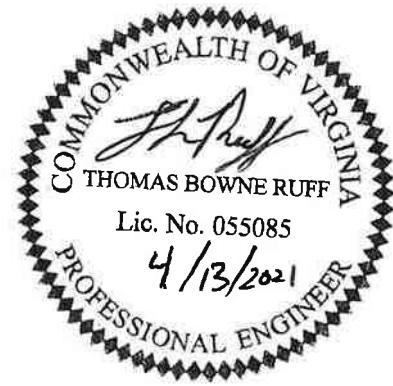


To: Dr. Dolores Carr (The Education Transformation Centre)
 From: Thomas Ruff, PE, PTOE (Timmons Group)
 RE: 2001 Earlysville Road, Turn-Lane Warrant Analysis
 Date: April 13, 2021
 Copy: Scott Dunn, AICP, PTP (TG); Danielle Soriano Brown, PE (TG)



Timmons Group performed a turn-lane warrant, queuing, and crash analysis investigating the need for an auxiliary southbound left-turn lane on Earlysville Road at the entrance of the existing Cornerstone Church complex located at 2001 Earlysville Road in Albemarle County, Virginia.

Background

The existing Cornerstone Church complex entrance is located on Earlysville Road between Woodlands Road and Solace Lane; this is the only point of ingress and egress for the site. The Education Transformation Centre is interested in using the existing church space to operate an alternative schooling program. A Special Use Permit (SUP) is being pursued with Albemarle County to allow the existing church complex to be used for educational activity during the week.

In support of the SUP, and at the request of VDOT, a left turn lane warrant is being completed. This analysis explores the need for an auxiliary southbound left-turn lane in association with additional site-generated traffic.

Existing Conditions

Earlysville Road is a north-south, two-lane, undivided roadway that is classified as an urban major collector with a posted speed limit of 45 mph. The *2019 VDOT Daily Traffic Volume Estimates Report* indicates that Earlysville Road has an Annual Average Daily Traffic (AADT) of 9,900 vehicles per day (vpd). Earlysville Road provides access to mainly residential areas north of Hydraulic Road.

The existing church entrance consists of one lane on all approaches, with the exception of the northbound approach, which has an auxiliary right-turn lane. Refer to Figure 1 for the existing intersection geometry at the study intersection. For reference, all figures are located at the end of this memorandum.

VDOT provided 24-hour directional volumes from 2018 for the section of Earlysville Road between Milford Road and Bradford Lane; this is the latest pre-COVID data available. Based on historical data and the limited amount of growth in the surrounding area, it was agreed that the 2018 data is representative of current conditions and could be used in the current analysis. A copy of the count data is included in Appendix A.

Peak Hour Selection

School activities for The Education Transformation Centre are proposed on weekdays between 8:00 AM and 3:30 PM. The peak hours selected for this analysis, 7:15 – 8:15 AM and 3:00 – 4:00 PM, were chosen to align with student drop-off in the morning and student pick-up in the evening. The existing peak hour volumes are shown on Figure 2.

Please note that since church activities are not conducted on the weekdays during school activities, the existing peak hour volumes do not include vehicles entering or exiting the church complex. In addition, any occasional/minimal volume from the residential entrance opposite the church will not impact the turn-lane warrant analysis.

Site Generated Trips and Trip Distribution

According to information provided by The Education Transformation Centre, school activities conducted at the church complex will add approximately 40 new peak hour trips to the project area. Of those trips, 30 are associated with student pick-up or drop-off, while the remaining 10 trips are associated with faculty and staff. To be conservative, it was assumed all 40 trips will arrive in the AM peak period and depart in the PM peak period.

Based on the location of the expected student/teacher population and the proximity of the site north of the City of Charlottesville, it is assumed that 90% of the new trips will enter/exit the church entrance from the south on Earlysville Road, and the remaining 10% of trips will access the entrance from the north on Earlysville Road.

The projected trip distributions and site-generated traffic are shown on Figure 3 and Figure 4, respectively.

Projected Opening Day Traffic

The existing traffic volumes from Figure 2 were combined with the generated trip estimates from Figure 4 to calculate the opening day volumes shown on Figure 5.

Turn-Lane Warrant Analysis

Using the opening day peak hour volumes shown on Figure 5, a left-turn lane warrant analysis was completed for the southbound approach of Earlysville Road to the church entrance. Turn-lane nomograph Figure 3-10 from Appendix F of the VDOT *Road Design Manual* was utilized for the analysis. Please note that this nomograph, based on a 5% left turn volume, is the closest applicable nomograph available. Based on the projected traffic volumes, only 0.26% of the total approaching traffic in the AM peak period and 0.61% of the total approaching traffic in the PM peak are turning left.

Per the Figure 3-10 nomograph, the southbound left-turn volume at the church entrance meets the warrants under AM and PM opening day peak hour volumes as shown on Figure 6. However, the likelihood of a warranted left-turn lane would be lower if a lower threshold were available for analyses. It should be noted that the turn-lane is warranted by the existing mainline Earlysville Road approaching and opposing traffic volumes, not the southbound left turning volumes.

If constructed, the posted speed limit (45 MPH) and functional classification of Earlysville Road (urban major collector) would entail a 100' minimum taper and 100' minimum storage for the southbound left-turn lane per the VDOT *Road Design Manual*.

Operational and Queueing Analysis

An operational and queuing analysis was performed using SYNCHRO Version 10 and HCM 6th Edition methodologies. The analysis assumed level terrain, exclusion of bus or parking impacts, exclusion of pedestrians, heavy vehicle percentages based on collected traffic data, and use of a minimum of 0.92 peak hour factor for the opening day analysis. The corresponding SYNCHRO worksheets are included in Appendix B.

Table 3 summarizes the 2021 opening day intersection LOS, delay, and 95th percentile queue lengths based on the traffic volumes shown on Figure 5 and the existing geometry shown on Figure 1.

**Table 1: Intersection Level of Service, Delay, and Queue Summary
 2021 Opening Day Conditions**

Intersection and Type of Control	Movement and Approach	Effective Turn Lane Storage (ft)	AM PEAK HOUR			PM PEAK HOUR		
			Delay (sec/veh)	LOS	HCS 95th Percentile Queue Length (ft)	Delay (sec/veh)	LOS	HCS 95th Percentile Queue Length (ft)
1. Earlysville Road (N-S) at Church Entrance / Private Home Entrance (E-W) Unsignalized	EB L - T - R		0.0	A	0	0.0	A	0
	<i>EB Approach</i>		0.0	A	--	0.0	A	--
	WB L - T - R		\$387.6	F	93	51.1	F	38
	<i>WB Approach</i>		\$387.6	F	--	51.1	F	--
	NB Left - Thru		0.0	A	0	0.0	A	0
	NB Right	160	0.0	A	0	0.0	A	0
	<i>NB Approach</i>		0.0	A	--	0.0	A	--
	SB L - T - R		8.8	A	0	9.2	A	0
	<i>SB Approach</i>		0.0	A	--	0.0	A	--
OVERALL			5.4	A	--	1.5	A	--

\$ Delay exceeds 300 seconds

As shown in Table 3, the study intersection will operate at an overall LOS A during each peak hour. The site-generated trips making a southbound left-turn will not impact the mainline movement on Earlysville Road according to the reported HCS 95th percentile queue length. Based on the minimal delay reported in both the AM and PM peak periods, one can conclude that sufficient gaps exist in the northbound through traffic to allow southbound left turning vehicles to complete a left-turn movement safely and efficiently.

It is anticipated that traffic exiting the site will encounter delays during both the AM and PM peaks, however, this will occur on-site, for which there is sufficient space to accommodate exiting vehicles.

Crash Analysis

Timmons Group reviewed the VDOT database for the five-year crash history within 500' of the existing intersection on Earlysville Road. From December 31, 2015 to December 31, 2020, there were three (3) crashes within 500' of the intersection. Of those three (3) total crashes, one (1) occurred in 2016, one (1) occurred in 2019, and one (1) occurred in 2020. Additional details regarding each crash are provided in Table 2 below.

Table 2: Crash Details

Crash Number	Date	Severity	Collision Type	Driver Action	Light Condition	Roadway Surface
1	04/19/2016	Severe Injury	Fixed Object in Road	No Improper Action	Daylight	Dry
2	07/26/2019	Property Damage Only	Fixed Object off Road	Avoiding Animal	Darkness – Road Lighted	Dry
3	11/07/2020	Property Damage Only	Deer	No Improper Action	Darkness – Road Not Lighted	Dry

Overall, during the five-year study period, there have been a limited number of crashes associated with the study intersection and no obvious pattern of crash history that would suggest a specific improvement or geometric change.

Conclusions

A turn-lane warrant, queueing, and crash analysis was performed to assess the need for a southbound left-turn lane at 2001 Earlysville Road. An increase in weekday AM and PM peak trips are anticipated in association with school activities proposed for the church premises. A total of 40 new trips, 30 student trips and 10 faculty/staff trips, are anticipated.

The turn-lane warrant analysis was based on Figure 3-10 from Appendix F of the VDOT *Road Design Manual*, for which there are inherent limitations. The nomograph is intended for use in situations where 5% of the approaching traffic turns left; in this case, the actual left turn percentage is 0.26% in the AM peak and 0.61% in the PM peak.

Considering the aforementioned limitations, the nomograph indicates a left-turn lane is warranted on the southbound approach of Earlysville Road at the existing church entrance. It should be noted that the turn-lane is warranted by the existing mainline Earlysville Road approaching and opposing traffic volumes, not the southbound left turning volumes. Overall, the site is expected to generate only 4 left turns during the AM peak hour and 3 left turns during the PM peak hour. The likelihood of the left-turn lane being warranted would be lower if an appropriate nomograph were available for this analysis.

Subsequently, an operational analysis was conducted to quantify the impacts of site-generated traffic on traffic operations at the site entrance. The results of that analysis indicate an overall LOS A at the study intersection during both peak hours with minimal mainline delay and no queuing.

A review of the crash data associated with the latest five-year study period indicates a limited number of crashes associated with the study intersection and no obvious pattern of crash history that would suggest a specific improvement or geometric change. There is no evidence to indicate that rear-end crashes are occurring due to queued left-turning vehicles.

Further, consideration should be given to the characteristics of the surrounding area. The Earlysville Road corridor between Hydraulic Road and Dickerson Road has numerous entrances and side streets where auxiliary left-turn lanes are not provided. Therefore, the current driver expectation on the corridor is to operate with no left-turn lanes.

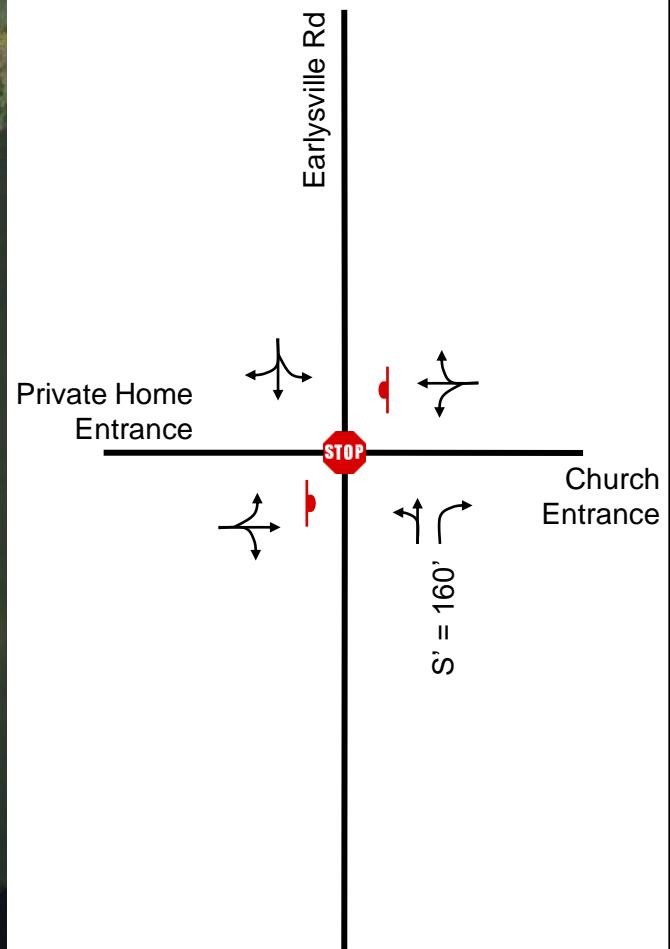
Finally, the installation of a southbound left-turn lane would require significant construction cost and effort considering the existing overhead utilities, guardrail, and drainage ditches adjacent to the roadway, as well as right-of-way acquisition. The installation of a southbound left-turn lane would also likely impact the approach to the bridge south of the project area due to the lane transitions. The anticipated construction costs for a southbound left-turn lane (>\$1,000,000) would far exceed the benefits of a southbound left-turn lane.

Recommendations

While the warrants indicate a southbound left-turn lane is warranted at the church entrance on Earlysville Road, the installation of those improvements is not recommended for the following reasons:

1. No Operational Benefit – As noted above, all mainline movements (left, through, and right) on Earlysville Road operate at LOS A during both peak hours with no queueing without a southbound left-turn lane. The projected queues generated by the proposed development are minimal and will not interfere with operations at existing intersections or commercial entrances upstream or downstream of the study intersection. The lack of queueing for the mainline southbound left-turn maneuver indicates that there will be minimal impacts to through traffic due to the left turning traffic.
2. Limited Safety Benefit – Although the installation of a left-turn lane on Earlysville Road would provide deceleration space for turning traffic, there are no existing safety issues present within the study area. The proposed site will introduce a maximum of 4 lefts during the AM peak hour (i.e. approximately one car every 15 minutes) and 3 lefts during the PM peak hour (approximately one car every 20 minutes).
3. Impact on Adjacent Property – Based on available GIS data, the existing right-of-way along Earlysville Road 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. Existing Corridor – A review of the existing Earlysville Road corridor finds that there are no left turn lanes installed at any side street or commercial/residential entrances between Hydraulic Road and Dickerson Road. The current driver expectation on the corridor is to operate with no left turn lanes.
5. Nature of the Land Use – The proposed SUP requests to grant access for an alternative education program that can accommodate up to 30 students and up to 10 staff members. The alternative education program will operate in conjunction with surrounding school systems and it is unlikely that the assumed maximum student population will be reached. The client has also discussed the likelihood of shared transportation for students, which would further reduce the trip generation estimates for the site. It is likely that the site will generate less than the 4 southbound left turns that are currently projected.
6. Turn Lane Nomograph Applicability – The turn-lane warrant analysis was based on Appendix F of the VDOT *Road Design Manual*, for which there are limitations. As such, a nomograph intended for 5% turn volumes was used for the turn-lane warrant analysis to represent the actual 0.26% (AM peak) and 0.61% (PM peak) turn volumes

Based on the summary of information provided in this report, a southbound left-turn lane is not recommended for installation in association with the proposed SUP for school activities by the Education Transformation Centre at 2001 Earlysville Road.



* Per TOSAM Guidelines,
effective storage equals
the full width storage
length plus $\frac{1}{2}$ the taper
length

NOT TO SCALE

LEGEND:

Church Complex

— Existing Road

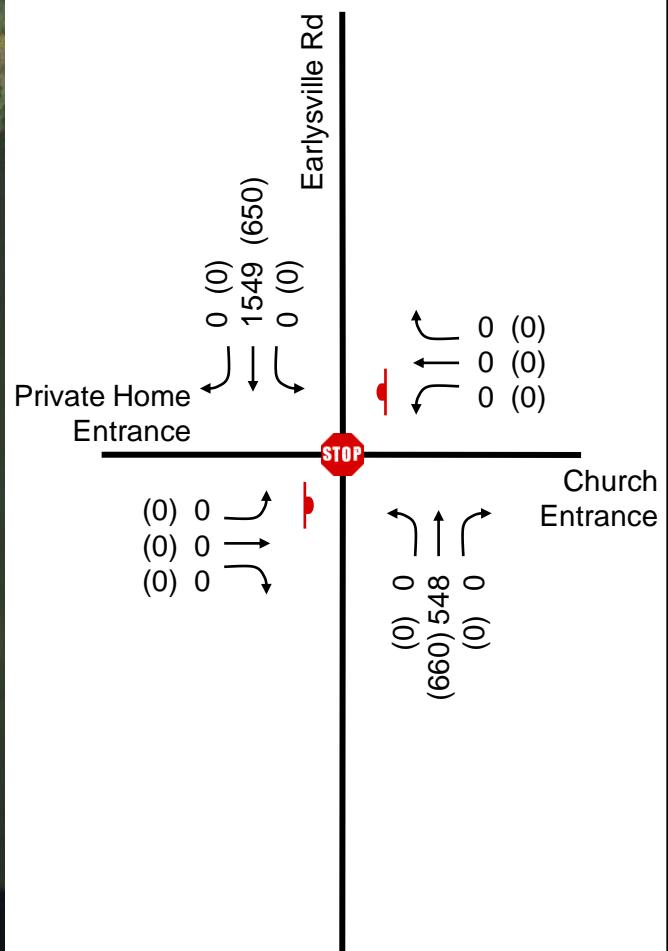
Stop Controlled Intersection

Existing Study Intersection

S' Effective Storage Length*

Stop Controlled Approach

Lane Configuration



Analysis Periods

AM Peak: 7:15 – 8:15 AM

PM Peak: 3:00 – 4:00 PM

NOT TO SCALE

LEGEND:

Church Complex

Existing Road

Stop Controlled Intersection

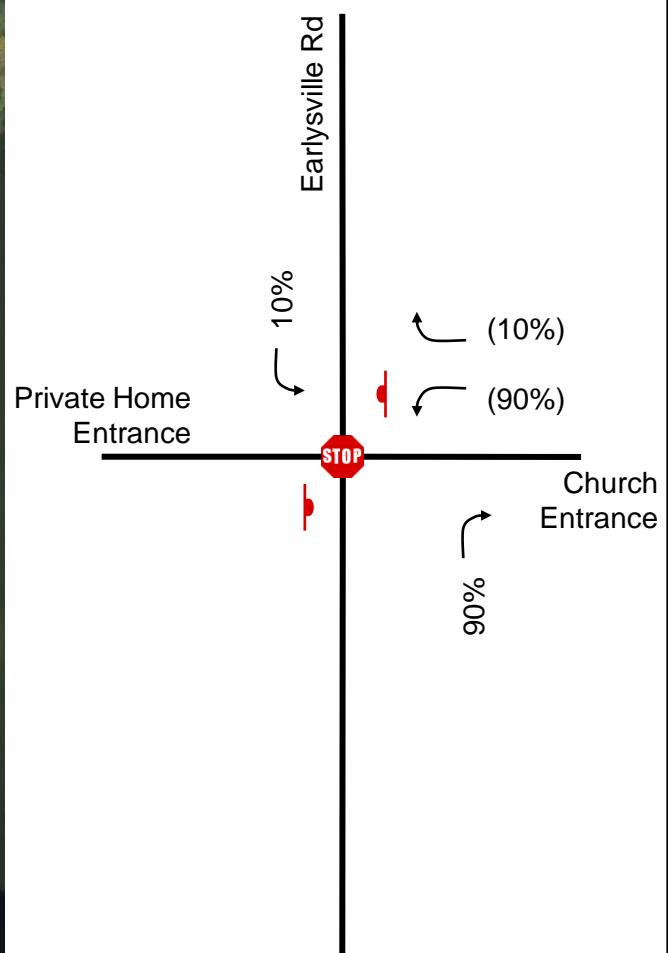
Existing Study Intersection

X AM Peak Hour Volume

Stop Controlled Approach

Turning Movement

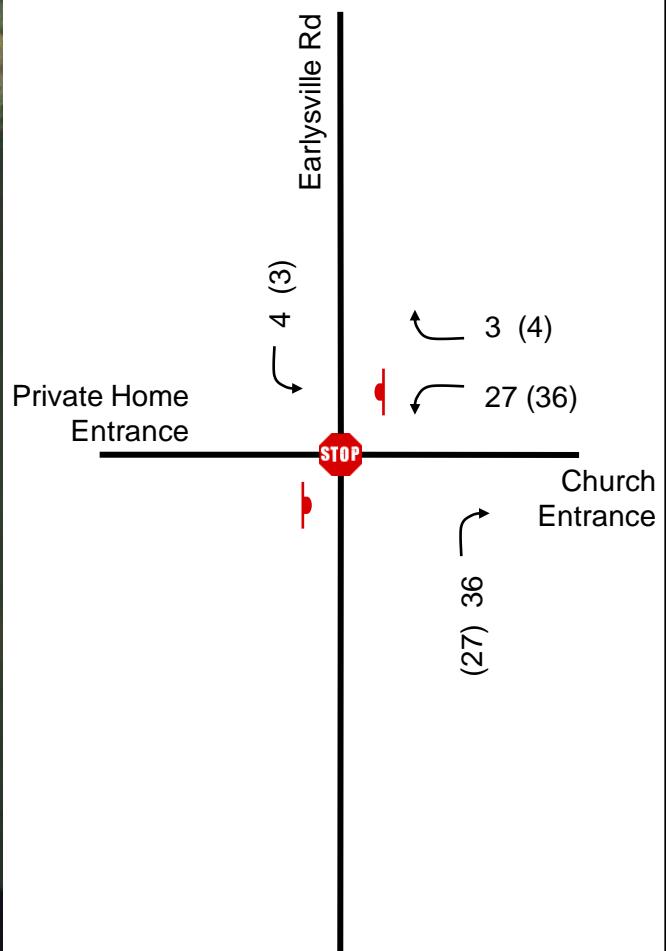
(X) PM Peak Hour Volume



NOT TO SCALE

LEGEND:

	Church Complex		Existing Road		Stop Controlled Intersection
	Existing Study Intersection	X	Entering Trip Distribution		Stop Controlled Approach
	Turning Movement	(X)	Exiting Trip Distribution		



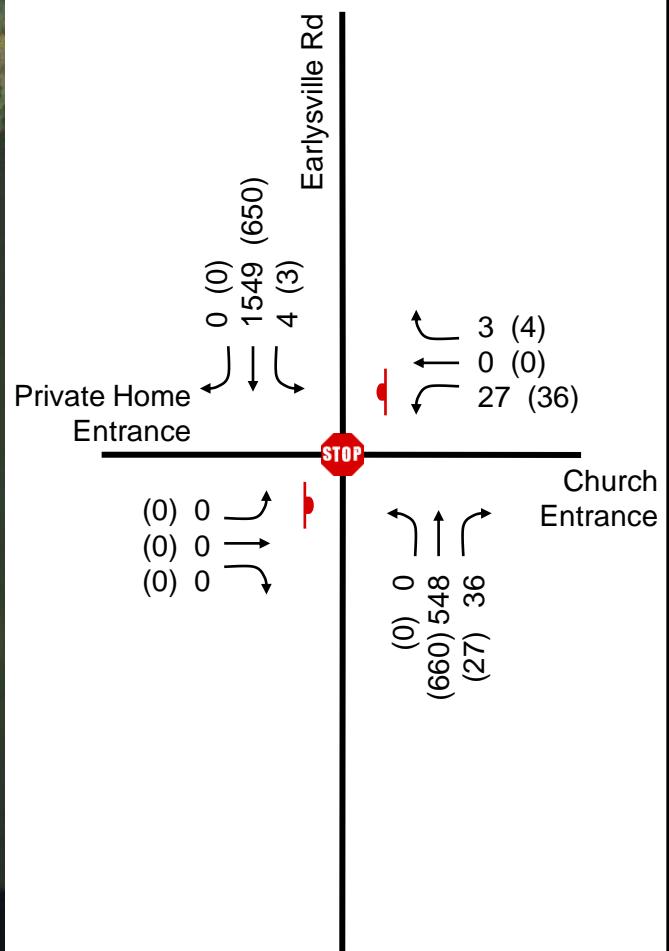
New Trips

Students: 30 trips (AM / PM in / out)
 Faculty: 10 trips (AM in / PM out)

NOT TO SCALE

LEGEND:

Church Complex	Existing Road	Stop Controlled Intersection
Existing Study Intersection	X AM Trip	Stop Controlled Approach
Turning Movement	(X) PM Trip	



Analysis Periods

AM Peak: 7:15 – 8:15 AM

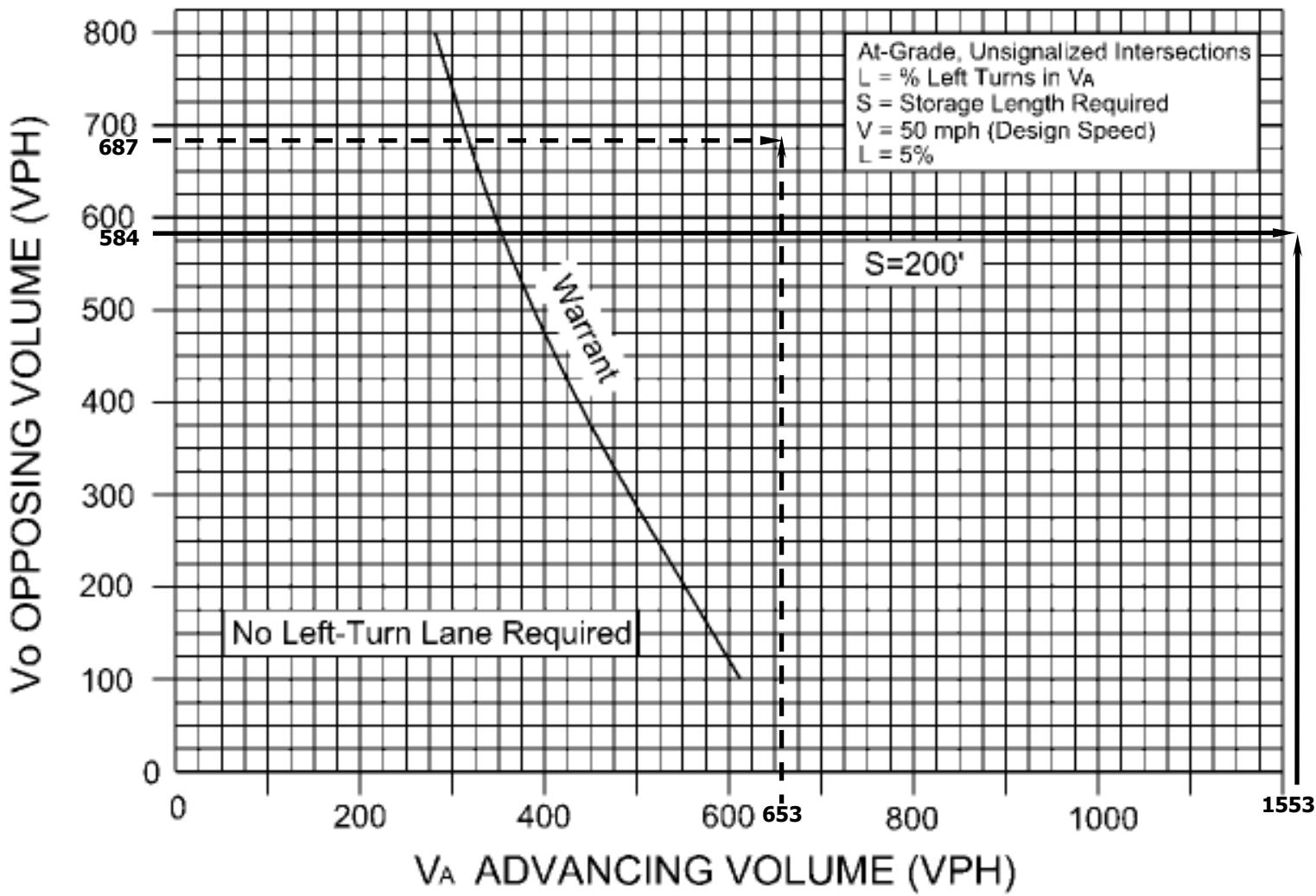
PM Peak: 3:00 – 4:00 PM

NOT TO SCALE

LEGEND:

Church Complex	Existing Road	Stop Controlled Intersection
Existing Study Intersection	X AM Peak Hour Volume	Stop Controlled Approach
Turning Movement	(X) PM Peak Hour Volume	

WARRANT FOR LEFT-TURN STORAGE LANES
ON TWO-LANE HIGHWAYS (50 MPH)
FIGURE 3-10 VDOT ROAD DESIGN MANUAL APPENDIX F



LEGEND

— AM Peak Hour
- - - PM Peak Hour

LEFT TURN LANE WARRANTED



Left-Turn Lane Warrant 2021 Opening Day Peak Hour Volumes Earlysville Road SBL at Church Entrance

Figure 6

APPENDIX A

24-Hour Directional Volumes

Earlysville Road – Milford Road to Bradford Lane

		Total Daily Volume	Hourly Volume
NB	4/11/2018	10005	
Corridor Peak Hour	4:45 PM - 5:45 PM		1328
AM School Peak	7:15 AM - 8:15 AM		548
PM School Peak	3:00 PM - 4:00 PM		660
NB	4/12/2018	9835	
Corridor Peak Hour	4:45 PM - 5:45 PM		1245
AM School Peak	7:15 AM - 8:15 AM		513
PM School Peak	3:00 PM - 4:00 PM		766
SB	4/11/2018	10342	
Corridor Peak Hour	7:45 AM - 8:45 AM		1653
AM School Peak	7:15 AM - 8:15 AM		1549
PM School Peak	3:00 PM - 4:00 PM		650
SB	4/12/2018	10399	
Corridor Peak Hour	7:30 AM - 8:30 AM		1603
AM School Peak	7:15 AM - 8:15 AM		1573
PM School Peak	3:00 PM - 4:00 PM		688
		Total Daily Volume	AM School Peak
NB + SB	4/11/2018	20347	2097
NB + SB	4/12/2018	20234	2086
			PM School Peak
			1310
			1454

LinkID	Lane	ChannelNu	Direction	StartDate	Interval
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'402124'	1	4/11/2018 19:15	15	167
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'402124'	1	4/11/2018 19:30	15	118
'402124'	3	4/11/2018 19:30	15	64
'402124'	1	4/11/2018 19:45	15	128
'402124'	3	4/11/2018 19:45	15	53
'402124'	1	4/11/2018 20:00	15	122
'402124'	3	4/11/2018 20:00	15	48
'402124'	1	4/11/2018 20:15	15	118
'402124'	3	4/11/2018 20:15	15	54
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'402124'	3	4/11/2018 20:30	15	82
'402124'	1	4/11/2018 20:45	15	82
'402124'	3	4/11/2018 20:45	15	32
'402124'	1	4/11/2018 21:00	15	98
'402124'	3	4/11/2018 21:00	15	60
'402124'	1	4/11/2018 21:15	15	99
'402124'	3	4/11/2018 21:15	15	32
'402124'	1	4/11/2018 21:30	15	74
'402124'	3	4/11/2018 21:30	15	30
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'402124'	1	4/11/2018 22:00	15	44
'402124'	3	4/11/2018 22:00	15	28
'402124'	1	4/11/2018 22:15	15	56
'402124'	3	4/11/2018 22:15	15	8
'402124'	1	4/11/2018 22:30	15	33
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'402124'	1	4/11/2018 22:45	15	24
'402124'	3	4/11/2018 22:45	15	12
'402124'	1	4/11/2018 23:00	15	30
'402124'	3	4/11/2018 23:00	15	14
'402124'	1	4/11/2018 23:15	15	30

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'402124'	1	4/11/2018 23:30	15	18
'402124'	3	4/11/2018 23:30	15	6
'402124'	1	4/11/2018 23:45	15	14
'402124'	3	4/11/2018 23:45	15	14
'402124'	1	4/12/2018 0:00	15	13
'402124'	3	4/12/2018 0:00	15	14
'402124'	1	4/12/2018 0:15	15	16
'402124'	3	4/12/2018 0:15	15	6
'402124'	1	4/12/2018 0:30	15	12
'402124'	3	4/12/2018 0:30	15	2
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'402124'	3	4/12/2018 0:45	15	0
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'402124'	3	4/12/2018 1:15	15	0
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'402124'	3	4/12/2018 3:00	15	2
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'402124'	3	4/12/2018 3:45	15	2
'402124'	1	4/12/2018 4:00	15	6
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'402124'	1	4/12/2018 4:45	15	14
'402124'	3	4/12/2018 4:45	15	22
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'402124'	1	4/12/2018 5:45	15	35
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'402124'	3	4/12/2018 6:30	15	185
'402124'	1	4/12/2018 6:45	15	90
'402124'	3	4/12/2018 6:45	15	209
'402124'	1	4/12/2018 7:00	15	69
'402124'	3	4/12/2018 7:00	15	244
'402124'	1	4/12/2018 7:15	15	118
'402124'	3	4/12/2018 7:15	15	311
'402124'	1	4/12/2018 7:30	15	119
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'402124'	1	4/12/2018 7:45	15	124
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'402124'	1	4/12/2018 8:00	15	152
'402124'	3	4/12/2018 8:00	15	439
'402124'	1	4/12/2018 8:15	15	111
'402124'	3	4/12/2018 8:15	15	341
'402124'	1	4/12/2018 8:30	15	123
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'402124'	1	4/12/2018 8:45	15	164
'402124'	3	4/12/2018 8:45	15	232
'402124'	1	4/12/2018 9:00	15	137
'402124'	3	4/12/2018 9:00	15	173
'402124'	1	4/12/2018 9:15	15	121
'402124'	3	4/12/2018 9:15	15	181
'402124'	1	4/12/2018 9:30	15	118
'402124'	3	4/12/2018 9:30	15	172
'402124'	1	4/12/2018 9:45	15	104
'402124'	3	4/12/2018 9:45	15	137
'402124'	1	4/12/2018 10:00	15	95
'402124'	3	4/12/2018 10:00	15	94
'402124'	1	4/12/2018 10:15	15	65
'402124'	3	4/12/2018 10:15	15	130
'402124'	1	4/12/2018 10:30	15	91
'402124'	3	4/12/2018 10:30	15	167
'402124'	1	4/12/2018 10:45	15	98
'402124'	3	4/12/2018 10:45	15	133
'402124'	1	4/12/2018 11:00	15	88

'402124'	3	4/12/2018 11:00	15	123
'402124'	1	4/12/2018 11:15	15	112
'402124'	3	4/12/2018 11:15	15	141
'402124'	1	4/12/2018 11:30	15	136
'402124'	3	4/12/2018 11:30	15	132
'402124'	1	4/12/2018 11:45	15	110
'402124'	3	4/12/2018 11:45	15	116
'402124'	1	4/12/2018 12:00	15	133
'402124'	3	4/12/2018 12:00	15	119
'402124'	1	4/12/2018 12:15	15	127
'402124'	3	4/12/2018 12:15	15	111
'402124'	1	4/12/2018 12:30	15	144
'402124'	3	4/12/2018 12:30	15	146
'402124'	1	4/12/2018 12:45	15	121
'402124'	3	4/12/2018 12:45	15	143
'402124'	1	4/12/2018 13:00	15	162
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'402124'	1	4/12/2018 13:15	15	127
'402124'	3	4/12/2018 13:15	15	96
'402124'	1	4/12/2018 13:30	15	148
'402124'	3	4/12/2018 13:30	15	118
'402124'	1	4/12/2018 13:45	15	128
'402124'	3	4/12/2018 13:45	15	138
'402124'	1	4/12/2018 14:00	15	150
'402124'	3	4/12/2018 14:00	15	118
'402124'	1	4/12/2018 14:15	15	165
'402124'	3	4/12/2018 14:15	15	111
'402124'	1	4/12/2018 14:30	15	179
'402124'	3	4/12/2018 14:30	15	122
'402124'	1	4/12/2018 14:45	15	158
'402124'	3	4/12/2018 14:45	15	152
'402124'	1	4/12/2018 15:00	15	153
'402124'	3	4/12/2018 15:00	15	143
'402124'	1	4/12/2018 15:15	15	162
'402124'	3	4/12/2018 15:15	15	122
'402124'	1	4/12/2018 15:30	15	200
'402124'	3	4/12/2018 15:30	15	231
'402124'	1	4/12/2018 15:45	15	251
'402124'	3	4/12/2018 15:45	15	192
'402124'	1	4/12/2018 16:00	15	255
'402124'	3	4/12/2018 16:00	15	214
'402124'	1	4/12/2018 16:15	15	264
'402124'	3	4/12/2018 16:15	15	166
'402124'	1	4/12/2018 16:30	15	262
'402124'	3	4/12/2018 16:30	15	243
'402124'	1	4/12/2018 16:45	15	332
'402124'	3	4/12/2018 16:45	15	154

'402124'	1	4/12/2018 17:00	15	304
'402124'	3	4/12/2018 17:00	15	212
'402124'	1	4/12/2018 17:15	15	327
'402124'	3	4/12/2018 17:15	15	243
'402124'	1	4/12/2018 17:30	15	282
'402124'	3	4/12/2018 17:30	15	217
'402124'	1	4/12/2018 17:45	15	248
'402124'	3	4/12/2018 17:45	15	180
'402124'	1	4/12/2018 18:00	15	247
'402124'	3	4/12/2018 18:00	15	168
'402124'	1	4/12/2018 18:15	15	236
'402124'	3	4/12/2018 18:15	15	160
'402124'	1	4/12/2018 18:30	15	216
'402124'	3	4/12/2018 18:30	15	128
'402124'	1	4/12/2018 18:45	15	172
'402124'	3	4/12/2018 18:45	15	132
'402124'	1	4/12/2018 19:00	15	123
'402124'	3	4/12/2018 19:00	15	85
'402124'	1	4/12/2018 19:15	15	128
'402124'	3	4/12/2018 19:15	15	75
'402124'	1	4/12/2018 19:30	15	97
'402124'	3	4/12/2018 19:30	15	70
'402124'	1	4/12/2018 19:45	15	132
'402124'	3	4/12/2018 19:45	15	88
'402124'	1	4/12/2018 20:00	15	94
'402124'	3	4/12/2018 20:00	15	43
'402124'	1	4/12/2018 20:15	15	112
'402124'	3	4/12/2018 20:15	15	64
'402124'	1	4/12/2018 20:30	15	79
'402124'	3	4/12/2018 20:30	15	36
'402124'	1	4/12/2018 20:45	15	102
'402124'	3	4/12/2018 20:45	15	42
'402124'	1	4/12/2018 21:00	15	102
'402124'	3	4/12/2018 21:00	15	44
'402124'	1	4/12/2018 21:15	15	107
'402124'	3	4/12/2018 21:15	15	30
'402124'	1	4/12/2018 21:30	15	58
'402124'	3	4/12/2018 21:30	15	32
'402124'	1	4/12/2018 21:45	15	60
'402124'	3	4/12/2018 21:45	15	48
'402124'	1	4/12/2018 22:00	15	70
'402124'	3	4/12/2018 22:00	15	26
'402124'	1	4/12/2018 22:15	15	52
'402124'	3	4/12/2018 22:15	15	26
'402124'	1	4/12/2018 22:30	15	48
'402124'	3	4/12/2018 22:30	15	20
'402124'	1	4/12/2018 22:45	15	30

'402124'	3	4/12/2018 22:45	15	14
'402124'	1	4/12/2018 23:00	15	38
'402124'	3	4/12/2018 23:00	15	20
'402124'	1	4/12/2018 23:15	15	22
'402124'	3	4/12/2018 23:15	15	24
'402124'	1	4/12/2018 23:30	15	22
'402124'	3	4/12/2018 23:30	15	8
'402124'	1	4/12/2018 23:45	15	10
'402124'	3	4/12/2018 23:45	15	8

APPENDIX B

SYNCHRO Analysis Reports

Earlysville Turn-Lane Warrant Analysis
1: Earlysville Rd & Private Home Entr/Church Entr

2021 Opening Day AM Peak
HCM 6th TWSC

Intersection

Int Delay, s/veh 5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	27	0	3	0	548	36	4	1549	0
Future Vol, veh/h	0	0	0	27	0	3	0	548	36	4	1549	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	160	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	29	0	3	0	596	39	4	1684	0

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	2309	2327	1684	2288	2288	596	1684	0	0	635	0	0
Stage 1	1692	1692	-	596	596	-	-	-	-	-	-	-
Stage 2	617	635	-	1692	1692	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	27	38	118	~28	39	504	380	-	-	948	-	-
Stage 1	119	151	-	490	492	-	-	-	-	-	-	-
Stage 2	481	476	-	118	149	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	25	36	118	~27	36	504	380	-	-	948	-	-
Mov Cap-2 Maneuver	25	36	-	~27	36	-	-	-	-	-	-	-
Stage 1	119	141	-	490	492	-	-	-	-	-	-	-
Stage 2	478	476	-	110	139	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB			
HCM Control Delay, s	0	\$ 387.6			0			0			
HCM LOS	A	F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	380	-	-	-	30	948	-	-			
HCM Lane V/C Ratio	-	-	-	-	1.087	0.005	-	-			
HCM Control Delay (s)	0	-	-	\$	387.6	8.8	0	-			
HCM Lane LOS	A	-	-	A	F	A	A	-			
HCM 95th %tile Q(veh)	0	-	-	-	3.7	0	-	-			

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Earlysville Turn-Lane Warrant Analysis
1: Earlysville Rd & Private Home Entr/Church Entr

2021 Opening Day PM Peak
HCM 6th TWSC

Intersection

Int Delay, s/veh 1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↑	↑	↔		
Traffic Vol, veh/h	0	0	0	36	0	4	0	660	27	3	650	0
Future Vol, veh/h	0	0	0	36	0	4	0	660	27	3	650	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	160	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	39	0	4	0	717	29	3	707	0

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	1447	1459	707	1430	1430	717	707	0	0	746	0	0
Stage 1	713	713	-	717	717	-	-	-	-	-	-	-
Stage 2	734	746	-	713	713	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	110	131	439	112	135	430	891	-	-	862	-	-
Stage 1	426	438	-	421	434	-	-	-	-	-	-	-
Stage 2	415	424	-	423	435	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	108	130	439	111	134	430	891	-	-	862	-	-
Mov Cap-2 Maneuver	108	130	-	111	134	-	-	-	-	-	-	-
Stage 1	426	435	-	421	434	-	-	-	-	-	-	-
Stage 2	411	424	-	420	432	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB				
HCM Control Delay, s	0	51.1			0			0				
HCM LOS	A	F										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	891	-	-	-	120	862	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.362	0.004	-	-				
HCM Control Delay (s)	0	-	-	0	51.1	9.2	0	-				
HCM Lane LOS	A	-	-	A	F	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	1.5	0	-	-				