TRAFFIC IMPACT STUDY

Harford Mall Redevelopment
Apartment Building with Parking Garage

TOWN OF BEL AIR, MARYLAND

DECEMBER 1, 2022

PREPARED FOR:

Castle Development Partners North, LLC

PREPARED BY:

TRAFFIC CONCEPTS, INC.

7525 CONNELLEY DRIVE
SUITE B
HANOVER, MARYLAND 21076
(410) 760-2911
www.traffic-concepts.com

TC #3941

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EXECUTIVE SUMMARY

Traffic Concepts, Inc. conducted a traffic impact study for the Harford Mall redevelopment project. The development site is the existing Harford Mall that is located at 600 Bel Air Road, Bel Air Maryland. The portion of the mall to be redeveloped is along Boulton Street and east of Gateway Drive. The project developer is Castle Development Partners and the owner is Shops at Harford Mall, LLC.

Project Description & Site Access: The planned project is a 300-unit apartment building with structured garage parking. The lot will have access to Boulton Street at the existing signalized Gateway Drive intersection. Additionally, the lot will have access to Boulton Street at a new unsignalized access point that aligns with the existing right-in/right-out retail center access that is labeled intersection #8. We note, the existing mall entrance at intersection #7 will be eliminated.

Scope of Services: The study area is defined by the key intersections listed below. These intersections were analyzed during weekday AM and PM peak hours.

1. Business US 1 (Baltimore Pike) @ Tollgate Road
2. Business US 1 (Baltimore Pike) @ MD 24 (Veterans Memorial Highway)
3. MD 24 (Veterans Memorial Highway) @ Boulton Street
4. Boulton Street @ Tollgate Road
5. Boulton Street @ Gateway Drive/Mall Access
6. Boulton Street @ Athletic Club/West Mall Access[1]
7. Boulton Street @ Existing East Mall Access/Retail Center[2]
8. Boulton Street @ Proposed Future East Mall Access/Retail Center[3]
9. Tollgate Road @ West Mall Access

[1] Intersection #6 was not identified as a "key intersection" by the Town. Therefore, this intersection was not analyzed but the intersection was counted and is included in the study exhibits to create a comprehensive understanding of the existing traffic flows.

[2] The developer proposes to eliminate the existing East Mall access (Intersection #7).

[3] The developer will construct a unsignalized mall access across from the existing retail center (Intersection #8).

Analysis Methodology: The key intersections were analyzed under the Existing, Background, and Future traffic conditions, as stated in the following formula:

Total Future Traffic = (***Existing Condition*** – *current intersection turning movement volumes +* ***Background Condition*** *– 2% Growth Rate compounded over 2 years + pipeline development traffic +* ***Future Condition*** *- site generated traffic)*

All key intersections were analyzed with the Highway Capacity Manual (HCM) methodologies. Also, as required by the Town, a Synchro analysis was conducted at the key intersections, which includes HCM and the 95th percentile SimTraffic back-of-queue reports.

Site Trips: The *ITE, Trip Generation Manual 11th Edition* (Land Use Code 221 - Multi-family Housing) was used to determine the new site trips. The site trip generation, the site distribution, and the trip assignment pattern were approved by the Town.

CONCLUSION: The minimum intersection LOS threshold for developments located within the Town of Bel Air limits is a "D" level of service. With the proposed mitigation measures, all key intersections would operate at acceptable levels of service with the full build-out of the project.

INTRODUCTION

Traffic Concepts, Inc. prepared a traffic impact study for the proposed Harford Mall redevelopment project. The proposed project is a 300-unit apartment building with a parking garage. The proposed development site is shown on Exhibit 1 along with the key intersections.

Scope of Services

A scope of services document developed by the Town is included in Appendix IV. The study limits are defined by the following key intersections:

1. Business US 1 (Baltimore Pike) @ Tollgate Road
2. Business US 1 (Baltimore Pike) @ MD 24 (Veterans Memorial Highway)
3. MD 24 (Veterans Memorial Highway) @ Boulton Street
4. Boulton Street @ Tollgate Road
5. Boulton Street @ Gateway Drive/Mall Access
6. Boulton Street @ Athletic Club/West Mall Access[1]
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[2] The developer proposes to eliminate the existing East Mall access (Intersection #7).

[3] The developer will construct a unsignalized mall access across from the existing retail center (Intersection #8).

Site Location & Site Access

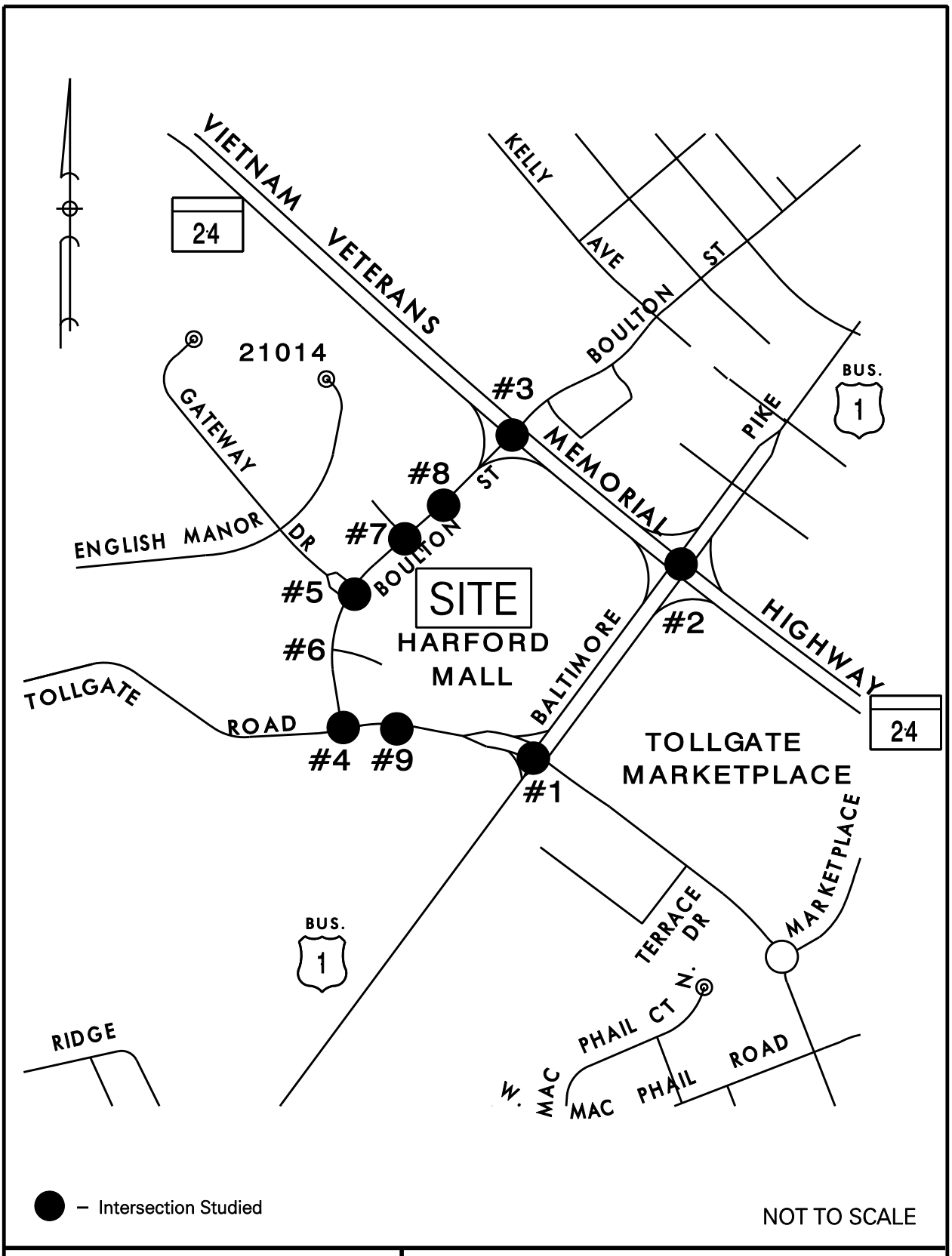
The proposed apartment building will be situated along the south side of Boulton Street, east of Gateway Drive. The Harford Mall site has three existing access points along Boulton Street. As shown on the site plan, the existing access leg at the signalized Boulton Street @ East Mall Access/Retail Center intersection (Intersection #7) will be eliminated. This intersection would then become a three-way signalized intersection that will continue to serve the existing retail center. A new unsignalized access point is proposed to align with the existing right-in/right-out access at the retail center across from the mall (Intersection #8). The new access would be restricted to left-in/right-in/right-out movements.

Methodology

The study was conducted with three traffic conditions that includes analyses of the key intersection with the existing, background, and future traffic volumes. The existing condition is created with the peak hour intersection turning movement counts. This information generates the baseline intersection level of service condition. The background condition includes a 2.2 percent regional traffic growth rate and peak hour trips generated by the nearby approved, but not yet built developments. The future condition includes an adjustment of peak hour traffic flows due to the reconfigured mall access points and includes the site generated peak hour trips.

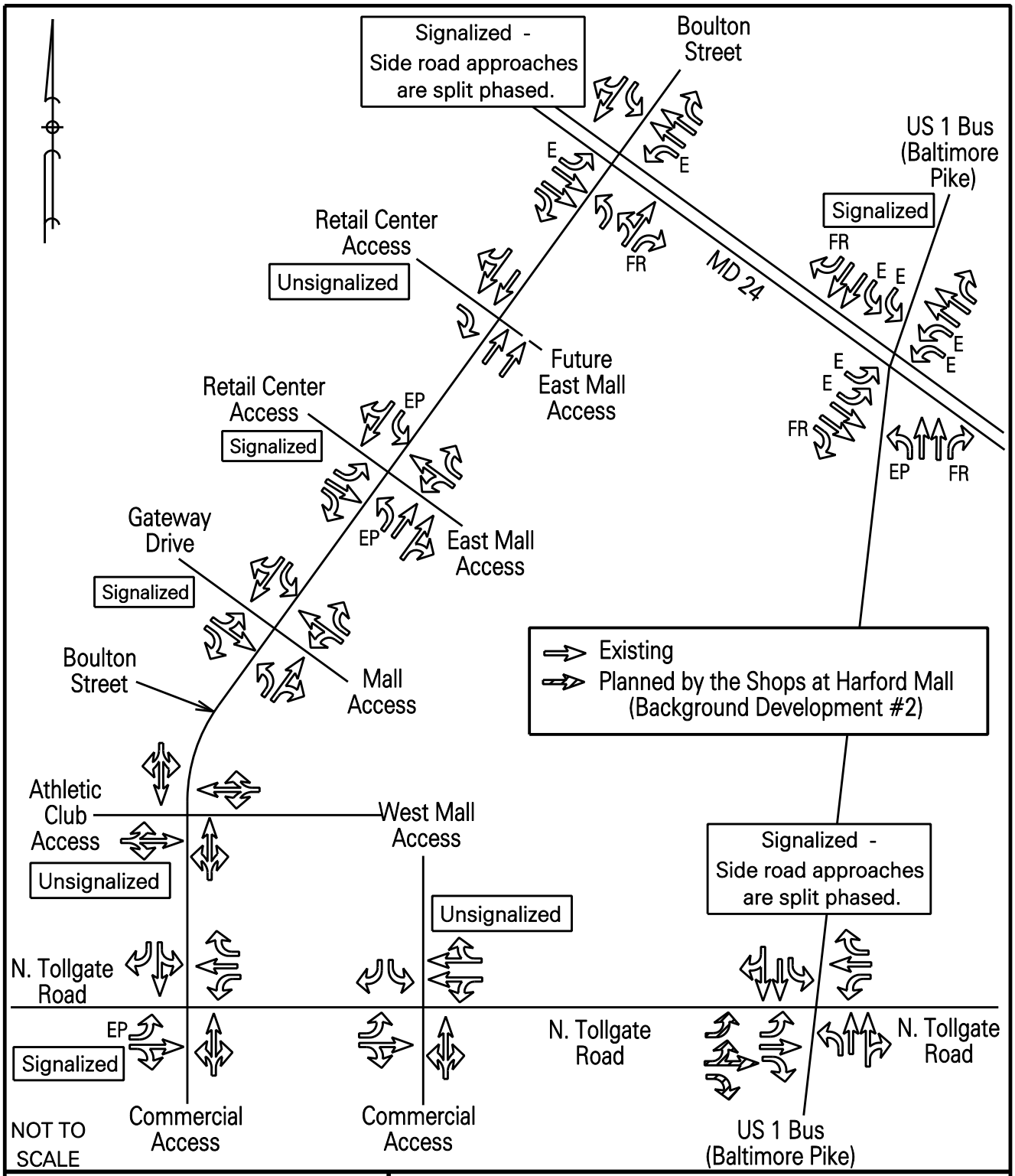
Analysis Tools

As stated in the scoping agreement, the key intersections were analyzed with Synchro software. This analysis method determined the HCM intersection levels of service and the 95th percentile back-of-queue.



TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 1
Site Location



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Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 2
Lane Configuration

EXISTING CONDITION

The existing traffic condition is created with intersection turning movement counts that were conducted at the key intersections during the weekday morning and afternoon peak hours. Each key intersection was field checked to determine the existing lane configuration. The existing lane use is shown on Exhibit 2. The existing peak one-hour traffic volumes are shown on Exhibit 3.

Road Network Description

This descriptive information is provided for the roadways and intersections that immediately surround the Harford Mall. The study roadway segments include: Business US 1 (Baltimore Pike); from Tollgate Road to MD 24, N. Tollgate; from Boulton Street to Business US 1, and Boulton Street; from Tollgate Road to MD 24.

Road Segment Descriptions

Business US 1 (Baltimore Pike) Segment

Business US 1 is functionally classified by MDOT SHA as an urban principal arterial roadway. Business US 1 is an undivided four-lane highway and has a posted speed limit of 35 mph. The study road segment has a continuous sidewalk that is approximately 5 feet in width and runs along both sides of Business US 1 from Tollgate Road to MD 24.

N. Tollgate Road Segment

The N. Tollgate Road segment begins at Business US 1 and ends at Boulton Street. Tollgate Road is a collector roadway and runs in an east to west direction. Along N. Tollgate Road, in the westbound direction, there are two travel lanes and one lane in the eastbound direction. A continuous sidewalk runs only along the north side of N. Tollgate Road.

Boulton Street Segment

Boulton Street is a collector roadway that runs in a north to south direction. Boulton Street has two northbound through travel lanes and one southbound through lane. The roadway is posted at 25 mph. There are sidewalks along both sides of Boulton Street. Traffic signals control the Boulton Street @ Gateway Drive/Harford Mall entrance intersection and the Bolton Street @ Harford Mall/commercial center access intersection.

Intersection Descriptions

Business US 1 @ Tollgate RD Intersection

The Business US 1 @ Tollgate Road intersection is controlled with a traffic signal and has video detection. A pedestrian crosswalk exists across Business US 1 on the north side of the intersection. The crosswalk has ramps and a ground mounted push button APS (Accessible Pedestrian Signal) and CPS (Countdown Pedestrian Signal) pedestrian signals. The existing pedestrian crosswalk connects the N. Tollgate Road sidewalk section to the sidewalk along S. Tollgate Road. An unsignalized and unsigned painted crosswalk exists on S. Tollgate Road at Azalea Drive.

MD 24 @ Business US 1 intersection

The MD 24 @ Business US 1 intersection is controlled with a signal with video detection. There are ground mounted pedestrian signals with push buttons APS and CPS signals on all corners of the intersection. The intersection has painted crosswalks and ramps. There is a MDOT SHA sign posted on Business US 1 noting “Stop for pedestrians at all crosswalks”.

N. Tollgate Road @ Boulton Street intersection

The traffic signal that controls the N Tollgate Road @ Boulton Street intersection has video detection on the eastbound approach. All other intersection approaches are controlled with loop detection. There are no crosswalks or pedestrian signals at this intersection.

Boulton Street @ Harford Mall/commercial center Intersection

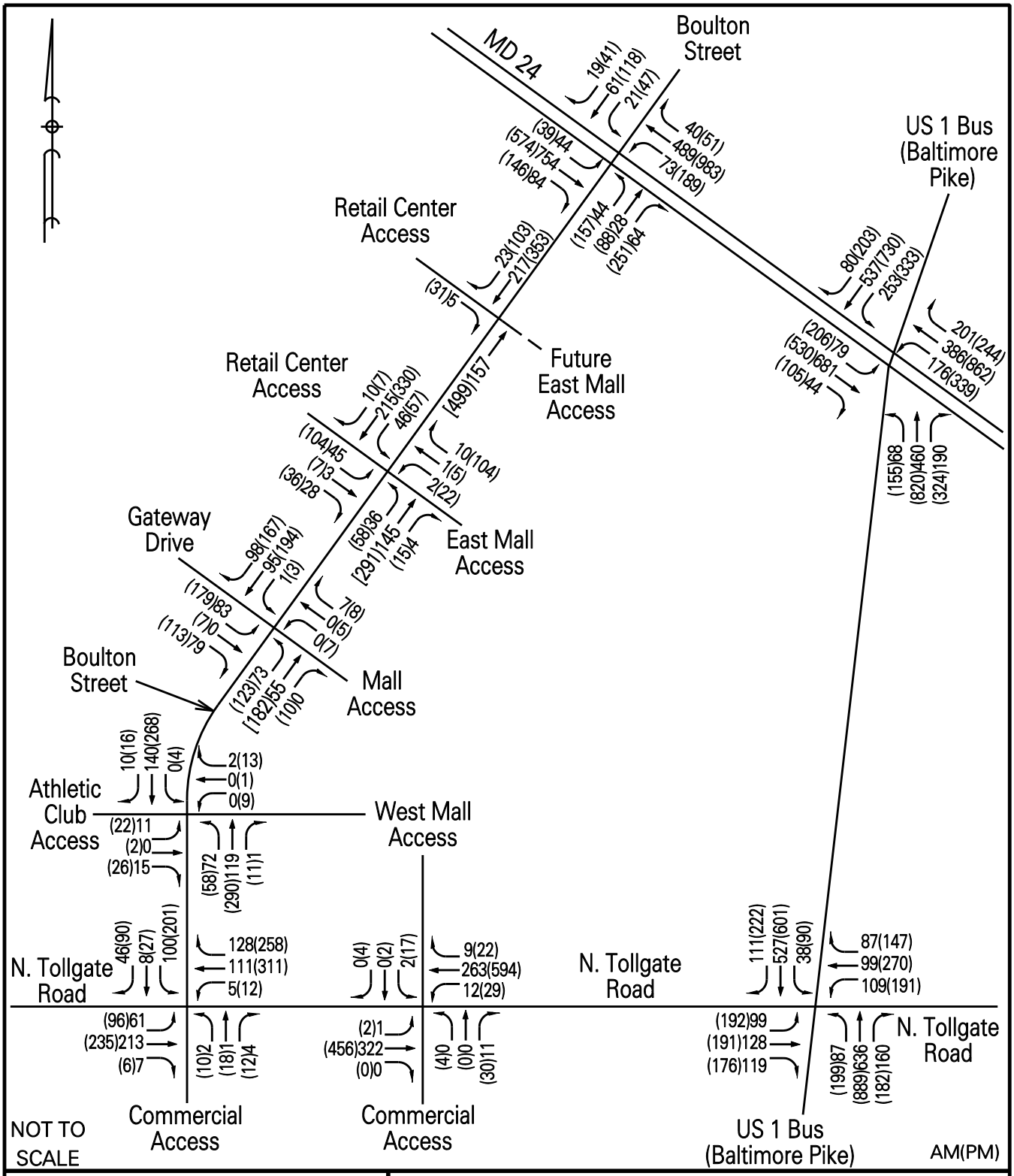
The Bolton Street @ Harford Mall/commercial center access signal has span wire to support the signal heads. The video detection cameras are mounted on the signal poles. The signal heads including the pedestrian signal heads appear to have been recently replaced with updated equipment. There are crosswalks and pedestrian ramps on all corners of the intersection.

Boulton Street @ Gateway Drive/Harford Mall entrance

The Boulton Street @ Gateway Drive/Harford Mall entrance signal heads are supported with poles and mast arms. The signal heads are updated and the intersection is controlled with video detection. There are no pedestrian crosswalks or pedestrian equipment at this intersection.

Transit Description

The Harford Transit link Bus Route 6 (Orange Line) operates a route through Bel Air and has a stop at the Harford Mall. Additionally, the Bus Route 1 (Green Line) also provides service to Harford Mall. The mall bus stop is located on the Boulton Street side of the mall, near the Green Turtle restaurant. A bus shelter is provided at this mall stop.



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7525 Connelley Drive
Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 3

Existing Traffic Volumes

BACKGROUND CONDITION

The background traffic condition evaluates the key intersections with the existing peak hour traffic and with additional traffic generated by growth rates and the stated background developments. Planned mitigation detailed on Exhibit 2 is also included at this stage.

Regional Growth Rate

The standard Harford County regional traffic growth rate of 2.2 percent was compounded over a five-year project build period to create the base (2027) traffic volumes. This information is shown on Exhibit 4.

Background Developments

Bel Air Town officials identified three (3) planned developments must be included in the study, which are shown on Exhibit 5. The Institute of Transportation Engineers' (ITE), Trip Generation Manual, 11th Edition was consulted to determine the following background trips:

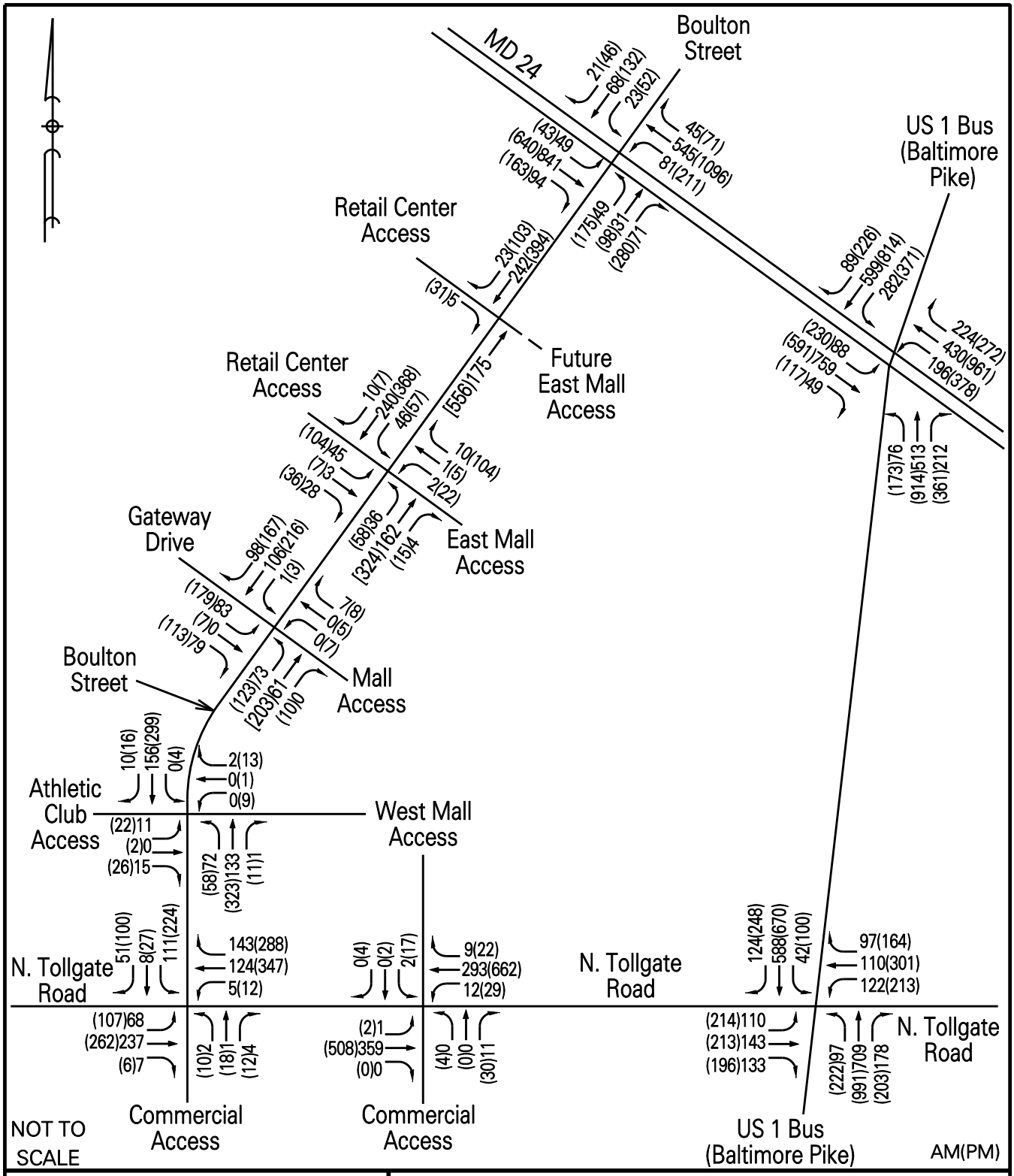
	AM		PM	
	IN	**OUT**	**IN**	**OUT**
1. Upper Chesapeake Medical Campus[4]				
2. Shops at Harford Mall (aka Sears Redevelopment) ITE LUC 821- Shopping Plaza (40-150k - with Supermarket) 62.0 ksf	136	83	285	309
Less ITE PM Pass-by Trips (40%)			**- 114**	**- 124**
Net New Trips	**136**	**83**	**171**	**185**
3. Stack and Store – 25,558 SF self-storage facility[5]				

[4] These trips were copied directly from the TIS approved by the Town.

[5] Minimal peak hour trips generated by the Stack and Store are accounted for with growth rates. (ITE LUC 151: 2 total AM; 4 total PM trips). ITE data is included in Appendix II.

The background peak hour trips were distributed along the road network and assigned to the key intersections, as shown on Exhibit 6. The background trip distribution and assignment pattern, as shown in this report, was previously approved by Town of Bel Air and Harford County staff.

The detailed traffic data for each individual development is included in Appendix II. We then combined the base 2027 traffic volumes (Exhibit 4) with the background traffic volumes (Exhibit 6), to arrive at the total background traffic volumes, as shown on Exhibit 7.



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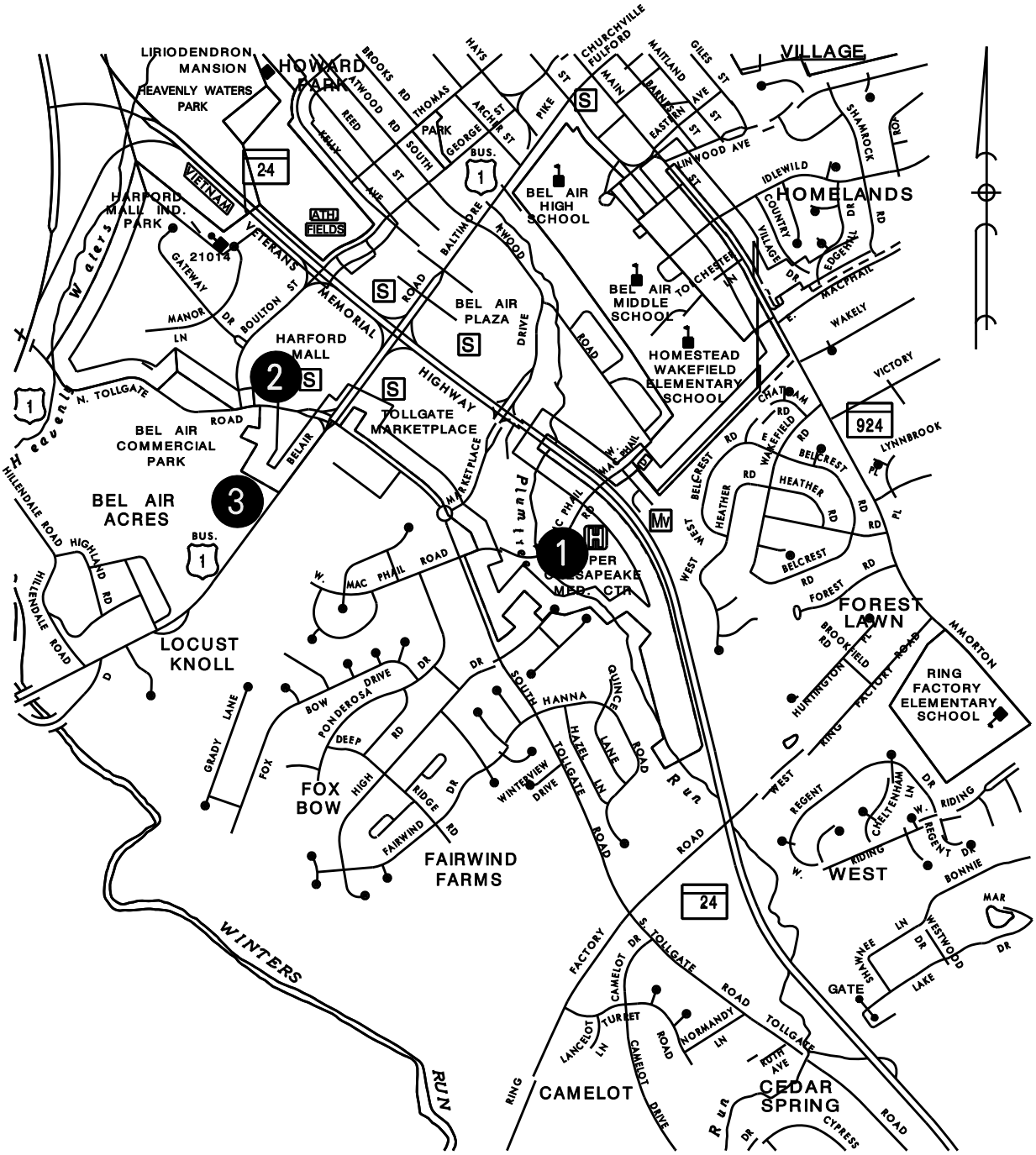
Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 4

Base Traffic Volumes (2027)



1. Upper Chesapeake Medical Campus (UCMC)
2. Sears Redevelopment (Shops at Harford Mall)
3. Stack and Store

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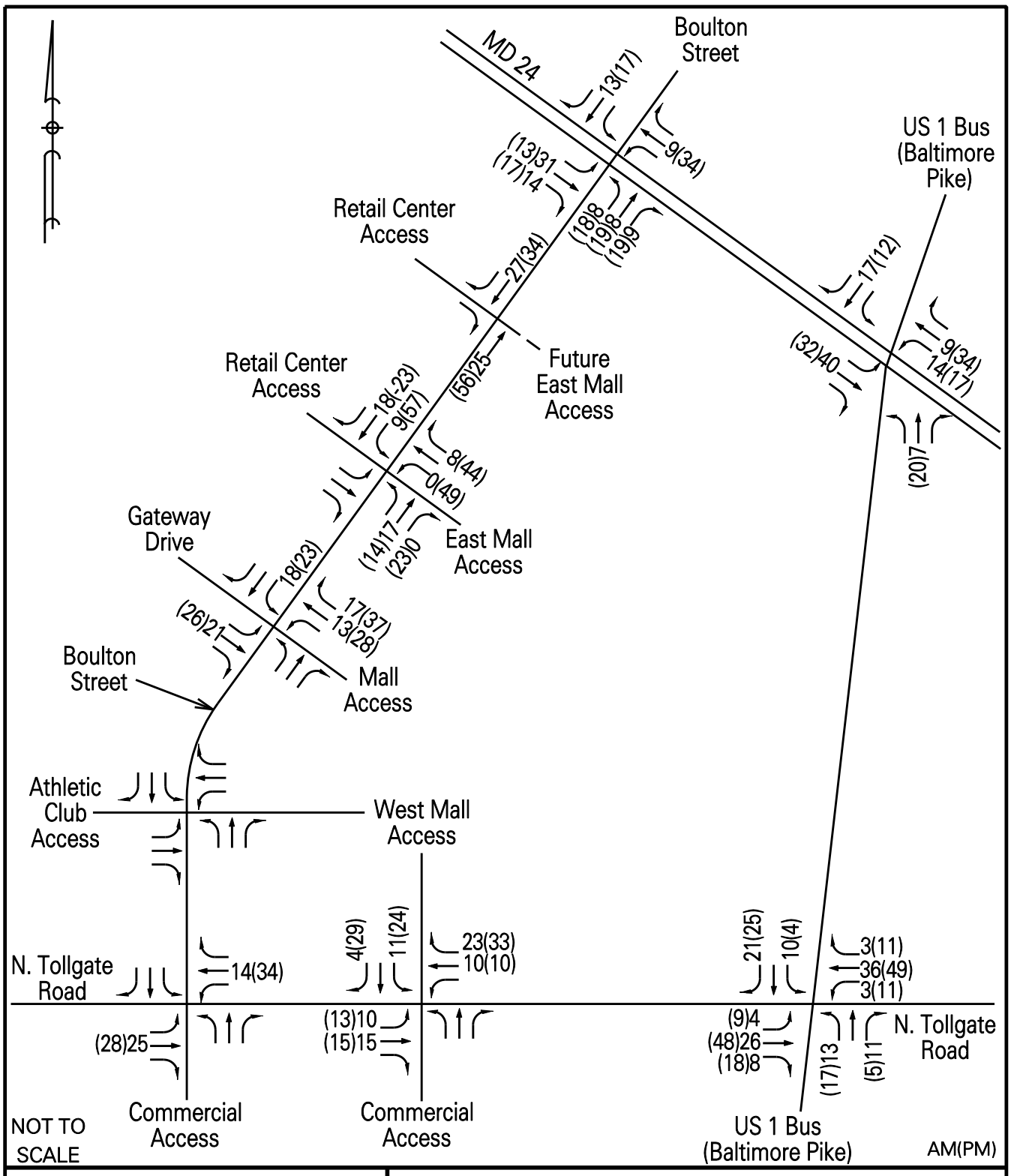
7525 Connelley Drive
Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 5
Background Development Locations



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Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 6
Background Traffic Volumes

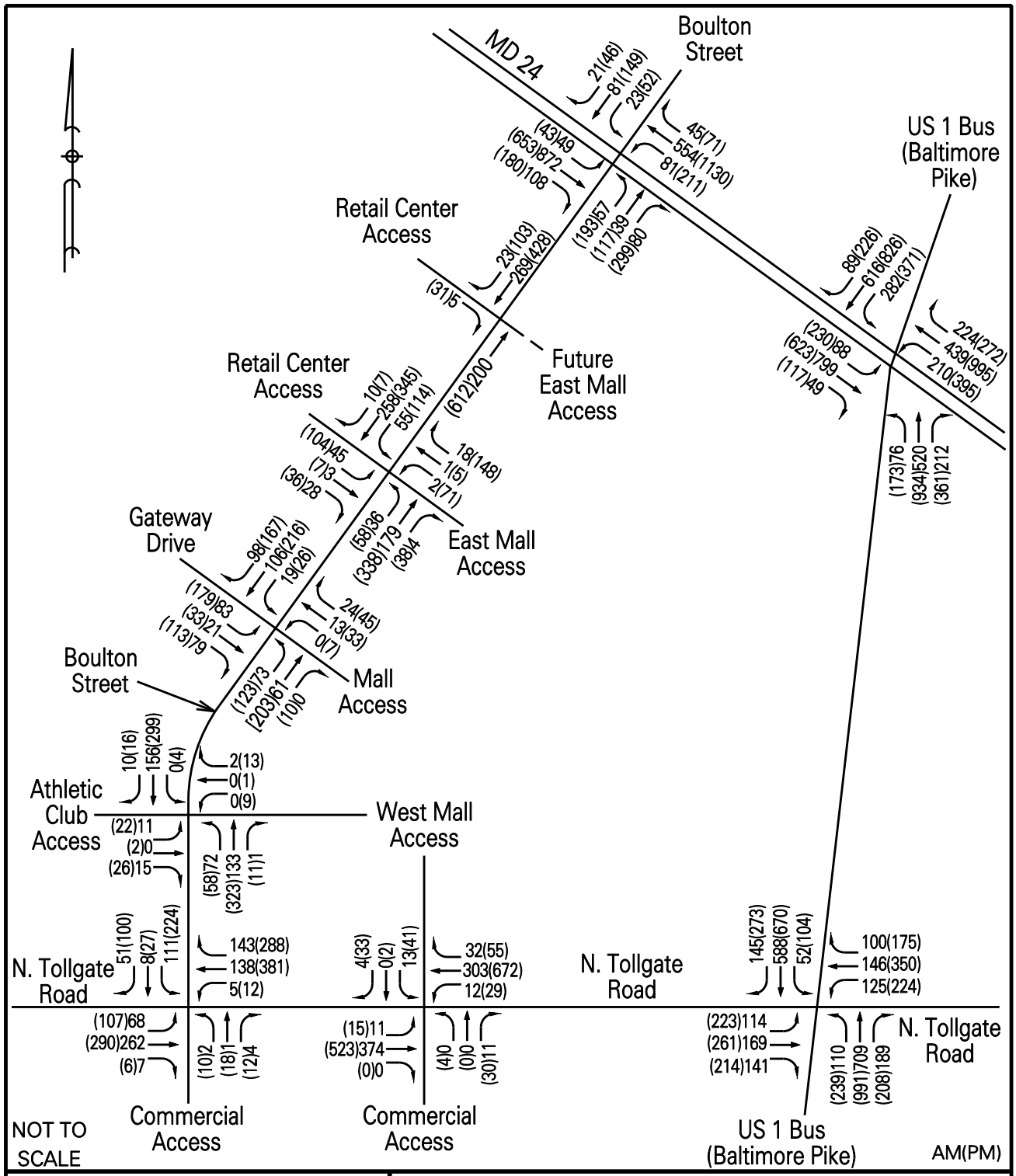

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EXHIBIT 7

Total Background Traffic Volumes (2027)

FUTURE CONDITION

The future traffic condition establishes the total future traffic volumes at the key intersections. This condition includes the new site generated peak hour trips and the proposed site access scenario.

Access Configuration

As stated, and shown on the site plan, the mall access points will be reconfigured for the proposed project. The Harford Mall site has three existing access points along Boulton Street. As shown on the site plan, the existing access leg at the signalized Boulton Street @ East Mall Access/Retail Center intersection (Intersection #7) will be eliminated. This intersection would then become a three-way signalized intersection that will continue to serve the existing retail center.

A new unsignalized access is proposed to align with the existing right-in/right-out access at the retail center across from the mall (Intersection #8). The new access would be restricted to left-in/right-in/right-out movements.

Peak Hour Trip Adjustments

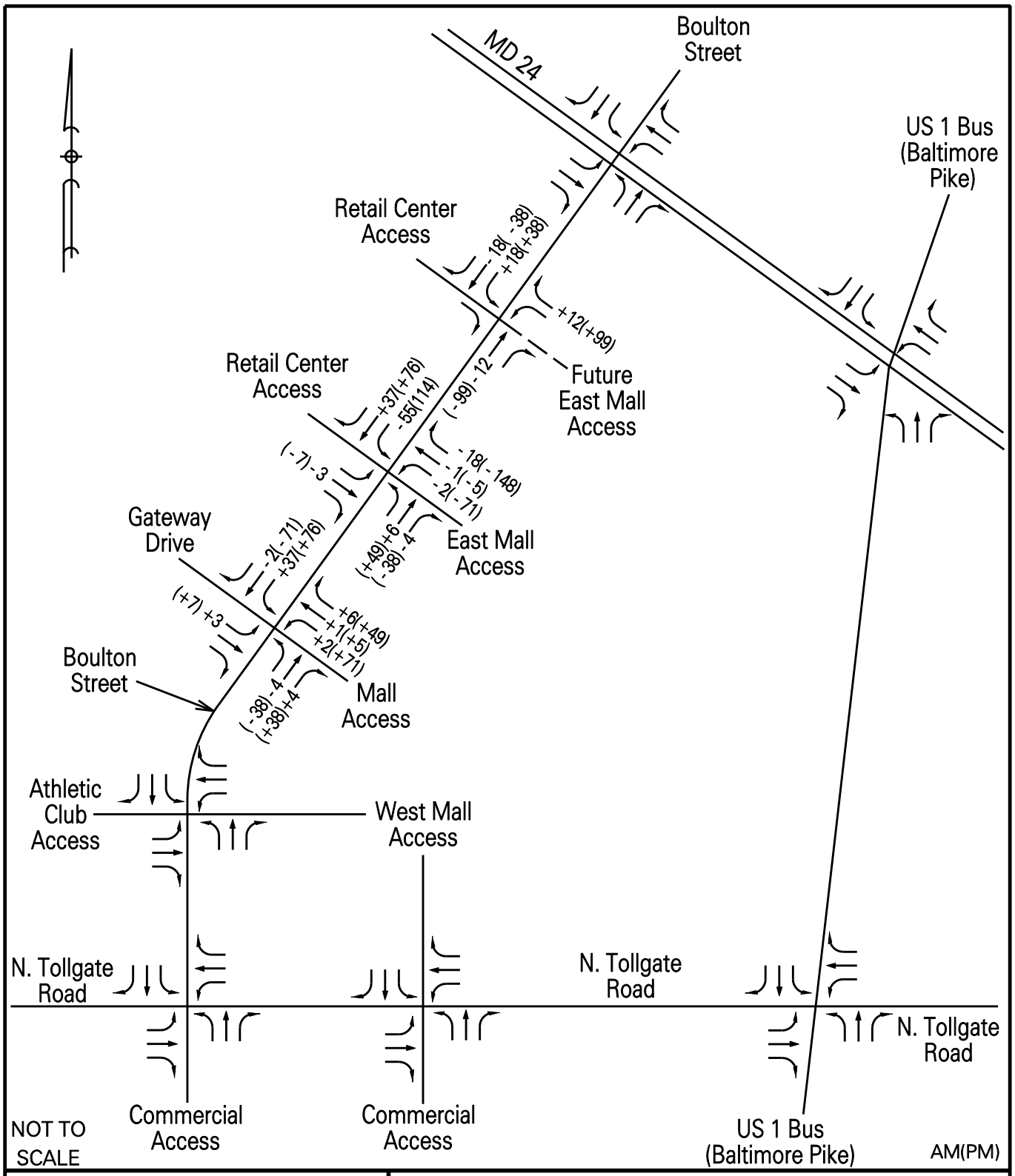
Due to the mall access modification, the peak hour traffic was adjusted as shown on exhibit 8. One-third of the inbound mall left turns from Boulton Street were assigned to the new unsignalized east mall access (intersection #8) and two-thirds of the inbound left turns were assigned to the signalized Gateway Drive/ mall access (intersection #5). Two-thirds of the outbound right-turn trips from the mall onto Boulton Street were assigned to the new unsignalized east mall access (intersection #8) and one-third of the right turn trips were assigned to the signalized Gateway Drive/ mall access (intersection #5). All remaining movements were shifted to the signalized Gateway Drive intersection.

Trip Generation

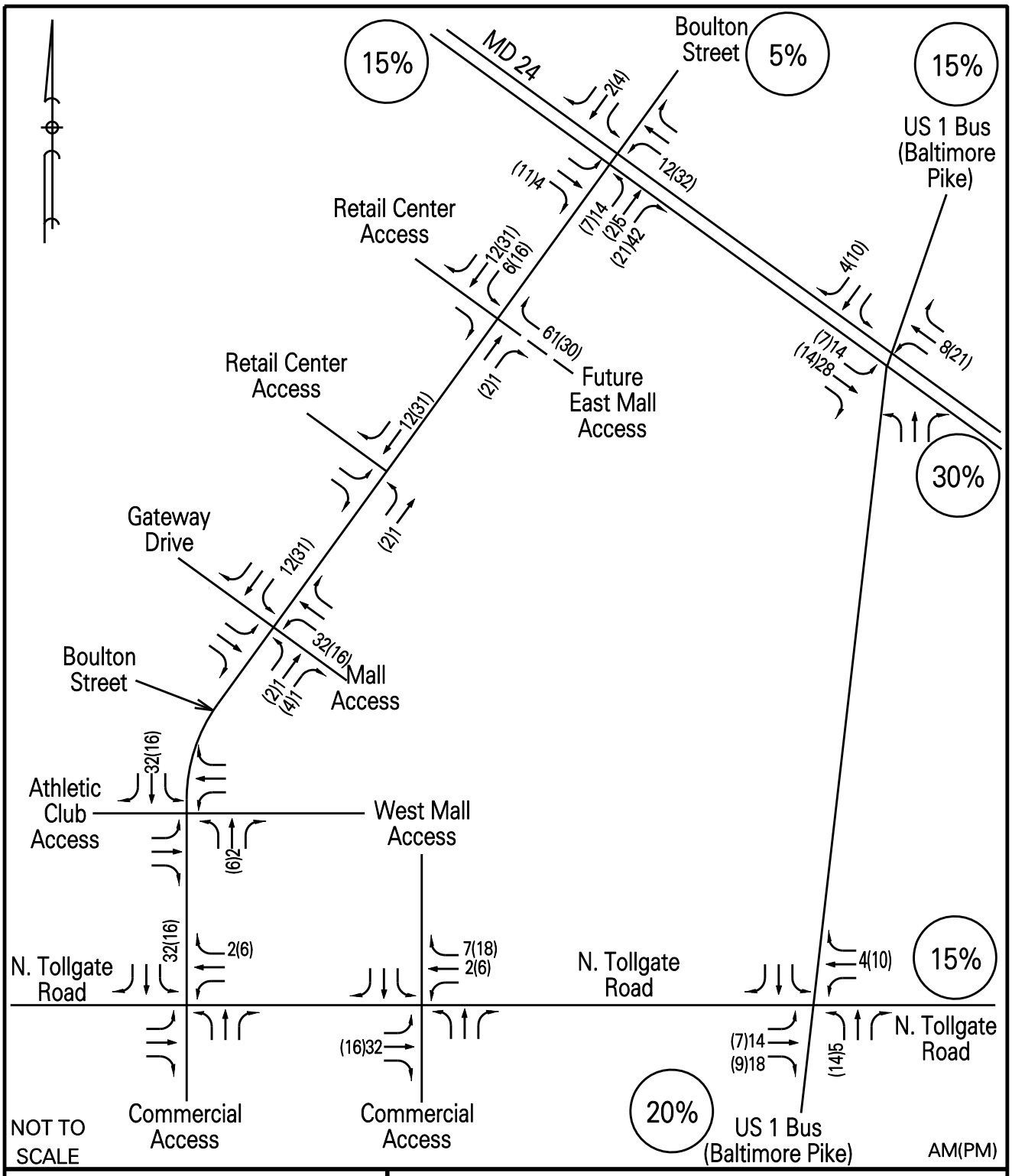
The *Institute of Transportation Engineers' (ITE), Trip Generation Manual, 11th Edition* was used to determine the site generated peak hour trips. The ITE data is included in Appendix IV.

	AM		PM	
	IN	**OUT**	**IN**	**OUT**
Site Trips				
ITE LUC 221(Multi-family Housing)				
300 apartment units	27	93	71	46

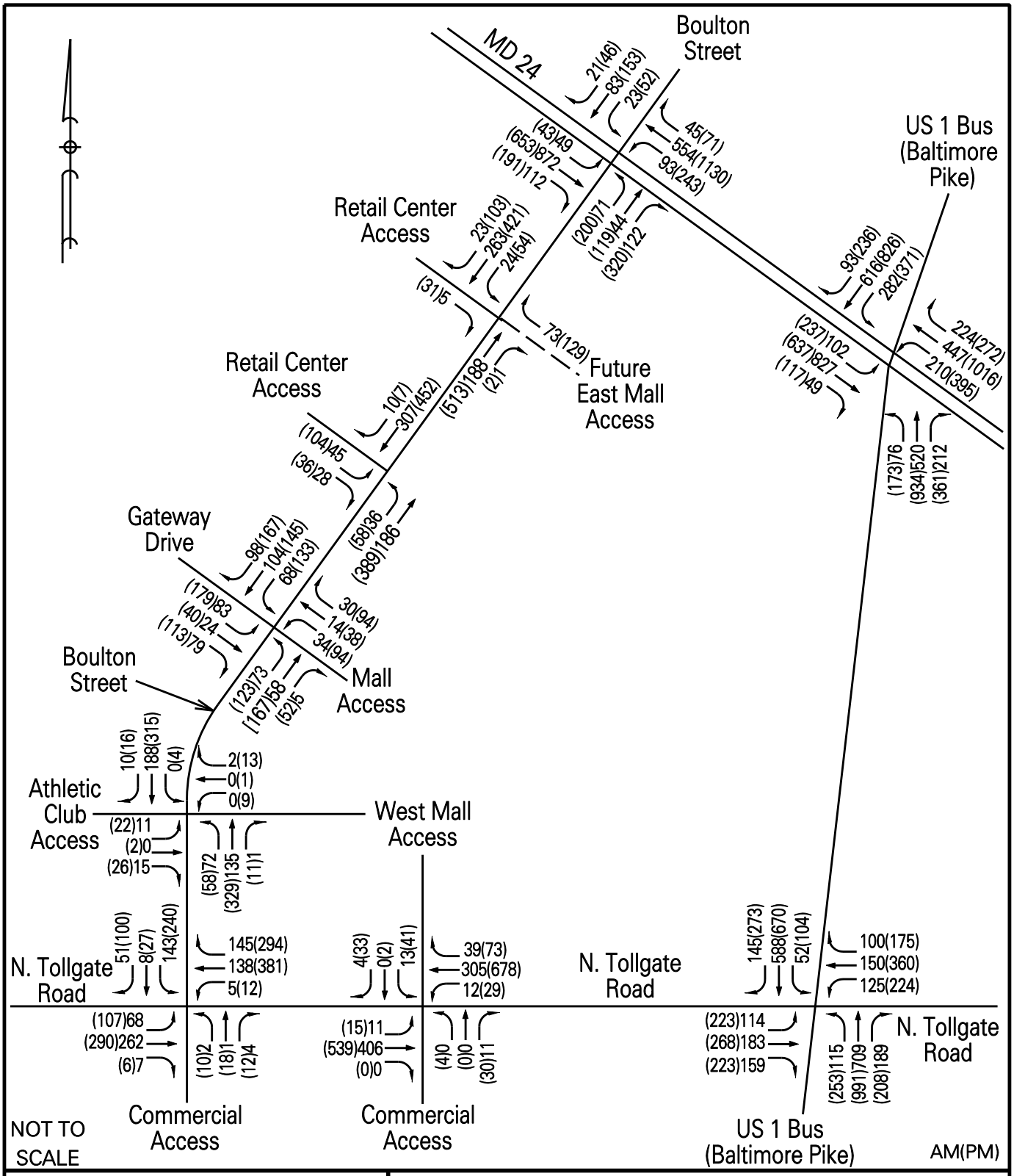
The trip distribution and assignment patterns were reviewed and approved by Town and County officials. The site trip distribution and assignment pattern are shown on Exhibit 9. The diverted peak hour traffic (Exhibit 8) and new site trips (Exhibit 9) were added to the total background traffic volumes (Exhibit 7), to arrive at total future traffic volumes shown on Exhibit 10.



TRAFFIC CONCEPTS, INC. 7525 Connelley Drive Suite B Hanover, Maryland 21076 410-760-2911	EXHIBIT 8 Diverted Peak Hour Traffic for New Access Configuration



TRAFFIC CONCEPTS, INC. 7525 Connelley Drive Suite B Hanover, Maryland 21076 410-760-2911	EXHIBIT 9 Site Generated Traffic



TRAFFIC CONCEPTS, INC. 7525 Connelley Drive Suite B Hanover, Maryland 21076 410-760-2911	EXHIBIT 10 Total Future Traffic Volumes (2027)

HIGHWAY CAPACITY MANUAL ANALYSIS RESULTS

The Highway Capacity Manual (HCM) analysis results are shown on the following tables. The HCM analysis was conducted for the existing traffic volume (Exhibit 3), the total background traffic volumes (Exhibit 7), and total future traffic volume (Exhibit 10). The HCM reports are provided in Appendix I.

HCM ANALYSIS – SIGNALIZED INTERSECTIONS						
Intersection	EXISTING Delay (LOS)		BACKGROUND Delay (LOS)		FUTURE Delay (LOS) *With Improvements*	
	AM	PM	AM	PM	AM	PM
Bus US 1 @ MD 24	45.0(D)	41.5(D)	47.7(D)	46.4(D)	48.0(D)	46.9(D)
Bus US 1 @ Tollgate Rd	25.0(C)	42.8(D)	28.4(C)*	57.6(E)*	29.2(C)* ***28.7(C)***	59.6(E)* ***54.1(D)***
MD 24 @ Boulton Street	19.6(B)	28.4(C)	22.3(C)	30.0(C)	23.5(C)	31.0(C)
Tollgate Road @ Boulton St	10.7(B)	16.9(B)	10.9(B)	18.9(B)	11.9(B)	19.7(B)
Boulton St @ Gateway Dr	8.2(A)	9.6(A)	8.8(A)	10.3(B)	8.9(A)	10.8(B)
Boulton St @ E. Mall Access	8.3(A)	11.6(B)	8.3(A)	12.7(B)	7.2(A)	9.3(A)
*Includes improvements required by the Shops at Harford Mall (as shown on Exhibit 2). ***Includes mitigation proposed with the Harford Mall Redevelopment project, as described in detail in the conclusions of this report and shown on Exhibit 11.***						

HCM ANALYSIS – UNSIGNALIZED INTERSECTIONS						
Intersection	EXISTING Delay (LOS)		BACKGROUND Delay (LOS)		FUTURE Delay (LOS)	
	AM	PM	AM	PM	AM	PM
Boulton St @ Retail Center/ Future East Mall Access						
- EB Right	9.2(A)	9.9(A)	9.4(A)	10.2(B)	10.6(B)	12.0(B)
- WB Right	-	-	-	-	9.5(A)	10.7(B)
- SB Left	-	-	-	-	7.8(A)	8.6(A)
Tollgate Rd @ West Mall Access						
- EB Left	7.8(A)	8.8(A)	8.0(A)	9.3(A)	8.1(A)	9.4(A)
- WB Left	0.8(A)	1.0(A)	0.7(A)	1.0(A)	0.7(A)	1.0(A)
- NB Approach	10.4(B)	13.0(B)	10.9(B)	14.7(B)	11.1(B)	15.0(C)
- SB Approach	19.3(C)	34.0(D)	21.4(C)	57.5(F)	22.8(C)	63.8(F)

QUEUING ANALYSIS

Queuing analyses were conducted at all dedicated left turn lanes with the background and future traffic volumes. The following 95th percentile back of queues were copied from the SimTraffic reports, included in Appendix I.

QUEUING ANALYSIS								
Intersection	BACKGROUND 95TH Percentile Back-of-Queue (feet)		FUTURE 95TH Percentile Back-of-Queue (feet)		FUTURE With Improvements 95TH Percentile Back-of-Queue (feet)		Storage (feet)	Site Impact (feet)
	AM	PM	AM	PM	AM	PM		
Bus US 1 @MD 24								
- EB Left – MD 24	82	164	100	166	102	173	*500*	Adequate
- WB Left – MD 24	146	676	154	489	154	791	*860*	Adequate
- NB Left	122	257	123	220	125	200	390	Adequate
- SB Left	207	268	212	267	206	250	*380*	Adequate
Bus US 1 @ Tollgate Rd								
- EB Left	155	**293**	125	316	124	**283**	260	**Mitigated**
- EB Left/Thru								Continuous
- WB Left	178	**439**	174	448	180	**419**	300	**Mitigated**
- NB Left – Bus US 1	109	321	113	329	106	365	400	Adequate
- SB Left – Bus US 1	59	120	67	131	78	135	420	Adequate
MD 24 @ Boulton St								
- EB Left – MD 24	94	96	103	87	94	97	455	Adequate
- WB Left – MD 24	138	281	137	313	152	314	575	Adequate
- NB Left	82	178	84	185	85	192	270	Adequate
- NB Left/Thru*	130	223	131	236	135	245	*	*
- SB Left	50	125	52	92	51	96	290	Adequate
Tollgate Rd @ Boulton St								
- EB Left	50	107	53	111	50	74	80	Adequate
- WB Left	12	40	11	36	14	34	35	Adequate
- SB Left/Thru*							*	*

This storage represents the average of the two turn lanes (each have different turn bay lengths); however, the longer of the two queues are reported.

*Although this shared left/thru movement has continuous storage, the queue is reported to show that the future peak hour queues will not queue past the proposed left-in/right-in/right-out East Mall access to be located over 375 feet south from the stop bar.

QUEUING ANALYSIS (CONTINUED)								
Intersection	BACKGROUND 95TH Percentile Back-of-Queue (feet)		FUTURE 95TH Percentile Back-of-Queue (feet)		FUTURE With Improvements 95TH Percentile Back-of-Queue (feet)		Storage (feet)	Site Impact (feet)
	AM	PM	AM	PM	AM	PM		
Boulton St @ Gateway Dr								
- EB Left/Thru*								
- WB Left/Thru*								
- NB Left	41	101	61	107	63	101	230	Adequate
- SB Left	30	39	57	91	52	105	110	Adequate
Boulton St @ Retail Ctr/ East Mall Access								
- EB Left	62	93	53	89	54	83	190	Adequate
- NB Left	39	56	43	58	42	59	130	Adequate
- SB Left	50	87	-	-	-	-	270	Adequate
Boulton St @ Retail Ctr/ Future East Mall Access								
- Proposed SB Left	-	-	24	48	23	45	60	Adequate
Tollgate Rd @ West Mall Access								
- EB Left	16	53	16	45	19	44	70	Adequate
- WB Left/Thru*							*	Adequate
- SB Left	56	237	55	212	52	62	200	Adequate
*This shared left/thru movement has continuous storage.								

SITE ACCESS - INTERSECTION DESCRIPTION

The Boulton Street East Mall Access (Intersection #8) and the Boulton Street @ Gateway entrances to the mall are the primary entrances to the proposed parking garage that supports the planned 300-unit apartment building.

Boulton Street East Mall Access (Intersection #8) - The HCM analysis results find the new Boulton Street East Mall Access (Intersection #8) proposed with a left-in/right-in/right-out access would operate with acceptable "B" or better (future condition) levels of service. As stated, this access is proposed with a left-in/right-in/right-out access configuration.

The future analysis also determined the 95th percentile vehicle queue turning left from Boulton Street at the proposed left-in/right-in/right-out site access is 48 feet (approximately two vehicles) and can be served by the proposed 60 feet of dedicated left turn storage. Additionally, the future queue along northbound Boulton Street approaching MD 24 is projected to be 245 feet. The proposed site access is located approximately 385 feet from the stop bar at the signal. Therefore, the Boulton Street traffic would not queue past the proposed site access or block the proposed inbound left turn movement.

Boulton Street @ Gateway Drive/mall access (Intersection #5) – This intersection would operate at level of service "B" or better at the future build-out condition. The 95th percentile queue are adequate and are maintained within the storage bays.

Harford Mall Access Intersection

Tollgate Road West Mall Access (intersection #9) – Due to the location of this intersection, it is not considered a site access intersection. The intersection will operate with acceptable levels of service with the exception of the outbound movement from the mall onto Tollgate Road, during the PM peak hour. As shown on the following table, the left turn delay was identified under the background conditions and is a typical delay pattern that is associated with unsignalized intersections.

Intersection	BACKGROUND Delay (LOS)		FUTURE Delay (LOS)	
	AM	PM	AM	PM
Tollgate Rd @ West Mall Access - EB Left - WB Left - NB Approach - SB Approach	 8.0(A) 0.7(A) 10.9(B) 21.4(C)	 9.3(A) 1.0(A) 14.7(B) **57.5(F)**	 8.1(A) 0.7(A) 11.1(B) 22.8(C)	 9.4(A) 1.0(A) 15.0(C) **63.8(F)**

Due to the location of the proposed apartment building and garage, the subject project would not increase the outbound peak hour trips at the mall access onto Tollgate Road.

PEDESTRIAN PEAK HOUR VOLUMES

MD 24 @ US 1 – Peak Hour Pedestrian Volume – 9/20/22				
	MD 24 EB	MD 24 WB	US 1 NB	US 1 SB
7:15 AM Peak Hour Ped Vol.	1	2	1	0
	MD 24 EB	MD 24 WB	US 1 NB	US 1 SB
4:30 PM Peak Hour Ped Vol.	8	8	5	8

US 1 @ Tollgate Rd – Peak Hour Pedestrian Volume - 9/20/22				
	Tollgate Rd EB	Tollgate Rd WB	US 1 NB	US 1 SB
8:00 AM Peak Hour Ped Vol.	0	0	0	1
	MD 24 EB	MD 24 WB	US 1 NB	US 1 SB
4:45 PM Peak Hour Ped Vol.	0	0	0	3

Tollgate Rd @ Boulton St – Peak Hour Pedestrian Volume - 9/20/22				
	Tollgate Rd EB	Tollgate Rd WB	Business Drive NB	Boulton St SB
8:00 AM Peak Hour Ped Vol.	1	0	0	0
	MD 24 EB	MD 24 WB	US 1 NB	US 1 SB
4:45 PM Peak Hour Ped Vol.	0	0	0	0

MD 24 @ Boulton St – Peak Hour Pedestrian Volume - 9/20/22				
	MD 24 EB	MD 24 WB	Boulton St NB	Boulton St SB
7:45 AM Peak Hour Ped Vol.	1	0	0	0
	MD 24 EB	MD 24 WB	US 1 NB	US 1 SB
4:30 PM Peak Hour Ped Vol.	4	3	1	0

Boulton St @ Commercial Access East – Peak Hour Pedestrian Volume - 9/20/22				
	Commercial EB		Boulton St NB	Boulton St SB
8:00 AM Peak Hour Ped Vol.	0		0	0
	MD 24 EB		US 1 NB	US 1 SB
4:15 PM Peak Hour Ped Vol.	1		0	1

Boulton St @ Gateway Drive– Peak Hour Pedestrian Volume - 9/20/22				
	Gateway Dr EB	Mall Drive WB	Boulton St NB	Boulton St SB
8:00 AM Peak Hour Ped Vol.	0	3	1	0
	MD 24 EB	MD 24 WB	US 1 NB	US 1 SB
4:15 PM Peak Hour Ped Vol.	0	0	1	0

Tollgate Rd @ Commercial Access – Peak Hour Pedestrian Volume - 9/20/22				
	Tollgate Rd EB	Tollgate Rd WB	Commercial Access NB	Mall Access SB
8:00 AM Peak Hour Ped Vol.	0	0	0	2
	MD 24 EB	MD 24 WB	US 1 NB	US 1 SB
4:45 PM Peak Hour Ped Vol.	4	0	1	3

All pedestrian counts were conducted on September 20, 2022. The weather on that day was clear and warm. Due to the low peak hour pedestrian volume, we offer no comment.

CONCLUSIONS AND RECOMMENDATIONS

The Town of Bel Air Code § 165-118 Design Standards provide the minimum acceptable level of service standard in commercial districts that shall be “D”.

Intersection Level of Service Findings

With the exception of the Business US 1 at Tollgate Road intersection, the study results determined all off-site key intersections would continue to operate at acceptable “D” or better levels of service with the full build-out of the 300-unit apartment building.

Business US 1 at Tollgate Road: The HCM analysis determined this intersection would operate with a an “E” LOS during the PM peak hour during the background and future traffic conditions.

Mitigation: **The proposed mitigation is to create a left, through, and a shared through/right lane configuration along the westbound N. Tollgate Road approach to US 1.** As shown on the table, the improvement creates an acceptable level of service condition. In order to achieve the proper lane widths for two Tollgate Road through lanes, this improvement depicted on Exhibit 11 would require minor modifications to the Tollgate Road right turn splitter island. The HCM analysis reports with this improvement are included in Appendix I.

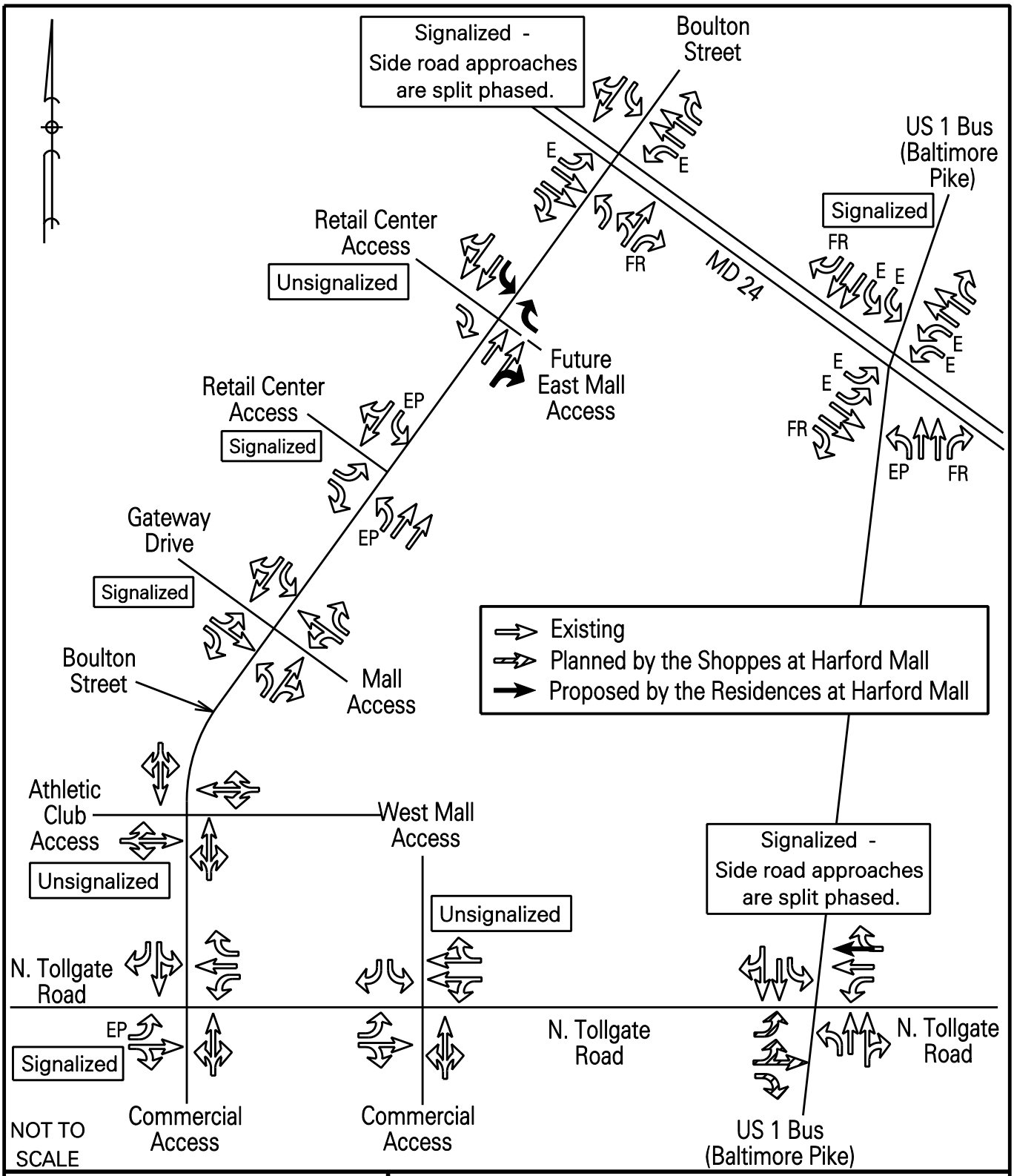
HCM ANALYSIS – SIGNALIZED INTERSECTION						
Intersection	BACKGROUND Delay (LOS)		FUTURE Delay (LOS)		FUTURE Delay (LOS) With Improvements	
	AM	PM	AM	PM	AM	PM
Bus US 1 @ Tollgate Rd	28.4(C)	**57.6(E)**	29.2(C)	**59.6(E)**	28.7(C)	**54.1(D)**

Queuing Analysis

With the exception of the Business US 1 @ Tollgate Road intersection, adequate left turn storage was found at all off site intersections. The proposed mitigation to construct a left, a through, and a shared through/right turn lane along the westbound N. Tollgate Road approach mitigates the eastbound and westbound left turn queues.

QUEUING ANALYSIS								
Intersection	BACKGROUND 95TH Percentile Back-of-Queue (feet)		FUTURE 95TH Percentile Back-of-Queue (feet)		FUTURE With Improvements 95TH Percentile Back-of-Queue (feet)		Storage (feet)	Site Impact (feet)
Bus US 1 @ Tollgate Rd								
- EB Left	155	**293**	125	316	124	**283**	260	**Mitigated**
- EB Left/Thru								Continuous
- WB Left	178	**439**	174	448	180	**419**	300	**Mitigated**
- NB Left – Bus US 1	109	321	113	329	106	365	400	Adequate
- SB Left – Bus US 1	59	120	67	131	78	135	420	Adequate

Based on the results of this study, we respectfully request approval of the proposed 300-unit apartment building with a parking garage from a traffic impact standpoint.



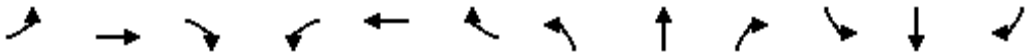
TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 11

Future Lane Configuration

APPENDIX I-A

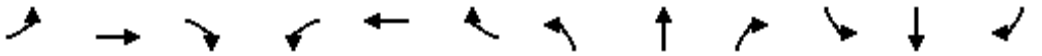
HIGHWAY CAPACITY MANUAL REPORTS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	128	119	109	99	87	87	636	160	38	527	111
Future Volume (vph)	99	128	119	109	99	87	87	636	160	38	527	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5		2.5	3.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1756	1584	1685	1756	1524	1710	3228		1770	3321	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.32	1.00		0.27	1.00	
Satd. Flow (perm)	1636	1756	1584	1685	1756	1524	568	3228		496	3321	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	111	144	134	122	111	98	98	715	180	43	592	125
RTOR Reduction (vph)	0	0	117	0	0	86	0	9	0	0	8	0
Lane Group Flow (vph)	111	144	17	122	111	12	98	886	0	43	709	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	2%	3%	0%	1%	1%	1%	4%	3%	3%	3%	5%
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3	6			2		
Actuated Green, G (s)	17.5	17.5	17.5	16.4	16.4	16.4	98.0	89.4		92.2	86.5	
Effective Green, g (s)	19.5	19.5	19.5	18.4	18.4	18.4	101.6	91.4		96.2	88.5	
Actuated g/C Ratio	0.13	0.13	0.13	0.12	0.12	0.12	0.68	0.61		0.64	0.59	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	212	228	205	206	215	186	465	1966		383	1959	
v/s Ratio Prot	0.07	c0.08		c0.07	0.06		c0.01	c0.27		0.01	0.21	
v/s Ratio Perm			0.01			0.01	0.13			0.07		
v/c Ratio	0.52	0.63	0.08	0.59	0.52	0.06	0.21	0.45		0.11	0.36	
Uniform Delay, d1	60.9	61.8	57.4	62.3	61.6	58.2	9.2	15.8		10.6	16.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.08	0.04	
Incremental Delay, d2	2.3	5.6	0.2	4.5	2.1	0.1	0.2	0.7		0.1	0.4	
Delay (s)	63.2	67.4	57.6	66.8	63.7	58.3	9.4	16.5		1.0	1.1	
Level of Service	E	E	E	E	E	E	A	B		A	A	
Approach Delay (s)		62.8			63.2			15.8			1.1	
Approach LOS		E			E			B			A	

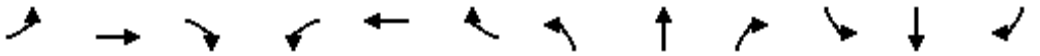
Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	681	44	176	386	201	68	460	190	253	537	80
Future Volume (vph)	79	681	44	176	386	201	68	460	190	253	537	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1595	3333	3404	1508	1838	3522	1398	3335	3371	1361
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.22	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1595	3333	3404	1508	432	3522	1398	3335	3371	1361
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	88	757	49	196	429	223	76	511	211	281	597	89
RTOR Reduction (vph)	0	0	0	0	0	105	0	0	0	0	0	0
Lane Group Flow (vph)	88	757	49	196	429	118	76	511	211	281	597	89
Confl. Peds. (#/hr)									2			
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	4%	0%	4%	5%	6%	2%	3%	7%	1%	3%	5%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	8.3	71.8	150.0	13.2	76.7	76.7	33.8	25.0	150.0	17.0	33.2	150.0
Effective Green, g (s)	10.3	74.8	150.0	15.2	79.7	79.7	37.8	28.0	150.0	19.0	36.2	150.0
Actuated g/C Ratio	0.07	0.50	1.00	0.10	0.53	0.53	0.25	0.19	1.00	0.13	0.24	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	231	1730	1595	337	1808	801	210	657	1398	422	813	1361
v/s Ratio Prot	0.03	c0.22		c0.06	0.13		0.03	0.15		c0.08	c0.18	
v/s Ratio Perm			0.03			0.08	0.07		0.15			0.07
v/c Ratio	0.38	0.44	0.03	0.58	0.24	0.15	0.36	0.78	0.15	0.67	0.73	0.07
Uniform Delay, d1	66.8	24.1	0.0	64.4	18.9	17.9	44.4	58.0	0.0	62.5	52.5	0.0
Progression Factor	1.16	0.58	1.00	0.73	1.46	6.30	1.41	1.17	1.00	1.24	0.83	1.00
Incremental Delay, d2	0.4	0.8	0.0	1.6	0.3	0.4	0.4	5.7	0.2	3.0	3.6	0.1
Delay (s)	77.5	14.8	0.0	48.4	27.8	113.0	62.9	73.4	0.2	80.4	47.1	0.1
Level of Service	E	B	A	D	C	F	E	E	A	F	D	A
Approach Delay (s)		20.2			55.0			53.1			52.4	
Approach LOS		C			D			D			D	

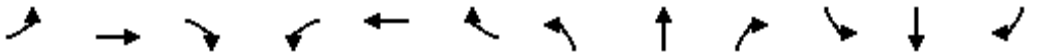
Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	754	84	73	489	40	44	28	64	21	61	19
Future Volume (vph)	44	754	84	73	489	40	44	28	64	21	61	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	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	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3470	1546	1752	3406	1615	1641	1625	1425	1787	1685	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3470	1546	1752	3406	1615	1641	1625	1425	1787	1685	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	47	811	90	78	526	43	47	30	69	23	66	20
RTOR Reduction (vph)	0	0	35	0	0	15	0	0	0	0	8	0
Lane Group Flow (vph)	47	811	56	78	526	28	38	39	69	23	78	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	0%	3%	0%	3%	6%	0%	2%	4%	3%	0%	5%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.4	91.5	91.5	12.5	95.6	95.6	8.7	8.7	150.0	14.3	14.3	
Effective Green, g (s)	10.4	93.5	92.5	14.5	97.6	97.6	10.7	10.7	150.0	16.3	16.3	
Actuated g/C Ratio	0.07	0.62	0.62	0.10	0.65	0.65	0.07	0.07	1.00	0.11	0.11	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	128	2162	953	169	2216	1050	117	115	1425	194	183	
v/s Ratio Prot	0.03	c0.23		c0.04	0.15		0.02	c0.02		0.01	c0.05	
v/s Ratio Perm			0.04			0.02			0.05			
v/c Ratio	0.37	0.38	0.06	0.46	0.24	0.03	0.32	0.34	0.05	0.12	0.43	
Uniform Delay, d1	66.7	13.9	11.4	64.1	10.8	9.3	66.2	66.3	0.0	60.4	62.5	
Progression Factor	1.00	1.00	1.00	1.06	0.35	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	0.5	0.1	2.3	0.3	0.0	2.2	2.4	0.1	0.4	2.2	
Delay (s)	68.8	14.4	11.5	70.2	4.1	9.4	68.4	68.7	0.1	60.7	64.7	
Level of Service	E	B	B	E	A	A	E	E	A	E	E	
Approach Delay (s)		16.8			12.4			36.2			63.8	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

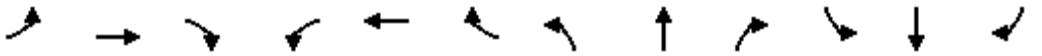
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	213	7	5	111	128	2	1	4	100	8	46
Future Volume (vph)	61	213	7	5	111	128	2	1	4	100	8	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	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	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1642	1646		1668	1704	1515		1730	1522		1747	1418
Flt Permitted	0.55	1.00		0.61	1.00	1.00		0.78	1.00		0.74	1.00
Satd. Flow (perm)	942	1646		1070	1704	1515		1397	1522		1353	1418
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)	66	232	8	5	121	139	2	1	4	109	9	50
RTOR Reduction (vph)	0	1	0	0	0	77	0	0	3	0	0	42
Lane Group Flow (vph)	66	239	0	5	121	62	0	3	1	0	118	8
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	2%	3%	0%	0%	3%	2%	0%	0%	0%	0%	0%	7%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	34.6	34.6		24.4	24.4	24.4		8.4	8.4		8.4	8.4
Effective Green, g (s)	34.6	34.6		24.4	24.4	24.4		8.4	8.4		8.4	8.4
Actuated g/C Ratio	0.63	0.63		0.44	0.44	0.44		0.15	0.15		0.15	0.15
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	646	1035		474	755	672		213	232		206	216
v/s Ratio Prot	0.01	c0.15			0.07							
v/s Ratio Perm	0.06			0.00		0.04		0.00	0.00		c0.09	0.01
v/c Ratio	0.10	0.23		0.01	0.16	0.09		0.01	0.00		0.57	0.04
Uniform Delay, d1	4.3	4.4		8.6	9.2	8.9		19.8	19.7		21.6	19.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.2		0.0	0.2	0.1		0.0	0.0		3.8	0.1
Delay (s)	4.4	4.7		8.6	9.4	9.0		19.8	19.8		25.4	19.9
Level of Service	A	A		A	A	A		B	B		C	B
Approach Delay (s)		4.6			9.2			19.8			23.8	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

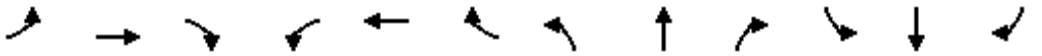
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	0	79	0	0	7	73	55	0	1	95	98
Future Volume (vph)	83	0	79	0	0	7	73	55	0	1	95	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5			5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00			1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		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	
Frt		1.00	0.85			0.85	1.00	1.00		1.00	0.92	
Flt Protected		0.95	1.00			1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1626	1526			1515	1693	1731		1751	1672	
Flt Permitted		0.76	1.00			1.00	0.61	1.00		0.71	1.00	
Satd. Flow (perm)		1296	1526			1515	1084	1731		1312	1672	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	104	0	99	0	0	9	91	69	0	1	119	122
RTOR Reduction (vph)	0	0	80	0	0	7	0	0	0	0	47	0
Lane Group Flow (vph)	0	104	19	0	0	2	91	69	0	1	195	0
Confl. Peds. (#/hr)			1	1					3	3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	4%	0%	0%	2%	2%
Turn Type	Perm	NA	Perm			Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		8.0	8.0			8.0	23.1	23.1		23.1	23.1	
Effective Green, g (s)		8.0	8.0			8.0	23.1	23.1		23.1	23.1	
Actuated g/C Ratio		0.19	0.19			0.19	0.56	0.56		0.56	0.56	
Clearance Time (s)		5.5	5.5			5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		249	293			291	601	961		728	928	
v/s Ratio Prot								0.04			c0.12	
v/s Ratio Perm		c0.08	0.01			0.00	0.08			0.00		
v/c Ratio		0.42	0.06			0.01	0.15	0.07		0.00	0.21	
Uniform Delay, d1		14.8	13.7			13.6	4.5	4.3		4.1	4.7	
Progression Factor		1.00	1.00			1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1	0.1			0.0	0.2	0.1		0.0	0.2	
Delay (s)		15.9	13.8			13.6	4.7	4.4		4.1	4.9	
Level of Service		B	B			B	A	A		A	A	
Approach Delay (s)		14.9			13.6			4.6			4.9	
Approach LOS		B			B			A			A	

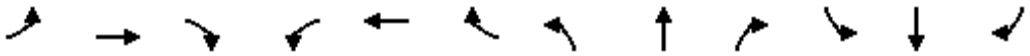
Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	41.6	Sum of lost time (s)	10.5
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	3	28	2	1	10	36	145	4	46	215	10
Future Volume (vph)	45	3	28	2	1	10	36	145	4	46	215	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	9	10	10	10	11	11	11	11	9	9
Grade (%)		-2%			0%			1%			-1%	
Total Lost time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		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	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1762	1443	1468		1709	1507	1684	3257		1686	1689	
Flt Permitted	0.91	1.00	1.00		0.80	1.00	0.58	1.00		0.60	1.00	
Satd. Flow (perm)	1686	1443	1468		1411	1507	1033	3257		1073	1689	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	58	4	36	3	1	13	46	186	5	59	276	13
RTOR Reduction (vph)	0	0	33	0	0	12	0	2	0	0	1	0
Lane Group Flow (vph)	58	4	3	0	4	1	46	189	0	59	288	0
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	33%	0%	0%	0%	0%	3%	5%	50%	4%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	4.4	4.4	4.4		4.4	4.4	28.9	26.7		31.3	27.9	
Effective Green, g (s)	4.4	4.4	4.4		4.4	4.4	28.9	26.7		31.3	27.9	
Actuated g/C Ratio	0.09	0.09	0.09		0.09	0.09	0.58	0.53		0.63	0.56	
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	148	126	129		124	132	625	1739		713	942	
v/s Ratio Prot		0.00					0.00	0.06		c0.01	c0.17	
v/s Ratio Perm	c0.03		0.00		0.00	0.00	0.04			0.05		
v/c Ratio	0.39	0.03	0.02		0.03	0.01	0.07	0.11		0.08	0.31	
Uniform Delay, d1	21.5	20.9	20.8		20.9	20.8	4.6	5.8		3.6	5.9	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.99	0.96	
Incremental Delay, d2	1.7	0.1	0.1		0.1	0.0	0.1	0.1		0.1	0.4	
Delay (s)	23.2	21.0	20.9		21.0	20.8	4.6	5.8		3.7	6.0	
Level of Service	C	C	C		C	C	A	A		A	A	
Approach Delay (s)		22.3			20.9			5.6			5.6	
Approach LOS		C			C			A			A	

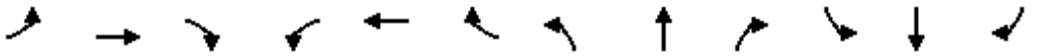
Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	0	0	0	0	157	0	0	217	23
Future Volume (Veh/h)	0	0	5	0	0	0	0	157	0	0	217	23
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	7	0	0	0	0	209	0	0	289	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								239			492	
pX, platoon unblocked												
vC, conflicting volume	409	514	160	354	498	104	289			209		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	409	514	160	354	498	104	289			209		
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	99	100	100	100	100			100		
cM capacity (veh/h)	532	468	863	572	472	930	1270			1359		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	104	104	193	127
Volume Left	0	0	0	0	0
Volume Right	7	0	0	0	31
cSH	863	1700	1700	1700	1700
Volume to Capacity	0.01	0.06	0.06	0.11	0.07
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	9.2	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.2	0.0		0.0	
Approach LOS	A				

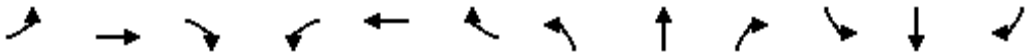
Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	16.7%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	322	0	12	263	9	0	0	11	2	0	0
Future Volume (Veh/h)	1	322	0	12	263	9	0	0	11	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	1	350	0	13	286	10	0	0	12	2	0	0
Pedestrians											2	
Lane Width (ft)											13.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	298			350			521	676	350	683	671	150
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	298			300			478	640	300	647	635	150
tC, single (s)	4.1			4.1			7.5	6.5	6.9	8.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	4.0	4.0	3.3
p0 queue free %	100			99			100	100	98	99	100	100
cM capacity (veh/h)	1272			1220			451	375	673	254	377	874

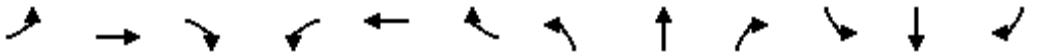
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	1	350	156	153	12	2	0
Volume Left	1	0	13	0	0	2	0
Volume Right	0	0	0	10	12	0	0
cSH	1272	1700	1220	1700	673	254	1700
Volume to Capacity	0.00	0.21	0.01	0.09	0.02	0.01	0.00
Queue Length 95th (ft)	0	0	1	0	1	1	0
Control Delay (s)	7.8	0.0	0.8	0.0	10.4	19.3	0.0
Lane LOS	A		A		B	C	A
Approach Delay (s)	0.0		0.4		10.4	19.3	
Approach LOS					B	C	

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	26.9%	ICU Level of Service		A
Analysis Period (min)	15			



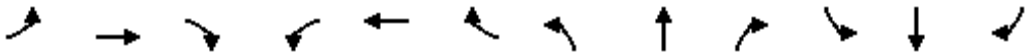
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	191	176	191	270	147	199	889	182	90	601	222
Future Volume (vph)	192	191	176	191	270	147	199	889	182	90	601	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5		2.5	3.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	1791	1615	1652	1756	1536	1694	3361		1823	3373	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.20	1.00		0.16	1.00	
Satd. Flow (perm)	1685	1791	1615	1652	1756	1536	351	3361		307	3373	
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)	200	199	183	199	281	153	207	926	190	94	626	231
RTOR Reduction (vph)	0	0	154	0	0	119	0	9	0	0	21	0
Lane Group Flow (vph)	200	199	29	199	281	34	207	1107	0	94	836	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	1%	0%	1%	2%	1%	0%	2%	0%	1%	0%	0%	1%
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3	6			2		
Actuated Green, G (s)	21.4	21.4	21.4	26.1	26.1	26.1	86.0	72.2		72.6	63.3	
Effective Green, g (s)	23.4	23.4	23.4	28.1	28.1	28.1	88.0	74.2		76.6	65.3	
Actuated g/C Ratio	0.16	0.16	0.16	0.19	0.19	0.19	0.59	0.49		0.51	0.44	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	262	279	251	309	328	287	386	1662		270	1468	
v/s Ratio Prot	c0.12	0.11		0.12	c0.16		c0.07	c0.33		0.03	0.25	
v/s Ratio Perm			0.02			0.02	0.24			0.15		
v/c Ratio	0.76	0.71	0.11	0.64	0.86	0.12	0.54	0.67		0.35	0.57	
Uniform Delay, d1	60.6	60.1	54.4	56.3	59.0	50.7	18.4	28.6		21.4	31.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.39	0.98	
Incremental Delay, d2	12.4	8.4	0.2	4.5	19.2	0.2	1.4	2.1		0.6	1.3	
Delay (s)	73.0	68.5	54.6	60.9	78.2	50.9	19.9	30.7		30.4	32.6	
Level of Service	E	E	D	E	E	D	B	C		C	C	
Approach Delay (s)		65.7			66.2			29.0			32.4	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



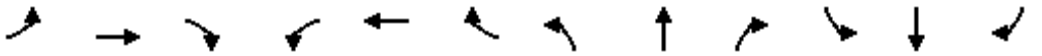
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	206	530	105	339	862	244	155	820	324	333	730	203
Future Volume (vph)	206	530	105	339	862	244	155	820	324	333	730	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1562	3432	3504	1536	1874	3628	1479	3335	3472	1426
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.19	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1562	3432	3504	1536	368	3628	1479	3335	3472	1426
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)	219	564	112	361	917	260	165	872	345	354	777	216
RTOR Reduction (vph)	0	0	0	0	0	119	0	0	0	0	0	0
Lane Group Flow (vph)	219	564	112	361	917	141	165	872	345	354	777	216
Confl. Peds. (#/hr)			4			8	7		6			7
Confl. Bikes (#/hr)			1						2			1
Heavy Vehicles (%)	2%	2%	2%	1%	2%	1%	0%	0%	1%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	13.9	48.2	150.0	19.9	54.2	54.2	52.2	39.6	150.0	19.3	46.3	150.0
Effective Green, g (s)	15.9	51.2	150.0	21.9	57.2	57.2	56.2	42.6	150.0	21.3	49.3	150.0
Actuated g/C Ratio	0.11	0.34	1.00	0.15	0.38	0.38	0.37	0.28	1.00	0.14	0.33	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	363	1207	1562	501	1336	585	284	1030	1479	473	1141	1426
v/s Ratio Prot	0.06	0.16		c0.11	c0.26		0.06	c0.24		c0.11	0.22	
v/s Ratio Perm			0.07			0.09	0.16		0.23			0.15
v/c Ratio	0.60	0.47	0.07	0.72	0.69	0.24	0.58	0.85	0.23	0.75	0.68	0.15
Uniform Delay, d1	64.0	38.7	0.0	61.1	38.9	31.6	33.9	50.6	0.0	61.8	43.5	0.0
Progression Factor	1.07	1.24	1.00	0.67	1.12	2.00	0.90	0.67	1.00	1.20	0.80	1.00
Incremental Delay, d2	1.9	1.3	0.1	3.5	2.4	0.8	1.6	5.6	0.3	5.3	1.7	0.2
Delay (s)	70.5	49.3	0.1	44.6	45.7	64.1	32.0	39.7	0.3	79.2	36.4	0.2
Level of Service	E	D	A	D	D	E	C	D	A	E	D	A
Approach Delay (s)		48.3			48.6			28.9			41.8	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



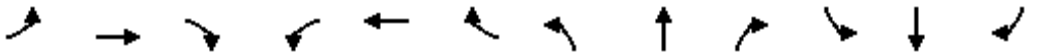
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	574	146	189	983	51	157	88	251	47	118	41
Future Volume (vph)	39	574	146	189	983	51	157	88	251	47	118	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3504	1513	1805	3539	1583	1658	1672	1435	1752	1702	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3504	1513	1805	3539	1583	1658	1672	1435	1752	1702	
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)	40	592	151	195	1013	53	162	91	259	48	122	42
RTOR Reduction (vph)	0	0	83	0	0	24	0	0	0	0	9	0
Lane Group Flow (vph)	40	592	68	195	1013	29	125	128	259	48	155	0
Confl. Peds. (#/hr)									3			4
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	2%	0%	0%	2%	2%	1%	0%	1%	2%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.0	66.5	66.5	22.1	80.6	80.6	19.2	19.2	150.0	19.2	19.2	
Effective Green, g (s)	10.0	68.5	67.5	24.1	82.6	82.6	21.2	21.2	150.0	21.2	21.2	
Actuated g/C Ratio	0.07	0.46	0.45	0.16	0.55	0.55	0.14	0.14	1.00	0.14	0.14	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	123	1600	680	290	1948	871	234	236	1435	247	240	
v/s Ratio Prot	0.02	0.17		c0.11	c0.29		0.08	c0.08		0.03	c0.09	
v/s Ratio Perm			0.04			0.02			0.18			
v/c Ratio	0.33	0.37	0.10	0.67	0.52	0.03	0.53	0.54	0.18	0.19	0.65	
Uniform Delay, d1	66.8	26.6	23.8	59.2	21.2	15.4	59.8	59.9	0.0	56.9	60.9	
Progression Factor	1.00	1.00	1.00	1.52	0.27	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.7	0.3	5.3	0.8	0.1	3.0	3.2	0.3	0.5	6.6	
Delay (s)	68.6	27.3	24.0	95.5	6.6	15.5	62.8	63.1	0.3	57.4	67.4	
Level of Service	E	C	C	F	A	B	E	E	A	E	E	
Approach Delay (s)		28.8			20.8			31.2			65.2	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	235	6	12	311	258	10	18	12	201	27	90
Future Volume (vph)	96	235	6	12	311	258	10	18	12	201	27	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1658	1696		1668	1756	1501		1760	1522		1735	1553
Flt Permitted	0.37	1.00		0.60	1.00	1.00		0.87	1.00		0.73	1.00
Satd. Flow (perm)	639	1696		1049	1756	1501		1552	1522		1320	1553
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)	104	255	7	13	338	280	11	20	13	218	29	98
RTOR Reduction (vph)	0	1	0	0	0	183	0	0	10	0	0	70
Lane Group Flow (vph)	104	261	0	13	338	97	0	31	3	0	247	28
Heavy Vehicles (%)	1%	0%	0%	0%	0%	3%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	36.2	36.2		22.8	22.8	22.8		17.4	17.4		17.4	17.4
Effective Green, g (s)	36.2	36.2		22.8	22.8	22.8		17.4	17.4		17.4	17.4
Actuated g/C Ratio	0.55	0.55		0.35	0.35	0.35		0.27	0.27		0.27	0.27
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	467	935		364	610	521		411	403		350	411
v/s Ratio Prot	0.03	c0.15			c0.19							
v/s Ratio Perm	0.10			0.01		0.06		0.02	0.00		c0.19	0.02
v/c Ratio	0.22	0.28		0.04	0.55	0.19		0.08	0.01		0.71	0.07
Uniform Delay, d1	7.9	7.8		14.1	17.3	14.9		18.1	17.7		21.8	18.0
Progression Factor	1.00	1.00		1.00	1.00	0.99		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.3		0.1	1.9	0.4		0.1	0.0		6.4	0.1
Delay (s)	8.1	8.1		14.2	19.1	15.2		18.1	17.8		28.1	18.1
Level of Service	A	A		B	B	B		B	B		C	B
Approach Delay (s)		8.1			17.3			18.0			25.3	
Approach LOS		A			B			B			C	

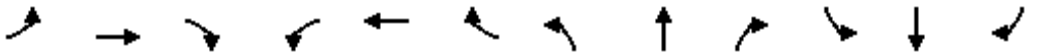
Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	7	113	7	5	8	123	182	10	3	194	167
Future Volume (vph)	179	7	113	7	5	8	123	182	10	3	194	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.98		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		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1634	1511		1657	1212	1676	1752		1754	1701	
Flt Permitted		0.73	1.00		0.82	1.00	0.51	1.00		0.63	1.00	
Satd. Flow (perm)		1242	1511		1394	1212	895	1752		1162	1701	
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)	190	7	120	7	5	9	131	194	11	3	206	178
RTOR Reduction (vph)	0	0	87	0	0	7	0	3	0	0	46	0
Lane Group Flow (vph)	0	197	33	0	12	2	131	202	0	3	338	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	1%	0%	2%	14%	0%	25%	2%	2%	0%	0%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		11.7	11.7		11.7	11.7	20.1	20.1		20.1	20.1	
Effective Green, g (s)		11.7	11.7		11.7	11.7	20.1	20.1		20.1	20.1	
Actuated g/C Ratio		0.28	0.28		0.28	0.28	0.48	0.48		0.48	0.48	
Clearance Time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		343	417		385	335	425	832		552	808	
v/s Ratio Prot								0.12			c0.20	
v/s Ratio Perm		c0.16	0.02		0.01	0.00	0.15			0.00		
v/c Ratio		0.57	0.08		0.03	0.01	0.31	0.24		0.01	0.42	
Uniform Delay, d1		13.2	11.3		11.2	11.1	6.8	6.6		5.8	7.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3	0.1		0.0	0.0	0.9	0.3		0.0	0.7	
Delay (s)		15.5	11.4		11.2	11.1	7.7	6.9		5.8	8.0	
Level of Service		B	B		B	B	A	A		A	A	
Approach Delay (s)		13.9			11.2			7.2			8.0	
Approach LOS		B			B			A			A	

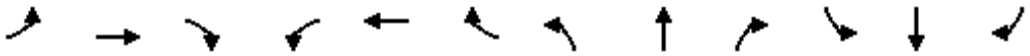
Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	10.5
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	7	36	22	5	104	58	291	15	57	330	7
Future Volume (vph)	104	7	36	22	5	104	58	291	15	57	330	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	9	10	10	10	11	11	11	11	9	9
Grade (%)		-2%			0%			1%			-1%	
Total Lost time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97		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		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1761	1683	1430		1699	1488	1736	3390		1719	1696	
Flt Permitted	0.74	1.00	1.00		0.76	1.00	0.51	1.00		0.56	1.00	
Satd. Flow (perm)	1369	1683	1430		1343	1488	936	3390		1010	1696	
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)	108	7	38	23	5	108	60	303	16	59	344	7
RTOR Reduction (vph)	0	0	32	0	0	91	0	4	0	0	1	0
Lane Group Flow (vph)	108	7	6	0	28	17	60	315	0	59	350	0
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Confl. Bikes (#/hr)			1						1			1
Heavy Vehicles (%)	0%	14%	0%	0%	0%	0%	0%	1%	13%	2%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	8.2	8.2	8.2		8.2	8.2	28.8	25.1		28.6	25.0	
Effective Green, g (s)	8.2	8.2	8.2		8.2	8.2	28.8	25.1		28.6	25.0	
Actuated g/C Ratio	0.16	0.16	0.16		0.16	0.16	0.55	0.48		0.55	0.48	
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	214	263	223		210	232	570	1623		599	809	
v/s Ratio Prot		0.00					c0.01	0.09		0.01	c0.21	
v/s Ratio Perm	c0.08		0.00		0.02	0.01	0.05			0.05		
v/c Ratio	0.50	0.03	0.03		0.13	0.07	0.11	0.19		0.10	0.43	
Uniform Delay, d1	20.2	18.7	18.7		19.0	18.9	5.5	7.8		5.6	9.0	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.0	0.0		0.3	0.1	0.1	0.1		0.1	0.8	
Delay (s)	22.1	18.8	18.8		19.3	19.0	5.6	8.0		5.7	9.8	
Level of Service	C	B	B		B	B	A	A		A	A	
Approach Delay (s)		21.1			19.1			7.6			9.2	
Approach LOS		C			B			A			A	

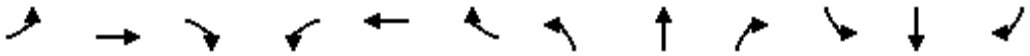
Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	52.4	Sum of lost time (s)	15.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	31	0	0	0	0	499	0	0	353	103
Future Volume (Veh/h)	0	0	31	0	0	0	0	499	0	0	353	103
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	33	0	0	0	0	525	0	0	372	108
Pedestrians		1									1	
Lane Width (ft)		14.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								239			492	
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	690	952	241	711	898	264	373			525		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	638	905	241	659	850	201	373			469		
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	96	100	100	100	100			100		
cM capacity (veh/h)	357	272	765	326	289	787	1181			1065		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	262	262	248	232
Volume Left	0	0	0	0	0
Volume Right	33	0	0	0	108
cSH	765	1700	1700	1700	1700
Volume to Capacity	0.04	0.15	0.15	0.15	0.14
Queue Length 95th (ft)	3	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.9	0.0		0.0	
Approach LOS	A				

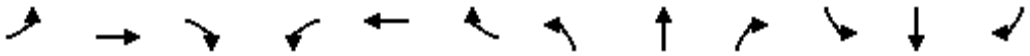
Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	23.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	456	0	29	594	22	4	0	30	17	2	4
Future Volume (Veh/h)	2	456	0	29	594	22	4	0	30	17	2	4
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	2	485	0	31	632	23	4	0	32	18	2	4
Pedestrians		4									2	
Lane Width (ft)		10.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	657			485			876	1208	485	1228	1196	334
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	657			407			828	1185	407	1208	1173	334
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			97			98	100	94	85	99	99
cM capacity (veh/h)	938			1080			238	171	557	120	174	665

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	2	485	347	339	36	18	6
Volume Left	2	0	31	0	4	18	0
Volume Right	0	0	0	23	32	0	4
cSH	938	1700	1080	1700	485	120	342
Volume to Capacity	0.00	0.29	0.03	0.20	0.07	0.15	0.02
Queue Length 95th (ft)	0	0	2	0	6	13	1
Control Delay (s)	8.8	0.0	1.0	0.0	13.0	40.1	15.7
Lane LOS	A		A		B	E	C
Approach Delay (s)	0.0		0.5		13.0	34.0	
Approach LOS					B	D	

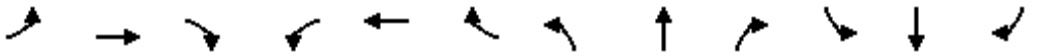
Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	51.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	169	141	125	146	100	110	709	189	52	588	145
Future Volume (vph)	114	169	141	125	146	100	110	709	189	52	588	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5		2.5	3.5	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	1661	1584	1685	1756	1524	1710	3224		1770	3308	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.25	1.00		0.21	1.00	
Satd. Flow (perm)	1554	1661	1584	1685	1756	1524	450	3224		386	3308	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	128	190	158	140	164	112	124	797	212	58	661	163
RTOR Reduction (vph)	0	0	132	0	0	96	0	11	0	0	10	0
Lane Group Flow (vph)	115	203	26	140	164	16	124	998	0	58	814	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	2%	3%	0%	1%	1%	1%	4%	3%	3%	3%	5%
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3	6			2		
Actuated Green, G (s)	22.8	22.8	22.8	19.6	19.6	19.6	90.3	80.2		82.9	76.5	
Effective Green, g (s)	24.8	24.8	24.8	21.6	21.6	21.6	93.1	82.2		86.9	78.5	
Actuated g/C Ratio	0.17	0.17	0.17	0.14	0.14	0.14	0.62	0.55		0.58	0.52	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	256	274	261	242	252	219	380	1766		301	1731	
v/s Ratio Prot	0.07	c0.12		0.08	c0.09		c0.03	c0.31		0.01	0.25	
v/s Ratio Perm			0.02			0.01	0.18			0.10		
v/c Ratio	0.45	0.74	0.10	0.58	0.65	0.07	0.33	0.56		0.19	0.47	
Uniform Delay, d1	56.4	59.5	53.1	59.9	60.6	55.5	13.6	22.2		15.4	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.10	0.05	
Incremental Delay, d2	1.3	10.3	0.2	3.3	5.9	0.1	0.5	1.3		0.3	0.7	
Delay (s)	57.7	69.8	53.3	63.3	66.5	55.7	14.1	23.5		1.8	1.9	
Level of Service	E	E	D	E	E	E	B	C		A	A	
Approach Delay (s)		61.4			62.5			22.5			1.9	
Approach LOS		E			E			C			A	

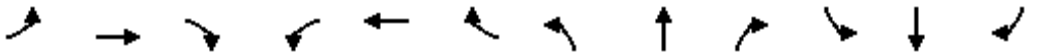
Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	799	49	210	439	224	76	520	212	282	616	89
Future Volume (vph)	88	799	49	210	439	224	76	520	212	282	616	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1595	3333	3404	1508	1838	3522	1398	3335	3371	1361
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.19	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1595	3333	3404	1508	373	3522	1398	3335	3371	1361
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	98	888	54	233	488	249	84	578	236	313	684	99
RTOR Reduction (vph)	0	0	0	0	0	124	0	0	0	0	0	0
Lane Group Flow (vph)	98	888	54	233	488	125	84	578	236	313	684	99
Confl. Peds. (#/hr)									2			
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	4%	0%	4%	5%	6%	2%	3%	7%	1%	3%	5%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	8.8	66.0	150.0	14.9	72.1	72.1	36.7	27.7	150.0	18.4	37.1	150.0
Effective Green, g (s)	10.8	69.0	150.0	16.9	75.1	75.1	40.7	30.7	150.0	20.4	40.1	150.0
Actuated g/C Ratio	0.07	0.46	1.00	0.11	0.50	0.50	0.27	0.20	1.00	0.14	0.27	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	242	1596	1595	375	1704	755	208	720	1398	453	901	1361
v/s Ratio Prot	0.03	c0.26		c0.07	0.14		0.03	0.16		c0.09	c0.20	
v/s Ratio Perm			0.03			0.08	0.08		0.17			0.07
v/c Ratio	0.40	0.56	0.03	0.62	0.29	0.17	0.40	0.80	0.17	0.69	0.76	0.07
Uniform Delay, d1	66.5	29.4	0.0	63.5	21.8	20.4	42.6	56.8	0.0	61.8	50.5	0.0
Progression Factor	1.18	0.57	1.00	0.70	1.37	6.12	1.64	1.34	1.00	1.30	0.82	1.00
Incremental Delay, d2	0.4	1.3	0.0	2.1	0.4	0.4	0.4	6.0	0.2	3.5	3.8	0.1
Delay (s)	78.6	18.1	0.0	46.4	30.3	125.1	70.2	82.0	0.2	83.6	45.2	0.1
Level of Service	E	B	A	D	C	F	E	F	A	F	D	A
Approach Delay (s)		22.9			58.5			59.4			52.1	
Approach LOS		C			E			E			D	

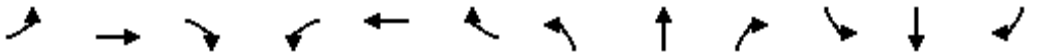
Intersection Summary			
HCM 2000 Control Delay	47.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	872	108	81	554	45	57	39	80	23	81	21
Future Volume (vph)	49	872	108	81	554	45	57	39	80	23	81	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	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	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3470	1546	1752	3406	1615	1641	1627	1425	1787	1689	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3470	1546	1752	3406	1615	1641	1627	1425	1787	1689	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	53	938	116	87	596	48	61	42	86	25	87	23
RTOR Reduction (vph)	0	0	48	0	0	18	0	0	0	0	7	0
Lane Group Flow (vph)	53	938	68	87	596	30	51	52	86	25	103	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	0%	3%	0%	3%	6%	0%	2%	4%	3%	0%	5%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.9	86.7	86.7	13.3	91.1	91.1	11.1	11.1	150.0	15.9	15.9	
Effective Green, g (s)	10.9	88.7	87.7	15.3	93.1	93.1	13.1	13.1	150.0	17.9	17.9	
Actuated g/C Ratio	0.07	0.59	0.58	0.10	0.62	0.62	0.09	0.09	1.00	0.12	0.12	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	134	2051	903	178	2113	1002	143	142	1425	213	201	
v/s Ratio Prot	0.03	c0.27		c0.05	0.18		0.03	c0.03		0.01	c0.06	
v/s Ratio Perm			0.04			0.02			0.06			
v/c Ratio	0.40	0.46	0.08	0.49	0.28	0.03	0.36	0.37	0.06	0.12	0.51	
Uniform Delay, d1	66.4	17.2	13.5	63.7	13.1	11.0	64.5	64.5	0.0	59.0	62.0	
Progression Factor	1.00	1.00	1.00	1.03	0.53	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.7	0.2	2.5	0.3	0.1	2.1	2.2	0.1	0.3	2.9	
Delay (s)	68.7	17.9	13.7	68.3	7.2	11.0	66.6	66.7	0.1	59.3	64.9	
Level of Service	E	B	B	E	A	B	E	E	A	E	E	
Approach Delay (s)		19.9			14.7			36.4			63.8	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

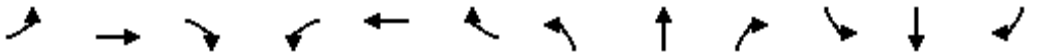
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	262	7	5	138	143	2	1	4	111	8	51
Future Volume (vph)	68	262	7	5	138	143	2	1	4	111	8	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1642	1647		1668	1704	1515		1730	1522		1746	1418
Flt Permitted	0.53	1.00		0.58	1.00	1.00		0.78	1.00		0.74	1.00
Satd. Flow (perm)	919	1647		1020	1704	1515		1403	1522		1351	1418
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)	74	285	8	5	150	155	2	1	4	121	9	55
RTOR Reduction (vph)	0	1	0	0	0	87	0	0	3	0	0	46
Lane Group Flow (vph)	74	292	0	5	150	68	0	3	1	0	130	9
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	2%	3%	0%	0%	3%	2%	0%	0%	0%	0%	0%	7%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	34.9	34.9		24.5	24.5	24.5		8.8	8.8		8.8	8.8
Effective Green, g (s)	34.9	34.9		24.5	24.5	24.5		8.8	8.8		8.8	8.8
Actuated g/C Ratio	0.63	0.63		0.44	0.44	0.44		0.16	0.16		0.16	0.16
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	632	1031		448	749	666		221	240		213	224
v/s Ratio Prot	0.01	c0.18			0.09							
v/s Ratio Perm	0.06			0.00		0.04		0.00	0.00		c0.10	0.01
v/c Ratio	0.12	0.28		0.01	0.20	0.10		0.01	0.00		0.61	0.04
Uniform Delay, d1	4.4	4.7		8.8	9.6	9.2		19.8	19.8		21.9	19.9
Progression Factor	1.00	1.00		1.00	1.00	0.97		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.3		0.0	0.3	0.1		0.0	0.0		5.1	0.1
Delay (s)	4.5	5.0		8.8	9.9	9.0		19.8	19.8		26.9	19.9
Level of Service	A	A		A	A	A		B	B		C	B
Approach Delay (s)		4.9			9.4			19.8			24.9	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	55.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

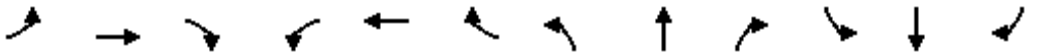
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	21	79	0	13	24	73	61	0	19	106	98
Future Volume (vph)	83	21	79	0	13	24	73	61	0	19	106	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.98		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		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.93	
Flt Protected		0.96	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1646	1526		1846	1515	1693	1731		1751	1679	
Flt Permitted		0.76	1.00		1.00	1.00	0.60	1.00		0.71	1.00	
Satd. Flow (perm)		1298	1526		1846	1515	1071	1731		1304	1679	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	104	26	99	0	16	30	91	76	0	24	132	122
RTOR Reduction (vph)	0	0	76	0	0	23	0	0	0	0	45	0
Lane Group Flow (vph)	0	130	23	0	16	7	91	76	0	24	211	0
Confl. Peds. (#/hr)			1	1					3	3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	4%	0%	0%	2%	2%
Turn Type	Perm	NA	Perm		NA	Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		10.1	10.1		10.1	10.1	22.1	22.1		22.1	22.1	
Effective Green, g (s)		10.1	10.1		10.1	10.1	22.1	22.1		22.1	22.1	
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.52	0.52		0.52	0.52	
Clearance Time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		307	360		436	358	554	895		674	868	
v/s Ratio Prot					0.01			0.04			c0.13	
v/s Ratio Perm		c0.10	0.02			0.00	0.09			0.02		
v/c Ratio		0.42	0.07		0.04	0.02	0.16	0.08		0.04	0.24	
Uniform Delay, d1		13.8	12.6		12.6	12.5	5.4	5.2		5.1	5.7	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.9	0.1		0.0	0.0	0.3	0.1		0.0	0.3	
Delay (s)		14.8	12.7		12.6	12.5	5.7	5.3		5.1	6.0	
Level of Service		B	B		B	B	A	A		A	A	
Approach Delay (s)		13.9			12.5			5.5			5.9	
Approach LOS		B			B			A			A	

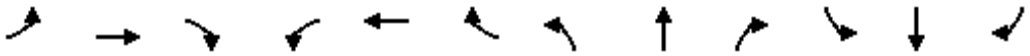
Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	42.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	3	28	2	1	18	36	179	4	55	258	10
Future Volume (vph)	45	3	28	2	1	18	36	179	4	55	258	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	9	10	10	10	11	11	11	11	9	9
Grade (%)		-2%			0%			1%			-1%	
Total Lost time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		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	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1762	1443	1468		1709	1507	1684	3266		1686	1691	
Flt Permitted	0.89	1.00	1.00		0.78	1.00	0.55	1.00		0.58	1.00	
Satd. Flow (perm)	1649	1443	1468		1379	1507	983	3266		1025	1691	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	58	4	36	3	1	23	46	229	5	71	331	13
RTOR Reduction (vph)	0	0	33	0	0	21	0	1	0	0	1	0
Lane Group Flow (vph)	58	4	3	0	4	2	46	233	0	71	343	0
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	33%	0%	0%	0%	0%	3%	5%	50%	4%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	4.5	4.5	4.5		4.5	4.5	28.7	26.5		31.3	27.8	
Effective Green, g (s)	4.5	4.5	4.5		4.5	4.5	28.7	26.5		31.3	27.8	
Actuated g/C Ratio	0.09	0.09	0.09		0.09	0.09	0.57	0.53		0.63	0.56	
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	148	129	132		124	135	595	1730		687	940	
v/s Ratio Prot		0.00					0.00	0.07		c0.01	c0.20	
v/s Ratio Perm	c0.04		0.00		0.00	0.00	0.04			0.06		
v/c Ratio	0.39	0.03	0.02		0.03	0.02	0.08	0.13		0.10	0.36	
Uniform Delay, d1	21.5	20.8	20.7		20.8	20.7	4.7	5.9		3.7	6.2	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.99	0.96	
Incremental Delay, d2	1.7	0.1	0.1		0.1	0.0	0.1	0.1		0.1	0.5	
Delay (s)	23.2	20.9	20.8		20.9	20.8	4.7	6.0		3.7	6.4	
Level of Service	C	C	C		C	C	A	A		A	A	
Approach Delay (s)		22.2			20.8			5.8			6.0	
Approach LOS		C			C			A			A	

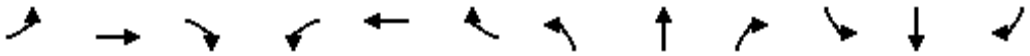
Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	0	0	0	0	200	0	0	269	23
Future Volume (Veh/h)	0	0	5	0	0	0	0	200	0	0	269	23
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	7	0	0	0	0	267	0	0	359	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								239			492	
pX, platoon unblocked												
vC, conflicting volume	508	642	195	446	626	134	359			267		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	508	642	195	446	626	134	359			267		
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	99	100	100	100	100			100		
cM capacity (veh/h)	453	396	820	491	399	891	1196			1294		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	134	134	239	151
Volume Left	0	0	0	0	0
Volume Right	7	0	0	0	31
cSH	820	1700	1700	1700	1700
Volume to Capacity	0.01	0.08	0.08	0.14	0.09
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	9.4	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.4	0.0		0.0	
Approach LOS	A				

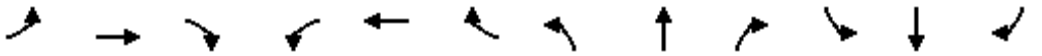
Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	18.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	374	0	12	303	32	0	0	11	13	0	4
Future Volume (Veh/h)	11	374	0	12	303	32	0	0	11	13	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	12	407	0	13	329	35	0	0	12	14	0	4
Pedestrians											2	
Lane Width (ft)											13.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.94			0.94	0.94	0.94	0.94	0.94	
vC, conflicting volume	366			407			626	823	407	818	806	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	366			338			571	780	338	775	762	184
tC, single (s)	4.1			4.1			7.5	6.5	6.9	8.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	4.0	4.0	3.3
p0 queue free %	99			99			100	100	98	93	100	100
cM capacity (veh/h)	1202			1159			376	303	624	195	310	832

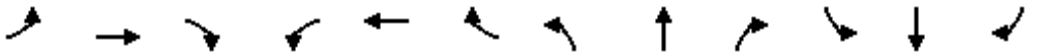
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	12	407	178	200	12	14	4
Volume Left	12	0	13	0	0	14	0
Volume Right	0	0	0	35	12	0	4
cSH	1202	1700	1159	1700	624	195	832
Volume to Capacity	0.01	0.24	0.01	0.12	0.02	0.07	0.00
Queue Length 95th (ft)	1	0	1	0	1	6	0
Control Delay (s)	8.0	0.0	0.7	0.0	10.9	24.9	9.3
Lane LOS	A		A		B	C	A
Approach Delay (s)	0.2		0.3		10.9	21.4	
Approach LOS					B	C	

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	33.7%	ICU Level of Service		A
Analysis Period (min)	15			



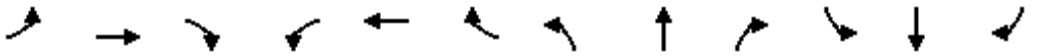
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	261	214	224	350	175	239	991	208	104	670	273
Future Volume (vph)	223	261	214	224	350	175	239	991	208	104	670	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5		2.5	3.5	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	1694	1615	1652	1756	1536	1694	3359		1823	3362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.11	1.00		0.10	1.00	
Satd. Flow (perm)	1600	1694	1615	1652	1756	1536	192	3359		193	3362	
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)	232	272	223	233	365	182	249	1032	217	108	698	284
RTOR Reduction (vph)	0	0	156	0	0	108	0	9	0	0	26	0
Lane Group Flow (vph)	209	295	67	233	365	74	249	1240	0	108	956	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	1%	0%	1%	2%	1%	0%	2%	0%	1%	0%	0%	1%
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3	6			2		
Actuated Green, G (s)	24.5	24.5	24.5	27.5	27.5	27.5	81.5	66.6		64.4	54.0	
Effective Green, g (s)	26.5	26.5	26.5	29.5	29.5	29.5	83.5	68.6		68.4	56.0	
Actuated g/C Ratio	0.18	0.18	0.18	0.20	0.20	0.20	0.56	0.46		0.46	0.37	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	282	299	285	324	345	302	357	1536		222	1255	
v/s Ratio Prot	0.13	c0.17		0.14	c0.21		c0.12	c0.37		0.04	0.28	
v/s Ratio Perm			0.04			0.05	0.27			0.18		
v/c Ratio	0.74	0.99	0.23	0.72	1.06	0.25	0.70	0.81		0.49	0.76	
Uniform Delay, d1	58.5	61.6	53.0	56.4	60.2	50.9	32.4	35.0		27.8	41.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.53	1.00	
Incremental Delay, d2	10.0	47.9	0.4	7.4	64.6	0.4	5.8	4.7		1.2	3.3	
Delay (s)	68.5	109.5	53.5	63.8	124.8	51.3	38.3	39.7		43.9	44.5	
Level of Service	E	F	D	E	F	D	D	D		D	D	
Approach Delay (s)		80.5			89.4			39.4			44.4	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	57.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



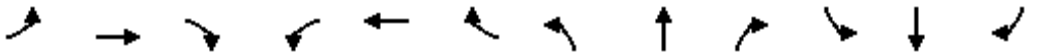
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	623	117	395	995	272	173	934	361	371	826	226
Future Volume (vph)	230	623	117	395	995	272	173	934	361	371	826	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1562	3432	3504	1536	1874	3628	1479	3335	3472	1426
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.14	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1562	3432	3504	1536	275	3628	1479	3335	3472	1426
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)	245	663	124	420	1059	289	184	994	384	395	879	240
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	0	0	0	0
Lane Group Flow (vph)	245	663	124	420	1059	168	184	994	384	395	879	240
Confl. Peds. (#/hr)			4			8	7		6			7
Confl. Bikes (#/hr)			1						2			1
Heavy Vehicles (%)	2%	2%	2%	1%	2%	1%	0%	0%	1%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	15.1	42.1	150.0	21.8	48.8	48.8	57.6	43.0	150.0	20.1	48.5	150.0
Effective Green, g (s)	17.1	45.1	150.0	23.8	51.8	51.8	61.6	46.0	150.0	22.1	51.5	150.0
Actuated g/C Ratio	0.11	0.30	1.00	0.16	0.35	0.35	0.41	0.31	1.00	0.15	0.34	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	391	1064	1562	544	1210	530	289	1112	1479	491	1192	1426
v/s Ratio Prot	0.07	0.19		c0.12	c0.30		0.07	c0.27		c0.12	0.25	
v/s Ratio Perm			0.08			0.11	0.19		0.26			0.17
v/c Ratio	0.63	0.62	0.08	0.77	0.88	0.32	0.64	0.89	0.26	0.80	0.74	0.17
Uniform Delay, d1	63.4	45.1	0.0	60.5	46.1	36.1	31.9	49.7	0.0	61.9	43.3	0.0
Progression Factor	1.06	1.39	1.00	0.64	1.08	1.71	1.34	0.69	1.00	1.18	0.85	1.00
Incremental Delay, d2	2.1	2.6	0.1	4.3	6.4	1.1	2.4	7.1	0.3	8.3	2.4	0.2
Delay (s)	69.6	65.4	0.1	42.7	56.3	62.9	45.3	41.5	0.3	81.5	39.2	0.2
Level of Service	E	E	A	D	E	E	D	D	A	F	D	A
Approach Delay (s)		58.5			54.2			31.8			44.0	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



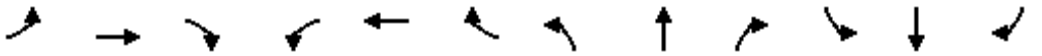
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	653	180	211	1130	71	193	117	299	52	149	46
Future Volume (vph)	43	653	180	211	1130	71	193	117	299	52	149	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3504	1513	1805	3539	1583	1658	1676	1435	1752	1707	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3504	1513	1805	3539	1583	1658	1676	1435	1752	1707	
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)	44	673	186	218	1165	73	199	121	308	54	154	47
RTOR Reduction (vph)	0	0	111	0	0	35	0	0	0	0	8	0
Lane Group Flow (vph)	44	673	75	218	1165	38	157	163	308	54	193	0
Confl. Peds. (#/hr)									3			4
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	2%	0%	0%	2%	2%	1%	0%	1%	2%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.2	59.5	59.5	24.1	75.4	75.4	22.2	22.2	150.0	21.2	21.2	
Effective Green, g (s)	10.2	61.5	60.5	26.1	77.4	77.4	24.2	24.2	150.0	23.2	23.2	
Actuated g/C Ratio	0.07	0.41	0.40	0.17	0.52	0.52	0.16	0.16	1.00	0.15	0.15	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	125	1436	610	314	1826	816	267	270	1435	270	264	
v/s Ratio Prot	0.02	0.19		c0.12	c0.33		0.09	c0.10		0.03	c0.11	
v/s Ratio Perm			0.05			0.02			0.21			
v/c Ratio	0.35	0.47	0.12	0.69	0.64	0.05	0.59	0.60	0.21	0.20	0.73	
Uniform Delay, d1	66.7	32.3	28.1	58.2	26.2	18.0	58.3	58.4	0.0	55.3	60.4	
Progression Factor	1.00	1.00	1.00	1.50	0.25	0.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	1.1	0.4	4.7	1.2	0.1	3.9	4.4	0.3	0.5	10.7	
Delay (s)	68.8	33.4	28.5	91.9	7.7	0.1	62.2	62.8	0.3	55.8	71.1	
Level of Service	E	C	C	F	A	A	E	E	A	E	E	
Approach Delay (s)		34.1			19.9			32.0			67.9	
Approach LOS		C			B			C			E	

Intersection Summary			
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	290	6	12	381	288	10	18	12	224	27	100
Future Volume (vph)	107	290	6	12	381	288	10	18	12	224	27	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1658	1697		1668	1756	1501		1760	1522		1734	1553
Flt Permitted	0.29	1.00		0.57	1.00	1.00		0.87	1.00		0.73	1.00
Satd. Flow (perm)	510	1697		993	1756	1501		1555	1522		1316	1553
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)	116	315	7	13	414	313	11	20	13	243	29	109
RTOR Reduction (vph)	0	1	0	0	0	202	0	0	9	0	0	68
Lane Group Flow (vph)	116	321	0	13	414	111	0	31	4	0	272	41
Heavy Vehicles (%)	1%	0%	0%	0%	0%	3%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	39.7	39.7		25.6	25.6	25.6		20.2	20.2		20.2	20.2
Effective Green, g (s)	39.7	39.7		25.6	25.6	25.6		20.2	20.2		20.2	20.2
Actuated g/C Ratio	0.55	0.55		0.36	0.36	0.36		0.28	0.28		0.28	0.28
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	410	937		353	625	534		436	427		369	436
v/s Ratio Prot	0.03	c0.19			c0.24							
v/s Ratio Perm	0.12			0.01		0.07		0.02	0.00		c0.21	0.03
v/c Ratio	0.28	0.34		0.04	0.66	0.21		0.07	0.01		0.74	0.09
Uniform Delay, d1	9.3	8.9		15.1	19.5	16.1		19.0	18.6		23.4	19.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.5		0.1	3.5	0.4		0.1	0.0		7.5	0.1
Delay (s)	9.7	9.4		15.2	23.0	16.5		19.0	18.6		30.9	19.2
Level of Service	A	A		B	C	B		B	B		C	B
Approach Delay (s)		9.4			20.1			18.9			27.6	
Approach LOS		A			C			B			C	

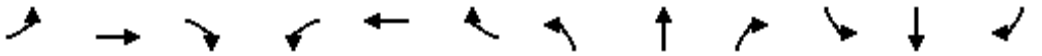
Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	71.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	33	113	7	33	45	123	203	10	26	216	167
Future Volume (vph)	179	33	113	7	33	45	123	203	10	26	216	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.98		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		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected		0.96	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1645	1511		1789	1212	1676	1753		1754	1708	
Flt Permitted		0.73	1.00		0.94	1.00	0.47	1.00		0.62	1.00	
Satd. Flow (perm)		1251	1511		1689	1212	830	1753		1139	1708	
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)	190	35	120	7	35	48	131	216	11	28	230	178
RTOR Reduction (vph)	0	0	83	0	0	33	0	3	0	0	42	0
Lane Group Flow (vph)	0	225	37	0	42	15	131	224	0	28	366	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	1%	0%	2%	14%	0%	25%	2%	2%	0%	0%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		13.4	13.4		13.4	13.4	20.1	20.1		20.1	20.1	
Effective Green, g (s)		13.4	13.4		13.4	13.4	20.1	20.1		20.1	20.1	
Actuated g/C Ratio		0.30	0.30		0.30	0.30	0.46	0.46		0.46	0.46	
Clearance Time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		380	460		514	369	379	800		520	780	
v/s Ratio Prot								0.13			c0.21	
v/s Ratio Perm		c0.18	0.02		0.02	0.01	0.16			0.02		
v/c Ratio		0.59	0.08		0.08	0.04	0.35	0.28		0.05	0.47	
Uniform Delay, d1		13.0	10.9		10.9	10.8	7.7	7.4		6.7	8.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.5	0.1		0.1	0.0	1.1	0.4		0.1	0.9	
Delay (s)		15.5	11.0		11.0	10.8	8.9	7.8		6.7	9.2	
Level of Service		B	B		B	B	A	A		A	A	
Approach Delay (s)		13.9			10.9			8.2			9.0	
Approach LOS		B			B			A			A	

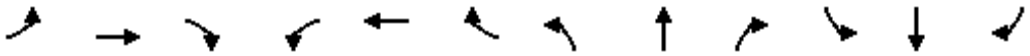
Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	7	36	71	5	148	58	338	38	114	345	7
Future Volume (vph)	104	7	36	71	5	148	58	338	38	114	345	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	9	10	10	10	11	11	11	11	9	9
Grade (%)		-2%			0%			1%			-1%	
Total Lost time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97		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		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1761	1683	1431		1688	1488	1736	3340		1719	1696	
Flt Permitted	0.71	1.00	1.00		0.73	1.00	0.53	1.00		0.48	1.00	
Satd. Flow (perm)	1308	1683	1431		1299	1488	962	3340		867	1696	
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)	108	7	38	74	5	154	60	352	40	119	359	7
RTOR Reduction (vph)	0	0	31	0	0	124	0	10	0	0	1	0
Lane Group Flow (vph)	108	7	7	0	79	30	60	382	0	119	365	0
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Confl. Bikes (#/hr)			1						1			1
Heavy Vehicles (%)	0%	14%	0%	0%	0%	0%	0%	1%	13%	2%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	10.3	10.3	10.3		10.3	10.3	26.0	22.1		29.8	24.0	
Effective Green, g (s)	10.3	10.3	10.3		10.3	10.3	26.0	22.1		29.8	24.0	
Actuated g/C Ratio	0.19	0.19	0.19		0.19	0.19	0.48	0.41		0.55	0.45	
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	250	322	274		249	285	521	1374		573	757	
v/s Ratio Prot		0.00					0.01	0.11		c0.02	c0.22	
v/s Ratio Perm	c0.08		0.01		0.06	0.02	0.05			0.09		
v/c Ratio	0.43	0.02	0.03		0.32	0.10	0.12	0.28		0.21	0.48	
Uniform Delay, d1	19.1	17.6	17.6		18.7	17.9	7.4	10.5		5.8	10.5	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.0	0.0		0.7	0.2	0.1	0.2		0.2	1.0	
Delay (s)	20.3	17.6	17.7		19.4	18.1	7.5	10.7		5.9	11.5	
Level of Service	C	B	B		B	B	A	B		A	B	
Approach Delay (s)		19.5			18.5			10.3			10.1	
Approach LOS		B			B			B			B	

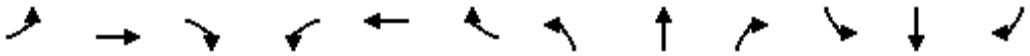
Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	15.5
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	31	0	0	0	0	612	0	0	428	103
Future Volume (Veh/h)	0	0	31	0	0	0	0	612	0	0	428	103
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	33	0	0	0	0	644	0	0	451	108
Pedestrians		1									1	
Lane Width (ft)		14.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								239			492	
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	829	1150	280	870	1096	323	452			644		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	724	1060	280	766	1004	193	452			530		
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	95	100	100	100	100			100		
cM capacity (veh/h)	302	216	722	266	229	777	1104			986		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	322	322	301	258
Volume Left	0	0	0	0	0
Volume Right	33	0	0	0	108
cSH	722	1700	1700	1700	1700
Volume to Capacity	0.05	0.19	0.19	0.18	0.15
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.2	0.0		0.0	
Approach LOS	B				

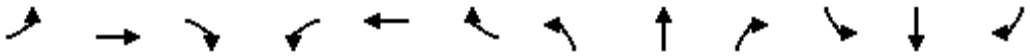
Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	25.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	523	0	29	672	55	4	0	30	41	2	33
Future Volume (Veh/h)	15	523	0	29	672	55	4	0	30	41	2	33
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	16	556	0	31	715	59	4	0	32	44	2	35
Pedestrians		4									2	
Lane Width (ft)		10.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.91			0.91	0.91	0.91	0.91	0.91	
vC, conflicting volume	776			556			1048	1426	556	1428	1396	393
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	776			458			1000	1418	458	1421	1386	393
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			97			98	100	94	45	98	94
cM capacity (veh/h)	848			1009			162	119	503	80	124	609

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	16	556	388	416	36	44	37
Volume Left	16	0	31	0	4	44	0
Volume Right	0	0	0	59	32	0	35
cSH	848	1700	1009	1700	408	80	503
Volume to Capacity	0.02	0.33	0.03	0.24	0.09	0.55	0.07
Queue Length 95th (ft)	1	0	2	0	7	60	6
Control Delay (s)	9.3	0.0	1.0	0.0	14.7	95.2	12.7
Lane LOS	A		A		B	F	B
Approach Delay (s)	0.3		0.5		14.7	57.5	
Approach LOS					B	F	

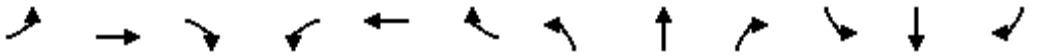
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	57.9%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	183	159	125	150	100	115	709	189	52	588	145
Future Volume (vph)	114	183	159	125	150	100	115	709	189	52	588	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5		2.5	3.5	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	1661	1584	1685	1756	1524	1710	3224		1770	3308	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.24	1.00		0.20	1.00	
Satd. Flow (perm)	1554	1661	1584	1685	1756	1524	440	3224		380	3308	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	128	206	179	140	169	112	129	797	212	58	661	163
RTOR Reduction (vph)	0	0	148	0	0	96	0	12	0	0	11	0
Lane Group Flow (vph)	115	219	31	140	169	16	129	997	0	58	813	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	2%	3%	0%	1%	1%	1%	4%	3%	3%	3%	5%
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3	6			2		
Actuated Green, G (s)	24.1	24.1	24.1	20.0	20.0	20.0	89.0	78.5		80.8	74.4	
Effective Green, g (s)	26.1	26.1	26.1	22.0	22.0	22.0	91.4	80.5		84.8	76.4	
Actuated g/C Ratio	0.17	0.17	0.17	0.15	0.15	0.15	0.61	0.54		0.57	0.51	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	270	289	275	247	257	223	373	1730		292	1684	
v/s Ratio Prot	0.07	c0.13		0.08	c0.10		c0.03	c0.31		0.01	0.25	
v/s Ratio Perm			0.02			0.01	0.18			0.10		
v/c Ratio	0.43	0.76	0.11	0.57	0.66	0.07	0.35	0.58		0.20	0.48	
Uniform Delay, d1	55.3	58.9	52.2	59.6	60.4	55.2	14.5	23.3		16.4	23.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.10	0.06	
Incremental Delay, d2	1.1	10.8	0.2	3.0	6.0	0.1	0.6	1.4		0.3	0.8	
Delay (s)	56.4	69.8	52.4	62.5	66.4	55.4	15.1	24.7		2.0	2.3	
Level of Service	E	E	D	E	E	E	B	C		A	A	
Approach Delay (s)		60.7			62.2			23.6			2.2	
Approach LOS		E			E			C			A	

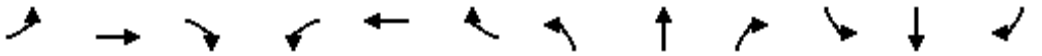
Intersection Summary			
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	827	49	210	447	224	76	520	212	282	616	93
Future Volume (vph)	102	827	49	210	447	224	76	520	212	282	616	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1595	3333	3404	1508	1838	3522	1398	3335	3371	1361
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.19	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1595	3333	3404	1508	373	3522	1398	3335	3371	1361
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	113	919	54	233	497	249	84	578	236	313	684	103
RTOR Reduction (vph)	0	0	0	0	0	125	0	0	0	0	0	0
Lane Group Flow (vph)	113	919	54	233	497	124	84	578	236	313	684	103
Confl. Peds. (#/hr)									2			
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	4%	0%	4%	5%	6%	2%	3%	7%	1%	3%	5%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	9.4	66.0	150.0	14.9	71.5	71.5	36.7	27.7	150.0	18.4	37.1	150.0
Effective Green, g (s)	11.4	69.0	150.0	16.9	74.5	74.5	40.7	30.7	150.0	20.4	40.1	150.0
Actuated g/C Ratio	0.08	0.46	1.00	0.11	0.50	0.50	0.27	0.20	1.00	0.14	0.27	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	255	1596	1595	375	1690	748	208	720	1398	453	901	1361
v/s Ratio Prot	0.03	c0.26		c0.07	0.15		0.03	0.16		c0.09	c0.20	
v/s Ratio Perm			0.03			0.08	0.08		0.17			0.08
v/c Ratio	0.44	0.58	0.03	0.62	0.29	0.17	0.40	0.80	0.17	0.69	0.76	0.08
Uniform Delay, d1	66.3	29.8	0.0	63.5	22.3	20.7	42.6	56.8	0.0	61.8	50.5	0.0
Progression Factor	1.24	0.55	1.00	0.69	1.37	6.07	1.67	1.38	1.00	1.30	0.82	1.00
Incremental Delay, d2	0.4	1.4	0.0	2.1	0.4	0.4	0.4	5.9	0.2	3.5	3.8	0.1
Delay (s)	82.4	17.9	0.0	46.2	30.9	126.2	71.6	84.1	0.2	83.6	45.2	0.1
Level of Service	F	B	A	D	C	F	E	F	A	F	D	A
Approach Delay (s)		23.7			58.7			60.9			51.9	
Approach LOS		C			E			E			D	

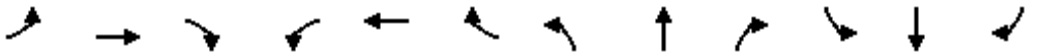
Intersection Summary			
HCM 2000 Control Delay	48.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	872	112	93	554	45	71	44	122	23	83	21
Future Volume (vph)	49	872	112	93	554	45	71	44	122	23	83	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	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	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3470	1546	1752	3406	1615	1641	1623	1425	1787	1690	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3470	1546	1752	3406	1615	1641	1623	1425	1787	1690	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	53	938	120	100	596	48	76	47	131	25	89	23
RTOR Reduction (vph)	0	0	52	0	0	19	0	0	0	0	7	0
Lane Group Flow (vph)	53	938	68	100	596	29	60	63	131	25	105	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	0%	3%	0%	3%	6%	0%	2%	4%	3%	0%	5%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.9	84.2	84.2	14.4	89.7	89.7	12.3	12.3	150.0	16.1	16.1	
Effective Green, g (s)	10.9	86.2	85.2	16.4	91.7	91.7	14.3	14.3	150.0	18.1	18.1	
Actuated g/C Ratio	0.07	0.57	0.57	0.11	0.61	0.61	0.10	0.10	1.00	0.12	0.12	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	134	1994	878	191	2082	987	156	154	1425	215	203	
v/s Ratio Prot	0.03	c0.27		c0.06	0.18		0.04	c0.04		0.01	c0.06	
v/s Ratio Perm			0.04			0.02			0.09			
v/c Ratio	0.40	0.47	0.08	0.52	0.29	0.03	0.38	0.41	0.09	0.12	0.52	
Uniform Delay, d1	66.4	18.6	14.6	63.1	13.7	11.5	63.7	63.9	0.0	58.8	61.9	
Progression Factor	1.00	1.00	1.00	1.04	0.56	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.8	0.2	2.9	0.3	0.1	2.1	2.4	0.1	0.3	2.9	
Delay (s)	68.7	19.4	14.8	68.8	8.1	11.6	65.9	66.3	0.1	59.1	64.8	
Level of Service	E	B	B	E	A	B	E	E	A	E	E	
Approach Delay (s)		21.3			16.5			32.1			63.8	
Approach LOS		C			B			C			E	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

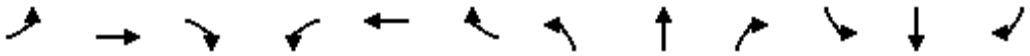
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	262	7	5	138	145	2	1	4	143	8	51
Future Volume (vph)	68	262	7	5	138	145	2	1	4	143	8	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.95	1.00
Satd. Flow (prot)	1642	1647		1668	1704	1515		1731	1522		1745	1419
Flt Permitted	0.52	1.00		0.58	1.00	1.00		0.83	1.00		0.74	1.00
Satd. Flow (perm)	899	1647		1020	1704	1515		1477	1522		1345	1419
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)	74	285	8	5	150	158	2	1	4	155	9	55
RTOR Reduction (vph)	0	1	0	0	0	97	0	0	3	0	0	43
Lane Group Flow (vph)	74	292	0	5	150	61	0	3	1	0	164	12
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	2%	3%	0%	0%	3%	2%	0%	0%	0%	0%	0%	7%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	32.7	32.7		22.1	22.1	22.1		12.2	12.2		12.2	12.2
Effective Green, g (s)	32.7	32.7		22.1	22.1	22.1		12.2	12.2		12.2	12.2
Actuated g/C Ratio	0.57	0.57		0.39	0.39	0.39		0.21	0.21		0.21	0.21
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	576	946		396	661	588		316	326		288	304
v/s Ratio Prot	0.01	c0.18			0.09							
v/s Ratio Perm	0.06			0.00		0.04		0.00	0.00		c0.12	0.01
v/c Ratio	0.13	0.31		0.01	0.23	0.10		0.01	0.00		0.57	0.04
Uniform Delay, d1	5.7	6.3		10.7	11.7	11.1		17.6	17.6		20.0	17.7
Progression Factor	1.00	1.00		1.00	1.00	0.97		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.4		0.0	0.4	0.2		0.0	0.0		2.6	0.1
Delay (s)	5.8	6.6		10.7	12.0	10.9		17.6	17.6		22.6	17.8
Level of Service	A	A		B	B	B		B	B		C	B
Approach Delay (s)		6.5			11.5			17.6			21.4	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

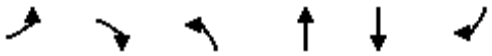
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	24	79	34	14	30	73	58	5	68	104	98
Future Volume (vph)	83	24	79	34	14	30	73	58	5	68	104	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.98		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		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1648	1526		1782	1515	1693	1714		1751	1678	
Flt Permitted		0.73	1.00		0.72	1.00	0.60	1.00		0.71	1.00	
Satd. Flow (perm)		1256	1526		1325	1515	1073	1714		1300	1678	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	104	30	99	42	18	38	91	72	6	85	130	122
RTOR Reduction (vph)	0	0	75	0	0	29	0	3	0	0	47	0
Lane Group Flow (vph)	0	134	24	0	61	9	91	76	0	85	206	0
Confl. Peds. (#/hr)			1	1					3	3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	4%	0%	0%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		10.3	10.3		10.3	10.3	21.9	21.9		21.9	21.9	
Effective Green, g (s)		10.3	10.3		10.3	10.3	21.9	21.9		21.9	21.9	
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.51	0.51		0.51	0.51	
Clearance Time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		302	368		319	365	550	879		666	860	
v/s Ratio Prot								0.04			c0.12	
v/s Ratio Perm		c0.11	0.02		0.05	0.01	0.08			0.07		
v/c Ratio		0.44	0.06		0.19	0.03	0.17	0.09		0.13	0.24	
Uniform Delay, d1		13.8	12.5		12.9	12.4	5.5	5.3		5.4	5.8	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0	0.1		0.3	0.0	0.3	0.1		0.2	0.3	
Delay (s)		14.8	12.6		13.2	12.4	5.8	5.4		5.6	6.1	
Level of Service		B	B		B	B	A	A		A	A	
Approach Delay (s)		13.9			12.9			5.6			6.0	
Approach LOS		B			B			A			A	

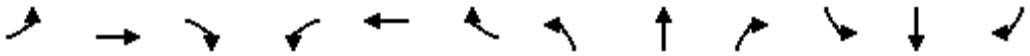
Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	42.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	45	28	36	186	307	10
Future Volume (vph)	45	28	36	186	307	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	9	9
Grade (%)	-2%			1%	-1%	
Total Lost time (s)	5.5	5.5	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
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	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	2066	1849	1685	3307	1693	
Flt Permitted	0.95	1.00	0.42	1.00	1.00	
Satd. Flow (perm)	2066	1849	738	3307	1693	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	58	36	46	238	394	13
RTOR Reduction (vph)	0	33	0	0	1	0
Lane Group Flow (vph)	58	3	46	238	406	0
Confl. Peds. (#/hr)			2			2
Confl. Bikes (#/hr)						2
Heavy Vehicles (%)	0%	0%	3%	5%	1%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		5	2	6	
Permitted Phases		8	2			
Actuated Green, G (s)	4.6	4.6	34.8	34.8	27.3	
Effective Green, g (s)	4.6	4.6	34.8	34.8	27.3	
Actuated g/C Ratio	0.09	0.09	0.70	0.70	0.55	
Clearance Time (s)	5.5	5.5	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	190	170	562	2306	926	
v/s Ratio Prot	c0.03		0.00	c0.07	c0.24	
v/s Ratio Perm		0.00	0.05			
v/c Ratio	0.31	0.02	0.08	0.10	0.44	
Uniform Delay, d1	21.2	20.6	2.8	2.5	6.7	
Progression Factor	1.00	1.00	1.00	1.00	0.95	
Incremental Delay, d2	0.9	0.0	0.1	0.0	0.7	
Delay (s)	22.1	20.6	2.9	2.5	7.1	
Level of Service	C	C	A	A	A	
Approach Delay (s)	21.5			2.6	7.1	
Approach LOS	C			A	A	

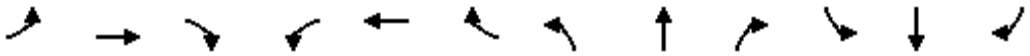
Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	15.5
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	0	0	73	0	188	1	24	263	23
Future Volume (Veh/h)	0	0	5	0	0	73	0	188	1	24	263	23
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	7	0	0	97	0	251	1	32	351	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								238			493	
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98		0.98					
vC, conflicting volume	556	682	366	666	666	126	351			252		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	534	664	341	647	647	126	325			252		
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	99	100	100	89	100			98		
cM capacity (veh/h)	371	366	647	337	370	901	1204			1310		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	97	167	85	32	382
Volume Left	0	0	0	0	32	0
Volume Right	7	97	0	1	0	31
cSH	647	901	1700	1700	1310	1700
Volume to Capacity	0.01	0.11	0.10	0.05	0.02	0.22
Queue Length 95th (ft)	1	9	0	0	2	0
Control Delay (s)	10.6	9.5	0.0	0.0	7.8	0.0
Lane LOS	B	A			A	
Approach Delay (s)	10.6	9.5	0.0		0.6	
Approach LOS	B	A				

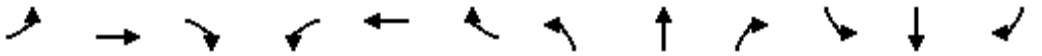
Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	25.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	406	0	12	305	39	0	0	11	13	0	4
Future Volume (Veh/h)	11	406	0	12	305	39	0	0	11	13	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	12	441	0	13	332	42	0	0	12	14	0	4
Pedestrians											2	
Lane Width (ft)											13.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	376			441			661	867	441	858	846	189
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			359			596	818	359	808	795	189
tC, single (s)	4.1			4.1			7.5	6.5	6.9	8.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	4.0	4.0	3.3
p0 queue free %	99			99			100	100	98	92	100	100
cM capacity (veh/h)	1191			1124			356	284	597	180	292	826

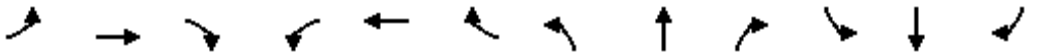
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	12	441	179	208	12	14	4
Volume Left	12	0	13	0	0	14	0
Volume Right	0	0	0	42	12	0	4
cSH	1191	1700	1124	1700	597	180	826
Volume to Capacity	0.01	0.26	0.01	0.12	0.02	0.08	0.00
Queue Length 95th (ft)	1	0	1	0	2	6	0
Control Delay (s)	8.1	0.0	0.7	0.0	11.1	26.6	9.4
Lane LOS	A		A		B	D	A
Approach Delay (s)	0.2		0.3		11.1	22.8	
Approach LOS					B	C	

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	35.4%	ICU Level of Service		A
Analysis Period (min)	15			



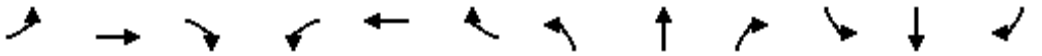
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	268	223	224	360	175	253	991	208	104	670	273
Future Volume (vph)	223	268	223	224	360	175	253	991	208	104	670	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5		2.5	3.5	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	1694	1615	1652	1756	1536	1694	3359		1823	3362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1600	1694	1615	1652	1756	1536	181	3359		198	3362	
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)	232	279	232	233	375	182	264	1032	217	108	698	284
RTOR Reduction (vph)	0	0	159	0	0	104	0	9	0	0	27	0
Lane Group Flow (vph)	209	302	73	233	375	78	264	1240	0	108	955	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	1%	0%	1%	2%	1%	0%	2%	0%	1%	0%	0%	1%
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3	6			2		
Actuated Green, G (s)	24.5	24.5	24.5	27.5	27.5	27.5	81.5	66.6		63.2	52.8	
Effective Green, g (s)	26.5	26.5	26.5	29.5	29.5	29.5	83.5	68.6		67.2	54.8	
Actuated g/C Ratio	0.18	0.18	0.18	0.20	0.20	0.20	0.56	0.46		0.45	0.37	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	282	299	285	324	345	302	365	1536		223	1228	
v/s Ratio Prot	0.13	c0.18		0.14	c0.21		c0.13	c0.37		0.04	0.28	
v/s Ratio Perm			0.05			0.05	0.28			0.18		
v/c Ratio	0.74	1.01	0.26	0.72	1.09	0.26	0.72	0.81		0.48	0.78	
Uniform Delay, d1	58.5	61.8	53.3	56.4	60.2	51.0	35.4	35.0		28.2	42.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.51	0.99	
Incremental Delay, d2	10.0	54.6	0.5	7.4	73.7	0.5	6.9	4.7		1.2	3.7	
Delay (s)	68.5	116.4	53.7	63.8	134.0	51.4	42.4	39.7		43.8	45.6	
Level of Service	E	F	D	E	F	D	D	D		D	D	
Approach Delay (s)		83.4			94.3			40.1			45.4	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	59.6	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)	13.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



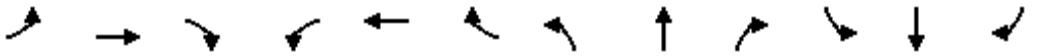
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	637	117	395	1016	272	173	934	361	371	826	236
Future Volume (vph)	237	637	117	395	1016	272	173	934	361	371	826	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1562	3432	3504	1536	1874	3628	1479	3335	3472	1426
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.14	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1562	3432	3504	1536	275	3628	1479	3335	3472	1426
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)	252	678	124	420	1081	289	184	994	384	395	879	251
RTOR Reduction (vph)	0	0	0	0	0	119	0	0	0	0	0	0
Lane Group Flow (vph)	252	678	124	420	1081	170	184	994	384	395	879	251
Confl. Peds. (#/hr)			4			8	7		6			7
Confl. Bikes (#/hr)			1						2			1
Heavy Vehicles (%)	2%	2%	2%	1%	2%	1%	0%	0%	1%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	15.4	42.1	150.0	21.8	48.5	48.5	57.6	43.0	150.0	20.1	48.5	150.0
Effective Green, g (s)	17.4	45.1	150.0	23.8	51.5	51.5	61.6	46.0	150.0	22.1	51.5	150.0
Actuated g/C Ratio	0.12	0.30	1.00	0.16	0.34	0.34	0.41	0.31	1.00	0.15	0.34	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	398	1064	1562	544	1203	527	289	1112	1479	491	1192	1426
v/s Ratio Prot	0.07	0.19		c0.12	c0.31		0.07	c0.27		c0.12	0.25	
v/s Ratio Perm			0.08			0.11	0.19		0.26			0.18
v/c Ratio	0.63	0.64	0.08	0.77	0.90	0.32	0.64	0.89	0.26	0.80	0.74	0.18
Uniform Delay, d1	63.3	45.4	0.0	60.5	46.8	36.4	31.9	49.7	0.0	61.9	43.3	0.0
Progression Factor	1.04	1.43	1.00	0.63	1.08	1.67	1.34	0.70	1.00	1.18	0.85	1.00
Incremental Delay, d2	2.3	2.7	0.1	4.2	7.7	1.1	2.4	7.1	0.3	8.2	2.4	0.3
Delay (s)	68.2	67.5	0.1	42.5	58.3	61.8	45.3	41.6	0.3	81.4	39.4	0.3
Level of Service	E	E	A	D	E	E	D	D	A	F	D	A
Approach Delay (s)		59.8			55.1			31.9			43.8	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	46.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



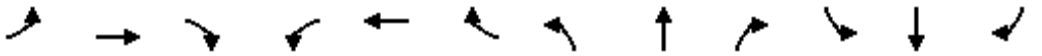
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	653	191	243	1130	71	200	119	320	52	153	46
Future Volume (vph)	43	653	191	243	1130	71	200	119	320	52	153	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3504	1513	1805	3539	1583	1658	1675	1435	1752	1708	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3504	1513	1805	3539	1583	1658	1675	1435	1752	1708	
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)	44	673	197	251	1165	73	206	123	330	54	158	47
RTOR Reduction (vph)	0	0	122	0	0	36	0	0	0	0	8	0
Lane Group Flow (vph)	44	673	75	251	1165	37	161	168	330	54	197	0
Confl. Peds. (#/hr)									3			4
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	2%	0%	0%	2%	2%	1%	0%	1%	2%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.2	56.2	56.2	26.8	74.8	74.8	22.6	22.6	150.0	21.4	21.4	
Effective Green, g (s)	10.2	58.2	57.2	28.8	76.8	76.8	24.6	24.6	150.0	23.4	23.4	
Actuated g/C Ratio	0.07	0.39	0.38	0.19	0.51	0.51	0.16	0.16	1.00	0.16	0.16	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	125	1359	576	346	1811	810	271	274	1435	273	266	
v/s Ratio Prot	0.02	0.19		c0.14	c0.33		0.10	c0.10		0.03	c0.12	
v/s Ratio Perm			0.05			0.02			0.23			
v/c Ratio	0.35	0.50	0.13	0.73	0.64	0.05	0.59	0.61	0.23	0.20	0.74	
Uniform Delay, d1	66.7	34.8	30.2	56.9	26.6	18.3	58.1	58.3	0.0	55.1	60.4	
Progression Factor	1.00	1.00	1.00	1.47	0.25	0.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	1.3	0.5	5.2	1.2	0.1	4.1	4.6	0.4	0.5	11.3	
Delay (s)	68.8	36.1	30.7	88.6	7.8	0.1	62.1	62.9	0.4	55.6	71.7	
Level of Service	E	D	C	F	A	A	E	E	A	E	E	
Approach Delay (s)		36.5			21.1			31.4			68.4	
Approach LOS		D			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	290	6	12	381	294	10	18	12	240	27	100
Future Volume (vph)	107	290	6	12	381	294	10	18	12	240	27	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1658	1697		1668	1756	1501		1760	1522		1733	1553
Flt Permitted	0.29	1.00		0.57	1.00	1.00		0.87	1.00		0.72	1.00
Satd. Flow (perm)	499	1697		993	1756	1501		1555	1522		1313	1553
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)	116	315	7	13	414	320	11	20	13	261	29	109
RTOR Reduction (vph)	0	1	0	0	0	208	0	0	9	0	0	67
Lane Group Flow (vph)	116	321	0	13	414	112	0	31	4	0	290	42
Heavy Vehicles (%)	1%	0%	0%	0%	0%	3%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	39.8	39.8		25.7	25.7	25.7		21.7	21.7		21.7	21.7
Effective Green, g (s)	39.8	39.8		25.7	25.7	25.7		21.7	21.7		21.7	21.7
Actuated g/C Ratio	0.54	0.54		0.35	0.35	0.35		0.30	0.30		0.30	0.30
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	397	918		347	614	524		459	449		387	458
v/s Ratio Prot	0.03	c0.19			c0.24							
v/s Ratio Perm	0.13			0.01		0.07		0.02	0.00		c0.22	0.03
v/c Ratio	0.29	0.35		0.04	0.67	0.21		0.07	0.01		0.75	0.09
Uniform Delay, d1	9.9	9.5		15.7	20.3	16.8		18.6	18.3		23.4	18.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.5		0.1	3.8	0.4		0.1	0.0		7.8	0.1
Delay (s)	10.3	10.0		15.9	24.1	17.2		18.7	18.3		31.2	18.8
Level of Service	B	B		B	C	B		B	B		C	B
Approach Delay (s)		10.1			21.0			18.6			27.8	
Approach LOS		B			C			B			C	

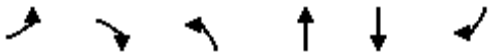
Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	40	113	94	38	94	123	167	52	133	145	167
Future Volume (vph)	179	40	113	94	38	94	123	167	52	133	145	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.98		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		1.00	0.85		1.00	0.85	1.00	0.96		1.00	0.92	
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1648	1510		1619	1212	1676	1710		1754	1681	
Flt Permitted		0.67	1.00		0.66	1.00	0.53	1.00		0.61	1.00	
Satd. Flow (perm)		1154	1510		1105	1212	934	1710		1132	1681	
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)	190	43	120	100	40	100	131	178	55	141	154	178
RTOR Reduction (vph)	0	0	78	0	0	65	0	18	0	0	67	0
Lane Group Flow (vph)	0	233	42	0	140	35	131	215	0	141	265	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	1%	0%	2%	14%	0%	25%	2%	2%	0%	0%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		16.5	16.5		16.5	16.5	20.1	20.1		20.1	20.1	
Effective Green, g (s)		16.5	16.5		16.5	16.5	20.1	20.1		20.1	20.1	
Actuated g/C Ratio		0.35	0.35		0.35	0.35	0.43	0.43		0.43	0.43	
Clearance Time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		404	528		387	424	398	729		483	717	
v/s Ratio Prot								0.13			c0.16	
v/s Ratio Perm		c0.20	0.03		0.13	0.03	0.14			0.12		
v/c Ratio		0.58	0.08		0.36	0.08	0.33	0.30		0.29	0.37	
Uniform Delay, d1		12.5	10.2		11.4	10.2	9.0	8.9		8.8	9.2	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.0	0.1		0.6	0.1	1.0	0.5		0.7	0.7	
Delay (s)		14.5	10.3		12.0	10.3	10.0	9.3		9.5	9.9	
Level of Service		B	B		B	B	B	A		A	A	
Approach Delay (s)		13.0			11.3			9.6			9.8	
Approach LOS		B			B			A			A	

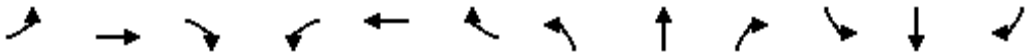
Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	10.5
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	104	36	58	389	452	7
Future Volume (vph)	104	36	58	389	452	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	9	9
Grade (%)	-2%			1%	-1%	
Total Lost time (s)	5.5	5.5	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	2066	1800	1736	3438	1698	
Flt Permitted	0.95	1.00	0.34	1.00	1.00	
Satd. Flow (perm)	2066	1800	616	3438	1698	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	108	38	60	405	471	7
RTOR Reduction (vph)	0	33	0	0	1	0
Lane Group Flow (vph)	108	5	60	405	477	0
Confl. Peds. (#/hr)	1	2	1			1
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		5	2	6	
Permitted Phases		8	2			
Actuated Green, G (s)	7.7	7.7	35.9	35.9	26.7	
Effective Green, g (s)	7.7	7.7	35.9	35.9	26.7	
Actuated g/C Ratio	0.14	0.14	0.66	0.66	0.49	
Clearance Time (s)	5.5	5.5	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	294	256	495	2281	838	
v/s Ratio Prot	c0.05		0.01	c0.12	c0.28	
v/s Ratio Perm		0.00	0.07			
v/c Ratio	0.37	0.02	0.12	0.18	0.57	
Uniform Delay, d1	21.0	20.0	4.1	3.5	9.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.0	0.1	0.1	1.5	
Delay (s)	21.8	20.0	4.3	3.5	11.1	
Level of Service	C	B	A	A	B	
Approach Delay (s)	21.3			3.6	11.1	
Approach LOS	C			A	B	

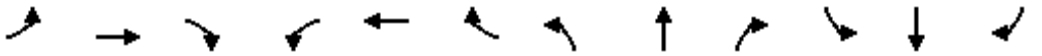
Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	15.5
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	31	0	0	129	0	513	2	54	421	103
Future Volume (Veh/h)	0	0	31	0	0	129	0	513	2	54	421	103
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	33	0	0	136	0	540	2	57	443	108
Pedestrians		1									1	
Lane Width (ft)		14.0									11.5	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								238			493	
pX, platoon unblocked	0.94	0.94	0.93	0.94	0.94	0.98	0.93			0.98		
vC, conflicting volume	883	1154	498	1098	1099	272	444			542		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	770	1059	420	1000	1001	223	362			497		
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	94	100	100	82	100			95		
cM capacity (veh/h)	217	200	545	166	214	766	1106			1044		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	136	360	182	57	551
Volume Left	0	0	0	0	57	0
Volume Right	33	136	0	2	0	108
cSH	545	766	1700	1700	1044	1700
Volume to Capacity	0.06	0.18	0.21	0.11	0.05	0.32
Queue Length 95th (ft)	5	16	0	0	4	0
Control Delay (s)	12.0	10.7	0.0	0.0	8.6	0.0
Lane LOS	B	B			A	
Approach Delay (s)	12.0	10.7	0.0		0.8	
Approach LOS	B	B				

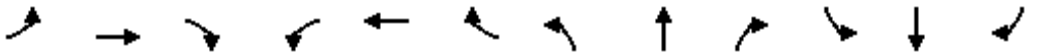
Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	38.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	539	0	29	678	73	4	0	30	41	2	33
Future Volume (Veh/h)	15	539	0	29	678	73	4	0	30	41	2	33
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	16	573	0	31	721	78	4	0	32	44	2	35
Pedestrians		4									2	
Lane Width (ft)		10.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	801			573			1068	1468	573	1461	1429	406
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	801			473			1021	1465	473	1457	1421	406
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			97			97	100	93	41	98	94
cM capacity (veh/h)	830			992			156	111	490	75	118	598

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	16	573	392	438	36	44	37
Volume Left	16	0	31	0	4	44	0
Volume Right	0	0	0	78	32	0	35
cSH	830	1700	992	1700	396	75	490
Volume to Capacity	0.02	0.34	0.03	0.26	0.09	0.59	0.08
Queue Length 95th (ft)	1	0	2	0	7	64	6
Control Delay (s)	9.4	0.0	1.0	0.0	15.0	106.6	13.0
Lane LOS	A		A		C	F	B
Approach Delay (s)	0.3		0.5		15.0	63.8	
Approach LOS					C	F	

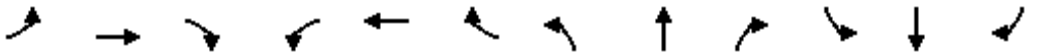
Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	58.7%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	183	159	125	150	100	115	709	189	52	588	145
Future Volume (vph)	114	183	159	125	150	100	115	709	189	52	588	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5		2.5	3.5		2.5	3.5	
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	1661	1584	1685	3119		1710	3224		1770	3308	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.25	1.00		0.21	1.00	
Satd. Flow (perm)	1554	1661	1584	1685	3119		447	3224		387	3308	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	128	206	179	140	169	112	129	797	212	58	661	163
RTOR Reduction (vph)	0	0	147	0	82	0	0	11	0	0	11	0
Lane Group Flow (vph)	115	219	32	140	199	0	129	998	0	58	813	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	2%	3%	0%	1%	1%	1%	4%	3%	3%	3%	5%
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4				6			2		
Actuated Green, G (s)	24.6	24.6	24.6	18.1	18.1		90.3	79.9		82.3	75.9	
Effective Green, g (s)	26.6	26.6	26.6	20.1	20.1		92.8	81.9		86.3	77.9	
Actuated g/C Ratio	0.18	0.18	0.18	0.13	0.13		0.62	0.55		0.58	0.52	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5		4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	275	294	280	225	417		380	1760		300	1717	
v/s Ratio Prot	0.07	c0.13		c0.08	0.06		c0.03	c0.31		0.01	0.25	
v/s Ratio Perm			0.02				0.18			0.10		
v/c Ratio	0.42	0.74	0.11	0.62	0.48		0.34	0.57		0.19	0.47	
Uniform Delay, d1	54.8	58.5	51.8	61.4	60.1		13.8	22.4		15.6	23.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.10	0.06	
Incremental Delay, d2	1.0	9.8	0.2	5.3	0.9		0.5	1.3		0.3	0.8	
Delay (s)	55.9	68.3	52.0	66.6	60.9		14.4	23.7		1.9	2.1	
Level of Service	E	E	D	E	E		B	C		A	A	
Approach Delay (s)		59.8			62.8			22.7			2.1	
Approach LOS		E			E			C			A	

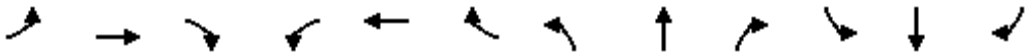
Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	827	49	210	447	224	76	520	212	282	616	93
Future Volume (vph)	102	827	49	210	447	224	76	520	212	282	616	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1595	3333	3404	1508	1838	3522	1398	3335	3371	1361
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.19	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1595	3333	3404	1508	373	3522	1398	3335	3371	1361
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	113	919	54	233	497	249	84	578	236	313	684	103
RTOR Reduction (vph)	0	0	0	0	0	125	0	0	0	0	0	0
Lane Group Flow (vph)	113	919	54	233	497	124	84	578	236	313	684	103
Confl. Peds. (#/hr)									2			
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	4%	4%	0%	4%	5%	6%	2%	3%	7%	1%	3%	5%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	9.4	66.0	150.0	14.9	71.5	71.5	36.7	27.7	150.0	18.4	37.1	150.0
Effective Green, g (s)	11.4	69.0	150.0	16.9	74.5	74.5	40.7	30.7	150.0	20.4	40.1	150.0
Actuated g/C Ratio	0.08	0.46	1.00	0.11	0.50	0.50	0.27	0.20	1.00	0.14	0.27	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	255	1596	1595	375	1690	748	208	720	1398	453	901	1361
v/s Ratio Prot	0.03	c0.26		c0.07	0.15		0.03	0.16		c0.09	c0.20	
v/s Ratio Perm			0.03			0.08	0.08		0.17			0.08
v/c Ratio	0.44	0.58	0.03	0.62	0.29	0.17	0.40	0.80	0.17	0.69	0.76	0.08
Uniform Delay, d1	66.3	29.8	0.0	63.5	22.3	20.7	42.6	56.8	0.0	61.8	50.5	0.0
Progression Factor	1.24	0.55	1.00	0.69	1.37	6.07	1.61	1.34	1.00	1.30	0.82	1.00
Incremental Delay, d2	0.4	1.4	0.0	2.1	0.4	0.4	0.4	5.9	0.2	3.5	3.8	0.1
Delay (s)	82.4	17.9	0.0	46.2	30.9	126.2	69.2	82.0	0.2	83.6	45.2	0.1
Level of Service	F	B	A	D	C	F	E	F	A	F	D	A
Approach Delay (s)		23.7			58.7			59.3			51.9	
Approach LOS		C			E			E			D	

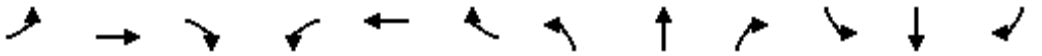
Intersection Summary			
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	872	112	93	554	45	71	44	122	23	83	21
Future Volume (vph)	49	872	112	93	554	45	71	44	122	23	83	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	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	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3470	1546	1752	3406	1615	1641	1623	1425	1787	1690	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3470	1546	1752	3406	1615	1641	1623	1425	1787	1690	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	53	938	120	100	596	48	76	47	131	25	89	23
RTOR Reduction (vph)	0	0	52	0	0	19	0	0	0	0	7	0
Lane Group Flow (vph)	53	938	68	100	596	29	60	63	131	25	105	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	0%	3%	0%	3%	6%	0%	2%	4%	3%	0%	5%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.9	84.2	84.2	14.4	89.7	89.7	12.3	12.3	150.0	16.1	16.1	
Effective Green, g (s)	10.9	86.2	85.2	16.4	91.7	91.7	14.3	14.3	150.0	18.1	18.1	
Actuated g/C Ratio	0.07	0.57	0.57	0.11	0.61	0.61	0.10	0.10	1.00	0.12	0.12	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	134	1994	878	191	2082	987	156	154	1425	215	203	
v/s Ratio Prot	0.03	c0.27		c0.06	0.18		0.04	c0.04		0.01	c0.06	
v/s Ratio Perm			0.04			0.02			0.09			
v/c Ratio	0.40	0.47	0.08	0.52	0.29	0.03	0.38	0.41	0.09	0.12	0.52	
Uniform Delay, d1	66.4	18.6	14.6	63.1	13.7	11.5	63.7	63.9	0.0	58.8	61.9	
Progression Factor	1.00	1.00	1.00	1.04	0.56	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.8	0.2	2.9	0.3	0.1	2.1	2.4	0.1	0.3	2.9	
Delay (s)	68.7	19.4	14.8	68.6	8.1	11.6	65.9	66.3	0.1	59.1	64.8	
Level of Service	E	B	B	E	A	B	E	E	A	E	E	
Approach Delay (s)		21.3			16.4			32.1			63.8	
Approach LOS		C			B			C			E	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

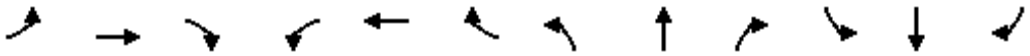
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	262	7	5	138	145	2	1	4	143	8	51
Future Volume (vph)	68	262	7	5	138	145	2	1	4	143	8	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.95	1.00
Satd. Flow (prot)	1642	1647		1668	1704	1515		1731	1522		1745	1419
Flt Permitted	0.52	1.00		0.58	1.00	1.00		0.83	1.00		0.74	1.00
Satd. Flow (perm)	899	1647		1020	1704	1515		1477	1522		1345	1419
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)	74	285	8	5	150	158	2	1	4	155	9	55
RTOR Reduction (vph)	0	1	0	0	0	97	0	0	3	0	0	43
Lane Group Flow (vph)	74	292	0	5	150	61	0	3	1	0	164	12
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	2%	3%	0%	0%	3%	2%	0%	0%	0%	0%	0%	7%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	32.7	32.7		22.1	22.1	22.1		12.2	12.2		12.2	12.2
Effective Green, g (s)	32.7	32.7		22.1	22.1	22.1		12.2	12.2		12.2	12.2
Actuated g/C Ratio	0.57	0.57		0.39	0.39	0.39		0.21	0.21		0.21	0.21
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	576	946		396	661	588		316	326		288	304
v/s Ratio Prot	0.01	c0.18			0.09							
v/s Ratio Perm	0.06			0.00		0.04		0.00	0.00		c0.12	0.01
v/c Ratio	0.13	0.31		0.01	0.23	0.10		0.01	0.00		0.57	0.04
Uniform Delay, d1	5.7	6.3		10.7	11.7	11.1		17.6	17.6		20.0	17.7
Progression Factor	1.00	1.00		1.00	1.00	0.97		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.4		0.0	0.4	0.2		0.0	0.0		2.6	0.1
Delay (s)	5.8	6.6		10.7	12.0	10.9		17.6	17.6		22.6	17.8
Level of Service	A	A		B	B	B		B	B		C	B
Approach Delay (s)		6.5			11.5			17.6			21.4	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

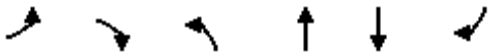
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	24	79	34	14	30	73	58	5	68	104	98
Future Volume (vph)	83	24	79	34	14	30	73	58	5	68	104	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.98		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		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1648	1526		1782	1515	1693	1714		1751	1678	
Flt Permitted		0.73	1.00		0.72	1.00	0.60	1.00		0.71	1.00	
Satd. Flow (perm)		1256	1526		1325	1515	1073	1714		1300	1678	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	104	30	99	42	18	38	91	72	6	85	130	122
RTOR Reduction (vph)	0	0	75	0	0	29	0	3	0	0	47	0
Lane Group Flow (vph)	0	134	24	0	61	9	91	76	0	85	206	0
Confl. Peds. (#/hr)			1	1					3	3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	4%	0%	0%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		10.3	10.3		10.3	10.3	21.9	21.9		21.9	21.9	
Effective Green, g (s)		10.3	10.3		10.3	10.3	21.9	21.9		21.9	21.9	
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.51	0.51		0.51	0.51	
Clearance Time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		302	368		319	365	550	879		666	860	
v/s Ratio Prot								0.04			c0.12	
v/s Ratio Perm		c0.11	0.02		0.05	0.01	0.08			0.07		
v/c Ratio		0.44	0.06		0.19	0.03	0.17	0.09		0.13	0.24	
Uniform Delay, d1		13.8	12.5		12.9	12.4	5.5	5.3		5.4	5.8	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0	0.1		0.3	0.0	0.3	0.1		0.2	0.3	
Delay (s)		14.8	12.6		13.2	12.4	5.8	5.4		5.6	6.1	
Level of Service		B	B		B	B	A	A		A	A	
Approach Delay (s)		13.9			12.9			5.6			6.0	
Approach LOS		B			B			A			A	

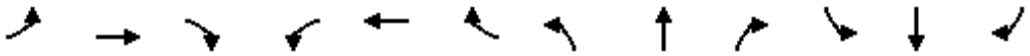
Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	42.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	45	28	36	186	307	10
Future Volume (vph)	45	28	36	186	307	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	9	9
Grade (%)	-2%			1%	-1%	
Total Lost time (s)	5.5	5.5	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
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	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	2066	1849	1685	3307	1693	
Flt Permitted	0.95	1.00	0.42	1.00	1.00	
Satd. Flow (perm)	2066	1849	738	3307	1693	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	58	36	46	238	394	13
RTOR Reduction (vph)	0	33	0	0	1	0
Lane Group Flow (vph)	58	3	46	238	406	0
Confl. Peds. (#/hr)			2			2
Confl. Bikes (#/hr)						2
Heavy Vehicles (%)	0%	0%	3%	5%	1%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		5	2	6	
Permitted Phases		8	2			
Actuated Green, G (s)	4.6	4.6	34.8	34.8	27.3	
Effective Green, g (s)	4.6	4.6	34.8	34.8	27.3	
Actuated g/C Ratio	0.09	0.09	0.70	0.70	0.55	
Clearance Time (s)	5.5	5.5	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	190	170	562	2306	926	
v/s Ratio Prot	c0.03		0.00	c0.07	c0.24	
v/s Ratio Perm		0.00	0.05			
v/c Ratio	0.31	0.02	0.08	0.10	0.44	
Uniform Delay, d1	21.2	20.6	2.8	2.5	6.7	
Progression Factor	1.00	1.00	1.00	1.00	0.95	
Incremental Delay, d2	0.9	0.0	0.1	0.0	0.7	
Delay (s)	22.1	20.6	2.9	2.5	7.1	
Level of Service	C	C	A	A	A	
Approach Delay (s)	21.5			2.6	7.1	
Approach LOS	C			A	A	

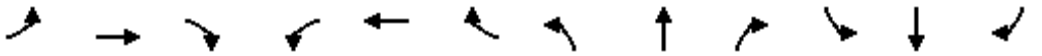
Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	15.5
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	0	0	73	0	188	1	24	263	23
Future Volume (Veh/h)	0	0	5	0	0	73	0	188	1	24	263	23
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	7	0	0	97	0	251	1	32	351	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								238			493	
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98		0.98					
vC, conflicting volume	556	682	366	666	666	126	351			252		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	534	664	341	647	647	126	325			252		
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	99	100	100	89	100			98		
cM capacity (veh/h)	371	366	647	337	370	901	1204			1310		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	97	167	85	32	382
Volume Left	0	0	0	0	32	0
Volume Right	7	97	0	1	0	31
cSH	647	901	1700	1700	1310	1700
Volume to Capacity	0.01	0.11	0.10	0.05	0.02	0.22
Queue Length 95th (ft)	1	9	0	0	2	0
Control Delay (s)	10.6	9.5	0.0	0.0	7.8	0.0
Lane LOS	B	A			A	
Approach Delay (s)	10.6	9.5	0.0		0.6	
Approach LOS	B	A				

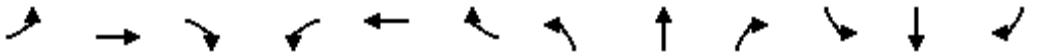
Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	25.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	406	0	12	305	39	0	0	11	13	0	4
Future Volume (Veh/h)	11	406	0	12	305	39	0	0	11	13	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	12	441	0	13	332	42	0	0	12	14	0	4
Pedestrians											2	
Lane Width (ft)											13.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	376			441			661	867	441	858	846	189
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			359			596	818	359	808	795	189
tC, single (s)	4.1			4.1			7.5	6.5	6.9	8.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	4.0	4.0	3.3
p0 queue free %	99			99			100	100	98	92	100	100
cM capacity (veh/h)	1191			1124			356	284	597	180	292	826

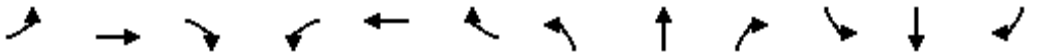
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	12	441	179	208	12	14	4
Volume Left	12	0	13	0	0	14	0
Volume Right	0	0	0	42	12	0	4
cSH	1191	1700	1124	1700	597	180	826
Volume to Capacity	0.01	0.26	0.01	0.12	0.02	0.08	0.00
Queue Length 95th (ft)	1	0	1	0	2	6	0
Control Delay (s)	8.1	0.0	0.7	0.0	11.1	26.6	9.4
Lane LOS	A		A		B	D	A
Approach Delay (s)	0.2		0.3		11.1	22.8	
Approach LOS					B	C	

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	35.4%	ICU Level of Service		A
Analysis Period (min)	15			



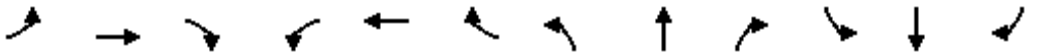
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	268	223	224	360	175	253	991	208	104	670	273
Future Volume (vph)	223	268	223	224	360	175	253	991	208	104	670	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	11	11	11	12	11	13
Grade (%)		-2%			0%			2%			-2%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5		2.5	3.5		2.5	3.5	
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	1694	1615	1652	3166		1694	3359		1823	3362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.10	1.00		0.11	1.00	
Satd. Flow (perm)	1600	1694	1615	1652	3166		186	3359		202	3362	
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)	232	279	232	233	375	182	264	1032	217	108	698	284
RTOR Reduction (vph)	0	0	159	0	40	0	0	9	0	0	27	0
Lane Group Flow (vph)	209	302	73	233	517	0	264	1240	0	108	955	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	1%	0%	1%	2%	1%	0%	2%	0%	1%	0%	0%	1%
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4				6			2		
Actuated Green, G (s)	27.0	27.0	27.0	24.5	24.5		82.0	67.1		63.7	53.3	
Effective Green, g (s)	29.0	29.0	29.0	26.5	26.5		84.0	69.1		67.7	55.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.18	0.18		0.56	0.46		0.45	0.37	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5		4.5	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	309	327	312	291	559		367	1547		225	1239	
v/s Ratio Prot	0.13	c0.18		0.14	c0.16		c0.13	c0.37		0.04	0.28	
v/s Ratio Perm			0.05				0.28			0.18		
v/c Ratio	0.68	0.92	0.23	0.80	0.93		0.72	0.80		0.48	0.77	
Uniform Delay, d1	56.1	59.4	51.1	59.2	60.8		34.6	34.6		27.8	41.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.52	1.00	
Incremental Delay, d2	5.8	30.7	0.4	14.5	21.4		6.6	4.5		1.2	3.5	
Delay (s)	61.9	90.1	51.5	73.8	82.1		41.2	39.1		43.4	45.1	
Level of Service	E	F	D	E	F		D	D		D	D	
Approach Delay (s)		70.1			79.7			39.4			45.0	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	54.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



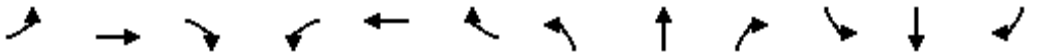
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	637	117	395	1016	272	173	934	361	371	826	236
Future Volume (vph)	237	637	117	395	1016	272	173	934	361	371	826	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	13	12	10	11	11	9
Grade (%)		0%			2%			-1%			1%	
Total Lost time (s)	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1562	3432	3504	1536	1874	3628	1479	3335	3472	1426
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.14	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1562	3432	3504	1536	275	3628	1479	3335	3472	1426
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)	252	678	124	420	1081	289	184	994	384	395	879	251
RTOR Reduction (vph)	0	0	0	0	0	119	0	0	0	0	0	0
Lane Group Flow (vph)	252	678	124	420	1081	170	184	994	384	395	879	251
Confl. Peds. (#/hr)			4			8	7		6			7
Confl. Bikes (#/hr)			1						2			1
Heavy Vehicles (%)	2%	2%	2%	1%	2%	1%	0%	0%	1%	1%	0%	0%
Turn Type	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			Free			2	8		Free			Free
Actuated Green, G (s)	15.4	42.1	150.0	21.8	48.5	48.5	57.6	43.0	150.0	20.1	48.5	150.0
Effective Green, g (s)	17.4	45.1	150.0	23.8	51.5	51.5	61.6	46.0	150.0	22.1	51.5	150.0
Actuated g/C Ratio	0.12	0.30	1.00	0.16	0.34	0.34	0.41	0.31	1.00	0.15	0.34	1.00
Clearance Time (s)	5.5	6.0		5.5	6.0	6.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	398	1064	1562	544	1203	527	289	1112	1479	491	1192	1426
v/s Ratio Prot	0.07	0.19		c0.12	c0.31		0.07	c0.27		c0.12	0.25	
v/s Ratio Perm			0.08			0.11	0.19		0.26			0.18
v/c Ratio	0.63	0.64	0.08	0.77	0.90	0.32	0.64	0.89	0.26	0.80	0.74	0.18
Uniform Delay, d1	63.3	45.4	0.0	60.5	46.8	36.4	31.9	49.7	0.0	61.9	43.3	0.0
Progression Factor	1.04	1.43	1.00	0.63	1.08	1.67	1.32	0.75	1.00	1.18	0.85	1.00
Incremental Delay, d2	2.3	2.7	0.1	4.2	7.7	1.1	2.2	6.6	0.3	8.2	2.4	0.3
Delay (s)	68.2	67.5	0.1	42.5	58.3	61.8	44.5	44.0	0.3	81.4	39.4	0.3
Level of Service	E	E	A	D	E	E	D	D	A	F	D	A
Approach Delay (s)		59.8			55.1			33.3			43.8	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



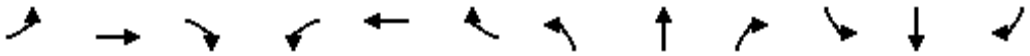
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	653	191	243	1130	71	200	119	320	52	153	46
Future Volume (vph)	43	653	191	243	1130	71	200	119	320	52	153	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	11	12	12	12	11	10	9	12	11	11
Grade (%)		2%			0%			-2%			2%	
Total Lost time (s)	3.5	3.5	4.5	3.5	3.5	3.5	4.0	4.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1847	3504	1513	1805	3539	1583	1658	1675	1435	1752	1708	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1847	3504	1513	1805	3539	1583	1658	1675	1435	1752	1708	
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)	44	673	197	251	1165	73	206	123	330	54	158	47
RTOR Reduction (vph)	0	0	122	0	0	36	0	0	0	0	8	0
Lane Group Flow (vph)	44	673	75	251	1165	37	161	168	330	54	197	0
Confl. Peds. (#/hr)									3			4
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	2%	0%	0%	2%	2%	1%	0%	1%	2%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Free	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			Free			
Actuated Green, G (s)	8.2	56.2	56.2	26.8	74.8	74.8	22.6	22.6	150.0	21.4	21.4	
Effective Green, g (s)	10.2	58.2	57.2	28.8	76.8	76.8	24.6	24.6	150.0	23.4	23.4	
Actuated g/C Ratio	0.07	0.39	0.38	0.19	0.51	0.51	0.16	0.16	1.00	0.16	0.16	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.5	5.0	5.0	3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	125	1359	576	346	1811	810	271	274	1435	273	266	
v/s Ratio Prot	0.02	0.19		c0.14	c0.33		0.10	c0.10		0.03	c0.12	
v/s Ratio Perm			0.05			0.02			0.23			
v/c Ratio	0.35	0.50	0.13	0.73	0.64	0.05	0.59	0.61	0.23	0.20	0.74	
Uniform Delay, d1	66.7	34.8	30.2	56.9	26.6	18.3	58.1	58.3	0.0	55.1	60.4	
Progression Factor	1.00	1.00	1.00	1.47	0.25	0.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	1.3	0.5	5.2	1.2	0.1	4.1	4.6	0.4	0.5	11.3	
Delay (s)	68.8	36.1	30.7	88.6	7.8	0.1	62.1	62.9	0.4	55.6	71.7	
Level of Service	E	D	C	F	A	A	E	E	A	E	E	
Approach Delay (s)		36.5			21.0			31.4			68.4	
Approach LOS		D			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	290	6	12	381	294	10	18	12	240	27	100
Future Volume (vph)	107	290	6	12	381	294	10	18	12	240	27	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	10	10	10	10	11	10	10	10	11	11	11
Grade (%)		8%			2%			-2%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	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
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1658	1697		1668	1756	1501		1760	1522		1733	1553
Flt Permitted	0.29	1.00		0.57	1.00	1.00		0.87	1.00		0.72	1.00
Satd. Flow (perm)	499	1697		993	1756	1501		1555	1522		1313	1553
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)	116	315	7	13	414	320	11	20	13	261	29	109
RTOR Reduction (vph)	0	1	0	0	0	208	0	0	9	0	0	67
Lane Group Flow (vph)	116	321	0	13	414	112	0	31	4	0	290	42
Heavy Vehicles (%)	1%	0%	0%	0%	0%	3%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	39.8	39.8		25.7	25.7	25.7		21.7	21.7		21.7	21.7
Effective Green, g (s)	39.8	39.8		25.7	25.7	25.7		21.7	21.7		21.7	21.7
Actuated g/C Ratio	0.54	0.54		0.35	0.35	0.35		0.30	0.30		0.30	0.30
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	397	918		347	614	524		459	449		387	458
v/s Ratio Prot	0.03	c0.19			c0.24							
v/s Ratio Perm	0.13			0.01		0.07		0.02	0.00		c0.22	0.03
v/c Ratio	0.29	0.35		0.04	0.67	0.21		0.07	0.01		0.75	0.09
Uniform Delay, d1	9.9	9.5		15.7	20.3	16.8		18.6	18.3		23.4	18.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.5		0.1	3.8	0.4		0.1	0.0		7.8	0.1
Delay (s)	10.3	10.0		15.9	24.1	17.2		18.7	18.3		31.2	18.8
Level of Service	B	B		B	C	B		B	B		C	B
Approach Delay (s)		10.1			21.0			18.6			27.8	
Approach LOS		B			C			B			C	

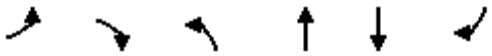
Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	40	113	94	38	94	123	167	52	133	145	167
Future Volume (vph)	179	40	113	94	38	94	123	167	52	133	145	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	11	11	10	10	10	10	11	11	11
Grade (%)		5%			-1%			-3%			-1%	
Total Lost time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.98		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		1.00	0.85		1.00	0.85	1.00	0.96		1.00	0.92	
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1648	1510		1619	1212	1676	1710		1754	1681	
Flt Permitted		0.67	1.00		0.66	1.00	0.53	1.00		0.61	1.00	
Satd. Flow (perm)		1154	1510		1105	1212	934	1710		1132	1681	
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)	190	43	120	100	40	100	131	178	55	141	154	178
RTOR Reduction (vph)	0	0	78	0	0	65	0	18	0	0	67	0
Lane Group Flow (vph)	0	233	42	0	140	35	131	215	0	141	265	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	1%	0%	2%	14%	0%	25%	2%	2%	0%	0%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		16.5	16.5		16.5	16.5	20.1	20.1		20.1	20.1	
Effective Green, g (s)		16.5	16.5		16.5	16.5	20.1	20.1		20.1	20.1	
Actuated g/C Ratio		0.35	0.35		0.35	0.35	0.43	0.43		0.43	0.43	
Clearance Time (s)		5.5	5.5		5.5	5.5	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		404	528		387	424	398	729		483	717	
v/s Ratio Prot								0.13			c0.16	
v/s Ratio Perm		c0.20	0.03		0.13	0.03	0.14			0.12		
v/c Ratio		0.58	0.08		0.36	0.08	0.33	0.30		0.29	0.37	
Uniform Delay, d1		12.5	10.2		11.4	10.2	9.0	8.9		8.8	9.2	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.0	0.1		0.6	0.1	1.0	0.5		0.7	0.7	
Delay (s)		14.5	10.3		12.0	10.3	10.0	9.3		9.5	9.9	
Level of Service		B	B		B	B	B	A		A	A	
Approach Delay (s)		13.0			11.3			9.6			9.8	
Approach LOS		B			B			A			A	

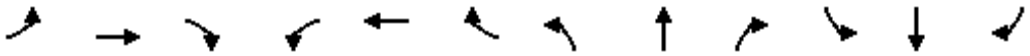
Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	10.5
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	104	36	58	389	452	7
Future Volume (vph)	104	36	58	389	452	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	9	9
Grade (%)	-2%			1%	-1%	
Total Lost time (s)	5.5	5.5	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	2066	1800	1736	3438	1698	
Flt Permitted	0.95	1.00	0.34	1.00	1.00	
Satd. Flow (perm)	2066	1800	616	3438	1698	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	108	38	60	405	471	7
RTOR Reduction (vph)	0	33	0	0	1	0
Lane Group Flow (vph)	108	5	60	405	477	0
Confl. Peds. (#/hr)	1	2	1			1
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		5	2	6	
Permitted Phases		8	2			
Actuated Green, G (s)	7.7	7.7	35.9	35.9	26.7	
Effective Green, g (s)	7.7	7.7	35.9	35.9	26.7	
Actuated g/C Ratio	0.14	0.14	0.66	0.66	0.49	
Clearance Time (s)	5.5	5.5	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	294	256	495	2281	838	
v/s Ratio Prot	c0.05		0.01	c0.12	c0.28	
v/s Ratio Perm		0.00	0.07			
v/c Ratio	0.37	0.02	0.12	0.18	0.57	
Uniform Delay, d1	21.0	20.0	4.1	3.5	9.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.0	0.1	0.1	1.5	
Delay (s)	21.8	20.0	4.3	3.5	11.1	
Level of Service	C	B	A	A	B	
Approach Delay (s)	21.3			3.6	11.1	
Approach LOS	C			A	B	

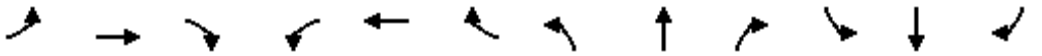
Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	15.5
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	31	0	0	129	0	513	2	54	421	103
Future Volume (Veh/h)	0	0	31	0	0	129	0	513	2	54	421	103
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			1%			1%			2%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	33	0	0	136	0	540	2	57	443	108
Pedestrians		1									1	
Lane Width (ft)		14.0									11.5	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								238			493	
pX, platoon unblocked	0.94	0.94	0.93	0.94	0.94	0.98	0.93			0.98		
vC, conflicting volume	883	1154	498	1098	1099	272	444			542		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	770	1059	420	1000	1001	223	362			497		
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	94	100	100	82	100			95		
cM capacity (veh/h)	217	200	545	166	214	766	1106			1044		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	136	360	182	57	551
Volume Left	0	0	0	0	57	0
Volume Right	33	136	0	2	0	108
cSH	545	766	1700	1700	1044	1700
Volume to Capacity	0.06	0.18	0.21	0.11	0.05	0.32
Queue Length 95th (ft)	5	16	0	0	4	0
Control Delay (s)	12.0	10.7	0.0	0.0	8.6	0.0
Lane LOS	B	B			A	
Approach Delay (s)	12.0	10.7	0.0		0.8	
Approach LOS	B	B				

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	38.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	539	0	29	678	73	4	0	30	41	2	33
Future Volume (Veh/h)	15	539	0	29	678	73	4	0	30	41	2	33
Sign Control		Free			Free			Stop			Stop	
Grade		-2%			3%			-4%			1%	
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)	16	573	0	31	721	78	4	0	32	44	2	35
Pedestrians		4									2	
Lane Width (ft)		10.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		225			778							
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	801			573			1068	1468	573	1461	1429	406
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	801			473			1021	1465	473	1457	1421	406
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			97			97	100	93	41	98	94
cM capacity (veh/h)	830			992			156	111	490	75	118	598

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	16	573	392	438	36	44	37
Volume Left	16	0	31	0	4	44	0
Volume Right	0	0	0	78	32	0	35
cSH	830	1700	992	1700	396	75	490
Volume to Capacity	0.02	0.34	0.03	0.26	0.09	0.59	0.08
Queue Length 95th (ft)	1	0	2	0	7	64	6
Control Delay (s)	9.4	0.0	1.0	0.0	15.0	106.6	13.0
Lane LOS	A		A		C	F	B
Approach Delay (s)	0.3		0.5		15.0	63.8	
Approach LOS					C	F	

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	58.7%	ICU Level of Service		B
Analysis Period (min)	15			

APPENDIX I-B

SIMTRAFFIC QUEUE REPORTS

Intersection: 1: US 1 Business & Tollgate Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	LT	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	227	297	172	227	264	73	129	294	320	72	93	123
Average Queue (ft)	72	183	13	96	120	36	61	157	190	26	17	25
95th Queue (ft)	155	279	108	178	218	64	109	258	301	59	62	79
Link Distance (ft)	290	290			411			468	468		582	582
Upstream Blk Time (%)		1	0		0							
Queuing Penalty (veh)		1	0		0							
Storage Bay Dist (ft)			190	300		200	335			420		
Storage Blk Time (%)		11			2			0				
Queuing Penalty (veh)		16			5			0				

Intersection: 2: US 1 Business & MD 24

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	T	T
Maximum Queue (ft)	90	100	366	384	147	166	252	260	221	154	349	359
Average Queue (ft)	35	42	142	165	71	88	137	151	32	61	194	208
95th Queue (ft)	75	82	300	326	134	146	219	238	146	122	311	329
Link Distance (ft)			962	962			1383	1383	1383		427	427
Upstream Blk Time (%)											0	0
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	500	500			860	860				390		
Storage Blk Time (%)											0	
Queuing Penalty (veh)											0	

Intersection: 2: US 1 Business & MD 24

Movement	SB	SB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	196	223	343	366
Average Queue (ft)	118	144	183	192
95th Queue (ft)	182	207	294	308
Link Distance (ft)		381	381	381
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	1
Storage Bay Dist (ft)	275			
Storage Blk Time (%)		0		0
Queuing Penalty (veh)		0		0

Intersection: 3: Boulton St & MD 24

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	T	R	L	LT	L	TR
Maximum Queue (ft)	109	274	288	156	155	175	38	109	156	62	186
Average Queue (ft)	46	150	144	73	56	61	9	30	75	17	82
95th Queue (ft)	94	248	250	138	122	138	32	82	130	50	155
Link Distance (ft)		1795	1795		962	962	962		373		453
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	455			575				270		290	
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 4: Tollgate Rd & Boulton St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	LT	R	LT	R
Maximum Queue (ft)	67	99	28	108	43	30	31	113	57
Average Queue (ft)	21	38	2	29	3	2	3	52	2
95th Queue (ft)	50	80	12	72	23	13	18	89	25
Link Distance (ft)		509		152	152	191	191	293	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	80		35						75
Storage Blk Time (%)	0	1	0	4				2	0
Queuing Penalty (veh)	0	0	0	0				1	0

Intersection: 5: Boulton St & Gateway Dr

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	TR	L	TR
Maximum Queue (ft)	94	63	47	43	70	60	51	99
Average Queue (ft)	41	25	9	15	25	19	7	37
95th Queue (ft)	75	51	32	41	58	51	30	76
Link Distance (ft)	178	178	292	292	226	226		309
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)							110	
Storage Blk Time (%)								0
Queuing Penalty (veh)								0

Intersection: 7: Boulton St & Harford Mall Annex/Harford Mall

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	LT	R	L	T	TR	L	TR
Maximum Queue (ft)	85	39	48	18	40	39	74	82	64	145
Average Queue (ft)	28	3	18	2	13	14	21	19	20	45
95th Queue (ft)	62	23	44	13	38	39	59	57	50	104
Link Distance (ft)		207		264	264		309	309	164	164
Upstream Blk Time (%)										0
Queuing Penalty (veh)										0
Storage Bay Dist (ft)	40		40			130				
Storage Blk Time (%)	3	1	1							
Queuing Penalty (veh)	1	0	1							

Intersection: 8: Boulton St & Harford Mall Annex

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: 9: Boulton Street Crossing/Harford Mall & Tollgate Rd

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	LT	TR	LTR	L	TR
Maximum Queue (ft)	28	41	4	31	78	30
Average Queue (ft)	3	3	0	9	16	5
95th Queue (ft)	16	20	3	31	56	24
Link Distance (ft)		351	351	152	198	198
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	70					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 28

Intersection: 1: US 1 Business & Tollgate Rd

Movement	EB	EB	EB	B10	WB	WB	WB	NB	NB	NB	B18	SB
Directions Served	L	LT	R	T	L	T	R	L	T	TR	T	L
Maximum Queue (ft)	337	368	290	426	350	450	275	399	459	518	35	144
Average Queue (ft)	155	357	236	358	277	420	212	157	317	347	1	69
95th Queue (ft)	293	381	420	538	439	478	377	321	433	475	18	120
Link Distance (ft)	290	290		351		411			468	468	587	
Upstream Blk Time (%)	2	66	2	46		61			0	1		
Queuing Penalty (veh)	7	196	0	273		0			0	0		
Storage Bay Dist (ft)			190		300		200	335				420
Storage Blk Time (%)		82	0		4	73	0	0	6			
Queuing Penalty (veh)		175	0		22	292	0	0	14			

Intersection: 1: US 1 Business & Tollgate Rd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	367	412
Average Queue (ft)	217	260
95th Queue (ft)	334	391
Link Distance (ft)	582	582
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 2: US 1 Business & MD 24

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	T	T
Maximum Queue (ft)	202	182	370	508	354	495	827	973	478	314	413	415
Average Queue (ft)	103	103	228	251	158	245	609	629	114	127	228	235
95th Queue (ft)	164	158	326	392	326	676	1021	1040	389	257	372	375
Link Distance (ft)			962	962			1383	1383	1383		427	427
Upstream Blk Time (%)				0						0	1	1
Queuing Penalty (veh)				0						0	2	2
Storage Bay Dist (ft)	500	500			860	860				390		
Storage Blk Time (%)					0	0	7				1	
Queuing Penalty (veh)					0	2	27				2	

Intersection: 2: US 1 Business & MD 24

Movement	B43	B43	SB	SB	SB	SB	SB
Directions Served	T	T	L	L	T	T	R
Maximum Queue (ft)	36	41	284	316	358	366	149
Average Queue (ft)	2	2	155	183	202	214	7
95th Queue (ft)	26	34	238	268	316	319	94
Link Distance (ft)	582	582		381	381	381	
Upstream Blk Time (%)				0	1	1	0
Queuing Penalty (veh)				0	3	3	0
Storage Bay Dist (ft)			275				350
Storage Blk Time (%)			0	1		1	
Queuing Penalty (veh)			0	3		3	

Intersection: 3: Boulton St & MD 24

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	LT	L	TR
Maximum Queue (ft)	125	322	285	48	316	162	322	29	206	249	195	308
Average Queue (ft)	45	193	176	2	186	80	108	7	102	150	43	157
95th Queue (ft)	96	287	264	24	281	148	277	27	178	223	125	264
Link Distance (ft)		1795	1795			962	962	962		373		453
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	455			445	575				270		290	
Storage Blk Time (%)										0		1
Queuing Penalty (veh)										0		1

Intersection: 4: Tollgate Rd & Boulton St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	LT	R	LT	R
Maximum Queue (ft)	104	393	71	223	121	48	43	270	125
Average Queue (ft)	54	131	9	104	20	17	9	133	44
95th Queue (ft)	107	325	40	202	77	46	34	249	140
Link Distance (ft)		509		152	152	191	191	293	
Upstream Blk Time (%)		1		4	0			1	
Queuing Penalty (veh)		0		14	0			4	
Storage Bay Dist (ft)	80		35						75
Storage Blk Time (%)	1	21	1	25				31	0
Queuing Penalty (veh)	3	23	2	3				31	0

Intersection: 5: Boulton St & Gateway Dr

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	TR	L	TR
Maximum Queue (ft)	134	78	64	84	126	114	52	188
Average Queue (ft)	68	33	20	29	53	46	12	71
95th Queue (ft)	115	61	49	65	101	93	39	133
Link Distance (ft)	178	178	292	292	226	226		309
Upstream Blk Time (%)	0							
Queuing Penalty (veh)	0							
Storage Bay Dist (ft)							110	
Storage Blk Time (%)								1
Queuing Penalty (veh)								0

Intersection: 7: Boulton St & Harford Mall Annex/Harford Mall

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	LT	R	L	T	TR	L	TR
Maximum Queue (ft)	117	52	44	91	80	65	94	133	120	226
Average Queue (ft)	51	7	20	39	42	28	41	53	44	87
95th Queue (ft)	93	32	47	75	68	56	78	103	87	175
Link Distance (ft)		207		264	264		309	309	164	164
Upstream Blk Time (%)									0	1
Queuing Penalty (veh)									0	3
Storage Bay Dist (ft)	40		40			130				
Storage Blk Time (%)	15	1	1				0			
Queuing Penalty (veh)	6	1	2				0			

Intersection: 8: Boulton St & Harford Mall Annex

Movement	EB	NB	SB
Directions Served	R	T	TR
Maximum Queue (ft)	55	6	59
Average Queue (ft)	5	0	2
95th Queue (ft)	31	4	23
Link Distance (ft)	145	164	373
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			0
Queuing Penalty (veh)			1

Intersection: 9: Boulton Street Crossing/Harford Mall & Tollgate Rd

Movement	EB	EB	WB	WB	B10	B10	NB	SB	SB
Directions Served	L	TR	LT	TR	T	T	LTR	L	TR
Maximum Queue (ft)	74	162	212	94	57	49	152	181	174
Average Queue (ft)	12	104	37	6	4	3	90	102	39
95th Queue (ft)	53	213	165	84	57	48	194	237	136
Link Distance (ft)		152	351	351	290	290	152	198	198
Upstream Blk Time (%)		18	1	0	0		43	36	7
Queuing Penalty (veh)		94	5	1	1		0	0	0
Storage Bay Dist (ft)	70								
Storage Blk Time (%)	0	33							
Queuing Penalty (veh)	0	5							

Zone Summary

Zone wide Queuing Penalty: 1225

Intersection: 1: US 1 Business & Tollgate Rd

Movement	EB	EB	EB	B10	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	L	T	R	L	T	TR	L	T
Maximum Queue (ft)	176	341	289	42	204	238	81	153	305	314	88	126
Average Queue (ft)	58	185	25	2	97	119	37	59	161	184	28	22
95th Queue (ft)	125	303	159	19	174	201	64	113	263	294	67	78
Link Distance (ft)	290	290		351		411			468	468		582
Upstream Blk Time (%)		2	0									
Queuing Penalty (veh)		3	0									
Storage Bay Dist (ft)			190		300		200	335			420	
Storage Blk Time (%)		12				1			0			
Queuing Penalty (veh)		18				3			0			

Intersection: 1: US 1 Business & Tollgate Rd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	122
Average Queue (ft)	33
95th Queue (ft)	93
Link Distance (ft)	582
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: US 1 Business & MD 24

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	T	T
Maximum Queue (ft)	107	109	339	362	172	182	260	481	229	170	358	347
Average Queue (ft)	43	55	137	162	82	95	156	181	46	63	199	212
95th Queue (ft)	88	100	296	323	147	154	231	422	172	123	319	325
Link Distance (ft)			962	962			1383	1383	1383		427	427
Upstream Blk Time (%)								0				
Queuing Penalty (veh)								0				
Storage Bay Dist (ft)	500	500			860	860				390		
Storage Blk Time (%)											0	
Queuing Penalty (veh)											0	

Intersection: 2: US 1 Business & MD 24

Movement	SB	SB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	216	244	344	336
Average Queue (ft)	123	144	187	199
95th Queue (ft)	189	212	294	304
Link Distance (ft)		381	381	381
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)	275			
Storage Blk Time (%)		0		0
Queuing Penalty (veh)		0		0

Intersection: 3: Boulton St & MD 24

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	T	R	L	LT	L	TR
Maximum Queue (ft)	121	281	298	157	185	168	48	112	153	71	194
Average Queue (ft)	51	169	162	78	58	58	7	31	79	18	77
95th Queue (ft)	103	264	255	137	135	131	29	84	131	52	150
Link Distance (ft)		1795	1795		962	962	962		396		453
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	455			575				270		290	
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 4: Tollgate Rd & Boulton St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	LT	R	LT	R
Maximum Queue (ft)	79	120	19	119	32	31	31	142	75
Average Queue (ft)	21	43	1	31	3	2	5	61	5
95th Queue (ft)	53	95	11	81	22	16	23	109	44
Link Distance (ft)		509		152	152	191	191	293	
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				0					
Storage Bay Dist (ft)	80		35						75
Storage Blk Time (%)	0	1	0	5				5	0
Queuing Penalty (veh)	0	1	0	0				2	0

Intersection: 5: Boulton St & Gateway Dr

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	TR	L	TR
Maximum Queue (ft)	94	55	64	52	75	66	72	108
Average Queue (ft)	43	26	25	14	28	17	24	31
95th Queue (ft)	78	48	55	40	61	50	57	72
Link Distance (ft)	178	178	292	292	226	226		312
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)							110	
Storage Blk Time (%)							0	0
Queuing Penalty (veh)							0	0

Intersection: 7: Boulton St & Harford Mall Annex

Movement	EB	EB	NB	NB	NB	SB
Directions Served	L	R	L	T	T	TR
Maximum Queue (ft)	56	35	48	54	61	169
Average Queue (ft)	27	16	15	14	14	61
95th Queue (ft)	53	41	43	44	46	132
Link Distance (ft)		208		312	312	152
Upstream Blk Time (%)						0
Queuing Penalty (veh)						1
Storage Bay Dist (ft)	40		130			
Storage Blk Time (%)	3	1				
Queuing Penalty (veh)	1	0				

Intersection: 8: Boulton St & Proposed Access

Movement	WB	SB	SB
Directions Served	R	L	TR
Maximum Queue (ft)	49	35	4
Average Queue (ft)	9	5	0
95th Queue (ft)	38	24	3
Link Distance (ft)	225		396
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		60	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 9: Boulton Street Crossing/Harford Mall & Tollgate Rd

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	LT	TR	LTR	L	TR
Maximum Queue (ft)	23	31	6	31	67	30
Average Queue (ft)	3	3	0	11	16	4
95th Queue (ft)	16	17	4	35	55	20
Link Distance (ft)		351	351	152	198	198
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	70					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 31

Intersection: 1: US 1 Business & Tollgate Rd

Movement	EB	EB	EB	B10	WB	WB	WB	NB	NB	NB	B18	B18
Directions Served	L	LT	R	T	L	T	R	L	T	TR	T	T
Maximum Queue (ft)	342	376	290	448	350	464	275	399	495	521	15	24
Average Queue (ft)	174	356	243	356	297	426	208	163	323	354	0	1
95th Queue (ft)	316	387	411	544	448	448	372	329	452	482	10	12
Link Distance (ft)	290	290		351		411			468	468	587	587
Upstream Blk Time (%)	2	64	2	45		64			0	1		
Queuing Penalty (veh)	6	194	0	278		0			0	0		
Storage Bay Dist (ft)			190		300		200	335				
Storage Blk Time (%)		80	0		0	75	0	0	6			
Queuing Penalty (veh)		178	1		0	298	1	0	14			

Intersection: 1: US 1 Business & Tollgate Rd

Movement	SB	SB	SB	B43	B43
Directions Served	L	T	TR	T	T
Maximum Queue (ft)	156	396	429	73	76
Average Queue (ft)	70	213	260	2	3
95th Queue (ft)	131	342	406	52	53
Link Distance (ft)		582	582	427	427
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	420				
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 2: US 1 Business & MD 24

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	T	T
Maximum Queue (ft)	184	179	378	527	373	563	934	946	505	291	458	440
Average Queue (ft)	107	105	244	271	150	200	644	657	124	116	240	250
95th Queue (ft)	166	157	359	438	269	489	972	980	337	220	379	390
Link Distance (ft)			962	962			1383	1383	1383		427	427
Upstream Blk Time (%)				0						0	0	1
Queuing Penalty (veh)				0						0	1	3
Storage Bay Dist (ft)	500	500			860	860				390		
Storage Blk Time (%)							4				1	
Queuing Penalty (veh)							18				1	

Intersection: 2: US 1 Business & MD 24

Movement	B43	SB	SB	SB	SB	SB
Directions Served	T	L	L	T	T	R
Maximum Queue (ft)	5	271	293	356	360	74
Average Queue (ft)	0	158	187	204	217	5
95th Queue (ft)	5	236	267	310	318	75
Link Distance (ft)	582		381	381	381	
Upstream Blk Time (%)				0	0	0
Queuing Penalty (veh)				0	1	0
Storage Bay Dist (ft)		275				350
Storage Blk Time (%)		0	1		1	0
Queuing Penalty (veh)		0	2		1	0

Intersection: 3: Boulton St & MD 24

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	LT	L	TR
Maximum Queue (ft)	111	366	329	27	344	307	479	32	197	259	104	270
Average Queue (ft)	39	212	198	1	203	77	99	11	107	159	42	151
95th Queue (ft)	87	309	301	19	313	207	272	32	185	236	92	246
Link Distance (ft)		1795	1795			962	962	962		396		453
Upstream Blk Time (%)							0					
Queuing Penalty (veh)							0					
Storage Bay Dist (ft)	455			445	575				270		290	
Storage Blk Time (%)										0		0
Queuing Penalty (veh)										0		0

Intersection: 4: Tollgate Rd & Boulton St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	LT	R	LT	R
Maximum Queue (ft)	104	469	66	228	100	45	36	338	125
Average Queue (ft)	52	161	7	110	18	16	11	167	61
95th Queue (ft)	111	390	36	205	71	43	35	321	161
Link Distance (ft)		509		152	152	191	191	293	
Upstream Blk Time (%)		1		4	0			9	
Queuing Penalty (veh)		0		13	0			30	
Storage Bay Dist (ft)	80		35						75
Storage Blk Time (%)	1	27	1	27				40	0
Queuing Penalty (veh)	2	29	2	3				40	0

Intersection: 5: Boulton St & Gateway Dr

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	TR	L	TR
Maximum Queue (ft)	157	102	123	97	133	104	126	138
Average Queue (ft)	78	33	58	41	57	48	43	57
95th Queue (ft)	132	69	104	80	107	91	91	113
Link Distance (ft)	178	178	292	292	226	226		312
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)							110	
Storage Blk Time (%)							0	1
Queuing Penalty (veh)							1	1

Intersection: 7: Boulton St & Harford Mall Annex

Movement	EB	EB	NB	NB	NB	SB
Directions Served	L	R	L	T	T	TR
Maximum Queue (ft)	100	63	62	78	89	217
Average Queue (ft)	52	20	29	30	33	93
95th Queue (ft)	89	50	58	68	74	190
Link Distance (ft)		208		312	312	152
Upstream Blk Time (%)						2
Queuing Penalty (veh)						9
Storage Bay Dist (ft)	40		130			
Storage Blk Time (%)	15	1				
Queuing Penalty (veh)	5	1				

Intersection: 8: Boulton St & Proposed Access

Movement	EB	WB	NB	SB	SB
Directions Served	R	R	T	L	TR
Maximum Queue (ft)	55	82	5	64	61
Average Queue (ft)	5	24	0	17	3
95th Queue (ft)	32	65	4	48	29
Link Distance (ft)	150	225	152		396
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				60	
Storage Blk Time (%)				0	0
Queuing Penalty (veh)				0	0

Intersection: 9: Boulton Street Crossing/Harford Mall & Tollgate Rd

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	LT	TR	LTR	L	TR
Maximum Queue (ft)	88	166	306	74	152	207	86
Average Queue (ft)	7	102	41	2	80	89	23
95th Queue (ft)	45	214	161	50	171	212	67
Link Distance (ft)		152	351	351	152	198	198
Upstream Blk Time (%)		21	0	0	24	22	0
Queuing Penalty (veh)		113	1	0	0	0	0
Storage Bay Dist (ft)	70						
Storage Blk Time (%)	0	34					
Queuing Penalty (veh)	0	5					

Zone Summary

Zone wide Queuing Penalty: 1258

Intersection: 1: US 1 Business & Tollgate Rd

Movement	EB	EB	EB	B10	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	L	T	TR	L	T	TR	L	T
Maximum Queue (ft)	164	337	290	64	219	220	213	133	296	344	103	141
Average Queue (ft)	60	191	27	3	98	82	106	62	166	198	35	26
95th Queue (ft)	124	298	166	35	180	170	190	106	259	306	78	83
Link Distance (ft)	290	290		351		411			468	468		584
Upstream Blk Time (%)		1	0									
Queuing Penalty (veh)		2	0									
Storage Bay Dist (ft)			190		300		200	335			420	
Storage Blk Time (%)		13				0	1		0			
Queuing Penalty (veh)		20				1	2		0			

Intersection: 1: US 1 Business & Tollgate Rd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	167
Average Queue (ft)	46
95th Queue (ft)	107
Link Distance (ft)	584
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: US 1 Business & MD 24

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	T	T
Maximum Queue (ft)	129	118	349	373	168	177	256	496	217	152	367	377
Average Queue (ft)	38	54	137	166	82	96	144	162	52	62	203	219
95th Queue (ft)	91	102	300	332	148	154	230	349	177	125	323	336
Link Distance (ft)			962	962			1383	1383	1383		427	427
Upstream Blk Time (%)								0			0	0
Queuing Penalty (veh)								0			0	0
Storage Bay Dist (ft)	500	500			860	860				390		
Storage Blk Time (%)											0	
Queuing Penalty (veh)											0	

Intersection: 2: US 1 Business & MD 24

Movement	B43	SB	SB	SB	SB
Directions Served	T	L	L	T	T
Maximum Queue (ft)	6	191	214	300	302
Average Queue (ft)	0	115	139	167	179
95th Queue (ft)	4	184	206	255	268
Link Distance (ft)	584		381	381	381
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		275			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Boulton St & MD 24

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	T	R	L	LT	L	TR
Maximum Queue (ft)	112	287	295	185	158	161	48	125	148	66	188
Average Queue (ft)	46	173	166	80	58	60	9	30	81	20	76
95th Queue (ft)	94	267	263	152	129	135	33	85	135	51	150
Link Distance (ft)		1795	1795		962	962	962		396		453
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	455			575				270		290	
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 4: Tollgate Rd & Boulton St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	LT	R	LT	R
Maximum Queue (ft)	64	115	28	92	18	35	31	148	72
Average Queue (ft)	21	43	2	25	1	4	4	65	4
95th Queue (ft)	50	91	14	66	9	21	22	113	38
Link Distance (ft)		509		152	152	191	191	293	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	80		35						75
Storage Blk Time (%)	0	1	0	3				6	0
Queuing Penalty (veh)	0	1	0	0				3	0

Intersection: 5: Boulton St & Gateway Dr

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	TR	L	TR
Maximum Queue (ft)	88	58	65	56	86	62	68	94
Average Queue (ft)	40	25	24	16	27	17	20	36
95th Queue (ft)	75	51	53	43	63	50	52	77
Link Distance (ft)	178	178	292	292	226	226		312
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)							110	
Storage Blk Time (%)								0
Queuing Penalty (veh)								0

Intersection: 7: Boulton St & Harford Mall Annex

Movement	EB	EB	NB	NB	NB	SB
Directions Served	L	R	L	T	T	TR
Maximum Queue (ft)	60	46	48	65	75	127
Average Queue (ft)	27	19	14	14	16	47
95th Queue (ft)	54	45	42	45	51	101
Link Distance (ft)		208		312	312	152
Upstream Blk Time (%)						0
Queuing Penalty (veh)						0
Storage Bay Dist (ft)	40		130			
Storage Blk Time (%)	3	1				
Queuing Penalty (veh)	1	1				

Intersection: 8: Boulton St & Proposed Access

Movement	WB	SB
Directions Served	R	L
Maximum Queue (ft)	51	35
Average Queue (ft)	8	5
95th Queue (ft)	36	23
Link Distance (ft)	225	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		60
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 9: Boulton Street Crossing/Harford Mall & Tollgate Rd

Movement	EB	WB	NB	SB	SB
Directions Served	L	LT	LTR	L	TR
Maximum Queue (ft)	28	52	36	64	34
Average Queue (ft)	4	6	10	16	4
95th Queue (ft)	19	31	34	52	20
Link Distance (ft)		351	152	198	198
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	70				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 32

Intersection: 1: US 1 Business & Tollgate Rd

Movement	EB	EB	EB	B10	WB	WB	WB	NB	NB	NB	B18	B18
Directions Served	L	LT	R	T	L	T	TR	L	T	TR	T	T
Maximum Queue (ft)	332	365	290	394	350	439	275	400	486	519	22	47
Average Queue (ft)	154	320	185	152	289	398	259	193	334	359	1	2
95th Queue (ft)	283	414	412	407	419	508	306	365	479	503	17	26
Link Distance (ft)	290	290		351		411			468	468	587	587
Upstream Blk Time (%)	1	34	1	8		36			1	2		
Queuing Penalty (veh)	2	104	0	47		0			0	0		
Storage Bay Dist (ft)			190		300		200	335				
Storage Blk Time (%)		59			14	38	56	0	8			
Queuing Penalty (veh)		131			77	217	227	1	21			

Intersection: 1: US 1 Business & Tollgate Rd

Movement	SB	SB	SB	B43
Directions Served	L	T	TR	T
Maximum Queue (ft)	187	365	441	83
Average Queue (ft)	76	241	291	3
95th Queue (ft)	135	358	426	59
Link Distance (ft)		584	584	427
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	420			
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 2: US 1 Business & MD 24

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	181	188	506	730	385	424	490	1114	1128	782	226	411
Average Queue (ft)	112	112	261	294	13	152	285	732	744	179	118	248
95th Queue (ft)	173	172	409	510	195	284	791	1180	1195	601	200	369
Link Distance (ft)			962	962	962			1383	1383	1383		427
Upstream Blk Time (%)			0	0	0			0	0	0		0
Queuing Penalty (veh)			0	0	0			0	1	0		1
Storage Bay Dist (ft)	500	500				860	860				390	
Storage Blk Time (%)								12				0
Queuing Penalty (veh)								49				1

Intersection: 2: US 1 Business & MD 24

Movement	NB	SB	SB	SB	SB	SB
Directions Served	T	L	L	T	T	R
Maximum Queue (ft)	427	251	265	357	365	149
Average Queue (ft)	257	156	181	204	215	7
95th Queue (ft)	380	224	250	314	322	93
Link Distance (ft)	427		381	381	381	
Upstream Blk Time (%)	0			0	0	0
Queuing Penalty (veh)	1			0	2	0
Storage Bay Dist (ft)		275				350
Storage Blk Time (%)		0	0		1	0
Queuing Penalty (veh)		0	1		2	0

Intersection: 3: Boulton St & MD 24

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	T	R	L	LT	L	TR
Maximum Queue (ft)	116	381	359	352	476	490	33	227	273	131	304
Average Queue (ft)	46	220	202	211	92	105	10	107	165	41	158
95th Queue (ft)	97	335	314	314	271	282	31	192	245	96	272
Link Distance (ft)		1795	1795		962	962	962		396		453
Upstream Blk Time (%)					0	0					
Queuing Penalty (veh)					0	0					
Storage Bay Dist (ft)	455			575				270		290	
Storage Blk Time (%)		0	0					0	1		1
Queuing Penalty (veh)		0	0					0	1		0

Intersection: 4: Tollgate Rd & Boulton St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	LT	R	LT	R
Maximum Queue (ft)	92	160	66	230	120	76	40	235	125
Average Queue (ft)	41	63	6	109	22	20	11	117	33
95th Queue (ft)	74	122	34	204	79	54	37	202	123
Link Distance (ft)		509		152	152	191	191	293	
Upstream Blk Time (%)				3	0			0	
Queuing Penalty (veh)				12	0			0	
Storage Bay Dist (ft)	80		35						75
Storage Blk Time (%)	1	3	0	22				22	
Queuing Penalty (veh)	2	3	1	3				22	

Intersection: 5: Boulton St & Gateway Dr

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	TR	L	TR
Maximum Queue (ft)	163	82	162	92	141	155	141	183
Average Queue (ft)	77	33	63	42	53	55	52	66
95th Queue (ft)	134	61	118	77	101	110	105	140
Link Distance (ft)	178	178	292	292	226	226		312
Upstream Blk Time (%)	0				0			
Queuing Penalty (veh)	0				0			
Storage Bay Dist (ft)							110	
Storage Blk Time (%)							1	1
Queuing Penalty (veh)							2	2

Intersection: 7: Boulton St & Harford Mall Annex

Movement	EB	EB	NB	NB	NB	SB
Directions Served	L	R	L	T	T	TR
Maximum Queue (ft)	94	57	70	98	98	224
Average Queue (ft)	47	20	29	33	38	106
95th Queue (ft)	83	49	59	78	83	207
Link Distance (ft)		208		312	312	152
Upstream Blk Time (%)						3
Queuing Penalty (veh)						13
Storage Bay Dist (ft)	40		130			
Storage Blk Time (%)	12	2		0		
Queuing Penalty (veh)	4	2		0		

Intersection: 8: Boulton St & Proposed Access

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	T	TR	L	TR
Maximum Queue (ft)	55	68	5	5	49	104
Average Queue (ft)	4	28	0	0	17	6
95th Queue (ft)	26	66	4	4	45	49
Link Distance (ft)	150	225	152	152		396
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)					60	
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 9: Boulton Street Crossing/Harford Mall & Tollgate Rd

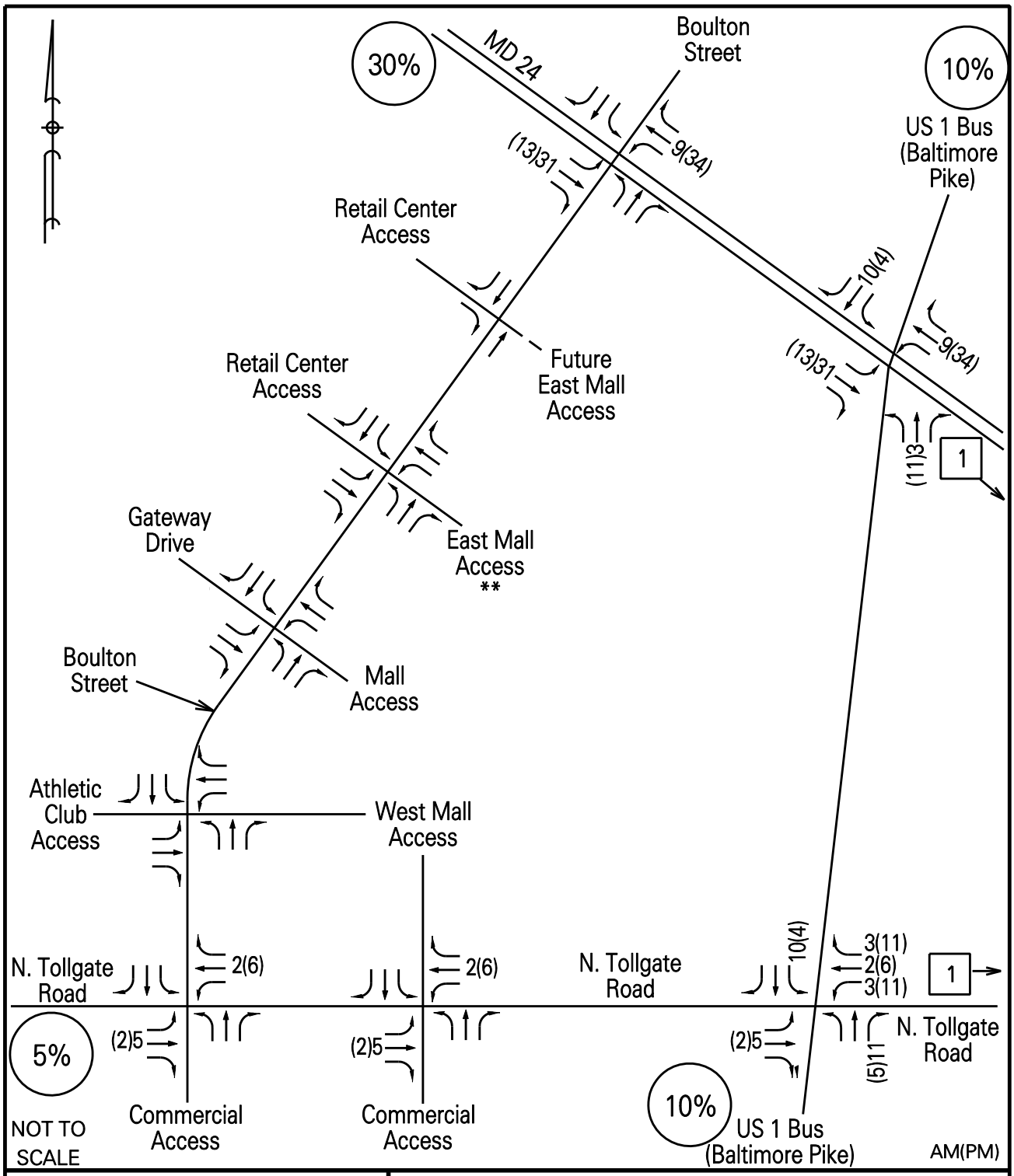
Movement	EB	EB	WB	WB	B10	B10	NB	SB	SB
Directions Served	L	TR	LT	TR	T	T	LTR	L	TR
Maximum Queue (ft)	89	138	196	115	15	16	66	83	60
Average Queue (ft)	9	25	27	4	0	1	25	26	24
95th Queue (ft)	44	109	116	62	10	11	55	62	53
Link Distance (ft)		152	351	351	290	290	152	198	198
Upstream Blk Time (%)		2	0	0					
Queuing Penalty (veh)		10	1	1					
Storage Bay Dist (ft)	70								
Storage Blk Time (%)		5							
Queuing Penalty (veh)		1							

Zone Summary

Zone wide Queuing Penalty: 963

APPENDIX II

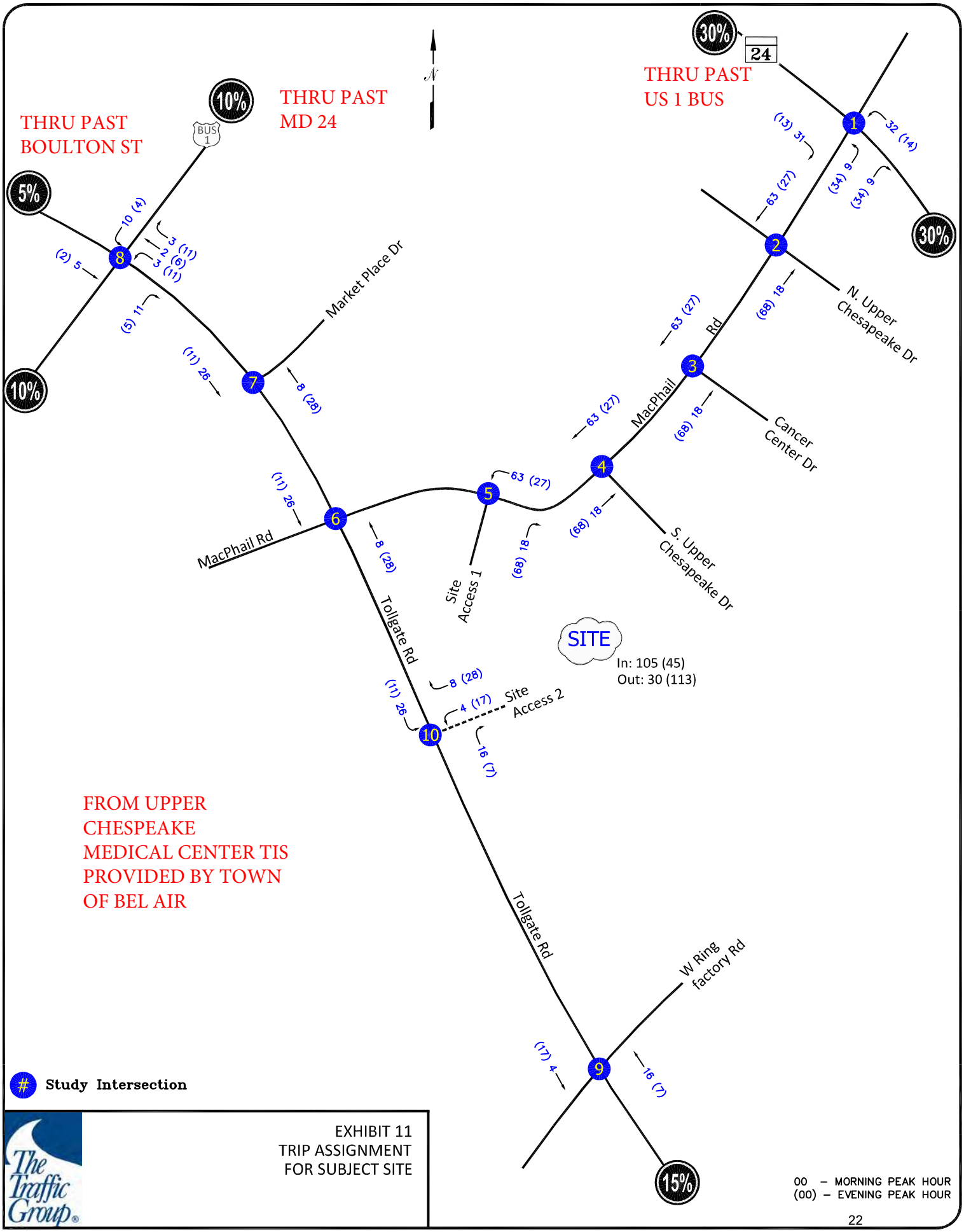
BAGKROUND
TRAFFIC DATA



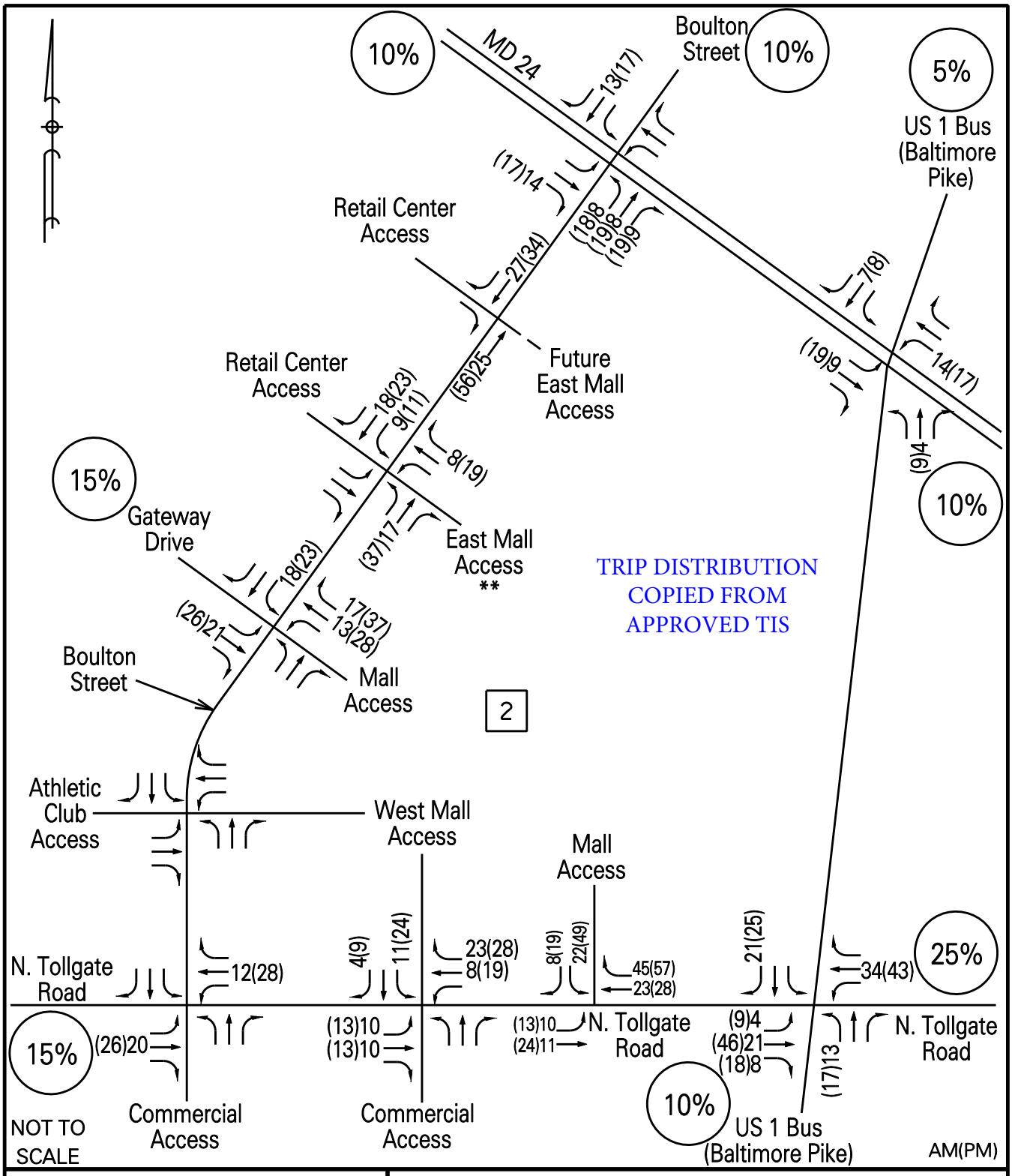
TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
Suite B
Hanover, Maryland 21076
410-760-2911

BACKGROUND 1

Upper Chesapeake Medical Campus



Rh, 180225\INITIAL\EX.dwg-STN, F03/30/18



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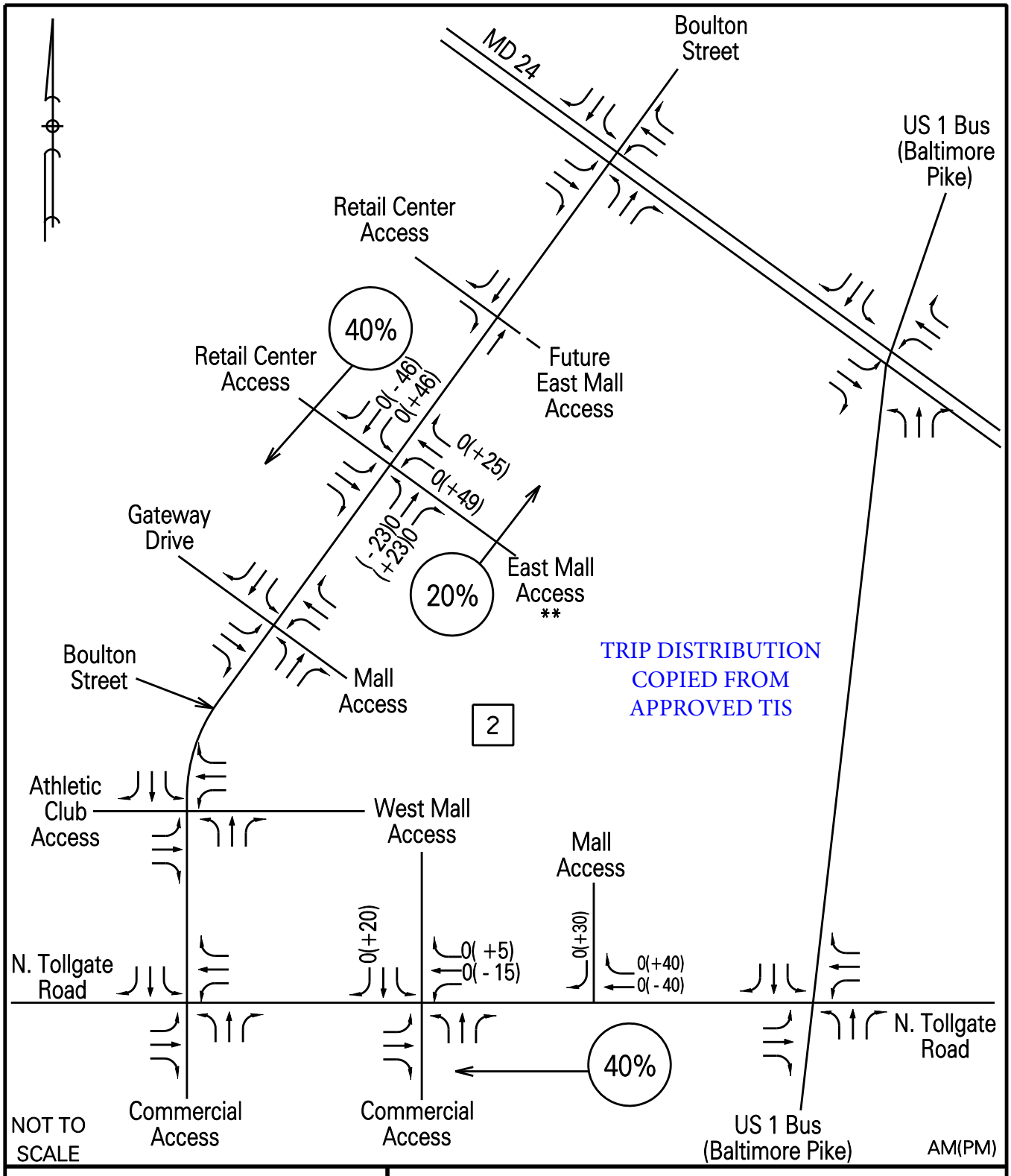
Suite B
Hanover, Maryland 21076
410-760-2911

BACKGROUND 2

Sears Redevelopment
(Shops at Harford Mall) - New Trips



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Suite B
Hanover, Maryland 21076
410-760-2911

BACKGROUND 2

Sears Redevelopment
(Shops at Harford Mall) - Pass-by Trips

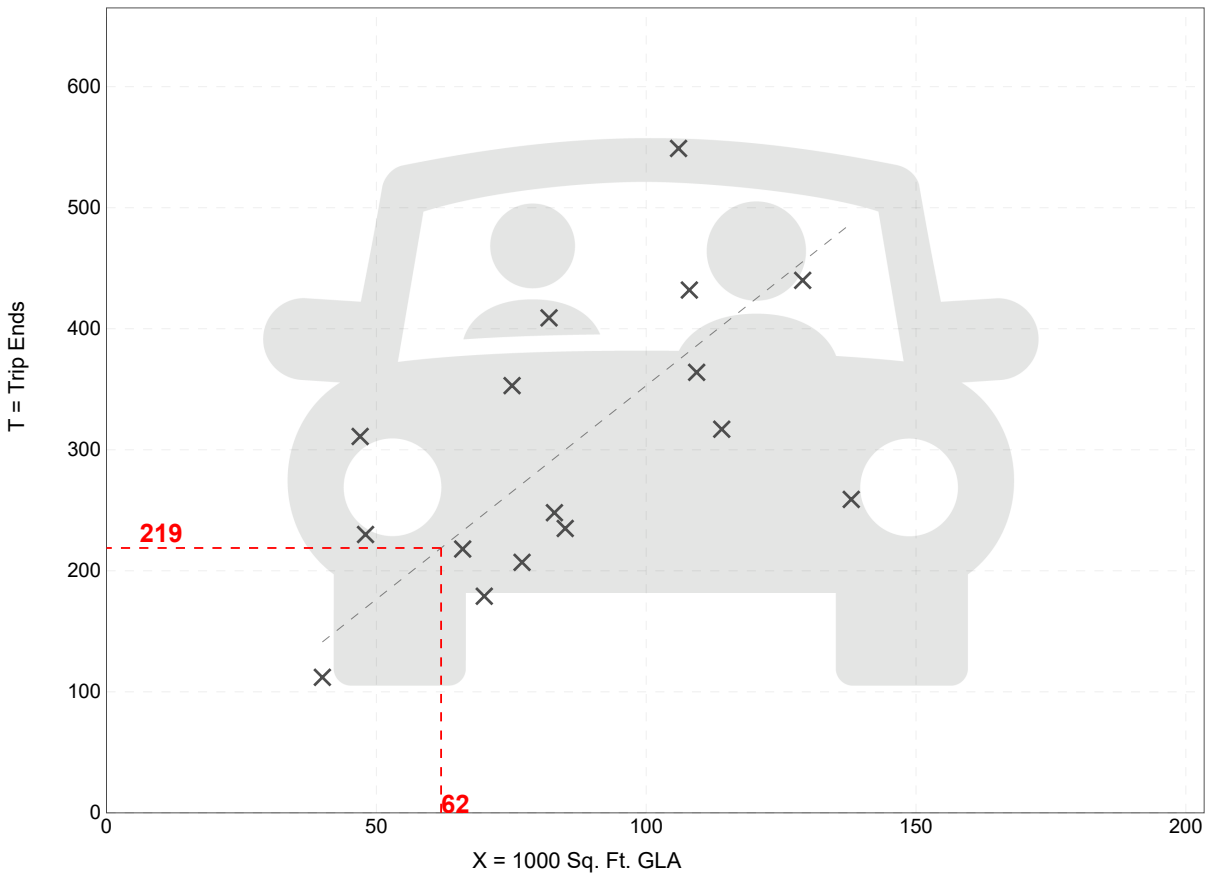
Shopping Plaza (40-150k) - Supermarket - Yes
(821)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 16
Avg. 1000 Sq. Ft. GLA: 86
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.53	1.88 - 6.62	1.17

Data Plot and Equation



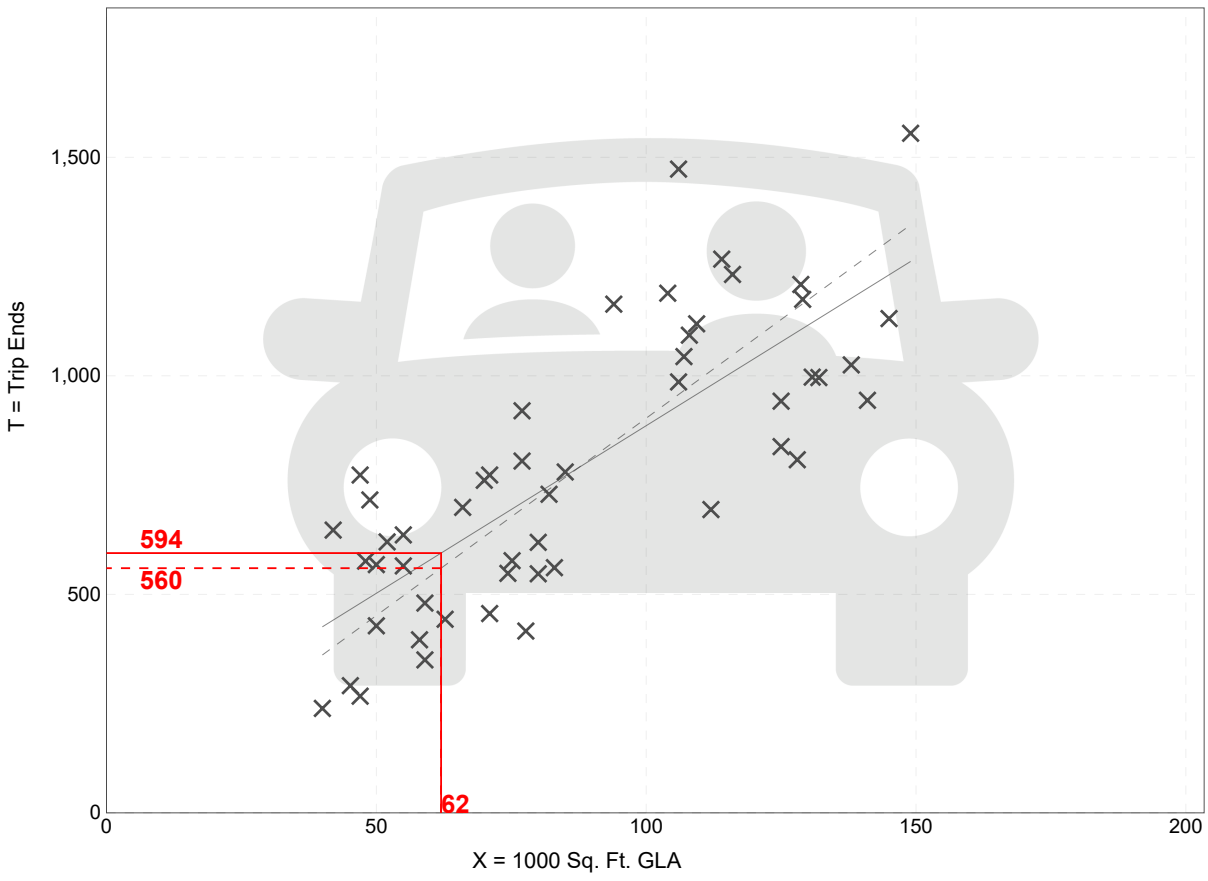
Shopping Plaza (40-150k) - Supermarket - Yes
(821)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 51
Avg. 1000 Sq. Ft. GLA: 87
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
9.03	5.35 - 16.45	2.37

Data Plot and Equation



Fitted Curve Equation: T = 7.67(X) + 118.86 285 IN - 309 OUT **R^2= 0.62**

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual* , 11th Edition

Land Use Code	821
Land Use	Shopping Plaza (40 - 150k)
Setting	General Urban/Suburban
Time Period	Weekday PM Peak Period
# Data Sites	15
Average Pass-By Rate	40%

Pass-By Characteristics for Individual Sites

GLA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source
					Primary (%)	Diverted (%)	Total (%)		
45	Florida	1992	844	56	24	20	44	—	30
50	Florida	1992	555	41	41	18	59	—	30
52	Florida	1995	665	42	33	25	58	—	30
53	Florida	1993	162	59	—	—	41	—	30
57.23	Kentucky	1993	247	31	53	16	69	2659	34
60	Florida	1995	1583	40	38	22	60	—	30
69.4	Kentucky	1993	109	25	42	33	75	1559	34
77	Florida	1992	365	46	—	—	54	—	30
78	Florida	1991	702	55	23	22	45	—	30
82	Florida	1992	336	34	—	—	66	—	30
92.857	Kentucky	1993	133	22	50	28	78	3555	34
100.888	Kentucky	1993	281	28	50	22	72	2111	34
121.54	Kentucky	1993	210	53	30	17	47	2636	34
144	New Jersey	1990	176	32	44	24	68	—	24
146.8	Kentucky	1993	—	36	39	25	64	—	34

STACK & STORE

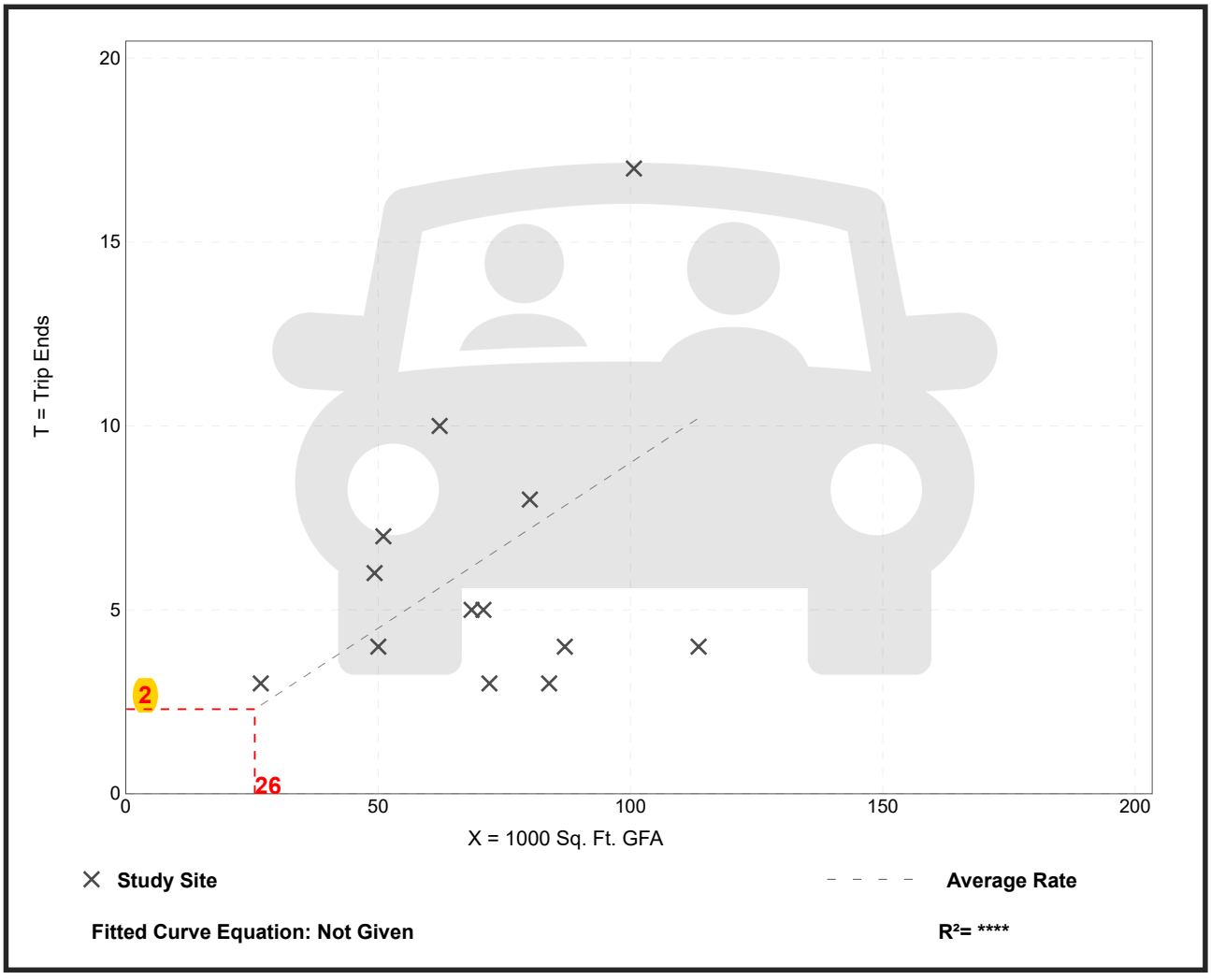
Mini-Warehouse
(151)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	13
Avg. 1000 Sq. Ft. GFA:	70
Directional Distribution:	59% entering, 41% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.09	0.04 - 0.17	0.05

Data Plot and Equation



STACK & STORE

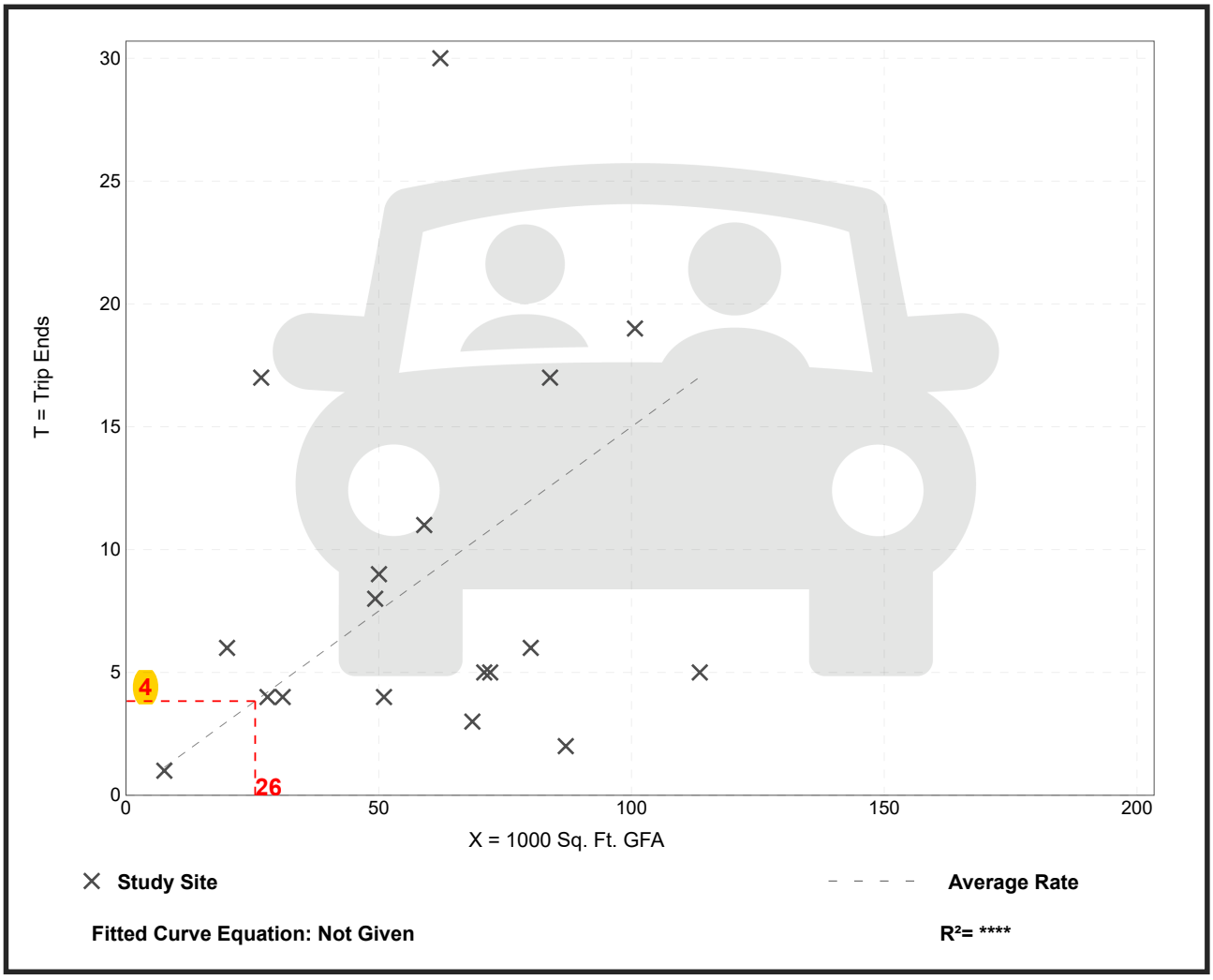
Mini-Warehouse
(151)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	18
Avg. 1000 Sq. Ft. GFA:	59
Directional Distribution:	47% entering, 53% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.15	0.02 - 0.64	0.14

Data Plot and Equation



APPENDIX III

TRAFFIC
COUNT DATA

TRI-STATE TRAFFIC DATA

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184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Harford County, MD
MD 24 & US 1
Tuesday, September 20, 2022
Location: 39.526378, -76.354496

Count Name: MD 24 & US 1
Site Code:
Start Date: 09/20/2022
Page No: 1

Turning Movement Data

Start Time	MD 24 Eastbound							MD 24 Westbound							US 1 Northbound							US 1 Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	18	119	7	4	0	1	148	47	50	32	31	0	0	160	11	104	9	14	0	0	138	35	111	2	5	0	0	153	599
7:15 AM	12	145	5	1	0	0	163	37	77	29	22	1	0	166	14	121	11	31	0	0	177	62	136	8	14	0	0	220	726
7:30 AM	18	163	6	4	0	0	191	54	105	14	41	0	2	214	17	131	12	33	0	0	193	52	126	6	6	0	0	190	788
7:45 AM	19	188	12	2	0	1	221	39	109	21	32	0	0	201	23	117	22	36	0	1	198	71	155	19	11	0	0	256	876
Hourly Total	67	615	30	11	0	2	723	177	341	96	126	1	2	741	65	473	54	114	0	1	706	220	528	35	36	0	0	819	2989
8:00 AM	30	185	9	5	0	0	229	45	95	13	29	0	0	182	14	91	14	31	0	0	150	68	120	10	6	0	0	204	765
8:15 AM	9	167	3	6	0	1	185	40	70	33	14	0	0	157	22	114	15	46	0	0	197	34	105	9	6	0	1	154	693
8:30 AM	29	154	6	7	0	0	196	50	110	38	21	0	1	219	26	128	11	40	0	0	205	52	101	7	14	0	0	174	794
8:45 AM	33	140	12	8	0	1	193	72	113	40	22	0	0	247	15	134	18	49	0	0	216	41	131	9	8	0	0	189	845
Hourly Total	101	646	30	26	0	2	803	207	388	124	86	0	1	805	77	467	58	166	0	0	768	195	457	35	34	0	1	721	3097
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	49	112	2	9	1	4	173	64	184	33	25	0	1	306	33	171	49	19	1	0	273	73	190	33	24	0	1	320	1072
4:15 PM	39	160	9	12	0	11	220	80	224	37	24	0	2	365	28	184	52	28	0	1	292	77	180	32	15	0	6	304	1181
4:30 PM	49	133	6	17	0	0	205	72	208	32	29	1	3	342	40	206	37	31	1	0	315	75	191	33	16	0	1	315	1177
4:45 PM	47	139	14	20	0	5	220	88	204	22	30	0	1	344	48	189	34	31	0	3	302	71	187	27	23	0	3	308	1174
Hourly Total	184	544	31	58	1	20	818	304	820	124	108	1	7	1357	149	750	172	109	2	4	1182	296	748	125	78	0	11	1247	4604
5:00 PM	66	132	7	17	0	1	222	89	223	44	25	1	2	382	30	228	51	39	0	0	348	98	192	33	17	0	3	340	1292
5:15 PM	44	126	11	13	0	2	194	87	227	36	26	1	2	377	36	197	64	37	0	2	334	89	160	32	22	0	1	303	1208
5:30 PM	46	108	8	20	0	1	182	82	175	56	16	0	0	329	44	226	35	28	0	0	333	78	160	49	14	0	1	301	1145
5:45 PM	69	121	5	26	0	0	221	79	184	64	12	0	0	339	54	209	51	28	0	1	342	83	131	38	10	0	0	262	1164
Hourly Total	225	487	31	76	0	4	819	337	809	200	79	2	4	1427	164	860	201	132	0	3	1357	348	643	152	63	0	5	1206	4809
Grand Total	577	2292	122	171	1	28	3163	1025	2358	544	399	4	14	4330	455	2550	485	521	2	8	4013	1059	2376	347	211	0	17	3993	15499
Approach %	18.2	72.5	3.9	5.4	0.0	-	-	23.7	54.5	12.6	9.2	0.1	-	-	11.3	63.5	12.1	13.0	0.0	-	-	26.5	59.5	8.7	5.3	0.0	-	-	-
Total %	3.7	14.8	0.8	1.1	0.0	-	20.4	6.6	15.2	3.5	2.6	0.0	-	27.9	2.9	16.5	3.1	3.4	0.0	-	25.9	6.8	15.3	2.2	1.4	0.0	-	25.8	-
Lights	568	2223	122	168	1	-	3082	998	2273	521	387	4	-	4183	451	2518	477	496	2	-	3944	1044	2345	341	207	0	-	3937	15146
% Lights	98.4	97.0	100.0	98.2	100.0	-	97.4	97.4	96.4	95.8	97.0	100.0	-	96.6	99.1	98.7	98.4	95.2	100.0	-	98.3	98.6	98.7	98.3	98.1	-	-	98.6	97.7
Buses	0	19	0	1	0	-	20	6	35	10	5	0	-	56	1	13	3	4	0	-	21	2	11	3	4	0	-	20	117
% Buses	0.0	0.8	0.0	0.6	0.0	-	0.6	0.6	1.5	1.8	1.3	0.0	-	1.3	0.2	0.5	0.6	0.8	0.0	-	0.5	0.2	0.5	0.9	1.9	-	-	0.5	0.8
Trucks	9	50	0	2	0	-	61	21	50	13	7	0	-	91	3	19	5	21	0	-	48	13	20	3	0	0	-	36	236
% Trucks	1.6	2.2	0.0	1.2	0.0	-	1.9	2.0	2.1	2.4	1.8	0.0	-	2.1	0.7	0.7	1.0	4.0	0.0	-	1.2	1.2	0.8	0.9	0.0	-	-	0.9	1.5
Bicycles on Crosswalk	-	-	-	-	-	16	-	-	-	-	-	-	2	-	-	-	-	-	-	3	-	-	-	-	-	-	5	-	-
% Bicycles on Crosswalk	-	-	-	-	-	57.1	-	-	-	-	-	-	14.3	-	-	-	-	-	-	37.5	-	-	-	-	-	-	29.4	-	-
Pedestrians	-	-	-	-	-	12	-	-	-	-	-	-	12	-	-	-	-	-	-	5	-	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	-	42.9	-	-	-	-	-	-	85.7	-	-	-	-	-	-	62.5	-	-	-	-	-	-	70.6	-	-

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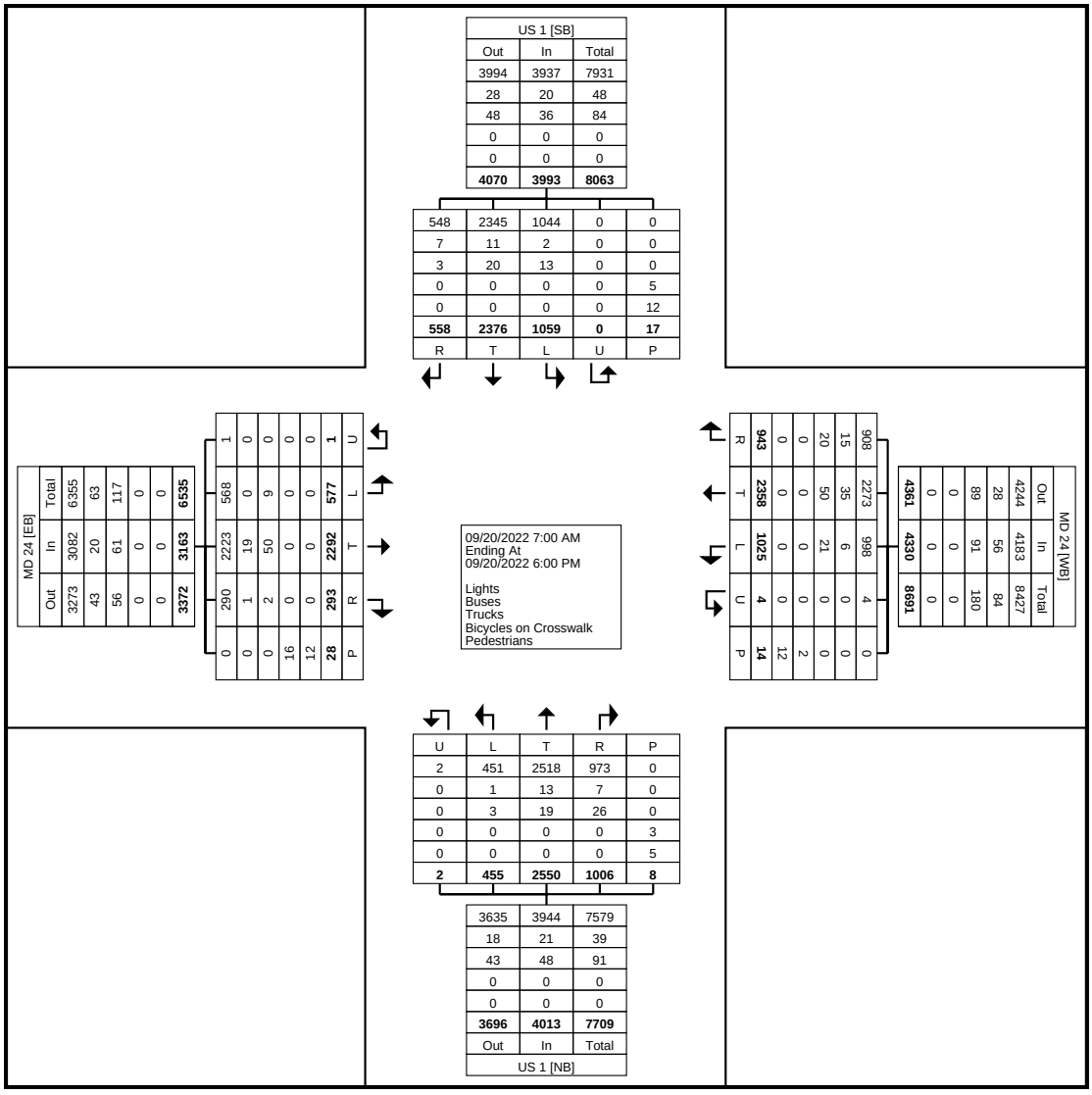

Turning Movement Data Plot

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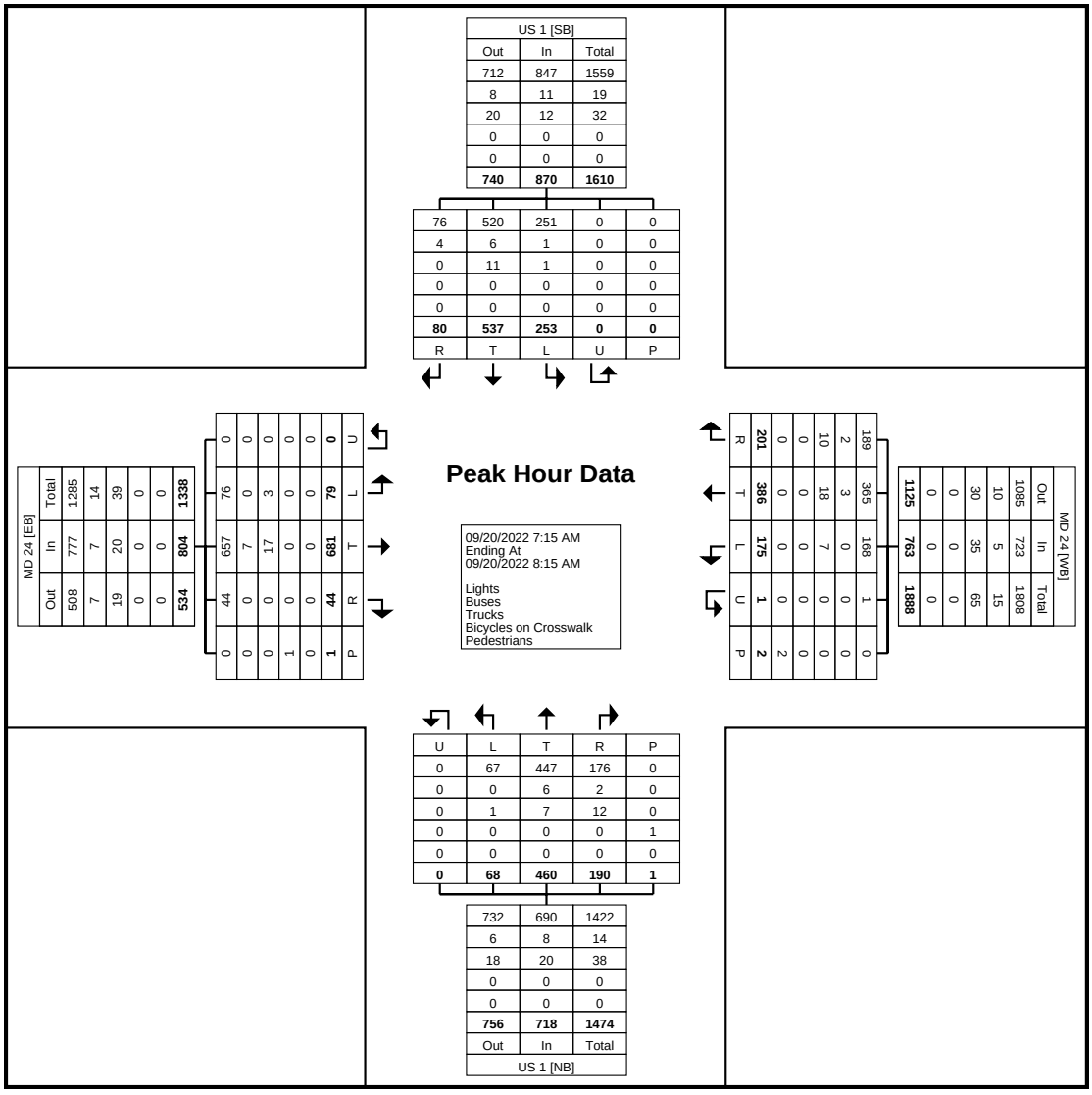
Harford County, MD
MD 24 & US 1
Tuesday, September 20, 2022
Location: 39.526378, -76.354496

Count Name: MD 24 & US 1
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (7:15 AM)

Start Time	MD 24 Eastbound							MD 24 Westbound							US 1 Northbound							US 1 Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:15 AM	12	145	5	1	0	0	163	37	77	29	22	1	0	166	14	121	11	31	0	0	177	62	136	8	14	0	0	220	726
7:30 AM	18	163	6	4	0	0	191	54	105	14	41	0	2	214	17	131	12	33	0	0	193	52	126	6	6	0	0	190	788
7:45 AM	19	188	12	2	0	1	221	39	109	21	32	0	0	201	23	117	22	36	0	1	198	71	155	19	11	0	0	256	876
8:00 AM	30	185	9	5	0	0	229	45	95	13	29	0	0	182	14	91	14	31	0	0	150	68	120	10	6	0	0	204	765
Total	79	681	32	12	0	1	804	175	386	77	124	1	2	763	68	460	59	131	0	1	718	253	537	43	37	0	0	870	3155
Approach %	9.8	84.7	4.0	1.5	0.0	-	-	22.9	50.6	10.1	16.3	0.1	-	-	9.5	64.1	8.2	18.2	0.0	-	-	29.1	61.7	4.9	4.3	0.0	-	-	-
Total %	2.5	21.6	1.0	0.4	0.0	-	25.5	5.5	12.2	2.4	3.9	0.0	-	24.2	2.2	14.6	1.9	4.2	0.0	-	22.8	8.0	17.0	1.4	1.2	0.0	-	27.6	-
PHF	0.658	0.906	0.667	0.600	0.000	-	0.878	0.810	0.885	0.664	0.756	0.250	-	0.891	0.739	0.878	0.670	0.910	0.000	-	0.907	0.891	0.866	0.566	0.661	0.000	-	0.850	0.900
Lights	76	657	32	12	0	-	777	168	365	68	121	1	-	723	67	447	57	119	0	-	690	251	520	41	35	0	-	847	3037
% Lights	96.2	96.5	100.0	100.0	-	-	96.6	96.0	94.6	88.3	97.6	100.0	-	94.8	98.5	97.2	96.6	90.8	-	-	96.1	99.2	96.8	95.3	94.6	-	-	97.4	96.3
Buses	0	7	0	0	0	-	7	0	3	2	0	0	-	5	0	6	0	2	0	-	8	1	6	2	2	0	-	11	31
% Buses	0.0	1.0	0.0	0.0	-	-	0.9	0.0	0.8	2.6	0.0	0.0	-	0.7	0.0	1.3	0.0	1.5	-	-	1.1	0.4	1.1	4.7	5.4	-	-	1.3	1.0
Trucks	3	17	0	0	0	-	20	7	18	7	3	0	-	35	1	7	2	10	0	-	20	1	11	0	0	0	-	12	87
% Trucks	3.8	2.5	0.0	0.0	-	-	2.5	4.0	4.7	9.1	2.4	0.0	-	4.6	1.5	1.5	3.4	7.6	-	-	2.8	0.4	2.0	0.0	0.0	-	-	1.4	2.8
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	100.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	0.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (7:15 AM)

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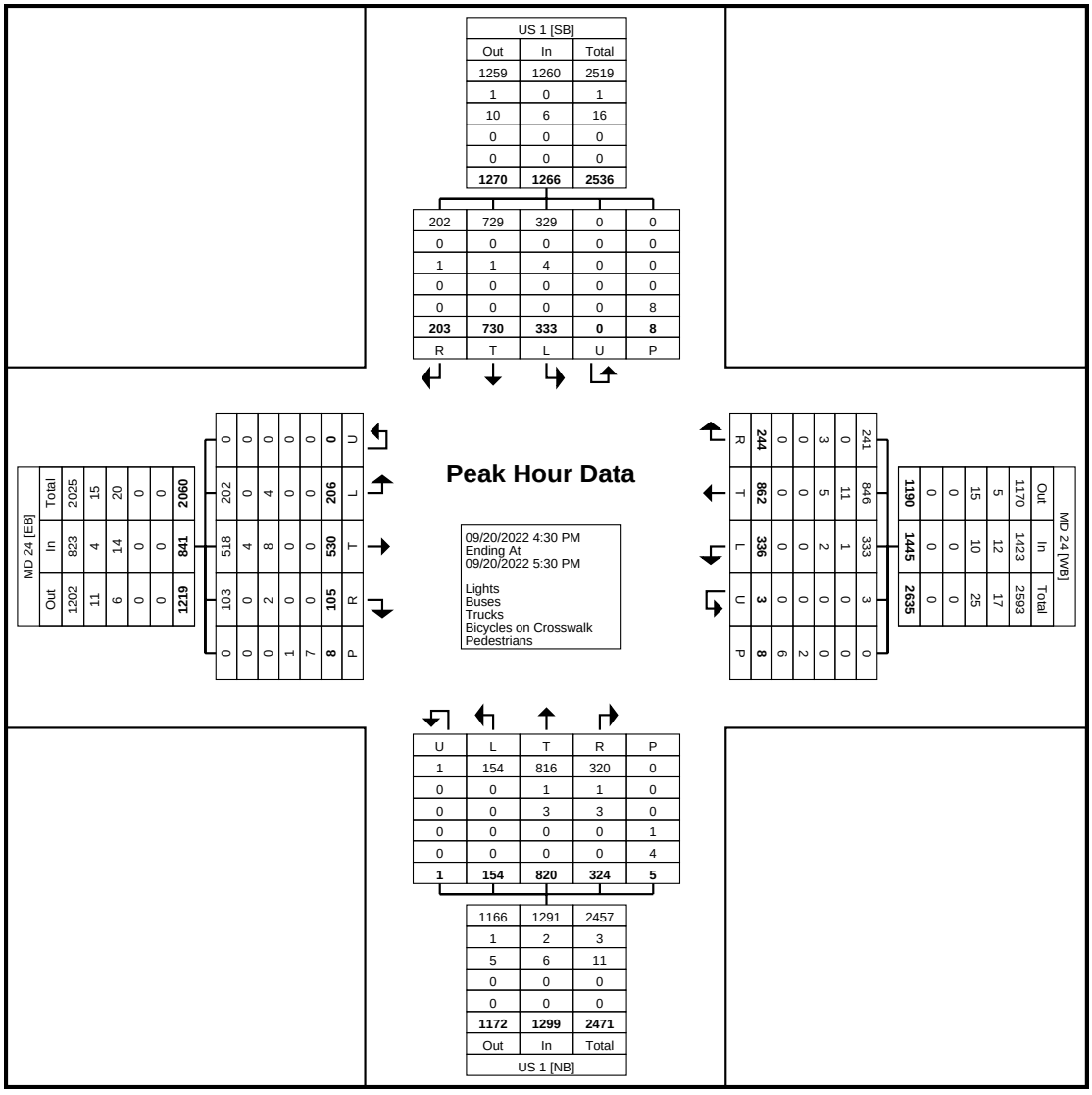
Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Harford County, MD
MD 24 & US 1
Tuesday, September 20, 2022
Location: 39.526378, -76.354496

Count Name: MD 24 & US 1
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	MD 24 Eastbound							MD 24 Westbound							US 1 Northbound							US 1 Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:30 PM	49	133	6	17	0	0	205	72	208	32	29	1	3	342	40	206	37	31	1	0	315	75	191	33	16	0	1	315	1177
4:45 PM	47	139	14	20	0	5	220	88	204	22	30	0	1	344	48	189	34	31	0	3	302	71	187	27	23	0	3	308	1174
5:00 PM	66	132	7	17	0	1	222	89	223	44	25	1	2	382	30	228	51	39	0	0	348	98	192	33	17	0	3	340	1292
5:15 PM	44	126	11	13	0	2	194	87	227	36	26	1	2	377	36	197	64	37	0	2	334	89	160	32	22	0	1	303	1208
Total	206	530	38	67	0	8	841	336	862	134	110	3	8	1445	154	820	186	138	1	5	1299	333	730	125	78	0	8	1266	4851
Approach %	24.5	63.0	4.5	8.0	0.0	-	-	23.3	59.7	9.3	7.6	0.2	-	-	11.9	63.1	14.3	10.6	0.1	-	-	26.3	57.7	9.9	6.2	0.0	-	-	-
Total %	4.2	10.9	0.8	1.4	0.0	-	17.3	6.9	17.8	2.8	2.3	0.1	-	29.8	3.2	16.9	3.8	2.8	0.0	-	26.8	6.9	15.0	2.6	1.6	0.0	-	26.1	-
PHF	0.780	0.953	0.679	0.838	0.000	-	0.947	0.944	0.949	0.761	0.917	0.750	-	0.946	0.802	0.899	0.727	0.885	0.250	-	0.933	0.849	0.951	0.947	0.848	0.000	-	0.931	0.939
Lights	202	518	38	65	0	-	823	333	846	132	109	3	-	1423	154	816	184	136	1	-	1291	329	729	124	78	0	-	1260	4797
% Lights	98.1	97.7	100.0	97.0	-	-	97.9	99.1	98.1	98.5	99.1	100.0	-	98.5	100.0	99.5	98.9	98.6	100.0	-	99.4	98.8	99.9	99.2	100.0	-	-	99.5	98.9
Buses	0	4	0	0	0	-	4	1	11	0	0	0	-	12	0	1	1	0	0	-	2	0	0	0	0	0	-	0	18
% Buses	0.0	0.8	0.0	0.0	-	-	0.5	0.3	1.3	0.0	0.0	0.0	-	0.8	0.0	0.1	0.5	0.0	0.0	-	0.2	0.0	0.0	0.0	0.0	-	-	0.0	0.4
Trucks	4	8	0	2	0	-	14	2	5	2	1	0	-	10	0	3	1	2	0	-	6	4	1	1	0	0	-	6	36
% Trucks	1.9	1.5	0.0	3.0	-	-	1.7	0.6	0.6	1.5	0.9	0.0	-	0.7	0.0	0.4	0.5	1.4	0.0	-	0.5	1.2	0.1	0.8	0.0	-	-	0.5	0.7
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	12.5	-	-	-	-	-	-	25.0	-	-	-	-	-	-	20.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	7	-	-	-	-	-	-	6	-	-	-	-	-	-	4	-	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	-	87.5	-	-	-	-	-	-	75.0	-	-	-	-	-	-	80.0	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)

U.S. 1 IS ASSUMED TO RUN IN A NORTH-SOUTH DIRECTION

EXISTING SIGNS TO REMAIN

27,34 Vietnam Vets. Mem. Hwy D-3(1) (VARx16")

R3-5(L) (30"x36") ONLY

M1-5(6) (24"x48") NORTH MARYLAND 1 BUSINESS

32,33,39, 40,46,47

36

EXISTING SIGNS TO BE REMOVED

25A NORTH MARYLAND 24 — M3-1 (24"x12"), M1-5 (24"x24"), M6-1(L) (21"x15")

27A LEFT TURN YIELD ON GREEN — R10-12 (24"x30")

28A SOUTH MARYLAND 24 — M3-3 (24"x12"), M1-5 (24"x24"), M6-1(L) (21"x15")

29A NORTH MARYLAND 24 — M3-1 (24"x12"), M1-5 (24"x24"), M6-1(R) (21"x15")

24A,30A ONE WAY — R6-1(R) (36"x12")

26A,31A ONE WAY — R6-1(L) (36"x12")

43A SOUTH BUSINESS 1 — M1-5(6) (36"x72")

37A,41A, 44A,48A "PUSH BUTTON TO CROSS BUS US 1" — R10 SERIES (9"x12")

EXISTING SIGNS TO BE RELOCATED

42 — OM1-3 (18"x18")

PROPOSED SIGNS

24 SOUTH MARYLAND 24 — M1-5(6) (24"x48")

25 NORTH MARYLAND 24 — M1-5(6) (36"x72")

29 NORTH MARYLAND 24 — M1-5(6) (24"x48")

30 SOUTH MARYLAND 24 — M1-5(6) (36"x72")

37 SOUTH BUSINESS 1 — M1-5(6) (36"x72")

43 SOUTH BUSINESS 1 — M1-5(6) (24"x48")

44 NORTH BUSINESS 1 — M1-5(6) (36"x72")

26,31 28,35 38,45 41,48 — PUSH BUTTON TO CROSS BALTIMORE PIKE — R10-3(1) 9" x 15"

EXISTING SIGNALS TO REMAIN

1 2 — 12"/8" 12"

3,6,7,10, 11,14,15 — 12"

4,5,8,9, 12,13 — 12"

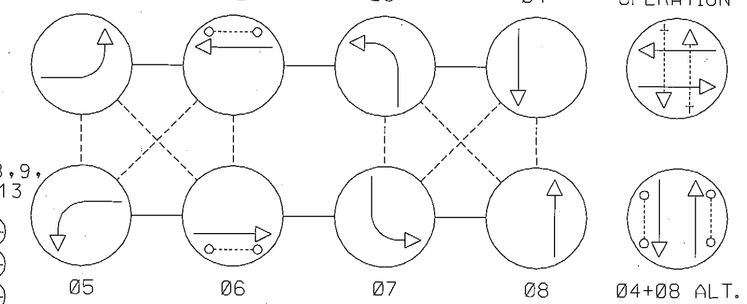
EXISTING SIGNALS TO BE REMOVED

16A-23A — 12"

PROPOSED SIGNALS

16-23 — 16" LED COUNTDOWN PEDESTRIAN SIGNAL

NEMA PHASING



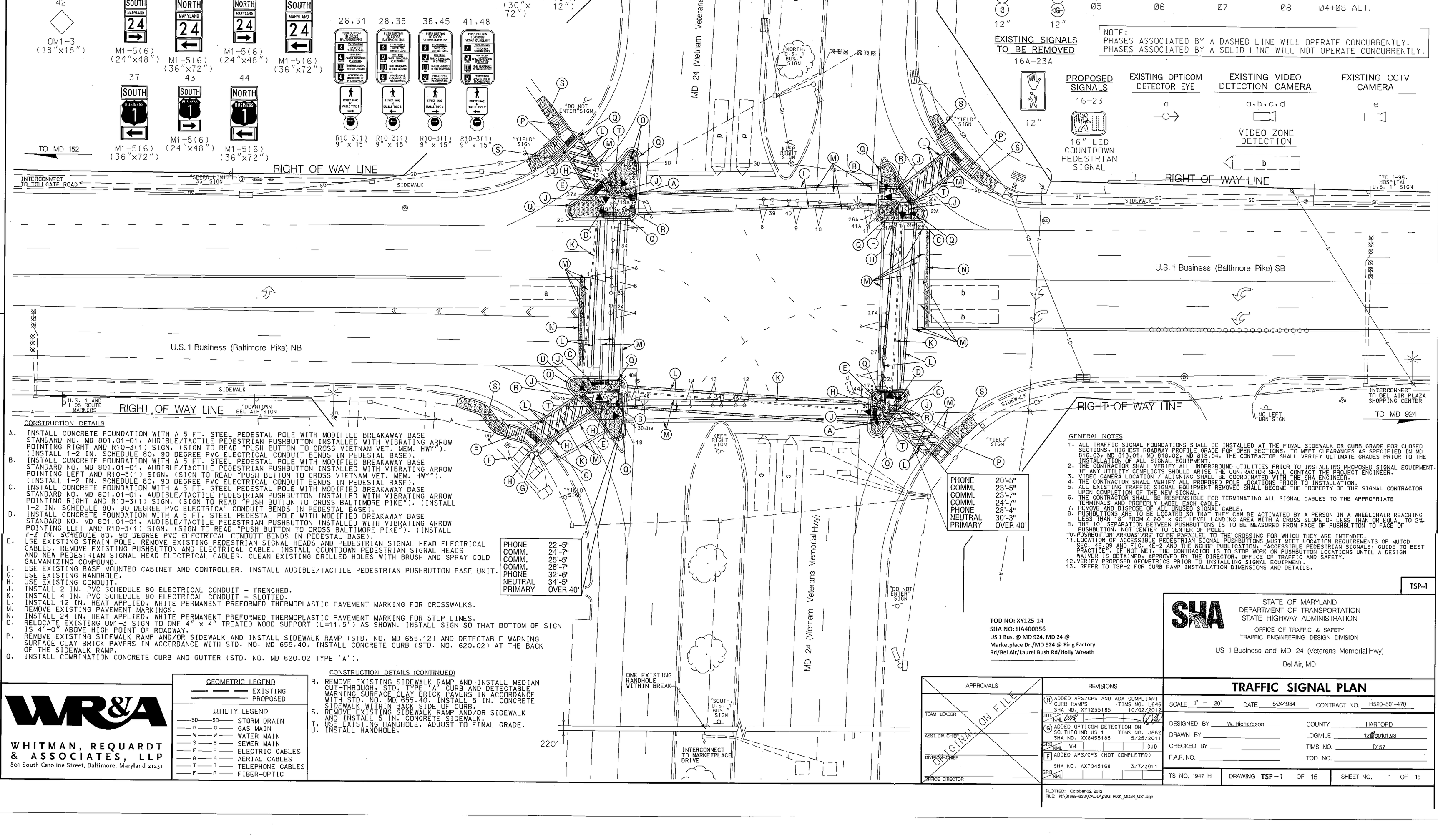
NOTE:
PHASES ASSOCIATED BY A DASHED LINE WILL OPERATE CONCURRENTLY.
PHASES ASSOCIATED BY A SOLID LINE WILL NOT OPERATE CONCURRENTLY.

EXISTING OPTICOM DETECTOR EYE — a

EXISTING VIDEO DETECTION CAMERA — a,b,c,d

VIDEO ZONE DETECTION — b

EXISTING CCTV CAMERA — e



PHONE	22'-5"
COMM.	24'-7"
COMM.	25'-5"
COMM.	26'-7"
PHONE	32'-6"
NEUTRAL	34'-5"
PRIMARY	OVER 40'

PHONE	20'-5"
COMM.	23'-5"
COMM.	23'-7"
COMM.	24'-7"
PHONE	28'-4"
NEUTRAL	30'-3"
PRIMARY	OVER 40'

CONSTRUCTION DETAILS

A. INSTALL CONCRETE FOUNDATION WITH A 5 FT. STEEL PEDESTAL POLE WITH MODIFIED BREAKAWAY BASE STANDARD NO. MD 801.01-01, AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON INSTALLED WITH VIBRATING ARROW POINTING RIGHT AND R10-3(1) SIGN. (SIGN TO READ "PUSH BUTTON TO CROSS VIETNAM VET. MEM. HWY"). (INSTALL 1-2 IN. SCHEDULE 80, 90 DEGREE PVC ELECTRICAL CONDUIT BENDS IN PEDESTAL BASE).
B. INSTALL CONCRETE FOUNDATION WITH A 5 FT. STEEL PEDESTAL POLE WITH MODIFIED BREAKAWAY BASE STANDARD NO. MD 801.01-01, AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON INSTALLED WITH VIBRATING ARROW POINTING LEFT AND R10-3(1) SIGN. (SIGN TO READ "PUSH BUTTON TO CROSS VIETNAM VET. MEM. HWY"). (INSTALL 1-2 IN. SCHEDULE 80, 90 DEGREE PVC ELECTRICAL CONDUIT BENDS IN PEDESTAL BASE).
C. INSTALL CONCRETE FOUNDATION WITH A 5 FT. STEEL PEDESTAL POLE WITH MODIFIED BREAKAWAY BASE STANDARD NO. MD 801.01-01, AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON INSTALLED WITH VIBRATING ARROW POINTING RIGHT AND R10-3(1) SIGN. (SIGN TO READ "PUSH BUTTON TO CROSS BALTIMORE PIKE"). (INSTALL 1-2 IN. SCHEDULE 80, 90 DEGREE PVC ELECTRICAL CONDUIT BENDS IN PEDESTAL BASE).
D. INSTALL CONCRETE FOUNDATION WITH A 5 FT. STEEL PEDESTAL POLE WITH MODIFIED BREAKAWAY BASE STANDARD NO. MD 801.01-01, AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON INSTALLED WITH VIBRATING ARROW POINTING LEFT AND R10-3(1) SIGN. (SIGN TO READ "PUSH BUTTON TO CROSS BALTIMORE PIKE"). (INSTALL 1-2 IN. SCHEDULE 80, 90 DEGREE PVC ELECTRICAL CONDUIT BENDS IN PEDESTAL BASE).
E. USE EXISTING STRAIN POLE. REMOVE EXISTING PEDESTRIAN SIGNAL HEADS AND PEDESTRIAN SIGNAL HEAD ELECTRICAL CABLES. REMOVE EXISTING PUSHBUTTON AND ELECTRICAL CABLE. INSTALL COUNTDOWN PEDESTRIAN SIGNAL HEADS AND NEW PEDESTRIAN SIGNAL HEAD ELECTRICAL CABLES. CLEAN EXISTING DRILLED HOLES WITH BRUSH AND SPRAY COLD GALVANIZING COMPOUND.
F. USE EXISTING BASE MOUNTED CABINET AND CONTROLLER. INSTALL AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON BASE UNIT.
G. USE EXISTING HANDHOLE.
H. USE EXISTING CONDUIT.
J. INSTALL 2 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - TRENCHED.
K. INSTALL 4 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - SLOTTED.
L. INSTALL 12 IN. HEAT APPLIED, WHITE PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING FOR CROSSWALKS.
M. REMOVE EXISTING PAVEMENT MARKINGS.
N. INSTALL 24 IN. HEAT APPLIED, WHITE PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING FOR STOP LINES.
O. RELOCATE EXISTING OM1-3 SIGN TO ONE 4" x 4" TREATED WOOD SUPPORT (L=11.5') AS SHOWN. INSTALL SIGN SO THAT BOTTOM OF SIGN IS 4'-0" ABOVE HIGH POINT OF ROADWAY.
P. REMOVE EXISTING SIDEWALK RAMP AND/OR SIDEWALK AND INSTALL SIDEWALK RAMP (STD. NO. MD 655.12) AND DETECTABLE WARNING SURFACE CLAY BRICK PAVERS IN ACCORDANCE WITH STD. NO. MD 655.40. INSTALL CONCRETE CURB (STD. NO. 620.02) AT THE BACK OF THE SIDEWALK RAMP.
Q. INSTALL COMBINATION CONCRETE CURB AND GUTTER (STD. NO. MD 620.02 TYPE 'A').

CONSTRUCTION DETAILS (CONTINUED)

R. REMOVE EXISTING SIDEWALK RAMP AND INSTALL MEDIAN CUT-THROUGH, STD. TYPE 'A' CURB AND DETECTABLE WARNING SURFACE CLAY BRICK PAVERS IN ACCORDANCE WITH STD. NO. MD 655.40. INSTALL 5 IN. CONCRETE SIDEWALK WITHIN BACK SIDE OF CURB.
S. REMOVE EXISTING SIDEWALK RAMP AND/OR SIDEWALK AND INSTALL 5 IN. CONCRETE SIDEWALK.
T. USE EXISTING HANDHOLE. ADJUST TO FINAL GRADE.
U. INSTALL HANDHOLE.

GENERAL NOTES

1. ALL TRAFFIC SIGNAL FOUNDATIONS SHALL BE INSTALLED AT THE FINAL SIDEWALK OR CURB GRADE FOR CLOSED SECTIONS, HIGHEST ROADWAY PROFILE GRADE FOR OPEN SECTIONS, TO MEET CLEARANCES AS SPECIFIED IN MD 816.03, MD 818.01, MD 818.02, MD 818.04. THE CONTRACTOR SHALL VERIFY ULTIMATE GRADES PRIOR TO THE INSTALLATION OF ALL SIGNAL EQUIPMENT.
2. THE CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED SIGNAL EQUIPMENT. IF ANY UTILITY CONFLICTS SHOULD ARISE THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER.
3. VIDEO CAMERA LOCATION / ALIGNING SHALL BE COORDINATED WITH THE SHA ENGINEER.
4. THE CONTRACTOR SHALL VERIFY ALL PROPOSED POLE LOCATIONS PRIOR TO INSTALLATION.
5. ALL EXISTING TRAFFIC SIGNAL EQUIPMENT REMOVED SHALL BECOME THE PROPERTY OF THE SIGNAL CONTRACTOR UPON COMPLETION OF THE NEW SIGNAL.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING ALL SIGNAL CABLES TO THE APPROPRIATE TERMINALS AND PROPERLY LABEL EACH CABLE.
7. REMOVE AND DISPOSE OF ALL UNUSED SIGNAL CABLE.
8. PUSHBUTTONS ARE TO BE LOCATED SO THAT THEY CAN BE ACTIVATED BY A PERSON IN A WHEELCHAIR REACHING LESS THAN 10" FROM A 60" x 60" LEVEL LANDING AREA WITH A CROSS SLOPE OF LESS THAN OR EQUAL TO 2%.
9. THE 10" SEPARATION BETWEEN PUSHBUTTONS IS TO BE MEASURED FROM FACE OF PUSHBUTTON TO FACE OF PUSHBUTTON, NOT CENTER TO CENTER OF POLE.
10. PUSHBUTTON ARROWS ARE TO BE PARALLEL TO THE CROSSING FOR WHICH THEY ARE INTENDED.
11. LOCATION OF ACCESSIBLE PEDESTRIAN SIGNAL PUSHBUTTONS MUST MEET LOCATION REQUIREMENTS OF MUTCD SEC. 4E.09 AND FIG. 4E-2 AND THE NCHRP PUBLICATION, "ACCESSIBLE PEDESTRIAN SIGNALS: GUIDE TO BEST PRACTICE". IF NOT MET, THE CONTRACTOR IS TO STOP WORK ON PUSHBUTTON LOCATIONS UNTIL A DESIGN WAIVER IS OBTAINED, APPROVED BY THE DIRECTOR, OFFICE OF TRAFFIC AND SAFETY.
12. VERIFY PROPOSED GEOMETRICS PRIOR TO INSTALLING SIGNAL EQUIPMENT.
13. REFER TO TSP-2 FOR CURB RAMP INSTALLATION DIMENSIONS AND DETAILS.

TOD NO: XY125-14
SHA NO: HA400B56
US 1 Bus. @ MD 924, MD 24 @ Marketplace Dr./MD 924 @ Ring Factory Rd/Bel Air/Laurel Bush Rd/Holly Wreath

TSP-1

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF TRAFFIC & SAFETY
TRAFFIC ENGINEERING DESIGN DIVISION

US 1 Business and MD 24 (Veterans Memorial Hwy)
Bel Air, MD

TRAFFIC SIGNAL PLAN

SCALE 1" = 20' DATE 5/24/1984 CONTRACT NO. H520-501-470

DESIGNED BY W. Richardson
DRAWN BY
CHECKED BY
F.A.P. NO.

COUNTY HARFORD
LOGMILE 12.20/0101.98
TIMS NO. D157
TOD NO.

TS NO. 1947 H | DRAWING TSP-1 OF 15 | SHEET NO. 1 OF 15

APPROVALS

TEAM LEADER
ASST. DIV. CHIEF
DIVISION CHIEF
ORIFICE DIRECTOR

ORIGINAL ON FILE

REVISIONS

(H) ADDED APS/CPS AND ADA COMPLIANT CURB RAMPS TIMS NO. L646 SHA NO. XY1255185 10/02/2012
(G) ADDED OPTICOM DETECTION ON SOUTHBOUND US 1 TIMS NO. J662 SHA NO. XX6455185 5/25/2011
(F) ADDED APS/CPS (NOT COMPLETED) SHA NO. AX7045168 3/7/2011

PLOTTED: October 02, 2012
FILE: N:\31669-238\CADD\pSG-P001_MD24_US1.dgn

WR&A
WHITMAN, REQUARDT & ASSOCIATES, LLP
801 South Caroline Street, Baltimore, Maryland 21231
BY: jcheng

GEOMETRIC LEGEND
EXISTING
PROPOSED

UTILITY LEGEND
SD STORM DRAIN
G GAS MAIN
W WATER MAIN
S SEWER MAIN
E ELECTRIC CABLES
A AERIAL CABLES
T TELEPHONE CABLES
F FIBER-OPTIC

TRI-STATE TRAFFIC DATA

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610-466-1469
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Harford County, MD
US 1 & Tollgate Rd
Tuesday, September 20, 2022
Location: 39.523739, -76.357062

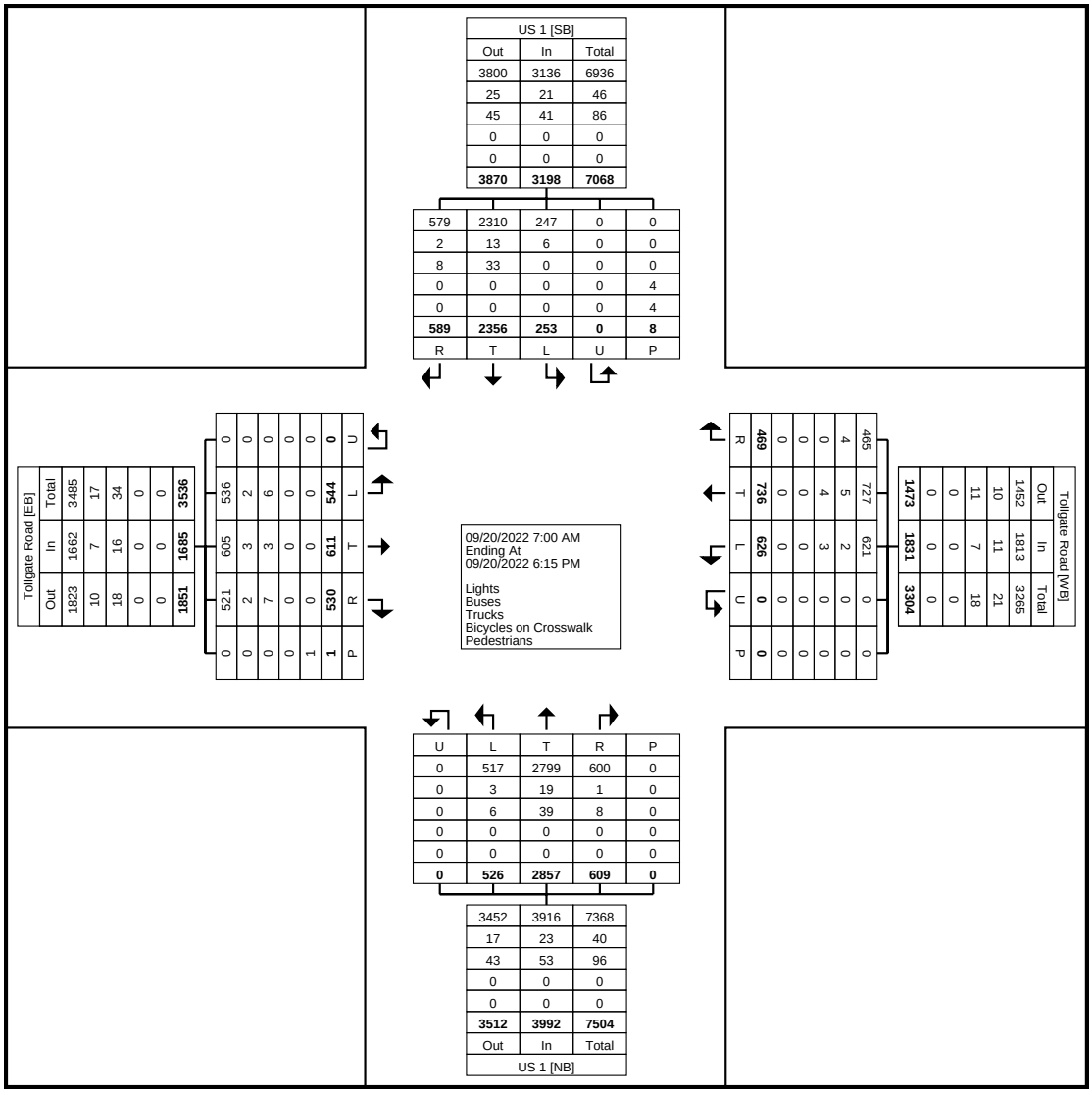
Count Name: US 1 & Tollgate Rd
Site Code:
Start Date: 09/20/2022
Page No: 1

Turning Movement Data

Start Time	Tollgate Road Eastbound							Tollgate Road Westbound							US 1 Northbound							US 1 Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	9	12	5	14	0	0	40	25	18	6	20	0	0	69	11	101	17	1	0	0	130	7	148	14	0	0	1	169	408
7:15 AM	21	15	6	26	0	0	68	33	12	6	19	0	0	70	13	157	18	0	0	0	188	10	144	15	0	0	0	169	495
7:30 AM	19	29	8	10	0	0	66	32	22	5	14	0	0	73	16	152	26	0	0	0	194	6	154	15	4	0	1	179	512
7:45 AM	19	31	9	13	0	0	72	35	23	8	17	0	0	83	22	148	37	4	0	0	211	21	172	20	3	0	0	216	582
Hourly Total	68	87	28	63	0	0	246	125	75	25	70	0	0	295	62	558	98	5	0	0	723	44	618	64	7	0	2	733	1997
8:00 AM	23	35	14	28	0	0	100	20	23	9	12	0	0	64	17	123	35	8	0	0	183	10	132	26	1	0	0	169	516
8:15 AM	27	32	12	13	0	0	84	37	26	9	14	0	0	86	27	151	34	3	0	0	215	11	112	23	2	0	0	148	533
8:30 AM	22	24	12	12	0	0	70	25	22	10	14	0	0	71	17	179	36	2	0	0	234	7	124	27	2	0	1	160	535
8:45 AM	27	37	6	22	0	0	92	27	28	8	11	0	0	74	26	183	41	1	0	0	251	10	159	30	0	0	0	199	616
Hourly Total	99	128	44	75	0	0	346	109	99	36	51	0	0	295	87	636	146	14	0	0	883	38	527	106	5	0	1	676	2200
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	41	46	22	18	0	1	127	39	76	20	12	0	0	147	42	175	30	3	0	0	250	17	166	30	21	0	0	234	758
4:15 PM	52	55	23	16	0	0	146	55	74	21	6	0	0	156	48	190	32	5	0	0	275	22	159	29	23	0	0	233	810
4:30 PM	42	49	13	17	0	0	121	52	64	17	9	0	0	142	47	215	44	0	0	0	306	22	168	21	22	0	0	233	802
4:45 PM	47	41	22	23	0	0	133	52	76	17	12	0	0	157	52	203	54	4	0	0	313	26	161	27	35	0	1	249	852
Hourly Total	182	191	80	74	0	1	527	198	290	75	39	0	0	602	189	783	160	12	0	0	1144	87	654	107	101	0	1	949	3222
5:00 PM	51	49	23	31	0	0	154	50	61	21	17	0	0	149	60	229	38	0	0	0	327	30	157	32	23	0	0	242	872
5:15 PM	47	49	21	19	0	0	136	43	63	25	11	0	0	142	46	234	37	7	0	0	324	17	149	27	21	0	0	214	816
5:30 PM	47	52	21	16	0	0	136	46	70	28	16	0	0	160	41	223	39	3	0	0	306	17	134	28	29	0	2	208	810
5:45 PM	50	55	21	14	0	0	140	55	78	30	25	0	0	188	41	194	48	2	0	0	285	20	117	16	23	0	2	176	789
Hourly Total	195	205	86	80	0	0	566	194	272	104	69	0	0	639	188	880	162	12	0	0	1242	84	557	103	96	0	4	840	3287
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	544	611	238	292	0	1	1685	626	736	240	229	0	0	1831	526	2857	566	43	0	0	3992	253	2356	380	209	0	8	3198	10706
Approach %	32.3	36.3	14.1	17.3	0.0	-	-	34.2	40.2	13.1	12.5	0.0	-	-	13.2	71.6	14.2	1.1	0.0	-	-	7.9	73.7	11.9	6.5	0.0	-	-	-
Total %	5.1	5.7	2.2	2.7	0.0	-	15.7	5.8	6.9	2.2	2.1	0.0	-	17.1	4.9	26.7	5.3	0.4	0.0	-	37.3	2.4	22.0	3.5	2.0	0.0	-	29.9	-
Lights	536	605	236	285	0	-	1662	621	727	238	227	0	-	1813	517	2799	558	42	0	-	3916	247	2310	371	208	0	-	3136	10527
% Lights	98.5	99.0	99.2	97.6	-	-	98.6	99.2	98.8	99.2	99.1	-	-	99.0	98.3	98.0	98.6	97.7	-	-	98.1	97.6	98.0	97.6	99.5	-	-	98.1	98.3
Buses	2	3	0	2	0	-	7	2	5	2	2	0	-	11	3	19	1	0	0	-	23	6	13	2	0	0	-	21	62
% Buses	0.4	0.5	0.0	0.7	-	-	0.4	0.3	0.7	0.8	0.9	-	-	0.6	0.6	0.7	0.2	0.0	-	-	0.6	2.4	0.6	0.5	0.0	-	-	0.7	0.6
Trucks	6	3	2	5	0	-	16	3	4	0	0	0	-	7	6	39	7	1	0	-	53	0	33	7	1	0	-	41	117
% Trucks	1.1	0.5	0.8	1.7	-	-	0.9	0.5	0.5	0.0	0.0	-	-	0.4	1.1	1.4	1.2	2.3	-	-	1.3	0.0	1.4	1.8	0.5	-	-	1.3	1.1
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.0	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.0	-	-

Harford County, MD
US 1 & Tollgate Rd
Tuesday, September 20, 2022
Location: 39.523739, -76.357062

Count Name: US 1 & Tollgate Rd
Site Code:
Start Date: 09/20/2022



Turning Movement Data Plot

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184 Baker Rd

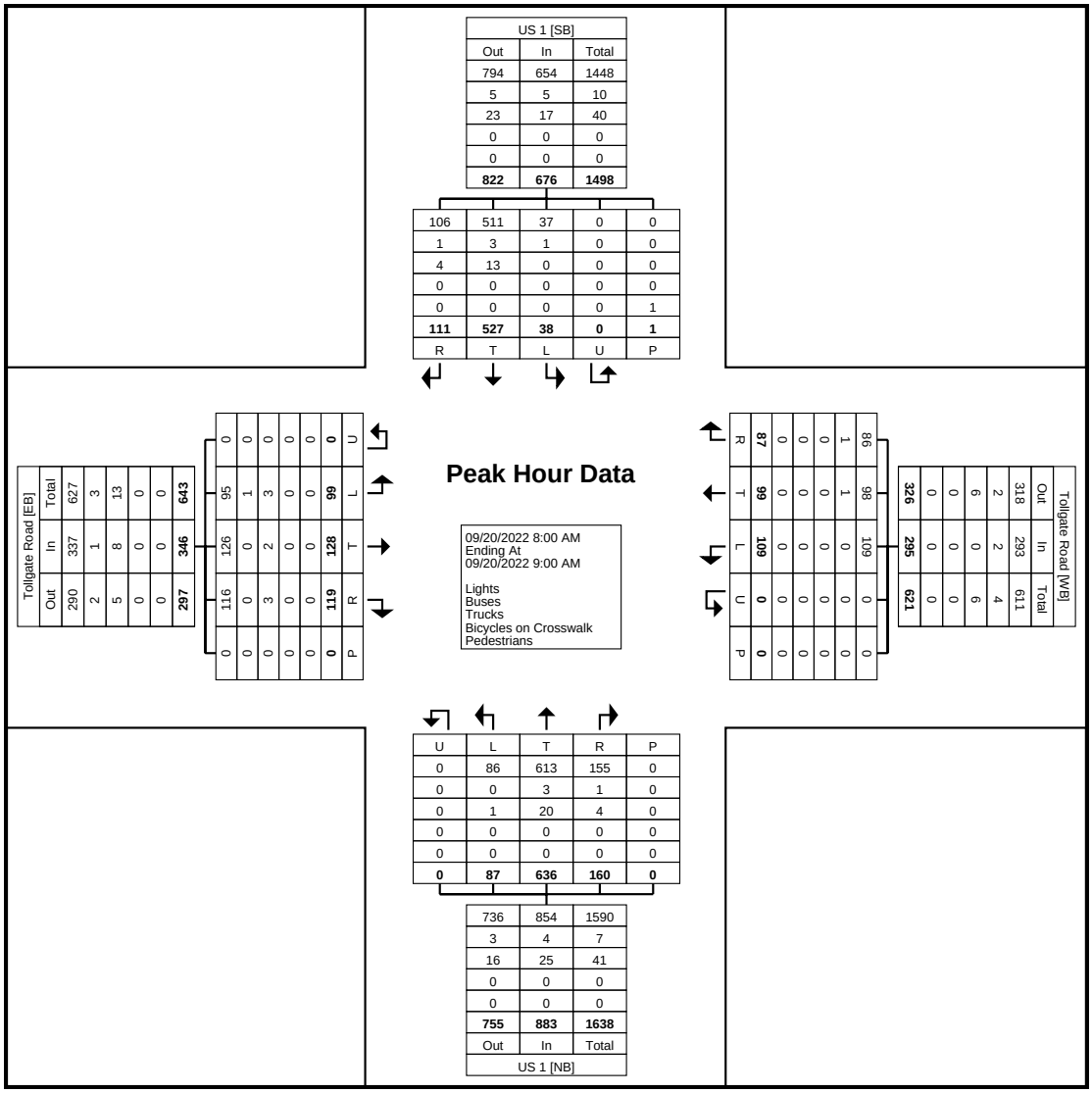
Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Harford County, MD
US 1 & Tollgate Rd
Tuesday, September 20, 2022
Location: 39.523739, -76.357062

Count Name: US 1 & Tollgate Rd
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Tollgate Road Eastbound							Tollgate Road Westbound							US 1 Northbound							US 1 Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
8:00 AM	23	35	14	28	0	0	100	20	23	9	12	0	0	64	17	123	35	8	0	0	183	10	132	26	1	0	0	169	516
8:15 AM	27	32	12	13	0	0	84	37	26	9	14	0	0	86	27	151	34	3	0	0	215	11	112	23	2	0	0	148	533
8:30 AM	22	24	12	12	0	0	70	25	22	10	14	0	0	71	17	179	36	2	0	0	234	7	124	27	2	0	1	160	535
8:45 AM	27	37	6	22	0	0	92	27	28	8	11	0	0	74	26	183	41	1	0	0	251	10	159	30	0	0	0	199	616
Total	99	128	44	75	0	0	346	109	99	36	51	0	0	295	87	636	146	14	0	0	883	38	527	106	5	0	1	676	2200
Approach %	28.6	37.0	12.7	21.7	0.0	-	-	36.9	33.6	12.2	17.3	0.0	-	-	9.9	72.0	16.5	1.6	0.0	-	-	5.6	78.0	15.7	0.7	0.0	-	-	-
Total %	4.5	5.8	2.0	3.4	0.0	-	15.7	5.0	4.5	1.6	2.3	0.0	-	13.4	4.0	28.9	6.6	0.6	0.0	-	40.1	1.7	24.0	4.8	0.2	0.0	-	30.7	-
PHF	0.917	0.865	0.786	0.670	0.000	-	0.865	0.736	0.884	0.900	0.911	0.000	-	0.858	0.806	0.869	0.890	0.438	0.000	-	0.879	0.864	0.829	0.883	0.625	0.000	-	0.849	0.893
Lights	95	126	44	72	0	-	337	109	98	35	51	0	-	293	86	613	142	13	0	-	854	37	511	101	5	0	-	654	2138
% Lights	96.0	98.4	100.0	96.0	-	-	97.4	100.0	99.0	97.2	100.0	-	-	99.3	98.9	96.4	97.3	92.9	-	-	96.7	97.4	97.0	95.3	100.0	-	-	96.7	97.2
Buses	1	0	0	0	0	-	1	0	1	1	0	0	-	2	0	3	1	0	0	-	4	1	3	1	0	0	-	5	12
% Buses	1.0	0.0	0.0	0.0	-	-	0.3	0.0	1.0	2.8	0.0	-	-	0.7	0.0	0.5	0.7	0.0	-	-	0.5	2.6	0.6	0.9	0.0	-	-	0.7	0.5
Trucks	3	2	0	3	0	-	8	0	0	0	0	0	-	0	1	20	3	1	0	-	25	0	13	4	0	0	-	17	50
% Trucks	3.0	1.6	0.0	4.0	-	-	2.3	0.0	0.0	0.0	0.0	-	-	0.0	1.1	3.1	2.1	7.1	-	-	2.8	0.0	2.5	3.8	0.0	-	-	2.5	2.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (8:00 AM)

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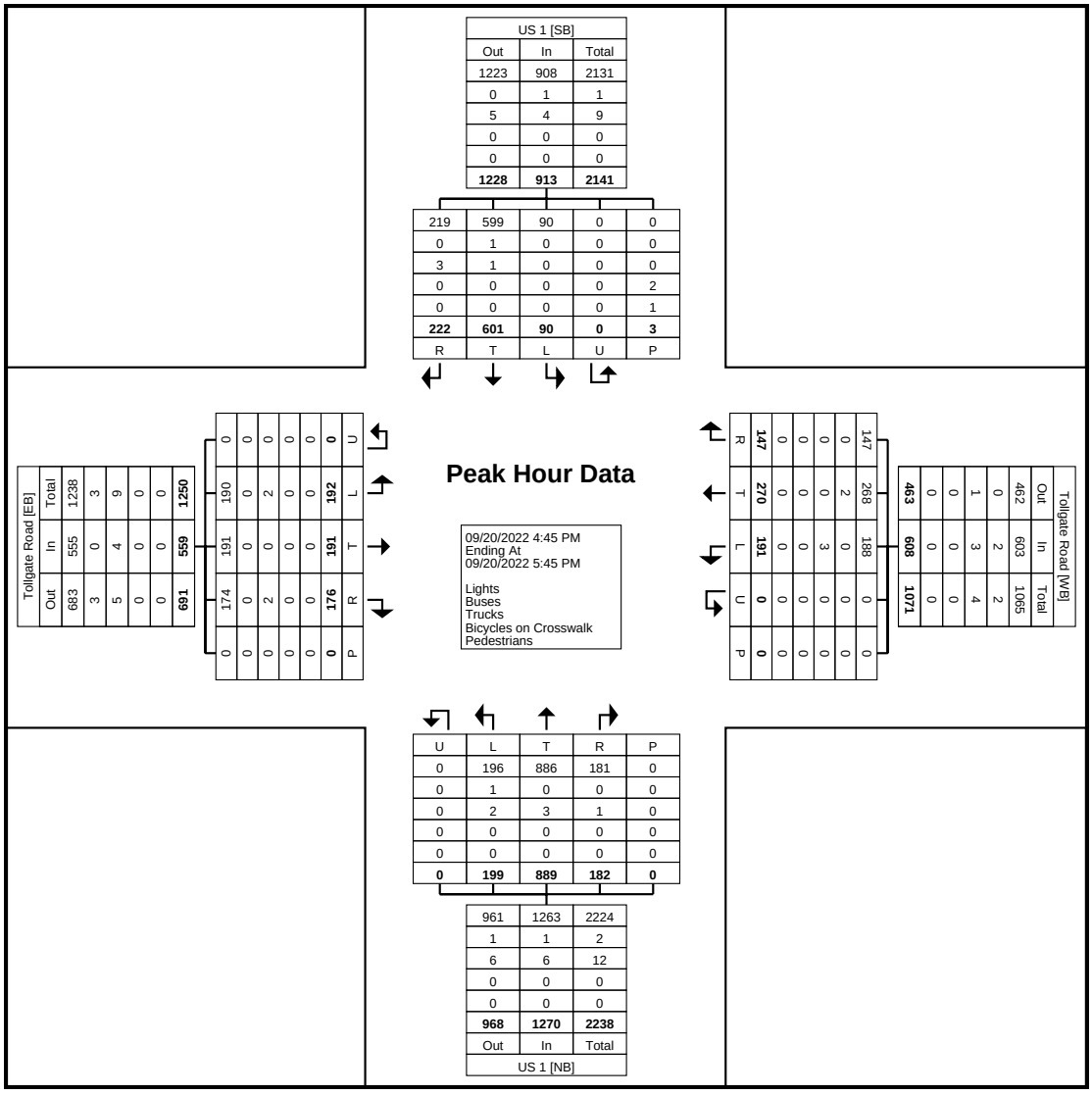
Harford County, MD
US 1 & Tollgate Rd
Tuesday, September 20, 2022
Location: 39.523739, -76.357062

Count Name: US 1 & Tollgate Rd
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Tollgate Road Eastbound							Tollgate Road Westbound							US 1 Northbound							US 1 Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:45 PM	47	41	22	23	0	0	133	52	76	17	12	0	0	157	52	203	54	4	0	0	313	26	161	27	35	0	1	249	852
5:00 PM	51	49	23	31	0	0	154	50	61	21	17	0	0	149	60	229	38	0	0	0	327	30	157	32	23	0	0	242	872
5:15 PM	47	49	21	19	0	0	136	43	63	25	11	0	0	142	46	234	37	7	0	0	324	17	149	27	21	0	0	214	816
5:30 PM	47	52	21	16	0	0	136	46	70	28	16	0	0	160	41	223	39	3	0	0	306	17	134	28	29	0	2	208	810
Total	192	191	87	89	0	0	559	191	270	91	56	0	0	608	199	889	168	14	0	0	1270	90	601	114	108	0	3	913	3350
Approach %	34.3	34.2	15.6	15.9	0.0	-	-	31.4	44.4	15.0	9.2	0.0	-	-	15.7	70.0	13.2	1.1	0.0	-	-	9.9	65.8	12.5	11.8	0.0	-	-	-
Total %	5.7	5.7	2.6	2.7	0.0	-	16.7	5.7	8.1	2.7	1.7	0.0	-	18.1	5.9	26.5	5.0	0.4	0.0	-	37.9	2.7	17.9	3.4	3.2	0.0	-	27.3	-
PHF	0.941	0.918	0.946	0.718	0.000	-	0.907	0.918	0.888	0.813	0.824	0.000	-	0.950	0.829	0.950	0.778	0.500	0.000	-	0.971	0.750	0.933	0.891	0.771	0.000	-	0.917	0.960
Lights	190	191	85	89	0	-	555	188	268	91	56	0	-	603	196	886	167	14	0	-	1263	90	599	112	107	0	-	908	3329
% Lights	99.0	100.0	97.7	100.0	-	-	99.3	98.4	99.3	100.0	100.0	-	-	99.2	98.5	99.7	99.4	100.0	-	-	99.4	100.0	99.7	98.2	99.1	-	-	99.5	99.4
Buses	0	0	0	0	0	-	0	0	2	0	0	0	-	2	1	0	0	0	0	-	1	0	1	0	0	0	-	1	4
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	0.0	-	-	0.3	0.5	0.0	0.0	0.0	-	-	0.1	0.0	0.2	0.0	0.0	-	-	0.1	0.1
Trucks	2	0	2	0	0	-	4	3	0	0	0	0	-	3	2	3	1	0	0	-	6	0	1	2	1	0	-	4	17
% Trucks	1.0	0.0	2.3	0.0	-	-	0.7	1.6	0.0	0.0	0.0	-	-	0.5	1.0	0.3	0.6	0.0	-	-	0.5	0.0	0.2	1.8	0.9	-	-	0.4	0.5
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66.7	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.3	-	-



Turning Movement Peak Hour Data Plot (4:45 PM)

GENERAL NOTES

1. ALL TRAFFIC SIGNAL FOUNDATIONS SHALL BE INSTALLED AT THE FINAL SIDEWALK OR CURB GRADE FOR CLOSED SECTIONS, HIGHEST ROADWAY PROFILE GRADE FOR OPEN SECTIONS, TO MEET CLEARANCES AS SPECIFIED IN MD 816.03, MD 818.01, MD 818.02, MD 818.04. THE CONTRACTOR SHALL VERIFY ULTIMATE GRADES PRIOR TO THE INSTALLATION OF ALL SIGNAL EQUIPMENT.
2. THE CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED SIGNAL EQUIPMENT. IF ANY UTILITY CONFLICTS SHOULD ARISE THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER.
3. VIDEO CAMERA LOCATION / ALIGNING SHALL BE COORDINATED WITH THE SHA ENGINEER.
4. THE CONTRACTOR SHALL CONTACT SHA TO SCHEDULE RETROFITTING OF THE CONTROLLER EQUIPMENT IN ORDER TO OPERATE VIDEO DETECTION EQUIPMENT.
5. THE CONTRACTOR SHALL VERIFY ALL PROPOSED POLE LOCATIONS PRIOR TO INSTALLATION.
6. ALL PROPOSED LUMINAIRES SHALL BE SUPPLIED WITH A PHOTOCELL.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING ALL SIGNAL CABLES TO THE APPROPRIATE TERMINALS AND PROPERLY LABEL EACH CABLE.
8. PUSHBUTTONS ARE TO BE LOCATED SO THAT THEY CAN BE ACTIVATED BY A PERSON IN A WHEELCHAIR REACHING LESS THAN 18" FROM A 60" x 60" LEVEL LANDING AREA WITH A CROSS SLOPE OF LESS THAN OR EQUAL TO 2%.
9. THE 10' SEPARATION BETWEEN PUSHBUTTONS IS TO BE MEASURED FROM FACE OF PUSHBUTTON TO FACE OF PUSHBUTTON, NOT CENTER TO CENTER OF POLE.
10. PUSHBUTTON ARROWS ARE TO BE PARALLEL TO THE CROSSING FOR WHICH THEY ARE INTENDED.
11. LOCATION OF ACCESSIBLE PEDESTRIAN SIGNAL PUSHBUTTONS MUST MEET LOCATION REQUIREMENTS OF MUTCD SEC. 4E.08 AND 4E.10 AND FIG. 4E-3 AND 4E-4 OF THE NCHRP PUBLICATION, "ACCESSIBLE PEDESTRIAN SIGNALS: GUIDE TO BEST PRACTICE". IF NOT MET, THE CONTRACTOR IS TO STOP WORK ON PUSHBUTTON LOCATIONS UNTIL A DESIGN WAIVER IS OBTAINED, APPROVED BY THE DIRECTOR, OFFICE OF TRAFFIC AND SAFETY.
12. ALL SIDEWALK RAMPS SHALL BE INSTALLED AS PER STANDARDS MD 655.11 AND MD 655.12 AS SHOWN ON TSP-2.
13. ALL HANDHOLES SHALL BE INSTALLED AT FINAL GRADE.
14. REFER TO SHEET 2 FOR DIMENSIONS OF SIGNAL EQUIPMENT AND PAVEMENT MARKINGS WITHIN INTERSECTION.

CONSTRUCTION DETAILS

A. INSTALL OVERHEAD VIDEO DETECTION CAMERA ON EXISTING MAST ARM AS SHOWN.
B. USE EXISTING BASE MOUNTED CABINET AND CONTROLLER. INSTALL AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON BASE UNIT. (NOTE: SHA FORCES SHALL INSTALL VIDEO INTERFACE EQUIPMENT (1-8 CAMERAS) TO OPERATE ADDITIONAL VIDEO DETECTION EQUIPMENT).
C. USE EXISTING HANDHOLE.
D. USE EXISTING CONDUIT.
E. USE EXISTING STEEL POLE.
F. RELOCATE EXISTING VIDEO DETECTION CAMERA AS SHOWN.
G. ADJUST EXISTING VIDEO DETECTION CAMERA TO DETECT THROUGH LANES AS SHOWN.
H. USE EXISTING LIGHTING BRACKET ARM. REMOVE EXISTING HPS LUMINAIRE AND INSTALL LED LUMINAIRE AS SHOWN.
J. USE EXISTING METERED SERVICE PEDESTAL.
K. INSTALL HANDHOLE.
L. INSTALL CONCRETE FOUNDATION WITH 10 FT. STEEL PEDESTAL POLE WITH MODIFIED BREAKAWAY BASE STANDARD NO. MD 801.01-01, COUNTDOWN PEDESTRIAN SIGNAL HEAD, AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON INSTALLED WITH VIBRATING ARROW POINTING LEFT AND R10-3(1) SIGN. (SIGN TO READ "PUSH BUTTON TO CROSS BELAIR ROAD"). (INSTALL 1-2 IN. SCHEDULE 80, 90 DEGREE PVC ELECTRICAL CONDUIT BEND IN PEDESTAL BASE).
M. INSTALL CONCRETE FOUNDATION WITH 10 FT. STEEL PEDESTAL POLE WITH MODIFIED BREAKAWAY BASE STANDARD NO. MD 801.01-01, COUNTDOWN PEDESTRIAN SIGNAL HEAD, AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON INSTALLED WITH VIBRATING ARROW POINTING RIGHT AND R10-3(1) SIGN. (SIGN TO READ "PUSH BUTTON TO CROSS BELAIR ROAD"). (INSTALL 1-2 IN. SCHEDULE 80, 90 DEGREE PVC ELECTRICAL CONDUIT BEND IN PEDESTAL BASE).
N. INSTALL 2 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - TRENCHED.
O. INSTALL 4 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - SLOTTED.
P. INSTALL 12 IN. HEAT APPLIED, WHITE PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING FOR CROSSWALKS.
Q. REMOVE EXISTING SIDEWALK RAMP AND INSTALL SIDEWALK RAMP (SEE SHEET TSP-2 FOR DETAILS) AND DETECTABLE WARNING SURFACE WITH THE PLACEMENT IN ACCORDANCE WITH STANDARD NO. MD 655.40.
R. INSTALL STANDARD TYPE A CONCRETE CURB.
S. INSTALL COMBINATION CONCRETE CURB AND GUTTER (STANDARD NO. MD 620.02 TYPE 'A').
T. REMOVE EXISTING CONCRETE SIDEWALK AND INSTALL MEDIAN CUT-THROUGH STANDARD NO. 655.21 (SEE SHEET TSP-2 FOR DETAILS) AND 24 IN. SLIDE SLOPE TO BE PAID AS ITEM NO. 6002.
U. INSTALL DETECTABLE WARNING SURFACE CLAY BRICK PAVERS WITH THE PLACEMENT IN ACCORDANCE WITH STANDARD NO. MD 655.40.
V. REMOVE EXISTING SIDEWALK AND INSTALL 5 IN. CONCRETE SIDEWALK.
W. REMOVE EXISTING PAVEMENT MARKINGS (CROSSWALK).

GEOMETRIC LEGEND

- EXISTING
- PROPOSED

UTILITY LEGEND

- SD — STORM DRAIN
- G — GAS MAIN
- W — WATER MAIN
- S — SEWER MAIN
- E — ELECTRIC CABLES
- A — AERIAL CABLES
- T — TELEPHONE CABLES
- F — FIBER-OPTIC

Whitman, Requardt & Associates, LLP
801 South Caroline Street, Baltimore, Maryland 21231

SHA
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF TRAFFIC & SAFETY
TRAFFIC ENGINEERING DESIGN DIVISION
US 1 Business (Belair Road) and Tollgate Road
Bel Air, MD

APPROVALS	REVISIONS
TEAM LEADER	1 REDLINE NO. 1 SHEET ADDED ADDED APS/CPS/ADA RAMPS TIMS# N254 CONTRACT SHA NO. XY1545185 10/09/2015 — SRB NML
ASST. DIV. CHIEF	H INSTALLED VIDEO DETECTION FOR ALL APPROACHES TIMS# N182 SHA NO. XY1545185 7/2015 — SRB NML
DIVISION CHIEF	G REBUILD TRAFFIC SIGNAL SHA. NO. XX4465185 6/29/2009 — SRB NML
OFFICE DIRECTOR	

ORIGINAL ON FILE

TRAFFIC SIGNALIZATION PLAN

SCALE 1" = 20'	ADVERTISED DATE 9/30/1971	CONTRACT NO. H-596X-475	
DESIGNED BY B.L.J.		COUNTY Harford	
DRAWN BY B.L.J.		LOGMILE 12800101.75	
CHECKED BY B.L.J.		TIMS NO. J429	
F.A.P. NO.		TOD NO.	
TS NO. 427 H	DRAWING TSP-1 OF 5	SHEET NO. 1 OF 19	

PLOTTED: Monday, March 29, 2021 AT 08:34 AM
FILE: M:\3700\3718\Signal_Previous-Revisions-From_OOTS\pSG-P001_us1&tollgate_RL1_Default.dgn

BORDER REV. DATE: March 27, 2007
BY: jhenk
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184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
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Harford County, MD
N Tollgate Rd & Boulton St
Tuesday, September 20, 2022
Location: 39.524129, -76.360506

Count Name: N. Tollgate Rd & Boulton St
Site Code:
Start Date: 09/20/2022

Turning Movement Data

Start Time	N. Tollgate Rd Eastbound							N. Tollgate Rd Westbound							Business Driveway Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	7	38	1	0	0	0	46	0	21	20	2	0	0	43	0	0	0	0	0	0	0	14	1	0	5	0	0	20	109
7:15 AM	7	44	0	0	0	0	51	0	19	17	1	0	0	37	0	0	0	0	0	0	0	25	0	2	7	0	0	34	122
7:30 AM	6	53	1	0	0	0	60	0	25	19	6	0	0	50	0	1	0	0	0	0	1	15	1	1	5	0	0	22	133
7:45 AM	11	52	1	1	0	0	65	1	30	22	7	0	0	60	1	0	0	0	0	0	1	18	1	0	10	0	0	29	155
Hourly Total	31	187	3	1	0	0	222	1	95	78	16	0	0	190	1	1	0	0	0	0	2	72	3	3	27	0	0	105	519
8:00 AM	10	55	0	1	0	0	66	1	26	15	8	0	0	50	0	0	2	0	0	0	2	34	4	7	8	0	0	53	171
8:15 AM	14	58	1	0	0	0	73	2	29	28	5	0	0	64	1	0	1	0	0	0	2	18	1	2	7	0	0	28	167
8:30 AM	10	44	4	0	0	0	58	0	29	32	4	0	0	65	1	0	1	0	0	0	2	23	2	2	9	0	0	36	161
8:45 AM	27	56	1	0	0	1	84	2	27	29	7	0	0	65	0	1	0	0	0	0	1	25	1	3	8	0	0	37	187
Hourly Total	61	213	6	1	0	1	281	5	111	104	24	0	0	244	2	1	4	0	0	0	7	100	8	14	32	0	0	154	686
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	10	52	1	0	0	0	63	2	65	40	30	0	0	137	2	6	1	3	0	0	12	51	3	12	11	0	0	77	289
4:15 PM	20	65	0	0	0	0	85	3	81	49	11	0	0	144	2	4	3	1	0	0	10	41	1	4	16	0	0	62	301
4:30 PM	18	61	1	0	0	0	80	3	67	39	23	0	0	132	2	4	1	3	0	0	10	41	4	6	21	0	0	72	294
4:45 PM	31	60	5	0	0	0	96	6	79	39	32	1	0	157	3	5	0	1	0	0	9	45	12	9	19	0	0	85	347
Hourly Total	79	238	7	0	0	0	324	14	292	167	96	1	0	570	9	19	5	8	0	0	41	178	20	31	67	0	0	296	1231
5:00 PM	19	55	0	0	0	0	74	3	79	28	35	0	0	145	2	3	4	2	0	0	11	53	5	12	15	0	0	85	315
5:15 PM	20	58	0	0	0	0	78	0	78	36	20	0	0	134	2	6	0	3	0	0	11	54	4	9	9	0	0	76	299
5:30 PM	26	62	1	0	0	0	89	2	75	42	26	0	0	145	3	4	1	1	0	0	9	49	6	8	9	0	0	72	315
5:45 PM	33	62	2	0	0	0	97	2	84	39	16	0	0	141	3	1	3	0	0	0	7	45	3	16	14	0	0	78	323
Hourly Total	98	237	3	0	0	0	338	7	316	145	97	0	0	565	10	14	8	6	0	0	38	201	18	45	47	0	0	311	1252
Grand Total	269	875	19	2	0	1	1165	27	814	494	233	1	0	1569	22	35	17	14	0	0	88	551	49	93	173	0	0	866	3688
Approach %	23.1	75.1	1.6	0.2	0.0	-	-	1.7	51.9	31.5	14.9	0.1	-	-	25.0	39.8	19.3	15.9	0.0	-	-	63.6	5.7	10.7	20.0	0.0	-	-	-
Total %	7.3	23.7	0.5	0.1	0.0	-	31.6	0.7	22.1	13.4	6.3	0.0	-	42.5	0.6	0.9	0.5	0.4	0.0	-	2.4	14.9	1.3	2.5	4.7	0.0	-	23.5	-
Lights	266	859	19	2	0	-	1146	27	805	485	230	1	-	1548	22	35	17	14	0	-	88	545	49	92	168	0	-	854	3636
% Lights	98.9	98.2	100.0	100.0	-	-	98.4	100.0	98.9	98.2	98.7	100.0	-	98.7	100.0	100.0	100.0	100.0	-	-	100.0	98.9	100.0	98.9	97.1	-	-	98.6	98.6
Buses	3	5	0	0	0	-	8	0	4	4	2	0	-	10	0	0	0	0	0	-	0	2	0	0	3	0	-	5	23
% Buses	1.1	0.6	0.0	0.0	-	-	0.7	0.0	0.5	0.8	0.9	0.0	-	0.6	0.0	0.0	0.0	0.0	-	-	0.0	0.4	0.0	0.0	1.7	-	-	0.6	0.6
Trucks	0	11	0	0	0	-	11	0	5	5	1	0	-	11	0	0	0	0	0	-	0	4	0	1	2	0	-	7	29
% Trucks	0.0	1.3	0.0	0.0	-	-	0.9	0.0	0.6	1.0	0.4	0.0	-	0.7	0.0	0.0	0.0	0.0	-	-	0.0	0.7	0.0	1.1	1.2	-	-	0.8	0.8
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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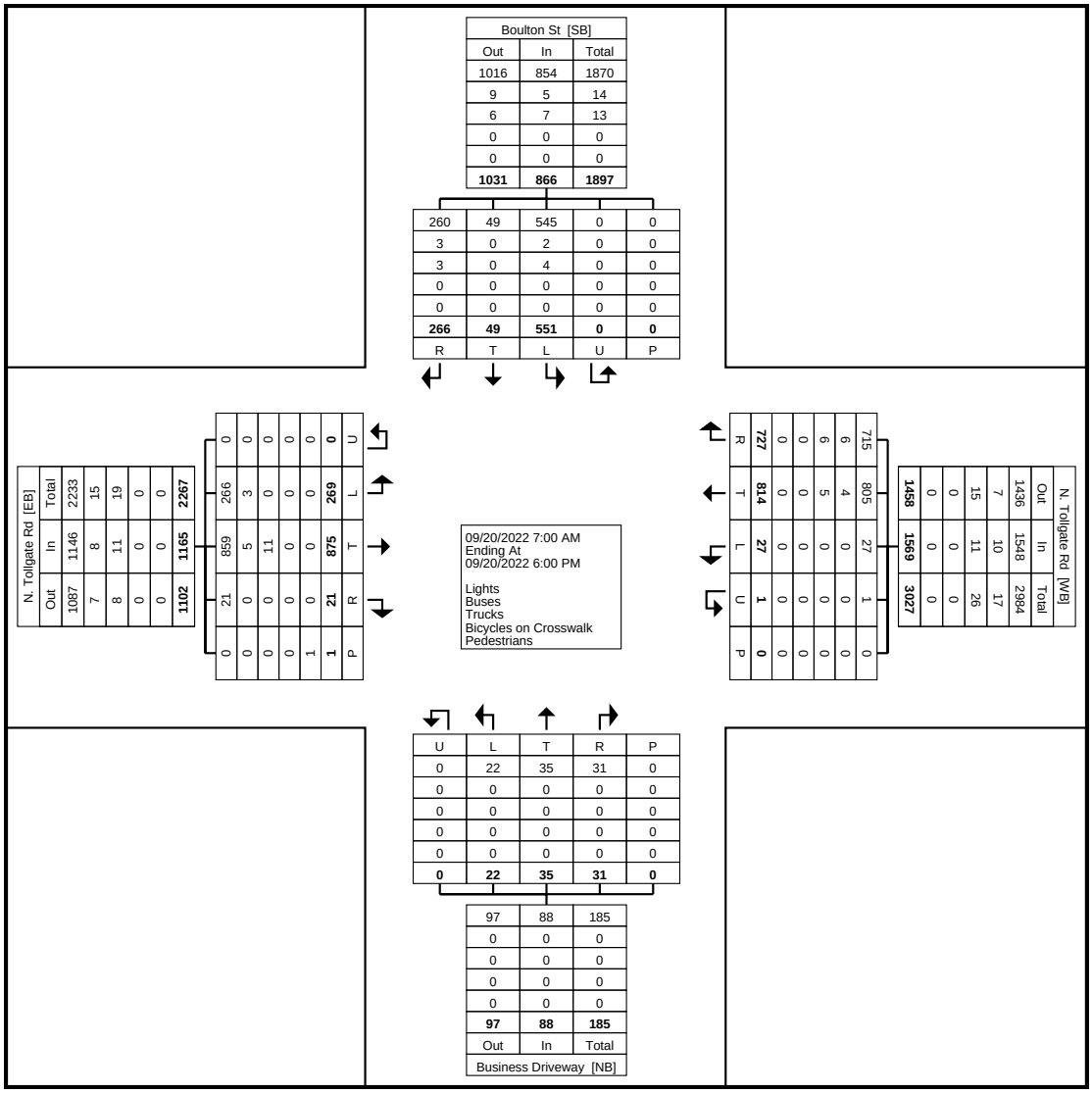
Harford County, MD
N Tollgate Rd & Boulton St
Tuesday, September 20, 2022
Location: 39.524129, -76.360506

Count Name: N. Tollgate Rd & Boulton St
Site Code:
Start Date: 09/20/2022
Page No: 2



Turning Movement Data Plot

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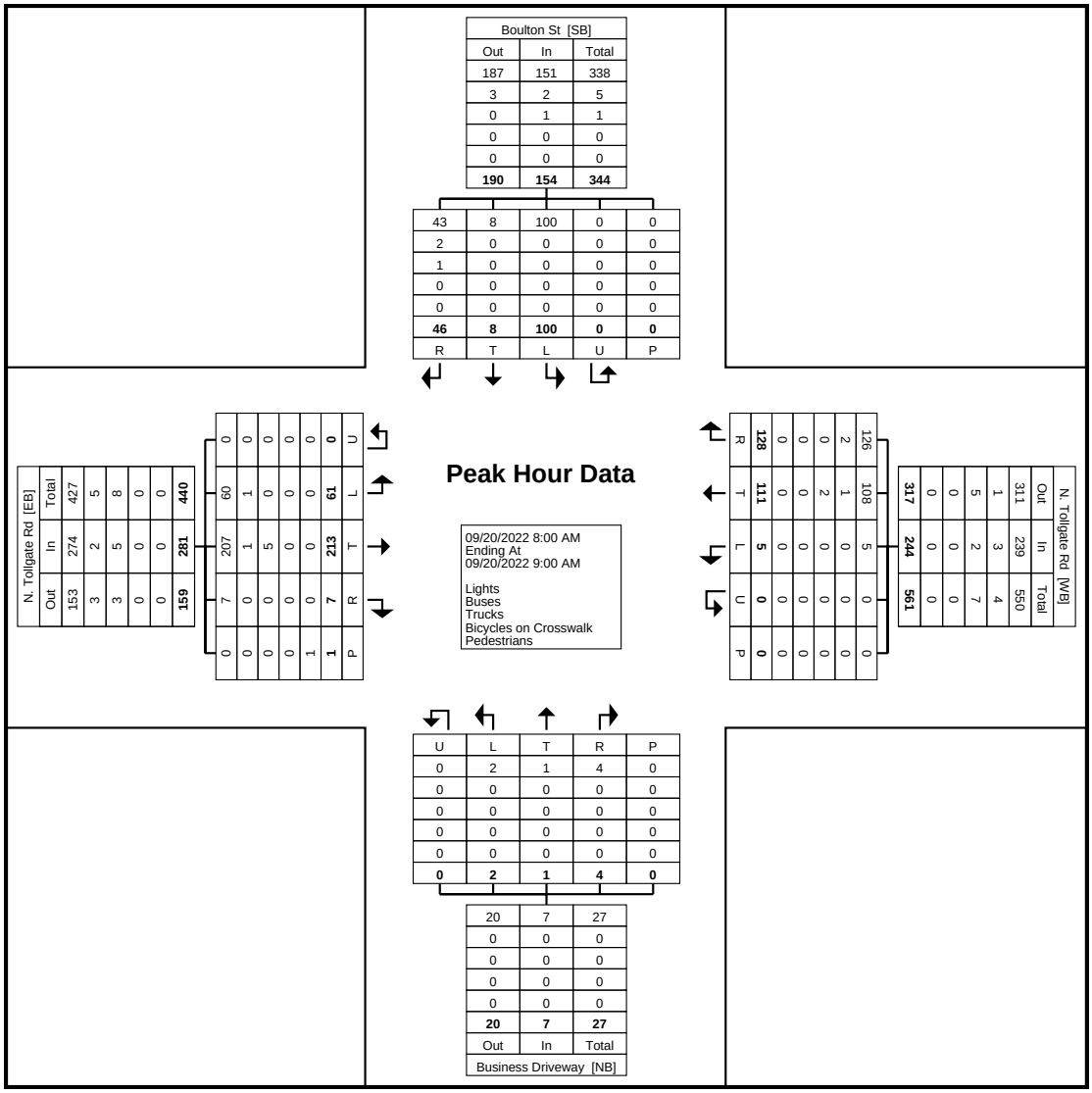
Harford County, MD
N Tollgate Rd & Boulton St
Tuesday, September 20, 2022
Location: 39.524129, -76.360506

Count Name: N. Tollgate Rd & Boulton St
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (8:00 AM)

Start Time	N. Tollgate Rd Eastbound							N. Tollgate Rd Westbound							Business Driveway Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
8:00 AM	10	55	0	1	0	0	66	1	26	15	8	0	0	50	0	0	2	0	0	0	2	34	4	7	8	0	0	53	171
8:15 AM	14	58	1	0	0	0	73	2	29	28	5	0	0	64	1	0	1	0	0	0	2	18	1	2	7	0	0	28	167
8:30 AM	10	44	4	0	0	0	58	0	29	32	4	0	0	65	1	0	1	0	0	0	2	23	2	2	9	0	0	36	161
8:45 AM	27	56	1	0	0	1	84	2	27	29	7	0	0	65	0	1	0	0	0	0	1	25	1	3	8	0	0	37	187
Total	61	213	6	1	0	1	281	5	111	104	24	0	0	244	2	1	4	0	0	0	7	100	8	14	32	0	0	154	686
Approach %	21.7	75.8	2.1	0.4	0.0	-	-	2.0	45.5	42.6	9.8	0.0	-	-	28.6	14.3	57.1	0.0	0.0	-	-	64.9	5.2	9.1	20.8	0.0	-	-	-
Total %	8.9	31.0	0.9	0.1	0.0	-	41.0	0.7	16.2	15.2	3.5	0.0	-	35.6	0.3	0.1	0.6	0.0	0.0	-	1.0	14.6	1.2	2.0	4.7	0.0	-	22.4	-
PHF	0.565	0.918	0.375	0.250	0.000	-	0.836	0.625	0.957	0.813	0.750	0.000	-	0.938	0.500	0.250	0.500	0.000	0.000	-	0.875	0.735	0.500	0.500	0.889	0.000	-	0.726	0.917
Lights	60	207	6	1	0	-	274	5	108	102	24	0	-	239	2	1	4	0	0	-	7	100	8	14	29	0	-	151	671
% Lights	98.4	97.2	100.0	100.0	-	-	97.5	100.0	97.3	98.1	100.0	-	-	98.0	100.0	100.0	100.0	-	-	-	100.0	100.0	100.0	100.0	90.6	-	-	98.1	97.8
Buses	1	1	0	0	0	-	2	0	1	2	0	0	-	3	0	0	0	0	0	-	0	0	0	0	2	0	-	2	7
% Buses	1.6	0.5	0.0	0.0	-	-	0.7	0.0	0.9	1.9	0.0	-	-	1.2	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	6.3	-	-	1.3	1.0
Trucks	0	5	0	0	0	-	5	0	2	0	0	0	-	2	0	0	0	0	0	-	0	0	0	0	1	0	-	1	8
% Trucks	0.0	2.3	0.0	0.0	-	-	1.8	0.0	1.8	0.0	0.0	-	-	0.8	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	3.1	-	-	0.6	1.2
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (8:00 AM)

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Harford County, MD
N Tollgate Rd & Boulton St
Tuesday, September 20, 2022
Location: 39.524129, -76.360506

Count Name: N. Tollgate Rd & Boulton St
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (4:45 PM)

Start Time	N. Tollgate Rd Eastbound							N. Tollgate Rd Westbound							Business Driveway Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:45 PM	31	60	5	0	0	0	96	6	79	39	32	1	0	157	3	5	0	1	0	0	9	45	12	9	19	0	0	85	347
5:00 PM	19	55	0	0	0	0	74	3	79	28	35	0	0	145	2	3	4	2	0	0	11	53	5	12	15	0	0	85	315
5:15 PM	20	58	0	0	0	0	78	0	78	36	20	0	0	134	2	6	0	3	0	0	11	54	4	9	9	0	0	76	299
5:30 PM	26	62	1	0	0	0	89	2	75	42	26	0	0	145	3	4	1	1	0	0	9	49	6	8	9	0	0	72	315
Total	96	235	6	0	0	0	337	11	311	145	113	1	0	581	10	18	5	7	0	0	40	201	27	38	52	0	0	318	1276
Approach %	28.5	69.7	1.8	0.0	0.0	-	-	1.9	53.5	25.0	19.4	0.2	-	-	25.0	45.0	12.5	17.5	0.0	-	-	63.2	8.5	11.9	16.4	0.0	-	-	-
Total %	7.5	18.4	0.5	0.0	0.0	-	26.4	0.9	24.4	11.4	8.9	0.1	-	45.5	0.8	1.4	0.4	0.5	0.0	-	3.1	15.8	2.1	3.0	4.1	0.0	-	24.9	-
PHF	0.774	0.948	0.300	0.000	0.000	-	0.878	0.458	0.984	0.863	0.807	0.250	-	0.925	0.833	0.750	0.313	0.583	0.000	-	0.909	0.931	0.563	0.792	0.684	0.000	-	0.935	0.919
Lights	95	234	6	0	0	-	335	11	311	141	110	1	-	574	10	18	5	7	0	-	40	199	27	38	52	0	-	316	1265
% Lights	99.0	99.6	100.0	-	-	-	99.4	100.0	100.0	97.2	97.3	100.0	-	98.8	100.0	100.0	100.0	100.0	-	-	100.0	99.0	100.0	100.0	100.0	-	-	99.4	99.1
Buses	1	0	0	0	0	-	1	0	0	2	2	0	-	4	0	0	0	0	0	-	0	1	0	0	0	0	-	1	6
% Buses	1.0	0.0	0.0	-	-	-	0.3	0.0	0.0	1.4	1.8	0.0	-	0.7	0.0	0.0	0.0	0.0	-	-	0.0	0.5	0.0	0.0	0.0	-	-	0.3	0.5
Trucks	0	1	0	0	0	-	1	0	0	2	1	0	-	3	0	0	0	0	0	-	0	1	0	0	0	0	-	1	5
% Trucks	0.0	0.4	0.0	-	-	-	0.3	0.0	0.0	1.4	0.9	0.0	-	0.5	0.0	0.0	0.0	0.0	-	-	0.0	0.5	0.0	0.0	0.0	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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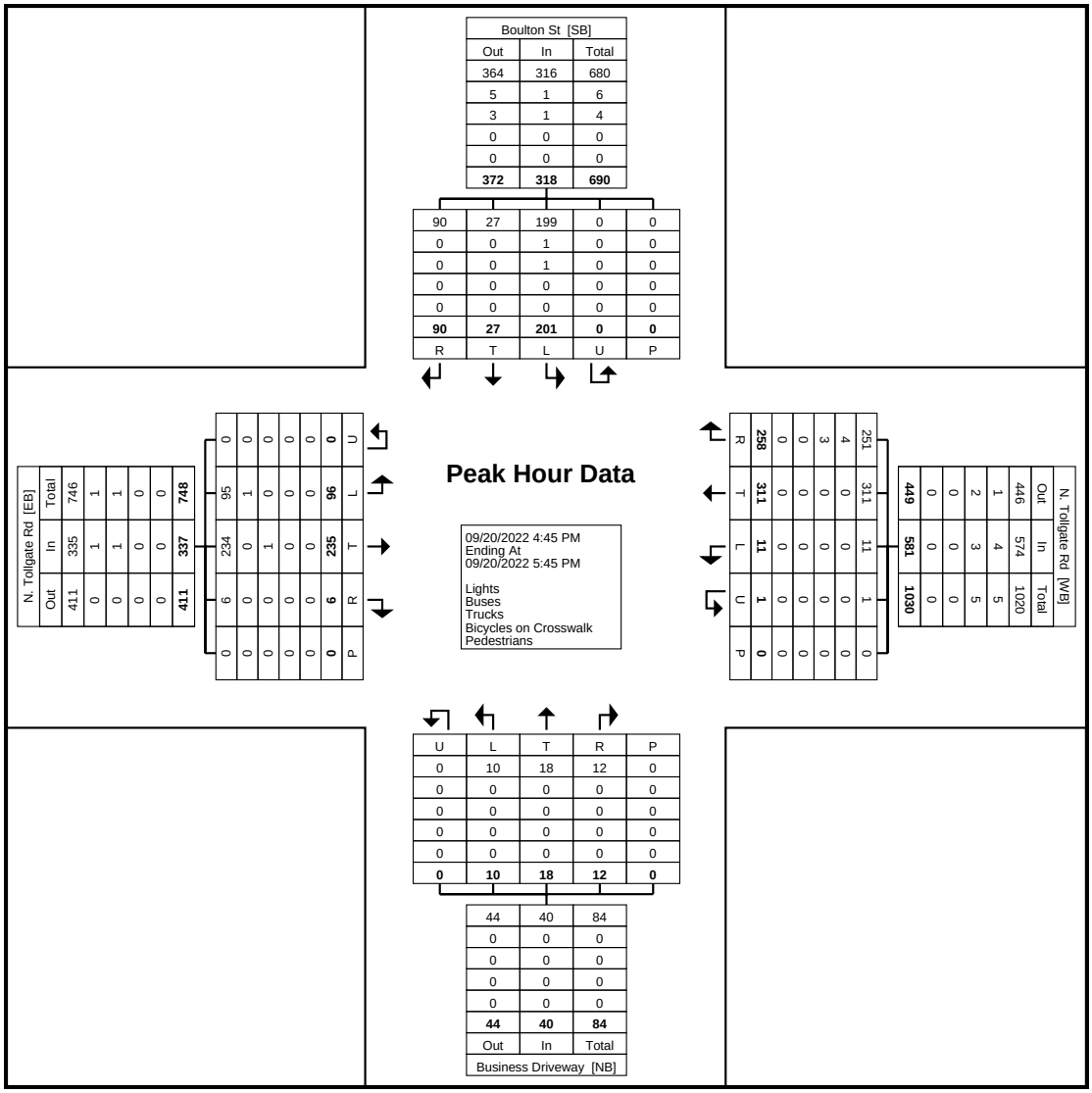
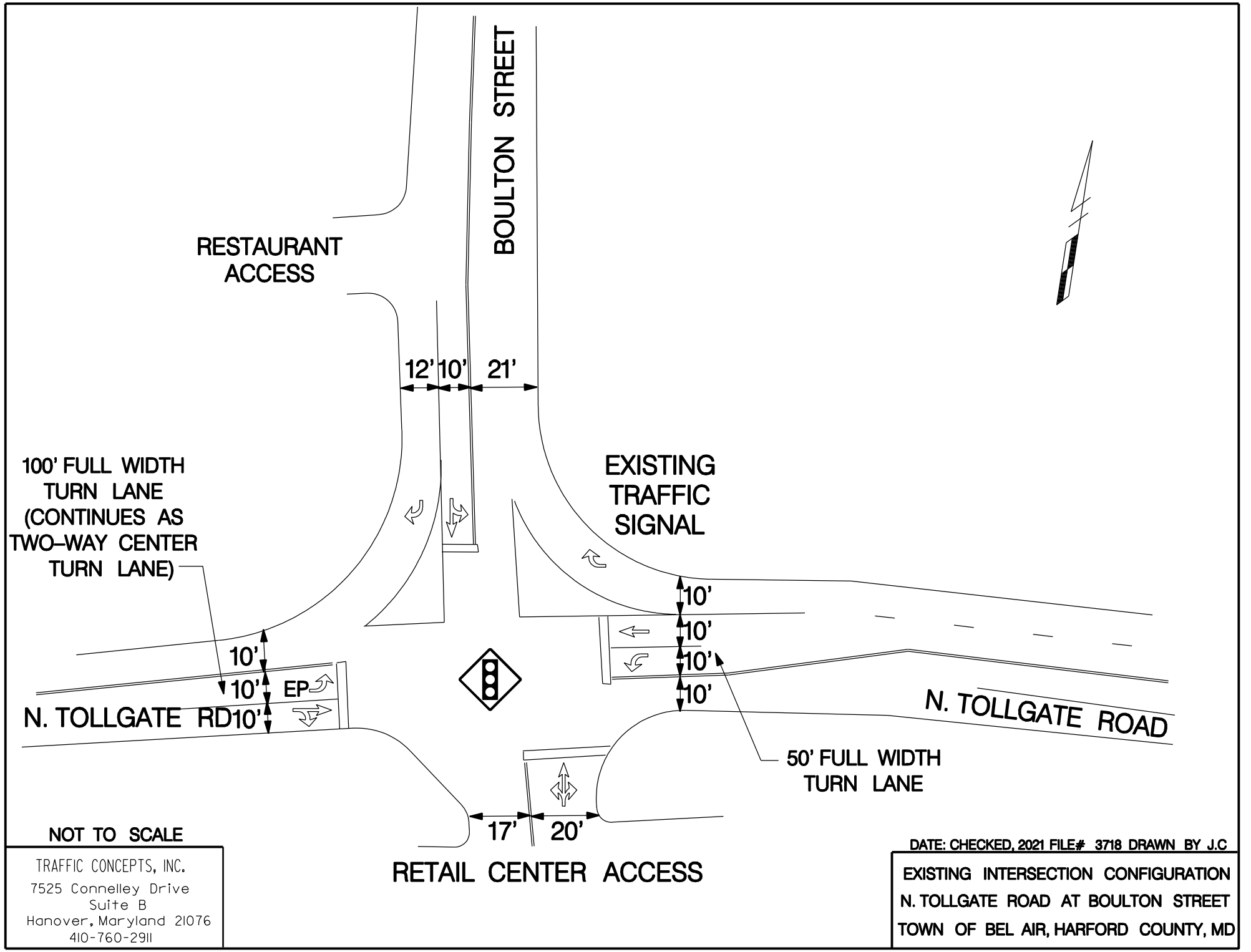
Harford County, MD
N Tollgate Rd & Boulton St
Tuesday, September 20, 2022
Location: 39.524129, -76.360506

Count Name: N. Tollgate Rd & Boulton St
Site Code:
Start Date: 09/20/2022
Page No: 6



Turning Movement Peak Hour Data Plot (4:45 PM)



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410-760-2911

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EXISTING INTERSECTION CONFIGURATION
N. TOLLGATE ROAD AT BOULTON STREET
TOWN OF BEL AIR, HARFORD COUNTY, MD

TRI-STATE TRAFFIC DATA

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Harford County, MD
MD 24 & Boulton St
Tuesday, September 20, 2022
Location: 39.528285, -76.357425

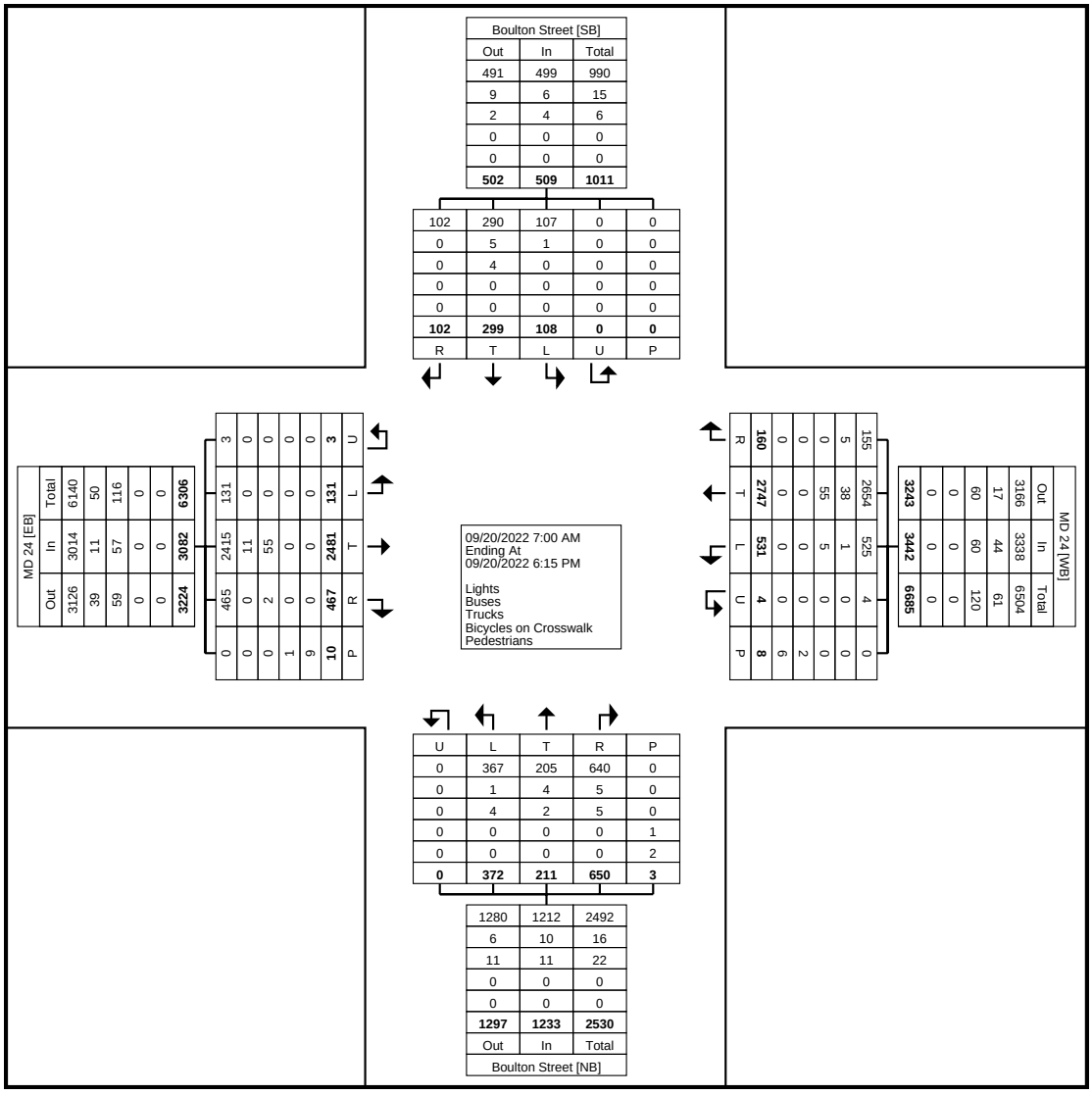
Count Name: MD 24 & Boulton St
Site Code:
Start Date: 09/20/2022
Page No: 1

Turning Movement Data

Start Time	MD 24 Eastbound						MD 24 Westbound							Boulton Street Northbound						Boulton Street Southbound							
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
7:00 AM	5	131	16	0	1	152	7	59	2	1	0	1	69	9	4	18	0	0	31	4	3	1	4	0	0	12	264
7:15 AM	5	145	19	0	0	169	13	104	0	0	0	0	117	5	4	17	0	0	26	2	14	2	1	0	0	19	331
7:30 AM	2	178	20	0	1	200	14	114	7	2	0	1	137	5	3	17	0	0	25	2	7	1	4	0	0	14	376
7:45 AM	19	206	22	0	0	247	27	123	8	5	0	0	163	14	6	8	0	0	28	8	10	3	3	0	0	24	462
Hourly Total	31	660	77	0	2	768	61	400	17	8	0	2	486	33	17	60	0	0	110	16	34	7	12	0	0	69	1433
8:00 AM	9	183	17	1	0	210	9	119	4	1	0	0	133	12	7	20	0	0	39	3	14	6	0	0	0	23	405
8:15 AM	9	193	19	0	1	221	13	98	5	7	0	0	123	13	5	14	0	0	32	6	22	2	1	0	0	31	407
8:30 AM	6	172	26	0	0	204	24	149	7	3	0	0	183	5	10	22	0	0	37	4	15	3	1	0	0	23	447
8:45 AM	4	155	33	0	0	192	32	100	12	0	0	0	144	16	11	25	0	0	52	7	18	0	0	0	0	25	413
Hourly Total	28	703	95	1	1	827	78	466	28	11	0	0	583	46	33	81	0	0	160	20	69	11	2	0	0	102	1672
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	7	120	34	0	2	161	52	214	12	2	0	1	280	29	20	64	0	2	113	5	29	6	1	0	0	41	595
4:15 PM	12	141	35	0	0	188	54	242	8	1	0	1	305	36	12	63	0	0	111	3	12	6	2	0	0	23	627
4:30 PM	8	153	42	0	1	203	47	238	6	2	0	0	293	37	20	56	0	0	113	16	37	12	0	0	0	65	674
4:45 PM	6	158	38	0	0	202	51	235	8	1	1	2	296	39	25	65	0	1	129	11	37	7	1	0	0	56	683
Hourly Total	33	572	149	0	3	754	204	929	34	6	1	4	1174	141	77	248	0	3	466	35	115	31	4	0	0	185	2579
5:00 PM	11	149	37	1	3	198	43	251	15	1	0	1	310	39	19	86	0	0	144	9	19	9	2	0	0	39	691
5:15 PM	12	114	29	1	0	156	46	259	13	5	1	0	324	42	24	44	0	0	110	11	25	9	1	0	0	46	636
5:30 PM	7	122	39	0	1	168	51	220	11	0	2	1	284	31	20	66	0	0	117	3	21	4	2	0	0	30	599
5:45 PM	9	161	41	0	0	211	48	222	11	0	0	0	281	40	21	65	0	0	126	14	16	4	4	0	0	38	656
Hourly Total	39	546	146	2	4	733	188	952	50	6	3	2	1199	152	84	261	0	0	497	37	81	26	9	0	0	153	2582
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	131	2481	467	3	10	3082	531	2747	129	31	4	8	3442	372	211	650	0	3	1233	108	299	75	27	0	0	509	8266
Approach %	4.3	80.5	15.2	0.1	-	-	15.4	79.8	3.7	0.9	0.1	-	-	30.2	17.1	52.7	0.0	-	-	21.2	58.7	14.7	5.3	0.0	-	-	-
Total %	1.6	30.0	5.6	0.0	-	37.3	6.4	33.2	1.6	0.4	0.0	-	41.6	4.5	2.6	7.9	0.0	-	14.9	1.3	3.6	0.9	0.3	0.0	-	6.2	-
Lights	131	2415	465	3	-	3014	525	2654	124	31	4	-	3338	367	205	640	0	-	1212	107	290	75	27	0	-	499	8063
% Lights	100.0	97.3	99.6	100.0	-	97.8	98.9	96.6	96.1	100.0	100.0	-	97.0	98.7	97.2	98.5	-	-	98.3	99.1	97.0	100.0	100.0	-	-	98.0	97.5
Buses	0	11	0	0	-	11	1	38	5	0	0	-	44	1	4	5	0	-	10	1	5	0	0	0	-	6	71
% Buses	0.0	0.4	0.0	0.0	-	0.4	0.2	1.4	3.9	0.0	0.0	-	1.3	0.3	1.9	0.8	-	-	0.8	0.9	1.7	0.0	0.0	-	-	1.2	0.9
Trucks	0	55	2	0	-	57	5	55	0	0	0	-	60	4	2	5	0	-	11	0	4	0	0	0	-	4	132
% Trucks	0.0	2.2	0.4	0.0	-	1.8	0.9	2.0	0.0	0.0	0.0	-	1.7	1.1	0.9	0.8	-	-	0.9	0.0	1.3	0.0	0.0	-	-	0.8	1.6
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	10.0	-	-	-	-	-	-	25.0	-	-	-	-	-	33.3	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	-	6	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	90.0	-	-	-	-	-	-	75.0	-	-	-	-	-	66.7	-	-	-	-	-	-	-	-	-

Harford County, MD
MD 24 & Boulton St
Tuesday, September 20, 2022
Location: 39.528285, -76.357425

Count Name: MD 24 & Boulton St
Site Code:
Start Date: 09/20/2022



Turning Movement Data Plot

www.TSTData.com
184 Baker Rd

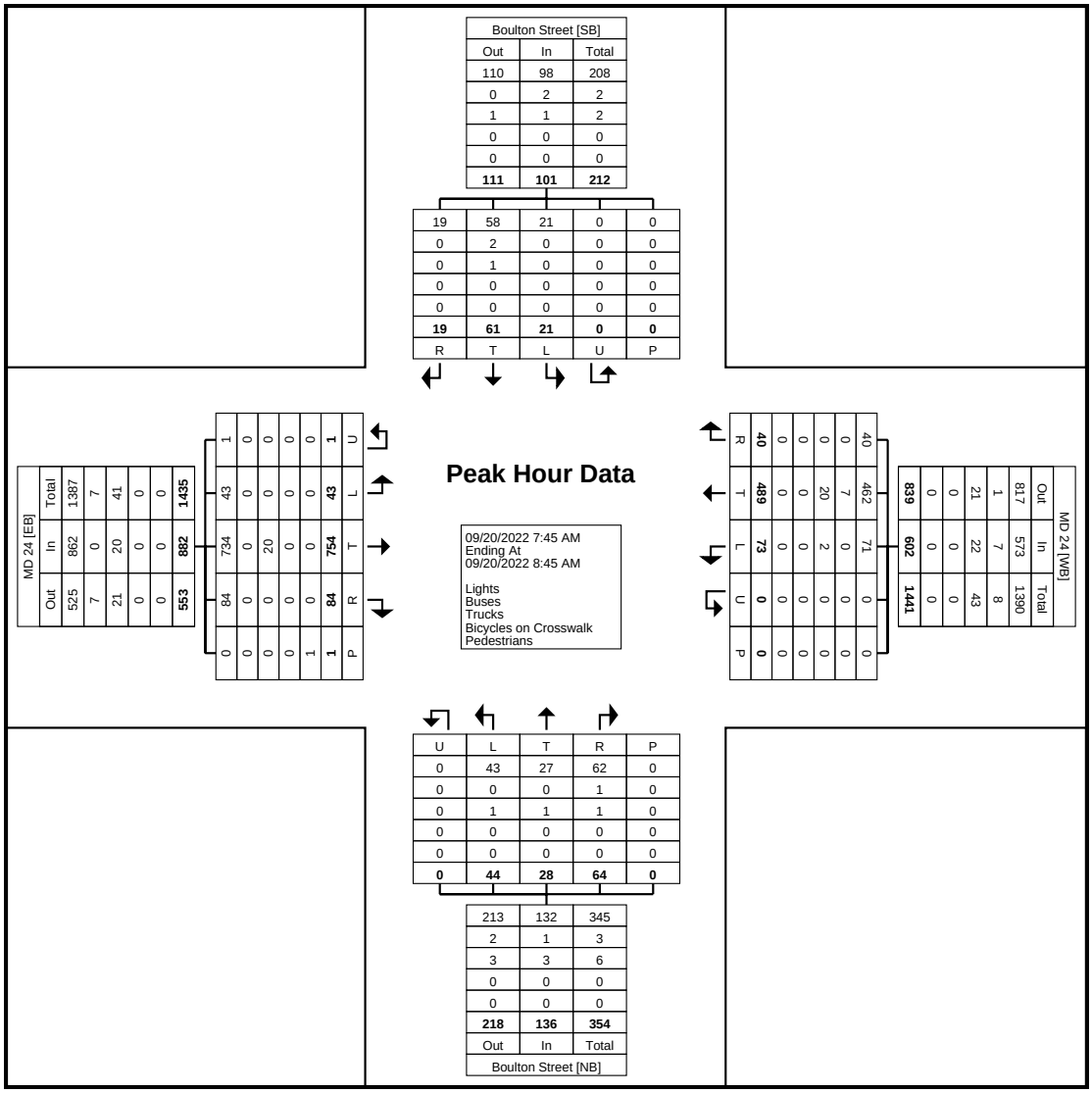
Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Harford County, MD
MD 24 & Boulton St
Tuesday, September 20, 2022
Location: 39.528285, -76.357425

Count Name: MD 24 & Boulton St
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (7:45 AM)

Start Time	MD 24 Eastbound						MD 24 Westbound							Boulton Street Northbound						Boulton Street Southbound							
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
7:45 AM	19	206	22	0	0	247	27	123	8	5	0	0	163	14	6	8	0	0	28	8	10	3	3	0	0	24	462
8:00 AM	9	183	17	1	0	210	9	119	4	1	0	0	133	12	7	20	0	0	39	3	14	6	0	0	0	23	405
8:15 AM	9	193	19	0	1	221	13	98	5	7	0	0	123	13	5	14	0	0	32	6	22	2	1	0	0	31	407
8:30 AM	6	172	26	0	0	204	24	149	7	3	0	0	183	5	10	22	0	0	37	4	15	3	1	0	0	23	447
Total	43	754	84	1	1	882	73	489	24	16	0	0	602	44	28	64	0	0	136	21	61	14	5	0	0	101	1721
Approach %	4.9	85.5	9.5	0.1	-	-	12.1	81.2	4.0	2.7	0.0	-	-	32.4	20.6	47.1	0.0	-	-	20.8	60.4	13.9	5.0	0.0	-	-	-
Total %	2.5	43.8	4.9	0.1	-	51.2	4.2	28.4	1.4	0.9	0.0	-	35.0	2.6	1.6	3.7	0.0	-	7.9	1.2	3.5	0.8	0.3	0.0	-	5.9	-
PHF	0.566	0.915	0.808	0.250	-	0.893	0.676	0.820	0.750	0.571	0.000	-	0.822	0.786	0.700	0.727	0.000	-	0.872	0.656	0.693	0.583	0.417	0.000	-	0.815	0.931
Lights	43	734	84	1	-	862	71	462	24	16	0	-	573	43	27	62	0	-	132	21	58	14	5	0	-	98	1665
% Lights	100.0	97.3	100.0	100.0	-	97.7	97.3	94.5	100.0	100.0	-	-	95.2	97.7	96.4	96.9	-	-	97.1	100.0	95.1	100.0	100.0	-	-	97.0	96.7
Buses	0	0	0	0	-	0	0	7	0	0	0	-	7	0	0	1	0	-	1	0	2	0	0	0	-	2	10
% Buses	0.0	0.0	0.0	0.0	-	0.0	0.0	1.4	0.0	0.0	-	-	1.2	0.0	0.0	1.6	-	-	0.7	0.0	3.3	0.0	0.0	-	-	2.0	0.6
Trucks	0	20	0	0	-	20	2	20	0	0	0	-	22	1	1	1	0	-	3	0	1	0	0	0	-	1	46
% Trucks	0.0	2.7	0.0	0.0	-	2.3	2.7	4.1	0.0	0.0	-	-	3.7	2.3	3.6	1.6	-	-	2.2	0.0	1.6	0.0	0.0	-	-	1.0	2.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (7:45 AM)

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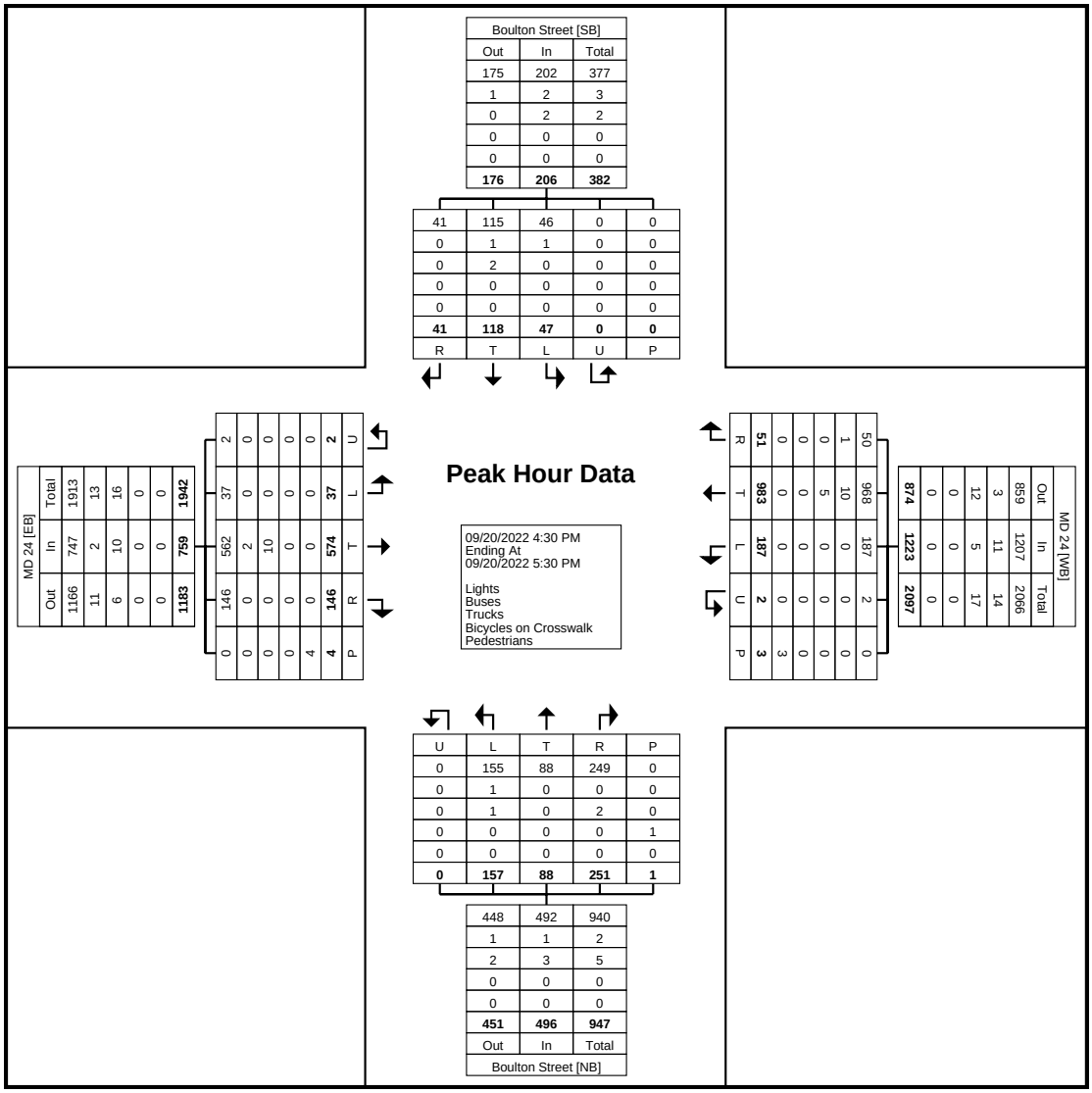
Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Harford County, MD
MD 24 & Boulton St
Tuesday, September 20, 2022
Location: 39.528285, -76.357425

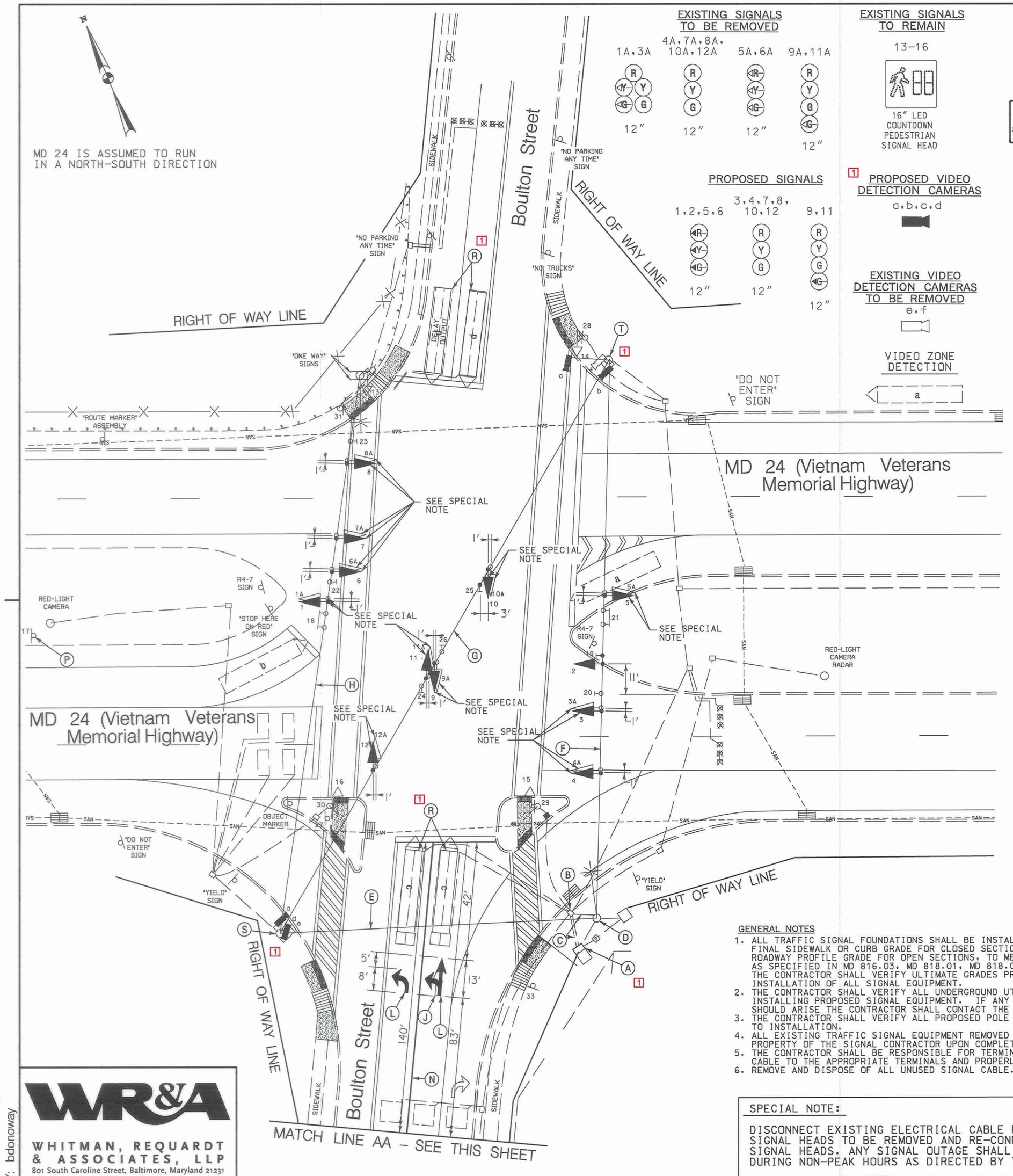
Count Name: MD 24 & Boulton St
Site Code:
Start Date: 09/20/2022

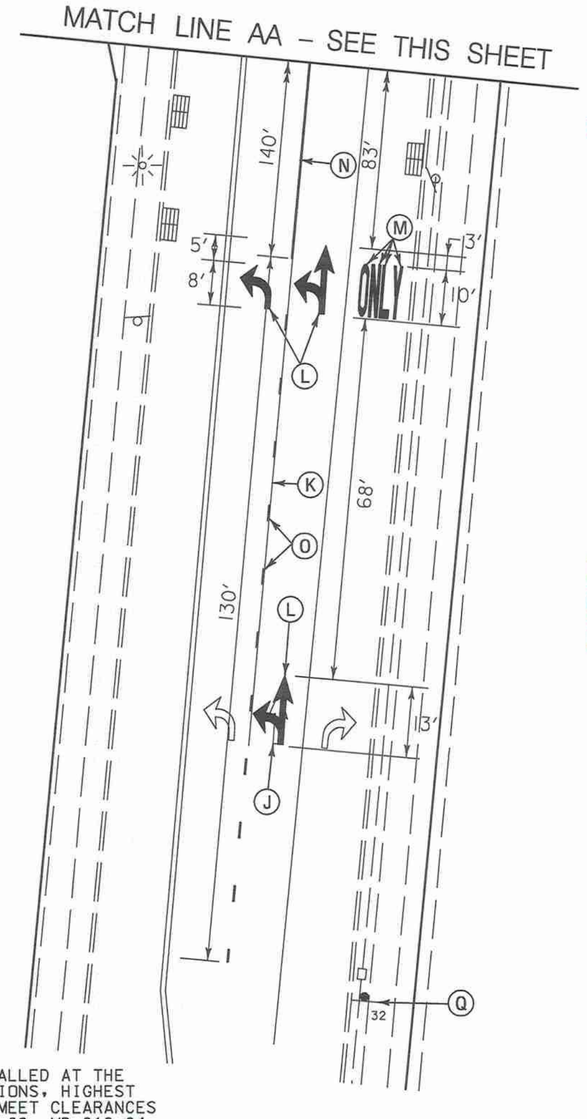
Turning Movement Peak Hour Data (4:30 PM)

Start Time	MD 24 Eastbound						MD 24 Westbound							Boulton Street Northbound						Boulton Street Southbound							
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
4:30 PM	8	153	42	0	1	203	47	238	6	2	0	0	293	37	20	56	0	0	113	16	37	12	0	0	0	65	674
4:45 PM	6	158	38	0	0	202	51	235	8	1	1	2	296	39	25	65	0	1	129	11	37	7	1	0	0	56	683
5:00 PM	11	149	37	1	3	198	43	251	15	1	0	1	310	39	19	86	0	0	144	9	19	9	2	0	0	39	691
5:15 PM	12	114	29	1	0	156	46	259	13	5	1	0	324	42	24	44	0	0	110	11	25	9	1	0	0	46	636
Total	37	574	146	2	4	759	187	983	42	9	2	3	1223	157	88	251	0	1	496	47	118	37	4	0	0	206	2684
Approach %	4.9	75.6	19.2	0.3	-	-	15.3	80.4	3.4	0.7	0.2	-	-	31.7	17.7	50.6	0.0	-	-	22.8	57.3	18.0	1.9	0.0	-	-	-
Total %	1.4	21.4	5.4	0.1	-	28.3	7.0	36.6	1.6	0.3	0.1	-	45.6	5.8	3.3	9.4	0.0	-	18.5	1.8	4.4	1.4	0.1	0.0	-	7.7	-
PHF	0.771	0.908	0.869	0.500	-	0.935	0.917	0.949	0.700	0.450	0.500	-	0.944	0.935	0.880	0.730	0.000	-	0.861	0.734	0.797	0.771	0.500	0.000	-	0.792	0.971
Lights	37	562	146	2	-	747	187	968	41	9	2	-	1207	155	88	249	0	-	492	46	115	37	4	0	-	202	2648
% Lights	100.0	97.9	100.0	100.0	-	98.4	100.0	98.5	97.6	100.0	100.0	-	98.7	98.7	100.0	99.2	-	-	99.2	97.9	97.5	100.0	100.0	-	-	98.1	98.7
Buses	0	2	0	0	-	2	0	10	1	0	0	-	11	1	0	0	0	-	1	1	1	0	0	0	-	2	16
% Buses	0.0	0.3	0.0	0.0	-	0.3	0.0	1.0	2.4	0.0	0.0	-	0.9	0.6	0.0	0.0	-	-	0.2	2.1	0.8	0.0	0.0	-	-	1.0	0.6
Trucks	0	10	0	0	-	10	0	5	0	0	0	-	5	1	0	2	0	-	3	0	2	0	0	0	-	2	20
% Trucks	0.0	1.7	0.0	0.0	-	1.3	0.0	0.5	0.0	0.0	0.0	-	0.4	0.6	0.0	0.8	-	-	0.6	0.0	1.7	0.0	0.0	-	-	1.0	0.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)





EXISTING SIGNALS TO BE REMOVED

PROPOSED SIGNALS

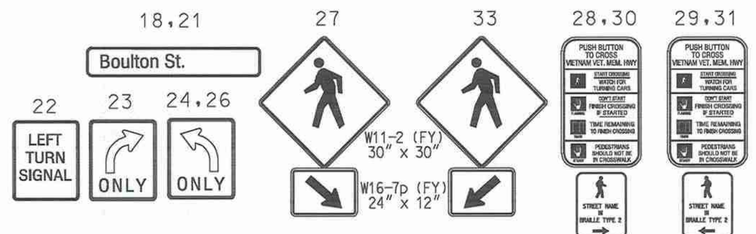
EXISTING SIGNALS TO REMAIN

[1] PROPOSED VIDEO DETECTION CAMERAS

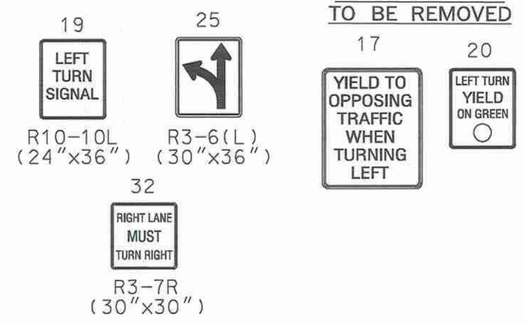
EXISTING VIDEO DETECTION CAMERAS TO BE REMOVED

VIDEO ZONE DETECTION

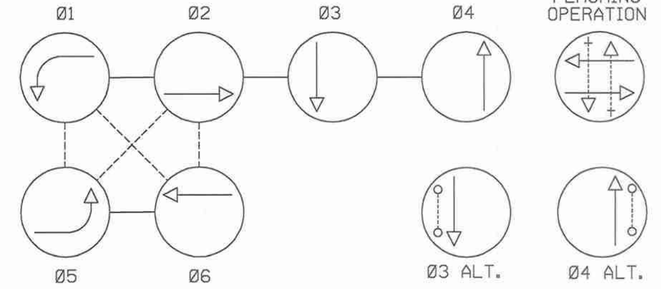
EXISTING SIGNS TO REMAIN



EXISTING SIGNS TO BE REMOVED



NEMA PHASING



NOTE:
PHASES ASSOCIATED BY A DASHED LINE WILL OPERATE CONCURRENTLY.
PHASES ASSOCIATED BY A SOLID LINE WILL NOT OPERATE CONCURRENTLY.

CONSTRUCTION DETAILS

[1] A. USE EXISTING BASE MOUNTED CABINET AND CONTROLLER. (SHA FORCES SHALL RETROFIT CONTROLLER EQUIPMENT TO OPERATE VIDEO DETECTION EQUIPMENT).
B. USE EXISTING HANDHOLE.
C. USE EXISTING CONDUIT.
D. USE EXISTING STEEL STRAIN POLE.
E. USE EXISTING STEEL SPAN WIRE.
F. USE EXISTING STEEL SPAN WIRE. REMOVE EXISTING SIGNAL HEADS AND SIGN. INSTALL NEW L.E.D SIGNAL HEADS AND SIGN.
G. USE EXISTING STEEL SPAN WIRE. REMOVE EXISTING SIGNAL HEADS AND INSTALL NEW L.E.D SIGNAL HEADS AND SIGN.
H. USE EXISTING STEEL SPAN WIRE. REMOVE EXISTING SIGNAL HEADS AND INSTALL NEW L.E.D SIGNAL HEADS.
J. REMOVE EXISTING PAVEMENT MARKING SYMBOL.
K. REMOVE EXISTING PAVEMENT MARKING LINE.
L. INSTALL HEAT APPLIED WHITE THERMOPLASTIC ARROWS.
M. INSTALL HEAT APPLIED WHITE PERMANENT PREFORMED MARKING LETTERS.
N. INSTALL 5 IN. HEAT APPLIED, WHITE PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING.
O. INSTALL 5 IN. HEAT APPLIED, WHITE PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING. (3 FT. LINE WITH 9 FT. GAP)
P. REMOVE EXISTING GROUND MOUNTED SIGN AND SUPPORT.
Q. INSTALL R3-7R (30 IN. x 30 IN.) SIGN ON ONE 4 IN. x 4 IN. WOOD SIGN SUPPORT.
[1] R. ABANDON EXISTING LOOP DETECTOR. DISCONNECT AND REMOVE LOOP DETECTOR CABLES FROM CONDUITS, HANDHOLES, SIGNAL STRUCTURES AND CONTROLLER.
[1] S. USE EXSITING STRAIN POLE. REMOVE EXISTING VIDEO DETECTION CAMERA. INSTALL PROPOSED VIDEO DETECTION CAMERAS MOUNTED ON STRAIN POLE.
[1] T. USE EXISTING STRAIN POLE. REMOVE EXISTING VIDEO DETECTION CAMERA. INSTALL PROPOSED VIDEO DETECTION CAMERA MOUNTED ON CAMERA ARM AND ON EXISTING STRAIN POLE.

GENERAL NOTES

1. ALL TRAFFIC SIGNAL FOUNDATIONS SHALL BE INSTALLED AT THE FINAL SIDEWALK OR CURB GRADE FOR CLOSED SECTIONS. HIGHEST ROADWAY PROFILE GRADE FOR OPEN SECTIONS. TO MEET CLEARANCES AS SPECIFIED IN MD 816.03, MD 818.01, MD 818.02, MD 818.04. THE CONTRACTOR SHALL VERIFY ULTIMATE GRADES PRIOR TO THE INSTALLATION OF ALL SIGNAL EQUIPMENT.
2. THE CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED SIGNAL EQUIPMENT. IF ANY UTILITIY CONFLICTS SHOULD ARISE THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER.
3. THE CONTRACTOR SHALL VERIFY ALL PROPOSED POLE LOCATIONS PRIOR TO INSTALLATION.
4. ALL EXISTING TRAFFIC SIGNAL EQUIPMENT REMOVED SHALL BECOME THE PROPERTY OF THE SIGNAL CONTRACTOR UPON COMPLETION OF THE NEW SIGNAL.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING ALL SIGNAL CABLE TO THE APPROPRIATE TERMINALS AND PROPERLY LABEL EACH CABLE.
6. REMOVE AND DISPOSE OF ALL UNUSED SIGNAL CABLE.

SPECIAL NOTE:

DISCONNECT EXISTING ELECTRICAL CABLE FROM EXISTING SIGNAL HEADS TO BE REMOVED AND RE-CONNECT TO PROPOSED SIGNAL HEADS. ANY SIGNAL OUTAGE SHALL BE SCHEDULED DURING NON-PEAK HOURS AS DIRECTED BY THE ENGINEER.

GEOMETRIC LEGEND
EXISTING
PROPOSED

UTILITY LEGEND
SD — SD — STORM DRAIN
G — G — GAS MAIN
W — W — WATER MAIN
S — S — SEWER MAIN
E — E — ELECTRIC CABLES
A — A — AERIAL CABLES
T — T — TELEPHONE CABLES
F — F — FIBER-OPTIC

WR&A
WHITMAN, REQUARDT & ASSOCIATES, LLP
801 South Caroline Street, Baltimore, Maryland 21231

BY: bdonoway

APPROVALS
TEAM LEADER
ASST. DIV. CHIEF
DIVISION CHIEF
OFFICE DIRECTOR
ORIGINAL ON FILE

REVISIONS

[1] REDLINE REVISION NO. 1 UPGRADE VIDEO DETECTION CONTRACT NO. XX4485185 8/13/10							
BRD	NML						
(E) PHASING CHANGE TO EXCLUSIVE LEFT TURN FROM E/P NB MD 24 CONTRACT NO. XX4485185 3/29/10							
BRD	NML						
D INSTALL NEW RED LIGHT CAMERA EQUIPMENT CONTRACT NO. BW9956M82 1/15/10							
FJH	DJD						

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF TRAFFIC & SAFETY
TRAFFIC ENGINEERING DESIGN DIVISION

MD 24 (Vietnam Veterans Memorial Highway) and Boulton Street
Bel Air, MD

TRAFFIC SIGNALIZATION PLAN

SCALE 1" = 20' ADVERTISED DATE 10-28-87 CONTRACT NO. AT7825185

DESIGNED BY S. Thacker
DRAWN BY
CHECKED BY D. Doda
F.A.P. NO.
COUNTY Harford
LOGMILE 12002409.28
TIMS NO. K318
TOD NO.

TS NO. 2386E | DRAWING TSP-1 OF 2 | SHEET NO. 1 OF 2

PLOTTED: 08-16-2010
FILE: N:\91669-065\CADD\pSG-P001_RL.dgn

TRI-STATE TRAFFIC DATA

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Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Harford County, MD
Boulton St & Commercial Access West
Thursday, September 22, 2022
Location: 39.526855, -76.359302

Count Name: Boulton St & Commercial Access West
Site Code:
Start Date: 09/22/2022

Turning Movement Data

Start Time	Shopping Center Dr Eastbound							Site Access Westbound							Boulton St Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	2	5	0	0	0	0	7	14
6:15 AM	1	0	0	0	0	0	1	0	1	1	0	0	0	2	0	20	1	0	0	0	21	2	9	1	0	0	0	12	36
6:30 AM	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	17	1	0	0	0	18	1	14	0	0	0	0	15	35
6:45 AM	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	17	1	0	0	0	18	4	20	0	0	0	0	24	44
Hourly Total	4	0	0	0	0	0	4	0	1	1	1	0	0	3	0	61	3	0	0	0	64	9	48	1	0	0	0	58	129
7:00 AM	3	0	0	0	0	1	3	0	3	0	2	0	0	5	3	17	0	0	0	0	20	1	32	1	0	0	0	34	62
7:15 AM	3	0	0	0	0	0	3	0	1	0	1	0	0	2	1	18	0	0	0	0	19	4	15	1	0	0	0	20	44
7:30 AM	4	1	1	1	0	0	7	0	3	0	1	0	0	4	1	22	0	0	0	0	23	2	37	1	1	0	0	41	75
7:45 AM	3	0	0	1	0	0	4	1	2	2	0	0	0	5	1	30	1	0	0	0	32	3	32	1	0	0	0	36	77
Hourly Total	13	1	1	2	0	1	17	1	9	2	4	0	0	16	6	87	1	0	0	0	94	10	116	4	1	0	0	131	258
8:00 AM	6	0	1	1	0	0	8	0	0	0	0	0	0	0	5	30	0	0	0	0	35	1	35	0	0	0	0	36	79
8:15 AM	2	0	1	2	0	0	5	0	1	0	0	0	1	1	4	34	0	0	0	0	38	2	37	3	0	0	0	42	86
8:30 AM	7	1	1	3	0	0	12	1	1	0	0	0	0	2	5	32	1	0	0	0	38	2	30	2	0	0	0	34	86
8:45 AM	8	1	1	2	0	0	12	1	0	0	1	0	0	2	4	41	0	1	0	0	46	10	67	2	0	0	0	79	139
Hourly Total	23	2	4	8	0	0	37	2	2	0	1	0	1	5	18	137	1	1	0	0	157	15	169	7	0	0	0	191	390
9:00 AM	7	0	1	6	0	1	14	0	0	3	1	0	0	4	6	41	0	0	0	0	47	5	52	1	0	0	0	58	123
9:15 AM	9	0	1	3	0	0	13	0	0	0	3	0	0	3	6	21	0	0	0	0	27	6	58	2	0	0	0	66	109
9:30 AM	12	0	1	4	0	1	17	0	0	2	0	0	0	2	12	31	0	0	0	0	43	15	56	5	0	0	0	76	138
9:45 AM	17	3	5	7	0	2	32	2	1	0	1	0	0	4	11	52	4	0	1	0	68	20	49	2	0	0	0	71	175
Hourly Total	45	3	8	20	0	4	76	2	1	5	5	0	0	13	35	145	4	0	1	0	185	46	215	10	0	0	0	271	545
10:00 AM	21	2	3	8	0	1	34	2	7	1	7	0	1	17	14	56	1	1	1	0	73	8	45	3	0	1	0	57	181
10:15 AM	24	2	4	7	0	0	37	2	7	2	12	0	1	23	13	53	2	0	1	0	69	15	44	1	1	0	0	61	190
10:30 AM	10	0	4	8	0	0	22	2	7	2	11	0	0	22	16	47	1	1	0	0	65	11	69	2	0	0	0	82	191
10:45 AM	27	6	5	5	0	0	43	0	13	3	7	0	0	23	8	61	2	1	0	0	72	13	53	2	0	0	0	68	206
Hourly Total	82	10	16	28	0	1	136	6	34	8	37	0	2	85	51	217	6	3	2	0	279	47	211	8	1	1	0	268	768
11:00 AM	20	1	3	7	0	0	31	3	1	3	9	0	0	16	12	58	0	0	0	0	70	19	62	2	0	0	0	83	200
11:15 AM	19	6	2	4	2	0	33	3	2	7	13	0	0	25	14	61	3	1	0	0	79	20	54	3	0	0	0	77	214
11:30 AM	33	2	7	8	0	0	50	5	2	6	18	0	0	31	21	53	4	0	1	0	79	15	69	1	0	0	0	85	245
11:45 AM	30	1	2	9	1	1	43	6	2	10	16	1	0	35	25	54	4	0	0	1	83	17	69	2	0	0	0	88	249
Hourly Total	102	10	14	28	3	1	157	17	7	26	56	1	0	107	72	226	11	1	1	1	311	71	254	8	0	0	0	333	908
12:00 PM	19	3	6	8	1	0	37	4	1	10	14	0	0	29	8	65	2	0	0	0	75	20	60	4	1	0	0	85	226
12:15 PM	24	2	4	7	1	0	38	5	1	9	21	0	0	36	7	71	5	0	0	0	83	19	58	2	0	0	0	79	236
12:30 PM	19	2	3	3	0	0	27	0	0	12	19	2	0	33	16	57	2	0	0	0	75	12	62	1	0	0	0	75	210
12:45 PM	17	2	3	5	0	0	27	4	2	6	21	0	0	33	14	48	3	0	0	0	65	16	57	1	0	0	0	74	199
Hourly Total	79	9	16	23	2	0	129	13	4	37	75	2	0	131	45	241	12	0	0	0	298	67	237	8	1	0	0	313	871
1:00 PM	21	2	3	4	0	0	30	1	2	10	17	1	0	31	14	50	2	1	0	0	67	19	45	4	1	0	0	69	197
1:15 PM	22	5	4	5	0	0	36	6	3	8	11	0	0	28	11	57	0	0	0	0	68	9	36	1	0	0	0	46	178
1:30 PM	21	1	4	7	0	0	33	3	1	3	14	0	0	21	14	62	3	1	0	0	80	16	58	2	0	0	0	76	210
1:45 PM	31	1	8	7	0	0	47	3	3	8	20	0	0	34	9	58	3	1	0	0	71	22	45	0	0	0	0	67	219
Hourly Total	95	9	19	23	0	0	146	13	9	29	62	1	0	114	48	227	8	3	0	0	286	66	184	7	1	0	0	258	804
2:00 PM	17	1	4	1	0	0	23	3	1	6	9	1	0	20	15	60	9	0	0	0	84	20	53	3	1	0	0	77	204
2:15 PM	20	1	2	4	0	0	27	8	1	13	9	0	0	31	10	59	1	0	0	0	70	12	49	0	0	0	0	61	189
2:30 PM	30	3	3	9	0	2	45	3	0	23	15	0	0	41	15	39	3	0	0	0	57	11	39	1	1	0	0	52	195
2:45 PM	21	5	3	6	0	0	35	7	0	8	15	0	0	30	11	56	3	0	1	0	71	17	46	3	0	0	1	66	202
Hourly Total	88	10	12	20	0	2	130	21	2	50	48	1	0	122	51	214	16	0	1	0	282	60	187	7	2	0	1	256	790
3:00 PM	37	1	3	3	1	0	45	5	2	6	15	0	0	28	9	68	0	1	0	0	78	22	45	8	0	1	0	76	227
3:15 PM	27	1	5	1	0	0	34	3	4	10	20	0	0	37	10	43	1	0	0	0	54	23	53	2	0	0	0	78	203
3:30 PM	18	3	6	2	0	0	29	5	2	5	12	0	1	24	3	48	4	0	0	0	55	12	41	0	0	0	0	53	161
3:45 PM	20	1	3	2	0	0	26	2	1	6	21	0	0	30	24	55	3	0	0	0	82	19	58	4	0	1	0	82	220
Hourly Total	102	6	17	8	1	0	134	15	9	27	68	0	1	119	46	214	8	1	0	0	269	76	197	14	0	2	0	289	811
4:00 PM	31	2	3	11	0	0	47	6	2	12	11	0	0	31	17	72	2	0	0	0	91	21	65	3	0	1	0	90	259
4:15 PM	18	3	4	5	1	0	31	6	1	7	15	0	0	29	18	70	4	0	0	1	92	15	82	2	0	1	1	100	252
4:30 PM	31	1	8	3	0	0	43	2	2	7	18	0	1	29	11	64	2	1	0	1	78	12	90	0	0	0	0	102	252
4:45 PM	25	2	6	5	0	1	38	7	1	13	10	0	1	31	16	75	1	2	0	1	94	17	88	1	1	0	0	107	270
Hourly Total	105	8	21	24	1	1	159	21	6	39	54	0	2	120	62	281	9	3	0	3	355	65	325	6	1	2	1	399	1033
5:00 PM	29	1	1	4	0	1	35	7	1	17	17	0	0	42	13	82	4	1	0	0	100	12	70	2	1	0	0	85	262
5:15 PM	20	3	5	5	1	1	34	7	0	12	17	0	0	36	12	63	1	1	0	0	77	21	76	4	0	2	0	103	250
5:30 PM	25	4	4	12	0	0	45	4	2	6	13	0	0	25	11	72	3	0	0	0	86	13	72	1	1	0	0	87	243
5:45 PM	24	1	6	9	0	0	40	4	3	9	9	0	0	25	16	87	3	0	0	0	106	13	73	2	0	0	0	88	259

Hourly Total	98	9	16	30	1	2	154	22	6	44	56	0	0	128	52	304	11	2	0	0	369	59	291	9	2	2	0	363	1014
6:00 PM	26	4	5	1	1	0	37	3	2	13	15	0	0	33	16	57	3	2	0	0	78	18	57	2	0	0	0	77	225
6:15 PM	21	2	4	8	0	0	35	2	0	6	15	0	0	23	11	58	3	3	0	0	75	12	76	0	0	0	0	88	221
6:30 PM	21	1	5	2	0	0	29	6	3	3	13	0	0	25	13	70	1	0	0	0	84	14	49	4	0	0	0	67	205
6:45 PM	20	1	6	10	0	0	37	1	1	10	17	0	0	29	9	53	0	0	0	0	62	23	52	1	0	0	0	76	204
Hourly Total	88	8	20	21	1	0	138	12	6	32	60	0	0	110	49	238	7	5	0	0	299	67	234	7	0	0	0	308	855
Grand Total	924	85	164	235	9	12	1417	145	96	300	527	5	6	1073	535	2592	97	19	5	4	3248	658	2668	96	9	7	2	3438	9176
Approach %	65.2	6.0	11.6	16.6	0.6	-	-	13.5	8.9	28.0	49.1	0.5	-	-	16.5	79.8	3.0	0.6	0.2	-	-	19.1	77.6	2.8	0.3	0.2	-	-	-
Total %	10.1	0.9	1.8	2.6	0.1	-	15.4	1.6	1.0	3.3	5.7	0.1	-	11.7	5.8	28.2	1.1	0.2	0.1	-	35.4	7.2	29.1	1.0	0.1	0.1	-	37.5	-
Lights	919	72	163	234	8	-	1396	145	95	296	522	4	-	1062	529	2519	81	15	5	-	3149	636	2629	96	8	7	-	3376	8983
% Lights	99.5	84.7	99.4	99.6	88.9	-	98.5	100.0	99.0	98.7	99.1	80.0	-	99.0	98.9	97.2	83.5	78.9	100.0	-	97.0	96.7	98.5	100.0	88.9	100.0	-	98.2	97.9
Buses	1	13	0	0	1	-	15	0	0	1	2	1	-	4	4	38	16	4	0	-	62	17	11	0	0	0	-	28	109
% Buses	0.1	15.3	0.0	0.0	11.1	-	1.1	0.0	0.0	0.3	0.4	20.0	-	0.4	0.7	1.5	16.5	21.1	0.0	-	1.9	2.6	0.4	0.0	0.0	0.0	-	0.8	1.2
Trucks	4	0	1	1	0	-	6	0	1	3	3	0	-	7	2	35	0	0	0	-	37	5	28	0	1	0	-	34	84
% Trucks	0.4	0.0	0.6	0.4	0.0	-	0.4	0.0	1.0	1.0	0.6	0.0	-	0.7	0.4	1.4	0.0	0.0	0.0	-	1.1	0.8	1.0	0.0	11.1	0.0	-	1.0	0.9
Bicycles on Crosswalk	-	-	-	-	-	5	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	41.7	-	-	-	-	-	-	16.7	-	-	-	-	-	-	25.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	7	-	-	-	-	-	-	5	-	-	-	-	-	-	3	-	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	58.3	-	-	-	-	-	-	83.3	-	-	-	-	-	-	75.0	-	-	-	-	-	-	100.0	-	-

Harford County, MD
Boulton St & Commercial Access West
Thursday, September 22, 2022
Location: 39.526855, -76.359302

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610-466-1469
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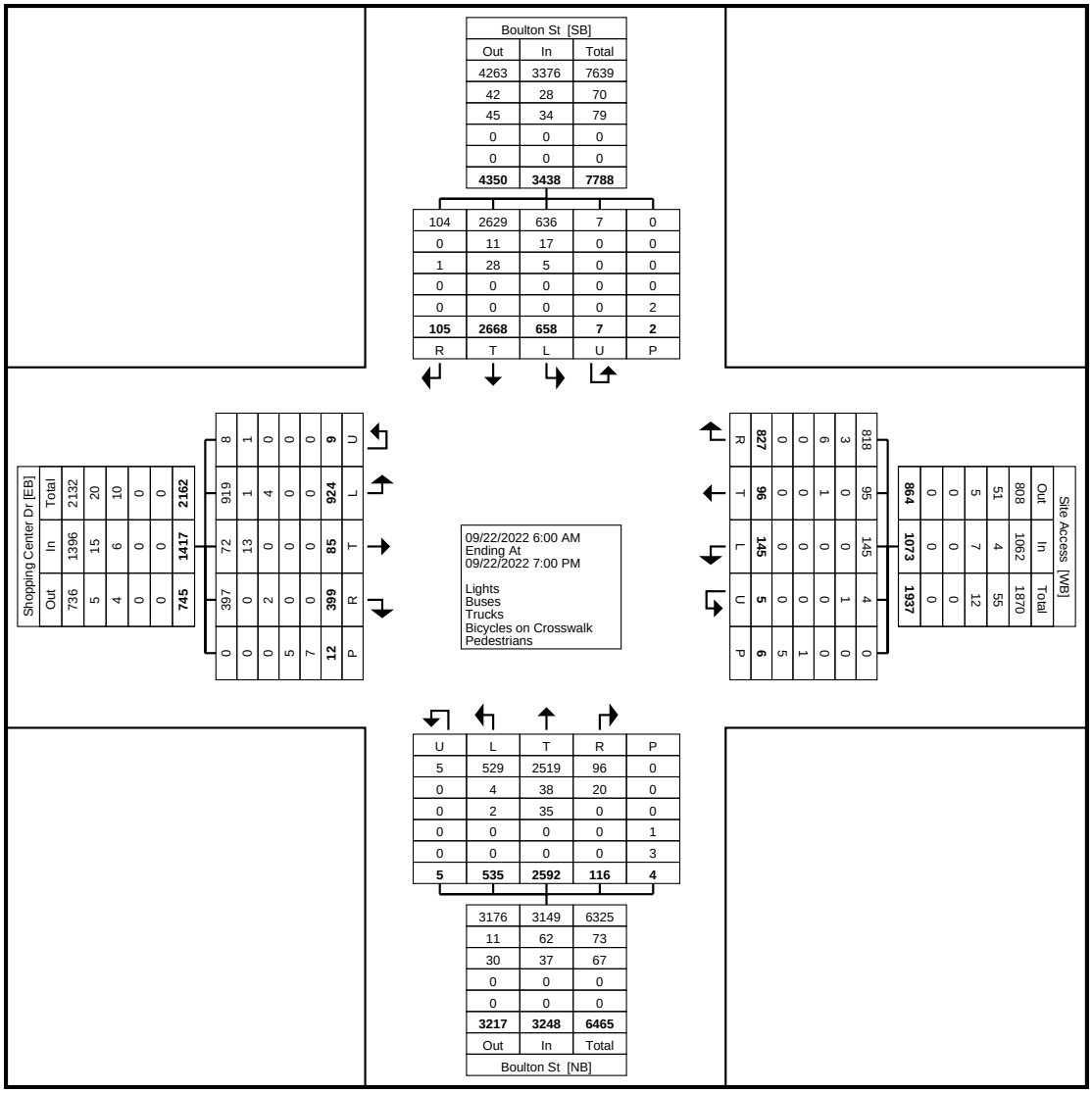
Count Name: Boulton St & Commercial Access West
Site Code:
Start Date: 09/22/2022



Turning Movement Data Plot

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Harford County, MD
Boulton St & Commercial Access West
Thursday, September 22, 2022
Location: 39.526855, -76.359302

Count Name: Boulton St & Commercial Access West
Site Code:
Start Date: 09/22/2022

Turning Movement Peak Hour Data (9:00 AM)

Start Time	Shopping Center Dr Eastbound							Site Access Westbound							Boulton St Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
9:00 AM	7	0	1	6	0	1	14	0	0	3	1	0	0	4	6	41	0	0	0	0	47	5	52	1	0	0	0	58	123
9:15 AM	9	0	1	3	0	0	13	0	0	0	3	0	0	3	6	21	0	0	0	0	27	6	58	2	0	0	0	66	109
9:30 AM	12	0	1	4	0	1	17	0	0	2	0	0	0	2	12	31	0	0	0	0	43	15	56	5	0	0	0	76	138
9:45 AM	17	3	5	7	0	2	32	2	1	0	1	0	0	4	11	52	4	0	1	0	68	20	49	2	0	0	0	71	175
Total	45	3	8	20	0	4	76	2	1	5	5	0	0	13	35	145	4	0	1	0	185	46	215	10	0	0	0	271	545
Approach %	59.2	3.9	10.5	26.3	0.0	-	-	15.4	7.7	38.5	38.5	0.0	-	-	18.9	78.4	2.2	0.0	0.5	-	-	17.0	79.3	3.7	0.0	0.0	-	-	-
Total %	8.3	0.6	1.5	3.7	0.0	-	13.9	0.4	0.2	0.9	0.9	0.0	-	2.4	6.4	26.6	0.7	0.0	0.2	-	33.9	8.4	39.4	1.8	0.0	0.0	-	49.7	-
PHF	0.662	0.250	0.400	0.714	0.000	-	0.594	0.250	0.250	0.417	0.417	0.000	-	0.813	0.729	0.697	0.250	0.000	0.250	-	0.680	0.575	0.927	0.500	0.000	0.000	-	0.891	0.779
Lights	45	2	8	20	0	-	75	2	1	5	5	0	-	13	34	138	2	0	1	-	175	44	213	10	0	0	-	267	530
% Lights	100.0	66.7	100.0	100.0	-	-	98.7	100.0	100.0	100.0	100.0	-	-	100.0	97.1	95.2	50.0	-	100.0	-	94.6	95.7	99.1	100.0	-	-	-	98.5	97.2
Buses	0	1	0	0	0	-	1	0	0	0	0	0	-	0	1	3	2	0	0	-	6	2	1	0	0	0	-	3	10
% Buses	0.0	33.3	0.0	0.0	-	-	1.3	0.0	0.0	0.0	0.0	-	-	0.0	2.9	2.1	50.0	-	0.0	-	3.2	4.3	0.5	0.0	-	-	-	1.1	1.8
Trucks	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	4	0	0	0	-	4	0	1	0	0	0	-	1	5
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.8	0.0	-	0.0	-	2.2	0.0	0.5	0.0	-	-	-	0.4	0.9
Bicycles on Crosswalk	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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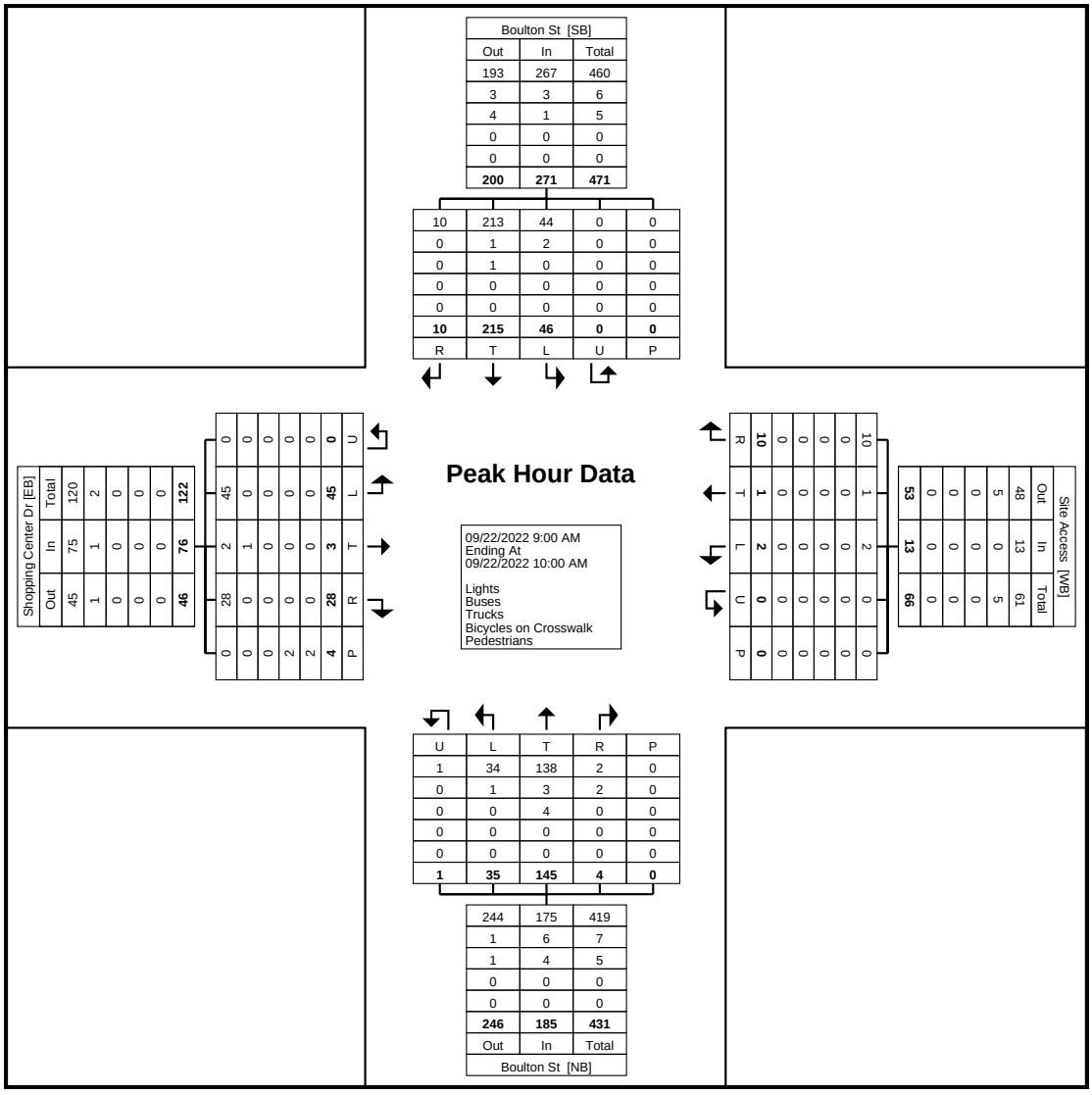

Turning Movement Peak Hour Data Plot (9:00 AM)

Harford County, MD
Boulton St & Commercial Access West
Thursday, September 22, 2022
Location: 39.526855, -76.359302

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Turning Movement Peak Hour Data (11:30 AM)

Start Time	Shopping Center Dr Eastbound							Site Access Westbound							Boulton St Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
11:30 AM	33	2	7	8	0	0	50	5	2	6	18	0	0	31	21	53	4	0	1	0	79	15	69	1	0	0	0	85	245
11:45 AM	30	1	2	9	1	1	43	6	2	10	16	1	0	35	25	54	4	0	0	1	83	17	69	2	0	0	0	88	249
12:00 PM	19	3	6	8	1	0	37	4	1	10	14	0	0	29	8	65	2	0	0	0	75	20	60	4	1	0	0	85	226
12:15 PM	24	2	4	7	1	0	38	5	1	9	21	0	0	36	7	71	5	0	0	0	83	19	58	2	0	0	0	79	236
Total	106	8	19	32	3	1	168	20	6	35	69	1	0	131	61	243	15	0	1	1	320	71	256	9	1	0	0	337	956
Approach %	63.1	4.8	11.3	19.0	1.8	-	-	15.3	4.6	26.7	52.7	0.8	-	-	19.1	75.9	4.7	0.0	0.3	-	-	21.1	76.0	2.7	0.3	0.0	-	-	-
Total %	11.1	0.8	2.0	3.3	0.3	-	17.6	2.1	0.6	3.7	7.2	0.1	-	13.7	6.4	25.4	1.6	0.0	0.1	-	33.5	7.4	26.8	0.9	0.1	0.0	-	35.3	-
PHF	0.803	0.667	0.679	0.889	0.750	-	0.840	0.833	0.750	0.875	0.821	0.250	-	0.910	0.610	0.856	0.750	0.000	0.250	-	0.964	0.888	0.928	0.563	0.250	0.000	-	0.957	0.960
Lights	105	8	19	32	3	-	167	20	6	34	69	1	-	130	61	235	14	0	1	-	311	69	253	9	1	0	-	332	940
% Lights	99.1	100.0	100.0	100.0	100.0	-	99.4	100.0	100.0	97.1	100.0	100.0	-	99.2	100.0	96.7	93.3	-	100.0	-	97.2	97.2	98.8	100.0	100.0	-	-	98.5	98.3
Buses	0	0	0	0	0	-	0	0	0	1	0	0	-	1	0	2	1	0	0	-	3	1	2	0	0	0	-	3	7
% Buses	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	2.9	0.0	0.0	-	0.8	0.0	0.8	6.7	-	0.0	-	0.9	1.4	0.8	0.0	0.0	-	-	0.9	0.7
Trucks	1	0	0	0	0	-	1	0	0	0	0	0	-	0	0	6	0	0	0	-	6	1	1	0	0	0	-	2	9
% Trucks	0.9	0.0	0.0	0.0	0.0	-	0.6	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	2.5	0.0	-	0.0	-	1.9	1.4	0.4	0.0	0.0	-	-	0.6	0.9
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-

Harford County, MD
Boulton St & Commercial Access West
Thursday, September 22, 2022
Location: 39.526855, -76.359302

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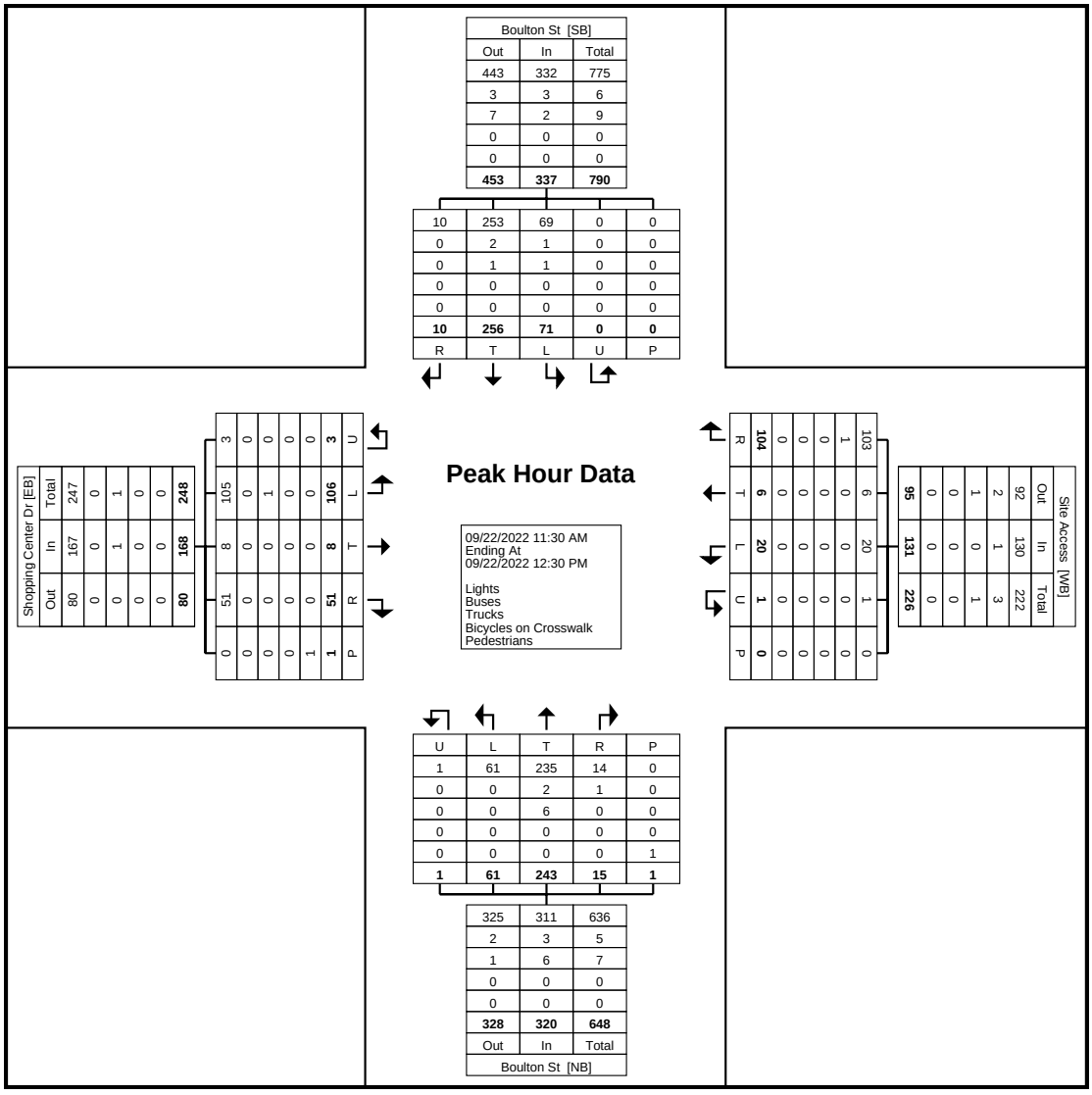

Turning Movement Peak Hour Data Plot (11:30 AM)

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Harford County, MD
Boulton St & Commercial Access West
Thursday, September 22, 2022
Location: 39.526855, -76.359302

Count Name: Boulton St & Commercial Access West
Site Code:
Start Date: 09/22/2022

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Shopping Center Dr Eastbound							Site Access Westbound							Boulton St Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:15 PM	18	3	4	5	1	0	31	6	1	7	15	0	0	29	18	70	4	0	0	1	92	15	82	2	0	1	1	100	252
4:30 PM	31	1	8	3	0	0	43	2	2	7	18	0	1	29	11	64	2	1	0	1	78	12	90	0	0	0	0	102	252
4:45 PM	25	2	6	5	0	1	38	7	1	13	10	0	1	31	16	75	1	2	0	1	94	17	88	1	1	0	0	107	270
5:00 PM	29	1	1	4	0	1	35	7	1	17	17	0	0	42	13	82	4	1	0	0	100	12	70	2	1	0	0	85	262
Total	103	7	19	17	1	2	147	22	5	44	60	0	2	131	58	291	11	4	0	3	364	56	330	5	2	1	1	394	1036
Approach %	70.1	4.8	12.9	11.6	0.7	-	-	16.8	3.8	33.6	45.8	0.0	-	-	15.9	79.9	3.0	1.1	0.0	-	-	14.2	83.8	1.3	0.5	0.3	-	-	-
Total %	9.9	0.7	1.8	1.6	0.1	-	14.2	2.1	0.5	4.2	5.8	0.0	-	12.6	5.6	28.1	1.1	0.4	0.0	-	35.1	5.4	31.9	0.5	0.2	0.1	-	38.0	-
PHF	0.831	0.583	0.594	0.850	0.250	-	0.855	0.786	0.625	0.647	0.833	0.000	-	0.780	0.806	0.887	0.688	0.500	0.000	-	0.910	0.824	0.917	0.625	0.500	0.250	-	0.921	0.959
Lights	103	6	19	17	0	-	145	22	5	44	60	0	-	131	58	289	9	4	0	-	360	55	327	5	2	1	-	390	1026
% Lights	100.0	85.7	100.0	100.0	0.0	-	98.6	100.0	100.0	100.0	100.0	-	-	100.0	100.0	99.3	81.8	100.0	-	-	98.9	98.2	99.1	100.0	100.0	100.0	-	99.0	99.0
Buses	0	1	0	0	1	-	2	0	0	0	0	0	-	0	0	2	2	0	0	-	4	1	1	0	0	0	-	2	8
% Buses	0.0	14.3	0.0	0.0	100.0	-	1.4	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.7	18.2	0.0	-	-	1.1	1.8	0.3	0.0	0.0	0.0	-	0.5	0.8
Trucks	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	2	0	0	0	-	2	2
% Trucks	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	0.0	0.0	-	0.5	0.2
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	50.0	-	-	-	-	-	-	50.0	-	-	-	-	-	-	33.3	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	50.0	-	-	-	-	-	-	50.0	-	-	-	-	-	-	66.7	-	-	-	-	-	-	100.0	-	-

Harford County, MD
Boulton St & Commercial Access West
Thursday, September 22, 2022
Location: 39.526855, -76.359302

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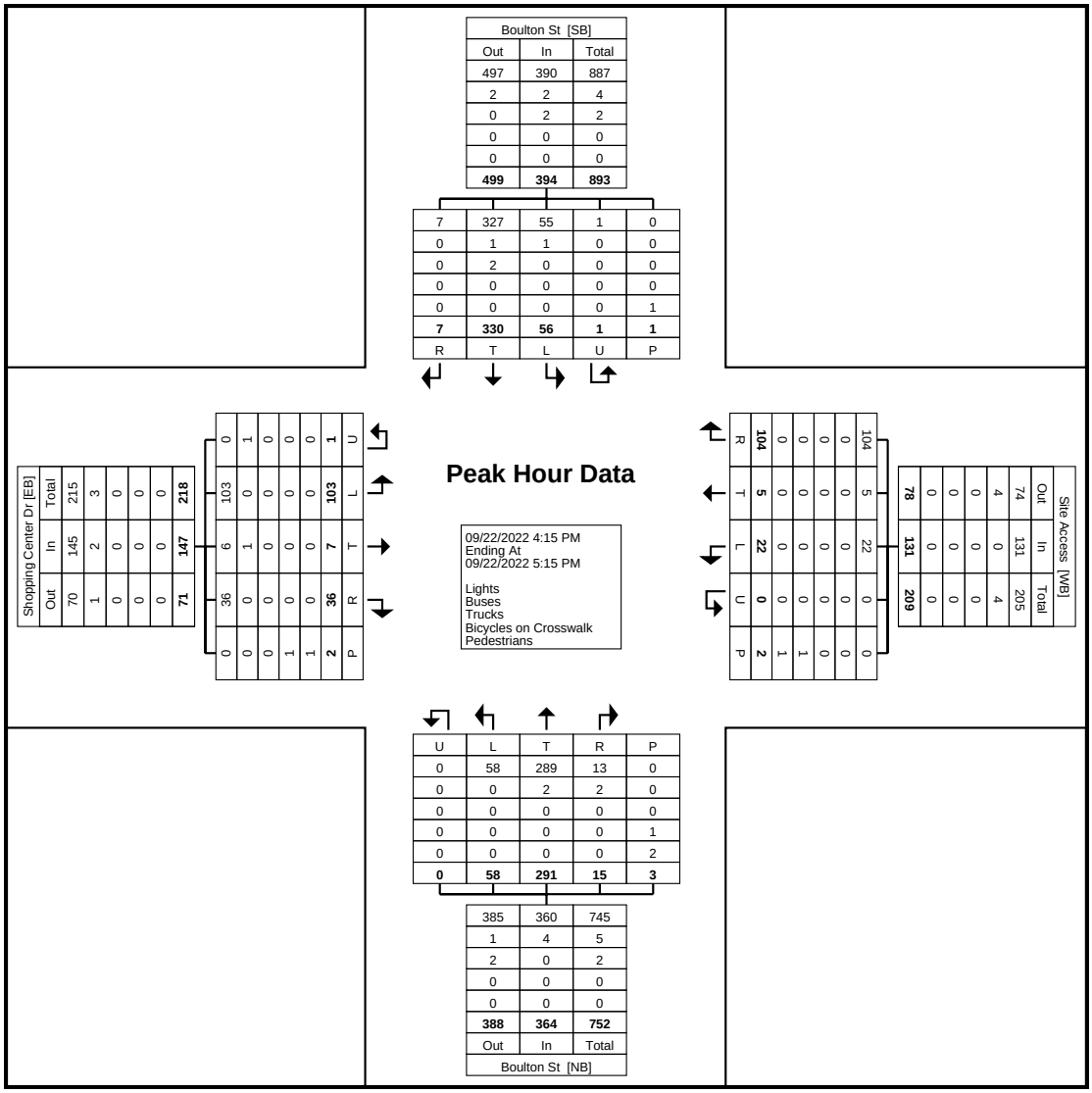

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Harford County, MD
Boulton St & Commercial Access East
Tuesday, September 20, 2022
Location: 39.527353, -76.358644

Count Name: Boulton St & Commercial Access East
Site Code:
Start Date: 09/20/2022

Turning Movement Data

Start Time	Commercial Access East Eastbound					Boulton St Northbound					Boulton St Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	0	1	0	1	1	0	36	0	0	36	24	5	0	0	29	66
7:15 AM	0	0	0	0	0	0	24	0	0	24	40	4	0	0	44	68
7:30 AM	0	2	0	0	2	0	27	0	0	27	33	5	0	0	38	67
7:45 AM	0	0	0	0	0	0	24	0	0	24	51	10	0	0	61	85
Hourly Total	0	3	0	1	3	0	111	0	0	111	148	24	0	0	172	286
8:00 AM	0	1	0	0	1	0	40	0	0	40	44	5	0	0	49	90
8:15 AM	0	0	0	0	0	0	34	0	0	34	42	6	0	0	48	82
8:30 AM	0	2	0	0	2	0	35	0	0	35	53	6	0	0	59	96
8:45 AM	0	2	0	0	2	0	48	0	0	48	78	6	0	0	84	134
Hourly Total	0	5	0	0	5	0	157	0	0	157	217	23	0	0	240	402
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	14	0	0	14	0	113	0	0	113	84	27	0	0	111	238
4:15 PM	0	3	0	0	3	0	107	0	0	107	80	21	0	0	101	211
4:30 PM	0	8	0	0	8	0	119	0	0	119	90	40	0	0	130	257
4:45 PM	0	12	0	0	12	0	128	0	0	128	101	18	0	0	119	259
Hourly Total	0	37	0	0	37	0	467	0	0	467	355	106	0	0	461	965
5:00 PM	0	8	0	1	8	0	145	0	0	145	82	24	0	1	106	259
5:15 PM	0	9	0	0	9	0	97	0	0	97	74	20	0	0	94	200
5:30 PM	0	6	0	1	6	0	116	0	0	116	75	22	0	0	97	219
5:45 PM	0	7	0	0	7	0	130	0	0	130	93	23	0	0	116	253
Hourly Total	0	30	0	2	30	0	488	0	0	488	324	89	0	1	413	931
Grand Total	0	75	0	3	75	0	1223	0	0	1223	1044	242	0	1	1286	2584
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	81.2	18.8	0.0	-	-	-
Total %	0.0	2.9	0.0	-	2.9	0.0	47.3	0.0	-	47.3	40.4	9.4	0.0	-	49.8	-
Lights	0	75	0	-	75	0	1202	0	-	1202	1027	242	0	-	1269	2546
% Lights	-	100.0	-	-	100.0	-	98.3	-	-	98.3	98.4	100.0	-	-	98.7	98.5
Buses	0	0	0	-	0	0	10	0	-	10	6	0	0	-	6	16
% Buses	-	0.0	-	-	0.0	-	0.8	-	-	0.8	0.6	0.0	-	-	0.5	0.6
Trucks	0	0	0	-	0	0	11	0	-	11	11	0	0	-	11	22
% Trucks	-	0.0	-	-	0.0	-	0.9	-	-	0.9	1.1	0.0	-	-	0.9	0.9
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	33.3	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	66.7	-	-	-	-	-	-	-	-	-	100.0	-	-

Harford County, MD
Boulton St & Commercial Access East
Tuesday, September 20, 2022
Location: 39.527353, -76.358644

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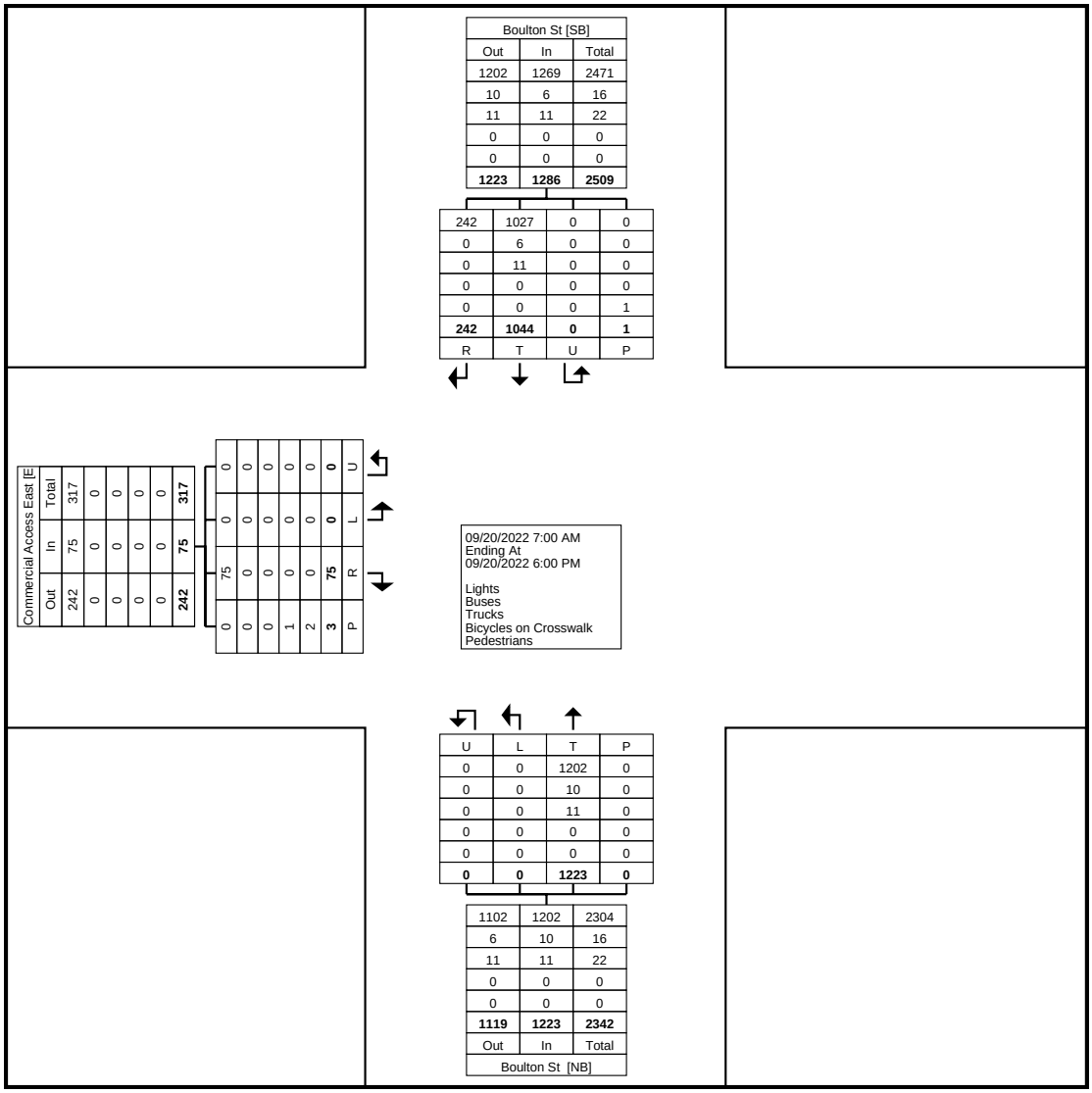

Turning Movement Data Plot

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Harford County, MD
Boulton St & Commercial Access East
Tuesday, September 20, 2022
Location: 39.527353, -76.358644

Count Name: Boulton St & Commercial Access East
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Commercial Access East Eastbound					Boulton St Northbound					Boulton St Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	0	1	0	0	1	0	40	0	0	40	44	5	0	0	49	90
8:15 AM	0	0	0	0	0	0	34	0	0	34	42	6	0	0	48	82
8:30 AM	0	2	0	0	2	0	35	0	0	35	53	6	0	0	59	96
8:45 AM	0	2	0	0	2	0	48	0	0	48	78	6	0	0	84	134
Total	0	5	0	0	5	0	157	0	0	157	217	23	0	0	240	402
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	90.4	9.6	0.0	-	-	-
Total %	0.0	1.2	0.0	-	1.2	0.0	39.1	0.0	-	39.1	54.0	5.7	0.0	-	59.7	-
PHF	0.000	0.625	0.000	-	0.625	0.000	0.818	0.000	-	0.818	0.696	0.958	0.000	-	0.714	0.750
Lights	0	5	0	-	5	0	153	0	-	153	210	23	0	-	233	391
% Lights	-	100.0	-	-	100.0	-	97.5	-	-	97.5	96.8	100.0	-	-	97.1	97.3
Buses	0	0	0	-	0	0	2	0	-	2	2	0	0	-	2	4
% Buses	-	0.0	-	-	0.0	-	1.3	-	-	1.3	0.9	0.0	-	-	0.8	1.0
Trucks	0	0	0	-	0	0	2	0	-	2	5	0	0	-	5	7
% Trucks	-	0.0	-	-	0.0	-	1.3	-	-	1.3	2.3	0.0	-	-	2.1	1.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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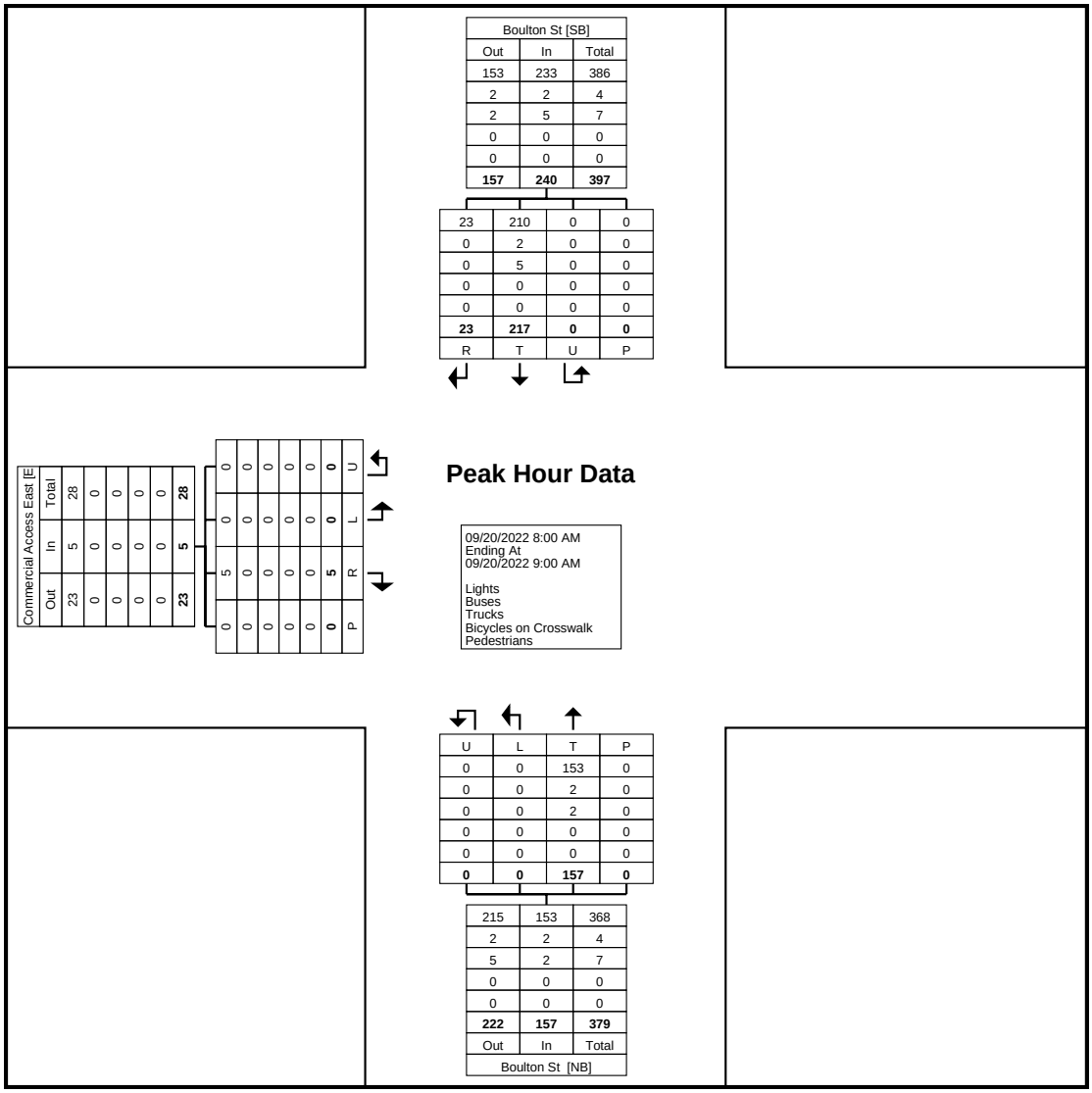

Turning Movement Peak Hour Data Plot (8:00 AM)

Harford County, MD
Boulton St & Commercial Access East
Tuesday, September 20, 2022
Location: 39.527353, -76.358644

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Turning Movement Peak Hour Data (4:15 PM)

Start Time	Commercial Access East Eastbound					Boulton St Northbound					Boulton St Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	0	3	0	0	3	0	107	0	0	107	80	21	0	0	101	211
4:30 PM	0	8	0	0	8	0	119	0	0	119	90	40	0	0	130	257
4:45 PM	0	12	0	0	12	0	128	0	0	128	101	18	0	0	119	259
5:00 PM	0	8	0	1	8	0	145	0	0	145	82	24	0	1	106	259
Total	0	31	0	1	31	0	499	0	0	499	353	103	0	1	456	986
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	77.4	22.6	0.0	-	-	-
Total %	0.0	3.1	0.0	-	3.1	0.0	50.6	0.0	-	50.6	35.8	10.4	0.0	-	46.2	-
PHF	0.000	0.646	0.000	-	0.646	0.000	0.860	0.000	-	0.860	0.874	0.644	0.000	-	0.877	0.952
Lights	0	31	0	-	31	0	496	0	-	496	350	103	0	-	453	980
% Lights	-	100.0	-	-	100.0	-	99.4	-	-	99.4	99.2	100.0	-	-	99.3	99.4
Buses	0	0	0	-	0	0	3	0	-	3	1	0	0	-	1	4
% Buses	-	0.0	-	-	0.0	-	0.6	-	-	0.6	0.3	0.0	-	-	0.2	0.4
Trucks	0	0	0	-	0	0	0	0	-	0	2	0	0	-	2	2
% Trucks	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.6	0.0	-	-	0.4	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

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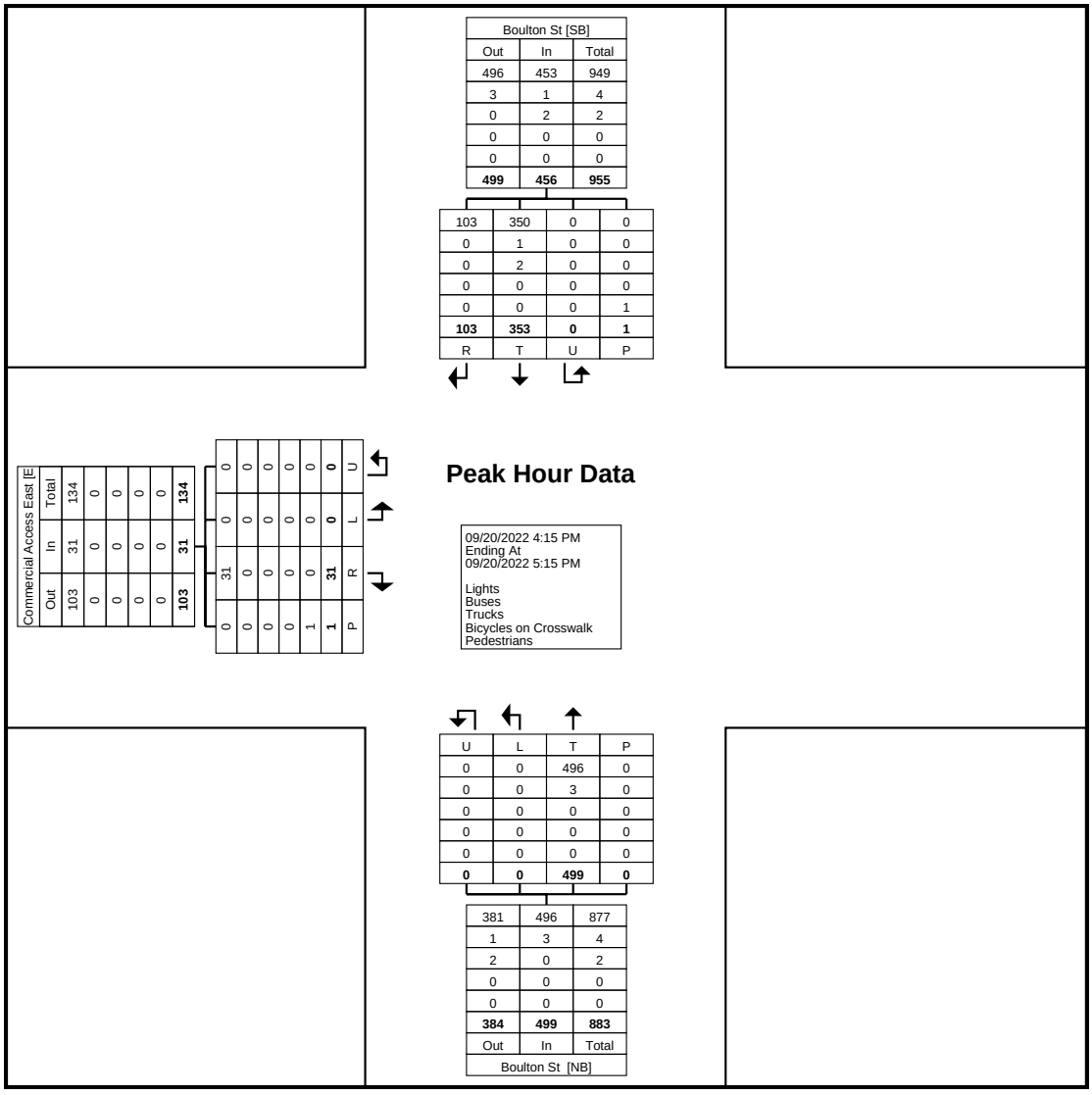
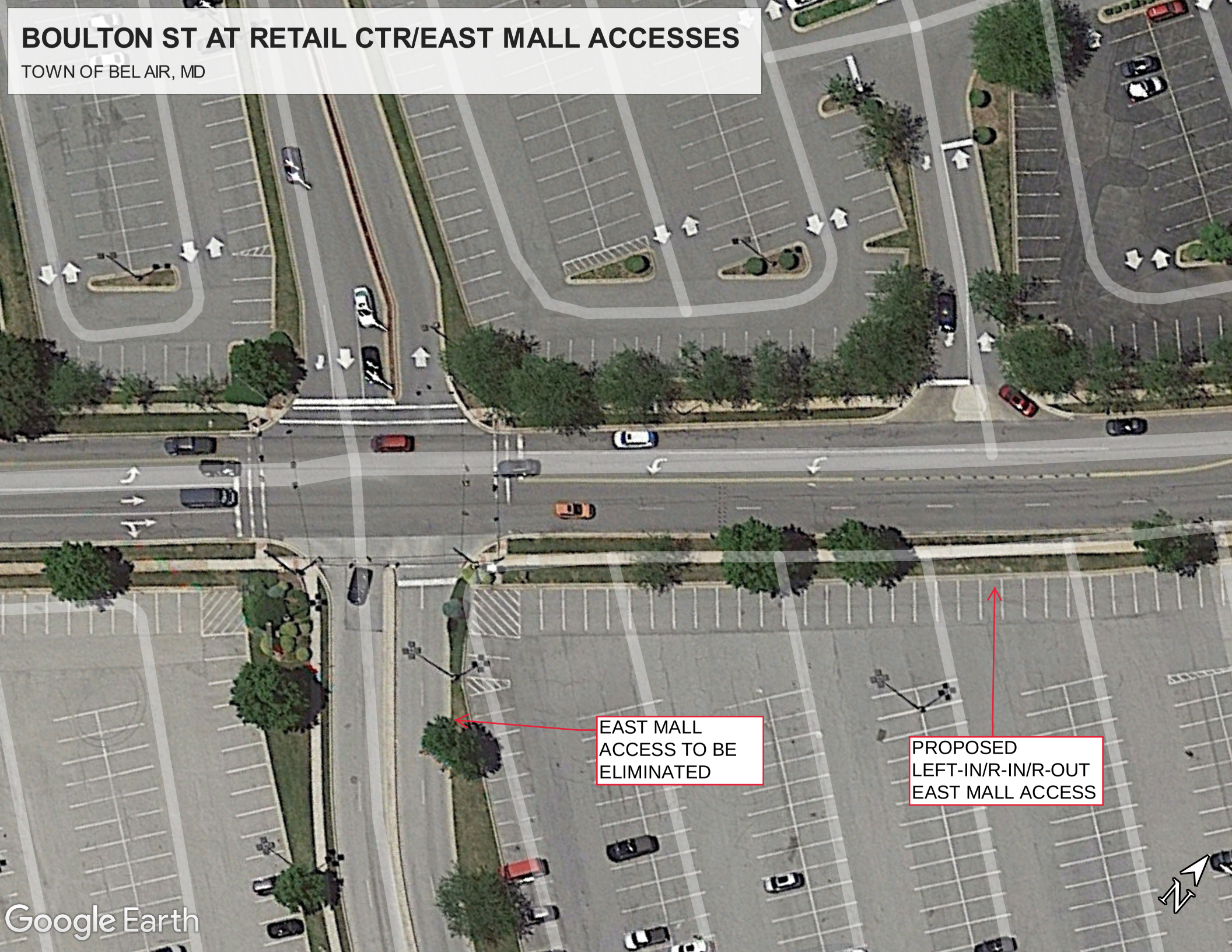


Turning Movement Peak Hour Data Plot (4:15 PM)

BOULTON ST AT RETAIL CTR/EAST MALL ACCESSES

TOWN OF BEL AIR, MD



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Harford County, MD
Boulton St & Gateway Dr
Tuesday, September 20, 2022
Location: 39.52606, -76.360328

Count Name: Boulton St & Gateway Dr
Site Code:
Start Date: 09/20/2022

Turning Movement Data

Start Time	Gateway Dr Eastbound							Mall Driveway Westbound							Boulton St Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	17	0	7	3	0	0	27	0	0	0	0	0	0	0	19	15	0	0	0	0	34	0	6	11	3	0	0	20	81
7:15 AM	10	0	9	9	0	0	28	1	0	1	1	0	0	3	13	11	0	1	0	1	25	0	20	17	2	0	0	39	95
7:30 AM	13	0	4	7	0	0	24	0	0	0	0	0	0	0	19	7	0	0	0	0	26	0	10	16	3	0	0	29	79
7:45 AM	12	0	5	5	0	0	22	0	0	0	1	0	0	1	20	16	0	0	0	0	36	0	19	19	0	0	0	38	97
Hourly Total	52	0	25	24	0	0	101	1	0	1	2	0	0	4	71	49	0	1	0	1	121	0	55	63	8	0	0	126	352
8:00 AM	28	0	18	14	0	0	60	0	0	0	0	0	1	0	17	11	0	0	0	1	28	1	22	11	6	0	0	40	128
8:15 AM	15	0	11	5	0	0	31	0	0	0	1	0	0	1	23	10	0	0	0	0	33	0	19	11	8	0	0	38	103
8:30 AM	19	0	12	5	0	0	36	0	0	0	1	0	1	1	13	11	0	0	0	0	24	0	23	14	8	0	0	45	106
8:45 AM	21	0	10	4	0	0	35	0	0	2	3	0	1	5	20	23	0	0	0	0	43	0	31	32	8	0	0	71	154
Hourly Total	83	0	51	28	0	0	162	0	0	2	5	0	3	7	73	55	0	0	0	1	128	1	95	68	30	0	0	194	491
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	42	0	13	11	0	0	66	1	1	0	4	0	0	6	34	35	2	2	0	0	73	0	51	35	5	0	0	91	236
4:15 PM	41	2	11	14	0	0	68	3	1	0	1	0	0	5	44	39	1	2	0	0	86	0	43	30	10	0	0	83	242
4:30 PM	31	4	18	16	0	0	69	2	2	0	1	0	0	5	30	44	2	0	0	0	76	1	41	37	5	0	0	84	234
4:45 PM	48	1	13	14	0	0	76	0	2	0	4	0	0	6	24	50	1	2	0	1	77	2	55	38	12	0	0	107	266
Hourly Total	162	7	55	55	0	0	279	6	6	0	10	0	0	22	132	168	6	6	0	1	312	3	190	140	32	0	0	365	978
5:00 PM	59	0	12	15	0	0	86	2	0	2	0	0	0	4	25	49	2	0	0	0	76	0	55	32	3	0	0	90	256
5:15 PM	29	2	16	11	0	1	58	2	0	0	2	0	0	4	20	44	3	0	0	2	67	1	42	34	12	0	0	89	218
5:30 PM	42	1	13	16	0	1	72	1	0	4	0	0	0	5	31	42	0	0	0	0	73	0	38	32	8	0	0	78	228
5:45 PM	45	2	9	14	0	0	70	0	2	0	2	0	0	4	32	38	3	4	0	0	77	0	51	32	10	0	0	93	244
Hourly Total	175	5	50	56	0	2	286	5	2	6	4	0	0	17	108	173	8	4	0	2	293	1	186	130	33	0	0	350	946
Grand Total	472	12	181	163	0	2	828	12	8	9	21	0	3	50	384	445	14	11	0	5	854	5	526	401	103	0	0	1035	2767
Approach %	57.0	1.4	21.9	19.7	0.0	-	-	24.0	16.0	18.0	42.0	0.0	-	-	45.0	52.1	1.6	1.3	0.0	-	-	0.5	50.8	38.7	10.0	0.0	-	-	-
Total %	17.1	0.4	6.5	5.9	0.0	-	29.9	0.4	0.3	0.3	0.8	0.0	-	1.8	13.9	16.1	0.5	0.4	0.0	-	30.9	0.2	19.0	14.5	3.7	0.0	-	37.4	-
Lights	465	12	178	159	0	-	814	11	8	6	17	0	-	42	377	436	14	11	0	-	838	5	520	398	100	0	-	1023	2717
% Lights	98.5	100.0	98.3	97.5	-	-	98.3	91.7	100.0	66.7	81.0	-	-	84.0	98.2	98.0	100.0	100.0	-	-	98.1	100.0	98.9	99.3	97.1	-	-	98.8	98.2
Buses	2	0	1	2	0	-	5	1	0	3	4	0	-	8	2	7	0	0	0	-	9	0	1	1	1	0	-	3	25
% Buses	0.4	0.0	0.6	1.2	-	-	0.6	8.3	0.0	33.3	19.0	-	-	16.0	0.5	1.6	0.0	0.0	-	-	1.1	0.0	0.2	0.2	1.0	-	-	0.3	0.9
Trucks	5	0	2	2	0	-	9	0	0	0	0	0	-	0	5	2	0	0	0	-	7	0	5	2	2	0	-	9	25
% Trucks	1.1	0.0	1.1	1.2	-	-	1.1	0.0	0.0	0.0	0.0	-	-	0.0	1.3	0.4	0.0	0.0	-	-	0.8	0.0	1.0	0.5	1.9	-	-	0.9	0.9
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	20.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	-	3	-	-	-	-	-	-	4	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	80.0	-	-	-	-	-	-	-	-	-

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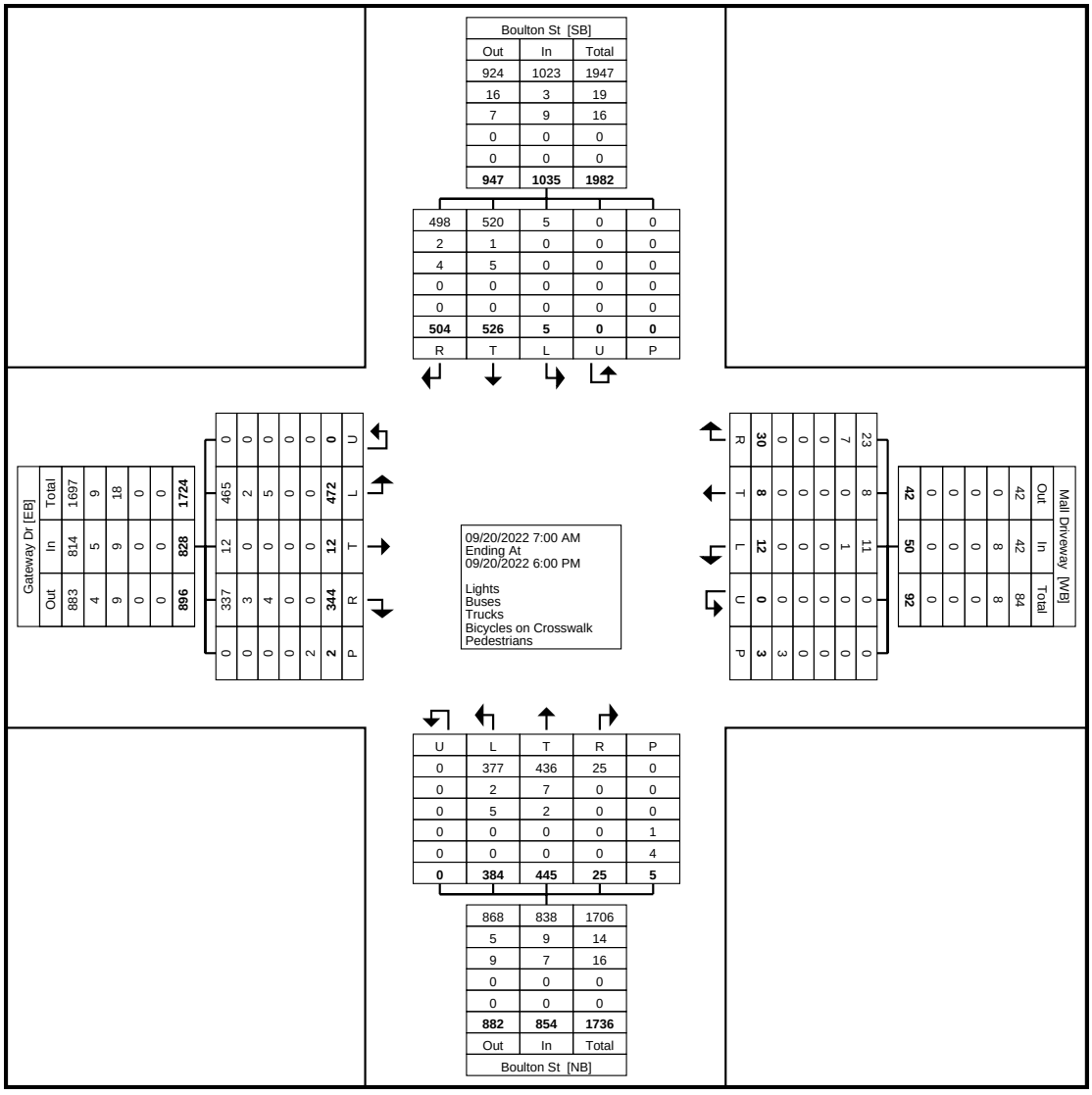
Harford County, MD
Boulton St & Gateway Dr
Tuesday, September 20, 2022
Location: 39.52606, -76.360328

Count Name: Boulton St & Gateway Dr
Site Code:
Start Date: 09/20/2022
Page No: 2



Turning Movement Data Plot

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Harford County, MD
Boulton St & Gateway Dr
Tuesday, September 20, 2022
Location: 39.52606, -76.360328

Count Name: Boulton St & Gateway Dr
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Gateway Dr Eastbound							Mall Driveway Westbound							Boulton St Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
8:00 AM	28	0	18	14	0	0	60	0	0	0	0	0	1	0	17	11	0	0	0	1	28	1	22	11	6	0	0	40	128
8:15 AM	15	0	11	5	0	0	31	0	0	0	1	0	0	1	23	10	0	0	0	0	33	0	19	11	8	0	0	38	103
8:30 AM	19	0	12	5	0	0	36	0	0	0	1	0	1	1	13	11	0	0	0	0	24	0	23	14	8	0	0	45	106
8:45 AM	21	0	10	4	0	0	35	0	0	2	3	0	1	5	20	23	0	0	0	0	43	0	31	32	8	0	0	71	154
Total	83	0	51	28	0	0	162	0	0	2	5	0	3	7	73	55	0	0	0	1	128	1	95	68	30	0	0	194	491
Approach %	51.2	0.0	31.5	17.3	0.0	-	-	0.0	0.0	28.6	71.4	0.0	-	-	57.0	43.0	0.0	0.0	0.0	-	-	0.5	49.0	35.1	15.5	0.0	-	-	-
Total %	16.9	0.0	10.4	5.7	0.0	-	33.0	0.0	0.0	0.4	1.0	0.0	-	1.4	14.9	11.2	0.0	0.0	0.0	-	26.1	0.2	19.3	13.8	6.1	0.0	-	39.5	-
PHF	0.741	0.000	0.708	0.500	0.000	-	0.675	0.000	0.000	0.250	0.417	0.000	-	0.350	0.793	0.598	0.000	0.000	0.000	-	0.744	0.250	0.766	0.531	0.938	0.000	-	0.683	0.797
Lights	82	0	50	28	0	-	160	0	0	2	5	0	-	7	72	53	0	0	0	-	125	1	93	68	28	0	-	190	482
% Lights	98.8	-	98.0	100.0	-	-	98.8	-	-	100.0	100.0	-	-	100.0	98.6	96.4	-	-	-	-	97.7	100.0	97.9	100.0	93.3	-	-	97.9	98.2
Buses	0	0	1	0	0	-	1	0	0	0	0	0	-	0	1	2	0	0	0	-	3	0	1	0	1	0	-	2	6
% Buses	0.0	-	2.0	0.0	-	-	0.6	-	-	0.0	0.0	-	-	0.0	1.4	3.6	-	-	-	-	2.3	0.0	1.1	0.0	3.3	-	-	1.0	1.2
Trucks	1	0	0	0	0	-	1	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	1	0	1	0	-	2	3
% Trucks	1.2	-	0.0	0.0	-	-	0.6	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	-	0.0	0.0	1.1	0.0	3.3	-	-	1.0	0.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	3	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-

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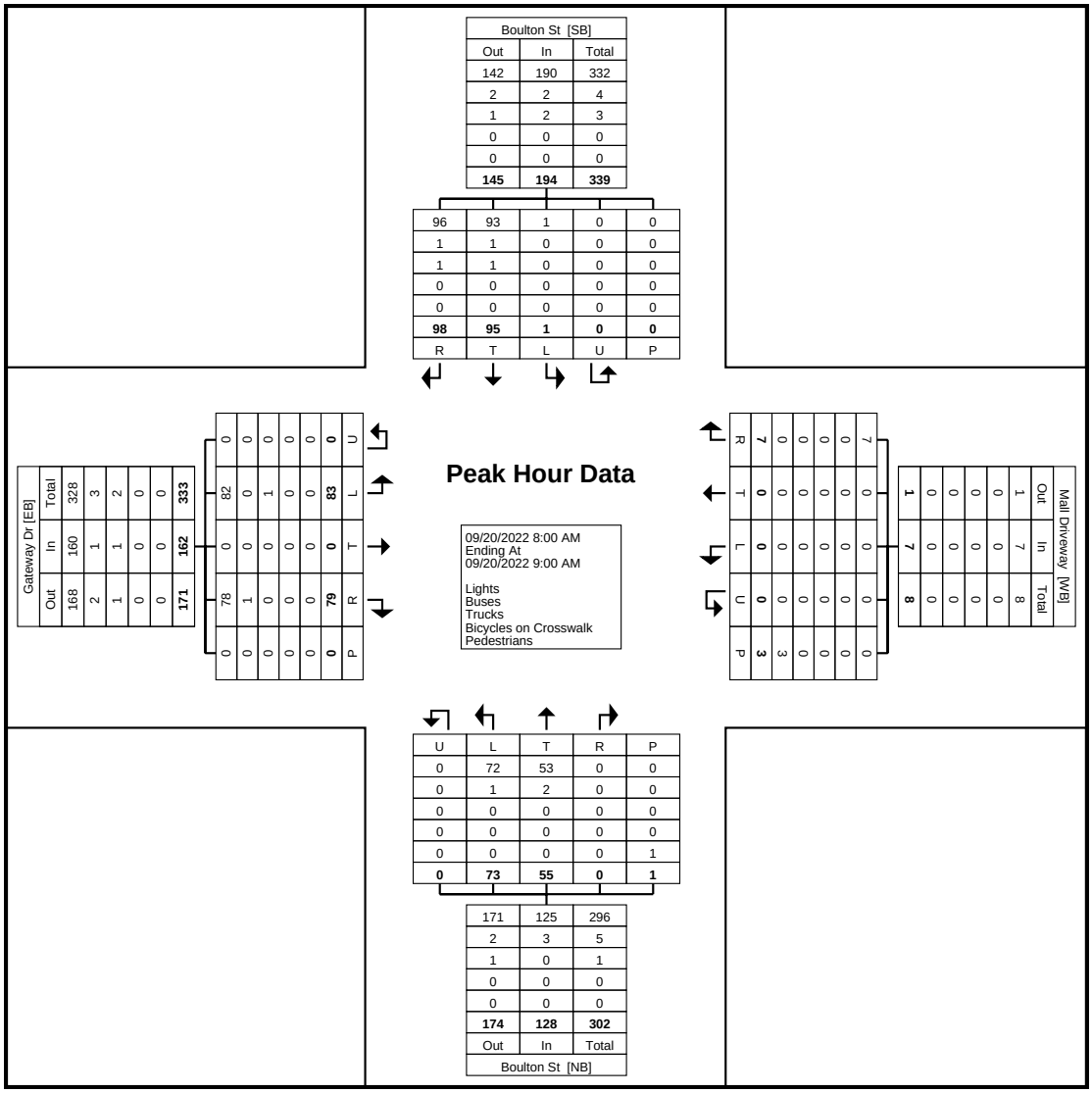
Harford County, MD
Boulton St & Gateway Dr
Tuesday, September 20, 2022
Location: 39.52606, -76.360328

Count Name: Boulton St & Gateway Dr
Site Code:
Start Date: 09/20/2022



Turning Movement Peak Hour Data Plot (8:00 AM)

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Harford County, MD
Boulton St & Gateway Dr
Tuesday, September 20, 2022
Location: 39.52606, -76.360328

Count Name: Boulton St & Gateway Dr
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Gateway Dr Eastbound							Mall Driveway Westbound							Boulton St Northbound							Boulton St Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:15 PM	41	2	11	14	0	0	68	3	1	0	1	0	0	5	44	39	1	2	0	0	86	0	43	30	10	0	0	83	242
4:30 PM	31	4	18	16	0	0	69	2	2	0	1	0	0	5	30	44	2	0	0	0	76	1	41	37	5	0	0	84	234
4:45 PM	48	1	13	14	0	0	76	0	2	0	4	0	0	6	24	50	1	2	0	1	77	2	55	38	12	0	0	107	266
5:00 PM	59	0	12	15	0	0	86	2	0	2	0	0	0	4	25	49	2	0	0	0	76	0	55	32	3	0	0	90	256
Total	179	7	54	59	0	0	299	7	5	2	6	0	0	20	123	182	6	4	0	1	315	3	194	137	30	0	0	364	998
Approach %	59.9	2.3	18.1	19.7	0.0	-	-	35.0	25.0	10.0	30.0	0.0	-	-	39.0	57.8	1.9	1.3	0.0	-	-	0.8	53.3	37.6	8.2	0.0	-	-	-
Total %	17.9	0.7	5.4	5.9	0.0	-	30.0	0.7	0.5	0.2	0.6	0.0	-	2.0	12.3	18.2	0.6	0.4	0.0	-	31.6	0.3	19.4	13.7	3.0	0.0	-	36.5	-
PHF	0.758	0.438	0.750	0.922	0.000	-	0.869	0.583	0.625	0.250	0.375	0.000	-	0.833	0.699	0.910	0.750	0.500	0.000	-	0.916	0.375	0.882	0.901	0.625	0.000	-	0.850	0.938
Lights	178	7	54	57	0	-	296	6	5	2	4	0	-	17	121	178	6	4	0	-	309	3	193	135	30	0	-	361	983
% Lights	99.4	100.0	100.0	96.6	-	-	99.0	85.7	100.0	100.0	66.7	-	-	85.0	98.4	97.8	100.0	100.0	-	-	98.1	100.0	99.5	98.5	100.0	-	-	99.2	98.5
Buses	1	0	0	2	0	-	3	1	0	0	2	0	-	3	1	3	0	0	0	-	4	0	0	0	0	0	-	0	10
% Buses	0.6	0.0	0.0	3.4	-	-	1.0	14.3	0.0	0.0	33.3	-	-	15.0	0.8	1.6	0.0	0.0	-	-	1.3	0.0	0.0	0.0	0.0	-	-	0.0	1.0
Trucks	0	0	0	0	0	-	0	0	0	0	0	0	-	0	1	1	0	0	0	-	2	0	1	2	0	0	-	3	5
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.8	0.5	0.0	0.0	-	-	0.6	0.0	0.5	1.5	0.0	-	-	0.8	0.5
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-

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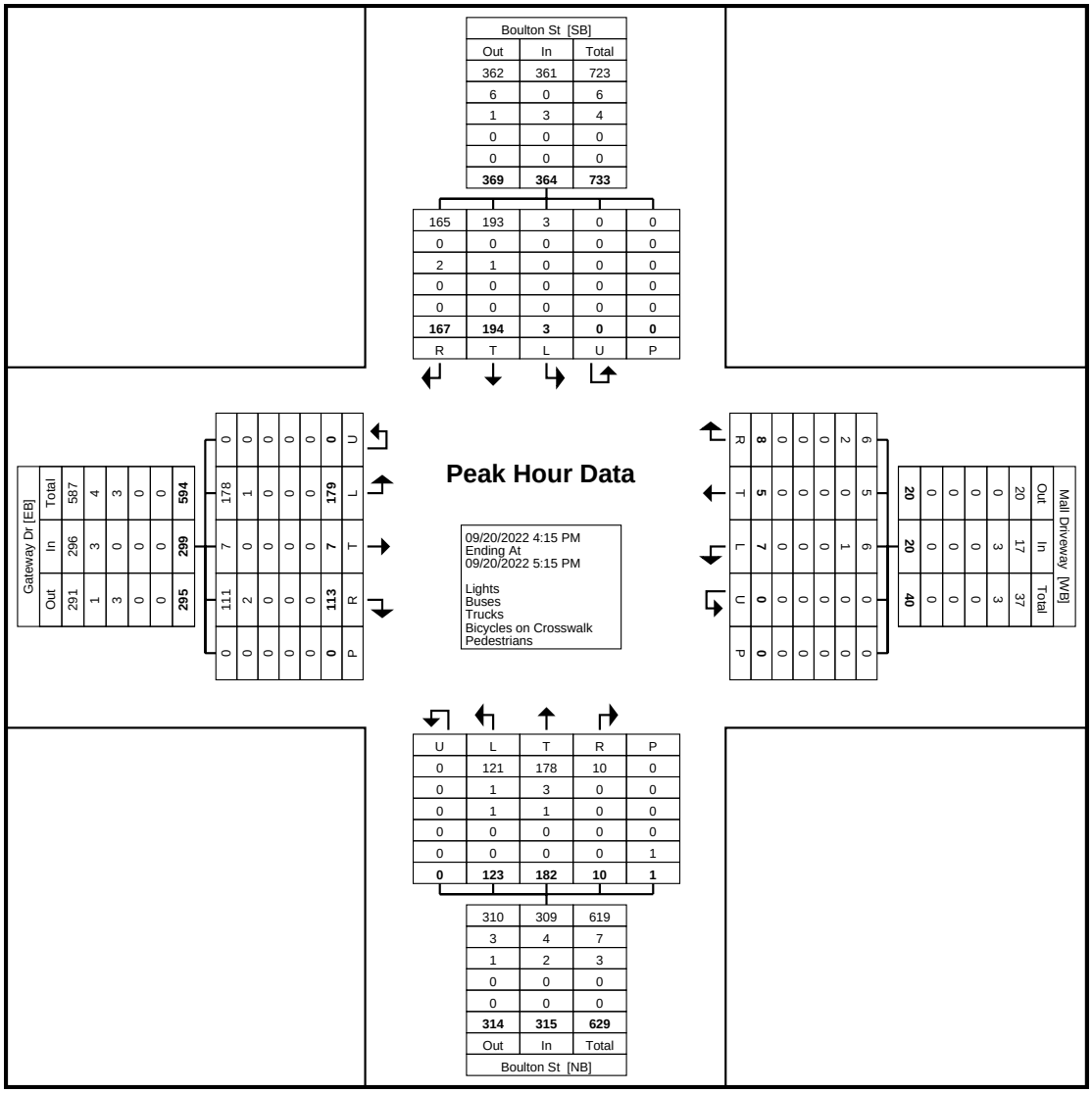
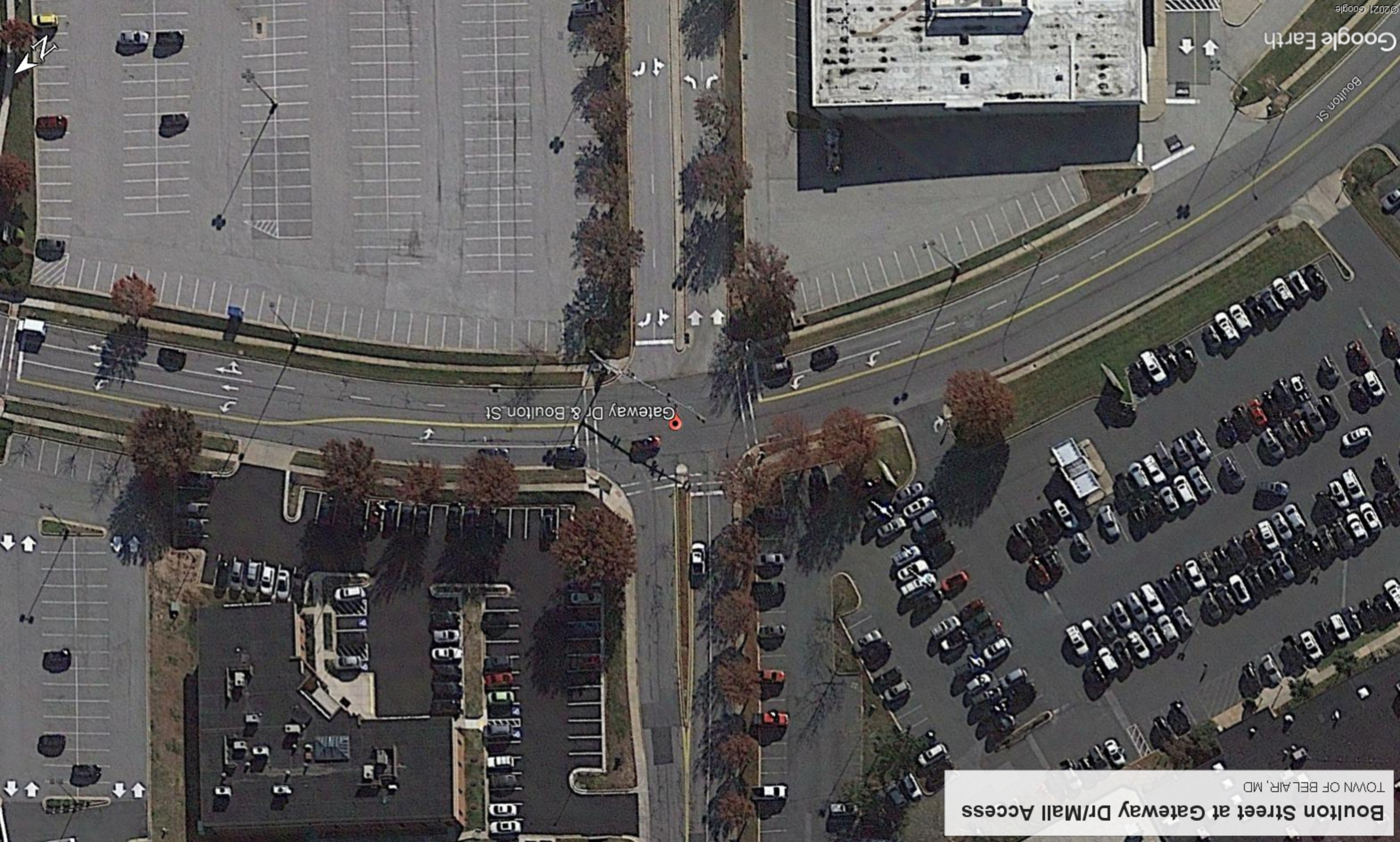
Boulton St & Gateway Dr
Tuesday, September 20, 2022
Location: 39.52606, -76.360328

Count Name: Boulton St & Gateway Dr
Site Code:
Start Date: 09/20/2022



Turning Movement Peak Hour Data Plot (4:15 PM)



Boulton Street at Gateway Dr/Mall Access

TOWN OF BEL AIR, MD

Harford County, MD
N Tollgate Rd & Commercial Access/Site Acccess
Tuesday, September 20, 2022
Location: 39.524189, -76.359695

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Count Name: N. Tollgate Rd & Commercial Access/Site Access
Site Code:
Start Date: 09/20/2022

Turning Movement Data

Start Time	N. Tollgate Rd Eastbound						N. Tollgate Rd Westbound						Commercial Access Northbound						Site Access Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	1	45	0	0	0	46	0	43	1	0	0	44	0	0	0	0	0	0	1	0	0	0	0	1	91
7:15 AM	0	69	0	0	0	69	1	35	3	0	0	39	0	0	0	0	0	0	0	0	0	0	0	0	108
7:30 AM	0	70	0	0	0	70	0	54	2	0	0	56	0	0	0	0	2	0	0	0	0	0	1	0	126
7:45 AM	0	69	0	0	0	69	0	57	2	0	0	59	0	0	0	0	0	0	0	0	0	0	0	0	128
Hourly Total	1	253	0	0	0	254	1	189	8	0	0	198	0	0	0	0	2	0	1	0	0	0	1	1	453
8:00 AM	0	93	0	0	0	93	1	62	2	0	0	65	0	0	4	0	0	4	1	0	0	0	0	1	163
8:15 AM	0	79	0	0	0	79	5	65	2	0	0	72	0	0	3	0	0	3	0	0	0	0	0	0	154
8:30 AM	1	62	0	0	0	63	3	66	0	0	0	69	0	0	2	0	0	2	0	0	0	0	1	0	134
8:45 AM	0	88	0	0	0	88	3	70	5	0	0	78	0	0	2	0	0	2	1	0	0	0	1	1	169
Hourly Total	1	322	0	0	0	323	12	263	9	0	0	284	0	0	11	0	0	11	2	0	0	0	2	2	620
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	104	0	0	0	104	9	140	7	0	0	156	0	0	4	0	0	4	5	0	0	0	0	5	269
4:15 PM	0	122	1	0	1	123	6	148	6	0	0	160	1	0	5	0	0	6	3	0	1	0	0	4	293
4:30 PM	0	103	0	0	0	103	8	136	4	0	0	148	0	1	5	0	0	6	8	0	1	0	0	9	266
4:45 PM	1	112	0	0	1	113	10	160	8	0	0	178	4	0	8	0	0	12	5	0	0	0	0	5	308
Hourly Total	1	441	1	0	2	443	33	584	25	0	0	642	5	1	22	0	0	28	21	0	2	0	0	23	1136
5:00 PM	0	112	0	0	3	112	7	150	5	0	0	162	0	0	11	0	0	11	4	2	1	0	1	7	292
5:15 PM	0	112	0	0	0	112	7	132	4	0	0	143	0	0	5	0	0	5	5	0	1	0	0	6	266
5:30 PM	1	120	0	0	0	121	5	152	5	0	0	162	0	0	6	0	1	6	3	0	2	0	2	5	294
5:45 PM	0	108	0	0	0	108	4	140	11	0	0	155	0	0	4	0	0	4	6	0	1	0	1	7	274
Hourly Total	1	452	0	0	3	453	23	574	25	0	0	622	0	0	26	0	1	26	18	2	5	0	4	25	1126
Grand Total	4	1468	1	0	5	1473	69	1610	67	0	0	1746	5	1	59	0	3	65	42	2	7	0	7	51	3335
Approach %	0.3	99.7	0.1	0.0	-	-	4.0	92.2	3.8	0.0	-	-	7.7	1.5	90.8	0.0	-	-	82.4	3.9	13.7	0.0	-	-	-
Total %	0.1	44.0	0.0	0.0	-	44.2	2.1	48.3	2.0	0.0	-	52.4	0.1	0.0	1.8	0.0	-	1.9	1.3	0.1	0.2	0.0	-	1.5	-
Lights	4	1446	1	0	-	1451	69	1584	65	0	-	1718	5	1	59	0	-	65	41	2	7	0	-	50	3284
% Lights	100.0	98.5	100.0	-	-	98.5	100.0	98.4	97.0	-	-	98.4	100.0	100.0	100.0	-	-	100.0	97.6	100.0	100.0	-	-	98.0	98.5
Buses	0	8	0	0	-	8	0	9	2	0	-	11	0	0	0	0	-	0	0	0	0	0	-	0	19
% Buses	0.0	0.5	0.0	-	-	0.5	0.0	0.6	3.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.6
Trucks	0	14	0	0	-	14	0	17	0	0	-	17	0	0	0	0	-	0	1	0	0	0	-	1	32
% Trucks	0.0	1.0	0.0	-	-	1.0	0.0	1.1	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	2.4	0.0	0.0	-	-	2.0	1.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	20.0	-	-	-	-	-	-	-	-	-	-	-	33.3	-	-	-	-	-	42.9	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	80.0	-	-	-	-	-	-	-	-	-	-	-	66.7	-	-	-	-	-	57.1	-	-

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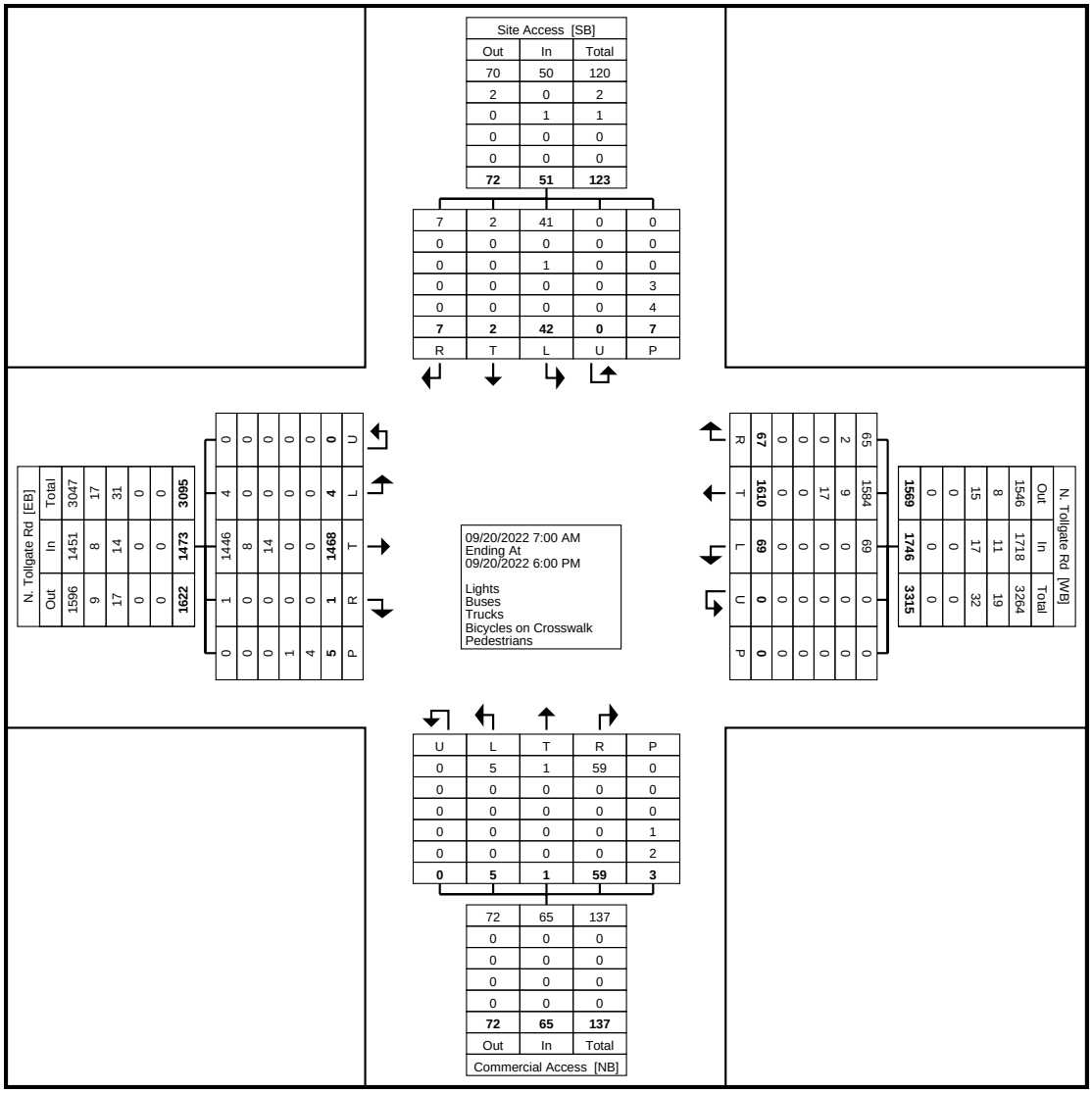

Turning Movement Data Plot

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Harford County, MD
N Tollgate Rd & Commercial Access/Site Acccess
Tuesday, September 20, 2022
Location: 39.524189, -76.359695

Count Name: N. Tollgate Rd & Commercial Access/Site Access
Site Code:
Start Date: 09/20/2022

Turning Movement Peak Hour Data (8:00 AM)

Start Time	N. Tollgate Rd Eastbound						N. Tollgate Rd Westbound						Commercial Access Northbound						Site Access Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	0	93	0	0	0	93	1	62	2	0	0	65	0	0	4	0	0	4	1	0	0	0	0	1	163
8:15 AM	0	79	0	0	0	79	5	65	2	0	0	72	0	0	3	0	0	3	0	0	0	0	0	0	154
8:30 AM	1	62	0	0	0	63	3	66	0	0	0	69	0	0	2	0	0	2	0	0	0	0	1	0	134
8:45 AM	0	88	0	0	0	88	3	70	5	0	0	78	0	0	2	0	0	2	1	0	0	0	1	1	169
Total	1	322	0	0	0	323	12	263	9	0	0	284	0	0	11	0	0	11	2	0	0	0	2	2	620
Approach %	0.3	99.7	0.0	0.0	-	-	4.2	92.6	3.2	0.0	-	-	0.0	0.0	100.0	0.0	-	-	100.0	0.0	0.0	0.0	-	-	-
Total %	0.2	51.9	0.0	0.0	-	52.1	1.9	42.4	1.5	0.0	-	45.8	0.0	0.0	1.8	0.0	-	1.8	0.3	0.0	0.0	0.0	-	0.3	-
PHF	0.250	0.866	0.000	0.000	-	0.868	0.600	0.939	0.450	0.000	-	0.910	0.000	0.000	0.688	0.000	-	0.688	0.500	0.000	0.000	0.000	-	0.500	0.917
Lights	1	315	0	0	-	316	12	255	9	0	-	276	0	0	11	0	-	11	1	0	0	0	-	1	604
% Lights	100.0	97.8	-	-	-	97.8	100.0	97.0	100.0	-	-	97.2	-	-	100.0	-	-	100.0	50.0	-	-	-	-	50.0	97.4
Buses	0	1	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	3
% Buses	0.0	0.3	-	-	-	0.3	0.0	0.8	0.0	-	-	0.7	-	-	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.5
Trucks	0	6	0	0	-	6	0	6	0	0	-	6	0	0	0	0	-	0	1	0	0	0	-	1	13
% Trucks	0.0	1.9	-	-	-	1.9	0.0	2.3	0.0	-	-	2.1	-	-	0.0	-	-	0.0	50.0	-	-	-	-	50.0	2.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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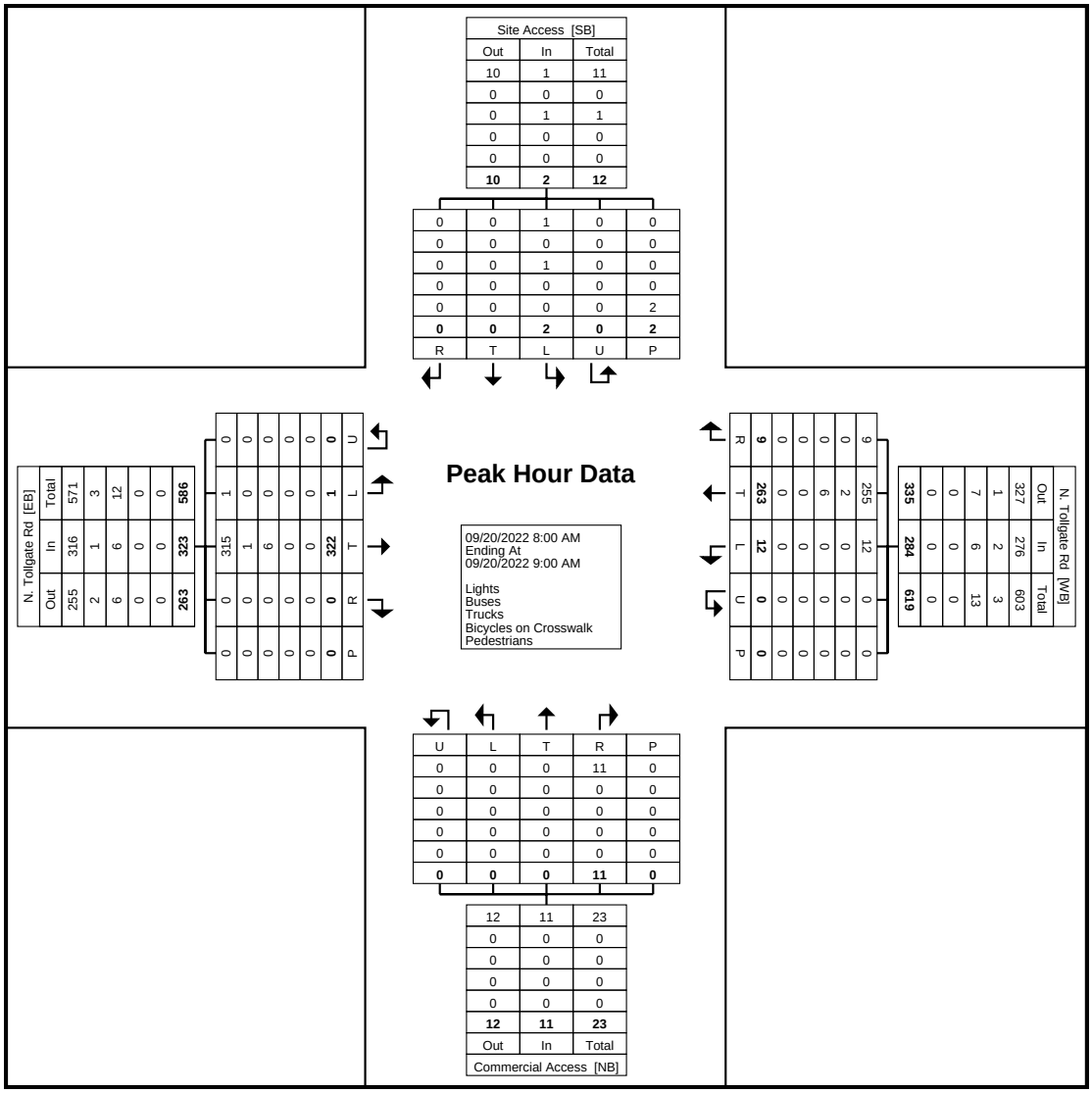

Turning Movement Peak Hour Data Plot (8:00 AM)

Harford County, MD
N Tollgate Rd & Commercial Access/Site Acccess
Tuesday, September 20, 2022
Location: 39.524189, -76.359695

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Turning Movement Peak Hour Data (4:45 PM)

Start Time	N. Tollgate Rd Eastbound						N. Tollgate Rd Westbound						Commercial Access Northbound						Site Access Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	1	112	0	0	1	113	10	160	8	0	0	178	4	0	8	0	0	12	5	0	0	0	0	5	308
5:00 PM	0	112	0	0	3	112	7	150	5	0	0	162	0	0	11	0	0	11	4	2	1	0	1	7	292
5:15 PM	0	112	0	0	0	112	7	132	4	0	0	143	0	0	5	0	0	5	5	0	1	0	0	6	266
5:30 PM	1	120	0	0	0	121	5	152	5	0	0	162	0	0	6	0	1	6	3	0	2	0	2	5	294
Total	2	456	0	0	4	458	29	594	22	0	0	645	4	0	30	0	1	34	17	2	4	0	3	23	1160
Approach %	0.4	99.6	0.0	0.0	-	-	4.5	92.1	3.4	0.0	-	-	11.8	0.0	88.2	0.0	-	-	73.9	8.7	17.4	0.0	-	-	-
Total %	0.2	39.3	0.0	0.0	-	39.5	2.5	51.2	1.9	0.0	-	55.6	0.3	0.0	2.6	0.0	-	2.9	1.5	0.2	0.3	0.0	-	2.0	-
PHF	0.500	0.950	0.000	0.000	-	0.946	0.725	0.928	0.688	0.000	-	0.906	0.250	0.000	0.682	0.000	-	0.708	0.850	0.250	0.500	0.000	-	0.821	0.942
Lights	2	453	0	0	-	455	29	585	22	0	-	636	4	0	30	0	-	34	17	2	4	0	-	23	1148
% Lights	100.0	99.3	-	-	-	99.3	100.0	98.5	100.0	-	-	98.6	100.0	-	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	99.0
Buses	0	1	0	0	-	1	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	5
% Buses	0.0	0.2	-	-	-	0.2	0.0	0.7	0.0	-	-	0.6	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.4
Trucks	0	2	0	0	-	2	0	5	0	0	-	5	0	0	0	0	-	0	0	0	0	0	-	0	7
% Trucks	0.0	0.4	-	-	-	0.4	0.0	0.8	0.0	-	-	0.8	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	66.7	-	-

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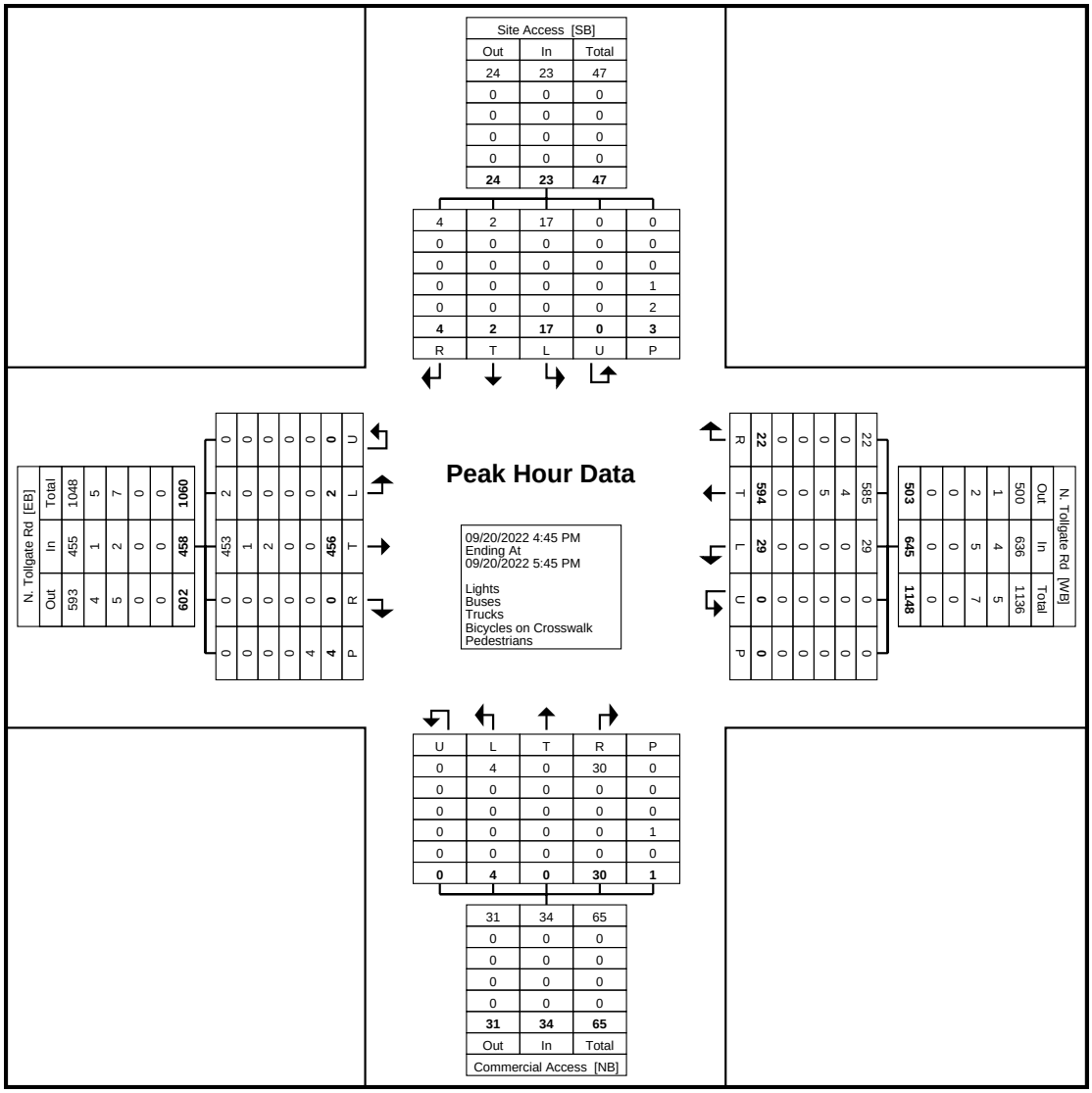
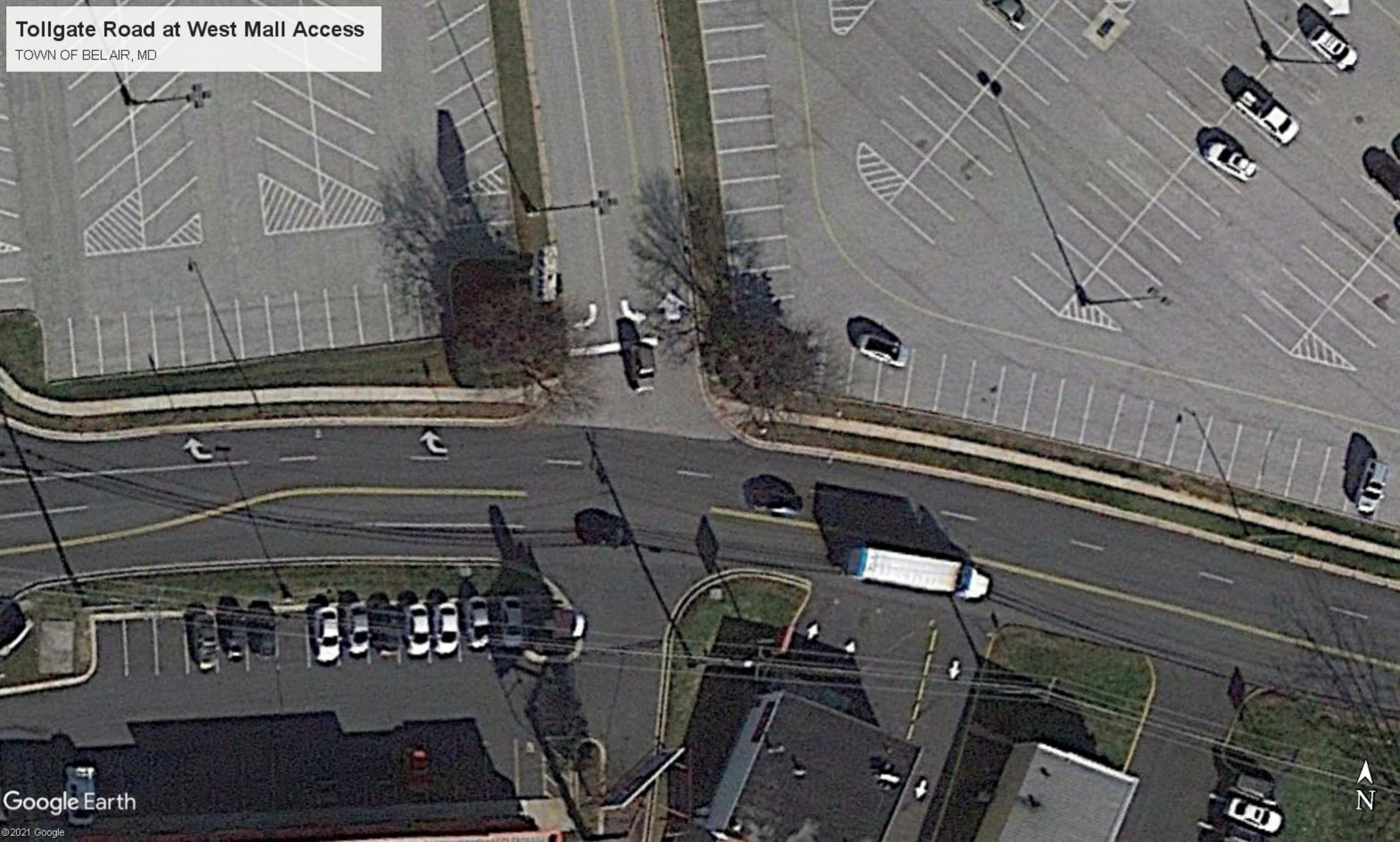


Turning Movement Peak Hour Data Plot (4:45 PM)

Tollgate Road at West Mall Access

TOWN OF BEL AIR, MD



APPENDIX IV

STUDY PARAMETERS
& SITE DATA

TRAFFIC IMPACT ANALYSIS INFORMATION

Scope of Review Meeting

Project Name: Residences at Harford Mall Date: 7/21/22

Project Description: 300 Apt. Units Multi-family (phase I)

Project Location: Harford Mall State Road: X Yes __ No

Developer: CBL/CDP Phone/E-Mail: County Road - yes

Consultant: Traffic Concepts Phone/E-Mail: kjames@castledp.com mkeeley

phase II - 250 + commercial and pad sites

Study Area Details:

The following intersections will be analyzed:

1. Tollgate & US Bus/Route 1
2. MD 24 & US Bus Route 1
3. MD 24 & Boulton
4. Boulton & Tollgate
5. Boulton & Gateway - / Site Access
6. Boulton & West Site Access
7. Boulton & East Signalized Annex Access *Signal Warrant for Annex
8. Boulton & East Annex Access (future Site access)
9. Tollgate & North Site Access

Weekday: A.M. 7-9 P.M. 4-6 Growth Rate: 2.2% or 2.2

Weekend: Day X Hours X ITE Land Use Codes: 221 Mid Rise Multi-Family

Design Year: 2025 Passby Percentages: X

Background Traffic (other approved development plans in the vicinity)

1. Attachment (Harford County) 2. Upper Chesapeake (Bel Air)
3. Sear Redevelopment

Approved Capital and Development Projects:

1. X 2.

Notes: Review Pedestrian conditions at all intersections (especially Boulton/Gateway) & Tollgate & US Route 1. Perform Synchro along Boulton/24/1/Tollgate

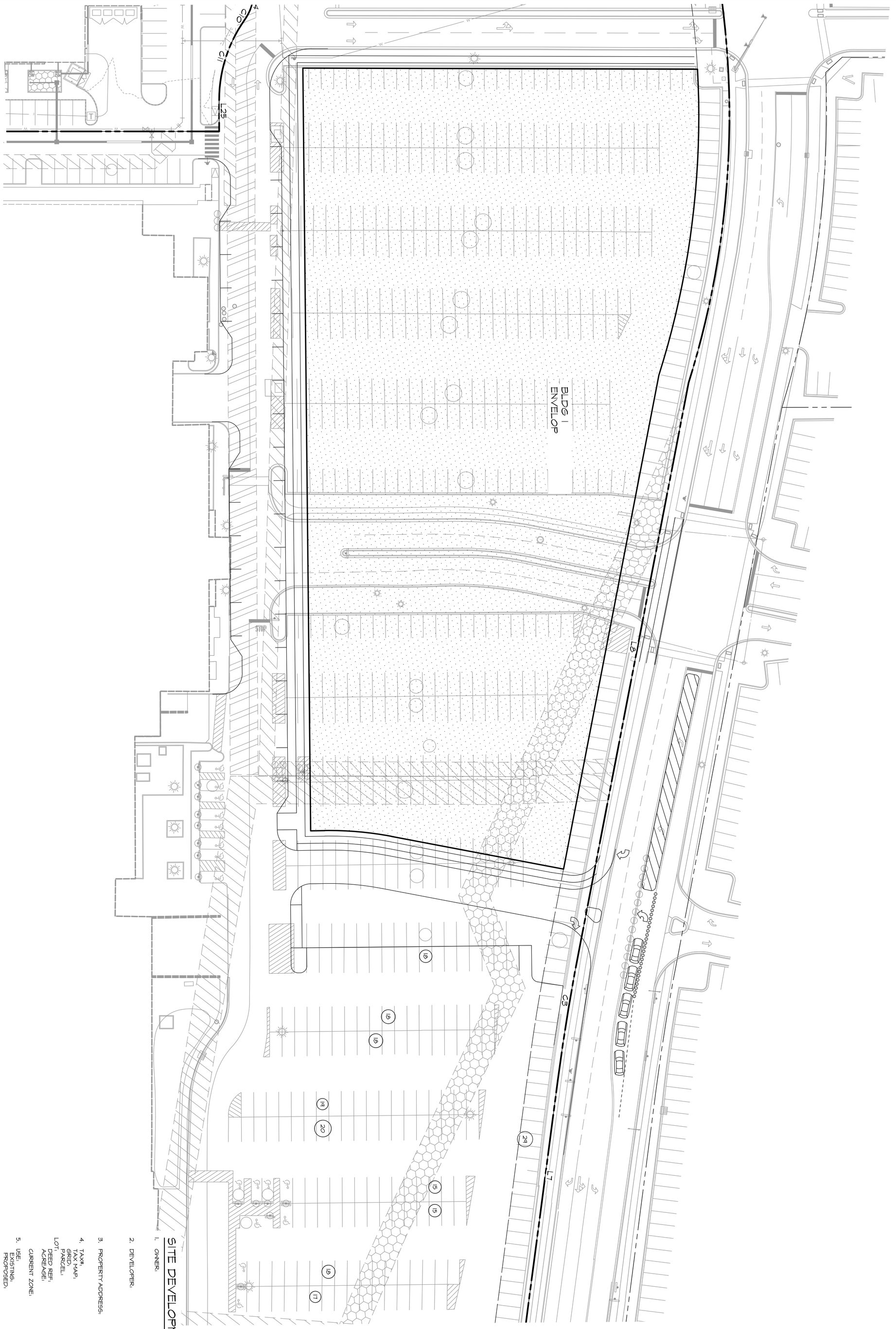
Harford Mall
Traffic Scope Meeting
Town of Bel Air
SIGN IN SHEET: Date July 21, 2022

NAME	ORGANIZATION/ADDRESS	PHONE/E-MAIL
Muge Turkmen	MDOT SHA District 4	410 229 2386 mturkmen@mdot.maryland.gov
Kimion Johnson	MDOTSHA -D4- TRAFFIC	410-229-2395 Kjohnson5@mdot.maryland.gov
John Boling	EXP - Towson	443-739-4875 John.boling@exp.com
Rowan Glidden	Town DPCD	410-638-4540 rglidden@belairmd.org
Brad Schmid	Traffic Concepts	410-450-3184 BSchmid@traffic-concepts.com
Kevin Small	TOBA	ksmall@belairmd.org 410-638-4540
Alex Rawls	Harford Co	410-638-3103 x1372 aarawls@harfordcountymd.gov
Charlie Dawson	TBA	410-638-4544 cdawson@belairmd.org
Kyle James	CPD, Towson, MD	443 324 2558 kjames@castlldp.com
Tom Miller	FWA	tmiller@fredward.com 443-299-2989

EXISTING SITE CONDITIONS

#1-#9 INTERSECTIONS TO BE STUDIED FOR PHASE-I MALL RESIDENCES

CASTLE DEVELOPMENT PARTNERS | CBL | 505 DESIGN | hord | coplan | macht



M:\PROJECTS\2221107.00 HARFORD MALL REDEVELOPMENT\DESIGN\ENGINEERING\CAD\PLANS\SITE PLAN -1.DWG, 30 SCALE, 9/27/2022 3:07 PM,tminer

SITE PLAN

SCALE: 1" = 30'

VICINITY MAP

1"=2000'

LEGEND

- PROPERTY LINE
- PROPERTY BOUNDARY
- RIGHT-OF-WAY LINE
- BUILDING SETBACK
- EX CONTOURS
- EX EASEMENT
- EX HANDRAIL
- EX EDGE OF VEGETATION
- EX CHAIN LINK FENCE
- EX WOOD FENCE
- EX EDGE OF PAVING
- EX EDGE OF PAVING/CURB
- EX OVERHEAD LINES
- EX SANITARY LINES
- EX WATER LINES
- EX STORM DRAIN LINES
- EXISTING GAS
- SOIL BOUNDARY
- EX EASEMENT
- EX BUILDING
- PROP BUILDING
- EX FIRE HYDRANT
- PROP FIRE HYDRANT
- PROP MANHOLE
- EX MANHOLE
- EX WATER VALVE
- PROP WATER VALVE
- EX UTILITY POLE
- PROP UTILITY POLE
- EX LIGHT POLE
- PROP LIGHT POLE
- EX SIGN
- PROP SIGN
- ⑤ PARKING ROW QUANTITY
- ♿ HANDICAP PARKING
- Ⓖ EXISTING GAS MANHOLE
- EXISTING STORMDRAIN MANHOLE
- EXISTING SEWER MANHOLE
- EX LIGHT POLE
- ⦸ EX BOLLARD
- EX STORMDRAIN

SOILS CHART

SYMBOL	UNIT NAME	HYDRIC	K-VALUE	HYDRIC GROUP
AdB	ALDINO SILT LOAM 3% - 8% SLOPES	-	0.49	C
MsB2	MONTALTO SILT LOAM 3% - 8% SLOPES	-	0.37	B
MsC2	MONTALTO SILT LOAM 8% - 15% SLOPES	-	0.37	B
NeB2	NESHAMINY SILT LOAM 3% - 8% SLOPES	-	0.37	B
NeC2	NESHAMINY SILT LOAM 8% - 15% SLOPES	-	0.37	B

X = HYDRIC
I = INCLUSIONAL SOILS
K-VALUE > 0.35 = HIGHLY ERODIBLE

SITE DEVELOPMENT DATA

1. OWNER: SHOPS AT HARFORD MALL, LLC.
115 HOWELL MILL RD, SUITE 140
ATLANTA, GA 30318

2. DEVELOPER: CASTLE DEVELOPMENT PARTNERS
TOWSON CITY CENTER
1 OLYMPIC PLACE, SUITE 900
TOWSON, MD 21204

3. PROPERTY ADDRESS: 600 BEL AIR RD
BEL AIR, MD 21014

4. TAX#: 03-004023
TAX MAP: 304
GRID: 7
PARCEL: 1946
LOT: A1
DEED REF: 5103/696
ACREAGE: 29.38 AC

CURRENT ZONE: B-3 (GENERAL BUSINESS DISTRICT)

5. USE:
EXISTING: SHOPPING CENTER
PROPOSED: MIXED USE: SHOPPING CENTER/
MULTI-FAMILY RESIDENCE

6. BULK AND YARD REGULATIONS (ZONE B-3: OTHER PERMITTED USE):
MIN. SIDE SETBACK FROM RES. LOT: 10'
MIN. REAR SETBACK FROM RES. LOT: 30'
MIN. FRONT YARD DEPTH: 22'
MIN. SIDE YARD WIDTH: 0'
MIN. REAR DEPTH: 10'
MAX. HEIGHT: 65'

7. DENSITY: TBD UNITS PER ACRE = TBD * TBD AC= TBD UNITS

8. UNIT BREAKDOWN:
FLOOR 1- GROUND LEVEL (±TBD SF): TBD UNITS (## x 1 BR, ## x 2 BR, ## x 3 BR)
FLOOR 2- RES. LEVEL (±TBD SF): TBD UNITS x 1 BR, ## x 2 BR, ## x 3 BR)
FLOOR 3- RES. LEVEL (±TBD SF): TBD UNITS x 1 BR, ## x 2 BR, ## x 3 BR)
FLOOR 4- RES. LEVEL (±TBD SF): TBD UNITS x 1 BR, ## x 2 BR, ## x 3 BR)
TBD UNITS (X ONE BEDROOMS, Y TWO BEDROOMS, Z THREE BEDROOMS)

9. PARKING:
REQUIRED:
1.5 PARKING SPACES X TBD ONE BEDROOM UNITS = TBD
2 PARKING SPACES X TBD TWO BEDROOM UNITS = TBD
2.5 PARKING SPACES X TBD THREE BEDROOM UNITS = TBD
TBD PARKING SPACES REQUIRED

EXISTING PARKING: 1204 PARKING SPACES ON SITE (INCLUDING 32 HANDICAP SPACES*)
PROVIDED PARKING: 700 SPACES AT GRADE
SPACES STRUCTURED

* ALL REQUIRED HANDICAP SPACES ARE PROVIDED ON SITE.

REVISIONS

REV#	DATE	DESCRIPTION

DEVELOPER
CASTLE DEVELOPMENT PARTNERS
TOWSON CITY CENTER
1 OLYMPIC PLACE, SUITE 900
TOWSON, MD 30213

ATTN: KYLE JAMES
PHONE: 443-324-2558

FREDERICK WARD ASSOCIATES
ARCHITECTS
ENGINEERS
PLANNERS
SURVEYORS
410-879-2090
frederickward.com
PO Box 727, 5 South Main Street Bel Air Maryland 21014

OWNER
SHOPS AT HARFORD MALL, LLC.
115 HOWELL MILL RD, SUITE 140
ATLANTA, GA 30318

ATTN: JEFF DEHART
PHONE: 770-692-8300

SITE PLAN

HARFORD MALL REDEVELOPMENT

3RD EELCTION DISTRICT
TOWN OF BEL AIR

DATE: 08/15/2022
SCALE: 1" = 30'
DESIGNED BY: TMM
DRAWN BY: KMC
CHECKED BY: TMM
DRAWING NO: SP01
SHEET 1 OF 1
FWA JOB NUMBER: 2221107.00

Gmail

Mark Keeley <mkeeley@traffic-concepts.com>

Harford Mall REDEVELOPMENT Traffic Study - Phase One

3 messages

Rowan Glidden <rglidden@belairmd.org> Tue, Aug 2, 2022 at 11:48 AM
To: "Miner, Tom" <TMiner@fredward.com>, "Mark Keeley - Traffic Concepts, Inc. (MKeeley@traffic-concepts.com)" <mkeeley@traffic-concepts.com>
Cc: "Kevin L. Small" <ksmall@belairmd.org>, Kyle James <kjames@castledp.com>, "John Boling (john.boling@exp.com)" <john.boling@exp.com>, "Alex Rawls - D. of Planning & Zoning; Harf. Co. (aarawls@harfordcountymd.gov)" <aarawls@harfordcountymd.gov>

Tom,

After discussing with Kevin and John, while our collective recollections don't align exactly with yours, we are okay with Traffic Concepts not including intersection #6 in the study.

This is with the caveat that if the study contemplates routing any of the new trips through the #6 ingress/egress point, some level of analysis will be required.

Mark,

Don't renumber the intersections, just note that #6 was not studied for this phase (Phase One) of the project.

regards,

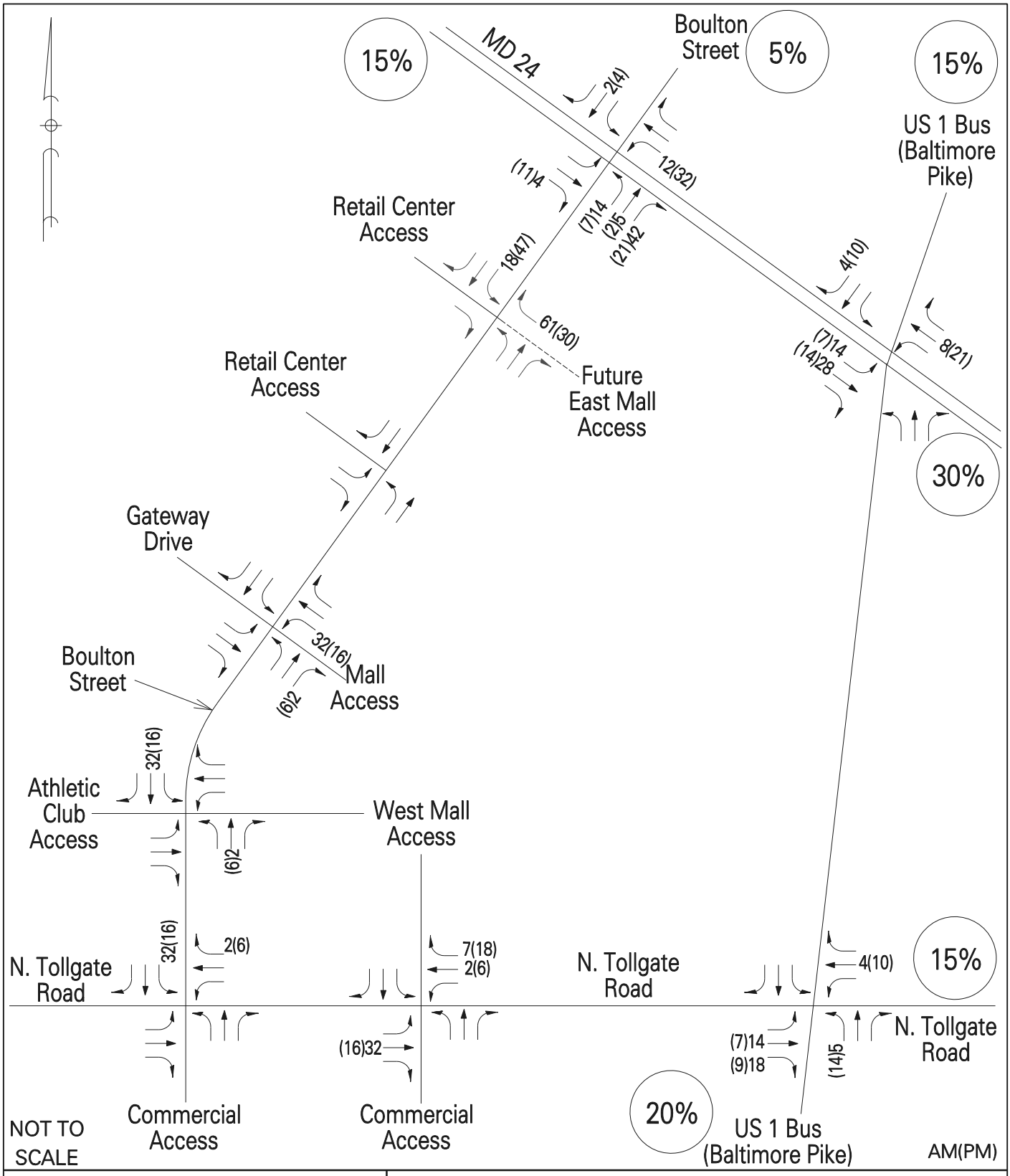
Rowan

Bel Air MARYLAND

Rowan G. Glidden, RLA
Senior Planner
Department of Planning and Community Development

rglidden@belairmd.org
410.879.9500
705 E. Churchville Rd.
Bel Air, Maryland 21014

From: Miner, Tom <TMiner@fredward.com>
Sent: Monday, August 1, 2022 10:46 AM
To: Rowan Glidden <rglidden@belairmd.org>
Cc: Kevin L. Small <ksmall@belairmd.org>; Mark Keeley - Traffic Concepts, Inc. (MKeeley@traffic-concepts.com) <mkeeley@traffic-concepts.com>; Kyle James <kjames@castledp.com>
Subject: RE: Harford Mall Traffic Study



TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
Suite B
Hanover, Maryland 21076
410-760-2911

Harford Mall Residential

Site Generated Traffic

Gmail

Jama Carey <jcarey@traffic-concepts.com>

Harford Mall Res - Site Distribution

4 messages

Mark Keeley <mkeeley@traffic-concepts.com> Thu, Nov 3, 2022 at 1:34 PM
To: John Boling <john.boling@exp.com>, alex rawls <aarawls@harfordcountymd.gov>
Cc: Kyle James <kjames@castledp.com>, "Miner, Tom" <tminer@fredward.com>, Ivette Halsall <ihalsall@traffic-concepts.com>, Jama Carey <jcarey@traffic-concepts.com>, Jon Meshel <jon.meshel@cblproperties.com>

John - I have attached the Bel Air Village (apartment Distribution) for your review. Based on that approved Bel Air Village traffic distribution, I am not inclined to change the distribution for the Mall site that we recently modified.

Alex, I included you in this email since you approved the Bel Air Village Dist. Can you provide your thoughts or concurrence? We need to get this study moving forward.

Thank you,

Mark Keeley, PTP
Project Manager
Traffic Concepts, Inc.
7525 Connelley Drive
Suite B
Hanover, Maryland 21076
Direct: 410-450-3190
Office: 410-760-2911

2 attachments

Ex 8 - Site Trips to discuss.pdf
86K

Bel Air Village Site Distribution.pdf
49K

John Boling <John.Boling@exp.com> Thu, Nov 3, 2022 at 3:11 PM
To: Mark Keeley <mkeeley@traffic-concepts.com>, alex rawls <aarawls@harfordcountymd.gov>
Cc: Kyle James <kjames@castledp.com>, "Miner, Tom" <tminer@fredward.com>, Ivette Halsall <ihalsall@traffic-concepts.com>, Jama Carey <jcarey@traffic-concepts.com>, Jon Meshel <jon.meshel@cblproperties.com>

Mark,
I agree with your percentages, unless Alex can shed new info please use your numbers.

Get Outlook for iOS

From: Mark Keeley <mkeeley@traffic-concepts.com>
Sent: Thursday, November 3, 2022 1:34:56 PM
To: John Boling <John.Boling@exp.com>; alex rawls <aarawls@harfordcountymd.gov>
Cc: Kyle James <kjames@castledp.com>; Miner, Tom <tminer@fredward.com>; Ivette Halsall <ihalsall@traffic-concepts.com>; Jama Carey <jcarey@traffic-concepts.com>; Jon Meshel <jon.meshel@cblproperties.com>
Subject: Harford Mall Res - Site Distribution

[Quoted text hidden]

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rawls, alex <aarawls@harfordcountymd.gov> Fri, Nov 4, 2022 at 3:58 PM
To: John Boling <John.Boling@exp.com>, Mark Keeley <mkeeley@traffic-concepts.com>
Cc: Kyle James <kjames@castledp.com>, "Miner, Tom" <TMiner@fredward.com>, Ivette Halsall <ihalsall@traffic-concepts.com>, Jama Carey <jcarey@traffic-concepts.com>, Jon Meshel <jon.meshel@cblproperties.com>

Mark I do not have anything to add

From: John Boling <John.Boling@exp.com>
Sent: Thursday, November 3, 2022 3:12 PM
To: Mark Keeley <mkeeley@traffic-concepts.com>; rawls, alex <aarawls@harfordcountymd.gov>
Cc: Kyle James <kjames@castledp.com>; Miner, Tom <TMiner@fredward.com>; Ivette Halsall <ihalsall@traffic-concepts.com>; Jama Carey <jcarey@traffic-concepts.com>; Jon Meshel <jon.meshel@cblproperties.com>
Subject: Re: Harford Mall Res - Site Distribution

[EXTERNAL SENDER]

Mark,

I agree with your percentages, unless Alex can shed new info please use your numbers.

Get Outlook for iOS

From: Mark Keeley <mkeeley@traffic-concepts.com>
Sent: Thursday, November 3, 2022 1:34:56 PM
To: John Boling <John.Boling@exp.com>; alex rawls <aarawls@harfordcountymd.gov>
Cc: Kyle James <kjames@castledp.com>; Miner, Tom <tminer@fredward.com>; Ivette Halsall <ihalsall@traffic-concepts.com>; Jama Carey <jcarey@traffic-concepts.com>; Jon Meshel <jon.meshel@cblproperties.com>
Subject: Harford Mall Res - Site Distribution

[Quoted text hidden]

Mark Keeley <mkeeley@traffic-concepts.com> Fri, Nov 4, 2022 at 4:25 PM
To: "rawls, alex" <aarawls@harfordcountymd.gov>
Cc: John Boling <John.Boling@exp.com>, Kyle James <kjames@castledp.com>, "Miner, Tom" <TMiner@fredward.com>, Ivette Halsall <ihalsall@traffic-concepts.com>, Jama Carey <jcarey@traffic-concepts.com>, Jon Meshel <jon.meshel@cblproperties.com>

Ok - Thanks Alex