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To: Tyler Ammermann
Up Campus Student Living, LLC

From: Thomas Ruff, PE, PTOE, AICP

RE: 1193 Seminole Trail
Turn Lane Warrant Analysis & Access Management Exception

Date: February 20, 2023

Copy: Clint Shifflett, PE (TG); Megan Nedostup, AICP (JLL)



Timmons Group performed a turn lane warrant analysis and access management exception (AM-E) for the proposed 1193 Seminole Trail residential development by Up Campus on US Route 29 in Albemarle, Virginia. The site is located just south of the US Route 29 at Greenbrier Drive intersection, on the southeast quadrant. See Figure 1 for the site location (all figures can be found at the end of this memorandum).

The proposed development will consist of approximately 300 dwelling units of multi-family housing in a 5-story building. The site will have approximately 7,500 SF of general commercial space on the first floor. Access to the site will be provided via two (2) proposed partial access entrances on US Route 29, one of which will be right-in only (370' from stop bar) and one of which will be a shared right-in/right-out entrance with the WaWa property located at 1215 Seminole Trail (125' from stop bar). The project is expected to be completed within 3 years; therefore, a 2026 buildout year has been assumed. The site layout is shown in Figure 2.

Background Information

US Route 29 is a ten-lane, divided principal arterial with a posted speed limit of 45 mph. According to 2019 VDOT count data, US Route 29 services approximately 54,000 vehicles per day and primarily serves as the major corridor for traffic through Albemarle County.

Greenbrier Drive (Route 866) is a three-lane, undivided urban major collector. To the west of US Route 29, the roadway is posted at 35 mph and carries approximately 8,000 vehicles per day. To the east of US Route 29, the roadway is posted at 25 mph and carries approximately 4,800 vehicles per day.

Existing Traffic Volumes

Peak hour directional turning movement (DTM) counts were collected on January 26, 2023, at the US Route 29 at Greenbrier Drive intersection during the AM (7-9) and PM (4-6) peak hours. Using the collected traffic data, the peak hours were determined to be 7:30 – 8:30 for the AM peak and 4:30 – 5:30 for the PM peak. The 2023 existing volumes can be found in Figure 3. A copy of all count data can be found in Appendix A.

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Background Traffic Volumes

The 2023 existing volumes were grown by 1% for 3 years to develop the background 2026 traffic volumes. The 2026 background growth volumes can be found on Figure 4.

The existing entrance on US Route 29 for the WaWa development located at 1215 Seminole Trail is proposed to be shared with the 1193 Seminole Trail property. The WaWa development is currently developing at this time and data collection was not possible. The following represents the trip generation and distribution for the background traffic at the WaWa entrance.

The WaWa development will consist of approximately 18 fueling positions and a 6,000 SF convenience store. Trips were generated using the ITE's *Trip Generation Manual, 11th Edition* for Land Use Code 945 with fueling positions as the independent variable, respectively. The background trip generation estimate is summarized in Table 1 below:

Table 1:
Site-Generated Traffic for WaWa Development (Background)

WaWa Development Background				Weekday[1]						
			Land Use	AM Peak Hour[2]			PM Peak Hour			Average
Land Use	Size	Units	Code	In	Out	Total	In	Out	Total	Daily Trips[3]
1. ITE Trip Generation[1]										
Convenience Store/Gas Station	18	VFP	945	285	284	569	242	242	484	6,224
Total ITE Generated Trips				**285**	**284**	**569**	**242**	**242**	**484**	**6,224**
2. Pass-By Trip Reduction[2]	Pass-By Rate									
	76%	AM		**(217)**	**(216)**	**(432)**				
	75%	PM					**(182)**	**(182)**	**(363)**	**(4,668)**
Total Pass-By Trips				**(217)**	**(216)**	**(432)**	**(182)**	**(182)**	**(363)**	**(4,668)**
3. Net New Trips (ITE - Pass-By)				**68**	**68**	**137**	**60**	**60**	**121**	**1,556**

Notes: (1) Based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.
(2) Pass-by Rates from ITE Trip Generation 11th Edition. ADT set to equal PM as ITE has no ADT Pass-By data.

Pass-by trips are trips that would be drawn to the development from the existing traffic stream on adjacent streets. These trips are intermediate stops on the route from an origin to the primary destination (i.e. stopping for gas on the route from work to home). These trips will not add to the overall traffic volumes on the roadway but will add to the turning traffic at the site entrances.

In accordance with VDOT Chapter 527 guidelines, the pass-by trip reduction was obtained from the ITE Trip Generation Manual, 11th Edition and indicates a 76% pass-by reduction in the AM peak hour and a 75% pass-by reduction in the PM peak hour. The ADT pass-by rate was assumed to equal the PM rate as ITE has no ADT data.

Based on the existing roadway geometry and traffic volumes, it is estimated that 75% of the WaWa development site traffic will utilize the entrance on US Route 29 as a right-in/right-out for access and 25% will enter via the Greenbrier Drive entrance. The pass-by site trips breakdown is shown on Figure 5. The new site trips breakdown is shown on Figure 6.

The 2026 background growth volumes were added to the WaWa pass-by and new trip development volumes. The 2026 background volumes can be found on Figure 7.

Proposed Trip Generation & Distribution

The proposed 1193 Seminole Trail residential development will consist of approximately 300 dwelling units of multi-family housing in a 5-story building. The site will have approximately 7,500 SF of general commercial space on the first floor. Trips were generated using the ITE's *Trip Generation Manual, 11th Edition* for Land Use Codes 221 and 822 with dwelling units and square footage as the independent variable, respectively. The trip generation estimate is summarized in Table 1 below:

Table 2:
Site-Generated Traffic for 1193 Seminole Trail Development

1193 Seminole Trail Development - UpCampus				Weekday						
			Land Use	AM Peak Hour			PM Peak Hour			Average
Land Use	Size	Units	Code	In	Out	Total	In	Out	Total	Daily Trips
1. ITE Trip Generation[1]										
Residential										
Multi-family Housing (Mid-Rise)	300	D.U.	221	28	92	120	71	46	117	1,385
Residential Subtotal				**28**	**92**	**120**	**71**	**46**	**117**	**1,385**
Retail										
General Commercial (<40,000 SF)	7,500	S.F.	822	11	7	18	32	31	63	408
Retail Subtotal				**11**	**7**	**18**	**32**	**31**	**63**	**408**
Total ITE Generated Trips (Residential + Retail)				**39**	**99**	**138**	**103**	**77**	**180**	**1,793**

Notes: (1) Based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.

Based on the existing roadway geometry and traffic volumes, all traffic for the proposed development will have to access the site via one of the two partial access entrances. Given the proximity it is estimated that 75% of the residential and commercial development site traffic will utilize the entrance the first entrance and 25% will utilize the second entrance for access. All exiting traffic will make a right out of the site from the second entrance. The proposed site trips breakdown is shown on Figure 8.

Projected Total Traffic

The 2026 background volumes shown on Figure 7 were combined with the site-generated traffic estimates shown on Figure 8 to calculate the 2026 total traffic volumes.

The 2026 total traffic volumes are shown on Figure 9.

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Turn Lane Warrant Analysis

The 2026 total volumes (background growth + WaWA development + proposed site) shown on Figure 9 were used in conjunction with the appropriate left and right turn lane nomographs from Appendix F of the VDOT *Road Design Manual*. The northbound right turn movements on US Route 29 at both proposed entrances were analyzed for turn lane warrants.

The turn lane nomographs used in the analysis are shown on Figures 10 and 11.

The turn lane warrant analysis indicates the following:

- Northbound right turn lane is warranted on US Route 29 at the right-in only entrance
- Northbound right turn lane is warranted on US Route 29 at the shared entrance

Given the posted speed limit and urban classification, the minimum turn lane configuration on US Route 29 is 100' of storage and 100' of taper.

Access Management Exception Request

In accordance with Table 2-2 of the VDOT *Road Design Manual, Appendix F* and the characteristics of US Route 29 (principal arterial with posted 45 mph speed limit), the proposed shared right-in/right out entrance requires 495 feet (measured centerline to centerline) from the intersection of US Route 29 at Greenbrier Drive. As shown on the conceptual site plan, the proposed shared right-in/right-out entrance spacing from the signalized intersection is 185 feet, or 310 feet short of the standard. In addition, the proposed right-in only entrance requires 495 feet from the proposed shared right-in/right-out only entrance. As shown on the conceptual site plan, the proposed right-in only entrance spacing from the proposed shared right-in/right-out intersection is 245 feet, or 250 feet short of the standard. The proposed right-in only entrance is also located 50 feet from the existing entrance to 1185 Seminole Trail, which is 445 feet short of the standard.

An Access Management Exception (AM-E) request is required as both proposed entrances on US Route 29 do not meet spacing standards and both entrances are within the functional area of the adjacent US Route 29 at Greenbrier Drive signalized intersection.

An operational analysis of the existing, background, and proposed conditions has been performed to provide supporting documentation for the AM-E request.

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Operational and Queuing Analysis

Per VDOT traffic engineering policy, the existing 2023 peak hour volumes, the 2026 background volumes with the WaWa development, and the projected 2026 total peak hour volumes were analyzed using appropriate TOSAM methodology to determine the operational effectiveness of the existing intersection geometry, the background geometry, and the impacts of the proposed new site traffic.

The operational and queuing analyses were performed using SYNCHRO Version 11 and HCM 6th Edition methodologies for the signalized intersection and HCM 2000 for the proposed unsignalized intersections due to the geometric limitations of HCM 6th Edition. It should be further noted that the number of lanes on US Route 29 is reduced to 4 for the background and total scenarios for the HCM 2000 analysis only, as HCM 2000 does not allow calculation of 5 lanes on the mainline. The SimTraffic analysis is completed using the appropriate geometry.

The analysis assumed level terrain, exclusion of bus or parking impacts, exclusion of pedestrians, heavy vehicle percentages based on collected traffic data, use of the existing PHF for all analysis years for the signalized intersection and used a PHF of factor 0.92 for the proposed intersections. The corresponding SYNCHRO worksheets are included in Appendix B.

Table 3 summarizes the existing 2023 intersection LOS, delay, 95th percentile queue lengths, and maximum queue lengths based on the existing traffic volumes the existing geometry.

Table 3:
Intersection Level of Service, Delay, and Queue Summary
Existing 2023 Conditions

Intersection and Type of Control	Movement and Approach	TOSAM Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)
1. US Route 29 (N-S) at	EB Left	200	48.1	D	137	169	53.3	D	183	192
Greenbrier Drive (E-W)	EB Thru		49.9	D	90	155	50.3	D	113	172
Signalized	EB Right	325	50.8	D	0	78	47.2	D	24	90
	EB Approach		*49.4*	*D*	--	--	*50.1*	*D*	--	--
	WB Left	425	45.2	D	107	158	44.7	D	98	128
	WB Thru/Right		90.1	F	#165	165	99.1	F	#251	254
	WB Approach		*67.6*	*E*	--	--	*80.0*	*E*	--	--
	NB Dual Left	750	48.6	D	#135	207	55.8	E	#171	236
	NB Thru		19.9	B	219	311	23.8	C	391	410
	NB Thru-Right		21.0	C	--	61	25.8	C	--	126
	NB Approach		*23.7*	*C*	--	--	*27.3*	*C*	--	--
	SB Left	275	61.0	E	117	267	69.8	E	65	272
	SB Thru		28.4	C	384	375	33.4	C	442	373
	SB Right	300	8.8	A	30	98	9.8	A	14	84
	SB Approach		*27.8*	*C*	--	--	*32.3*	*C*	--	--
	Overall		29.3	C	--	--	33.3	C	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

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

As shown in Table 3, the overall signalized intersection operates at LOS C during both the AM and PM peak hours. The mainline movements on northbound and southbound US Route 29 do not have any operational issues. The side street approaches operate at LOS D for all movements except for the westbound through/right. The queuing analysis shows that all existing turn lanes are capable of handling the existing volumes.

It should be noted that the northbound through-right lane on US Route 29 at Greenbrier Drive has a simulated queue of 61 feet in the AM peak and 126 feet in the PM peak.

Table 4 summarizes the projected 2026 background intersection LOS, delay, 95th percentile queue lengths, and maximum queue lengths based on the background traffic volumes and background geometry with the WaWa right-in/right-out entrance.

Table 4:
Intersection Level of Service, Delay, and Queue Summary
Background 2026 Conditions

Intersection and Type of Control	Movement and Approach	TOSAM Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)
1. US Route 29 (N-S) at	EB Left	200	49.1	D	142	184	54.5	D	187	195
Greenbrier Drive (E-W)	EB Thru		50.0	D	92	145	54.8	D	116	223
Signalized	EB Right	325	56.1	E	0	92	137.5	F	29	149
	EB Approach		*51.8*	*D*	--	--	*90.4*	*F*	--	--
	WB Left	425	64.7	E	#234	295	46.7	D	164	237
	WB Thru/Right		94.0	F	#169	215	106.7	F	#261	274
	WB Approach		*75.3*	*E*	--	--	*77.6*	*E*	--	--
	NB Dual Left	750	48.6	D	#142	98	57.9	E	#180	98
	NB Thru		23.0	C	237	165	27.4	C	420	161
	NB Thru-Right		24.5	C	--	116	30.2	C	--	123
	NB Approach		*26.4*	*C*	--	--	*30.8*	*C*	--	--
	SB Left	275	122.4	F	#268	274	176.8	F	#215	274
	SB Thru		28.3	C	378	512	33.4	C	455	430
	SB Right	300	9.0	A	33	98	9.5	A	16	126
	SB Approach		*33.1*	*C*	--	--	*37.9*	*D*	--	--
	Overall		33.9	C	--	--	40.6	D	--	--
2. US Route 29 (N-S) at	WB Right		19.8	C	67	121	27.3	C	81	203
WaWa RI/RO Entrance (E-W)	*WB Approach*		19.8	C	--	--	27.3		--	--
Unsignalized	NB Thru		†	†	†	†	†	†	†	†
	NB Thru-Right		†	†	†	†	†	†	†	†
	NB Approach		†	†	--	--	†	†	--	--
	SB Thru		†	†	†	†	†	†	†	†
	SB Approach		†	†	--	--	†	†	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

As shown in Table 4, the overall signalized intersection continues to operate at LOS C during the AM peak but worsens to operate at LOS D during the PM peak. The mainline movements on northbound and southbound US Route 29 do not have any operational issues. The southbound left to access the WaWa through Greenbrier Drive sees additional operational delays but the queues are contained within the existing turn lane. The side street approaches have a worsening delay due to the additional background volumes and the additional WaWa volumes on Greenbrier Drive. The queuing analysis shows that all turn lanes are capable of handling the volumes.

It should be noted that the northbound through-right lane on US Route 29 at Greenbrier Drive has a simulated queue of 116 feet in the AM peak and 123 feet in the PM peak.

Table 5 summarizes the projected 2026 total intersection LOS, delay, 95th percentile queue lengths, and maximum queue lengths based on the total traffic volumes and proposed geometry with a shared right-in/right-out entrance with WaWa and a right-in only entrance. The right-in entrance is not shown on the figure as there is no operational results for an unsignalized through-right movement.

Table 5:
Intersection Level of Service, Delay, and Queue Summary
Total 2026 Conditions

Intersection and Type of Control	Movement and Approach	TOSAM Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)
1. US Route 29 (N-S) at Greenbrier Drive (E-W) Signalized	EB Left	200	49.1	D	142	162	54.5	D	187	192
	EB Thru		50.0	D	92	119	54.8	D	116	246
	EB Right	325	56.1	E	0	84	137.5	F	29	185
	EB Approach		*51.8*	*D*	--	--	*90.4*	*F*	--	--
	WB Left	425	64.7	E	#234	318	46.7	D	164	211
	WB Thru/Right		94.0	F	#169	249	106.7	F	#261	261
	WB Approach		*75.3*	*E*	--	--	*77.6*	*E*	--	--
	NB Dual Left	750	48.6	D	#142	98	57.9	E	#180	98
	NB Thru		23.4	C	255	163	28.0	C	440	161
	NB Thru-Right		25.1	C	--	117	31.1	C	--	122
	NB Approach		*26.7*	*C*	--	--	*31.3*	*C*	--	--
	SB Left	275	122.4	F	#268	274	176.8	F	#215	274
	SB Thru		28.3	C	378	492	33.4	C	455	492
	SB Right	300	9.0	A	33	108	9.5	A	16	129
	SB Approach		*33.1*	*C*	--	--	*37.9*	*D*	--	--
	Overall		33.9	C	--	--	40.7	D	--	--
2. US Route 29 (N-S) at WaWa RI/RO Entrance (E-W) Unsignalized	WB Right		30.5	D	145	212	47.9	D	175	290
	WB Approach		30.5	D	--	--	47.9		--	--
	NB Thru		†	†	†	†	†	†	†	†
	NB Thru-Right		†	†	†	†	†	†	†	†
	NB Approach		†	†	--	--	†	†	--	--
	SB Thru		†	†	†	†	†	†	†	†
	SB Approach		†	†	--	--	†	†	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

As shown in Table 5, the overall signalized intersection continues to operate at LOS C during the AM peak and at LOS D during the PM peak. The mainline movements on northbound and southbound US Route 29 do not have any operational issues. The southbound left to access the WaWa through Greenbrier Drive sees additional operational delays but the queues are contained within the existing turn lane. The side street approaches have a worsening delay due to the additional background volumes and the additional WaWa volumes on Greenbrier Drive. The queuing analysis shows that all turn lanes are capable of handling the volumes.

It should be noted that the northbound through-right lane on US Route 29 at Greenbrier Drive has a simulated queue of 117 feet in the AM peak and 122 feet in the PM peak.

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Conclusions

A turn lane warrant analysis, queuing analysis, and operational analysis were prepared in support of the proposed residential development located at 1193 Seminole Trail.

The results of the analysis indicate the following:

- The proposed development on US Route 29 will consist of approximately 300 dwelling units of multi-family housing with approximately 7,500 SF of commercial space in the first floor. The proposed development will generate a total of 1,793 daily trips, 138 AM peak trips (39 in and 99 out), and 180 PM peak trips (103 in and 77 out).

- Access to the site will be provided via two (2) proposed partial access entrances on US Route 29, one of which will be right-in only (370' from stop bar) and one of which will be a shared right-in/right-out entrance with the WaWa property located at 1215 Seminole Trail (125' from stop bar).

- A turn lane warrant analysis was performed for the northbound right turn movements on US Route 29 at the two (2) proposed entrances. The analysis shows that both entrances warrant right turn lanes based on the proposed traffic volumes.

- The operational analysis of the 2023 existing conditions found that the overall signalized intersection of US Route 29 at Greenbrier Drive operated at LOS C during both peak hours. The queuing analysis shows that all existing turn lanes are capable of handling the existing volumes.

- Under 2026 background conditions with the WaWa development only, the overall signalized intersection of US Route 29 at Greenbrier Drive maintained similar levels of service to the existing, with only the SB left and WB left operating poorly due to the additional traffic from the gas station. The queuing analysis shows that all existing turn lanes are capable of handling the background volumes.

- Under 2026 total conditions with the proposed mixed-use development only, the overall signalized intersection of US Route 29 at Greenbrier Drive maintained similar levels of service to the background and did not make the side streets worse. The queuing analysis shows that all existing turn lanes are capable of handling the background volumes.

- Per VDOT standards, a proposed partial access entrances on a principal arterial posted at 45 mph will require 495 feet from any other intersection. The proposed shared right-in/right-out entrance with WaWa is located 185 feet from the signalized intersection and will require an exception of 310 feet. The proposed right-in only entrance is located 50 feet from the existing entrance to 1185 Seminole Trail, which will require an exception of 445 feet.

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Recommendations

While the turn lane warrant analysis indicates a northbound right turn lane is warranted at both proposed partial access entrances to US Route 29, the installation of those improvements is not recommended for the following reasons:

1. Improvement on Existing Conditions – The parcel for 1215 Seminole Trail (WaWa) has 2 existing right-in/right-out partial entrances on US Route 29. The parcel for 1193 Seminole Trail (new development) has 2 existing right-in/right-out partial entrances on US Route 29. The proposed development will condense the 4 existing partial access entrances down to 2 partial access entrances, one of which will be right-in only.

2. Existing Through-Right Lane – The existing northbound US Route 29 corridor has a 5-lane section that is made up of 4 through lanes and 1 through-right lane. The operational analysis found that the queuing for the northbound through-right lane at the signalized intersection was less than 130 feet in the existing conditions, which indicates that the lane has capacity to perform as a de facto right turn lane.

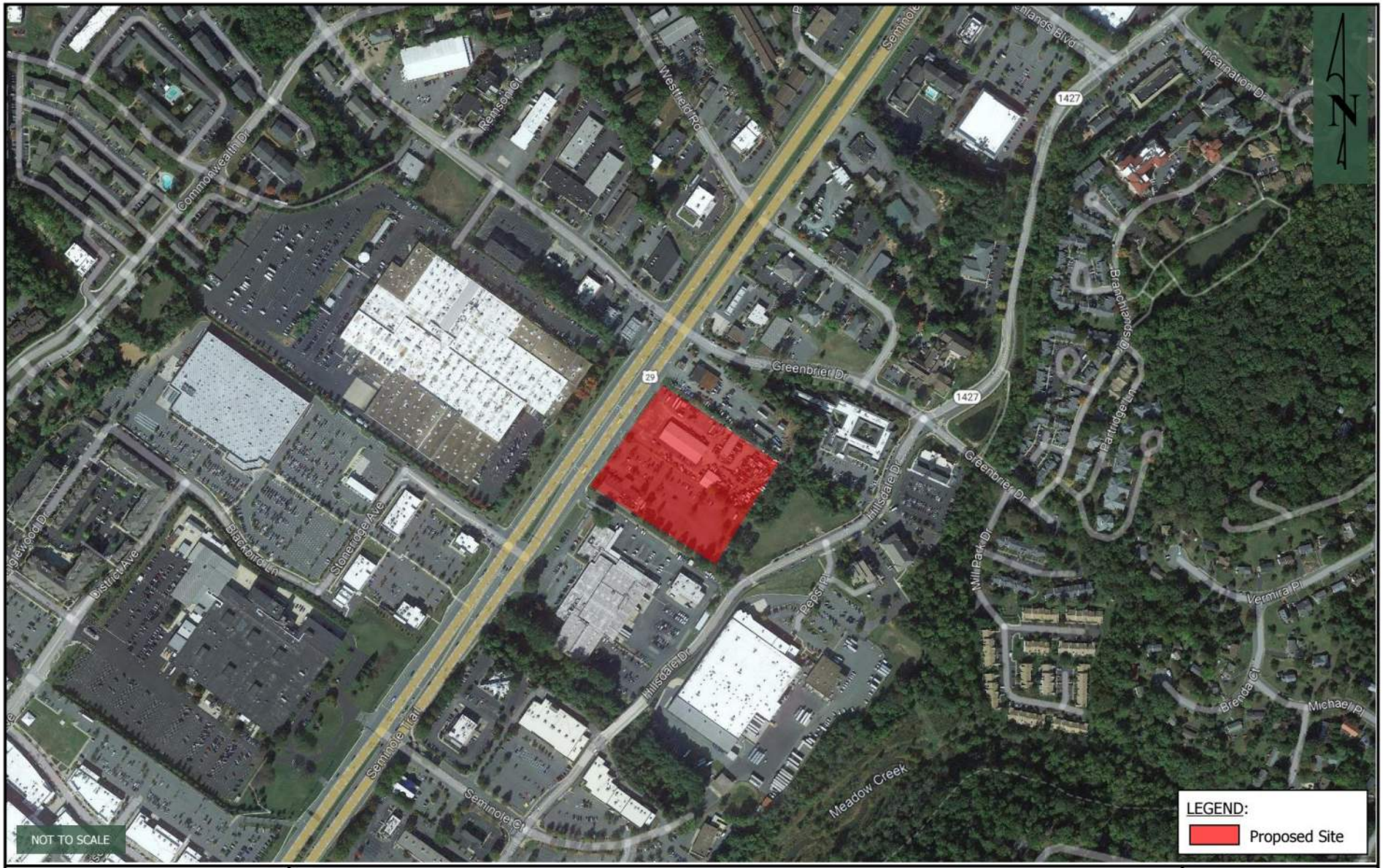
3. Impact on Adjacent Property – Based on survey data, the existing right-of-way along US Route 29 is insufficient to accommodate widening associated with the aforementioned auxiliary turn lane. The geometric improvements would require the acquisition of right-of-way from adjacent landowners and construction costs in excess of $1,000,000 for the benefit of 4 left turns.

4. Operational Analysis – Per the operational analysis, the through-right lane on US Route 29 northbound does not have queuing or capacity concerns. The analysis shows that the addition of the traffic volumes for the proposed development will not have a negative impact on the operations of the signalized intersection nor the US Route 29 corridor.

Based on the summary of information provided in this report, a northbound right turn lane on US Route 29 is not recommended for installation in association with the proposed residential development for either the proposed shared right-in/right-out partial entrance or the proposed right-in partial entrance.

In addition, given the improvement to the existing access management on US Route 29 northbound, it is recommended that the Access Management Exception (AM-E) be approved for both proposed partial access entrances to be installed at less than the minimum spacing standard.

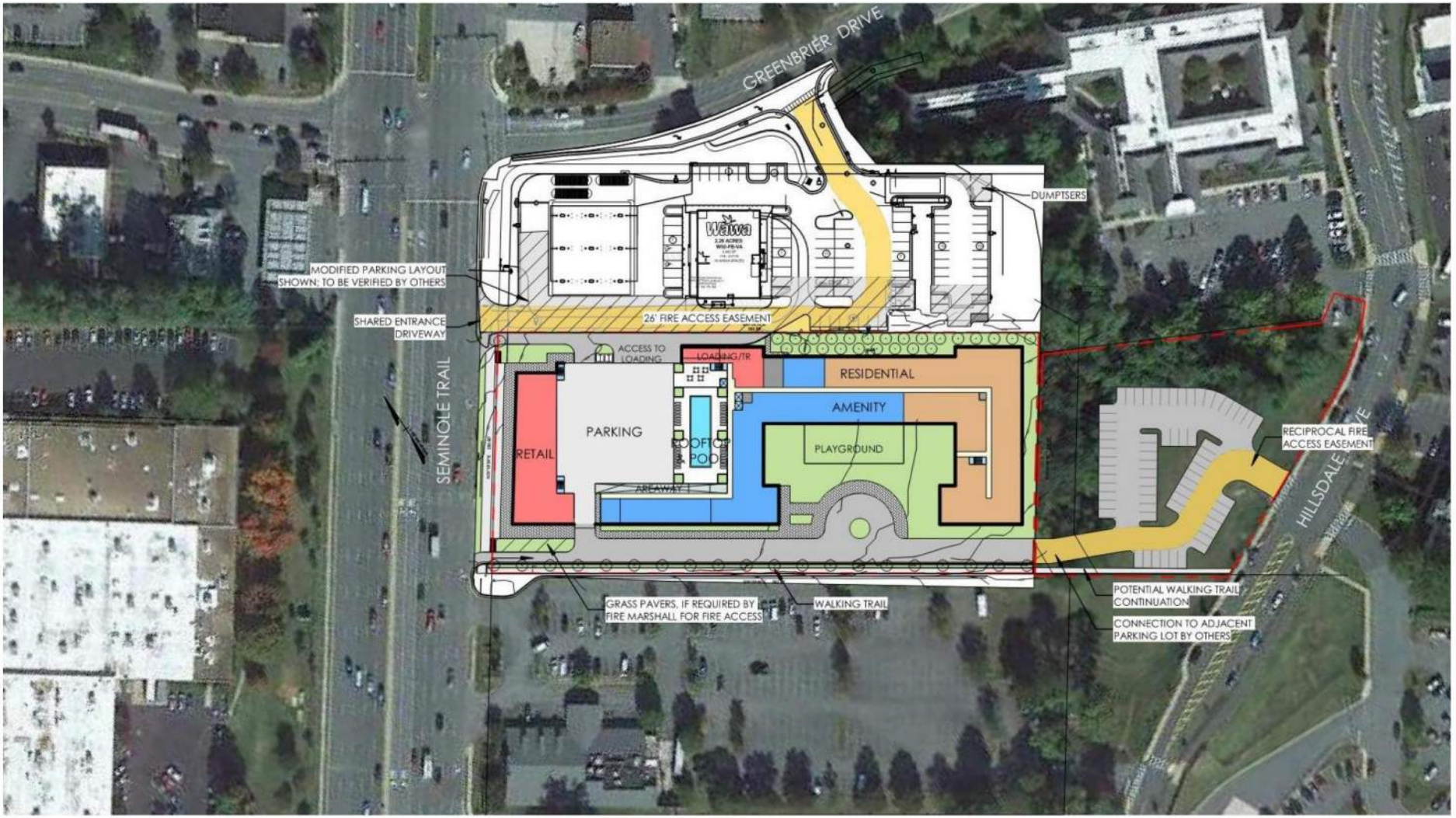
The VDOT form for requesting an AM-E is included in Appendix C.



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1193 Seminole Trail Residential Development
Surrounding Roadway Network and Site Location
Albemarle, VA

Figure
1

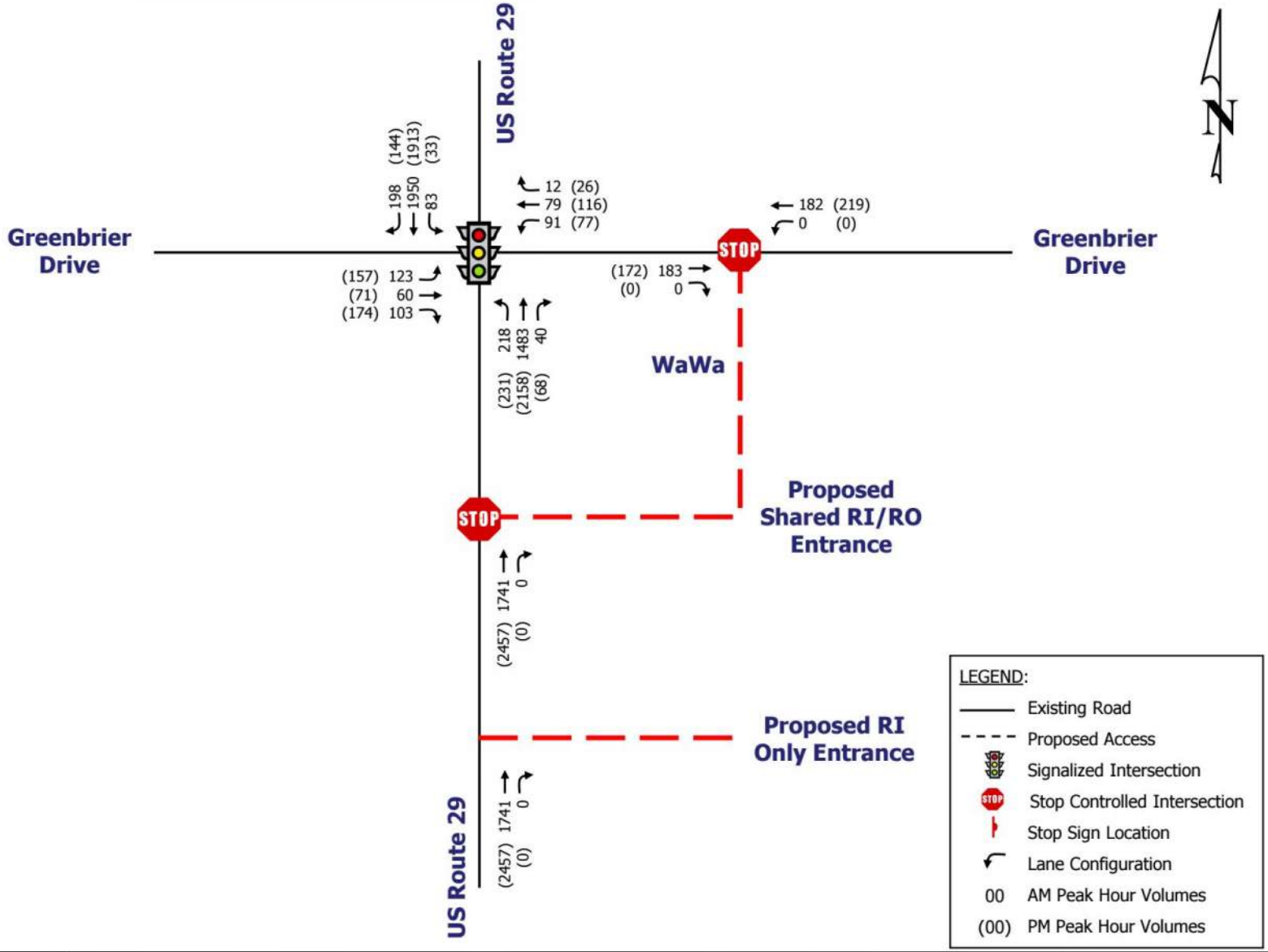


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1193 Seminole Trail Residential Development
Conceptual Site Plan
Albemarle, VA

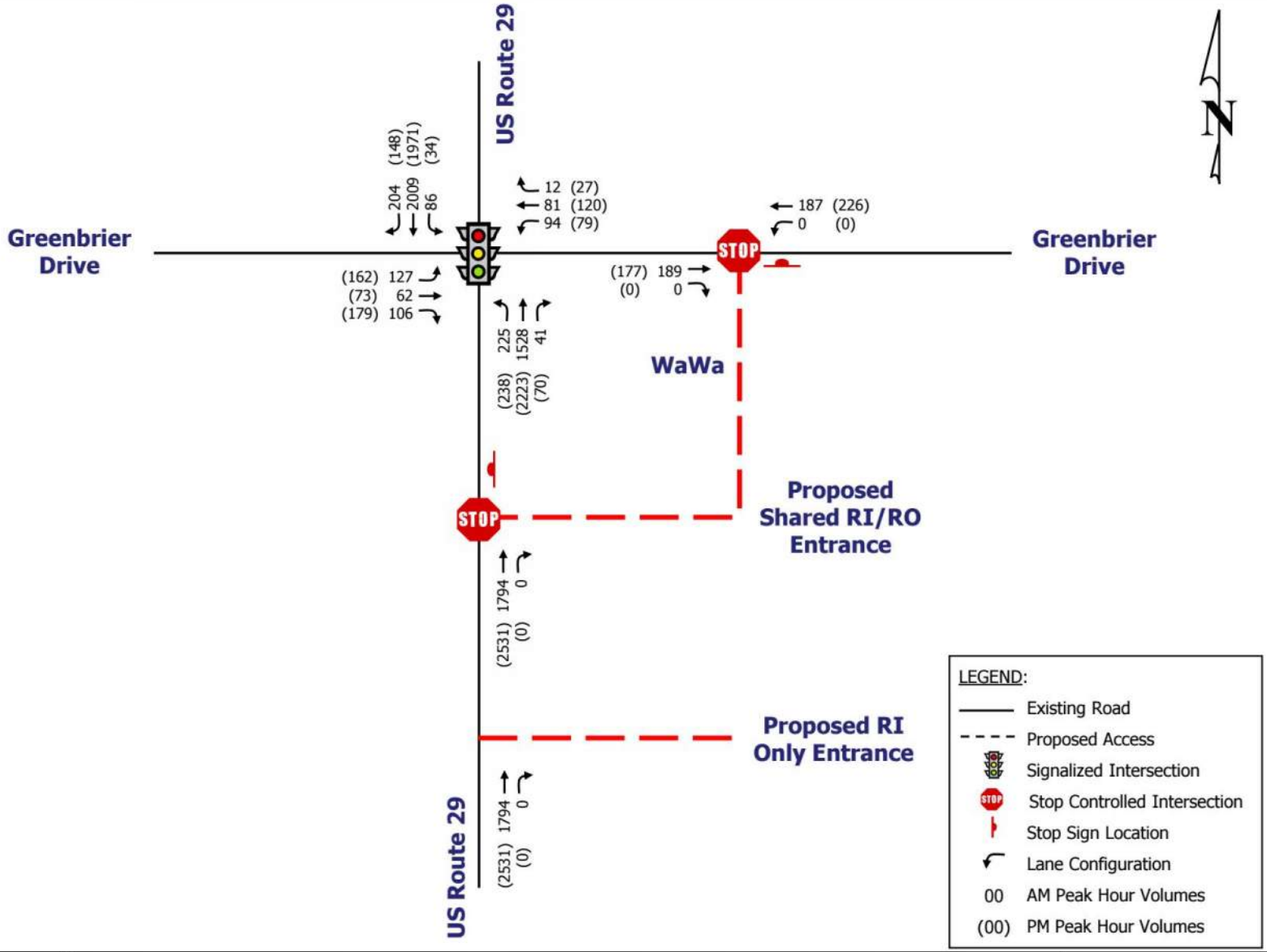
Figure
2



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1193 Seminole Trail Residential Development
2023 Existing Volumes
Albemarle, VA

Figure 3

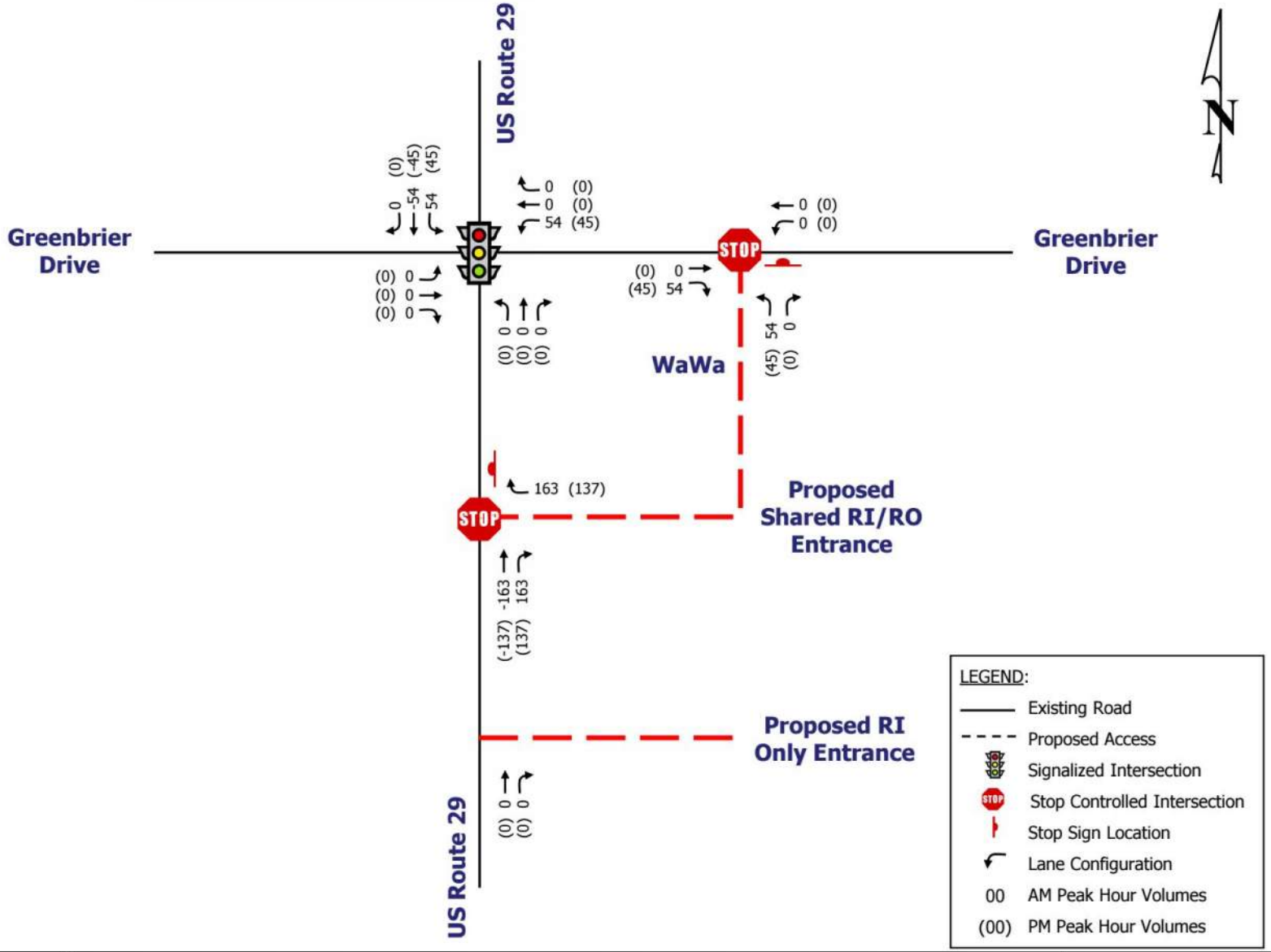


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1193 Seminole Trail Residential Development
2026 Background Growth
Albemarle, VA

Figure 4

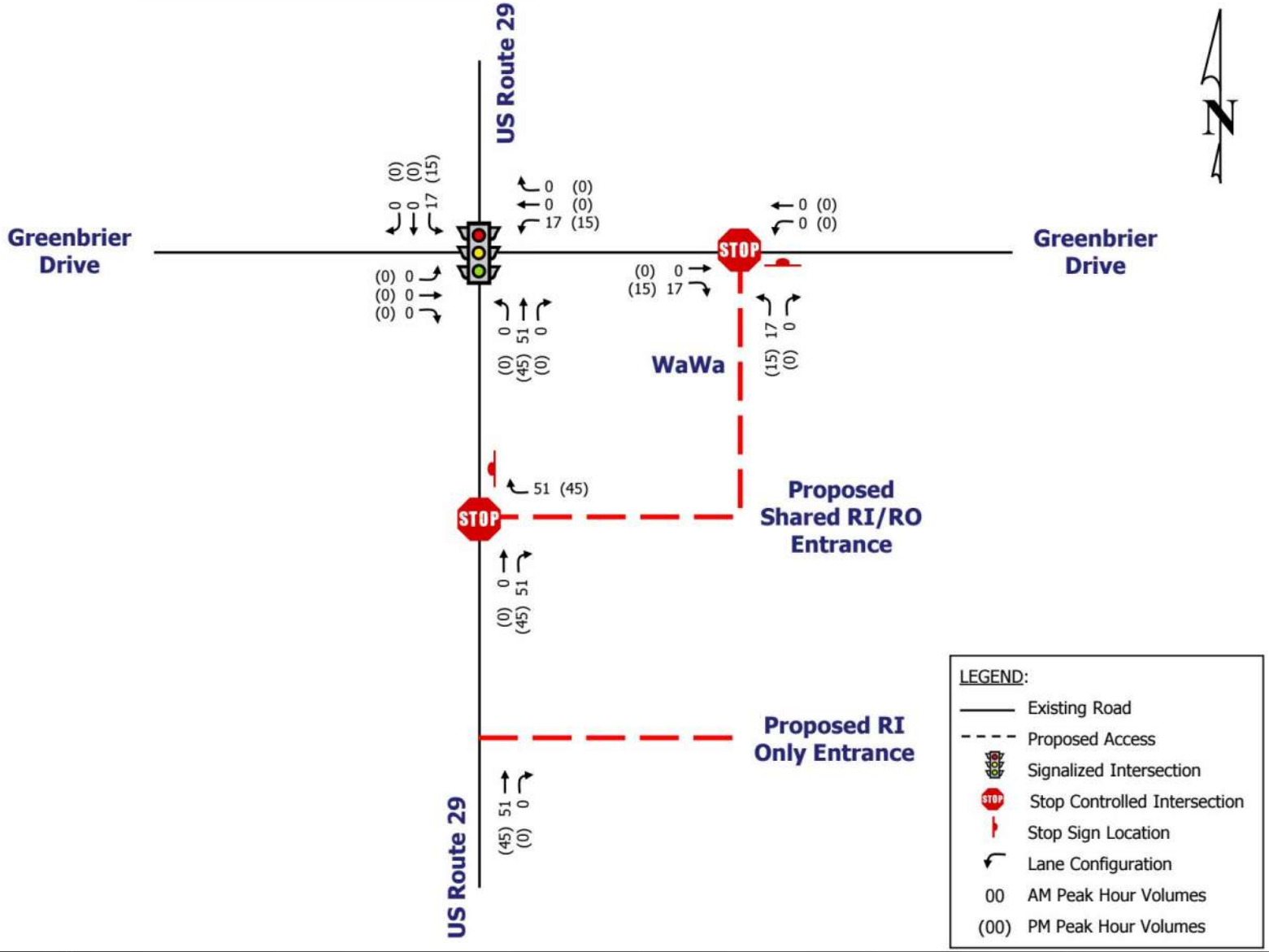


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1193 Seminole Trail Residential Development
WaWa Pass-By Trips
Albemarle, VA

Figure 5

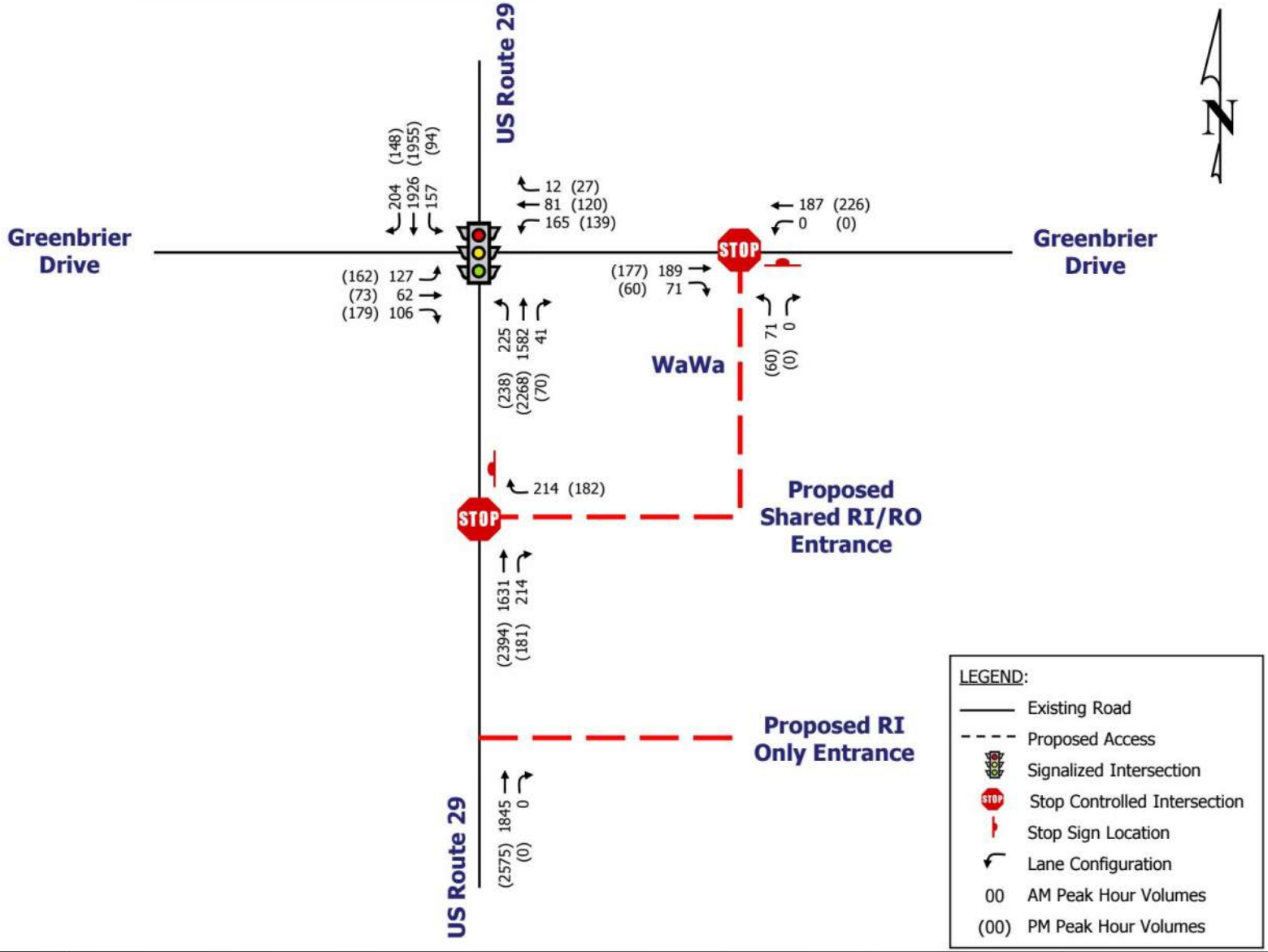


NOT TO SCALE

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1193 Seminole Trail Residential Development
WaWa New Site Trips
Albemarle, VA

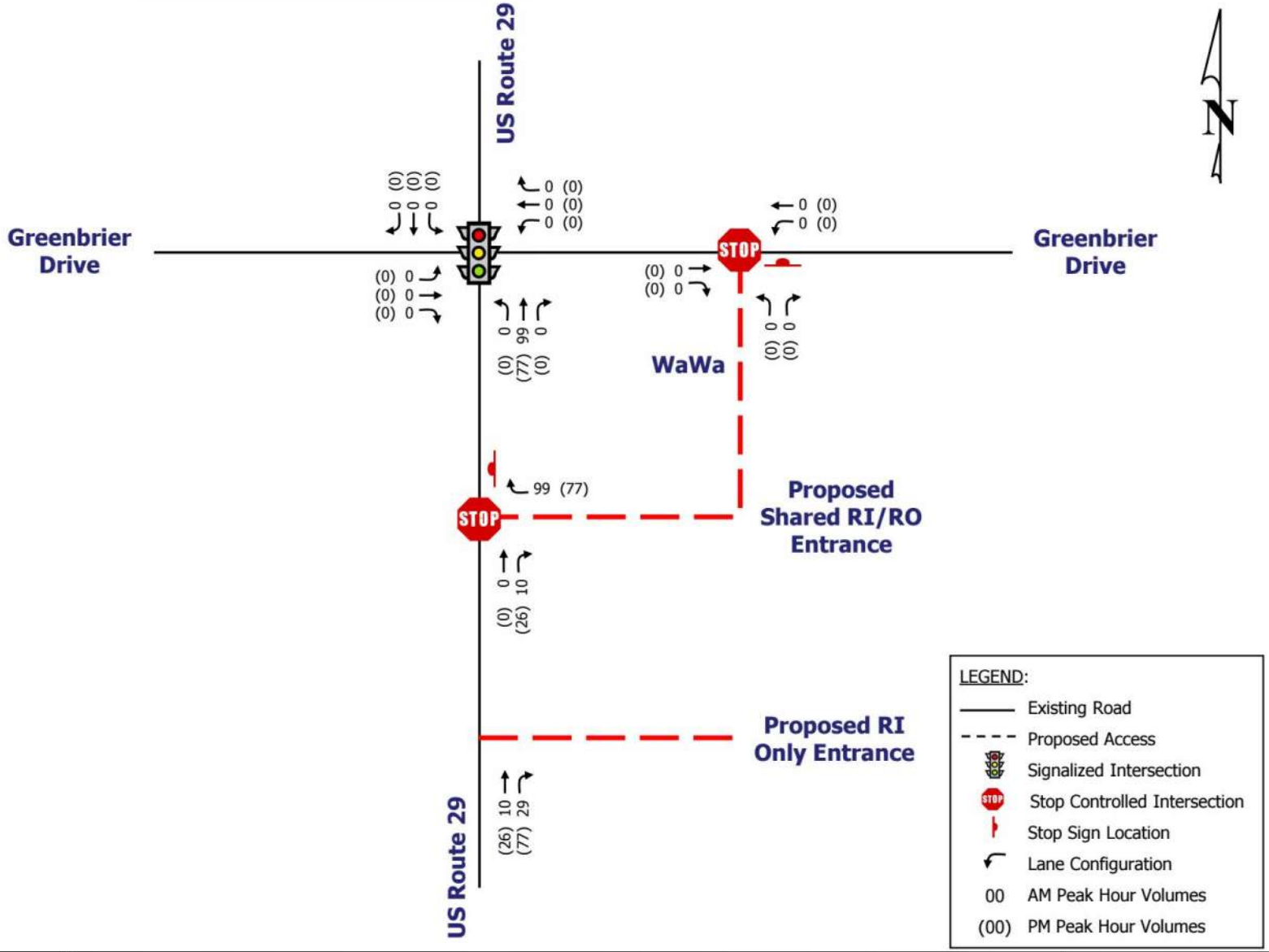
Figure 6



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1193 Seminole Trail Residential Development
2026 Background Volumes
Albemarle, VA

Figure 7

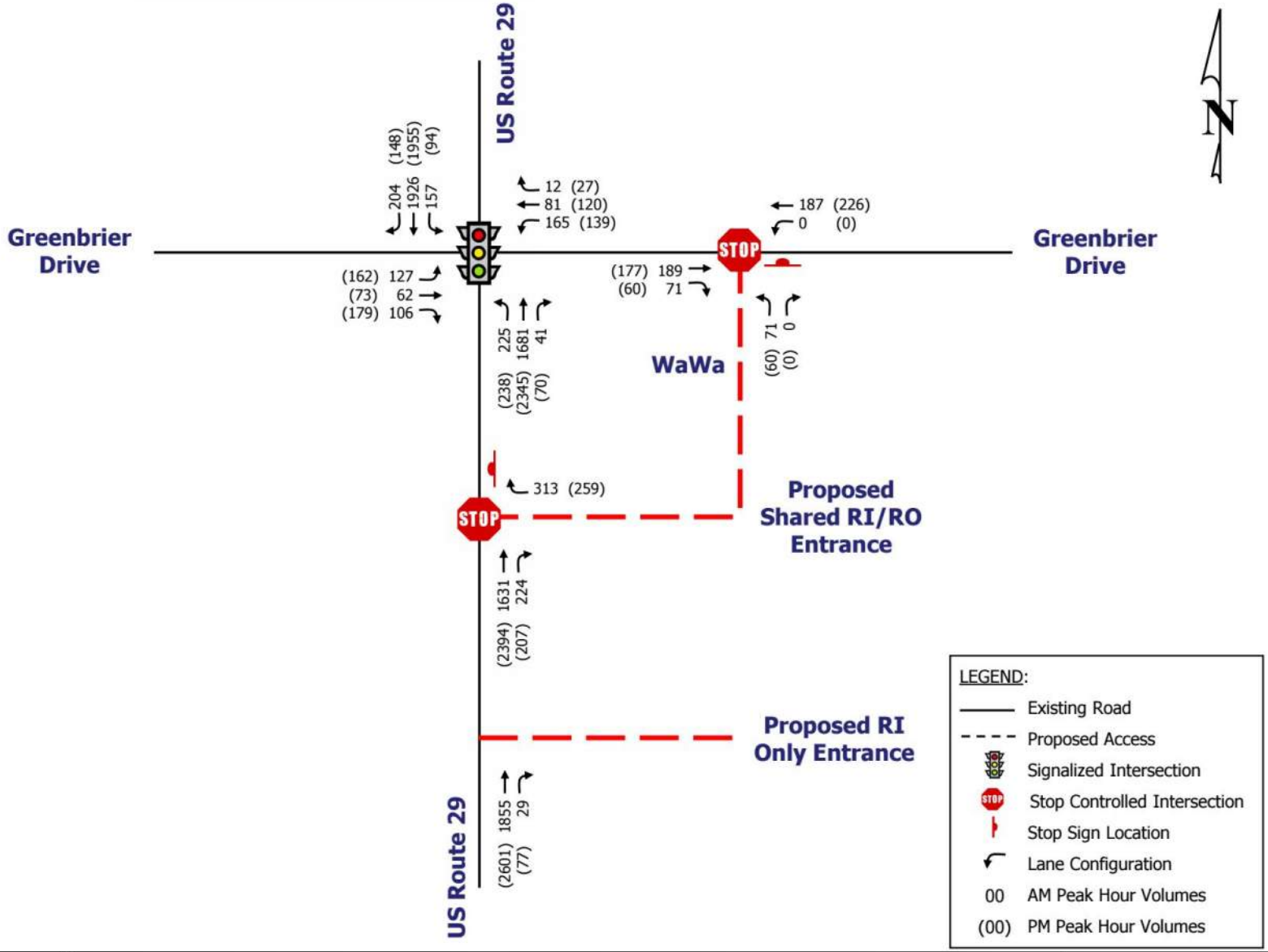


NOT TO SCALE

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1193 Seminole Trail Residential Development
Proposed New Site Trips
Albemarle, VA

Figure 8



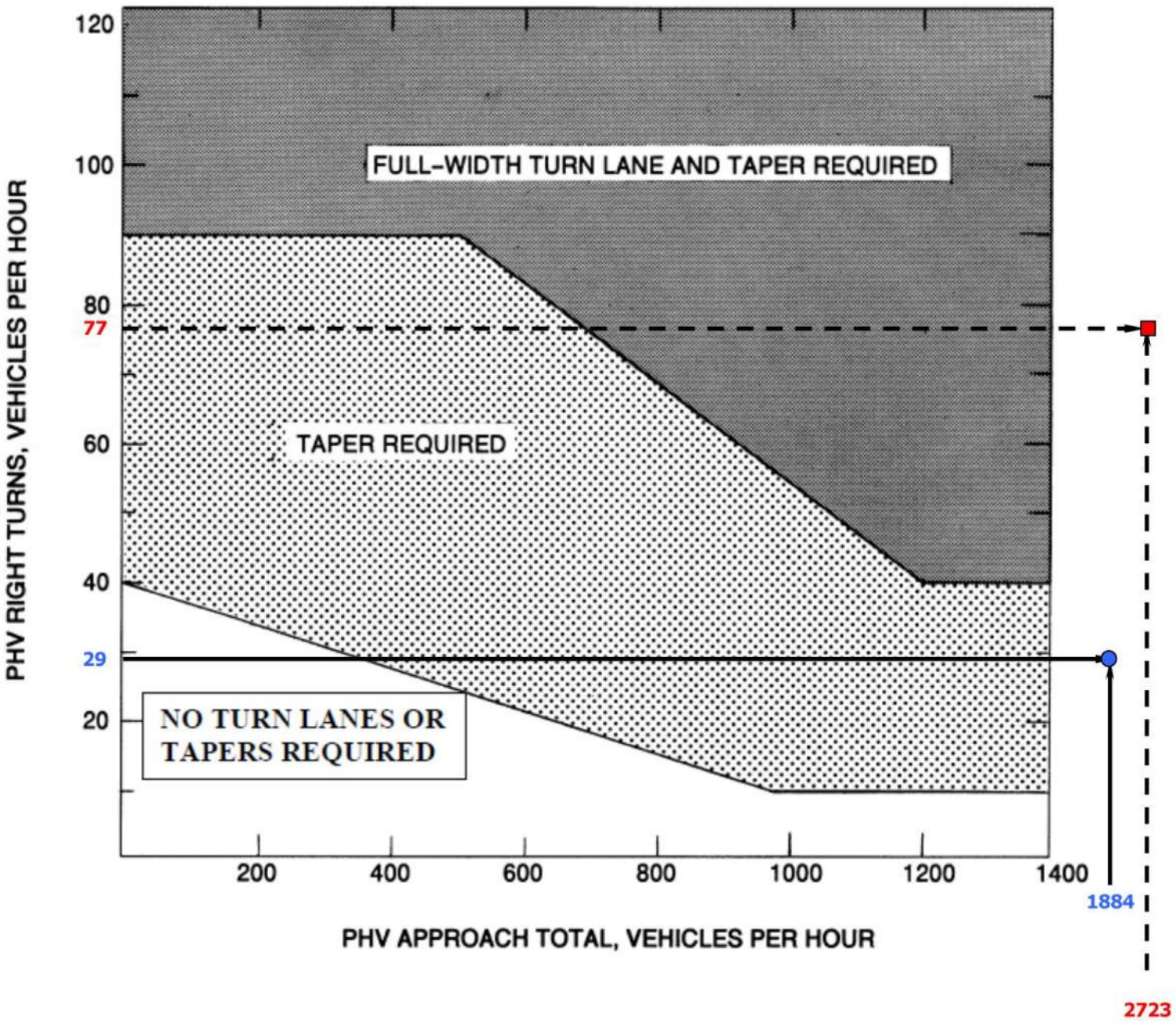
NOT TO SCALE

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1193 Seminole Trail Residential Development
2026 Total Future Volumes
Albemarle, VA

Figure 9

GUIDELINES FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)
FIGURE 3-27 VDOT ROAD DESIGN MANUAL APPENDIX F

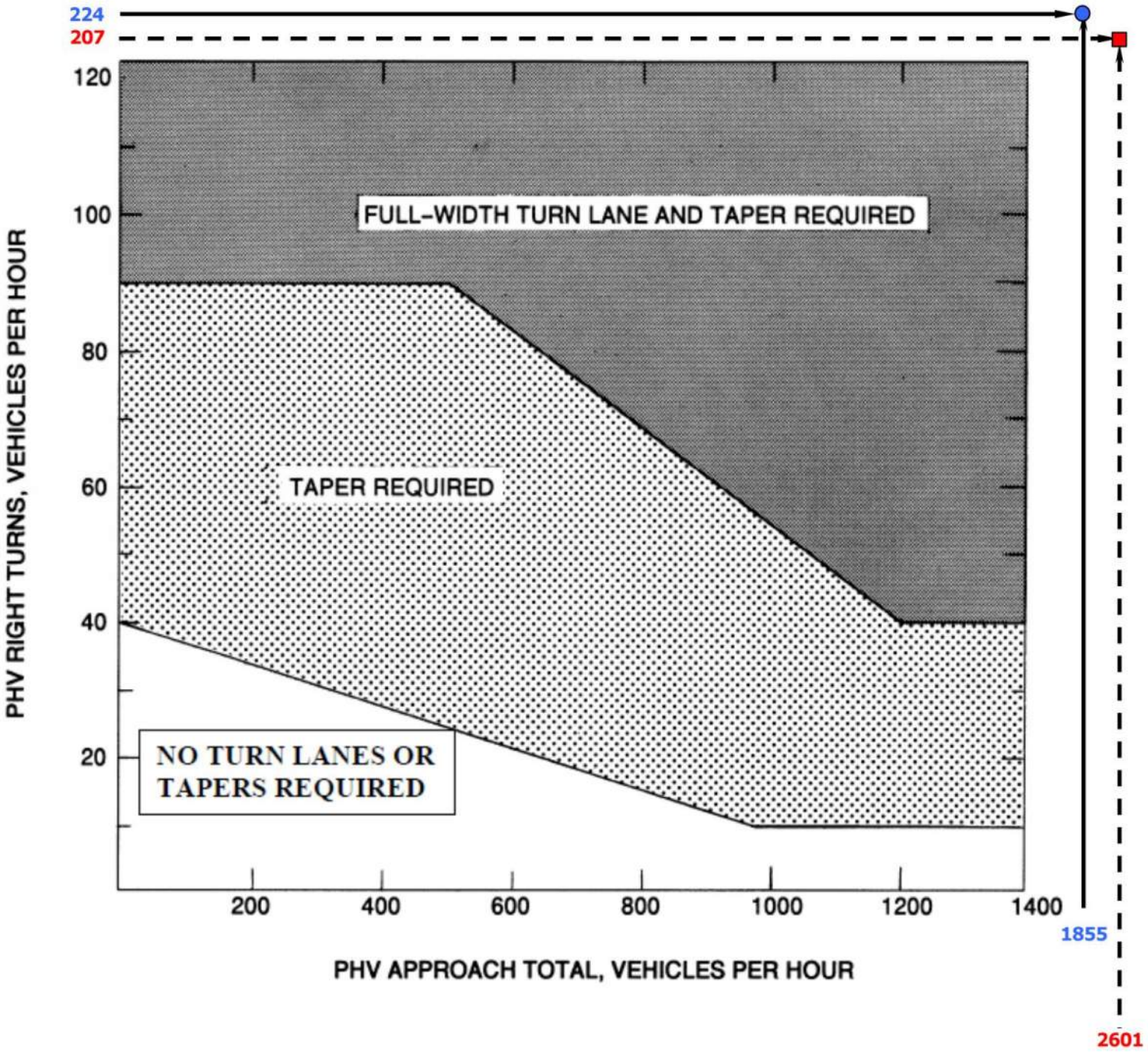


LEGEND
AM Peak Hour
PM Peak Hour

RIGHT TURN LANE WARRANTED

TIMMONS GROUP YOUR VISION ACHIEVED THROUGH OURS.	Right-Turn Lane Guideline 2026 Total Volumes NB Right on US 29 at RI Only Entrance	Figure 10

GUIDELINES FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)
FIGURE 3-27 VDOT ROAD DESIGN MANUAL APPENDIX F



LEGEND
- AM Peak Hour
- PM Peak Hour

RIGHT TURN LANE WARRANTED

TIMMONS GROUP YOUR VISION ACHIEVED THROUGH OURS.	Right-Turn Lane Guideline 2026 Total Volumes NB Right on US 29 at Shared Entrance	Figure 11

APPENDIX A

2022 Traffic Data

Data Collection Group

LSmith@DataCollectionGroup.net

File Name : Rte 29 and Greenbrier
Site Code :
Start Date : 1/26/2023
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Rte 29 From North				Greenbrier Dr From East				Rte 29 From South				Greenbrier Dr From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	8	321	37	366	13	14	5	32	20	251	6	277	13	8	10	31	706
07:15 AM	9	427	31	467	18	5	3	26	19	278	8	305	18	5	15	38	836
07:30 AM	15	498	41	554	28	15	4	47	44	338	9	391	35	16	16	67	1059
07:45 AM	19	520	63	602	23	27	4	54	61	377	6	444	29	14	31	74	1174
Total	51	1766	172	1989	82	61	16	159	144	1244	29	1417	95	43	72	210	3775
08:00 AM	23	496	45	564	21	13	2	36	56	404	14	474	30	12	28	70	1144
08:15 AM	26	436	49	511	19	24	2	45	57	364	11	432	29	18	28	75	1063
08:30 AM	7	478	60	545	23	19	2	44	27	353	12	392	31	12	27	70	1051
08:45 AM	16	493	66	575	12	23	9	44	52	341	16	409	32	15	26	73	1101
Total	72	1903	220	2195	75	79	15	169	192	1462	53	1707	122	57	109	288	4359
04:00 PM	8	388	30	426	18	19	11	48	47	550	21	618	61	29	62	152	1244
04:15 PM	12	442	31	485	19	16	10	45	59	517	20	596	43	24	42	109	1235
04:30 PM	8	425	22	455	22	27	11	60	63	566	22	651	39	15	47	101	1267
04:45 PM	11	479	37	527	16	30	6	52	51	524	14	589	33	21	47	101	1269
Total	39	1734	120	1893	75	92	38	205	220	2157	77	2454	176	89	198	463	5015
05:00 PM	9	519	42	570	21	36	5	62	70	554	18	642	51	19	47	117	1391
05:15 PM	5	490	43	538	18	23	4	45	47	514	14	575	34	16	33	83	1241
05:30 PM	6	482	43	531	23	14	5	42	41	499	20	560	29	13	42	84	1217
05:45 PM	4	418	27	449	15	16	6	37	44	459	8	511	34	18	33	85	1082
Total	24	1909	155	2088	77	89	20	186	202	2026	60	2288	148	66	155	369	4931
Grand Total	186	7312	667	8165	309	321	89	719	758	6889	219	7866	541	255	534	1330	18080
Apprch %	2.3	89.6	8.2		43	44.6	12.4		9.6	87.6	2.8		40.7	19.2	40.2		
Total %	1	40.4	3.7	45.2	1.7	1.8	0.5	4	4.2	38.1	1.2	43.5	3	1.4	3	7.4	
Passenger Veh	177	7058	641	7876	291	307	86	684	740	6680	214	7634	533	241	522	1296	17490
% Passenger Veh	95.2	96.5	96.1	96.5	94.2	95.6	96.6	95.1	97.6	97	97.7	97.1	98.5	94.5	97.8	97.4	96.7
Trucks	9	254	26	289	18	14	3	35	18	209	5	232	8	14	12	34	590
% Trucks	4.8	3.5	3.9	3.5	5.8	4.4	3.4	4.9	2.4	3	2.3	2.9	1.5	5.5	2.2	2.6	3.3

Data Collection Group

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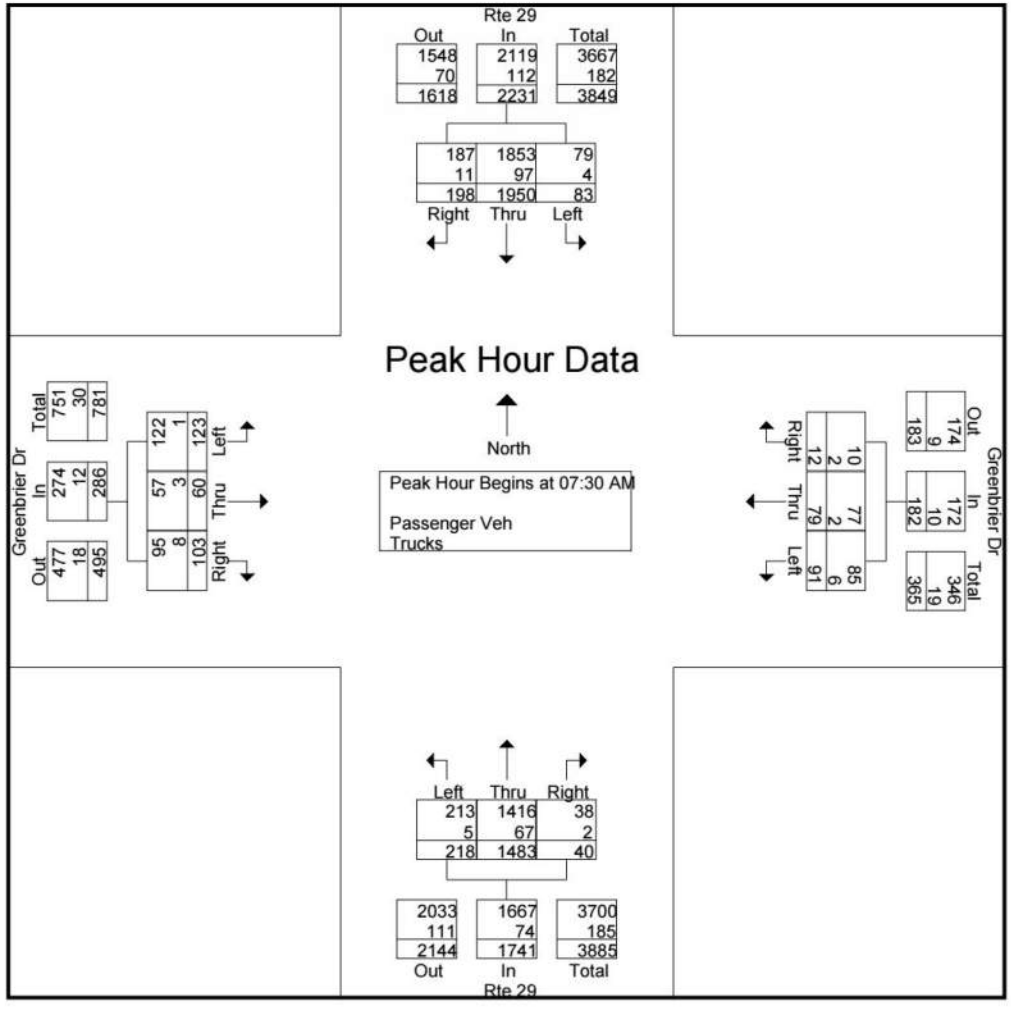
File Name : Rte 29 and Greenbrier
Site Code :
Start Date : 1/26/2023
Page No : 2

	Rte 29 From North				Greenbrier Dr From East				Rte 29 From South				Greenbrier Dr From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	15	498	41	554	**28**	15	**4**	47	44	338	9	391	**35**	16	16	67	1059
07:45 AM	19	**520**	**63**	**602**	23	**27**	4	**54**	**61**	377	6	444	29	14	**31**	74	**1174**
08:00 AM	23	496	45	564	21	13	2	36	56	**404**	**14**	**474**	30	12	28	70	1144
08:15 AM	**26**	436	49	511	19	24	2	45	57	364	11	432	29	**18**	28	**75**	1063
Total Volume	83	1950	198	2231	91	79	12	182	218	1483	40	1741	123	60	103	286	4440
% App. Total	3.7	87.4	8.9		50	43.4	6.6		12.5	85.2	2.3		43	21	36		
PHF	.798	.938	.786	.926	.813	.731	.750	.843	.893	.918	.714	.918	.879	.833	.831	.953	.945
Passenger Veh	79	1853	187	2119	85	77	10	172	213	1416	38	1667	122	57	95	274	4232
% Passenger Veh	95.2	95.0	94.4	95.0	93.4	97.5	83.3	94.5	97.7	95.5	95.0	95.7	99.2	95.0	92.2	95.8	95.3
Trucks	4	97	11	112	6	2	2	10	5	67	2	74	1	3	8	12	208
% Trucks	4.8	5.0	5.6	5.0	6.6	2.5	16.7	5.5	2.3	4.5	5.0	4.3	0.8	5.0	7.8	4.2	4.7

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File Name : Rte 29 and Greenbrier
Site Code :
Start Date : 1/26/2023
Page No : 3



Data Collection Group

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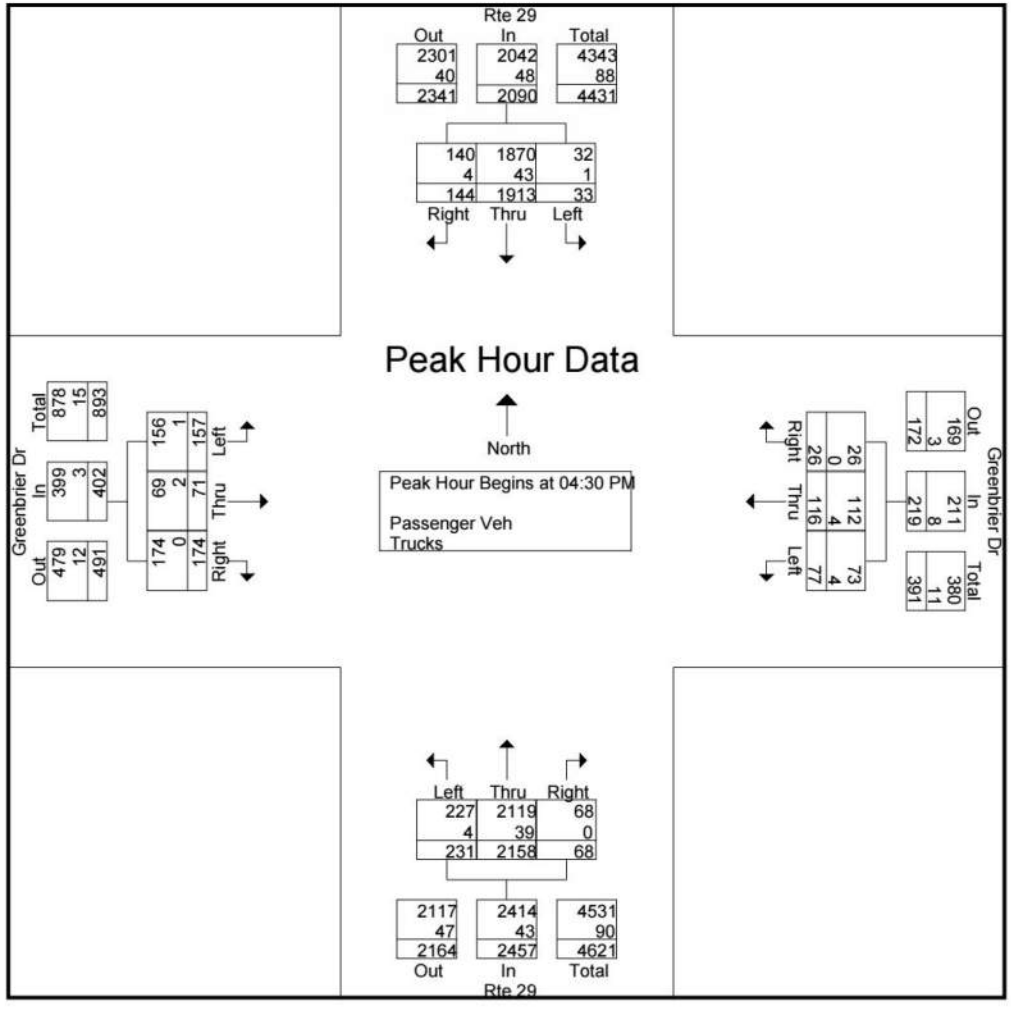
File Name : Rte 29 and Greenbrier
Site Code :
Start Date : 1/26/2023
Page No : 4

	Rte 29 From North				Greenbrier Dr From East				Rte 29 From South				Greenbrier Dr From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	8	425	22	455	**22**	27	**11**	60	63	**566**	**22**	**651**	39	15	**47**	101	1267
04:45 PM	**11**	479	37	527	16	30	6	52	51	524	14	589	33	**21**	47	101	1269
05:00 PM	9	**519**	42	**570**	21	**36**	5	**62**	**70**	554	18	642	**51**	19	47	**117**	**1391**
05:15 PM	5	490	**43**	538	18	23	4	45	47	514	14	575	34	16	33	83	1241
Total Volume	33	1913	144	2090	77	116	26	219	231	2158	68	2457	157	71	174	402	5168
% App. Total	1.6	91.5	6.9		35.2	53	11.9		9.4	87.8	2.8		39.1	17.7	43.3		
PHF	.750	.921	.837	.917	.875	.806	.591	.883	.825	.953	.773	.944	.770	.845	.926	.859	.929
Passenger Veh	32	1870	140	2042	73	112	26	211	227	2119	68	2414	156	69	174	399	5066
% Passenger Veh	97.0	97.8	97.2	97.7	94.8	96.6	100	96.3	98.3	98.2	100	98.2	99.4	97.2	100	99.3	98.0
Trucks	1	43	4	48	4	4	0	8	4	39	0	43	1	2	0	3	102
% Trucks	3.0	2.2	2.8	2.3	5.2	3.4	0	3.7	1.7	1.8	0	1.8	0.6	2.8	0	0.7	2.0

Data Collection Group

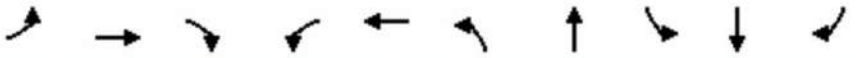
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File Name : Rte 29 and Greenbrier
Site Code :
Start Date : 1/26/2023
Page No : 5



APPENDIX B

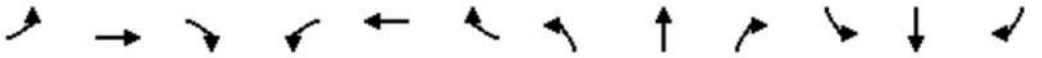
Synchro/SimTraffic Analysis Outputs



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	129	63	108	96	96	229	1603	87	2053	208
v/c Ratio	0.59	0.41	0.28	0.48	0.83	0.74	0.43	0.64	0.69	0.24
Control Delay	49.8	57.9	1.9	46.8	97.9	66.3	18.8	71.2	25.2	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	57.9	1.9	46.8	97.9	66.3	18.8	71.2	25.2	2.3
Queue Length 50th (ft)	80	45	0	58	68	86	189	63	340	0
Queue Length 95th (ft)	137	90	0	107	#165	#135	219	117	384	30
Internal Link Dist (ft)		785			946		982		1665	
Turn Bay Length (ft)	200		325	425		750		275		300
Base Capacity (vph)	227	162	385	201	117	322	3751	162	2971	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.39	0.28	0.48	0.82	0.71	0.43	0.54	0.69	0.24

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	123	60	103	91	79	12	218	1483	40	83	1950	198
Future Volume (veh/h)	123	60	103	91	79	12	218	1483	40	83	1950	198
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1781	1796	1856	1648	1870	1826	1826	1826	1826	1811
Adj Flow Rate, veh/h	129	63	108	96	83	13	229	1561	42	87	2053	208
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
Percent Heavy Veh, %	1	5	8	7	3	17	2	5	5	5	5	6
Cap, veh/h	222	164	135	223	99	16	415	3620	97	109	2779	679
Arrive On Green	0.08	0.09	0.09	0.05	0.06	0.06	0.12	0.48	0.48	0.06	0.44	0.44
Sat Flow, veh/h	1795	1826	1510	1711	1566	245	3456	7504	202	1739	6281	1535
Grp Volume(v), veh/h	129	63	108	96	0	96	229	1230	373	87	2053	208
Grp Sat Flow(s),veh/h/ln	1795	1826	1510	1711	0	1811	1728	1479	1790	1739	1570	1535
Q Serve(g_s), s	7.6	3.7	5.6	5.9	0.0	6.0	7.2	15.6	15.7	5.7	31.1	6.1
Cycle Q Clear(g_c), s	7.6	3.7	5.6	5.9	0.0	6.0	7.2	15.6	15.7	5.7	31.1	6.1
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	222	164	135	223	0	115	415	2854	863	109	2779	679
V/C Ratio(X)	0.58	0.39	0.80	0.43	0.00	0.83	0.55	0.43	0.43	0.80	0.74	0.31
Avail Cap(c_a), veh/h	222	164	135	223	0	115	415	2854	863	165	2944	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.5	49.4	24.9	44.7	0.0	53.3	47.7	19.4	19.5	53.2	26.6	7.7
Incr Delay (d2), s/veh	2.5	0.6	25.9	0.5	0.0	36.8	0.9	0.5	1.6	7.8	1.8	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.7	1.0	2.5	0.0	3.9	3.1	5.1	6.5	2.7	11.2	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.1	49.9	50.8	45.2	0.0	90.1	48.6	19.9	21.0	61.0	28.4	8.8
LnGrp LOS	D	D	D	D	A	F	D	B	C	E	C	A
Approach Vol, veh/h		300			192			1832			2348	
Approach Delay, s/veh		49.4			67.6			23.7			27.8	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.3	63.7	16.0	20.0	22.0	57.0	19.0	17.0
Change Period (Y+Rc), s	* 8.1	* 8.2	9.7	9.7	8.2	6.1	9.7	9.7
Max Green Setting (Gmax), s	* 11	* 54	6.3	10.3	10.8	53.9	9.3	7.3
Max Q Clear Time (g_c+I1), s	7.7	17.7	7.9	7.6	9.2	33.1	9.6	8.0
Green Ext Time (p_c), s	0.0	19.4	0.0	0.1	0.1	17.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 1: US Route 29 & Greenbrier Drive

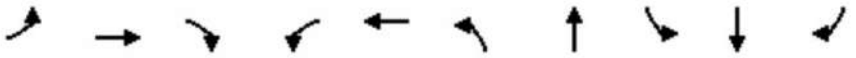
Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	R	L	TR	L	L	T	T	T	T	TR
Maximum Queue (ft)	169	155	78	158	165	184	207	311	290	231	159	61
Average Queue (ft)	79	55	30	73	79	85	136	206	185	128	40	19
95th Queue (ft)	144	122	59	135	146	178	202	301	272	226	110	48
Link Distance (ft)		774			931			1018	1018	1018	1018	1018
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200		325	425		750	750					
Storage Blk Time (%)	0	0										
Queuing Penalty (veh)	0	0										

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	267	375	367	314	250	98
Average Queue (ft)	91	260	250	203	122	43
95th Queue (ft)	213	350	337	294	233	79
Link Distance (ft)		1695	1695	1695	1695	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	275					300
Storage Blk Time (%)	0	4			0	
Queuing Penalty (veh)	0	3			0	

Network Summary

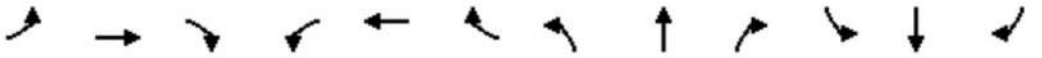
Network wide Queuing Penalty: 4



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	169	76	187	83	153	248	2393	35	2057	155
v/c Ratio	0.62	0.35	0.46	0.31	0.87	0.82	0.58	0.42	0.69	0.18
Control Delay	50.3	58.3	5.8	40.3	96.4	79.3	21.2	74.7	29.3	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	58.3	5.8	40.3	96.4	79.3	21.2	74.7	29.3	1.3
Queue Length 50th (ft)	115	59	0	54	123	107	359	29	398	0
Queue Length 95th (ft)	183	113	24	98	#251	#171	391	65	442	14
Internal Link Dist (ft)		785			946		982		1665	
Turn Bay Length (ft)	200		325	425		750		275		300
Base Capacity (vph)	287	216	404	312	180	311	4123	92	2976	838
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.35	0.46	0.27	0.85	0.80	0.58	0.38	0.69	0.18

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	71	174	77	116	26	231	2158	68	33	1913	144
Future Volume (veh/h)	157	71	174	77	116	26	231	2158	68	33	1913	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1856	1900	1826	1856	1900	1870	1870	1900	1856	1870	1856
Adj Flow Rate, veh/h	169	76	187	83	125	28	248	2320	73	35	2057	155
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	3	0	5	3	0	2	2	0	3	2	3
Cap, veh/h	246	260	226	261	139	31	417	3855	121	49	2744	671
Arrive On Green	0.10	0.14	0.14	0.05	0.09	0.09	0.12	0.50	0.50	0.03	0.43	0.43
Sat Flow, veh/h	1795	1856	1610	1739	1468	329	3456	7646	241	1767	6434	1572
Grp Volume(v), veh/h	169	76	187	83	0	153	248	1839	554	35	2057	155
Grp Sat Flow(s),veh/h/ln	1795	1856	1610	1739	0	1796	1728	1515	1827	1767	1609	1572
Q Serve(g_s), s	10.9	4.8	10.3	5.3	0.0	11.0	8.8	28.1	28.1	2.6	35.0	5.0
Cycle Q Clear(g_c), s	10.9	4.8	10.3	5.3	0.0	11.0	8.8	28.1	28.1	2.6	35.0	5.0
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	246	260	226	261	0	170	417	3055	921	49	2744	671
V/C Ratio(X)	0.69	0.29	0.83	0.32	0.00	0.90	0.60	0.60	0.60	0.72	0.75	0.23
Avail Cap(c_a), veh/h	252	260	226	333	0	170	417	3055	921	94	2915	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.2	50.1	26.6	44.5	0.0	58.2	54.2	22.9	22.9	62.7	31.4	9.0
Incr Delay (d2), s/veh	6.1	0.2	20.6	0.3	0.0	40.8	1.6	0.9	2.9	7.1	1.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	2.2	5.3	2.3	0.0	6.9	3.9	9.7	12.2	1.2	13.3	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	50.3	47.2	44.7	0.0	99.1	55.8	23.8	25.8	69.8	33.4	9.8
LnGrp LOS	D	D	D	D	A	F	E	C	C	E	C	A
Approach Vol, veh/h		432			236			2641			2247	
Approach Delay, s/veh		50.1			80.0			27.3			32.3	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	73.7	16.6	27.9	23.9	61.5	22.6	22.0
Change Period (Y+Rc), s	* 8.1	* 8.2	9.7	9.7	8.2	6.1	9.7	9.7
Max Green Setting (Gmax), s	* 6.9	* 64	12.3	13.3	11.8	58.9	13.3	12.3
Max Q Clear Time (g_c+I1), s	4.6	30.1	7.3	12.3	10.8	37.0	12.9	13.0
Green Ext Time (p_c), s	0.0	27.8	0.0	0.1	0.0	18.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 1: US Route 29 & Greenbrier Drive

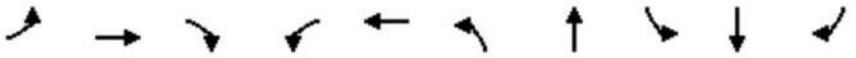
Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	R	L	TR	L	L	T	T	T	T	TR
Maximum Queue (ft)	192	172	90	128	254	218	236	410	384	330	226	126
Average Queue (ft)	105	61	37	53	119	104	150	271	254	198	99	38
95th Queue (ft)	182	132	71	105	211	209	223	373	357	299	203	93
Link Distance (ft)		774			931			1018	1018	1018	1018	1018
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200		325	425		750	750					
Storage Blk Time (%)	1	0										
Queuing Penalty (veh)	3	0										

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	272	373	372	324	265	84
Average Queue (ft)	45	283	269	225	149	36
95th Queue (ft)	157	356	342	305	247	69
Link Distance (ft)		1695	1695	1695	1695	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	275					300
Storage Blk Time (%)	0	7			0	
Queuing Penalty (veh)	0	2			0	

Network Summary

Network wide Queuing Penalty: 5

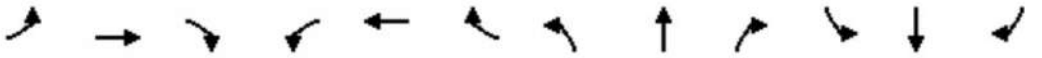


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	134	65	112	174	98	237	1708	165	2027	215
v/c Ratio	0.60	0.45	0.30	0.84	0.82	0.76	0.50	0.93	0.69	0.25
Control Delay	50.4	59.9	2.0	76.0	95.1	67.7	22.0	103.1	25.2	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	59.9	2.0	76.0	95.1	67.7	22.0	103.1	25.2	2.5
Queue Length 50th (ft)	83	46	0	112	69	89	209	~126	334	0
Queue Length 95th (ft)	142	92	0	#234	#169	#142	237	#268	378	33
Internal Link Dist (ft)		785			946		96		1665	
Turn Bay Length (ft)	200		325	425		750		275		300
Base Capacity (vph)	229	162	385	206	120	322	3437	178	2952	845
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.40	0.29	0.84	0.82	0.74	0.50	0.93	0.69	0.25

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	62	106	165	81	12	225	1582	41	157	1926	204
Future Volume (veh/h)	127	62	106	165	81	12	225	1582	41	157	1926	204
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1781	1796	1856	1648	1870	1826	1826	1826	1826	1811
Adj Flow Rate, veh/h	134	65	112	174	85	13	237	1665	43	165	2027	215
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
Percent Heavy Veh, %	1	5	8	7	3	17	2	5	5	5	5	6
Cap, veh/h	221	164	135	221	100	15	422	3384	87	165	2766	676
Arrive On Green	0.08	0.09	0.09	0.05	0.06	0.06	0.12	0.45	0.45	0.09	0.44	0.44
Sat Flow, veh/h	1795	1826	1510	1711	1572	240	3456	7513	194	1739	6281	1535
Grp Volume(v), veh/h	134	65	112	174	0	98	237	1311	397	165	2027	215
Grp Sat Flow(s),veh/h/ln	1795	1826	1510	1711	0	1812	1728	1479	1791	1739	1570	1535
Q Serve(g_s), s	7.9	3.9	5.8	6.3	0.0	6.2	7.4	18.0	18.0	10.9	30.7	6.4
Cycle Q Clear(g_c), s	7.9	3.9	5.8	6.3	0.0	6.2	7.4	18.0	18.0	10.9	30.7	6.4
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	221	164	135	221	0	115	422	2665	807	165	2766	676
V/C Ratio(X)	0.61	0.40	0.83	0.79	0.00	0.85	0.56	0.49	0.49	1.00	0.73	0.32
Avail Cap(c_a), veh/h	221	164	135	221	0	115	422	2783	843	165	2944	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	49.4	24.9	49.1	0.0	53.3	47.6	22.3	22.3	52.1	26.6	7.8
Incr Delay (d2), s/veh	3.4	0.6	31.3	15.7	0.0	40.7	1.0	0.7	2.1	70.4	1.8	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	1.8	3.3	3.1	0.0	4.1	3.2	6.0	7.6	7.8	11.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.1	50.0	56.1	64.7	0.0	94.0	48.6	23.0	24.5	122.4	28.3	9.0
LnGrp LOS	D	D	E	E	A	F	D	C	C	F	C	A
Approach Vol, veh/h		311			272			1945			2407	
Approach Delay, s/veh		51.8			75.3			26.4			33.1	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	60.0	16.0	20.0	22.3	56.7	19.0	17.0
Change Period (Y+Rc), s	* 8.1	* 8.2	9.7	9.7	8.2	6.1	9.7	9.7
Max Green Setting (Gmax), s	* 11	* 54	6.3	10.3	10.8	53.9	9.3	7.3
Max Q Clear Time (g_c+I1), s	12.9	20.0	8.3	7.8	9.4	32.7	9.9	8.2
Green Ext Time (p_c), s	0.0	20.1	0.0	0.1	0.1	18.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	33.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	214	1631	214	0	2197
Future Volume (Veh/h)	0	214	1631	214	0	2197
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	233	1773	233	0	2388
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						176
pX, platoon unblocked	0.75					
vC, conflicting volume	2486	560			2006	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1304	560			2006	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	51			100	
cM capacity (veh/h)	114	472			289	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	233	507	507	507	486	597	597	597	597
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	233	0	0	0	233	0	0	0	0
cSH	472	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.49	0.30	0.30	0.30	0.29	0.35	0.35	0.35	0.35
Queue Length 95th (ft)	67	0	0	0	0	0	0	0	0
Control Delay (s)	19.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C								
Approach Delay (s)	19.8	0.0				0.0			
Approach LOS	C								

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	47.1%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	R	L	TR	L	L	T	T	T	T	TR
Maximum Queue (ft)	184	145	92	295	215	96	98	165	163	147	124	116
Average Queue (ft)	87	51	31	154	91	73	91	134	117	105	78	80
95th Queue (ft)	150	105	65	292	209	119	108	162	148	133	129	121
Link Distance (ft)		774			932			98	98	98	98	98
Upstream Blk Time (%)						5	26	69	46	22	3	9
Queuing Penalty (veh)						0	0	256	170	83	12	33
Storage Bay Dist (ft)	200		325	425		750	750					
Storage Blk Time (%)	0	0		0	0	5	26	69				
Queuing Penalty (veh)	1	0		0	0	16	84	155				

Intersection: 1: US Route 29 & Greenbrier Drive

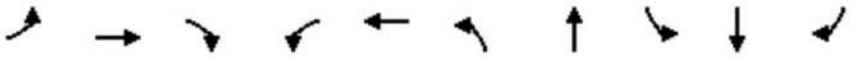
Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	274	512	467	366	242	98
Average Queue (ft)	184	282	268	205	128	46
95th Queue (ft)	311	443	410	301	229	84
Link Distance (ft)		1695	1695	1695	1695	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	275					300
Storage Blk Time (%)	8	6			0	
Queuing Penalty (veh)	38	9			0	

Intersection: 2: US Route 29 & WaWa Entrance

Movement	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	T	T	T	TR	T	T	T	T
Maximum Queue (ft)	121	636	589	444	240	110	12	34	36	17
Average Queue (ft)	55	423	373	238	44	6	0	2	1	1
95th Queue (ft)	93	591	541	405	173	47	9	18	17	11
Link Distance (ft)	346	862	862	862	862	862	98	98	98	98
Upstream Blk Time (%)								0	0	
Queuing Penalty (veh)								0	0	
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 857

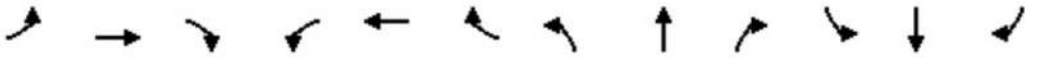


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	174	78	192	149	158	256	2514	101	2102	159
v/c Ratio	0.64	0.41	0.50	0.53	0.90	0.81	0.68	0.96	0.71	0.19
Control Delay	51.3	61.8	6.9	46.5	100.4	78.1	26.2	139.1	30.2	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	61.8	6.9	46.5	100.4	78.1	26.2	139.1	30.2	1.5
Queue Length 50th (ft)	119	63	0	100	128	111	386	~95	411	0
Queue Length 95th (ft)	187	116	29	164	#261	#180	420	#215	455	16
Internal Link Dist (ft)		785			946		96		1665	
Turn Bay Length (ft)	200		325	425		750		275		300
Base Capacity (vph)	284	191	386	293	179	315	3711	105	2941	831
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.41	0.50	0.51	0.88	0.81	0.68	0.96	0.71	0.19

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	73	179	139	120	27	238	2268	70	94	1955	148
Future Volume (veh/h)	162	73	179	139	120	27	238	2268	70	94	1955	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1856	1900	1826	1856	1900	1870	1870	1900	1856	1870	1856
Adj Flow Rate, veh/h	174	78	192	149	129	29	256	2439	75	101	2102	159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	3	0	5	3	0	2	2	0	3	2	3
Cap, veh/h	247	196	170	285	139	31	396	3644	112	94	2768	676
Arrive On Green	0.10	0.11	0.11	0.09	0.09	0.09	0.11	0.48	0.48	0.05	0.43	0.43
Sat Flow, veh/h	1795	1856	1610	1739	1467	330	3456	7653	235	1767	6434	1572
Grp Volume(v), veh/h	174	78	192	149	0	158	256	1931	583	101	2102	159
Grp Sat Flow(s),veh/h/ln	1795	1856	1610	1739	0	1796	1728	1515	1828	1767	1609	1572
Q Serve(g_s), s	11.2	5.1	9.9	9.8	0.0	11.4	9.2	31.9	31.9	6.9	35.9	5.1
Cycle Q Clear(g_c), s	11.2	5.1	9.9	9.8	0.0	11.4	9.2	31.9	31.9	6.9	35.9	5.1
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	247	196	170	285	0	170	396	2886	871	94	2768	676
V/C Ratio(X)	0.71	0.40	1.13	0.52	0.00	0.93	0.65	0.67	0.67	1.08	0.76	0.24
Avail Cap(c_a), veh/h	248	196	170	292	0	170	396	2988	901	94	2915	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	54.3	30.0	46.1	0.0	58.4	55.0	26.2	26.2	61.6	31.3	8.7
Incr Delay (d2), s/veh	7.5	0.5	107.5	0.7	0.0	48.3	2.9	1.3	4.1	115.2	2.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	2.4	9.0	4.3	0.0	7.5	4.1	11.1	14.1	6.0	13.7	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.5	54.8	137.5	46.7	0.0	106.7	57.9	27.4	30.2	176.8	33.4	9.5
LnGrp LOS	D	D	F	D	A	F	E	C	C	F	C	A
Approach Vol, veh/h		444			307			2770			2362	
Approach Delay, s/veh		90.4			77.6			30.8			37.9	
Approach LOS		F			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	70.1	21.5	23.4	23.1	62.0	22.9	22.0
Change Period (Y+Rc), s	* 8.1	* 8.2	9.7	9.7	8.2	6.1	9.7	9.7
Max Green Setting (Gmax), s	* 6.9	* 64	12.3	13.3	11.8	58.9	13.3	12.3
Max Q Clear Time (g_c+I1), s	8.9	33.9	11.8	11.9	11.2	37.9	13.2	13.4
Green Ext Time (p_c), s	0.0	26.0	0.0	0.1	0.0	18.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	40.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	182	2394	181	0	2273
Future Volume (Veh/h)	0	182	2394	181	0	2273
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	198	2602	197	0	2471
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						176
pX, platoon unblocked	0.74					
vC, conflicting volume	3318	749			2799	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2367	749			2799	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	44			100	
cM capacity (veh/h)	22	354			136	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	198	743	743	743	569	618	618	618	618
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	198	0	0	0	197	0	0	0	0
cSH	354	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.56	0.44	0.44	0.44	0.33	0.36	0.36	0.36	0.36
Queue Length 95th (ft)	81	0	0	0	0	0	0	0	0
Control Delay (s)	27.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D								
Approach Delay (s)	27.3	0.0				0.0			
Approach LOS	D								

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	55.6%	ICU Level of Service		B
Analysis Period (min)	15			

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	R	L	TR	L	L	T	T	T	T	TR
Maximum Queue (ft)	195	223	149	237	274	96	98	161	152	147	133	123
Average Queue (ft)	115	71	44	98	128	82	94	132	111	110	102	95
95th Queue (ft)	196	177	98	185	251	113	103	160	135	132	122	123
Link Distance (ft)		774			932			98	98	98	98	98
Upstream Blk Time (%)						18	48	76	45	37	21	16
Queuing Penalty (veh)						0	0	391	231	193	107	82
Storage Bay Dist (ft)	200		325	425		750	750					
Storage Blk Time (%)	2	0	0		0	18	48	76				
Queuing Penalty (veh)	6	1	0		0	82	216	181				

Intersection: 1: US Route 29 & Greenbrier Drive

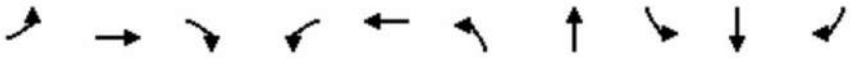
Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	274	430	423	383	279	126
Average Queue (ft)	134	303	289	241	158	39
95th Queue (ft)	277	401	378	331	256	93
Link Distance (ft)		1695	1695	1695	1695	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	275					300
Storage Blk Time (%)	2	9			0	0
Queuing Penalty (veh)	10	8			0	0

Intersection: 2: US Route 29 & WaWa Entrance

Movement	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	T	T	T	TR	T	T	T	T
Maximum Queue (ft)	203	881	801	650	448	282	9	13	28	18
Average Queue (ft)	71	657	603	441	252	84	0	0	1	1
95th Queue (ft)	157	891	818	623	397	246	7	10	16	11
Link Distance (ft)	346	862	862	862	862	862	98	98	98	98
Upstream Blk Time (%)	0	6	0						0	
Queuing Penalty (veh)	0	0	0						0	
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 1507

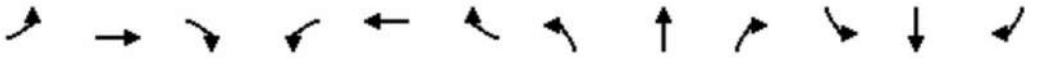


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	134	65	112	174	98	237	1812	165	2027	215
v/c Ratio	0.60	0.45	0.30	0.84	0.82	0.76	0.54	0.93	0.69	0.25
Control Delay	50.4	59.9	2.0	76.0	95.1	67.7	22.6	103.1	25.2	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	59.9	2.0	76.0	95.1	67.7	22.6	103.1	25.2	2.5
Queue Length 50th (ft)	83	46	0	112	69	89	225	~126	334	0
Queue Length 95th (ft)	142	92	0	#234	#169	#142	255	#268	378	33
Internal Link Dist (ft)		785			946		96		1665	
Turn Bay Length (ft)	200		325	425		750		275		300
Base Capacity (vph)	229	162	385	206	120	322	3436	178	2952	845
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.40	0.29	0.84	0.82	0.74	0.53	0.93	0.69	0.25

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	62	106	165	81	12	225	1681	41	157	1926	204
Future Volume (veh/h)	127	62	106	165	81	12	225	1681	41	157	1926	204
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1781	1796	1856	1648	1870	1826	1826	1826	1826	1811
Adj Flow Rate, veh/h	134	65	112	174	85	13	237	1769	43	165	2027	215
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
Percent Heavy Veh, %	1	5	8	7	3	17	2	5	5	5	5	6
Cap, veh/h	221	164	135	221	100	15	422	3390	82	165	2766	676
Arrive On Green	0.08	0.09	0.09	0.05	0.06	0.06	0.12	0.45	0.45	0.09	0.44	0.44
Sat Flow, veh/h	1795	1826	1510	1711	1572	240	3456	7526	183	1739	6281	1535
Grp Volume(v), veh/h	134	65	112	174	0	98	237	1390	422	165	2027	215
Grp Sat Flow(s),veh/h/ln	1795	1826	1510	1711	0	1812	1728	1479	1793	1739	1570	1535
Q Serve(g_s), s	7.9	3.9	5.8	6.3	0.0	6.2	7.4	19.4	19.4	10.9	30.7	6.4
Cycle Q Clear(g_c), s	7.9	3.9	5.8	6.3	0.0	6.2	7.4	19.4	19.4	10.9	30.7	6.4
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	221	164	135	221	0	115	422	2665	808	165	2766	676
V/C Ratio(X)	0.61	0.40	0.83	0.79	0.00	0.85	0.56	0.52	0.52	1.00	0.73	0.32
Avail Cap(c_a), veh/h	221	164	135	221	0	115	422	2783	843	165	2944	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	49.4	24.9	49.1	0.0	53.3	47.6	22.7	22.7	52.1	26.6	7.8
Incr Delay (d2), s/veh	3.4	0.6	31.3	15.7	0.0	40.7	1.0	0.7	2.4	70.4	1.8	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	1.8	3.3	3.1	0.0	4.1	3.2	6.5	8.3	7.8	11.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.1	50.0	56.1	64.7	0.0	94.0	48.6	23.4	25.1	122.4	28.3	9.0
LnGrp LOS	D	D	E	E	A	F	D	C	C	F	C	A
Approach Vol, veh/h		311			272			2049			2407	
Approach Delay, s/veh		51.8			75.3			26.7			33.1	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	60.0	16.0	20.0	22.3	56.7	19.0	17.0
Change Period (Y+Rc), s	* 8.1	* 8.2	9.7	9.7	8.2	6.1	9.7	9.7
Max Green Setting (Gmax), s	* 11	* 54	6.3	10.3	10.8	53.9	9.3	7.3
Max Q Clear Time (g_c+I1), s	12.9	21.4	8.3	7.8	9.4	32.7	9.9	8.2
Green Ext Time (p_c), s	0.0	20.9	0.0	0.1	0.1	18.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	33.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	313	1631	224	0	2197
Future Volume (Veh/h)	0	313	1631	224	0	2197
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	340	1773	243	0	2388
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						176
pX, platoon unblocked	0.75					
vC, conflicting volume	2492	565			2016	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1311	565			2016	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	27			100	
cM capacity (veh/h)	112	468			287	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	340	507	507	507	496	597	597	597	597
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	340	0	0	0	243	0	0	0	0
cSH	468	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.73	0.30	0.30	0.30	0.29	0.35	0.35	0.35	0.35
Queue Length 95th (ft)	146	0	0	0	0	0	0	0	0
Control Delay (s)	30.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D								
Approach Delay (s)	30.5	0.0				0.0			
Approach LOS	D								

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	53.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	1855	29	0	2197
Future Volume (Veh/h)	0	0	1855	29	0	2197
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	2016	32	0	2388
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						423
pX, platoon unblocked	0.75					
vC, conflicting volume	2629	520			2048	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1509	520			2048	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	84	501			271	

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	576	576	576	320	597	597	597	597
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	32	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.34	0.34	0.19	0.35	0.35	0.35	0.35
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	R	L	TR	L	L	T	T	T	T	TR
Maximum Queue (ft)	162	119	84	318	249	95	98	163	163	158	128	117
Average Queue (ft)	89	48	32	157	88	77	92	132	117	109	89	95
95th Queue (ft)	155	102	63	304	200	117	108	158	147	142	127	124
Link Distance (ft)		774			932			98	98	98	98	98
Upstream Blk Time (%)						8	29	72	48	28	9	17
Queuing Penalty (veh)						0	0	281	187	111	34	67
Storage Bay Dist (ft)	200		325	425		750	750					
Storage Blk Time (%)	0	0		0	0	8	29	72				
Queuing Penalty (veh)	0	0		0	0	27	99	162				

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	274	492	459	365	246	108
Average Queue (ft)	194	297	283	209	134	47
95th Queue (ft)	313	478	440	307	229	87
Link Distance (ft)		1695	1695	1695	1695	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	275					300
Storage Blk Time (%)	11	5			0	
Queuing Penalty (veh)	55	8			0	

Intersection: 2: US Route 29 & Shared WaWa Entrance

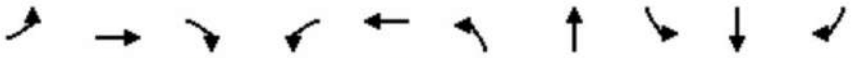
Movement	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	T	T	T	TR	T	T	T	T
Maximum Queue (ft)	212	232	261	231	198	156	16	33	25	20
Average Queue (ft)	88	214	219	178	68	17	1	1	1	1
95th Queue (ft)	165	230	257	259	190	83	14	15	13	12
Link Distance (ft)	345	203	203	203	203	203	98	98	98	98
Upstream Blk Time (%)		43	18	3	0	0	0	0		
Queuing Penalty (veh)		162	66	10	1	0	0	0		
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 3: US Route 29 & Proposed RI Only

Movement	NB	NB	NB	NB	NB	SB	SB
Directions Served	T	T	T	T	TR	T	T
Maximum Queue (ft)	502	440	269	37	10	4	2
Average Queue (ft)	282	224	59	2	0	0	0
95th Queue (ft)	500	447	218	34	10	4	2
Link Distance (ft)	612	612	612	612	612	203	203
Upstream Blk Time (%)	1						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Network Summary

Network wide Queuing Penalty: 1273

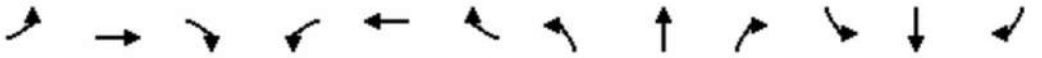


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	174	78	192	149	158	256	2597	101	2102	159
v/c Ratio	0.64	0.41	0.50	0.53	0.90	0.81	0.70	0.96	0.71	0.19
Control Delay	51.3	61.8	6.9	46.5	100.4	78.1	26.7	139.1	30.2	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	61.8	6.9	46.5	100.4	78.1	26.7	139.1	30.2	1.5
Queue Length 50th (ft)	119	63	0	100	128	111	406	~95	411	0
Queue Length 95th (ft)	187	116	29	164	#261	#180	440	#215	455	16
Internal Link Dist (ft)		785			946		96		1665	
Turn Bay Length (ft)	200		325	425		750		275		300
Base Capacity (vph)	284	191	386	293	179	315	3710	105	2941	831
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.41	0.50	0.51	0.88	0.81	0.70	0.96	0.71	0.19

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	73	179	139	120	27	238	2345	70	94	1955	148
Future Volume (veh/h)	162	73	179	139	120	27	238	2345	70	94	1955	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1856	1900	1826	1856	1900	1870	1870	1900	1856	1870	1856
Adj Flow Rate, veh/h	174	78	192	149	129	29	256	2522	75	101	2102	159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	3	0	5	3	0	2	2	0	3	2	3
Cap, veh/h	247	196	170	285	139	31	396	3648	108	94	2768	676
Arrive On Green	0.10	0.11	0.11	0.09	0.09	0.09	0.11	0.48	0.48	0.05	0.43	0.43
Sat Flow, veh/h	1795	1856	1610	1739	1467	330	3456	7661	228	1767	6434	1572
Grp Volume(v), veh/h	174	78	192	149	0	158	256	1995	602	101	2102	159
Grp Sat Flow(s),veh/h/ln	1795	1856	1610	1739	0	1796	1728	1515	1829	1767	1609	1572
Q Serve(g_s), s	11.2	5.1	9.9	9.8	0.0	11.4	9.2	33.4	33.4	6.9	35.9	5.1
Cycle Q Clear(g_c), s	11.2	5.1	9.9	9.8	0.0	11.4	9.2	33.4	33.4	6.9	35.9	5.1
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	247	196	170	285	0	170	396	2886	871	94	2768	676
V/C Ratio(X)	0.71	0.40	1.13	0.52	0.00	0.93	0.65	0.69	0.69	1.08	0.76	0.24
Avail Cap(c_a), veh/h	248	196	170	292	0	170	396	2988	902	94	2915	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	54.3	30.0	46.1	0.0	58.4	55.0	26.6	26.6	61.6	31.3	8.7
Incr Delay (d2), s/veh	7.5	0.5	107.5	0.7	0.0	48.3	2.9	1.4	4.5	115.2	2.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	2.4	9.0	4.3	0.0	7.5	4.1	11.7	14.9	6.0	13.7	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.5	54.8	137.5	46.7	0.0	106.7	57.9	28.0	31.1	176.8	33.4	9.5
LnGrp LOS	D	D	F	D	A	F	E	C	C	F	C	A
Approach Vol, veh/h		444			307			2853			2362	
Approach Delay, s/veh		90.4			77.6			31.3			37.9	
Approach LOS		F			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	70.1	21.5	23.4	23.1	62.0	22.9	22.0
Change Period (Y+Rc), s	* 8.1	* 8.2	9.7	9.7	8.2	6.1	9.7	9.7
Max Green Setting (Gmax), s	* 6.9	* 64	12.3	13.3	11.8	58.9	13.3	12.3
Max Q Clear Time (g_c+I1), s	8.9	35.4	11.8	11.9	11.2	37.9	13.2	13.4
Green Ext Time (p_c), s	0.0	25.3	0.0	0.1	0.0	18.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	40.7
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	259	2394	207	0	2273
Future Volume (Veh/h)	0	259	2394	207	0	2273
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	282	2602	225	0	2471
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						176
pX, platoon unblocked	0.74					
vC, conflicting volume	3332	763			2827	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2386	763			2827	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	19			100	
cM capacity (veh/h)	21	347			133	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	282	743	743	743	597	618	618	618	618
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	282	0	0	0	225	0	0	0	0
cSH	347	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.81	0.44	0.44	0.44	0.35	0.36	0.36	0.36	0.36
Queue Length 95th (ft)	175	0	0	0	0	0	0	0	0
Control Delay (s)	47.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	E								
Approach Delay (s)	47.9	0.0				0.0			
Approach LOS	E								

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	2601	77	0	2273
Future Volume (Veh/h)	0	0	2601	77	0	2273
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	2827	84	0	2471
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						423
pX, platoon unblocked	0.74					
vC, conflicting volume	3487	749			2911	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2605	749			2911	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	15	355			123	

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	808	808	808	488	618	618	618	618
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	84	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.48	0.48	0.48	0.29	0.36	0.36	0.36	0.36
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	R	L	TR	L	L	T	T	T	T	TR
Maximum Queue (ft)	192	246	185	211	261	95	98	161	156	152	137	122
Average Queue (ft)	109	64	48	95	127	79	93	133	113	111	104	100
95th Queue (ft)	191	158	118	179	227	115	106	157	138	135	127	119
Link Distance (ft)		774			932			98	98	98	98	98
Upstream Blk Time (%)						14	38	76	47	40	26	24
Queuing Penalty (veh)						0	0	405	251	214	137	127
Storage Bay Dist (ft)	200		325	425		750	750					
Storage Blk Time (%)	2	0	0		0	14	38	76				
Queuing Penalty (veh)	5	2	0		0	64	178	182				

Intersection: 1: US Route 29 & Greenbrier Drive

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	274	492	464	418	326	129
Average Queue (ft)	153	316	300	247	167	41
95th Queue (ft)	297	475	446	379	284	96
Link Distance (ft)		1695	1695	1695	1695	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	275					300
Storage Blk Time (%)	5	11			0	0
Queuing Penalty (veh)	23	11			1	0

Intersection: 2: US Route 29 & Shared WaWa Entrance

Movement	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	T	T	T	TR	T	T	T	T
Maximum Queue (ft)	290	232	266	262	218	208	9	13	46	25
Average Queue (ft)	128	214	231	219	181	96	0	0	2	1
95th Queue (ft)	262	227	268	251	248	211	10	8	20	16
Link Distance (ft)	345	203	203	203	203	203	98	98	98	98
Upstream Blk Time (%)	2	61	31	14	3	1	0			
Queuing Penalty (veh)	0	316	163	73	14	3	0			
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 3: US Route 29 & Proposed RI Only

Movement	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	T	T	T	TR	T	T	T
Maximum Queue (ft)	639	598	460	287	58	3	23	16
Average Queue (ft)	509	438	267	60	3	0	1	1
95th Queue (ft)	709	616	467	214	34	3	24	10
Link Distance (ft)	612	612	612	612	612	203	203	203
Upstream Blk Time (%)	9	0					0	
Queuing Penalty (veh)	0	0					0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 2167

APPENDIX C

Synchro/SimTraffic Analysis Outputs

VDOT Virginia Department of Transportation

February 2015

ACCESS MANAGEMENT EXCEPTION REQUEST: AM-E

ACCESS MANAGEMENT REGULATIONS 24 VAC 30-73

SECTION 120

Submitted by: Thomas Ruff, PE, PTOE		**Date:** 02/20/2023
Email Address: thomas.ruff@timmons.com		**Phone:** 434.774.0023
Address: 608 Preston Avenue, Suite 200, Charlottesville, VA 22903		
Project Name: 1193 Seminole Trail - Up Campus	**Rte #** US Route 29	**Locality:** Albemarle County
Description of Project: The proposed development consists of a 300 unit multi-family housing with approximately 7,500 SF of commercial on the first floor. Access to the site is proposed via one right-in/right-out partial access on US Route 29 that will be shared with the existing WaWa development, which is located 185' from the Greenbrier Drive signalized intersection. A second access is proposed via one right-in only partial access on US Route 29, which is located 50' from another partial access entrance to the south. The AM-E is requested for spacing standards for both entrances		
VDOT District: Culpeper	**Area Land Use Engineer:** Doug McAvoy, PE	

NOTES:

(1). Submit this form and any attachments to one of the District's Area Land Use Engineers.

(2). See Section 120 of the Regulations for details on the requirements, exceptions, and exception request review process.

(3). Attach additional information as necessary to justify the exception request(s).

(4). If a traffic engineering study is required, the decision on the request will be based on VDOT engineering judgment.

(5). Use the LD-440 Design Exception or the LD-448 Design Waiver forms for *design and engineering standards*, e.g. radius, grade, sight distance. See IIM-LD-227 on VDOT web site for additional instructions.

Select the Exception(s) Being Requested

☐ **Exception to the shared commercial entrance requirement.** (Access M. Regulations Section 120 C.2)

Reason for exception:

☐ **A. An agreement to share the entrance could not be reached with adjoining property owner.**

☐ **Attached:** Written evidence that adjoining property owner will not share the entrance.

☐ **B. Physical constraints: topography, adjacent hazardous land use, stream, wetland, other.**

☐ **Specify constraint:** _____

☐ **Attached:** Documentation of constraint such as aerial photo or topographic map.

☐ **Exception to the vehicular connection to adjoining undeveloped property requirement.** (Section 120 C.4)

Reason for exception:

☐ **A. Physical constraints: topography, adjacent hazardous land use, stream, wetland, other.**

☐ **Specify constraint:** _____

☐ **Attached:** Documentation of constraint such as aerial photo or topographic map.

☐ **B. Other reason:** _____

☑ **Exception to the commercial entrance shall not be located within the functional area of an intersection requirement.** (See Regulation Section 120 C. 1; Appendix F, Rd Design Manual)

☑ **Attached:** A traffic engineering study documenting that the operation of the intersection and public safety will not be adversely impacted.

☑ **EXCEPTION TO THE SPACING STANDARDS FOR:**

- **Commercial entrances; intersections/median crossovers (Table 2-2);**
- **Commercial entrances/intersections near interchange ramps (Tables 2-3, 2-4);** or
- **Corner clearance (Figure 4-4).** Appendix F, Road Design Manual

Information on the Exception Request

☑ **ON A STATE HIGHWAY**

Functional classification: Principal Arterial: ☑ Minor Arterial: ☐ Collector: ☐ Local: ☐

Posted speed limit: 45 mph

☐ **NEAR AN INTERCHANGE RAMP** (Submittal of a traffic engineering study required)

☐ **CORNER CLEARANCE** (Submittal of a traffic engineering study required)

Type of intersection/entrance: Signalized ☐ Unsignalized ☐ Full Access ☐ Partial Access ☑

Required spacing distance 495 **ft**

Proposed spacing distance 185 **ft**

Requested exception: Reduction in required spacing 310 **ft**

REASON FOR EXCEPTION:

☐ **A. To be located on an older, established business corridor along a highway where existing spacing did not meet the standards prior to 7/1/08 or 10/14/09.** (Regulation Section 120 C.3.c)

☐ **Attached:** Dated aerial photo of corridor identifying proposed entrance/intersection location.

☑ **B. Not enough property frontage to meet spacing standard, but the applicant does not want a partial access right-in/right-out entrance.** (Section 120 C.3.f)

☑ **Attached:** A traffic engineering study documenting that left turn movements at the entrance will not have a negative impact on highway operation or safety.

☐ **C. To be located within a new urbanism mixed use type development.** (Section 120 C.3.d)

☐ **Attached:** The design of the development and compliance with intersection sight distance.

☐ **D. The proposed entrance meets the signal warrants but does not meet the signalized intersection spacing standard. The applicant requests an exception to the spacing standard.**

☐ **Attached:** A traffic engineering study that (i) evaluates the location's suitability for a roundabout and (ii) provides documentation that the proposed signal will not impact safety and traffic flow. (Section 120 C.5)

☐ **E. The development's 2nd (or additional) entrance does not meet the spacing standards but is necessary for the streets to be accepted into the secondary system.** (Section 120 C.3.e)

☐ **Attached:** Information on the development that identifies the location of entrances.

☐ **F. To be located within the limits of a VDOT and locality approved access management corridor plan.**

☐ **Attached:** Aerial photo of corridor identifying proposed entrance/intersection location. (Sect 120 C.3.b)

FOR VDOT USE ONLY

Recommendation on Exception Request: Approve ☐ **Deny** ☐	**Date:**
Area Land Use Engineer or: _____ **Name** _____	
Remarks:	

Exception Request Action: Approved ☐ **Denied** ☐	**Date:**
District Administrator or Designee: _____ **Name (and position if Designee)** _____	
Remarks:	

District Staff: Please email copy to Bradley.Shelton@VDOT.Virginia.gov