

January 16, 2019

Ms. Ellen Cook
James City County – Community Development
101 Mounts Bay Road
Building A
Williamsburg, Virginia 23185
Phone: (757) 253-6671

Reference: Lightfoot Road C-Store
Traffic Impact Analysis (TIA) – **Supplement #1**
York County and James City County, Virginia

Dear Ms. Cook,

Ramey Kemp & Associates, Inc. (RKA) submitted the Traffic Impact Analysis (TIA) for this proposed convenience store redevelopment on October 8. The purpose of this letter is to respond to the two TIA review comments in the County's letter dated December 3.

In response to Comment #1, yes – the build 2020 analysis includes the recommended extension of the eastbound U.S. 60 left-turn lane. The turn lane storage lengths do not affect the vehicle delay and level-of-service (LOS) calculations in Synchro.

In the TIA, we analyzed the signalized intersection of U.S. 60 (Richmond Road) at Lightfoot Road / Williamsburg Outlet Mall Driveway. This intersection is part of a coordinated signal system along U.S. 60, but it was the only traffic signal in our Synchro model. Therefore, the Synchro model assumed it was isolated, and did not account for the benefit of coordination with the other traffic signals on the corridor. As a result, the LOS during the PM peak hour went from LOS C for the existing conditions, to just into the LOS D range for the no-build and build conditions.

The Centerville Road traffic signal is approximately 685 feet southeast of the Lightfoot Road signal. We added the Centerville Road signal to the Synchro model to account for the progression of the through volumes on both directions of U.S. 60. As a result, the average delays at the Lightfoot Road signal decreased by 0.6 seconds during the AM peak hour, and by 4.6 seconds during the PM peak hour for the build-out condition, so LOS C is maintained in both peak hours at build-out.

Table 1 summarizes the updated capacity analysis results for the signalized intersection of U.S. 60 at Lightfoot Road / Williamsburg Outlet Mall Driveway, which takes into account coordination with the Centerville Road signal.

Table 1
Level-of-Service Summary for U.S. 60 at Lightfoot Road / Williamsburg Outlet Mall Driveway

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)	Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)
Existing 2018 Traffic Conditions	EBU/L	D	50.7	207	C (22.6 sec)	E	61.8	273	C (27.8 sec)
	EBT	B	17.3	242		C	25.6	330	
	EBR	A	0.1	0		A	0.2	0	
	WBL	D	35.2	39		D	38.2	88	
	WBT	C	20.1	213		C	25.3	292	
	WBR	A	0.1	0		A	0.2	0	
	NBL	D	49.5	51		D	53.2	88	
	NBL/T	D	49.5	53		D	52.9	90	
	NBR	A	0.8	0		A	1.2	0	
	SBT/L	D	51.4	176		E	57.0	334	
No-Build 2020 Traffic Conditions	SBR	A	6.3	33		A	7.5	74	
	EBU/L	D	50.8	212	C (24.9 sec)	E	63.0	283	C (31.7 sec)
	EBT	C	24.8	233		C	34.0	356	
	EBR	A	4.7	37		A	4.6	47	
	WBL	C	33.8	64		D	40.3	170	
	WBT	C	20.5	144		C	29.6	353	
	WBR	A	0.1	0		A	0.2	0	
	NBL	D	51.3	76		E	63.7	155	
	NBL/T	D	51.0	76		E	63.6	156	
	NBR	A	2.2	0		A	6.8	30	
	SBT/L	D	51.7	195		E	59.6	360	
Build 2020 Traffic Conditions	SBR	A	8.6	52		A	7.5	77	
	EBU/L	D	51.7	251	C (27.7 sec)	E	60.6	315	C (34.1 sec)
	EBT	C	27.9	225		C	34.6	339	
	EBR	A	5.0	38		A	4.6	46	
	WBL	C	32.4	69		D	37.0	152	
	WBT	C	24.8	161		C	33.2	428	
	WBR	A	0.1	0		A	0.2	0	
	NBL	D	52.2	77		E	64.5	156	
	NBL/T	D	52.3	81		E	64.3	160	
	NBR	A	2.3	0		A	6.9	30	
	SBT/L	D	52.2	239		E	68.8	434	
	SBR	A	7.7	51		A	8.6	91	

Capacity analysis indicates this intersection currently operates at LOS C during the AM and PM peak hours. Under no-build 2020 traffic conditions, this intersection is expected to continue to operate at LOS C during the AM and PM peak hours. Under build 2020 traffic conditions, this intersection is projected to continue to operate at LOS C during the AM and PM peak hours without degrading the LOS for any individual lane group.

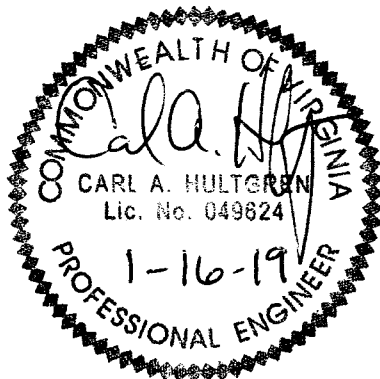
Ms. Ellen Cook

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We appreciate your attention to this matter. Please contact me at (804) 217-8560 if you have any questions about this report.

Sincerely yours,

Ramey Kemp & Associates, Inc.



Carl Hultgren, P.E., PTOE
Regional Manager

Enclosures: Synchro output

Copy to: Mr. Paul Holt, AICP, James City County Planning
Ms. Susan Kassel, York County Planning
Mr. Jason Fowler, P.E., VDOT
Mr. Glenn Brooks, P.E., VDOT
Mr. Andy Sadler, Woodfin
Mr. Timothy Trant, Kaufman & Canoles, P.C.
Mr. Dan Caskie, P.E., Bay Companies

Lightfoot Road C-Store - York County, VA
1: Commercial Driveway /Lightfoot Road & U.S. 60

Existing (2018) Conditions
Timing Plan: AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	196	587	55	24	476	134	37	20	37	119	38	156
Future Volume (vph)	196	587	55	24	476	134	37	20	37	119	38	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		175	0		100	0		0
Storage Lanes	1		1	1		1	1		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1741	1583	0	1794	1583
Flt Permitted	0.950			0.950			0.950	0.984			0.963	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1741	1583	0	1794	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			268			208			208
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		182			741			417			201	
Travel Time (s)		2.8			11.2			11.4			3.0	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)							25%					
Lane Group Flow (vph)	228	683	64	28	553	156	32	34	43	0	182	181
Turn Type	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			Free			3			4
Detector Phase	5	2	2	1	6		3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	31.0	54.0	54.0	13.0	36.0		16.0	16.0	16.0	27.0	27.0	27.0
Total Split (%)	28.2%	49.1%	49.1%	11.8%	32.7%		14.5%	14.5%	14.5%	24.5%	24.5%	24.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	21.1	63.1	63.1	12.8	47.4	110.0	9.6	9.6	9.6		18.1	18.1
Actuated g/C Ratio	0.19	0.57	0.57	0.12	0.43	1.00	0.09	0.09	0.09		0.16	0.16
v/c Ratio	0.67	0.34	0.07	0.14	0.36	0.10	0.22	0.22	0.13		0.62	0.42
Control Delay	50.7	17.3	0.1	35.2	20.1	0.1	49.5	49.5	0.8		51.4	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	50.7	17.3	0.1	35.2	20.1	0.1	49.5	49.5	0.8		51.4	6.3
LOS	D	B	A	D	C	A	D	D	A		D	A
Approach Delay		24.0			16.5			30.3			28.9	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	150	105	0	19	110	0	22	24	0		120	0
Queue Length 95th (ft)	207	242	0	39	213	0	51	53	0		176	33
Internal Link Dist (ft)		102			661			337			121	
Turn Bay Length (ft)				300		175			100			
Base Capacity (vph)	434	2145	1018	212	1527	1583	184	190	358		375	495
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0		0	0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

Existing (2018) Conditions

Timing Plan: AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Reduced v/c Ratio	0.53	0.32	0.06	0.13	0.36	0.10	0.17	0.18	0.12		0.49	0.37

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 96 (87%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 22.6

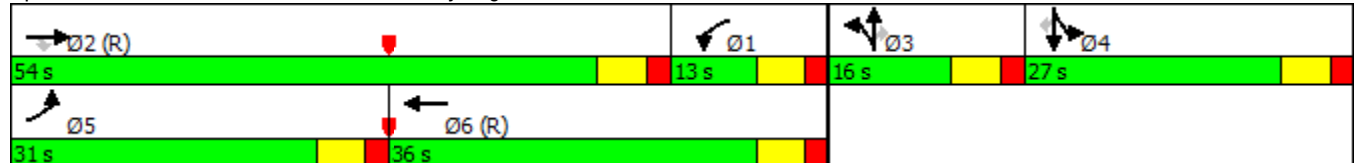
Intersection LOS: C

Intersection Capacity Utilization 49.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60



Lightfoot Road C-Store - York County, VA
1: Commercial Driveway /Lightfoot Road & U.S. 60

Existing (2018) Conditions
Timing Plan: PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	222	865	71	61	879	205	77	40	60	248	48	322
Future Volume (vph)	222	865	71	61	879	205	77	40	60	248	48	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		175	0		100	0		0
Storage Lanes	1		1	1		1	1		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1741	1583	0	1788	1583
Flt Permitted	0.950			0.950			0.950	0.984			0.960	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1741	1583	0	1788	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			268			208			346
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		182			750			417			201	
Travel Time (s)		2.8			11.4			11.4			3.0	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)							25%					
Lane Group Flow (vph)	239	930	76	66	945	220	62	64	65	0	319	346
Turn Type	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			Free			3			4
Detector Phase	5	2	2	1	6		3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	24.0	51.0	51.0	13.0	40.0		16.0	16.0	16.0	30.0	30.0	30.0
Total Split (%)	21.8%	46.4%	46.4%	11.8%	36.4%		14.5%	14.5%	14.5%	27.3%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	19.0	51.4	51.4	12.4	42.4	110.0	10.6	10.6	10.6		24.3	24.3
Actuated g/C Ratio	0.17	0.47	0.47	0.11	0.39	1.00	0.10	0.10	0.10		0.22	0.22
v/c Ratio	0.78	0.56	0.09	0.33	0.69	0.14	0.38	0.38	0.19		0.81	0.56
Control Delay	61.8	25.6	0.2	38.2	25.3	0.2	53.2	52.9	1.2		57.0	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	61.8	25.6	0.2	38.2	25.3	0.2	53.2	52.9	1.2		57.0	7.5
LOS	E	C	A	D	C	A	D	D	A		E	A
Approach Delay		31.0			21.5			35.4			31.3	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	161	291	0	46	347	0	43	45	0		209	0
Queue Length 95th (ft)	#273	330	0	88	292	0	88	90	0		#334	74
Internal Link Dist (ft)		102			670			337			121	
Turn Bay Length (ft)				300		175			100			
Base Capacity (vph)	321	1742	854	203	1363	1583	183	189	358		424	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0		0	0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

Existing (2018) Conditions

Timing Plan: PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Reduced v/c Ratio	0.74	0.53	0.09	0.33	0.69	0.14	0.34	0.34	0.18		0.75	0.54

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 100 (91%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 27.8

Intersection LOS: C

Intersection Capacity Utilization 69.5%

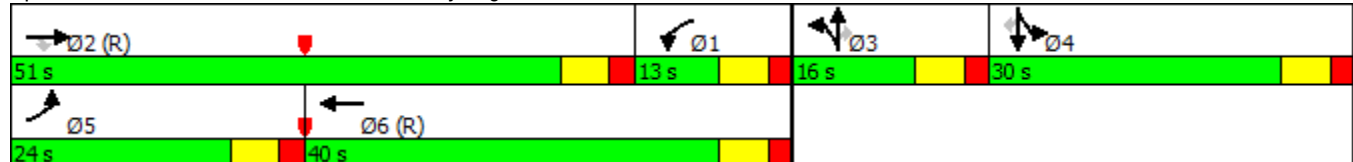
ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60



Lightfoot Road C-Store - York County, VA
1: Commercial Driveway /Lightfoot Road & U.S. 60

No-Build (2020) Conditions
Timing Plan: AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	200	561	128	75	469	144	75	20	88	134	44	179
Future Volume (vph)	200	561	128	75	469	144	75	20	88	134	44	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		175	0		100	0		0
Storage Lanes	1		1	1		1	1		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1720	1583	0	1796	1583
Flt Permitted	0.950			0.950			0.950	0.972			0.964	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1720	1583	0	1796	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			268			208			208
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		182			744			417			201	
Travel Time (s)		2.8			11.3			11.4			3.0	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)							37%					
Lane Group Flow (vph)	233	652	149	87	545	167	55	55	102	0	207	208
Turn Type	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			Free			3			4
Detector Phase	5	2	2	1	6		3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	31.0	48.0	48.0	17.0	34.0		17.0	17.0	17.0	28.0	28.0	28.0
Total Split (%)	28.2%	43.6%	43.6%	15.5%	30.9%		15.5%	15.5%	15.5%	25.5%	25.5%	25.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	21.4	48.7	48.7	17.7	42.5	110.0	10.7	10.7	10.7		19.4	19.4
Actuated g/C Ratio	0.19	0.44	0.44	0.16	0.39	1.00	0.10	0.10	0.10		0.18	0.18
v/c Ratio	0.68	0.42	0.19	0.31	0.40	0.11	0.34	0.33	0.30		0.66	0.46
Control Delay	50.8	24.8	4.7	33.8	20.5	0.1	51.3	51.0	2.2		51.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	50.8	24.8	4.7	33.8	20.5	0.1	51.3	51.0	2.2		51.7	8.6
LOS	D	C	A	C	C	A	D	D	A		D	A
Approach Delay		27.8			17.7			27.6			30.1	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	153	178	0	52	116	0	38	38	0		137	0
Queue Length 95th (ft)	212	233	37	64	144	0	76	76	0		195	52
Internal Link Dist (ft)		102			664			337			121	
Turn Bay Length (ft)				300		175			100			
Base Capacity (vph)	434	1640	813	299	1367	1583	198	203	370		391	508
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0		0	0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

No-Build (2020) Conditions

Timing Plan: AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Reduced v/c Ratio	0.54	0.40	0.18	0.29	0.40	0.11	0.28	0.27	0.28		0.53	0.41

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 85 (77%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 24.9

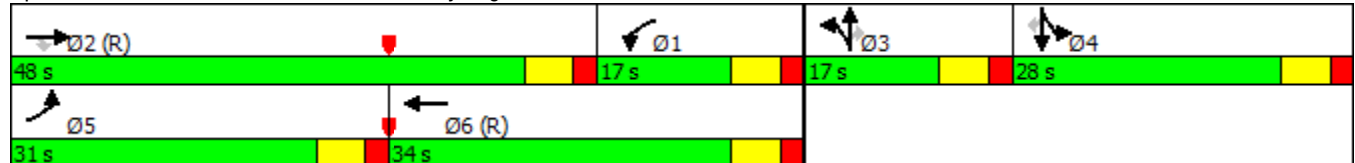
Intersection Capacity Utilization 50.4%

Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service A

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60



Lightfoot Road C-Store - York County, VA
1: Commercial Driveway /Lightfoot Road & U.S. 60

No-Build (2020) Conditions

Timing Plan: PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	228	828	176	144	865	233	172	41	151	260	51	339
Future Volume (vph)	228	828	176	144	865	233	172	41	151	260	51	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		175	0		100	0		0
Storage Lanes	1		1	1		1	1		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1717	1583	0	1788	1583
Flt Permitted	0.950			0.950			0.950	0.970			0.960	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1717	1583	0	1788	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			189			268			208			365
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		182			750			417			201	
Travel Time (s)		2.8			11.4			11.4			3.0	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)							39%					
Lane Group Flow (vph)	245	890	189	155	930	251	113	116	162	0	335	365
Turn Type	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			Free			3			4
Detector Phase	5	2	2	1	6		3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	24.0	43.0	43.0	21.0	40.0		16.0	16.0	16.0	30.0	30.0	30.0
Total Split (%)	21.8%	39.1%	39.1%	19.1%	36.4%		14.5%	14.5%	14.5%	27.3%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	19.2	39.5	39.5	18.1	38.5	110.0	11.7	11.7	11.7		24.7	24.7
Actuated g/C Ratio	0.17	0.36	0.36	0.16	0.35	1.00	0.11	0.11	0.11		0.22	0.22
v/c Ratio	0.80	0.70	0.27	0.53	0.75	0.16	0.63	0.64	0.46		0.84	0.57
Control Delay	63.0	34.0	4.6	40.3	29.6	0.2	63.7	63.6	6.8		59.6	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	63.0	34.0	4.6	40.3	29.6	0.2	63.7	63.6	6.8		59.6	7.5
LOS	E	C	A	D	C	A	E	E	A		E	A
Approach Delay		35.2			25.4			40.1			32.5	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	166	282	0	110	344	0	81	84	0		223	0
Queue Length 95th (ft)	#283	356	47	170	353	0	#155	#156	30		#360	77
Internal Link Dist (ft)		102			670			337			121	
Turn Bay Length (ft)				300		175			100			
Base Capacity (vph)	321	1288	696	291	1238	1583	185	189	359		422	652
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0		0	0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

No-Build (2020) Conditions
 Timing Plan: PM Peak Hour

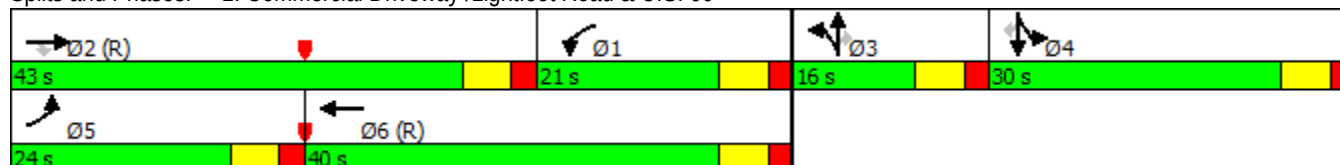
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0		0	0
Reduced v/c Ratio	0.76	0.69	0.27	0.53	0.75	0.16	0.61	0.61	0.45		0.79	0.56

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 104 (95%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 31.7
 Intersection Capacity Utilization 70.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60



Lightfoot Road C-Store - York County, VA
1: Commercial Driveway /Lightfoot Road & U.S. 60

Build (2020) Conditions

Timing Plan: AM Peak Hour

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	45	195	535	128	75	478	144	78	20	88	176	47
Future Volume (vph)	45	195	535	128	75	478	144	78	20	88	176	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	300		175	0		100	0	
Storage Lanes		1		1	1		1	1		1	0	
Taper Length (ft)		100			100			100			100	
Satd. Flow (prot)	0	1770	3539	1583	1770	3539	1583	1681	1718	1583	0	1792
Flt Permitted		0.950			0.950			0.950	0.971			0.962
Satd. Flow (perm)	0	1770	3539	1583	1770	3539	1583	1681	1718	1583	0	1792
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				149			268			208		
Link Speed (mph)			45			45			25			45
Link Distance (ft)			321			666			417			402
Travel Time (s)			4.9			10.1			11.4			6.1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)								38%				
Lane Group Flow (vph)	0	279	622	149	87	556	167	56	58	102	0	260
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA
Protected Phases	5	5	2		1	6		3	3		4	4
Permitted Phases				2			Free			3		
Detector Phase	5	5	2	2	1	6		3	3	3	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0
Total Split (s)	32.0	32.0	49.0	49.0	15.0	32.0		16.0	16.0	16.0	30.0	30.0
Total Split (%)	29.1%	29.1%	44.5%	44.5%	13.6%	29.1%		14.5%	14.5%	14.5%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Min	C-Min	None	C-Min		None	None	None	None	None
Act Effect Green (s)		23.7	52.9	52.9	10.9	37.6	110.0	10.5	10.5	10.5		22.2
Actuated g/C Ratio		0.22	0.48	0.48	0.10	0.34	1.00	0.10	0.10	0.10		0.20
v/c Ratio		0.73	0.37	0.18	0.50	0.46	0.11	0.35	0.36	0.30		0.72
Control Delay		51.7	20.7	3.9	57.1	32.0	0.1	52.2	52.3	2.3		52.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		51.7	20.7	3.9	57.1	32.0	0.1	52.2	52.3	2.3		52.2
LOS		D	C	A	E	C	A	D	D	A		D
Approach Delay			26.6			28.1			28.7			32.4
Approach LOS			C			C			C			C
Queue Length 50th (ft)		183	156	0	58	165	0	38	41	0		171
Queue Length 95th (ft)		251	201	34	107	229	0	77	81	0		239
Internal Link Dist (ft)			241			586			337			322
Turn Bay Length (ft)					300		175			100		
Base Capacity (vph)		450	1703	839	183	1210	1583	183	187	358		423
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

Build (2020) Conditions
 Timing Plan: AM Peak Hour

Lane Group SBR

Land Configurations

Traffic Volume (vph) 179

Future Volume (vph) 179

Ideal Flow (vphpl) 1900

Storage Length (ft) 225

Storage Lanes 1

Taper Length (ft)

Satd. Flow (prot) 1583

Flt Permitted

Satd. Flow (perm) 1583

Right Turn on Red Yes

Satd. Flow (RTOR) 208

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor 0.86

Shared Lane Traffic (%)

Lane Group Flow (vph) 208

Turn Type Perm

Protected Phases

Permitted Phases 4

Detector Phase 4

Switch Phase

Minimum Initial (s) 5.0

Minimum Split (s) 16.0

Total Split (s) 30.0

Total Split (%) 27.3%

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s) -2.0

Total Lost Time (s) 4.0

Lead/Lag Lag

Lead-Lag Optimize? Yes

Recall Mode None

Act Effct Green (s) 22.2

Actuated g/C Ratio 0.20

v/c Ratio 0.43

Control Delay 7.7

Queue Delay 0.0

Total Delay 7.7

LOS A

Approach Delay

Approach LOS

Queue Length 50th (ft) 0

Queue Length 95th (ft) 51

Internal Link Dist (ft)

Turn Bay Length (ft) 225

Base Capacity (vph) 533

Starvation Cap Reductn 0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

Build (2020) Conditions

Timing Plan: AM Peak Hour

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.62	0.37	0.18	0.48	0.46	0.11	0.31	0.31	0.28		0.61

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 28.3

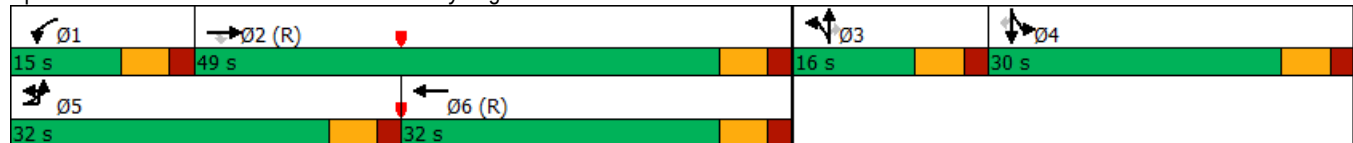
Intersection LOS: C

Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60





Lane Group	SBR
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.39
Intersection Summary	

Lightfoot Road C-Store - York County, VA
1: Commercial Driveway /Lightfoot Road & U.S. 60

Build (2020) Conditions

Timing Plan: PM Peak Hour

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	37	227	805	176	144	874	233	174	41	151	299	53
Future Volume (vph)	37	227	805	176	144	874	233	174	41	151	299	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		325		0	300		175	0		100	0	
Storage Lanes		1		1	1		1	1		1	0	
Taper Length (ft)		100			100			100			100	
Satd. Flow (prot)	0	1770	3539	1583	1770	3539	1583	1681	1717	1583	0	1786
Flt Permitted		0.950			0.950			0.950	0.970			0.959
Satd. Flow (perm)	0	1770	3539	1583	1770	3539	1583	1681	1717	1583	0	1786
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				189			208			162		
Link Speed (mph)			45			45			25			45
Link Distance (ft)			321			666			417			407
Travel Time (s)			4.9			10.1			11.4			6.2
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
Shared Lane Traffic (%)								39%				
Lane Group Flow (vph)	0	284	866	189	155	940	251	114	117	162	0	379
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA
Protected Phases	5	5	2		1	6		3	3		4	4
Permitted Phases				2			Free			3		
Detector Phase	5	5	2	2	1	6		3	3	3	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0
Total Split (s)	27.0	27.0	42.0	42.0	21.0	36.0		20.0	20.0	20.0	27.0	27.0
Total Split (%)	24.5%	24.5%	38.2%	38.2%	19.1%	32.7%		18.2%	18.2%	18.2%	24.5%	24.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Min	C-Min	None	C-Min		None	None	None	None	None
Act Effect Green (s)		21.8	39.6	39.6	15.3	33.1	110.0	13.9	13.9	13.9		25.2
Actuated g/C Ratio		0.20	0.36	0.36	0.14	0.30	1.00	0.13	0.13	0.13		0.23
v/c Ratio		0.81	0.68	0.27	0.63	0.88	0.16	0.54	0.54	0.48		0.93
Control Delay		60.6	33.5	4.7	56.2	48.0	0.2	54.4	54.3	11.6		72.7
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		60.6	33.5	4.7	56.2	48.0	0.2	54.4	54.3	11.6		72.7
LOS		E	C	A	E	D	A	D	D	B		E
Approach Delay			35.2			40.0			36.7			45.1
Approach LOS			D			D			D			D
Queue Length 50th (ft)		190	275	0	103	337	0	80	82	0		266
Queue Length 95th (ft)		#315	350	47	172	#458	0	140	143	60		#470
Internal Link Dist (ft)			241			586			337			327
Turn Bay Length (ft)		325			300		175			100		
Base Capacity (vph)		370	1273	690	273	1066	1583	244	249	368		409
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

Build (2020) Conditions
 Timing Plan: PM Peak Hour

Lane Group SBR

Land Configurations

Traffic Volume (vph) 339

Future Volume (vph) 339

Ideal Flow (vphpl) 1900

Storage Length (ft) 225

Storage Lanes 1

Taper Length (ft)

Satd. Flow (prot) 1583

Flt Permitted

Satd. Flow (perm) 1583

Right Turn on Red Yes

Satd. Flow (RTOR) 272

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor 0.93

Shared Lane Traffic (%)

Lane Group Flow (vph) 365

Turn Type Perm

Protected Phases

Permitted Phases 4

Detector Phase 4

Switch Phase

Minimum Initial (s) 5.0

Minimum Split (s) 16.0

Total Split (s) 27.0

Total Split (%) 24.5%

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s) -2.0

Total Lost Time (s) 4.0

Lead/Lag Lag

Lead-Lag Optimize? Yes

Recall Mode None

Act Effct Green (s) 25.2

Actuated g/C Ratio 0.23

v/c Ratio 0.64

Control Delay 16.4

Queue Delay 0.0

Total Delay 16.4

LOS B

Approach Delay

Approach LOS

Queue Length 50th (ft) 55

Queue Length 95th (ft) 163

Internal Link Dist (ft)

Turn Bay Length (ft) 225

Base Capacity (vph) 572

Starvation Cap Reductn 0

Lightfoot Road C-Store - York County, VA
 1: Commercial Driveway /Lightfoot Road & U.S. 60

Build (2020) Conditions
 Timing Plan: PM Peak Hour

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.77	0.68	0.27	0.57	0.88	0.16	0.47	0.47	0.44		0.93

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 97 (88%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 39.0
 Intersection Capacity Utilization 79.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: D
 ICU Level of Service D

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	42 s	20 s	27 s
 Ø5	 Ø6 (R)		
27 s	36 s		



Lane Group	SBR
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.64
Intersection Summary	

Lightfoot Road C-Store - York County, VA

Build (2020) Conditions with Centerville Signal

1: Commercial Driveway /Lightfoot Road & U.S. 60

Timing Plan: AM Peak Hour

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	45	195	535	128	75	478	144	78	20	88	176	47
Future Volume (vph)	45	195	535	128	75	478	144	78	20	88	176	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	300		175	0		100	0	
Storage Lanes		1		1	1		1	1		1	0	
Taper Length (ft)		100			100			100			100	
Satd. Flow (prot)	0	1770	3539	1583	1770	3539	1583	1681	1718	1583	0	1792
Flt Permitted		0.950			0.950			0.950	0.971			0.962
Satd. Flow (perm)	0	1770	3539	1583	1770	3539	1583	1681	1718	1583	0	1792
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				149			268			208		
Link Speed (mph)			45			45			25			45
Link Distance (ft)			321			732			417			402
Travel Time (s)			4.9			11.1			11.4			6.1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)								38%				
Lane Group Flow (vph)	0	279	622	149	87	556	167	56	58	102	0	260
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA
Protected Phases	5	5	2		1	6		3	3		4	4
Permitted Phases				2			Free			3		
Detector Phase	5	5	2	2	1	6		3	3	3	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0
Total Split (s)	32.0	32.0	49.0	49.0	15.0	32.0		16.0	16.0	16.0	30.0	30.0
Total Split (%)	29.1%	29.1%	44.5%	44.5%	13.6%	29.1%		14.5%	14.5%	14.5%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Min	C-Min	None	C-Min		None	None	None	None	None
Act Effect Green (s)		23.7	44.4	44.4	19.4	37.6	110.0	10.5	10.5	10.5		22.2
Actuated g/C Ratio		0.22	0.40	0.40	0.18	0.34	1.00	0.10	0.10	0.10		0.20
v/c Ratio		0.73	0.44	0.20	0.28	0.46	0.11	0.35	0.36	0.30		0.72
Control Delay		51.7	27.9	5.0	32.4	24.8	0.1	52.2	52.3	2.3		52.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		51.7	27.9	5.0	32.4	24.8	0.1	52.2	52.3	2.3		52.2
LOS		D	C	A	C	C	A	D	D	A		D
Approach Delay			31.0			20.5			28.7			32.4
Approach LOS			C			C			C			C
Queue Length 50th (ft)		183	187	0	37	121	0	38	41	0		171
Queue Length 95th (ft)		251	225	38	69	161	0	77	81	0		239
Internal Link Dist (ft)			241			652			337			322
Turn Bay Length (ft)					300		175			100		
Base Capacity (vph)		450	1636	812	320	1210	1583	183	187	358		423
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0

Lane Group SBR

Lane Configurations	7
Traffic Volume (vph)	179
Future Volume (vph)	179
Ideal Flow (vphpl)	1900
Storage Length (ft)	225
Storage Lanes	1
Taper Length (ft)	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	208
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.86
Shared Lane Traffic (%)	
Lane Group Flow (vph)	208
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Detector Phase	4
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	16.0
Total Split (s)	30.0
Total Split (%)	27.3%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	-2.0
Total Lost Time (s)	4.0
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	22.2
Actuated g/C Ratio	0.20
v/c Ratio	0.43
Control Delay	7.7
Queue Delay	0.0
Total Delay	7.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	51
Internal Link Dist (ft)	
Turn Bay Length (ft)	225
Base Capacity (vph)	533
Starvation Cap Reductn	0

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.62	0.38	0.18	0.27	0.46	0.11	0.31	0.31	0.28		0.61

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 85 (77%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 27.7

Intersection Capacity Utilization 55.4%

Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service B

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60

 Ø2 (R)	 Ø1	 Ø3	 Ø4
49 s	15 s	16 s	30 s
 Ø5	 Ø6 (R)		
32 s	32 s		



Lane Group	SBR
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.39
Intersection Summary	

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	37	227	805	176	144	874	233	174	41	151	299	53
Future Volume (vph)	37	227	805	176	144	874	233	174	41	151	299	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		325		0	300		175	0		100	0	
Storage Lanes		1		1	1		1	1		1	0	
Taper Length (ft)		100			100			100			100	
Satd. Flow (prot)	0	1770	3539	1583	1770	3539	1583	1681	1717	1583	0	1786
Flt Permitted		0.950			0.950			0.950	0.970			0.959
Satd. Flow (perm)	0	1770	3539	1583	1770	3539	1583	1681	1717	1583	0	1786
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				189			268			208		
Link Speed (mph)			45			45			25			45
Link Distance (ft)			321			679			417			407
Travel Time (s)			4.9			10.3			11.4			6.2
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
Shared Lane Traffic (%)								39%				
Lane Group Flow (vph)	0	284	866	189	155	940	251	114	117	162	0	379
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Free	Split	NA	Perm	Split	NA
Protected Phases	5	5	2		1	6		3	3		4	4
Permitted Phases				2			Free			3		
Detector Phase	5	5	2	2	1	6		3	3	3	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	16.0		16.0	16.0	16.0	16.0	16.0
Total Split (s)	27.0	27.0	44.0	44.0	20.0	37.0		16.0	16.0	16.0	30.0	30.0
Total Split (%)	24.5%	24.5%	40.0%	40.0%	18.2%	33.6%		14.5%	14.5%	14.5%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Min	C-Min	None	C-Min		None	None	None	None	None
Act Effect Green (s)		21.8	38.1	38.1	18.7	35.0	110.0	11.6	11.6	11.6		25.6
Actuated g/C Ratio		0.20	0.35	0.35	0.17	0.32	1.00	0.11	0.11	0.11		0.23
v/c Ratio		0.81	0.71	0.28	0.52	0.84	0.16	0.64	0.65	0.46		0.91
Control Delay		60.6	34.6	4.6	37.0	33.2	0.2	64.5	64.3	6.9		68.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		60.6	34.6	4.6	37.0	33.2	0.2	64.5	64.3	6.9		68.8
LOS		E	C	A	D	C	A	E	E	A		E
Approach Delay			35.9			27.5			40.7			39.2
Approach LOS			D			C			D			D
Queue Length 50th (ft)		190	272	0	108	350	0	82	84	0		261
Queue Length 95th (ft)		#315	339	46	152	#428	0	#156	#160	30		#434
Internal Link Dist (ft)			241			599			337			327
Turn Bay Length (ft)		325			300		175			100		
Base Capacity (vph)		370	1286	695	300	1125	1583	183	187	358		422
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0

Lane Group SBR

Land Configurations

Traffic Volume (vph) 339

Future Volume (vph) 339

Ideal Flow (vphpl) 1900

Storage Length (ft) 225

Storage Lanes 1

Taper Length (ft)

Satd. Flow (prot) 1583

Flt Permitted

Satd. Flow (perm) 1583

Right Turn on Red Yes

Satd. Flow (RTOR) 348

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor 0.93

Shared Lane Traffic (%)

Lane Group Flow (vph) 365

Turn Type Perm

Protected Phases

Permitted Phases 4

Detector Phase 4

Switch Phase

Minimum Initial (s) 5.0

Minimum Split (s) 16.0

Total Split (s) 30.0

Total Split (%) 27.3%

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s) -2.0

Total Lost Time (s) 4.0

Lead/Lag Lag

Lead-Lag Optimize? Yes

Recall Mode None

Act Effect Green (s) 25.6

Actuated g/C Ratio 0.23

v/c Ratio 0.57

Control Delay 8.6

Queue Delay 0.0

Total Delay 8.6

LOS A

Approach Delay

Approach LOS

Queue Length 50th (ft) 9

Queue Length 95th (ft) 91

Internal Link Dist (ft)

Turn Bay Length (ft) 225

Base Capacity (vph) 639

Starvation Cap Reductn 0

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.77	0.67	0.27	0.52	0.84	0.16	0.62	0.63	0.45		0.90

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 3 (3%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 34.1

Intersection LOS: C

Intersection Capacity Utilization 79.0%

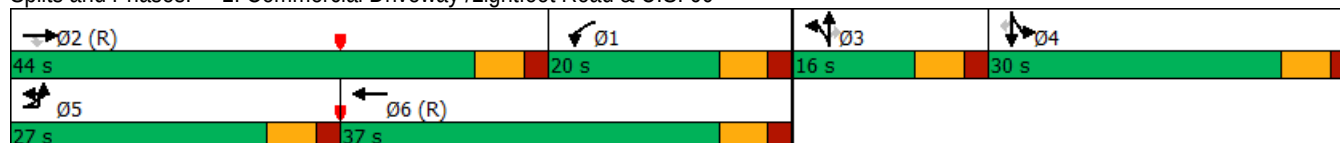
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Commercial Driveway /Lightfoot Road & U.S. 60





Lane Group	SBR
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.57
Intersection Summary	
