0.54			0.42	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.4	52.7		60.6	32.8			46.1	33.4	63.8	63.9	59.6
Progression Factor	1.72	1.45		1.01	1.10			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	30.7		11.9	1.4			0.7	6.3	3.7	7.2	0.1
Delay (s)	57.7	107.1		73.2	37.6			46.8	39.7	67.5	71.2	59.7
Level of Service	E	F		E	D			D	D	E	E	E
Approach Delay (s)		103.8			51.5			41.3			67.9	
Approach LOS		F			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			66.8			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			93.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Total Future PM Phase 2 Restricted
02/07/2025

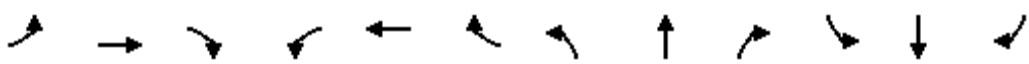
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	4	1	7	0	749	9	5	709	0
Future Volume (Veh/h)	0	0	0	4	1	7	0	749	9	5	709	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	4	1	8	0	832	10	6	788	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							184			256		
pX, platoon unblocked												
vC, conflicting volume	1224	1642	394	1243	1637	421	788				842	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1224	1642	394	1243	1637	421	788				842	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	97	99	99	100				99	
cM capacity (veh/h)	131	98	605	130	99	581	827				789	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	13	555	287	269	525							
Volume Left	4	0	0	6	0							
Volume Right	8	0	10	0	0							
cSH	238	1700	1700	789	1700							
Volume to Capacity	0.05	0.33	0.17	0.01	0.31							
Queue Length 95th (ft)	4	0	0	1	0							
Control Delay (s)	21.0	0.0	0.0	0.3	0.0							
Lane LOS	C				A							
Approach Delay (s)	21.0	0.0	0.1									
Approach LOS	C											
Intersection Summary												
Average Delay				0.2								
Intersection Capacity Utilization				33.1%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future PM Phase 2 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Volume (vph)	30	19	43	59	20	89	46	639	49	45	600	68
Future Volume (vph)	30	19	43	59	20	89	46	639	49	45	600	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	10	10	12
Total Lost time (s)		4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.94		1.00	0.88			0.99			0.99	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1718		1770	1635			1834			3244	
Flt Permitted		0.98		0.95	1.00			0.93			0.88	
Satd. Flow (perm)		1718		1770	1635			1707			2865	
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)	31	20	44	61	21	92	47	659	51	46	619	70
RTOR Reduction (vph)	0	39	0	0	83	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	56	0	61	30	0	0	755	0	0	728	0
Confl. Peds. (#/hr)									18	18		
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		6.2		6.2	6.2			34.2			34.2	
Effective Green, g (s)		6.2		6.2	6.2			34.2			34.2	
Actuated g/C Ratio		0.10		0.10	0.10			0.57			0.57	
Clearance Time (s)		4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		177		182	168			971			1630	
v/s Ratio Prot		c0.03		c0.03	0.02							
v/s Ratio Perm								c0.44			0.25	
v/c Ratio		0.31		0.34	0.18			0.78			0.45	
Uniform Delay, d1		25.0		25.0	24.6			10.0			7.5	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.0		1.1	0.5			4.0			0.2	
Delay (s)		26.0		26.1	25.2			14.0			7.7	
Level of Service		C		C	C			B			A	
Approach Delay (s)		26.0			25.5			14.0			7.7	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			13.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			60.1			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			82.5%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

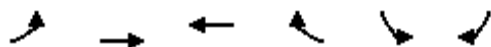
Total Future PM Phase 2 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	334	220	52	15	169	268	17	127	42	281	131	329
Future Volume (vph)	334	220	52	15	169	268	17	127	42	281	131	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1679		1640	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.52	1.00		0.59	1.00	1.00	0.67	1.00		0.65	1.00	1.00
Satd. Flow (perm)	894	1679		1012	1739	1422	1154	1660		1105	1739	1478
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)	348	229	54	16	176	279	18	132	44	293	136	343
RTOR Reduction (vph)	0	11	0	0	0	193	0	15	0	0	0	153
Lane Group Flow (vph)	348	272	0	16	176	86	18	161	0	293	136	190
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.2	44.2		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.2
Effective Green, g (s)	44.2	44.2		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.2
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	629	931		311	534	437	347	499		332	523	819
v/s Ratio Prot	c0.10	0.16			0.10			0.10			0.08	0.13
v/s Ratio Perm	c0.21			0.02		0.06	0.02			c0.27		
v/c Ratio	0.55	0.29		0.05	0.33	0.20	0.05	0.32		0.88	0.26	0.23
Uniform Delay, d1	10.4	9.4		19.4	21.3	20.3	19.8	21.6		26.5	21.1	9.1
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	2.3	0.1		0.3	1.6	1.0	0.1	0.4		27.0	1.2	0.4
Delay (s)	12.6	9.5		19.7	22.9	21.3	19.8	21.9		53.5	22.3	9.5
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		11.2			21.9			21.7			28.4	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.1									
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			79.7							17.0		
Intersection Capacity Utilization			82.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 10: Bou Ave & Pike Center

Total Future PM Phase 2 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	556	468	40	0	178
Future Volume (Veh/h)	0	556	468	40	0	178
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	573	482	41	0	184
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	283			
pX, platoon unblocked						
vC, conflicting volume	530				796	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530				796	270
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	75
cM capacity (veh/h)	1027				322	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	286	286	321	202	184	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	41	184	
cSH	1700	1700	1700	1700	723	
Volume to Capacity	0.17	0.17	0.19	0.12	0.25	
Queue Length 95th (ft)	0	0	0	0	25	
Control Delay (s)	0.0	0.0	0.0	0.0	11.7	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		11.7	
Approach LOS					B	
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	412	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	98	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	315	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.0		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			71.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2183	105	99	1825	30
Future Volume (vph)	98	66	87	210	70	127	197	2183	105	99	1825	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4873		1711	4899	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	84	4873		90	4899	
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)	103	69	92	221	74	134	207	2298	111	104	1921	32
RTOR Reduction (vph)	0	72	0	0	0	105	0	3	0	0	1	0
Lane Group Flow (vph)	103	89	0	221	74	29	207	2406	0	104	1952	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Effective Green, g (s)	32.6	32.6		32.6	32.6	32.6	105.4	87.6		92.2	79.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.70	0.58		0.61	0.53	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	275	684		255	404	344	275	2845		188	2609	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.49		0.05	0.40	
v/s Ratio Perm	0.08			c0.19			0.43			0.29		
v/c Ratio	0.37	0.13		0.87	0.18	0.08	0.75	0.85		0.55	0.75	
Uniform Delay, d1	50.0	47.3		56.6	47.8	46.8	45.6	25.6		29.9	27.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.52	0.38		1.00	1.00	
Incremental Delay, d2	1.8	0.2		27.0	0.5	0.2	8.0	2.0		5.9	2.0	
Delay (s)	51.8	47.5		83.6	48.3	47.0	77.5	11.7		35.8	29.2	
Level of Service	D	D		F	D	D	E	B		D	C	
Approach Delay (s)		49.2			66.1			16.9			29.6	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay		27.3										
HCM 2000 Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		98.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future PM Phase 2 Restricted

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		326	3303	1428
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)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	139	0	19	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	150	33	1545	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Effective Green, g (s)	11.4	11.4		23.4	23.4	38.8	85.0	79.3		90.4	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	127	119		253	256	396	338	2419		357	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.10	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.72	0.71	0.38	0.10	0.64		0.39	0.44	0.02
Uniform Delay, d1	65.7	66.8		60.1	60.1	45.7	14.9	25.2		16.4	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.87		1.00	1.00	1.00
Incremental Delay, d2	1.5	4.6		9.2	9.1	0.6	0.1	0.7		0.7	0.8	0.1
Delay (s)	67.2	71.4		69.4	69.2	46.3	12.9	22.5		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.2			59.1			22.3			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			27.5			
Intersection Capacity Utilization			70.6%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1056	74	202	808	189	125	145	311	298	171	24
Future Volume (vph)	21	1056	74	202	808	189	125	145	311	298	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3254		1770	3416		1684	1801	1531	1763	1863	1583
Flt Permitted	0.19	1.00		0.06	1.00		0.64	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	327	3254		116	3416		1141	1801	1531	819	1863	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)	22	1112	78	213	851	199	132	153	327	314	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1190	0	213	1050	0	132	153	327	314	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	62.3	58.1		79.5	69.3		42.1	27.8	27.8	57.5	36.7	36.7
Effective Green, g (s)	62.3	58.1		79.5	69.3		42.1	27.8	27.8	57.5	36.7	36.7
Actuated g/C Ratio	0.42	0.39		0.53	0.46		0.28	0.19	0.19	0.38	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	172	1260		231	1578		372	333	283	459	455	387
v/s Ratio Prot	0.00	0.37		c0.09	0.31		0.03	0.08	c0.21	c0.11	0.10	0.02
v/s Ratio Perm	0.05			c0.39			0.07			0.16		
v/c Ratio	0.13	0.94		0.92	0.67		0.35	0.46	1.16	0.68	0.40	0.06
Uniform Delay, d1	27.1	44.4		46.7	31.3		42.1	54.4	61.1	35.3	47.4	43.5
Progression Factor	0.84	0.78		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	13.8		38.4	2.2		0.8	1.4	102.3	4.5	0.8	0.1
Delay (s)	23.1	48.5		85.0	33.6		42.9	55.8	163.4	39.8	48.1	43.6
Level of Service	C	D		F	C		D	E	F	D	D	D
Approach Delay (s)		48.0			42.3			110.5			42.9	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			55.9			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			91.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2716	250	161	2107	26
Future Volume (vph)	40	12	32	186	13	138	18	2716	250	161	2107	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6076		1711	4901	
Flt Permitted	0.54	1.00		0.73	1.00		0.05	1.00		0.04	1.00	
Satd. Flow (perm)	927	1589		1354	1496		95	6076		76	4901	
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)	42	12	33	194	14	144	19	2829	260	168	2195	27
RTOR Reduction (vph)	0	27	0	0	118	0	0	9	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	40	0	19	3080	0	168	2221	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Effective Green, g (s)	27.3	27.3		27.3	27.3		93.7	88.7		110.2	99.2	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.62	0.59		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	168	289		246	272		113	3592		224	3241	
v/s Ratio Prot		0.01			0.03		0.01	c0.51		c0.08	c0.45	
v/s Ratio Perm	0.05			c0.14			0.10			0.47		
v/c Ratio	0.25	0.07		0.79	0.15		0.17	0.86		0.75	0.69	
Uniform Delay, d1	52.6	50.8		58.6	51.6		13.3	25.4		47.2	15.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.25	0.41	
Incremental Delay, d2	1.6	0.2		17.5	0.5		1.5	2.9		12.4	0.9	
Delay (s)	54.2	51.0		76.1	52.1		14.8	28.3		71.5	7.3	
Level of Service	D	D		E	D		B	C		E	A	
Approach Delay (s)		52.5			65.3			28.2			11.8	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		24.2										
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		100.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 2 Restricted

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Future Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3257		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.27	1.00		0.22	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	470	3257		386	3303	1432	1711	1665		1681	1573	
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)	150	1015	75	15	804	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	48	0	20	0	0	0	0
Lane Group Flow (vph)	150	1088	0	15	804	84	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Effective Green, g (s)	99.9	91.8		86.2	83.1	83.1	9.5	9.5		22.6	22.6	
Actuated g/C Ratio	0.67	0.61		0.57	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	405	1993		247	1829	793	108	105		253	236	
v/s Ratio Prot	c0.03	c0.33		0.00	0.24		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.03		0.06						
v/c Ratio	0.37	0.55		0.06	0.44	0.11	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.9	17.0		14.2	19.7	15.8	67.9	66.9		59.1	60.6	
Progression Factor	1.00	1.00		0.55	0.44	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.1		0.1	0.6	0.2	4.6	1.7		3.4	10.6	
Delay (s)	11.7	18.0		8.0	9.3	1.9	72.4	68.6		62.5	71.2	
Level of Service	B	B		A	A	A	E	E		E	E	
Approach Delay (s)		17.3			8.3			70.6			67.2	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay			22.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			23.0			
Intersection Capacity Utilization			68.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			6	
Lane Width (ft)		16.0			16.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		8			7			5			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	830	366	394			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	93	76	93	95	99	97			99		
cM capacity (veh/h)	235	251	545	133	250	624	1067			1097		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	409	207	1067	1097								
Volume to Capacity	0.43	0.13	0.03	0.01								
Queue Length 95th (ft)	53	11	2	0								
Control Delay (s)	20.3	25.0	1.0	0.2								
Lane LOS	C	D	A	A								
Approach Delay (s)	20.3	25.0	1.0	0.2								
Approach LOS	C	D										
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			51.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 18: Rockville Pike - 355 & Rollins Ave Extension

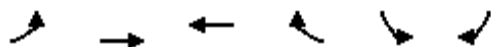
Total Future PM Phase 2 Restricted
02/07/2025

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			   			   	
Traffic Volume (veh/h)	0	146	2581	278	0	1919	
Future Volume (Veh/h)	0	146	2581	278	0	1919	
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)	0	159	2805	302	0	2086	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.65	0.54			0.54		
vC, conflicting volume	3651	1086			3107		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	891	0			1932		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	73			100		
cM capacity (veh/h)	184	588			163		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	159	1122	1122	863	695	695	695
Volume Left	0	0	0	0	0	0	0
Volume Right	159	0	0	302	0	0	0
cSH	588	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.27	0.66	0.66	0.51	0.41	0.41	0.41
Queue Length 95th (ft)	27	0	0	0	0	0	0
Control Delay (s)	13.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.4	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			71.8%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

19: Rollins Ave Extension & New Street

Total Future PM Phase 2 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	0	217	151	0	0	0
Future Volume (Veh/h)	0	217	151	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	236	164	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			401			
pX, platoon unblocked						
vC, conflicting volume	164				400	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	164				400	164
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1414				606	881
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	236	164	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1414	1700	1700			
Volume to Capacity	0.00	0.10	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			14.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

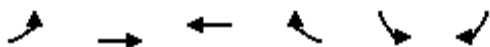
20: Driveway & Rollins Ave Extension

Total Future PM Phase 2 Restricted
02/07/2025

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	139	71	115	108	39	8
Future Volume (Veh/h)	139	71	115	108	39	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	151	77	125	117	42	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)	280					
pX, platoon unblocked						
vC, conflicting volume			228		556	190
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			228		556	190
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		91	99
cM capacity (veh/h)			1340		446	852
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	228	242	51			
Volume Left	0	125	42			
Volume Right	77	0	9			
cSH	1700	1340	487			
Volume to Capacity	0.13	0.09	0.10			
Queue Length 95th (ft)	0	8	9			
Control Delay (s)	0.0	4.5	13.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.5	13.3			
Approach LOS			B			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			37.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 24: Rollins Ave Extension

Total Future PM Phase 2 Restricted
02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	120	27	31	96	8	192
Future Volume (vph)	120	27	31	96	8	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	29	34	104	9	209
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	159	138	218			
Volume Left (vph)	130	0	9			
Volume Right (vph)	0	104	209			
Hadj (s)	0.20	-0.42	-0.53			
Departure Headway (s)	4.7	4.2	4.0			
Degree Utilization, x	0.21	0.16	0.25			
Capacity (veh/h)	718	811	836			
Control Delay (s)	9.0	7.9	8.4			
Approach Delay (s)	9.0	7.9	8.4			
Approach LOS	A	A	A			
Intersection Summary						
Delay			8.4			
Level of Service			A			
Intersection Capacity Utilization			37.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 34: Pike Center/Driveway

Total Future PM Phase 2 Restricted
02/07/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	104	0	78	0	0	27	165	104	0
Future Volume (Veh/h)	0	0	0	104	0	78	0	0	27	165	104	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	113	0	85	0	0	29	179	113	0
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	570	500	113	486	486	14	113				29	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	570	500	113	486	486	14	113				29	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	75	100	92	100				89	
cM capacity (veh/h)	363	419	940	449	427	1065	1476				1584	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	198	29	292								
Volume Left	0	113	0	179								
Volume Right	0	85	29	0								
cSH	1700	598	1700	1584								
Volume to Capacity	0.00	0.33	0.02	0.11								
Queue Length 95th (ft)	0	36	0	10								
Control Delay (s)	0.0	14.0	0.0	5.0								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	14.0	0.0	5.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay				8.1								
Intersection Capacity Utilization				38.5%	ICU Level of Service				A			
Analysis Period (min)				15								

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	75	75	75	75	75	75
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	5	5	5	5	5	5
Vehs Entered	17815	17922	17521	17770	17599	17722
Vehs Exited	17125	17242	16797	17156	16886	17044
Starting Vehs	0	0	0	0	0	0
Ending Vehs	690	680	724	614	713	675
Travel Distance (mi)	7798	7761	7541	7754	7730	7717
Travel Time (hr)	1145.0	1013.3	1188.9	1074.6	1255.8	1135.5
Total Delay (hr)	886.0	754.9	936.7	816.3	998.6	878.5
Total Stops	31389	29068	30127	30010	30297	30176
Fuel Used (gal)	507.1	475.5	506.9	489.8	529.7	501.8

Interval #0 Information Seed

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3679	3689	3569	3548	3645	3625
Vehs Exited	3040	3076	2985	2947	3034	3016
Starting Vehs	0	0	0	0	0	0
Ending Vehs	639	613	584	601	611	603
Travel Distance (mi)	1460	1428	1430	1398	1436	1430
Travel Time (hr)	133.2	130.7	129.7	122.9	141.9	131.7
Total Delay (hr)	84.8	83.1	82.3	76.3	94.2	84.2
Total Stops	5194	5188	5087	5014	5423	5182
Fuel Used (gal)	76.1	74.1	74.0	72.0	77.3	74.7

Interval #1 Information 1

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3502	3587	3561	3586	3524	3550
Vehs Exited	3471	3619	3512	3587	3463	3530
Starting Vehs	639	613	584	601	611	603
Ending Vehs	670	581	633	600	672	623
Travel Distance (mi)	1553	1635	1572	1601	1572	1587
Travel Time (hr)	197.5	187.2	190.6	169.0	201.2	189.1
Total Delay (hr)	145.9	133.1	138.2	115.6	148.9	136.3
Total Stops	6274	6200	6324	6119	6063	6188
Fuel Used (gal)	94.3	94.8	92.7	89.0	95.7	93.3

Interval #2 Information 2

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3547	3610	3656	3558	3486	3568
Vehs Exited	3506	3602	3539	3529	3489	3534
Starting Vehs	670	581	633	600	672	623
Ending Vehs	711	589	750	629	669	659
Travel Distance (mi)	1548	1619	1577	1577	1555	1575
Travel Time (hr)	244.0	198.4	226.0	211.6	262.5	228.5
Total Delay (hr)	192.6	144.5	173.4	158.9	210.7	176.0
Total Stops	6543	5868	6354	6074	6108	6188
Fuel Used (gal)	104.8	96.0	100.7	98.1	109.2	101.8

Interval #3 Information 3

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3601	3518	3537	3559	3436	3532
Vehs Exited	3580	3541	3536	3493	3430	3515
Starting Vehs	711	589	750	629	669	659
Ending Vehs	732	566	751	695	675	683
Travel Distance (mi)	1635	1566	1561	1585	1569	1583
Travel Time (hr)	274.3	226.5	283.1	267.3	306.7	271.6
Total Delay (hr)	219.9	174.1	230.9	214.5	254.7	218.8
Total Stops	6931	6030	6625	6288	6229	6425
Fuel Used (gal)	113.7	101.2	113.6	110.7	119.0	111.7

Interval #4 Information 4

Start Time 5:45
End Time 6:00
Total Time (min) 15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3486	3518	3198	3519	3508	3442
Vehs Exited	3528	3404	3225	3600	3470	3443
Starting Vehs	732	566	751	695	675	683
Ending Vehs	690	680	724	614	713	675
Travel Distance (mi)	1602	1513	1401	1592	1598	1541
Travel Time (hr)	296.0	270.4	359.5	303.8	343.5	314.6
Total Delay (hr)	242.8	220.1	311.8	250.8	290.1	263.1
Total Stops	6447	5782	5737	6515	6474	6190
Fuel Used (gal)	118.2	109.4	125.7	120.0	128.4	120.4

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	L	TR	L	T	T	T	R	L	T
Maximum Queue (ft)	123	101	212	231	196	200	458	476	458	461	199	247
Average Queue (ft)	57	40	147	175	138	73	377	377	389	228	177	208
95th Queue (ft)	120	93	225	242	226	179	522	532	549	451	235	275
Link Distance (ft)	102		197	197			420	420	420	420		200
Upstream Blk Time (%)	12	0	3	10	1		9	6	18	7	29	53
Queuing Penalty (veh)	0	0	9	33	0		64	46	129	51	0	341
Storage Bay Dist (ft)		90			100	160					160	
Storage Blk Time (%)	18	1		35	26	1	50				60	30
Queuing Penalty (veh)	6	1		84	56	5	28				343	61

Intersection: 1: Rockville Pike - 355 & Bou Ave

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	237	222
Average Queue (ft)	177	181
95th Queue (ft)	241	236
Link Distance (ft)	200	200
Upstream Blk Time (%)	7	10
Queuing Penalty (veh)	47	65
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Rockville Pike - 355 & Federal Plaza/New Street

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	B3
Directions Served	LT	R	LTR	L	T	T	TR	L	T	T	TR	T
Maximum Queue (ft)	128	146	72	239	239	158	166	176	245	190	178	370
Average Queue (ft)	94	101	45	110	54	49	71	83	125	60	58	117
95th Queue (ft)	153	156	69	194	154	118	126	193	285	158	141	366
Link Distance (ft)	112				294	294	294		186	186	186	255
Upstream Blk Time (%)	17	23	1		0	0		0	34	1	1	21
Queuing Penalty (veh)	0	0	0		2	0		0	202	4	4	128
Storage Bay Dist (ft)		150		125				110				
Storage Blk Time (%)	17	23		10	1			3	38			
Queuing Penalty (veh)	23	31		84	2			20	26			

Intersection: 2: Rockville Pike - 355 & Federal Plaza/New Street

Movement	B3	B3
Directions Served	T	T
Maximum Queue (ft)	269	258
Average Queue (ft)	38	24
95th Queue (ft)	178	136
Link Distance (ft)	255	255
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	2	1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	B3	B3
Directions Served	T	TR	T	T	R	L	T	T	T	R	T	T
Maximum Queue (ft)	796	828	296	331	180	249	286	293	299	255	52	82
Average Queue (ft)	391	418	119	120	102	54	175	199	206	36	2	3
95th Queue (ft)	950	982	227	260	195	134	260	287	301	180	29	33
Link Distance (ft)	1311	1311	563	563			255	255	255		186	186
Upstream Blk Time (%)	0	1				0	1	2	3	0	0	0
Queuing Penalty (veh)	0	3				0	8	18	28	0	0	0
Storage Bay Dist (ft)					65	130				280		
Storage Blk Time (%)				12	19	2	21		3	0		
Queuing Penalty (veh)				20	29	11	30		4	1		

Intersection: 4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Movement	B3	SB	SB	SB	SB
Directions Served	T	L	T	T	TR
Maximum Queue (ft)	94	464	751	717	560
Average Queue (ft)	6	220	423	386	351
95th Queue (ft)	43	456	761	634	545
Link Distance (ft)	186		1192	1192	1192
Upstream Blk Time (%)	0		3	0	
Queuing Penalty (veh)	1		18	0	
Storage Bay Dist (ft)		350			
Storage Blk Time (%)		0	22		
Queuing Penalty (veh)		0	60		

Intersection: 5: Chapman Ave & Twinbrook Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	L	L	T
Maximum Queue (ft)	200	527	601	309	376	519	438	212	224	175	200	174
Average Queue (ft)	85	361	409	202	248	211	210	124	197	76	112	93
95th Queue (ft)	228	559	635	325	375	410	357	208	246	151	178	159
Link Distance (ft)		563	563			1314	1314	200	200		541	
Upstream Blk Time (%)		0	6					3	28			
Queuing Penalty (veh)		0	24					13	107			
Storage Bay Dist (ft)	130			240	240					85		300
Storage Blk Time (%)	0	59		3	18	4				5	32	
Queuing Penalty (veh)	1	40		10	52	21				12	84	

Intersection: 6: Chapman Ave & Pike Center North/Driveway

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	T	TR	LT	T
Maximum Queue (ft)	44	89	146	143	184
Average Queue (ft)	8	5	110	17	22
95th Queue (ft)	28	36	184	85	96
Link Distance (ft)	67	130	130	200	200
Upstream Blk Time (%)	0	0	14	0	0
Queuing Penalty (veh)	0	0	53	1	1
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Movement	EB	WB	WB	NB	B8	SB	SB
Directions Served	LTR	L	TR	LTR	T	LT	TR
Maximum Queue (ft)	67	86	107	234	179	163	168
Average Queue (ft)	39	29	48	185	112	85	92
95th Queue (ft)	62	62	91	258	201	165	173
Link Distance (ft)	58	94	94	128	40	130	130
Upstream Blk Time (%)	8	1	2	51	56	6	3
Queuing Penalty (veh)	3	0	0	369	411	20	12
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9: Chapman Ave & Bou Ave

Movement	EB	EB	WB	WB	WB	NB	NB	B35	B48	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	T	T	L	T	R
Maximum Queue (ft)	246	186	43	198	344	89	228	262	154	133	113	128
Average Queue (ft)	177	70	8	77	63	24	139	69	14	107	56	85
95th Queue (ft)	283	143	31	144	265	79	252	273	98	140	107	140
Link Distance (ft)	221	221		821	821		143	285	528	40	40	40
Upstream Blk Time (%)	25	0					29	10		69	17	21
Queuing Penalty (veh)	69	0					85	28		162	40	49
Storage Bay Dist (ft)			270			40						
Storage Blk Time (%)						2	55					
Queuing Penalty (veh)						3	9					

Intersection: 9: Chapman Ave & Bou Ave

Movement	B8	B8	B8
Directions Served	T	T	T
Maximum Queue (ft)	175	69	153
Average Queue (ft)	74	3	31
95th Queue (ft)	173	28	105
Link Distance (ft)	128	128	128
Upstream Blk Time (%)	9	0	1
Queuing Penalty (veh)	21	0	1
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: Bou Ave & Pike Center

Movement	EB	EB	WB	WB	SB
Directions Served	T	T	T	TR	R
Maximum Queue (ft)	100	215	103	170	92
Average Queue (ft)	35	51	7	31	54
95th Queue (ft)	105	193	46	110	90
Link Distance (ft)		197	221	221	70
Upstream Blk Time (%)		7		0	9
Queuing Penalty (veh)		42		0	18
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	25	0			
Queuing Penalty (veh)	69	0			

Queuing and Blocking Report
Pike Center Total Future PM Phase 2

Total Future PM Phase 2 Restricted
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Intersection: 11: East Jefferson Street & Rollins Avenue /Rollins Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	TR
Maximum Queue (ft)	40	122	526	377	320	293	184	148
Average Queue (ft)	8	49	254	91	170	65	85	33
95th Queue (ft)	31	94	460	251	304	168	153	100
Link Distance (ft)	483	483	1311	1311	301	301	323	323
Upstream Blk Time (%)					2	1		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	174	107	141	346	161	228	194	303	279	182	225	359
Average Queue (ft)	79	45	53	206	57	103	132	111	81	74	118	327
95th Queue (ft)	146	94	103	329	128	187	202	246	188	156	254	385
Link Distance (ft)		337	337	329	329			1192	1192	1192		315
Upstream Blk Time (%)				5	0							31
Queuing Penalty (veh)				0	0							0
Storage Bay Dist (ft)	250					450	120				125	
Storage Blk Time (%)					0		28	4			2	40
Queuing Penalty (veh)					0		206	7			14	40

Intersection: 12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	333	324
Average Queue (ft)	278	194
95th Queue (ft)	371	311
Link Distance (ft)	315	315
Upstream Blk Time (%)	5	1
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Pike Center Total Future PM Phase 2

Total Future PM Phase 2 Restricted
02/07/2025

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	L	LT	R	L	T	T	TR	L	L	T
Maximum Queue (ft)	91	184	232	299	338	88	235	248	330	144	180	339
Average Queue (ft)	34	64	123	164	186	15	142	165	236	13	78	192
95th Queue (ft)	71	125	206	259	298	52	223	241	342	71	146	312
Link Distance (ft)	354	354		496	496		1314	1314			410	410
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			160			160			500	210		
Storage Blk Time (%)			2	14			6				0	
Queuing Penalty (veh)			5	21			2				0	

Intersection: 13: Twinbrook Parkway & Parklawn Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	288	44
Average Queue (ft)	143	10
95th Queue (ft)	269	31
Link Distance (ft)	410	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		135
Storage Blk Time (%)	6	
Queuing Penalty (veh)	2	

Intersection: 14: Nebel Street & Randolph Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	140	517	524	160	313	309	151	166	170	283	296	69
Average Queue (ft)	24	279	287	135	241	239	60	70	154	151	116	16
95th Queue (ft)	87	478	482	195	350	349	129	147	170	254	219	49
Link Distance (ft)		605	605		276	276		139	139		1627	1627
Upstream Blk Time (%)		0	0		10	9	3	6	77			
Queuing Penalty (veh)		1	0		0	0	0	0	0			
Storage Bay Dist (ft)	140			120			150			175		
Storage Blk Time (%)	0	30		24	19		3	6		8	1	
Queuing Penalty (veh)	0	6		98	39		4	7		13	4	

Queuing and Blocking Report
Pike Center Total Future PM Phase 2

Total Future PM Phase 2 Restricted
02/07/2025

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	TR	L	T	T
Maximum Queue (ft)	134	73	194	189	47	265	272	264	275	191	286	275
Average Queue (ft)	38	18	135	119	12	235	232	237	236	97	105	122
95th Queue (ft)	99	49	215	210	35	284	274	276	278	191	237	238
Link Distance (ft)	179	179	167	167		227	227	227	227		420	420
Upstream Blk Time (%)	1		10	22		36	30	45	43			
Queuing Penalty (veh)	0		0	0		0	0	0	0			
Storage Bay Dist (ft)					580					160		
Storage Blk Time (%)						36				6	2	
Queuing Penalty (veh)						7				39	3	

Intersection: 15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Movement	SB
Directions Served	TR
Maximum Queue (ft)	280
Average Queue (ft)	126
95th Queue (ft)	229
Link Distance (ft)	420
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	180	362	350	39	255	260	132	130	106	174	245
Average Queue (ft)	69	188	170	9	68	74	13	50	35	88	137
95th Queue (ft)	127	321	299	31	172	177	62	102	77	146	218
Link Distance (ft)		372	372		605	605			382	233	233
Upstream Blk Time (%)		0	0								1
Queuing Penalty (veh)		0	0								1
Storage Bay Dist (ft)	330			165			200	200			
Storage Blk Time (%)		0			1	1					
Queuing Penalty (veh)		1			0	1					

Intersection: 17: Chapman Ave/Chapman Road & Thompson Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	121	52	82	86
Average Queue (ft)	53	18	14	11
95th Queue (ft)	91	43	53	43
Link Distance (ft)	198	143	541	205
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Rockville Pike - 355 & Rollins Ave Extension

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	96	65	85	87	314	317	297
Average Queue (ft)	60	2	3	3	208	77	60
95th Queue (ft)	101	25	34	35	407	252	205
Link Distance (ft)	84	200	200	200	294	294	294
Upstream Blk Time (%)	6		0	0	24	0	0
Queuing Penalty (veh)	10		0	0	151	2	2
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 19: Rollins Ave Extension & New Street

Movement	EB	WB
Directions Served	LT	TR
Maximum Queue (ft)	15	64
Average Queue (ft)	0	9
95th Queue (ft)	7	40
Link Distance (ft)	84	53
Upstream Blk Time (%)		2
Queuing Penalty (veh)		4
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 20: Driveway & Rollins Ave Extension

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	11	88	70
Average Queue (ft)	0	24	28
95th Queue (ft)	7	65	55
Link Distance (ft)	53	96	71
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	0	1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 24: Rollins Ave Extension

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	80	59	79
Average Queue (ft)	39	36	54
95th Queue (ft)	64	56	85
Link Distance (ft)	96	58	64
Upstream Blk Time (%)	0	0	2
Queuing Penalty (veh)	0	1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Pike Center/Driveway

Movement	WB	NB	SB
Directions Served	LTR	TR	LTR
Maximum Queue (ft)	74	6	76
Average Queue (ft)	43	0	25
95th Queue (ft)	61	4	66
Link Distance (ft)	33	70	71
Upstream Blk Time (%)	19		1
Queuing Penalty (veh)	0		2
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 4658