

Memorandum

TO: Chuck Proctor **DATE:** July 24, 2022

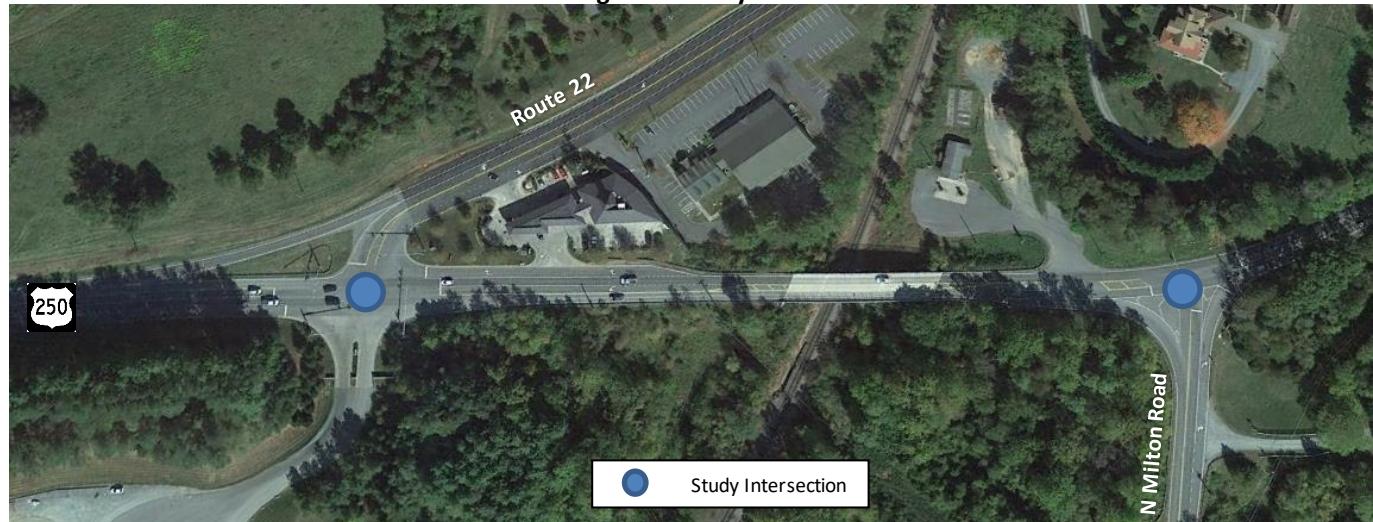
FROM: Zach Harris, P.E. **SUBJECT:** Project Pipeline – Shadwell Results Memo

The purpose of this memorandum is to document the results of the traffic analyses conducted at the intersections of US 250 with Route 22 and N Milton Road in Shadwell. This memo documents the existing and future conditions, alternatives analysis, and the recommendation. This analysis was performed as part of the VDOT Project Pipeline process.

Study Area

The study area, presented in Figure 1, includes the intersections of US 250 with Route 22 and N Milton Road in Shadwell, Virginia.

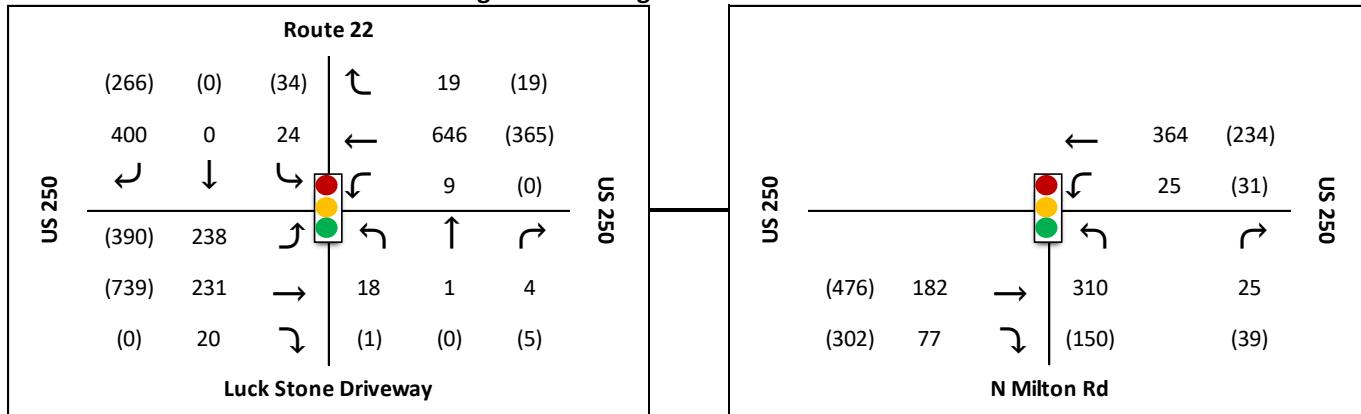
Figure 1: Study Area



Existing Conditions

Traffic counts were collected at the study intersections in August, 2021. Figure 2 shows the turn movements collected for the AM and PM peak hours. The AM peak hour was determined to be between 7:15 and 8:15 AM, the PM peak hour was determined to be between 4:45 and 5:45 PM.

Figure 2: Existing Turn Movement Counts



Crash data were collected for the years 2015-2019 and are presented in Figure 3. The most prevalent crash type at the study intersections is rear-end crashes, which are common in locations with high delays and stop-and-go traffic. These intersections were identified to as very high safety improvement priorities in the VTRANS mid-term needs evaluation.

Figure 3: Crashes (2015-2019)



Future Conditions

The existing turning movement counts were grown between 2022 and 2045 using a 1% global growth rate as discussed with VDOT Culpeper District Planning on November 8, 2021. This growth rate was developed using the historical VDOT Average Annual Daily Traffic. This data can be found attached to this memo. The resulting 2045 turning movement volumes are presented in Figure 4.

Figure 4: 2045 Turning Movement Counts

Route 22								
(330)	(0)	(43)	↑	56	(24)			
587	0	55	←	866	(453)			
↪	↓	↪	↪	20	(0)	US 250		
(633)	296	↑	↪	↑	↪			
(1103)	287	→	11	1	2	US 250		
(2)	25	↓	(4)	(2)	(7)		←	452 (291)
Luck Stone Driveway						N Milton Rd		

Figure 5: US 250 and Route 22 Build Alternative – Displaced Left Turn



Table 1: US 250 and Route 22 Build Alternative – LOS and Delay

Intersection	Scenario	Control	Overall LOS (Delay)	LOS and Delay per Lane Group by Approach (sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak															
US 250 (Richmond Road) & Route 22 (Louisa Road)	Existing Conditions	Signal	C (22.5)	B (17.2)	B (10.5)	A (8.8)	B (14.8)	C (26.8)	B (15.5)	E (62.7)	E (62.7)	E (62.7)	E (58.5)	E (58.5)	E (58.5)
	2045 No Build		F (100.0)	B (13.7)			C (26.3)			E (62.7)			E (58.5)		
	2045 Build			D (36.3)	B (12.2)	A (9.8)	C (24.8)	F (163.7)	C (22.7)	E (63.4)	E (63.4)	E (63.4)	E (57.1)	E (57.1)	E (57.1)
	Partial Displaced Left Turn	Signal	C (27.8)	C (23.8)			F (152.3)			E (63.4)			E (57.1)		
	2045 Build		C (27.8)	D (43.3)	B (12.8)	B (10.3)	A (5.7)	D (44.0)	A (5.6)	E (60.3)	E (60.3)	E (60.3)	E (62.5)	A (0.0)	E (67.1)
	Partial Displaced Left Turn			C (27.5)			D (40.9)			E (60.3)			E (66.7)		
PM Peak															
	Existing Conditions	Signal	B (18.0)	B (10.5)	B (10.9)	B (10.9)	E (64.5)	E (64.5)	E (64.5)	B (10.5)	B (10.9)	B (10.9)	D (35.5)	D (35.5)	B (16.6)
	2045 No Build		D (53.4)	B (10.8)			E (64.5)			B (10.8)			C (34.5)		
	2045 Build			D (40.1)	C (22.2)	A (5.5)	A (0.0)	F (146.4)	D (38.7)	E (63.6)	E (63.6)	E (63.6)	E (76.9)	E (76.9)	E (76.9)
	Partial Displaced Left Turn	Signal	C (21.0)	C (28.7)			F (141.1)			E (63.6)			E (76.9)		
	2045 Build		C (21.0)	C (28.5)	C (25.6)	A (6.0)	A (0.0)	D (39.5)	A (5.2)	D (53.5)	D (53.5)	D (53.5)	D (53.4)	A (0.0)	B (14.9)
	Partial Displaced Left Turn			C (26.6)			D (37.8)			D (53.5)			B (19.3)		

Table 2: US 250 and Route 22– 95% Queue Lengths

Intersection	Scenario	Queue Length 95th (LF)												
		Eastbound			Westbound			Northbound			Southbound			
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak Hour														
US 250 & Route 22	Existing	175	172	0	10	683	0	43			49			
	Future No Build	467	223	0	11	1089	0	32			86			
	Future Build	275	209	0	15	679	0	32			91		663	
	PM Peak Hour													
	Existing	227	541	0	0	433	0	0			65			
	Future No Build	870	1274	0	0	626	0	27			78			
	Future Build	430	1150	0	0	226	0	25			71		129	

As shown in Table 1, the displaced left turn (DLT) alternative significantly reduces delay through the intersection during both peak hours, particularly for the westbound through movement. As shown in Table 2, the queue lengths for the westbound through movement are also expected to decrease significantly for both peak hours, as well as the eastbound left-turn queue length.

It is important to note that although the eastbound through lane has a queue length of 1150' in the AM peak hour Build scenario, the queue will not block the entrance to the left-turn lane at the crossover intersection. The LOS for this movement will also be maintained when compared to the No-Build scenario.

The anticipated queue lengths on US 250 for the 2045 Build Alternatives (including the proposed roundabout at the intersection of US 250 and N Milton Road) are presented in Figure 7 and Figure 8, for the AM and PM peak hours, respectively. As shown in Figure 7, the queue length for the westbound movement at the intersection of US 250 and Route 22 does not extend into the roundabout.

Analyses were also conducted for the intersection of US 250 and N Milton Road. The existing condition scenario and future No-Build alternative were both analyzed using Synchro software. SIDRA Intersection 8.0 software was used to analyze the roundabout Build alternative, as required by the VDOT TOSAM. The Build Alternative is presented in Figure 6. The Level of Service (LOS) and Delay (seconds per vehicle) for the three (3) scenarios are presented in Table 3. The queue length analysis results are presented in Table 4.

Figure 6: US 250 and N Milton Road Build Alternative – Roundabout



Table 3: US 250 and N Milton Road Build Alternative – LOS and Delay

Intersection	AM Peak Hour Scenario	Control	Overall LOS (Delay)	LOS and Delay per Lane Group by Approach (sec/veh)												
				Eastbound			Westbound			Northbound			Southbound			
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak																
US 250 (Richmond Road) & North Milton Road	Existing Conditons		Signal	C (30.1)	--	C (22.2)	D (41.9)	E (58.9)	B (10.7)	--	D (52.0)	--	D (35.3)	--	--	
					C (28.1)			B (13.8)			D (50.8)			---		
	2045 No Build		Signal	D (46.4)	--	D (41.7)	F (114.0)	E (60.6)	B (19.7)	--	D (47.0)	--	C (26.4)	--	--	
					E (79.3)			C (28.1)			D (44.9)			---		
	2045 Build	Roundabout	None	B (13.0)	--	A (5.5)	A (5.4)	C (24.2)	B (17.5)	--	B (12.2)	--	A (6.4)	--	--	
					5.6			25.8			11.9			---		
	PM Peak															
	Existing Conditons		Signal	B (17.6)	--	A (9.5)	A (7.6)	E (65.1)	A (5.4)	--	E (61.7)	--	D (48.4)	--	--	
					A (8.7)			B (12.3)			E (59.0)			---		
	2045 No Build		Signal	C (20.3)	A (0.0)	B (14.6)	B (14.7)	E (62.1)	A (6.3)	A (0.0)	E (61.5)	A (0.0)	D (46.7)	--	--	
					B (14.6)			B (12.9)			E (57.4)			---		
	2045 Build	Roundabout	None	A (6.7)	--	A (5.1)	A (4.9)	B (11.8)	A (6.2)	--	B (16.0)	--	B (10.2)	--	--	
					5.0			7.2			15.6			---		

Table 4: US 250 and N Milton Road Build Alternative – Queue Lengths

Intersection	Scenario	Queue Length 95th (LF)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
US 250 & North Milton Road	Existing	-	235	77	49	224	-	312	-	21	-	-	-
	Future No Build	-	219	140	179	380	-	445	-	26	-	-	-
	Future Build	-	20	22	299	299	-	113	-	113	-	-	-
	PM Peak Hour												
	Existing	-	182	71	67	85	-	195	-	33	-	-	-
	Future No Build	-	309	208	72	138	-	233	-	35	-	-	-
	Future Build	-	83	71	58	58	-	63	-	63	-	-	-

As shown in Table 3, the roundabout Build alternative significantly reduces delay for the intersection, particularly for the eastbound movements during the AM peak hour and the westbound movements during the PM peak hour. As shown in Table 4, the queue lengths are also reduced significantly, particularly for the eastbound and westbound through movements during both peak hours. The anticipated queue lengths for the 2045 Build Alternative (including the proposed DLT at the intersection of US 250 and Route 22) are presented in Figures 7 and 8 for the AM and PM peak hours, respectively.

Figure 7: 2045 AM Peak Hour 95th Percentile Queue Lengths

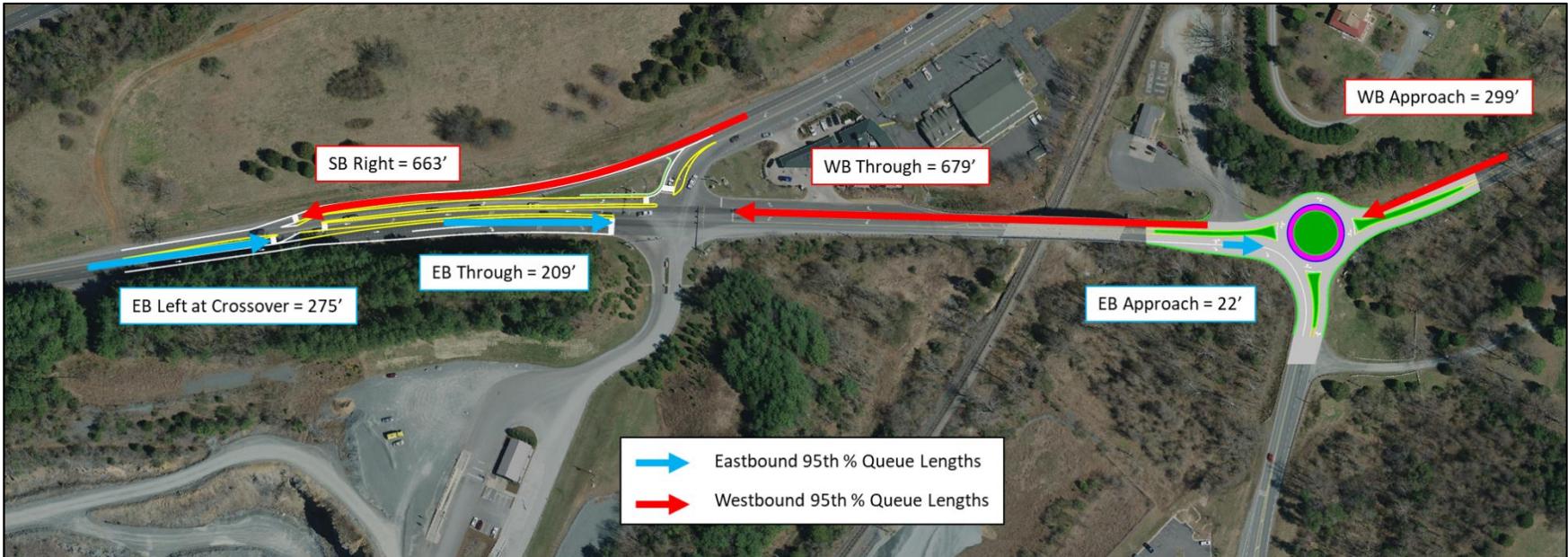
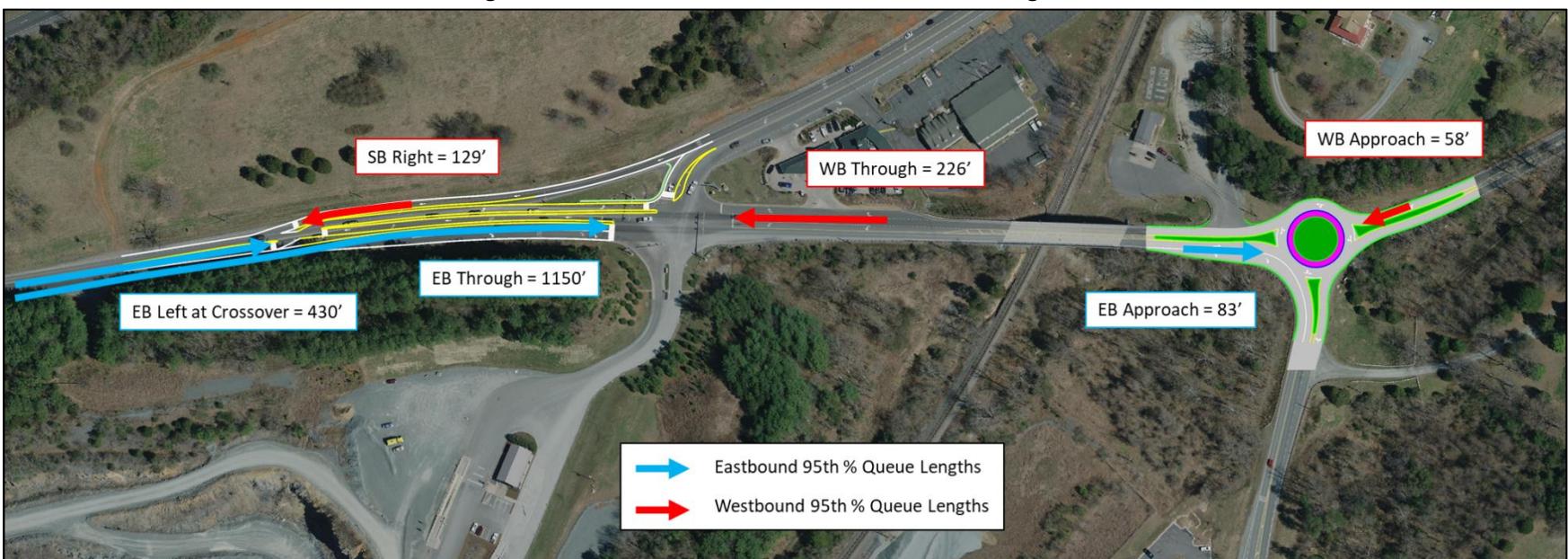


Figure 8: 2045 PM Peak Hour 95th Percentile Queue Lengths



Alternatives Analysis

The identified mid-term VTRANS needs for the segment of US 250 that includes the study intersections are listed below:

- Congestion Mitigation
- Improve Safety
- Improve Reliability

VJuST was used to screen preliminary improvement concepts for controlling peak hour (the PM peak hour). The volume-to-capacity (V/C) ratio and conflict points were used to evaluate operations and safety, respectively. Lower numbers are better for either metric. Table 5 summarizes the preliminary VJuST results.

Table 5: VJuST Results

US 250 and Route 22				
Type	Dir	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points
Conventional	-	0.52	[dotted pattern]	48
Partial Displaced Left Turn	-	0.49	-	44
Roundabout	-	0.86		8
Two-Way Stop Control	-	0.88		48

US 250 and N Milton Road				
Type	Dir	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points
Conventional	-	0.42	[dotted pattern]	48
Thru-Cut	-	0.42		28
Roundabout	-	0.59		8
Two-Way Stop Control	-	0.42		48

Community Feedback

Community feedback was taken between February 1 and February 18, 2022. A total of 267 responses were submitted. Public feedback for the DLT at the intersection of US 250 and Route 22 was almost split, with an average score of 2.96 out of 5 for the no-build condition and an average score of 2.45 out of 5 for the DLT. Public feedback for the roundabout at the intersection of US 250 and Route N Milton Road was favorable, with an average score of 2.57 out of 5 for the no-build condition and an average score of 3.53 out of 5 for the roundabout.

Attachments

1. 2022 Turn Movement Volumes
2. Future growth rate data
3. VJuST Results
4. Analysis Results Output
5. Public Survey Feedback

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd AM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	
06:00 AM	14	4	0	0	18	1	32	0	33	24	1	0	25	76
06:15 AM	17	6	0	0	23	0	39	0	39	43	9	0	52	114
06:30 AM	11	9	0	0	20	0	42	0	42	71	2	0	73	135
06:45 AM	25	7	0	0	32	4	46	0	50	66	4	0	70	152
Total	67	26	0	0	93	5	159	0	164	204	16	0	220	477
07:00 AM	24	14	0	0	38	4	71	0	75	66	3	0	69	182
07:15 AM	32	17	0	0	49	14	79	0	93	93	7	0	100	242
07:30 AM	33	20	0	0	53	3	93	0	96	82	8	0	90	239
07:45 AM	49	14	0	0	63	3	87	0	90	66	7	0	73	226
Total	138	65	0	0	203	24	330	0	354	307	25	0	332	889
08:00 AM	46	20	0	0	66	2	94	0	96	65	3	0	68	230
08:15 AM	46	36	0	0	82	20	63	0	83	70	4	0	74	239
08:30 AM	45	37	0	0	82	6	76	0	82	72	19	0	91	255
08:45 AM	59	32	0	0	91	6	66	0	72	57	6	0	63	226
Total	196	125	0	0	321	34	299	0	333	264	32	0	296	950
Grand Total	401	216	0	0	617	63	788	0	851	775	73	0	848	2316
Apprch %	65	35	0	0		7.4	92.6	0		91.4	8.6	0		
Total %	17.3	9.3	0	0	26.6	2.7	34	0	36.7	33.5	3.2	0	36.6	

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total				
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:45 AM														
07:45 AM	49	14	0	63	3	87	90	66	7	73			226	
08:00 AM	46	20	0	66	2	94	96	65	3	68			230	
08:15 AM	46	36	0	82	20	63	83	70	4	74			239	
08:30 AM	45	37	0	82	6	76	82	72	19	91			255	
Total Volume	186	107	0	293	31	320	351	273	33	306			950	
% App. Total	63.5	36.5	0		8.8	91.2		89.2	10.8					
PHF	.949	.723	0	.893	.388	.851	.914	.948	.434	.841			.931	

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd AM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Trucks

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	
06:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	1
06:15 AM	3	0	0	0	3	0	2	0	2	0	0	0	0	5
06:30 AM	0	0	0	0	0	0	4	0	4	0	0	0	0	4
06:45 AM	1	1	0	0	2	0	1	0	1	6	1	0	7	10
Total	4	2	0	0	6	0	7	0	7	6	1	0	7	20
07:00 AM	0	0	0	0	0	0	4	0	4	2	0	0	2	6
07:15 AM	1	3	0	0	4	0	0	0	0	2	0	0	2	6
07:30 AM	6	2	0	0	8	0	8	0	8	1	0	0	1	17
07:45 AM	5	1	0	0	6	2	1	0	3	1	0	0	1	10
Total	12	6	0	0	18	2	13	0	15	6	0	0	6	39
08:00 AM	2	0	0	2	2	1	2	0	3	0	0	0	0	5
08:15 AM	3	0	0	0	3	2	1	0	3	1	1	0	2	8
08:30 AM	5	0	0	0	5	0	1	0	1	2	0	0	2	8
08:45 AM	3	8	0	0	11	0	2	0	2	3	1	0	4	17
Total	13	8	0	0	21	3	6	0	9	6	2	0	8	38
Grand Total	29	16	0	45	5	26	0	31	18	3	0	21	97	
Apprch %	64.4	35.6	0		16.1	83.9	0		85.7	14.3	0			
Total %	29.9	16.5	0	46.4	5.2	26.8	0	32	18.6	3.1	0	21.6		

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total
	Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total			
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	6	2	8		0	8	8	1	0	1			17
07:45 AM	5	1	6		2	1	3	1	0	1			10
08:00 AM	2	0	2		1	2	3	0	0	0			5
08:15 AM	3	0	3		2	1	3	1	1	2			8
Total Volume	16	3	19		5	12	17	3	1	4			40
% App. Total	84.2	15.8			29.4	70.6		75	25				
PHF	.667	.375	.594		.625	.375	.531	.750	.250	.500			.588

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd AM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars - Trucks

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	
06:00 AM	14	5	0	19		1	32	0	33	24	1	0	25	77
06:15 AM	20	6	0	26		0	41	0	41	43	9	0	52	119
06:30 AM	11	9	0	20		0	46	0	46	71	2	0	73	139
06:45 AM	26	8	0	34		4	47	0	51	72	5	0	77	162
Total	71	28	0	99		5	166	0	171	210	17	0	227	497
07:00 AM	24	14	0	38		4	75	0	79	68	3	0	71	188
07:15 AM	33	20	0	53		14	79	0	93	95	7	0	102	248
07:30 AM	39	22	0	61		3	101	0	104	83	8	0	91	256
07:45 AM	54	15	0	69		5	88	0	93	67	7	0	74	236
Total	150	71	0	221		26	343	0	369	313	25	0	338	928
08:00 AM	48	20	0	68		3	96	0	99	65	3	0	68	235
08:15 AM	49	36	0	85		22	64	0	86	71	5	0	76	247
08:30 AM	50	37	0	87		6	77	0	83	74	19	0	93	263
08:45 AM	62	40	0	102		6	68	0	74	60	7	0	67	243
Total	209	133	0	342		37	305	0	342	270	34	0	304	988
Grand Total	430	232	0	662		68	814	0	882	793	76	0	869	2413
Apprch %	65	35	0			7.7	92.3	0		91.3	8.7	0		
Total %	17.8	9.6	0	27.4		2.8	33.7	0	36.6	32.9	3.1	0	36	
Cars	401	216	0	617		63	788	0	851	775	73	0	848	2316
% Cars	93.3	93.1	0	93.2		92.6	96.8	0	96.5	97.7	96.1	0	97.6	96
Trucks	29	16	0	45		5	26	0	31	18	3	0	21	97
% Trucks	6.7	6.9	0	6.8		7.4	3.2	0	3.5	2.3	3.9	0	2.4	4

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total				
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 08:00 AM														
08:00 AM	48	20	68		3	96	99		65	3	68		235	
08:15 AM	49	36	85		22	64	86		71	5	76		247	
08:30 AM	50	37	87		6	77	83		74	19	93		263	
08:45 AM	62	40	102		6	68	74		60	7	67		243	
Total Volume	209	133	342		37	305	342		270	34	304		988	
% App. Total	61.1	38.9		10.8		89.2			88.8	11.2				
PHF	.843	.831	.838		.420	.794	.864		.912	.447	.817		.939	

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd AM
Site Code :
Start Date : 8/10/2021
Page No : 1

Groups Printed- Pedestrians

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd PM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	
04:00 PM	93	53	0	0	146	6	64	0	70	26	5	0	31	247
04:15 PM	95	50	0	0	145	10	51	0	61	35	4	0	39	245
04:30 PM	92	65	0	0	157	5	71	0	76	35	7	0	42	275
04:45 PM	114	71	0	0	185	13	49	0	62	44	8	0	52	299
Total	394	239	0	0	633	34	235	0	269	140	24	0	164	1066
05:00 PM	131	69	0	0	200	6	61	0	67	39	11	0	50	317
05:15 PM	118	85	0	0	203	7	50	0	57	29	12	0	41	301
05:30 PM	96	81	0	0	177	9	40	0	49	33	5	0	38	264
05:45 PM	101	66	0	0	167	5	54	0	59	34	7	0	41	267
Total	446	301	0	0	747	27	205	0	232	135	35	0	170	1149
06:00 PM	95	60	0	0	155	5	39	0	44	28	9	0	37	236
06:15 PM	69	63	0	0	132	5	43	0	48	21	3	0	24	204
06:30 PM	74	58	0	0	132	5	28	0	33	20	4	0	24	189
06:45 PM	63	47	0	0	110	4	28	0	32	14	1	0	15	157
Total	301	228	0	0	529	19	138	0	157	83	17	0	100	786
Grand Total	1141	768	0	0	1909	80	578	0	658	358	76	0	434	3001
Apprch %	59.8	40.2	0	0		12.2	87.8	0		82.5	17.5	0		
Total %	38	25.6	0	0	63.6	2.7	19.3	0	21.9	11.9	2.5	0	14.5	

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total				
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:30 PM														
04:30 PM	92	65	0	157	5	71	76	35	7	42			275	
04:45 PM	114	71	0	185	13	49	62	44	8	52			299	
05:00 PM	131	69	0	200	6	61	67	39	11	50			317	
05:15 PM	118	85	0	203	7	50	57	29	12	41			301	
Total Volume	455	290	0	745	31	231	262	147	38	185			1192	
% App. Total	61.1	38.9	0		11.8	88.2		79.5	20.5					
PHF	.868	.853	0	.917	.596	.813	.862	.835	.792	.889			.940	

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd PM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Trucks

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	
04:00 PM	0	0	0	0	0	0	2	0	2	2	0	0	2	4
04:15 PM	5	3	0	8	0	0	2	0	2	2	0	0	2	12
04:30 PM	1	1	0	2	0	0	2	0	2	1	0	0	1	5
04:45 PM	1	0	0	1	0	0	0	0	0	1	0	0	1	2
Total	7	4	0	11	0	6	0	6	6	6	0	0	6	23
05:00 PM	2	2	0	4	0	0	0	0	0	1	1	0	2	6
05:15 PM	0	0	0	0	0	0	1	0	1	1	0	0	1	2
05:30 PM	1	0	0	1	0	2	0	2	2	0	0	0	0	3
05:45 PM	1	1	0	2	0	1	0	1	1	1	0	0	1	4
Total	4	3	0	7	0	4	0	4	3	1	0	0	4	15
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	1	0	0	1	0	1	0	1	1	0	0	0	0	2
06:30 PM	0	0	0	0	0	0	1	0	1	1	0	0	1	2
06:45 PM	1	0	0	1	0	0	0	0	0	1	0	0	1	2
Total	2	0	0	2	0	2	0	2	2	0	0	0	2	6
Grand Total	13	7	0	20	0	12	0	12	11	1	0	12	44	
Apprch %	65	35	0		0	100	0		91.7	8.3	0			
Total %	29.5	15.9	0	45.5	0	27.3	0	27.3	25	2.3	0	27.3		

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total
	Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total			
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM	04:15 PM	5	3	8	0	2	2	2	0	2	1	0	12
	04:30 PM	1	1	2	0	2	2	1	0	1	0	1	5
	04:45 PM	1	0	1	0	0	0	1	0	1	0	1	2
	05:00 PM	2	2	4	0	0	0	1	1	1	2	2	6
Total Volume		9	6	15	0	4	4	5	1	6			25
% App. Total		60	40		0	100	0	83.3	16.7				
PHF		.450	.500	.469	.000	.500	.500	.625	.250	.750			.521

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd PM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars - Trucks

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	
04:00 PM	93	53	0	146		6	66	0	72	28	5	0	33	251
04:15 PM	100	53	0	153		10	53	0	63	37	4	0	41	257
04:30 PM	93	66	0	159		5	73	0	78	36	7	0	43	280
04:45 PM	115	71	0	186		13	49	0	62	45	8	0	53	301
Total	401	243	0	644		34	241	0	275	146	24	0	170	1089
05:00 PM	133	71	0	204		6	61	0	67	40	12	0	52	323
05:15 PM	118	85	0	203		7	51	0	58	30	12	0	42	303
05:30 PM	97	81	0	178		9	42	0	51	33	5	0	38	267
05:45 PM	102	67	0	169		5	55	0	60	35	7	0	42	271
Total	450	304	0	754		27	209	0	236	138	36	0	174	1164
06:00 PM	95	60	0	155		5	39	0	44	28	9	0	37	236
06:15 PM	70	63	0	133		5	44	0	49	21	3	0	24	206
06:30 PM	74	58	0	132		5	29	0	34	21	4	0	25	191
06:45 PM	64	47	0	111		4	28	0	32	15	1	0	16	159
Total	303	228	0	531		19	140	0	159	85	17	0	102	792
Grand Total	1154	775	0	1929		80	590	0	670	369	77	0	446	3045
Apprch %	59.8	40.2	0			11.9	88.1	0		82.7	17.3	0		
Total %	37.9	25.5	0	63.3		2.6	19.4	0	22	12.1	2.5	0	14.6	
Cars	1141	768	0	1909		80	578	0	658	358	76	0	434	3001
% Cars	98.9	99.1	0	99		100	98	0	98.2	97	98.7	0	97.3	98.6
Trucks	13	7	0	20		0	12	0	12	11	1	0	12	44
% Trucks	1.1	0.9	0	1		0	2	0	1.8	3	1.3	0	2.7	1.4

	Richmond Rd Eastbound				Richmond Rd Westbound				N Milton Rd Northbound				Int. Total	
	Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total				
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:30 PM														
04:30 PM	93	66	159		5	73	78		36	7	43		280	
04:45 PM	115	71	186		13	49	62		45	8	53		301	
05:00 PM	133	71	204		6	61	67		40	12	52		323	
05:15 PM	118	85	203		7	51	58		30	12	42		303	
Total Volume	459	293	752		31	234	265		151	39	190		1207	
% App. Total	61	39			11.7	88.3			79.5	20.5				
PHF	.863	.862	.922		.596	.801	.849		.839	.813	.896		.934	

Peggy Malone & Associates
(888) 247-8602

File Name : 23-Richmond Rd and N Milton Rd PM
Site Code :
Start Date : 8/10/2021
Page No : 1

Groups Printed- Pedestrians

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd AM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					
	Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total
06:00 AM	15	16	1	0	32	0	47	2	0	49	0	0	0	0	0	3	0	35	0	38	119
06:15 AM	24	19	0	0	43	1	81	3	0	85	0	0	0	0	0	6	0	49	0	55	183
06:30 AM	45	18	0	0	63	1	102	1	0	104	0	0	0	0	0	3	0	81	0	84	251
06:45 AM	58	32	0	0	90	2	101	8	0	111	0	0	0	0	0	2	0	73	0	75	276
Total	142	85	1	0	228	4	331	14	0	349	0	0	0	0	0	14	0	238	0	252	829
07:00 AM	40	29	1	0	70	1	132	3	0	136	0	0	1	0	1	7	1	84	0	92	299
07:15 AM	63	45	0	0	108	0	155	6	0	161	1	0	0	0	1	6	0	95	0	101	371
07:30 AM	50	40	1	1	92	0	166	8	0	174	0	1	0	0	1	7	0	117	0	124	391
07:45 AM	50	69	2	0	121	2	139	1	0	142	0	0	0	0	0	7	0	86	0	93	356
Total	203	183	4	1	391	3	592	18	0	613	1	1	1	0	3	27	1	382	0	410	1417
08:00 AM	62	60	0	0	122	0	143	4	0	147	1	0	1	0	2	4	0	90	0	94	365
08:15 AM	53	66	1	0	120	1	129	5	0	135	0	0	0	0	0	11	0	63	0	74	329
08:30 AM	41	84	2	0	127	0	131	6	0	137	1	0	0	0	1	11	0	85	0	96	361
08:45 AM	60	78	0	0	138	1	123	6	0	130	2	1	0	0	3	7	0	68	0	75	346
Total	216	288	3	0	507	2	526	21	0	549	4	1	1	0	6	33	0	306	0	339	1401
Grand Total	561	556	8	1	1126	9	1449	53	0	1511	5	2	2	0	9	74	1	926	0	1001	3647
Apprch %	49.8	49.4	0.7	0.1		0.6	95.9	3.5	0	1511	55.6	22.2	22.2	0	7.4	0.1	92.5	0			
Total %	15.4	15.2	0.2	0	30.9	0.2	39.7	1.5	0	41.4	0.1	0.1	0.1	0	0.2	2	0	25.4	0	27.4	

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound				
	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 06:00 AM to 08:45 AM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 07:15 AM																				
07:15 AM	63	45	0	108		0	155	6	161	1	0	0	1	6	0	95	101			371
07:30 AM	50	40	1	91		0	166	8	174	0	1	0	1	7	0	117	124			390
07:45 AM	50	69	2	121		2	139	1	142	0	0	0	0	7	0	86	93			356
08:00 AM	62	60	0	122		0	143	4	147	1	0	1	2	4	0	90	94			365
Total Volume	225	214	3	442		2	603	19	624	2	1	1	4	24	0	388	412			1482
% App. Total	50.9	48.4	0.7			0.3	96.6	3		50	25	25		5.8	0	94.2				
PHF	.893	.775	.375	.906		.250	.908	.594	.897	.500	.250	.250	.500	.857	.000	.829	.831			.950

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd AM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Trucks

Start Time	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4	
06:15 AM	2	2	2	0	6	0	2	0	0	2	0	0	0	0	0	0	0	0	0	8	
06:30 AM	3	0	0	0	3	0	4	1	0	5	0	0	0	0	0	0	1	0	1	9	
06:45 AM	4	2	2	0	8	4	4	0	0	8	0	0	0	0	0	0	0	3	0	19	
Total	10	6	4	0	20	4	10	1	0	15	0	0	0	0	0	0	0	5	0	40	
07:00 AM	3	0	0	0	3	3	2	0	0	5	2	0	0	0	2	0	1	2	0	3	13
07:15 AM	2	4	4	0	10	1	1	0	0	2	4	0	1	0	5	0	0	5	0	5	22
07:30 AM	5	5	3	0	13	4	4	0	0	8	3	0	2	0	5	0	0	5	0	5	31
07:45 AM	2	6	4	0	12	0	1	0	0	1	6	0	0	0	6	0	0	2	0	2	21
Total	12	15	11	0	38	8	8	0	0	16	15	0	3	0	18	0	1	14	0	15	87
08:00 AM	4	2	6	0	12	2	2	0	0	4	3	0	0	0	3	0	0	0	0	0	19
08:15 AM	6	3	5	0	14	0	1	0	0	1	5	1	0	0	6	0	0	3	0	3	24
08:30 AM	3	4	5	0	12	2	1	0	0	3	9	0	0	0	9	1	0	6	0	7	31
08:45 AM	9	8	2	0	19	2	3	0	0	5	4	0	2	0	6	1	0	3	0	4	34
Total	22	17	18	0	57	6	7	0	0	13	21	1	2	0	24	2	0	12	0	14	108
Grand Total	44	38	33	0	115	18	25	1	0	44	36	1	5	0	42	2	1	31	0	34	235
Apprch %	38.3	33	28.7	0	40.9	56.8	2.3	0	85.7	2.4	11.9	0	5.9	2.9	91.2	0					
Total %	18.7	16.2	14	0	48.9	7.7	10.6	0.4	0	18.7	15.3	0.4	2.1	0	17.9	0.9	0.4	13.2	0	14.5	

Start Time	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	4	2	6	12		2	2	0	4		3	0	0	3		0	0	0	0		19
08:15 AM	6	3	5	14		0	1	0	1		5	1	0	6		0	0	3	0		24
08:30 AM	3	4	5	12		2	1	0	3		9	0	0	9		1	0	6	7		31
08:45 AM	9	8	2	19		2	3	0	5		4	0	2	6		1	0	3	4		34
Total Volume	22	17	18	57		6	7	0	13		21	1	2	24		2	0	12	14		108
% App. Total	38.6	29.8	31.6			46.2	53.8	0			87.5	4.2	8.3			14.3	0	85.7			
PHF	.611	.531	.750	.750		.750	.583	.000	.650		.583	.250	.250	.667		.500	.000	.500	.500		.794

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd AM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars - Trucks

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					Int. Total
	Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total
06:00 AM	16	18	1	0	35	0	47	2	0	49	0	0	0	0	0	3	0	36	0	39	123
06:15 AM	26	21	2	0	49	1	83	3	0	87	0	0	0	0	0	6	0	49	0	55	191
06:30 AM	48	18	0	0	66	1	106	2	0	109	0	0	0	0	0	3	0	82	0	85	260
06:45 AM	62	34	2	0	98	6	105	8	0	119	0	0	0	0	0	2	0	76	0	78	295
Total	152	91	5	0	248	8	341	15	0	364	0	0	0	0	0	14	0	243	0	257	869
07:00 AM	43	29	1	0	73	4	134	3	0	141	2	0	1	0	3	7	2	86	0	95	312
07:15 AM	65	49	4	0	118	1	156	6	0	163	5	0	1	0	6	6	0	100	0	106	393
07:30 AM	55	45	4	1	105	4	170	8	0	182	3	1	2	0	6	7	0	122	0	129	422
07:45 AM	52	75	6	0	133	2	140	1	0	143	6	0	0	0	6	7	0	88	0	95	377
Total	215	198	15	1	429	11	600	18	0	629	16	1	4	0	21	27	2	396	0	425	1504
08:00 AM	66	62	6	0	134	2	145	4	0	151	4	0	1	0	5	4	0	90	0	94	384
08:15 AM	59	69	6	0	134	1	130	5	0	136	5	1	0	0	6	11	0	66	0	77	353
08:30 AM	44	88	7	0	139	2	132	6	0	140	10	0	0	0	10	12	0	91	0	103	392
08:45 AM	69	86	2	0	157	3	126	6	0	135	6	1	2	0	9	8	0	71	0	79	380
Total	238	305	21	0	564	8	533	21	0	562	25	2	3	0	30	35	0	318	0	353	1509
Grand Total	605	594	41	1	1241	27	1474	54	0	1555	41	3	7	0	51	76	2	957	0	1035	3882
Apprch %	48.8	47.9	3.3	0.1		1.7	94.8	3.5	0		80.4	5.9	13.7	0		7.3	0.2	92.5	0		
Total %	15.6	15.3	1.1	0	32	0.7	38	1.4	0	40.1	1.1	0.1	0.2	0	1.3	2	0.1	24.7	0	26.7	
Cars	561	556	8	1	1126	9	1449	53	0	1511	5	2	2	0	9	74	1	926	0	1001	3647
% Cars	92.7	93.6	19.5	100	90.7	33.3	98.3	98.1	0	97.2	12.2	66.7	28.6	0	17.6	97.4	50	96.8	0	96.7	93.9
Trucks	44	38	33	0	115	18	25	1	0	44	36	1	5	0	42	2	1	31	0	34	235
% Trucks	7.3	6.4	80.5	0	9.3	66.7	1.7	1.9	0	2.8	87.8	33.3	71.4	0	82.4	2.6	50	3.2	0	3.3	6.1

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					Int. Total
	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 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	65	49	4	118	1	156	6	163	5	0	1	6	6	0	100	106		393			
07:30 AM	55	45	4	104	4	170	8	182	3	1	2	6	7	0	122	129		421			
07:45 AM	52	75	6	133	2	140	1	143	6	0	0	6	7	0	88	95		377			
08:00 AM	66	62	6	134	2	145	4	151	4	0	1	5	4	0	90	94		384			
Total Volume	238	231	20	489	9	611	19	639	18	1	4	23	24	0	400	424		1575			
% App. Total	48.7	47.2	4.1		1.4	95.6	3		78.3	4.3	17.4		5.7	0	94.3						
PHF	.902	.770	.833	.912	.563	.899	.594	.878	.750	.250	.500	.958	.857	.000	.820	.822		.935			

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd AM
Site Code :
Start Date : 8/10/2021
Page No : 1

Groups Printed- Pedestrians

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd PM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					
	Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total
04:00 PM	77	130	0	0	207	0	96	1	0	97	0	0	5	0	5	5	0	49	0	54	363
04:15 PM	77	160	0	0	237	0	75	3	0	78	0	0	0	0	0	11	0	55	0	66	381
04:30 PM	90	128	0	0	218	0	102	5	0	107	0	0	0	0	0	11	0	71	0	82	407
04:45 PM	94	188	0	0	282	0	80	9	0	89	0	0	0	0	0	9	0	56	0	65	436
Total	338	606	0	0	944	0	353	18	0	371	0	0	5	0	5	36	0	231	0	267	1587
05:00 PM	92	195	0	0	287	0	93	2	0	95	1	0	2	0	3	9	0	68	0	77	462
05:15 PM	96	179	0	0	275	0	70	4	0	74	0	0	3	0	3	8	0	55	0	63	415
05:30 PM	102	170	0	0	272	0	72	3	0	75	0	0	0	0	0	8	0	71	0	79	426
05:45 PM	84	149	0	0	233	0	74	4	0	78	0	0	0	0	0	13	0	54	0	67	378
Total	374	693	0	0	1067	0	309	13	0	322	1	0	5	0	6	38	0	248	0	286	1681
06:00 PM	73	144	0	0	217	2	63	5	0	70	0	0	0	0	0	9	0	56	0	65	352
06:15 PM	53	118	0	0	171	0	54	5	0	59	0	0	0	0	0	11	0	34	0	45	275
06:30 PM	61	123	1	0	185	0	46	0	0	46	0	0	0	0	0	8	0	37	0	45	276
06:45 PM	54	102	1	0	157	0	39	3	0	42	0	0	1	0	1	4	0	30	0	34	234
Total	241	487	2	0	730	2	202	13	0	217	0	0	1	0	1	32	0	157	0	189	1137
Grand Total	953	1786	2	0	2741	2	864	44	0	910	1	0	11	0	12	106	0	636	0	742	4405
Apprch %	34.8	65.2	0.1	0		0.2	94.9	4.8	0		8.3	0	91.7	0		14.3	0	85.7	0		
Total %	21.6	40.5	0	0	62.2	0	19.6	1	0	20.7	0	0	0.2	0	0.3	2.4	0	14.4	0	16.8	

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound				
	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 04:00 PM to 06:45 PM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 04:45 PM																				
04:45 PM	94	188	0	282	0	80	9	89	0	0	0	0	0	9	0	56	65	436		
05:00 PM	92	195	0	287	0	93	2	95	1	0	2	3	9	0	68	77	462			
05:15 PM	96	179	0	275	0	70	4	74	0	0	3	3	8	0	55	63	415			
05:30 PM	102	170	0	272	0	72	3	75	0	0	0	0	8	0	71	79	426			
Total Volume	384	732	0	1116	0	315	18	333	1	0	5	6	34	0	250	284	1739			
% App. Total	34.4	65.6	0		0	94.6	5.4		16.7	0	83.3	0	12	0	88					
PHF	.941	.938	.000	.972	.000	.847	.500	.876	.250	.000	.417	.500	.944	.000	.880	.899	.941			

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd PM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Trucks

Start Time	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	1	2	1	0	4	0	3	0	0	3	0	0	0	0	0	0	0	3	0	3	10
04:15 PM	1	7	0	0	8	0	4	0	0	4	1	1	0	0	2	1	0	0	0	1	15
04:30 PM	2	1	0	0	3	0	2	0	0	2	0	0	0	0	0	0	0	1	0	1	6
04:45 PM	1	3	0	0	4	0	2	1	0	3	0	0	0	0	0	0	0	8	0	8	15
Total	5	13	1	0	19	0	11	1	0	12	1	1	0	0	2	1	0	12	0	13	46
05:00 PM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4
05:15 PM	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	0	0	2	0	2	5
05:30 PM	4	1	0	0	5	0	1	0	0	1	0	0	0	0	0	0	0	5	0	5	11
05:45 PM	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	3	0	3	7
Total	5	6	0	0	11	0	5	0	0	5	0	0	0	0	0	0	0	11	0	11	27
06:00 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
06:15 PM	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	4	0	4	6
06:30 PM	1	0	2	0	3	1	1	0	0	2	0	0	1	0	1	0	0	2	0	2	8
06:45 PM	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	1	0	2	0	3	5
Total	4	0	3	0	7	1	3	0	0	4	0	0	1	0	1	1	0	9	0	10	22
Grand Total	14	19	4	0	37	1	19	1	0	21	1	1	1	0	3	2	0	32	0	34	95
Apprch %	37.8	51.4	10.8	0		4.8	90.5	4.8	0		33.3	33.3	33.3	0		5.9	0	94.1	0		
Total %	14.7	20	4.2	0	38.9	1.1	20	1.1	0	22.1	1.1	1.1	1.1	0	3.2	2.1	0	33.7	0	35.8	

Start Time	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					
	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 04:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	2	1	4		0	3	0	3		0	0	0	0		0	0	3	3	10	
04:15 PM	1	7	0	8		0	4	0	4		1	1	0	2		1	0	0	1	15	
04:30 PM	2	1	0	3		0	2	0	2		0	0	0	0		0	0	1	1	6	
04:45 PM	1	3	0	4		0	2	1	3		0	0	0	0		0	0	8	8	15	
Total Volume	5	13	1	19		0	11	1	12		1	1	0	2		1	0	12	13	46	
% App. Total	26.3	68.4	5.3			0	91.7	8.3			50	50	0			7.7	0	92.3			
PHF	.625	.464	.250	.594		.000	.688	.250	.750		.250	.250	.000	.250		.250	.000	.375	.406	.767	

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd PM
 Site Code :
 Start Date : 8/10/2021
 Page No : 1

Groups Printed- Cars - Trucks

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound					
	Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total
04:00 PM	78	132	1	0	211	0	99	1	0	100	0	0	5	0	5	5	0	52	0	57	373
04:15 PM	78	167	0	0	245	0	79	3	0	82	1	1	0	0	2	12	0	55	0	67	396
04:30 PM	92	129	0	0	221	0	104	5	0	109	0	0	0	0	0	11	0	72	0	83	413
04:45 PM	95	191	0	0	286	0	82	10	0	92	0	0	0	0	0	9	0	64	0	73	451
Total	343	619	1	0	963	0	364	19	0	383	1	1	5	0	7	37	0	243	0	280	1633
05:00 PM	92	198	0	0	290	0	93	2	0	95	1	0	2	0	3	9	0	69	0	78	466
05:15 PM	97	179	0	0	276	0	72	4	0	76	0	0	3	0	3	8	0	57	0	65	420
05:30 PM	106	171	0	0	277	0	73	3	0	76	0	0	0	0	0	8	0	76	0	84	437
05:45 PM	84	151	0	0	235	0	76	4	0	80	0	0	0	0	0	13	0	57	0	70	385
Total	379	699	0	0	1078	0	314	13	0	327	1	0	5	0	6	38	0	259	0	297	1708
06:00 PM	75	144	0	0	219	2	63	5	0	70	0	0	0	0	0	9	0	57	0	66	355
06:15 PM	54	118	0	0	172	0	55	5	0	60	0	0	0	0	0	11	0	38	0	49	281
06:30 PM	62	123	3	0	188	1	47	0	0	48	0	0	1	0	1	8	0	39	0	47	284
06:45 PM	54	102	2	0	158	0	40	3	0	43	0	0	1	0	1	5	0	32	0	37	239
Total	245	487	5	0	737	3	205	13	0	221	0	0	2	0	2	33	0	166	0	199	1159
Grand Total	967	1805	6	0	2778	3	883	45	0	931	2	1	12	0	15	108	0	668	0	776	4500
Apprch %	34.8	65	0.2	0	0	0.3	94.8	4.8	0	13.3	6.7	80	0	0	13.9	0	86.1	0	0	0	0
Total %	21.5	40.1	0.1	0	61.7	0.1	19.6	1	0	20.7	0	0	0.3	0	0.3	2.4	0	14.8	0	17.2	0
Cars	953	1786	2	0	2741	2	864	44	0	910	1	0	11	0	12	106	0	636	0	742	4405
% Cars	98.6	98.9	33.3	0	98.7	66.7	97.8	97.8	0	97.7	50	0	91.7	0	80	98.1	0	95.2	0	95.6	97.9
Trucks	14	19	4	0	37	1	19	1	0	21	1	1	1	0	3	2	0	32	0	34	95
% Trucks	1.4	1.1	66.7	0	1.3	33.3	2.2	2.2	0	2.3	50	100	8.3	0	20	1.9	0	4.8	0	4.4	2.1

	Richmond Rd Eastbound					Richmond Rd Westbound					Lock Stone Dwy Northbound					Louisa Rd Southbound				
	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 04:00 PM to 06:45 PM - Peak 1 of 1																				
Peak Hour For Entire Intersection Begins at 04:45 PM																				
04:45 PM	95	191	0	286	0	82	10	92	0	0	0	0	0	9	0	64	73	451		
05:00 PM	92	198	0	290	0	93	2	95	1	0	2	3	9	0	69	78	466			
05:15 PM	97	179	0	276	0	72	4	76	0	0	3	3	8	0	57	65	420			
05:30 PM	106	171	0	277	0	73	3	76	0	0	0	0	8	0	76	84	437			
Total Volume	390	739	0	1129	0	320	19	339	1	0	5	6	34	0	266	300	1774			
% App. Total	34.5	65.5	0	0	0	94.4	5.6	16.7	0	83.3	0	11.3	0	88.7	0	88.7				
PHF	.920	.933	.000	.973	.000	.860	.475	.892	.250	.000	.417	.500	.944	.000	.875	.893	.952			

Peggy Malone & Associates
(888) 247-8602

File Name : 22-Richmond Rd and N Milton Rd PM
Site Code :
Start Date : 8/10/2021
Page No : 1

Groups Printed- Pedestrians

From: [Scolese, Daniel](#)
To: [Cory, Kelly M](#); [Vukovic, Ivana](#)
Subject: FW: Project Pipeline Growth Rates Follow Up
Date: Monday, November 15, 2021 10:52:00 AM
Attachments: [Culpeper Growth Rates.xlsx](#)

From: Scolese, Daniel
Sent: Monday, November 08, 2021 9:45 PM
To: Proctor, Charles <charles.proctor@vdot.virginia.gov>; Kobina Gaituah <kobina.gaituah@vdot.virginia.gov>
Cc: Harris, Zach <ZHarris@mbakerintl.com>
Subject: Project Pipeline Growth Rates Follow Up

Gentleman,

Thank you for the call this afternoon, I wanted to summarize our discussion below:

- Town of Warrenton : Apply 0.5% global growth rate
- 15/29 at Route 605 : Apply a weighted average based on the historical trends then use as a global growth rate (0.60%)
- Bealeton : Apply a weighted average based on the historical trends then use as a global growth rate (1.0%)
 - US 17 data will be based on Coffman Road to Route 28
- Shadwell : Use the 2045 ADT projection and intersection splits for future volumes
- Pantops : Use 0.3%, based on 250/20 study and historical trends

I've also attached the spreadsheet that I was showing during our call today.

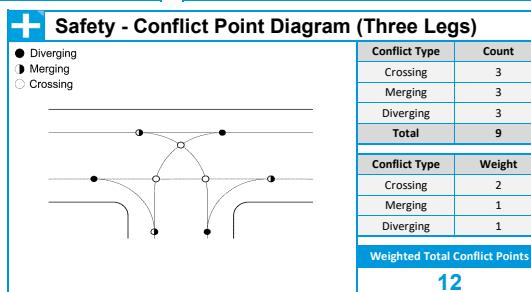
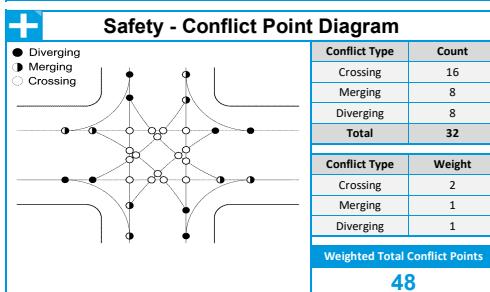
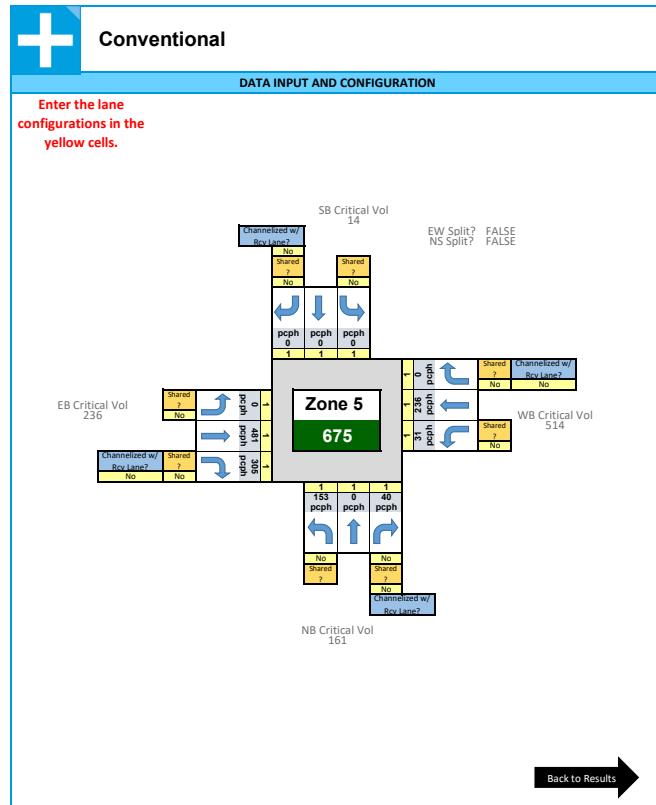
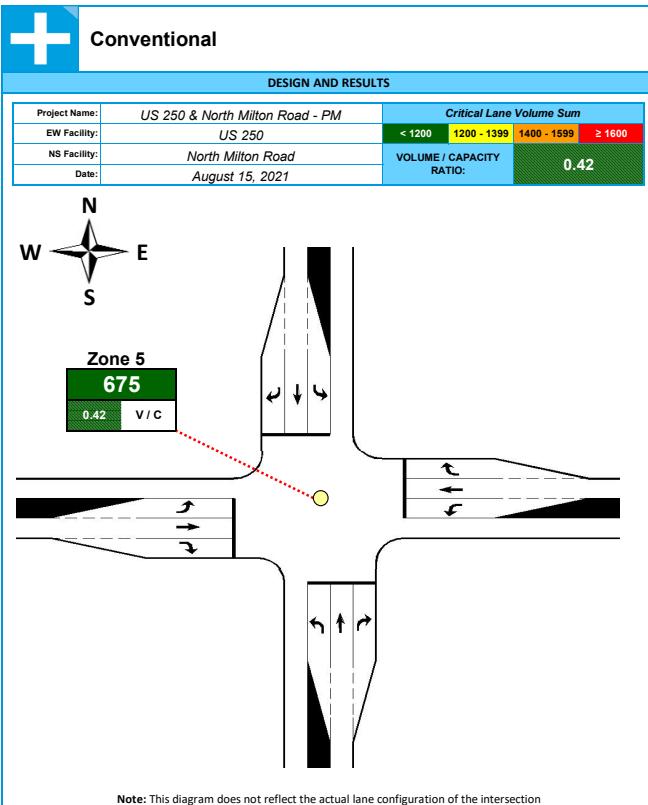
Please let me know if you have any questions. I'll have our folks start working on updating the volumes and see if any concepts may drop out. I'll also work on the TMPD documentation.

Thank you
Dan

Daniel Scolese, P.E. | Traffic Engineer/Project Manager | Michael Baker International
3200 Rockbridge Street, Suite 104 | Richmond, VA 23230 | [O] 804-287-3168
daniel.scolese@mbakerintl.com | www.mbakerintl.com

Interchange Results					
Type	Dir	Maximum V/C	Accommodation Compared to Traditional Diamond	Weighted Total Conflict Points	Notes

Information	
Congestion	The maximum v/c ratio represents the worst v/c of all zones that make up an intersection.
Pedestrian	Compares the potential of each design to accommodate pedestrians based on safety, wayfinding, and delay. Potential is qualitatively defined as better (+), similar (blank cell), or worse (-) than a conventional intersection or traditional diamond interchange.
Safety	Weighted Total = (2 x Crossing Conflicts) + Merging Conflicts + Diverging Conflicts





Thru-Cut

DESIGN AND RESULTS

Project Name:	US 250 & North Milton Road - PM	Critical Lane Volume Sum
EW Facility:	US 250	< 1200 1200 - 1399 1400 - 1599 ≥ 1600
NS Facility:	North Milton Road	VOLUME / CAPACITY RATIO: 0.42
Date:	August 15, 2021	



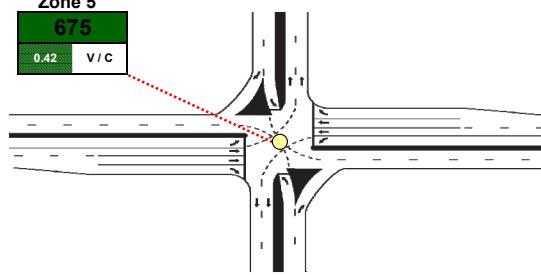
North arrow directions will appear once the directional question has been answered on the Input Worksheet.

Zone 5

675

0.42

V / C



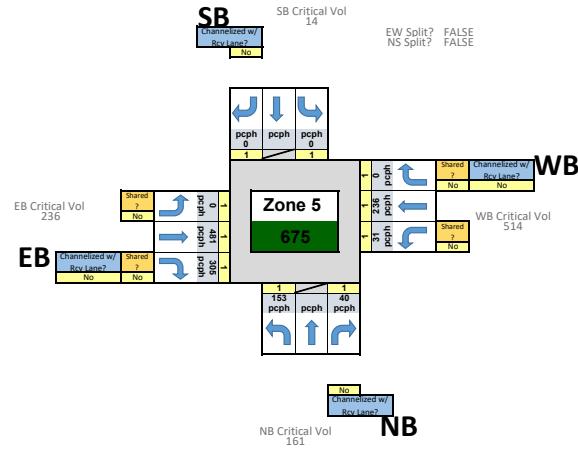
Note: This diagram does not reflect the actual lane configuration of the intersection



Thru-Cut

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.

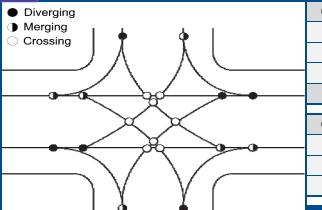


[Back to Results](#) ➔



Safety - Conflict Point Diagram

- Diverging
- Merging
- Crossing



Conflict Type	Count
Crossing	8
Merging	6
Diverging	6
Total	20

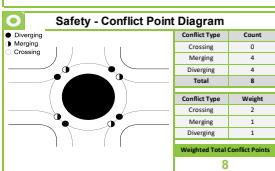
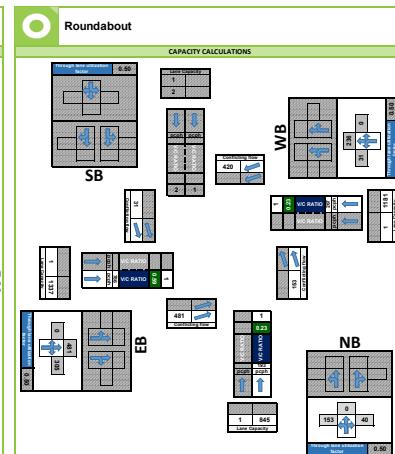
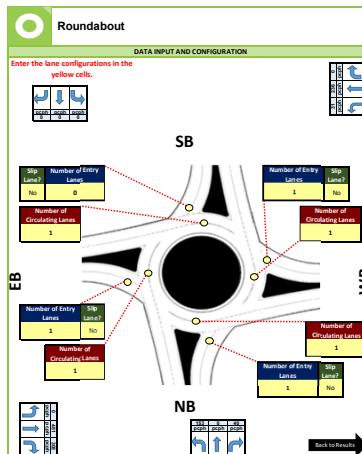
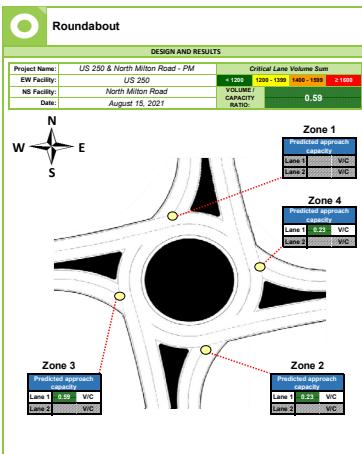
Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1
Weighted Total Conflict Points	28

Assumptions

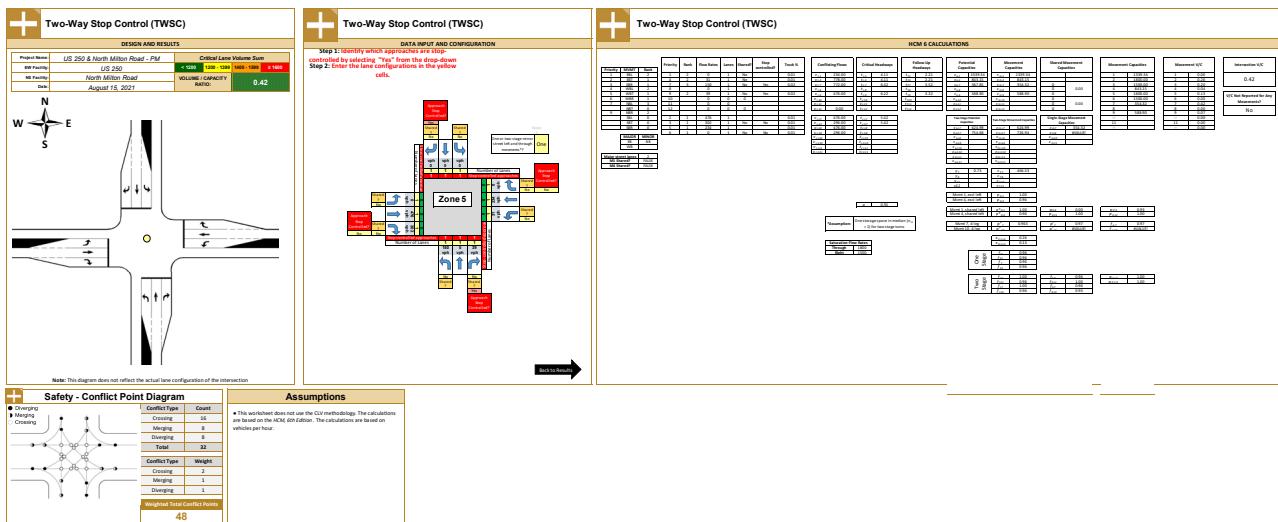
- Minor street through traffic does not need to re-enter the intersection from the major street to complete the desired movement. There are no u-turn crossover intersections on the major street.
- The original through volumes were split evenly to left-turns and right-turns.

Guidance

- A thru-cut is a signalized intersection form best suited for locations at which minor street through volumes are relatively low but major street through volumes are high enough to warrant a thru-cut. If minor street through volumes are less than 300 vehicles per leg in peak hour, but may be appropriate with minor street through volumes if the major street through volume is very high. This will often occur at locations where land uses served by each of the minor street legs are likely to generate only a small number of trips between them. VDOT envisions thru-cuts to predominantly be used as relatively low-cost improvements and not include the implementation of u-turn crossovers to facilitate minor street through movements. Thru-cuts will generally be implemented in locations where the surrounding road and/or driveway network already supports alternative routes for minor street through-movement trips. The following are additional design considerations for thru-cuts:
 - The vehicular signal phasing does not accommodate a pedestrian crossing of the major street. A pedestrian phase—likely pedestrian only—is needed for designs including a major street pedestrian crossing. If the pedestrian phase is frequently actuated, then the operational benefit of the thru-cut will be diminished.
 - Channelization is needed on the minor street to 1) align both left-turn movements so they can operate concurrently and 2) physically prevent through movements. This is similar to the channelization at an off-ramp at a single-point diamond interchange. Channelization may require some minor widening in the immediate vicinity of the intersection.
 - Minor street right turns will generally be yield-controlled but could be signalized or stop-controlled.
- The benefits of an unsignalized thru-cut are limited. The design would encourage concurrent minor street left turns and two stage left turns with a stop in the median, which are not necessarily desirable. Additionally, minor street left-turn movements would still have conflict points with both directions of the major street.



EQUATION: $A \times \exp(-B \times Q)$			
Number of Entry Lanes	Number of Circulating Lanes	Lane A	Lane B
1	2	-	3380 0.00102
2	1	Left 1420 0.00085	Right 1420 0.00091
2	1	Left 1350 0.00092	Right 1420 0.00085
2	2	Left 1420 0.00085	Right 1420 0.00085



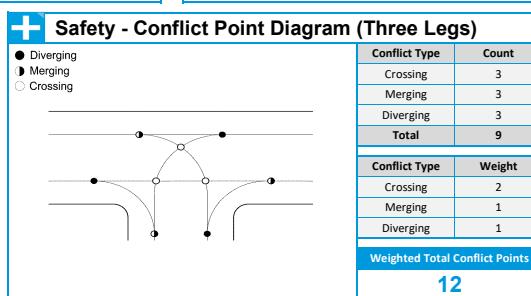
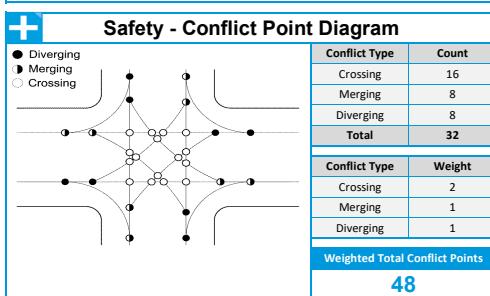
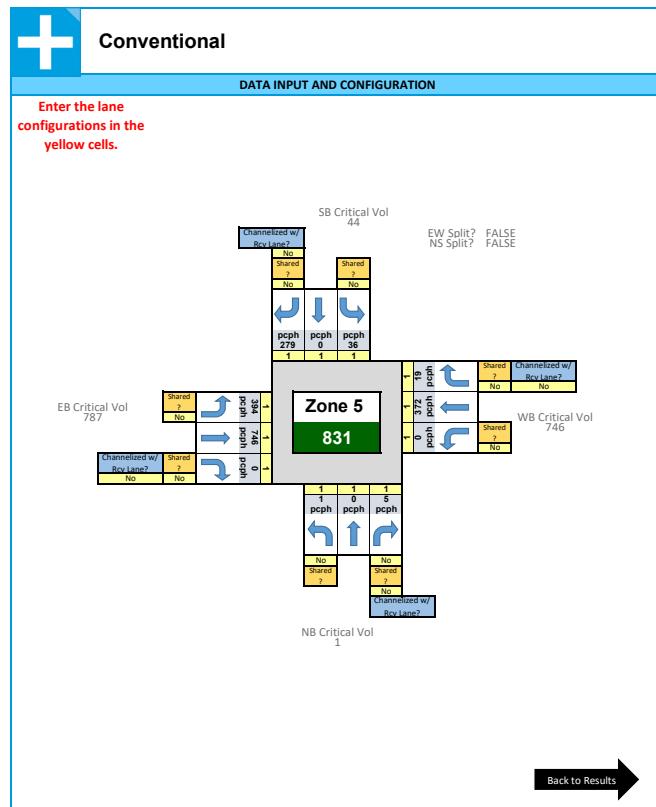
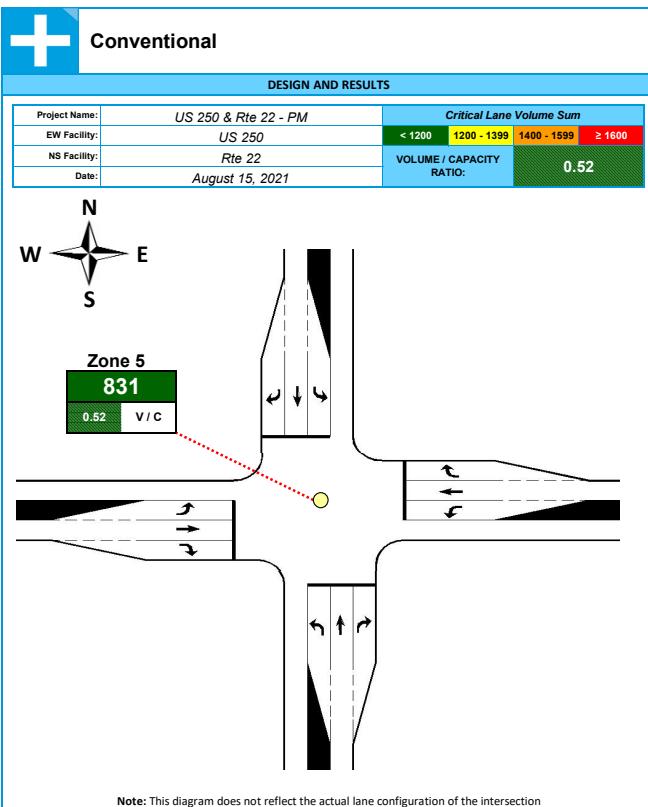
VDOT Junction Screening Tool																								
Results Worksheet																								
<table border="1"> <thead> <tr> <th colspan="4">General Information</th></tr> </thead> <tbody> <tr> <td>Project Title:</td><td colspan="3">US 250 & Rte 22 - PM</td></tr> <tr> <td>EW Facility:</td><td colspan="3">US 250</td></tr> <tr> <td>NS Facility:</td><td colspan="3">Rte 22</td></tr> <tr> <td>Date:</td><td colspan="3" rowspan="2">August 15, 2021</td></tr> </tbody> </table>					General Information				Project Title:	US 250 & Rte 22 - PM			EW Facility:	US 250			NS Facility:	Rte 22			Date:	August 15, 2021		
General Information																								
Project Title:	US 250 & Rte 22 - PM																							
EW Facility:	US 250																							
NS Facility:	Rte 22																							
Date:	August 15, 2021																							
<table border="1"> <thead> <tr> <th>Volumes (veh/hr)</th><th>U-Turn / Left</th><th>Through</th><th>Right</th></tr> </thead> <tbody> <tr> <td>Eastbound</td><td>390</td><td>739</td><td>0</td></tr> <tr> <td>Westbound</td><td>0</td><td>365</td><td>19</td></tr> <tr> <td>Northbound</td><td>1</td><td>0</td><td>5</td></tr> <tr> <td>Southbound</td><td>34</td><td>0</td><td>266</td></tr> </tbody> </table>				Volumes (veh/hr)	U-Turn / Left	Through	Right	Eastbound	390	739	0	Westbound	0	365	19	Northbound	1	0	5	Southbound	34	0	266	General Instructions: All intersection and interchange configurations have a default assumption of one exclusive lane per movement. No results shall be interpreted until the user has verified the lane configurations on each worksheet.
Volumes (veh/hr)	U-Turn / Left	Through	Right																					
Eastbound	390	739	0																					
Westbound	0	365	19																					
Northbound	1	0	5																					
Southbound	34	0	266																					

Intersection Results					
Type	Dir	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points	Notes
Conventional	-	0.52		48	
Partial Displaced Left Turn	-	0.49	-	44	
Roundabout	-	0.86		8	
Two-Way Stop Control	-	0.88		48	

*The continuous green-T is the only three-legged innovative intersection in this tool. To compare the continuous green-T to other innovative intersections, conflicts corresponding with the fourth leg must be removed. This has been done for the conventional intersection. Conflict point diagrams for three-legged and four-legged conventional intersections have been provided on the conventional intersection worksheet for reference.

Interchange Results					
Type	Dir	Maximum V/C	Accommodation Compared to Traditional Diamond	Weighted Total Conflict Points	Notes

Information	
Congestion	The maximum v/c ratio represents the worst v/c of all zones that make up an intersection.
Pedestrian	Compares the potential of each design to accommodate pedestrians based on safety, wayfinding, and delay. Potential is qualitatively defined as better (+), similar (blank cell), or worse (-) than a conventional intersection or traditional diamond interchange.
Safety	Weighted Total = (2 x Crossing Conflicts) + Merging Conflicts + Diverging Conflicts



Partial Displaced Left Turn Intersection

DESIGN AND RESULTS

Project Name:	US 250 & Rte 22 - PM	Critical Lane Volume Sum		
EW Facility:	US 250	< 1200	1200 - 1399	1400 - 1599
NS Facility:	Rte 22	VOLUME / CAPACITY		
Date:	August 15, 2021	RATIO: 0.49		

W N S E

North arrow directions will appear once the directional question has been answered on the [Input Worksheet](#).

Zone 1
788
0.49 V / C

Zone 5
766
0.48 V / C

Zone 2
788
0.49 V / C

Note: This diagram does not reflect the actual lane configuration of the intersection

Partial Displaced Left Turn Intersection

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.

EB (East Bound) Configuration:

- Channeled w/ Rev Lane? No
- pcph: 8, 746, 734
- 1 1 1
- Zone 1: 788
- 1 279 pcph
- Is the EB movement free flow at Zone 1? No
- 1 373 pcph

NB (North Bound) Configuration:

- Shared Yes
- pcph: 0, 0, 0
- 1 1 1
- Zone 5: 766
- 1 1 1
- SB (South Bound) Critical Vol: 19

IB/SB (Inbound/South Bound) Critical Vol: 746

WB (West Bound) Configuration:

- Channeled w/ Rev Lane? No
- pcph: 782
- 1
- Is the NB movement free flow at Zone 2? No
- pcph: 5
- 1
- Zone 2: 788
- 1 372 pcph
- 1 19 pcph
- WB: 19
- No Channeled w/ Rev Lane?

Back to Results

Safety - Conflict Point Diagram

- Diverging
- Merging
- Crossing

Conflict Type	Count
Crossing	14
Merging	8
Diverging	8
Total	30

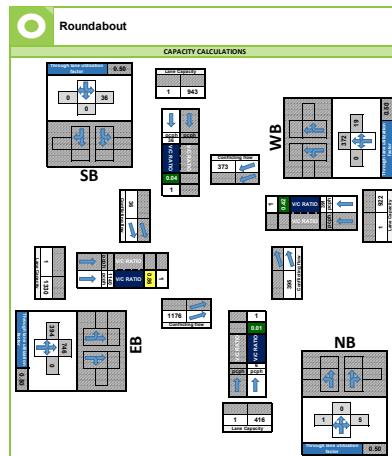
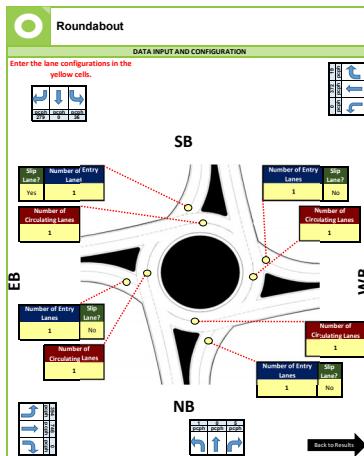
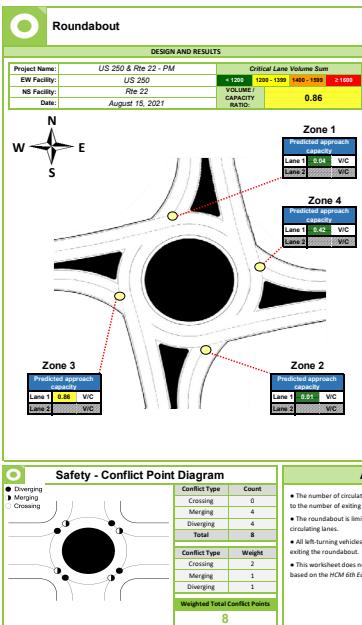
Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

44

Assumptions

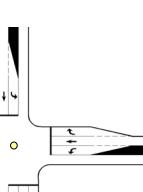
- CLV calculations at Zone 5 do not include the right-turn movements from the non-displaced-left approaches.
- The number of through lanes entered in one zone is assumed to be equal to the number of through lanes in all zones that the movement passes through.



Two-Way Stop Control (TWSC)

DESIGN AND RESULTS

Project Name:	US 280 & Hwy 22 - PM	Critical Lane Volume/Sum:	1,400
Wk Facility:	US 280	1-hour	1,400
Wk Facility:	Hwy 22	Peak Hour	1,400
Date:	August 15, 2021	VOLUME / CAPACITY	0.88

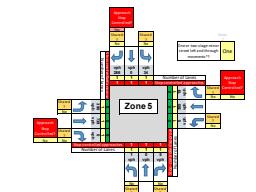


Note: This diagram does not reflect the actual lane configuration of the intersection.

Two-Way Stop Control (TWSC)

DATA INPUT AND CONFIGURATION

Step 1: Identify which approach has TWSC controlled by selecting "YES" from the drop-down
Step 2: Enter the lane configurations in the yellow cells.



Two-Way Stop Control (TWSC)

HCM 5 CALCULATIONS

Flow Type	North	South	West	East	North	South	West	East
Conflicting Flow	1	1	1	1	1	1	1	1
Critical Headway	1	1	1	1	1	1	1	1
Induced Headway	1	1	1	1	1	1	1	1
Potential Headway	1	1	1	1	1	1	1	1
Minimum Headway	1	1	1	1	1	1	1	1
Desired Headway	1	1	1	1	1	1	1	1
Minimum Capacity	1	1	1	1	1	1	1	1
Minimum V/C	1	1	1	1	1	1	1	1
Maximum V/C	1	1	1	1	1	1	1	1
Max Occupied Lanes	1	1	1	1	1	1	1	1
Min Occupied Lanes	1	1	1	1	1	1	1	1

Safety - Conflict Point Diagram

Assumptions

Conflict Type	Count
Crossing	14
Merging	8
Dividing	8
Total	32

The worksheet does not use the E2 methodology. The calculations are based on the HCM 5th edition. The calculations are based on vehicles per hour.

Conflict Type	Weight
Crossing	2
Merging	1
Dividing	1

Weighted Total Conflict Points

48

Two-Way Stop Control (TWSC)



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NET	SWT
Lane Group Flow (vph)	256	248	22	10	695	20	24	26
v/c Ratio	0.58	0.18	0.03	0.02	0.69	0.02	0.34	0.21
Control Delay	14.9	9.6	0.1	9.0	25.8	0.1	58.1	56.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	9.6	0.1	9.0	25.8	0.1	58.1	56.9
Queue Length 50th (ft)	68	65	0	3	314	0	15	19
Queue Length 95th (ft)	#175	172	0	m10	#683	m0	43	49
Internal Link Dist (ft)		176			930		773	154
Turn Bay Length (ft)			400	330		300		
Base Capacity (vph)	441	1355	796	413	1006	945	100	203
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.18	0.03	0.02	0.69	0.02	0.24	0.13

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

9: N Milton Rd & US 250

12/10/2021



Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	192	81	26	383	326	26
v/c Ratio	0.20	0.09	0.23	0.33	0.78	0.07
Control Delay	25.1	13.7	57.5	12.0	55.8	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	13.7	57.5	12.0	55.8	11.4
Queue Length 50th (ft)	71	0	20	126	238	0
Queue Length 95th (ft)	235	77	49	224	312	21
Internal Link Dist (ft)	930			1324	905	
Turn Bay Length (ft)		130	180			330
Base Capacity (vph)	974	864	163	1175	778	718
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.09	0.16	0.33	0.42	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis

8: US 250 & Rte 22

12/10/2021

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	238	231	20	9	646	19	18	1	4	24	0	0
Future Volume (vph)	238	231	20	9	646	19	18	1	4	24	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	16	12	12	16	12
Total Lost time (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	6.5			5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	0.98				1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.96				0.95	
Satd. Flow (prot)	1719	1776	989	1014	1881	1615		1107			2046	
Flt Permitted	0.18	1.00	1.00	0.61	1.00	1.00	0.75				0.81	
Satd. Flow (perm)	324	1776	989	646	1881	1615	866				1734	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	256	248	22	10	695	20	19	1	4	26	0	0
RTOR Reduction (vph)	0	0	8	0	0	10	0	4	0	0	0	0
Lane Group Flow (vph)	256	248	14	10	695	10	0	20	0	0	26	0
Heavy Vehicles (%)	5%	7%	85%	78%	1%	0%	89%	0%	75%	0%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			3	
Permitted Phases	2		2	6		6	4			3		
Actuated Green, G (s)	86.2	74.6	74.6	60.8	59.2	59.2		6.2			5.2	
Effective Green, g (s)	86.2	74.6	74.6	60.8	59.2	59.2		6.2			5.2	
Actuated g/C Ratio	0.72	0.62	0.62	0.51	0.49	0.49		0.05			0.04	
Clearance Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		6.5			5.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	430	1104	614	332	927	796		44			75	
v/s Ratio Prot	c0.08	0.14		0.00	c0.37							
v/s Ratio Perm	0.34		0.01	0.01		0.01		c0.02		c0.01		
v/c Ratio	0.60	0.22	0.02	0.03	0.75	0.01		0.46			0.35	
Uniform Delay, d ₁	15.0	10.0	8.7	14.7	24.4	15.5		55.3			55.8	
Progression Factor	1.00	1.00	1.00	1.00	0.88	1.00		1.00			1.00	
Incremental Delay, d ₂	2.2	0.5	0.1	0.0	5.3	0.0		7.4			2.8	
Delay (s)	17.2	10.5	8.8	14.8	26.8	15.5		62.7			58.5	
Level of Service	B	B	A	B	C	B		E			E	
Approach Delay (s)		13.7			26.3			62.7			58.5	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.5			HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)				32.4			
Intersection Capacity Utilization		75.9%			ICU Level of Service				D			
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

9: N Milton Rd & US 250

12/10/2021



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	182	77	25	364	310	25
Future Volume (vph)	182	77	25	364	310	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1759	1495	1612	1845	1787	1615
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1759	1495	1612	1845	1787	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	192	81	26	383	326	26
RTOR Reduction (vph)	0	38	0	0	0	20
Lane Group Flow (vph)	192	43	26	383	326	6
Heavy Vehicles (%)	8%	8%	12%	3%	1%	0%
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	4	
Permitted Phases		2			4	
Actuated Green, G (s)	63.3	63.3	5.3	76.4	28.1	28.1
Effective Green, g (s)	63.3	63.3	5.3	76.4	28.1	28.1
Actuated g/C Ratio	0.53	0.53	0.04	0.64	0.23	0.23
Clearance Time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	927	788	71	1174	418	378
v/s Ratio Prot	0.11		0.02	c0.21	c0.18	
v/s Ratio Perm		0.03			0.00	
v/c Ratio	0.21	0.05	0.37	0.33	0.78	0.02
Uniform Delay, d1	15.0	13.8	55.7	10.0	43.1	35.3
Progression Factor	1.45	3.03	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	3.2	0.7	8.9	0.0
Delay (s)	22.2	41.9	58.9	10.7	52.0	35.3
Level of Service	C	D	E	B	D	D
Approach Delay (s)	28.1			13.8	50.8	
Approach LOS	C			B	D	
Intersection Summary						
HCM 2000 Control Delay		30.1		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.48				
Actuated Cycle Length (s)		120.0		Sum of lost time (s)	23.3	
Intersection Capacity Utilization		50.9%		ICU Level of Service	A	
Analysis Period (min)		15				
c Critical Lane Group						



Lane Group	SEL	SET	NWT	NWR	NET	SWT
Lane Group Flow (vph)	411	778	384	20	6	36
v/c Ratio	0.57	0.53	0.38	0.02	0.02	0.50
Control Delay	10.1	10.3	39.0	0.1	0.0	75.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	10.3	39.0	0.1	0.0	75.5
Queue Length 50th (ft)	98	242	258	0	0	29
Queue Length 95th (ft)	227	541	433	0	0	65
Internal Link Dist (ft)		176	930		773	154
Turn Bay Length (ft)				300		
Base Capacity (vph)	784	1463	1014	950	508	95
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.53	0.38	0.02	0.01	0.38

Intersection Summary

Queues

9: N Milton Rd & US 250

12/10/2021



Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	498	331	38	218	159	40
v/c Ratio	0.41	0.30	0.33	0.15	0.68	0.16
Control Delay	10.8	5.0	65.3	5.4	68.1	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	5.0	65.3	5.4	68.1	14.9
Queue Length 50th (ft)	130	31	31	45	130	0
Queue Length 95th (ft)	182	71	67	85	195	33
Internal Link Dist (ft)	930			1324	905	
Turn Bay Length (ft)		130	180			330
Base Capacity (vph)	1216	1093	308	1408	575	542
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.30	0.12	0.15	0.28	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis

8: US 250 & Rte 22

12/10/2021

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	390	739	0	0	365	19	1	0	5	34	0	0
Future Volume (vph)	390	739	0	0	365	19	1	0	5	34	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	16	12	12	16	12
Total Lost time (s)	10.0	10.0			10.0	10.0		6.5			5.9	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Fr _t	1.00	1.00			1.00	0.85		0.89			1.00	
Flt Protected	0.95	1.00			1.00	1.00		0.99			0.95	
Satd. Flow (prot)	1770	1881			1863	1538		1895			2046	
Flt Permitted	0.41	1.00			1.00	1.00		1.00			0.30	
Satd. Flow (perm)	758	1881			1863	1538		1911			653	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	411	778	0	0	384	20	1	0	5	36	0	0
RTOR Reduction (vph)	0	0	0	0	0	10	0	6	0	0	0	0
Lane Group Flow (vph)	411	778	0	0	384	10	0	0	0	0	36	0
Heavy Vehicles (%)	2%	1%	0%	0%	2%	5%	0%	0%	0%	0%	0%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			3	
Permitted Phases	2		2	6		6	4			3		
Actuated Green, G (s)	92.8	92.8			64.5	64.5		1.6			13.2	
Effective Green, g (s)	92.8	92.8			64.5	64.5		1.6			13.2	
Actuated g/C Ratio	0.71	0.71			0.50	0.50		0.01			0.10	
Clearance Time (s)	10.0	10.0			10.0	10.0		6.5			5.9	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	683	1342			924	763		23			66	
v/s Ratio Prot	0.08	c0.41			0.21							
v/s Ratio Perm	c0.34					0.01		c0.00			c0.06	
v/c Ratio	0.60	0.58			0.42	0.01		0.00			0.55	
Uniform Delay, d1	9.0	9.1			20.8	16.6		63.4			55.5	
Progression Factor	1.00	1.00			1.64	1.00		1.00			1.00	
Incremental Delay, d2	1.5	1.8			1.4	0.0		0.1			8.9	
Delay (s)	10.5	10.9			35.5	16.6		63.5			64.5	
Level of Service	B	B			D	B		E			E	
Approach Delay (s)		10.8			34.5			63.5			64.5	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay		18.0			HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		130.0			Sum of lost time (s)				32.4			
Intersection Capacity Utilization		72.7%			ICU Level of Service				C			
Analysis Period (min)		15										

c Critical Lane Group

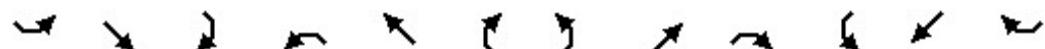
HCM Signalized Intersection Capacity Analysis

9: N Milton Rd & US 250

12/10/2021



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	463	308	35	203	148	37
Future Volume (vph)	463	308	35	203	148	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1881	1599	1805	1881	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1881	1599	1805	1881	1770	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	498	331	38	218	159	40
RTOR Reduction (vph)	0	62	0	0	0	35
Lane Group Flow (vph)	498	269	38	218	159	5
Heavy Vehicles (%)	1%	1%	0%	1%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1		4	
Permitted Phases		2		6		4
Actuated Green, G (s)	82.5	82.5	7.1	97.4	17.1	17.1
Effective Green, g (s)	82.5	82.5	7.1	97.4	17.1	17.1
Actuated g/C Ratio	0.63	0.63	0.05	0.75	0.13	0.13
Clearance Time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1193	1014	98	1409	232	208
v/s Ratio Prot	c0.26		c0.02		c0.09	
v/s Ratio Perm		0.17		0.12		0.00
v/c Ratio	0.42	0.27	0.39	0.15	0.69	0.03
Uniform Delay, d1	11.8	10.4	59.4	4.6	53.9	49.2
Progression Factor	0.75	0.72	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.6	2.5	0.2	8.1	0.0
Delay (s)	9.8	8.1	61.9	4.9	62.0	49.2
Level of Service	A	A	E	A	E	D
Approach Delay (s)	9.2			13.3	59.4	
Approach LOS	A			B	E	
Intersection Summary						
HCM 2000 Control Delay		17.8		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.46				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)		23.3
Intersection Capacity Utilization		50.2%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	296	287	25	20	866	56	11	1	2	55	0	0
Future Volume (vph)	296	287	25	20	866	56	11	1	2	55	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	16	12	12	16	12
Total Lost time (s)	10.0	10.0	10.0	10.0	10.0	10.0		6.5			5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.98			1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96			0.95	
Satd. Flow (prot)	1719	1776	989	1014	1881	1615		1122			2046	
Flt Permitted	0.07	1.00	1.00	0.57	1.00	1.00		0.92			0.80	
Satd. Flow (perm)	127	1776	989	611	1881	1615		1077			1725	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	318	309	27	22	931	60	12	1	2	59	0	0
RTOR Reduction (vph)	0	0	11	0	0	37	0	2	0	0	0	0
Lane Group Flow (vph)	318	309	16	22	931	23	0	13	0	0	59	0
Heavy Vehicles (%)	5%	7%	85%	78%	1%	0%	89%	0%	75%	0%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			3	
Permitted Phases	2		2	6		6	4			3		
Actuated Green, G (s)	85.4	72.2	72.2	50.1	46.9	46.9		3.9			8.3	
Effective Green, g (s)	85.4	72.2	72.2	50.1	46.9	46.9		3.9			8.3	
Actuated g/C Ratio	0.71	0.60	0.60	0.42	0.39	0.39		0.03			0.07	
Clearance Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		6.5			5.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	468	1068	595	265	735	631		35			119	
v/s Ratio Prot	c0.16	0.17		0.00	c0.49							
v/s Ratio Perm	0.32		0.02	0.03		0.01		c0.01		c0.03		
v/c Ratio	0.68	0.29	0.03	0.08	1.27	0.04		0.37			0.50	
Uniform Delay, d1	32.4	11.5	9.7	21.1	36.5	22.6		56.9			53.8	
Progression Factor	1.00	1.00	1.00	1.17	0.95	1.00		1.00			1.00	
Incremental Delay, d2	3.9	0.7	0.1	0.1	129.0	0.1		6.6			3.2	
Delay (s)	36.3	12.2	9.8	24.8	163.7	22.7		63.4			57.1	
Level of Service	D	B	A	C	F	C		E		E		
Approach Delay (s)		23.8			152.3			63.4			57.1	
Approach LOS		C			F			E		E		
Intersection Summary												
HCM 2000 Control Delay		100.0			HCM 2000 Level of Service				F			
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)				32.4			
Intersection Capacity Utilization		90.7%			ICU Level of Service				E			
Analysis Period (min)		15										

c Critical Lane Group



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	165	179	117	452	490	58
Future Volume (vph)	165	179	117	452	490	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1759	1495	1612	1845	1787	1615
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1759	1495	1612	1845	1787	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	174	188	123	476	516	61
RTOR Reduction (vph)	0	122	0	0	0	40
Lane Group Flow (vph)	174	66	123	476	516	21
Heavy Vehicles (%)	8%	8%	12%	3%	1%	0%
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	4	
Permitted Phases		2			4	
Actuated Green, G (s)	42.1	42.1	13.6	63.5	41.0	41.0
Effective Green, g (s)	42.1	42.1	13.6	63.5	41.0	41.0
Actuated g/C Ratio	0.35	0.35	0.11	0.53	0.34	0.34
Clearance Time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	617	524	182	976	610	551
v/s Ratio Prot	0.10		0.08	c0.26	c0.29	
v/s Ratio Perm		0.04			0.01	
v/c Ratio	0.28	0.13	0.68	0.49	0.85	0.04
Uniform Delay, d1	28.1	26.5	51.1	17.9	36.6	26.3
Progression Factor	1.45	4.29	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.5	9.5	1.7	10.5	0.0
Delay (s)	41.7	114.0	60.6	19.7	47.0	26.4
Level of Service	D	F	E	B	D	C
Approach Delay (s)	79.3			28.1	44.9	
Approach LOS	E			C	D	
Intersection Summary						
HCM 2000 Control Delay		46.4		HCM 2000 Level of Service		D
HCM 2000 Volume to Capacity ratio		0.68				
Actuated Cycle Length (s)		120.0		Sum of lost time (s)		23.3
Intersection Capacity Utilization		63.9%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NET	SWT
Lane Group Flow (vph)	318	309	27	22	931	60	15	59
v/c Ratio	0.67	0.24	0.04	0.07	1.14	0.08	0.19	0.42
Control Delay	38.8	12.3	0.1	11.2	107.8	0.2	52.7	60.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	12.3	0.1	11.2	107.8	0.2	52.7	60.5
Queue Length 50th (ft)	154	51	0	5	~828	0	10	44
Queue Length 95th (ft)	#467	223	0	m11	#1089	m0	32	86
Internal Link Dist (ft)		176			930		773	154
Turn Bay Length (ft)			400	330		300		
Base Capacity (vph)	472	1262	753	332	815	799	122	202
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.24	0.04	0.07	1.14	0.08	0.12	0.29

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.
- m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	174	188	123	476	516	61
v/c Ratio	0.28	0.29	0.68	0.49	0.85	0.10
Control Delay	46.6	22.0	69.3	21.7	49.3	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	22.0	69.3	21.7	49.3	5.7
Queue Length 50th (ft)	85	0	91	227	366	0
Queue Length 95th (ft)	219	140	#179	380	445	26
Internal Link Dist (ft)	930			1324	905	
Turn Bay Length (ft)		130	180			330
Base Capacity (vph)	616	645	190	975	778	738
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.29	0.65	0.49	0.66	0.08

Intersection Summary

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

Queue shown is maximum after two cycles.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	633	1103	2	0	453	24	4	2	7	43	0	0
Future Volume (vph)	633	1103	2	0	453	24	4	2	7	43	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	16	12	12	16	12
Total Lost time (s)	10.0	10.0	10.0		10.0	10.0		6.5			5.9	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85		1.00	0.85		0.93			1.00	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.98			0.95	
Satd. Flow (prot)	1770	1881	1830		1863	1538		1967			2046	
Flt Permitted	0.10	1.00	1.00		1.00	1.00		0.88			0.34	
Satd. Flow (perm)	186	1881	1830		1863	1538		1757			743	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	666	1161	2	0	477	25	4	2	7	45	0	0
RTOR Reduction (vph)	0	0	1	0	0	19	0	7	0	0	0	0
Lane Group Flow (vph)	666	1161	1	0	477	6	0	6	0	0	45	0
Heavy Vehicles (%)	2%	1%	0%	0%	2%	5%	0%	0%	0%	0%	0%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			3	
Permitted Phases	2		2	6		6	4			3		
Actuated Green, G (s)	92.3	92.3	92.3		30.0	30.0		3.2			12.1	
Effective Green, g (s)	92.3	92.3	92.3		30.0	30.0		3.2			12.1	
Actuated g/C Ratio	0.71	0.71	0.71		0.23	0.23		0.02			0.09	
Clearance Time (s)	10.0	10.0	10.0		10.0	10.0		6.5			5.9	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	769	1335	1299		429	354		43			69	
v/s Ratio Prot	0.35	c0.62			c0.26							
v/s Ratio Perm	0.27		0.00			0.00		c0.00		c0.06		
v/c Ratio	0.87	0.87	0.00		1.11	0.02		0.14			0.65	
Uniform Delay, d1	30.1	14.3	5.5		50.0	38.6		62.1			56.9	
Progression Factor	1.00	1.00	1.00		1.39	1.00		1.00			1.00	
Incremental Delay, d2	10.1	7.9	0.0		77.0	0.1		1.5			20.0	
Delay (s)	40.1	22.2	5.5		146.4	38.7		63.6			76.9	
Level of Service	D	C	A		F	D		E			E	
Approach Delay (s)		28.7			141.1			63.6			76.9	
Approach LOS		C			F			E			E	
Intersection Summary												
HCM 2000 Control Delay		53.4			HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio		0.96										
Actuated Cycle Length (s)		130.0			Sum of lost time (s)				32.4			
Intersection Capacity Utilization		91.0%			ICU Level of Service				E			
Analysis Period (min)		15										
c Critical Lane Group												



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	603	550	39	291	186	49
Future Volume (vph)	603	550	39	291	186	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1881	1599	1805	1881	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1881	1599	1805	1881	1770	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	648	591	42	313	200	53
RTOR Reduction (vph)	0	91	0	0	0	45
Lane Group Flow (vph)	648	500	42	313	200	8
Heavy Vehicles (%)	1%	1%	0%	1%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1		4	
Permitted Phases		2		6		4
Actuated Green, G (s)	79.2	79.2	7.3	94.3	20.2	20.2
Effective Green, g (s)	79.2	79.2	7.3	94.3	20.2	20.2
Actuated g/C Ratio	0.61	0.61	0.06	0.73	0.16	0.16
Clearance Time (s)	7.8	7.8	7.8	7.8	7.7	7.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1145	974	101	1364	275	245
v/s Ratio Prot	c0.34		c0.02		c0.11	
v/s Ratio Perm		0.31		0.17		0.01
v/c Ratio	0.57	0.51	0.42	0.23	0.73	0.03
Uniform Delay, d1	15.1	14.4	59.3	5.9	52.3	46.6
Progression Factor	0.88	0.93	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.2	2.8	0.4	9.2	0.1
Delay (s)	14.6	14.7	62.1	6.3	61.5	46.7
Level of Service	B	B	E	A	E	D
Approach Delay (s)	14.6			12.9	58.4	
Approach LOS	B			B	E	
Intersection Summary						
HCM 2000 Control Delay	20.3			HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.59					
Actuated Cycle Length (s)	130.0			Sum of lost time (s)	23.3	
Intersection Capacity Utilization	55.6%			ICU Level of Service	B	
Analysis Period (min)	15					
c Critical Lane Group						



Lane Group	SEL	SET	SER	NWT	NWR	NET	SWT
Lane Group Flow (vph)	666	1161	2	477	25	13	45
v/c Ratio	0.86	0.81	0.00	0.95	0.04	0.11	0.60
Control Delay	42.5	20.8	0.0	93.1	0.1	41.7	84.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	20.8	0.0	93.1	0.1	41.7	84.8
Queue Length 50th (ft)	417	502	0	420	0	5	37
Queue Length 95th (ft)	#870	#1274	0	#626	0	27	78
Internal Link Dist (ft)		176		930		773	154
Turn Bay Length (ft)			400		300		
Base Capacity (vph)	776	1437	1437	501	594	256	109
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.81	0.00	0.95	0.04	0.05	0.41

Intersection Summary

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

Queue shown is maximum after two cycles.



Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	648	591	42	313	200	53
v/c Ratio	0.55	0.55	0.36	0.23	0.73	0.18
Control Delay	16.2	10.4	65.7	7.0	67.0	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	10.4	65.7	7.0	67.0	12.5
Queue Length 50th (ft)	168	78	35	78	162	0
Queue Length 95th (ft)	309	208	72	138	233	35
Internal Link Dist (ft)	930			1324	905	
Turn Bay Length (ft)		130	180			330
Base Capacity (vph)	1168	1080	308	1364	575	550
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.55	0.14	0.23	0.35	0.10

Intersection Summary

Movement	SBL2	SET	SER	NWL	NWT	NWR2	NEL2	NET	NER	SWL	SWT	SWR2
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	296	287	25	20	866	56	11	1	2	55	0	587
Future Volume (vph)	296	287	25	20	866	56	11	1	2	55	0	587
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1759	1759	1770	1770	1583	1583
Flt Permitted	0.95	1.00	1.00	0.57	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1055	1863	1583	1829	1829	1770	1770	1583	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	322	312	27	22	941	61	12	1	2	60	0	638
RTOR Reduction (vph)	0	0	11	0	0	18	0	2	0	0	0	0
Lane Group Flow (vph)	322	312	16	22	941	43	0	13	0	0	60	638
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA		Split	NA	Free
Protected Phases	2	2			1	6			4		3	3
Permitted Phases			2	6		6	4					Free
Actuated Green, G (s)	71.1	71.1	71.1	84.1	84.1	84.1	84.1	84.1	84.1	84.1	84.1	71.1
Effective Green, g (s)	71.1	71.1	71.1	84.1	84.1	84.1	84.1	84.1	84.1	84.1	84.1	71.1
Actuated g/C Ratio	0.59	0.59	0.59	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1048	1103	937	759	1305	1109	1109	1109	1109	1109	1109	1109
v/s Ratio Prot	0.18	0.17			0.00	c0.51						0.03
v/s Ratio Perm			0.01	0.02		0.03	0.03	0.03	0.03	0.03	0.03	c0.40
v/c Ratio	0.31	0.28	0.02	0.03	0.72	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Uniform Delay, d1	12.2	12.0	10.1	5.7	10.9	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Progression Factor	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.6	0.0	0.0	3.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Delay (s)	13.3	12.6	10.1	5.7	14.3	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Level of Service	B	B	B	A	B	A	A	E	E	E	E	A
Approach Delay (s)		12.4			13.6			60.3	60.3	60.3	60.3	6.1
Approach LOS		B			B			E	E	E	E	A
Intersection Summary												
HCM 2000 Control Delay				11.5				HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio				0.85								
Actuated Cycle Length (s)				120.0				Sum of lost time (s)			35.2	
Intersection Capacity Utilization				87.6%				ICU Level of Service			E	
Analysis Period (min)				15								
c Critical Lane Group												



Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations		↑	↑	↑	↑	
Traffic Volume (vph)	0	587	296	312	877	0
Future Volume (vph)	0	587	296	312	877	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.2	5.2	4.0	5.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frt		0.86	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1611	1770	1863	1863	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		1611	1770	1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	638	322	339	953	0
RTOR Reduction (vph)	0	64	0	0	0	0
Lane Group Flow (vph)	0	574	322	339	953	0
Turn Type	pm+ov	Prot	NA	NA		
Protected Phases	5	5	Free	6		
Permitted Phases	8					
Actuated Green, G (s)	44.0	44.0	120.0	65.2		
Effective Green, g (s)	44.0	44.0	120.0	65.2		
Actuated g/C Ratio	0.37	0.37	1.00	0.54		
Clearance Time (s)	5.2	5.2		5.6		
Vehicle Extension (s)	3.0	3.0		3.0		
Lane Grp Cap (vph)	590	649	1863	1012		
v/s Ratio Prot	c0.36	0.18	0.18	c0.51		
v/s Ratio Perm						
v/c Ratio	0.97	0.50	0.18	0.94		
Uniform Delay, d1	37.4	29.4	0.0	25.6		
Progression Factor	1.00	1.00	1.00	0.61		
Incremental Delay, d2	28.9	0.6	0.2	14.1		
Delay (s)	66.3	30.0	0.2	29.7		
Level of Service	E	C	A	C		
Approach Delay (s)	66.3		14.7	29.7		
Approach LOS	E		B	C		
Intersection Summary						
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service			D	
HCM 2000 Volume to Capacity ratio	0.99					
Actuated Cycle Length (s)	120.0	Sum of lost time (s)			15.3	
Intersection Capacity Utilization	91.5%	ICU Level of Service			F	
Analysis Period (min)	15					

c Critical Lane Group



Lane Group	SBL2	SET	SER	NWL	NWT	NWR2	NET	SWT	SWR2
Lane Group Flow (vph)	322	312	27	22	941	61	15	60	638
v/c Ratio	0.26	0.24	0.02	0.03	0.66	0.05	0.12	0.47	0.40
Control Delay	11.6	11.7	0.0	6.8	13.1	0.1	50.3	65.6	0.8
Queue Delay	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0
Total Delay	11.6	11.7	0.0	6.8	14.5	0.1	50.3	65.6	0.8
Queue Length 50th (ft)	0	54	0	3	273	0	10	45	0
Queue Length 95th (ft)	360	209	0	15	679	0	32	91	0
Internal Link Dist (ft)	493		1152			86		735	
Turn Bay Length (ft)			300	225	250				
Base Capacity (vph)	1258	1324	1184	845	1435	1247	123	135	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	288	0	0	0	94
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.24	0.02	0.03	0.82	0.05	0.12	0.44	0.43

Intersection Summary



Lane Group	WBR	SEL	SET	NWT
Lane Group Flow (vph)	638	322	339	953
v/c Ratio	0.98	0.50	0.18	0.94
Control Delay	60.2	32.2	0.2	31.9
Queue Delay	0.6	0.0	0.0	0.0
Total Delay	60.8	32.2	0.2	31.9
Queue Length 50th (ft)	416	187	0	687
Queue Length 95th (ft)	#663	275	0	#981
Internal Link Dist (ft)		854	493	
Turn Bay Length (ft)				
Base Capacity (vph)	654	649	1863	1011
Starvation Cap Reductn	2	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.98	0.50	0.18	0.94

Intersection Summary

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

Queue shown is maximum after two cycles.

Movement	SBL2	SET	SER	NWL	NWT	NWR2	NEL2	NET	NER	SWL	SWT	SWR2
Lane Configurations												
Traffic Volume (vph)	633	1103	2	0	453	24	4	2	7	43	0	330
Future Volume (vph)	633	1103	2	0	453	24	4	2	7	43	0	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	10.0		10.0	10.0			8.2		5.9	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85		0.92		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1863	1583		1695		1770	1583	
Flt Permitted	0.95	1.00	1.00		1.00	1.00		0.89		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583		1863	1583		1525		1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	688	1199	2	0	492	26	4	2	8	47	0	359
RTOR Reduction (vph)	0	0	1	0	0	8	0	8	0	0	0	0
Lane Group Flow (vph)	688	1199	1	0	492	18	0	6	0	0	47	359
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA		Split	NA	Free
Protected Phases	2	2			1	6			4		3	3
Permitted Phases			2	6		6	4					Free
Actuated Green, G (s)	76.3	76.3	76.3		76.3	76.3		3.2			6.4	110.0
Effective Green, g (s)	76.3	76.3	76.3		76.3	76.3		3.2			6.4	110.0
Actuated g/C Ratio	0.69	0.69	0.69		0.69	0.69		0.03			0.06	1.00
Clearance Time (s)	10.0	10.0	10.0		10.0	10.0		8.2			5.9	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	1227	1292	1098		1292	1098		44			102	1583
v/s Ratio Prot	0.39	c0.64			0.26						c0.03	
v/s Ratio Perm			0.00			0.01		0.00				c0.23
v/c Ratio	0.56	0.93	0.00		0.38	0.02		0.14			0.46	0.23
Uniform Delay, d1	8.4	14.5	5.2		7.0	5.2		52.1			50.1	0.0
Progression Factor	0.63	1.00	1.00		1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	1.4	10.3	0.0		0.9	0.0		1.5			3.3	0.3
Delay (s)	6.8	24.8	5.2		7.9	5.2		53.5			53.4	0.3
Level of Service	A	C	A		A	A		D			D	A
Approach Delay (s)		24.8			7.7			53.5			6.5	
Approach LOS		C			A			D			A	
Intersection Summary												
HCM 2000 Control Delay			14.8		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				34.1			
Intersection Capacity Utilization			118.3%		ICU Level of Service				H			
Analysis Period (min)			15									
c Critical Lane Group												



Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations		↑	↑	↑	↑	
Traffic Volume (vph)	0	330	633	1105	457	0
Future Volume (vph)	0	330	633	1105	457	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frt		0.86	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1611	1770	1863	1863	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		1611	1770	1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	359	688	1201	497	0
RTOR Reduction (vph)	0	58	0	0	0	0
Lane Group Flow (vph)	0	301	688	1201	497	0
Turn Type	Over	Prot	NA	NA		
Protected Phases		5	5	5 6	6	
Permitted Phases						
Actuated Green, G (s)	59.4	59.4	110.0	39.6		
Effective Green, g (s)	59.4	59.4	110.0	39.6		
Actuated g/C Ratio	0.54	0.54	1.00	0.36		
Clearance Time (s)	5.5	5.5		5.5		
Vehicle Extension (s)	3.0	3.0		3.0		
Lane Grp Cap (vph)	869	955	1863	670		
v/s Ratio Prot	0.19	c0.39	0.64	c0.27		
v/s Ratio Perm						
v/c Ratio	0.35	0.72	0.64	0.74		
Uniform Delay, d1	14.3	19.0	0.0	30.7		
Progression Factor	1.00	1.00	1.00	0.80		
Incremental Delay, d2	0.2	2.7	0.8	7.0		
Delay (s)	14.6	21.7	0.8	31.6		
Level of Service	B	C	A	C		
Approach Delay (s)	14.6		8.4	31.6		
Approach LOS	B		A	C		
Intersection Summary						
HCM 2000 Control Delay		13.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio		0.73				
Actuated Cycle Length (s)		110.0	Sum of lost time (s)		11.0	
Intersection Capacity Utilization		68.3%	ICU Level of Service		C	
Analysis Period (min)		15				

c Critical Lane Group



Lane Group	SBL2	SET	SER	NWT	NWR2	NET	SWT	SWR2
Lane Group Flow (vph)	688	1199	2	492	26	14	47	359
v/c Ratio	0.51	0.84	0.00	0.34	0.02	0.12	0.37	0.23
Control Delay	6.2	19.1	0.0	7.3	0.0	34.5	57.2	0.3
Queue Delay	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	19.1	0.0	7.3	0.0	34.5	57.2	0.3
Queue Length 50th (ft)	1	420	0	83	0	4	32	0
Queue Length 95th (ft)	568	#1150	m0	226	0	25	71	0
Internal Link Dist (ft)		493		1152		114	735	
Turn Bay Length (ft)			300		250			
Base Capacity (vph)	1358	1429	1263	1429	1240	118	128	1583
Starvation Cap Reductn	298	1	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.84	0.00	0.34	0.02	0.12	0.37	0.23

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	WBR	SEL	SET	NWT
Lane Group Flow (vph)	359	688	1201	497
v/c Ratio	0.39	0.72	0.64	0.74
Control Delay	9.5	23.3	1.7	34.3
Queue Delay	0.0	0.3	0.3	0.0
Total Delay	9.5	23.6	2.1	34.3
Queue Length 50th (ft)	79	321	0	319
Queue Length 95th (ft)	129	430	0	#521
Internal Link Dist (ft)		854	493	
Turn Bay Length (ft)				
Base Capacity (vph)	1010	1053	1853	671
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	65	207	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.70	0.73	0.74

Intersection Summary

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

Queue shown is maximum after two cycles.

MOVEMENT SUMMARY

▼ Site: 101 [2045 AM w SlipLn]

US 250 & N Milton Rd

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Deg. Satn HV %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph	
South: N Milton Rd												
3	L2	516	1.0	0.537	12.2	LOS B	4.5	112.7	0.56	0.67	0.56	36.0
18	R2	61	0.0	0.537	6.4	LOS A	4.5	112.7	0.56	0.67	0.56	35.4
Approach		577	0.9	0.537	11.6	LOS B	4.5	112.7	0.56	0.67	0.56	35.9
East: US 250												
1	L2	123	12.0	0.808	24.2	LOS C	11.5	298.6	1.00	1.18	1.54	31.2
6	T1	476	3.0	0.808	17.5	LOS B	11.5	298.6	1.00	1.18	1.54	32.5
Approach		599	4.9	0.808	18.9	LOS B	11.5	298.6	1.00	1.18	1.54	32.2
West: US 250												
2	T1	174	8.0	0.145	5.5	LOS A	0.8	20.5	0.31	0.47	0.31	38.5
12	R2	188	8.0	0.157	5.4	LOS A	0.8	22.5	0.31	0.53	0.31	37.6
Approach		362	8.0	0.157	5.4	LOS A	0.8	22.5	0.31	0.50	0.31	38.0
All Vehicles		1538	4.1	0.808	13.0	LOS B	11.5	298.6	0.67	0.83	0.88	34.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MICHAEL BAKER INTERNATIONAL | Processed: Thursday, March 10, 2022 11:28:58 AM

Project: \\RICHFS1.bkr.mbakercorp.com\PROJECTS\VDOT TMPD On-Call 2017\Term 3 Task Orders\TO 53 - General Planning Task Order\TO 53.1

Culpeper Pipeline Phase 1\Work_Files\Analysis\Sidra\US250&NMilton\US250&NMilton_RAW_030722.sip8

MOVEMENT SUMMARY

▼ Site: 101 [2045 PM w SlipLn]

US 250 & N Milton Rd

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Deg. Satn HV %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph	
South: N Milton Rd												
3	L2	200	2.0	0.332	16.0	LOS B	2.5	63.3	0.77	0.80	0.77	34.5
18	R2	53	2.0	0.332	10.2	LOS B	2.5	63.3	0.77	0.80	0.77	33.8
Approach		253	2.0	0.332	14.8	LOS B	2.5	63.3	0.77	0.80	0.77	34.3
East: US 250												
1	L2	42	0.0	0.346	11.8	LOS B	2.3	58.1	0.50	0.59	0.50	38.5
6	T1	313	1.0	0.346	6.2	LOS A	2.3	58.1	0.50	0.59	0.50	38.5
Approach		355	0.9	0.346	6.9	LOS A	2.3	58.1	0.50	0.59	0.50	38.5
West: US 250												
2	T1	648	1.0	0.455	5.1	LOS A	3.3	82.9	0.20	0.43	0.20	40.1
12	R2	591	1.0	0.415	4.9	LOS A	2.8	70.8	0.19	0.50	0.19	39.1
Approach		1240	1.0	0.455	5.0	LOS A	3.3	82.9	0.19	0.46	0.19	39.6
All Vehicles		1847	1.1	0.455	6.7	LOS A	3.3	82.9	0.33	0.53	0.33	38.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MICHAEL BAKER INTERNATIONAL | Processed: Thursday, March 10, 2022 11:28:54 AM

Project: \\RICHFS1.bkr.mbakercorp.com\PROJECTS\VDOT TMPD On-Call 2017\Term 3 Task Orders\TO 53 - General Planning Task Order\TO 53.1

Culpeper Pipeline Phase 1\Work_Files\Analysis\Sidra\US250&NMilton\US250&NMilton_RAW_030722.sip8

US 250 (CU02) Shadwell

Metroquest Highlights:

- February 1 – February 18, 2022
- 267 total participants
- 73% are residents of the area
- 99% travel this area by personal vehicle, 11% would prefer to bike
- 44% of participants were between 25-54 years old



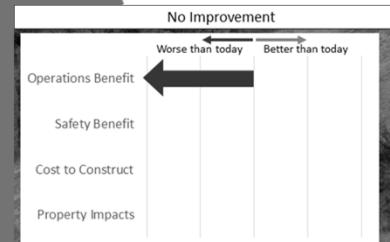
P PROJECT PIPELINE



US 250 (CU02)

No Improvement: Leave the existing configuration as-is but extend the existing merge lane from southbound Route 22 to westbound US 250.

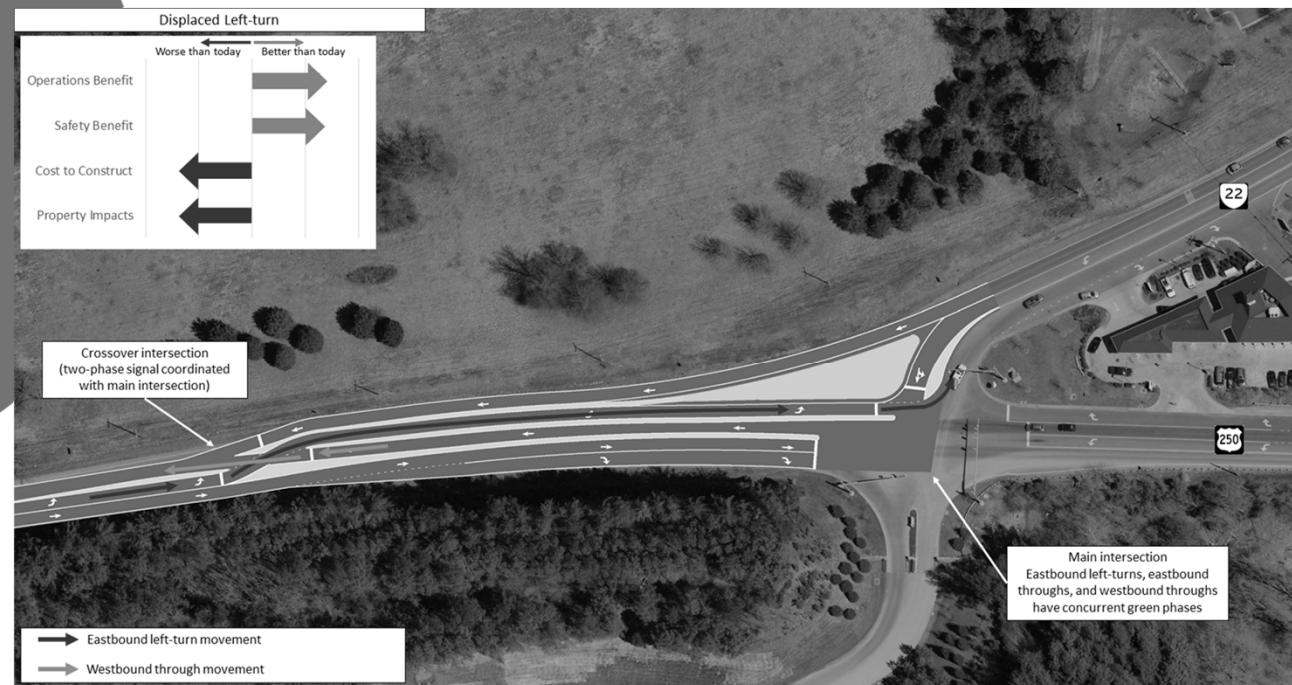
- Average score: 2.96



US 250 (CU02)

Displaced Left-turn: This alternative will reconstruct the west leg of the intersection as a displaced left-turn which will improve safety and decrease congestion.

- Average score: 2.45
- Comments: Some of the commenters expressed concerns of confusion for motorists utilizing the recommendation.



US 250 (CU02)

No Improvement: Leave the existing conditions as is; no improvements.

- Average score: 2.57
- Comments: Some of the commenters expressed the intersection currently does not operate well.



US 250 (CU02)

Roundabout: This alternative reconfigures the intersection to a roundabout with a right-turn lane for vehicles turning right onto SB N Milton Road from EB US 250. Roundabouts improve operations and safety.

- Average score: 3.53

